Radiology Collection

Question Bank with Answers & Explanations

Generated on April 18, 2026

26 Topics • 541 Questions

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Part A — All Questions

• [01_Basics of Radiology] 001 Basics Of Radiology

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[01_Basics of Radiology] 001 Basics Of Radiology — Quick Jump

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Q25 (p. 28)					

Q1: What is the primary difference between axial and helical CT scanning? (Q852956)

A. Axial CT uses contrast agents, while helical CT does not.

B. Axial CT scans in single slices, while helical CT scans continuously in a spiral.

C. Helical CT requires more radiation than axial CT.

D. Axial CT produces 3D images, while helical CT produces 2D images.

See Answer in Part B → Q1

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Q2: Which of the following imaging modalities requires the use of iodinated contrast for both diagnostic and therapeutic purposes? (Q852968)

A. CT Angiography

B. MRA

C. DSA - Fluoroscopy

D. Both A and C

See Answer in Part B → Q2

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Q3: A 38 year old woman presents with chronic pelvic pain and menorrhagia due to multiple uterine fibroids. She is exploring non-invasive treatment options and wishes to avoid surgery. Her gynecologist suggests high-intensity focused ultrasound (HIFU) as a potential treatment. What is the primary mechanism by which HIFU treats uterine fibroids? (Q852967)

A. HIFU emits continuous low-energy ultrasound waves that dissolve fibroid tissue through vibration.

B. HIFU directs focused ultrasound energy to induce thermal damage and coagulation necrosis within the fibroid.

C. HIFU causes cavitation within blood vessels, disrupting the fibroid's blood supply and leading to ischemia.

D. HIFU uses ultrasound energy to fragment fibroid tissue through mechanical shearing forces.

See Answer in Part B → Q3

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Q4: Which of the following is considered a primary clinical advantage of CEUS over traditional Contrast-Enhanced CT (CECT) or MRI? (Q852966)

A. CEUS allows for targeted drug delivery to specific hepatic lesions

B. CEUS provides real-time imaging with superior lesion detection

C. CEUS is a safe alternative for patients with significant renal impairment

D. All the above

See Answer in Part B → Q4

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Q5: A 45 year old woman presents to the emergency department with dull abdominal pain. An ultrasound of the abdomen is performed, and a cystic structure is seen in the right kidney. The ultrasound technician notes increased echogenicity behind the cystic structure. Which of the following best explains this ultrasound finding? (Q852965)

A. Posterior Acoustic shadowing

B. Posterior acoustic enhancement

C. Reverberation artifact

D. Comet tail artifact

See Answer in Part B → Q5

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Q6: A 45 year old female patient presents for a carotid Doppler ultrasound due to complaints of transient ischemic attacks. During the examination, the radiologist notices that the displayed velocity of blood flow in the carotid artery appears higher than expected. Upon reviewing the images, he suspects an artifact affecting the velocity measurements. Which artifact is most likely responsible for the incorrect velocity display, and what is the best method to mitigate it? (Q852964)

A. Aliasing; mitigate by increasing the pulse repetition frequency (PRF).

B. Blooming; mitigate by increasing the wall filter settings.

C. Direction Ambiguity; mitigate by adjusting the beam angle to be more parallel to the flow.

D. Twinkle Artifact; mitigate by adjusting the color gain settings.

See Answer in Part B → Q6

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Q7: A 35-year-old patient presents to the emergency department with chest pain and shortness of breath following a traumatic injury. M-mode ultrasound is utilized to assess pneumothorax. Which specific ultrasound finding would indicate the absence of a pneumothorax? (Q852963)

A. Absence of pleural sliding

B. Barcode sign (stratosphere sign)

C. Absence of diaphragmatic movement

D. Seashore sign

See Answer in Part B → Q7

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Q8: Which of the following statements accurately distinguishes between A-scan from B-scan ultrasound in ophthalmology? (Q852962)

A. A-scan provides a two-dimensional image, while B-scan provides a one-dimensional image.

B. A-scan is primarily used to measure axial length, whereas B-scan is used to visualize internal ocular structures.

C. B-scan displays spikes on a graph, while A-scan displays a dotted section of the eyeball.

D. A-scan requires the probe to be applied on the eyelids, while B-scan requires direct contact with the cornea.

See Answer in Part B → Q8

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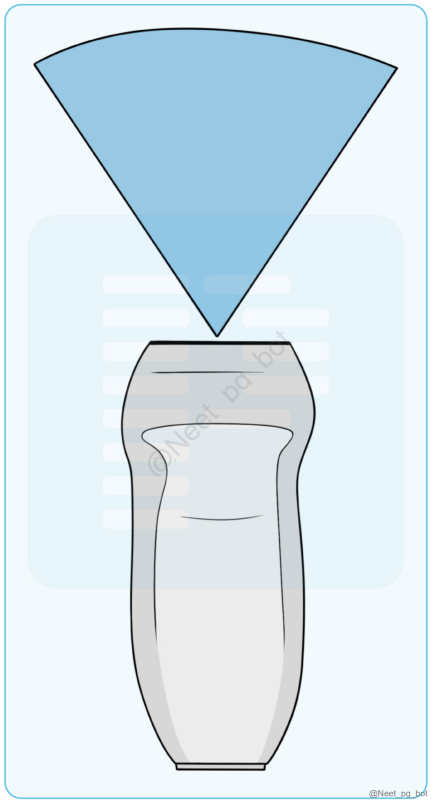
Q9: Match each type of ultrasound probe with its primary use. Probe Primary Use 1) a) Vascular, high-resolution imaging 2) b) Cardiac, endocavitary, neonatal brain 3) c) Abdominal, OBS/GYN (Q852961)

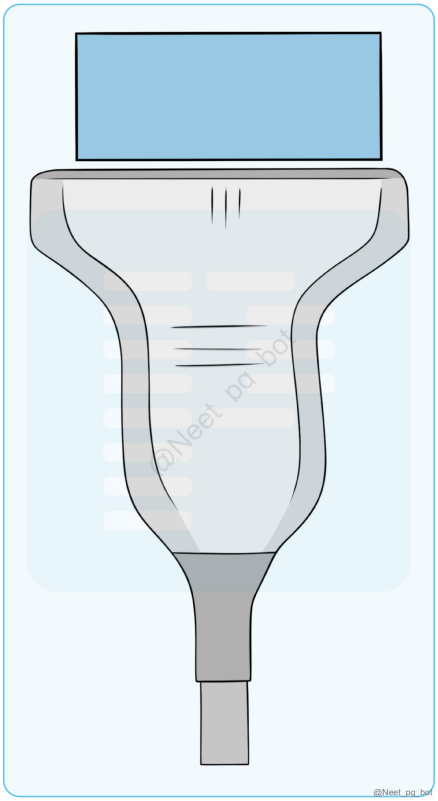
A. 1b,2a,3c

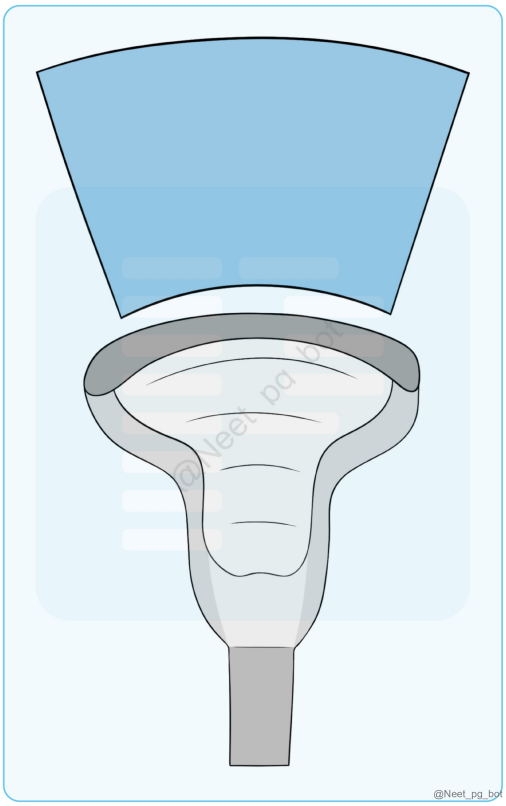
B. 1a,2b,3c

C. 1c,2a,3b

D. 1a,2c,3b


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See Answer in Part B → Q9

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Q10: What is the primary reason for applying ultrasound gel during an ultrasound examination? (Q852960)

A. To enhance image contrast

B. To act as a lubricant for easier probe movement

C. To eliminate air pockets between the probe and skin

D. To cool down the transducer while in constant use

See Answer in Part B → Q10

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Q11: Which among the following is a common clinical application of dual-energy CT (DECT)? Detection of intracranial hemorrhage B) Differentiation between gout and pseudogout crystals C) Removal of calcium from carotid arteries in head and neck angiography D) Quantification of liver fat in hepatic steatosis E) Reduction of artifacts caused by metal implants F) Characterization of solitary lung nodules (Q852959)

A. All except A

B. All except E

C. All except A and C

D. All the above

See Answer in Part B → Q11

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Q12: In which scenario would CECT be preferred over NCCT? (Q852958)

A. Evaluating a fracture in a long bone

B. Assessing a lung nodule for malignancy

C. Diagnosing kidney stones

D. Evaluating head trauma

See Answer in Part B → Q12

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Q13: A 65-year-old male patient presents with a 6-month history of progressive shortness of breath and a dry cough. He is a former smoker, having quit 10 years ago, and has no significant past medical history. On examination, he has clubbing of the fingers and fine crackles on lung auscultation. Pulmonary function tests reveal a restrictive pattern with reduced lung volumes and a decreased diffusion capacity.Which imaging modality is most appropriate for confirming the diagnosis of this condition? (Q852957)

A. Contrast-Enhanced Computed Tomography (CECT) of the chest

B. High-Resolution CT (HRCT) of the chest

C. MRI of the chest

D. Chest X-ray

See Answer in Part B → Q13

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Q14: Arrange the following in their decreasing order of penetration power 1) Neutrons 2) Alpha (α) rays 3) Beta (β) rays 4) Gamma (γ) rays (Q852944)

A. 1>2>3>4

B. 1>4>3>2

C. 4>3>2>1

D. 2>3>4>1

See Answer in Part B → Q14

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Q15: Which window setting would be most appropriate for viewing bone structures in a CT scan? (Q852955)

A. Low window level and narrow window width

B. High window level and wide window width

C. Low window level and wide window width

D. High window level and narrow window width

See Answer in Part B → Q15

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Q16: A 45-year-old man presents with sudden headache, confusion, and decreased consciousness following recent cranial surgery. CT image is given below. What is the black area seen in the CT? (Q852954)

A. Blood

B. Air

C. Pus

D. Highly vascularised areas



See Answer in Part B → Q16

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Q17: Match the following items with its corresponding Hounsfield Unit: Item Hounsfield Unit 1.Metal a.1000 2.Bone b.3000 3.Air c.-1000 4. Water d. 0 (Q852953)

A. 1b,2a,3c,4d

B. 1a,2b,3d,4c

C. 1c,2d,3a,4b

D. 1d,2c,3b,4a

See Answer in Part B → Q17

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Q18: Which of the following statements is NOT true about Computed Tomography? (Q852952)

A. Uses a rotating beam of X-ray

B. Uses more radiation than a plain X-ray

C. The computer generates the images

D. Slices are as if viewing from the head end of the bed

See Answer in Part B → Q18

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Q19: Which of the following statements is false? (Q852951)

A. C-arm is a mobile X-ray machine

B. Fluoroscopy shows continuous X-ray images in a monitor

C. In fluoroscopy, only movement of a body part can be visualized

D. Fluoroscopy can be used in catheter insertion

See Answer in Part B → Q19

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Q20: Which of the following statements is false about mammography? (Q852950)

A. Grids are used to reduce scattered radiation

B. Primarily for women over 40

C. Breast compression is required

D. The craniocaudal view will show the breast with the axillary tail

See Answer in Part B → Q20

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Q21: Match the following types of X-rays with its mechanism 1. Film X-ray a. X-rays hit a detector which converts them into an electrical charge 2. Computed Radiography b. X-rays strike a plate that absorbs the energy and stores it at a specific location 3. Digital Radiography c. X-rays strike a fluorescent screen, producing light (Q852949)

A. 1a,2b,3c

B. 1c,2b,3a

C. 1b,2a,3c

D. 1b,2c,3a

See Answer in Part B → Q21

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Q22: True about Compton effect in X-rays are 1) Interacts with the innermost electron 2) Interacts with the outermost electron 3) Responsible for contrast on the films 4) Produces scattered radiations on the films (Q852948)

A. 1,3

B. 2,3

C. 1,4

D. 2,4

See Answer in Part B → Q22

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Q23: Which among the following statements is true regarding the machine shown below (Q852947)

A. Produced by sudden deceleration of moving electrons

B. Anode is primarily made up of Lead (Pb)

C. The majority of heat dissipation is by convection

D. Electron beam travels from anode to the cathode



See Answer in Part B → Q23

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Q24: Which among the following are examples of ionizing radiation? 1) X-rays 2) UV rays 3) MRI 4) SPECT 5) Doppler 6) IVP (Intravenous pyelography) (Q852946)

A. 1,3,5,6

B. 1,2,4,6

C. 1,4,6

D. 1,2,4

See Answer in Part B → Q24

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Q25: Regarding X-rays in comparison to Gamma (γ) rays, that X-rays have all among the following except (Q852945)

A. Less penetration power

B. Emits a higher wavelength light

C. Relative lower frequency

D. Emitted from within the nucleus

See Answer in Part B → Q25

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• [01_Basics of Radiology] 002 Basics Of Usg Mri And Interventional Radiology

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[01_Basics of Radiology] 002 Basics Of Usg Mri And Interventional Radiology — Quick Jump

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Q1: Which of the following structures appears anechoic on ultrasonography? (Q885715)

A. Muscle

B. Gallstones

C. Bone

D. Bile

See Answer in Part B → Q1

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Q2: Diffusion-weighted MRI is useful in identifying which of the following pathological conditions? 1. Acute ischemic stroke 2. Brain abscess 3. Creutzfeldt-Jakob disease 4. Vasogenic oedema 5. Highly cellular tumours (Q885735)

A. 1, 3, 4, 5

B. 3, 4, 5

C. 1, 2, 4

D. 1, 2, 3, 5

See Answer in Part B → Q2

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Q3: A patient suspected of having biliary tract pathology undergoes the imaging shown. Identify the modality and structure marked “B”. (Q885733)

A. ERCP - Pancreatic duct

B. MRCP - Common bile duct

C. ERCP - Cystic duct

D. MRCP - Right hepatic duct



See Answer in Part B → Q3

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Q4: Which imaging modality is most sensitive for screening ductal carcinoma in situ (DCIS)? (Q885732)

A. CT

B. Ultrasonography

C. Mammogram

D. MRI

See Answer in Part B → Q4

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Q5: Which imaging plane is best suited for accurate volumetric assessment of the hippocampus? (Q885730)

A. All of the above

See Answer in Part B → Q5

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Q6: The vessel marked in the angiographic image supplies the lateral surface of the cerebral hemisphere. Identify the mark vessel. (Q885729)

A. Anterior cerebral artery

B. Internal carotid artery

C. Middle cerebral artery

D. Posterior cerebral artery



See Answer in Part B → Q6

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Q7: The MRI image shown demonstrates uniform fat suppression with high signal from oedema. Identify the sequence. (Q885726)

A. Diffusion tensor imaging

B. MR spectroscopy

C. STIR

D. FLAIR

See Answer in Part B → Q7

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Q8: Functional MRI performed in a stroke patient is based on which underlying principle? (Q885724)

A. Diffusion of water molecules

B. Brownian motion

C. Time-of-flight technique

D. BOLD technique

See Answer in Part B → Q8

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Q9: Which imaging technique visualises blood flow using the time-of-flight principle? (Q885723)

A. Spiral CT

B. Colour Doppler

C. MR imaging

D. CT angiography

See Answer in Part B → Q9

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Q10: Which contrast agent is routinely used for image enhancement in magnetic resonance imaging? (Q885721)

A. Omnipaque

B. Optison

C. Gadolinium

D. Iodine

See Answer in Part B → Q10

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Q11: What is the unit used to measure magnetic field strength in MRI machines? (Q885720)

A. Hounsfield units

B. Tesla

C. Kilohertz

D. Weber

See Answer in Part B → Q11

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Q12: What Doppler waveform is typically seen in lower-limb deep vein thrombosis? (Q885719)

A. Biphasic

B. Triphasic

C. Monophasic

D. Multiphasic

See Answer in Part B → Q12

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Q13: The Doppler effect refers to a relative change in which property of sound waves? (Q885718)

A. Amplitude

B. Frequency

C. Direction

D. Phase

See Answer in Part B → Q13

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Q14: A 29-year-old lactating woman presents with a painful breast lump for 5 days. What is the investigation of choice? (Q885717)

A. CT

B. Ultrasonography

C. MRI

D. Mammogram

See Answer in Part B → Q14

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Q15: Harmonic imaging is primarily used in which imaging modality? (Q885716)

A. Sonography

B. Digital subtraction angiography

C. MRCP

D. Nuclear imaging

See Answer in Part B → Q15

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Q16: A 45-year-old patient is scheduled for an MRI of the brain to assess potential lesions. Which of the following best describes the fundamental principle of MRI? (Q852908)

A. Evaluate changes in magnetic field strength around tissues

B. Alignment and relaxation of hydrogen nuclei

C. Detection of thermal radiation emitted by tissues.

D. Measurement of varying ionizing radiation absorption.

See Answer in Part B → Q16

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Q17: Which material is most commonly used in an ultrasonography transducer? (Q885714)

A. Sodium fluoride

B. Lead zirconate

C. Barium titanate

D. Sodium zirconate

See Answer in Part B → Q17

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Q18: Which imaging modality operates based on the principle of the piezoelectric effect? (Q885713)

A. MRI

B. Ultrasonography

C. MR spectroscopy

D. X-ray

See Answer in Part B → Q18

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Q19: Match the following imaging modalities with their corresponding terms. Imaging Modality Terms 1. X-ray a) Hypoechoic / Hyperechoic 2. CT (Computed Tomography) b) Hypointense / Hyperintense 3. MRI (Magnetic Resonance Imaging) c) Radiolucent / Opaque 4. USG (Ultrasound) d) Hypodense / Hyperdense (Q852924)

A. 1-b, 2-d, 3-c, 4-a

B. 1-c, 2-d, 3-b, 4-a

C. 1-a, 2-b, 3-d, 4-c

D. 1-c, 2-d, 3-a, 4-b

See Answer in Part B → Q19

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Q20: A 55-year-old male with chronic bronchitis and smoking presents with persistent hemoptysis. After consulting a specialist, he is advised to undergo bronchial artery embolization (BAE), and the risks are explained. He wants more details about the procedure, specifically regarding the types of embolic agents used. Which of the following is not a permanent type of embolic agent? (Q852923)

A. Injectable coil

B. Onyx

C. Polyvinyl alcohol

D. Gelfoam

See Answer in Part B → Q20

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Q21: A 55-year-old female presents with 6 months of heavy menstrual bleeding, pelvic pressure, and frequent urination due to multiple uterine fibroids. After failed conservative treatments and a history of hypertension and obesity, uterine fibroid embolisation (UFE) is planned, and the risks have been explained. Which of the following is not an advantage of the single wall puncture technique? (Q852922)

A. Fewer complications at the arterial puncture site

B. Beneficial for patients with coagulopathy

C. Less risk of arterial dissection

D. A favored technique for ultrasound-guided access

See Answer in Part B → Q21

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Q22: A 70-year-old patient requires arterial access via the femoral artery using the Seldinger technique. After sterilizing the area, the physician successfully punctures the artery with a needle. What is the next step in the Seldinger technique? (Q852921)

A. Secure the catheter

B. Insert a dilator through the needle

C. Insert a guide wire through the needle

D. Remove the needle and insert a dilator

See Answer in Part B → Q22

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Q23: A 60-year-old patient is scheduled for an MRI to evaluate cognitive changes. Which of the following systems is specifically designed to provide shielding against radio frequency interference during the scan? (Q852920)

A. Gradient coils

B. Helmholtz coils

C. Shim coils

D. Faraday’s cage

See Answer in Part B → Q23

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Q24: A 35-year-old female with a copper IUD is scheduled for an MRI to investigate unexplained headaches. She has a history of cardiac stenting done a year ago, as well as cochlear and dental implants from childhood. Which of the following is the absolute contraindication of MRI? (Q852919)

A. Coronary stenting

B. Copper IUD

C. Dental implants

D. Cochlear implants

See Answer in Part B → Q24

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Q25: A 55-year-old male with recent seizures is advised to undergo an MRI for further investigation. In which of the following conditions would an MRI be a preferred diagnostic tool? Subarachnoid Hemorrhage Ischemic disease patient with pacemaker Vascular dementia Rebleed of aneurysm post-clipping Primary neoplasm of brain (Q852918)

A. 1,2,3

B. 2,3,4

C. 2,4,5

D. 1,3,5

See Answer in Part B → Q25

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Q26: A 20-year-old male arrives at the emergency department after a road traffic accident with multiple fractures. The orthopaedic team plans to stabilise his injuries

using internal and external fixators. An MRI is requested to assess soft tissue injuries. Which of the following orthopaedic fixations is usually compatible with MRI? (Q852917)

A. K-wire

B. Uniplanar Fixator

C. External fixator with aluminium rods

D. Internal fixation with Titanium

See Answer in Part B → Q26

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Q27: A 65-year-old patient presents with cognitive decline and movement difficulties. Imaging studies reveal iron deposition in the basal ganglia. The neurologist wants to confirm the extent of iron accumulation and assess for any associated microbleeds. Which MRI technique is preferred for evaluating iron deposition in this patient? (Q852916)

A. Susceptibility-Weighted Imaging (SWI)

B. Diffusion-Weighted Imaging (DWI)

C. Functional MRI (fMRI)

D. MR Spectroscopy

See Answer in Part B → Q27

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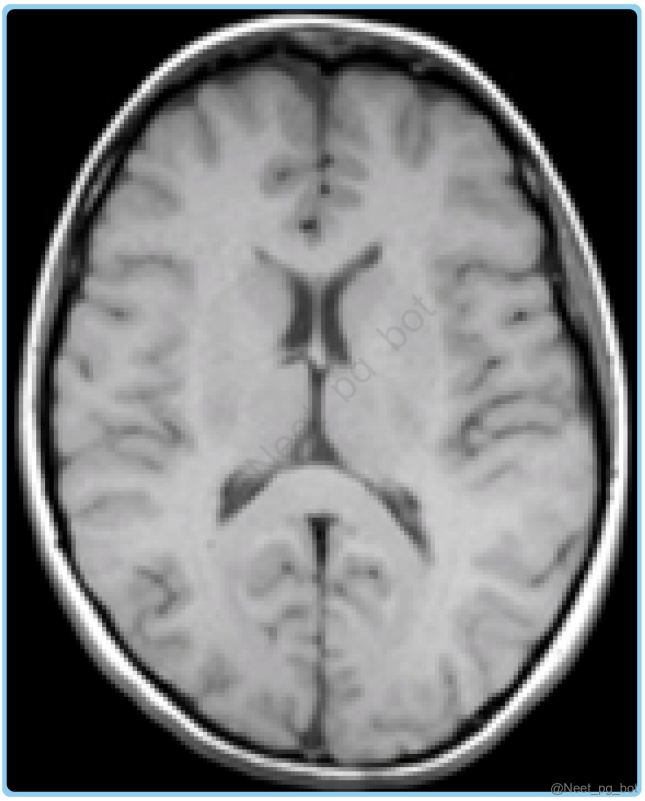
Q28: Match the following: 1) a) FLAIR 2) b) Diffusion-weighted MRI 3) c) T1-Weighted MRI 4) d) T2-Weighted MRI (Q852913)

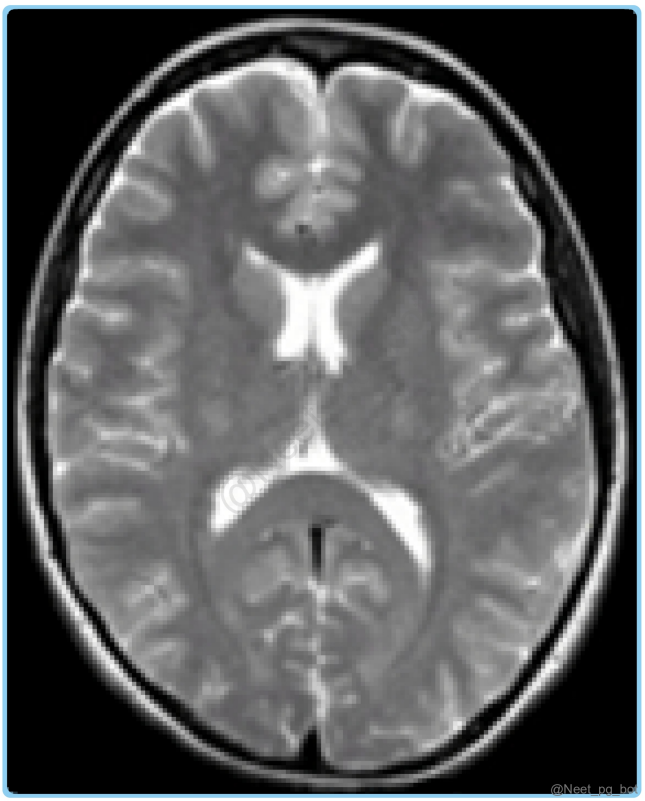
A. 1-c, 2-d, 3-a, 4-b

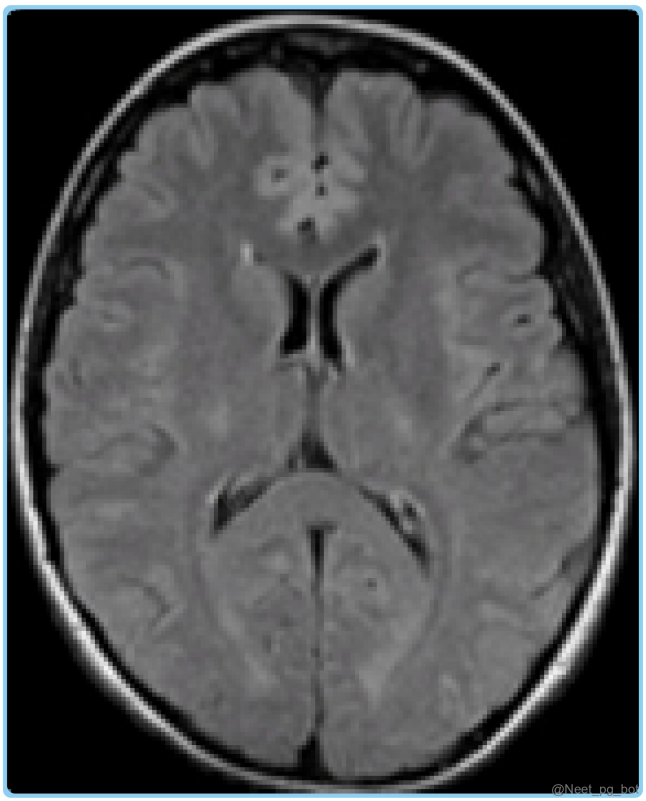
B. 1-a, 2-b, 3-c, 4-d

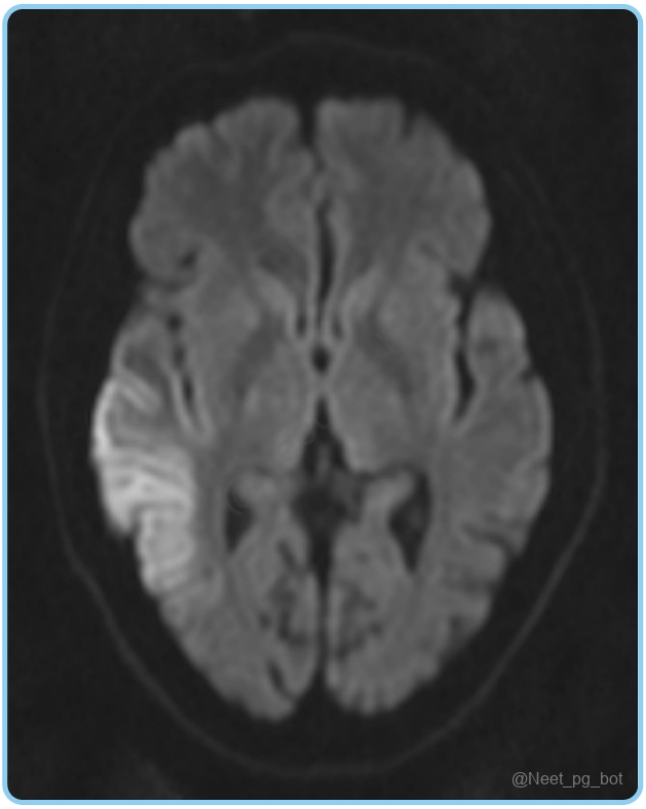
C. 1-b, 2-c, 3-d, 4-a

D. 1-d, 2-a, 3-b, 4-c









See Answer in Part B → Q28

@Neet_pg_bot

Q29: Which statements correctly describe the differences between T1 and T2 relaxation in MRI? (Q852911)

A. T1 measures transverse decay; T2 measures longitudinal recovery.

B. T1 involves energy exchange; T2 involves loss of phase coherence.

C. T1 relaxation is typically shorter in duration than T2

D. Longer T1 appears Brighter & Longer T2 appears Darker

See Answer in Part B → Q29

@Neet_pg_bot

Q30: Which of the following accurately describes the stages of MRI image acquisition? (Q852910)

A. Protons align uniformly, get excited, and relax, emitting radiation.

B. Protons align randomly and emit radiation upon excitation.

C. Protons rest and emit radiation continuously without excitation.

D. Excited protons emit radiation before aligning with the magnetic field.

See Answer in Part B → Q30

@Neet_pg_bot

• [01_Basics of Radiology] 003 Radiation Exposure Hazards Protection Guidelines And Contrast Media

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[01_Basics of Radiology] 003 Radiation Exposure Hazards Protection Guidelines And Contrast Media — Quick Jump

Q1 (p. 44) *Q2 (p. 44)* *Q3 (p. 45)* *Q4 (p. 45)* *Q5 (p. 46)* *Q6 (p. 46)*
Q7 (p. 47) *Q8 (p. 47)* *Q9 (p. 48)* *Q10 (p. 48)* *Q11 (p. 49)* *Q12 (p. 49)*
Q13 (p. 50)

Q1: A patient exposed to radiation presents with severe nausea, vomiting, and diarrhoea within a few days. Based on these symptoms, what is the expected radiation dose that has likely caused this Gastrointestinal Syndrome? (Q852931)

A. 1-5 Gy

B. 5-20 Gy

C. 20-30 Gy

D. >30 Gy

See Answer in Part B → Q1

@Neet_pg_bot

Q2: A 55-year-old male presents to the emergency department with acute abdominal pain and altered bowel habits. The physician suspects abdominal pathology and considers various imaging studies, weighing concerns about radiation exposure. Which imaging modality would expose the patient to the highest level of radiation? (Q852934)

A. CT scan of the abdomen

B. Barium enema

C. Lumbar spine X-ray

D. Micturating cystourethrogram (MCU)

See Answer in Part B → Q2

@Neet_pg_bot

Q3: A 20-year-old female has recently started working in the radiology department and is concerned about radiation exposure. She seeks advice from the occupational health department. According to AERB guidelines, what is the maximum dose limit for occupational workers exposed to whole-body radiation in a year? (Q852928)

A. 50 mSv

B. 20 mSv

C. 30 mSv

D. 15 mSv

See Answer in Part B → Q3

@Neet_pg_bot

Q4: A 25-year-old male who recently joined the radiology department was instructed to wear the device shown in the image. Which of the following statements about this device is incorrect? (Q852929)

A. Assess the amount of radiation exposure

B. Comprise of thermoluminescent phosphors

C. Should be sent for dose monitoring every 3 months

D. It is worn over the lead apron



See Answer in Part B → Q4

@Neet_pg_bot

Q5: A 50-year-old female patient with a history of breast cancer is scheduled for a follow-up PET scan. During the consultation, she expresses concern about the long-term effects of radiation exposure. Which of the following statements regarding the stochastic effects of radiation exposure is correct? (Q852930)

A. The severity of the effects is dose-dependent

B. It can also result in radiation-induced cataracts

C. No threshold dose is required for the occurrence

D. All of the above

See Answer in Part B → Q5

@Neet_pg_bot

Q6: In the context of the ALARA (As Low As Reasonably Achievable) principle, which of the following strategies is not aligned with minimising radiation exposure for healthcare workers during interventional procedures? (Q852932)

A. Increasing the distance between the operator and the radiation source.

B. Continuous fluoroscopy instead of Pulsed fluoroscopy

C. Implementing lead shielding and personal protective equipment (PPE).

D. Reducing the duration of time the patient is exposed to radiation.

See Answer in Part B → Q6

@Neet_pg_bot

Q7: A 28-year-old woman arrives at the emergency department with acute abdominal pain. The attending physician is considering an abdominal X-ray. What does the "10-day rule" advise regarding X-ray exposure for women of childbearing age? (Q852933)

A. A gap of at least 10 days between two successive X-rays.

B. Avoid non-urgent X-rays within 10 days post-menstruation

C. Perform X-rays during the first 10 days of the menstrual cycle.

D. X-rays should be avoided 10 days before menstruation.

See Answer in Part B → Q7

@Neet_pg_bot

Q8: A 45-year-old patient is scheduled for a CT scan to evaluate abdominal pain. The radiologist aims to ensure adequate visualization of the bowel without creating significant contrast between the bowel contents and surrounding tissues. Which of the following is a neutral contrast agent appropriate for this procedure? (Q852935)

A. Barium

B. Iodinated contrast medium

C. Water

D. Air

See Answer in Part B → Q8

@Neet_pg_bot

Q9: A 58-year-old male with chronic kidney disease (CKD) is scheduled for a contrast MRI using Gadodiamide. Kidney function was assessed prior to the scan. Which of the following regarding kidney function is correct? (Q852936)

A. Serum creatinine evaluation is not necessary for this group of gadolinium

B. Repeat contrast is safe only after 7 days if eGFR > 30

C. There is a risk of Nephrogenic systemic fibrosis (NSF) with creatinine 0.8 mg/dL

D. The scan can be done if eGFR is > 30

See Answer in Part B → Q9

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Q10: A 35-year-old female is scheduled for an ERCP using the contrast mentioned below. Which type of contrast agent is it? (Q852937)

A. Ionic Dimer

B. Non-ionic Dimer

C. Ionic Monomer

D. Non-ionic Monomer



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See Answer in Part B → Q10

@Neet_pg_bot

Q11: A 42-year-old female with a history of ulcerative colitis presents with severe abdominal pain and diarrhoea. The gastroenterologist is considering performing a barium study to assess her condition. Which of the following conditions would contraindicate using a barium study in this patient? (Q852938)

A. Malabsorption syndrome

B. Colon carcinoma

C. Ileocecal Tuberculosis

D. Inflammatory bowel disease (IBD) exacerbation

See Answer in Part B → Q11

@Neet_pg_bot

Q12: A 35-year-old pregnant woman is being assessed for suspected appendicitis. An abdominal ultrasound shows inflammation but in limited detail. What is the best contrast agent to enhance USG? (Q852939)

A. Barium sulfate

B. Iodinated contrast agents

C. Saline solution

D. Sulfur Hexafluoride microbubbles

See Answer in Part B → Q12

@Neet_pg_bot

Q13: A 70-year-old patient with multiple comorbidities is being evaluated for contrast-enhanced imaging. The healthcare team is assessing risk factors for contrast-induced nephropathy (CIN). Which of the following is NOT considered a risk factor for CIN? (Q852940)

A. History of diabetes

B. Use of metformin

C. Use of nonsteroidal anti-inflammatory drugs (NSAIDs)

D. History of asthma

See Answer in Part B → Q13

@Neet_pg_bot

• [01_Basics of Radiology] 004 Previous Year Questions

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[01_Basics of Radiology] 004 Previous Year Questions — Quick Jump

Q1 (p. 51)	*Q2 (p. 51)*	*Q3 (p. 52)*	*Q4 (p. 52)*	*Q5 (p. 52)*	*Q6 (p. 53)*
Q7 (p. 53)	*Q8 (p. 53)*	*Q9 (p. 54)*	*Q10 (p. 54)*	*Q11 (p. 55)*	*Q12 (p. 55)*
Q13 (p. 56)	*Q14 (p. 56)*	*Q15 (p. 57)*	*Q16 (p. 57)*	*Q17 (p. 58)*	*Q18 (p. 59)*
Q19 (p. 60)	*Q20 (p. 60)*	*Q21 (p. 61)*	*Q22 (p. 61)*	*Q23 (p. 61)*	*Q24 (p. 62)*
Q25 (p. 62)	*Q26 (p. 63)*	*Q27 (p. 63)*	*Q28 (p. 64)*	*Q29 (p. 64)*	*Q30 (p. 65)*
Q31 (p. 65)	*Q32 (p. 65)*				

Q1: Which of the following statements is false regarding acute radiation syndrome? (Q856928)

A. Gl manifestations occur at a lower radiation dose than bone marrow depression

B. Doses greater than 2 Gy cause hematopoietic syndrome with pancytopenia

C. Doses greater than 6 Gy cause GI syndrome with dehydration

D. Doses greater than 20 -30 Gy cause Cardiovascular syndrome

See Answer in Part B → Q1

@Neet_pg_bot

Q2: A child with acute lymphoblastic leukemia undergoes prophylactic irradiation prior autologous hematopoietic stem cell transplantation. Which of the following will be the least affected? (Q856172)

A. Spermatogonia

B. Intestinal epithelial cells

C. Neurons

D. Bone marrow/ erythroid precursor cells

See Answer in Part B → Q2

@Neet_pg_bot

Q3: Which phase of the cell cycle displays the highest resistance to radiation among the following options? (Q856694)

A. S phase

B. M phase

C. G1 phase

D. G2 phase

See Answer in Part B → Q3

@Neet_pg_bot

Q4: Side effects of Pituitary irradiation? (Q858175)

A. Hypopituitarism

B. Increased risk of cerebrovascular accident

C. Optic nerve damage

D. All of the above

See Answer in Part B → Q4

@Neet_pg_bot

Q5: What is the name of the radiotherapy treatment given to a cancer patient that involves administering a dose of 1.8 to 2 Gy once daily for 5 days per week over a period of 6 to 8 weeks? (Q858194)

A. Regular Fractionated radiotherapy

B. Hyper fractionated radiotherapy

C. Accelerated fractionation radiotherapy

D. Brachytherapy

See Answer in Part B → Q5

@Neet_pg_bot

Q6: Radioactive isotope used for teletherapy? (Q860597)

A. Iridium-192

B. lodine-125

C. Cobalt-60

D. lodine-131

See Answer in Part B → Q6

@Neet_pg_bot

Q7: Radioisotope used in PET-CT scan? (Q860579)

A. 18F-FDG

B. lodine

C. Radium

D. Cesium-131

See Answer in Part B → Q7

@Neet_pg_bot

Q8: Which of the following is the most likely side effect of radioactive iodine (I-131) ablation therapy? (Q852581)

A. Acute Thyroiditis

B. Hypothyroidism

C. Hyperthyroidism

D. Thyroid Storm

See Answer in Part B → Q8

@Neet_pg_bot

Q9: What does a linear accelerator (LINAC) produce in radiation therapy? (Q866873)

A. Alpha and beta rays

B. X-rays and gamma rays

C. X-rays and electrons

D. Neutrons and positrons

See Answer in Part B → Q9

@Neet_pg_bot

Q10: Identify the marked blood vessel in this MR Angiogram. (Q852784)

A. Superficial temporal artery

B. Basilar artery

C. Middle meningeal artery

D. Occipital artery



See Answer in Part B → Q10

@Neet_pg_bot

Q11: Which of the following is the investigation of choice for spinal TB? (Q865265)

A. Ultrasound

B. MRI

C. CT scan

D. CBNAAT

See Answer in Part B → Q11

@Neet_pg_bot

Q12: In which of the following scans does maximum radiation exposure occur? (Q859937)

A. X-ray abdomen

B. Chest X ray

C. IV pyelography

D. CT

See Answer in Part B → Q12

@Neet_pg_bot

Q13: IOC for Ureteric calculi is? (Q852785)

A. USG

B. NC-CT

C. CE-CT

D. Ureteroscopy

See Answer in Part B → Q13

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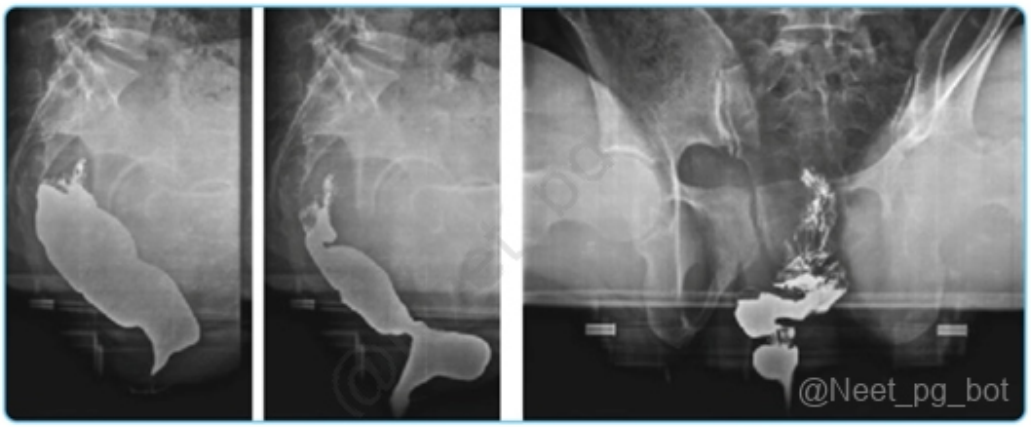
Q14: Which imaging modality is being used in the image shown below? (Q865272)

A. MRI Defecography

B. X-ray Defecography

C. CT abdomen

D. Barium Enema



See Answer in Part B → Q14

@Neet_pg_bot

Q15: Personal monitoring of radiation is done by: (Q858496)

A. TLD badge

B. Collimators

C. Linear accelerator

D. Grid

See Answer in Part B → Q15

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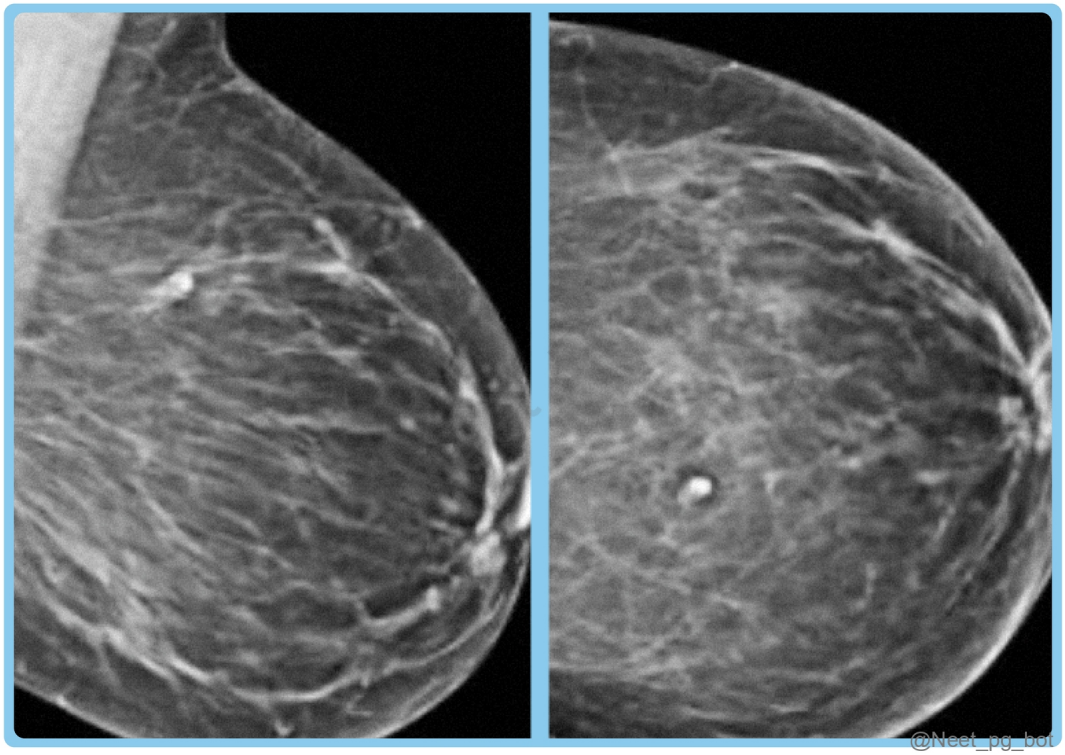
Q16: Identify the investigation shown in the image: (Q866871)

A. Mammography

B. CT

C. X-ray

D. MRI



See Answer in Part B → Q16

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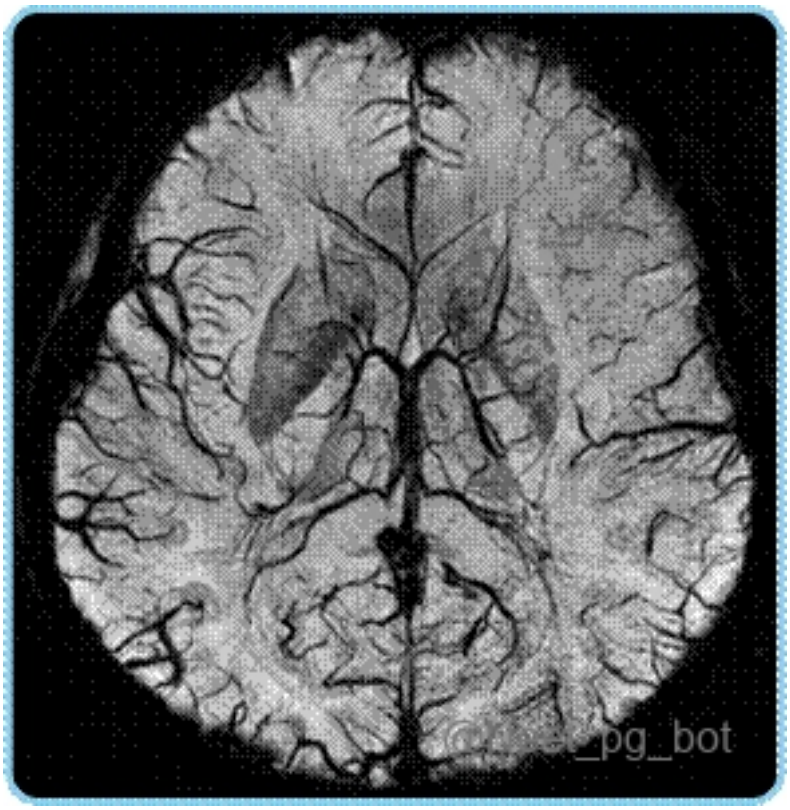
Q17: What type of MRI image is given below? (Q856681)

A. Proton density image

B. Susceptibility weighted image

C. Gradient echo image

D. Inversion recovery image



See Answer in Part B → Q17

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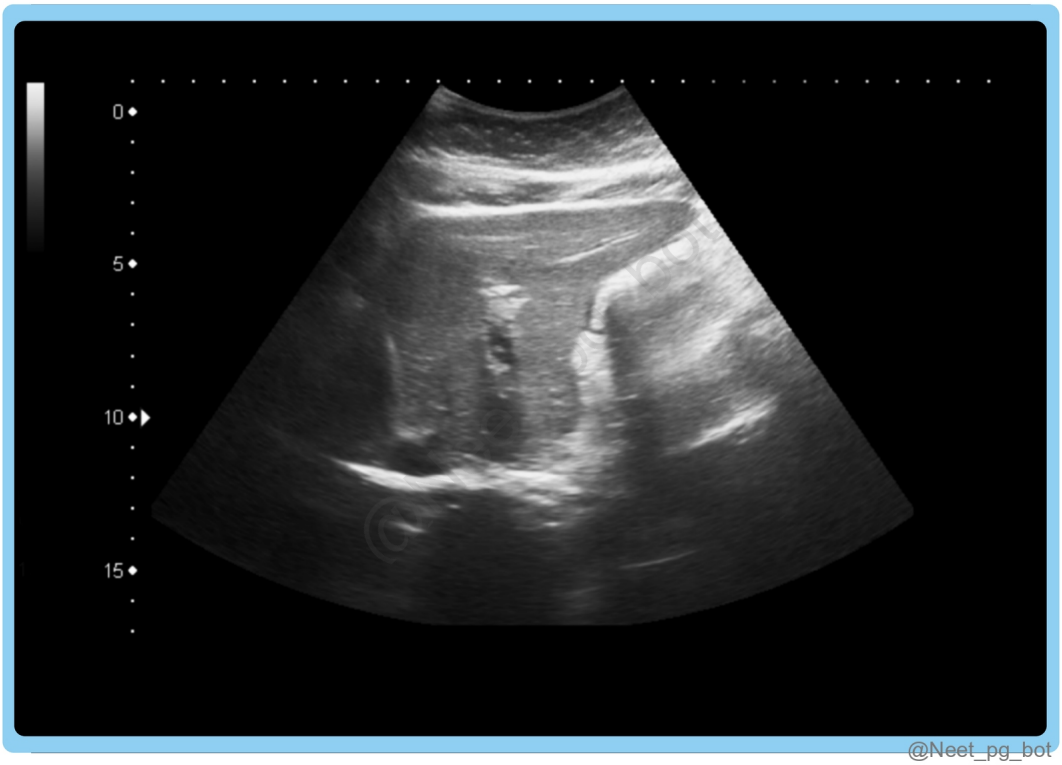
Q18: Identify the imaging modality given below. (Q858183)

A. USG

B. Fluoroscopy

C. X-Ray

D. MRI



See Answer in Part B → Q18

@Neet_pg_bot

Q19: The magnetic field in MRI machines is measured in which of the following units? (Q857618)

A. Tesla

B. HU

C. KHz

D. Hg

See Answer in Part B → Q19

@Neet_pg_bot

Q20: Which of the following is not included in the whole-body CT scan protocol for a trauma patient? (Q855082)

A. CT Head

B. CT Cervical spine

C. CT Limbs

D. CT Abdomen

See Answer in Part B → Q20

@Neet_pg_bot

Q21: Whole-body CT scan protocol for a trauma patient includes all, except (Q858232)

A. CT Head

B. CT Cervical spine

C. CT Limbs

D. CT Abdomen

See Answer in Part B → Q21

@Neet_pg_bot

Q22: The principle of Linear accelerators is utilized in the production of? (Q830816)

A. Protons

B. X-rays

C. Gamma rays

D. Neutrons

See Answer in Part B → Q22

@Neet_pg_bot

Q23: What statement accurately describes radiotherapy? (Q830807)

A. Intensity is inversely proportional to square of the distance

B. Vomiting is a late adverse reaction

C. Rapidly proliferating cells are most radioresistant

D. All the adverse effects are reversible

See Answer in Part B → Q23

@Neet_pg_bot

Q24: A 40-year-old female patient presents with complaints of abdominal pain; further investigations show elevated PTH levels and renal calculi. Which of the following investigations should be done next? (Q860281)

A. USG thyroid

B. TC 99m sestamibi scan

C. Dexa scan

D. Radioactive iodine uptake test

See Answer in Part B → Q24

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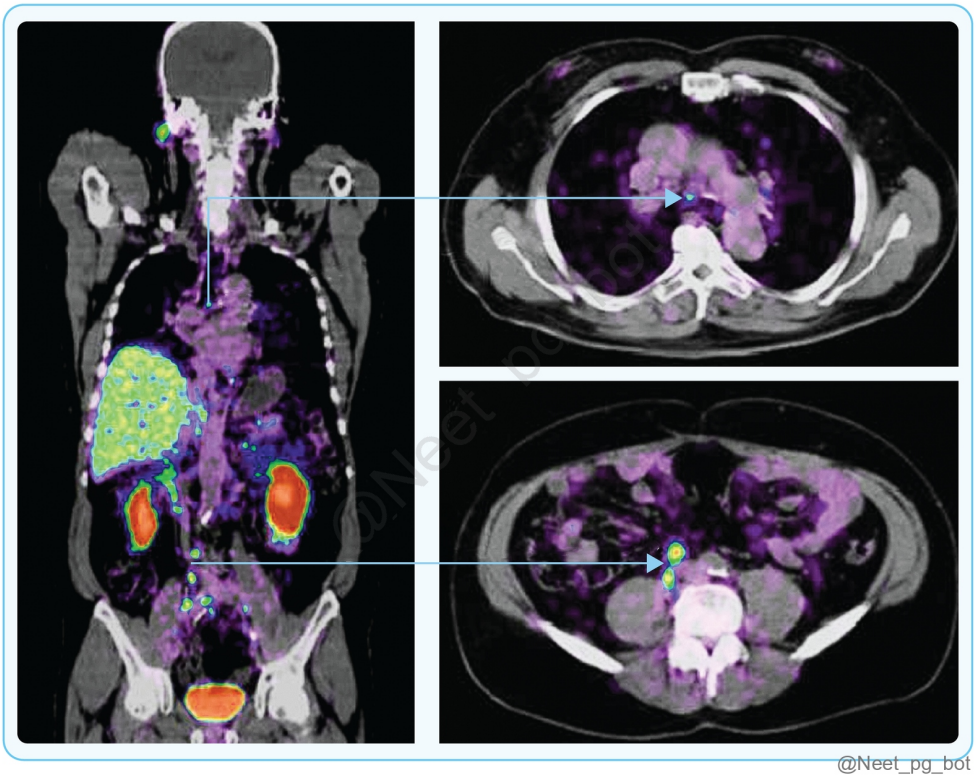
Q25: During the procedure shown below which one of the following substances is uptaken by the cancer cells? (Q860279)

A. Alanine

B. Glucose

C. Sodium

D. Calcium



See Answer in Part B → Q25

@Neet_pg_bot

Q26: Ga-68 PSMA PET scan is used to diagnose which of the following conditions? (Q860266)

A. Lung cancer

B. Prostate cancer

C. Colon cancer

D. Liver cancer

See Answer in Part B → Q26

@Neet_pg_bot

Q27: Which of the following is the best management of aneurysm by interventional radiologist? (Q840072)

A. Coiling

B. endothermal ablation

C. Bare stent placement

D. Sclerotherapy

See Answer in Part B → Q27

@Neet_pg_bot

Q28: Which of the following contrast agents is safe to use in renal failure patients? (Q840069)

A. Gadolinium

B. Iodinated ionic contrast

C. Iodinated non-ionic contrast

D. USG contrast

See Answer in Part B → Q28

@Neet_pg_bot

Q29: Which of the following is true regarding CT scan? (Q840058)

A. CT score of water is 0

B. CT consists of unfiltered X-ray beams

C. It is the investigation of choice for Gallstones

D. The typical effective dose for a NCCT head scan is 20mSv

See Answer in Part B → Q29

@Neet_pg_bot

Q30: Ideal thickness of lead aprons to be worn by workers working in radiology department? (Q860589)

A. 0.5mm

B. 1mm

C. 0.75mm

D. 2mm

See Answer in Part B → Q30

@Neet_pg_bot

Q31: Which among the following is most radiosensitive? (Q860578)

A. Testis

B. Bone

C. Nerve

D. Muscle

See Answer in Part B → Q31

@Neet_pg_bot

Q32: Which among the following radioactive isotopes is not employed in brachytherapy? (Q793101)

A. Iodine-125

B. Iodine-131

C. Cobalt-60

D. Iridium-192

See Answer in Part B → Q32

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• [02_Musculoskeletal Radiology] 005 Musculoskeletal Radiology - I

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[02_Musculoskeletal Radiology] 005 Musculoskeletal Radiology - I — Quick Jump

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Q13 (p. 79)	*Q14 (p. 79)*	*Q15 (p. 80)*	*Q16 (p. 81)*	*Q17 (p. 82)*	*Q18 (p. 84)*
Q19 (p. 85)	*Q20 (p. 88)*	*Q21 (p. 90)*	*Q22 (p. 90)*	*Q23 (p. 91)*	*Q24 (p. 92)*
Q25 (p. 94)	*Q26 (p. 94)*				

Q1: A 47-year-old woman with a history of chronic kidney disease (CKD) from diabetic nephropathy has been on hemodialysis for three years. She reports persistent back pain and changes in posture. An X-ray shows specific findings, shown below. What is the most likely diagnosis? (Q853031)

A. Ankylosing spondylitis

B. Hyperparathyroidism

C. Osteoporosis

D. Osteoblastic metastases



See Answer in Part B → Q1

@Neet_pg_bot

Q2: A 62-year-old man with a history of heart failure and sensorineural hearing loss presents with worsening bone pain in his pelvis and lower back, fatigue, heaviness in his legs, tibial deformities, and occasional headaches. Laboratory tests show elevated alkaline phosphatase (ALP) levels. Which radiographic finding is least likely associated with his condition? (Q853047)

A. Osteoporosis circumscripta

B. Tam O'Shanter sign

C. Candle flame sign

D. Champagne glass pelvis.

See Answer in Part B → Q2

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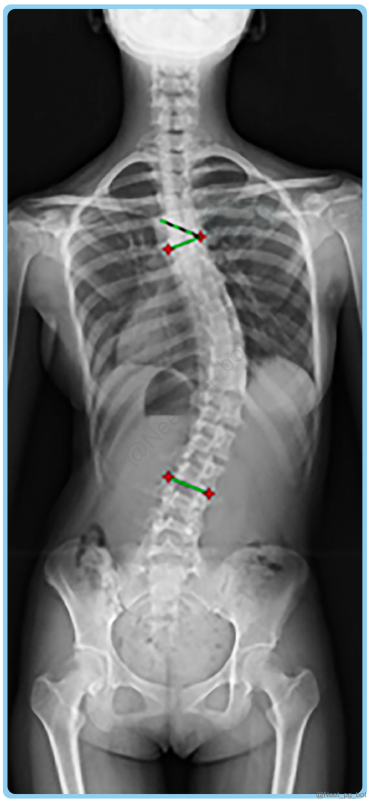
Q3: Which angle is typically used to measure the degree of spinal curvature? (Q853063)

A. Codman angle

B. Ferguson angle

C. Cobb angle

D. Q-angle



See Answer in Part B → Q3

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Q4: A 5-year-old boy presents with short stature and disproportionate limb length. His parents mention he has a broad forehead and has been slower to walk than peers & genetic testing reveals mutation in FGFR3 gene. Based on this presentation, which of the following radiological findings is least likely associated with his condition? (Q853090)

A. Bullet nose vertebrae

B. Tam o'shanter sign

C. Trident hand sign

D. Champagne glass pelvis

See Answer in Part B → Q4

@Neet_pg_bot

Q5: A 28-year-old female presents to the emergency department with sudden pain in her right foot after playing soccer. She reports hearing a "snap" when she landed awkwardly while attempting to head the ball. On examination, swelling and tenderness are noted. An X-ray is shown below. What is the most likely diagnosis? (Q853089)

A. Aviator fracture

B. Jones fracture

C. Pseudo-jones fracture

D. Lover’s fracture



See Answer in Part B → Q5

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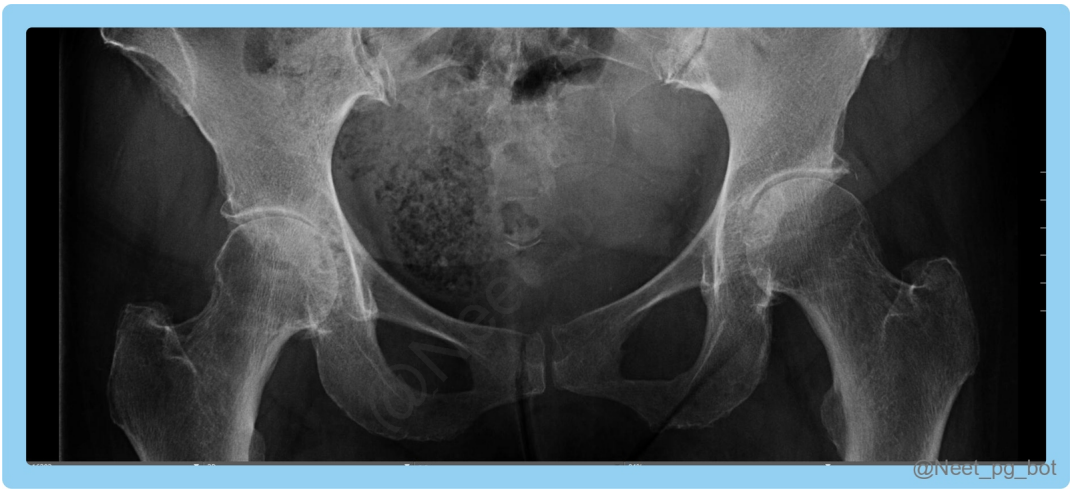
Q6: A 78-year-old woman presents to the emergency department with a sudden onset of severe left hip pain after falling in her living room. She reports losing her balance while trying to stand up from the couch. X-rays reveal disruption of Shenton's line. Based on the findings, which of the following conditions would most likely preserve Shenton's line? (Q853088)

A. Femoral neck fracture

B. Posterior hip dislocation

C. Intertrochanteric fracture

D. Osteoarthritis of the hip



See Answer in Part B → Q6

@Neet_pg_bot

Q7: Match the following fractures with their radiographs: 1. Bennett's fracture a. 2. Rolando's fracture b. 3. Gamekeeper fracture c. 4. Boxer's fracture d. (Q853087)

A. 1-d, 2-c, 3-a, 4-b

B. 1-b, 2-d, 3-a, 4-c

C. 1-c, 2-a, 3-b, 4-d

D. 1-b, 2-a, 3-d, 4-c


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See Answer in Part B → Q7

Q8: A 25-year-old man presents with wrist pain and swelling following a fall while skiing and also reports difficulty moving his wrist. Based on the X-ray findings, what is the cause of his condition? (Q853086)

A. Avascular necrosis of Scaphoid

B. Scaphoid waist fracture line

C. Radial styloid fracture leading to carpal instability

D. Scapholunate ligament tear



See Answer in Part B → Q8

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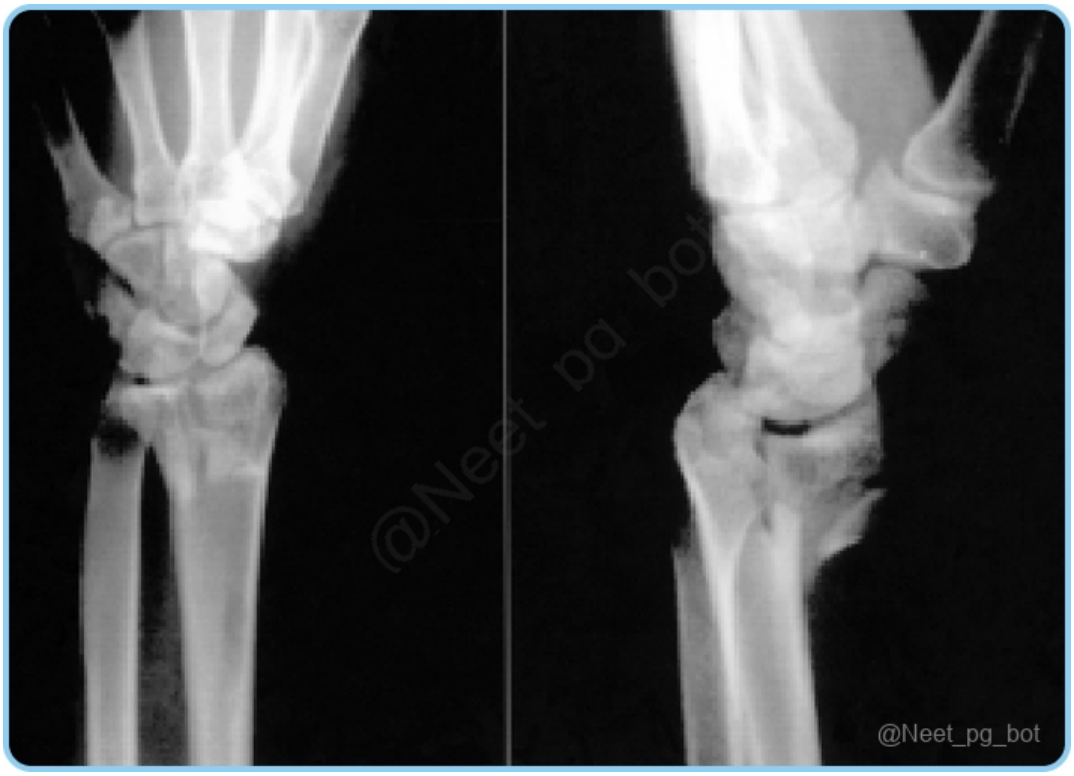
Q9: A 32-year-old woman presents with wrist pain and swelling after sustaining a fall on an outstretched hand. An X-ray is performed; what is the likely diagnosis based on the findings? (Q853084)

A. Hutchinson fracture

B. Colles fracture

C. Smith fracture

D. Barton’s fracture



See Answer in Part B → Q9

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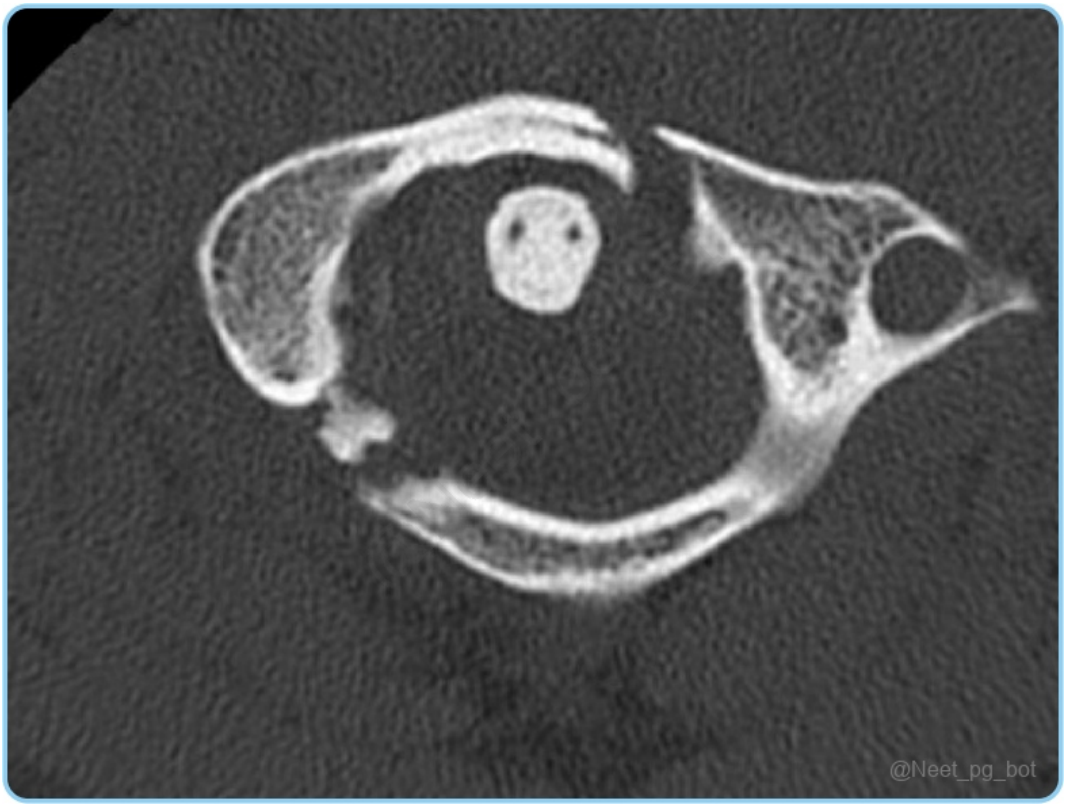
Q10: A 28-year-old man presents with severe neck pain and limited head movement after falling from a 13-foot building. Examination reveals tenderness and restricted motion in the cervical spine. Based on his radiological findings, what is the likely diagnosis? (Q853082)

A. Chance fracture

B. Hangman's fracture

C. Clay shoveller’s fracture

D. Jefferson fracture



See Answer in Part B → Q10

@Neet_pg_bot

Q11: A 17-year-old male presents with a 3-month history of persistent pain and swelling above the left ankle, with constant and worsening discomfort, especially during physical activity. On examination, there is tenderness and a palpable mass over the lateral aspect of the distal fibula. An X-ray shows characteristic findings depicted in the image. What is the most likely diagnosis? (Q853077)

A. Ewing's Sarcoma

B. Osteosarcoma

C. Osteoblastoma

D. Osteochondroma



See Answer in Part B → Q11

@Neet_pg_bot

Q12: A 30-year-old patient presents with localized pain and swelling in the anterior tibia. X-ray findings reveal the characteristics shown in the image. Based on these imaging features, what is the most likely diagnosis? (Q853076)

A. Simple Bone Cyst

B. Giant Cell Tumor

C. Aneurysmal Bone Cyst

D. Adamantinoma



See Answer in Part B → Q12

@Neet_pg_bot

Q13: A 10-year-old patient presents with symptoms suggestive of osteomyelitis. An MRI is performed, and the radiologist notes a finding indicative of acute osteomyelitis. Which of the following findings is considered pathognomonic for this condition? (Q853074)

A. Penumbra sign

B. Bone marrow edema

C. Sequestrum

D. Involucrum

See Answer in Part B → Q13

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Q14: A 10-year-old boy presents with mild left arm pain, which has worsened over the past few months, particularly after a recent fall while playing. There are no signs of infection or soft tissue involvement. An X-ray shows the findings depicted in the image. What is the most likely diagnosis? (Q853073)

A. Simple Bone Cyst

B. Aneurysmal Bone Cyst

C. Brodie Abscess

D. Sequestrum



See Answer in Part B → Q14

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Q15: A 30-year-old male presents with pain in the thigh and a noticeable deformity, as shown in the image. This deformity can be seen in all the following conditions except? (Q853065)

A. Paget's disease of bone

B. Osteogenesis imperfecta

C. Osteopetrosis

D. Fibrous dysplasia



See Answer in Part B → Q15

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Q16: A 24-year-old male presents with persistent nocturnal pain in his right femur that is relieved by nonsteroidal anti-inflammatory drugs (NSAIDs). On examination, there is localised tenderness in the area & no history of trauma. The radiographic evaluation shows a small, well-defined lytic lesion with a central nidus. What is the investigation of choice to confirm the diagnosis? (Q853029)

A. X-ray of the femur

B. MRI of the femur

C. DEXA scan

D. CT scan of the femur

See Answer in Part B → Q16

@Neet_pg_bot

Q17: Match the following skull findings according to their respective conditions. S.No Finding Condition 1. a) Paget's Disease 2. b) Hyperparathyroidism 3. c) Sickle Cell Anemia 4. d) Multiple Myeloma 5. e) Langerhans Cell Histiocytosis (Q853056)

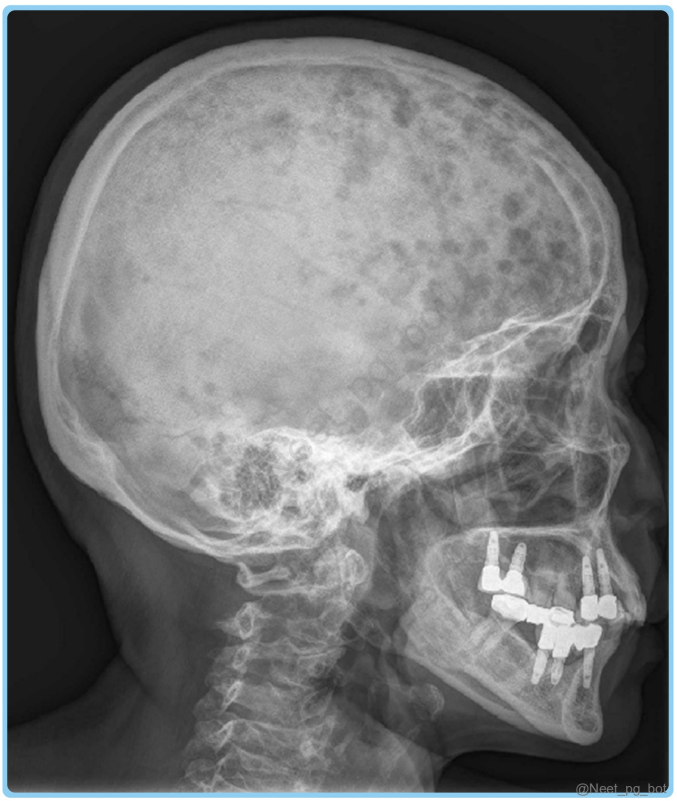
A. 1-b, 2-d, 3-a, 4-e, 5-c

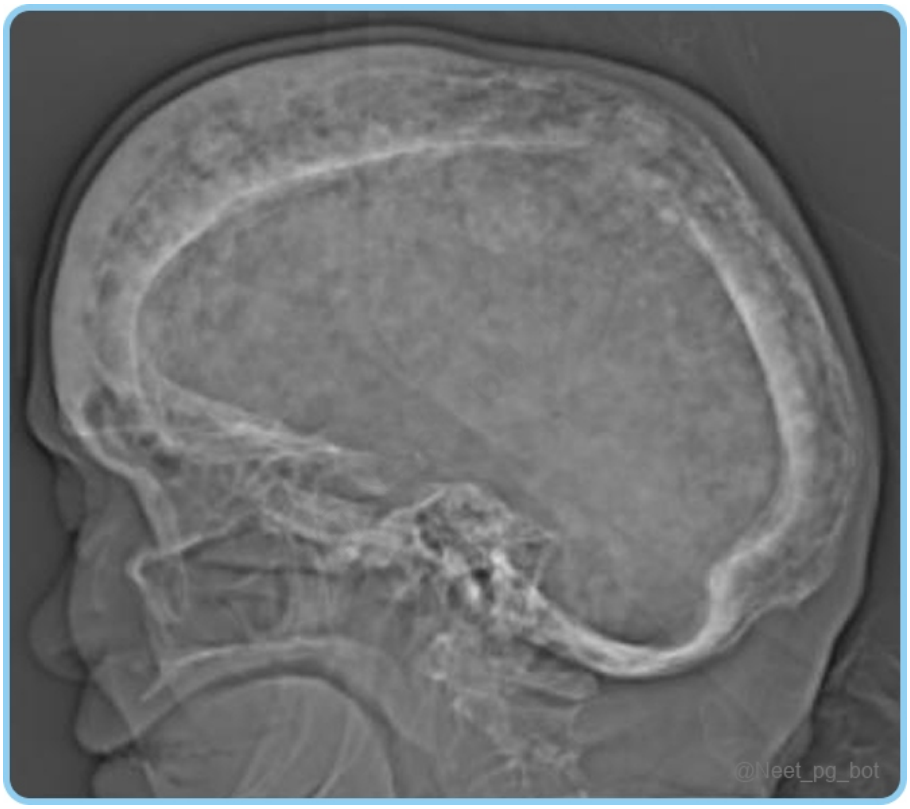
B. 1-c, 2-e, 3-b, 4-d, 5-a

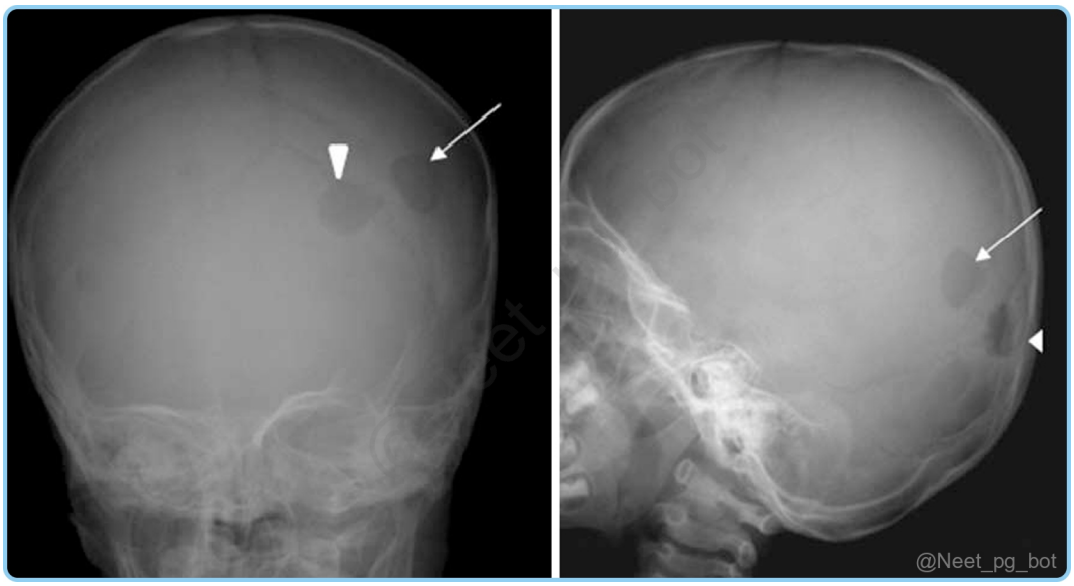
C. 1-e, 2-c, 3-d, 4-b, 5-a

D. 1-a, 2-b, 3-e, 4-c, 5-d




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See Answer in Part B → Q17

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Q18: A 45-year-old woman presents with a 3-month history of bilateral wrist and knee pain, worse with inactivity and improving with movement. She reports morning

stiffness lasting over an hour, fatigue, and low-grade fever. On examination, hand deformities are noted. All of the following are associated with her condition except: (Q853054)

A. Hitchhiker's thumb deformity

B. Boutonniere deformity

C. Swan neck deformity

D. Calcinosis cutis

See Answer in Part B → Q18

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Q19: Match the following X-rays with their corresponding diagnoses X-rays Diagnosis 1. A. Achondroplasia 2. B. Tuberculosis 3. C. Acromegaly 4. D. Crest Syndrome 5. E. Psoriatic Arthritis (Q853053)

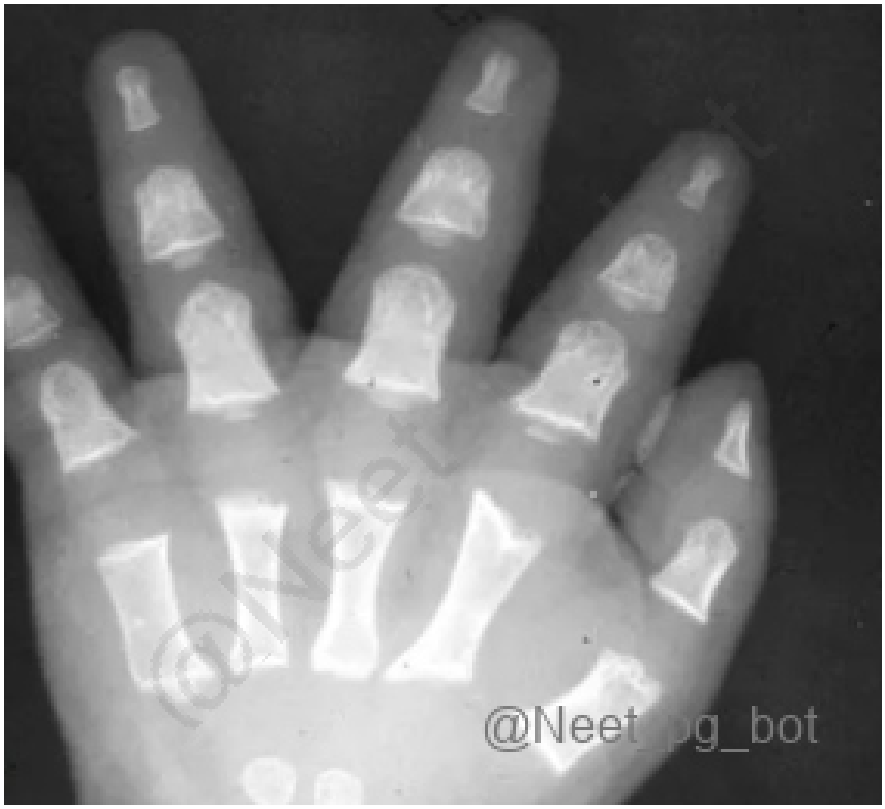
A. 1-B, 2-A, 3-D, 4-E, 5-C

B. 1-E, 2-C, 3-B, 4-A, 5-D

C. 1-D, 2-B, 3-E, 4-C, 5-A

D. 1-C, 2-A, 3-E, 4-B, 5-D


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See Answer in Part B → Q19

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Q20: A 52-year-old man presents with chronic joint pain, stiffness, and mottling of teeth. He has a history of living in a rural area for several decades. His X-ray reveals increased bone density and calcification of ligaments. Based on these findings, which condition is most likely responsible for his symptoms? (Q853051)

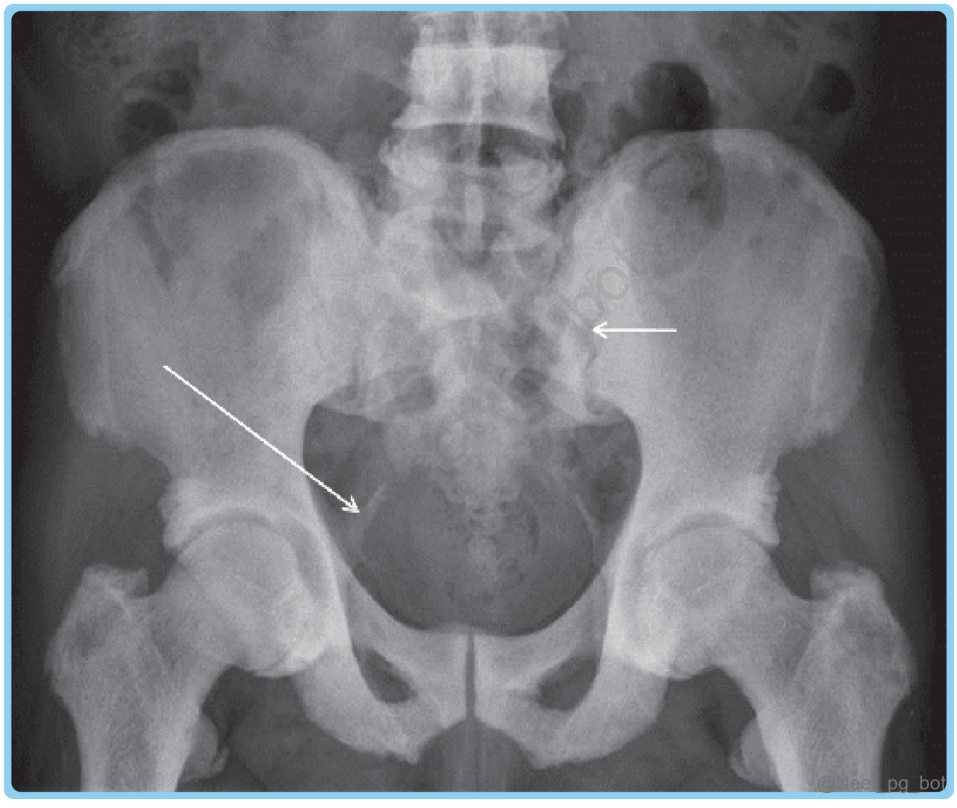
A. Accumulation of Homogentisic acid

B. Accumulation of Mucopolysaccharides

C. Excessive accumulation of Iron

D. Increased fluoride intake





See Answer in Part B → Q20

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Q21: "Scotty dog" sign is seen in? (Q853050)

A. Normal vertebral findings

B. Spondylolisthesis

C. Osteoporosis

D. Spondylolysis



See Answer in Part B → Q21

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Q22: A 15-year-old boy, notably taller than his peers, presents with lower back pain and has a history of frequent shoulder dislocations. Scoliosis is noted, and an MRI has been recommended for further evaluation. Which of the following conditions aligns with the given radiological finding? (Q853049)

A. Aortic aneurysm

B. Retroperitoneal lymphadenopathy

C. Down’s syndrome

D. Marfan syndrome



See Answer in Part B → Q22

@Neet_pg_bot

Q23: What is the most likely T-score that would confirm the diagnosis of osteoporosis? (Q853048)

A. >-1.0

B. -1.0 to -2.5

C. <-2.5

D. <-2.5 with fracture

See Answer in Part B → Q23

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Q24: Match the following radiological findings with their associated condition. Radiological finding Condition 1. a) Paget's disease 2. b) Vertebral hemangioma 3. c) Osteopetrosis 4. d) Ankylosing spondylitis (Q853046)

A. 1-c, 2-d, 3-b, 4-a

B. 1-c, 2-b, 3-a, 4-d

C. 1-d, 2-c, 3-a, 4-b

D. 1-b, 2-c, 3-d, 4-a




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See Answer in Part B → Q24

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Q25: A 16-year-old girl with sickle cell anemia was diagnosed at birth. She recently went to the hospital due to severe back pain that worsens with activity, as well as numbness and tingling in her legs, difficulty walking, and occasional weakness in her lower extremities. Which option accurately represents the radiographic findings of her spine for her condition? (Q853032)

See Answer in Part B → Q25

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Q26: A 3-year-old child presents with fatigue, swollen and bleeding gums, bruising, joint pain, and dry skin. After a dietary assessment, it is found that the child has been consuming a diet low in fruits and vegetables. Which radiographic feature is most indicative of the probable condition? (Q853030)

A. Widening of the growth plate

B. Cupping of the metaphysis

C. Wimberger’s ring in the epiphysis

D. Absence of white line of Frankel

See Answer in Part B → Q26

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• [02_Musculoskeletal Radiology] 006 Previous Year Questions

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[02_Musculoskeletal Radiology] 006 Previous Year Questions — Quick Jump

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Q7 (p. 101) *Q8 (p. 102)* *Q9 (p. 103)* *Q10 (p. 104)* *Q11 (p. 105)*

Q1: Identify the tarsal bone marked by the arrow in the given X-ray of the right foot. (Q866870)

A. Navicular

B. Cuboid

C. Intermediate cuneiform

D. Lateral cuneiform



See Answer in Part B → Q1

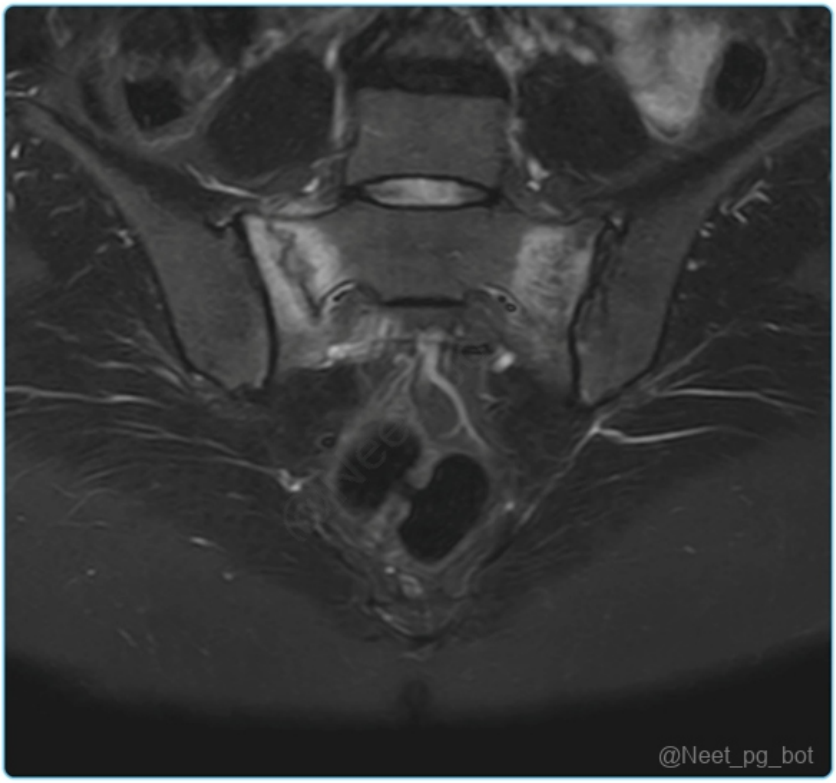
Q2: Identify the condition associated with the image shown below: (Q865269)

A. Sacral metastasis

B. Sacral insufficiency fracture

C. Transient edema of the sacroiliac joint

D. Infective sacroiliitis



See Answer in Part B → Q2

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Q3: A 60-year-old patient presents with an inability to bear weight following a trivial trauma. X-rays of the pelvis and thigh reveal lytic lesions with cortical destruction. She has a history of weight loss. What is the most likely diagnosis? (Q852786)

A. Eosinophilic granuloma

B. Disseminated TB

C. Brown tumor

D. Metastasis





See Answer in Part B → Q3

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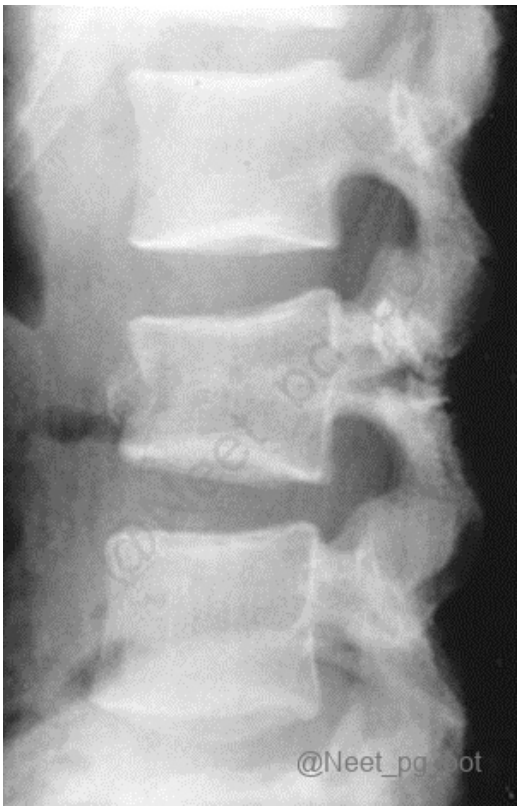
Q4: Identify the given fracture: (Q843929)

A. Burst fracture

B. Compression fracture

C. Chance fracture

D. Impacted fracture



See Answer in Part B → Q4

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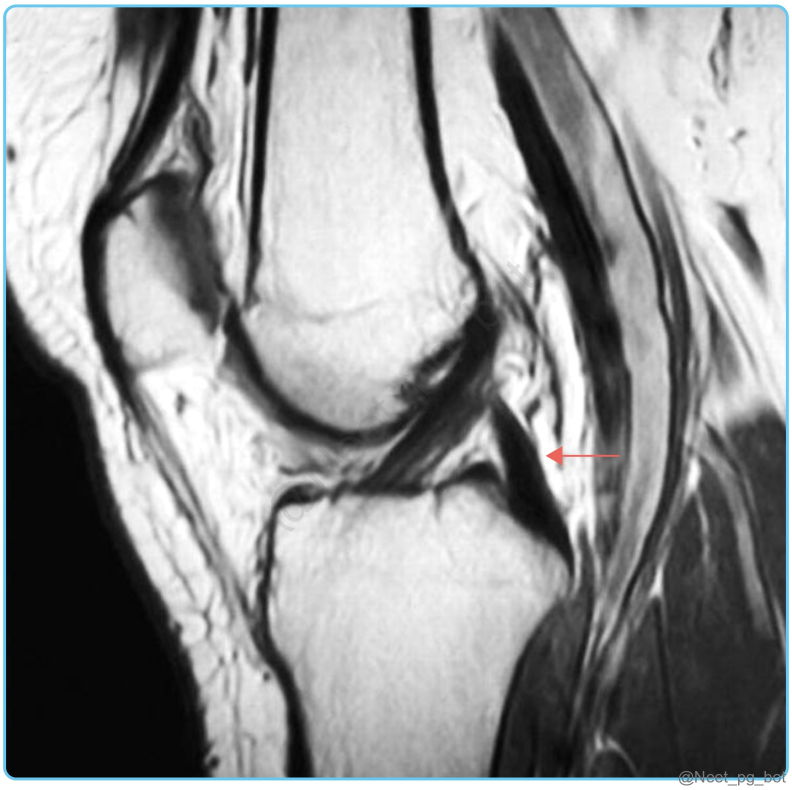
Q5: Identify the marked ligament? (Q857382)

A. PCL

B. ACL

C. Patellar tendon

D. None of the above



See Answer in Part B → Q5

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Q6: What is the most radiosensitive tissue in our body? (Q857620)

A. Skin

B. Muscles

C. Bone marrow

D. Nervous tissue

See Answer in Part B → Q6

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Q7: A 15-year-old patient with a history of spinal tuberculosis was brought to the hospital with low-grade fever, dull backache, and persistent flexion of the hip joint.

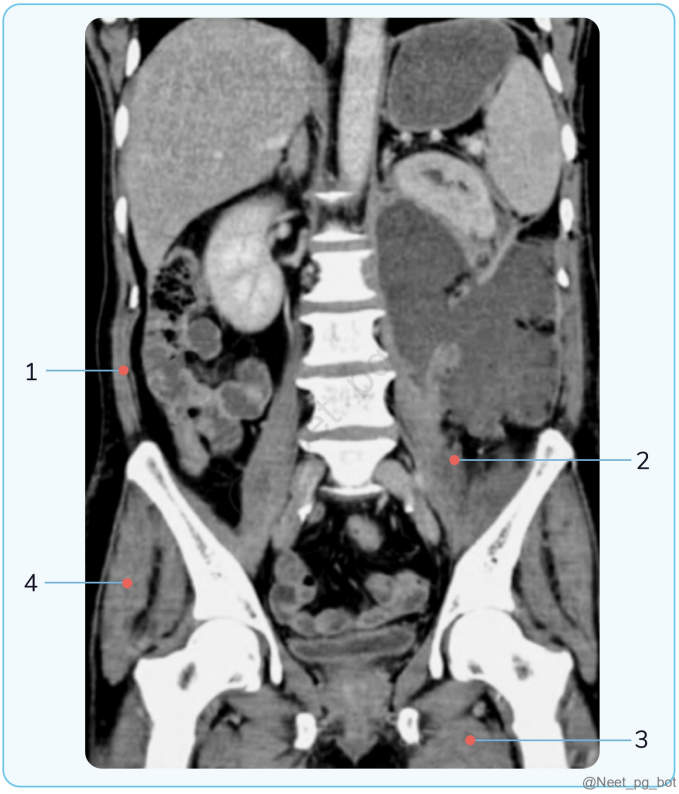
Hip joint motion was limited and painful. Identify the muscle affected in the CT image. (Q856156)

A. 1

B. 2

C. 3

D. 4



See Answer in Part B → Q7

@Neet_pg_bot

Q8: A 13-year-old boy presents to you with a limitation of abduction and internal rotation of the left hip. The x-ray appearance of his left hip joint is shown in the below image. What is the diagnosis of this patient? (Q859251)

A. Slipped capital femoral epiphysis

B. Perthes disease

C. Development of dysplasia of the hip

D. Ankylosing spondylitis



See Answer in Part B → Q8

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Q9: 10-year-old girl presents to the OPD with a back deformity. What is the likely cause? (Q859949)

A. Congenital

B. NF1

C. Idiopathic

D. Neuromuscular



See Answer in Part B → Q9

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Q10: A 14-year-old boy presents with pain and swelling over the right humerus for 2 months. He also has a fever and raised ESR. Blood tests show leucocytosis with neutrophilia. An X-ray of the humerus is shown below. Which of the following is the next step for this patient? (Q878877)

A. Bone marrow biopsy

B. CT-guided biopsy

C. MRI of the affected limb

D. PET



See Answer in Part B → Q10

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Q11: Based on the provided image, what possible diagnosis can be determined? (Q793093)

A. Multiple myeloma

B. Ankylosing spondylitis

C. Pyogenic spondylitis

D. Pott’s spine



See Answer in Part B → Q11

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• [03_Thoracic Radiology] 007 Respiratory Radiology - I

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[03_Thoracic Radiology] 007 Respiratory Radiology - I — Quick Jump

Q1 (p. 107)	*Q2 (p. 107)*	*Q3 (p. 108)*	*Q4 (p. 109)*	*Q5 (p. 109)*	*Q6 (p. 110)*
Q7 (p. 111)	*Q8 (p. 112)*	*Q9 (p. 112)*	*Q10 (p. 112)*	*Q11 (p. 113)*	*Q12 (p. 113)*
Q13 (p. 114)	*Q14 (p. 114)*	*Q15 (p. 115)*	*Q16 (p. 115)*	*Q17 (p. 116)*	*Q18 (p. 116)*
Q19 (p. 117)	*Q20 (p. 118)*	*Q21 (p. 118)*	*Q22 (p. 119)*	*Q23 (p. 119)*	*Q24 (p. 120)*
Q25 (p. 121)	*Q26 (p. 121)*	*Q27 (p. 122)*	*Q28 (p. 123)*	*Q29 (p. 124)*	*Q30 (p. 125)*
Q31 (p. 125)	*Q32 (p. 126)*	*Q33 (p. 127)*	*Q34 (p. 128)*	*Q35 (p. 129)*	*Q36 (p. 130)*
Q37 (p. 131)	*Q38 (p. 131)*	*Q39 (p. 132)*	*Q40 (p. 132)*	*Q41 (p. 133)*	*Q42 (p. 134)*
Q43 (p. 135)					

Q1: A 35-year-old woman presents with B/L hilar lymphadenopathy without any significant lung parenchymal involvement. Her chest X-ray shows symmetric mediastinal and hilar lymphadenopathy in a "1-2-3" pattern. What is the most likely stage of sarcoidosis in this patient? (Q853232)

A. Stage 4

B. Stage 1

C. Stage 2

D. Stage 3

See Answer in Part B → Q1

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Q2: A young male is brought for a medico-legal examination under court orders to determine his age for criminal liability for a rape case. Based on the given radiographic findings, what is the most likely age of the accused? (Q882196)

A. 12-14 years

B. 14-16 years

C. 16-18 years

D. 18+ years



See Answer in Part B → Q2

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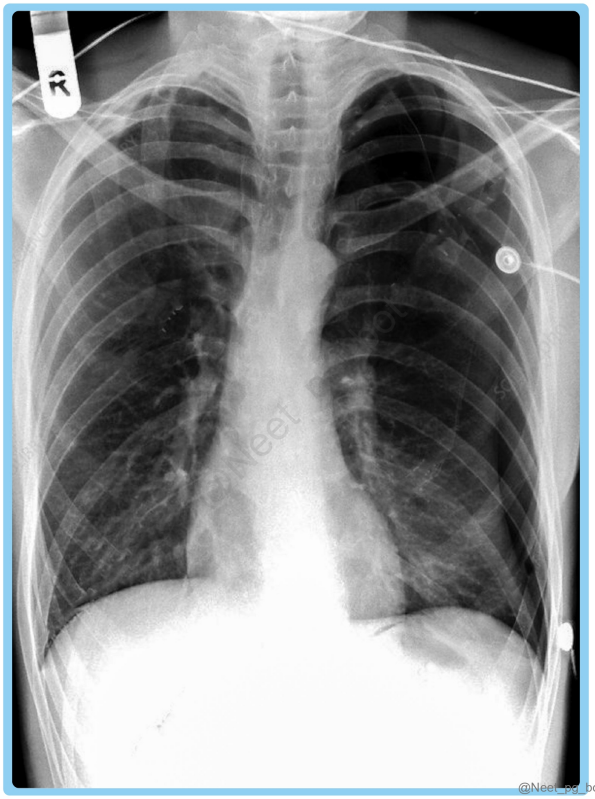
Q3: A 25-year-old tall, thin male with marfanoid features presents with a sudden onset of breathlessness. A chest radiograph is provided. What is the most likely diagnosis? (Q885219)

A. Pulmonary consolidation with air bronchogram

B. Primary spontaneous pneumothorax

C. Massive pleural effusion with mediastinal shift

D. Interstitial pulmonary fibrosis



See Answer in Part B → Q3

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Q4: The most common HRCT finding in a patient with COVID-19 is: (Q853230)

A. Consolidation

B. Ground-glass opacities

C. Honeycombing

D. Pleural effusion

See Answer in Part B → Q4

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Q5: A 65-year-old male presents with progressive dyspnea, a dry cough, and weight loss over the past six months. On examination, clubbing of the fingers is noted. A chest

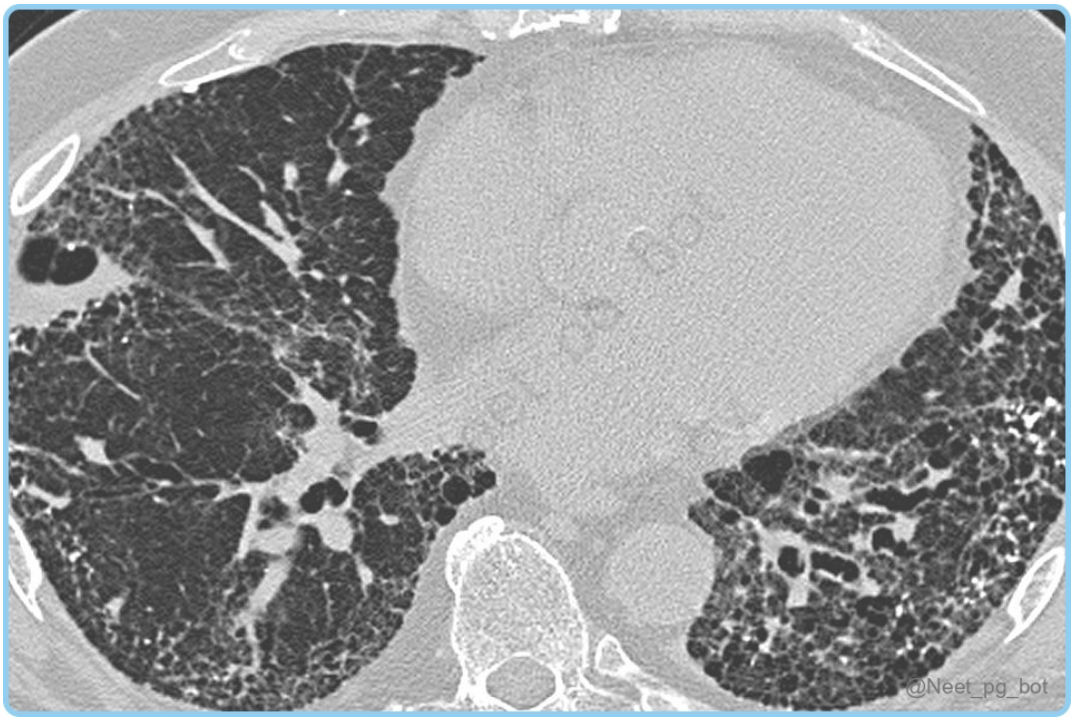
CT scan reveals a predominantly subpleural reticular pattern with areas of honeycombing predominantly affecting the lower lobes. What is the most likely diagnosis? (Q853231)

A. Non-Specific Interstitial Pneumonia (NSIP)

B. Usual Interstitial Pneumonia (UIP)

C. Cryptogenic Organizing Pneumonia (COP)

D. Sarcoidosis



See Answer in Part B → Q5

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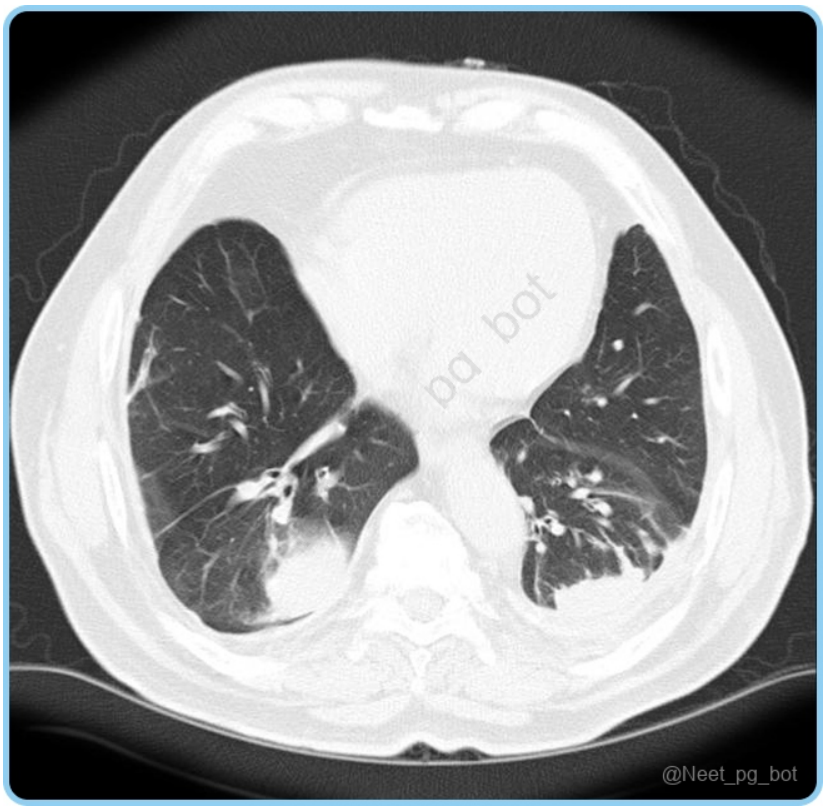
Q6: A 60-year-old man with a history of working as a shipyard worker presents with progressive dyspnea, a persistent dry cough, and chest tightness. He also reports recent weight loss and has experienced crackles upon auscultation. A CT scan of the chest reveals a distinct structure. What could be the underlying mechanism responsible for the observed sign on the CT image? (Q853234)

A. Round atelectasis causing a distinct pattern of lung collapse.

B. Calcified pleural plaques resulting in alterations in the pleural surface.

C. A large nodule surrounded by small nodules indicating a significant inflammatory process.

D. Interstitial fibrosis leading to a reticular pattern affecting lung architecture.



See Answer in Part B → Q6

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Q7: A 55-year-old male presents with drooping of the right eyelid, a constricted right pupil, and lack of sweating on the right side of his face. He also reports weakness, pain, and numbness in his right arm. Chest x-ray reports an apical lung mass on the right side. What is the imaging modality of choice to identify the underlying cause of his symptoms? (Q853236)

A. Chest X-ray

B. MRI

C. CT Scan

D. PET Scan

See Answer in Part B → Q7

@Neet_pg_bot

Q8: A 45-year-old male presents with a chronic cough and mild chest discomfort. A chest X-ray reveals a mediastinal mass with well-defined margins and a paravertebral location, suggestive of a lesion arising from neural tissue. To confirm the diagnosis and further evaluate the mass, the physician orders additional imaging. What is the most appropriate imaging modality to confirm the diagnosis? (Q853237)

A. MRI of the chest

B. PET-CT scan

C. CT scan of the chest with contrast

D. Ultrasound

See Answer in Part B → Q8

@Neet_pg_bot

Q9: A patient comes for a routine chest examination. Which X-ray projection is typically preferred for standard imaging? (Q885215)

A. Posteroanterior (PA) view

B. Anteroposterior (AP) view

C. Lateral view

D. Oblique view

See Answer in Part B → Q9

@Neet_pg_bot

Q10: Which oblique chest X-ray projection provides optimal visualisation of the right lung field? (Q885216)

A. Right anterior oblique

B. Left anterior oblique

C. Right posterior oblique

D. Left posterior oblique

See Answer in Part B → Q10

@Neet_pg_bot

Q11: A patient is suspected of having a pathology involving the right middle lobe of the lung. Which chest X-ray projection is most useful for optimal visualisation? (Q885217)

A. Lordotic view

B. PA view

C. Oblique view

D. Left anterior oblique view

See Answer in Part B → Q11

@Neet_pg_bot

Q12: Popcorn calcification in lung is seen in: (Q853229)

A. Angioinvasive aspergillosis

B. Aspergillus mycetoma

C. Bacterial pneumonia

D. Pulmonary hamartoma

See Answer in Part B → Q12

@Neet_pg_bot

Q13: A term neonate born by vacuum-assisted delivery developed mild respiratory distress 1 hour after birth. Arterial oxygen saturation remained >95% without supplemental oxygen. Chest radiography performed 6 hours after birth is given below. What is the diagnosis? (Q885220)

A. Pneumomediastinum

B. Pneumothorax

C. Pneumoperitoneum

D. Consolidation



See Answer in Part B → Q13

@Neet_pg_bot

Q14: A 45-year-old man presents to the emergency department with acute pleuritic chest pain and reduced air entry over the right hemithorax on examination. A small pleural effusion is suspected clinically. Which chest X-ray vie (Q885221)

A. Lateral decubitus view

B. PA view

C. Left anterior oblique view

D. Right anterior oblique view

See Answer in Part B → Q14

@Neet_pg_bot

Q15: A 55-year-old patient undergoes a chest X-ray for evaluation of chronic respiratory symptoms. Multiple pleural calcifications are noted. Which of the following conditions is least likely to present with pleural calcification? (Q885222)

A. Occupational exposure to asbestos

B. Previous hemothorax

C. Healed empyema

D. Sarcoidosis

See Answer in Part B → Q15

@Neet_pg_bot

Q16: On a standard posteroanterior chest radiograph, which of the following structures does NOT normally contribute to the hilar shadow? (Q885237)

A. Bronchus

B. Pulmonary artery

C. Upper lobe veins

D. Lower lobe veins

See Answer in Part B → Q16

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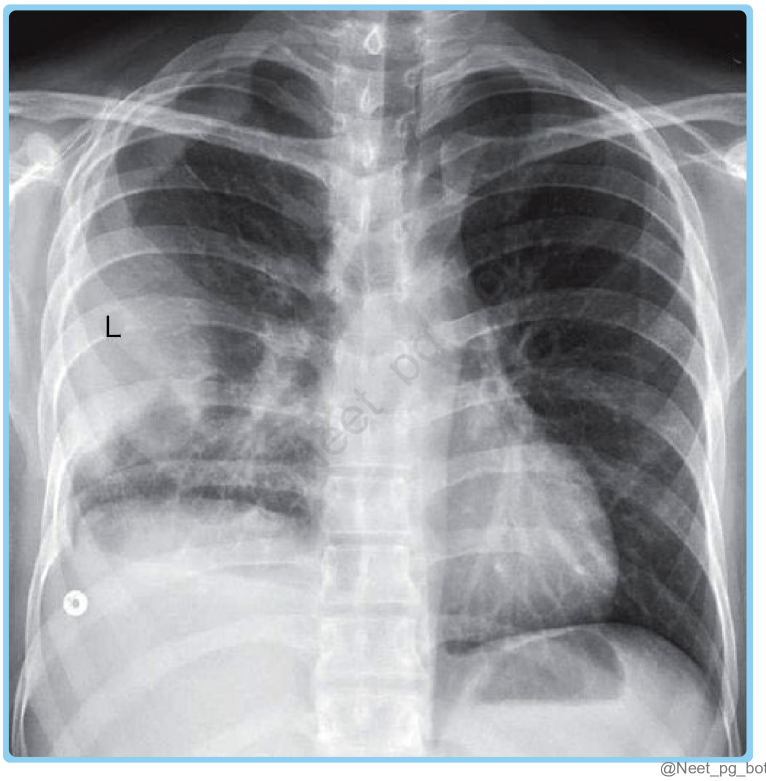
Q17: A 32-year-old male presents with persistent fever and sharp, pleuritic chest pain for one week. He has restricted chest movements on the affected side. Chest radiograph shows a non-dependent, lenticular opacity along the lateral chest wall with obtuse margins. What is the most likely diagnosis? (Q885238)

A. Loculated pleural effusion

B. Pneumothorax

C. Consolidation

D. Fibrosis



See Answer in Part B → Q17

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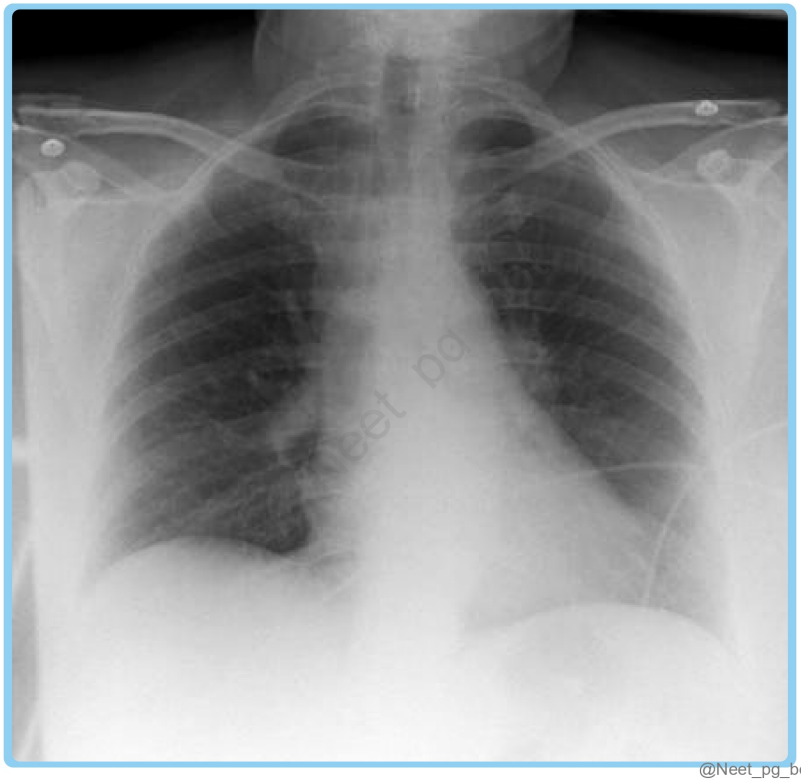
Q18: A 50-year-old woman develops sudden pleuritic chest pain and shortness of breath two days after a long-haul flight. A chest X-ray is performed. Which of the following radiologic signs is most suggestive of her condition? (Q885241)

A. Palla's sign

B. Sausage sign

C. McConnell's sign

D. Westermark sign



See Answer in Part B → Q18

@Neet_pg_bot

Q19: A 28-year-old man is evaluated with a chest X-ray for abnormal lung findings. In which of the following conditions is a hypertranslucent lung least likely to be observed? (Q885246)

A. Asthma with air-trapping

B. Congenital lobar emphysema

C. Pulmonary fibrosis

D. Bullous emphysema

See Answer in Part B → Q19

@Neet_pg_bot

Q20: Which of the following correctly describes Kerley A lines on chest X-ray? (Q885247)

A. Short lines at the lung periphery that do not reach the pleura

B. Lines radiating from the hilum toward the periphery of the lung

C. Lines running perpendicular to the pleural surface and extending to it

D. Fine interlacing lines giving a spider-web appearance

See Answer in Part B → Q20

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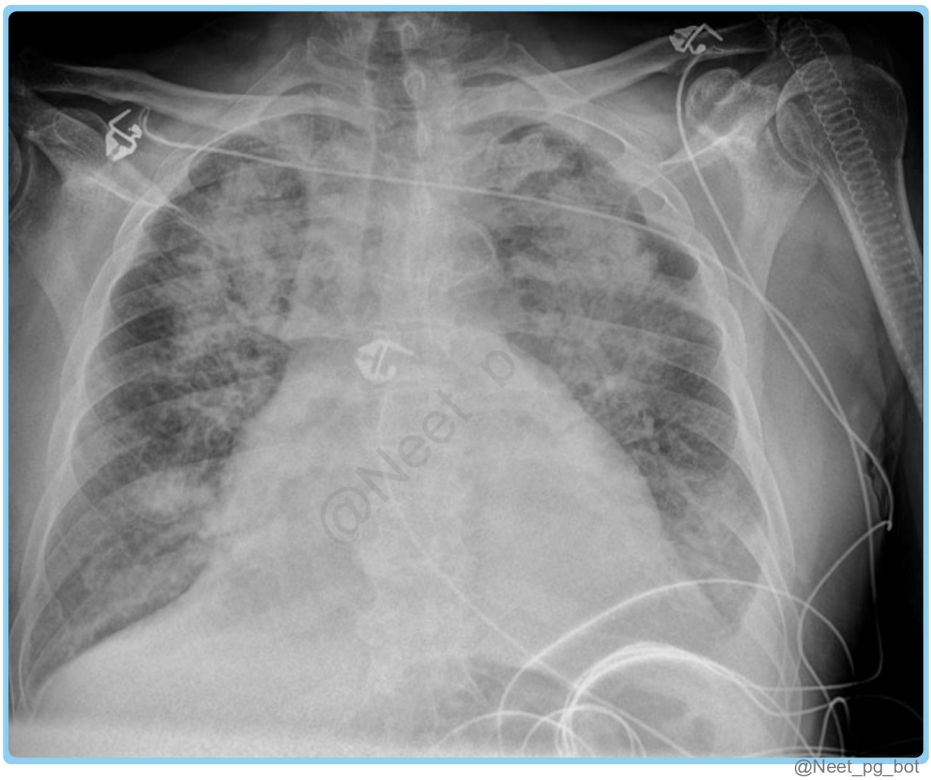
Q21: A patient presents with acute breathlessness and orthopnoea. Chest X-ray shows bilateral central alveolar opacities predominantly around the hila with relative peripheral sparing, producing a bat-wing distribution. This radiographic pattern is most suggestive of: (Q885249)

A. Pulmonary oedema

B. Sarcoidosis

C. Pulmonary embolism

D. Pneumoconiosis



See Answer in Part B → Q21

@Neet_pg_bot

Q22: Pulmonary sequestration most frequently involves which of the following lung segments? (Q885250)

A. Posterobasal segment of right lower lobe

B. Apical segment of left upper lobe

C. Posterobasal segment of left lower lobe

D. Apical segment of right upper lobe

See Answer in Part B → Q22

@Neet_pg_bot

Q23: A 30-year-old female presents with sudden-onset chest pain and difficulty breathing after a recent blunt trauma to the chest. Chest Xray is taken and is shown below. Which of the following radiological findings is not typically seen in this case? (Q853219)

A. Barcode sign

B. Tubular artery sign

C. Continuous diaphragm sign

D. Double bronchial wall sign



See Answer in Part B → Q23

@Neet_pg_bot

Q24: A 25-year-old male involved in a road traffic accident was stabilized in the field with needle decompression for severe shortness of breath, decreased breath sounds, and hyper-resonance on the right side of the chest. Upon arrival at the emergency department, he is hemodynamically stable. Which chest X-ray view is most

appropriate to confirm the underlying condition? (Q853208)

A. Inspiration Chest X-ray

B. Expiration Chest X-ray

C. Lateral Decubitus Chest X-ray

D. Oblique Chest X-ray

See Answer in Part B → Q24

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Q25: Match the following chest pathologies and their corresponding imaging modalities. Chest Pathology Imaging Modality of Choice 1. Aortic aneurysm a. MRI 2. Pneumonia b. Ultrasound 3. Pleural Effusion c. CECT 4. Posterior mediastinal mass d. Chest X-ray (Q853209)

A. 1 - c, 2 - d, 3 - b, 4 - a

B. 1 - a, 2 - b, 3 - c, 4 - d

C. 1 - b, 2 - d, 3 - c, 4 - a

D. 1 - d, 2 - c, 3 - b, 4 - a

See Answer in Part B → Q25

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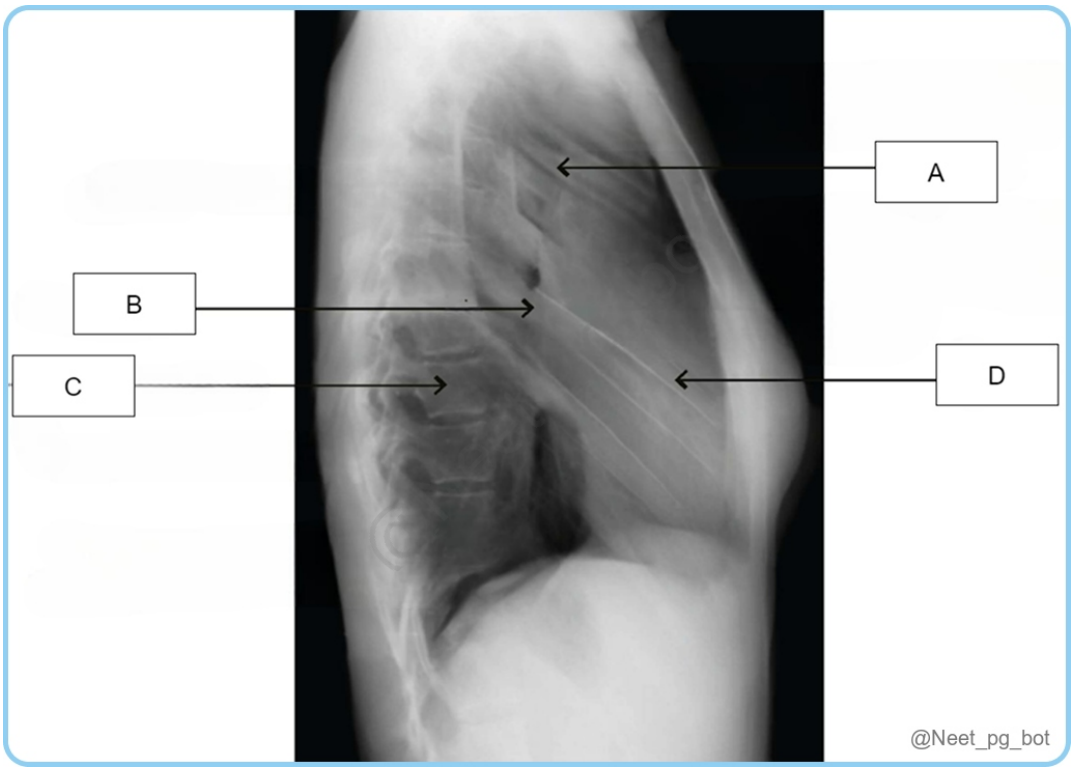
Q26: In a lateral chest X-ray, which area should you focus on to identify pathology in the hilar region? (Q853210)

A. A

B. B

C. C

D. D



See Answer in Part B → Q26

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Q27: A 55-year-old male presents with significant facial swelling, prominent neck veins, and difficulty breathing. These findings suggest an obstruction in the venous return from the head, neck, and upper limbs. A CT scan is conducted to assess the cause of these symptoms. In the diagram provided below, which of the following structures is most likely obstructed, leading to the clinical presentation observed in this patient? (Q853211)

A. A

B. B

C. C

D. D



See Answer in Part B → Q27

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Q28: A patient presents to the clinic with the following anomalies of chest and hands. He has a history of having these anomalies since childhood but has no other symptoms. His chest X-ray shows a left hyperlucent lobe. Which other condition can show a similar chest X-ray picture? (Q853212)

A. Atelectasis of the entire lung

B. Pulmonary agenesis

C. Bullous emphysema

D. Large pleural effusion



See Answer in Part B → Q28

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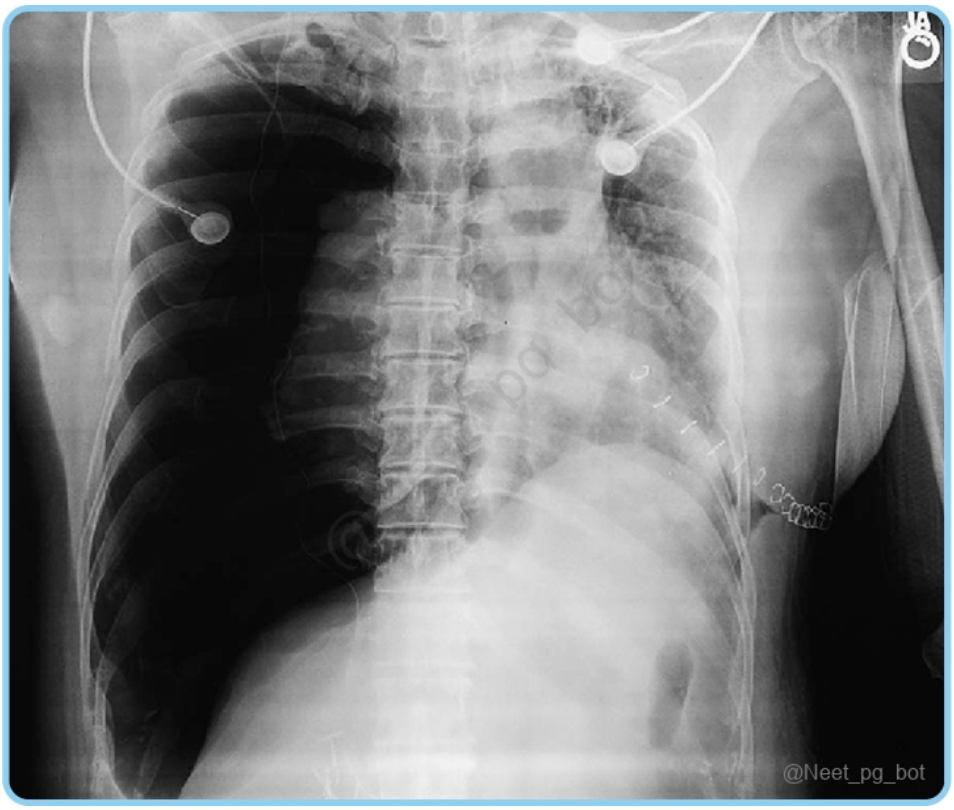
Q29: A patient is brought to the emergency after a fall from a tree. He developed shortness of breath and chest pain, is tachypneic, and has distended neck veins on examination. His chest X-ray: Which of the following is the correct finding here? (Q853214)

A. Ipsilateral deviation of mediastinum

B. Contralateral depression of hemidiaphragm

C. Collapsed lung

D. White-out lung



See Answer in Part B → Q29

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Q30: A patient with a large tension pneumothorax after experiencing a fall is being examined with ultrasound. Which of the following findings will be present in this patient? (Q853215)

A. Sliding lung sign

B. Sea-shore sign

C. Pleural stripe

D. A-lines

See Answer in Part B → Q30

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Q31: A 65-year-old male with a history of COPD presents with a 2-week history of increasing shortness of breath and a persistent cough. On examination, decreased breath sounds are noted on the left, and a chest X-ray is taken, which is shown below. What is the most likely diagnosis? (Q853216)

A. Lung abscess

B. Pneumothorax

C. Pleural effusion

D. Hydropneumothorax



See Answer in Part B → Q31

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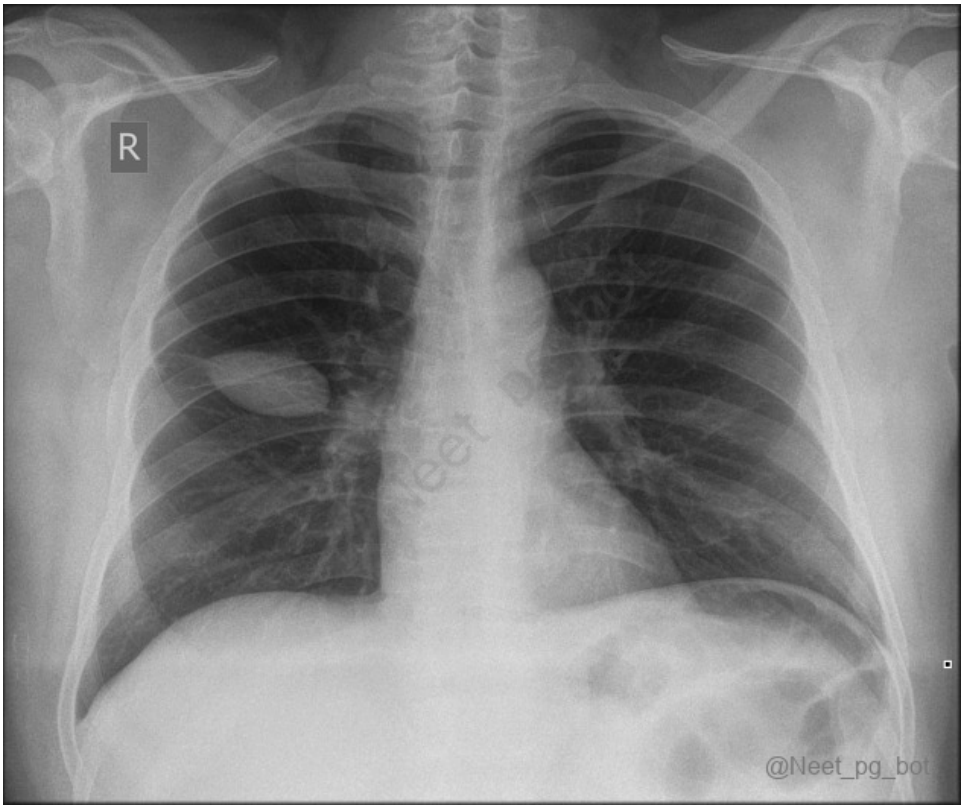
Q32: A 75-year-old male patient with a history of congestive heart failure presents with worsening shortness of breath and pleuritic chest pain. A chest X-ray PA view is taken, which is shown below. Which of the following statements about the finding on the chest X-ray is most accurate? (Q853217)

A. It is most commonly with effusion occupying the oblique fissure.

B. It may be mistaken for a lung mass due to its appearance.

C. It will typically require surgical intervention to resolve.

D. It is always associated with exudative pleural effusion.



See Answer in Part B → Q32

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Q33: A 68-year-old male patient presents with cough, fever, and pleuritic chest pain. A contrast CT is taken and shown below. What is the most likely diagnosis for this patient? (Q853218)

A. Lobar Pneumonia

B. Empyema

C. Pleural Effusion

D. Lung Abscess



See Answer in Part B → Q33

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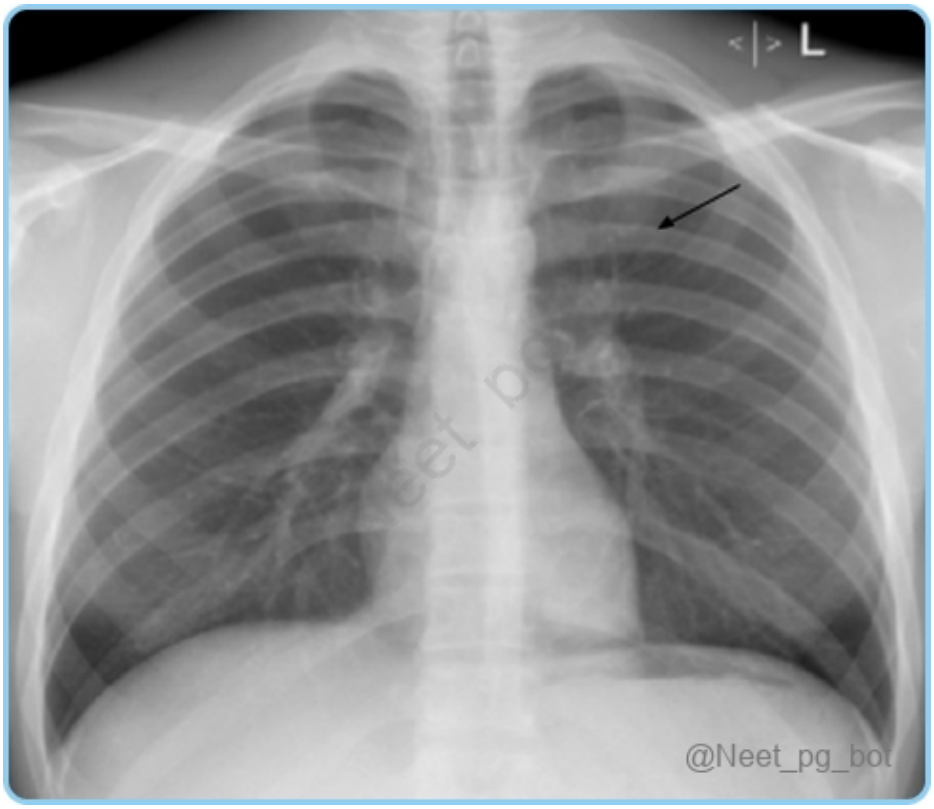
Q34: A medical student is learning to identify anterior and posterior ribs on a PA chest X-ray. Identify the marked rib shown below: (Q853206)

A. 5th Anterior rib

B. 5th Posterior rib

C. 6th Anterior rib

D. 6th Posterior rib



See Answer in Part B → Q34

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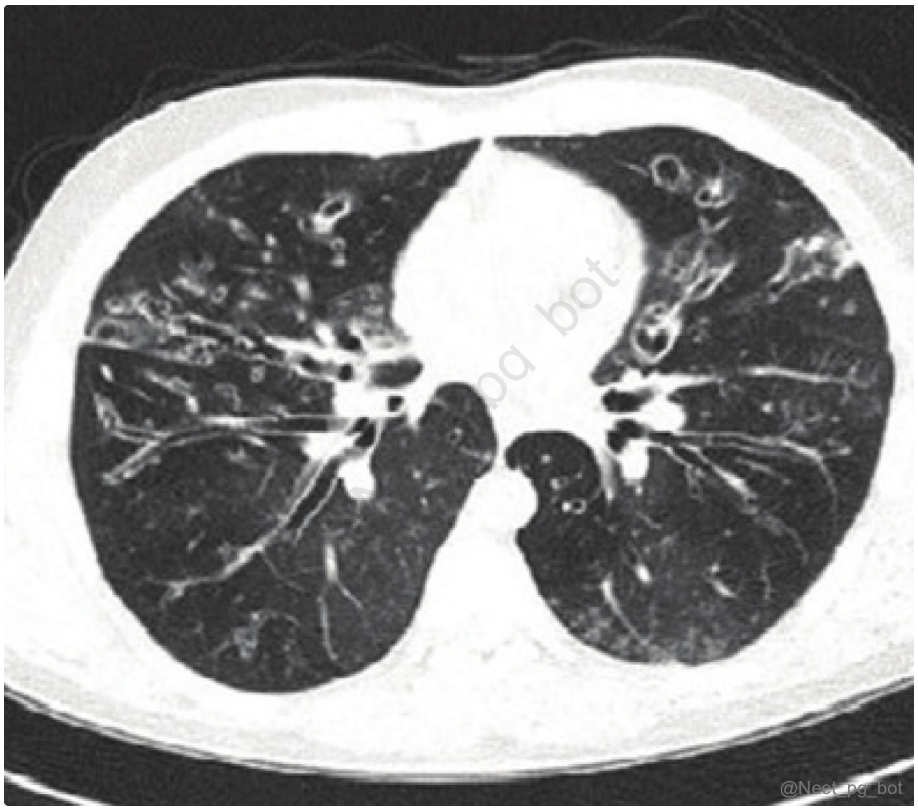
Q35: A 35-year-old woman presents with a chronic productive cough and recurrent episodes of foul-smelling sputum and hemoptysis. A high-resolution CT (HRCT) of the chest is shown below. Which of the following radiological signs is most characteristic of the condition seen in this image? (Q853220)

A. Tree-in-bud appearance

B. Ground-glass opacities

C. Tram track sign

D. Air bronchogram



See Answer in Part B → Q35

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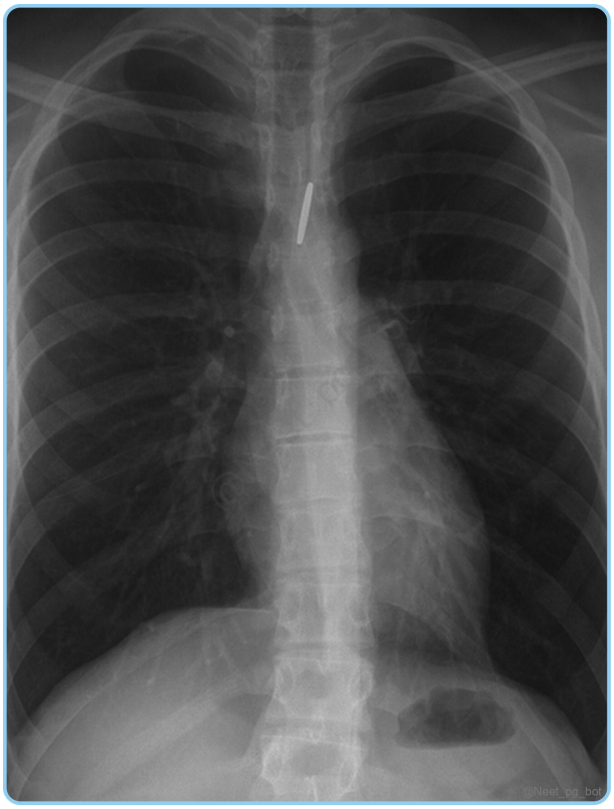
Q36: A 10-year-old child is brought to the emergency by her father after she accidentally swallowed a coin while playing. Her chest X-ray reveals the following findings: Identify the location of the foreign body. (Q853221)

A. At cricopharyngeus in esophagus

B. Larynx

C. At aortic arch in esophagus

D. Trachea



See Answer in Part B → Q36

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Q37: A 65-year-old male presents with fever, cough, and pleuritic chest pain. X-ray chest is performed, revealing an air bronchogram. Which of the following conditions is characterized by the absence of air bronchograms? (Q853222)

A. Pleural effusion

B. Pulmonary consolidation

C. Adenocarcinoma of the lung

D. Severe interstitial lung disease

See Answer in Part B → Q37

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Q38: A 45-year-old male presents with a cough, dyspnea, and fever. A chest radiograph shows loss of the right heart border. Which lung area is most likely affected? (Q853223)

A. Right upper lobe

B. Right middle lobe

C. Right lower lobe

D. Left upper lobe

See Answer in Part B → Q38

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Q39: Match the following: Disease Radiologic Finding A) Klebsiella Pneumonia 1) Reticular Shadows B) Aspergilloma 2) Air Bronchogram C) Staphylococcal Pneumonia 3) Bulging Fissure Sign D) Acute Epiglottitis 4) Air-Crescent Sign E) Pneumocystis carinii Pneumonia 5) Thumb Sign (Q853224)

A. A1, B2, C3, D4, E5

B. A3, B4, C2, D5, E1

C. A2, B3, C1, D4, E5

D. A1, B4, C2, D3, E5

See Answer in Part B → Q39

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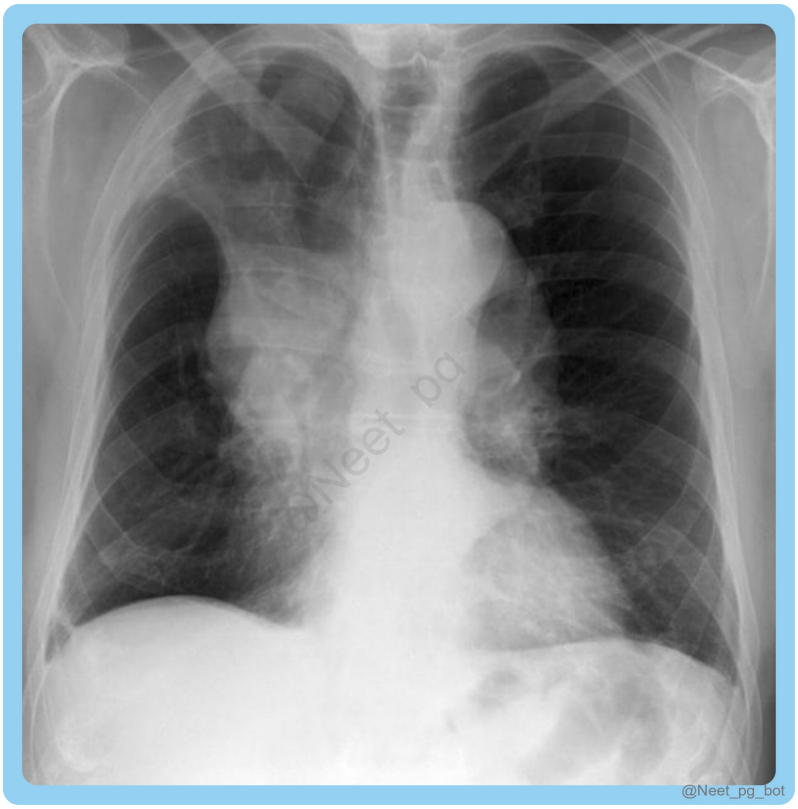
Q40: A 62-year-old male with a history of smoking presents to the emergency department with increased shortness of breath and fever. A chest X-ray is performed, as shown below. Which of the following radiological signs is seen in this case? (Q853225)

A. Luftsichel sign

B. Flat waist sign

C. Golden S sign

D. Superior triangle sign



See Answer in Part B → Q40

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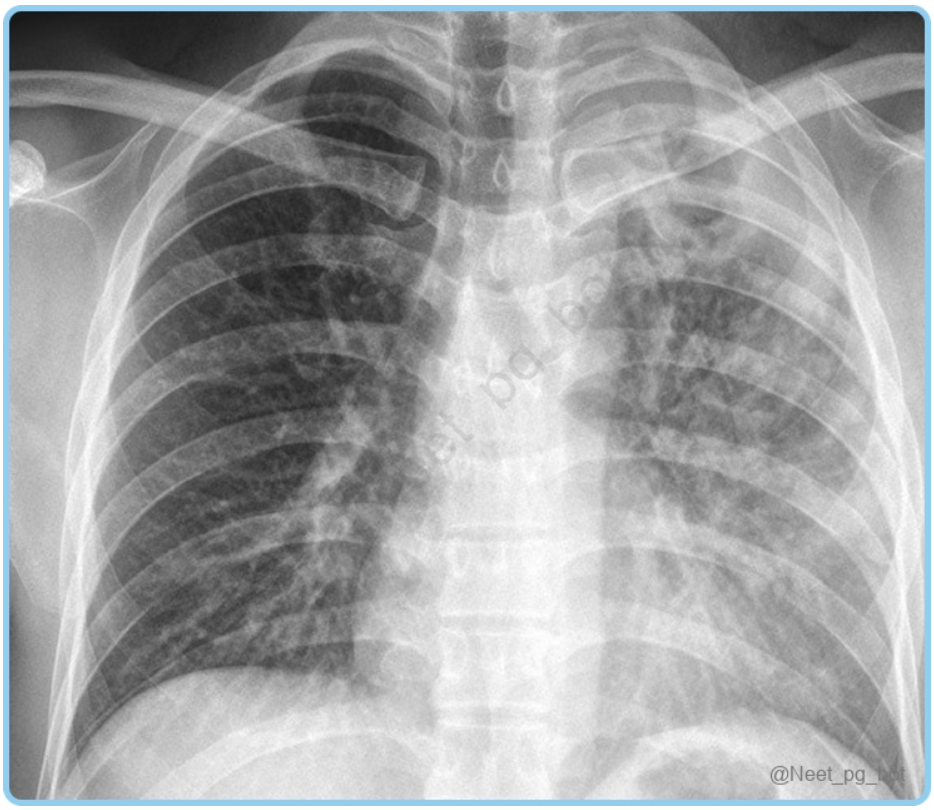
Q41: A 45-year-old female presents with a persistent cough, night sweats, and weight loss. The chest X-ray is taken and is shown below. What is the most probable diagnosis? (Q853226)

A. Lung Abscess

B. Solitary Cavitary Nodule

C. Invasive Aspergillosis

D. Active Pulmonary Tuberculosis



See Answer in Part B → Q41

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Q42: A 30-year-old male presents with fever, cough, night sweats, and unintentional weight loss over the past month. X-ray chest is taken and is shown below. What is the most probable diagnosis? (Q853227)

A. Miliary Tuberculosis

B. Pulmonary Sarcoidosis

C. Mycoplasma Pneumonia

D. Metastatic Lung Disease



See Answer in Part B → Q42

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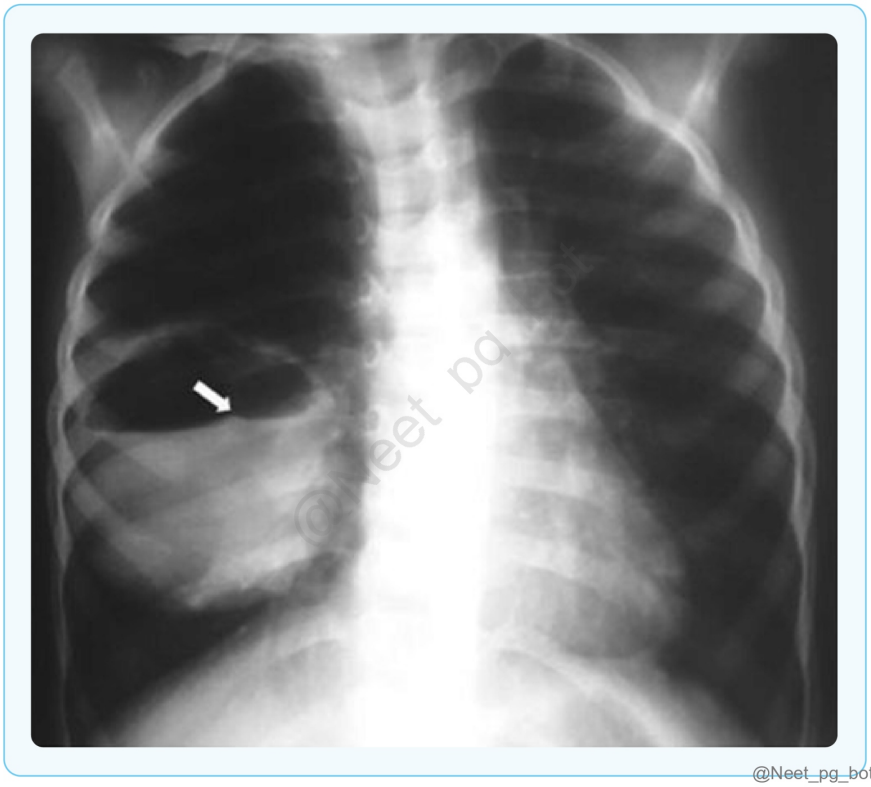
Q43: A 28-year-old shepherd presents with chronic cough and occasional hemoptysis. A chest X-ray is shown below. Which of the following radiological signs is most likely represented in this image? (Q853228)

A. Meniscus sign

B. Onion peel sign

C. Water lily sign

D. Cumbo sign



See Answer in Part B → Q43

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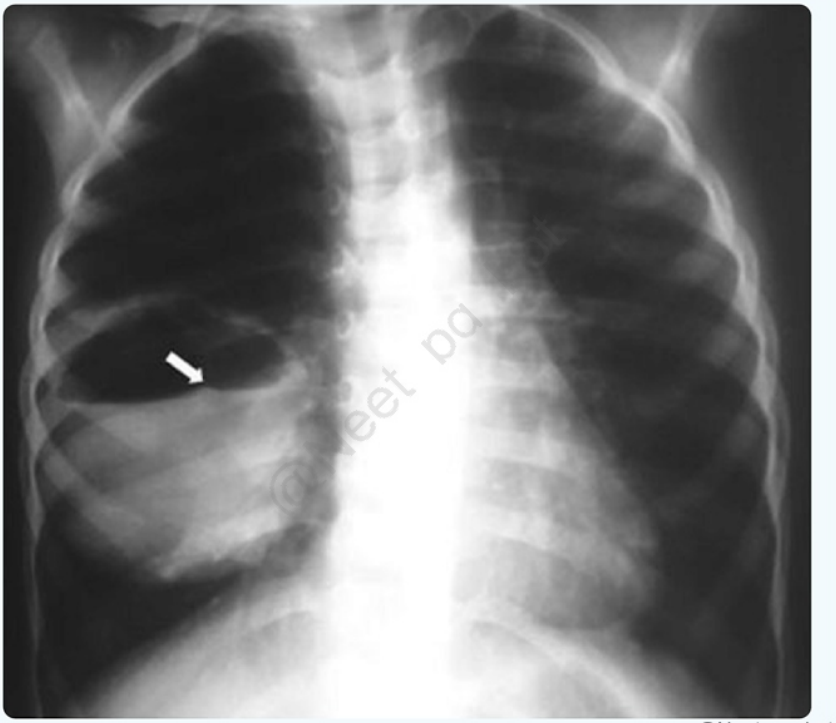
Q1: What is the probable diagnosis for a 36-year-old farmer who presented with a cough, chest pain lasting one week, fatigue persisting for a month, and a chest x-ray revealing the image provided below. (Q859236)

A. Hydatid cyst

B. Anthrax

C. Silicosis

D. Byssinosis



See Answer in Part B → Q1

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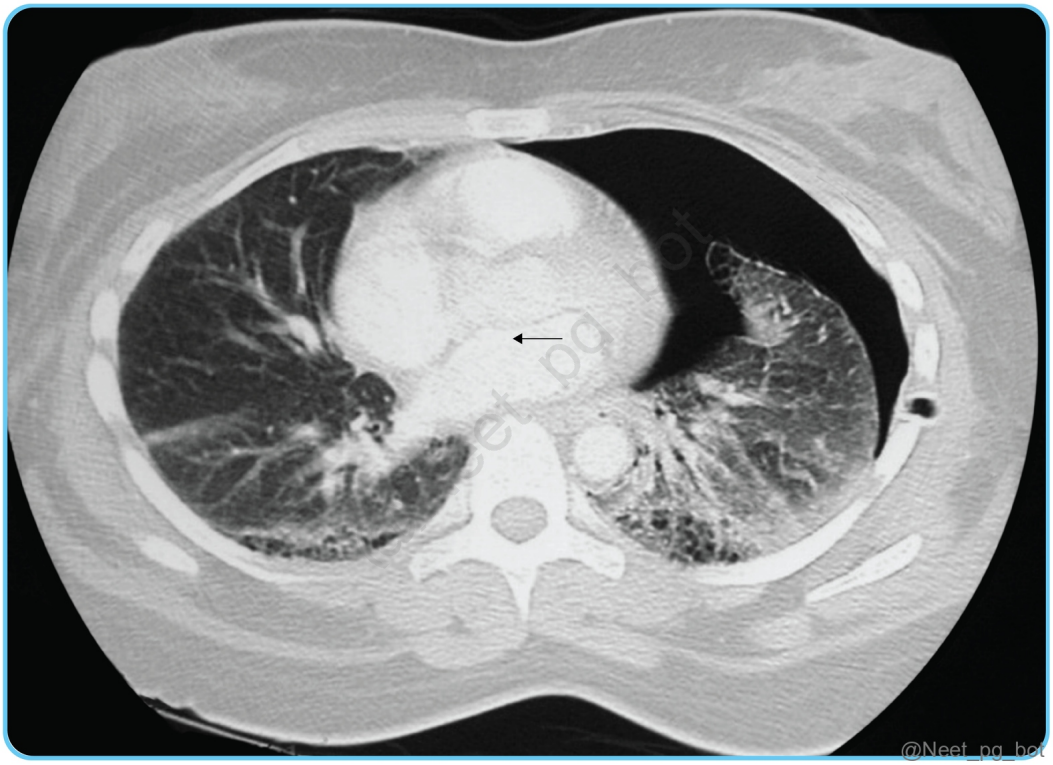
Q2: Identify the heart chamber marked in the given CT image {{caption_text}} (Q857196)

A. Right atrium

B. Right ventricle

C. Left ventricle

D. Left atrium



See Answer in Part B → Q2

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Q3: In what situation is popcorn calcification observed? (Q857199)

A. Hodgkin’s lymphoma

B. Pulmonary hamartoma

C. Metastasis

D. Fungal ball

See Answer in Part B → Q3

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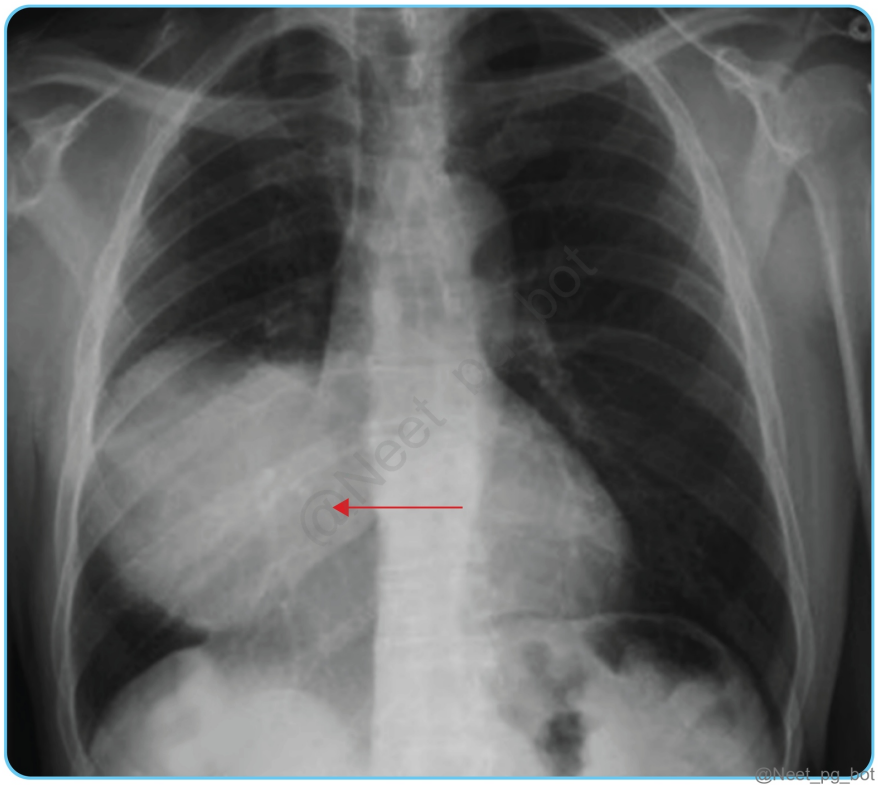
Q4: Obliteration of the right cardiac border on chest X-ray indicated pathology involving which of the following structures? (Q857609)

A. Right lower lobe

B. Right Atrium

C. Right middle lobe

D. Right ventricle



See Answer in Part B → Q4

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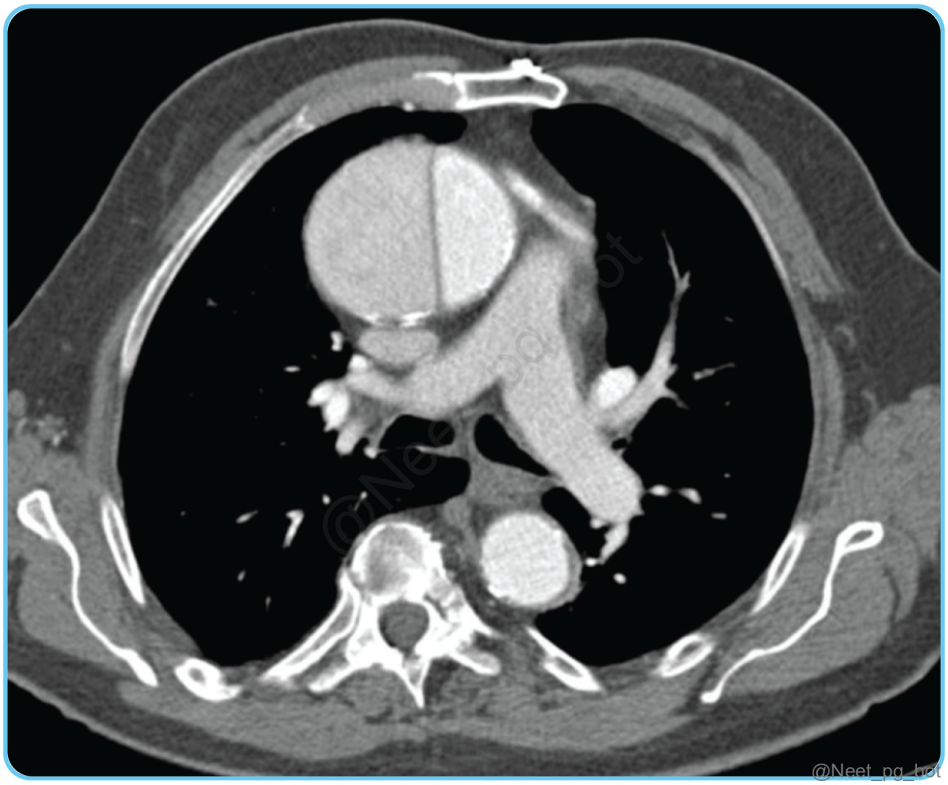
Q5: Comment on the diagnosis of CT chest shown below. (Q857621)

A. Aortic dissection

B. Pulmonary embolism

C. Cardiac myxoma

D. Aortic aneurysm



See Answer in Part B → Q5

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Q6: A 55 year old male patient presented with complaints of dyspnea with congestive heart failure. The clinician wants to know whether it's HF with preserved EF or reduced EF. Which of the below investigation is used for calculation of ejection fraction? (Q857624)

A. MUGA

B. SPECT using thallium

C. PET myocardial perfusion imaging

D. Sestamibi scan with pharmacological stress

See Answer in Part B → Q6

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Q7: Which of the following statements is accurate concerning CORADS? CORADS: COVID-19 Reporting and Data System (Q856693)

A. CORADS- 0 indicates normal lung

B. CORADS-5 is typical of COVID- 19

C. Pleural thickening is typical of COVID-19

D. Lobar consolidation is typical of COVID-19

See Answer in Part B → Q7

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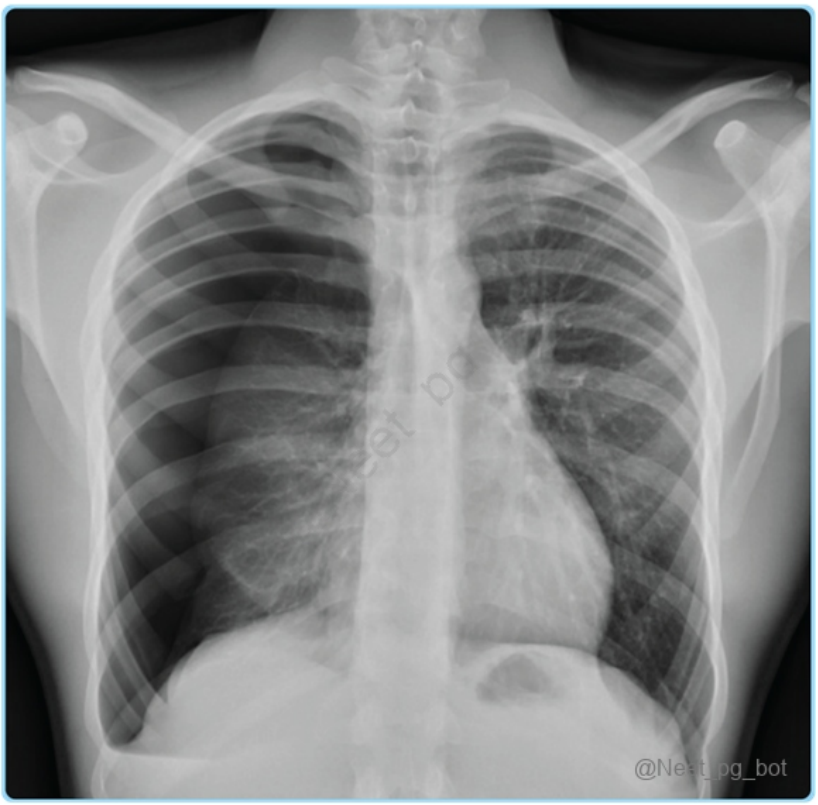
Q8: A 25-year-old male patient with Marfanoid features presented with a sudden onset of breathlessness. The chest X-ray is given below. What is the diagnosis? (Q856940)

A. Pneumothorax

B. Pleural effusion

C. Consolidation

D. Fibrosis



See Answer in Part B → Q8

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Q9: Plethoric lung fields are seen in? (Q855007)

A. TAPVC

B. Tricuspid atresia

C. Ebstein anomaly

D. TOF

See Answer in Part B → Q9

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Q10: A 30-year-old woman presented with hypertension, chest pain, and cramping of the legs. A chest radiograph was taken which revealed the condition as shown in the

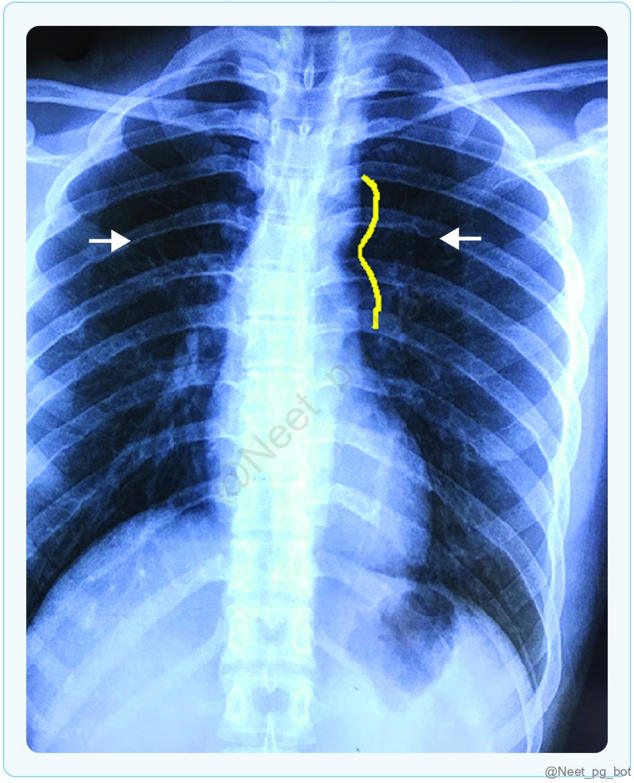
image below. What is the likely cause of hypertension in this patient? (Q858499)

A. Coarctation of aorta

B. Essential hypertension

C. Aortic aneurysm

D. Aorta-arteritis



See Answer in Part B → Q10

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Q11: The appearance of USG at saphenofemoral junction, showing common femoral vein, common femoral artery, and the great saphenous vein is called as: (Q858501)

A. Mickey Mouse sign

B. String sign

C. Tillaux sign

D. Stamers sign

See Answer in Part B → Q11

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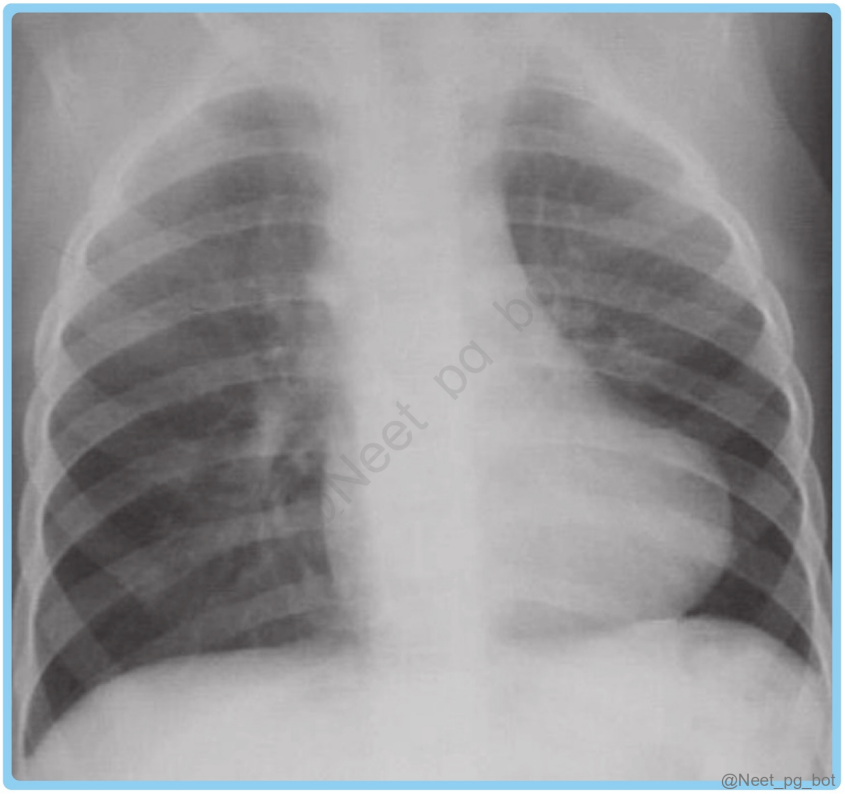
Q12: A child presents with cyanosis. His chest radiograph is shown below. What is the diagnosis? (Q855086)

A. Tetralogy of Fallot (TOF)

B. Ebstein’s anomaly

C. Transposition of great arteries (TGA)

D. Total anomalous pulmonary venous return (TAPVC)



See Answer in Part B → Q12

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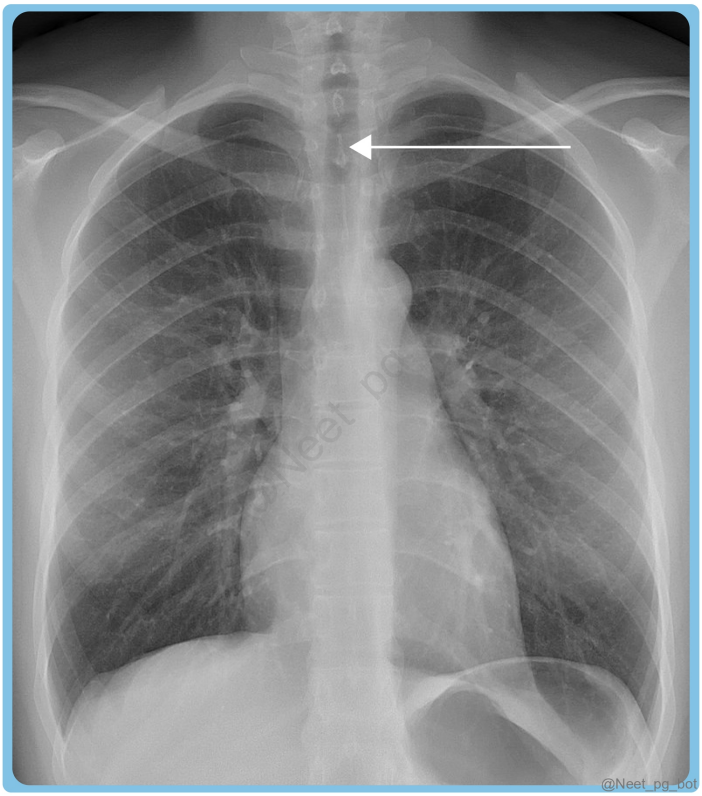
Q13: The structure marked with arrowhead is? (Q859941)

A. Esophagus

B. Pulmonary artery

C. Trachea

D. Left atrium



See Answer in Part B → Q13

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Q14: A patient presented with complaints of dyspnoea. The shown X-ray is suggestive of:- (Q859943)

A. Consolidation

B. Exudative pleural effusion

C. Pneumothorax

D. Hydropneumothorax



See Answer in Part B → Q14

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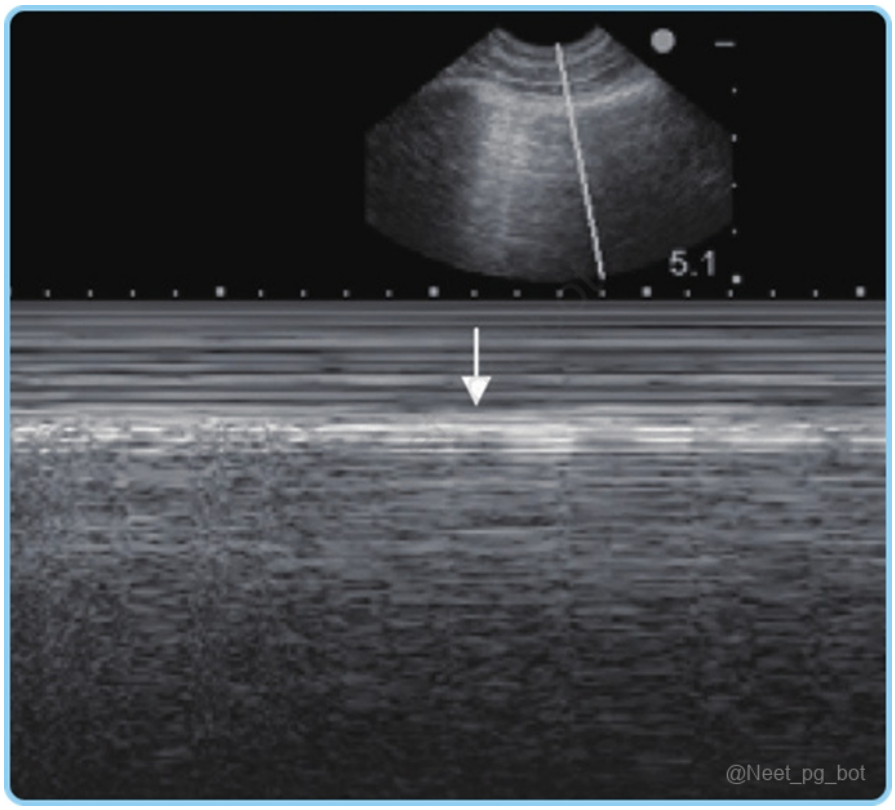
Q15: Identify the sign: {{caption_text}} (Q859944)

A. Seashore sign

B. Barcode sign

C. Stratosphere sign

D. Deep sulcus sign



See Answer in Part B → Q15

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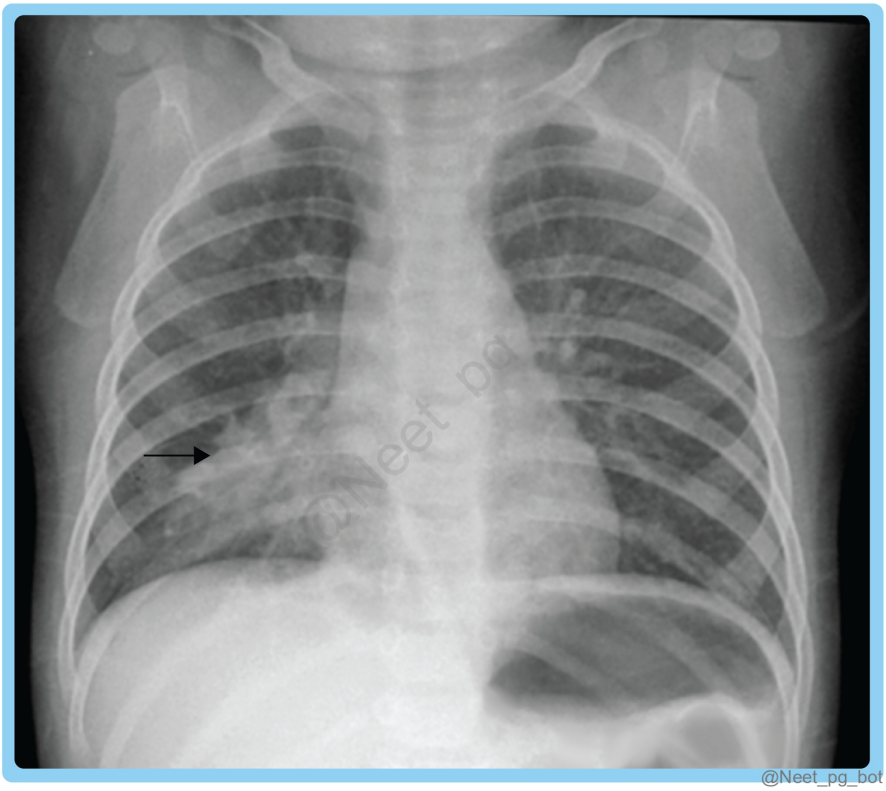
Q16: A 35-year-old male patient presented with a productive cough. He is a chronic smoker and alcoholic. CXR is shown below. What is the likely diagnosis? (Q859951)

A. Abscess

B. Consolidation

C. Cavity

D. Pleural effusion



See Answer in Part B → Q16

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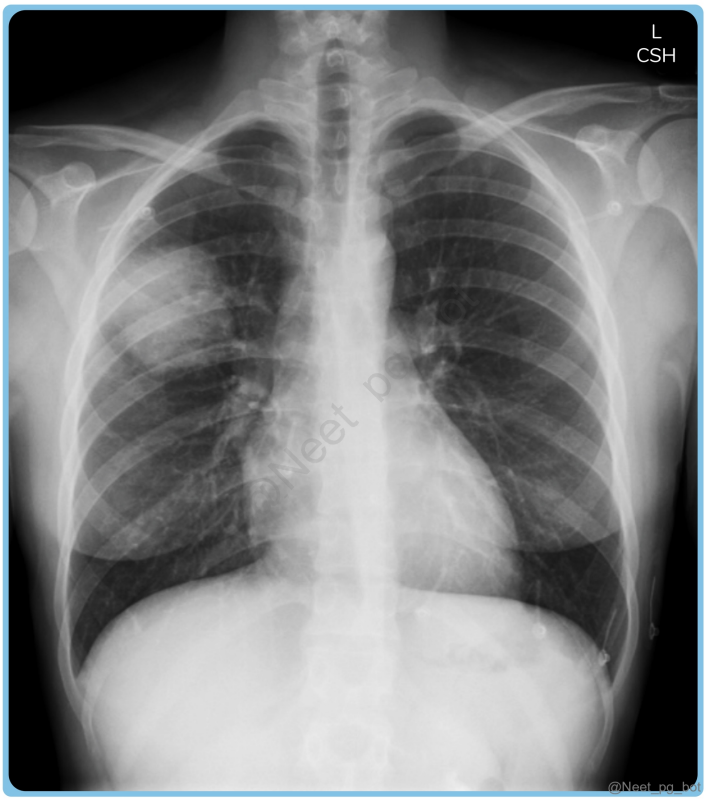
Q17: A patient presented with fever and cough with expectoration. The chest X-ray has been shown below. What is the likely causative organism? (Q859957)

A. Hemophilus influenza

B. Parainfluenza virus

C. Pneumococcus

D. S.aureus



See Answer in Part B → Q17

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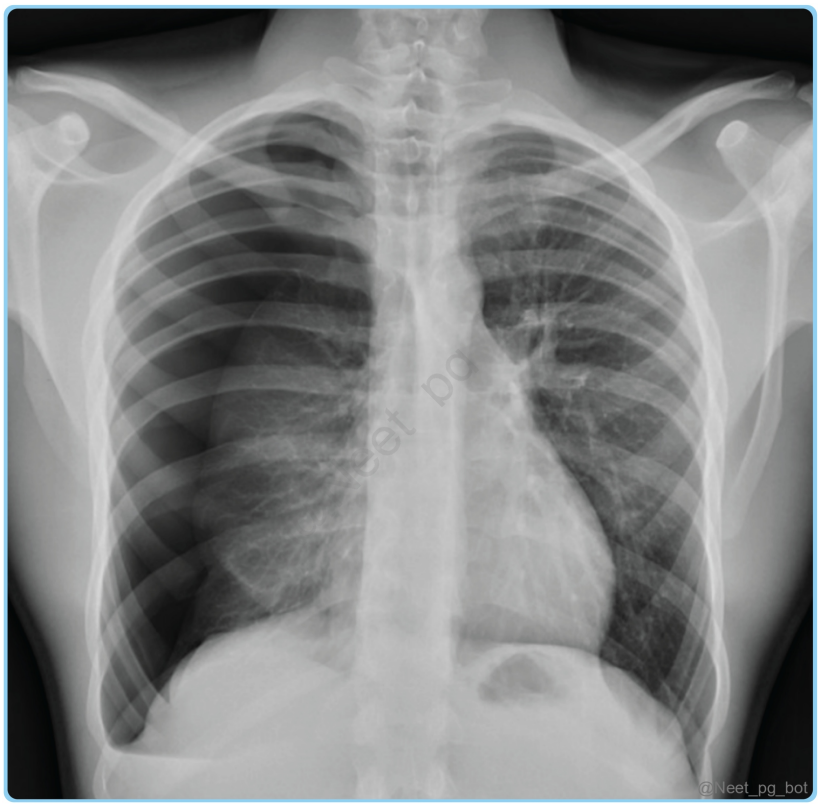
Q18: After a road traffic accident, a patient arrives at the emergency department. Upon examination, the patient is awake and alert, with a blood pressure of 90/60 mm Hg, a respiratory rate of 40 breaths per minute, and a pulse rate of 120 bpm. An X-ray is provided for evaluation. What would be the subsequent course of action in terms of treatment? (Q856059)

A. Chest tube insertion

B. Pericardiocentesis

C. Thoracotomy

D. Pleurodesis



See Answer in Part B → Q18

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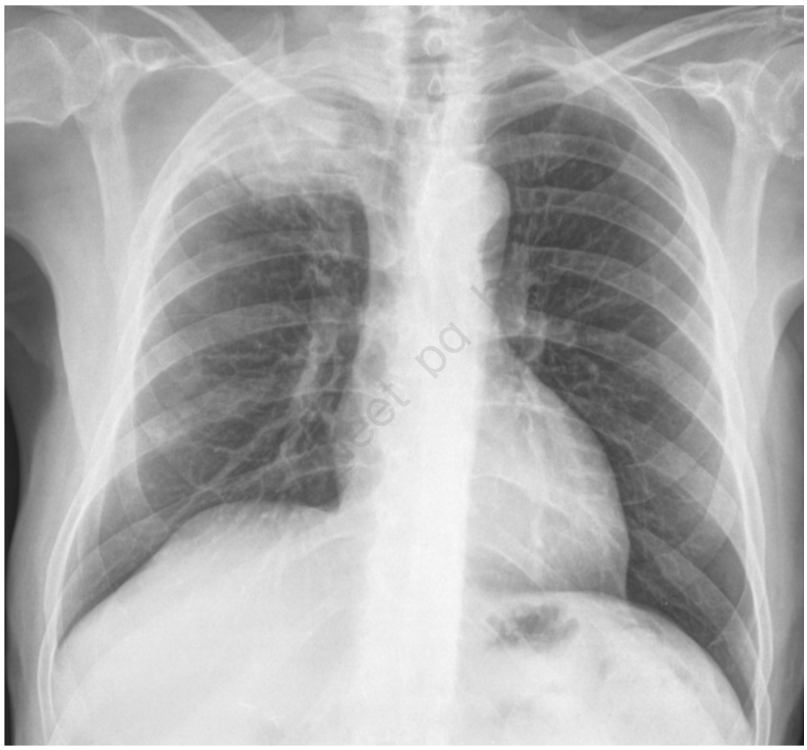
Q19: A 55 year old chronic smoker presents with drooping of the right eyelid, constricted pupil, and absence of sweating on the right side of the face. He also complains of shoulder pain and tingling sensation in the right arm. The chest x-ray of the patient is given below. Which of the following is the best investigation to confirm the diagnosis? (Q878942)

A. Sputum microscopy

B. CT scan-guided biopsy

C. Nerve conduction studies

D. Chest ultrasound



See Answer in Part B → Q19

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Q20: A 35 year old man presents to the emergency department with sudden onset shortness of breath. Below is the CT of the patient. What is the next best step in management? (Q878943)

A. Needle thoracostomy

B. Intercostal chest tube insertion

C. Sputum microscopy and culture

D. Thoracic ultrasound



See Answer in Part B → Q20

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Q21: A 42-year-old man presents with a 3-month history of cough that has recently become productive. He also reports one episode of hemoptysis. Chest x -ray of the patient is shown below. Which of the following is the most likely diagnosis? (Q878944)

A. Lung abscess

B. Pulmonary tuberculosis

C. Metastatic carcinoma

D. Bronchiectasis



See Answer in Part B → Q21

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Q22: A 25-year-old male presents with a history of low-grade fever and cough. Based on the provided Chest X-ray image, what is the most likely diagnosis? (Q860256)

A. Lung cancer

B. Miliary TB

C. ARDS

D. Aspergilloma



See Answer in Part B → Q22

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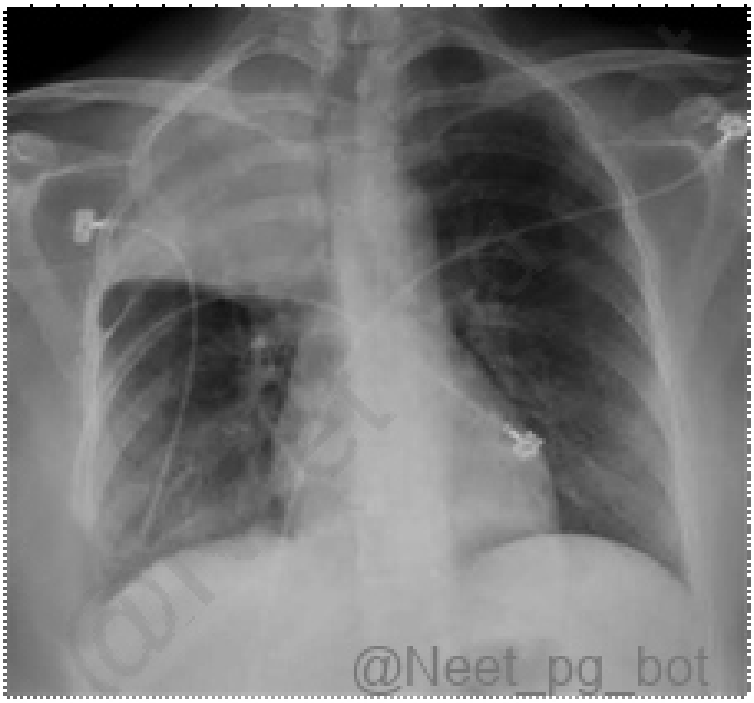
Q23: What is the most probable diagnosis based on the image provided? (Q866518)

A. RUL collapse

B. RUL consolidation

C. Bronchogenic carcinoma

D. Lung abscess



See Answer in Part B → Q23

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Q24: A 47-year-old diabetic patient presents with fever, malaise, and productive cough. Which of the following is an incorrect statement? (Q852787)

A. Patchy infiltrates are seen in pyogenic pneumonia

B. Interstitial infiltrates are seen in Mycoplasma pneumonia

C. Hilar lymphadenopathy with lung infiltrates is seen in malignancy

D. Aspiration pneumonia is more common in the posterior segment of the upper lobes and superior segment of the lower lobes

See Answer in Part B → Q24

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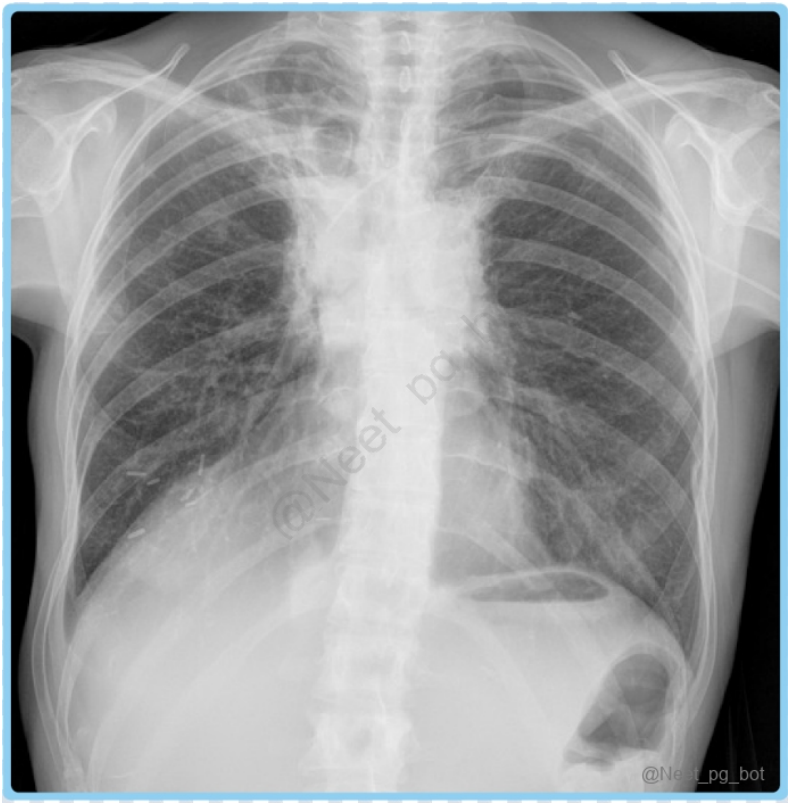
Q25: A patient with a history of breast cancer underwent Cobalt-60 radiotherapy. She now presents with respiratory distress, and imaging shows haziness in the left lung. What is the most likely diagnosis? (Q852579)

A. Radiation Pneumonitis

B. Recurrence of Breast Cancer

C. Pulmonary Embolism

D. Infective Pneumonia



See Answer in Part B → Q25

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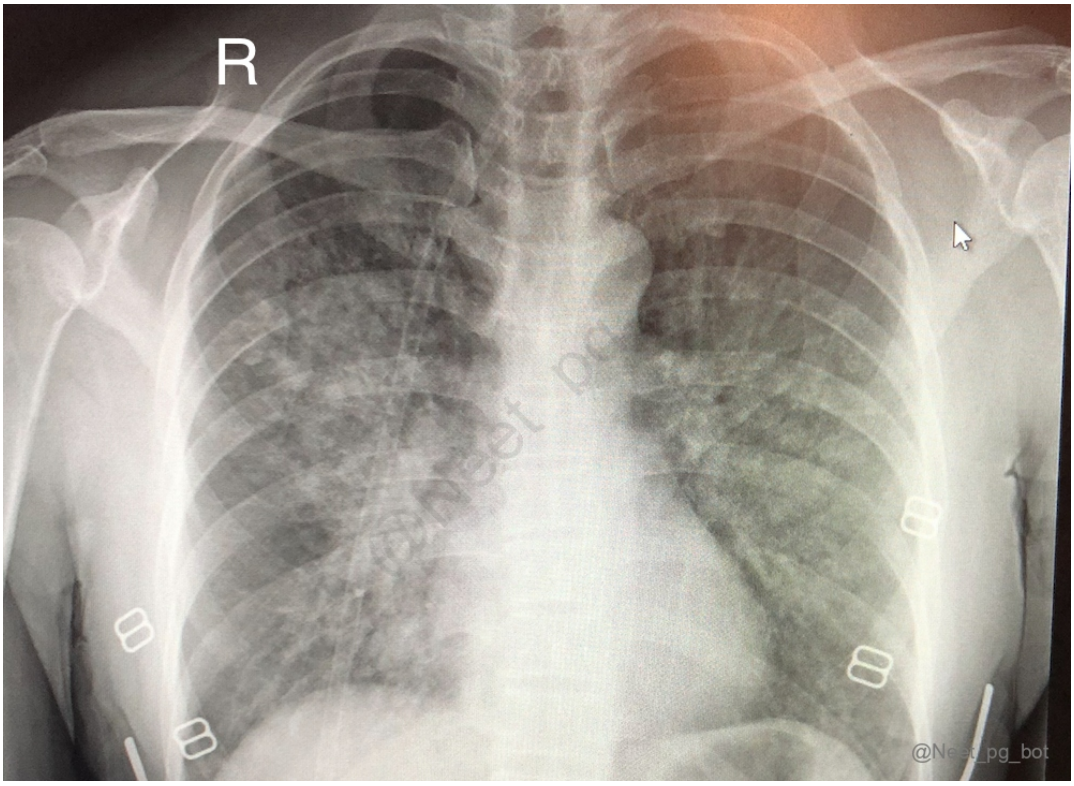
Q26: What is the most likely diagnosis? (Q852589)

A. Pulmonary oedema

B. Hydrothorax

C. Pleural effusion

D. Pulmonary fibrosis



See Answer in Part B → Q26

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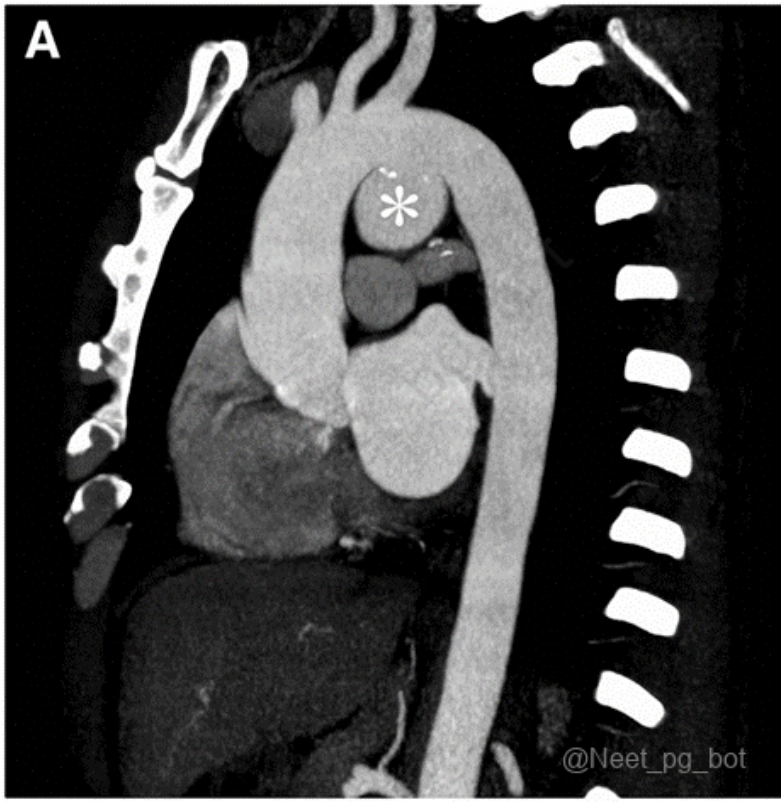
Q27: A 38-year-old patient presents with chest pain and hoarseness of voice for the past month. Based on the radiographic image provided, what is the most likely diagnosis? (Q843910)

A. Saccular aneurysm of the distal arch

B. Dissecting aneurysm of the arch of the aorta

C. Coarctation of the aorta

D. Stenosis of the aorta



See Answer in Part B → Q27

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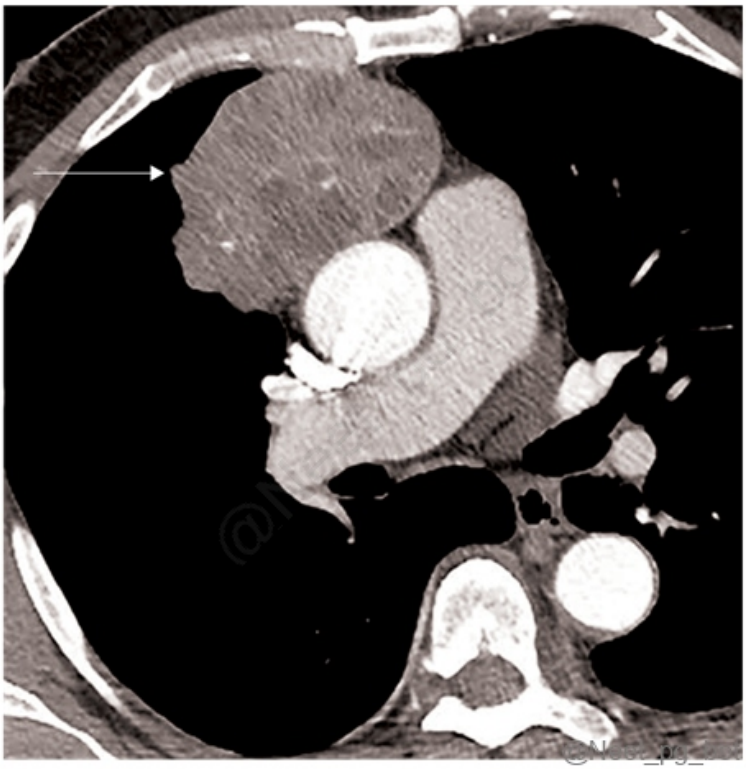
Q28: A 45-year-old patient presents with ptosis and muscle weakness that improves with rest. She also complains of dysphagia and has engorged veins in her thorax. Based on the CT scan image provided, what is the most likely diagnosis? (Q843911)

A. Thymoma

B. Pancoast tumor

C. Adenocarcinoma

D. Small cell lung cancer



See Answer in Part B → Q28

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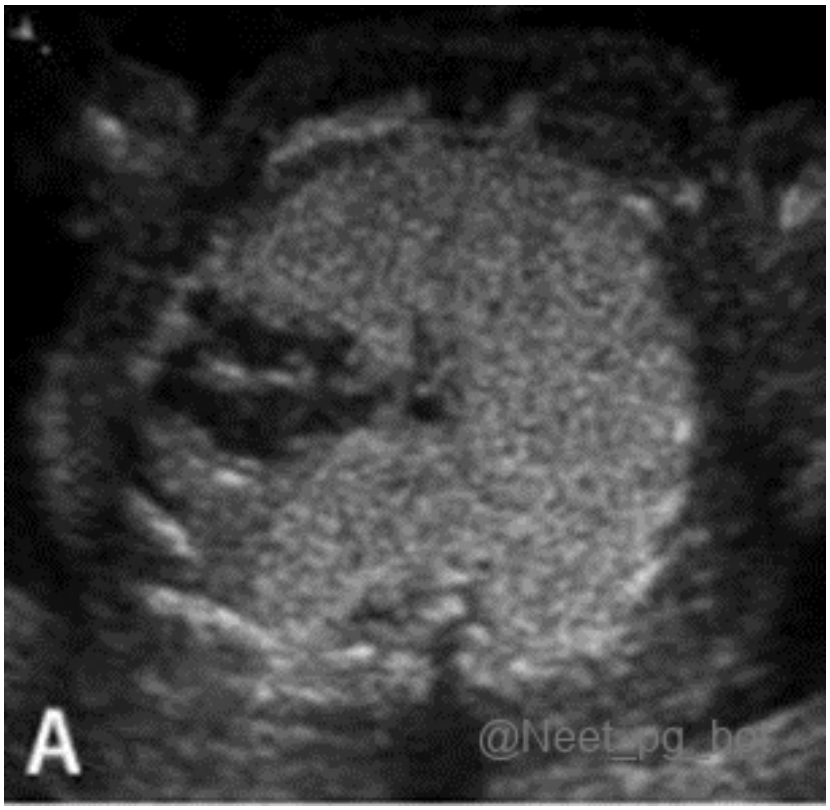
Q29: A 3-year-old child presents with respiratory distress and a history of recurrent respiratory infections. Based on the radiographs provided, what is the most likely diagnosis? (Q843928)

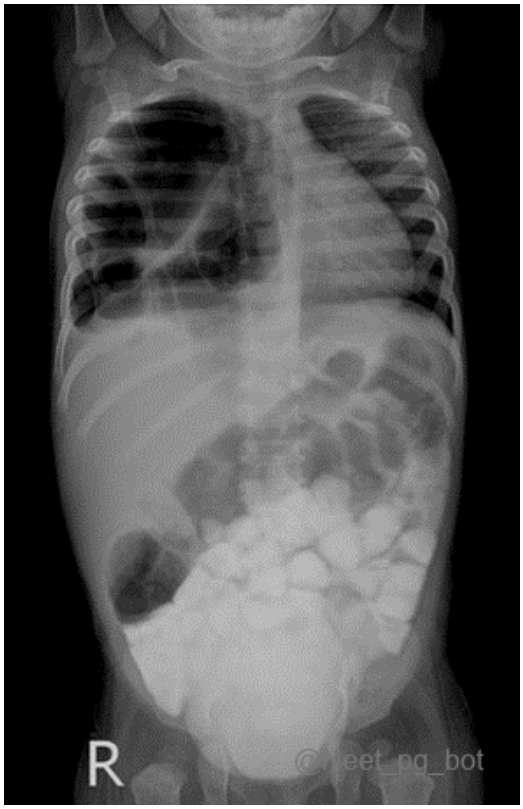
A. Lung abscess

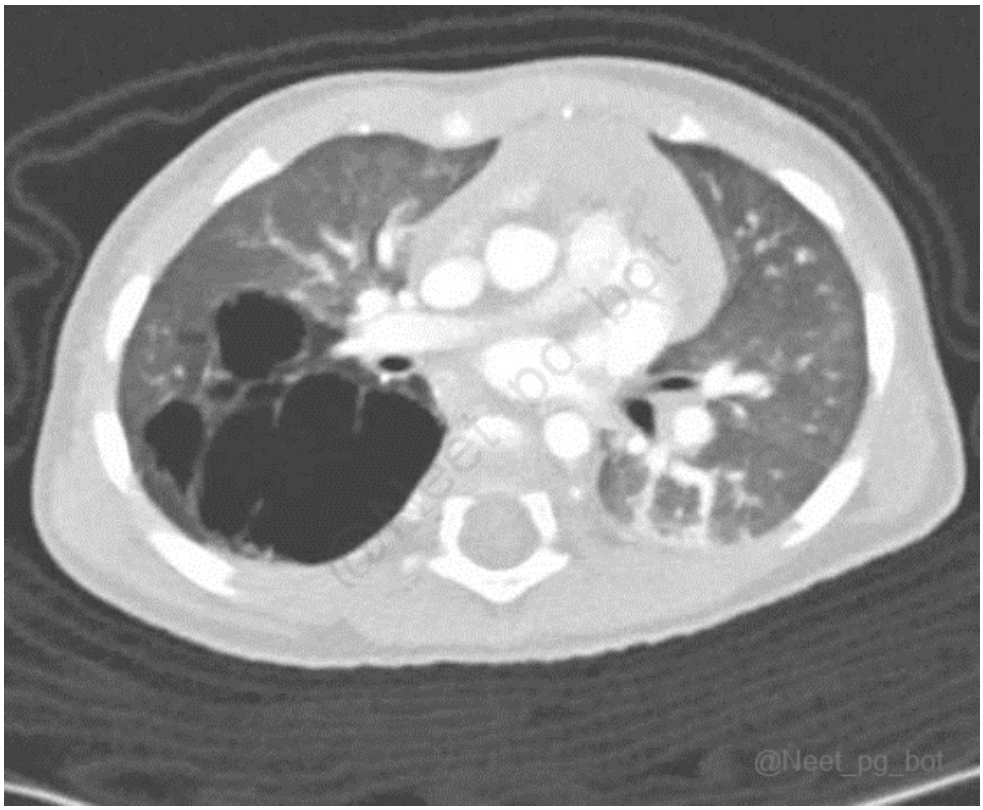
B. Congenital pulmonary airway malformation

C. Pyopneumothorax

D. Congenital diaphragmatic hernia


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See Answer in Part B → Q29

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Q30: A 25-year-old patient presented with acute epigastric pain and elevated serum lipase. He was stabilized after three days. What is the most common pathology associated with the chest X-ray obtained? (Q843948)

A. Acute Respiratory Distress Syndrome (ARDS)

B. Acute pulmonary edema

C. Pulmonary thromboembolism

D. Miliary tuberculosis (TB)



See Answer in Part B → Q30

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Q31: A patient presents with foul-smelling sputum, breathlessness, and fever. Based on the X-ray below, what is the most likely diagnosis? (Q843966)

A. Lung abscess

B. Pneumothorax

C. Pleural effusion

D. Pericardial effusion



See Answer in Part B → Q31

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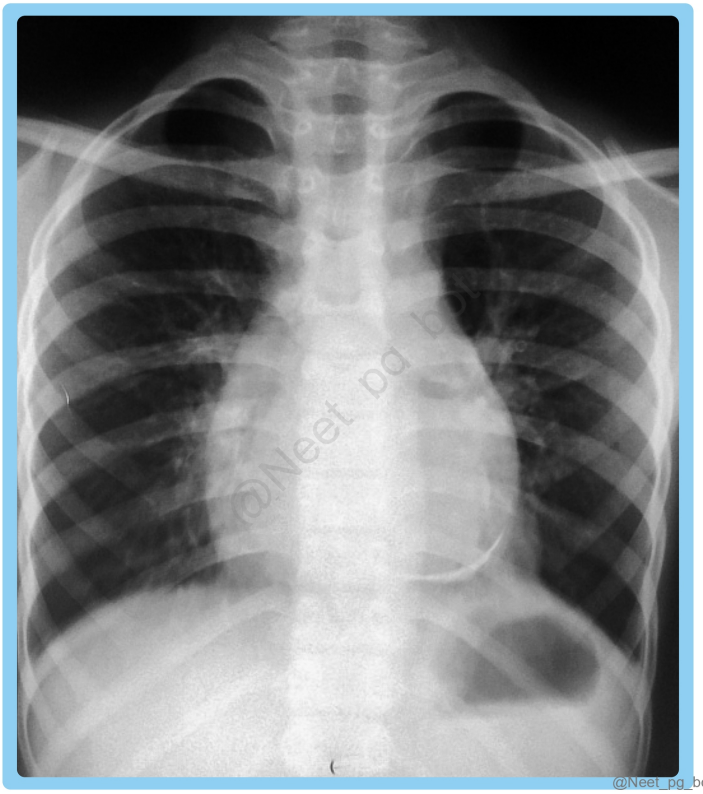
Q32: A patient complains of difficulty breathing, and fatigue. On examination, distended neck veins and muffled heart sounds were found. X-ray is shown below. Identify the disease. (Q860595)

A. Constrictive pericarditis

B. Bronchial asthma

C. Acute pericarditis

D. Atrial myxoma



See Answer in Part B → Q32

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Q33: Identify the condition shown in the chest X-ray of a sand mine worker. What is the most likely diagnosis? (Q866872)

A. Sarcoidosis

B. Tuberculosis

C. Silicosis

D. Pneumoconiosis due to asbestos



See Answer in Part B → Q33

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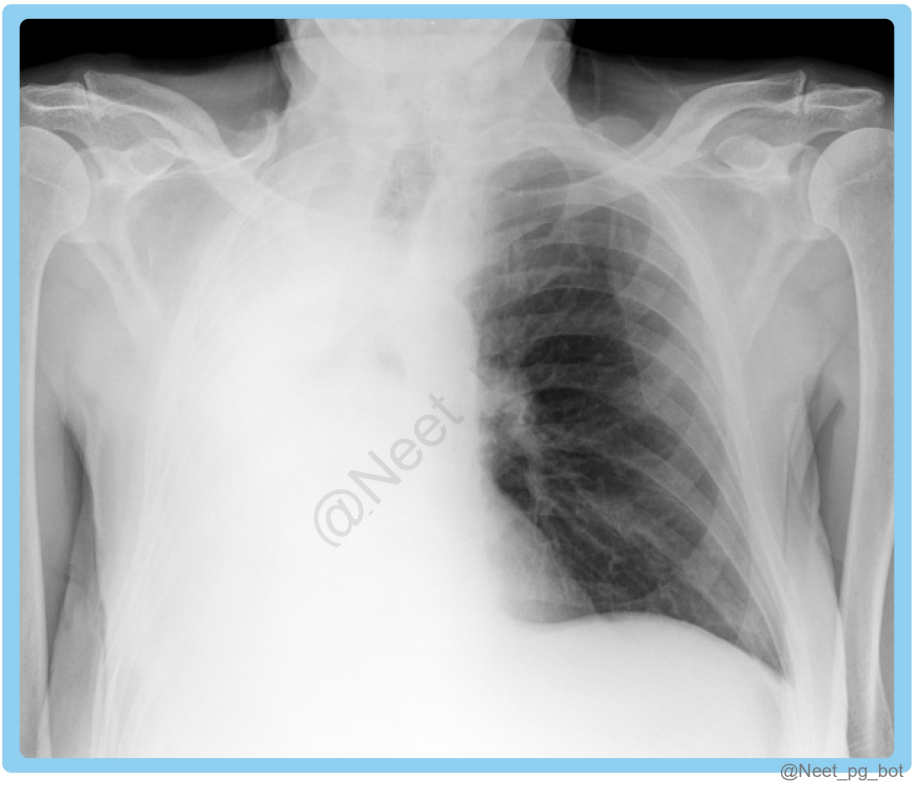
Q34: Which of the following conditions is not a potential cause for the radiological finding shown below? (Q860259)

A. Consolidation

B. Collapse

C. Pleural effusion

D. Foreign body



See Answer in Part B → Q34

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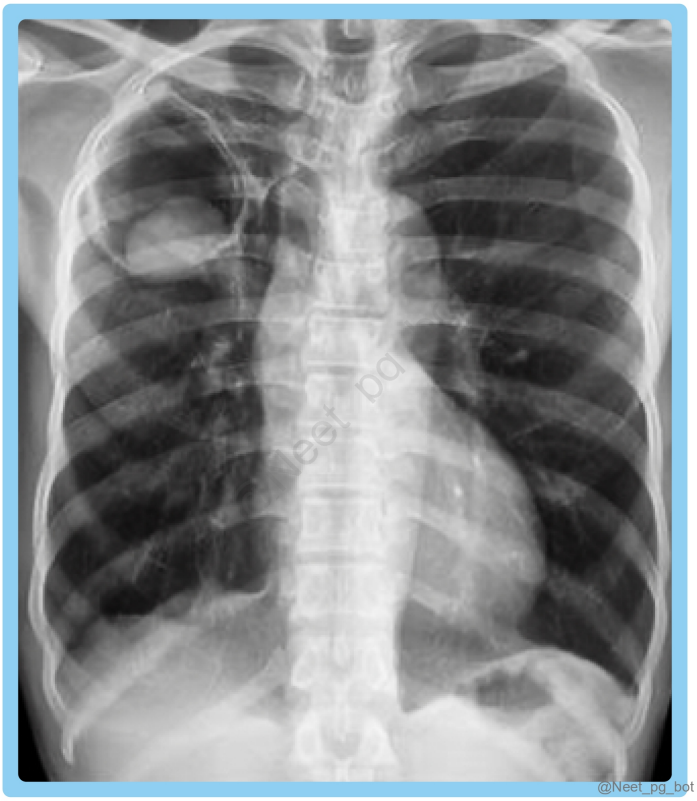
Q35: A patient who has been treated for TB in the past now presented with hemoptysis. Make a diagnosis based on the given X-ray. (Q860288)

A. Bronchogenic carcinoma

B. Aspergilloma

C. Hydatid cyst

D. Lung abscess



See Answer in Part B → Q35

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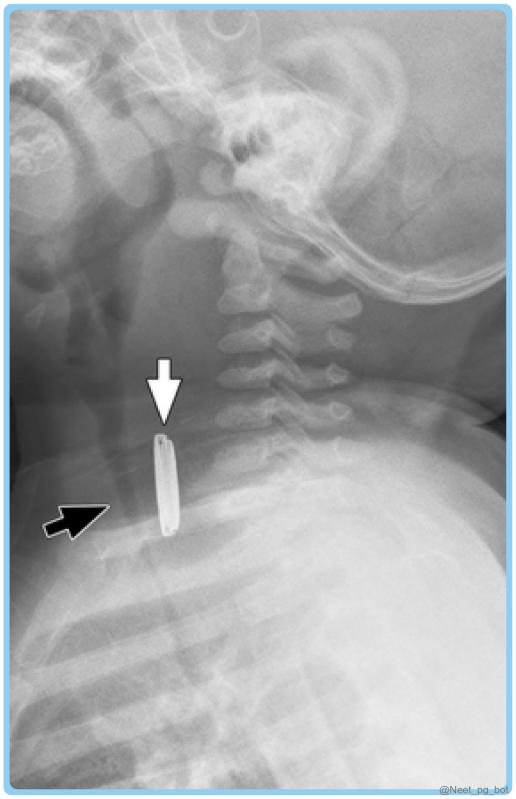
Q36: A child presents with breathlessness. On chest x-ray, the following object is seen. Identify the object. (Q854732)

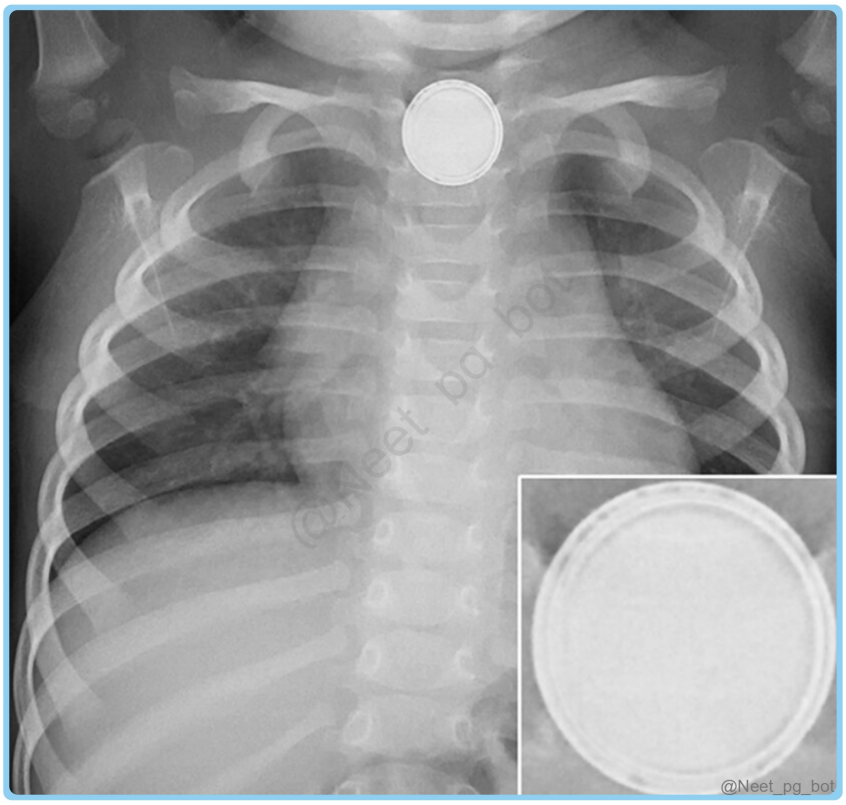
A. Button battery

B. Coin

C. Ball

D. Bottle cap





See Answer in Part B → Q36

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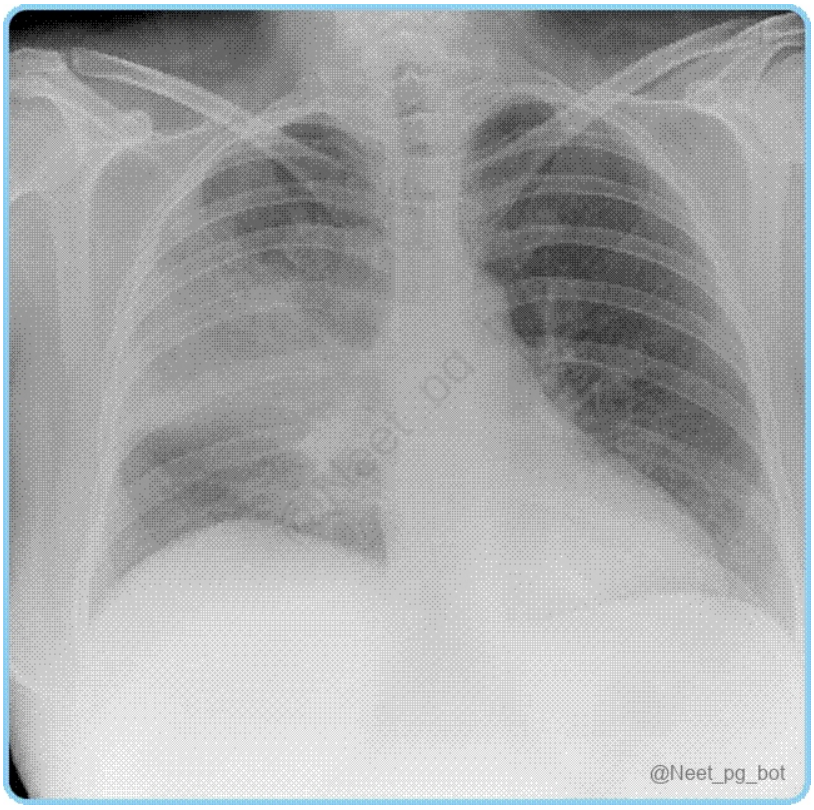
Q37: The patient has a history of fever and cough for the last 5 days. The examination findings show crepitations, and a chest X-ray is shown below. Based on these details, what is the likely diagnosis for this patient? (Q855486)

A. Apical segment of Right lower lobe consolidation

B. Right middle lobe consolidation

C. Posterior segment of right lower lobe consolidation

D. Loculated pleural effusion



See Answer in Part B → Q37

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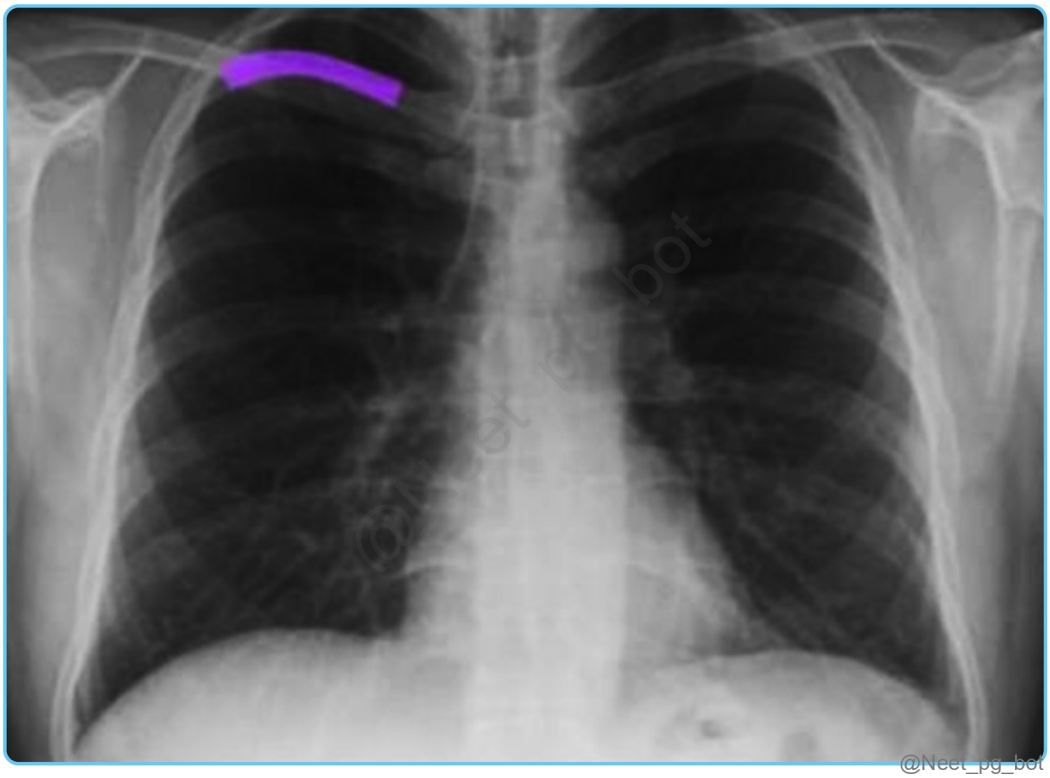
Q38: Please identify the rib that is shown in the X-ray. (Q858143)

A. 3rd rib anterior part

B. 3rd rib posterior part

C. 4th rib anterior part

D. 1st rib anterior part



See Answer in Part B → Q38

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Q39: Hamman sign is seen in (Q858212)

A. Pneumoperitoneum

B. Pneumopericardium

C. Pneumomediastinum

D. Hydropneumothorax

See Answer in Part B → Q39

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Q40: Which of the following findings are seen in a high-resolution CT scan of fungal pneumonia? 1. Interlobular septations 2. Peripheral wedge-shaped consolidation 3. Pleural effusion 4. Cavitatory lesions with surrounding ground glass opacities (Q855084)

A. 1,2,4

B. 1,3,4

C. 1,2,3

D. 2,3,4

See Answer in Part B → Q40

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Q41: What is the diagnosis of a 74-year-old man, who comes to the outpatient department (OPD) with a history of substantial unintentional weight loss, lack of appetite, and iron deficiency anemia, after a chest x-ray was performed and the results are provided below? (Q793094)

A. Bronchogenic carcinoma

B. Mesothelioma

C. Metastasis

D. Pneumoconiosis



See Answer in Part B → Q41

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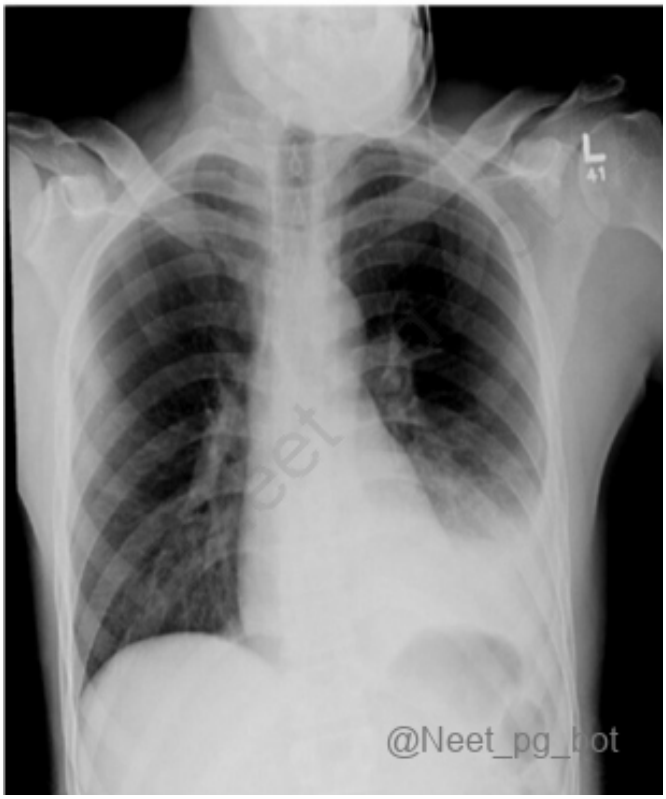
Q42: What is the subject matter of the X-ray image below? (Q793097)

A. Emphysema

B. Tension pneumothorax

C. Pleural effusion

D. Bronchiectasis



See Answer in Part B → Q42

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• [04_Gastrointestinal Radiology] 009 Git Radiology-I

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[04_Gastrointestinal Radiology] 009 Git Radiology-I — Quick Jump

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Q7 (p. 180) *Q8 (p. 181)* *Q9 (p. 182)* *Q10 (p. 183)* *Q11 (p. 184)* *Q12 (p. 187)*
Q13 (p. 187) *Q14 (p. 188)* *Q15 (p. 190)* *Q16 (p. 191)* *Q17 (p. 191)* *Q18 (p. 192)*
Q19 (p. 193)

Q1: A 55-year-old woman presents with complaints of chronic heartburn, regurgitation, and chest discomfort, especially after meals. A barium swallow study is performed, and the following radiograph is obtained. What is the most likely diagnosis based on the image findings? (Q853515)

A. Paraesophageal hernia (Type II)

B. Sliding hiatal hernia (Type I)

C. Mixed (Type III) hernia

D. Intrathoracic stomach (Type IV)



See Answer in Part B → Q1

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Q2: A term neonate presents with failure to pass meconium within the first 48 hours of life. Imaging shows a narrow distal bowel segment with proximal colonic dilatation. The Barium Enema image of the neonate is given below. What is the most likely condition affecting this neonate? (Q853525)

A. Hirschsprung disease

B. Toxic megacolon

C. Crohn's disease

D. Ulcerative colitis



See Answer in Part B → Q2

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Q3: A 40-year-old male presents with abdominal pain, weight loss, and chronic diarrhea. Radiologic studies reveal skip lesions in the ileum and cecum with a cobblestone appearance and deep ulcers. Which of the following radiologic signs is most consistent with this patient's diagnosis? (Q853524)

A. Lead pipe colon

B. Collar button ulcers

C. String sign of Kantor

D. Loss of haustrations

See Answer in Part B → Q3

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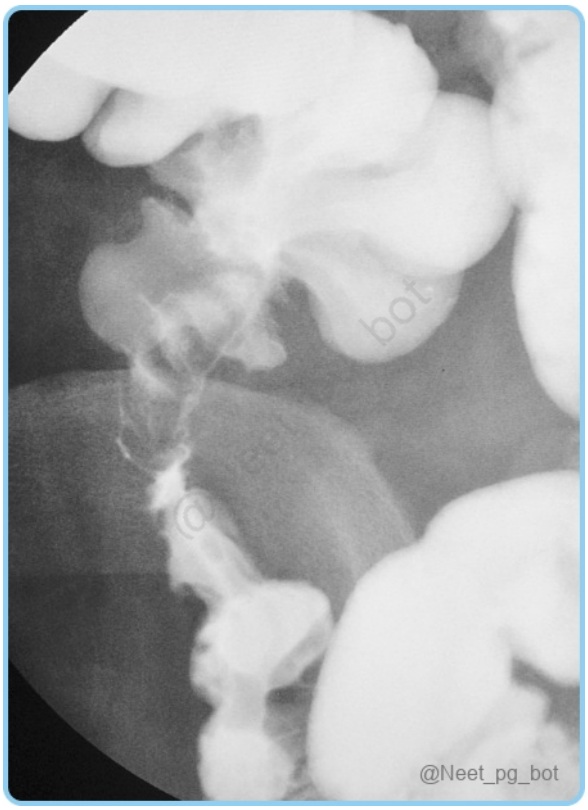
Q4: A 35-year-old male presents to the emergency department with chronic abdominal pain, fever, and unintentional weight loss over the past month. He reports altered bowel habits and has a history of exposure to individuals with tuberculosis. A small bowel follow-through imaging is provided below. Based on the clinical presentation and the attached imaging, which of the following features is not typically seen in the patient? (Q853523)

A. Spasm and edema at the ileocecal valve

B. Uniform thickening of the entire colon

C. Presence of mesenteric adenopathy

D. Stierlin Sign with rapid barium emptying



See Answer in Part B → Q4

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Q5: A 60-year-old female presents to the emergency department with severe abdominal pain, bloating, and vomiting. On examination, her abdomen is distended,

and bowel sounds are decreased. A radiograph abdomen of the patient is given below. Which of the following is not a feature of the patient's condition? (Q853522)

A. Arises in the pelvis, specifically the left lower quadrant

B. Maintains a colonic haustral pattern

C. Causes whirlpool sign

D. Characterized by the coffee-bean sign



See Answer in Part B → Q5

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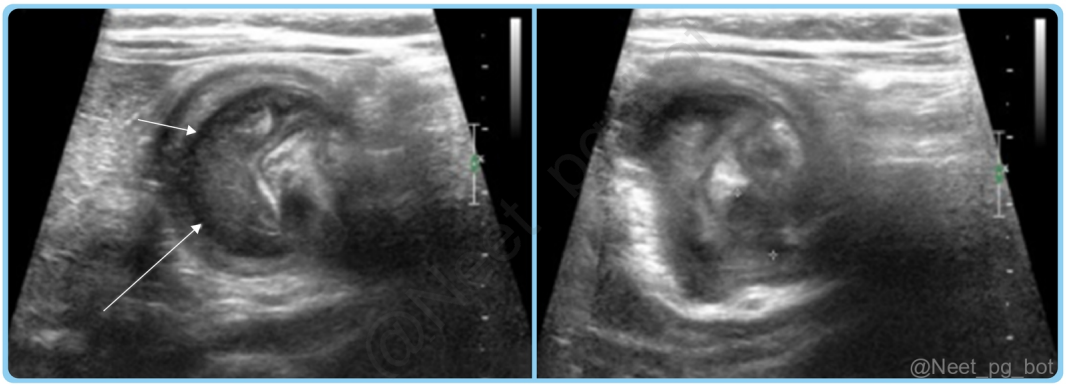
Q6: A 7-year-old girl with a known H/o lymphoma is brought to the ER for evaluation of severe abdominal pain and intermittent vomiting. Her parents report that she has recently passed currant jelly stools. O/E, a palpable abdominal mass is noted in the RUQ. An abdominal ultrasound is given below. Based on the clinical presentation and the ultrasound findings, what is the most likely diagnosis? (Q853521)

A. Acute appendicitis

B. Intussusception

C. Sigmoid Volvulus

D. Cecal Volvulus



See Answer in Part B → Q6

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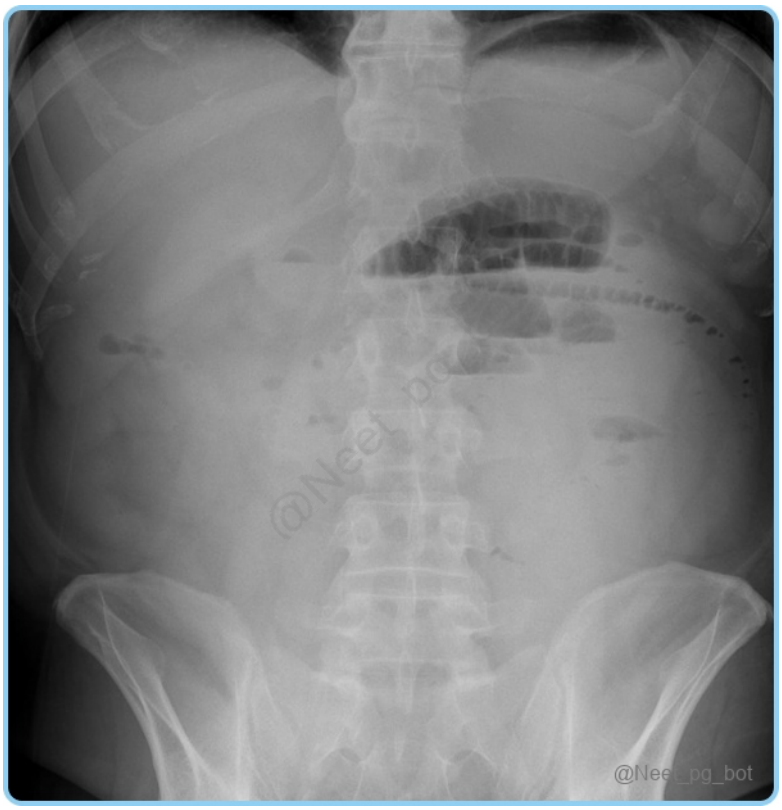
Q7: A 45-year-old male presents to the emergency department with severe abdominal pain, vomiting, and a distended abdomen. On examination, his bowel sounds are diminished. An abdominal radiograph is given below. What is the most likely diagnosis for this patient based on the given findings? (Q853520)

A. Mesenteric ischemia

B. Small bowel obstruction

C. Acute gastroenteritis

D. Saline catharsis



See Answer in Part B → Q7

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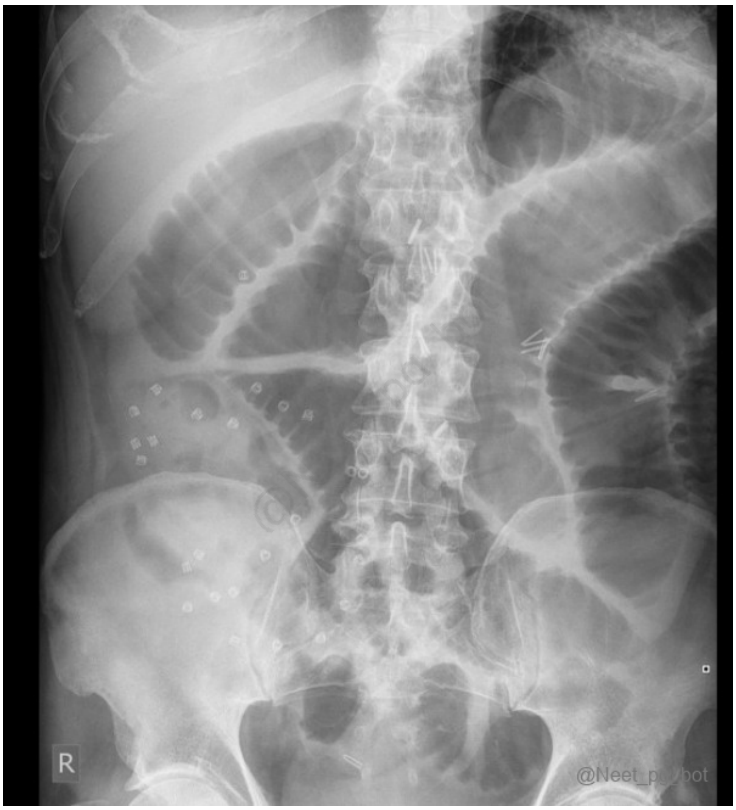
Q8: A 65-year-old male presents with colicky abdominal pain, distension, vomiting, and absolute constipation for the past 48 hours. He has a history of prior abdominal surgery. On physical examination, his abdomen is distended with high-pitched bowel sounds. An abdominal X-ray is obtained and shows the following features. What is the most likely diagnosis based on the clinical presentation and radiographic findings? (Q853519)

A. Small bowel obstruction

B. Large bowel obstruction

C. Sigmoid volvulus

D. Paralytic ileus



See Answer in Part B → Q8

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Q9: A 1-day-old neonate presents with bilious vomiting and abdominal distension. An abdominal X-ray is performed and is given below. Which of the following is the most likely diagnosis? (Q853518)

A. Pyloric atresia

B. Duodenal atresia

C. Jejunal atresia

D. Ileal atresia



See Answer in Part B → Q9

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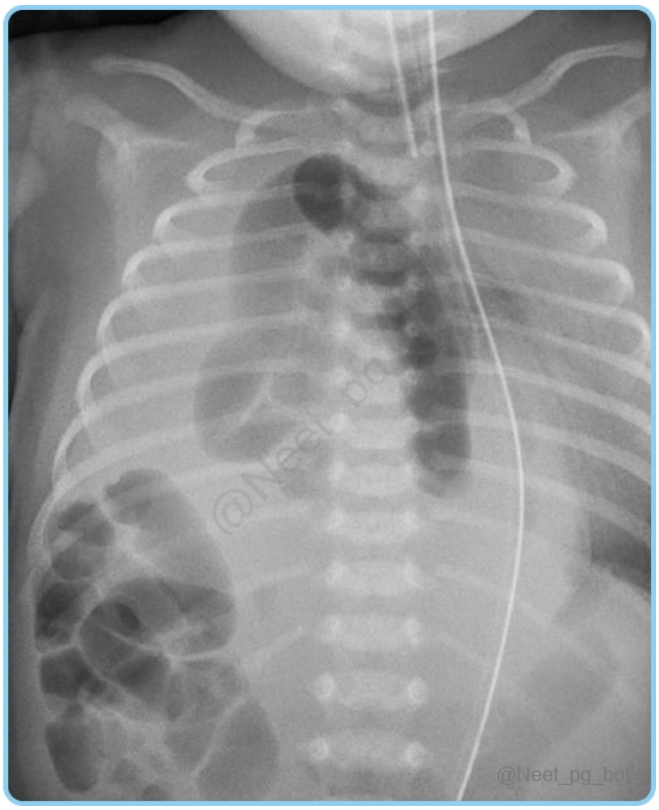
Q10: A 1-day-old newborn presents with respiratory distress. A chest X-ray is performed and is given below. Based on the findings, what is the most likely diagnosis? (Q853517)

A. Congenital Diaphragmatic Hernia

B. Esophageal atresia with tracheoesophageal fistula

C. Pulmonary sequestration

D. Congenital pulmonary airway malformation (CPAM)



See Answer in Part B → Q10

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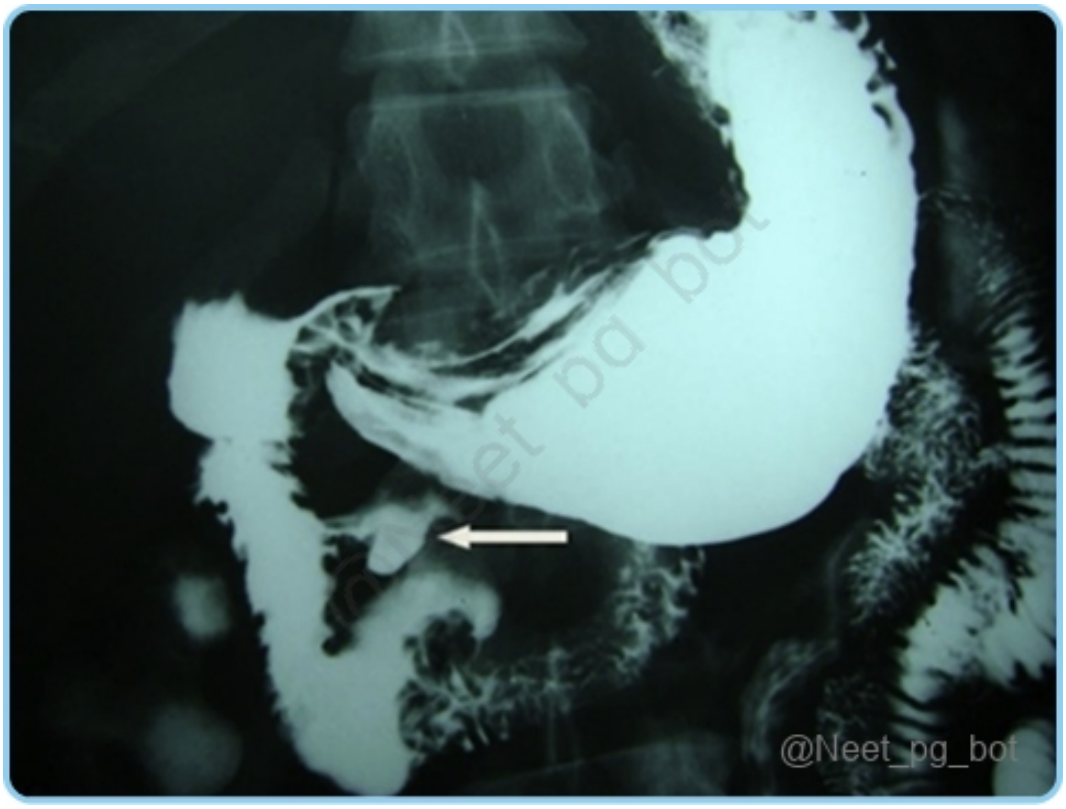
Q11: Match the following: Barium swallow a) 2.Barium meal b) 3.Barium follow through c) 4.Barium enema d) (Q853495)

A. 1-b, 2-d, 3-a, 4-c

B. 1-c, 2-a, 3-d, 4-b

C. 1-a, 2-c, 3-b, 4-d

D. 1-b, 2-a, 3-d, 4-c


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See Answer in Part B → Q11

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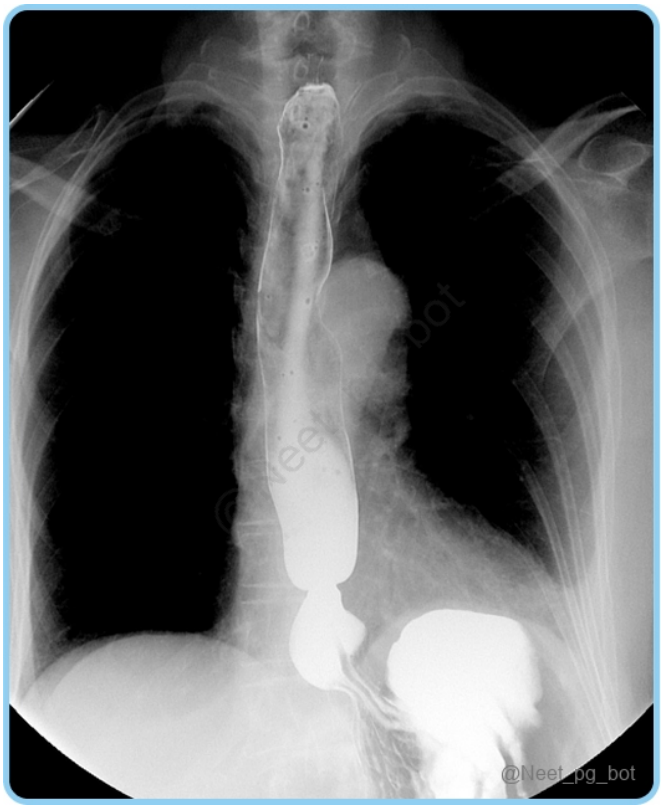
Q12: A 45-year-old woman presents with intermittent dysphagia to solids but not liquids. A barium swallow study is performed, as shown below. Which of the following is the most likely diagnosis based on the radiological findings? (Q853514)

A. Schatzki ring

B. Plummer-Vinson syndrome

C. Diffuse esophageal spasm

D. Achalasia



See Answer in Part B → Q12

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Q13: A 55-year-old patient presents with intermittent chest pain and dysphagia. A barium swallow study is performed as part of the diagnostic workup. Which of the following radiographic findings is most characteristic of diffuse esophageal spasm

(DES) as shown in the image? (Q853503)

A. Bird-beak appearance of the distal esophagus

B. Corkscrew or rosary bead appearance of the esophagus

C. Smooth, tapered narrowing of the mid-esophagus

D. Saccular outpouchings along the entire length of the esophagus



See Answer in Part B → Q13

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Q14: A 55-year-old patient presents with progressive dysphagia, initially for solids and later for liquids. A barium swallow study is performed, and two different radiographic findings are shown below. Which of the following statements correctly differentiates between these images? (Q853502)

A. Image 1 shows achalasia cardia with a "bird beak" sign, while Image 2 shows carcinoma esophagus with irregular narrowing

B. Image 1 shows carcinoma esophagus with smooth narrowing, while Image 2 shows achalasia cardia

C. Both images show achalasia cardia

D. Both images show carcinoma esophagus affecting different parts of the esophagus





See Answer in Part B → Q14

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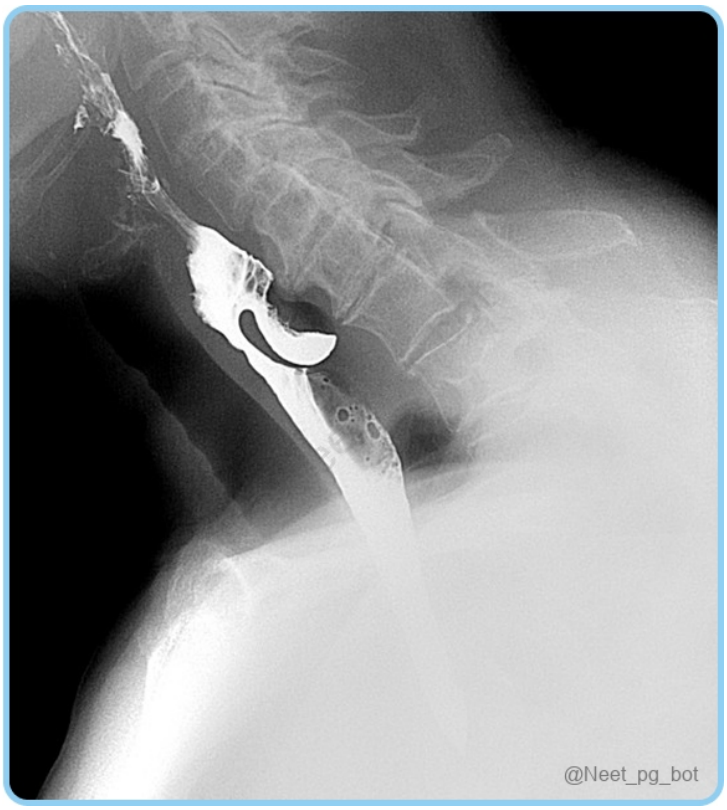
Q15: A 72-year-old man presents with dysphagia, regurgitation, and halitosis. A barium swallow examination is performed which is given below. Which of the following radiological findings is most consistent with the presentation? (Q853501)

A. An outpouching arising from the anterior wall of the proximal esophagus

B. Multiple small diverticula along the length of the esophagus

C. A diverticulum arising from the midline of the posterior wall of the distal pharynx

D. A smooth narrowing of the distal esophagus



See Answer in Part B → Q15

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Q16: A 58-year-old man presents to the emergency department with acute onset of severe abdominal pain and distension. An abdominal X-ray is performed, showing free air in the peritoneal cavity. Which of the following signs represents free air outlining the lateral umbilical ligaments? (Q853500)

A. Ligamentum sign

B. Inverted V sign

C. Telltale triangle sign

D. Doge cap sign

See Answer in Part B → Q16

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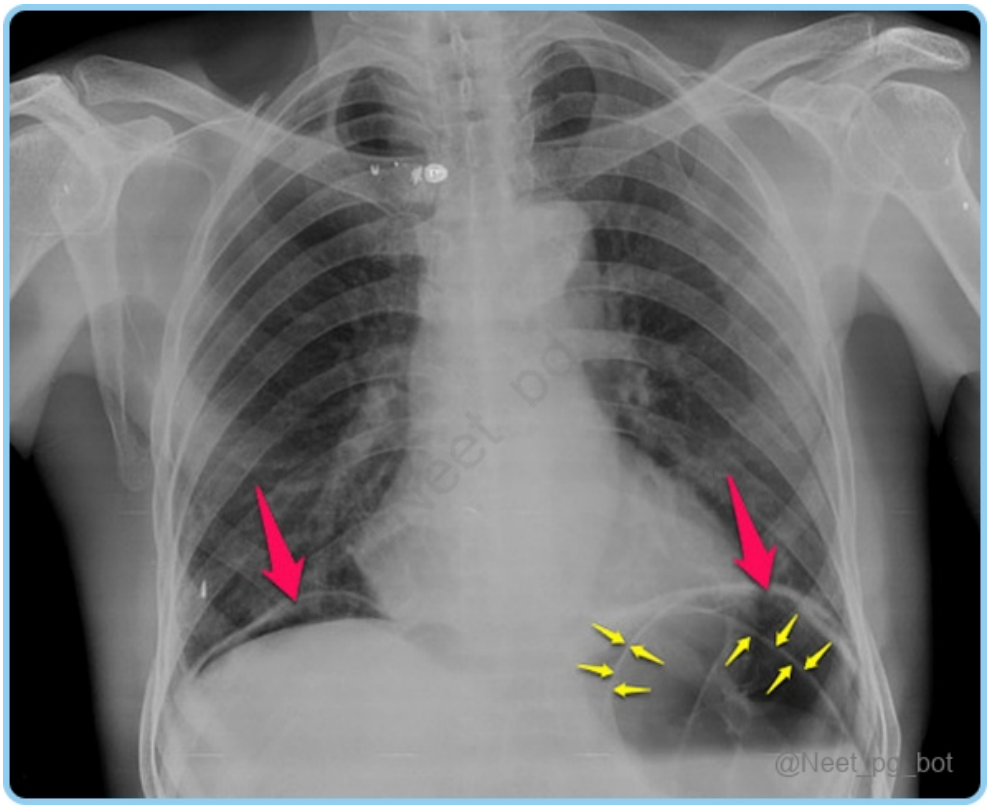
Q17: A 72-year-old woman presents to the emergency department with sudden onset of severe abdominal pain and distension. An upright chest X-ray is performed, showing the following finding: Which of the following is the most likely diagnosis based on this radiographic finding? (Q853499)

A. Bowel obstruction

B. Pneumoperitoneum

C. Subphrenic abscess

D. Pneumatosis intestinalis



See Answer in Part B → Q17

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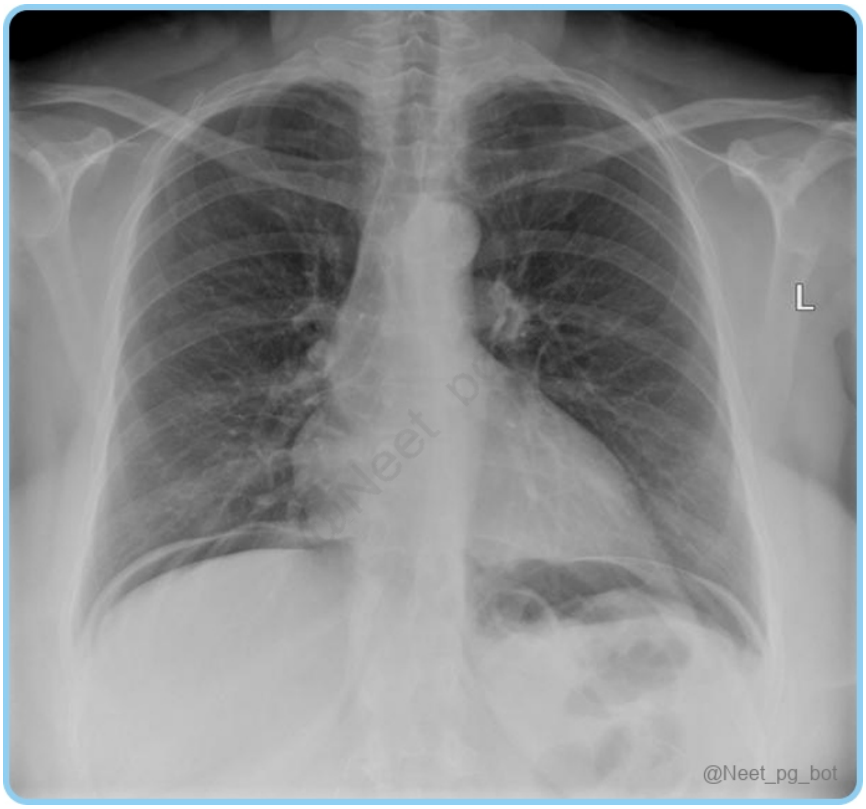
Q18: A 65-year-old man presents with sudden, severe abdominal pain and a rigid abdomen. He has a history of peptic ulcer disease. An erect chest X-ray is given below. Which of the following radiological signs is NOT expected in this case? (Q853498)

A. Cupola sign

B. Rigler’s sign

C. Free gas under the right hemidiaphragm

D. Chilaiditi sign



See Answer in Part B → Q18

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Q19: A newborn is diagnosed with an anorectal malformation (imperforate anus) on physical examination. Given the high association with VACTERL anomalies, the medical team decides to conduct a series of radiographic studies to assess for potential associated conditions. Which of the following is a key imaging modality in the evaluation of a neonate with imperforate anus? (Q853496)

A. Plain abdominal X-ray

B. Invertogram

C. Abdominal ultrasound

D. Distal colostogram

See Answer in Part B → Q19

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• [04_Gastrointestinal Radiology] 010 Previous Year Questions

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[04_Gastrointestinal Radiology] 010 Previous Year Questions — Quick Jump

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Q1: What could be the most probable diagnosis for an elderly woman who is experiencing abdominal pain and swelling, considering her past medical history of scoliosis? Please refer to the provided X-ray image of the woman's upright abdomen for further information. (Q855870)

A. Large bowel obstruction due to sigmoid volvulus

B. Large bowel obstruction due to faecolith

C. Cecal volvulus

D. Small bowel obstruction due to bowel perforation



See Answer in Part B → Q1

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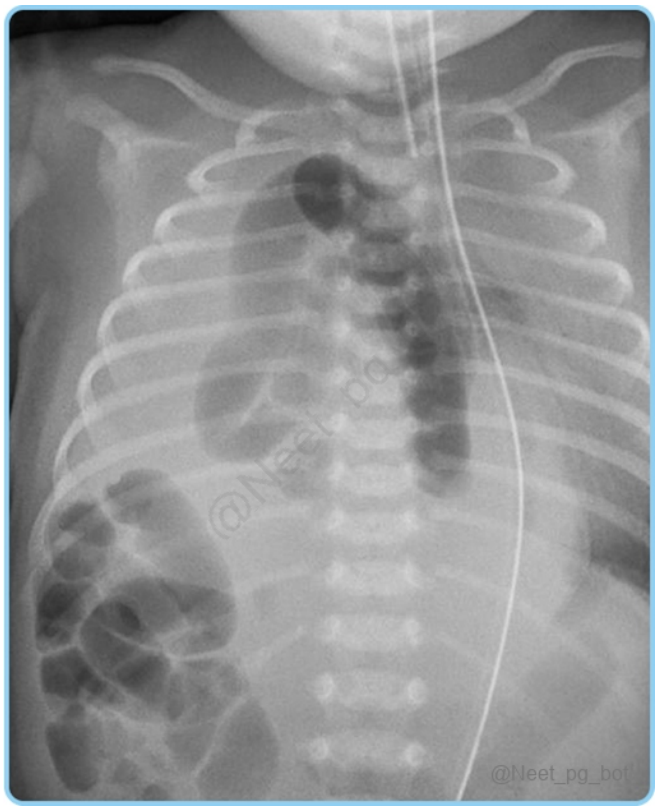
Q2: Which of the following images accurately represents the medical condition described in the given scenario? (Q859934)

A. Diaphragmatic hernia

B. Intestinal obstruction

C. Pleural effusion

D. Pneumonia



See Answer in Part B → Q2

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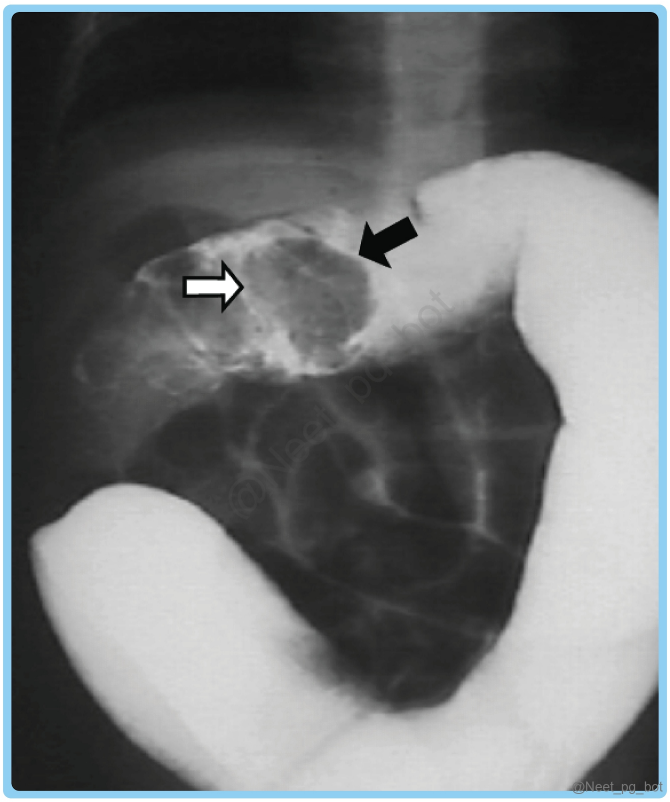
Q3: A 51-year-old man complains of abdominal pain and blood-stained stools. The X ray of his intestines shows the following finding. What is the most likely diagnosis? (Q859323)

A. Intussusception

B. Volvulus

C. Diverticulitis

D. Ulcerative colitis



See Answer in Part B → Q3

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Q4: What is the likely diagnosis for a 20-year-old male who presents with pain in the right flank, along with fever and chills? The patient experiences pain when the hip is passively extended on the right side. Lab tests indicate an increased white blood cell count, and a CT scan reveals specific findings. (Q859264)

A. Pyelonephritis

B. Psoas abscess

C. Appendicitis

D. Torsion of right undescended testis



See Answer in Part B → Q4

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Q5: A 51-year-old man complains of abdominal pain and blood-stained stools. The barium study of his intestines shows the following finding. What is the most likely diagnosis? (Q854996)

A. Intussusception

B. Volvulus

C. Diverticulitis

D. Ulcerative colitis



See Answer in Part B → Q5

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Q6: A 56-year-old female patient presented with progressive dysphagia for solids, loss of weight, and loss of appetite. A barium swallow done is given below. What is the most probable diagnosis (Q854992)

A. Carcinoma esophagus

B. Diffuse esophageal spasm

C. Esophageal leiomyoma

D. Esophageal web



See Answer in Part B → Q6

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Q7: Which of the options below represents a characteristic observed in cases of large bowel obstruction? (Q856414)

A. Dilated loops of the intestine with plica circulars

B. Dilated loops with haustrations

C. String of pearls sign

D. Central dilated bowel loops

See Answer in Part B → Q7

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Q8: A patient presents with abdominal pain and distension. An X-ray was taken which showed dilated bowel loops as given in the image below. Identify the segment involved. (Q856170)

A. Jejunum

B. Ileum

C. Duodenum

D. Transverse colon



See Answer in Part B → Q8

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Q9: A patient following a skid resulting in a motor traffic accident was brought to the emergency room 2 hours later. On examination, he was stable with GCS 15/15. The pupil was reactive to light. Tenderness and bruising over the left lower chest wall with petechiae were seen. Severe tenderness was elicited in the left hypochondriac region and BP-90/50 mm of Hg. What is the best investigation used in the ER? GCS: Glasgow

coma scale FAST: Focused Assessment with Sonography for Trauma (Q856166)

A. FAST

B. X-ray

C. Diagnostic peritoneal lavage

D. CT scan

See Answer in Part B → Q9

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Q10: What is the diagnosis of a young child who is experiencing mild intermittent upper abdominal pain and has an X-ray shown below? (Q858225)

A. Bochdalek hernia

B. Morgagni hernia

C. Gastric volvulus

D. Eventration of diaphragm



See Answer in Part B → Q10

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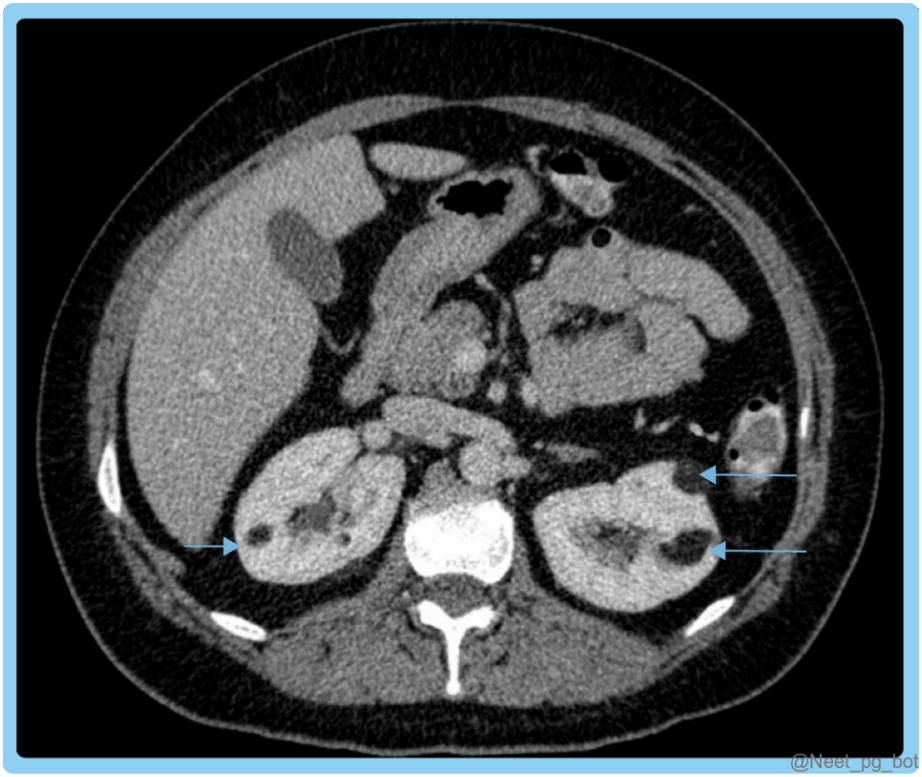
Q11: A 45-year-old patient presented with vague abdominal pain. What is the diagnosis? (Q858177)

A. RCC

B. Renal oncocytoma

C. Renal Angiomyolipoma

D. Renal cyst



See Answer in Part B → Q11

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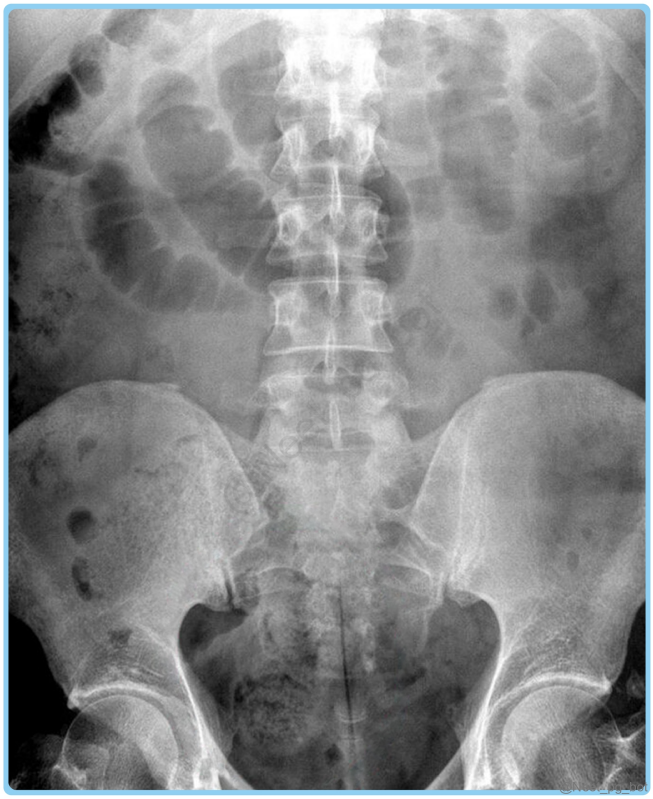
Q12: A patient presents with abdominal pain and distension. An x-ray was taken which showed dilated bowel loops as given in the image below. Identify the segment involved. (Q857607)

A. Jejunum

B. Ileum

C. Duodenum

D. Transverse colon



See Answer in Part B → Q12

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Q13: Identify the investigation shown below which is the investigation of choice in distal bowel tumors. (Q857200)

A. Enteroclysis

B. Barium meal

C. Barium meal follow-through

D. Barium enema



See Answer in Part B → Q13

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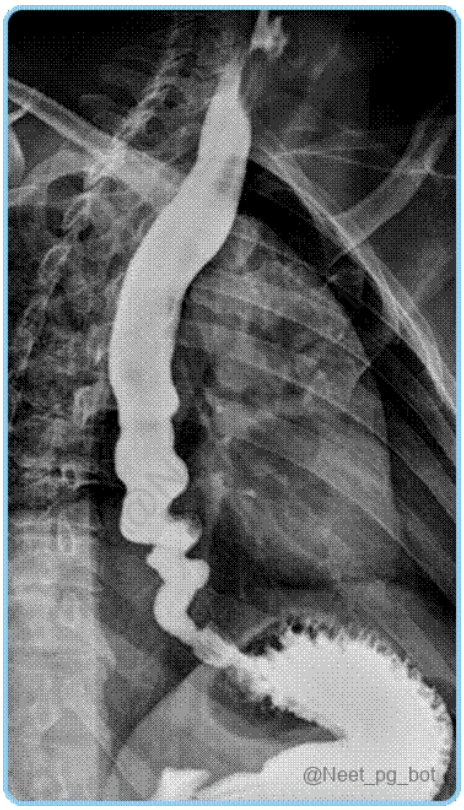
Q14: The characteristic appearance of the esophagus on barium swallow, as shown in the image below, is seen in which of the following conditions? (Q857181)

A. Diffuse oesophageal spasm

B. Esophageal carcinoma

C. Esophageal ulcer

D. Achalasia cardia



See Answer in Part B → Q14

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Q15: Match the following: 1. Football sign a. Hypertrophic pyloric stenosis 2. String sign b. Achalasia cardia 3. Rat tail sign c. Ileocecal TB 4. Inverted umbrella sign d. Pneumoperitoneum (Q855875)

A. 1-b, 2-d, 3-a, 4-c

B. 1-c, 2-a, 3-b, 4-d

C. 1-d, 2-b, 3-a, 4-c

D. 1-d, 2-a, 3-b, 4-c

See Answer in Part B → Q15

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Q16: The following radiological image was taken to assess the urinary tract. Identify the investigation shown below. (Q866869)

A. Intravenous pyelogram (IVP)

B. Pelvic X-ray

C. Retrograde pyelogram

D. Micturating cystourethrogram (MCUG)



See Answer in Part B → Q16

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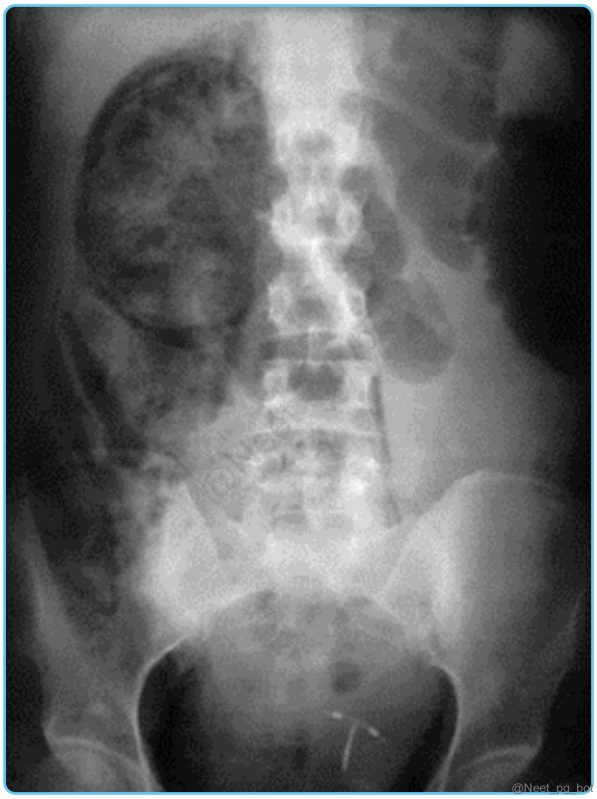
Q17: A 55-year-old female patient presents to the emergency department with chills and rigors. She has acute pain in the right flank region. The imaging is shown below. What is the most likely diagnosis? (Q858202)

A. Cholecystitis

B. Emphysematous pyelonephritis

C. Small bowel obstruction

D. Volvulus



See Answer in Part B → Q17

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Q18: Please identify the section of the intestine shown in the barium study provided. (Q858197)

A. Ileum

B. Transverse colon

C. Jejunum

D. Splenic flexure



See Answer in Part B → Q18

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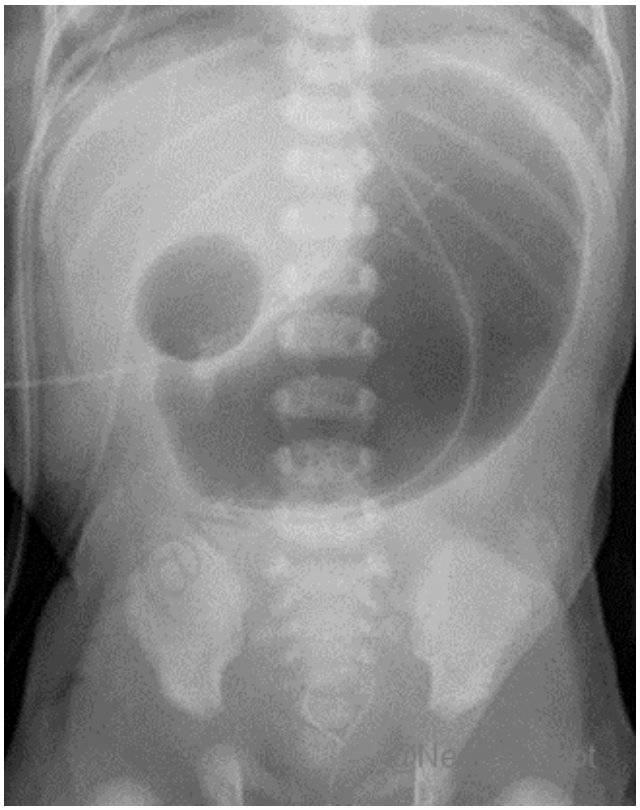
Q19: A newborn presents with bilious vomiting. Which sign is depicted in the following radiograph? (Q820181)

A. Double bubble sign

B. Air crescent sign

C. Cupola sign

D. Triple bubble sign:



See Answer in Part B → Q19

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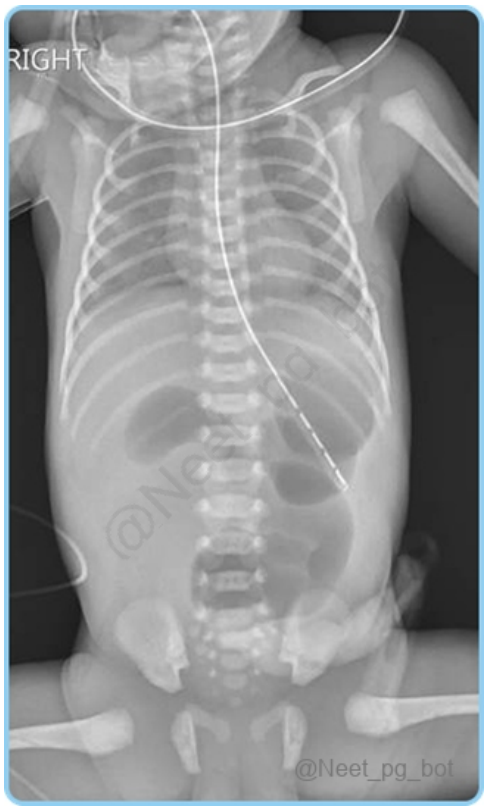
Q20: Identify the condition in the image shown below: (Q860270)

A. Duodenal atresia

B. Jejunal atresia

C. Small bowel obstruction

D. Ileal atresia



See Answer in Part B → Q20

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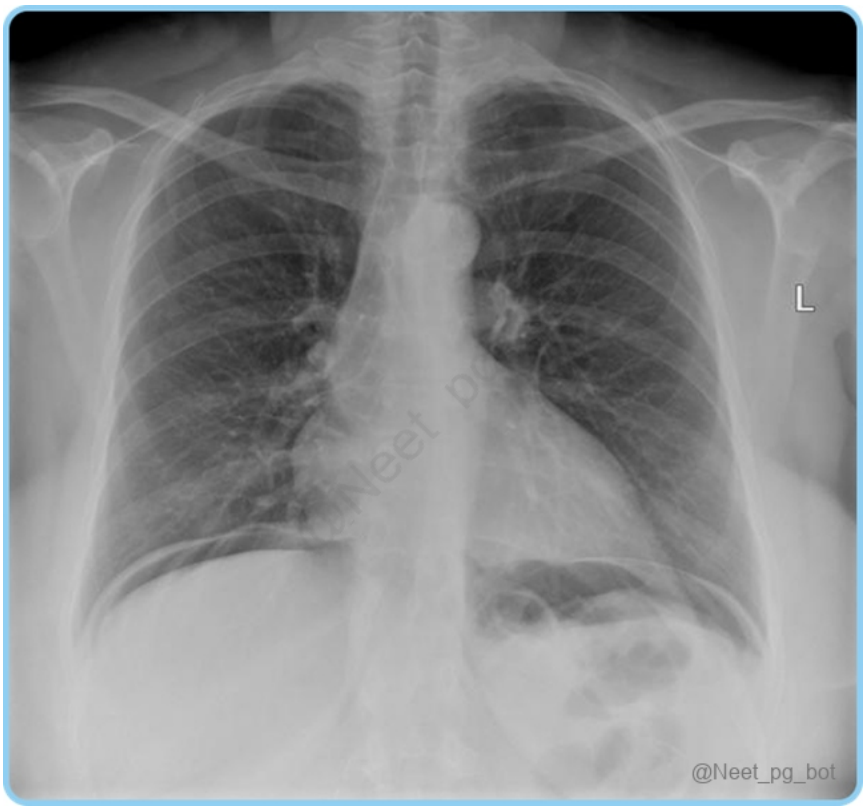
Q21: A 45-year-old male presented with severe abdominal pain following alcohol intake. Make a diagnosis based on the given X-ray. (Q860264)

A. Pneumoperitoneum

B. SBO

C. Esophageal perforation

D. Pneumomediastinum



See Answer in Part B → Q21

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Q22: Identify pancreas, liver, and spleen? (Q860593)

A. A-liver, B-pancreas, C-spleen

B. A-Kidney, B-liver, C-pancreas

C. A-pancreas, B-liver, C-spleen

D. A-spleen, B-kidney, C-liver



See Answer in Part B → Q22

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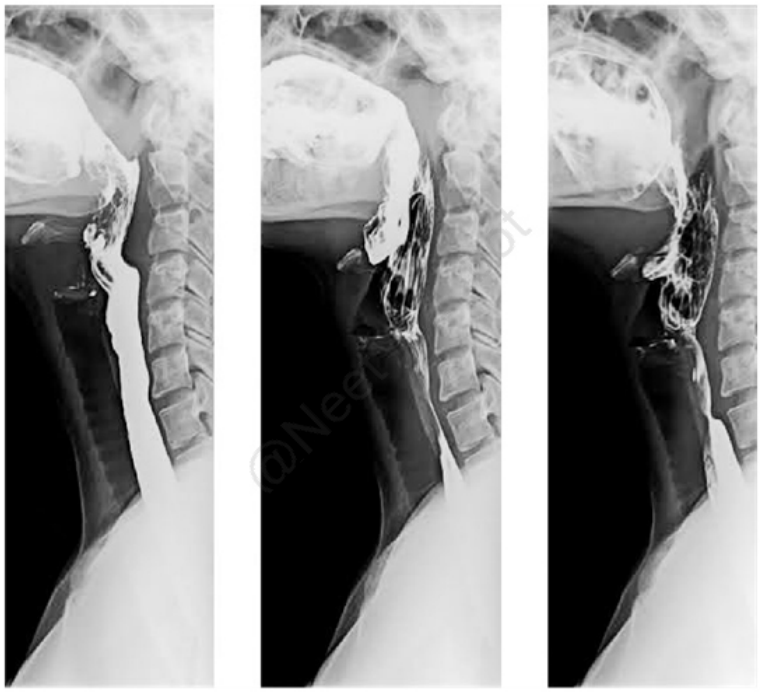
Q23: What investigation is being performed in the image below? (Q843952)

A. Fluoroscopy

B. Barium swallow

C. X-ray for alkali ingestion

D. X-ray for acid ingestion



See Answer in Part B → Q23

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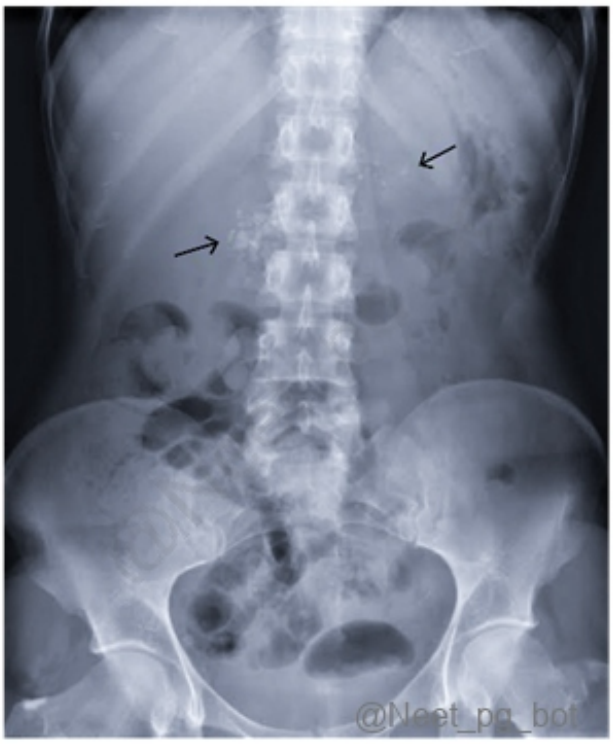
Q24: Identify the condition depicted in the radiograph below. (Q843938)

A. Pancreatic calcification

B. Mesenteric calcification

C. Horseshoe kidney

D. Jejunal fecolith



See Answer in Part B → Q24

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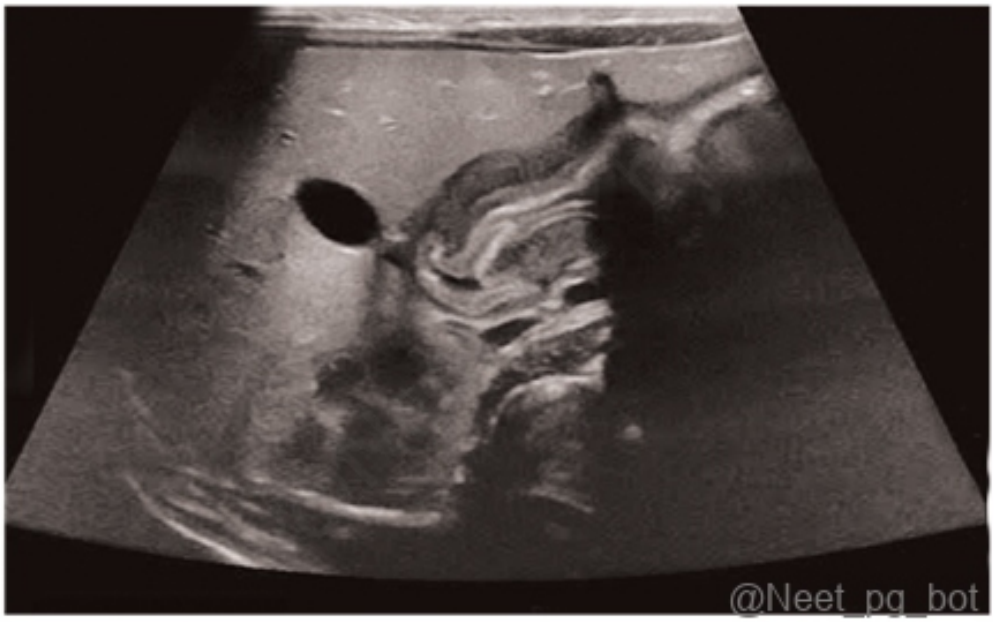
Q25: A 6-week-old child is brought to the emergency department with recurrent projectile, non-bilious vomiting. Based on the radiograph provided, what is the most likely diagnosis? (Q843914)

A. Annular pancreas

B. Congenital Hypertrophic Pyloric Stenosis

C. Duodenal atresia

D. Meckel’s diverticulum



See Answer in Part B → Q25

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Q26: A patient presents with a history of dysphagia, which is more pronounced for liquids than solids. Which radiological sign is most likely to be seen? (Q852583)

A. Rat-tail sign

B. Filling defect

C. Corkscrew esophagus

D. Apple-core lesion

See Answer in Part B → Q26

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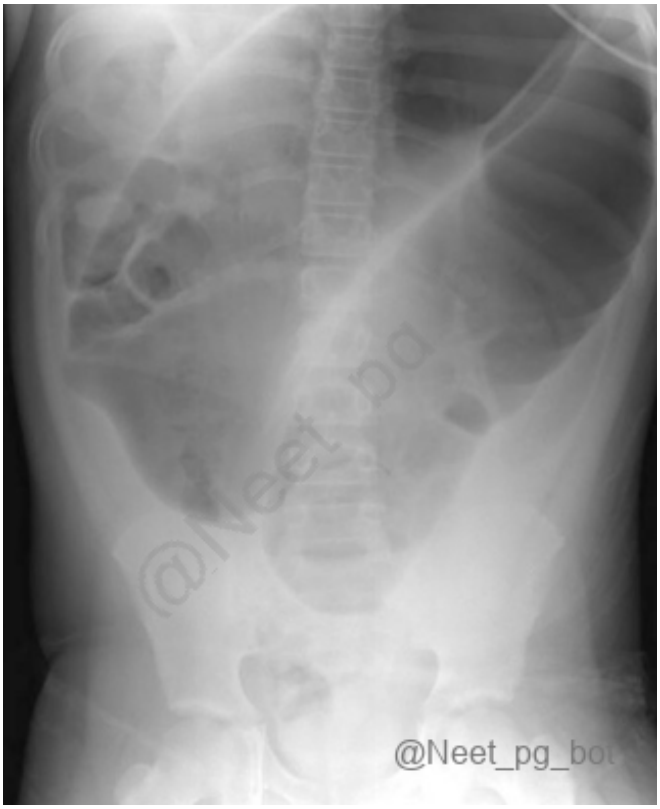
Q27: A 70-year-old patient presents with absolute constipation and abdominal distension. And the X-ray abdomen is given below. What is the most likely diagnosis? (Q852591)

A. Caecal Volvulus

B. Sigmoid Volvulus

C. Intestinal Obstruction

D. Small Bowel Volvulus



See Answer in Part B → Q27

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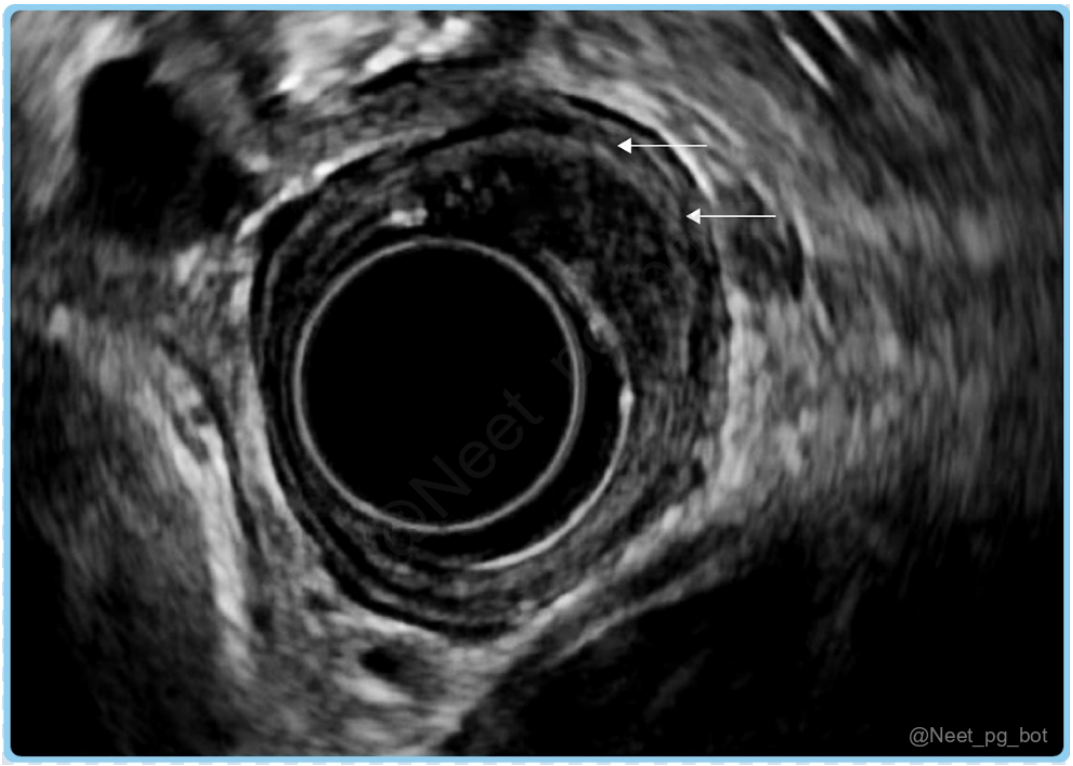
Q28: Which of the following is a primary use of this imaging modality? (Q852585)

A. Staging of esophageal cancer

B. Evaluation of gastroesophageal reflux disease (GERD)

C. Identifying the cause of dysphagia

D. Assessing cardiac and aortic pathology



See Answer in Part B → Q28

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Q29: A 26-year-old male presents with complaints of lower abdominal pain, and passage of blood mixed with stools for the past 3 months. Based on his radiological findings, what is the most likely diagnosis? (Q865267)

A. Ulcerative colitis

B. Pseudomembranous colitis

C. Crohn’s disease

D. Intestinal TB



See Answer in Part B → Q29

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• [05_Hepatobiliary Radiology] 011 Hepatobiliary And Pancreatic Radiology

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Q1: A 35 y/o woman presents with an incidental liver mass found on ultrasound. Further imaging with CT and MRI is performed, revealing a well-defined mass with a central scar which is hyperintense on T2w MRI. The lesion shows hot spot on sulphur colloid scan. Which of the following diagnoses is most likely? (Q852898)

A. Hepatic adenoma

B. Hepatocellular carcinoma

C. Focal nodular hyperplasia (FNH)

D. Fibrolamellar carcinoma (FLC)

See Answer in Part B → Q1

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Q2: A 48-year-old man presents with a sudden onset of severe epigastric pain radiating to the back, associated with repeated vomiting. The pain worsens after meals and is partially relieved by leaning forward. X-ray findings are shown below. What is the most likely diagnosis? (Q887943)

A. Large bowel obstruction

B. Acute pancreatitis

C. Sigmoid volvulus

D. Diverticulitis



See Answer in Part B → Q2

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Q3: A 60 y/o man presents with recurrent abdominal pain and jaundice. A CT abdomen reveals a "sausage-shaped" pancreas and long segmental pancreatic duct strictures. What is the most likely diagnosis? (Q852915)

A. Chronic pancreatitis

B. Autoimmune pancreatitis

C. Necrotizing pancreatitis

D. Pancreatic pseudocyst



See Answer in Part B → Q3

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Q4: A 62-year-old male presents with painless progressive jaundice and a palpable gallbladder. Contrast-enhanced CT shows a hypoattenuating, ill-defined mass in the pancreatic head, with simultaneous dilation of the common bile duct and pancreatic duct. What is the most likely radiological sign indicated, and the probable diagnosis? (Q852925)

A. Corkscrew sign- Cholangiocarcinoma

B. Double duct sign - Carcinoma of the head of pancreas

C. Apple core lesion- Duodenal carcinoma

D. Inverted umbrella sign - Ampullary carcinoma

See Answer in Part B → Q4

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Q5: A 55 y/o perimenopausal woman presents with vague abdominal pain. A CT scan of the abdomen reveals a large, multilocular cystic lesion in the tail of the pancreas with thick septations and peripheral calcifications. Lab results show elevated CEA levels. What is the most likely diagnosis? (Q852926)

A. Pseudocyst

B. Mucinous Cystic Neoplasm (MCN)

C. Serous Cystic Neoplasm (SCN)

D. Intraductal Papillary Mucinous Neoplasm (IPMN)

See Answer in Part B → Q5

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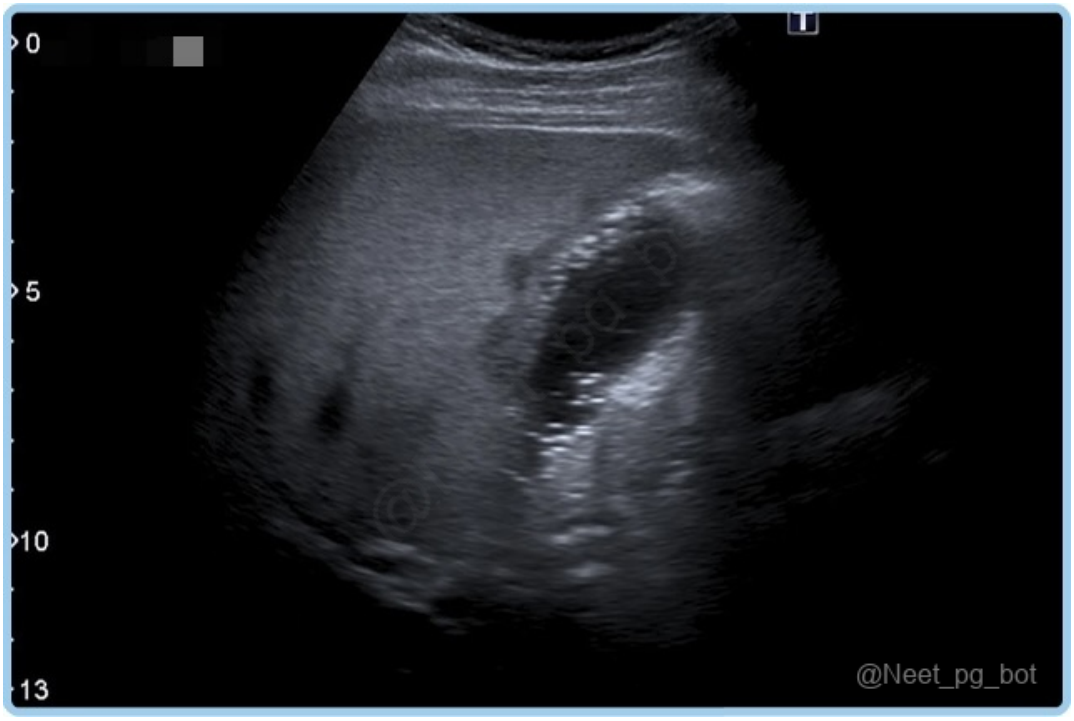
Q6: A 65 y/o diabetic male presents with severe right upper quadrant pain, fever, and signs of sepsis. A USG reveals highly echogenic reflectors with dirty shadowing and ring-down artefacts in the gallbladder. Subsequent CT imaging demonstrates gas within the gallbladder wall and pneumoperitoneum. What is the most likely diagnosis? (Q852927)

A. Chronic cholecystitis

B. Acute calculous cholecystitis

C. Emphysematous cholecystitis

D. Gallbladder adenocarcinoma



See Answer in Part B → Q6

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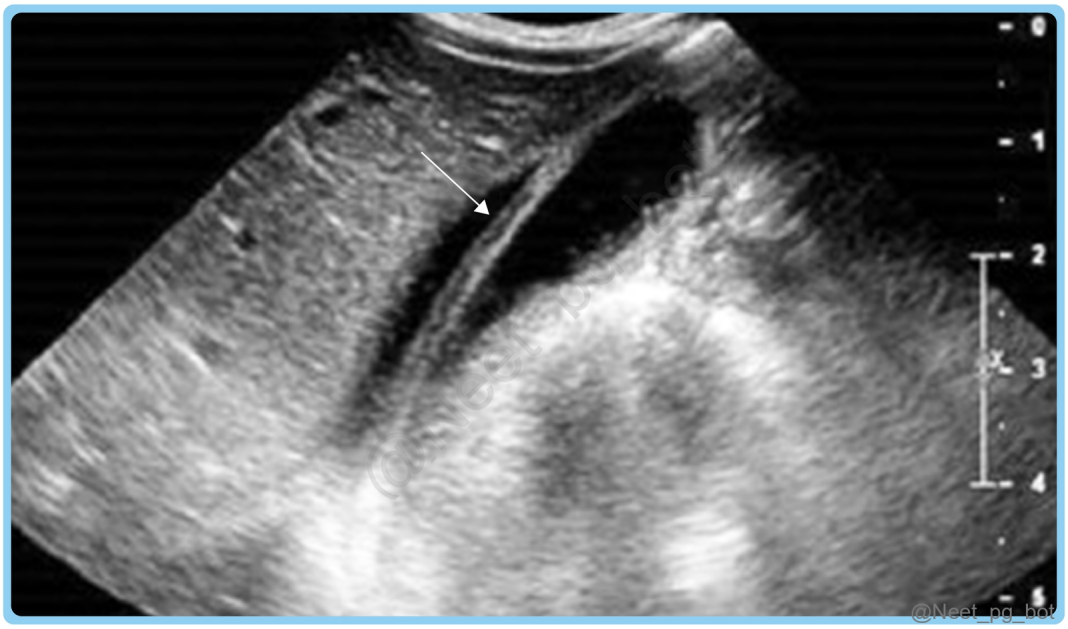
Q7: A 35 y/o woman from a rural area presents with severe right upper quadrant pain, fever, and jaundice. She reports intermittent episodes of abdominal discomfort. Laboratory tests reveal an elevated bilirubin level, and an ultrasound shows a long, echogenic structure within the common bile duct with a hypoechoic centre. What imaging modality is preferred for non-invasively confirming the diagnosis? (Q852942)

A. Fluoroscopy

B. CT

C. MRCP

D. ERCP



See Answer in Part B → Q7

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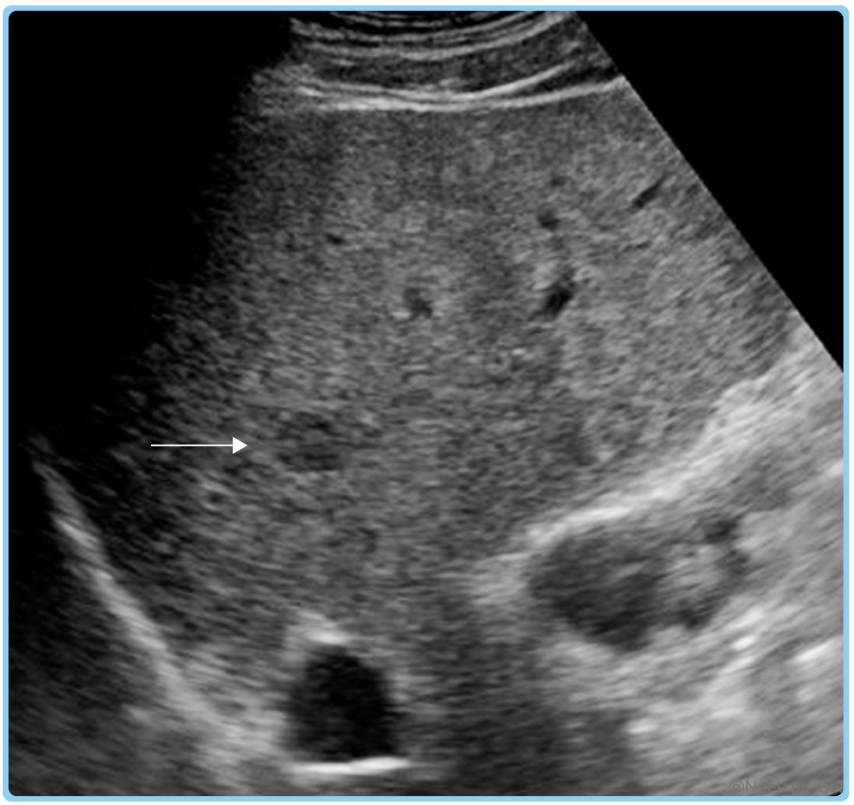
Q8: A 55-year-old male with a history of chronic hepatitis presents with abdominal discomfort. Ultrasound shows a heterogeneous liver mass with a "nodule-in-nodule" appearance. CT reveals a hypervascular lesion with mosaic enhancement and washout on delayed phases. MRI demonstrates decreased T1 and increased T2 signal intensities with late arterial enhancement. Based on the imaging findings, what is the most likely diagnosis? (Q852943)

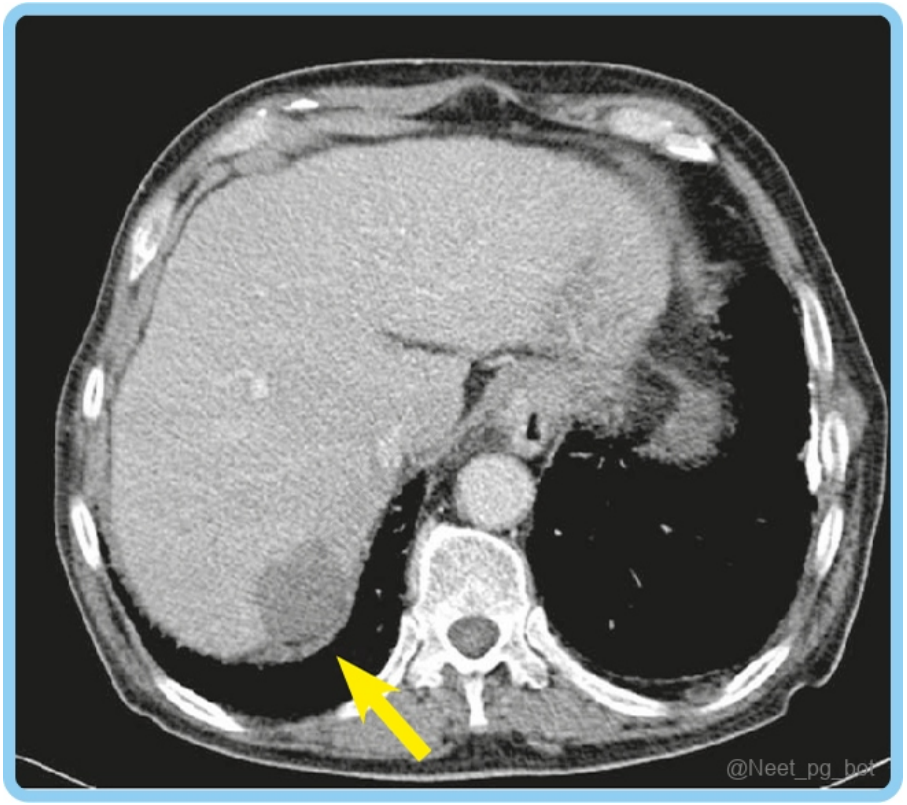
A. Focal Nodular Hyperplasia (FNH)

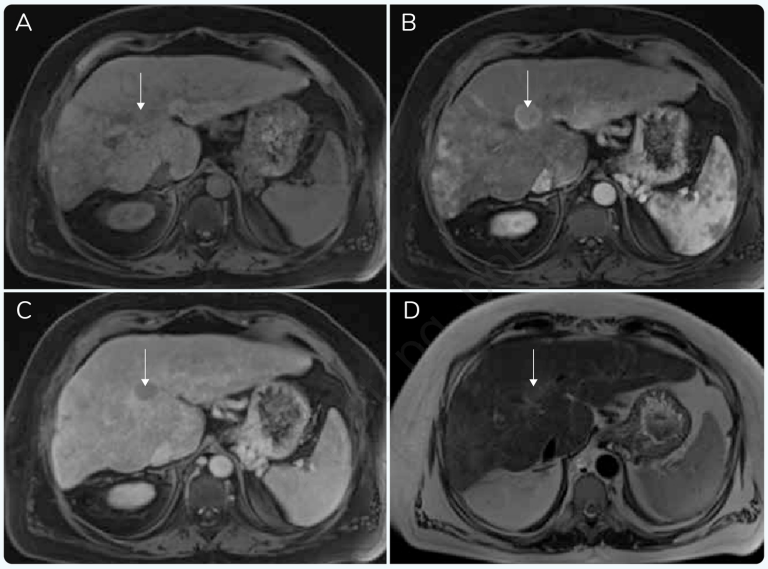
B. Hepatocellular Carcinoma (HCC)

C. Hepatic Adenoma

D. Metastatic Liver Disease




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A. Avid enhancement on the arterial phase (Arrow)
B. Washout on the delayed phase (Arrow)
C. Shows an enhancing capsule (Arrow)
D. A mildly increased signal is observed on T2-weighted nonfat-saturated single-shot images (Arrow)

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See Answer in Part B → Q8

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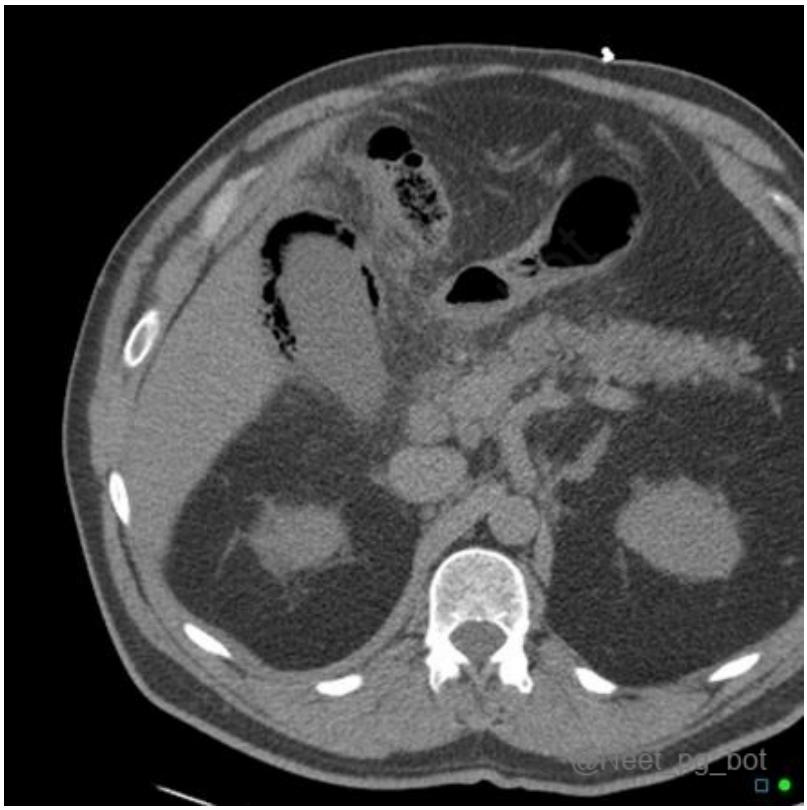
Q9: A patient presents with acute right upper quadrant pain and systemic toxicity. CT abdomen shows air within the gallbladder wall without evidence of biliary-enteric communication. What is the most likely diagnosis? (Q887937)

A. Acute pancreatitis

B. Emphysematous cholecystitis

C. Choledocholithiasis

D. Calculous cholecystitis



See Answer in Part B → Q9

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Q10: A neonate presents with persistent jaundice and pale stools since birth. Ultrasound abdomen shows an echogenic triangular structure anterior to the right portal vein at the porta hepatis. What is the most likely diagnosis? (Q887941)

A. Galactosemia

B. Hemangioma

C. Biliary atresia

D. Caroli’s disease

See Answer in Part B → Q10

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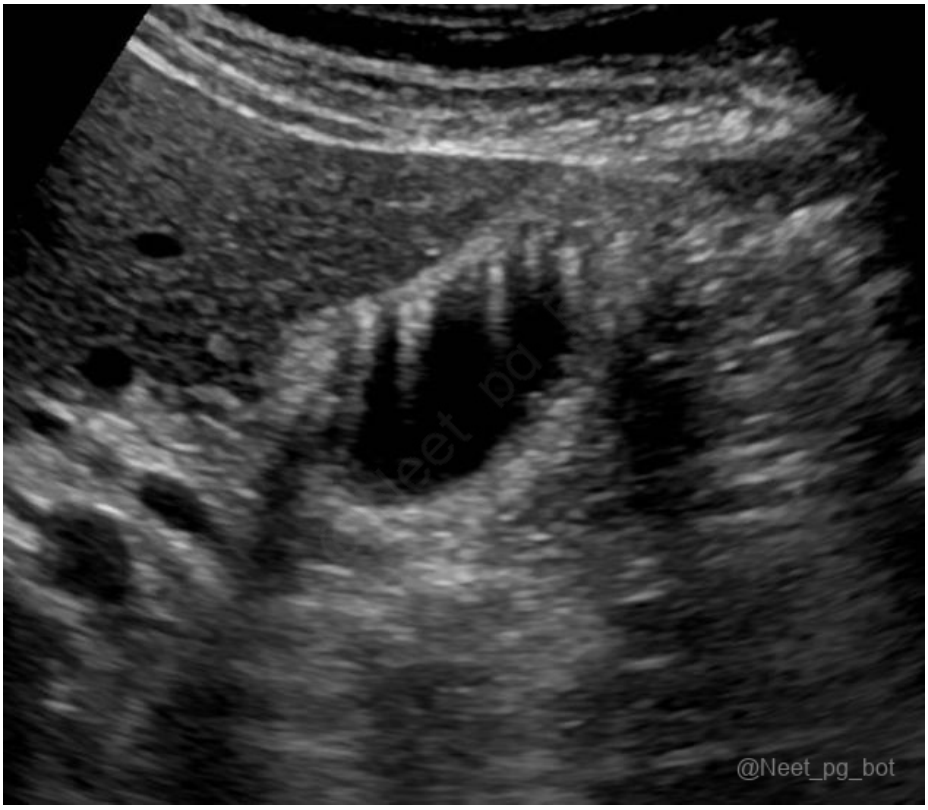
Q11: A 54-year-old man complains of episodic right upper quadrant discomfort without fever or jaundice. Ultrasound examination of the gallbladder shows localised mural thickening with intramural echogenic foci producing a comet-tail artefact. No gallstones are seen. What is the most likely diagnosis? (Q887942)

A. Porcelain gallbladder

B. Gallbladder adenomyomatosis

C. Acute calculous cholecystitis

D. Gallbladder carcinoma



See Answer in Part B → Q11

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Q12: A 45 y/o woman with a history of acute pancreatitis presents with persistent abdominal pain and weight loss. A CT scan performed 5 weeks after her initial episode shows a thick-walled fluid collection containing gas bubbles. What is the most likely diagnosis? (Q852914)

A. Pancreatic pseudocyst

B. Walled-off necrosis

C. Abscess

D. Interstitial edematous pancreatitis



See Answer in Part B → Q12

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Q13: A patient diagnosed with acute pancreatitis is being evaluated for disease severity and prognosis after initial stabilisation. Which imaging modality is most appropriate to assess pancreatic necrosis and predict outcome in this patient? (Q887948)

A. Endoscopic ultrasound (EUS)

B. Contrast-enhanced CT (CECT)

C. Magnetic resonance cholangiopancreatography (MRCP)

D. Endoscopic retrograde cholangiopancreatography (ERCP)

See Answer in Part B → Q13

@Neet_pg_bot

Q14: A patient presents with progressive painless jaundice, anorexia, and weight loss. The MRCP performed for biliary evaluation is shown below. What is the most likely diagnosis? (Q887954)

A. Choledocholithiasis

B. Chronic cholecystitis

C. Pancreatic head carcinoma

D. Primary sclerosing cholangitis



See Answer in Part B → Q14

@Neet_pg_bot

Q15: A middle-aged man presents with progressive weight loss, anorexia, and upper abdominal discomfort. A barium meal study of the patient is given below. What is the most likely diagnosis? (Q887956)

A. Malignant duodenal ulcer

B. Crohn's disease

C. Carcinoma of the pylorus

D. Carcinoma head of the pancreas



See Answer in Part B → Q15

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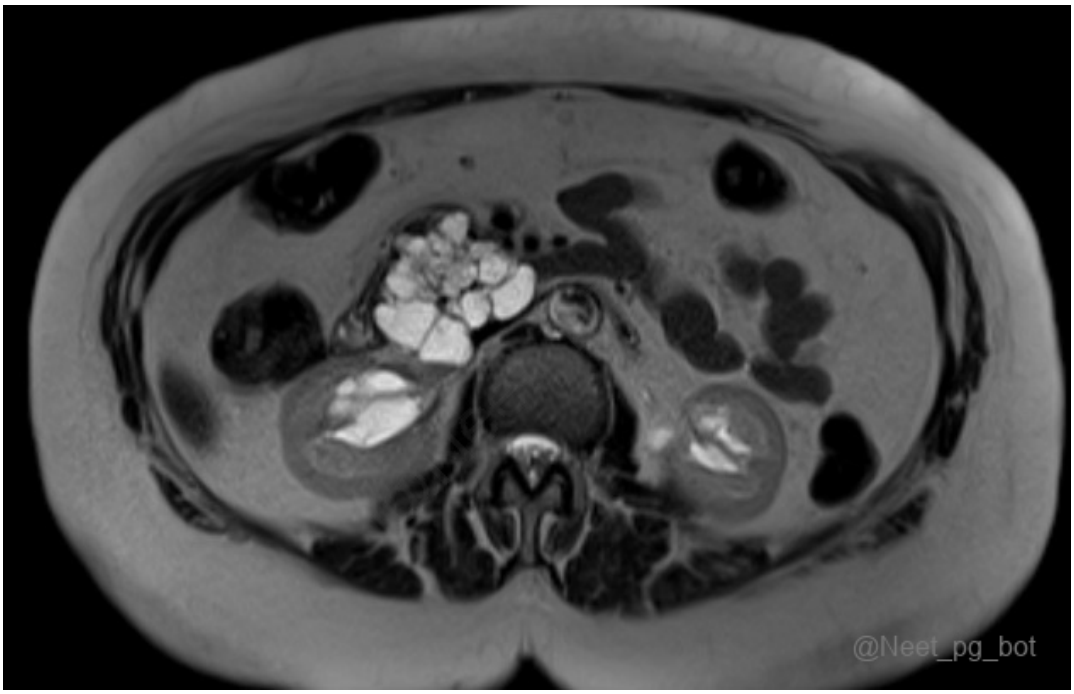
Q16: A contrast-enhanced CT abdomen of a patient is given below. Which diagnosis best fits this imaging description? (Q887960)

A. Serous cystadenoma of the pancreas

B. Pancreatic adenocarcinoma

C. Adenosquamous carcinoma

D. Mucinous cystadenocarcinoma



See Answer in Part B → Q16

@Neet_pg_bot

Q17: A child presents with jaundice and intermittent right upper quadrant abdominal pain. Contrast-enhanced CT abdomen of the patient is given below. What is the most likely diagnosis? (Q887961)

A. Caroli’s disease

B. Hepatoma

C. Hydatid cyst

D. Hepatic hemangioma



See Answer in Part B → Q17

@Neet_pg_bot

Q18: A young female patient with a history of long-term oral contraceptive use undergoes abdominal imaging that is given below. What is the most likely diagnosis? (Q887974)

A. Hepatic hemangioma

B. Hepatic adenoma

C. Metastatic liver deposits

D. Hepatocellular carcinoma



See Answer in Part B → Q18

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Q19: Following blunt abdominal trauma, a patient is suspected to have splenic injury. Which of the following findings is least likely to be identified on a plain abdominal or chest radiograph? (Q887976)

A. Elevation of the left hemidiaphragm

B. Obliteration of the splenic outline

C. Kehr’s sign

D. Loss of the left psoas shadow

See Answer in Part B → Q19

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Q20: A 45-year-old woman presents with intermittent right upper quadrant pain. An ultrasound shows echogenic foci with posterior acoustic shadowing. What is the most likely diagnosis? (Q852902)

A. Gallbladder polyp

B. Gallbladder calculus

C. Gallbladder adenomyomatosis

D. Porcelain gallbladder

See Answer in Part B → Q20

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Q21: Which of the following statements about imaging modalities for the gallbladder is TRUE ? (Q852888)

A. CT-IVC is commonly used to diagnose jaundiced patients.

B. ERCP has a low complication rate and is only diagnostic.

C. USG is less accurate than CT for diagnosing acute biliary diseases.

D. T-tube cholangiography assesses stone clearance post-CBD exploration.

See Answer in Part B → Q21

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Q22: A 65 y/o male presents with severe abdominal pain and elevated liver enzymes. After imaging, he is found to have a suspected bile duct obstruction due to a stone. The physician plans to both visualize and potentially treat the obstruction. Which imaging modality should be chosen? (Q852893)

A. Magnetic Resonance Cholangiopancreatography

B. Endoscopic Retrograde Cholangiopancreatography

C. Ultrasound

D. Computed Tomography

See Answer in Part B → Q22

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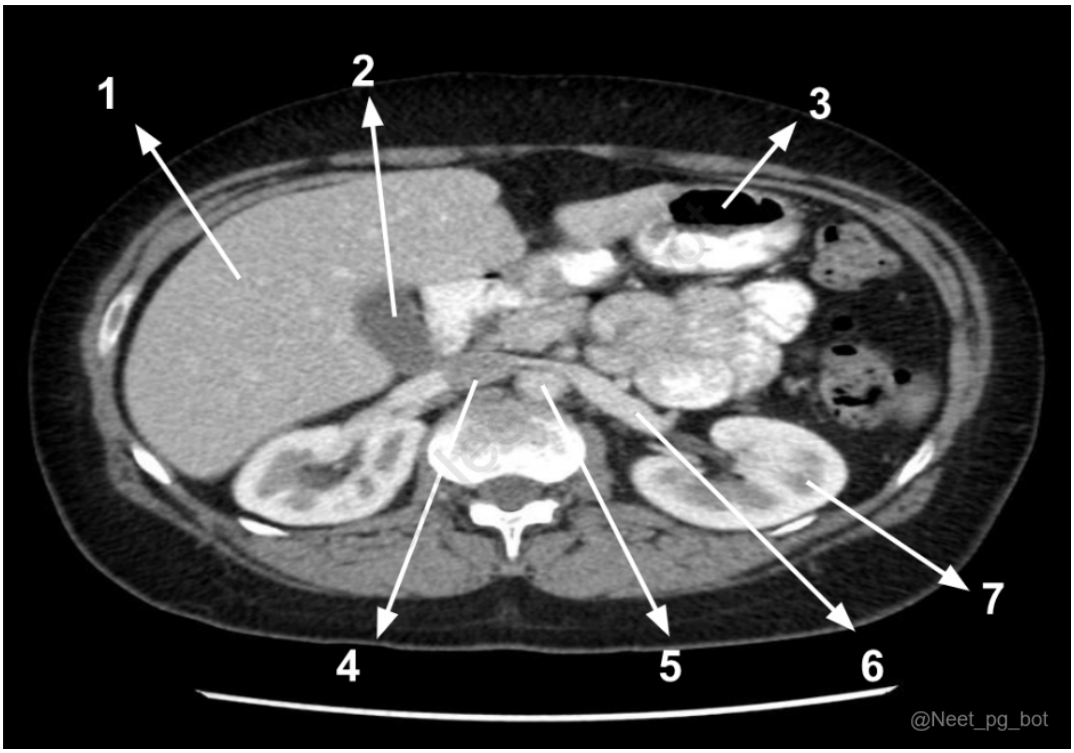
Q23: From the CT abdomen given below identify the labeled structures. (Q852894)

A. 1- Liver, 2- IVC, 7- Right kidney

B. 4- Aorta, 5- IVC, 7- Left kidney

C. 3- Stomach, 4- IVC, 7- Spleen

D. 2- Gallbladder, 5- Aorta, 6- Left Renal Vein



See Answer in Part B → Q23

@Neet_pg_bot

Q24: A 45-year-old female presents to the hospital for evaluation of recurrent abdominal discomfort over the past few months. She has a history of autosomal

dominant polycystic kidney disease. An abdominal MRI reveals multiple irregularly delineated hyper-intense cystic nodules in the liver that do not communicate with the biliary tree. Which of the following statements is true regarding the diagnosis suggested by the MRI findings? (Q852895)

A. Very commonly associated with malignant transformation.

B. Typically asymptomatic and often found incidentally.

C. Characterized by enhancement on contrast CT.

D. Not associated with Caroli's disease.



See Answer in Part B → Q24

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Q25: Match the following with their respective radiologic images Radiological Imaging Diagnosis a. 1. Caroli's Disease b. 2. HCC c. 3. Hepatic Cyst d. 4. Hepatic Hemangioma (Q852896)

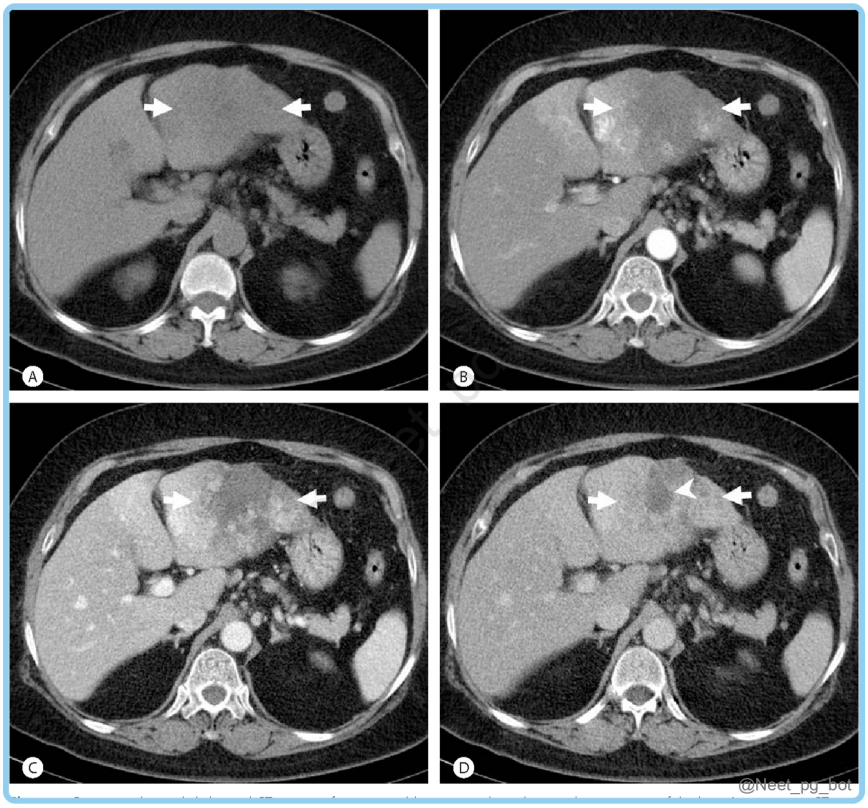
A. a-2; b-3; c-4; d-1

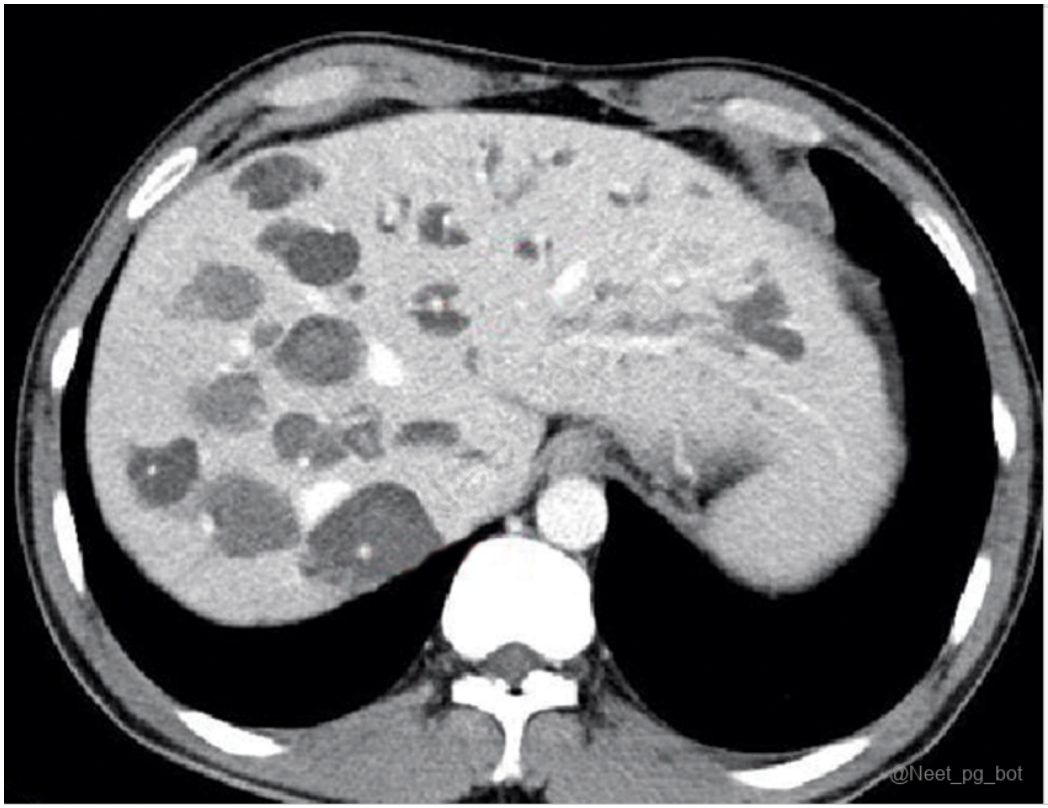
B. a-3; b-4; c-1; d-2

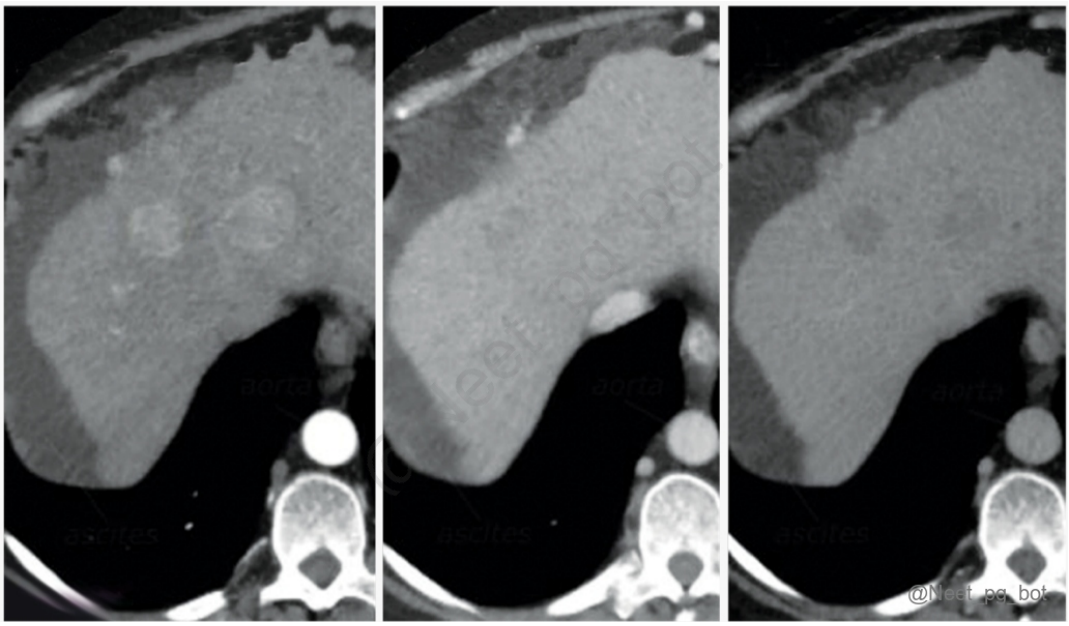
C. a-4; b-3; c-1; d-2

D. a-1; b-4; c-3; d-2




A
B
C
D
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See Answer in Part B → Q25

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Q26: A 45 y/o man from an endemic region presents with abdominal pain. An ultrasound reveals a cyst with multiple septations, resembling a honeycomb. Based on the WHO classification, which of the following stages does this hydatid cyst most likely represent? (Q852899)

A. CE1

B. CE2

C. CE3a

D. CE5

See Answer in Part B → Q26

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Q27: Which of the following statements about gallstones is correct? (Q852900)

A. Cholesterol stones are typically radiopaque and easily visible on X-rays.

B. The Mercedes-Benz sign refers to a star-shaped pattern of gas fissuring in gallstones seen on imaging.

C. Pigment stones are primarily composed of cholesterol and easily visible on X-ray.

D. All gallstones require immediate surgical intervention.

See Answer in Part B → Q27

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Q28: A 45 y/o woman presents with right upper quadrant pain and fever. Ultrasound shows gallbladder wall thickening, gallstones, and pericholecystic fluid. Which of the following findings would most likely suggest chronic cholecystitis rather than acute cholecystitis? (Q852901)

A. Positive sonographic Murphy sign

B. Absence of pericholecystic fluid

C. High-density bile on CT

D. Gallbladder distension on computed tomography (CT)

See Answer in Part B → Q28

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Q29: Which of the following statements about imaging modalities used in the liver is FALSE? (Q852882)

A. USG is the first-line investigation for hepatic disorders.

B. T1-weighted images show a normal liver as hypointense compared to the spleen and kidney.

C. CT allows multiphasic examinations, including arterial, portal, and delayed phases.

D. Digital Subtraction Angiography (DSA) is primarily reserved for therapeutic purposes.

See Answer in Part B → Q29

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Q30: A 60 y/o jaundiced patient presents with upper abdominal pain. Ultrasound reveals a dilated bile duct, but the cause of obstruction is unclear. What would be the next best non-invasive imaging technique to evaluate this condition? (Q852903)

A. Magnetic Resonance Cholangiopancreatography (MRCP)

B. Endoscopic Retrograde Cholangiopancreatography (ERCP)

C. Ultrasound with colour Doppler

D. Plain radiography



See Answer in Part B → Q30

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Q31: Which of the following is the hallmark radiological feature of primary sclerosing cholangitis (PSC) on MRCP? (Q852904)

A. Diffuse dilation of bile ducts

B. Beaded appearance due to alternating strictures and dilations

C. A single long stricture in the common bile duct

D. Multiple large masses in the liver

See Answer in Part B → Q31

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Q32: A 2-month-old infant presents with persistent jaundice and pale stools. An ultrasound reveals no biliary dilation but shows the "triangular cord sign." Which condition is most likely suggested by this finding? (Q852905)

A. Choledochal Cyst

B. Biliary Atresia

C. Neonatal Hepatitis

D. Caroli’s Disease

See Answer in Part B → Q32

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Q33: Which investigation is most sensitive for detecting bile leakage but does not provide information about the exact location of the leak? (Q852906)

A. HIDA Scan

B. CECT

C. MRI with Hepatobiliary Contrast

D. Percutaneous Transhepatic Cholangiography

See Answer in Part B → Q33

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Q34: A 50 y/o man presents with severe epigastric pain radiating to the back for the past two days. His serum lipase is elevated to five times the normal limit. An abdominal X-ray shows a dilated loop of small intestine near the pancreas. Which of the following is the most likely imaging sign observed on the X-ray in this patient? (Q852907)

A. Colon cut-off sign

B. Pneumoperitoneum

C. Sentinel loop sign

D. Ground-glass opacity



See Answer in Part B → Q34

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Q35: A 50-year-old male presents with severe epigastric pain radiating to his back, ongoing for four days. Serum lipase is elevated. A contrast-enhanced CT scan reveals over 30% pancreatic necrosis, multiple peripancreatic fluid collections, and bilateral

pleural effusions. Based on the Modified CT Severity Index (MCTSI) for acute pancreatitis, how would you grade this patient's condition? (Q852909)

A. Mild

B. Moderate

C. Severe

D. Very severe

See Answer in Part B → Q35

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Q36: A 52 y/o man diagnosed with necrotizing pancreatitis presents with worsening abdominal pain. A CT scan on day 3 of his illness is performed. What is the most likely imaging finding seen on day 3 in this patient? (Q852912)

A. Bulky pancreas with mild thickening

B. Parenchymal calcifications

C. Non-enhancing areas in the pancreatic body and tail

D. Homogeneous enhancement of the pancreas

See Answer in Part B → Q36

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• [05_Hepatobiliary Radiology] 012 Previous Year Questions

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[05_Hepatobiliary Radiology] 012 Previous Year Questions — Quick Jump

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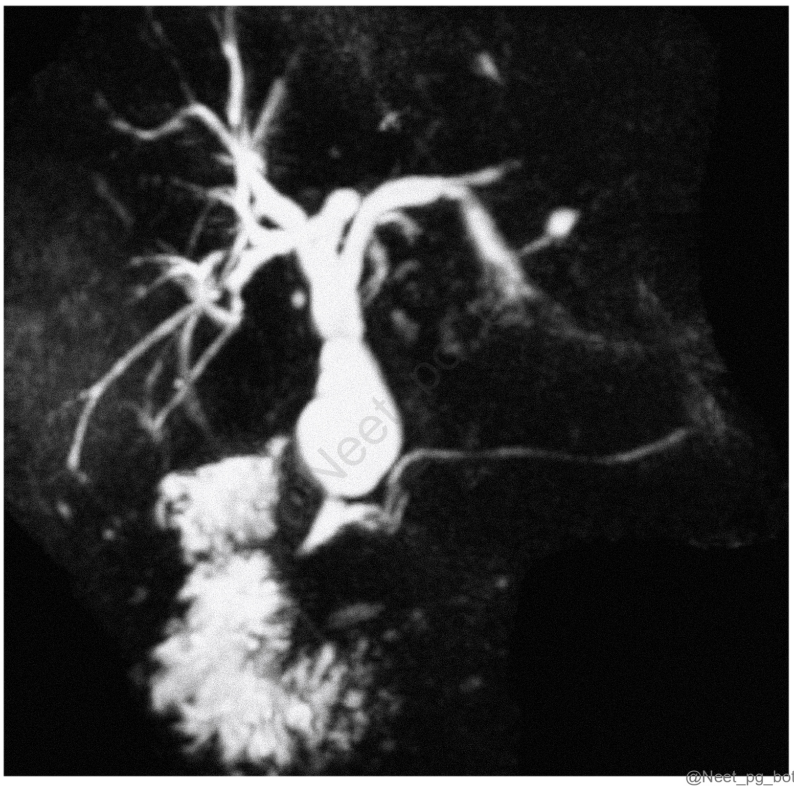
Q1: What condition is indicated by the MRCP image below? (Q843963)

A. Choledochal cyst

B. Cholangiocarcinoma

C. Cholelithiasis

D. Choledocholithiasis



See Answer in Part B → Q1

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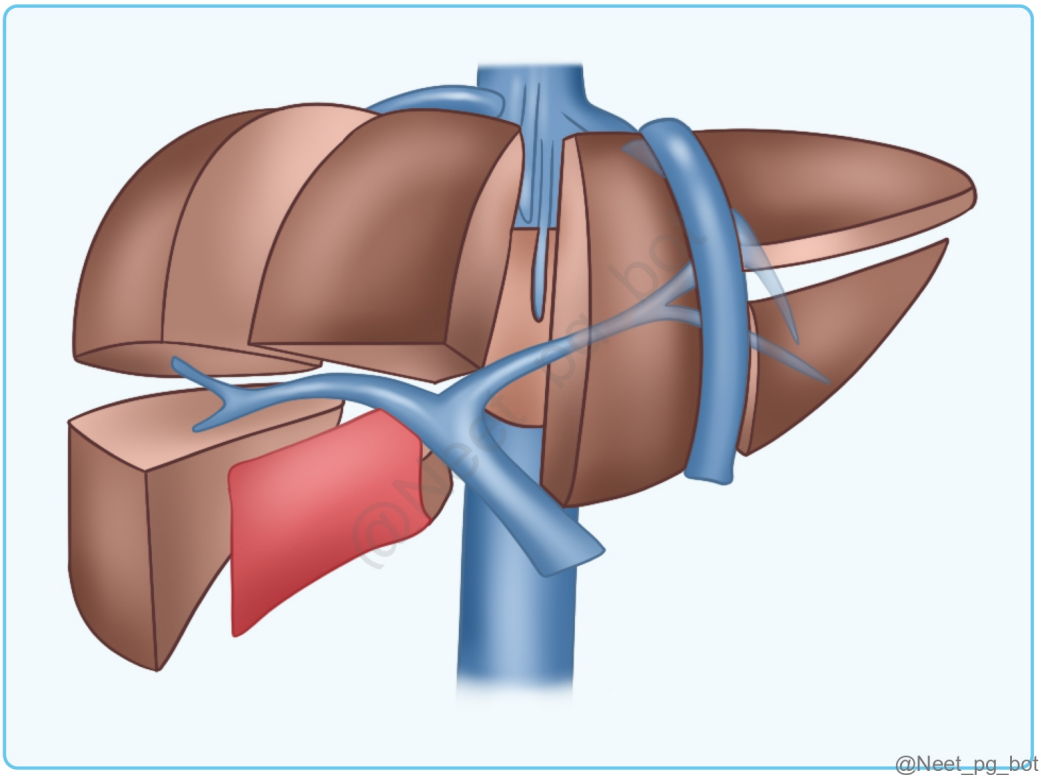
Q2: Please determine the segment of the liver that is highlighted in red in the provided image. (Q858192)

A. V

B. IVa

C. VII

D. III



See Answer in Part B → Q2

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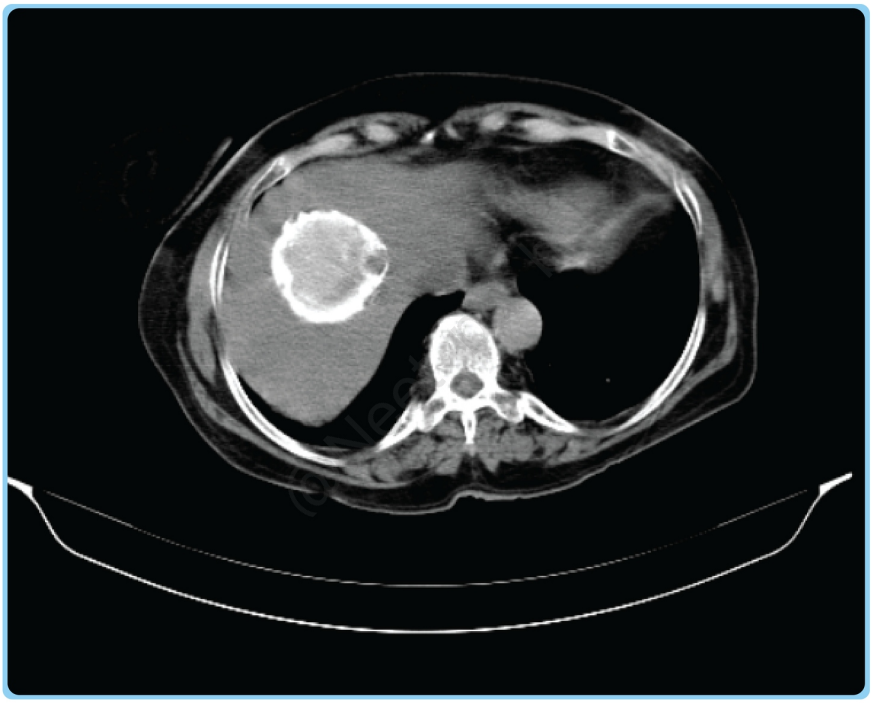
Q3: Identify the condition based on the non-contrast CT scan of a patient given below: (Q855072)

A. Hepatocellular carcinoma

B. Fibronodular hyperplasia

C. Liver abscess

D. Hydatid cyst



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See Answer in Part B → Q3

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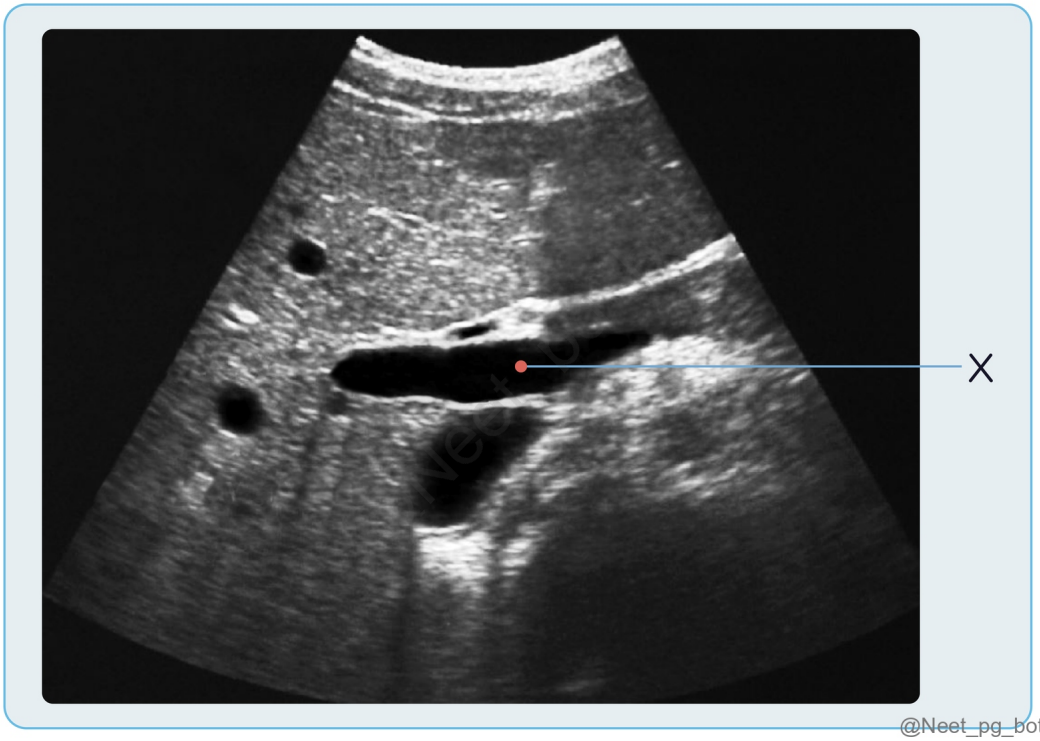
Q4: Please identify the structure labelled 'X' in the given ultrasound image of the liver. ■ (Q859278)

A. Portal vein

B. Hepatic artery

C. Hepatic vein

D. Inferior vena cava



See Answer in Part B → Q4

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• [06_OBGy Imaging] 013 Obstetrics Gynaecology And Breast Imaging

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[06_OBGy Imaging] 013 Obstetrics Gynaecology And Breast Imaging — Quick Jump

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Q19 (p. 263)	*Q20 (p. 264)*	*Q21 (p. 265)*			

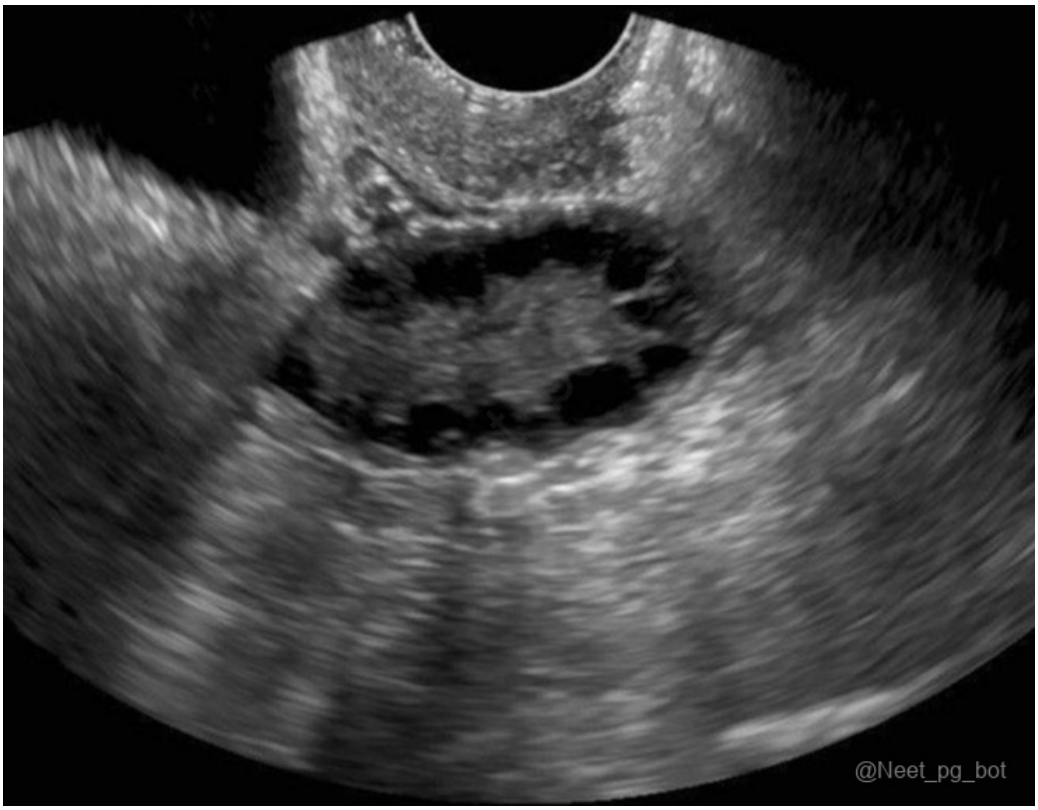
Q1: Based on the given ultrasound of the ovary, which radiological pattern is observed? (Q882193)

A. Chocolate cyst

B. String of pearls sign

C. Honeycomb appearance

D. Ground-glass appearance



See Answer in Part B → Q1

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Q2: A 32-year-old woman presents for a routine ultrasound at 28 weeks of gestation. The obstetrician notes an abnormal S/D ratio in the umbilical artery Doppler assessment. Which of the following implications is most likely associated with this finding? (Q853430)

A. Low S/D ratio reflects increased resistance in placental blood flow

B. Increased resistance to blood flow in the placenta, indicating potential placental insufficiency

C. Fetal anemia requiring immediate intervention

D. Indicated fetal distress and warrants delivery

See Answer in Part B → Q2

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Q3: A 30-year-old female patient presents with infertility and undergoes radiological evaluation. Hysterosalpingography (HSG) reveals a "tobacco pouch" appearance and beaded fallopian tubes. Which of the following conditions is most likely responsible for these findings? (Q853432)

A. Hydrosalpinx

B. Endometriosis

C. Female Genital Tuberculosis (FGTB)

D. Ovarian Cyst

See Answer in Part B → Q3

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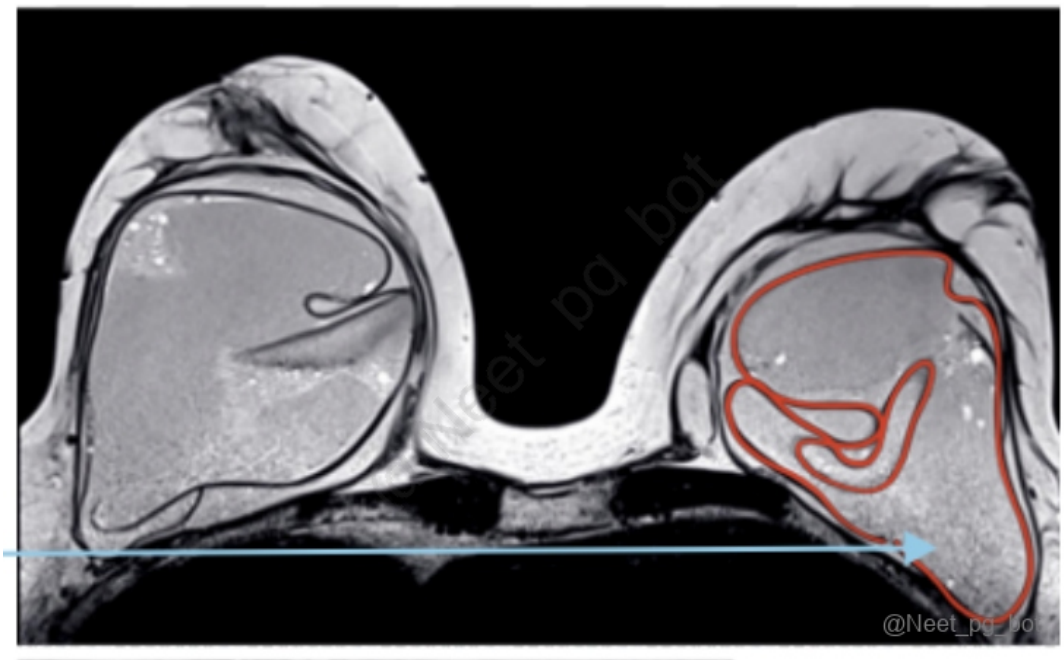
Q4: The following sign in breast MRI is characteristic of: (Q853441)

A. Fibrocystic breast disease

B. Intracapsular breast implant rupture

C. Extracapsular breast implant rupture

D. Fat necrosis of the breast



See Answer in Part B → Q4

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Q5: A 17-year-old male presents to the emergency department with a sudden onset of severe left scrotal pain radiating to the groin. He describes nausea but denies any trauma. On examination, the left testis is high-riding, and there is tenderness upon palpation. Which imaging modality is preferred in this scenario? (Q853440)

A. Computed Tomography

B. Magnetic Resonance Imaging

C. Ultrasonography

D. X-ray of the pelvis

See Answer in Part B → Q5

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Q6: Scrotal pain with the whirlpool sign on ultrasound is suggestive of: (Q853439)

A. Torsion

B. Epididymo-orchitis

C. Varicocele

D. Hydrocele

See Answer in Part B → Q6

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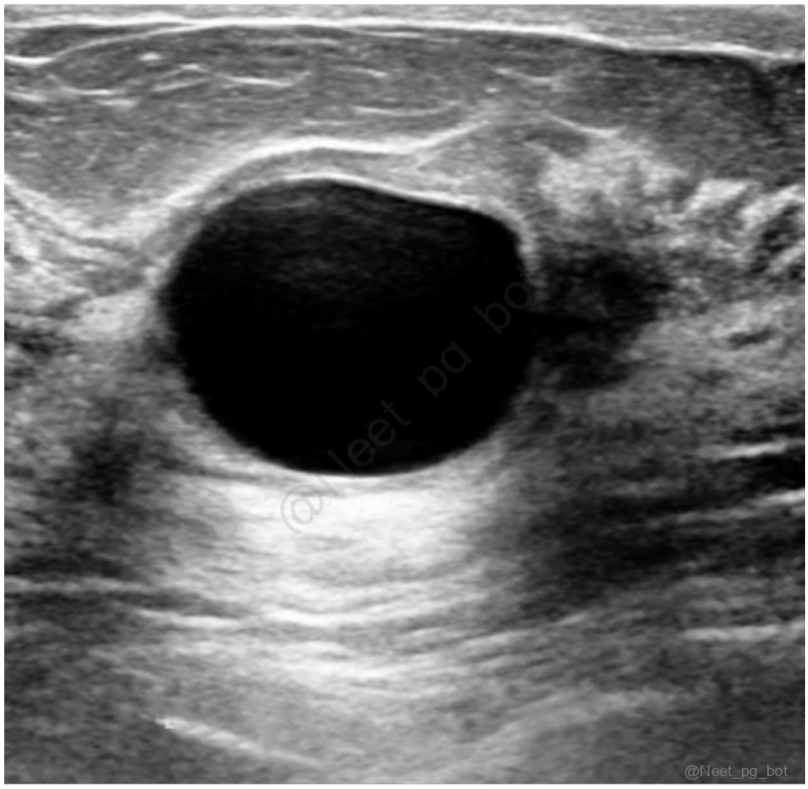
Q7: A 35-year-old woman presents to the clinic with a palpable lump in her right breast that she first noticed two weeks ago. The lump is round, mobile, and non-tender on examination. An ultrasound image is given below. What is the most likely diagnosis? (Q853438)

A. Simple cyst

B. Complex cyst

C. Complicated cyst

D. Breast cancer



See Answer in Part B → Q7

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Q8: A 52-year-old woman undergoes routine mammography screening. The report indicates a 1.5 cm spiculated mass with irregular borders in the upper outer quadrant of the right breast. The radiologist assigns it a BIRADS 5 category. Which of the following best describes the implication of a BIRADS 5 category on mammography? (Q853437)

A. Highly suggestive of malignancy, >95% chance

B. Probably benign, <2% chance of malignancy

C. Highly suggestive of malignancy, <95% chance

D. Benign finding, no follow-up required

See Answer in Part B → Q8

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Q9: Match the following: Disease Mammography features a. Fibroadenoma (i) Eggshell calcification b. Fat Necrosis (ii) Broken-needle appearance c. Duct ectasia (iii) Teacup calcification d. Fibrocystic disease (iv) Popcorn calcifications (Q853436)

A. a-iv, b-i, c-ii, d-iii

B. a-ii, b-iii, c-iv, d-i

C. a-iii, b-ii, c-iv, d-i

D. a-iii, b-iv, c-i, d-ii

See Answer in Part B → Q9

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Q10: A 28-year-old woman is evaluated for a pelvic mass. An ultrasound shows a complex ovarian mass with a Rokitansky nodule and areas of calcification. What is the most likely diagnosis? (Q853435)

A. Endometrioma

B. Serous cystadenoma

C. Ovarian dermoid

D. Ovarian carcinoma

See Answer in Part B → Q10

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Q11: A 35-year-old woman presents with heavy menstrual bleeding and pelvic pressure. An ultrasound reveals a well-circumscribed, hypoechoic, solid uterine mass with shadowing. What is the most likely imaging diagnosis? (Q853434)

A. Endometrial carcinoma

B. Uterine fibroid (leiomyoma)

C. Ovarian cyst

D. Adenomyosis

See Answer in Part B → Q11

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Q12: A 42-year-old woman presents with chronic pelvic pain, dysmenorrhea, and menorrhagia. Transvaginal ultrasound shows an enlarged, symmetrical uterus with sub-endometrial linear striations, 3-mm cysts, and a "rain shower" appearance. What is the most likely diagnosis? (Q853433)

A. Uterine fibroids

B. Endometrial polyp

C. Adenomyosis

D. Endometriosis

See Answer in Part B → Q12

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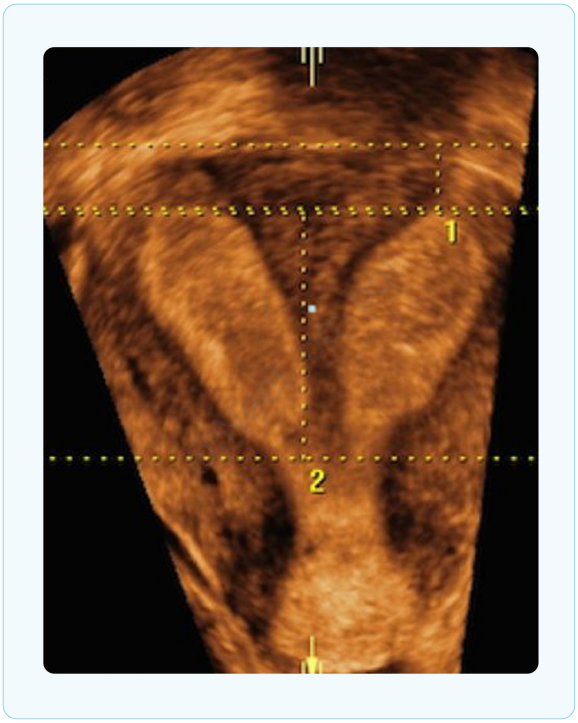
Q13: A 35-year-old woman with a history of infertility is undergoing evaluation. The scan image is shown below. What is the most likely diagnosis? (Q853422)

A. Septate uterus

B. Arcuate uterus

C. Bicornuate uterus

D. Unicornuate uterus



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See Answer in Part B → Q13

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Q14: A 30-year-old woman undergoing controlled ovarian hyperstimulation for in vitro fertilization presents with abdominal pain and significant distension. Which of the following is the most likely finding on an ultrasound seen in this patient that helps differentiate it from PCOS? (Q853431)

A. Echogenic stroma

B. Ovarian volume >10 ml

C. Presence of ascites

D. Multiple cysts measuring 2-9 mm

See Answer in Part B → Q14

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Q15: Which of the following is not typically associated with IUFD as observed on ultrasound? (Q853429)

A. Maceration

B. Spalding sign

C. Increased amniotic fluid volume

D. Presence of soft tissue edema

See Answer in Part B → Q15

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Q16: A 12-week pregnant patient presents with a nuchal translucency (NT) measurement of 3.2 mm during her first-trimester ultrasound. What is the most appropriate follow-up ultrasound examination to assess for potential anomalies? (Q853428)

A. Second-trimester anatomy scan at 20 weeks

B. Fetal echocardiography

C. Nuchal translucency re-evaluation at 16 weeks

D. Doppler ultrasound of the umbilical artery

See Answer in Part B → Q16

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Q17: An ultrasound scan image of a 30-year-old woman who presented for a routine ultrasound at 6 weeks of gestation is shown below. What is the most significant ultrasound finding in this case? (Q853427)

A. T-sign

B. Lambda sign

C. Snowstorm appearance

D. Pseudogestational sac



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See Answer in Part B → Q17

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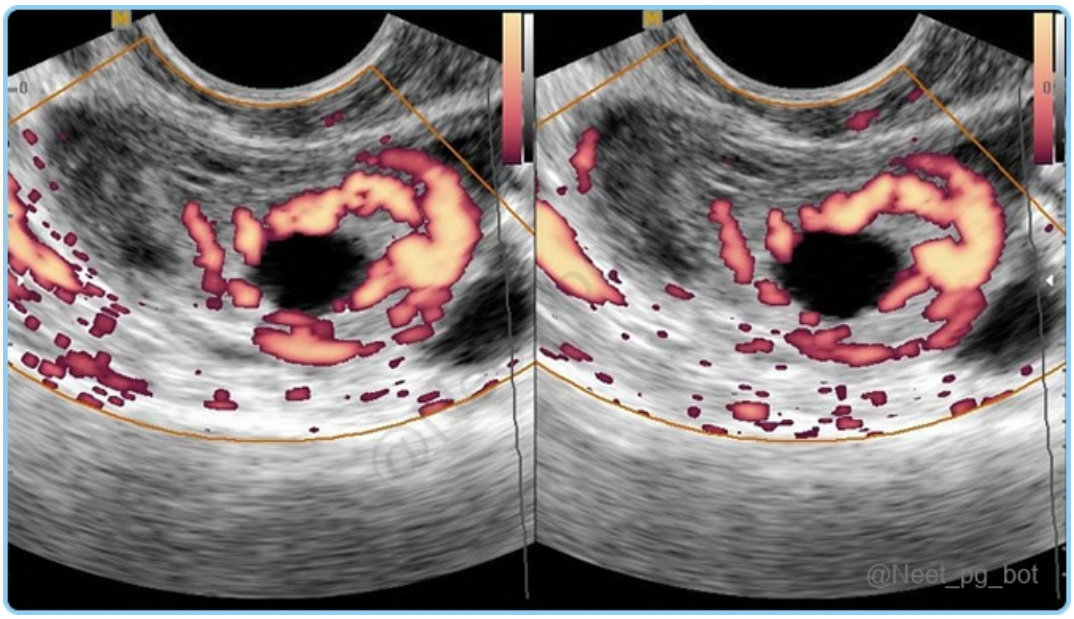
Q18: A 33-year-old woman with a history of tubal ligation presents with sudden lower abdominal pain and vaginal bleeding. She has a positive serum hCG, and transvaginal ultrasound is shown below. What is the most definitive radiological feature confirming the diagnosis of ectopic pregnancy in this case? (Q853426)

A. Ring of fire appearance

B. Lambda sign

C. Trilaminar appearance

D. Double decidual sac sign



See Answer in Part B → Q18

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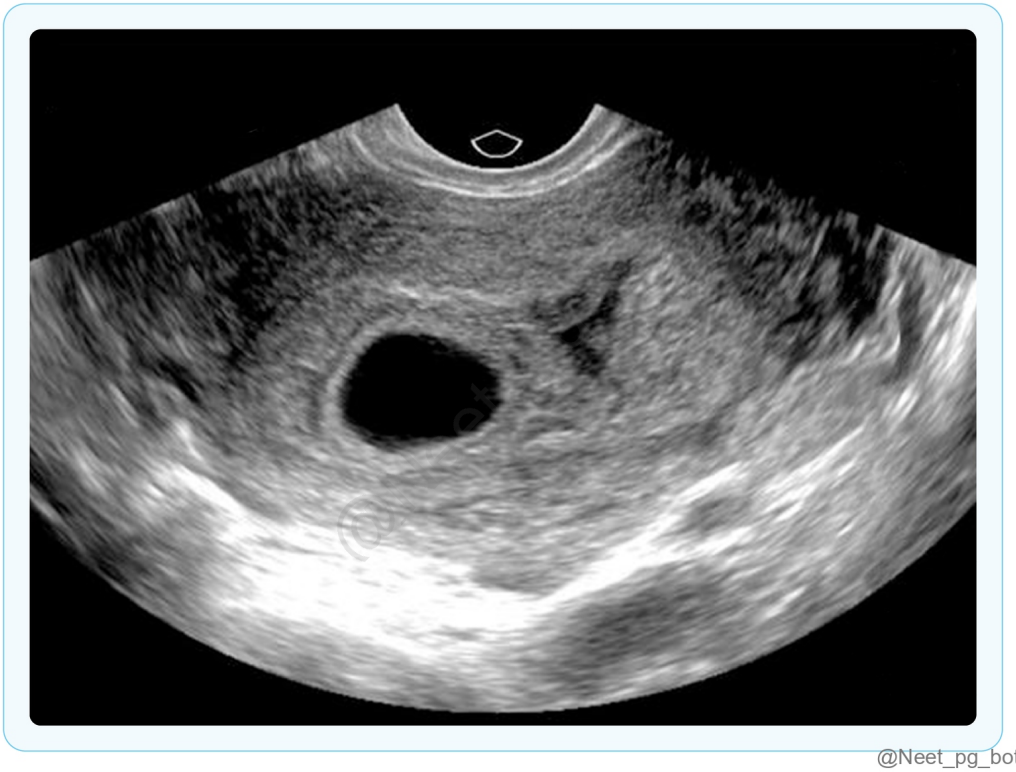
Q19: A 30-year-old woman with a history of recurrent pregnancy loss presents to the Obstetrics clinic at 4.5 weeks gestation for her ultrasound scanning appointment. An image of the transvaginal ultrasound is shown below. shows a well-defined gestational sac with the double decidual sac sign, but no yolk sac or fetal pole is visible. What is the significance of this ultrasound finding? (Q853425)

A. High likelihood of ectopic pregnancy

B. Accurate measurement of gestational age

C. Indicative of an intrauterine pregnancy

D. Suspicious for a molar pregnancy



See Answer in Part B → Q19

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Q20: A 32-year-old woman with a history of infertility and recurrent pelvic discomfort is undergoing further evaluation with imaging. She has no history of recent infections but had an episode of acute pelvic inflammatory disease (PID) 5 years ago that was treated with antibiotics. The radiological image is shown below. What is the most likely diagnosis? (Q853424)

A. Hydrosalpinx

B. Ovarian cyst

C. Uterine adhesions

D. Right Cornual obstruction



See Answer in Part B → Q20

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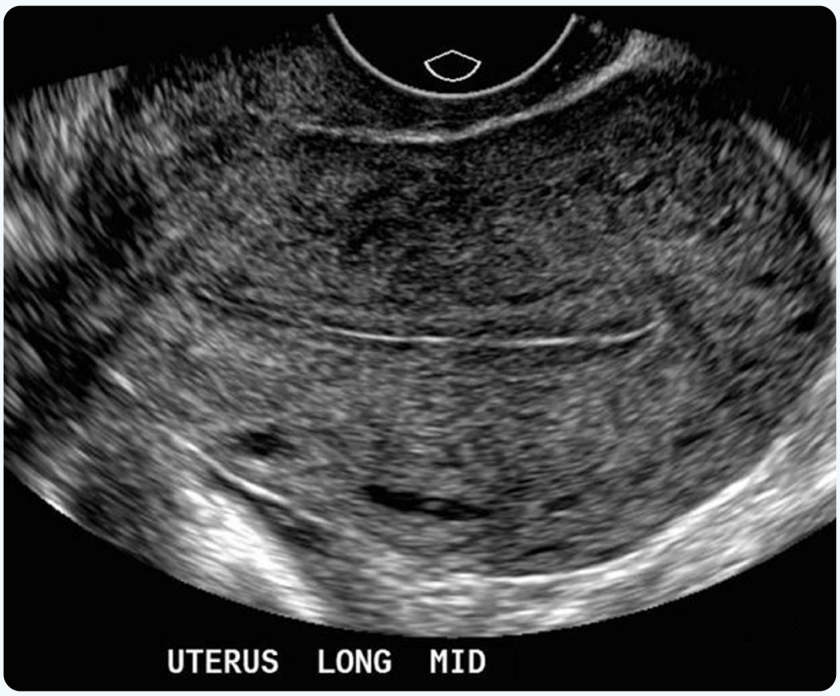
Q21: A 34-year-old woman is undergoing a fertility evaluation. The transvaginal USG image is shown below. Which phase of the menstrual cycle is she most likely in? (Q853423)

A. Menstrual phase

B. Early proliferative phase

C. Late proliferative phase

D. Secretory phase



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See Answer in Part B → Q21

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[06_OBGy Imaging] 014 Previous Year Questions — Quick Jump

Q1 (p. 267) *Q2 (p. 267)* *Q3 (p. 267)* *Q4 (p. 268)* *Q5 (p. 269)* *Q6 (p. 269)*

Q1: Fetal anaemia is primarily determined by Doppler assessment of which artery? (Q866874)

A. Middle cerebral artery

B. Umbilical artery

C. Ductus venosus

D. Uterine artery

See Answer in Part B → Q1

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Q2: Which investigation is contraindicated in pregnancy? (Q865259)

A. CT scan

B. MRI

C. Ultrasound

D. Doppler

See Answer in Part B → Q2

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Q3: Which of the following methods is used to measure fetal anemia? (Q852578)

A. Umbilical artery Doppler

B. Cord blood sampling

C. Chorionic villus sampling

D. Peak systolic velocity in the fetal middle cerebral artery (MCA)

See Answer in Part B → Q3

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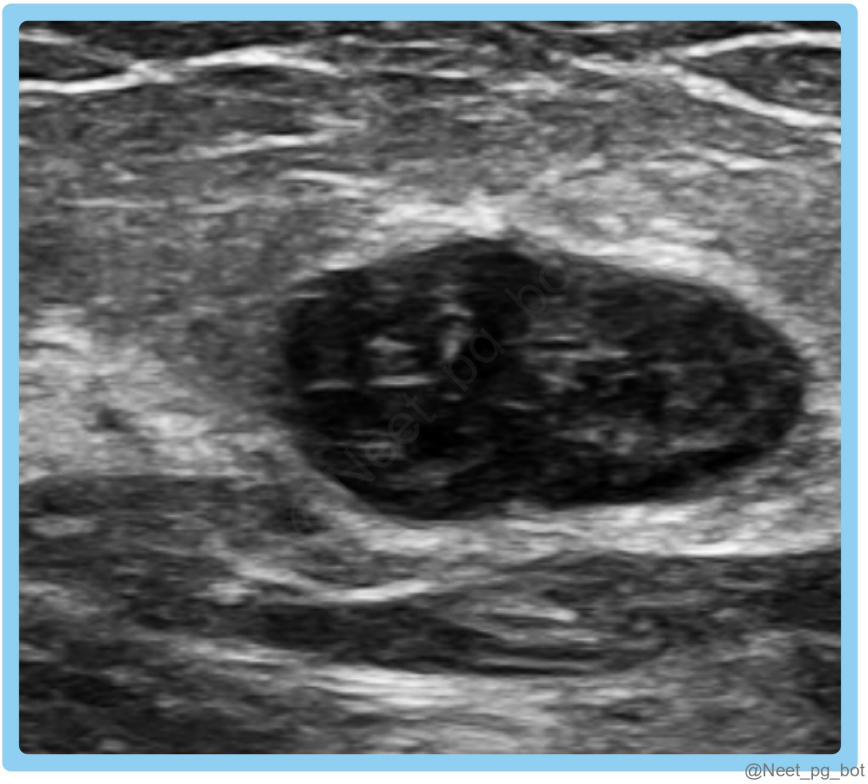
Q4: Which of the following is most likely to show the following finding on USG? (Q860590)

A. Fibroadenoma

B. Breast cyst

C. Breast carcinoma

D. Metastasis to the breast from another primary site



See Answer in Part B → Q4

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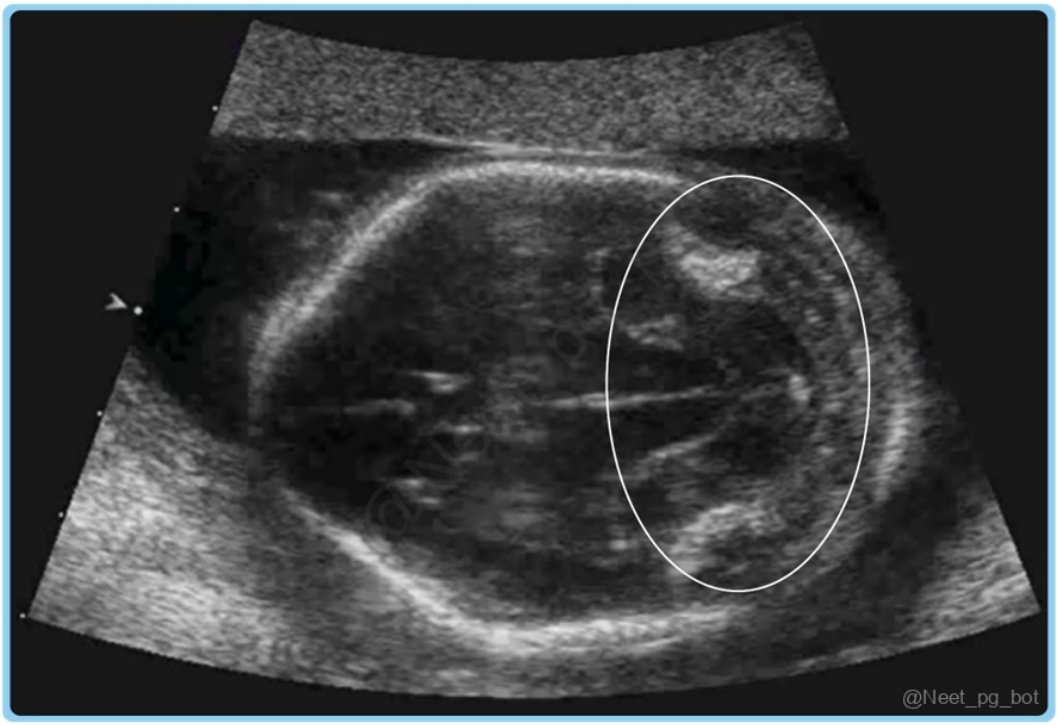
Q5: Banana sign on USG is seen in which of the following conditions? (Q857384)

A. Omphalocele

B. Spina bifida

C. Anencephaly

D. Encephalocele



See Answer in Part B → Q5

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Q6: Which of the following is not a benefit of ultrasound (USG) compared to mammography? (Q857385)

A. USG can be used to detect calcifications, asymmetries, and distortions better than mammography

B. Can be used for guided biopsy

C. In young females with dense breasts

D. Can be used to differentiate solid VS cystic

See Answer in Part B → Q6

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• [07_Nuclear Medicine] 015 Nuclear Medicine And Radiotherapy

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[07_Nuclear Medicine] 015 Nuclear Medicine And Radiotherapy — Quick Jump

Q1 (p. 271)	*Q2 (p. 271)*	*Q3 (p. 272)*	*Q4 (p. 272)*	*Q5 (p. 272)*	*Q6 (p. 273)*
Q7 (p. 273)	*Q8 (p. 274)*	*Q9 (p. 274)*	*Q10 (p. 274)*	*Q11 (p. 275)*	*Q12 (p. 276)*
Q13 (p. 276)	*Q14 (p. 277)*	*Q15 (p. 277)*	*Q16 (p. 278)*	*Q17 (p. 279)*	*Q18 (p. 279)*
Q19 (p. 280)	*Q20 (p. 281)*	*Q21 (p. 282)*	*Q22 (p. 282)*	*Q23 (p. 283)*	

Q1: A 62-year-old female with a history of hypertension and diabetes presents to the emergency department with new-onset chest pain and fatigue. An electrocardiogram shows ST-segment changes suggestive of ischemia. Which scan type should be prioritized in this case? (Q853407)

A. Thallium scan

B. Pyrophosphate scan

C. MUGA scan

D. PET scan

See Answer in Part B → Q1

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Q2: A 65-year-old man with a suspicion of lung cancer is being evaluated with an FDG PET scan to guide his treatment plan. Which of the following is NOT a typical use of FDG PET in clinical practice? (Q853410)

A. Evaluating the presence of distant metastasis from the primary lung tumor

B. Differentiating between benign inflammatory conditions and malignant lesions

C. Assessing the effectiveness of chemotherapy

D. Staging the extent of lung cancer prior to treatment

See Answer in Part B → Q2

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Q3: A 65-year-old patient with a history of smoking undergoes a positron emission tomography (PET) scan for suspected lung cancer. The scan shows increased radiotracer uptake in the right lung. However, further investigation reveals no malignancy. Which of the following is the most likely cause of this false positive result? (Q853421)

A. Low metabolic activity of the tumor

B. Physiological uptake due to muscle activity

C. Small size of the tumor

D. Inflammation from a recent pneumonia infection

See Answer in Part B → Q3

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Q4: A 55-year-old male patient diagnosed with nasopharyngeal carcinoma (NPC) is being considered for radiotherapy. Which of the following statements regarding the radiosensitivity of NPC is correct? (Q853420)

A. Low radiosensitivity, high failure rates.

B. Highly radiosensitive; 70% to 98% control with IMRT.

C. EMT promotes radiosensitivity.

D. High RPA1 expression indicates sensitivity.

See Answer in Part B → Q4

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Q5: Which of the following factors is most likely associated with increased radiosensitivity in tumor cells? (Q853419)

A. Efficient DNA double-strand break (DSB) repair mechanisms

B. Low apoptosis rates in response to radiation

C. High levels of γ-H2AX foci indicating unrepaired DNA damage

D. High proportion of cancer stem cells (CSCs) within the tumor

See Answer in Part B → Q5

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Q6: A 55-year-old male is undergoing fractionated radiotherapy for the treatment of a large head and neck tumor. The radiation oncologist opts for a standard fractionation schedule. Which of the following principles is not part of the "5 Rs of Radiobiology" that underlie the rationale for fractionation? (Q853418)

A. Radiosensitivity

B. Repair

C. Radioresistance

D. Reoxygenation

See Answer in Part B → Q6

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Q7: A 60-year-old male with localized prostate cancer is referred for radiotherapy. The oncologist wants to use a technique that provides superior dose conformity to the tumor, reduces treatment time, and limits radiation exposure to surrounding healthy tissues. Which of the following radiotherapy techniques would be most appropriate for this patient? (Q853417)

A. VMAT

B. IGRT

C. CyberKnife

D. NCT

See Answer in Part B → Q7

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Q8: A 65-year-old patient with a lung tumor is undergoing radiation therapy. The radiation oncologist decides to implement a gating technique to minimize damage to surrounding healthy tissue. What is the primary advantage of using gating for this patient? (Q853416)

A. It shapes the radiation dose to match the tumor's irregular shape

B. It prevents the tumor from moving during treatment by immobilizing the patient

C. It directs radiation beams from different angles to target the tumor

D. Synchronizes radiation delivery with the tumor's position during the respiratory cycle

See Answer in Part B → Q8

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Q9: A 9-year-old patient is undergoing proton therapy for a localized brain tumor located near critical structures like the optic nerve and brainstem. The radiation oncologist uses proton therapy to take advantage of the Bragg peak. What is the primary benefit of using proton therapy with the Bragg peak in this scenario? (Q853415)

A. Uniform radiation delivery to both the tumor and surrounding brain tissues.

B. Deliver the highest dose of radiation at the tumor site while sparing the optic nerve and brainstem.

C. Greater radiation scatter, which is ideal for treating tumors near critical structures.

D. Photon therapy provides better tissue sparing than proton therapy.

See Answer in Part B → Q9

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Q10: In the image, applicators have been placed on a 58-year-old woman who is undergoing high-dose interstitial brachytherapy for early-stage breast cancer. Which of the following advantages does afterloading provide in this scenario? {{caption_text}} (Q853414)

A. Eliminates the need for imaging confirmation before placing the radioactive seeds.

B. Minimizes radiation exposure to healthcare workers during seed placement.

C. It enhances the mobility of radioactive seeds for more uniform dose distribution.

D. Allows for real-time radiation delivery without the use of encapsulated seeds.



See Answer in Part B → Q10

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Q11: Which of the following statements is NOT true regarding the use of linear accelerators (LINAC) in radiotherapy? (Q853413)

A. The X-ray beam used for treatment is generated by an overhead X-ray tube.

B. LINACs do not require the use of radioisotopes for radiation production.

C. LINACs are commonly used in brachytherapy procedures.

D. Microwave energy is used to accelerate electrons within the LINAC.

See Answer in Part B → Q11

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Q12: External beam radiation therapy is planned for a 58-year-old woman with a diagnosis of superficial basal cell carcinoma on her forehead as she refused surgical intervention Considering the characteristics of various radiation modalities, which type of beam would be the most appropriate for achieving effective treatment while minimizing damage to the underlying tissues? (Q853412)

A. X-ray

B. Photon beams

C. Electron beams

D. Gamma rays

See Answer in Part B → Q12

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Q13: A 65-year-old man has metastatic castration-resistant prostate cancer (mCRPC). Which of the following agents would be most suitable for palliative treatment? (Q853411)

A. Phosphorus-32

B. Radium-223

C. Electron beams

D. None of the above

See Answer in Part B → Q13

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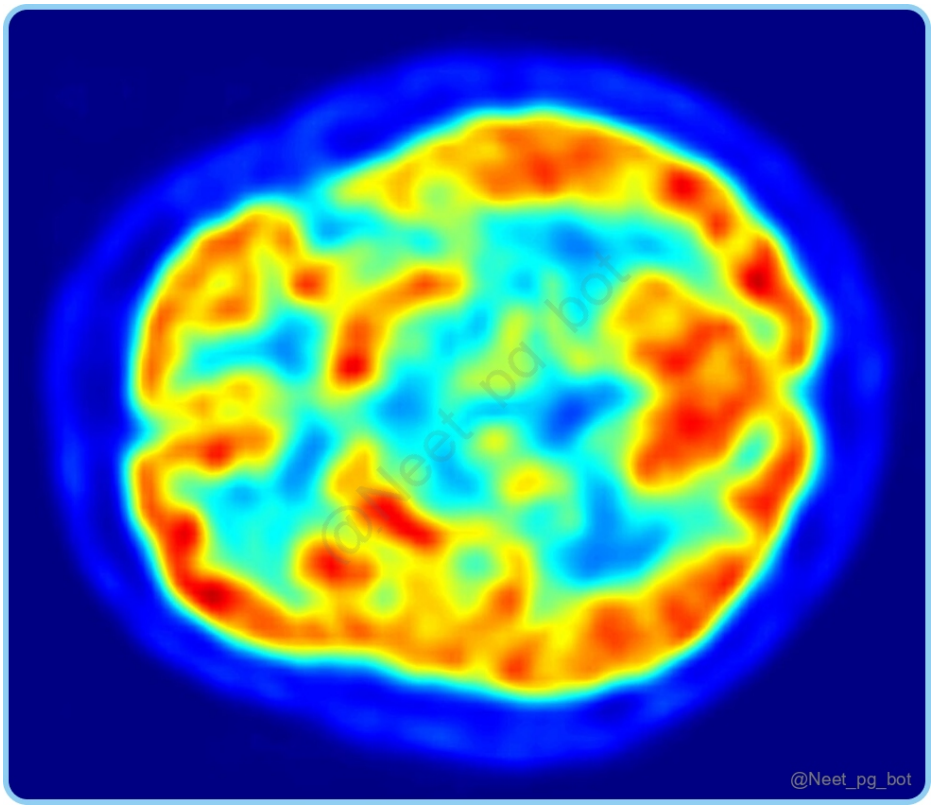
Q14: Which of the following is an incorrect statement about this scan? {{caption_text}} (Q853399)

A. Uses F-18 fluorodeoxyglucose

B. Doesn't show metabolic changes

C. Uses a ring of multiple detectors

D. Very expensive



See Answer in Part B → Q14

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Q15: Which liver lesion shows hot spot on the sulphur colloid scan? (Q853409)

A. Hepatic hemangioma

B. Hepatocellular carcinoma

C. Focal nodular hyperplasia

D. Hepatic cyst

See Answer in Part B → Q15

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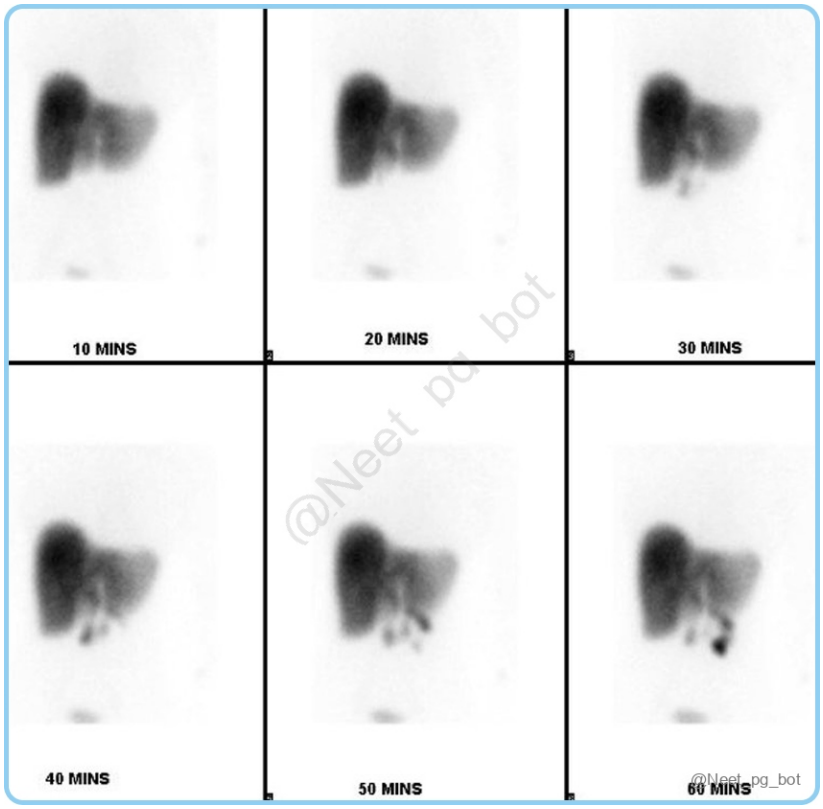
Q16: Hepatic hot rim sign is seen in which of the following? {{caption_text}} (Q853408)

A. Chronic cholecystitis

B. Acute cholecystitis

C. Bile leak

D. Gallbladder dyskinesia



See Answer in Part B → Q16

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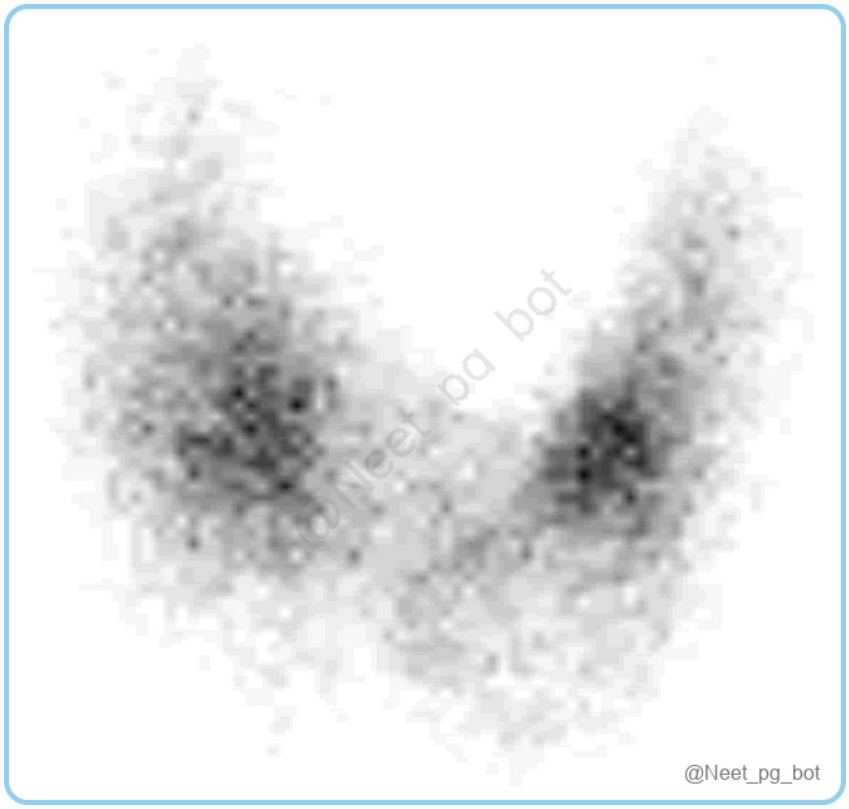
Q17: A 42-year-old woman presents with concerns about a lump on her neck that she first noticed approximately three weeks ago. A scan was performed as shown in the image. Which of the following is incorrect for this scan? {{caption_text}} (Q853406)

A. I-123 is the most commonly used

B. There is an increased uptake of tracer in one area

C. 99mTc-sestamibi can be used for this scan

D. Half-life of the most common tracer is 13.2 hours



See Answer in Part B → Q17

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Q18: A 2-year-old boy presents with intermittent right lower quadrant pain and hematochezia. His parents report he has been irritable for the past few weeks. A scan is performed as given below. Which of the following is not a false positive for such type

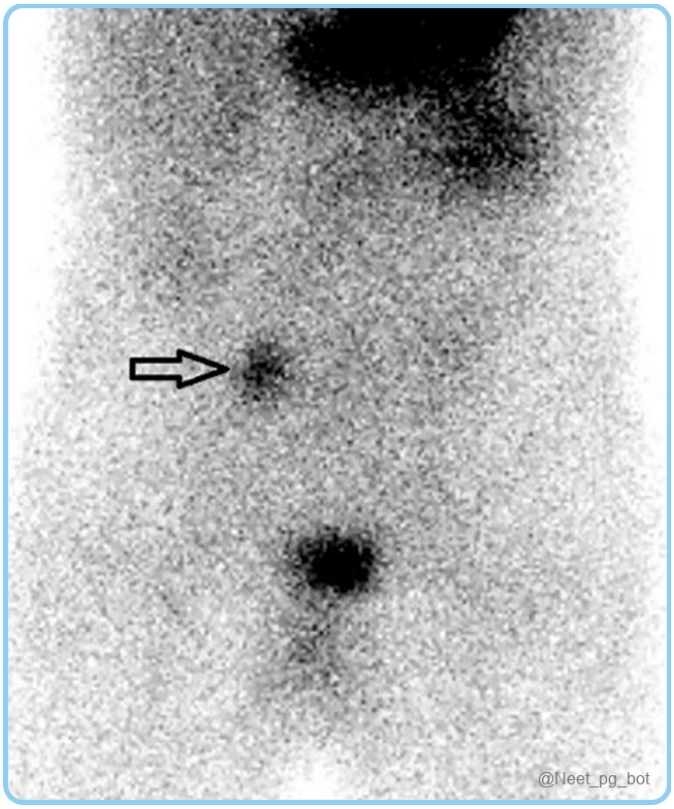
of scans? {{caption_text}} (Q853405)

A. Chron’s disease

B. Appendicitis

C. Intussusception

D. Warthin’s tumor



See Answer in Part B → Q18

@Neet_pg_bot

Q19: Which of the following is incorrect about this scan? {{caption_text}} (Q853404)

A. Fibrous cortical defects show hot spot

B. Tracer in the bladder is physiological

C. In cellulitis tracer does not show prolonged retention in delayed phase

D. Superscan is seen in hyperparathyroidism



See Answer in Part B → Q19

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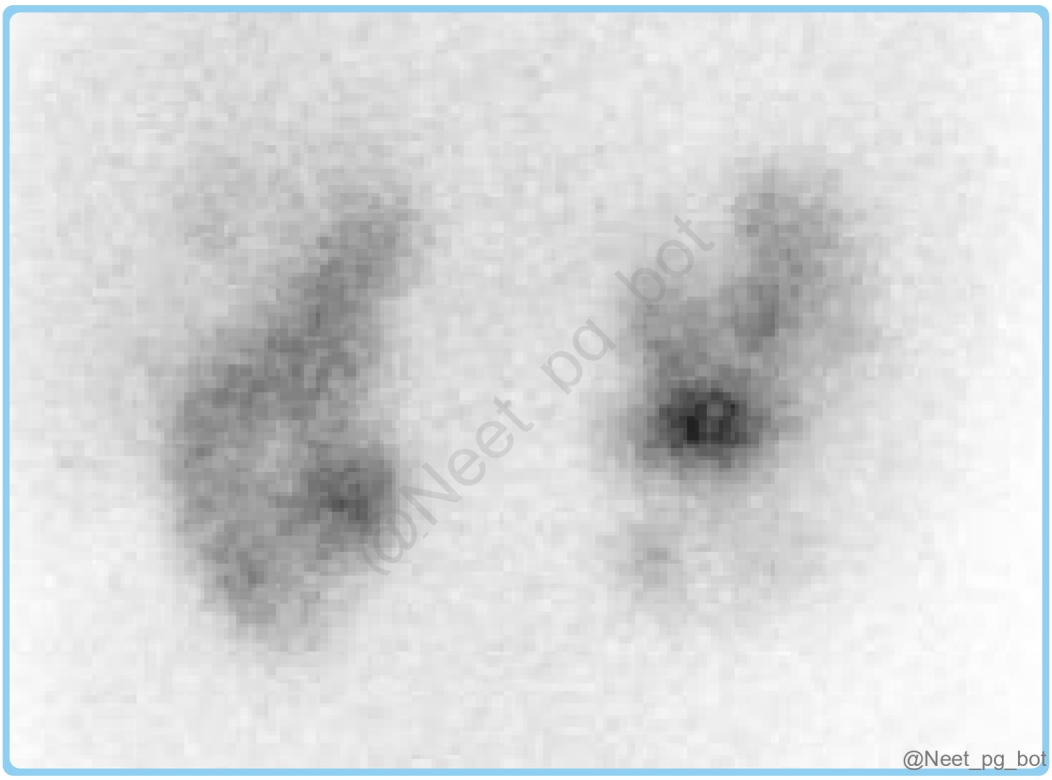
Q20: A 35-year-old female presents with fever, flank pain, and dysuria. A renal scan was performed as shown with the marked defect is given below. For this condition, what other pattern can be encountered on the scan? {{caption_text}} (Q853403)

A. A single area of decreased cortical uptake

B. Multiple unilateral or bilateral defects

C. Diffuse involvement of an entire kidney

D. All of the above



See Answer in Part B → Q20

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Q21: A 6-year-old patient is referred for a renal scan to assess for potential scarring or morphological changes in the kidneys due to a history of recurrent urinary tract infections. Which of the following scans would be the most appropriate for evaluating the kidneys in this scenario? (Q853402)

A. DTPA Scan

B. MAG3 Scan

C. DMSA Scan

D. Captopril DTPA Scan

See Answer in Part B → Q21

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Q22: A 45-year-old male presents to the emergency department with a 12-hour history of severe right upper quadrant pain. A scan is performed after the injection of a radiopharmaceutical as shown below. Which of the following findings is not consistent with the image shown? {{caption_text}} (Q853401)

A. Cystic duct obstruction

B. Prompt excretion into the bile ducts

C. Tracer activity was seen in the gallbladder

D. Radioisotope used is 99mTc.



See Answer in Part B → Q22

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Q23: Which of the following best describes the Warburg effect in cancer cells? (Q853400)

A. Cancer cells prefer oxidative phosphorylation under anaerobic conditions

B. Tumor cells primarily use glycolysis even in the presence of oxygen

C. Lactate production occurs only under hypoxic conditions in tumors

D. Mitochondrial function is absent in cancer cells

See Answer in Part B → Q23

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• [07_Nuclear Medicine] 016 Previous Year Questions

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[07_Nuclear Medicine] 016 Previous Year Questions — Quick Jump

Q1 (p. 285) *Q2 (p. 285)* *Q3 (p. 285)*

Q1: What is the investigation of choice for the diagnosis of a parathyroid adenoma? (Q854735)

A. Tc99-Sestamibi scan

B. Sestamibi SPECT

C. USG

D. CT

See Answer in Part B → Q1

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Q2: Most common radio-isotope in pet scan : (Q857203)

A. 13C

B. 14C

C. 18F

D. All of the above

See Answer in Part B → Q2

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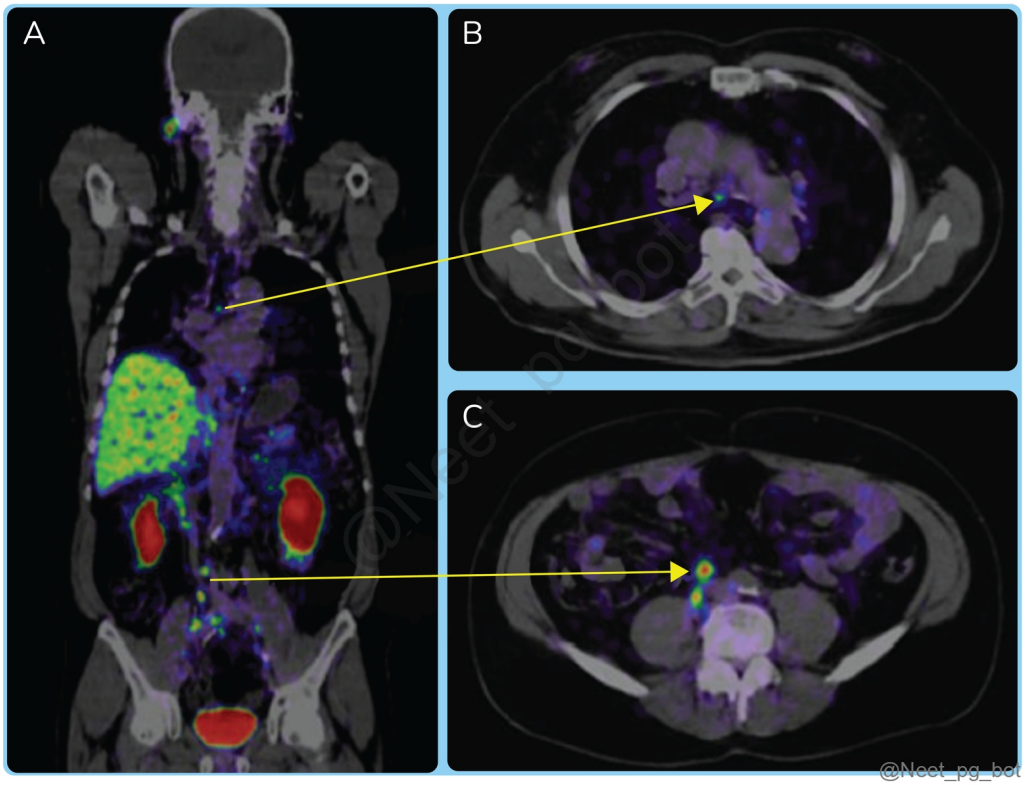
Q3: Identify the image modality given below. (Q856046)

A. Cerebral blood flow scan

B. Sestamibi scan

C. PET CT

D. Full body MDCT



See Answer in Part B → Q3

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• [08_Head _ Neck Imaging] 017 Head And Neck Radiology

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[08_Head _ Neck Imaging] 017 Head And Neck Radiology — Quick Jump

Q1 (p. 287) *Q2 (p. 287)* *Q3 (p. 288)* *Q4 (p. 289)* *Q5 (p. 290)* *Q6 (p. 292)*
Q7 (p. 292) *Q8 (p. 293)* *Q9 (p. 294)* *Q10 (p. 295)* *Q11 (p. 296)* *Q12 (p. 297)*
Q13 (p. 297) *Q14 (p. 298)* *Q15 (p. 299)* *Q16 (p. 300)* *Q17 (p. 300)* *Q18 (p. 301)*
Q19 (p. 302)

Q1: A 35-year-old male presents with complaints of nasal obstruction, more prominent on the right side, and recurrent nasal discharge over the past six months. He also reports occasional headaches and mouth breathing but denies any facial pain or fever. On nasal endoscopy, a smooth, pale, pedunculated mass is seen originating from the maxillary sinus and extending into the nasopharynx. A CT scan reveals a soft tissue mass filling the left maxillary sinus.What is the most likely diagnosis? (Q853176)

A. Mucus retention cyst

B. Antrochoanal polyp

C. Mucocele

D. Juvenile angiofibroma

See Answer in Part B → Q1

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Q2: Following an RTA, a patient’s CT is as follows What is the likely fracture? (Q853181)

A. Le Fort I

B. Le Fort II

C. Le Fort III

D. Jarjaway fracture



See Answer in Part B → Q2

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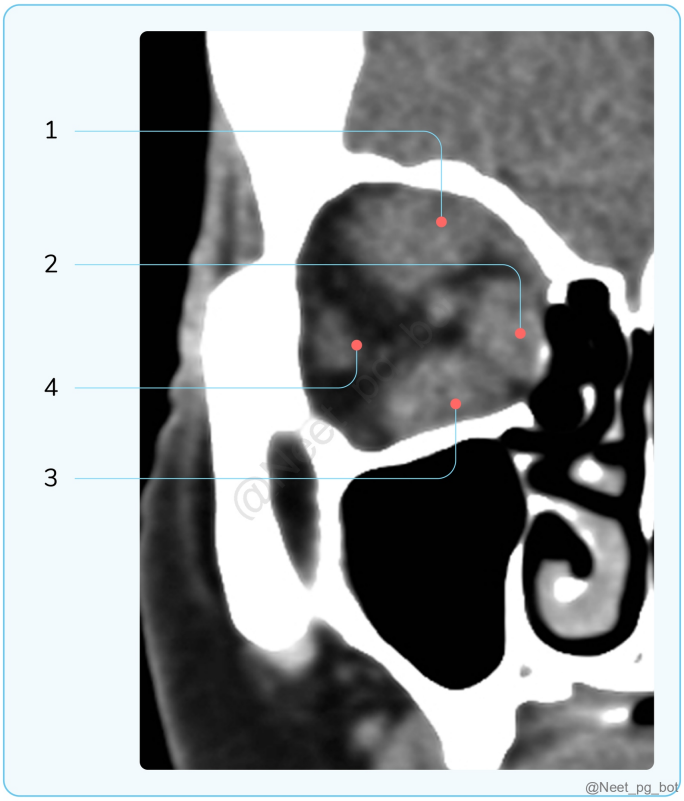
Q3: A 30-year old female visited an Ophthalmology clinic with complaints of proptosis, difficulty in eye mobility and redness of eyes. Her TFT values were T3/T4-high, TSH-low. Which of the following structures shown in the right orbit is first to be affected first in her condition? (Q853195)

A. 1

B. 2

C. 3

D. 4



See Answer in Part B → Q3

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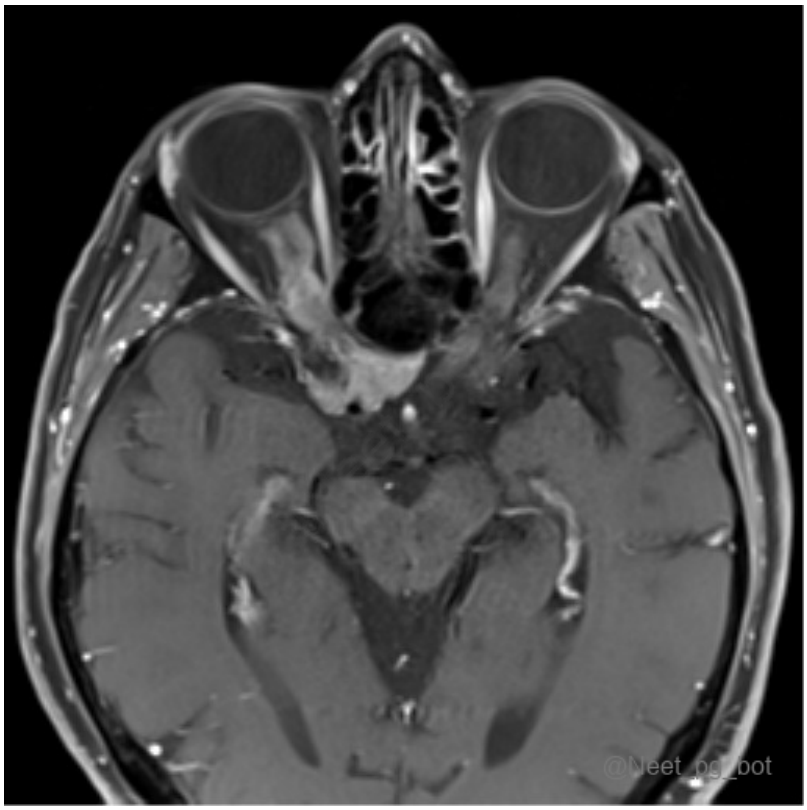
Q4: The MRI images below display a "tram-track" sign, characterized by enhancement surrounding the optic nerve. This radiological feature is most indicative of which condition? (Q853193)

A. Optic neuritis

B. Optic nerve sheath meningioma

C. Optic nerve glioma

D. Orbital pseudotumor



See Answer in Part B → Q4

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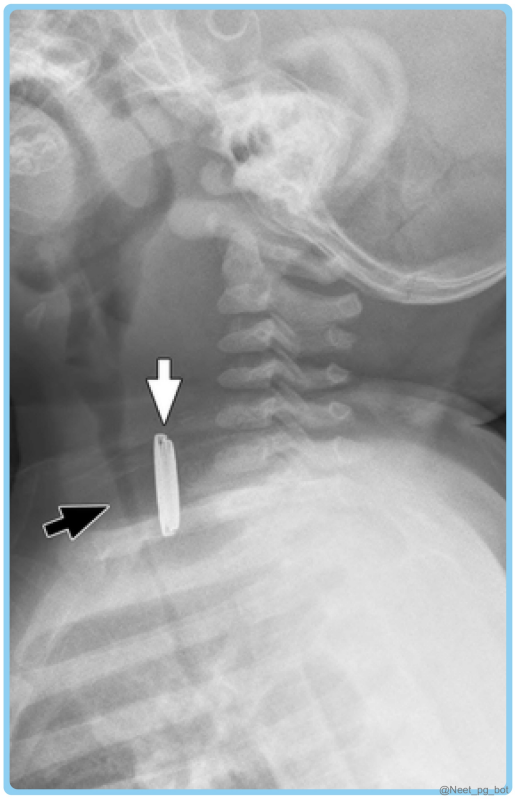
Q5: Match the following X-rays with the corresponding pathologies: 1) a) Coin in trachea 2) b) Coin in esophagus c) Button battery in esophagus d) Button battery in trachea (Q853192)

A. 1d, 2a

B. 1d, 2b

C. 1a, 2b

D. 1c, 2b





See Answer in Part B → Q5

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Q6: Young female with lower jaw swelling, X-ray showed the following. What is the likely diagnosis (Q853190)

A. Pindborg tumor

B. Adamantinoma

C. Sialolithiasis

D. Ranula



See Answer in Part B → Q6

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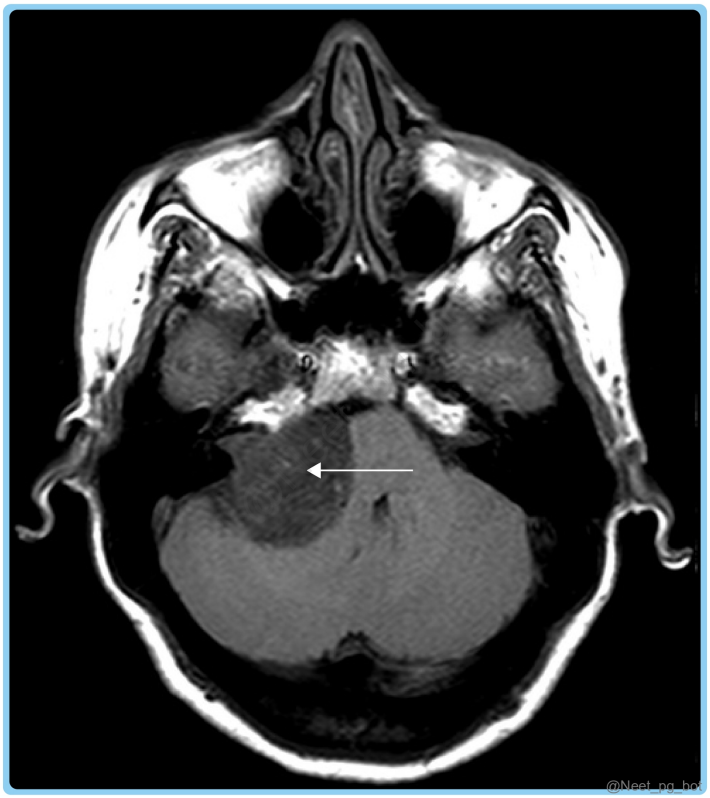
Q7: An elderly male presented with unilateral hearing loss associated with tinnitus came. Investigation done showed the following appearance. What is the investigation of choice for this condition? (Q853189)

A. MRI without contrast

B. MRI with contrast

C. CT without contrast

D. Vertebral Angiography



See Answer in Part B → Q7

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Q8: Following sign was seen while performing a radiological investigation Identify the investigation and the corresponding diagnosis. (Q853187)

A. MR Angiogram- Glomus jugulare

B. Digital subtraction Angiography-glomus jugulare

C. Digital subtraction Angiography- Carotid body tumor

D. MR Angiogram- Carotid body tumor



See Answer in Part B → Q8

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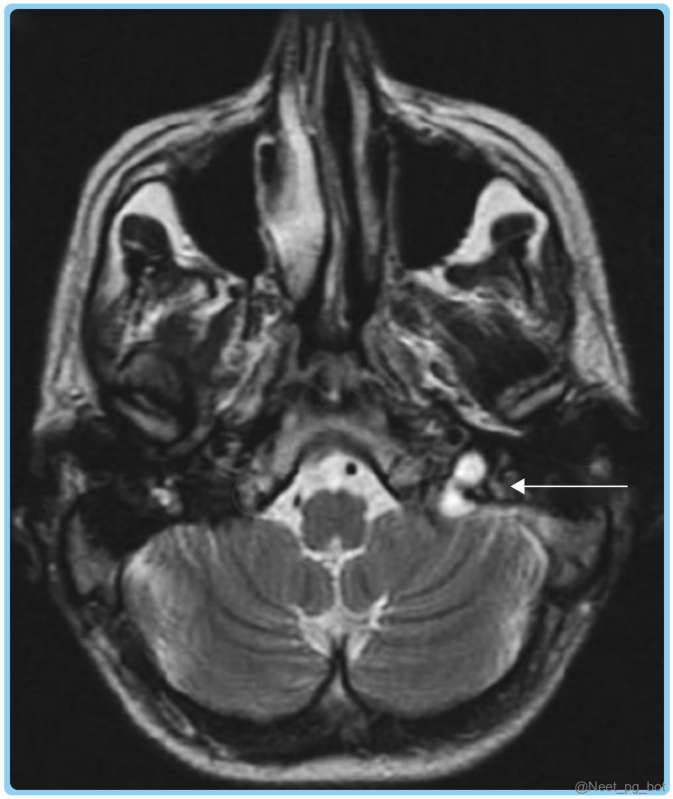
Q9: A 20-weeks primigravida complaints of severe headache, nausea and vomiting. MRI done showed the following. Which of the following combinations of diagnosis and investigation of choice is most appropriate? (Q853186)

A. Tortuous internal carotid artery; CT angiogram

B. Sigmoid sinus thrombosis;NCCT

C. Tortuous internal carotid artery; CECT

D. Sigmoid sinus thrombosis; MR venogram



See Answer in Part B → Q9

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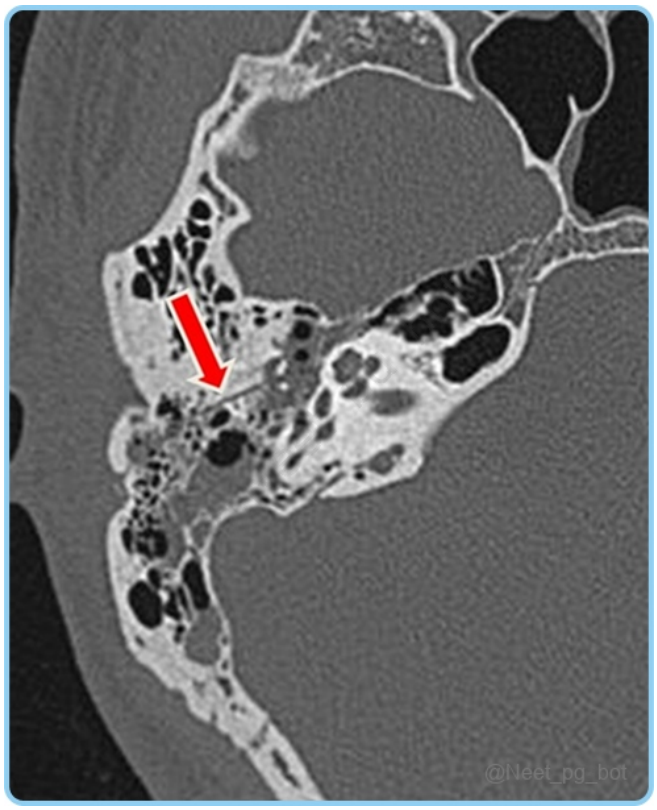
Q10: A 30-year-old female presents with right ear bleeding and conductive hearing loss (Rinne negative, Weber lateralized to right following head trauma.CT findings as shown as below.What is the most likely diagnosis? (Q853185)

A. Longitudinal fracture- Left temporal bone

B. Longitudinal fracture- Right temporal bone

C. Transverse fracture- Left temporal bone

D. Transverse fracture- Right temporal bone



See Answer in Part B → Q10

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Q11: Daniel, a 60 year old male presented with complaints of nasal obstruction and epistaxis. MRI Head showed the following. What is the likely diagnosis? (Q853184)

A. Juvenile nasopharyngeal angiofibroma

B. Inverted papilloma

C. Esthesioneuroblastoma

D. Antrochoanal polyp



See Answer in Part B → Q11

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Q12: Which view will best assess the maxillary sinus for potential fractures? (Q853168)

A. Waters' view

B. Caldwell's view

C. Lateral view

D. Submentovertex view

See Answer in Part B → Q12

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Q13: Following a fall, a 20 year old male patient developed bleeding from the nose associated with pain and swelling. X-ray done is shown below. What is the most likely injury? (Q853179)

A. Cribriform plate fracture

B. Chevallet fracture

C. Jarjaway fracture

D. Deviated nasal septum



See Answer in Part B → Q13

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Q14: A 20-year old male, following a fist fight where he got hit over his front face presented with pain and swelling over his nose. A leak from the nasal cavity was noted, watery in consistency. What is the initial investigation of choice to localize the site of leak? (Q853178)

A. X-ray PNS

B. Beta-2 transferrin assay

C. HRCT

D. CT Angiography

See Answer in Part B → Q14

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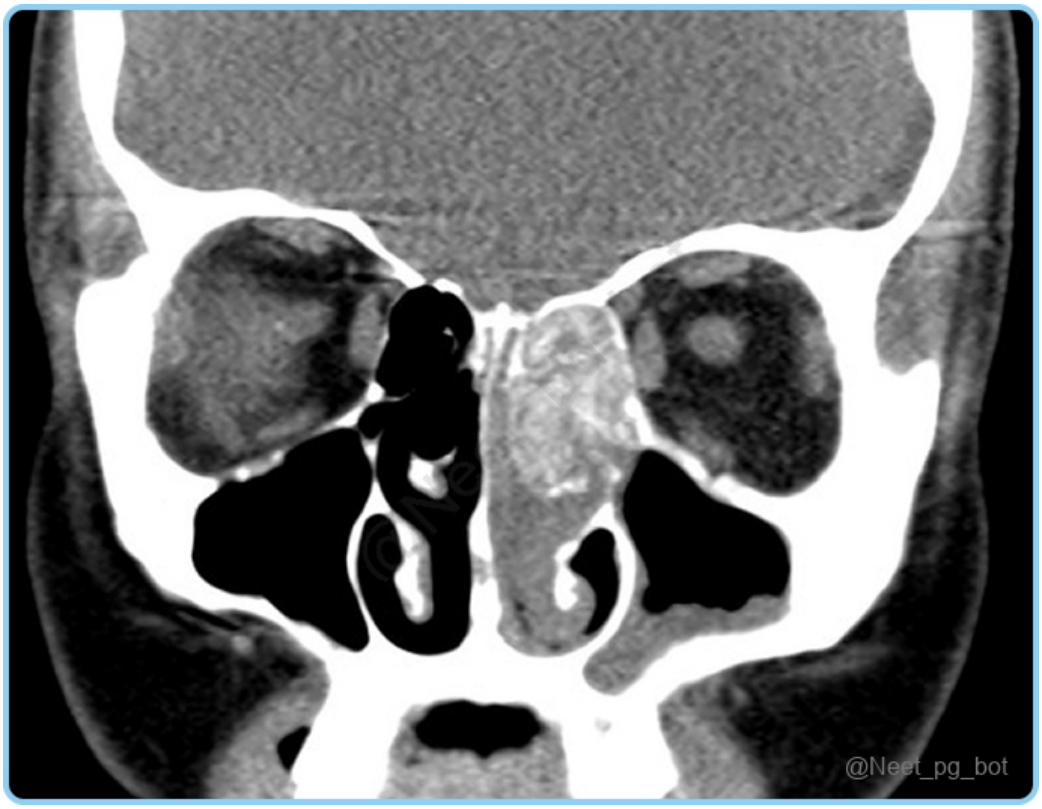
Q15: The imaging below shows a double density sign in the paranasal sinuses. What is the most likely diagnosis? (Q853175)

A. Acute Bacterial sinusitis

B. Carcinoma- Maxillary sinus

C. Chronic Bacterial sinusitis

D. Allergic fungal sinusitis



See Answer in Part B → Q15

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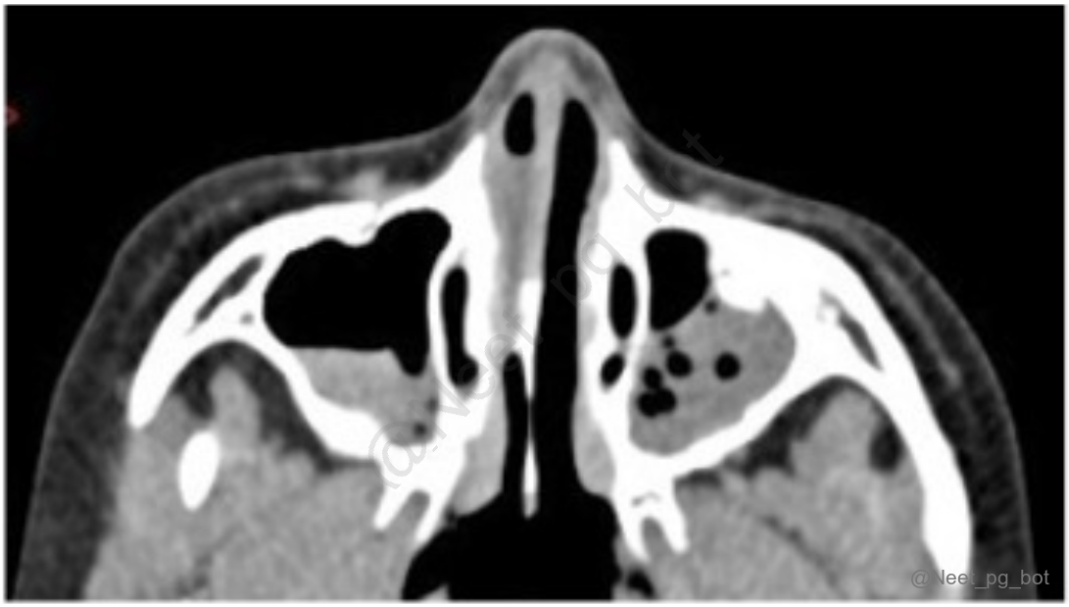
Q16: A 28-year-old male presents with persistent nasal congestion, facial pain exacerbated by bending forward, thick yellow nasal discharge, and reduced olfaction for two weeks. CT imaging reveals abnormalities in the paranasal sinuses. What is the most likely diagnosis? (Q853174)

A. Viral rhinitis

B. Allergic rhinitis

C. Sinusitis

D. Nasal polyps



See Answer in Part B → Q16

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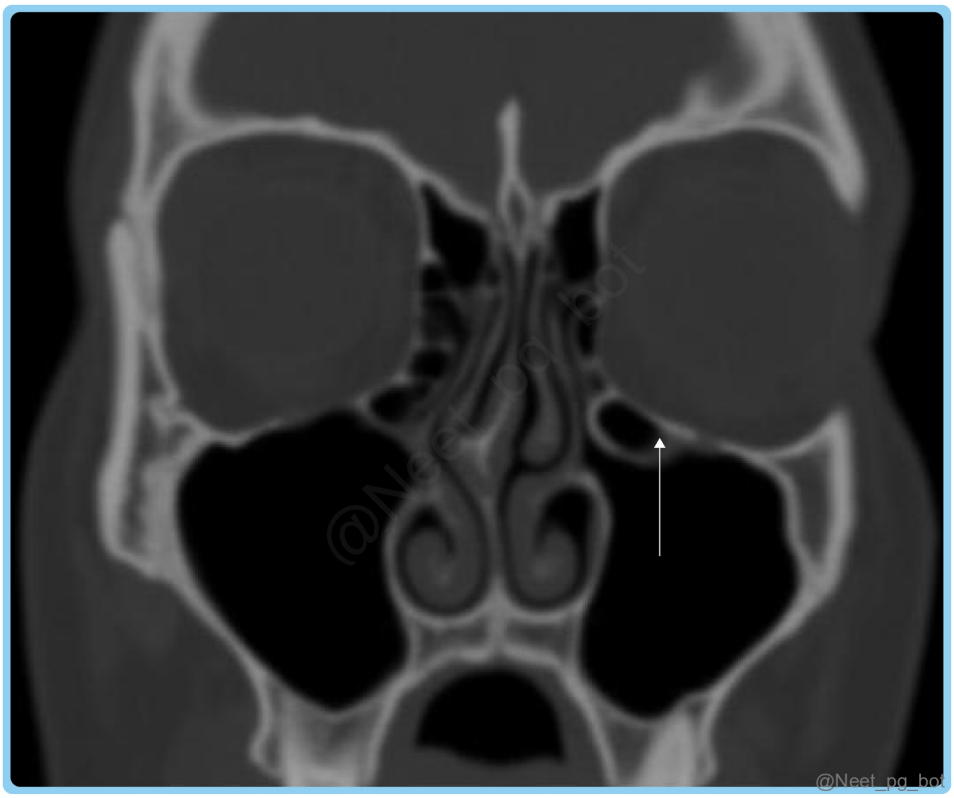
Q17: Following CT image is kept as a spotter in your final year exam viva. What is the marked structure? (Q853172)

A. Concha bullosa

B. Agger nasi cell

C. Pneumatized superior turbinate

D. Haller cell



See Answer in Part B → Q17

@Neet_pg_bot

Q18: Which of the following arteries does NOT supply the ethmoidal air cells? (Q853171)

A. Supraorbital artery

B. Posterior ethmoidal artery

C. Temporal artery

D. Sphenopalatine artery

See Answer in Part B → Q18

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Q19: Which of the following sinuses does NOT drain through the osteomeatal unit? (Q853169)

A. Maxillary sinus

B. Frontal sinus

C. Anterior ethmoid sinus

D. Posterior ethmoidal sinus

See Answer in Part B → Q19

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• [08_Head _ Neck Imaging] 018 Previous Year Questions

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[08_Head _ Neck Imaging] 018 Previous Year Questions — Quick Jump

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Q7 (p. 308)	*Q8 (p. 309)*	*Q9 (p. 309)*	*Q10 (p. 310)*	*Q11 (p. 311)*	*Q12 (p. 311)*
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Q19 (p. 318)	*Q20 (p. 318)*	*Q21 (p. 319)*	*Q22 (p. 320)*		

Q1: Identify the structure marked in the image given below. (Q858136)

A. External capsule

B. Internal Capsule

C. Caudate nucleu

D. Putamen



See Answer in Part B → Q1

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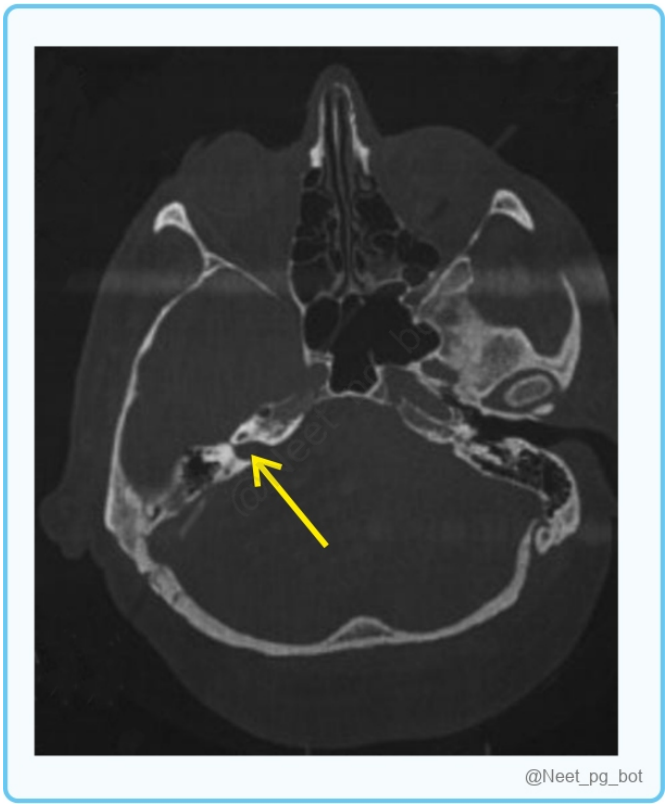
Q2: Identify the marked structure in the below image. (Q878947)

A. External auditory meatus

B. Internal auditory meatus

C. Carotid canal

D. Vestibular aqueduct



See Answer in Part B → Q2

@Neet_pg_bot

Q3: What is the probable diagnosis for a 50-year-old female patient who shows a progressive decline in visual clarity in her eye? A post-contrast CT scan of her head indicates the presence of thickening in a specific structure, in the image. (Q859291)

A. Optic nerve sheath meningioma

B. Optic nerve glioma

C. Retinoblastoma

D. Rhabdomyosarcoma



See Answer in Part B → Q3

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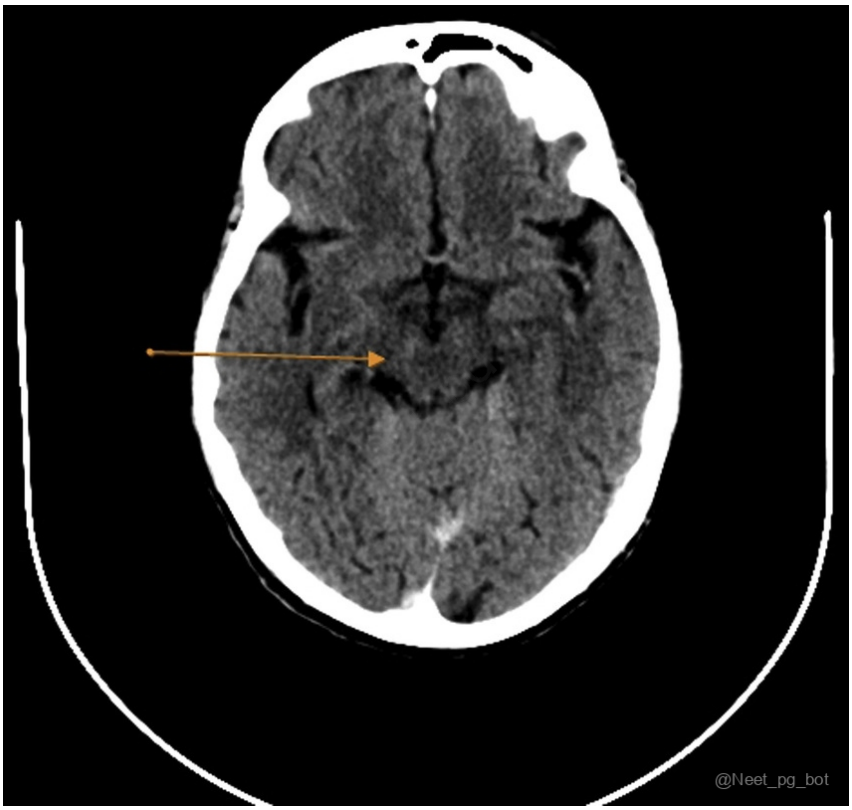
Q4: Identify the labelled structure in the image? (Q859269)

A. Midbrain

B. Pons

C. Medulla

D. Cerebellum



See Answer in Part B → Q4

@Neet_pg_bot

Q5: A patient complains of neck stiffness and severe headache. The CT image shown below is suggestive of which of the following conditions? (Q855010)

A. Meningitis

B. Subarachnoid hemorrhage

C. Intraparenchymal hemorrhage

D. Hemorrhagic stroke



See Answer in Part B → Q5

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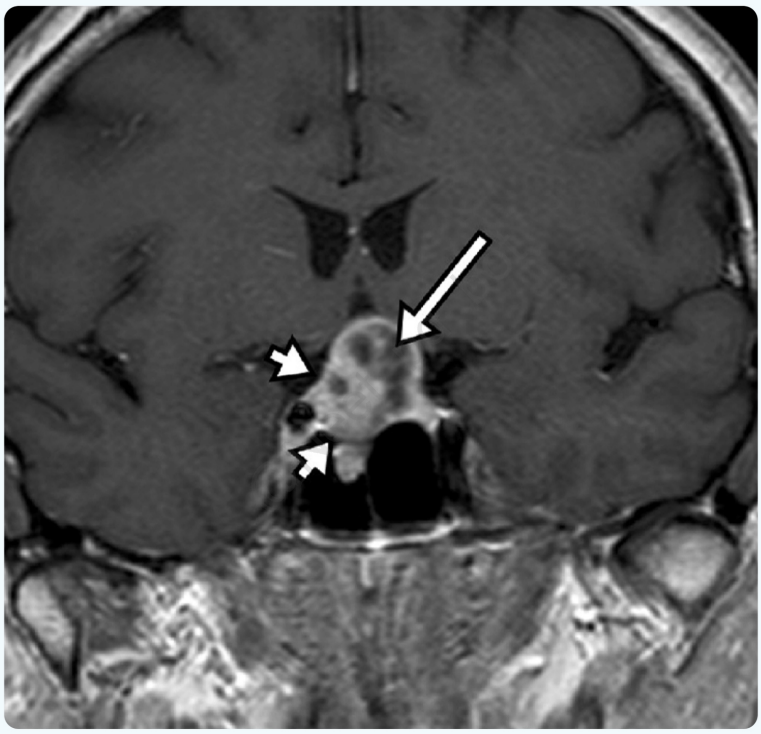
Q6: A cystic lesion in the suprasellar region with calcification is seen on the MRI. What is the most likely diagnosis? (Q855001)

A. Craniopharyngioma

B. Pituitary adenoma

C. Meningioma

D. Oligodendroglioma



See Answer in Part B → Q6

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Q7: A 22-year-old male arrived at the emergency room after being involved in a car accident. During the examination, his Glasgow Coma Scale (GCS) score was E2M2V3, indicating a level of consciousness. No fractures, hydrocephalus, or increased pressure within the skull were detected. A non-contrast CT scan was conducted and showed no abnormalities. The probable diagnosis is- (Q856423)

A. Diffuse axonal injury

B. Post-concussion syndrome

C. Extradural hemorrhage

D. Herniation of brain

See Answer in Part B → Q7

@Neet_pg_bot

Q8: A 46-year-old male presented with chronic back pain and neck stiffness. An X-ray cervical spine is given below. What is the diagnosis? (Q856406)

A. Ankylosing spondylitis

B. Diffuse idiopathic skeletal hyperostosis

C. Klippel feil syndrome

D. Sprengel deformity



See Answer in Part B → Q8

@Neet_pg_bot

Q9: A 22-year-old male was brought to the emergency room after being involved in a car accident. During the examination, his Glasgow Coma Scale (GCS) score was E2M2V3. There were no fractures, hydrocephalus, or increased pressure within the skull. A non-contrast CT scan was conducted and revealed no abnormalities. The suspected diagnosis is (Q856688)

A. Diffuse axonal injury

B. Post-concussion syndrome

C. Extradural haemorrhage

D. Herniation of brain

See Answer in Part B → Q9

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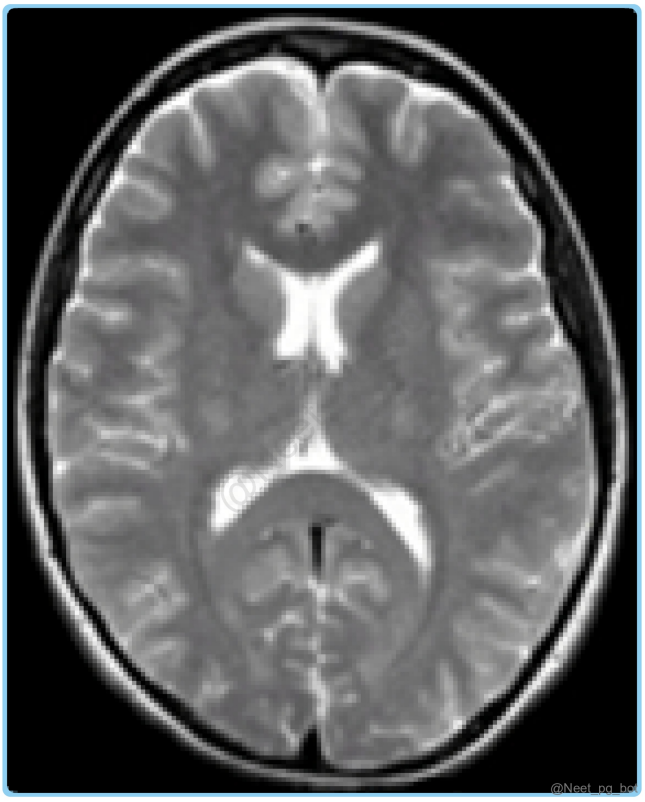
Q10: Which of the following MRI imaging techniques is shown in the image below? (Q857612)

A. T1 MRI

B. T2 MRI

C. STIR

D. FLAIR



See Answer in Part B → Q10

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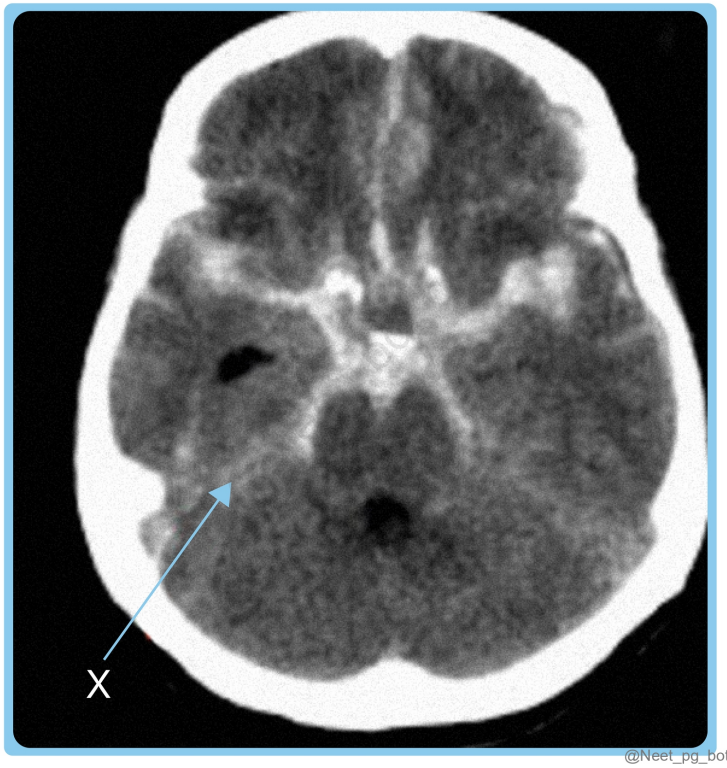
Q11: A patient presents with severe headache. A CT scan of the brain reveals hyperdense areas in the right basal region, marked as 'X'. Which of the following is the most likely diagnosis? (Q866868)

A. Subarachnoid hemorrhage

B. Meningococcal meningitis

C. Brain abscess

D. Pneumocephalus



See Answer in Part B → Q11

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Q12: A 2-month-old infant is brought to the OPD with a parietal swelling present since birth. The X-ray image is given below. What could be the probable diagnosis? (Q855471)

A. Subgaleal hematoma

B. Cephalohematoma

C. Caput succedaneum

D. Enecephalocele



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See Answer in Part B → Q12

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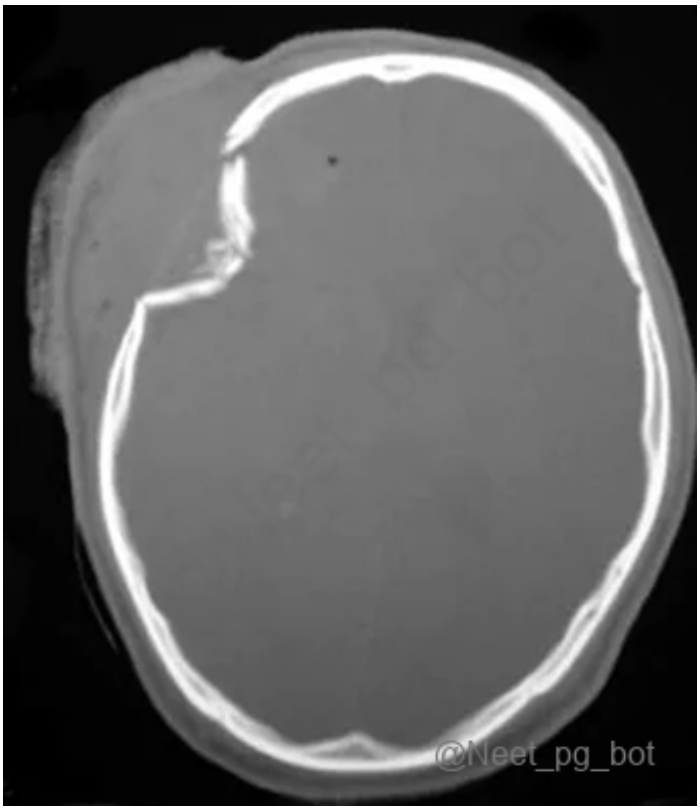
Q13: A patient presented with a head injury after a hammer fell on the skull. CT is shown below. What is the likely diagnosis? (Q820189)

A. Concussion

B. Epidural hematoma

C. Depressed skull fracture

D. Subarachnoid hemorrhage



See Answer in Part B → Q13

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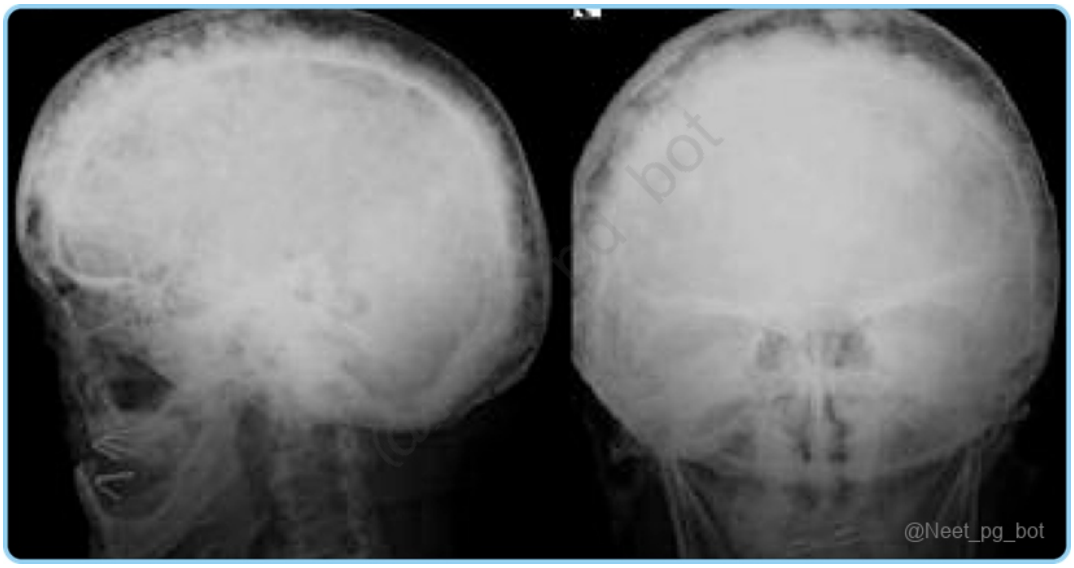
Q14: Identify the radiological image of the condition given below. (Q860273)

A. Paget's disease

B. Multiple myeloma

C. Hyperparathyroidism

D. Sickle cell anemia



See Answer in Part B → Q14

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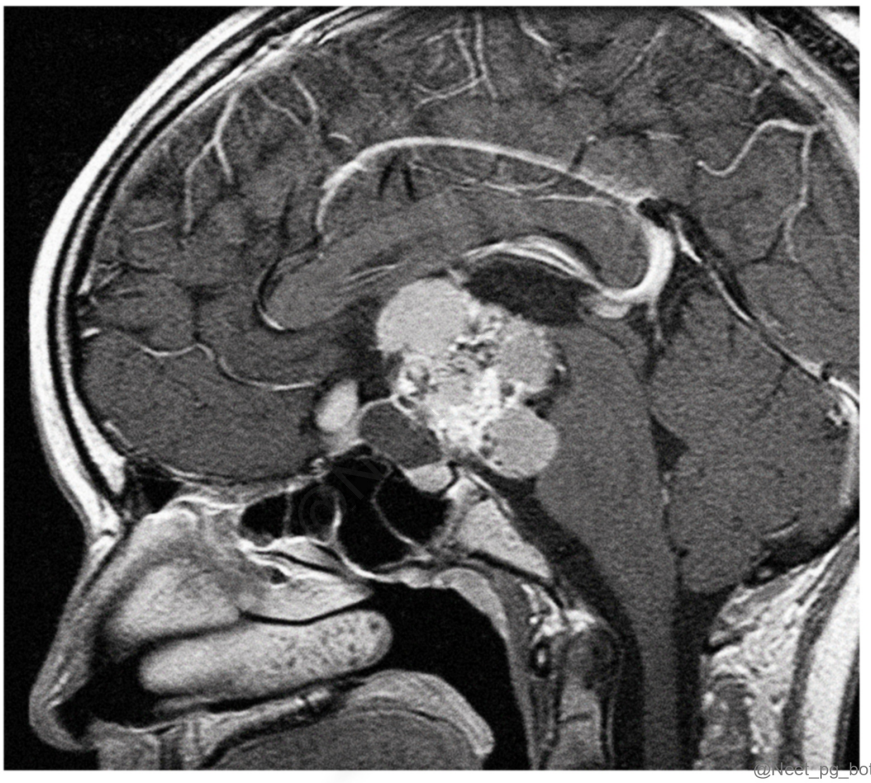
Q15: Which visual field defect is likely to be caused by the lesion shown in the given radiograph? (Q843973)

A. Altitudinal defect

B. Bitemporal hemianopia

C. Inferior arcuate scotoma

D. Bjerrum scotoma



See Answer in Part B → Q15

@Neet_pg_bot

Q16: Using the radiograph provided, which diagnosis is most likely? (Q843946)

A. Chiari type 1 malformation

B. Dandy-Walker malformation

C. Vein of Galen malformation

D. Corpus callosum agenesis



See Answer in Part B → Q16

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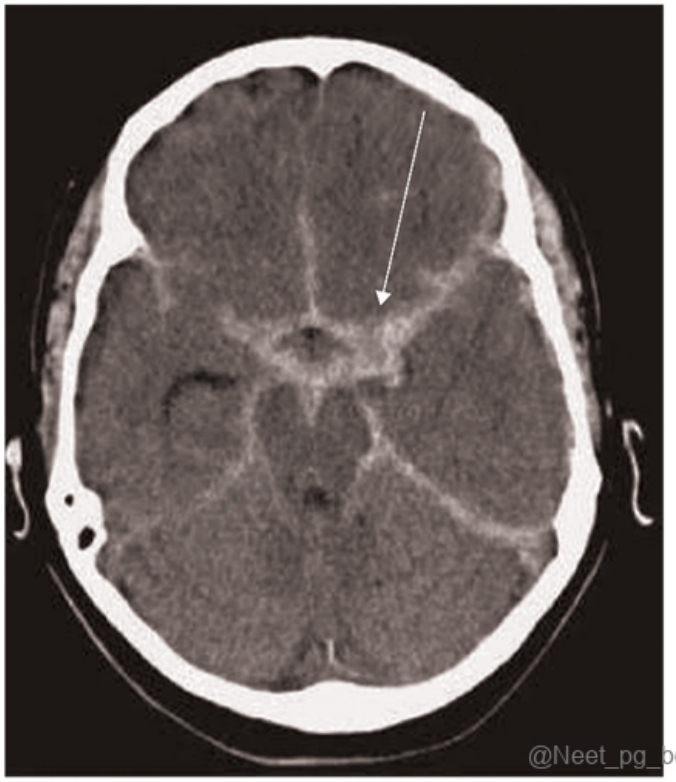
Q17: A 40-year-old female patient complains of a persistent headache. A CT scan of the head was performed, as shown below. What is the most accurate diagnosis? (Q843915)

A. Subarachnoid hemorrhage (SAH)

B. Epidural hemorrhage

C. Subdural hemorrhage

D. Intraparenchymal hemorrhage



See Answer in Part B → Q17

@Neet_pg_bot

Q18: An elderly man presents with a 7-month history of progressive dysphagia and bad breath. An image is provided. What is the most likely diagnosis? (Q852788)

A. Achalasia

B. Carcinoma esophagus

C. Zenker diverticulum

D. Diffuse esophageal spasm



See Answer in Part B → Q18

@Neet_pg_bot

Q19: Which of the following is the most accurate investigation to localize the lesion in a case of primary hyperparathyroidism? (Q865289)

A. Ultrasonography

B. Sestamibi scan

C. 4D computed tomography

D. MRI

See Answer in Part B → Q19

@Neet_pg_bot

Q20: Identify the condition associated with the MRI finding shown below: (Q865262)

A. Pantothenate kinase deficiency

B. Wilson’s disease

C. Krabbe’s disease

D. Huntington chorea



See Answer in Part B → Q20

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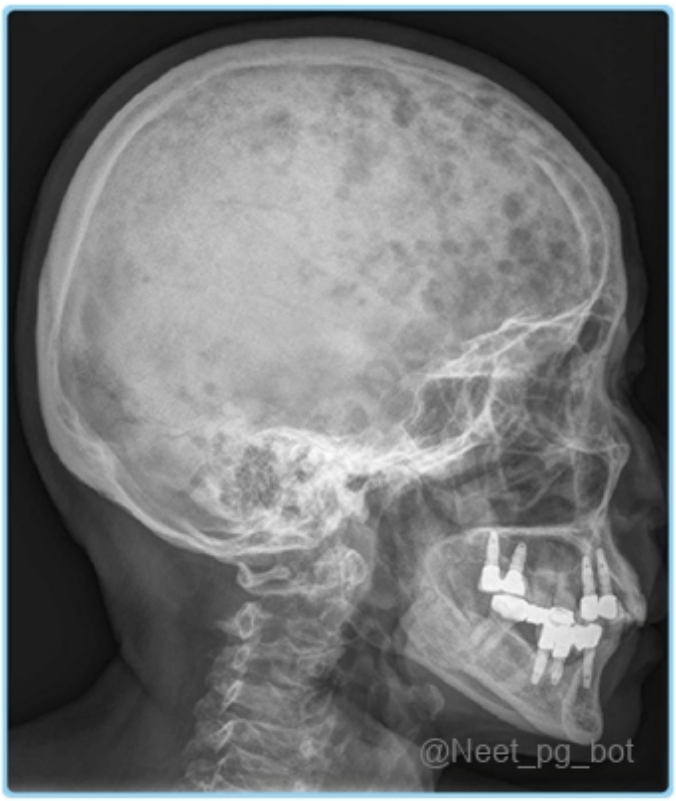
Q21: Based on the X-ray image provided, determine the type of thyroid malignancy: (Q865252)

A. Papillary carcinoma

B. Hürthle cell carcinoma

C. Follicular carcinoma

D. Thyroid lymphoma



See Answer in Part B → Q21

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Q22: From the provided MRI, please identify the medical condition observed in the lower back of the newborn, which presents as an abnormal lump. (Q793098)

A. Meningocele

B. Myelomeningocele

C. Spina bifida occulta

D. Bone cyst



See Answer in Part B → Q22

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• [09_Genitourinary Radiology] 019 Genitourinary Radiology

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[09_Genitourinary Radiology] 019 Genitourinary Radiology — Quick Jump

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Q13 (p. 331)	*Q14 (p. 331)*	*Q15 (p. 332)*	*Q16 (p. 333)*	*Q17 (p. 333)*	*Q18 (p. 334)*
Q19 (p. 334)	*Q20 (p. 335)*	*Q21 (p. 336)*	*Q22 (p. 336)*	*Q23 (p. 336)*	*Q24 (p. 337)*
Q25 (p. 338)	*Q26 (p. 338)*				

Q1: A 45 y/o male presents with right-sided flank pain and recurrent urinary tract infections. The imaging study is given below. What is the most likely diagnosis? {{caption_text}} (Q852809)

A. Vesicoureteral reflux

B. Transitional cell carcinoma

C. Polycystic kidney disease

D. Retro-caval ureter



See Answer in Part B → Q1

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Q2: A 55 y/o woman undergoing routine health screening is found to have an incidental adrenal mass on ultrasound. The lesion is smooth, round, hypoechoic, and measures 2.5 cm with low vascularity. A non-contrast CT scan shows a density of 8 HU. What is the most likely diagnosis? (Q852821)

A. Pheochromocytoma

B. Adrenal calcification

C. Adrenal adenoma

D. Metastasis

See Answer in Part B → Q2

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Q3: A 65 y/o male with a history of coronary artery disease presents with hypertension resistant to medication. A Doppler ultrasound shows a renal artery to proximal aorta ratio (RAR) of 4:1 and a peak systolic velocity (PSV) of 250 cm/s. What is the most likely cause of these findings? (Q852820)

A. Ureteral obstruction

B. Fibromuscular dysplasia

C. Renal vein thrombosis

D. Renal artery stenosis

See Answer in Part B → Q3

@Neet_pg_bot

Q4: A 45 y/o patient with a history of diabetes and prolonged analgesic use presents with signs of acute renal failure. A CT urography shows deformed calyces and filling defects in the pelvicalyceal system. What is the likely cause of the filling defects seen in this patient? (Q852819)

A. Necrosed papilla

B. Medullary sponge kidney

C. Ureteral stricture

D. Vesicoureteric reflux

See Answer in Part B → Q4

@Neet_pg_bot

Q5: A 6-month-old infant is evaluated for an abdominal mass found during a routine examination. An ultrasound reveals large cysts in the kidney and it appears predominantly cystic with little to no identifiable renal parenchyma. What is the most likely diagnosis? {{caption_text}} (Q852818)

A. Autosomal recessive polycystic kidney disease (ARPKD)

B. Multicystic dysplastic kidney (MCDK)

C. Autosomal dominant polycystic kidney disease (ADPKD)

D. Simple renal cysts



See Answer in Part B → Q5

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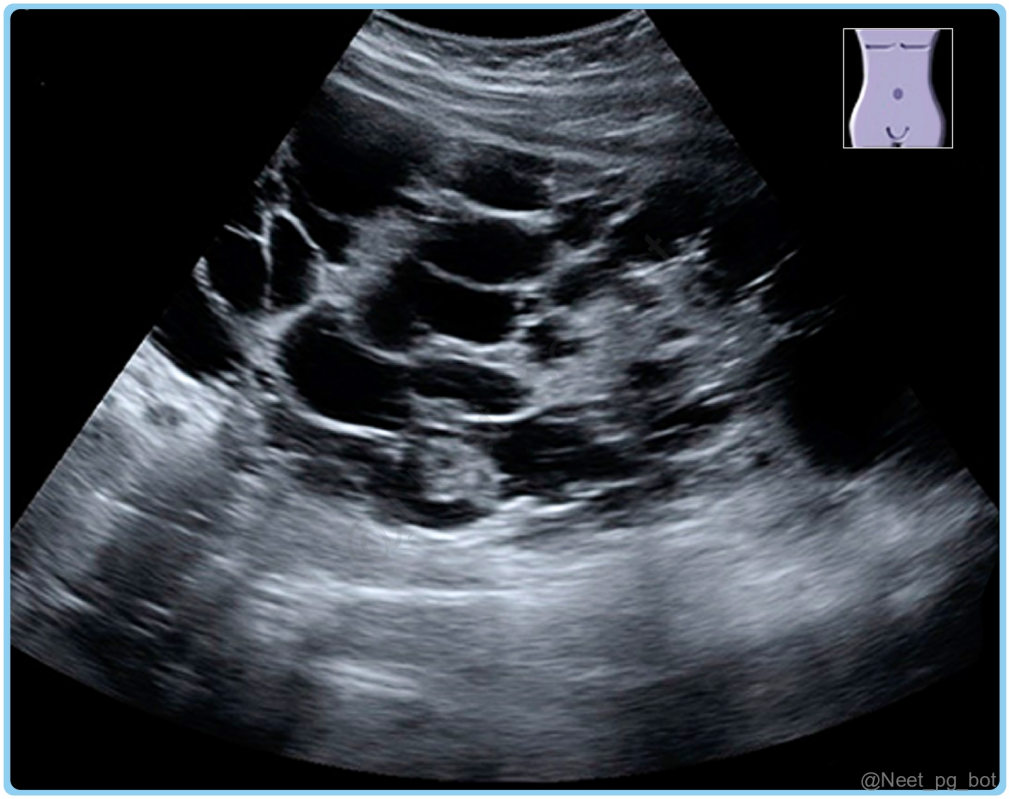
Q6: A 55-year-old woman, with a family history of renal disease, presents with hematuria and hypertension. She has a history of recurrent flank pain and is currently diagnosed with renal failure. Ultrasound imaging is given below. What is the most likely diagnosis? {{caption_text}} (Q852817)

A. Simple renal cysts

B. Autosomal dominant polycystic kidney disease (ADPKD)

C. Multicystic dysplastic kidney

D. Renal cell carcinoma



See Answer in Part B → Q6

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Q7: A 45 y/o woman presents with a family history of renal cell carcinoma, along with multiple skin lesions resembling fibrofolliculomas. She also reports episodes of spontaneous pneumothorax. What is the most likely diagnosis? (Q852816)

A. Angiomyolipoma

B. Oncocytoma

C. Birt-Hogg-Dubé syndrome

D. Tuberous sclerosis

See Answer in Part B → Q7

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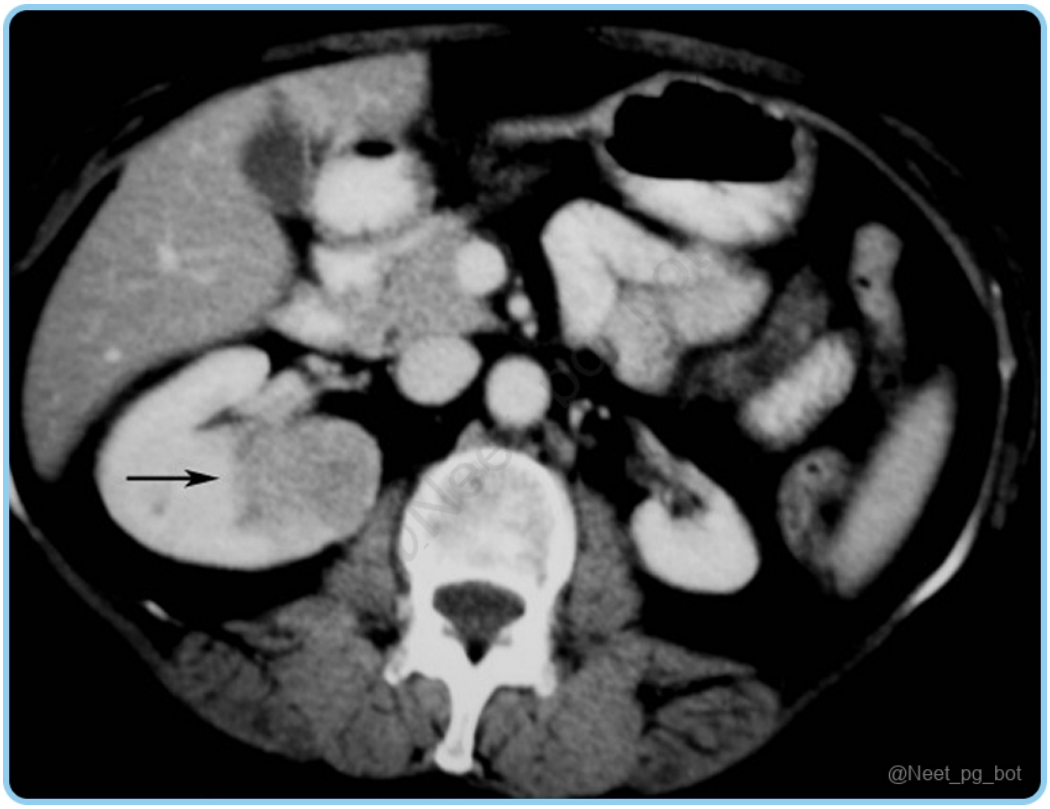
Q8: A 62 y/o female patient presents with hematuria and flank pain. A CECT scan reveals a solid hyper-enhancing renal mass measuring 5 cm. The radiologist notes heterogeneous enhancement and suggests further evaluation for possible extension into the inferior vena cava (IVC). Which of the following imaging modalities is the most appropriate next step to evaluate for potential IVC extension or thrombus? (Q852815)

A. Contrast-enhanced ultrasound

B. Contrast-enhanced CT

C. Contrast MRI

D. Plain abdominal X-ray



See Answer in Part B → Q8

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Q9: A 45 y/o male undergoes an imaging study for evaluation of flank pain. A CECT scan reveals a renal cyst with multiple hairline thin septa and minimal wall

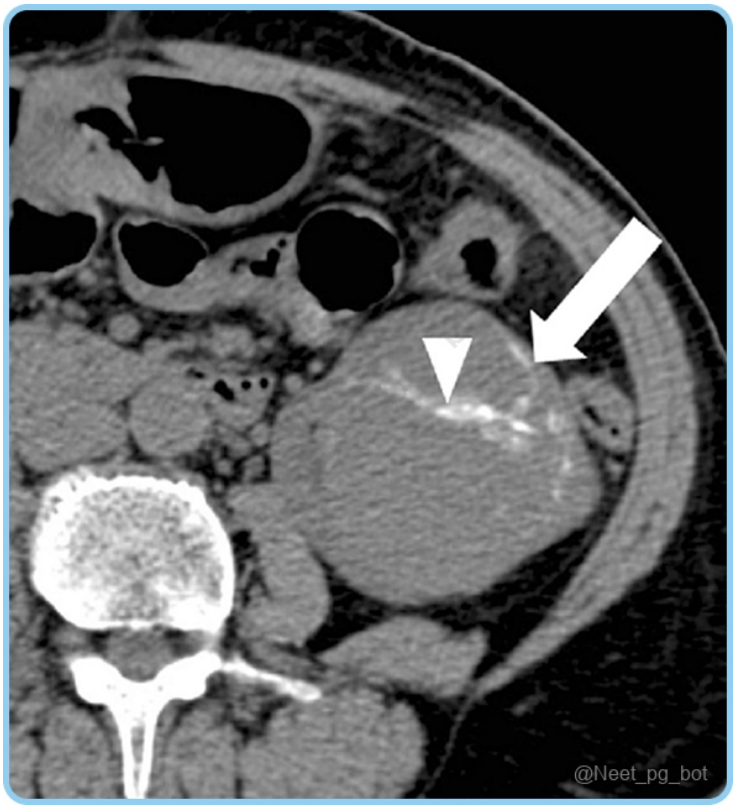
thickening. The cyst shows thick nodular calcifications but no measurable enhancement after contrast administration. Based on the Bosniak classification, which of the following management options is most appropriate for this patient? {{caption_text}} (Q852814)

A. No follow-up is needed; continue routine monitoring.

B. Follow-up imaging every 6 months for 1 year.

C. Surgical excision or ablation of the cyst.

D. Follow-up imaging every 6 weeks for 1 year.



See Answer in Part B → Q9

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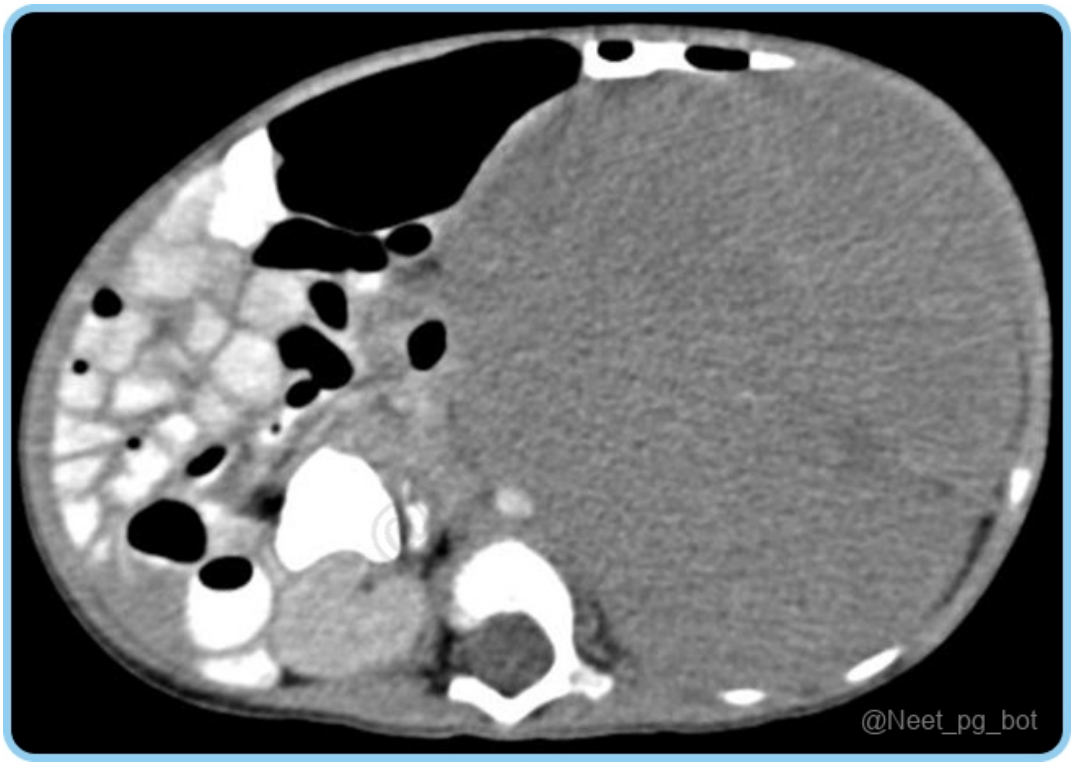
Q10: A 2 y/o child presents with abdominal distension and a palpable abdominal mass. A CT scan is given below. What is the most likely diagnosis? {{caption_text}} (Q852813)

A. Wilms Tumor (Nephroblastoma)

B. Neuroblastoma

C. Renal Cell Carcinoma

D. Hepatoblastoma



See Answer in Part B → Q10

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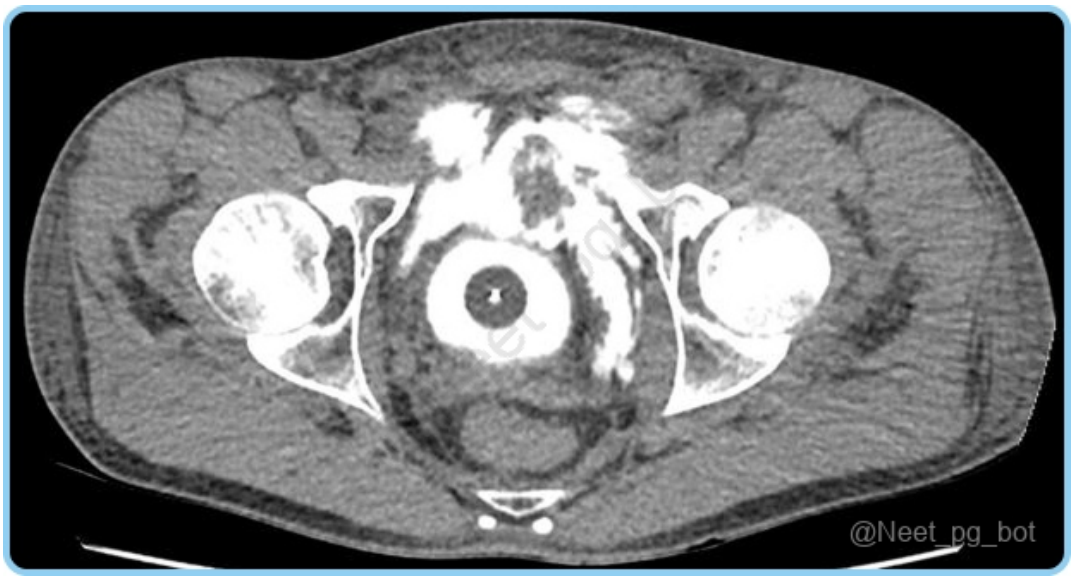
Q11: A 42-year-old male presents to the emergency department with severe pelvic pain after a motor vehicle collision. CT cystogram of the patient is given below. What type of injury is most likely responsible for the patient's symptoms? {{caption_text}} (Q852812)

A. Intraperitoneal bladder rupture

B. Extraperitoneal bladder rupture

C. Bulbous urethra rupture

D. Membranous urethra rupture



See Answer in Part B → Q11

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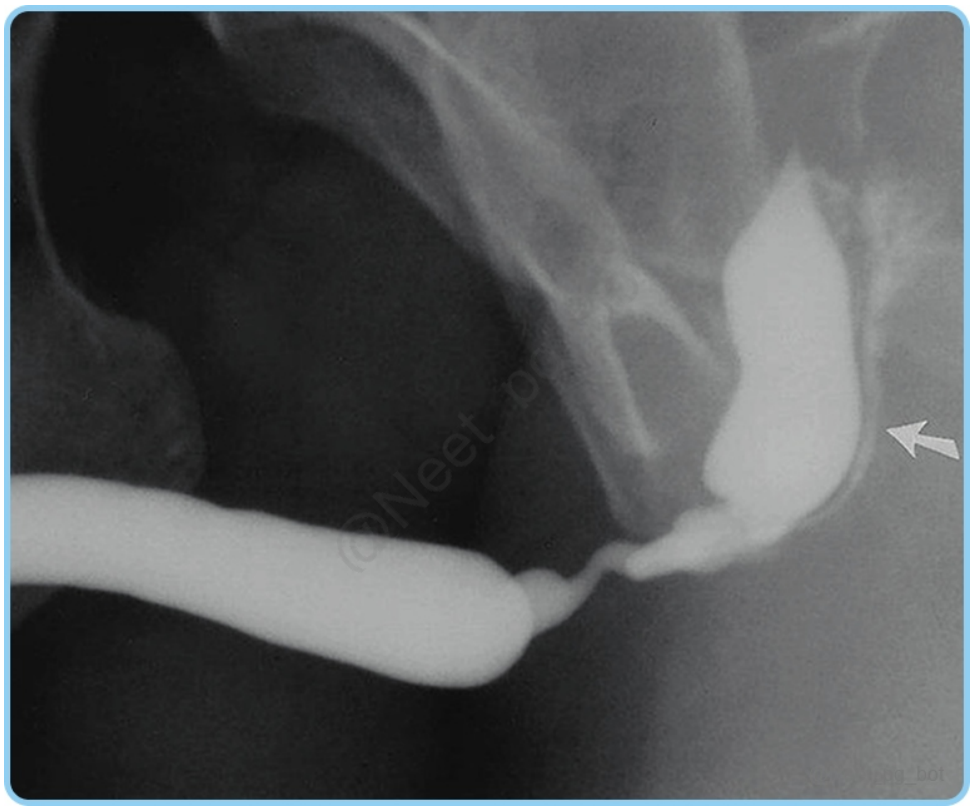
Q12: A 35-year-old male presents with difficulty urinating and a history of profuse, creamy urethral discharge. He reports a prior untreated sexually transmitted infection. The urethrogram of the patient is given below. What is the most likely diagnosis? (Q852811)

A. Urethral carcinoma

B. Bulbar urethral stricture

C. Penile urethral stricture

D. Benign prostatic hyperplasia



See Answer in Part B → Q12

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Q13: A 40 y/o male presents with a history of urinary incontinence and recurrent urinary tract infections. Imaging reveals a bladder with a thickened, trabeculated wall and an elongated shape, resembling a cone. Which of the following bladder appearances is most likely to be seen in this patient? (Q852810)

A. Christmas tree bladder

B. Keyhole appearance

C. Bladder wall calcification

D. Teardrop bladder

See Answer in Part B → Q13

@Neet_pg_bot

Q14: A 50 y/o male presents to the emergency department with severe flank pain and hematuria. Initial imaging with ultrasound suggests the presence of renal stones. The urologist considers further imaging to assess the urinary tract. The options for further evaluation include Intravenous Pyelography and Retrograde Pyelogram. Which imaging modality is more appropriate for identifying potential ureteral injuries in this patient? (Q852775)

A. Intravenous Pyelography

B. Retrograde Pyelogram

C. Both modalities are equally appropriate.

D. Neither modality is appropriate.

See Answer in Part B → Q14

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Q15: A 35 y/o female presents with recurrent urinary tract infections and mild flank pain. An ultrasound reveals a cystic dilation near the lower ureter, and an IVU is shown below. What is the most likely diagnosis? {{caption_text}} (Q852808)

A. Ureterocele

B. Vesicoureteral reflux

C. Hydronephrosis

D. Renal calculi



See Answer in Part B → Q15

@Neet_pg_bot

Q16: Which of the following is a typical finding in the end-stage tuberculosis of the kidney, visible on abdominal radiography? (Q852807)

A. Putty kidney

B. Phantom calyx

C. Sawtooth ureter

D. Hydronephrosis

See Answer in Part B → Q16

@Neet_pg_bot

Q17: A 45 y/o woman with a history of recurrent urinary tract infections presents with fever, flank pain, and weight loss. An ultrasound reveals an enlarged kidney with a large echogenic centre, and CT confirms the presence of a staghorn calculus along with renal enlargement and calyceal dilatation. What is the most likely diagnosis based on these findings? (Q852806)

A. Acute pyelonephritis

B. Xanthogranulomatous pyelonephritis

C. Emphysematous pyelonephritis

D. Acute lobar nephronia

See Answer in Part B → Q17

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Q18: A 12-year-old boy presents with a history of antenatal hydronephrosis detected on prenatal ultrasound. He now reports recurrent urinary tract infections and intermittent flank pain. Diuretic renography reveals delayed drainage of radiotracer. What is the most likely diagnosis? (Q852805)

A. Staghorn calculus

B. Vesicoureteric reflux (VUR)

C. Ureteropelvic junction (PUJ) obstruction

D. Urinary tract infection

See Answer in Part B → Q18

@Neet_pg_bot

Q19: A 66 y/o woman presents with pelvic pain and a palpable mass. Imaging studies show a pelvic mass with extensive calcification that has a characteristic "popcorn" appearance. Which of the following diagnoses is most consistent with these findings? (Q852804)

A. Ureteric calculus

B. Vesical calculus

C. Uterine leiomyoma (fibroid)

D. Ovarian teratoma

See Answer in Part B → Q19

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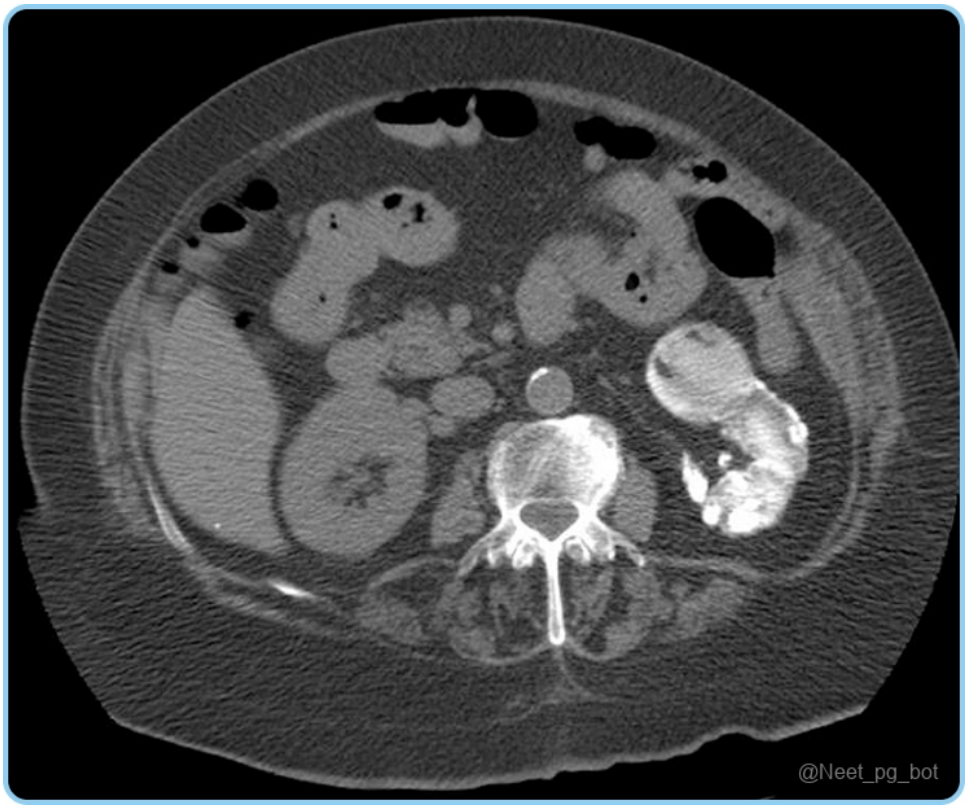
Q20: A 60 y/o male presents with chronic back pain and a history of tuberculosis. A CT scan of the patient is given below. What is the most likely diagnosis based on these findings? {{caption_text}} (Q852782)

A. Staghorn calculus

B. Medullary nephrocalcinosis

C. Putty kidney

D. Renal cell carcinoma



See Answer in Part B → Q20

@Neet_pg_bot

Q21: A 32 y/o female presents with left flank pain and nausea. She has a history of recurrent urinary tract infections. Ultrasound reveals moderate hydronephrosis, and a voiding cystourethrogram (VCUG) is performed, which shows vesicoureteric reflux (VUR). What is the most appropriate imaging study to evaluate the severity of the obstruction? (Q852781)

A. Magnetic resonance imaging (MRI)

B. Diuretic renography

C. Computed tomography (CT) urography

D. Repeat Voiding cystourethrogram (VCUG)

See Answer in Part B → Q21

@Neet_pg_bot

Q22: A 45 y/o male presents with sudden onset of severe right-sided flank pain and gross hematuria. He has a history of recurrent urinary tract infections. A non-contrast CT scan reveals a large, radio-opaque stone forming a staghorn shape in the renal pelvis. Which of the following is the most likely composition of the stone? (Q852780)

A. Uric acid

B. Calcium oxalate

C. Struvite

D. Cystine

See Answer in Part B → Q22

@Neet_pg_bot

Q23: A 12-year-old girl is evaluated for recurrent urinary tract infections. Imaging studies reveal that she has a duplex collecting system, with the upper renal moiety's ureter inserting ectopically into the bladder. The lower renal moiety's ureter is positioned normally. According to Weigert-Meyer law, which of the following statements is true regarding her condition? (Q852779)

A. The upper renal moiety's ureter typically drains into the bladder orthotopically.

B. The lower renal moiety's ureter is more likely to be associated with ureterocele.

C. Vesicoureteral reflux is more common with the lower renal moiety's ureter.

D. The ectopic ureter insertion of the upper moiety is often located lateral to the lower moiety's

See Answer in Part B → Q23

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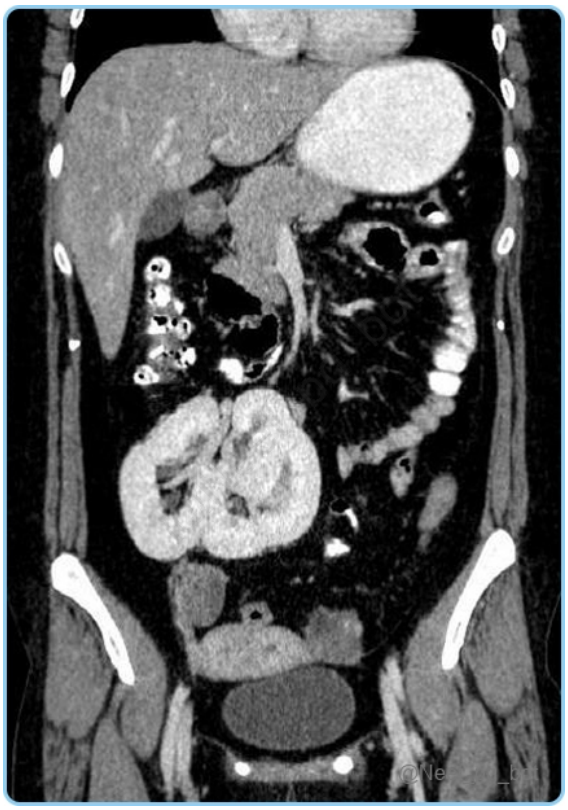
Q24: A 30 y/o presents with recurrent urinary tract infections and abdominal discomfort. An abdominal ultrasound is performed, revealing a fusion anomaly of the kidneys. Further imaging confirms the presence of a unique kidney shape, where both upper and lower poles are merged and located anterior to the aortic bifurcation. The CT Abdomen of the patient is given below. Which of the following is not the most likely diagnosis of the patient? {{caption_text}} (Q852778)

A. Horseshoe Kidney

B. Pancake Kidney

C. Discoid Kidney

D. Fused Pelvic Kidney



See Answer in Part B → Q24

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Q25: A 45 y/o male presents to the emergency department with severe left flank pain and hematuria. A CT scan is performed, revealing a 1 cm ureteric stone obstructing the left ureter. Which of the following procedures would be most appropriate to facilitate urine drainage from the kidney in this patient? (Q852777)

A. CT Urography

B. Magnetic Resonance Urography

C. Double J Stenting

D. Retrograde Urethrography

See Answer in Part B → Q25

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Q26: Which of the following statements is true regarding the indications for Voiding Cystourethrography (VCUG) and Retrograde Urethrography (RUG)? (Q852776)

A. VCUG is the gold standard for evaluating urethral strictures.

B. RUG is the gold standard for detecting vesicoureteral reflux (VUR).

C. VCUG is the most important modality for examining urinary tract anomalies in children.

D. Blood at the urethral meatus is a key indicator for performing VCUG.

See Answer in Part B → Q26

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• [09_Genitourinary Radiology] 020 Previous Year Questions

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[09_Genitourinary Radiology] 020 Previous Year Questions — Quick Jump

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Q7 (p. 345) *Q8 (p. 346)* *Q9 (p. 347)* *Q10 (p. 348)* *Q11 (p. 348)* *Q12 (p. 349)*

Q1: Which of the following is the best investigation for detecting ureteric calculi? (Q865284)

A. NCCT

B. Ureteroscopy

C. X-ray

D. CT scan

See Answer in Part B → Q1

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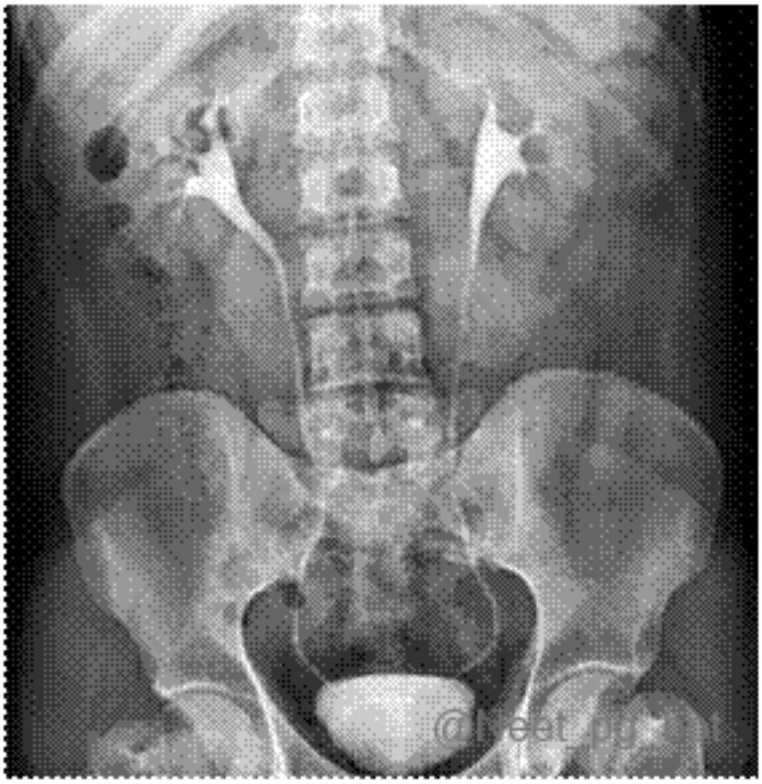
Q2: What is true about the investigation shown below? (Q866517)

A. Invasive procedure

B. Non invasive procedure to diagnose PUJ obstruction

C. Gold standard for bladder cancer

D. Done percutaneously



See Answer in Part B → Q2

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Q3: What is the investigation shown in the image? (Q852587)

A. Intravenous Pyelogram (IVP)

B. Retrograde Pyelogram

C. Computed Tomography (CT) Urography

D. Magnetic Resonance Urography



See Answer in Part B → Q3

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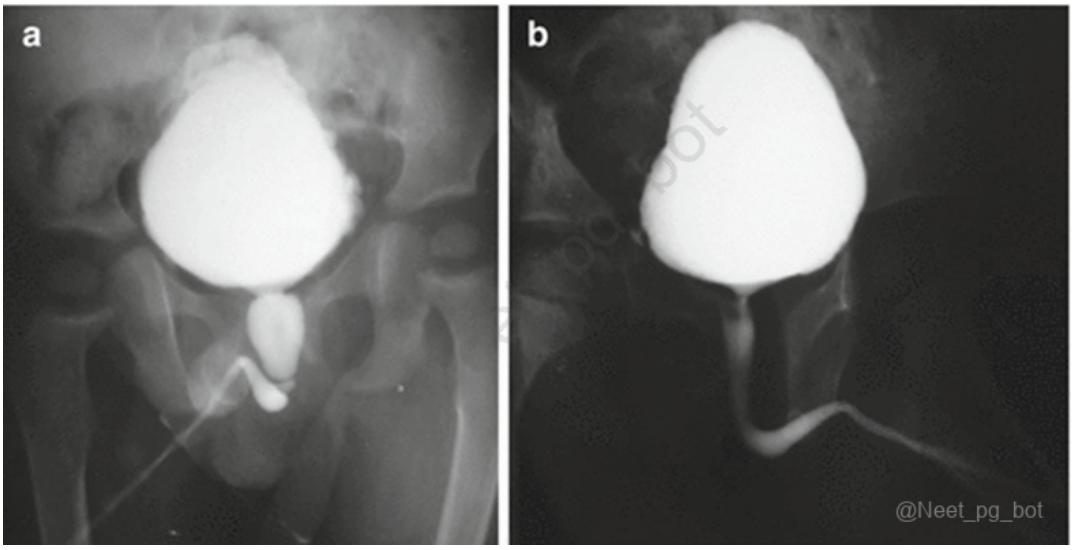
Q4: A 7-year-old male child presents with a history of recurrent urinary tract infections, poor urinary stream, and failure to thrive. On examination, his abdomen is distended, and there is a palpable bladder. His MCU is given below. What is the next best step in management? (Q843932)

A. Cystoscopic resection

B. Urethral reconstruction

C. Intermittent catheterization

D. Bladder augmentation surgery



See Answer in Part B → Q4

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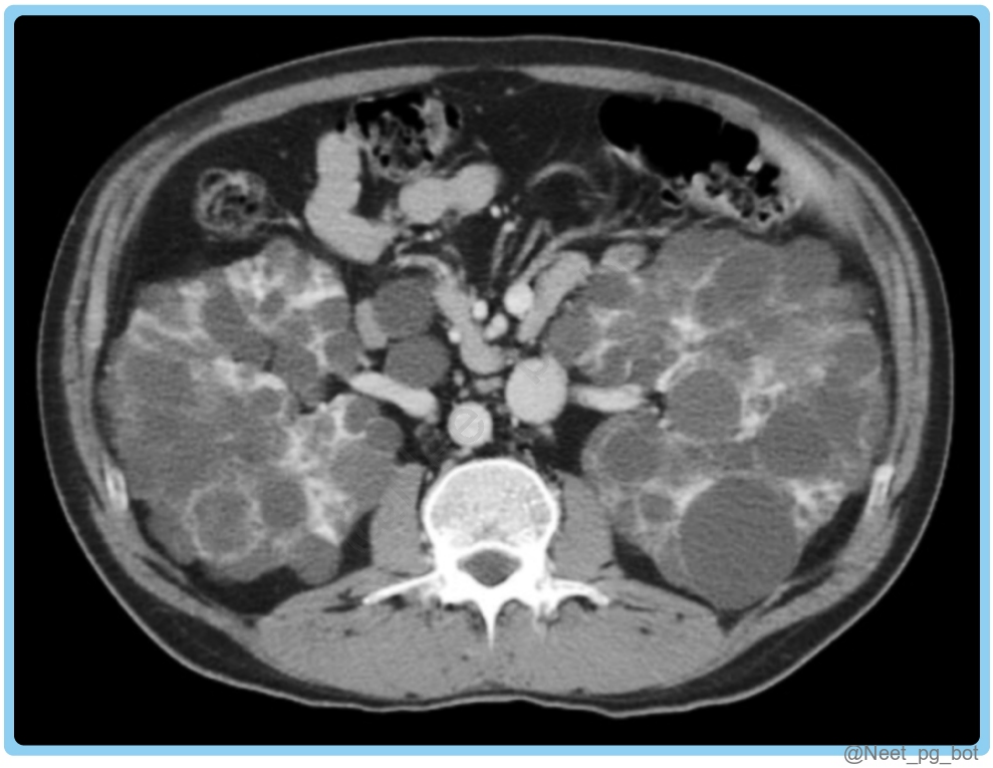
Q5: Based on the CT scan shown below, what is the most likely diagnosis? (Q843935)

A. Renal cyst

B. Renal cell carcinoma

C. Polycystic kidney disease (AD)

D. Renal angiomyolipoma



See Answer in Part B → Q5

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Q6: A 28-year-old patient presents with recurrent urinary tract infections and left flank pain . CT scan of the abdomen was performed and the image is shown below. What is the likely diagnosis? (Q820195)

A. Horseshoe kidney

B. Polycystic kidney disease

C. Renal ectopia

D. Hydronephrosis



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See Answer in Part B → Q6

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Q7: A patient presented with abdominal pain and sterile pyuria, and the x-ray showed the following features. What is the likely diagnosis? (Q855474)

A. Putty kidney

B. Staghorn calculus

C. Nephrocalcinosis

D. Psoas calcification



See Answer in Part B → Q7

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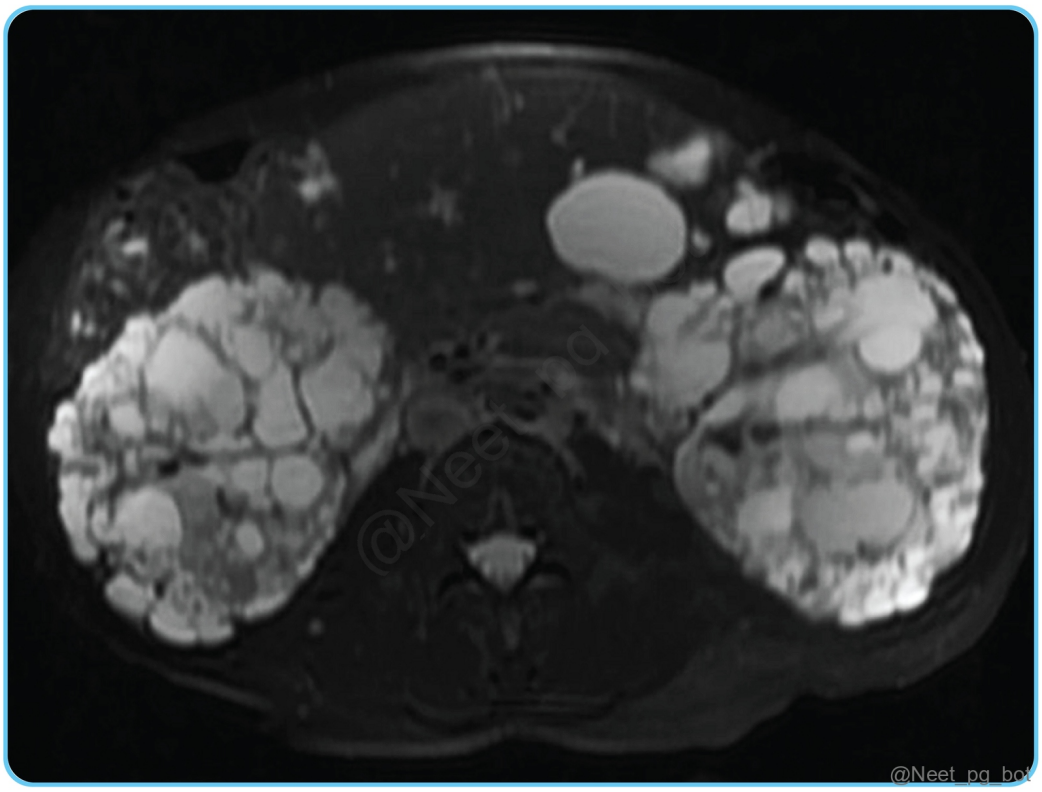
Q8: In the case presented, can you identify the imaging technique employed and the specific diagnosis related to the kidneys? (Q857197)

A. MRI of polycystic kidney disease

B. CT of polycystic kidney disease

C. MRI of Horseshoe kidney

D. CT of Horseshoe Kidney



See Answer in Part B → Q8

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Q9: ■ What is the cause of the following appearance in IVP? ■■ ■■ (Q859326)

A. Horseshoe kidney

B. Ureterocoele

C. Bladder tumor

D. Posterior urethral valve



See Answer in Part B → Q9

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Q10: A woman with endometrial carcinoma is undergoing radiotherapy. Which of the following is true? (Q855484)

A. Intensity is inversely proportional to the square of the distance from the source

B. Small blood vessels are most radioresistant

C. Rapidly proliferating cells are most radioresistant

D. Small intestinal mucosa is most radio-resistant

See Answer in Part B → Q10

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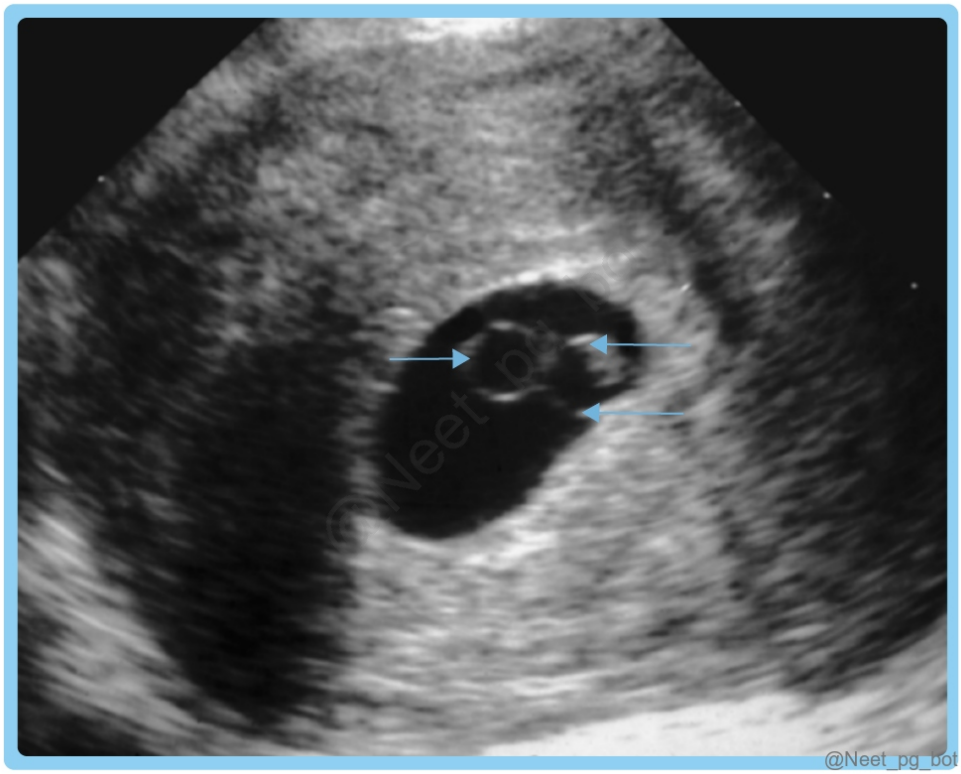
Q11: What is the cause of the double bleb sign observed during early pregnancy? (Q858242)

A. Twin pregnancy

B. Amnion and chorion

C. Yolk sac and amniotic sac

D. Heterotopic pregnancy



See Answer in Part B → Q11

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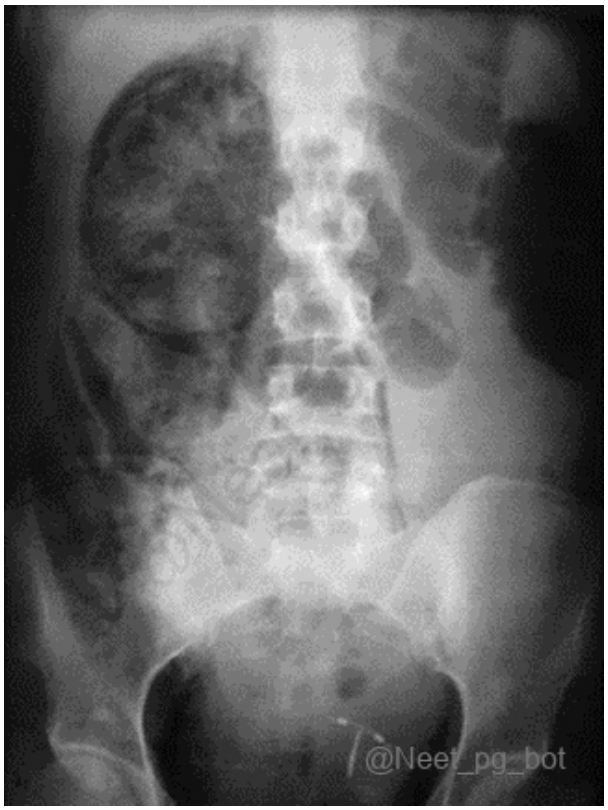
Q12: A 55-year-old female patient presents to the emergency department with chills and rigors . She has acute pain in right flank region . The imaging is shown below. What is the most likely diagnosis? (Q820179)

A. Cholecystitis

B. Emphysematous pyelonephritis

C. Small bowel obstruction

D. Volvulus



See Answer in Part B → Q12

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• [10_Radiotherapy] 021 Previous Year Questions

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[10_Radiotherapy] 021 Previous Year Questions — Quick Jump

Q1 (p. 351) *Q2 (p. 351)* *Q3 (p. 351)* *Q4 (p. 352)* *Q5 (p. 352)* *Q6 (p. 353)*
Q7 (p. 353) *Q8 (p. 353)* *Q9 (p. 354)*

Q1: Which of the following is the most likely side effect of radioactive iodine (I-131) ablation therapy? (Q852581)

A. Acute Thyroiditis

B. Hypothyroidism

C. Hyperthyroidism

D. Thyroid Storm

See Answer in Part B → Q1

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Q2: A child with acute lymphoblastic leukemia undergoes prophylactic irradiation prior autologous hematopoietic stem cell transplantation. Which of the following will be the least affected? (Q856172)

A. Spermatogonia

B. Intestinal epithelial cells

C. Neurons

D. Bone marrow/ erythroid precursor cells

See Answer in Part B → Q2

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Q3: Which phase of the cell cycle displays the highest resistance to radiation among the following options? (Q856694)

A. S phase

B. M phase

C. G1 phase

D. G2 phase

See Answer in Part B → Q3

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Q4: Side effects of Pituitary irradiation? (Q858175)

A. Hypopituitarism

B. Increased risk of cerebrovascular accident

C. Optic nerve damage

D. All of the above

See Answer in Part B → Q4

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Q5: What is the name of the radiotherapy treatment given to a cancer patient that involves administering a dose of 1.8 to 2 Gy once daily for 5 days per week over a period of 6 to 8 weeks? (Q858194)

A. Regular Fractionated radiotherapy

B. Hyper fractionated radiotherapy

C. Accelerated fractionation radiotherapy

D. Brachytherapy

See Answer in Part B → Q5

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Q6: Radioisotope used in PET-CT scan? (Q860579)

A. 18F-FDG

B. lodine

C. Radium

D. Cesium-131

See Answer in Part B → Q6

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Q7: Radioactive isotope used for teletherapy? (Q860597)

A. Iridium-192

B. lodine-125

C. Cobalt-60

D. lodine-131

See Answer in Part B → Q7

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Q8: What does a linear accelerator (LINAC) produce in radiation therapy? (Q866873)

A. Alpha and beta rays

B. X-rays and gamma rays

C. X-rays and electrons

D. Neutrons and positrons

See Answer in Part B → Q8

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Q9: Which among the following radioactive isotopes is not employed in brachytherapy? (Q793101)

A. Iodine-125

B. Iodine-131

C. Cobalt-60

D. Iridium-192

See Answer in Part B → Q9

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• [11_Cardiovascular Radiology] 022 Cvs Radiology

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[11_Cardiovascular Radiology] 022 Cvs Radiology — Quick Jump

Q1 (p. 355)	*Q2 (p. 356)*	*Q3 (p. 357)*	*Q4 (p. 357)*	*Q5 (p. 358)*	*Q6 (p. 359)*
Q7 (p. 360)	*Q8 (p. 361)*	*Q9 (p. 361)*	*Q10 (p. 362)*	*Q11 (p. 363)*	*Q12 (p. 364)*
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Q19 (p. 369)	*Q20 (p. 370)*	*Q21 (p. 371)*	*Q22 (p. 372)*	*Q23 (p. 373)*	*Q24 (p. 374)*
Q25 (p. 375)	*Q26 (p. 376)*	*Q27 (p. 376)*	*Q28 (p. 377)*	*Q29 (p. 378)*	*Q30 (p. 379)*
Q31 (p. 380)	*Q32 (p. 380)*	*Q33 (p. 381)*	*Q34 (p. 382)*	*Q35 (p. 383)*	

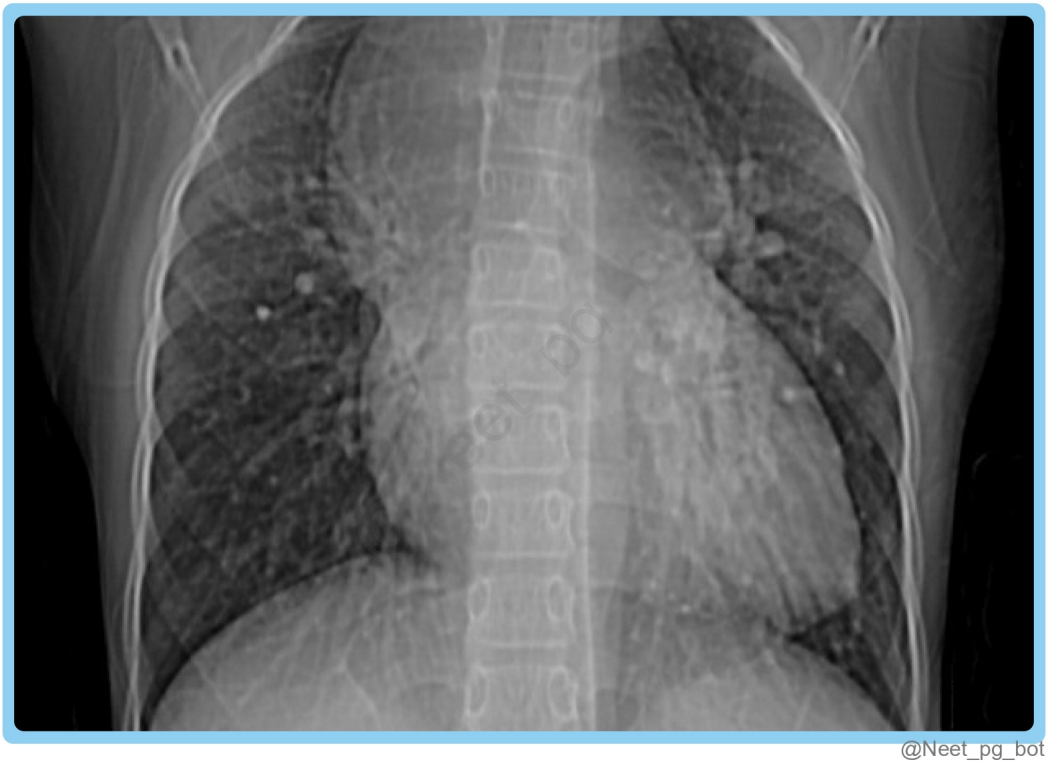
Q1: A neonate presents with early-onset respiratory distress, poor feeding, and central cyanosis not responding adequately to oxygen therapy. Chest X-ray reveals cardiomegaly with increased pulmonary vascular markings and a characteristic mediastinal contour. Based on the clinical presentation and radiographic appearance, what is the most likely diagnosis? (Q885190)

A. Endocardial cushion defect

B. Total anomalous pulmonary venous circulation

C. Supravalvular aortic stenosis

D. Primary pulmonary artery hypertension



See Answer in Part B → Q1

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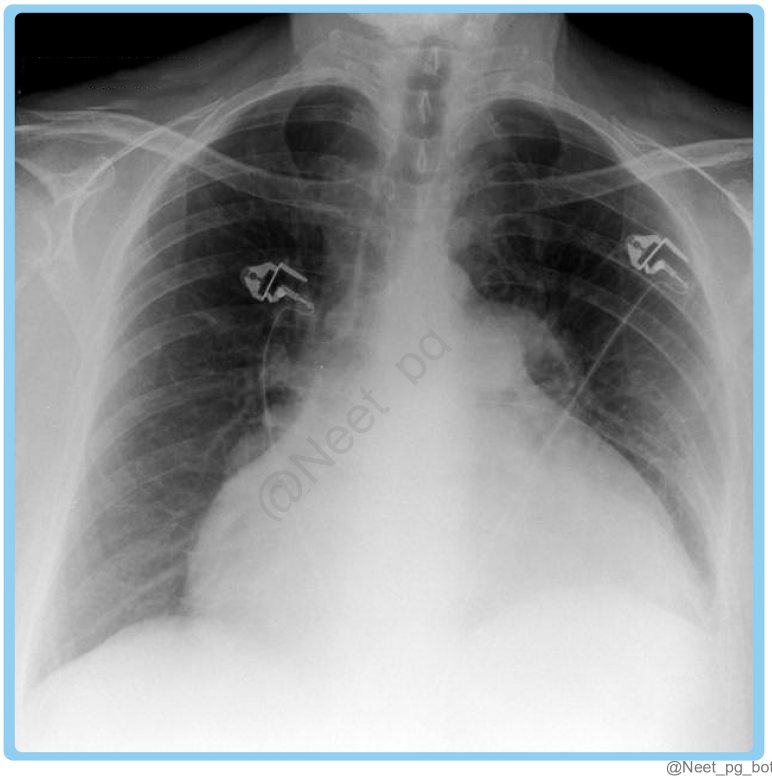
Q2: A 38-year-old male presents with gradually worsening retrosternal chest pain associated with low-grade fever for several days. A chest radiograph obtained shows an enlarged, globular cardiac silhouette with clear lung fields. Based on the clinical presentation and radiographic findings, what is the most likely diagnosis? (Q885128)

A. Pneumonia

B. Aortic dissection

C. Pericardial effusion

D. Coarctation of the aorta



See Answer in Part B → Q2

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Q3: On a routine posteroanterior chest radiograph, which finding appears first and indicates early enlargement of the left atrium? (Q885172)

A. Straightening of the right cardiac border

B. Prominence of the left atrial appendage

C. Appearance of a double right heart border

D. Elevation of the left main bronchus with carinal widening

See Answer in Part B → Q3

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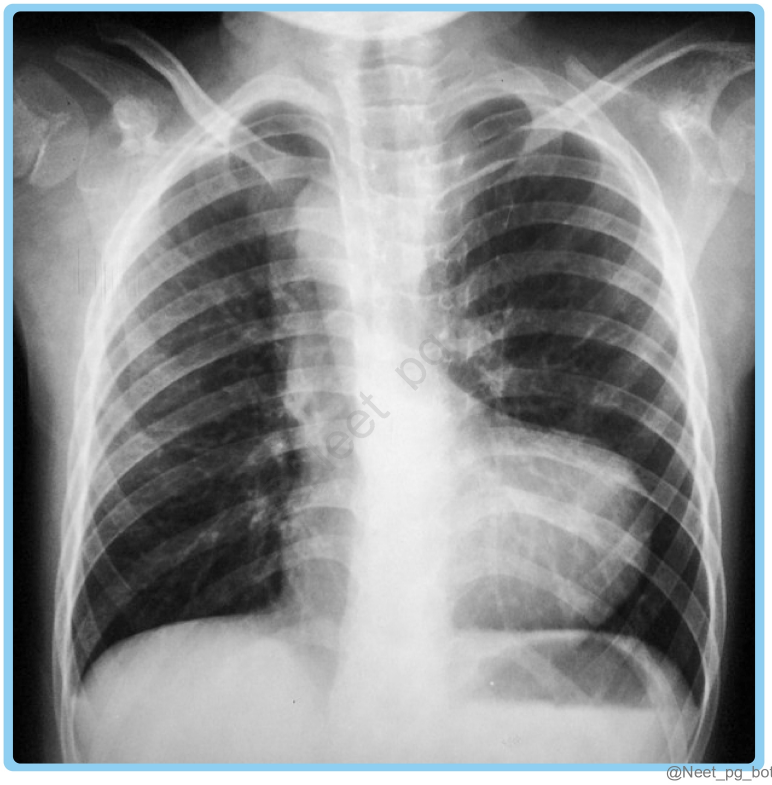
Q4: A 6-year-old child is brought with a history of progressive breathlessness and episodes of bluish discoloration of lips that worsen during exertion. A chest radiograph demonstrates a characteristic cardiac silhouette with reduced pulmonary vascular markings. What is the most likely diagnosis? (Q885173)

A. Transposition of great arteries

B. Tetralogy of Fallot

C. Ebstein's anomaly

D. Coarctation of the aorta



See Answer in Part B → Q4

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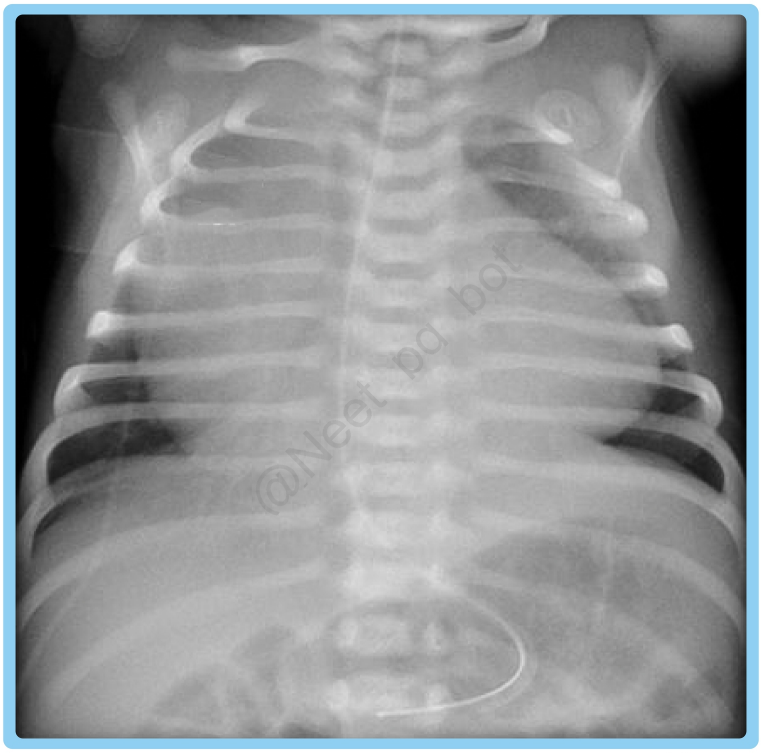
Q5: A 3-month-old infant is evaluated for recurrent episodes of central cyanosis, especially during crying and feeding. Chest radiograph demonstrates cardiomegaly with a characteristic box-shaped heart and reduced pulmonary vascularity. Which of the following best explains the underlying pathology? (Q885176)

A. Single arterial trunk supplying both systemic and pulmonary circulation

B. Downward displacement of the tricuspid valve with atrialization of the right ventricle

C. Obstruction of the right ventricular outflow tract with overriding of the aorta

D. Abnormal drainage of pulmonary veins into systemic venous circulation



See Answer in Part B → Q5

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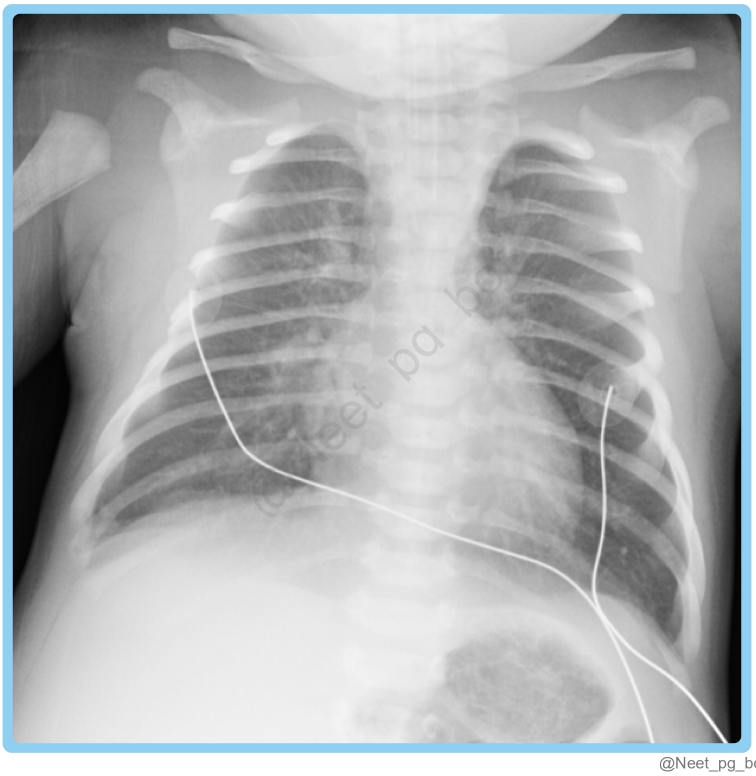
Q6: A 2-week-old neonate presents with poor feeding, lethargy, and mild central cyanosis since birth. Oxygen saturation shows minimal improvement with supplemental oxygen. A chest radiograph demonstrates a narrow superior mediastinum with an ovoid cardiac silhouette Based on the clinical and radiographic findings, which diagnosis is most likely? (Q885178)

A. Partial anomalous pulmonary venous return

B. Endocardial cushion defect

C. Transposition of the great arteries

D. Total anomalous pulmonary venous return



See Answer in Part B → Q6

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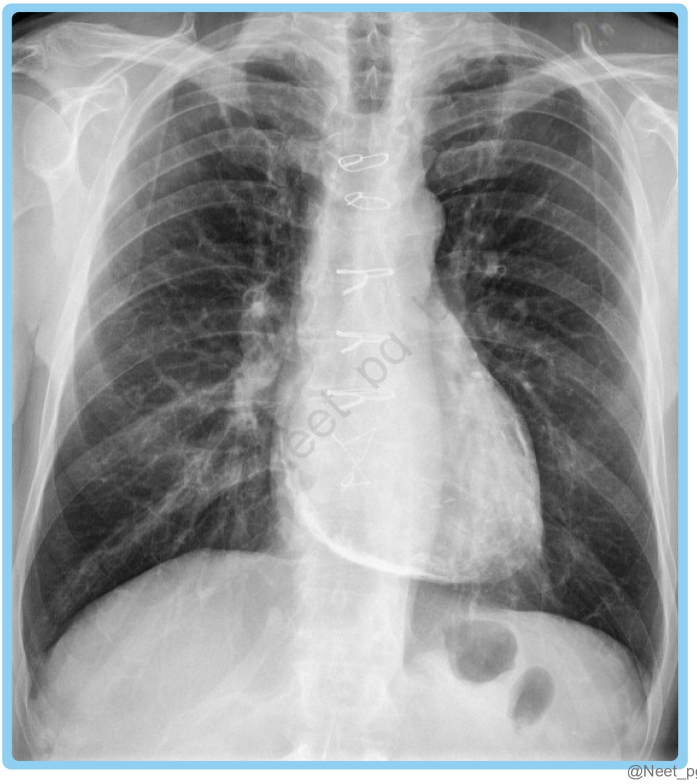
Q7: A 62-year-old woman with a long-standing history of treated tuberculosis presents with progressive exertional dyspnoea, easy fatigability, and lower limb swelling. A chest X-ray shows curvilinear calcification outlining the cardiac silhouette. What is the most likely diagnosis? (Q885185)

A. Pulmonary arterial hypertension

B. Constrictive pericarditis

C. Pericardial effusion

D. Hypertrophic obstructive cardiomyopathy



See Answer in Part B → Q7

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Q8: An infant undergoing fluoroscopic evaluation for suspected congenital heart disease shows prominent, rhythmic pulsations of the pulmonary arteries at both hila (hilar dance). Which of the following cardiac lesions is most likely responsible for this finding? (Q885187)

A. Tetralogy of Fallot

B. Ventricular septal defect

C. Patent ductus arteriosus

D. Atrial septal defect

See Answer in Part B → Q8

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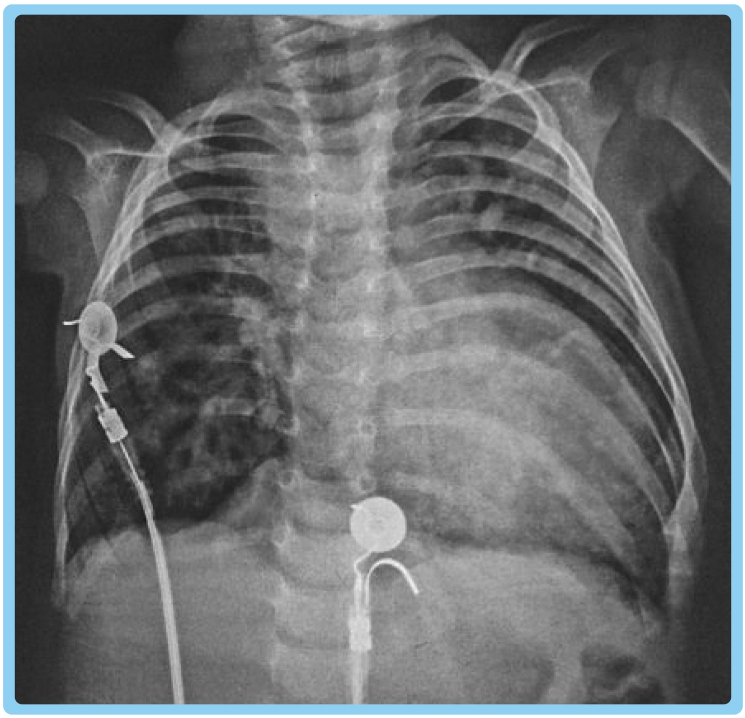
Q9: A newborn presents with cyanosis and features of early congestive cardiac failure. Chest X-ray shows cardiomegaly with a characteristic “sitting-duck” appearance of the heart due to the absence of normal great vessel separation. This radiographic finding is most suggestive of which congenital heart disease? (Q885188)

A. Transposition of great arteries

B. Tetralogy of Fallot

C. Persistent truncus arteriosus

D. Pulmonary arterial hypertension



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See Answer in Part B → Q9

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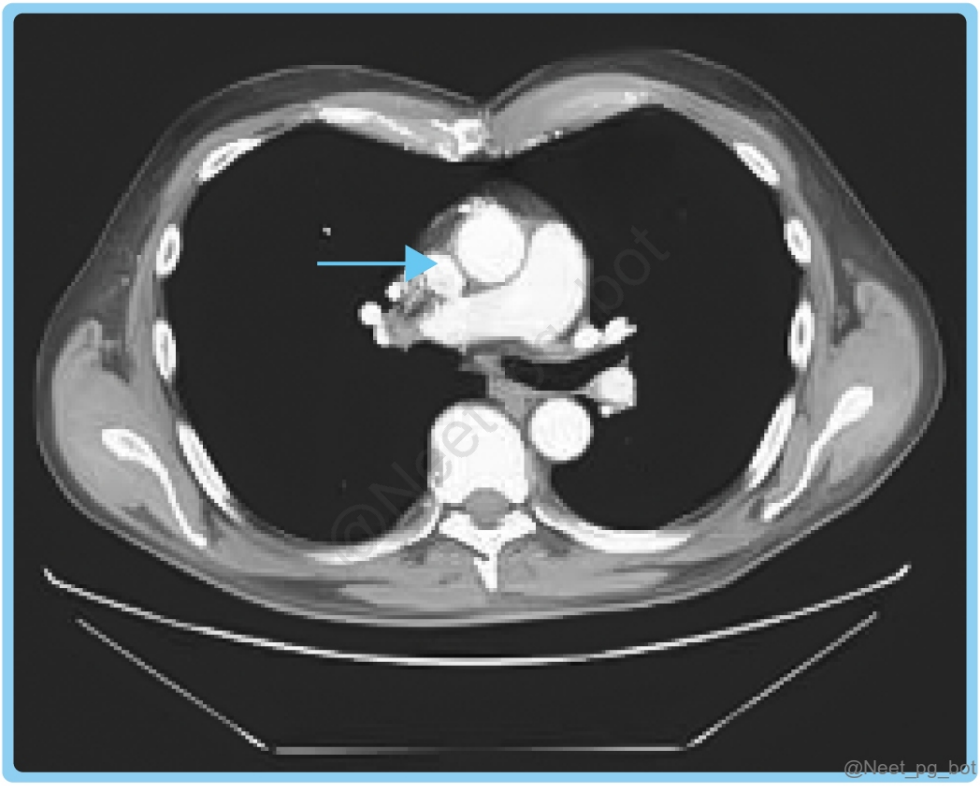
Q10: On the axial CT image of the thorax shown, the labelled vascular structure is best identified as which of the following? (Q885127)

A. Descending aorta

B. Ascending aorta

C. Superior vena cava

D. Right pulmonary artery



See Answer in Part B → Q10

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Q11: A 28-year-old woman reports long-standing upper limb hypertension associated with exertional fatigue and pain in the lower limbs while walking. On examination, femoral pulses are delayed compared to radial pulses. A chest radiograph demonstrates characteristic rib notching. What is the most likely cause of her systemic hypertension? (Q885191)

A. Aortitis

B. Coarctation of the aorta

C. Essential hypertension

D. Thoracic aortic aneurysm



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See Answer in Part B → Q11

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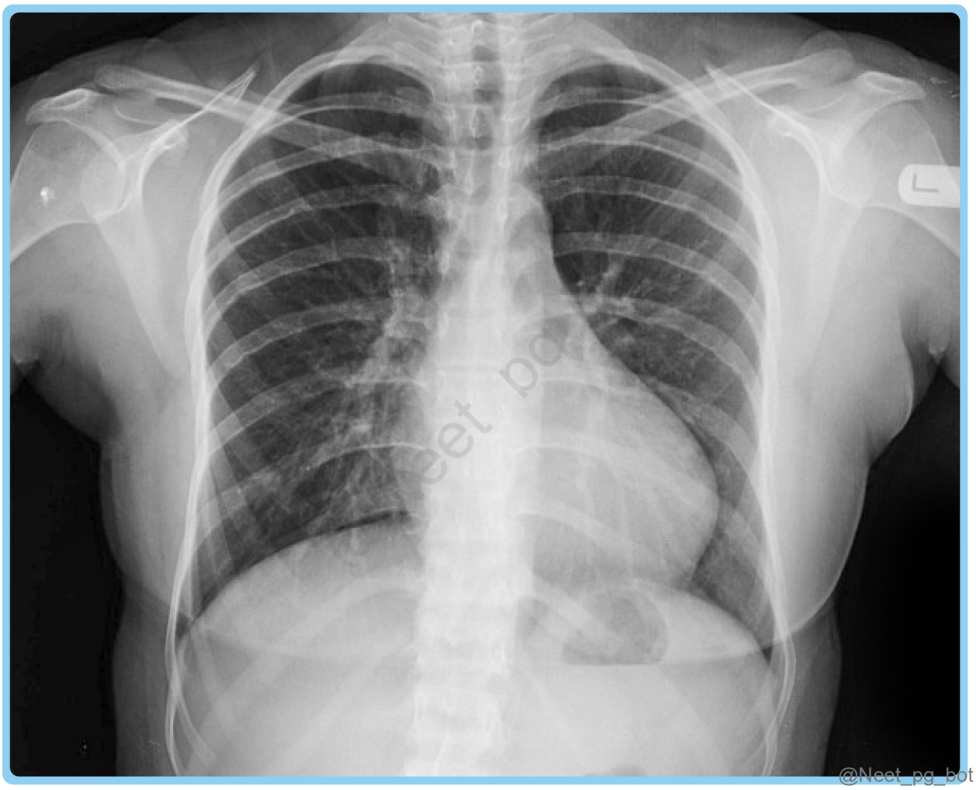
Q12: A 32-year-old patient undergoes a chest X-ray. Which of the following conditions is most likely responsible for the abnormality seen? (Q885193)

A. Marfan’s syndrome

B. Coarctation of the aorta

C. Rickets

D. Multiple myeloma



See Answer in Part B → Q12

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Q13: A 40-year-old patient undergoes chest radiography, which demonstrates abnormal rib changes. Based on the X-ray, which of the following conditions is most likely responsible for the findings? (Q885196)

A. Coarctation of aorta

B. Neurofibromatosis

C. Rheumatoid arthritis

D. Systemic lupus erythematosus



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See Answer in Part B → Q13

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Q14: A 55-year-old patient presents with progressive shortness of breath and exertional dyspnea. The chest imaging shows tapering and reduced calibre of the distal pulmonary arteries. Which of the following conditions is most likely responsible? (Q885198)

A. Pulmonary hypertension

B. Pulmonary embolism

C. Pulmonary oedema

D. Pulmonary infarction

See Answer in Part B → Q14

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Q15: Plethoric lung fields on chest X-ray are most commonly seen in which of the following conditions? (Q885200)

A. Tricuspid atresia

B. Ebstein anomaly

C. Tetralogy of Fallot

D. Total anomalous pulmonary venous connection

See Answer in Part B → Q15

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Q16: A 50-year-old man presents with sudden, severe chest pain. CT chest reveals an intimal flap within the aorta. What is the diagnosis? (Q885212)

A. Pulmonary embolism

B. Aortic aneurysm

C. Aortic dissection

D. Myocardial infarction



See Answer in Part B → Q16

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Q17: On colour Doppler ultrasonography of the groin, the arrangement of the common femoral vein, common femoral artery, and the great saphenous vein produces a characteristic appearance. What is this sign called? (Q885213)

A. Tillaux sign

B. Mickey Mouse sign

C. Stemmer sign

D. String sign

See Answer in Part B → Q17

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Q18: A middle-aged woman presenting with acute coronary syndrome is clinically stabilised. To assess myocardial segments that are viable but ischemic and likely to

recover function, which investigation is most appropriate? (Q885214)

A. Resting echocardiography

B. Thallium myocardial perfusion scan

C. Coronary angiography

D. MUGA scan

See Answer in Part B → Q18

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Q19: A 68-year-old female patient presents to the emergency department with complaints of increasing shortness of breath over the past few weeks and occasional palpitations. She has a history of hypertension and was diagnosed with mitral stenosis five years ago. A chest X-ray is performed, and the radiologist notes specific findings. Based on the chest X-ray findings, which of the following features is most indicative of the condition observed? (Q853488)

A. Elevation of the left main bronchus

B. Widening of the mediastinum

C. Presence of pleural effusion

D. Cardiomegaly with a normal heart border



See Answer in Part B → Q19

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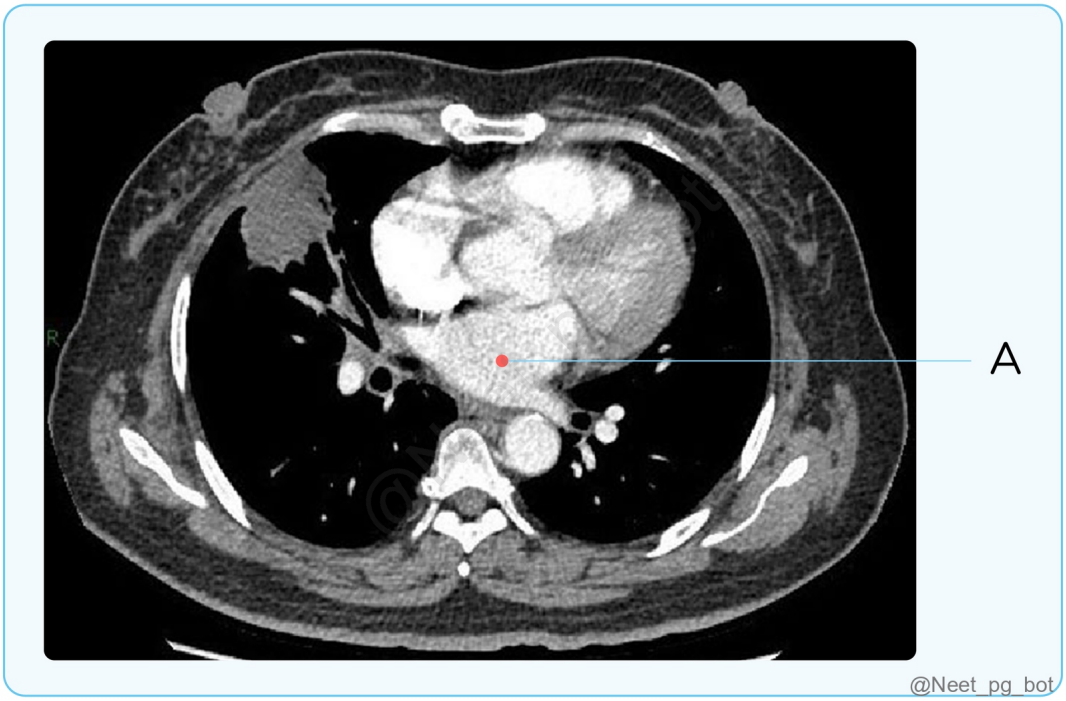
Q20: You are shown a CT scan of the chest. The scan is taken in the arterial phase. Based on the anatomy and contrast enhancement, identify the structure marked as 'A' by the arrow. (Q853480)

A. Left atrium

B. Ascending Aorta

C. Pulmonary trunk

D. Right Atrium



See Answer in Part B → Q20

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Q21: A 3-year-old child presents with cyanosis and difficulty in breathing during physical exertion. On physical examination, the patient has a harsh systolic murmur heard best at the left upper sternal border. A chest X-ray is performed and it shows the following features. What is the most likely diagnosis? (Q853481)

A. Transposition of the Great Arteries (TGA)

B. Tetralogy of Fallot (TOF)

C. Total Anomalous Pulmonary Venous Connection (TAPVC)

D. Tricuspid Atresia



See Answer in Part B → Q21

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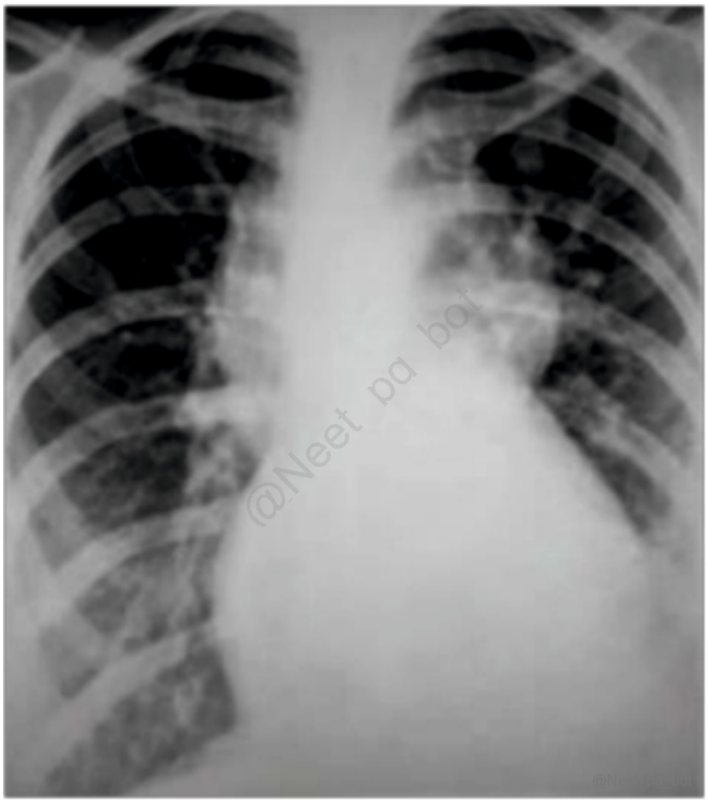
Q22: A 5-month-old male infant presents with cyanosis, difficulty breathing, and failure to thrive. On physical examination, a loud second heart sound (S2) is heard, and there are signs of pulmonary congestion. The patient's chest X-ray is given below. What is the most likely diagnosis? (Q853482)

A. Partial anomalous pulmonary venous return (PAPVR)

B. Tetralogy of Fallot (TOF)

C. Transposition of the great arteries (TGA)

D. Total anomalous pulmonary venous connection (TAPVC)



See Answer in Part B → Q22

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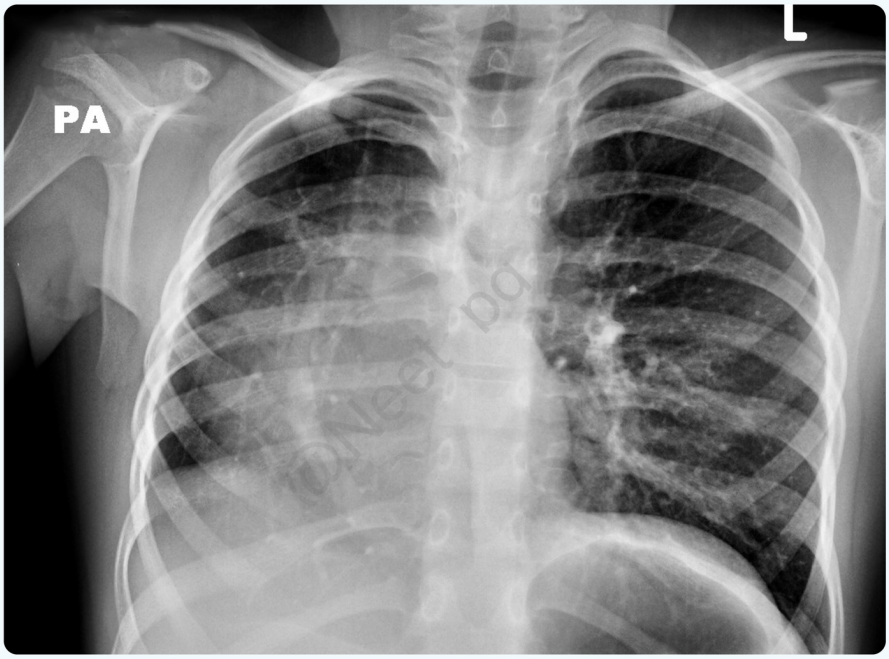
Q23: A 25-year-old male presents with mild exertional dyspnea. Clinical examination reveals a fixed split S2 and a systolic ejection murmur at the left upper sternal border. A chest X-ray shows the following features. What is the most likely diagnosis? (Q853483)

A. Partial Anomalous Pulmonary Venous Connection (PAPVC)

B. Ventricular Septal Defect (VSD)

C. Mitral Stenosis

D. Total Anomalous Pulmonary Venous Connection (TAPVC)



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See Answer in Part B → Q23

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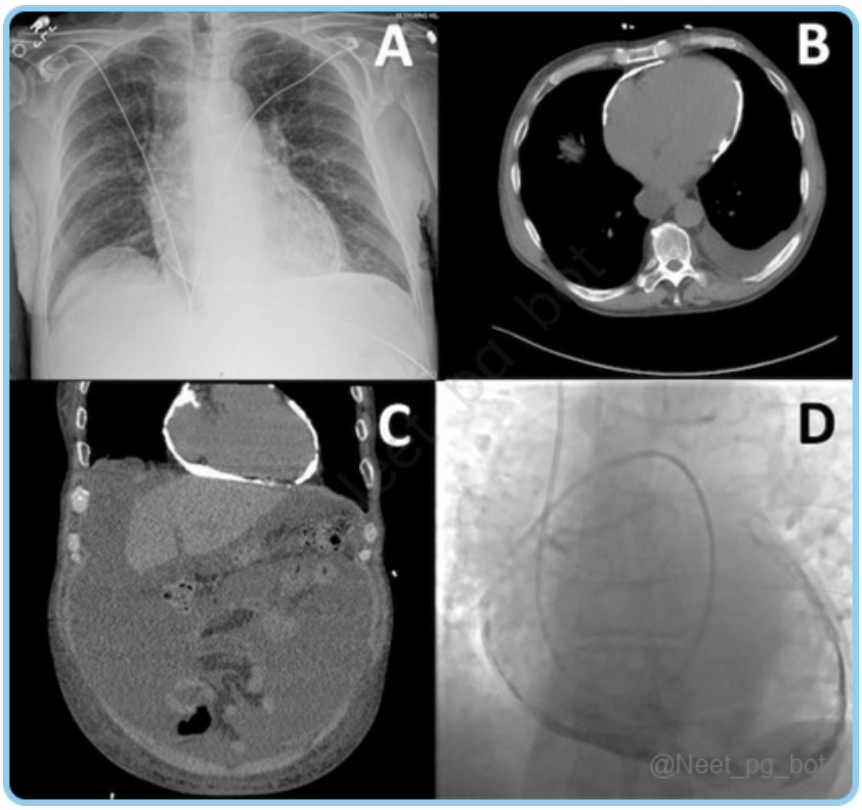
Q24: A 31-year-old man presents with dyspnea, orthopnea and fatigue. The radiological images are attached below. Based on the given information, which of the following is the most likely diagnosis? (Q853484)

A. Acute pericarditis

B. Calcific constrictive pericarditis

C. Cardiac tamponade

D. Myocardial infarction



See Answer in Part B → Q24

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Q25: A 3-day-old newborn is brought to the emergency department with marked central cyanosis. On examination, his heart rate is 160 bpm, respiratory rate is 65 breaths/min, and oxygen saturation is 80% on room air. A chest radiograph is performed, showing cardiomegaly with a characteristic "egg on a string" appearance. If an echocardiogram is conducted, which of the following echocardiographic findings would be most consistent with the suspected condition? (Q853485)

A. Ventricular septal defect with overriding aorta

B. Single great artery arising from the heart

C. Parallel great vessels with the aorta anterior and slightly to the right of the pulmonary artery

D. Abnormal pulmonary venous connections to the right atrium

See Answer in Part B → Q25

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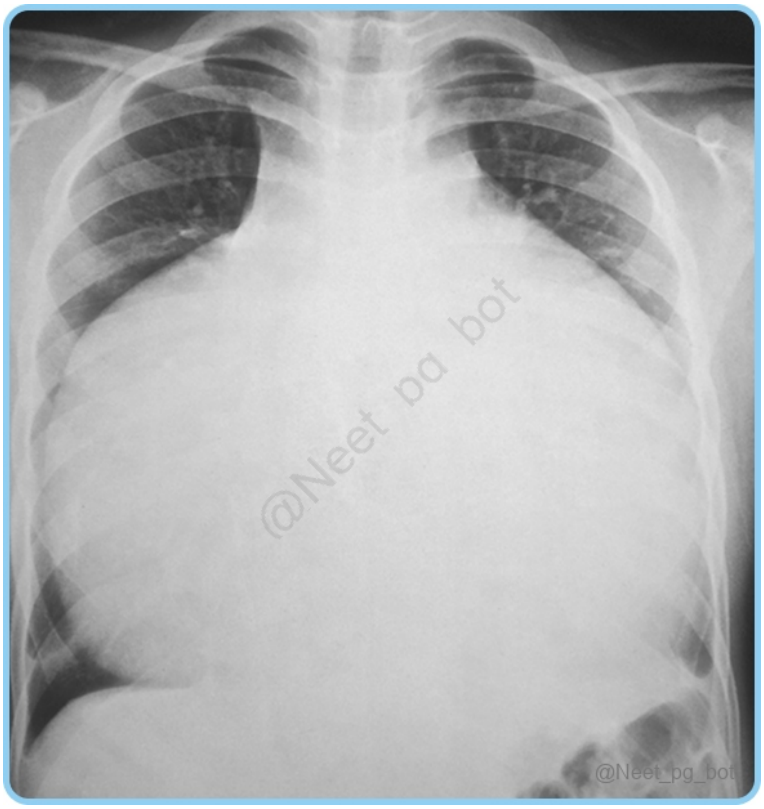
Q26: A 16-year-old female presents to the emergency department with complaints of shortness of breath and palpitations. A chest X-ray is performed, and the radiologist notes a distinctive cardiac silhouette, as shown in the image. Which of the following best describes the cardiac abnormality suggested by this radiographic appearance? (Q853486)

A. Boot-shaped heart; Tetralogy of Fallot

B. Box-shaped heart; Ebstein anomaly

C. Egg-on-string appearance; Transposition of the Great Arteries

D. Snowman sign; Total Anomalous Pulmonary Venous Return



See Answer in Part B → Q26

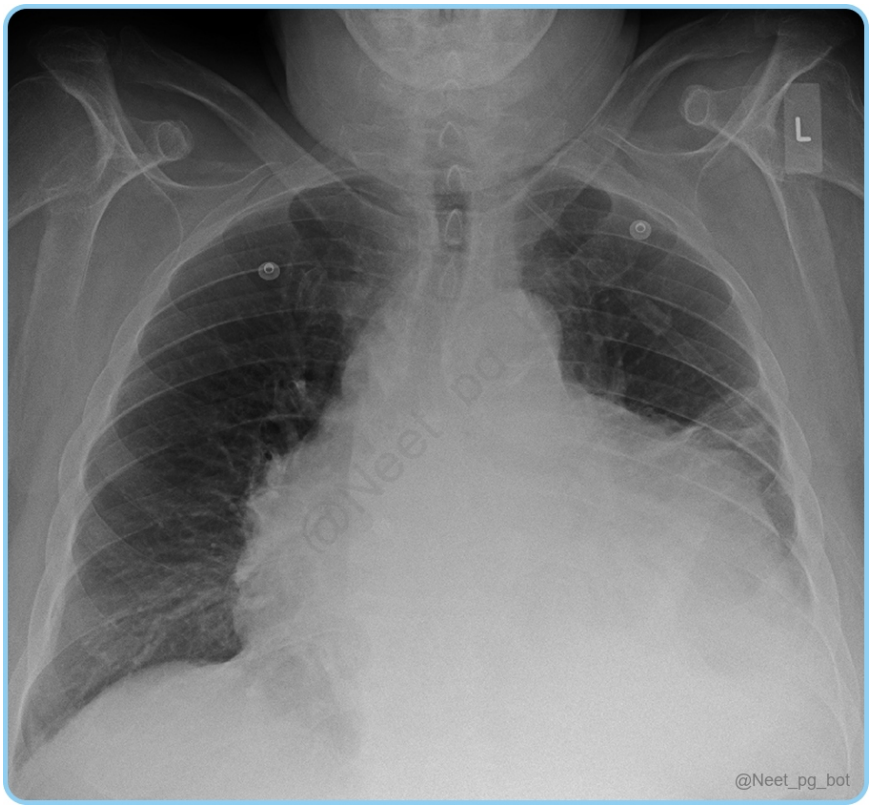
Q27: A 45-year-old woman presents with gradually worsening dyspnea and reduced exercise tolerance over the past month. The chest X-ray is given below. Regarding this patient's condition, which of the following statements is INCORRECT? (Q853487)

A. "Oreo cookie" sign will be seen on lateral view on Chest X Ray

B. The patient typically shows abrupt enlargement of cardiothoracic ratio

C. Seldinger technique is employed for management of this condition

D. An Echocardiogram is a better modality than CT to confirm the diagnosis



See Answer in Part B → Q27

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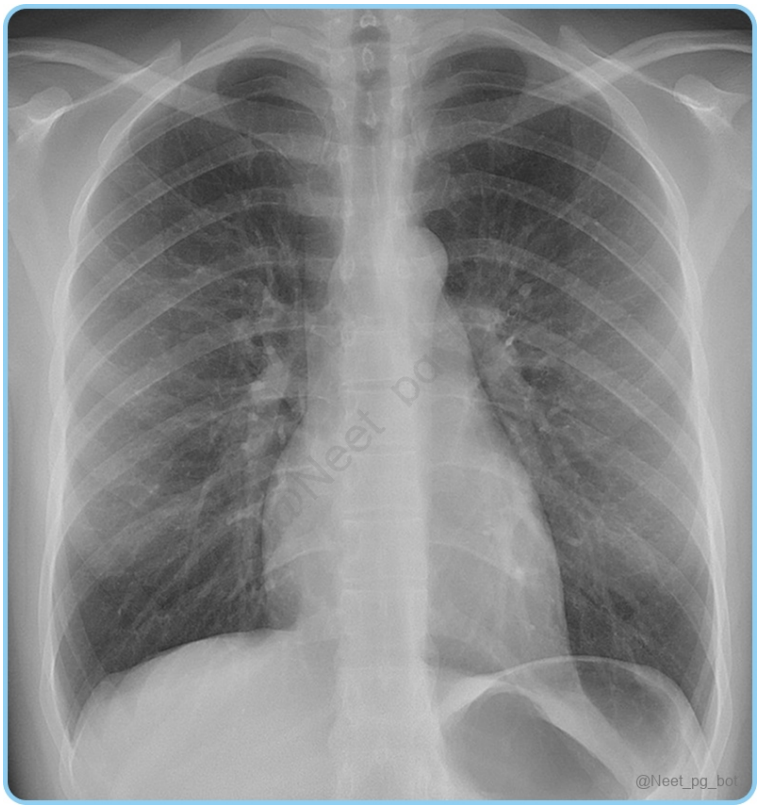
Q28: A 45-year-old male patient presents with dyspnea on exertion and occasional palpitations. A chest X-ray is performed, revealing the cardiac silhouette. Study the image provided and answer the following question. Which of the following statements regarding the heart's position, size, and borders on the chest radiograph is correct? (Q853479)

A. The right heart border is formed primarily by the right ventricle

B. The left atrium primarily forms the left heart border

C. The cardiothoracic ratio (CTR) is considered normal if it is less than 0.5 on a PA chest X-ray

D. The right atrium and the left ventricle mainly form the inferior border of the heart



See Answer in Part B → Q28

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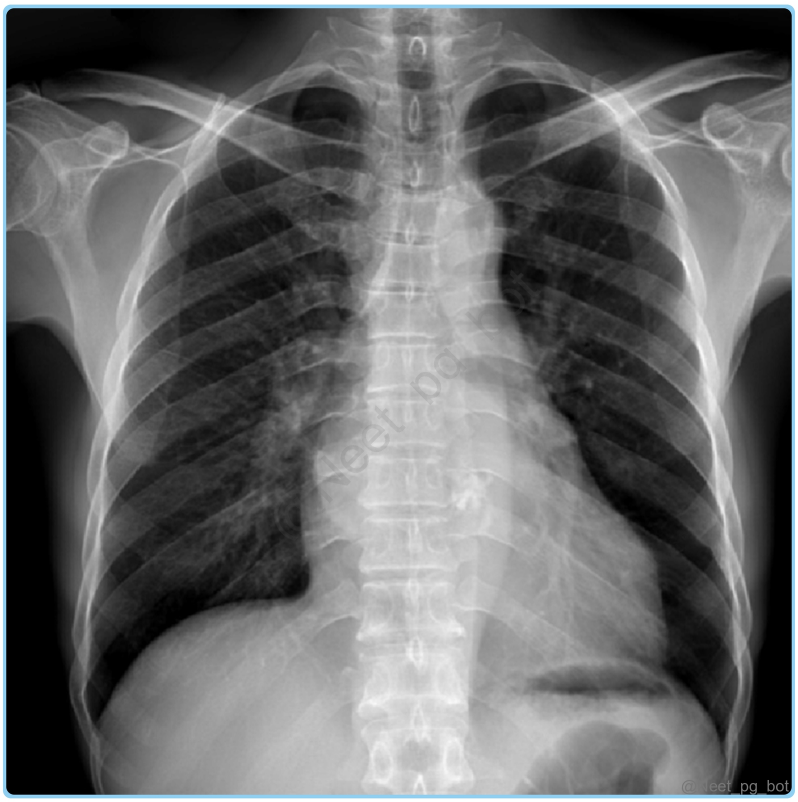
Q29: In mitral stenosis, which Mogul sign is seen? (Q853489)

A. First

B. second

C. Third

D. Fourth



See Answer in Part B → Q29

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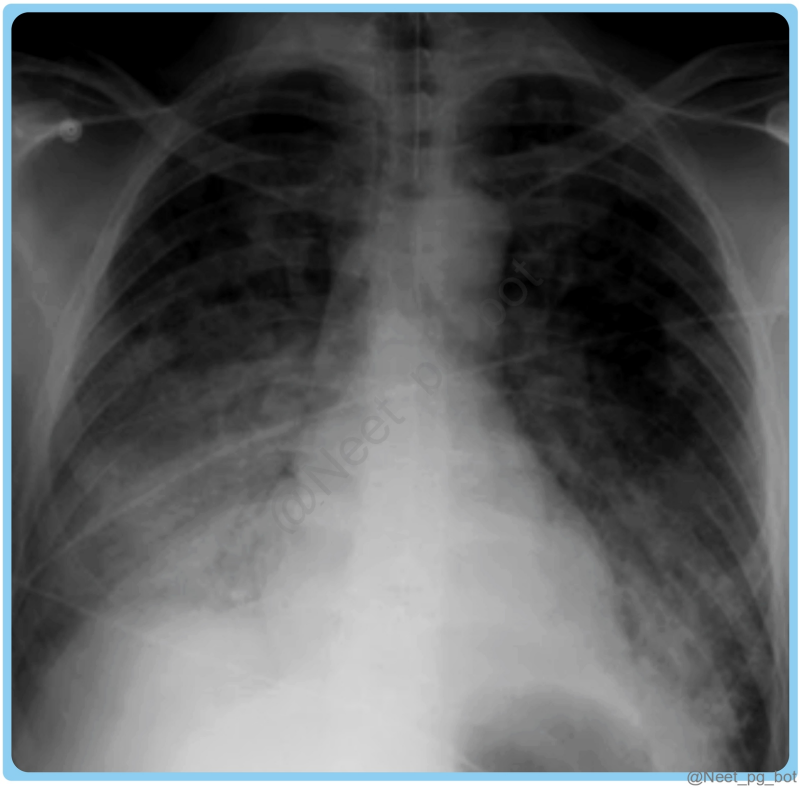
Q30: A 70-year-old male patient presents to the emergency department with acute respiratory distress following a severe allergic reaction. He has a history of asthma and reports recent exposure to a known allergen. Chest X-ray of the patient is given below. Which of the following findings on the chest X-ray is NOT characteristic of the patient's condition? (Q853490)

A. Bat's Wing Distribution

B. Air Bronchogram

C. Widened Mediastinum

D. Kerley B lines



See Answer in Part B → Q30

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Q31: A 60-year-old male with hypertension, hyperlipidemia, and a smoking history presents for a routine evaluation. He has no symptoms but is concerned about cardiovascular health due to a family history of heart disease. Which score is used to assess coronary artery disease risk? (Q853491)

A. CHA2DS2-VASc Score

B. Agatston Score

C. Reynolds Risk Score

D. Carotid Intima-Media Thickness

See Answer in Part B → Q31

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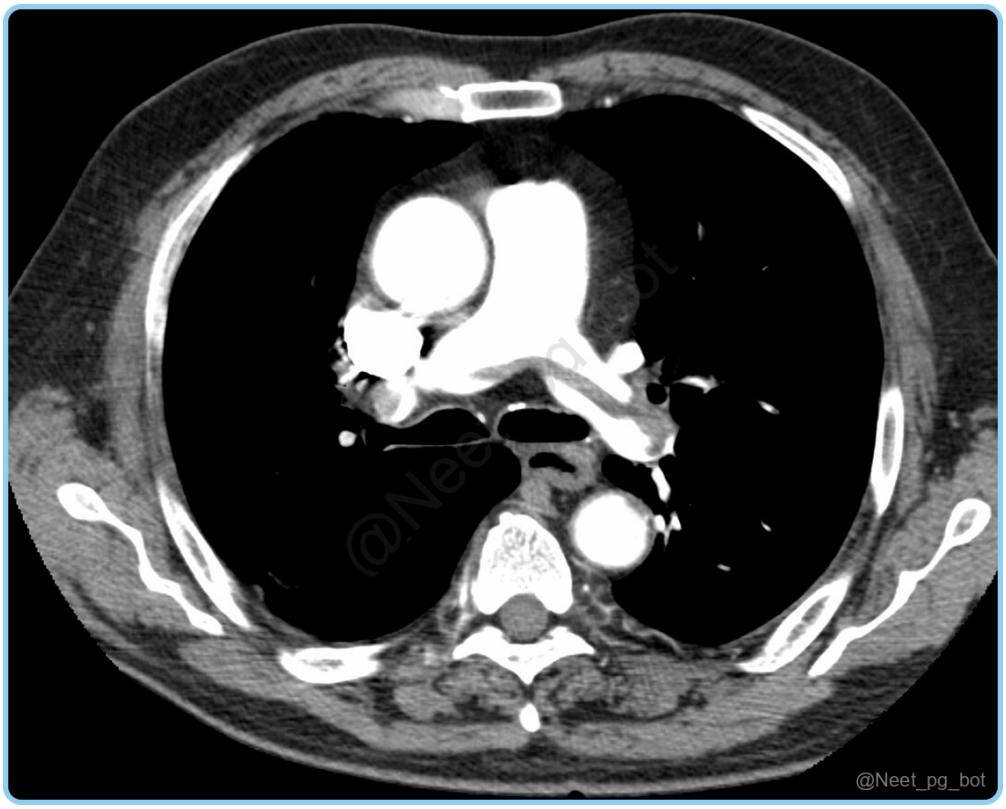
Q32: A 58-year-old male with a history of hypertension and recent long-distance travel presents with sudden chest pain and dyspnea. A Computed Tomography Pulmonary Angiography (CTPA) is performed, and the findings are given below. Which of the following statements regarding the findings associated with the given condition is FALSE? (Q853492)

A. Hampton Hump indicates hemorrhage and necrotic lung tissue in pulmonary infarction.

B. The Westermark Sign shows regional oligemia due to reduced blood flow.

C. Chang Sign shows an enlargement of the right descending pulmonary artery.

D. Palla Sign indicates enlargement of the right descending pulmonary artery.



See Answer in Part B → Q32

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Q33: A 10-year-old boy presents with brachio-femoral pulse delay and a history of recurrent chest pain. A chest X-ray is performed, revealing a contour abnormality of the aorta and rib notching. Which of the following radiographic features is most likely

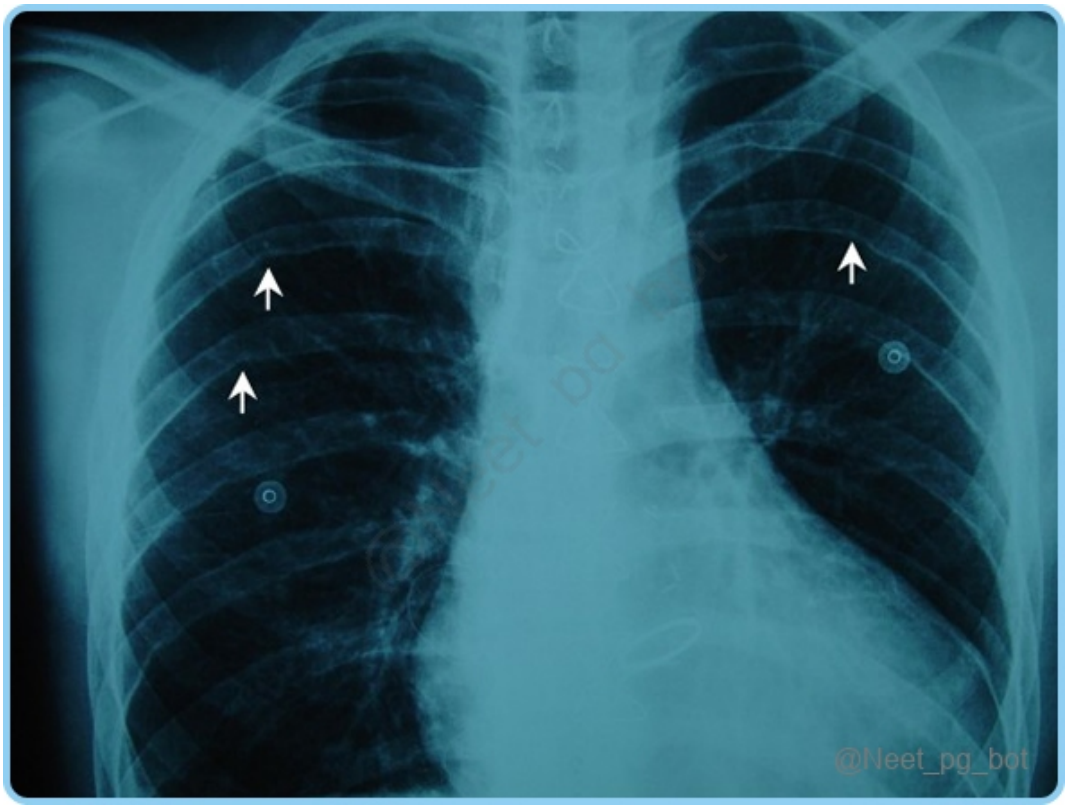
observed in this patient? (Q853493)

A. Figure of 3 sign

B. Widened mediastinum

C. Kerley B lines

D. Enlarged cardiac silhouette



See Answer in Part B → Q33

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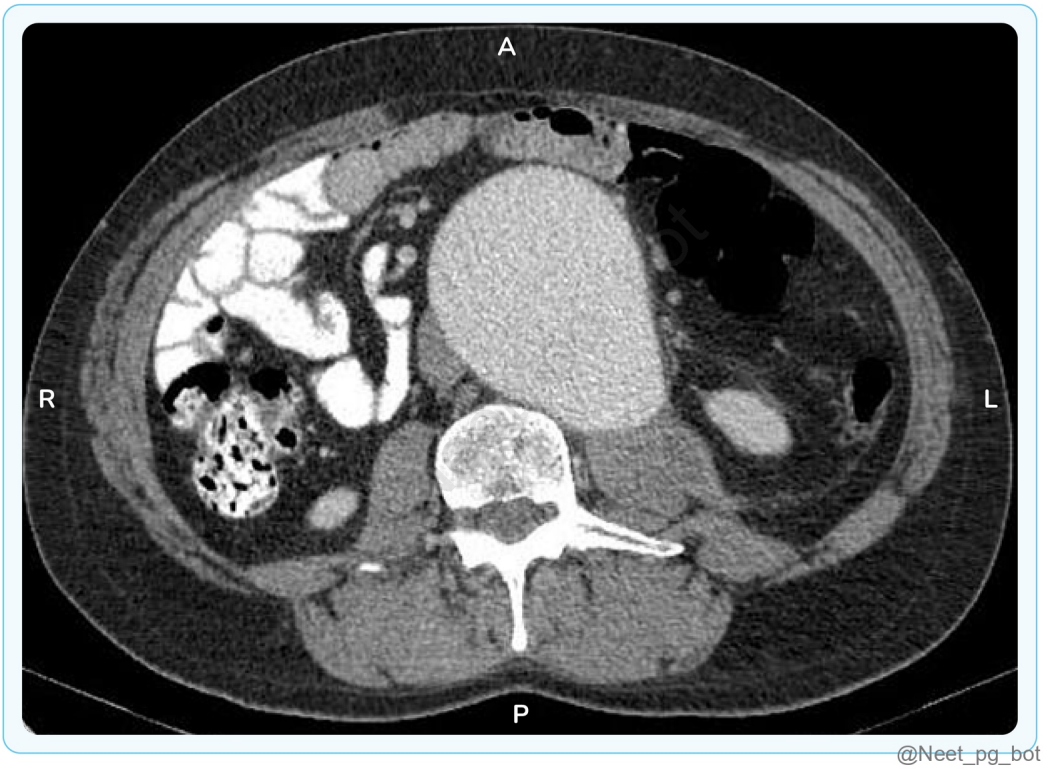
Q34: A 72-year-old male with a history of hypertension and hyperlipidemia presents to the emergency department with sudden, severe abdominal pain radiating to the back. A CT angiogram is given below. Which of the following radiological signs on the CT angiogram indicates an impending rupture of the patient's condition? (Q853494)

A. Retroperitoneal hematoma

B. Contrast extravasation

C. Draped aorta sign

D. Para-aortic fat stranding



See Answer in Part B → Q34

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Q35: On a standard posteroanterior chest radiograph, which structure does not contribute to the formation of the right heart border? (Q885126)

A. Right ventricle

B. Superior vena cava

C. Right atrium

D. Inferior vena cava

See Answer in Part B → Q35

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• [11_Cardiovascular Radiology] 023 Previous Year Questions

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[11_Cardiovascular Radiology] 023 Previous Year Questions — Quick Jump

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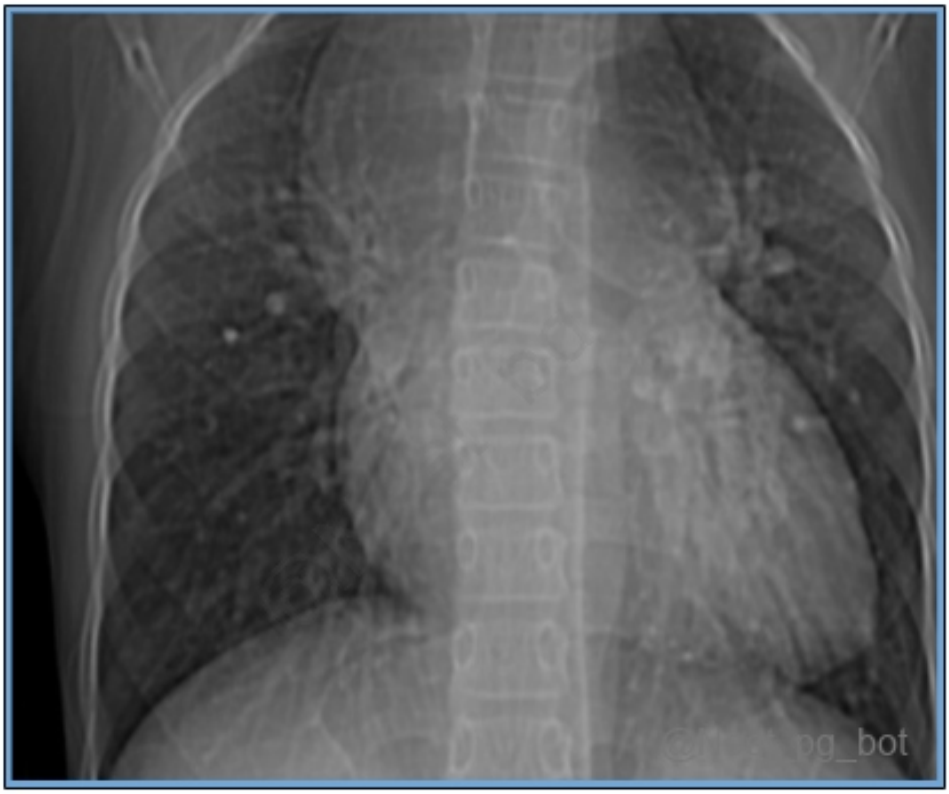
Q1: A 12-week-old infant presented with fever, cyanosis, and fatigue. His chest X-ray is shown below. What is the most likely diagnosis? (Q856159)

A. Total anomalous pulmonary venous circulation

B. Tetralogy of Fallot

C. Transposition of great arteries

D. Pericardial effusion



See Answer in Part B → Q1

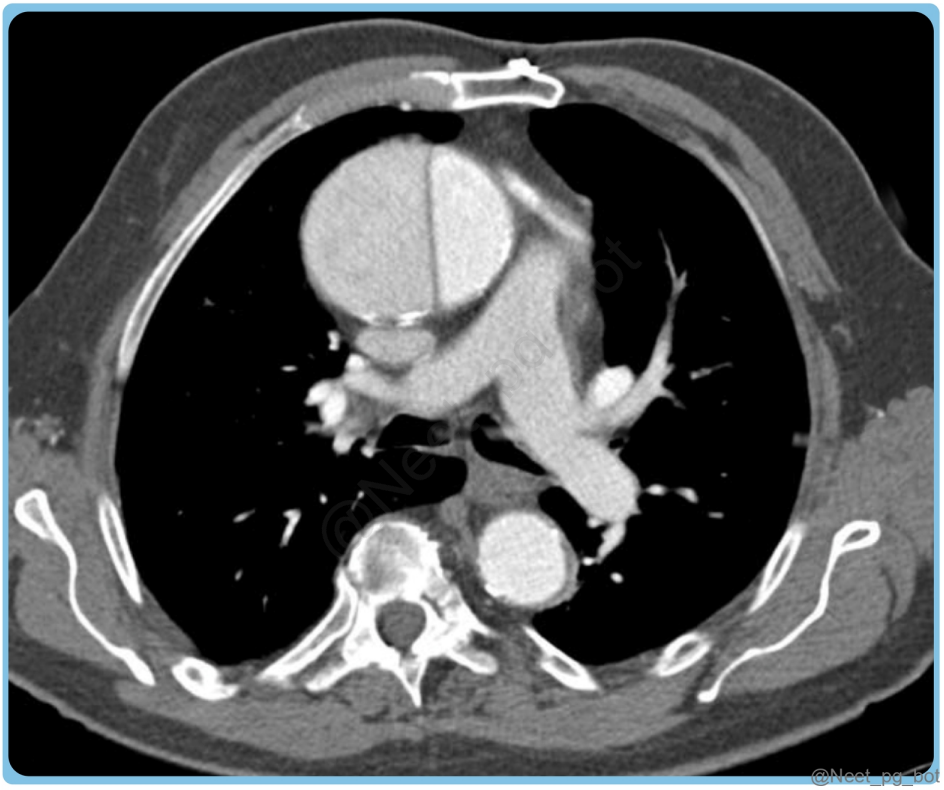
Q2: Comment on the diagnosis of the CT chest shown below. {{caption_text}} (Q859926)

A. Aortic dissection

B. Pulmonary embolism

C. Cardiac myxoma

D. Aortic aneurysm



See Answer in Part B → Q2

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Q3: A 55 year old male patient presented with complaints of dyspnea with congestive heart failure. The clinician wants to know whether it's HF with preserved EF or reduced EF. Which of the below investigation is used for calculation of ejection fraction? (Q859929)

A. MUGA

B. SPECT using thallium

C. PET myocardial perfusion imaging

D. Sestamibi scan with pharmacological stress

See Answer in Part B → Q3

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• [12_Neuro Radiology] 024 Neuroradiology-I

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[12_Neuro Radiology] 024 Neuroradiology-I — Quick Jump

Q1 (p. 387)	*Q2 (p. 388)*	*Q3 (p. 389)*	*Q4 (p. 389)*	*Q5 (p. 390)*	*Q6 (p. 390)*
Q7 (p. 391)	*Q8 (p. 392)*	*Q9 (p. 393)*	*Q10 (p. 393)*	*Q11 (p. 394)*	*Q12 (p. 395)*
Q13 (p. 396)	*Q14 (p. 396)*	*Q15 (p. 397)*	*Q16 (p. 398)*	*Q17 (p. 399)*	*Q18 (p. 399)*
Q19 (p. 400)	*Q20 (p. 401)*	*Q21 (p. 401)*	*Q22 (p. 402)*	*Q23 (p. 403)*	

Q1: A 50-year-old patient is admitted to the ICU after experiencing a cardiac arrest. CT imaging is given below. What is this radiological finding called? (Q853064)

A. Reversal Sign

B. White Cerebellum Sign

C. Pseudo subarachnoid hemorrhage

D. Delta Sign



See Answer in Part B → Q1

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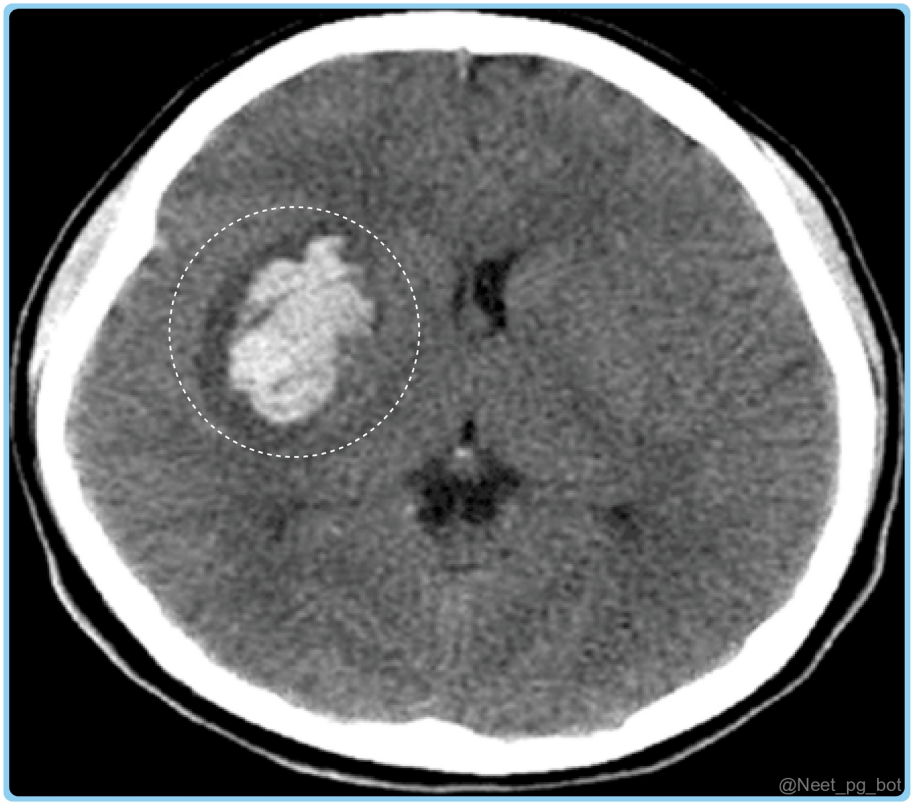
Q2: A 65-year-old male patient with a history of hypertension presents with a sudden onset of severe headache, vomiting, and right-sided weakness. Additionally, he exhibits altered sensorimotor integration and difficulty with voluntary movement control. His blood pressure is recorded at 190/110 mmHg. A CT scan of the head is performed with findings given below Based on the findings, Which artery is most likely involved in this case? (Q852981)

A. Anterior choroidal artery

B. Lenticulostriate artery

C. Posterior cerebral artery

D. Middle meningeal artery



See Answer in Part B → Q2

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Q3: A 65-year-old patient presents with bilateral thalamic and basal ganglia symptoms, including motor weakness and sensory disturbances. MRI reveals bilateral infarcts in these regions. Which type of venous thrombosis is most likely responsible for these findings? (Q853057)

A. Superior sagittal sinus thrombosis

B. Internal cerebral vein thrombosis

C. Lateral venous sinus thrombosis

D. Vein of Labbe thrombosis

See Answer in Part B → Q3

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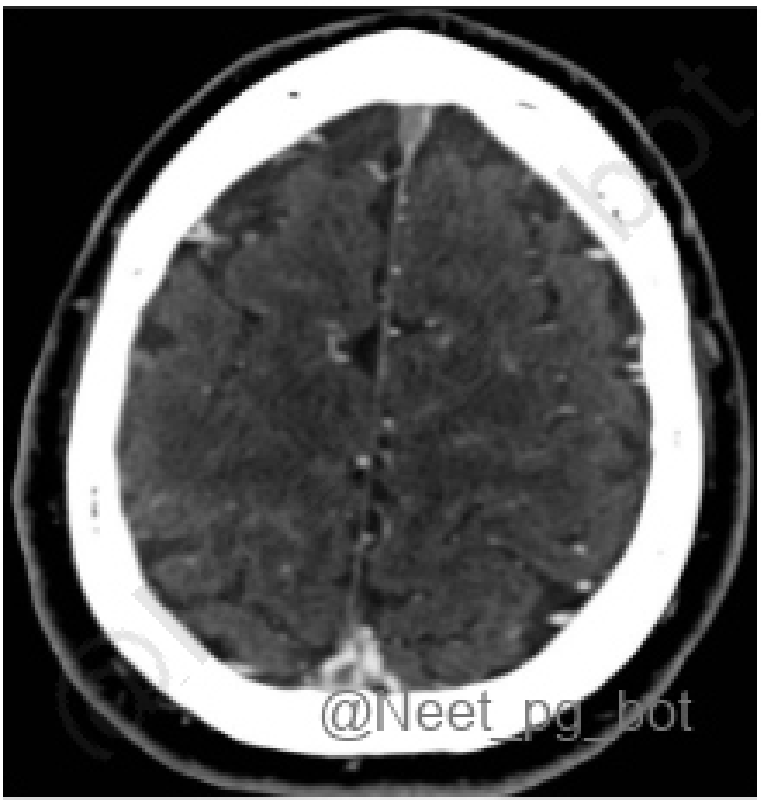
Q4: A 28-year-old woman presents with a severe headache that started 2 days ago. She reports associated symptoms of nausea, vomiting, and a few episodes of seizure. A history of recent oral contraceptive use is present. On examination, she has a mild altered mental status but no focal deficits. A CECT is given below. What specific sign on CT is characteristic of this diagnosis? (Q853055)

A. Empty delta sign

B. Empty theca sign

C. Empty sella sign

D. Dense vein sign



See Answer in Part B → Q4

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Q5: A 65-year-old male presents to the emergency department with sudden onset of right-sided weakness and difficulty speaking. The physician suspects a lacunar infarct. Which of the following radiologic features is typically seen in a lacunar infarct? (Q852989)

A. Bright signal on T1-weighted MRI

B. CT can detect infarcts as small as 0.2 mm

C. Hypointense signal on DWI with restricted diffusion

D. Ill-defined hypodensity on non-contrast CT scan

See Answer in Part B → Q5

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Q6: A 75-year-old female with a history of stroke presents for follow-up imaging 6 months after an acute right middle cerebral artery (MCA) infarct. CT head is taken and is shown below. Which of the following imaging findings is most characteristic in this case? (Q852988)

A. T2 hypointensity in the ipsilateral corticospinal tract

B. High signal intensity on DWI and low signal on ADC

C. Enlarged sulci and ventricles with CSF-like signal intensity

D. Ipsilateral cerebellar volume loss due to large MCA infarcts



See Answer in Part B → Q6

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Q7: A 64-year-old male presents with left-sided weakness and speech difficulty for 8 hours. NCCT shows no hemorrhage, and CTAngiography reveals a proximal MCA occlusion. DWI shows a large infarct volume (>70 ml). According to the Massachusetts General Hospital (MGH) Acute Stroke Imaging Algorithm, what is the most

appropriate next step for this patient? (Q852987)

A. Proceed with intra-arterial thrombectomy (IAT)

B. Continue with tPA infusion and monitor

C. Consider perfusion imaging with CT or MRI

D. Administer aspirin and start rehabilitation

See Answer in Part B → Q7

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Q8: A 65-year-old male with hypertension and atrial fibrillation presents with sudden right-sided weakness and speech difficulty, starting 1 hour ago. A non-contrast CT scan is performed and is shown below. Which of the following signs is marked (arrow) in this case? (Q852986)

A. Sylvian fissure dot sign

B. Disappearing basal ganglia sign

C. Hyperdense basilar artery sign

D. Hyperdense middle cerebral artery (MCA) sign



See Answer in Part B → Q8

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Q9: A 75-year-old male presents with a sudden onset of left-sided weakness and difficulty speaking. The emergency physician needs to determine the best initial imaging modality to assess for an acute ischemic stroke and potential hemorrhage. Which imaging technique should be performed first? (Q852985)

A. MRI

B. CT Angiography

C. Non-Contrast CT

D. MR Angiography

See Answer in Part B → Q9

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Q10: A 45-year-old male presents to the emergency department with a sudden onset of severe headache and loss of consciousness. An MRI is performed shortly after the incident and shows a hyperintense lesion on T1-weighted images and a hypointense lesion on T2-weighted images, consistent with subacute hematoma. What would be the phase of blood in this condition? (Q852984)

A. Deoxyhemoglobin

B. Oxyhemoglobin

C. Methemoglobin

D. Hemosiderin

See Answer in Part B → Q10

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Q11: A 30-year-old male presents to the emergency department with confusion and headache. A CT scan of the brain is performed which shows as follows: The radiologist notes a characteristic appearance of increased spacing between the frontal lobes. What is the most probable diagnosis? (Q852983)

A. Porencephalic cyst

B. ACOM aneurysm

C. Pneumocephalus

D. Carotid cavernous fistula



See Answer in Part B → Q11

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Q12: A 32-year-old male is brought to the emergency department after a road traffic accident. He presents with loss of consciousness, altered mental status, decerebrate posturing, and widespread cerebral edema. A CT scan returns normal. After intubation, which MRI sequence is preferred for evaluating the extent of his neurological injuries? (Q852982)

A. T1-weighted MRI (T1W)

B. Susceptibility-Weighted Imaging (SWI)

C. FLAIR (Fluid-Attenuated Inversion Recovery) MRI

D. Diffusion-weighted MRI (DWI)

See Answer in Part B → Q12

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Q13: Assertion (A): On CT scan, the bone cortex appears black, while on MRI, it appears white. Reason (R): The appearance of structures on CT and MRI depends on the density of tissues and the presence of hydrogen atoms. (Q852969)

A. Both Assertion (A) and Reason (R) are true, and Reason (R) is the correct explanation of Assertion (A).

B. Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).

C. Assertion (A) is false, but Reason (R) is true.

D. Both Assertion (A) and Reason (R) are false.

See Answer in Part B → Q13

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Q14: A 45-year-old male with a significant history of smoking presents with a sudden onset of a severe headache. He reports accompanying symptoms of palpitations, photophobia, and neck stiffness. On examination, signs of meningeal irritation are noted. The patient also has hyperflexible joints and mentions that his symptoms began after experiencing a minor jerk while in the car. A CT scan reveals specific findings given below. What is the most likely cause of this patient's symptoms? (Q852980)

A. Meningitis secondary to a bacterial infection

B. Cervical spine injury leading to meningeal irritation

C. Migraine with aura exacerbated by the minor jerk

D. Rupture of a cerebral aneurysm



See Answer in Part B → Q14

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Q15: A 35-year-old male presents after a road traffic accident. He experienced a brief loss of consciousness, followed by a lucid interval. On examination, he has a Glasgow Coma Scale score of 13 and exhibits signs of a head injury. A CT scan of the head was performed, and the image revealed the following findings. What is the most likely diagnosis? (Q852979)

A. Subdural hematoma (SDH)

B. Epidural hematoma (EDH)

C. Subarachnoid hemorrhage (SAH)

D. Cerebral contusion



See Answer in Part B → Q15

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Q16: A 28-year-old male presents to the emergency department following a head injury sustained during a fall. He is alert, opens his eyes to speech, follows commands, and is oriented but complains of a mild headache. On assessment, he opens his eyes spontaneously, is verbally coherent but slightly disoriented, and follows motor commands. There are no focal neurological deficits, bleeding disorders, seizures, or intoxication. Based on the clinical findings and his GCS score, what is the next appropriate step in management? (Q852978)

A. Immediate intubation and mechanical ventilation

B. CT scan of the head

C. Observation with repeat neurological assessment every 4 hours

D. Initiate anticonvulsant therapy

See Answer in Part B → Q16

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Q17: A patient comes with his MR angiography brain report to the clinic. Identify the marked artery in this image. (Q852977)

A. Anterior cerebral artery

B. Vertebral artery

C. Basilar artery

D. Middle cerebral artery



See Answer in Part B → Q17

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Q18: Which of the following statements about the given image is not true? (Q852976)

A. It is a standard investigation alongside non-contrast CT for diagnosing stroke

B. It is used to resolve discrepancies in findings from noninvasive imaging

C. It diagnoses spontaneous subarachnoid hemorrhage when CTA results are negative

D. It can be used for embolization of AVMs and fistulas



See Answer in Part B → Q18

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Q19: Match the following structures with their corresponding CT score. Structure CT score in HU a) Air 1) 0 b) Water 2) -1000 c) Grey Matter 3) 700 to 3000 d) Bone 4) 37 to 45 (Q852975)

A. a-2, b-1, c-4, d-3

B. a-1, b-2, c-3, d-4

C. a-2, b-3, c-1, d-4

D. a-1, b-4, c-2, d-3

See Answer in Part B → Q19

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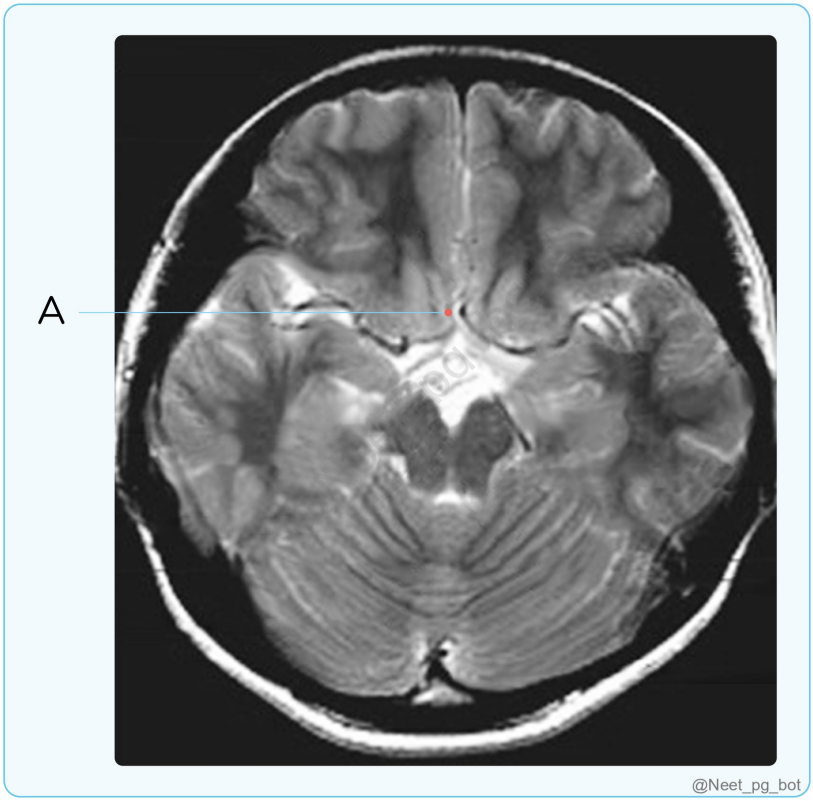
Q20: A student is analyzing an MRI of the brain at the midbrain level. The examiner asks the student to identify the structure marked as “a”. What is this structure? (Q852974)

A. Optic tract

B. Amygdala

C. Mamillary body

D. Anterior cerebral artery



See Answer in Part B → Q20

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Q21: A 58-year-old male presents with persistent headaches and cognitive decline. An MRI reveals a suspicious mass in the parietal lobe. To further characterize the mass,

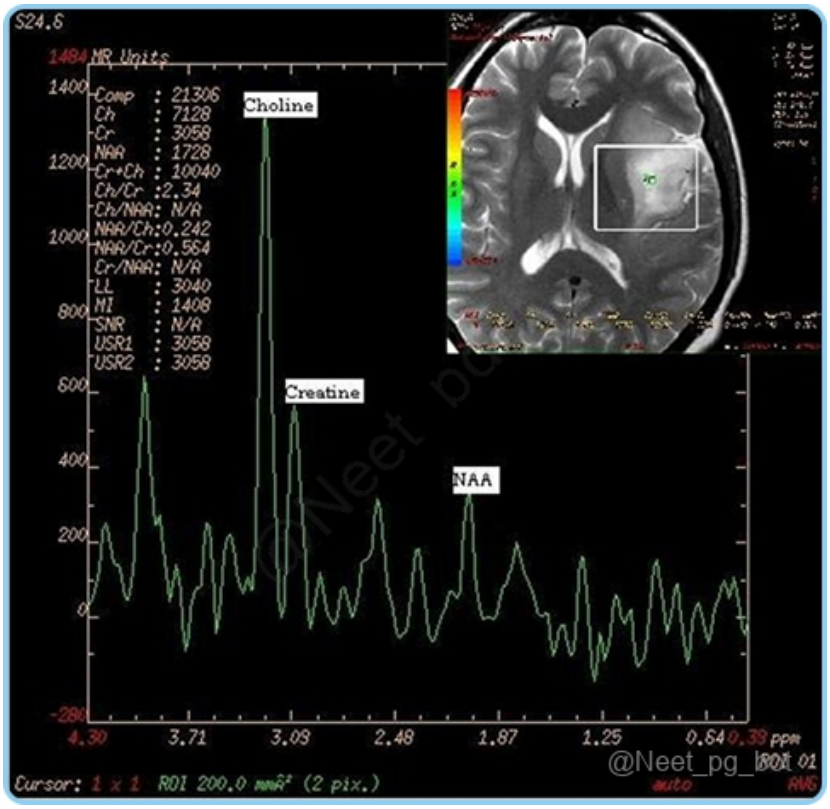
an MR spectroscopy (MRS) is performed which shows: Which of the following interpretations is most accurate regarding the metabolic changes observed in MR spectroscopy? (Q852972)

A. The elevated choline levels suggest high cellular turnover

B. The decreased NAA indicates significant neuronal viability

C. The absence of any metabolites in the spectrum indicates healthy brain tissue

D. Raised creatinine levels show low metabolic activity



See Answer in Part B → Q21

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Q22: A 65-year-old male with progressive memory loss and word-finding difficulty shows language deficits on a neurological exam. The physician orders an MRI to map language centers before treatment. Which MRI technique is most appropriate for this? (Q852971)

A. Diffuse Tensor Imaging

B. Susceptibility Weighted Imaging

C. Functional MRI

D. Perfusion Weighted Imaging

See Answer in Part B → Q22

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Q23: A 60-year-old man is brought to the emergency department with a sudden onset of weakness for an hour on one side of his body. He has a history of deep vein thrombosis but is not compliant with his medications. A CT scan is performed, which shows no acute hemorrhage. An MRI of the brain was performed below. Which MRI sequence is most appropriate for detecting early ischemic changes in this patient? (Q852970)

A. T1 weighted

B. Fluid-attenuated inversion recovery

C. T2 weighted

D. Diffusion-weighted imaging



See Answer in Part B → Q23

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• [12_Neuro Radiology] 025 Neuroradiology-Ii

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[12_Neuro Radiology] 025 Neuroradiology-Ii — Quick Jump

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Q13 (p. 414)	*Q14 (p. 415)*	*Q15 (p. 416)*	*Q16 (p. 417)*	*Q17 (p. 418)*	*Q18 (p. 418)*
Q19 (p. 418)	*Q20 (p. 419)*	*Q21 (p. 420)*	*Q22 (p. 421)*	*Q23 (p. 422)*	

Q1: An intern reviewing an MRI scan observes a "boxcar ventricle" This radiological finding is indicative of which of the following conditions? (Q853137)

A. Creutzfeldt-Jakob disease

B. Huntington's disease

C. Pick's disease

D. Alzheimer's disease

See Answer in Part B → Q1

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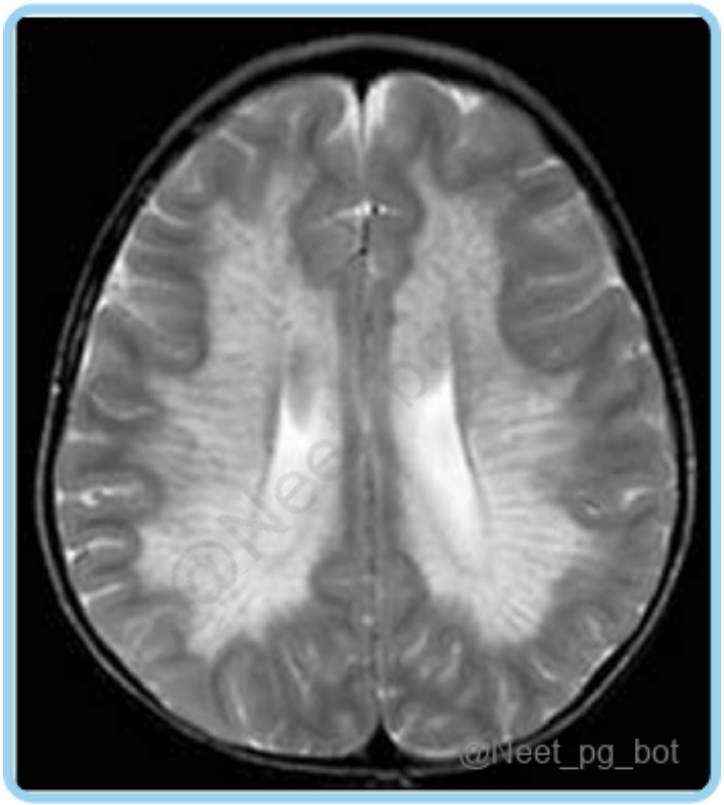
Q2: A 3-year-old child presents with progressive motor decline, cognitive regression, and spasticity. MRI shows confluent and symmetric hyperintense T2 signals in the periventricular and deep white matter, with sparing of subcortical U fibers & tigroid pattern is noted. What is the underlying enzymatic deficiency? (Q853142)

A. Aspartoacylase deficiency

B. Arylsulfatase A deficiency

C. β-Galactocerebrosidase deficiency

D. Glutaryl-CoA deficiency



See Answer in Part B → Q2

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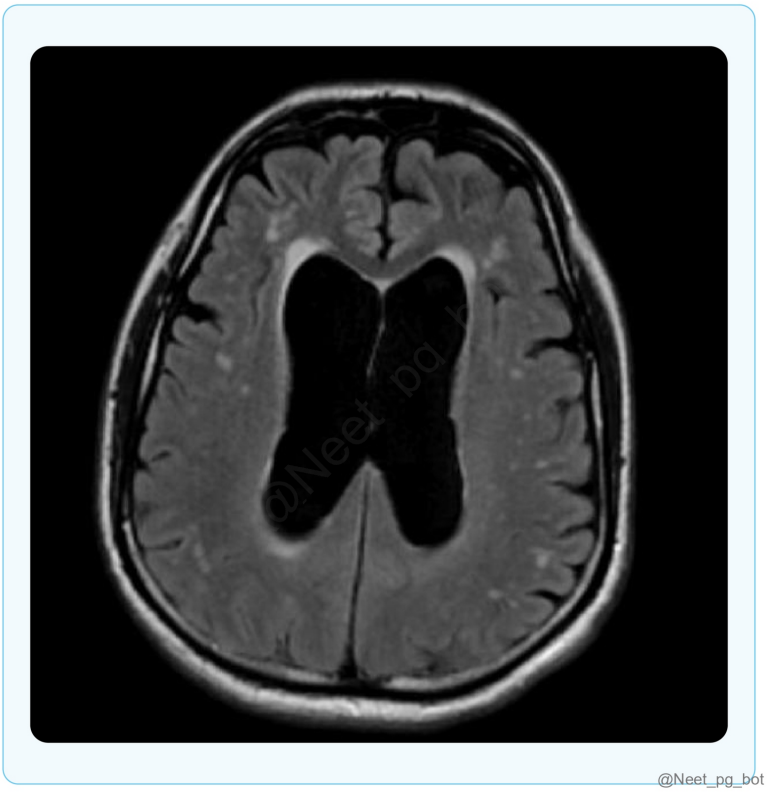
Q3: A 75-year-old female presents to the clinic with a 6-month history of progressive difficulty in walking, frequent urinary urgency, and occasional episodes of confusion. Imaging is performed, revealing ventriculomegaly and effacement of the sulci at the vertex as shown. Which of the following statements about the condition is false? (Q853166)

A. It is idiopathic but can be caused due to past injuries

B. The Evans ratio is less than 0.31

C. The callosal angle is less than 90 degrees

D. A disproportionately enlarged subarachnoid space is seen



See Answer in Part B → Q3

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Q4: A 6-year-old boy presents to the pediatric neurologist with a history of recurrent seizures since he was 1 year old. Upon examination, a port wine stain is noted on the right side of his face. What imaging findings would you expect to see in this patient, considering Sturge–Weber Syndrome? (Q853165)

A. Normal MRI with no abnormality

B. Cystic lesions with enhancing mural nodules in the cerebellum

C. Tramline calcifications and atrophy of the affected hemisphere

D. Cerebellar atrophy

See Answer in Part B → Q4

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Q5: An infant undergoes a brain MRI that reveals a crescent-shaped mass filling the entire ventricular system, with the interhemispheric fissure not visible. The cerebrum exhibits a pancake-like appearance of the cerebral tissue, and there are no identifiable structures of the corpus callosum or falx cerebri. Which of the following conditions is the most likely diagnosis for this infant? (Q853164)

A. Alobar holoprosencephaly

B. Schizencephaly

C. Lissencephaly

D. Lobar holoprosencephaly

See Answer in Part B → Q5

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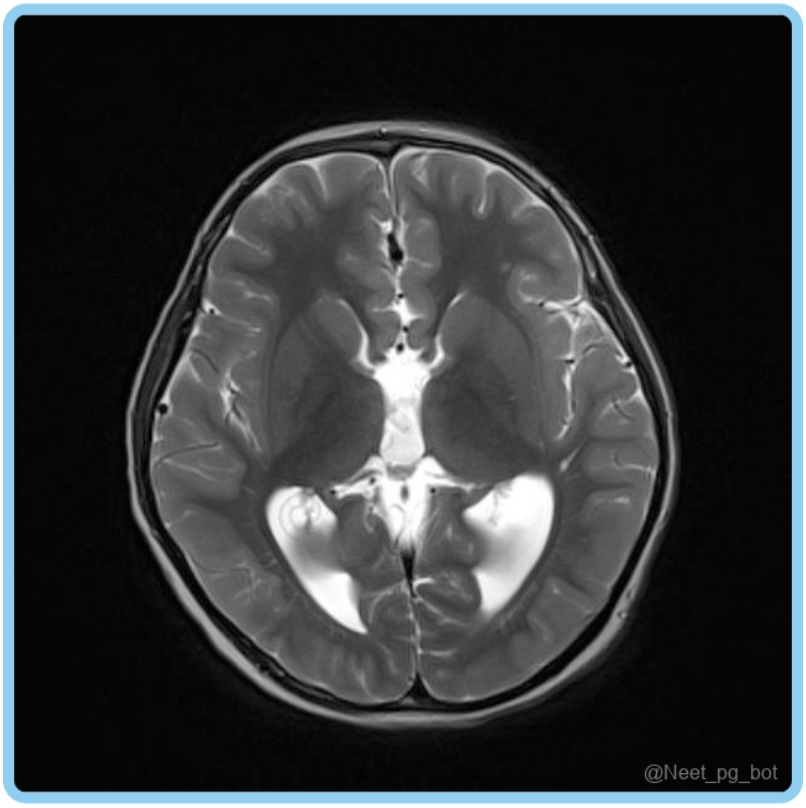
Q6: The brain imaging of a child reveals the following: What is the classical appearance of the lateral ventricles in this image called? (Q853162)

A. Batwing appearance

B. Sunray appearance

C. Race car appearance

D. Moose-head appearance



See Answer in Part B → Q6

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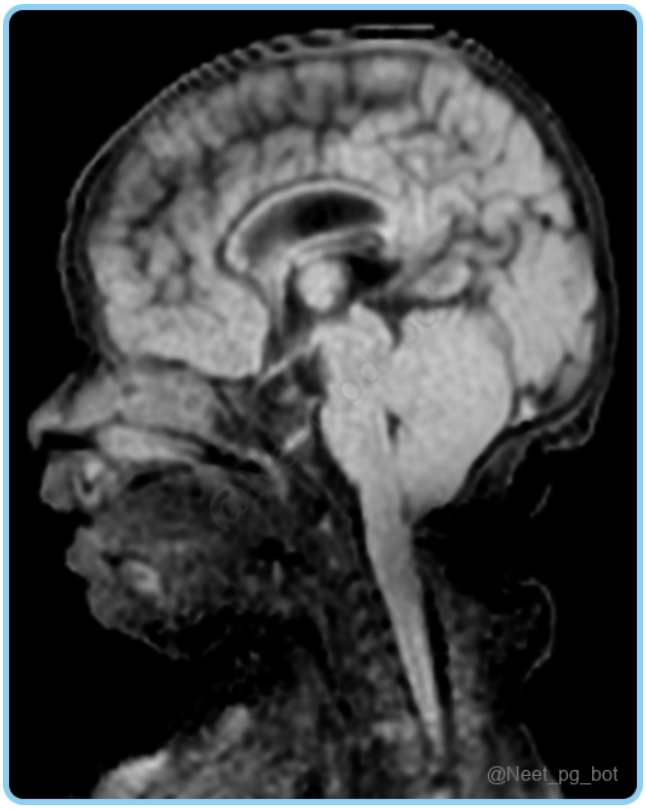
Q7: A 3-month-old infant is evaluated for developmental delays and abnormal head shape. An MRI reveals a dysplastic cerebellum with an everted inferior vermis. Which type of Chiari malformation is most likely indicated by these findings? (Q853160)

A. Chiari Type I

B. Chiari Type II

C. Chiari Type III

D. Chiari Type IV



See Answer in Part B → Q7

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Q8: A 10-year-old boy presents with progressive headaches, vision changes, and growth delay. Neurological examination reveals bitemporal hemianopia. MRI of the brain shows a large, lobulated, multiloculated cystic lesion with a small enhancing solid component and calcifications in the suprasellar region. What is the most likely diagnosis? (Q853159)

A. Pituitary adenoma

B. Craniopharyngioma

C. Melanoma

D. Astrocytoma



See Answer in Part B → Q8

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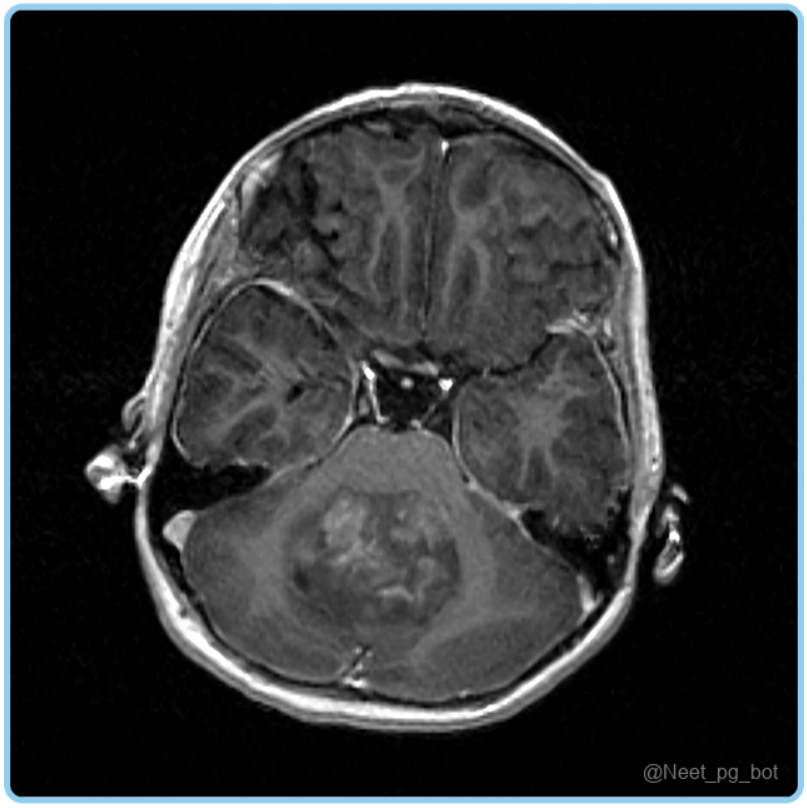
Q9: A 6-year-old boy presents with headache, nausea, and balance difficulties. MRI reveals a hyperdense mass in the midline cerebellar vermis, with surrounding vasogenic edema and hydrocephalus. The mass shows restricted diffusion on MRI and homogeneous contrast enhancement. What is the most likely diagnosis? (Q853154)

A. Ependymoma

B. Medulloblastoma

C. Cerebellar Pilocytic Astrocytoma

D. CNS Lymphoma



See Answer in Part B → Q9

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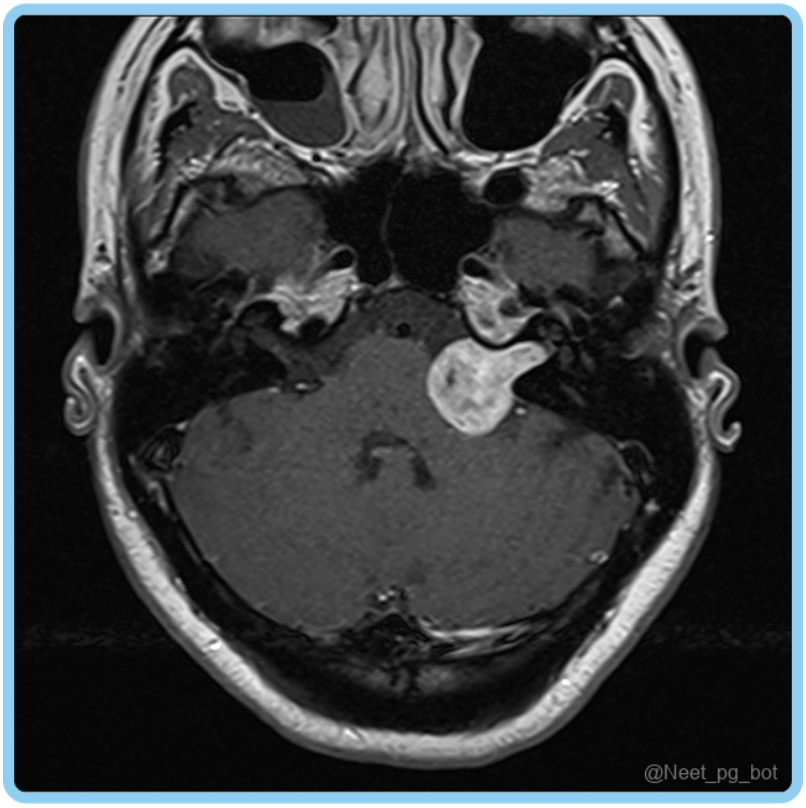
Q10: A 45-year-old woman presents with progressive SNHL and non-pulsatile tinnitus in the right ear. MRI reveals a solid, enhancing mass in the internal auditory canal extending into the cerebellopontine angle, creating an "ice cream cone" appearance. What is the most likely diagnosis? (Q853152)

A. Glioblastoma Multiforme

B. Oligodendroglioma

C. Vestibular Schwannoma

D. Meningioma



See Answer in Part B → Q10

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Q11: A 27-year-old woman with a family history of an autosomal dominant genetic disorder presents with recurrent seizures and developmental delay. On physical examination, she has red papules on her face consistent with adenoma sebaceum. Which of the following is not a radiologic finding typically associated with this condition? (Q853149)

A. Cortical tubers

B. Subependymal nodules

C. Sphenoid wing dysplasia

D. Lymphangioleiomyomatosis

See Answer in Part B → Q11

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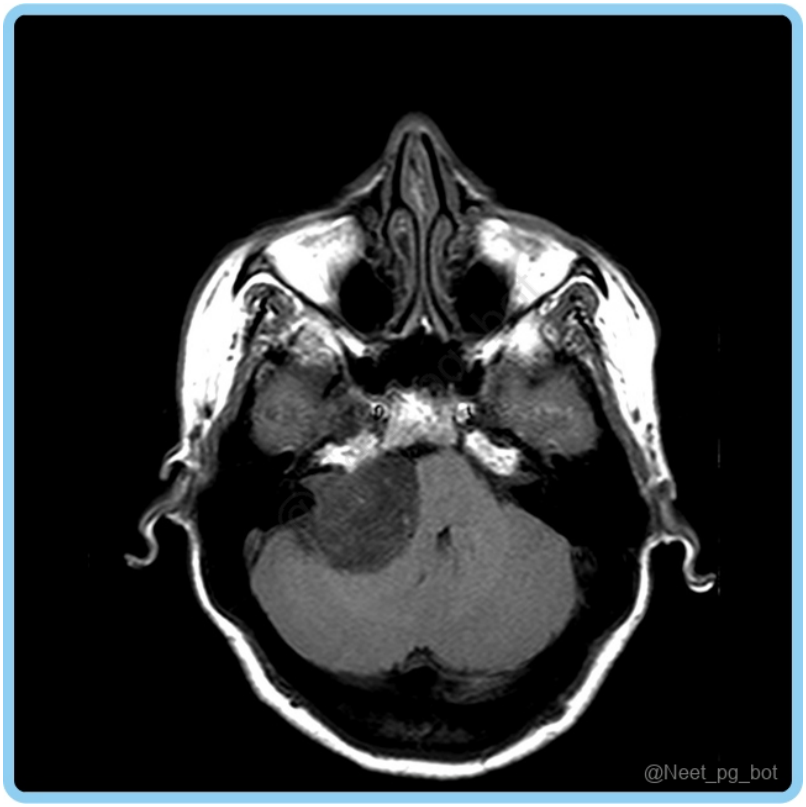
Q12: A 25-year-old patient with a family history of an autosomal dominant condition was diagnosed with a mutation in chromosome 22 and advised to have an MRI every 2 years to monitor for tumors. An MRI scan was performed and shown below. Identify the radiological finding shown below that is most consistent with this chromosomal abnormality? (Q853147)

A. Dural ectasia

B. Pilocytic astrocytomas

C. Vestibular schwannomas

D. Plexiform neurofibromas



See Answer in Part B → Q12

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Q13: A 2-week-old neonate is evaluated for failure to thrive and persistent tachycardia. A cranial MRI shows a large vascular malformation with multiple

feeding arteries and a dilated vein of Galen. What is the most likely diagnosis? (Q853145)

A. Mural type Vein of Galen Malformation

B. Choroidal type Vein of Galen Malformation

C. Arteriovenous malformation

D. Developmental venous anomaly

See Answer in Part B → Q13

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Q14: A 35-year-old male presents with a 2-week history of worsening headache, fever, and progressive neurological deficits, including weakness in his right arm. He has no significant past medical history. On examination, he exhibits right-sided hemiparesis and mild confusion. Blood tests show mild leukocytosis. A CT image is given below. Which of the following is the most likely diagnosis? (Q853069)

A. Metastatic disease

B. Brain abscess

C. Neurocysticercosis

D. Lymphoma



See Answer in Part B → Q14

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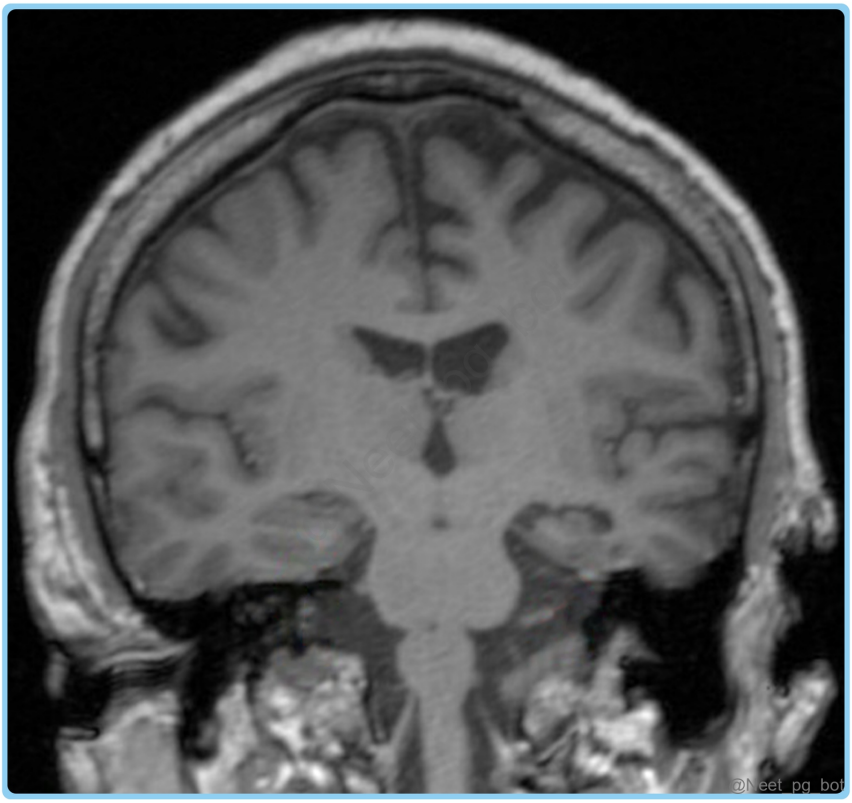
Q15: A 65-year-old patient presents with epilepsy and progressive memory loss over the past year. Neuroimaging reveals hippocampal volume loss and abnormal signal intensity on high-resolution coronal MRI. The internal laminated architecture of the hippocampus is disrupted. Which of the following is the most likely diagnosis? (Q853140)

A. Alzheimer's Disease

B. Mild Cognitive Impairment

C. Mesial Temporal Sclerosis (MTS)

D. Frontotemporal Dementia



See Answer in Part B → Q15

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Q16: A 55-year-old chronic alcoholic presents with symptoms of confusion, ataxia, and memory impairment. He has a history of Alcoholic Liver Disease. An MRI is ordered to assess any potential brain damage due to chronic alcohol abuse. The MRI reveals signaling abnormalities. Which of the following locations are likely to show abnormal signals? Locations: Mammillary bodies Periventricular grey matter Thalamus Corpus callosum Hippocampus (Q853138)

A. 1, 2, and 5

B. 2, 3, and 4

C. 1, 2, and 3

D. 3, 4, and 5

See Answer in Part B → Q16

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Q17: Assertion: The absence of the swallow tail on MRI is indicative of Parkinson's disease. Reason: It represents the characteristic loss of dopamine-producing neurons in the substantia nigra, leading to specific changes in the brain's morphology. (Q853093)

A. Both the assertion and reason are true, and the reason correctly explains the assertion

B. Both the assertion and reason are true, but the reason does not correctly explain the assertion

C. The assertion is true, but the reason is false

D. The assertion is false, but the reason is true

See Answer in Part B → Q17

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Q18: Match the following diseases and their associated radiological signs Radiological Sign Disease 1) Giant Panda sign a) Ceruloplasmin Defeciency 2) tram track calcification b) Fahr’s Disease 3) Eye of the tiger sign c) Sturge Weber syndrome 4) Basal ganglia Calcification d) Hallervorden-Spatz disease (Q853083)

A. 1-a, 2-c, 3-d, 4-b

B. 1-c, 2-b, 3-a, 4-d

C. 1-b, 2-d, 3-c, 4-a

D. 1-d, 2-a, 3-c, 4-b

See Answer in Part B → Q18

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Q19: An 80-year-old male presents to his physician with complaints of difficulty sleeping and frequently waking up during the night. He denies any accompanying symptoms, such as pain, anxiety, or other disturbances. Concerned about his sleep issues, the physician orders a CT scan of the brain. The CT findings reveal an

appearance commonly referred to as "brain sand." Based on the findings, what is the most likely diagnosis? (Q853081)

A. Choroid plexus calcification

B. Pineal gland calcification

C. Falx cerebri calcification

D. Basal ganglia calcification



See Answer in Part B → Q19

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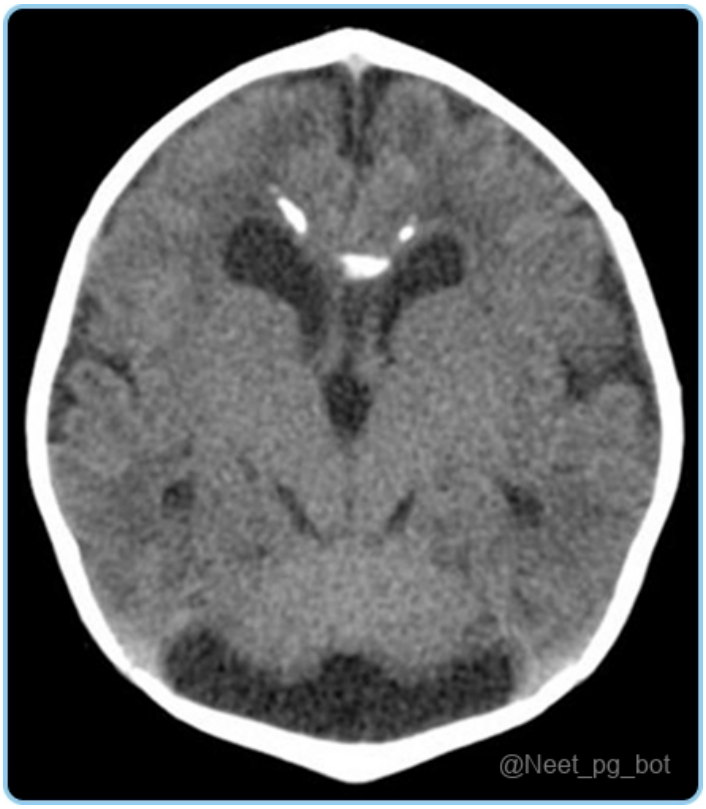
Q20: A 2-month-old infant is brought to the clinic with persistent jaundice, hepatosplenomegaly, petechiae, and microcephaly. On further evaluation, the infant is found to have sensorineural hearing loss and signs of developmental delay. The mother reports a history of a flu-like illness during pregnancy. A CT scan of the infant's brain reveals the following findings. Based on these findings, which of the following is the most likely causative agent? (Q853080)

A. Rubella

B. Toxoplasma gondii

C. Zika virus

D. Cytomegalovirus (CMV)



See Answer in Part B → Q20

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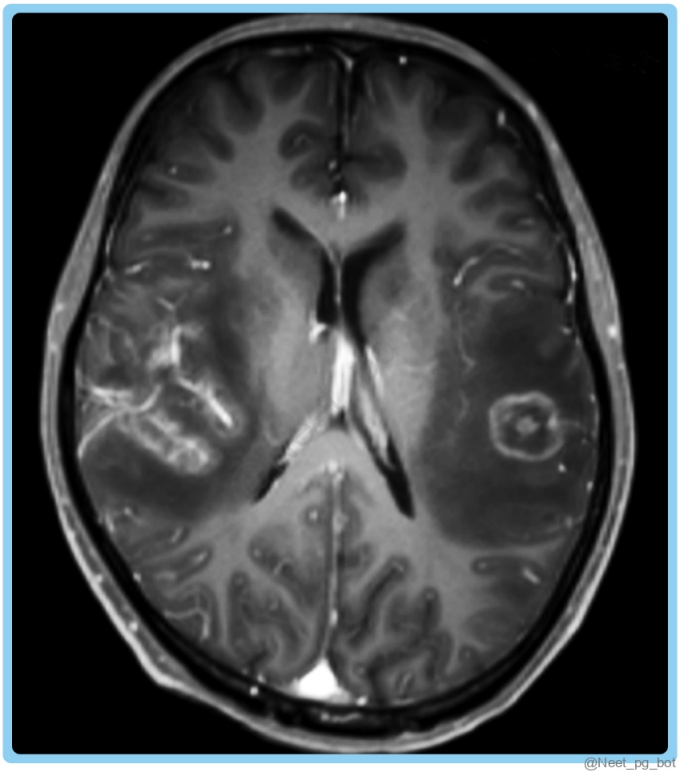
Q21: A 35-year-old man with a history of HIV presents to the emergency department with new-onset seizures and altered mental status. His CD4 count is 80 cells/mm³. A brain MRI is performed to evaluate for potential infections and is as shown below. What is the diagnosis? (Q853079)

A. Herpes simplex

B. Japanese encephalitis

C. Cryptococcosis

D. Toxoplasmosis



See Answer in Part B → Q21

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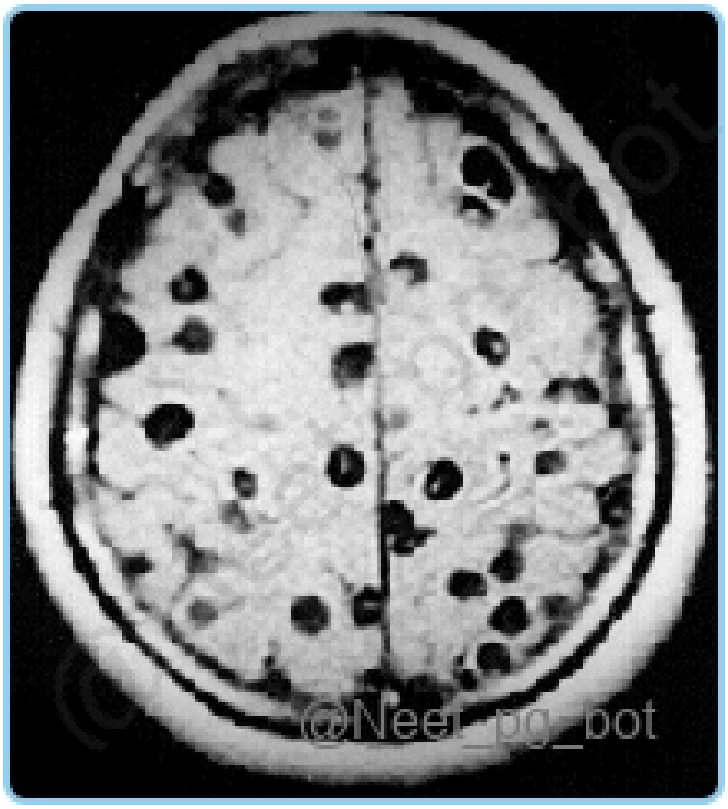
Q22: A 32-year-old male presents with recurrent seizures. MRI imaging reveals as follows: Based on the MRI findings, which stage of neurocysticercosis is most consistent with this presentation? (Q853075)

A. Granular nodular stage

B. Vesicular stage

C. Colloidal vesicular stage

D. Calcified nodular stage



See Answer in Part B → Q22

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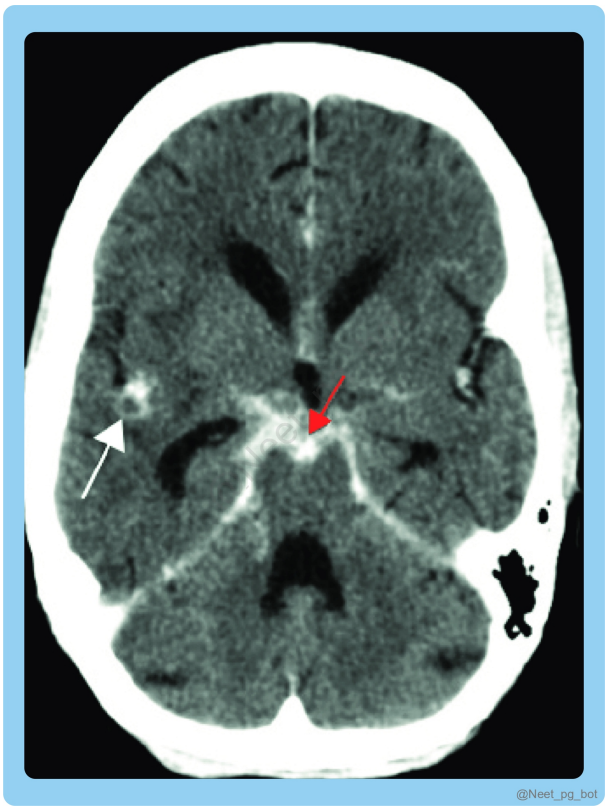
Q23: A 35-year-old male, an HIV-positive patient, presents with fever, headache, and confusion for the past week. Neurological examination reveals neck stiffness and altered mental status. CT shows basal meningeal enhancement and hydrocephalus. What is the most likely diagnosis? (Q853072)

A. Tuberculomas

B. Tuberculous meningitis

C. Cerebritis

D. Miliary tuberculosis



See Answer in Part B → Q23

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• [12_Neuro Radiology] 026 Previous Year Questions

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[12_Neuro Radiology] 026 Previous Year Questions — Quick Jump

Q1 (p. 424) *Q2 (p. 424)* *Q3 (p. 425)* *Q4 (p. 426)* *Q5 (p. 426)* *Q6 (p. 427)*

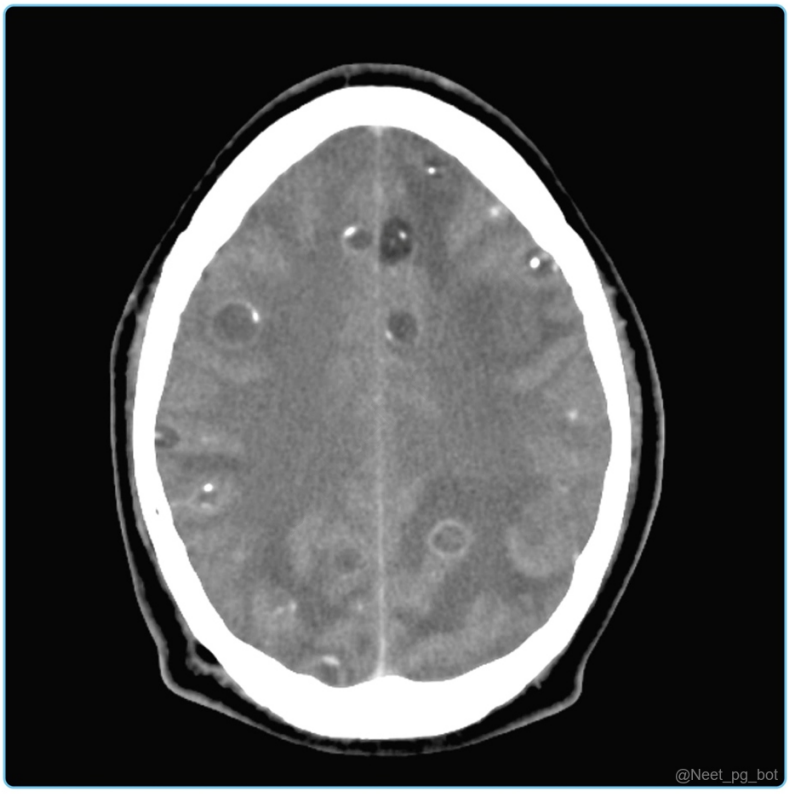
Q1: Based on the given CT finding, what is the most likely diagnosis? (Q865277)

A. Tuberculoma

B. Brain abscess

C. Neurocysticercosis

D. Brain metastasis



See Answer in Part B → Q1

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Q2: Identify the hemorrhage shown in the following image? (Q860591)

A. Extradural hemorrhage

B. Intraparenchymal hemorrhage

C. Subarachnoid hemorrhage

D. Subdural hemorrhage



See Answer in Part B → Q2

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Q3: Identify the condition that presents with an empty delta sign. (Q860602)

A. Subarachnoid hemorrhage

B. Subdural hemorrhage

C. Cerebral venous thrombosis

D. Intraparenchymal hemorrhage

See Answer in Part B → Q3

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Q4: Which imaging technique is preferred for diagnosing primary hyperparathyroidism in a woman who presented with confusion, constipation, and headache, and has elevated serum calcium (13.1 mg/dL) and ALP levels? (Q856691)

A. MRI

B. FDG PET

C. CT

D. Sestamibi scan

See Answer in Part B → Q4

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Q5: A young woman, aged 18, has come forward with seizures. Her radiological image is provided below. MR spectroscopy shows prominent lipid–lactate peaks with decreased N-acetyl aspartate (NAA), what is the probable medical condition she is facing? (Q856935)

A. Cerebral toxoplasmosis

B. Neurocysticercosis

C. Cryptococcosis

D. Multiple tuberculomas



See Answer in Part B → Q5

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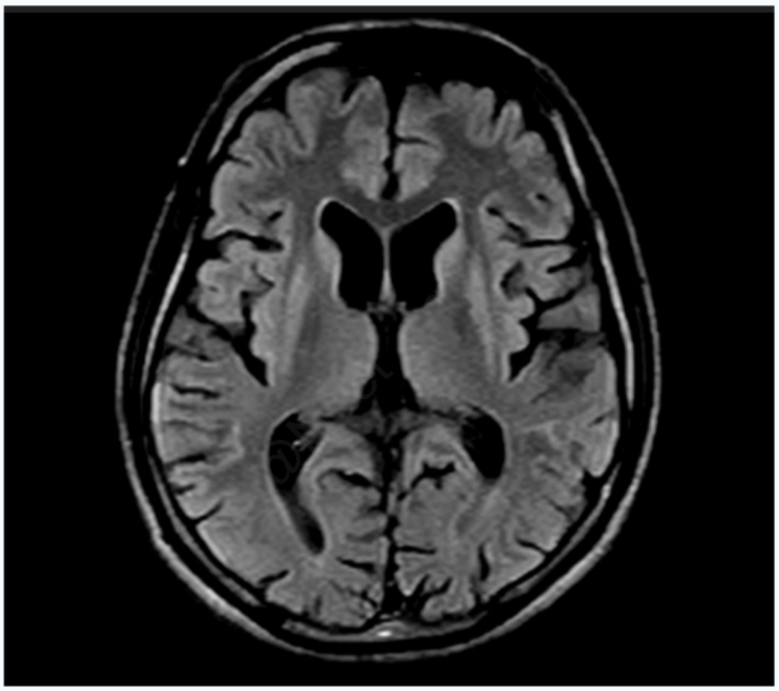
Q6: A 28-year-old man presents with involuntary, jerky movements of the face and limbs that have gradually worsened over the past year. His family reports personality changes, irritability and progressive forgetfulness. On examination, he has choreiform movements involving both upper and lower limbs and an unsteady gait. Which of the following is the most likely diagnosis? (Q878941)

A. Tardive Dyskinesia

B. Huntington’s disease

C. Sydenham’s chorea

D. Tourette syndrome



See Answer in Part B → Q6

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Part B — All Answers & Explanations

• [01_Basics of Radiology] 001 Basics Of Radiology

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[01_Basics of Radiology] 001 Basics Of Radiology — Quick Jump

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Q7 (p. 438)	*Q8 (p. 440)*	*Q9 (p. 442)*	*Q10 (p. 446)*	*Q11 (p. 447)*	*Q12 (p. 448)*
Q13 (p. 450)	*Q14 (p. 452)*	*Q15 (p. 453)*	*Q16 (p. 454)*	*Q17 (p. 456)*	*Q18 (p. 457)*
Q19 (p. 458)	*Q20 (p. 459)*	*Q21 (p. 462)*	*Q22 (p. 463)*	*Q23 (p. 464)*	*Q24 (p. 467)*
Q25 (p. 468)					

Q1: What is the primary difference between axial and helical CT scanning? (Q852956)

A. Axial CT uses contrast agents, while helical CT does not.

B. Axial CT scans in single slices, while helical CT scans continuously in a spiral.

C. Helical CT requires more radiation than axial CT.

D. Axial CT produces 3D images, while helical CT produces 2D images.

Correct Answer: B. Axial CT scans in single slices, while helical CT scans continuously in a spiral.

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: The key difference is that axial CT acquires images one slice at a time, whereas helical CT continuously collects data in a spiral path as the patient moves through the scanner. Axial and Helical CT: Axial CT (Computed Tomography) and Helical CT(also known as Spiral CT) are two different scanning techniques used in medical imaging to obtain cross-sectional images of the body. Axial CT Helical CT Definition Axial CT scans acquire images in discrete slices or cross-sections of the body. The scanner rotates around the patient, capturing one slice at a time. Helical CT scans acquire images continuously in a spiral pattern as the patient moves through the scanner. This allows for a continuous data stream and overlapping slices. Data Acquisition The table holding the patient moves in small increments between scans. After each slice is acquired, the table stops to allow for the next slice to be taken. The scanner rotates around the patient while the table moves through the gantry simultaneously, resulting in a spiral path of data collection. Scan Time Generally longer due to the stepwise approach, as the table must move and stop for each slice. Much faster than axial CT, as the entire area can be scanned in a single breath-hold, which is beneficial for patients who may have difficulty remaining still. Image Quality Typically provides high-resolution images, making it ideal for detailed examinations, especially of the

brain and other structures. Provides good quality images and can be processed for 3D reconstructions , making it useful for dynamic studies and quick imaging. Advantages High-resolution images, ideal for detailed examinations. Faster scans, less motion artifact, and the ability to reconstruct images in multiple planes. Disadvantages Longer scan times and may be less effective for dynamic imaging. May require higher radiation doses depending on parameters and can have slightly lower image resolution compared to axial scans. Axial CT uses contrast agents, while helical CT does not.(Option A): Both axial and helical CT can use contrast agents, depending on the clinical requirements. Helical CT requires more radiation than axial CT.(Option C): Helical CT does not inherently require more radiation than axial CT; radiation exposure can depend on various factors, including scan parameters. Axial CT produces 3D images, while helical CT produces 2D images.(Option D): Both axial and helical CT can be processed to create 3D images.

References:

David Sutton Textbook of Radiology edition 8, page 254, 255, 256 & 257

↑ *Back to this question in Part A*

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Q2: Which of the following imaging modalities requires the use of iodinated contrast for both diagnostic and therapeutic purposes? (Q852968)

A. CT Angiography

B. MRA

C. DSA - Fluoroscopy

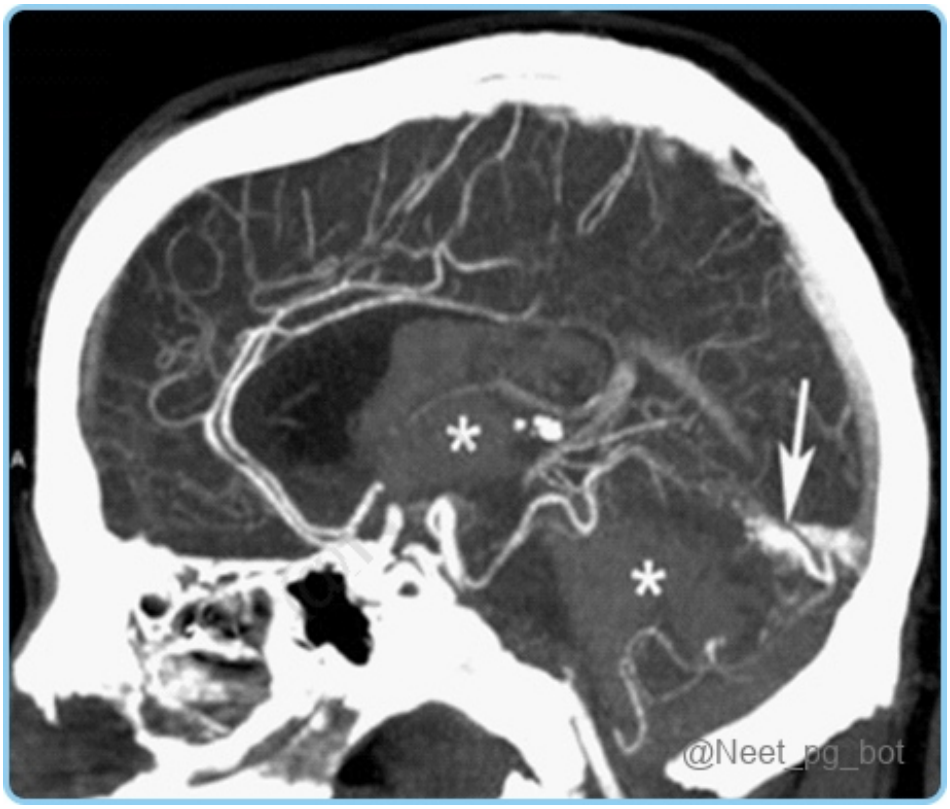
D. Both A and C

Correct Answer: C. DSA - Fluoroscopy

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: DSA - Fluoroscopy requires iodinated contrast and can be used for both diagnostic and therapeutic purposes. It is invasive, using intra-arterial contrast via catheter angiography. CT Angiography MRA DSA - Fluoroscopy Vessels White White Black/white (fluoroscopy gives inverted images). Contrast Essential It can be done without contrast . TOF sequence (time of flight) It can be used in renal failure patients. (without gadolinum since gadolinium is nephrotoxic) Essential Type of contrast Iodinated contrast Gadolinium (Option B ruled out) Iodinated contrast Route of contrast IV Non-invasive IV Non-invasive Intra-arterial contrast (catheter angiography) Invasive. Application Diagnostic (Option A and D ruled out) Diagnostic Both diagnostic and therapeutic (Option C) CT Angiography (Option A): Uses iodinated contrast but is non-invasive and only for diagnostic purposes.


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References:

David Sutton textbook of Radiology & Imaging Edition 8, Volume I, Page 390-394

Angiography - StatPearls - NCBI Bookshelf

Coronary CT Angiography - StatPearls - NCBI Bookshelf

Digital subtraction angiography

https://www.ncbi.nlm.nih.gov/books/NBK482487/

↑ *Back to this question in Part A*

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Q3: A 38 year old woman presents with chronic pelvic pain and menorrhagia due to multiple uterine fibroids. She is exploring non-invasive treatment options and wishes to avoid surgery. Her gynecologist suggests high-intensity focused ultrasound (HIFU) as a potential treatment. What is the primary mechanism by which HIFU treats uterine fibroids? (Q852967)

A. HIFU emits continuous low-energy ultrasound waves that dissolve fibroid tissue through vibration.

B. HIFU directs focused ultrasound energy to induce thermal damage and coagulation necrosis within the fibroid.

C. HIFU causes cavitation within blood vessels, disrupting the fibroid's blood supply and leading to ischemia.

D. HIFU uses ultrasound energy to fragment fibroid tissue through mechanical shearing forces.

Correct Answer: B. HIFU directs focused ultrasound energy to induce thermal damage and coagulation necrosis within the fibroid.

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: HIFU directs focused ultrasound energy to induce thermal damage and coagulation necrosis within the fibroid. Therapeutic applications of USG- High-intensity focused ultrasonography (HIFU) Mechanism (Option B) Uses high-intensity ultrasound waves focused on a specific target area, delivering localized energy while minimizing damage to surrounding tissues. Thermal Effects: Heat from ultrasound energy leads to coagulation necrosis. Cavitation Effects: Formation and collapse of microbubbles generate mechanical forces for tissue destruction. Applications Bleeding Sites: Coagulates vessels to stop bleeding. Uterine Fibroids: Induces necrosis in fibroid tissue, causing shrinkage. Tumours: Destroys tumour cells in organs like the prostate, liver and breast while sparing healthy tissues. Limitations Gas or Bone Interference: Ultrasound waves can be scattered or reflected by gas or bone, reducing effectiveness. Unintended Tissue Damage: Heating and damage can occur to normal tissue, especially near reflectors like bowel gas or bone. Guidance Systems Ultrasound Guidance: Real-time imaging for accurate targeting. MRI Guidance: Monitors tissue temperature during treatment, allowing better control of thermal effects.

References:

David Sutton textbook of Radiology & Imaging Edition 8, Volume I, Page 231,232

↑ *Back to this question in Part A*

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Q4: Which of the following is considered a primary clinical advantage of CEUS over traditional Contrast-Enhanced CT (CECT) or MRI? (Q852966)

A. CEUS allows for targeted drug delivery to specific hepatic lesions

B. CEUS provides real-time imaging with superior lesion detection

C. CEUS is a safe alternative for patients with significant renal impairment

D. All the above

Correct Answer: C. CEUS is a safe alternative for patients with significant renal impairment

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: While CEUS offers several technical benefits, its most critical advantage in a clinical setting is its safety profile in patients with chronic kidney disease (CKD) . Renal Advantage: CT Contrast: Uses iodinated agents, which carry a risk of Contrast-Induced Nephropathy (CIN) . MRI Contrast: Uses Gadolinium-based agents, which, in severe renal failure, can cause Nephrogenic Systemic Fibrosis (NSF) . CEUS Contrast: Uses microbubbles (e.g., sulfur hexafluoride) that are not excreted by the kidneys . Instead, the gas is exhaled through the lungs, and the shell is metabolized by the liver. Therefore, it can be safely used even in patients with end-stage renal disease. Targeted Drug Delivery (Option A): While research into "Molecular Imaging" and using microbubbles for site-specific drug delivery (sonoporation) is highly promising, it is currently a specialized research application and not a "primary" clinical advantage used in standard diagnostic liver imaging. Real-time Imaging (Option B): CEUS does offer superior temporal resolution (real-time observation of the arterial, portal-venous, and late phases). However, modern multi-detector CT and fast MRI also provide excellent lesion detection.

References:

David Sutton textbook of Radiology & Imaging Edition 8, Volume I, Page 223, 229, 230

↑ *Back to this question in Part A*

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Q5: A 45 year old woman presents to the emergency department with dull abdominal pain. An ultrasound of the abdomen is performed, and a cystic structure is seen in the right kidney. The ultrasound technician notes increased echogenicity behind the cystic structure. Which of the following best explains this ultrasound finding? (Q852965)

A. Posterior Acoustic shadowing

B. Posterior acoustic enhancement

C. Reverberation artifact

D. Comet tail artifact

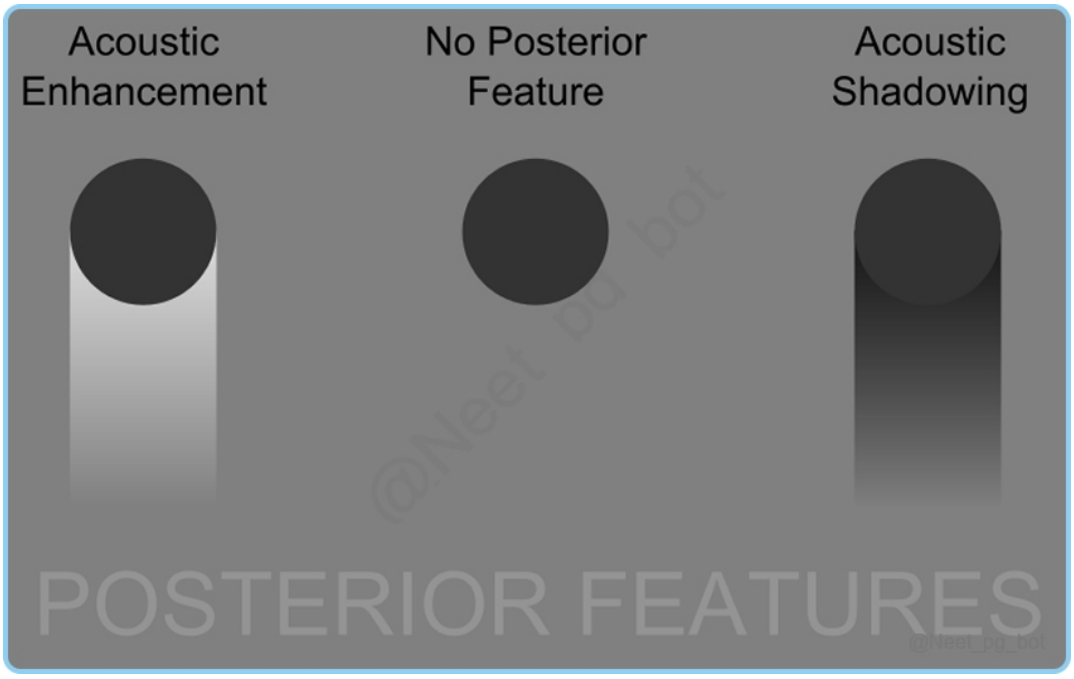
Correct Answer: B. Posterior acoustic enhancement

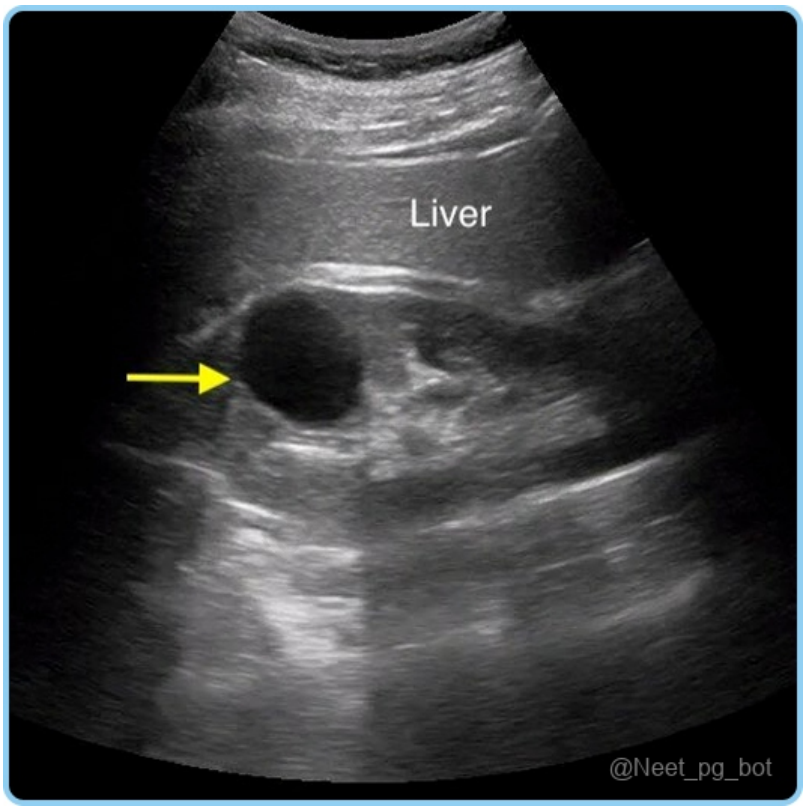
■ *Listen (English)*

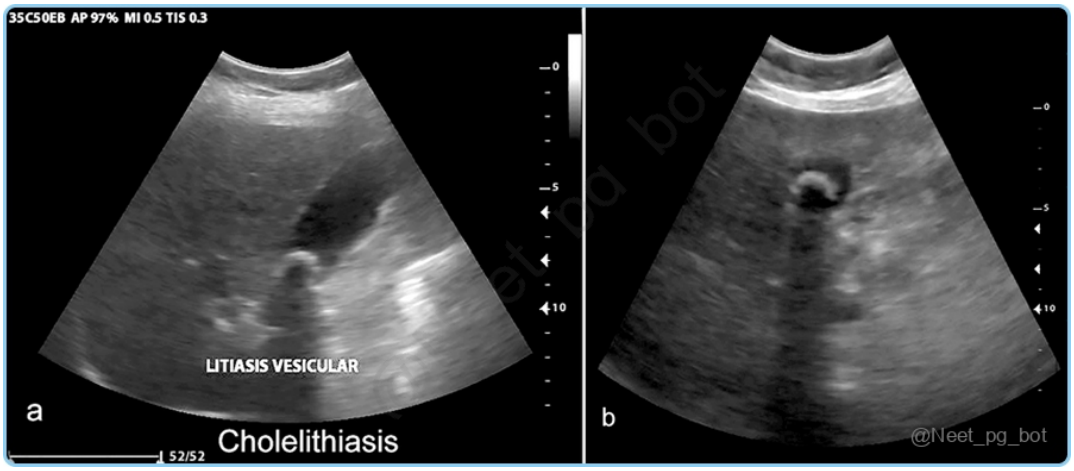
■ *Listen (Hindi)*

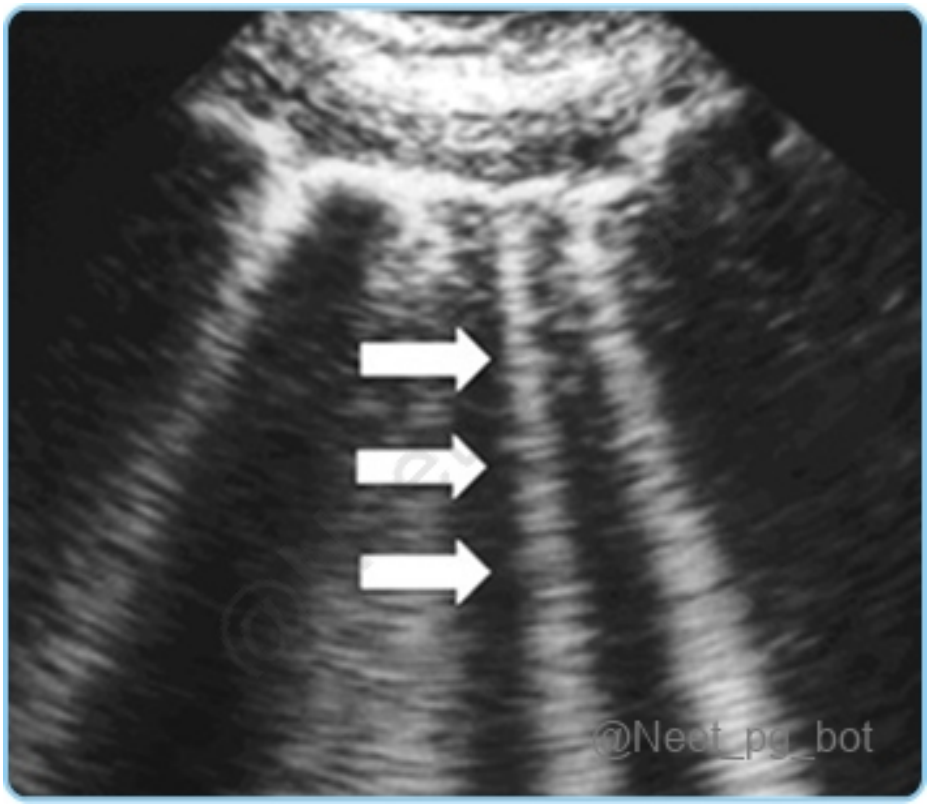
Explanation: Posterior acoustic enhancement artifact occurs when the ultrasound beam passes through a fluid-filled structure (like a cyst), causing less attenuation (energy loss) compared to surrounding tissue. As a result, tissues behind the fluid appear brighter, which explains the increased echogenicity behind the cystic structure. Black and white principles of USG Posterior Acoustic Enhancement Ultrasound artifact where tissues

behind fluid appear brighter Occurs because fluid causes less attenuation of ultrasound waves Mechanism: Ultrasound beam encounters fluid-filled structure ↓ Less energy lost passing through fluid vs. surrounding tissue ↓ More energy reaches tissues behind fluid ↓ Result: Increased echogenicity (brightness) posterior to fluid Helpful For Identifying: Cysts Bladder Ascites Other fluid-filled structures Can cause misinterpretation: Example: Kidneys viewed through ascites may appear falsely hyperechoic Posterior Acoustic shadowing (Option A ruled out) Ultrasound artifact appearing as dark area behind highly attenuating structures Results from significant reduction in ultrasound intensity Mechanism: Ultrasound beam hits highly reflective/attenuating structure ↓ Most sound waves are blocked or reflected ↓ Little to no energy reaches tissues behind structure ↓ Result: Dark (hypoechoic) area appears on image Helpful For Identifying: Calcifications Stones Foreign bodies Bone Reverberation artifact (Option C): Reverberation occurs when ultrasound waves bounce back and forth between two strong reflectors, creating multiple lines on the image. This artifact does not relate to the increased brightness seen here. Comet tail artifact (Option D): A form of reverberation artifact, comet tail appears as a series of closely spaced echoes behind a reflective object, not related to increased brightness behind a fluid-filled structure




Liver
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35C50EB AP 97% MI 0.5 TIS 0.3
LITIASIS VESICULAR
a
Cholelithiasis
52/52
b
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References:

David Sutton textbook of Radiology & Imaging Edition 8, Volume I, Page 202, 203,204, 205

↑ *Back to this question in Part A*

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Q6: A 45 year old female patient presents for a carotid Doppler ultrasound due to complaints of transient ischemic attacks. During the examination, the radiologist notices that the displayed velocity of blood flow in the carotid artery appears higher than expected. Upon reviewing the images, he suspects an artifact affecting the velocity measurements. Which artifact is most likely responsible for the incorrect velocity display, and what is the best method to mitigate it? (Q852964)

A. Aliasing; mitigate by increasing the pulse repetition frequency (PRF).

B. Blooming; mitigate by increasing the wall filter settings.

C. Direction Ambiguity; mitigate by adjusting the beam angle to be more parallel to the flow.

D. Twinkle Artifact; mitigate by adjusting the color gain settings.

Correct Answer: A. Aliasing; mitigate by increasing the pulse repetition frequency (PRF).

Explanation: Aliasing is the most common artifact seen in spectral and color Doppler ultrasound , especially when high blood flow velocities are being measured, such as in the carotid arteries . It occurs when the velocity of blood flow exceeds the Nyquist limit (which is half the PRF), causing the displayed waveform to wrap around , leading to overestimation or misinterpretation of velocity. Aliasing appears as a sudden shift or wrap-around of the spectral waveform or color scale reversal (e.g., red to blue). To mitigate aliasing: Increase PRF (not decrease). Use a lower frequency transducer . Adjust the baseline downward . Use continuous wave Doppler if feasible. So, the mitigation option in the question is incorrect — you should increase PRF, not decrease it. Corrected Answer: Aliasing; mitigate by increasing the pulse repetition frequency (PRF). Ruling Out Incorrect Options: Blooming (Option B): Incorrect , because blooming causes overestimation of vessel diameter or area due to excessive gain; it doesn't affect velocity. Increasing wall filter doesn't mitigate blooming. Direction Ambiguity (Option C): Incorrect , this occurs with transcranial or abdominal Doppler using large sample volumes ; not typical in carotid studies . Twinkle Artifact (Option D): Incorrect , seen in color Doppler near calcifications or stones , not relevant to velocity overestimation in carotids. Summary Table: Artifact Appearance Best Solution Aliasing Wrap-around waveform or reversed color Increase PRF , lower frequency, shift baseline Blooming Overfilled color/velocity extending beyond vessel wall Reduce gain, optimize wall filters Direction Ambiguity Flow appears in both directions Use angle correction, reduce sample volume Twinkle Artifact Color speckling behind calcified area Lower color gain or change angle

References:

David Sutton textbook of Radiology & Imaging Edition 8, Volume I, Page 209-221

↑ *Back to this question in Part A*

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Q7: A 35-year-old patient presents to the emergency department with chest pain and shortness of breath following a traumatic injury. M-mode ultrasound is utilized to assess pneumothorax. Which specific ultrasound finding would indicate the absence of a pneumothorax? (Q852963)

A. Absence of pleural sliding

B. Barcode sign (stratosphere sign)

C. Absence of diaphragmatic movement

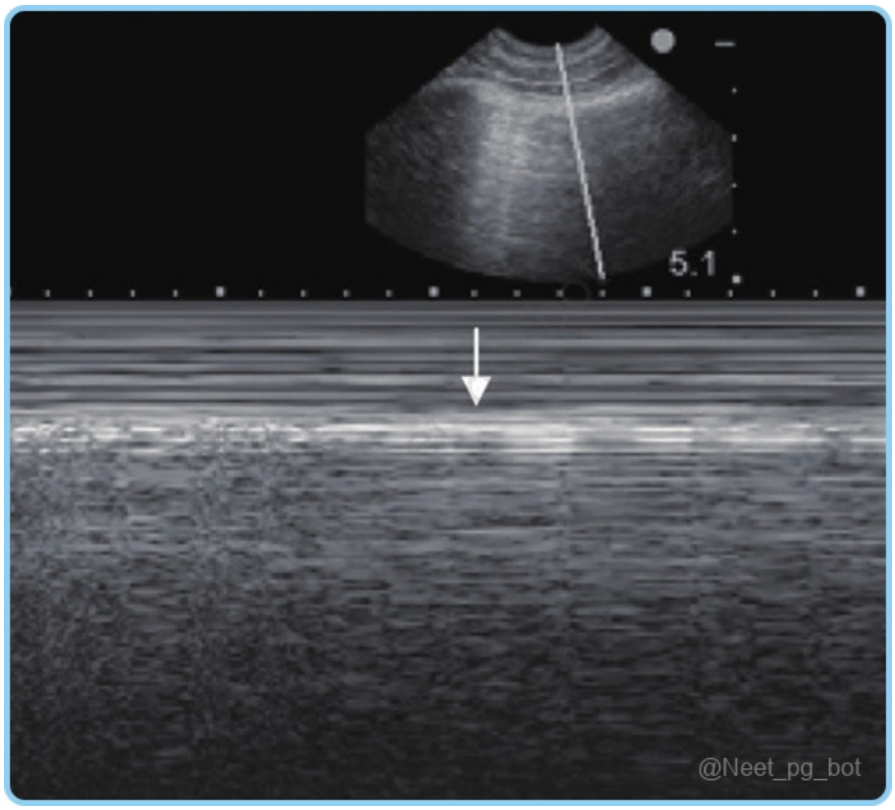
D. Seashore sign

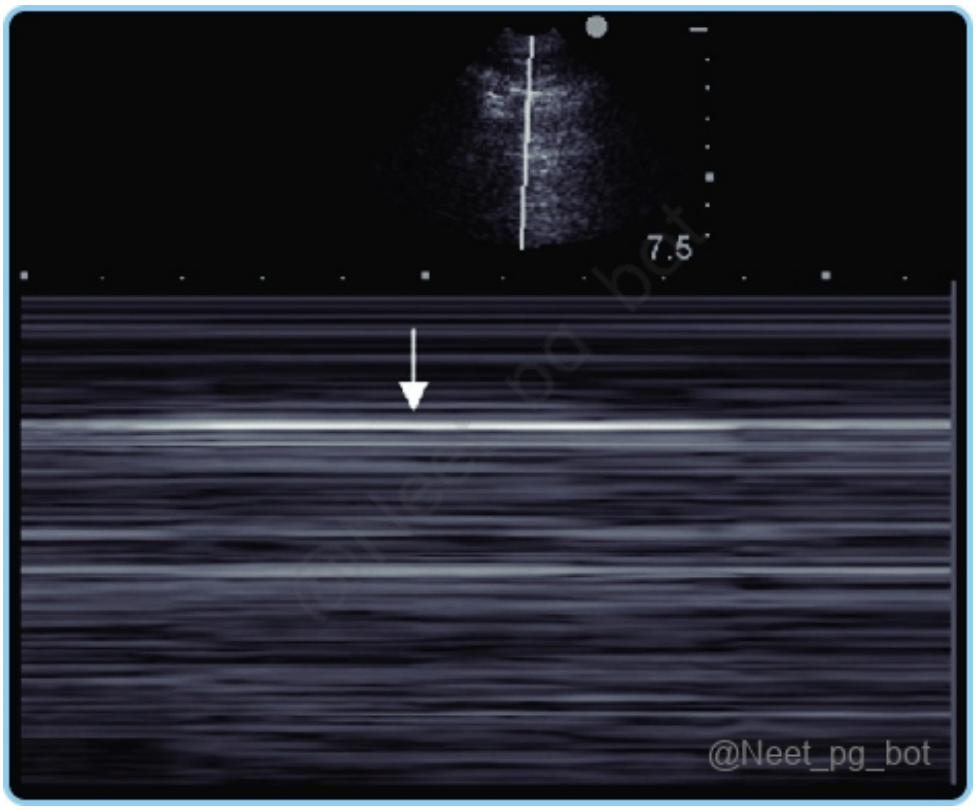
Correct Answer: D. Seashore sign

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: Pleural sliding with a "seashore sign" indicates normal lung movement, seen on M-mode ultrasound. The presence of this pattern confirms that there is no pneumothorax. "Barcode sign" or "stratosphere sign" is indicative of a pneumothorax, where the normal pleural sliding is absent , and the image resembles parallel horizontal lines (Option A and B ruled out). Absence of diaphragmatic movement (Option C): This is related to diaphragmatic paralysis or dysfunction, not pneumothorax, and is not a reliable indicator in this context.





References:

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3564184/

https://pubmed.ncbi.nlm.nih.gov/26293413/

https://pubmed.ncbi.nlm.nih.gov/21144957

https://pubmed.ncbi.nlm.nih.gov/30077562/

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3299161/

↑ *Back to this question in Part A*

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Q8: Which of the following statements accurately distinguishes between A-scan from B-scan ultrasound in ophthalmology? (Q852962)

A. A-scan provides a two-dimensional image, while B-scan provides a one-dimensional image.

B. A-scan is primarily used to measure axial length, whereas B-scan is used to visualize internal ocular structures.

C. B-scan displays spikes on a graph, while A-scan displays a dotted section of the eyeball.

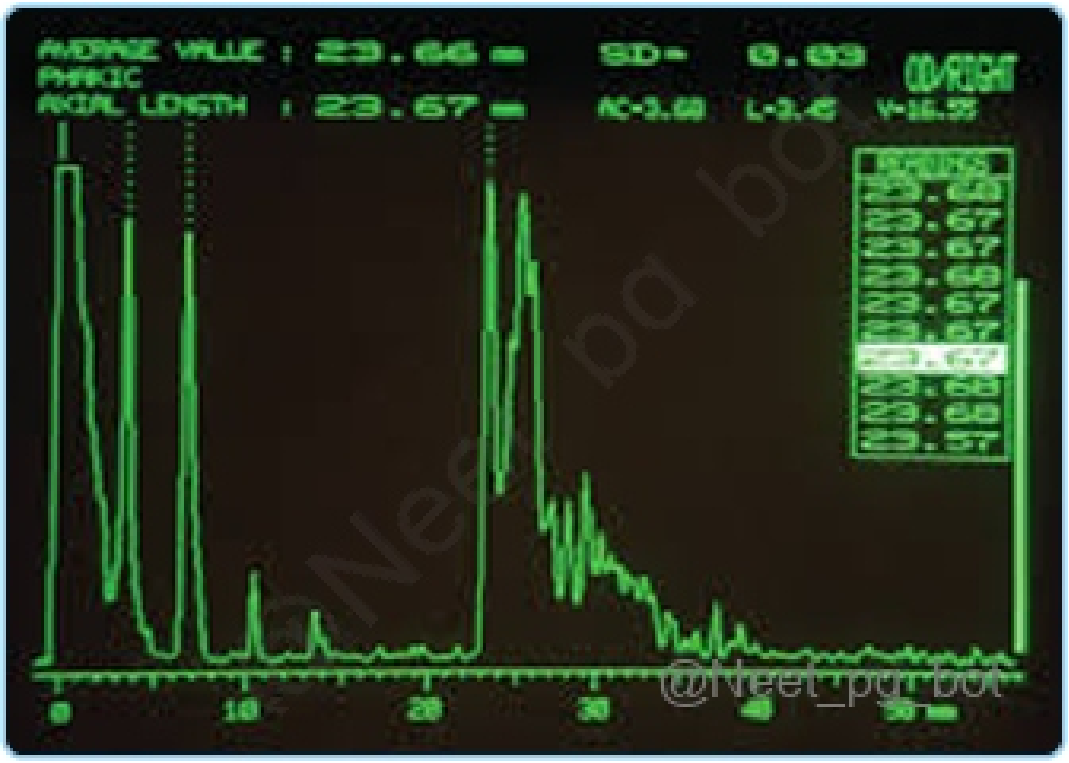
D. A-scan requires the probe to be applied on the eyelids, while B-scan requires direct contact with the cornea.

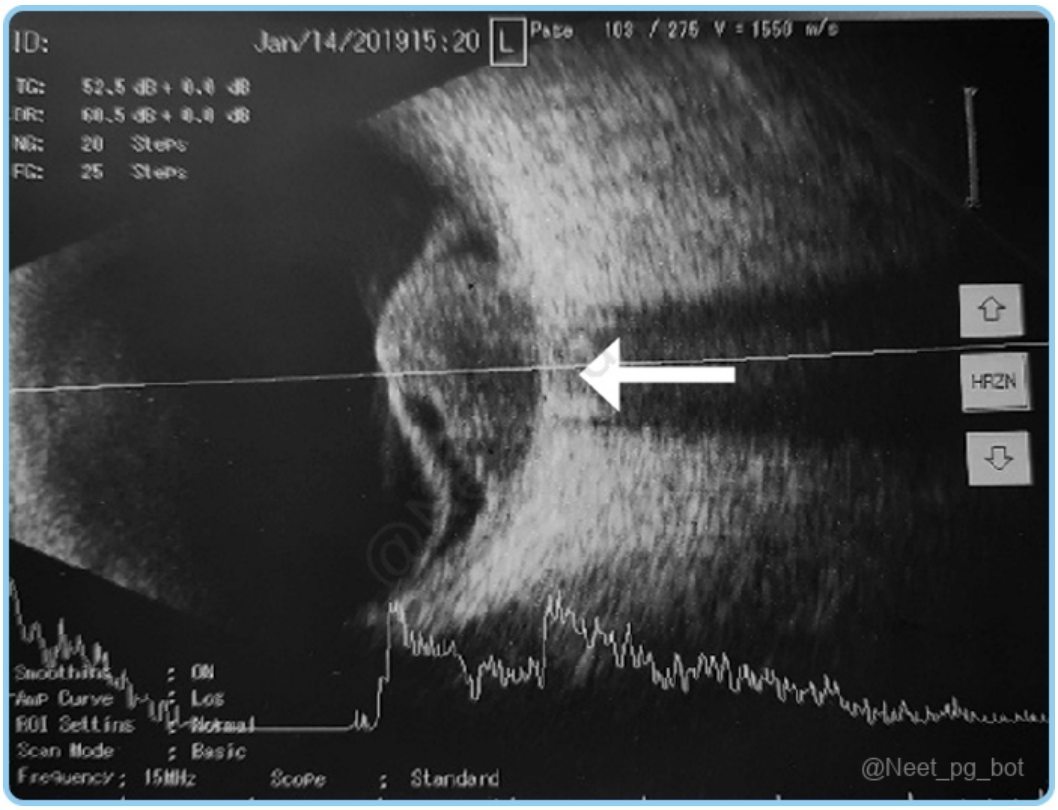
Correct Answer: B. A-scan is primarily used to measure axial length, whereas B-scan is used to visualize internal ocular structures.

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: A-scan is primarily used to measure the axial length of the eye, which is crucial for intraocular lens (IOL) power calculation and anterior chamber depth measurements. A-Scan (Time Amplitude) B-Scan (Intensity Modulation) Dimension (Option A ruled out) One-dimensional Two-dimensional Probe size Smaller Larger Method (Option D ruled out) The patient's eye is numbed with anesthetic drops, and a small A-scan probe is applied to the cornea to collect measurements. The B scan probe is softly positioned on the eyelids as the patient gazes in different directions to obtain various angles. Purpose (Option B) Measures axial length Visualizes internal structures Display (Option C ruled out) Spikes on graph Interpretation: Spike distance = tissue measurement Spike height = tissue density High spikes: cornea, lens, sclera Low spikes: vitreous structures Dotted section of eyeball Uses IOL power calculation (biometry) Anterior chamber depth measurement Intraocular mass thickness assessment Posterior segment evaluation with opaque media Tumor assessment: Intraocular Orbital Foreign body localization: Intraocular Intraorbital Advantage: Easier interpretation of structure location/size





References:

A K Khurana Comprehensive Ophthalmology, 7th edition, Page 542

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4790172/

↑ *Back to this question in Part A*

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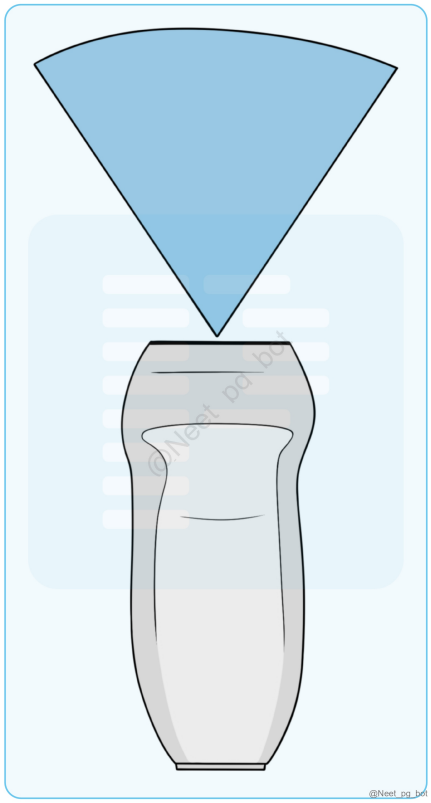
Q9: Match each type of ultrasound probe with its primary use. Probe Primary Use 1) a) Vascular, high-resolution imaging 2) b) Cardiac, endocavitary, neonatal brain 3) c) Abdominal, OBS/GYN (Q852961)

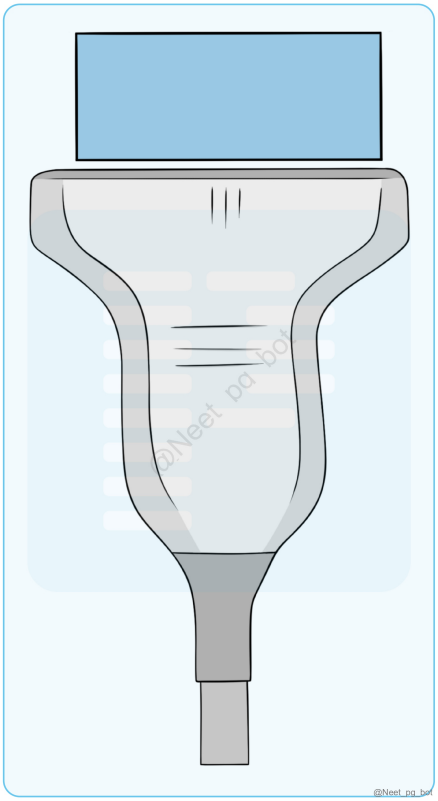
A. 1b,2a,3c

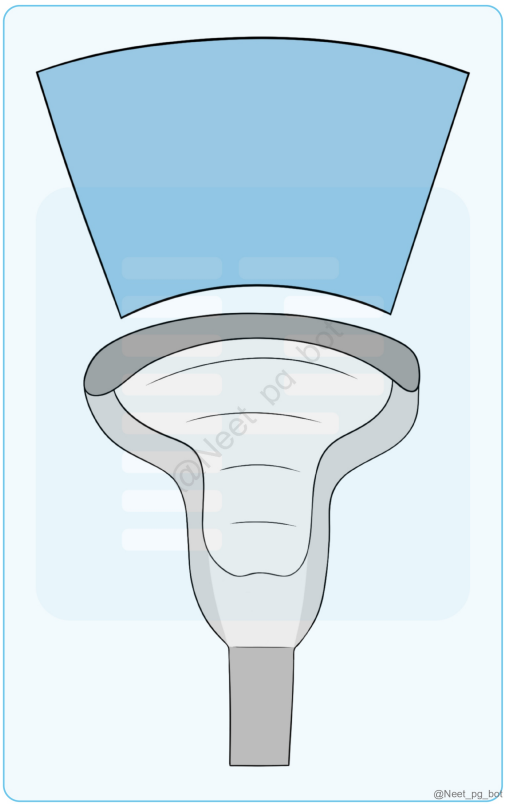
B. 1a,2b,3c

C. 1c,2a,3b

D. 1a,2c,3b


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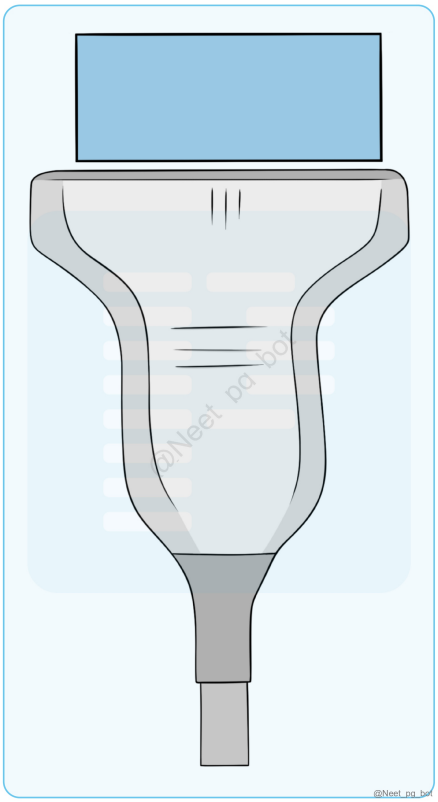

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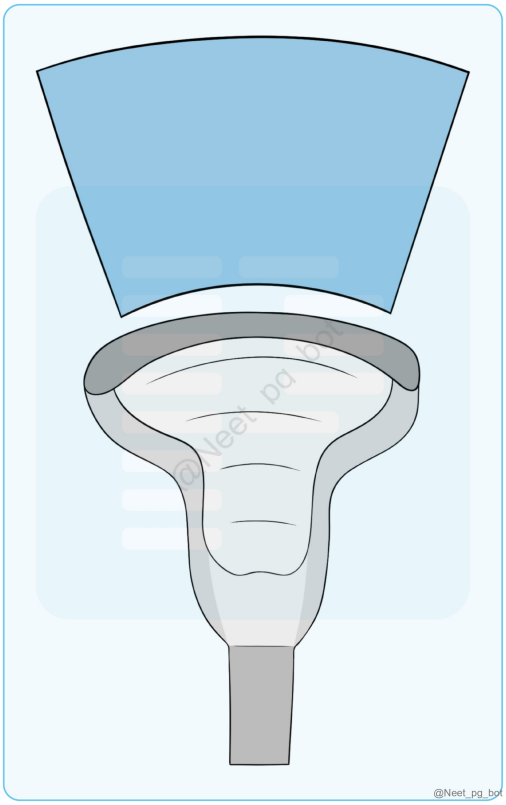


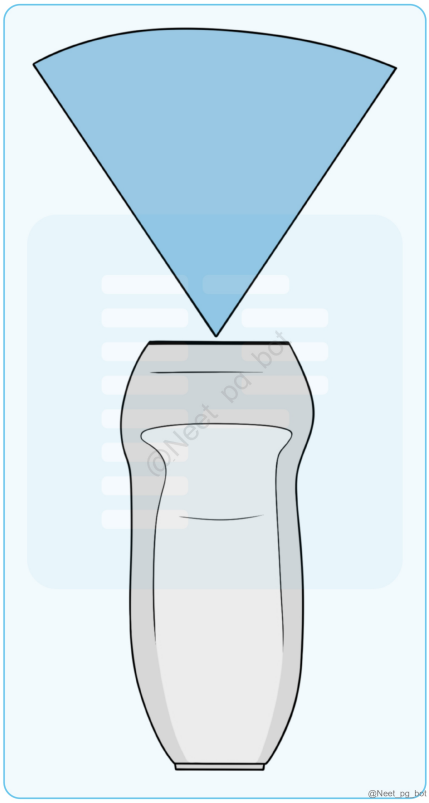
Correct Answer: A. 1b,2a,3c

- *Listen (English)*
- *Listen (Hindi)*

Explanation: Types of Ultrasound Transducers/ Probes Linear Shape: Rectangular/parallelogram image Use: Vascular, high-resolution imaging Convex Shape: Sector image, curved top Use: Abdominal, OBS/ GYN Phased Array Shape: Sector image, pointed top Use: Cardiac (fits between ribs), endocavitary (like endovaginal), neonatal brain Vector/ Trapezoidal Shape: Trapezoidal image Use: Abdominal, cardiac, Doppler Features: Hybrid of linear & phased


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References:

David Sutton textbook of Radiology & Imaging Edition 8, Volume I, Page 182, 183, 194-196

↑ *Back to this question in Part A*

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Q10: What is the primary reason for applying ultrasound gel during an ultrasound examination? (Q852960)

A. To enhance image contrast

B. To act as a lubricant for easier probe movement

C. To eliminate air pockets between the probe and skin

D. To cool down the transducer while in constant use

Correct Answer: C. To eliminate air pockets between the probe and skin

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: Primary reason for applying ultrasound gel during an ultrasound examination to eliminate air pockets between the probe and skin. Although the gel can provide lubrication, its main purpose is not it. (Option B ruled out) Ultrasound Gel Purpose of Gel Eliminates air pockets between probe and skin for effective sound transmission. (Option C) Serves as a medium for sound and lubricant. Preferred Gel Hydrogel is preferred over Lipogel for easier cleaning. Ingredients Distilled water, carbomer, ethylenediaminetetraacetic acid (EDTA), propylene glycol, glycerin, trolamine, and occasionally contains blue colorant. Infection Control Cover transducer and skin with plastic for patients with open wounds or skin issues. ↓ Apply gel on both sides of the plastic. ↓ Clean transducer after each use

References:

David Sutton textbook of Radiology & Imaging Edition 8, Volume I, Page 197,198

↑ *Back to this question in Part A*

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Q11: Which among the following is a common clinical application of dual-energy CT (DECT)? Detection of intracranial hemorrhage B) Differentiation between gout and pseudogout crystals C) Removal of calcium from carotid arteries in head and neck angiography D) Quantification of liver fat in hepatic steatosis E) Reduction of artifacts caused by metal implants F) Characterization of solitary lung nodules (Q852959)

A. All except A

B. All except E

C. All except A and C

D. All the above

Correct Answer: D. All the above

Explanation: Dual-energy CT (DECT) -capturing CT images using two different energy spectra, enabling the assessment of tissue composition in ways that traditional CT cannot provide. System Applications of DECT Central Nervous System Removal of calcium from carotid arteries in head and neck angiography (Option A and C ruled out) (Option D) Detection of intracranial hemorrhage (Option A and C ruled out) (Option D) Elimination of bone structures in CT angiography to enhance vascular imaging Cardiovascular System Assessment of myocardial viability and blood flow Detection of iron deposits in the myocardium Evaluation of coronary stents and calcified plaque Identification of aortic endoleaks post-repair Thoracic System Evaluation of pulmonary blood flow for diagnosing pulmonary embolism Characterization of solitary lung nodules by measuring iodine concentration (Option D) Gastrointestinal System Detection of colonic masses and polyps during CT colonography Quantification of liver fat in steatosis (Option D) Detection of liver iron accumulation Identification of gallstones Urinary System Identification and characterization of renal stones for treatment planning Assessment and characterization of renal cysts Musculoskeletal System Differentiation between gout and pseudogout crystals

(Option D) Reduction of artifacts caused by metal implants (Option B ruled out) (Option D) Distinction of bone marrow edema from trabecular bone to locate fractures and lesions Visualization of tendons and ligaments for better assessment

References:

David Sutton textbook of Radiology & Imaging Edition 8, Volume I, Page 316, 323-326

↑ *Back to this question in Part A*

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Q12: In which scenario would CECT be preferred over NCCT? (Q852958)

A. Evaluating a fracture in a long bone

B. Assessing a lung nodule for malignancy

C. Diagnosing kidney stones

D. Evaluating head trauma

Correct Answer: B. Assessing a lung nodule for malignancy

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: CECT is preferred for evaluating lung nodules because the contrast enhances the visibility of the nodule and its characteristics, which helps in differentiating between benign and malignant lesions. It also allows for better assessment of surrounding structures and lymph nodes. Non-Contrast Computed Tomography (NCCT) and Contrast-Enhanced Computed Tomography (CECT) Non-Contrast Computed Tomography (NCCT) Contrast-Enhanced Computed Tomography (CECT) NCCT refers to CT imaging performed without the use of intravenous contrast agents. CECT involves the administration of an intravenous contrast agent to enhance the visibility of vascular structures and improve differentiation of tissues in the body. Indications : Bone Injuries: Fractures, especially of the spine and long bones. (Option A ruled out) Kidney Stones: Evaluation of renal calculi (stones) and urinary tract obstruction. (Option C ruled out) Head Trauma: Detecting hemorrhage or skull fractures. (Option D ruled out) Acute Abdomen: Initial evaluation of acute abdominal pain (appendicitis, diverticulitis). Indications: Tumor Detection: Identifying and characterizing masses or tumors in various organs. Pulmonary Diseases: Assessing lung pathology (pneumonia, lung nodules). (Option B) Vascular Assessment: Evaluating blood vessels for stenosis, thrombosis, or aneurysms. Infection : Assessing abscesses or inflammatory conditions where contrast can delineate structures. Staging of Cancer: Determining the extent of malignancies by evaluating lymph nodes and distant metastases. Assessment of Organ Perfusion : Evaluating blood flow in organs. Advantages : No Allergic Reactions: Eliminates the risk of allergic reactions to contrast agents. No Need for Renal Function Assessment: Suitable for patients with renal impairment who cannot tolerate contrast. Faster : Typically quicker to perform than CECT, as no time is needed for contrast administration. Cost-effective: Generally less expensive than CECT. Advantages: Enhanced Visualization : Improves the contrast between different tissues, making it easier to identify abnormalities. Better Soft Tissue Detail: Provides superior detail of soft tissue

structures compared to NCCT. Vascular Imaging: Excellent for visualizing blood vessels and detecting vascular pathologies. Limitations: Limited Diagnostic Capability: May not provide enough detail for soft tissue structures or vascular assessments. Less Sensitivity: Lower sensitivity for detecting certain conditions, such as tumors or vascular abnormalities, compared to CECT. Limitations: Risk of Allergic Reactions: Possible allergic reactions to contrast agents, ranging from mild to severe (anaphylaxis). Renal Impairment: Requires caution in patients with pre-existing kidney disease, as contrast can further compromise renal function (risk of Contrast-Induced Nephropathy). Increased Radiation Exposure: Slightly higher radiation exposure compared to NCCT due to additional imaging phases.





References:

www.ncbi.nlm.nih.gov/pmc/articles/PMC9672504/

↑ *Back to this question in Part A*

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Q13: A 65-year-old male patient presents with a 6-month history of progressive shortness of breath and a dry cough. He is a former smoker, having quit 10 years ago, and has no significant past medical history. On examination, he has clubbing of the fingers and fine crackles on lung auscultation. Pulmonary function tests reveal a restrictive pattern with reduced lung volumes and a decreased diffusion capacity.Which imaging modality is most appropriate for confirming the diagnosis of this condition? (Q852957)

A. Contrast-Enhanced Computed Tomography (CECT) of the chest

B. High-Resolution CT (HRCT) of the chest

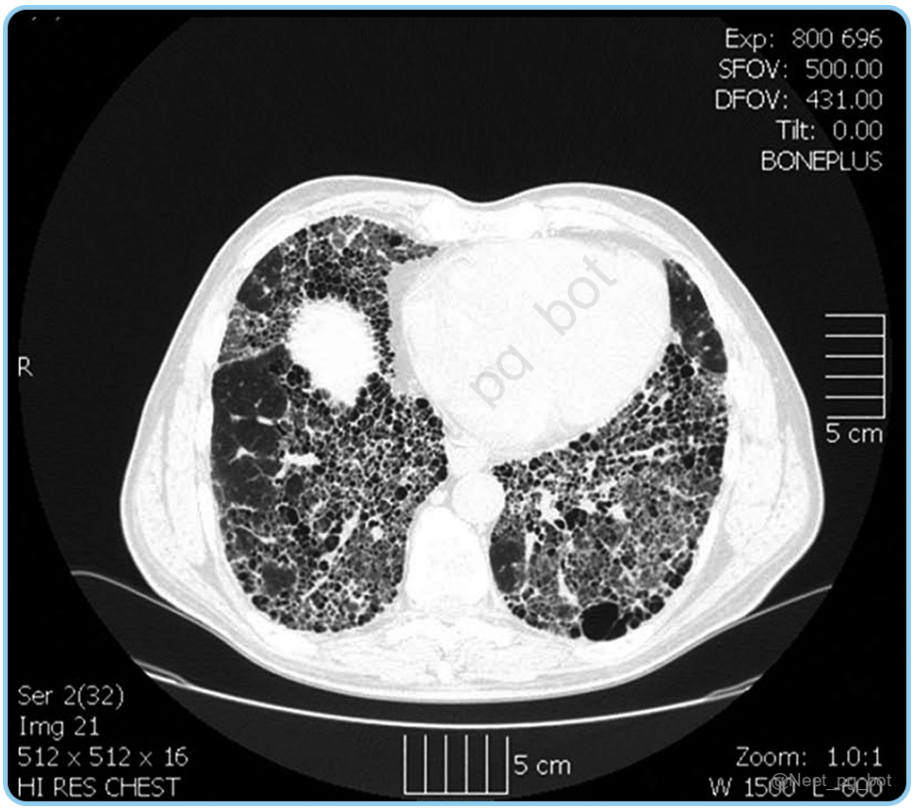
C. MRI of the chest

D. Chest X-ray

Correct Answer: B. High-Resolution CT (HRCT) of the chest

- *Listen (English)*
- *Listen (Hindi)*

Explanation: The given condition is Idiopathic pulmonary fibrosis(IPF) Clinical Features: Progressive dyspnea (shortness of breath) Dry cough Clubbing of fingers Fine crackles on auscultation Restrictive lung pattern on pulmonary function tests HRCT is the gold standard for diagnosing IPF , as it can reveal the characteristic patterns of fibrosis, such as reticular patterns, honeycombing, and ground-glass opacities. HRCT showing IPF High-Resolution CT (HRCT): Definition Specialized imaging technique that provides highly detailed cross-sectional images of the body's internal structures, primarily the lungs Technique Thin Collimation: Uses thin slices (usually 1 mm or less) to improve image resolution. High Spatial Resolution: Optimized scanning protocols to enhance the detail of structures. Breath-Holding: Images are often obtained during full inspiration to reduce motion artifacts. Indications Pulmonary Assessment: Primarily used to evaluate lung diseases, especially interstitial lung diseases (e.g., Idiopathic Pulmonary Fibrosis, sarcoidosis). Tumor Evaluation: Assessing lung nodules and tumors. (For Pancoast tumor MRI is preferred) Infectious Diseases : Identifying lung infections (pneumonia, tuberculosis). Key Imaging Features Reticular Patterns: Suggestive of fibrosis and interstitial lung disease. Ground-Glass Opacities: Indicate inflammation or partial consolidation. Nodules and Masses: Detailed visualization of pulmonary nodules. Advantages High Sensitivity and Specificity: Superior ability to detect and characterize lung pathologies compared to standard CT or X-rays. Detailed Assessment: Provides detailed anatomical information, aiding in accurate diagnosis and treatment planning. 3D Reconstruction: Data can be processed to create 3D images for better anatomical visualization. Limitations Radiation Exposure: Increased radiation dose compared to conventional radiography. Cost : Generally more expensive than standard imaging modalities. Contrast-Enhanced Computed Tomography (CECT) of the chest (Option A): It is not the preferred method for diagnosing IPF as it does not provide the high-resolution images necessary to visualize the specific interstitial patterns of fibrosis. MRI of the chest (Option C): Not routinely used for the diagnosis of IPF; HRCT is preferred due to better visualization of lung parenchyma. Ultrasound of the chest (Option D): Not a suitable modality for diagnosing interstitial lung diseases like IPF, as it cannot provide detailed images of lung parenchyma.



References:

www.ncbi.nlm.nih.gov/pmc/articles/PMC7607720/

https://www.ncbi.nlm.nih.gov/books/NBK556109/

↑ *Back to this question in Part A*

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Q14: Arrange the following in their decreasing order of penetration power 1) Neutrons 2) Alpha (α) rays 3) Beta (β) rays 4) Gamma (γ) rays (Q852944)

A. 1>2>3>4

B. 1>4>3>2

C. 4>3>2>1

D. 2>3>4>1

Correct Answer: B. 1>4>3>2

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: Penetration power is maximum with Neutrons (1) > Gamma (γ) rays (4) > Beta (β) rays (3) > Alpha (α) rays (2). Hence, the correct answer is 1>4>3>2 (Option B) . Alpha (α), Beta (β) & Gamma (γ) rays: Alpha (α) rays: Particles emitted by the nucleus through α decay, containing 2 protons and 2 neutrons. Beta (β) rays: Particles emitted by the nucleus through β decay, either electrons/positrons Gamma (γ) rays: Photons emitted by the nucleus. Ionizing power: (damaging capacity of linear energy transfer - LET) Alpha (α) > Beta (β) > X-Rays > Gamma (γ) rays Penetration power: Neutrons > Gamma (γ)rays >Beta (β)rays >Alpha (α)rays

References:

https://www.ncbi.nlm.nih.gov/books/NBK158792/ Basic Radiotherapy Physics and Biology by David S. Chang, Foster D. Lasley, Indra J. Das, Marc S. Mendonca, Joseph R. Dynlacht (Springer) pages - 11-17

↑ *Back to this question in Part A*

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Q15: Which window setting would be most appropriate for viewing bone structures in a CT scan? (Q852955)

A. Low window level and narrow window width

B. High window level and wide window width

C. Low window level and wide window width

D. High window level and narrow window width

Correct Answer: B. High window level and wide window width

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: High window level and wide window width are ideal for visualizing dense structures like bone because it allows for better differentiation of highly dense tissues. In CT imaging, the window refers to the range of Hounsfield units (HU) that are displayed on the CT image , allowing radiologists to better visualize specific tissues or structures by adjusting the image contrast. The window settings include two key components: Window Width (WW) Window Level (WL) This defines the range of Hounsfield units that will be displayed. It controls the contrast of the image. A narrow window width is used for better contrast of soft tissues. A wide window width is used for imaging high-contrast structures like bone . This determines the central Hounsfield value of the window range and adjusts the brightness of the image. A higher window level is used to visualize dense tissues like bones . A lower window level is used for soft tissues. Types of CT Windows: Bone window: High window level and wide window width to clearly view bones and other dense structures. Lung window: Narrow window width and lower window level for optimal visualization of lung parenchyma and air spaces. Soft tissue window: Lower window level and narrower width to focus on soft tissue structures like muscles, organs, and the brain. Low window level and narrow window width (Option A) are more suitable for soft tissues where contrast needs to be enhanced, not

for dense structures like bone. Low window level and wide window width (Option C) would reduce brightness, making it harder to see dense structures like bones. High window level and narrow window width (Option D): While a high window level is appropriate for bones, a narrow window width would reduce the ability to distinguish different densities within the bone itself.

References:

www.ncbi.nlm.nih.gov/pmc/articles/PMC6209492/

↑ *Back to this question in Part A*

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Q16: A 45-year-old man presents with sudden headache, confusion, and decreased consciousness following recent cranial surgery. CT image is given below. What is the black area seen in the CT? (Q852954)

A. Blood

B. Air

C. Pus

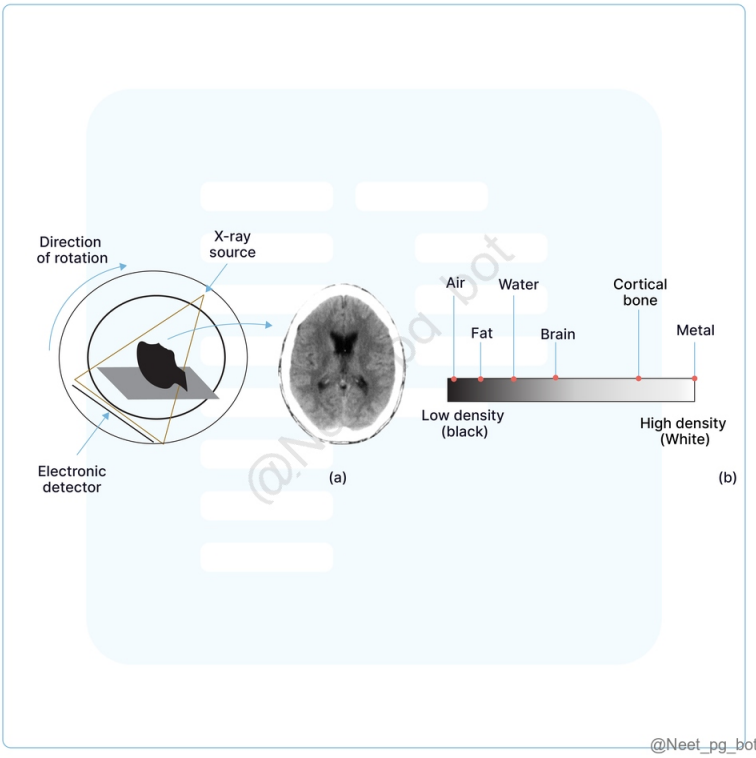
D. Highly vascularised areas

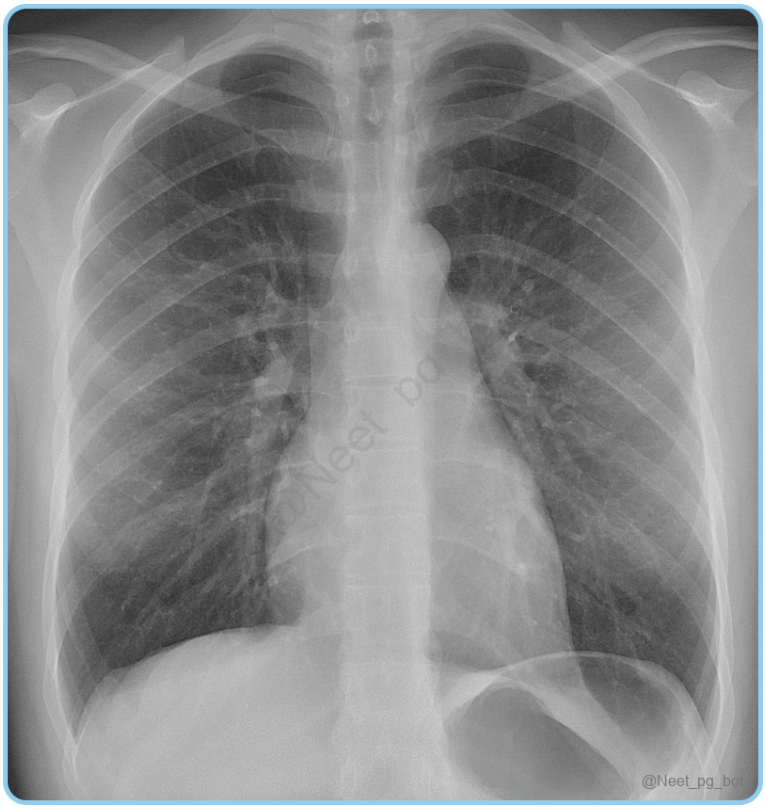


Correct Answer: B. Air

- *Listen (English)*
- *Listen (Hindi)*

Explanation: The scenario is of tension pneumocephalus - air trapped under pressure in the intracranial space, compressing the brain structures and showing the classic Mount Fuji sign in CT. The black area here is air. In CT imaging, black areas usually correspond to low-density substances like air or fluid, which do not absorb much X-ray radiation. Imaging principles of CT scan: CT uses filtered x-ray beams and a computer to create cross-sectional images of the body. CT slices reveal specific anatomy levels, with slice thickness chosen to minimise scatter radiation and superimposition using collimators. CT data are divided into pixels, forming a matrix, each representing different image details. Structures in CT images are depicted in varying shades of grey based on x-ray beam attenuation principles. The linear attenuation coefficient quantifies photon interaction with matter and varies with density, atomic number, and energy. Higher density and atomic number lead to more significant attenuation, affecting image contrast. CT images reflect these coefficients, showing denser materials as white and less dense ones as black. Contrast agents, like iodine, temporarily modify structure density differences for better visualization. Imaging principles of X-Ray: X-ray Appearance Cause Examples Black X-rays pass through less dense tissues and reach the cassette with more energy Air or gas , e.g., lungs, bowel gas White X-rays are mostly absorbed by very dense tissues , so little reaches the cassette Bone , metal , calcified areas Gray X-rays pass through intermediate-density tissues Soft tissues , muscles , fat , organs Dense structures like bone (Option A): Appear white or light gray because they absorb more X-rays. Soft tissues like muscle (Option B): Appear in shades of gray, not black, because they have intermediate density. Highly vascularized areas (Option D): Especially with contrast agents, appear brighter or in lighter shades, not black.





References:

www.ncbi.nlm.nih.gov/books/NBK564362/

www.ncbi.nlm.nih.gov/books/NBK597347/#

↑ *Back to this question in Part A*

@Neet_pg_bot

Q17: Match the following items with its corresponding Hounsfield Unit: Item Hounsfield Unit 1.Metal a.1000 2.Bone b.3000 3.Air c.-1000 4. Water d. 0 (Q852953)

A. 1b,2a,3c,4d

B. 1a,2b,3d,4c

C. 1c,2d,3a,4b

D. 1d,2c,3b,4a

Correct Answer: A. 1b,2a,3c,4d

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: The Hounsfield Unit (HU): Relative quantitative measure of radiodensity used in CT (Computed Tomography) images to evaluate tissue density Calculated based on the absorption/attenuation coefficient of the X-ray beam within different tissues Item Hounsfield Unit (HU) Water 0 HU Air -1000 HU Bone 1000 HU Dense bones like the cochlea 2000 HU Metals 3000 HU

References:

https://www.ncbi.nlm.nih.gov/books/NBK547721/

↑ *Back to this question in Part A*

@Neet_pg_bot

Q18: Which of the following statements is NOT true about Computed Tomography? (Q852952)

A. Uses a rotating beam of X-ray

B. Uses more radiation than a plain X-ray

C. The computer generates the images

D. Slices are as if viewing from the head end of the bed

Correct Answer: D. Slices are as if viewing from the head end of the bed

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: CT slices are as if viewing from the foot end of the bed, not head end. Computed Tomography (CT): CT uses a rotating fan beam of X-rays (Option A ruled out) to pass through the patient and measure transmission at thousands of points A computer calculates X-ray absorption at specific points in the patient and manipulates data for various image displays (Option C ruled out) CT uses 10 to 100 times more radiation than plain X-rays (Option B ruled out) CT slices are two-dimensional and shown as if viewing the patient from the foot of the bed i.e., the right side of the patient appears on the left of the image (Option D)



References:

Fred A. Mettler Jr. Essentials of Radiology, 4th edition pages 4-5

↑ *Back to this question in Part A*

@Neet_pg_bot

Q19: Which of the following statements is false? (Q852951)

A. C-arm is a mobile X-ray machine

B. Fluoroscopy shows continuous X-ray images in a monitor

C. In fluoroscopy, only movement of a body part can be visualized

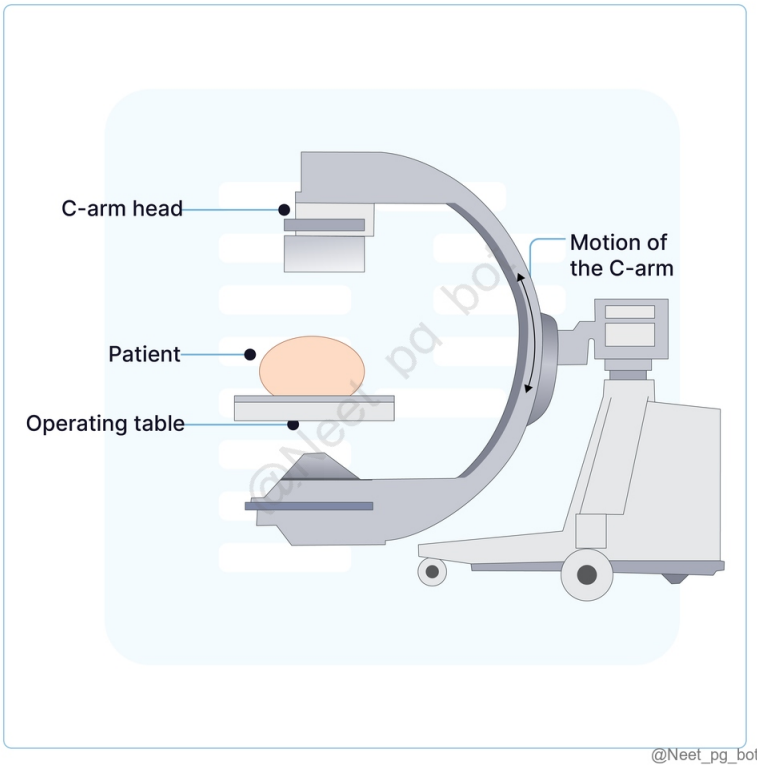
D. Fluoroscopy can be used in catheter insertion

Correct Answer: C. In fluoroscopy, only movement of a body part can be visualized

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: In fluoroscopy movement of a body part or an instrument or contrast agent through the body can be seen in detail Fluoroscopy: An imaging technique that shows a continuous X-ray image on a monitor The movement of a body part or an instrument or contrast agent through the body can be seen in detail Used in : Barium X-rays and enemas Catheter insertion and manipulation Placement of devices within the body, such as stents Angiograms Orthopedic surgery C-arm (Option A): Mobile X-ray machine with a half-moon frame Allows mobility in all directions, enhancing flexibility in imaging Fluoroscopy shows continuous X-ray images (Option B): Fluoroscopy provides real-time continuous imaging, allowing visualization of movement (contrast flow, joint motion, catheter advancement). Fluoroscopy can be used in catheter insertion (Option D): It is routinely used to guide central venous catheters, biliary drainage, ureteric stents, angiographic procedures, etc.



References:

https://www.ncbi.nlm.nih.gov/books/NBK573065/#

https://www.fda.gov/radiation-emitting-products/medical-x-ray-imaging/fluoroscopy

↑ *Back to this question in Part A*

@Neet_pg_bot

Q20: Which of the following statements is false about mammography? (Q852950)

A. Grids are used to reduce scattered radiation

B. Primarily for women over 40

C. Breast compression is required

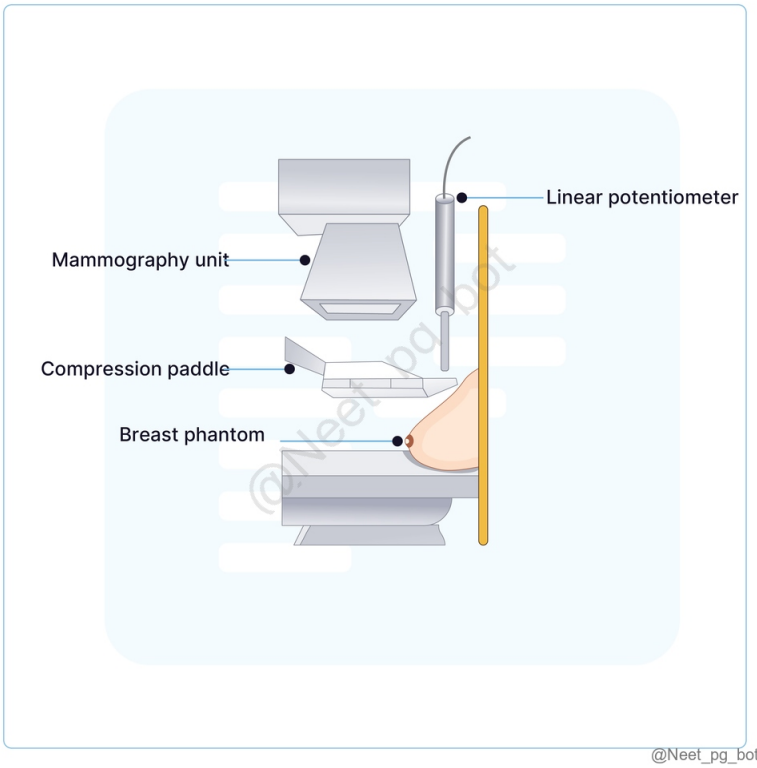
D. The craniocaudal view will show the breast with the axillary tail

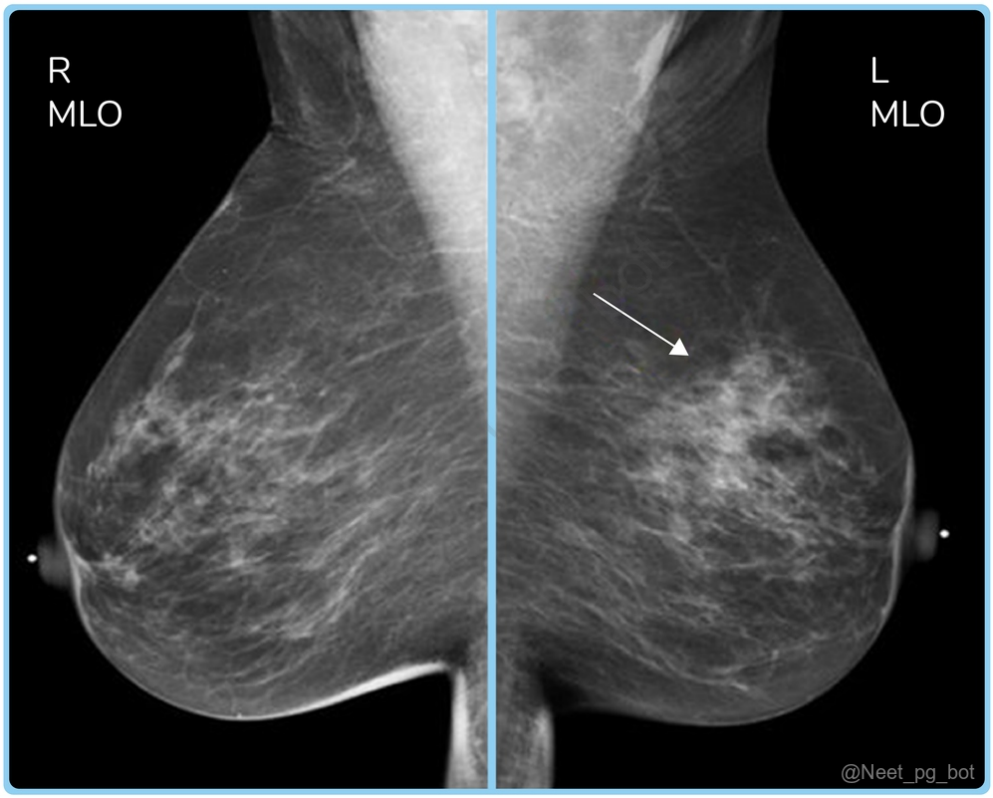
Correct Answer: D. The craniocaudal view will show the breast with the axillary tail

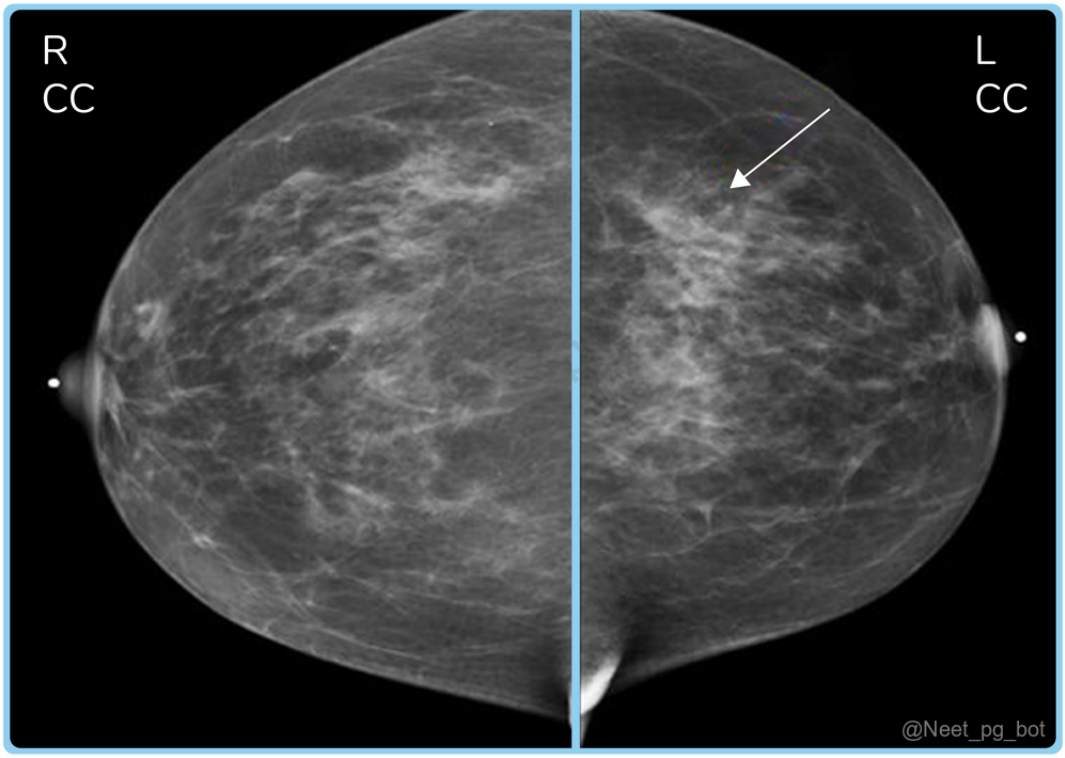
■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: The mediolateral oblique view is the comprehensive view of the breast with the axillary tail, not the craniocaudal view Mammography: X-ray imaging method used to examine the breast for the early detection of cancer and other breast diseases Primarily used for women over 40 (Option B ruled out) for breast cancer screening and follow-up after treatment (Women > 40 have less dense breast and more fatty tissues). Guides biopsy and preoperative localization Molybdenum targets are common. Other target/filter combinations - molybdenum/rhodium, rhodium/rhodium, tungsten/molybdenum, and tungsten/rhodium Grids reduce scattered radiation (Option A ruled out) The breast is compressed for better results (Option C ruled out) Standard two-view mammography has a radiation dose of ~3 mGy Standard Projections: Mediolateral Oblique (MLO) View: Comprehensive view of the breast with the axillary tail (Option C) Craniocaudal (CC) View: Visualises most of the medial and lateral breast tissue with superior-to-inferior compression







References:

Grainger and Allison's Diagnostic Radiology, 7th edition, pages 1654-1657

↑ *Back to this question in Part A*

@Neet_pg_bot

Q21: Match the following types of X-rays with its mechanism 1. Film X-ray a. X-rays hit a detector which converts them into an electrical charge 2. Computed Radiography b. X-rays strike a plate that absorbs the energy and stores it at a specific location 3. Digital Radiography c. X-rays strike a fluorescent screen, producing light (Q852949)

A. 1a,2b,3c

B. 1c,2b,3a

C. 1b,2a,3c

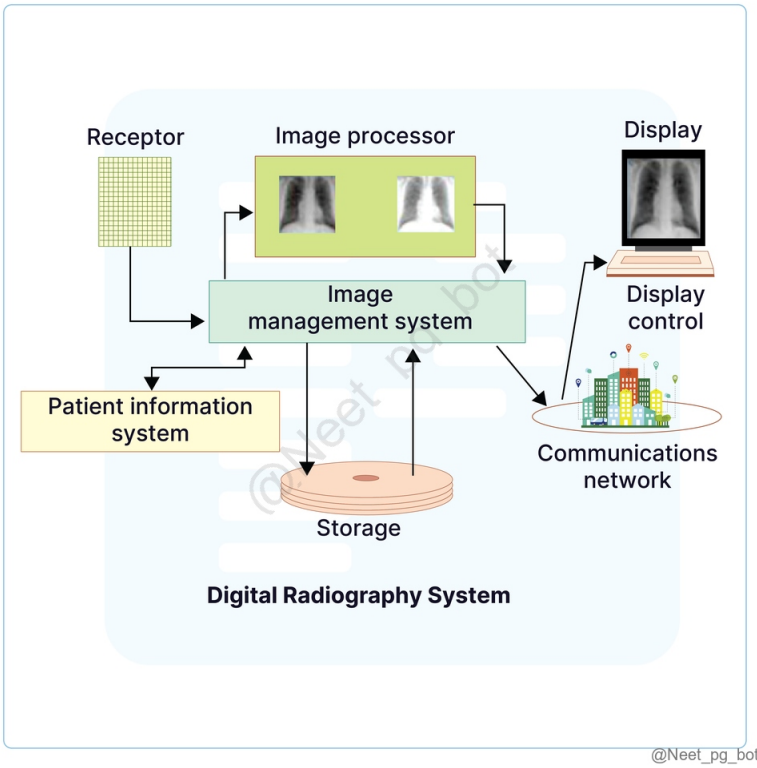
D. 1b,2c,3a

Correct Answer: B. 1c,2b,3a

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: Type of X-ray System Description Film/Screen Combination - X-ray beam strikes a fluorescent screen, producing light. - The light exposes a film, which is then developed. Computed Radiography (CR) - X-rays strike a plate that absorbs the energy and stores it at a specific location. - A laser scans the plate, releasing light from the location, which is then detected and stored in a computer. Digital Radiography (DR) - X-rays hit a detector, which converts them into light or an electrical charge immediately. - The image is stored directly in a computer.



References:

Fred A. Mettler Jr. Essentials of Radiology, 4th edition page 2

↑ *Back to this question in Part A*

@Neet_pg_bot

Q22: True about Compton effect in X-rays are 1) Interacts with the innermost electron 2) Interacts with the outermost electron 3) Responsible for contrast on the films 4) Produces scattered radiations on the films (Q852948)

A. 1,3

B. 2,3

C. 1,4

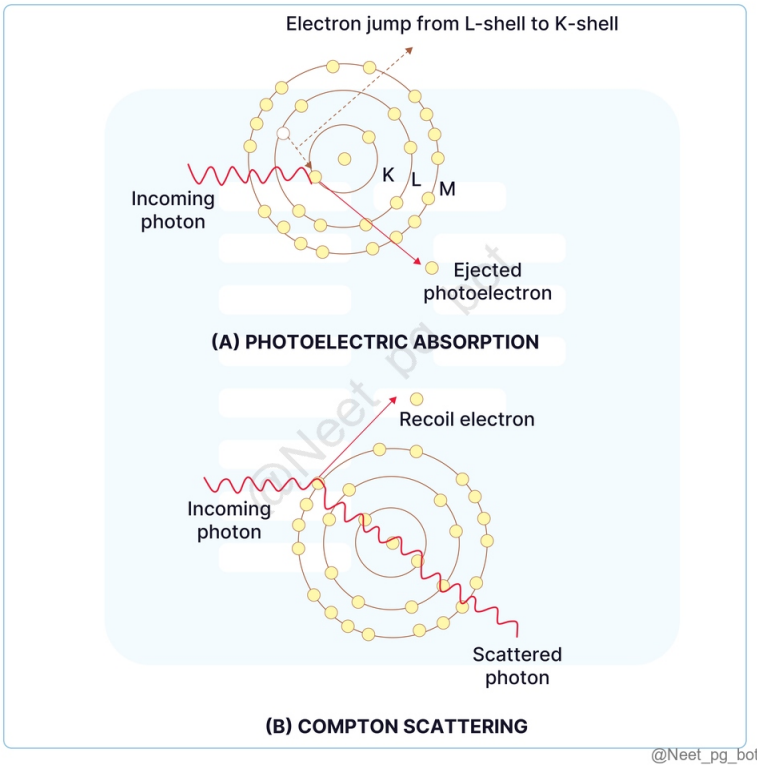
D. 2,4

Correct Answer: D. 2,4

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: The scattered radiation produced when the electron beam reacts with the outermost electron is called Compton scatter (or) effect . Compton effect & Photoelectric effect: Compton effect Photoelectric effect Interaction Outermost electron (Statement-2) Innermost electron (Statement-1) Process Displaces the outer electron and a high energy photon is emitted Displaces the innermost electron and a low energy photon is emitted Result Scattered radiations on the film - obscures the image (Statement-4) Responsible for Contrast in the film - Good (provides a good image) (Statement-4) Relation to atomic number Independent of atomic number Directly proportional to atomic number



References:

David Sutton textbook of Radiology & Imaging 8th edition pages - 96-108

↑ *Back to this question in Part A*

@Neet_pg_bot

Q23: Which among the following statements is true regarding the machine shown below (Q852947)

A. Produced by sudden deceleration of moving electrons

B. Anode is primarily made up of Lead (Pb)

C. The majority of heat dissipation is by convection

D. Electron beam travels from anode to the cathode

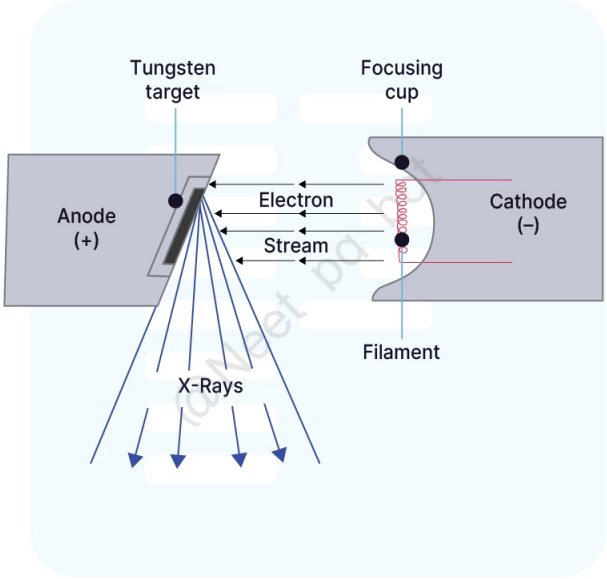


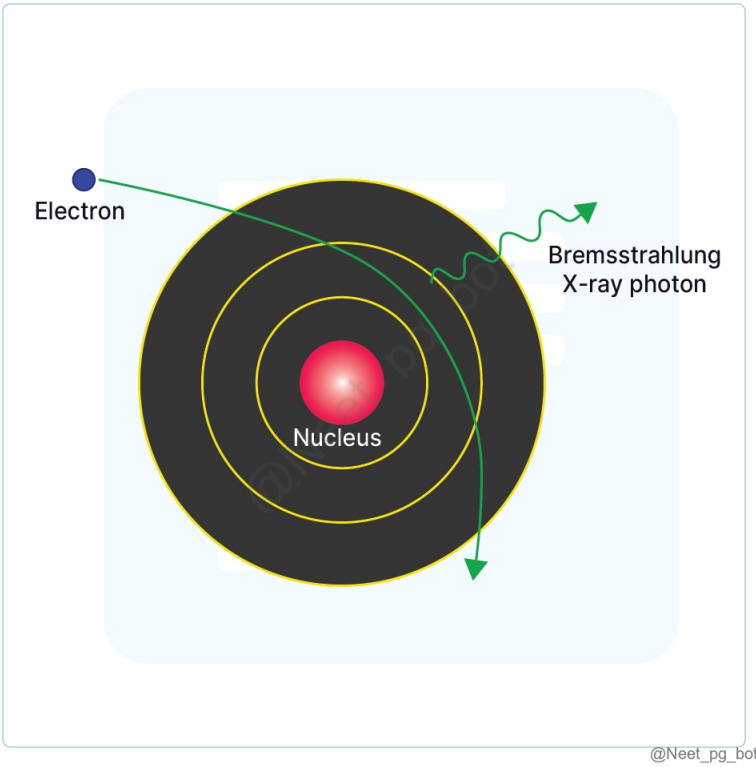
Correct Answer: A. Produced by sudden deceleration of moving electrons

- *Listen (English)*
- *Listen (Hindi)*

Explanation: Image shown is an X-ray machine , which is produced by sudden deceleration of moving electrons. X-ray: Introduction Discovered by W.C. Roentgen on 8 November 1895 (International Day of Radiology). Production By sudden deceleration of fast-moving electron beam (Option A) Working principle The Cathode (filament) is an electron source that produces the electron beam and the Anode is a tungsten target for the electron beam. The electron beam travels from the cathode (negatively charged) to the anode (positively charged) (Option D) Thermionic emission occurs at the Cathode. Blocking of the electron beam is done at the Anode, where 99% of heat dissipation is by Radiation (Option C) and the remaining 1% escapes through the window onto a film called X-rays. Components The Cathode Made up of Tungsten (atomic no.- 74) & Thorium . The Anode Made up of Tungsten & Rhenium (Option B) . Rotatory anodes are preferred (to avoid focal points), now stationary anodes are only used in Portable X-ray machines. Glass envelope Made up of Lead (Pb). Focusing cup Made up of Nickel. Bremsstrahlung radiation (produced by the interaction of electron with nucleus) : Electromagnetic radiation produced by the deceleration of a charged particle when deflected by another charged particle. When an electron beam (negatively charged) travels towards the anode, the nucleus (positively charged) gets deflected and travels in a different direction. Bremsstrahlung radiation depends upon the angle of deflection . Characteristic radiation: Phenomenon similar to Bremsstrahlung radiation, but depends upon the atomic number of the element, produced by interaction of electron with the orbital shell.


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Tungsten target
Focusing cup
Anode (+)
Electron
Stream
Cathode (–)
Filament
X-Rays
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References:

David Sutton textbook of Radiology & Imaging 8th edition pages - 68-86

↑ *Back to this question in Part A*

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Q24: Which among the following are examples of ionizing radiation? 1) X-rays 2) UV rays 3) MRI 4) SPECT 5) Doppler 6) IVP (Intravenous pyelography) (Q852946)

A. 1,3,5,6

B. 1,2,4,6

C. 1,4,6

D. 1,2,4

Correct Answer: C. 1,4,6

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: Among the given options, Ionizing radiation: X-rays, SPECT (single-photon emission computed tomography), IVP (Intravenous pyelography) Non-ionizing radiation: MRI, USG-Doppler Ionizing and non-ionizing radiation: Ionizing radiation Non-ionizing radiation Rays that have the ability to displace orbiting electrons from the atom thus causing biomolecular damage. Some electromagnetic and mechanical waves do not dissipate energy and hence are called non-ionizing. Conventional X-rays , Mammography, CT Contrast X-rays: HSG, IVP, ERCP, Myelography Nuclear imaging (gamma rays): PET, SPECT, Scintigraphy UV rays USG (including Doppler, FAST) MRI (Magnetic resonance imaging), MRCP Thermography

References:

https://radiopaedia.org/articles/ionizing-radiation-1

↑ *Back to this question in Part A*

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Q25: Regarding X-rays in comparison to Gamma (γ) rays, that X-rays have all among the following except (Q852945)

A. Less penetration power

B. Emits a higher wavelength light

C. Relative lower frequency

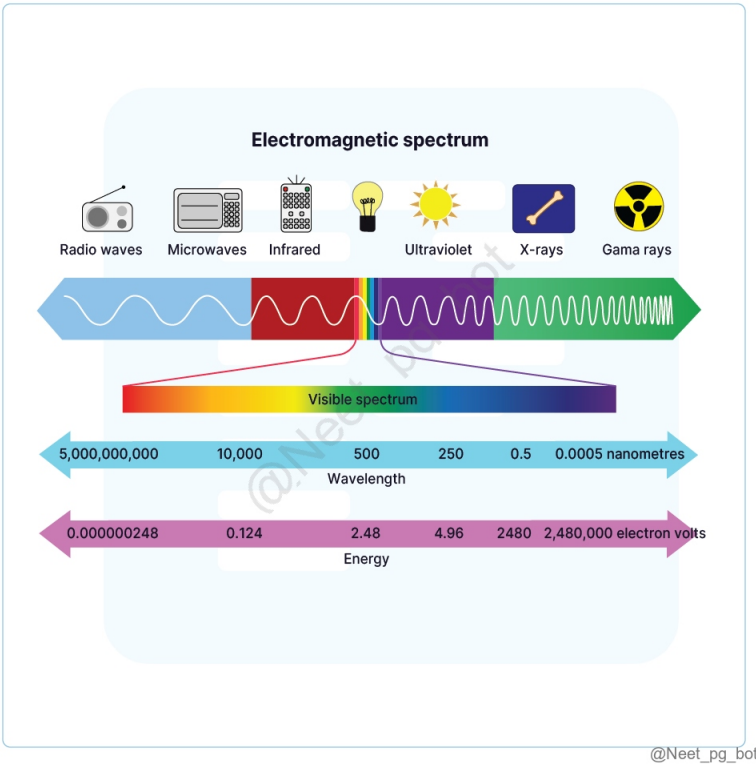
D. Emitted from within the nucleus

Correct Answer: D. Emitted from within the nucleus

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: X-rays are extranuclear i.e the rays are emitted from processes outside the nucleus whereas Gamma (γ) rays are emitted from within the nucleus. X-rays and Gamma (γ) rays: X-rays Gamma (γ) rays Energy Low High Frequency Low High Penetration power Low High Wavelength High Low Origin Extranuclear Nucleus



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References:

https://www.epa.gov/radiation/radiation-basics#:~:text=Gamma%20rays%20(%CE%B3)%20are%20weightless,beta%20particles%20during%20radioactive%20decay Basic Radiotherapy Physics and Biology by David S. Chang, Foster D. Lasley, Indra J. Das, Marc S. Mendonca, Joseph R. Dynlacht (Springer) pages - 11,12

↑ *Back to this question in Part A*

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• [01_Basics of Radiology] 002 Basics Of Usg Mri And Interventional Radiology

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[01_Basics of Radiology] 002 Basics Of Usg Mri And Interventional Radiology — Quick Jump

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Q7 (p. 476)	*Q8 (p. 477)*	*Q9 (p. 478)*	*Q10 (p. 478)*	*Q11 (p. 479)*	*Q12 (p. 479)*
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Q19 (p. 486)	*Q20 (p. 487)*	*Q21 (p. 488)*	*Q22 (p. 490)*	*Q23 (p. 493)*	*Q24 (p. 496)*
Q25 (p. 497)	*Q26 (p. 498)*	*Q27 (p. 500)*	*Q28 (p. 503)*	*Q29 (p. 506)*	*Q30 (p. 507)*

Q1: Which of the following structures appears anechoic on ultrasonography? (Q885715)

A. Muscle

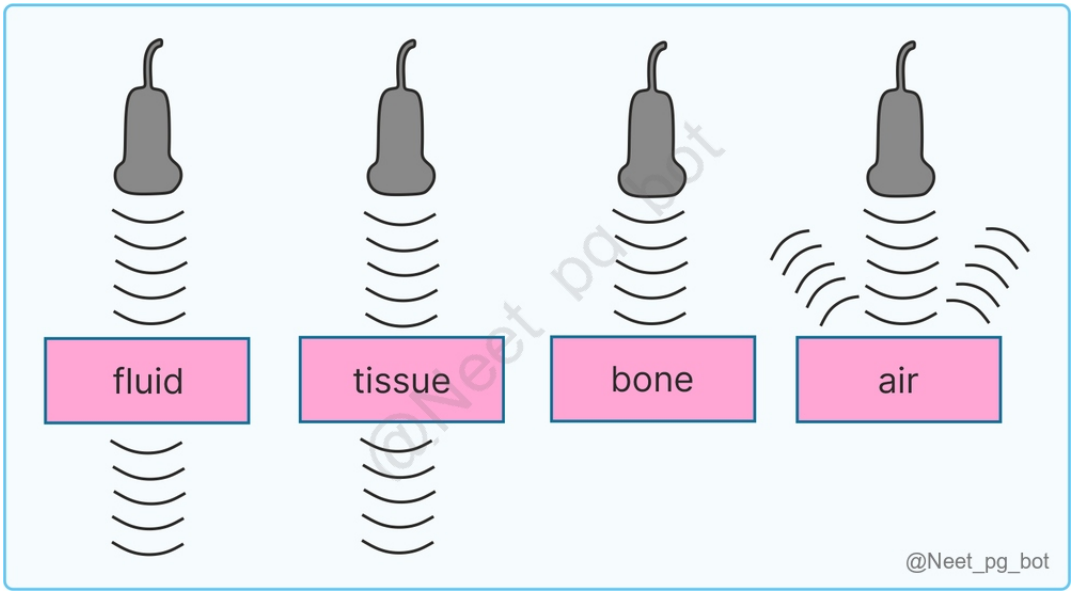
B. Gallstones

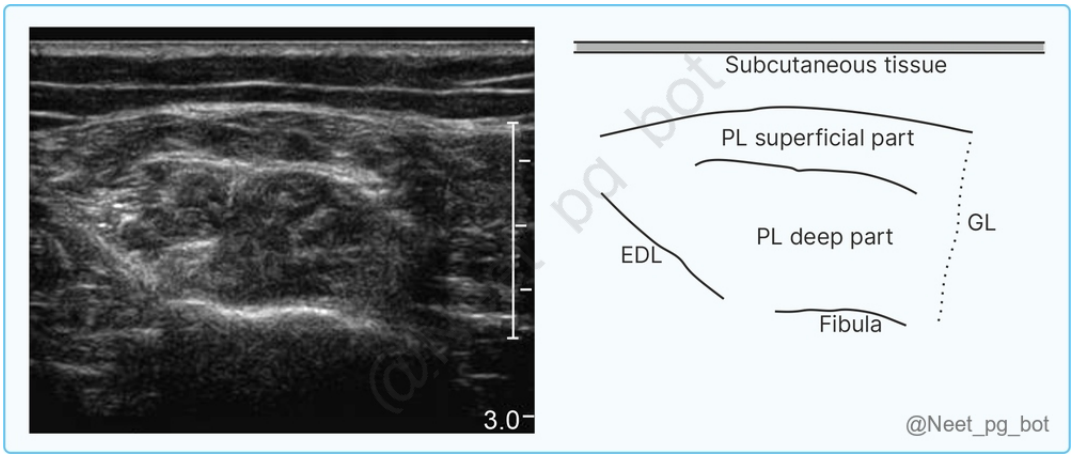
C. Bone

D. Bile

Correct Answer: D. Bile

Explanation: On ultrasonography, the appearance of tissues depends on their acoustic properties , particularly the presence or absence of internal interfaces that can reflect sound waves. Bile is a homogeneous fluid with uniform acoustic density. Because there are no internal interfaces within bile to reflect ultrasound waves, it does not produce echoes . As a result, bile appears anechoic (black) on ultrasonography. In addition, bile allows excellent transmission of sound waves, leading to posterior acoustic enhancement of structures lying deep to it, an important supporting feature of fluid-filled structures. Posterior acoustic enhancement is often seen behind bony structures, air and calculi. Muscle (Option A): Muscle tissue has multiple internal interfaces formed by muscle fibers and connective tissue septa. These interfaces reflect ultrasound waves, producing a hypoechoic to moderately echogenic appearance Ultrasound image of the peroneus longus (PL) muscle. Gallstones (Option B): Gallstones are highly echogenic structures because of their high acoustic impedance compared to surrounding bile. They also characteristically produce posterior acoustic shadowing . Bone (Option C): Bone has very high acoustic impedance and strongly reflects ultrasound waves. It appears hyperechoic with marked posterior acoustic shadowing , preventing visualization of deeper structures.


fluid
tissue
bone
air
@Neet_pg_bot


3.0
Subcutaneous tissue
PL superficial part
PL deep part
EDL
GL
Fibula
@Neet_pg_bot



References:

Carol M. Rumack’s Diagnostic Ultrasound, 5th Edition, Page 165.

↑ *Back to this question in Part A*

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Q2: Diffusion-weighted MRI is useful in identifying which of the following pathological conditions? 1. Acute ischemic stroke 2. Brain abscess 3. Creutzfeldt-Jakob disease 4. Vasogenic oedema 5. Highly cellular tumours (Q885735)

A. 1, 3, 4, 5

B. 3, 4, 5

C. 1, 2, 4

D. 1, 2, 3, 5

Correct Answer: D. 1, 2, 3, 5

Explanation: DWI detects the restriction of water molecule movement. Acute ischemic stroke shows cytotoxic oedema with restricted diffusion. Brain abscess shows marked diffusion restriction due to pus. Creutzfeldt-Jakob disease shows cortical and basal ganglia restriction. Highly cellular tumours restrict diffusion due to dense cell packing. DWI allows early diagnosis before conventional MRI changes.

References:

David Sutton's Textbook of Radiology and Imaging,7th Edition, Page 1778 .

↑ *Back to this question in Part A*

@Neet_pg_bot

Q3: A patient suspected of having biliary tract pathology undergoes the imaging shown. Identify the modality and structure marked "B". (Q885733)

A. ERCP - Pancreatic duct

B. MRCP - Common bile duct

C. ERCP - Cystic duct

D. MRCP - Right hepatic duct



Correct Answer: B. MRCP - Common bile duct

Explanation: MRCP is a heavily T2-weighted MRI technique. Fluid-filled biliary structures appear hyperintense. It is non-invasive and contrast-free. The common bile duct is the main extrahepatic duct. Used to evaluate obstruction and choledocholithiasis. ERCP- Pancreatic duct (A): Invasive endoscopic procedures. ERCP - Cystic duct (C): Invasive endoscopic procedures. Right hepatic duct (Option D): An intrahepatic branch, not the main duct.

References:

Grainger & Allison's Diagnostic Radiology, 7th Edition, Page 673

↑ *Back to this question in Part A*

@Neet_pg_bot

Q4: Which imaging modality is most sensitive for screening ductal carcinoma in situ (DCIS)? (Q885732)

A. CT

B. Ultrasonography

C. Mammogram

D. MRI

Correct Answer: C. Mammogram

Explanation: DCIS commonly presents as microcalcifications. Mammography is highly sensitive for detecting calcifications. It is the standard screening tool in asymptomatic women. Cost-effective and widely available. MRI is adjunctive, not primary. CT (Option A): No role in breast cancer screening. Ultrasonography (Option B): Poor sensitivity for microcalcifications. MRI (Option D): Better for invasive cancers and extent mapping.

References:

Grainger & Allison's Diagnostic Radiology, 7th Edition, Page 1663.

↑ *Back to this question in Part A*

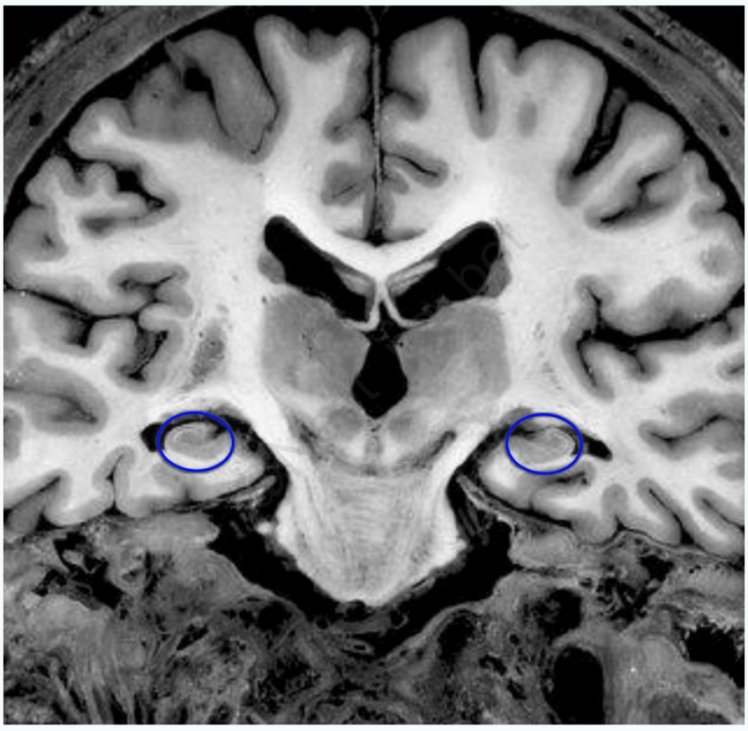
@Neet_pg_bot

Q5: Which imaging plane is best suited for accurate volumetric assessment of the hippocampus? (Q885730)

A. All of the above

Correct Answer: Unknown

Explanation: The coronal plane is perpendicular to the long axis of the hippocampus. Minimizes partial volume averaging. Allows accurate delineation of hippocampal boundaries. Standard plane for epilepsy and dementia protocols. Recommended in volumetric MRI analysis. Sagittal (Option A): Not optimal for hippocampal measurements. Axial (Option B): Causes partial volume effects.



References:

https://radiopaedia.org/articles/hippocampus

↑ *Back to this question in Part A*

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Q6: The vessel marked in the angiographic image supplies the lateral surface of the cerebral hemisphere. Identify the mark vessel. (Q885729)

A. Anterior cerebral artery

B. Internal carotid artery

C. Middle cerebral artery

D. Posterior cerebral artery



Correct Answer: C. Middle cerebral artery

Explanation: MCA supplies the lateral aspects of the frontal, parietal, and temporal lobes. It is the most commonly involved artery in ischemic stroke. Seen extending laterally on angiographic images. Arises from the internal carotid artery. Supplies Broca's and Wernicke's areas. Anterior cerebral artery (Option A): Supplies the medial cerebral surfaces. Internal carotid artery (Option B): Parent vessel, not a cortical branch. Posterior cerebral artery (Option D): Supplies occipital lobes and inferior temporal cortex.

References:

Grainger & Allison's Diagnostic Radiology, 7th Edition, Pages 1384, 1442.

↑ *Back to this question in Part A*

@Neet_pg_bot

Q7: The MRI image shown demonstrates uniform fat suppression with high signal from oedema. Identify the sequence. (Q885726)

A. Diffusion tensor imaging

B. MR spectroscopy

C. STIR

D. FLAIR

Correct Answer: C. STIR

Explanation: STIR is a fat-suppressed inversion recovery sequence. The fat signal is uniformly suppressed regardless of field inhomogeneity. Oedema and inflammation appear hyperintense. Widely used in musculoskeletal imaging. Contrast administration does not affect fat suppression. Diffusion tensor imaging (Option A): Used for white matter tract mapping. MR spectroscopy (Option B): Provides metabolic information, not anatomical images. FLAIR (Option D): Suppresses CSF, not fat.

References:

Grainger & Allison's Diagnostic Radiology, 7th Edition, Pages 13, 1375.

↑ *Back to this question in Part A*

@Neet_pg_bot

Q8: Functional MRI performed in a stroke patient is based on which underlying principle? (Q885724)

A. Diffusion of water molecules

B. Brownian motion

C. Time-of-flight technique

D. BOLD technique

Correct Answer: D. BOLD technique

Explanation: Functional MRI uses Blood Oxygen Level Dependent (BOLD) contrast. It detects changes in oxyhemoglobin and deoxyhemoglobin concentration. Increased neuronal activity increases regional blood flow. Deoxyhemoglobin is paramagnetic and alters the MR signal. Used for functional brain mapping. Diffusion of water (Option A): Principle of diffusion-weighted imaging, not fMRI. Brownian motion (Option B): Describes molecular motion underlying DWI. Time-of-flight (Option C): Used in MR angiography.

References:

https://radiopaedia.org/articles/bold-imaging

↑ *Back to this question in Part A*

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Q9: Which imaging technique visualises blood flow using the time-of-flight principle? (Q885723)

A. Spiral CT

B. Colour Doppler

C. MR imaging

D. CT angiography

Correct Answer: C. MR imaging

Explanation: Time-of-flight (TOF) is a non-contrast MR angiography technique. It relies on the inflow of unsaturated spins into the imaging slice. Flowing blood appears bright compared to stationary tissues. Commonly used for intracranial vessel imaging. Does not require contrast administration. Spiral CT (Option A): Refers to the CT acquisition technique, not the flow imaging principle. Colour Doppler (Option B): Uses ultrasound frequency shift, not the TOF principle. CT angiography (Option D): Uses iodinated contrast and X-rays.

References:

https://www.researchgate.net/publication/278652514_Time-of-Flight_Angiography

↑ *Back to this question in Part A*

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Q10: Which contrast agent is routinely used for image enhancement in magnetic resonance imaging? (Q885721)

A. Omnipaque

B. Optison

C. Gadolinium

D. Iodine

Correct Answer: C. Gadolinium

Explanation: Gadolinium-based agents are paramagnetic substances used in MRI. They shorten T1 relaxation time, causing signal enhancement. Commonly used to evaluate tumours, inflammation, and vascular lesions. They

do not involve ionising radiation. They are preferred in patients with iodine allergy. Used cautiously in renal failure due to the risk of NSF. Omnipaque (Option A): A non-ionic iodinated contrast used in CT, not MRI. Optison (Option B): A microbubble contrast used in echocardiography. Iodine (Option D): Used in CT and angiographic studies, not MRI.

References:

Grainger & Allison's Diagnostic Radiology, 7th Edition, Page 13.

↑ *Back to this question in Part A*

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Q11: What is the unit used to measure magnetic field strength in MRI machines? (Q885720)

A. Hounsfield units

B. Tesla

C. Kilohertz

D. Weber

Correct Answer: B. Tesla

Explanation: MRI field strength is measured in Tesla. Common clinical MRI systems operate at 1.5 T and 3 T. Higher Tesla improves the signal-to-noise ratio. Enhances spatial and temporal resolution. Defines low-, mid-, and high-field MRI systems. Hounsfield units (Option A): Used in CT for tissue density measurement and not for MRI fields. Kilohertz (Option C): Represents RF pulse frequency and is not a measure of field strength. Weber (Option D): Unit of magnetic flux and not used to quantify MRI field strength.

References:

Christensen's Physics of Diagnostic Radiology, 4th Edition, Page 471.

↑ *Back to this question in Part A*

@Neet_pg_bot

Q12: What Doppler waveform is typically seen in lower-limb deep vein thrombosis? (Q885719)

A. Biphasic

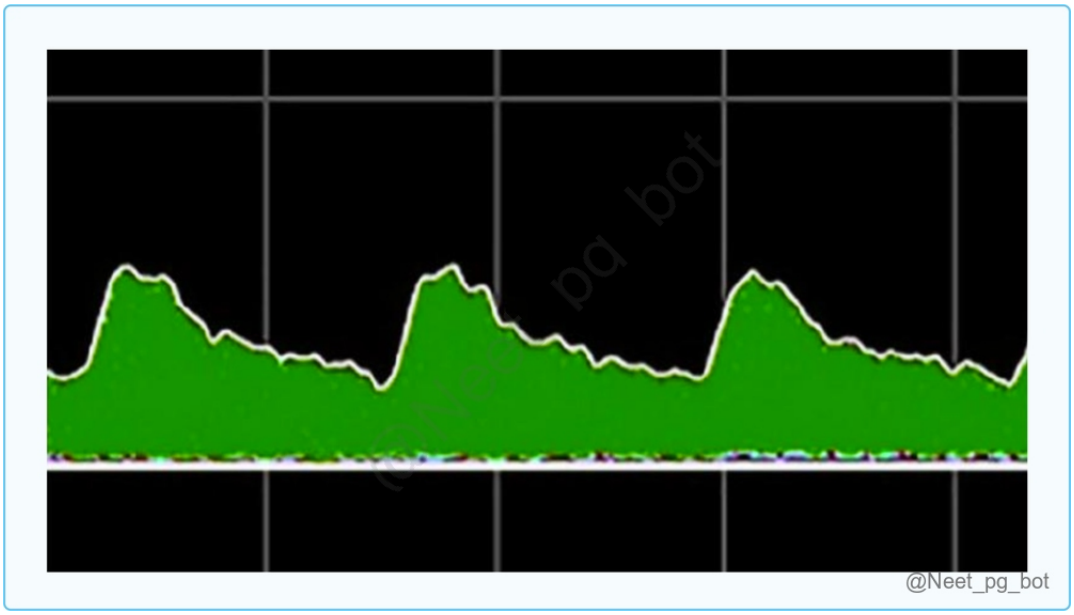
B. Triphasic

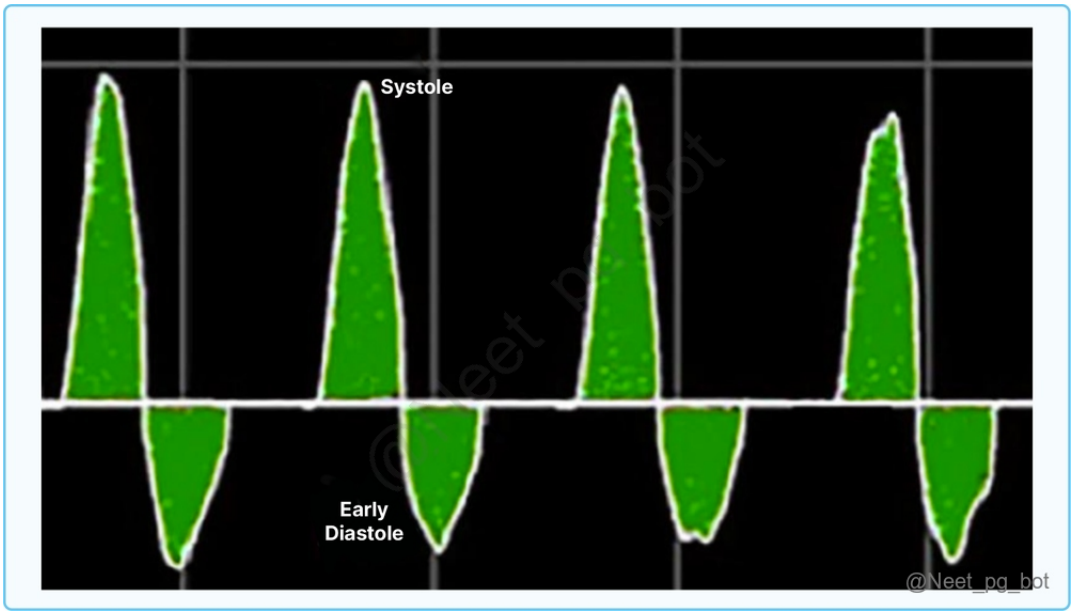
C. Monophasic

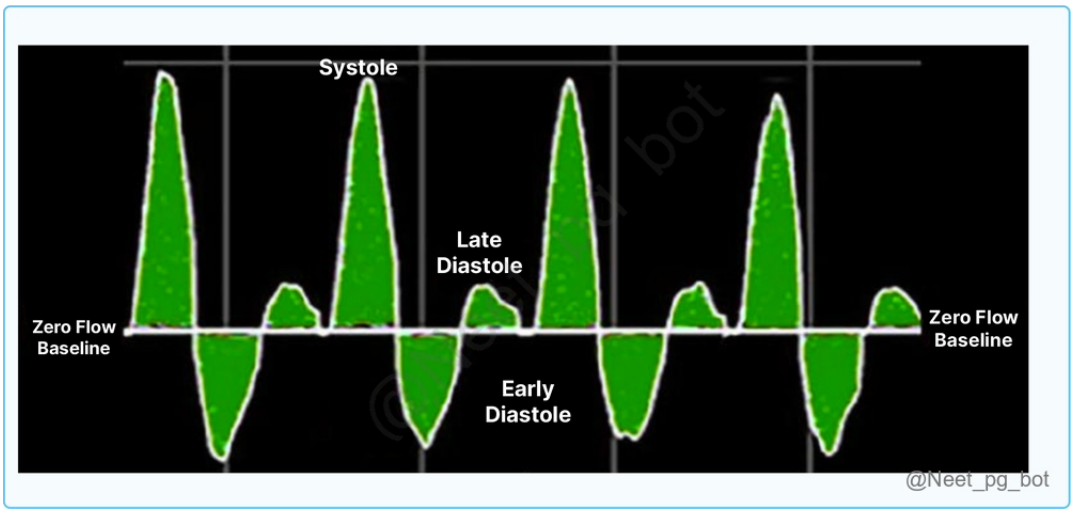
D. Multiphasic

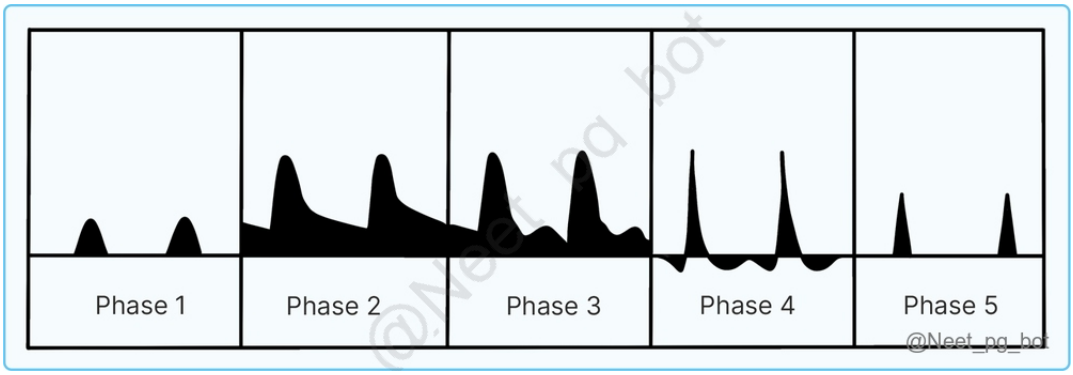
Correct Answer: C. Monophasic

Explanation: In lower-limb deep vein thrombosis (DVT) , the normal venous hemodynamics are altered due to partial or complete obstruction of venous flow by thrombus. Normally, venous flow in the lower limbs is phasic with respiration , reflecting changes in intrathoracic and intra-abdominal pressures. In DVT , venous obstruction causes: Loss of respiratory phasicity Continuous, flattened flow pattern This produces a monophasic Doppler waveform , which is a key indirect sign of proximal venous obstruction. Biphasic (Option A): Seen in partial obstruction and does not represent complete DVT. Triphasic (Option B): Triphasic waveform is normal in healthy peripheral arteries. Multiphasic (Option D): Indicates normal venous flow. Diagrammatic representation of multiphasic Doppler waveforms encountered during normal erection in the cavernosal arteries.









References:

Carol M. Rumack's Diagnostic Ultrasound, 5th Edition, Page 966.

↑ *Back to this question in Part A*

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Q13: The Doppler effect refers to a relative change in which property of sound waves? (Q885718)

A. Amplitude

B. Frequency

C. Direction

D. Phase

Correct Answer: B. Frequency

Explanation: The Doppler effect describes the change in the observed frequency of a sound wave when there is relative motion between the source of the sound and the observer (or reflector) . In medical ultrasonography, the Doppler effect occurs when ultrasound waves reflect off moving structures , most commonly red blood cells . Movement toward or away from the transducer alters the frequency of the reflected sound waves , producing a measurable Doppler frequency shift . Amplitude (Option A): Amplitude relates to the strength or intensity of the sound wave and affects image brightness. Direction (Option C): Direction of flow can be inferred from Doppler frequency shifts, but the Doppler effect itself refers specifically to a change in frequency , not direction. Phase (Option D): Phase describes the position of a wave within its cycle and is not the defining feature of the Doppler effect in ultrasound.

References:

Carol M. Rumack’s Diagnostic Ultrasound, 5th Edition, Page 21.

↑ *Back to this question in Part A*

@Neet_pg_bot

Q14: A 29-year-old lactating woman presents with a painful breast lump for 5 days. What is the investigation of choice? (Q885717)

A. CT

B. Ultrasonography

C. MRI

D. Mammogram

Correct Answer: B. Ultrasonography

Explanation: In a 29-year-old lactating woman with a painful breast lump of short duration (5 days), the most likely clinical considerations include mastitis or a breast abscess . The choice of imaging must account for the patient's young age, dense breast tissue, and lactational status, and hence ultrasound is used. It is the first-line modality in young women (<30 years) and lactating women who have dense breasts , which significantly reduces the sensitivity of mammography. It is used for evaluating inflammatory breast conditions, to differentiate mastitis from abscess, detect fluid collections, guide needle aspiration or drainage if required. It uses no ionizing radiation , making it ideal for breastfeeding women. CT (Option A): Not used for primary breast evaluation due to poor soft tissue characterization and unnecessary radiation exposure. MRI (Option C): Although sensitive, it is not a first-line investigation in acute breast pain or infection and is costly and less accessible. Mammogram (Option D): Has low sensitivity in young, dense, and lactating breasts and is generally avoided in acute inflammatory conditions.

References:

Bailey and Love's Short Practice of Surgery, 28th Edition, Page 927.

↑ *Back to this question in Part A*

@Neet_pg_bot

Q15: Harmonic imaging is primarily used in which imaging modality? (Q885716)

A. Sonography

B. Digital subtraction angiography

C. MRCP

D. Nuclear imaging

Correct Answer: A. Sonography

Explanation: Harmonic imaging is a technique used in ultrasonography that exploits the nonlinear propagation of ultrasound waves through tissues. When an ultrasound wave travels through soft tissue, the tissue generates harmonic frequencies (multiples of the transmitted fundamental frequency), especially the second harmonic . Modern ultrasound machines are designed to receive these harmonic signals rather than the original transmitted frequency. Harmonic imaging is used in sonography because it: Improves spatial and contrast resolution Reduces artifacts such as side lobes, reverberation, and near-field clutter Enhances image quality , particularly in obese patients or in technically difficult examinations Improves lesion conspicuity , especially for cystic and solid lesion differentiation Digital subtraction angiography (Option B): Uses X-ray fluoroscopy and uses subtraction of pre- and post-contrast images to enhance vascular structures. MRCP (Option C): An MRI technique based on heavily T2-weighted sequences to visualize biliary and pancreatic ducts. Nuclear imaging (Option D): Uses radioactive tracers and gamma rays instead of ultrasound.



References:

Carol M. Rumack’s Diagnostic Ultrasound, 5th Edition, Page 13.

↑ *Back to this question in Part A*

@Neet_pg_bot

Q16: A 45-year-old patient is scheduled for an MRI of the brain to assess potential lesions. Which of the following best describes the fundamental principle of MRI? (Q852908)

A. Evaluate changes in magnetic field strength around tissues

B. Alignment and relaxation of hydrogen nuclei

C. Detection of thermal radiation emitted by tissues.

D. Measurement of varying ionizing radiation absorption.

Correct Answer: B. Alignment and relaxation of hydrogen nuclei

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: MRI primarily works by aligning the hydrogen nuclei in the body's tissues with a strong magnetic field and then detecting the signals produced as these nuclei return to their equilibrium state (relaxation). Radiofrequency (RF) pulses excite hydrogen protons, and the emitted signals are captured and processed to generate detailed images of internal structures. MRI: Magnetic Resonance Imaging (MRI) is a noninvasive diagnostic technique that uses non-ionizing electromagnetic radiation, making it safer than CT scans, which

involve ionizing radiation. (Option D) Principle: MRI operates on the principle of Nuclear Magnetic Resonance (NMR), utilizing a superconducting magnet to produce a strong magnetic field. Mechanism: MRI primarily works by aligning the hydrogen nuclei in the body's tissues with a strong magnetic field and then detecting the signals produced as these nuclei return to their equilibrium state (relaxation). Radiofrequency (RF) pulses excite hydrogen protons, and the emitted signals are captured and processed to generate detailed images of internal structures. Scan duration: Scans typically last from 10 minutes for simpler studies to about an hour for more complex examinations. Noise: The process is noisy due to the rapid switching of gradient coils ; hence, patients are provided hearing protection. Specialized Techniques: Advanced methods such as MR angiography (MRA), venography, perfusion imaging, spectroscopy, tractography, and functional MRI (fMRI) are used for specific, detailed evaluations. Evaluate changes in magnetic field strength around tissues (Option A): MRI focuses on the behavior of hydrogen nuclei rather than changes in magnetic field strength around tissues. Detection of thermal radiation emitted by tissues (Option C): This refers to Thermography, and MRI does not utilize thermal radiation for imaging.

References:

Grainger & Allison’s Diagnostic Radiology, Volume 2, 7th Edition, Page 1374

↑ *Back to this question in Part A*

@Neet_pg_bot

Q17: Which material is most commonly used in an ultrasonography transducer? (Q885714)

A. Sodium fluoride

B. Lead zirconate

C. Barium titanate

D. Sodium zirconate

Correct Answer: C. Barium titanate

Explanation: Piezoelectric Principle Ultrasonography is based on the piezoelectric effect Certain crystals generate ultrasound waves when an electric current is applied The same crystals generate electrical signals when deformed by returning echoes This property allows the same transducer to act as both: Transmitter Receiver Lead Zirconate (PZT) Lead zirconate , combined with lead titanate, forms PZT (Lead Zirconate Titanate) PZT is the most commonly used material in modern ultrasound transducers due to: High piezoelectric efficiency Greater sensitivity to returning echoes Wide bandwidth → improved axial resolution Better mechanical strength and durability Superior signal-to-noise ratio These properties make PZT ideal for real-time, high-resolution imaging Sodium fluoride (Option A): Does not possess piezoelectric properties and therefore cannot be used to generate or receive ultrasound waves. Lead zirconate (Option B): Used only in combination with lead titanate as PZT; alone it is not a standard ultrasound transducer material. Sodium zirconate (Option D): Has no effective piezoelectric application in medical ultrasonography and is not used in transducers.

References:

Christensen’s Physics of Diagnostic Radiology, 4th Edition, Page 329.

↑ *Back to this question in Part A*

@Neet_pg_bot

Q18: Which imaging modality operates based on the principle of the piezoelectric effect? (Q885713)

A. MRI

B. Ultrasonography

C. MR spectroscopy

D. X-ray

Correct Answer: B. Ultrasonography

Explanation: Ultrasonography works on the piezoelectric effect. Piezoelectric crystals generate sound waves when an electric current is applied. The same crystals act as receivers by converting returning echoes into electrical signals. This dual property allows both transmission and reception of ultrasound waves. Image formation in all ultrasound modes depends on this principle. MRI (Option A): Uses nuclear magnetic resonance and strong magnetic fields, so it does not involve piezoelectricity or sound wave generation. MR spectroscopy (Option C): An MRI-based technique for metabolic analysis that does not use ultrasound or crystals. X-ray (Option D): Uses ionising radiation to create images and does not depend on piezoelectric effects.

References:

Christensen’s Physics of Diagnostic Radiology, 4th Edition, Page 328.

↑ *Back to this question in Part A*

@Neet_pg_bot

Q19: Match the following imaging modalities with their corresponding terms. Imaging Modality Terms 1. X-ray a) Hypoechoic / Hyperechoic 2. CT (Computed Tomography) b) Hypointense / Hyperintense 3. MRI (Magnetic Resonance Imaging) c) Radiolucent / Opaque 4. USG (Ultrasound) d) Hypodense / Hyperdense (Q852924)

A. 1-b, 2-d, 3-c, 4-a

B. 1-c, 2-d, 3-b, 4-a

C. 1-a, 2-b, 3-d, 4-c

D. 1-c, 2-d, 3-a, 4-b

Correct Answer: B. 1-c, 2-d, 3-b, 4-a

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: X-ray → Radiolucent / Opaque: Radiolucent structures allow X-rays to pass through, appearing dark on the image (e.g., air, fat). Opaque structures do not allow X-rays to pass, appearing white (e.g., bones, metal). CT (Computed Tomography) → Hypodense / Hyperdense: Hypodense areas appear darker on a CT scan, indicating less density (e.g., fluid). Hyperdense areas appear brighter, indicating higher density (e.g., bone, calcifications). MRI (Magnetic Resonance Imaging) → Hypointense / Hyperintense : Hypointense signals are darker, indicating less hydrogen density (e.g., certain tumors, cysts). Hyperintense signals are brighter, indicating higher hydrogen density (e.g., fluid, edema). USG (Ultrasound) → Hypoechoic / Hyperechoic : Hypoechoic areas appear darker on ultrasound due to fewer echoes returning (e.g., fluid-filled structures). Hyperechoic areas appear brighter due to more echoes (e.g., solid masses, calcifications).

References:

Fred A. Mettler, Jr. Essentials of Radiology, 4th Edition, Page 1-6

↑ *Back to this question in Part A*

@Neet_pg_bot

Q20: A 55-year-old male with chronic bronchitis and smoking presents with persistent hemoptysis. After consulting a specialist, he is advised to undergo bronchial artery embolization (BAE), and the risks are explained. He wants more details about the procedure, specifically regarding the types of embolic agents used. Which of the following is not a permanent type of embolic agent? (Q852923)

A. Injectable coil

B. Onyx

C. Polyvinyl alcohol

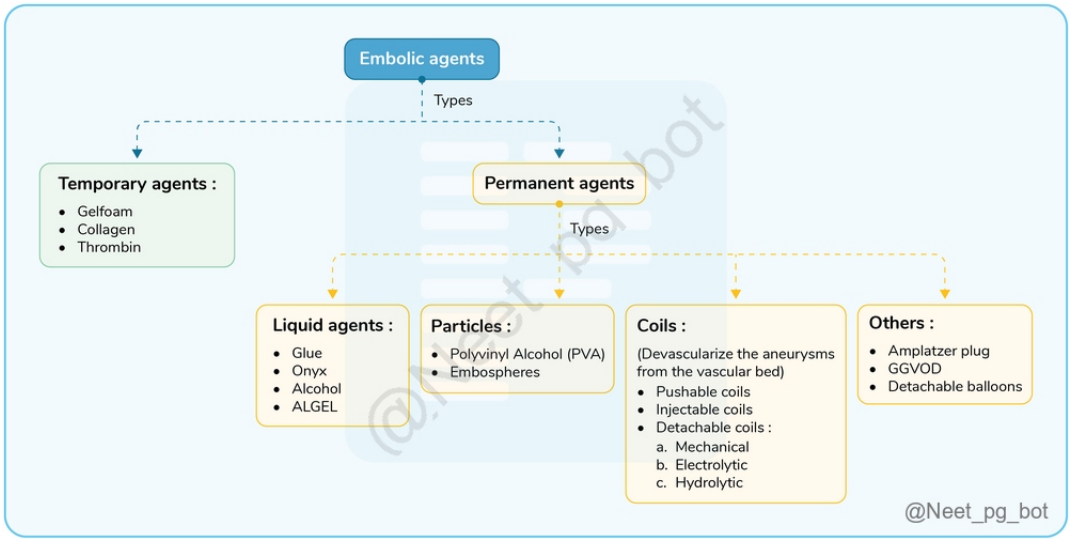
D. Gelfoam

Correct Answer: D. Gelfoam

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: Gelfoam is a temporary embolic agent that dissolves over time, making it suitable for temporary occlusion in embolization. In contrast, injectable coils, Onyx, and polyvinyl alcohol (PVA) are considered permanent or semi-permanent. Types of Embolic agents: Significance of Embolisation: It effectively controls acute hemorrhage by selectively occluding bleeding vessels, providing rapid stabilization in emergencies. This minimally invasive technique shrinks hypervascular tumors, facilitating easier surgical resection while reducing recovery times and complications.



References:

Grainger and Allison's Diagnostic Radiology, 7th Edition, Page 2094, 2096.

David Sutton's Textbook of Radiology and Imaging, Volume II, 7th Edition, Page 1710, 1711

↑ *Back to this question in Part A*

@Neet_pg_bot

Q21: A 55-year-old female presents with 6 months of heavy menstrual bleeding, pelvic pressure, and frequent urination due to multiple uterine fibroids. After failed conservative treatments and a history of hypertension and obesity, uterine fibroid embolisation (UFE) is planned, and the risks have been explained. Which of the following is not an advantage of the single wall puncture technique? (Q852922)

A. Fewer complications at the arterial puncture site

B. Beneficial for patients with coagulopathy

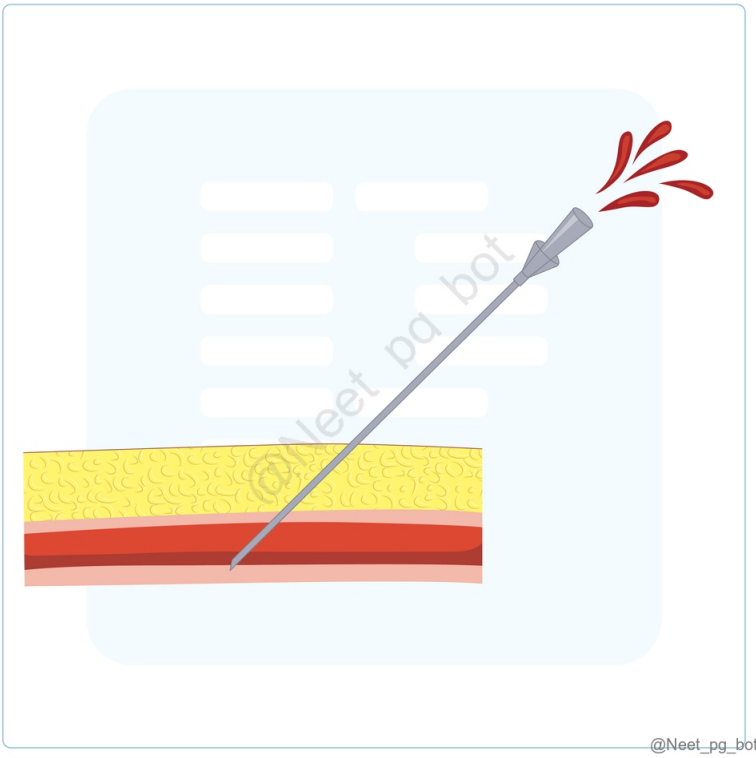
C. Less risk of arterial dissection

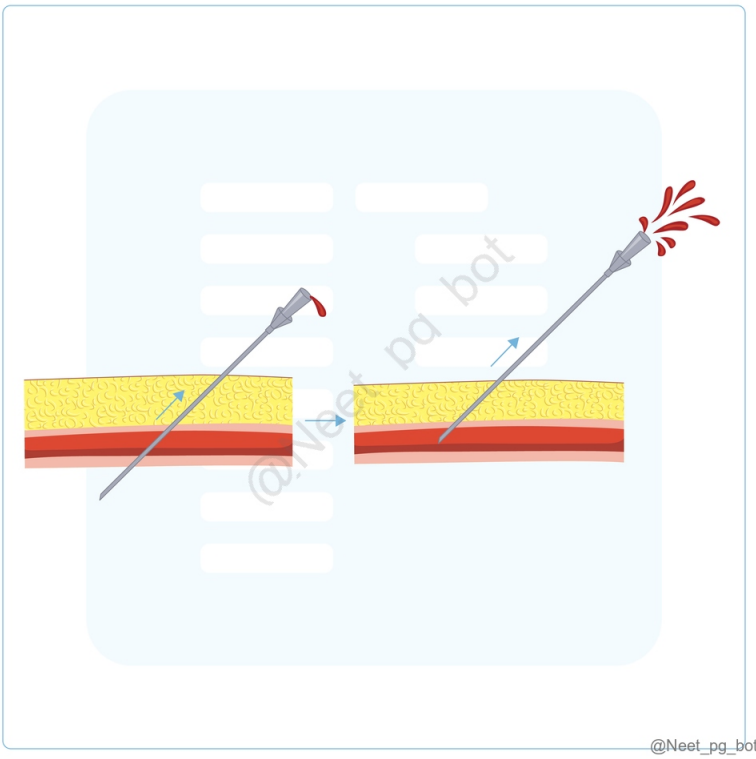
D. A favored technique for ultrasound-guided access

Correct Answer: C. Less risk of arterial dissection

- *Listen (English)*
- *Listen (Hindi)*

Explanation: In the single wall puncture technique , the needle is advanced just enough to puncture the front wall of the artery without going through the back wall. While this technique reduces the risk of hematoma and pseudoaneurysm compared to the double-wall (through-and-through) puncture, it does not reduce the risk of arterial dissection . In fact, manipulating the needle tip within the arterial lumen (especially if not carefully aligned) can potentially increase the risk of dissection. Single-wall Puncture Technique Double-wall Puncture Technique Description Puncturing only one layer (tunica intima) of the arterial wall. Advantages Fewer complications at the arterial puncture site. (Option A) Beneficial for patients with coagulopathy. (Option B) A favored technique for ultrasound-guided access. (Option D) Decreases the time required for arterial access. Decreases the number of attempts needed. Decreased risk of arterial dissection. It can strike the bony landmark located behind the vessels (such as the femoral head). Disadvantages The risk of arterial dissection may increase due to guidewire buckling if it is only partially within the lumen. Prone to complications such as: Hematoma Arteriovenous fistula Retroperitoneal hemorrhage





References:

Grainger and Allison's Diagnostic Radiology, 7th Edition, Page 2065

↑ *Back to this question in Part A*

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Q22: A 70-year-old patient requires arterial access via the femoral artery using the Seldinger technique. After sterilizing the area, the physician successfully punctures the artery with a needle. What is the next step in the Seldinger technique? (Q852921)

A. Secure the catheter

B. Insert a dilator through the needle

C. Insert a guide wire through the needle

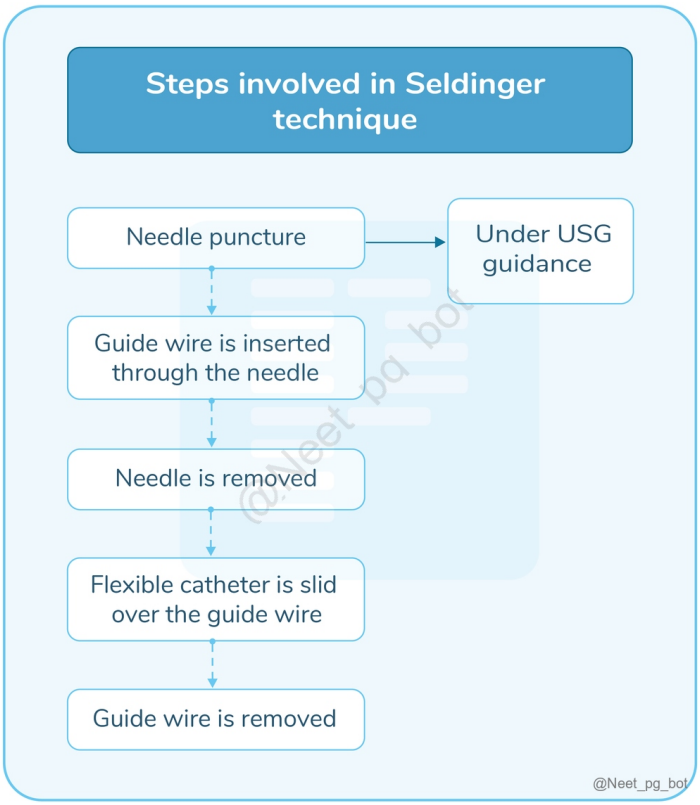
D. Remove the needle and insert a dilator

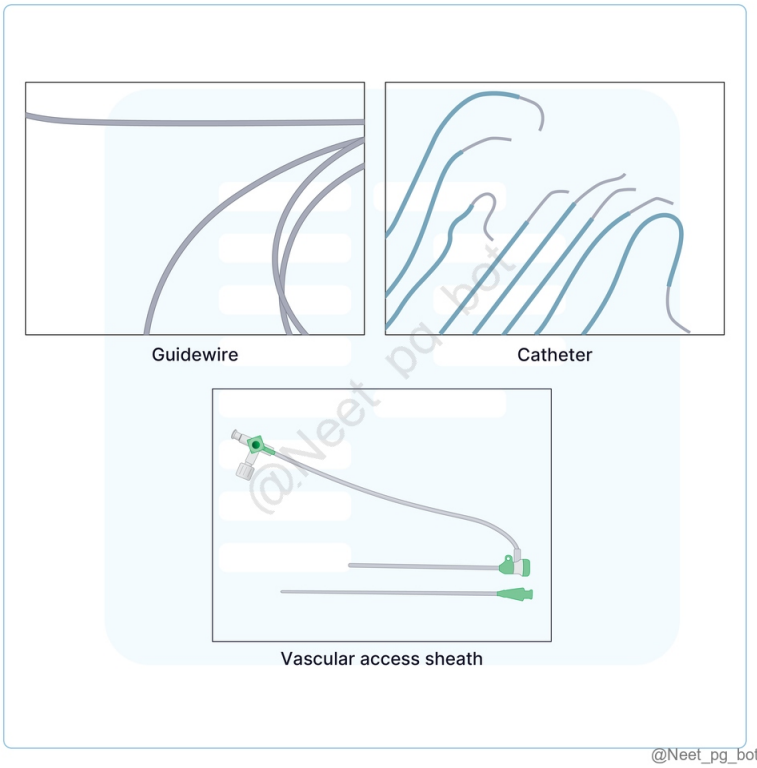
Correct Answer: C. Insert a guide wire through the needle

■ *Listen (English)*

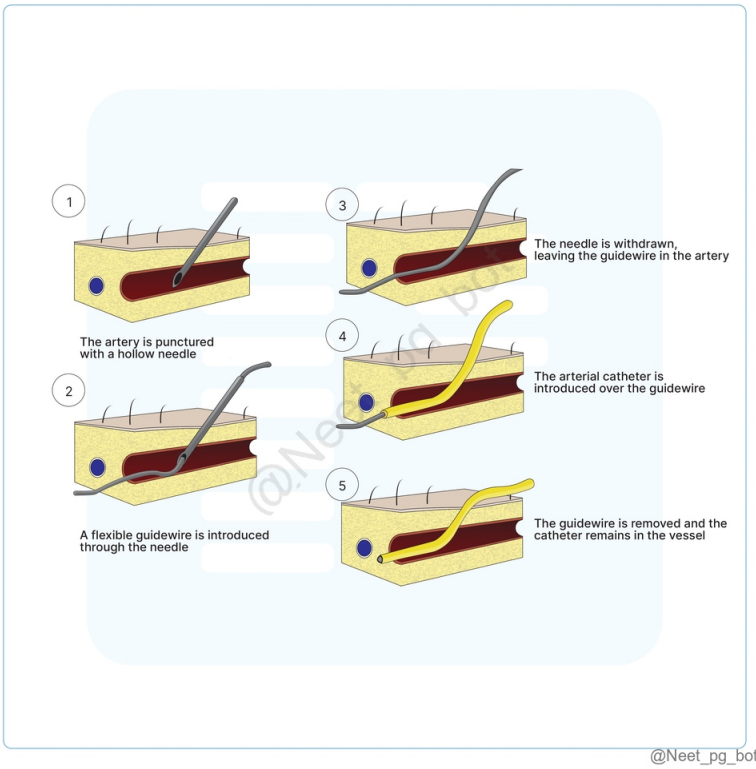
■ *Listen (Hindi)*

Explanation: After arterial puncture with the needle, a flexible guide wire is threaded through the needle into the vessel. This confirms and maintains access to the vessel, guiding subsequent insertion of dilators and catheters. This is a key step in the Seldinger technique. The Seldinger technique is a method for accessing a blood vessel under Ultrasound guidance that allows for more controlled catheter placement, especially in situations with an increased risk.





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References:

Grainger and Allison’s diagnostic radiology, 7th edition, page 2134

↑ *Back to this question in Part A*

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Q23: A 60-year-old patient is scheduled for an MRI to evaluate cognitive changes. Which of the following systems is specifically designed to provide shielding against radio frequency interference during the scan? (Q852920)

A. Gradient coils

B. Helmholtz coils

C. Shim coils

D. Faraday’s cage

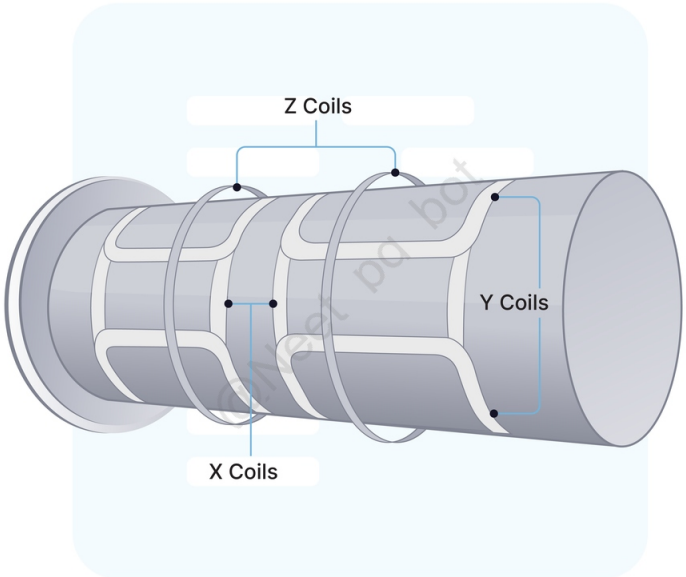
Correct Answer: D. Faraday’s cage

■ *Listen (English)*

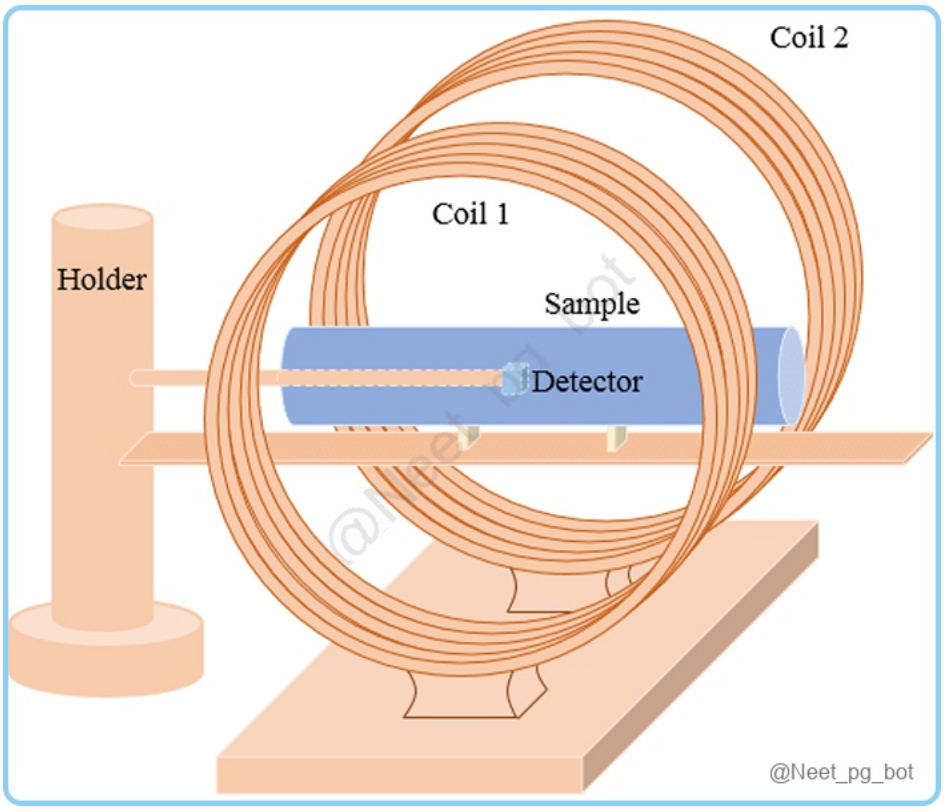
■ *Listen (Hindi)*

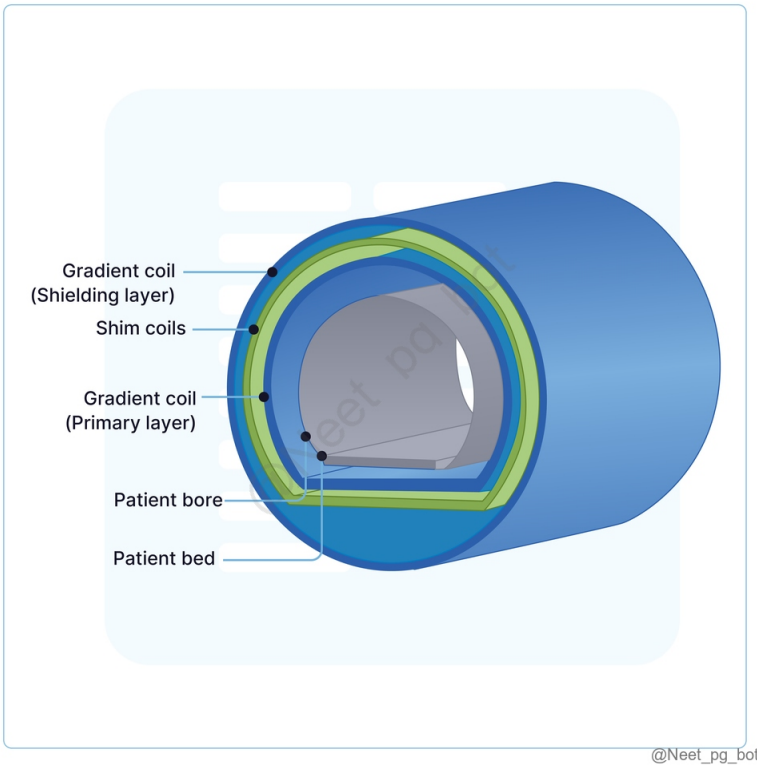
Explanation: A Faraday cage is a conductive enclosure that shields its inner space from electromagnetic interference. In MRI environments, this enclosure is typically constructed using wooden panels wrapped in copper wires, which provide effective radiofrequency (RF) shielding. This shielding helps minimize interference, which leads to imaging artifacts and ensures clearer and more accurate MRI results. In the MRI facility, the cage is often visible through the special window glass separating the control room from the scanner area, further emphasizing its role in maintaining optimal imaging conditions. Gradient Coils (Option A) are three sets, X, Y, and Z, used in the MRI imaging process to create intentional variations in the main magnetic field. These changes in the magnetic field enable the localisation of image slices. Helmholtz coils (Option B) are a pair of circular coils arranged parallel to one another and function as Z gradient coils in MRI scanners. Shim coils (Option C) are used to correct minor spatial discrepancies in the main static magnetic field and ensure optimal spatial uniformity, improving MRI image quality by reducing artifacts.





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References:

David Sutton Textbook of Radiology and Imaging, Volume 1, 8th edition, page 353, 355, 356

radiopaedia.org/articles/faraday-cage

radiopaedia.org/articles/gradient-coils-1

radiopaedia.org/articles/radiofrequency-coils-1

↑ *Back to this question in Part A*

@Neet_pg_bot

Q24: A 35-year-old female with a copper IUD is scheduled for an MRI to investigate unexplained headaches. She has a history of cardiac stenting done a year ago, as well as cochlear and dental implants from childhood. Which of the following is the absolute contraindication of MRI? (Q852919)

A. Coronary stenting

B. Copper IUD

C. Dental implants

D. Cochlear implants

Correct Answer: D. Cochlear implants

Explanation: Most cochlear implants are absolute contraindications for MRI due to their metallic components, which can be affected by the strong magnetic fields and may cause image artifacts that compromise scan quality. However, some newer cochlear implants are classified as relative contraindications and may be used in specific conditional circumstances. Risks of MRI are mainly due to The static magnetic field causes high-velocity pull of metals due to the Ferromagnetic nature. Gradient magnetic fields can induce electrical currents in conductive materials and may lead to neuromuscular stimulation. Radiofrequency pulses primarily induce thermogenic heat, leading to tissue heating and potentially heating the metal implants. MRI contraindications Absolute Contraindications Relative Contraindications Cochlear implants Metallic splinters in the eye Subcutaneous insulin pump Orthopaedic external fixators Hemodynamic monitoring devices Temporary pacing devices Ventricular assist devices Intra-aortic balloon pumps Claustrophobia Older vascular clips Cardiac pacemaker Few newer cochlear implants Some metallic devices are not contraindications , such as Surgical sutures (metallic and non-metallic) Orthopaedic implants (Internal fixations) Dental implants contain titanium alloy, which is non-ferromagnetic. Peripheral and Coronary artery stents Cardiac occluder devices Prosthetic metal cardiac valves Embolisation coils Non-ferromagnetic vascular clips Coronary stenting (Option A) , including both bare metal and drug-eluting varieties, are safe for MRI because they are made from non-ferromagnetic materials like platinum, cobalt, and tantalum. These materials do not pose risks of heating or movement during the imaging process. Copper intrauterine devices (IUDs) (Option B) are also considered safe for MRI. Although there is limited clinical evidence regarding significant heating or movement, the presence of copper does not interfere with MRI safety. Dental implants (Option C) are primarily made from titanium or its alloys, which are non-ferromagnetic. As a result, they do not pose any safety concerns during MRI procedures.

References:

David Sutton Textbook of Radiology and Imaging, Volume 1, 8th edition, Page 498 - 505.

www.ncbi.nlm.nih.gov/pmc/articles/PMC6177157/#:~:text=In%20view%20of%20our%20results,)%2C%20which%20are%20MR%20unsafe.

↑ *Back to this question in Part A*

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Q25: A 55-year-old male with recent seizures is advised to undergo an MRI for further investigation. In which of the following conditions would an MRI be a preferred diagnostic tool? Subarachnoid Hemorrhage Ischemic disease patient with pacemaker Vascular dementia Rebleed of aneurysm post-clipping Primary neoplasm of brain (Q852918)

A. 1,2,3

B. 2,3,4

C. 2,4,5

D. 1,3,5

Correct Answer: D. 1,3,5

Explanation: MRI (Magnetic Resonance Imaging) is used in identifying various neurological disorders, including brain trauma, for assessing bone conditions involving marrow and is primarily utilised for soft tissue pathologies. It is a diagnostic imaging technique that uses strong magnetic fields and radiofrequency pulses to diagnose and monitor various medical conditions. Some contraindications for MRI include patients with aneurysm clips and pacemakers , as these can produce artifacts that degrade image quality and lead to magnetic interference, respectively. (Statements 2 and 4) Indications of MRI Indications Conditions like Examples Soft Tissue pathologies Mediastinal lesions Bronchogenic cysts Vascular malformations Mediastinal fibrosis Carcinomas Abdominal lesions Hepatic tumors; Pancreatic lesions Recurrent Crohn's disease Bone Tumors Osteosarcoma multiple myeloma Bone pathologies, including marrow Osteomyelitis Marrow infiltration in leukemia Muscles condition Dermatomyositis, Muscle tears Nerves conditions Neuropathies and Nerve sheath tumors Sensorineural hearing loss Cauda equina syndrome Cartilage issues Meniscus tears Ligaments issues ACL and PCL tear Neurological Conditions Head Trauma Diffuse axonal injury Hemorrhages Neurodegenerative conditions Vascular dementia Alzheimer's disease Neoplasms Meningioma Glioma Aneurysm Used to evaluate the location, characteristics, or rupture of it. Seizures To identify any structural causes and differentiate types of seizures. Used in Pre-OP evaluation in patients with seizures.

References:

Grainger and Allison’s Diagnostic Radiology, 7th Edition, Page 1379

Fred A. Mettler Jr's Essentials of Radiology, 4th Edition, Page 12, 200

↑ *Back to this question in Part A*

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Q26: A 20-year-old male arrives at the emergency department after a road traffic accident with multiple fractures. The orthopaedic team plans to stabilise his injuries using internal and external fixators. An MRI is requested to assess soft tissue injuries. Which of the following orthopaedic fixations is usually compatible with MRI? (Q852917)

A. K-wire

B. Uniplanar Fixator

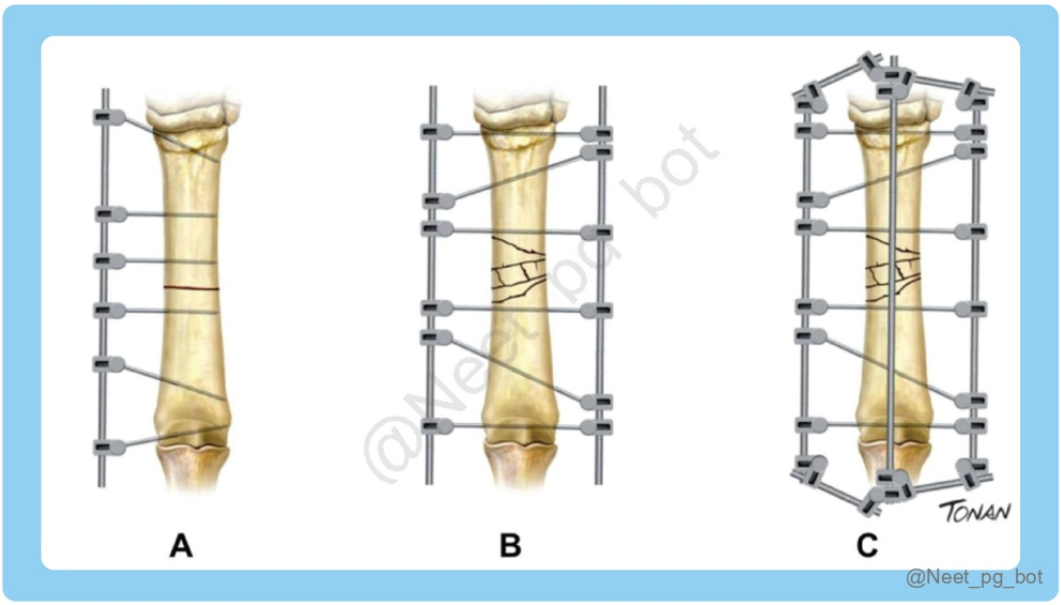
C. External fixator with aluminium rods

D. Internal fixation with Titanium

Correct Answer: D. Internal fixation with Titanium

Explanation: Internal fixation with titanium i s safe for MRI because of its non-ferromagnetic properties and minimal artifacts. Most orthopaedic implants, including internal fixation devices, are compatible with MRI. External Fixators are ferromagnetic; hence, MRI must be avoided with these as they can lead to movement of the fixator and potentially cause injury. (Option C) K-wire (Option A) or Kirschner wire is a type of external fixator made of thin, metallic wire used for temporary stabilisation of fractures. Uniplanar Fixator (Option B) is an external fixation device that stabilizes fractures in a single plane using pins or screws connected by rods.





References:

David Sutton Textbook of Radiology and Imaging, Volume 1, 8th edition, Page 498, 501, 503

↑ *Back to this question in Part A*

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Q27: A 65-year-old patient presents with cognitive decline and movement difficulties. Imaging studies reveal iron deposition in the basal ganglia. The neurologist wants to confirm the extent of iron accumulation and assess for any associated microbleeds. Which MRI technique is preferred for evaluating iron deposition in this patient? (Q852916)

A. Susceptibility-Weighted Imaging (SWI)

B. Diffusion-Weighted Imaging (DWI)

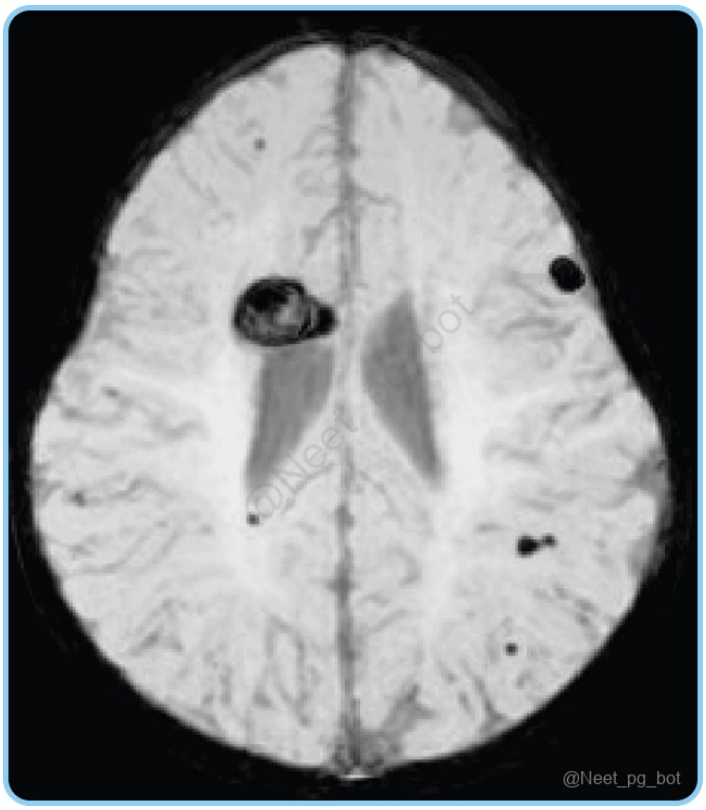
C. Functional MRI (fMRI)

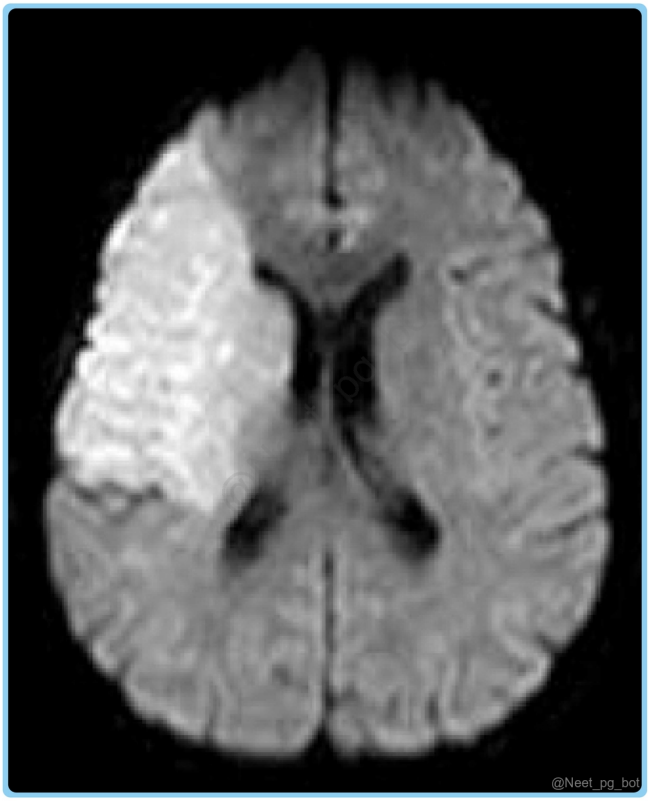
D. MR Spectroscopy

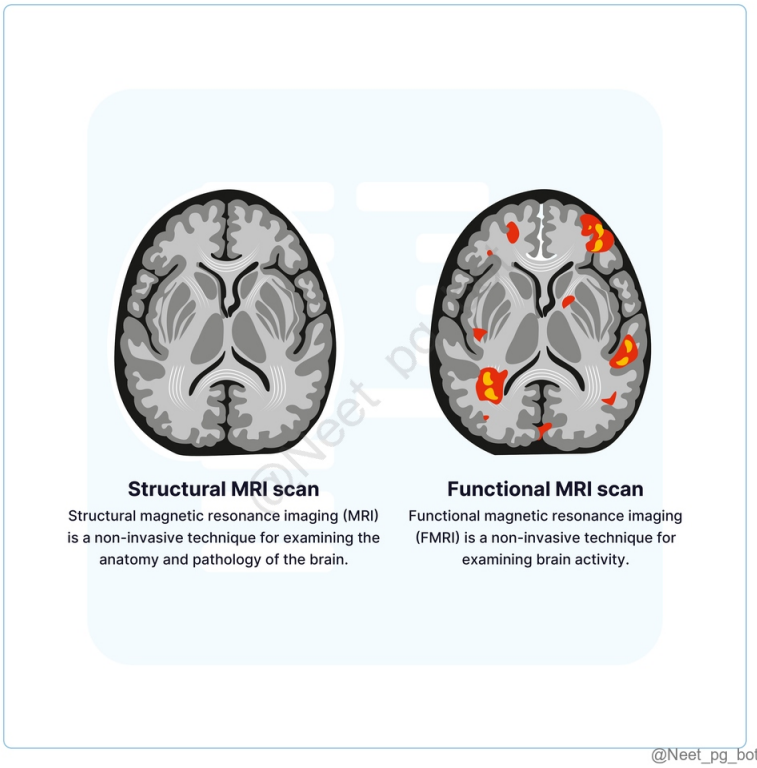
Correct Answer: A. Susceptibility-Weighted Imaging (SWI)

- *Listen (English)*
- *Listen (Hindi)*

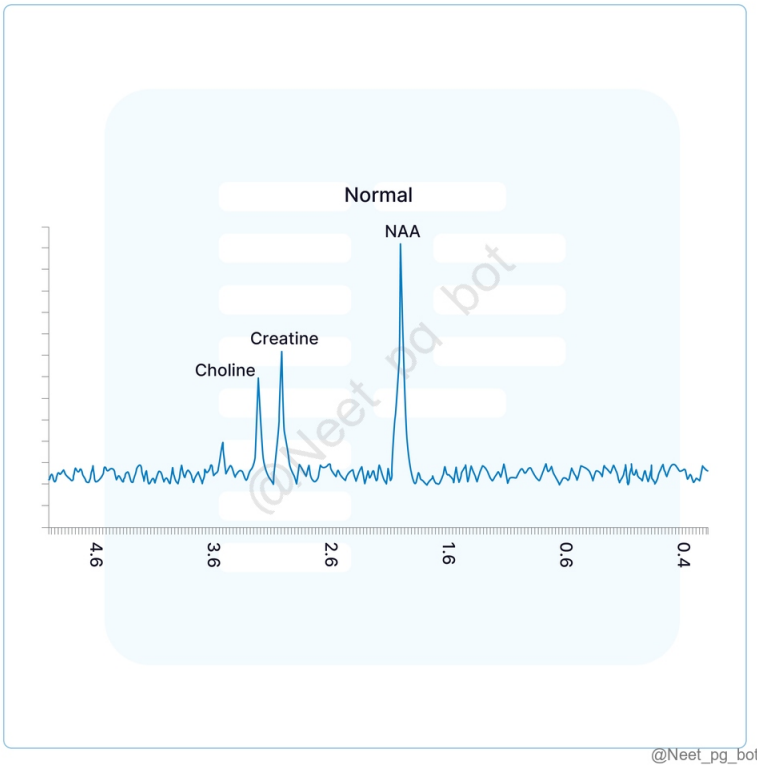
Explanation: Susceptibility-weighted imaging (SWI) is an advanced MRI technique that enhances the visibility of tissues based on magnetic susceptibility differences. It is highly sensitive for detecting microbleeds (common in hypertension), iron deposits (seen in neurodegenerative diseases and hemorrhagic lesions), and calcifications. Black dots on SWI indicate areas of Microbleeds/Iron deposition/Calcification. CSF appears dark, not bright. Diffusion-weighted imaging (DWI) (Option B) is primarily used to assess the diffusion of water molecules and is not specifically designed to visualise iron deposition. It is preferred in acute infarcts, brain abscesses, and brain tumours. Functional MRI (fMRI) (Option C) focuses on detecting brain activity rather than structural changes like iron deposition. Clinically, it is commonly used for pre-surgical planning in brain tumour and Arteriovenous Malformation (AVM) surgeries, as well as for localising language centres and determining hemispheric dominance before epilepsy surgery. MR Spectroscopy (Option D) provides metabolic information but does not directly assess iron accumulation. Key metabolites include N-acetyl aspartate (NAA) as a marker of neuronal integrity, choline (Cho) associated with membrane turnover and elevated in tumors, creatine (Cr) for energy metabolism, lactate indicative of hypoxia or ischemia, and myo-inositol, reflecting glial activity.


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References:

Grainger & Allison’s Diagnostic Radiology, Volume 2, 7th Edition, Page 1375

↑ *Back to this question in Part A*

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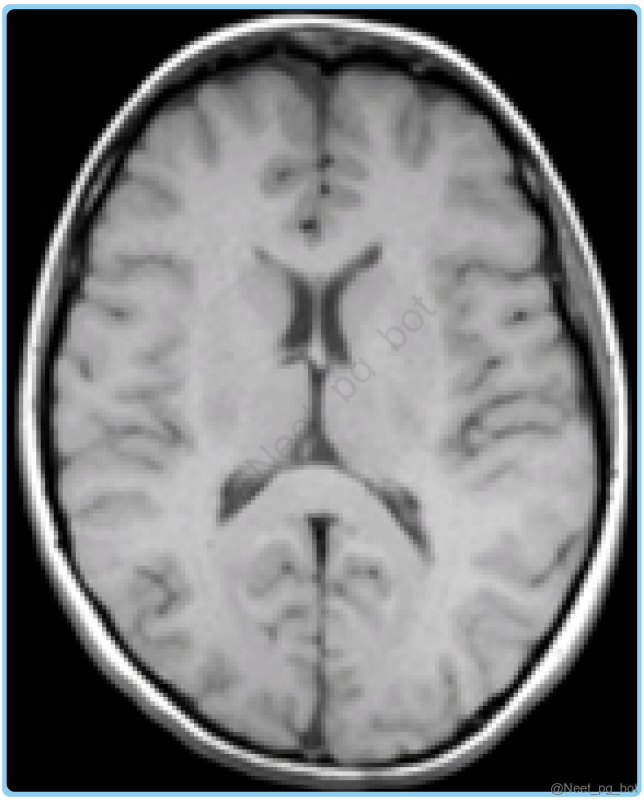
Q28: Match the following: 1) a) FLAIR 2) b) Diffusion-weighted MRI 3) c) T1-Weighted MRI 4) d) T2-Weighted MRI (Q852913)

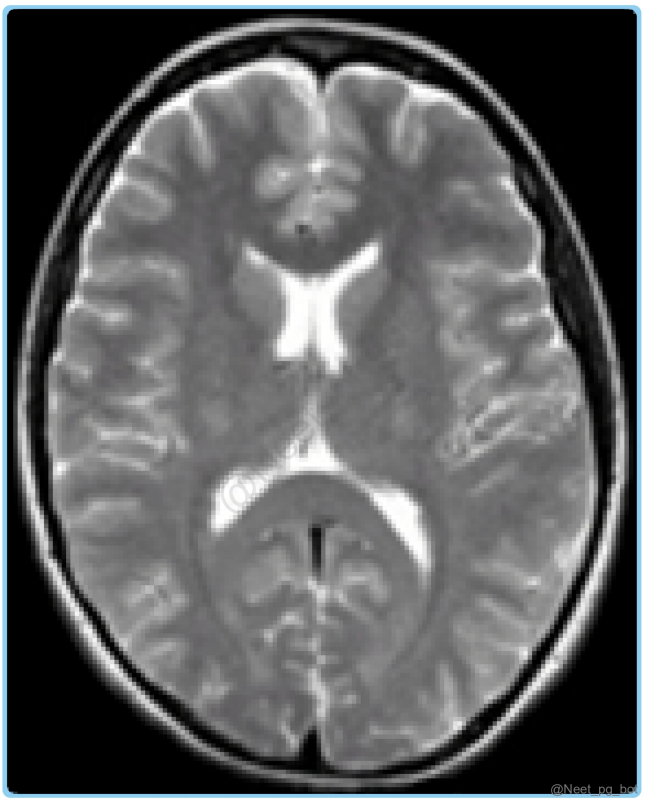
A. 1-c, 2-d, 3-a, 4-b

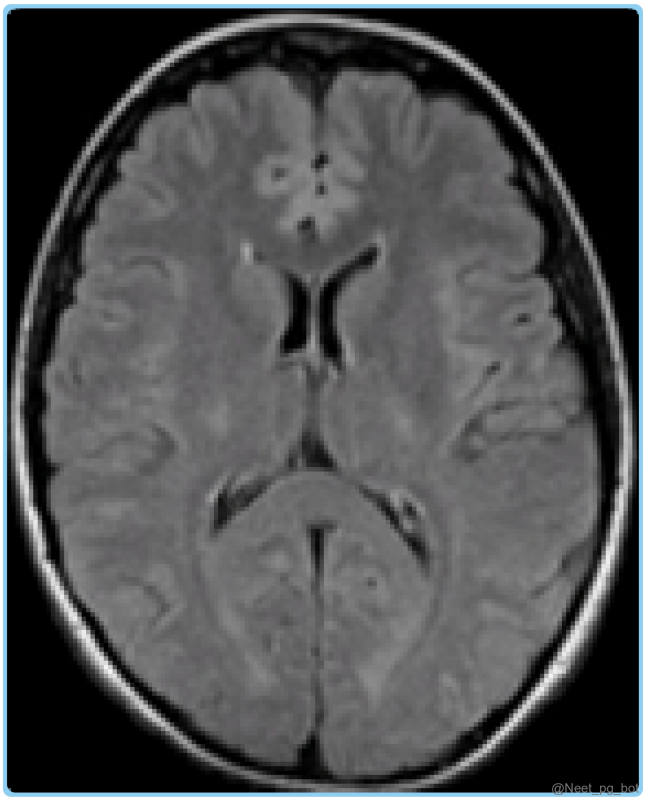
B. 1-a, 2-b, 3-c, 4-d

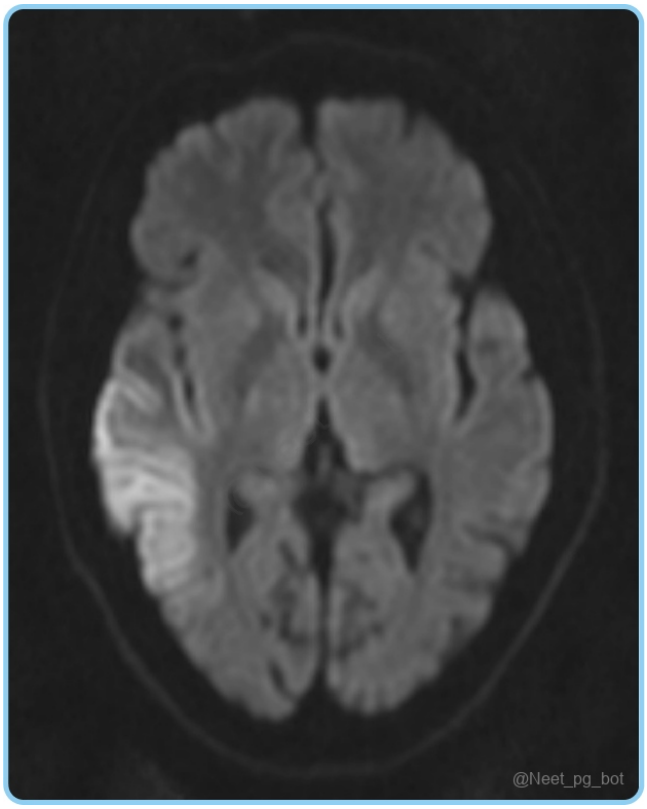
C. 1-b, 2-c, 3-d, 4-a

D. 1-d, 2-a, 3-b, 4-c




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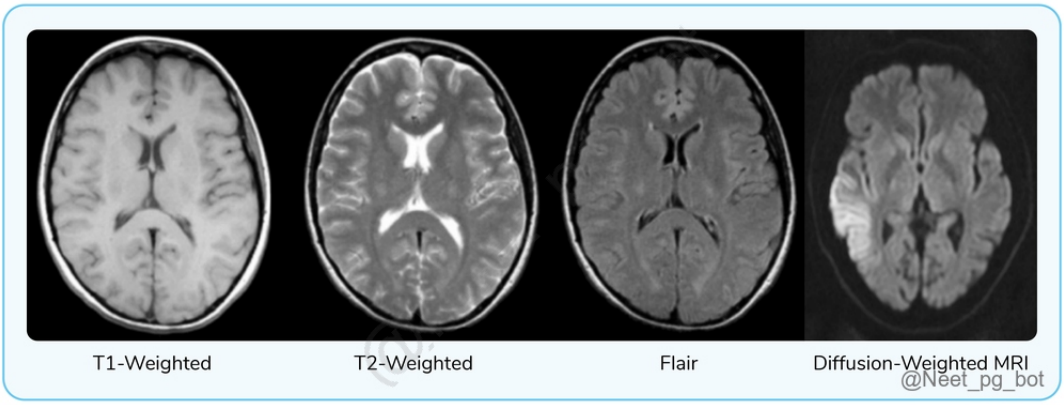

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Correct Answer: A. 1-c, 2-d, 3-a, 4-b

- *Listen (English)*
- *Listen (Hindi)*

Explanation: Tissue T1-Weighted T2-Weighted FLAIR CSF Dark Bright Dark White matter Light Dark gray Dark gray Cortex (Gray matter) Gray Light gray Light gray Fat Bright Light Light Inflammation Dark Bright Bright DWI (Diffuse Weighted Imaging): Measures diffusion of water molecules & is sensitive to changes in cellular density. Lacks the outline of the skull and scalp, focusing primarily on brain tissue. Acute ischemic strokes and high cellularity areas, such as tumours, both appear hyperintense (bright) due to restricted water diffusion. FLAIR (Fluid-Attenuated Inversion Recovery) nullifies the CSF signals & enhances the visibility of lesions, edema, and infarcts.



References:

Grainger & Allison's Diagnostic Radiology, Volume 2, 7th Edition, Page 1376

↑ *Back to this question in Part A*

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Q29: Which statements correctly describe the differences between T1 and T2 relaxation in MRI? (Q852911)

A. T1 measures transverse decay; T2 measures longitudinal recovery.

B. T1 involves energy exchange; T2 involves loss of phase coherence.

C. T1 relaxation is typically shorter in duration than T2

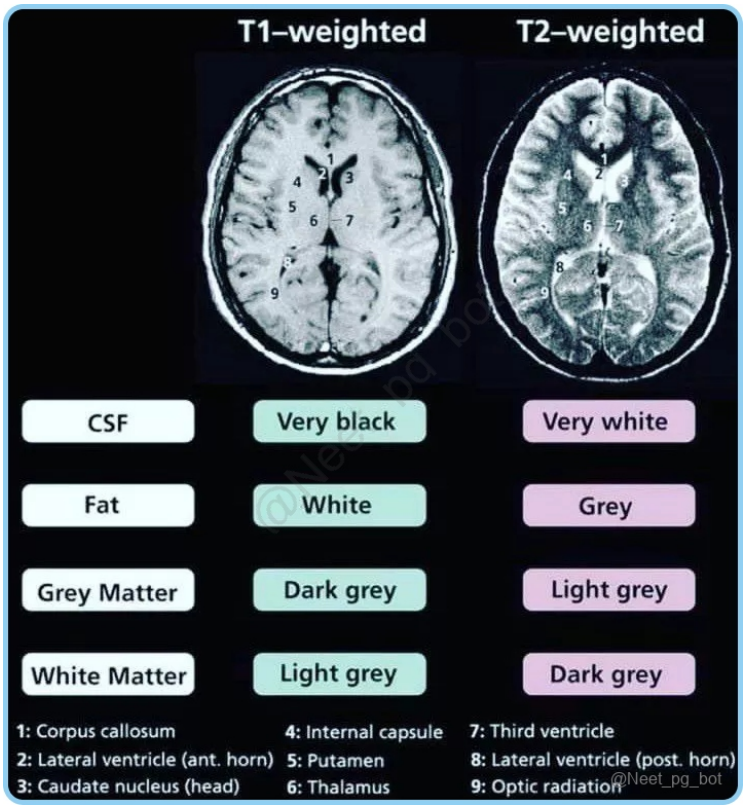
D. Longer T1 appears Brighter & Longer T2 appears Darker

Correct Answer: B. T1 involves energy exchange; T2 involves loss of phase coherence.

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: T1-weighted MRI involves energy exchange between spins and the environment, while T2-weighted MRI involves loss of phase coherence among spins. T1 & T2 Weighted MRI: Parameter T1-Weighted MRI T2-Weighted MRI Definition It is time for longitudinal magnetisation to recover to its equilibrium after excitation. It is time for transverse magnetisation to decay. Mechanism Involves energy exchange between spins and surrounding environment (spin-lattice interaction) Involves loss of phase coherence among spins (spin-spin interaction) Tissue Assessment Useful for assessing fat content in tissues (e.g., brain white matter) Useful for assessing water content in tissues (e.g., cerebrospinal fluid) Tissue Appearance Darker for longer T1, brighter for shorter T1 Brighter for longer T2, darker for shorter T2 Bright Area Significance Bright areas indicate tissues with shorter T1 times (e.g., fat-rich tissues) Bright areas indicate tissues with longer T2 times (e.g., fluid-rich tissues) Time Range Microseconds to seconds Typically shorter than T1 T1 measures transverse decay; T2 measures longitudinal recovery (Option A): T1 relaxation measures longitudinal recovery — how quickly the net magnetization returns to align with the main magnetic field (along the z-axis). T2 relaxation measures transverse decay — how quickly the spins dephase in the transverse plane (xy-plane). T1 relaxation is typically shorter in duration than T2 (Option C): T1 relaxation times are typically longer than T2. For most tissues, it takes longer for longitudinal magnetization to recover than it does for transverse magnetization to decay. Longer T1 appears Brighter & Longer T2 appears Darker (Option D): In T1-weighted images , tissues with short T1 times appear brighter , while those with long T1 appear darker. In T2-weighted images , tissues with long T2 times appear brighter because their signal decays more slowly, maintaining more signal during image acquisition.



References:

Grainger & Allison's Diagnostic Radiology, Volume 2, 7th Edition, Page 1375

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9617470/

↑ *Back to this question in Part A*

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Q30: Which of the following accurately describes the stages of MRI image acquisition? (Q852910)

A. Protons align uniformly, get excited, and relax, emitting radiation.

B. Protons align randomly and emit radiation upon excitation.

C. Protons rest and emit radiation continuously without excitation.

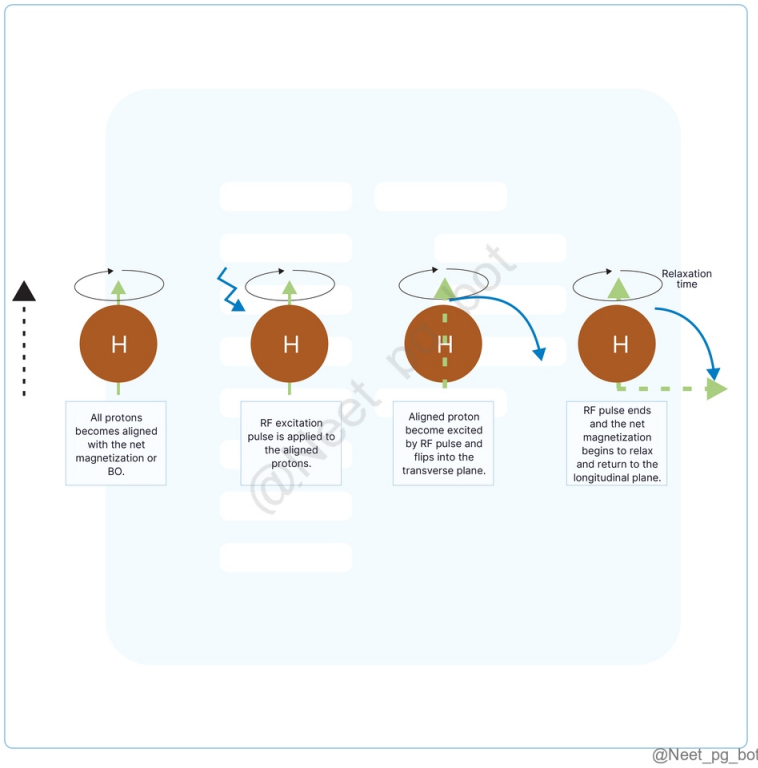
D. Excited protons emit radiation before aligning with the magnetic field.

Correct Answer: A. Protons align uniformly, get excited, and relax, emitting radiation.

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: Protons align uniformly in a magnetic field, which then gets excited by Radiofrequency pulses and emits radiation while relaxing. This radiation is detected and used to create MRI Images. MRI Image Acquisition Process (Four Stages): Resting State : In this initial phase, protons in the body are randomly aligned and moving, resulting in no net magnetisation. Magnetisation : An external magnetic field is applied, causing the protons to align uniformly , creating a net magnetisation vector along the longitudinal axis. Excitation : An RF(Radio Frequency) coil is activated, sending an RF pulse that excites the protons, moving them to a higher energy state. This excitation causes the protons to transition from longitudinal magnetisation to transverse magnetisation. Relaxation: Once the RF coil is switched off, protons return to their lower energy state (longitudinal magnetisation). As they relax, the difference in energy states emits radiation, which is detected to create the MRI images.



References:

Grainger & Allison’s Diagnostic Radiology, Volume 2, 7th Edition, Page 1374,1375

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1121941/

↑ *Back to this question in Part A*

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• [01_Basics of Radiology] 003 Radiation Exposure Hazards Protection Guidelines And Contrast Media

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[01_Basics of Radiology] 003 Radiation Exposure Hazards Protection Guidelines And Contrast Media — Quick Jump

Q1 (p. 509) *Q2 (p. 510)* *Q3 (p. 510)* *Q4 (p. 511)* *Q5 (p. 514)* *Q6 (p. 516)*
Q7 (p. 516) *Q8 (p. 517)* *Q9 (p. 518)* *Q10 (p. 519)* *Q11 (p. 521)* *Q12 (p. 522)*
Q13 (p. 523)

Q1: A patient exposed to radiation presents with severe nausea, vomiting, and diarrhoea within a few days. Based on these symptoms, what is the expected radiation dose that has likely caused this Gastrointestinal Syndrome? (Q852931)

A. 1-5 Gy

B. 5-20 Gy

C. 20-30 Gy

D. >30 Gy

Correct Answer: B. 5-20 Gy

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: Gastrointestinal syndrome occurs at radiation doses greater than 5 Gy , with significant symptoms emerging primarily in the 5-20 Gy range. It is characterised by severe nausea, vomiting, and diarrhea, indicating serious gastrointestinal distress from radiation exposure. Acute Radiation Syndrome (ARS): It refers to symptoms following whole-body or significant partial-body exposure to high doses of radiation (>1 Gy). LD50/60, or Lethal Dose 50/60 , is the radiation dose expected to cause death in 50% of the exposed population within 60 days. An LD50/60 of approximately 4.5 Gy indicates that this level of whole-body radiation can lead to 50% mortality without medical intervention. Clinical Phases of ARS: Phase Time Post-Exposure Symptoms/Outcomes Prodromal Phase 0–2 days Nausea, vomiting, anorexia, fever, headache, early skin erythema (suggesting significant exposure >2 Gy) Latent Phase 2–20 days Temporary symptom improvement; abnormal lab results (lymphopenia, granulocytopenia) despite feeling well Manifest Illness Phase 21–60 days Symptoms vary by syndrome: Hematopoietic syndrome (1-8 Gy , death in months): Gastrointestinal syndrome (>5 Gy , death in 2 weeks) Neurovascular syndrome (>20 Gy , death within 48 hours) Final Phase Recovery or Death The outcome depends on the absorbed dose, dose rate, and exposure heterogeneity.

References:

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3863169/

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3863296/

↑ *Back to this question in Part A*

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Q2: A 55-year-old male presents to the emergency department with acute abdominal pain and altered bowel habits. The physician suspects abdominal pathology and considers various imaging studies, weighing concerns about radiation exposure. Which imaging modality would expose the patient to the highest level of radiation? (Q852934)

A. CT scan of the abdomen

B. Barium enema

C. Lumbar spine X-ray

D. Micturating cystourethrogram (MCU)

Correct Answer: A. CT scan of the abdomen

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: Among the given options, CT Abdomen is associated with the highest radiation exposure. Tertiary diagnostic modalities like CT/radionuclide studies have high radiation exposures. Radiation Level associated with various imaging modalities & Level of Hazards: Hazard Level Modality Investigation Effective Dose (mSv) DANGER PET/CT/Radionuclide Studies CT Abdomen 10 CT Thorax 8 PET 5 Bone Scan 4 CT Head 2 - 3.5 WARNING Diagnostic procedures– multiple views Barium Enema 7 Barium Meal follow-through 3 Barium Meal 2.6 Barium Swallow 1.5 Micturating Cystourethrogram (MCU) 1.2 SAFE Spot radiographs: Only 1 or 2 X-ray exposures to the patient X-ray Lumbar Spine 1 - 1.5 X-ray Abdomen 0.7 - 1.2 Hip Joint 0.4 Skull 0.06 CXR (PA View) 0.02 Limb & Joint (Except Hip) <0.01

References:

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2996147/

↑ *Back to this question in Part A*

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Q3: A 20-year-old female has recently started working in the radiology department and is concerned about radiation exposure. She seeks advice from the occupational health department. According to AERB guidelines, what is the maximum dose limit for occupational workers exposed to whole-body radiation in a year? (Q852928)

A. 50 mSv

B. 20 mSv

C. 30 mSv

D. 15 mSv

Correct Answer: C. 30 mSv

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: 30 mSv According to the Atomic Energy Regulatory Board (AERB) guidelines, the maximum dose limit for occupational workers exposed to whole-body radiation in any given year is 30 mSv. However, the average annual dose limit over five years should not exceed 20 mSv per year. Dose limitations as per AERB (Atomic Energy Regulatory Board) guidelines are: Part of the body Occupational Exposure Public Exposure Whole body 20 mSv per year (averaged over 5 years) (Option B) 30 mSV in a year (maximum) (Option C) 1mSv per year Lens of the eyes 150 mSv per year 15 mSv per year (Option D) Skin and Extremities (hand and feet) 500 mSv in a year 50 mSv per year (Option A) Pregnant radiation workers (once pregnancy is declared) 1 mSv (for the embryo/fetus) 2 mSv (for the pregnant women) - As per NCRP (National Council on Radiation Protection and Management) guidelines, the recommended exposure dose limit for pregnant ladies is: < 5mSv during the entire pregnancy, or < 0.5mSv per month

References:

David Sutton’s Textbook of Radiology and Imaging, Volume I, 7th Edition, Page 459, 460.

↑ *Back to this question in Part A*

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Q4: A 25-year-old male who recently joined the radiology department was instructed to wear the device shown in the image. Which of the following statements about this device is incorrect? (Q852929)

A. Assess the amount of radiation exposure

B. Comprise of thermoluminescent phosphors

C. Should be sent for dose monitoring every 3 months

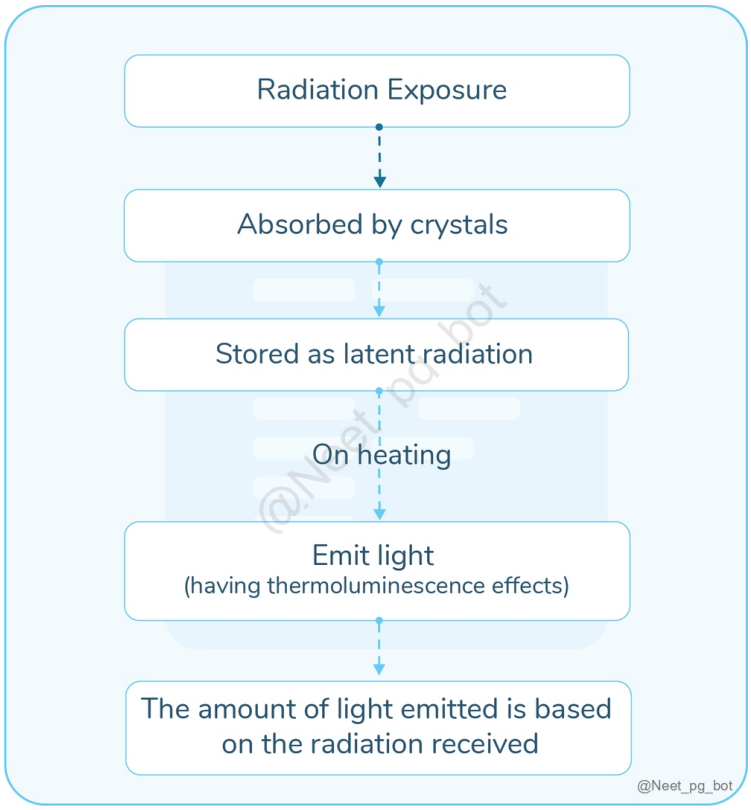
D. It is worn over the lead apron



Correct Answer: D. It is worn over the lead apron

- *Listen (English)*
- *Listen (Hindi)*

Explanation: It is worn over the lead apron The image depicts a TLD (Thermoluminescent Dosimeter) Badge which is worn beneath the lead apron to accurately measure the radiation dose (Option A) that penetrates the body. TLD (Thermoluminescent Dosimeter) Badge Purpose It is worn by individuals in radiation-exposed environments, such as medical imaging or nuclear facilities, to track their radiation dose and ensure it stays within safe limits. Location Worn beneath the lead apron (as lead apron cuts off some radiation) Duration According to the Atomic Energy Regulatory Board (AERB) of India, TLD badges are generally replaced and analyzed every 3 months to assess cumulative radiation exposure. (Option C) Composition Thermoluminescent phosphor crystals : (Option B) Calcium sulfate dysprosium Lithium fluoride Lithium borate Berrylium oxide Principle





References:

David Sutton’s Textbook of Radiology and Imaging, Volume I, 7th Edition, Page 463, 464

↑ *Back to this question in Part A*

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Q5: A 50-year-old female patient with a history of breast cancer is scheduled for a follow-up PET scan. During the consultation, she expresses concern about the long-term effects of radiation exposure. Which of the following statements regarding the stochastic effects of radiation exposure is correct? (Q852930)

A. The severity of the effects is dose-dependent

B. It can also result in radiation-induced cataracts

C. No threshold dose is required for the occurrence

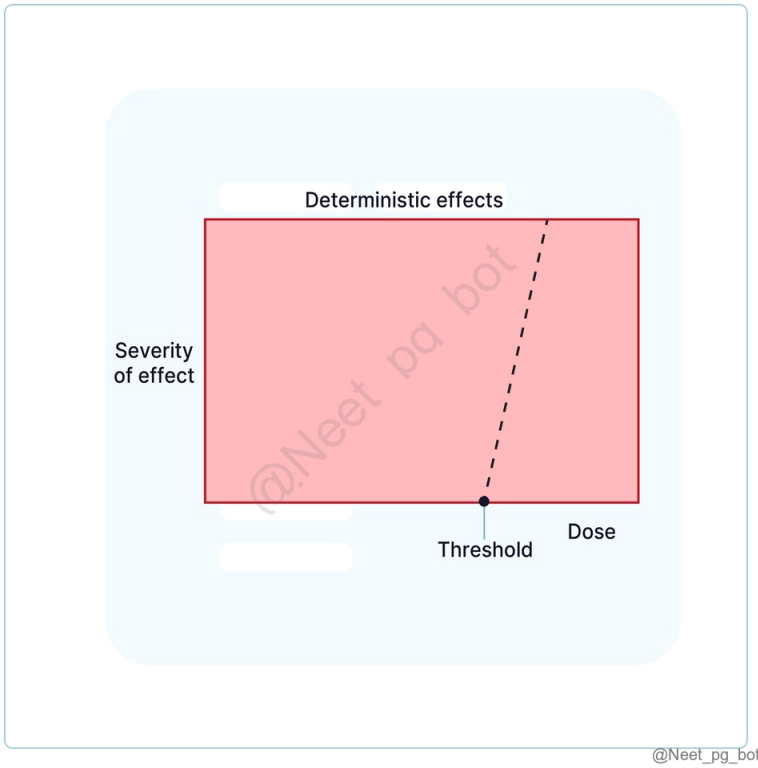
D. All of the above

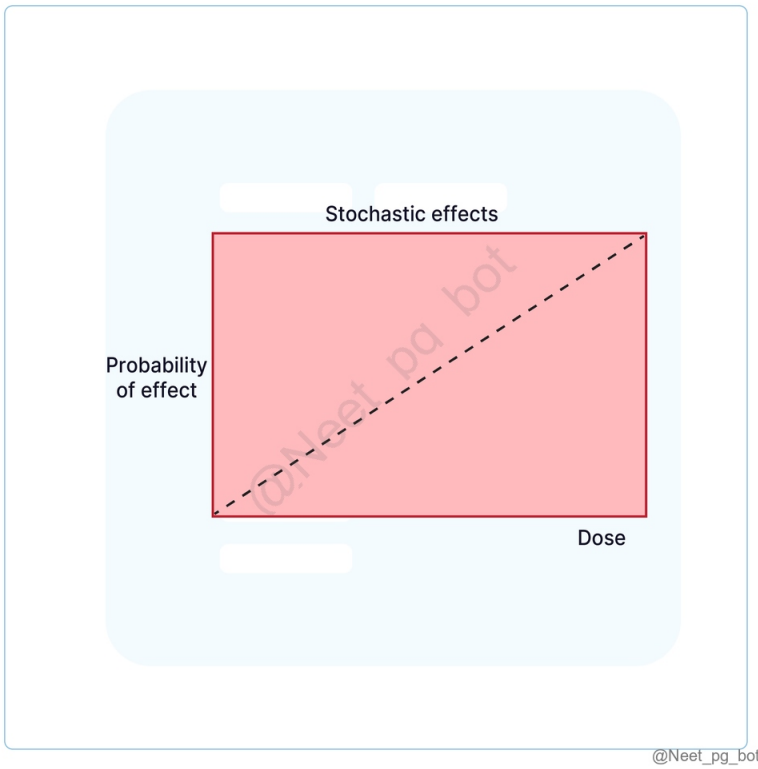
Correct Answer: C. No threshold dose is required for the occurrence

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: The condition described is a case of radiation-induced cancer resulting from stochastic effects , a type of radiation effect that does not require a threshold dose for occurrence. Types of Radiation Effects: Deterministic Effects Stochastic Effects Threshold dose Required Not required (occur by chance, at any dose) (Option C) Severity Dose-dependent (Option A) Dose-independent Dose increased Severity increases The probability of occurrence increases Examples Radiation-induced cataract (Option B) Skin erythema (most common side effect) Radiation-induced cancer (most common is Leukemia) Congenital malformations Mutations





References:

Grainger and Allison’s Diagnostic Radiology, 7th Edition, Page 773.

David Sutton’s Textbook of Radiology and Imaging, Volume II, 7th Edition, by, Page 452, 453

↑ *Back to this question in Part A*

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Q6: In the context of the ALARA (As Low As Reasonably Achievable) principle, which of the following strategies is not aligned with minimising radiation exposure for healthcare workers during interventional procedures? (Q852932)

A. Increasing the distance between the operator and the radiation source.

B. Continuous fluoroscopy instead of Pulsed fluoroscopy

C. Implementing lead shielding and personal protective equipment (PPE).

D. Reducing the duration of time the patient is exposed to radiation.

Correct Answer: B. Continuous fluoroscopy instead of Pulsed fluoroscopy

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: Continuous fluoroscopy results in higher radiation exposure compared to pulsed fluoroscopy, which does not align with the ALARA Principle. ALARA (As Low As Reasonably Achievable) Principle: It serves as a guiding framework for minimising radiation exposure during diagnostic and interventional procedures. Its core application is to reduce radiation exposure while maintaining the quality of medical procedures. Strategies for reducing radiation exposure: Increase distance (Option A ruled out) : According to the inverse square law, radiation exposure decreases significantly with increased distance from the source. Use shielding (Option C ruled out) : Employ physical barriers to block radiation, such as personal protective equipment (PPE) like lead aprons and thyroid collars, along with architectural shielding in facilities (e.g., concrete walls in X-ray rooms). Reduce time (Option D) : Minimizing the duration of exposure during procedures is crucial, as shorter exposure times directly reduce the risk for both patients and healthcare workers.

References:

https://www.ncbi.nlm.nih.gov/books/NBK565909/

https://www.ncbi.nlm.nih.gov/books/NBK557499/

↑ *Back to this question in Part A*

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Q7: A 28-year-old woman arrives at the emergency department with acute abdominal pain. The attending physician is considering an abdominal X-ray. What does the "10-day rule" advise regarding X-ray exposure for women of childbearing age? (Q852933)

A. A gap of at least 10 days between two successive X-rays.

B. Avoid non-urgent X-rays within 10 days post-menstruation

C. Perform X-rays during the first 10 days of the menstrual cycle.

D. X-rays should be avoided 10 days before menstruation.

Correct Answer: C. Perform X-rays during the first 10 days of the menstrual cycle.

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: The "10-day rule for Radiological Examination of women of childbearing age:" is a radiology guideline used to minimize the risk of radiation exposure to a potentially pregnant woman. Proposed by the International Commission on Radiological Protection (ICRP). It states that radiological examinations of the lower abdomen and pelvis should be conducted, whenever possible, within the first 10 days following the onset of menstruation unless pregnancy is excluded. In early pregnancy, radiation exposure, especially during organogenesis (weeks 3-8 post-conception), can lead to teratogenic effects (e.g., congenital anomalies), increased risk of miscarriage, or even fetal growth restriction. This rule helps to prevent radiation exposure during early pregnancy that can potentially harm the developing embryo.

References:

DC Dutta’s Textbook of Obstetrics, 9th Edition, Page 606

↑ *Back to this question in Part A*

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Q8: A 45-year-old patient is scheduled for a CT scan to evaluate abdominal pain. The radiologist aims to ensure adequate visualization of the bowel without creating significant contrast between the bowel contents and surrounding tissues. Which of the following is a neutral contrast agent appropriate for this procedure? (Q852935)

A. Barium

B. Iodinated contrast medium

C. Water

D. Air

Correct Answer: C. Water

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: Water is used as a neutral contrast agent to avoid altering the visibility of surrounding tissues while ensuring adequate visualization of the bowel. Contrast media are substances used in medical imaging to enhance the visibility of structures within the body. Type of Contrast Media Description Examples Positive contrast media Appear white on X-ray images due to greater attenuation of X-rays than surrounding tissues. Barium (Option A), Iodinated solutions (Option B) Negative contrast media Appear black due to less attenuation of X-rays than surrounding tissues. Air (Option C) Carbon dioxide Neutral contrast media Do not significantly alter X-ray attenuation, providing balanced contrast without adding brightness or darkness to the images. Water Mannitol (draws water into bowel loop)

References:

Grainger and Allison's Diagnostic Radiology, 7th Edition, Page 501, 532

↑ *Back to this question in Part A*

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Q9: A 58-year-old male with chronic kidney disease (CKD) is scheduled for a contrast MRI using Gadodiamide. Kidney function was assessed prior to the scan. Which of the following regarding kidney function is correct? (Q852936)

A. Serum creatinine evaluation is not necessary for this group of gadolinium

B. Repeat contrast is safe only after 7 days if eGFR > 30

C. There is a risk of Nephrogenic systemic fibrosis (NSF) with creatinine 0.8 mg/dL

D. The scan can be done if eGFR is > 30

Correct Answer: D. The scan can be done if eGFR is > 30

Explanation: Gadodiamide is a Group I Gadolinium-Based Contrast Media (GBCA) , which can be administered safely if the eGFR is > 30. GBCAs are classified into three groups based on their NSF risk. Groups I and III require kidney function assessment before use, while Group II can be administered without prior evaluation. Group I GBCAs Group II GBCAs Group III GBCAs Gadodiamide Gadoversetamide Gadopentate dimeglumine Gadobenate dimeglumine Gadobutrol Gadoteric acid Gadoteridol Gadoxetate GBCAs are the commonly used contrast agents for MRI GBCAs Route of administration Intravenous (Common), per-oral and intra-articular. Nature Paramagnetic, they alter the local magnetic field and consequently change the appearance of MRI images. Blood-brain Barrier Does not cross , but it can be appreciated in tumors that surpass it, like Glioblastoma

multiforme Level of Concentration To ensure safety and adequate imaging quality, a very low concentration of contrast media, typically 0.1 ml/kg , is used. Adverse effects of Gadolinium Gadolinium-based contrast agents (GBCAs) are nephrotoxic , necessitating kidney evaluation, including eGFR and creatinine levels (Option A) , in patients with kidney issues, acute kidney injury (AKI), those on dialysis, or other comorbidities, as they are at high risk for nephrogenic systemic fibrosis (NSF). In patients with impaired contrast elimination, this results in a fibrosing response. NSF is a long-term complication caused by the deposition of gadolinium chelates in tissues. Symptoms include: Skin thickening & tightening Joint pain & stiffness & potential involvement of internal organs. Hence, as a protocol, group I and III GBCAs can be administered if the eGFR is > 30, and a repeat contrast can be safely given after 4 hours (Option B). There is a risk of NSF with creatinine 0.8 mg/dL (Option C) : This is incorrect because a creatinine level of 0.8 mg/dL is normal and does not indicate a risk for nephrogenic systemic fibrosis (NSF) from contrast administration.



References:

David Sutton’s Textbook of Radiology and Imaging, Volume 1, 8th edition, Page 494, 495

Grainger and Allison’s Diagnostic Radiology, 7th edition, Page 1412

↑ *Back to this question in Part A*

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Q10: A 35-year-old female is scheduled for an ERCP using the contrast mentioned below. Which type of contrast agent is it? (Q852937)

A. Ionic Dimer

B. Non-ionic Dimer

C. Ionic Monomer

D. Non-ionic Monomer

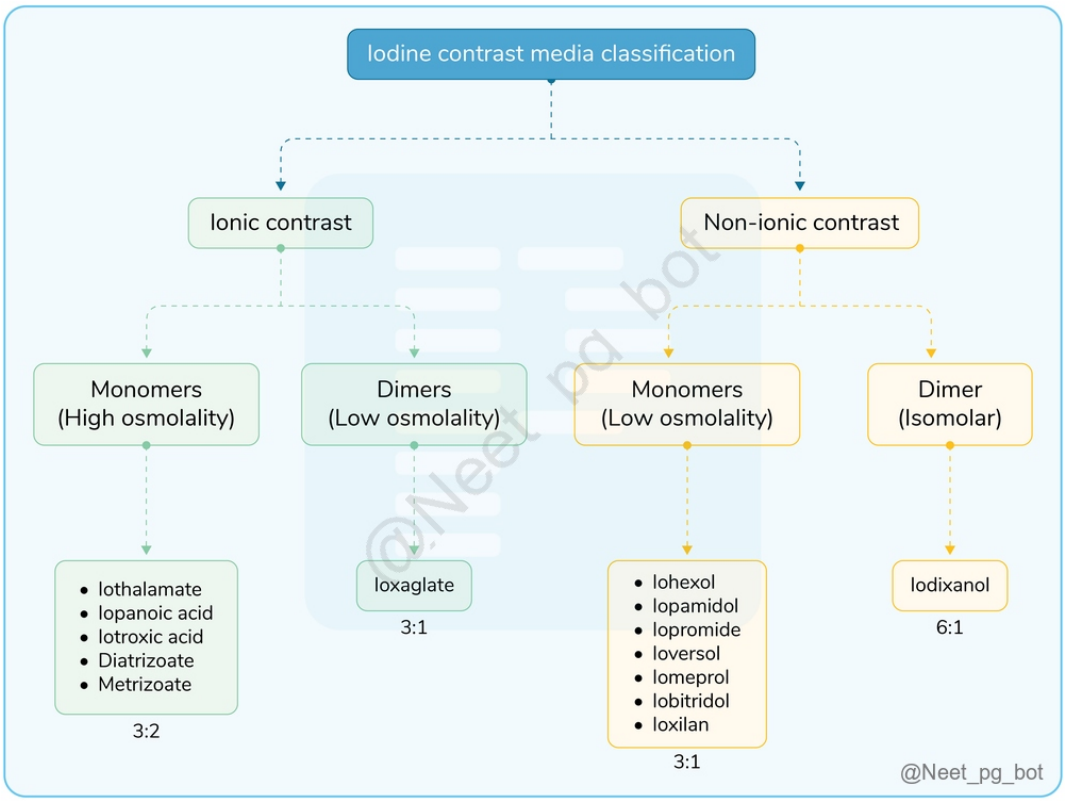


Correct Answer: D. Non-ionic Monomer

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: Non-ionic Monomer Iohexol is an iodine contrast agent that is classified as a Non-ionic monomer . The commonly used iodine contrast agents are water soluble and are classified into ionic and non-ionic groups based on their osmolality and chemical structure. The iodine particle ratio helps decide the osmolality of the drug, where high osmolar drugs pose a higher risk for kidney damage. Iodine Particle Ratio Ionic = 2 particles Non-ionic = 1 particle Monomer = 3 iodine Dimer = 6 iodine Ionic Monomer Ionic Dimer Non-ionic Monomer Non-ionic Dimer 3:2 (High osmolality) 3:1 (Low osmolality) 3:1 6:1



References:

David Sutton's Textbook of Radiology and Imaging, Volume 1, 8th edition, Pages 473 - 490

↑ *Back to this question in Part A*

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Q11: A 42-year-old female with a history of ulcerative colitis presents with severe abdominal pain and diarrhoea. The gastroenterologist is considering performing a barium study to assess her condition. Which of the following conditions would contraindicate using a barium study in this patient? (Q852938)

A. Malabsorption syndrome

B. Colon carcinoma

C. Ileocecal Tuberculosis

D. Inflammatory bowel disease (IBD) exacerbation

Correct Answer: D. Inflammatory bowel disease (IBD) exacerbation

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: Barium contrast study is contraindicated in Inflammatory bowel disease (IBD) exacerbation (acute inflammation) as it poses a risk of perforation, where barium can leak into the abdominal cavity, leading to peritonitis and severe complications. Barium contrast is a water-insoluble substance used in imaging studies to enhance the visualization of the GI tract, aiding in the assessment of conditions like gastroesophageal reflux disease (GERD), esophageal strictures, tumors, diverticulosis, ulcers, and motility disorders. Contraindications of Barium Study: GI Perforation: Can lead to peritonitis or mediastinitis. Bowel Obstruction: May exacerbate the obstruction and increase the risk of perforation. Tracheoesophageal Fistula: Risk of aspiration leading to pneumonia; iso-osmolar or low-osmolar non-ionic contrast is preferred. Acute Abdominal Inflammation: Risk of perforation and severe complications. Types of Barium Studies Type Conditions Barium Swallow To evaluate normal swallowing function. Suspected oesophagal disorders (e.g., strictures, tumours) Achalasia cardia Zenkers diverticulum Hiatus hernia Barium Meal To evaluate normal gastric emptying Evaluation of gastric and duodenal conditions (e.g., ulcers, carcinoma, pyloric stenosis) Barium Meal Follow-Through Assessment of small bowel disorders Malabsorption syndrome (Option A) Ileocecal TB (Option C) Barium Enema Assessment of lower gastrointestinal tract (e.g. Colonic carcinoma) (Option B)z

References:

David Sutton’s Textbook of Radiology and Imaging, Volume 1, 8th edition, page 2024, 2036, 2090, 2240, 1139

↑ *Back to this question in Part A*

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Q12: A 35-year-old pregnant woman is being assessed for suspected appendicitis. An abdominal ultrasound shows inflammation but in limited detail. What is the best contrast agent to enhance USG? (Q852939)

A. Barium sulfate

B. Iodinated contrast agents

C. Saline solution

D. Sulfur Hexafluoride microbubbles

Correct Answer: D. Sulfur Hexafluoride microbubbles

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: Sulfur Hexafluoride microbubbles In contrast-enhanced ultrasound (CEUS), microbubbles or microspheres , such as those found in Sonovist and Levovist , contain sulfur hexafluoride gas encapsulated in a phospholipid shell. These microbubbles improve the visualization of blood flow and enhance the imaging of vascular structures and lesions. Another type of microbubble in CEUS consists of octafluoropropane gas within a

phospholipid shell. Contrast agents for USG Examples Sonovue (sulfur hexafluoride) Lumason (sulfur hexafluoride) Definity (perflutren) Sonozoid (perflubutane) Preferred route Intravenous Eliminated by Lungs (hence safe in Renal conditions) Indications Liver lesions Micturating cystosonography Renal lesions Obstruction in Crohn's disease Evaluation of Aortic aneurysm repair Adverse Effects It is the safest contrast media and rarely causes mild anaphylactoid reactions. Barium sulfate (Option A) is the most commonly used contrast agent for identifying gastrointestinal tract issues such as ulcers, tumours, strictures, or inflammation. It is not water-soluble and is given orally or rectally. Iodinated contrast agents (Option B) are water-soluble and are widely used for X-rays, CT scans, and interventional radiology. However, they are highly nephrotoxic and should be used with caution in patients with renal impairment only after evaluating renal function. Saline solution (Option C) enhances the visualisation of internal structures, such as in saline infusion sonohysterography and hysterosalpingo-contrast sonography, which is mixed with air to improve the visibility of fallopian tubes and identify peritoneal spills.

References:

David Sutton’s Textbook of Radiology and Imaging, Volume 1, 8th edition, Page 496, 497, 3545

↑ *Back to this question in Part A*

@Neet_pg_bot

Q13: A 70-year-old patient with multiple comorbidities is being evaluated for contrast-enhanced imaging. The healthcare team is assessing risk factors for contrast-induced nephropathy (CIN). Which of the following is NOT considered a risk factor for CIN? (Q852940)

A. History of diabetes

B. Use of metformin

C. Use of nonsteroidal anti-inflammatory drugs (NSAIDs)

D. History of asthma

Correct Answer: D. History of asthma

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: History of asthma Previous history of asthma is not considered a risk factor for nephrotoxicity related to contrast media. Contrast-induced Nephropathy: (Contrast-Induced Acute Kidney Injury (AKI)) Defined as an increase in serum creatinine by > 0.5 mg/dL or a > 25% rise from the baseline within 3 days of contrast administration, without any other clear cause. Patients at higher risk for CIN typically include those with: A history of renal disease Diabetes (Option A ruled out) Use of metformin (Option B ruled out) Use of aminoglycosides Chronic use of nonsteroidal anti-inflammatory drugs (NSAIDs) (Option C ruled out) Prevention: Hydration with intravenous saline (0.9%) is recommended at a rate of 100 mL/h, starting 12 hours before the angiography and continuing for 12 hours after the procedure.

References:

Grainger and Allison’s Diagnostic Radiology, 7th edition, Page 2068

↑ *Back to this question in Part A*

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• [01_Basics of Radiology] 004 Previous Year Questions

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[01_Basics of Radiology] 004 Previous Year Questions — Quick Jump

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Q13 (p. 539)	*Q14 (p. 540)*	*Q15 (p. 541)*	*Q16 (p. 543)*	*Q17 (p. 544)*	*Q18 (p. 545)*
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Q31 (p. 561)	*Q32 (p. 562)*				

Q1: Which of the following statements is false regarding acute radiation syndrome? (Q856928)

A. Gl manifestations occur at a lower radiation dose than bone marrow depression

B. Doses greater than 2 Gy cause hematopoietic syndrome with pancytopenia

C. Doses greater than 6 Gy cause GI syndrome with dehydration

D. Doses greater than 20 -30 Gy cause Cardiovascular syndrome

Correct Answer: A. Gl manifestations occur at a lower radiation dose than bone marrow depression

Explanation: In acute radiation syndrome (ARS) , different organ systems are affected at varying radiation dose levels. The hematopoietic (bone marrow) syndrome occurs at a lower radiation dose (≥2 Gy), while gastrointestinal (GI) syndrome occurs at a higher dose (≥6 Gy). Therefore, it is incorrect to state that GI symptoms appear at a lower dose than bone marrow depression, making Option A false . Acute Radiation Syndrome (ARS) ARS occurs due to high doses of ionizing radiation and is classified into three main syndromes: Syndrome Radiation Dose (Gy) Clinical Features Hematopoietic Syndrome >2 Gy Pancytopenia, infections, bleeding, anemia Gastrointestinal Syndrome >6 Gy Nausea, vomiting, dehydration, diarrhea, shock Cardiovascular/CNS Syndrome >30 Gy Hypotension, seizures, coma, cardiovascular collapse ■■■■■■■ Doses greater than 2 Gy cause hematopoietic syndrome with pancytopenia (Option B): Correct because bone marrow suppression occurs at doses above 2 Gy. Doses greater than 6 Gy cause GI syndrome with dehydration (Option C): Correct because GI symptoms appear at higher doses (>6 Gy), leading to severe dehydration. Doses greater than 20-30 Gy cause cardiovascular syndrome (Option D): Correct because cardiovascular and CNS symptoms occur at doses exceeding 30 Gy, leading to rapid fatality.

References:

Rosen's Emergency Medicine: Concepts and Clinical Practice 9th Edition • Page no. 1807

https://www.cdc.gov/nceh/radiation/emergencies/arsphysicianfactsheet.htm

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3863169/

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3863296/

↑ *Back to this question in Part A*

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Q2: A child with acute lymphoblastic leukemia undergoes prophylactic irradiation prior autologous hematopoietic stem cell transplantation. Which of the following will be the least affected? (Q856172)

A. Spermatogonia

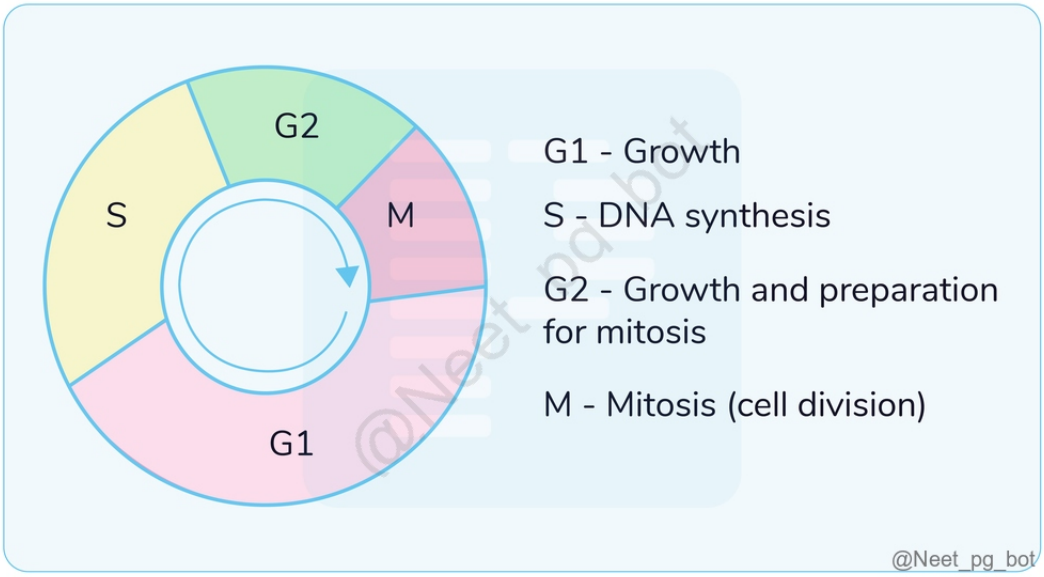
B. Intestinal epithelial cells

C. Neurons

D. Bone marrow/ erythroid precursor cells

Correct Answer: C. Neurons

Explanation: Neurons are terminally differentiated, non-dividing cells. Their low mitotic activity makes them relatively resistant to radiation-induced damage. According to the Law of Bergonie: The more the cells are rapidly dividing, the more they are sensitive to radiation. M-phase (dividing phase) is the most radiosensitive phase S-phase (Synthesizing phase) is the most radioresistant phase Most radiosensitive tissue in the body is Bone marrow (rapidly dividing). Most radioresistant tissue in the body is neurons (non-dividing). Most radiosensitive cells in the blood are lymphocytes. The most radioresistant cell in the blood is the platelet. The most radioresistant organ in the body is the vagina. Spermatogonia (Option A): are highly radiosensitive because they are actively dividing cells. Irradiation can severely affect spermatogenesis. Intestinal epithelial cells (Option B): are composed of rapidly dividing cells. It has one of the highest turnover rates in the body, making it highly sensitive to radiation. Bone marrow/erythroid precursor cells (Option D): Bone marrow cells, including erythroid precursors, are highly proliferative and sensitive to radiation. Irradiation often results in significant suppression of hematopoiesis.



References:

https://pmc.ncbi.nlm.nih.gov/articles/PMC7312565/#:~:text

↑ *Back to this question in Part A*

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Q3: Which phase of the cell cycle displays the highest resistance to radiation among the following options? (Q856694)

A. S phase

B. M phase

C. G1 phase

D. G2 phase

Correct Answer: A. S phase

Explanation: The S phase of the cell cycle is the most radioresistant phase. During this phase, the DNA is actively being replicated, and mechanisms for DNA repair are highly active, providing protection against radiation-induced damage. M phase (option B): This is incorrect because the M phase (mitosis) is the most radiosensitive phase due to the condensed state of chromosomes and limited time for DNA repair mechanisms to function. G1 phase (option C): This is incorrect because cells in the G1 phase are moderately sensitive to radiation. However, their sensitivity depends on whether they are preparing for DNA synthesis. G2 phase (option D): This is incorrect because the G2 phase is also a radiosensitive phase, as the cell prepares for mitosis and DNA repair capacity is lower than in the S phase.

References:

Radiation Resistance of Cancer Stem Cells: The 4 R’s of Radiobiology Revisited - PMC

↑ *Back to this question in Part A*

@Neet_pg_bot

Q4: Side effects of Pituitary irradiation? (Q858175)

A. Hypopituitarism

B. Increased risk of cerebrovascular accident

C. Optic nerve damage

D. All of the above

Correct Answer: D. All of the above

Explanation: Pituitary irradiation , commonly used in the treatment of pituitary adenomas or certain hormonal disorders, can lead to various side effects due to the proximity of critical structures in the brain. Hypopituitarism: This is the most common long-term side effect. Radiation can damage the normal pituitary tissue, leading to deficiencies in pituitary hormones (e.g., growth hormone, thyroid-stimulating hormone, or gonadotropins). Increased risk of cerebrovascular accident (CVA): Radiation exposure to nearby vascular structures, such as the carotid arteries, can lead to vascular damage and increase the risk of strokes or transient ischemic attacks over time. Optic nerve damage: Radiation can damage the optic nerves or the optic chiasm, leading to visual deficits such as visual field loss or, in severe cases, blindness.

References:

David Sutton Textbook of Radiology & Imaging, 8th Edition, Volume 2, Page 2284-2286, 2287, 2288

↑ *Back to this question in Part A*

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Q5: What is the name of the radiotherapy treatment given to a cancer patient that involves administering a dose of 1.8 to 2 Gy once daily for 5 days per week over a period of 6 to 8 weeks? (Q858194)

A. Regular Fractionated radiotherapy

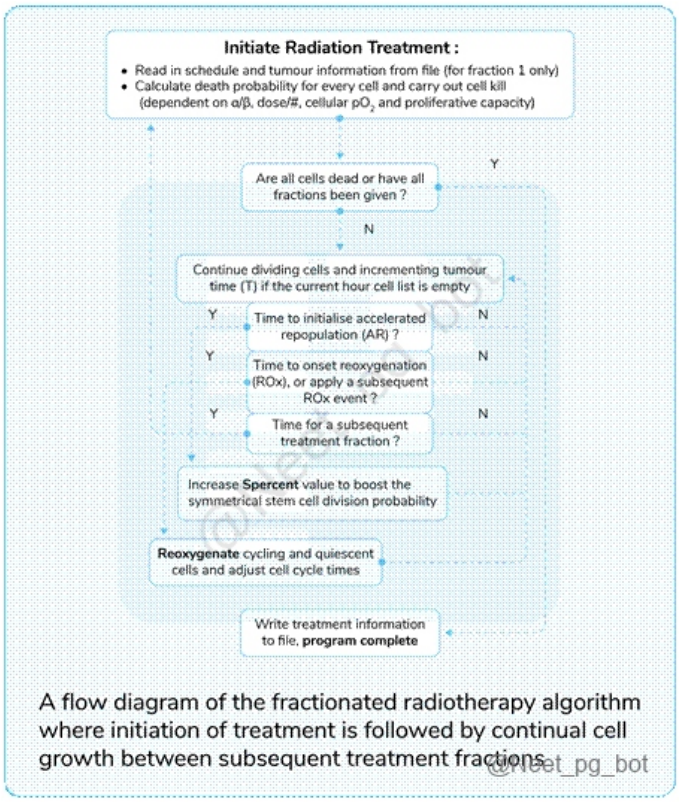
B. Hyper fractionated radiotherapy

C. Accelerated fractionation radiotherapy

D. Brachytherapy

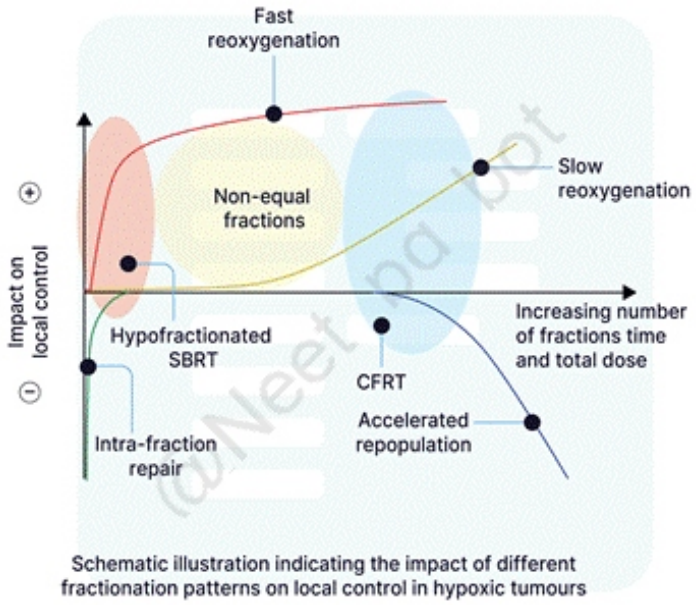
Correct Answer: A. Regular Fractionated radiotherapy

Explanation: Regular Fractionated Radiotherapy : This is the standard treatment regimen in radiotherapy for many cancers. The patient receives a dose of 1.8 to 2 Gy per day , typically administered once daily for 5 days a week (Monday to Friday), with a total treatment course lasting between 6 to 8 weeks . This approach allows for normal tissue recovery while delivering effective doses to the cancerous tissue. Fractionated Radiotherapy Definition : Treatment in multiple smaller doses (fractions) to enhance tumor control and protect normal tissue. Key Principles Therapeutic Window : Balances damage to tumor vs. normal tissue using the "5 Rs of Radiobiology": Radiosensitivity : Tumor cells are more sensitive to radiation. Repair : Normal tissue repairs better between treatments. Reoxygenation : Hypoxic tumor cells reoxygenate, increasing sensitivity. Redistribution : Cells cycle through phases of varying sensitivity. Repopulation : Normal tissue regeneration, affecting treatment outcomes. Fraction Size and Dose : Standard doses are 1.8-2 Gy per session, totaling 50-66 Gy over weeks. Advances in Fractionation Technique Key Features Spatially Fractionated Radiation Therapy (SFRT) Delivers heterogeneous doses to spare normal tissue, effective in bulky tumors. Hyperfractionation More frequent, smaller doses to enhance local control. Accelerated Fractionation Shortens overall treatment time, maintaining or enhancing efficacy. Challenges Radioresistance : Tumors may develop resistance, requiring careful dose planning. Scheduling : Ideal fractionation depends on tumor type, size, and location; research is ongoing Hyper fractionated Radiotherapy (option B) : Incorrect because in hyperfractionated radiotherapy, smaller doses of radiation (usually 1.2 to 1.5 Gy) are given multiple times a day (typically twice), rather than once daily. Accelerated Fractionation Radiotherapy (option C) : Incorrect because accelerated fractionation involves delivering radiation doses more frequently, often with a shorter overall treatment duration (e.g., increasing the daily dose or increasing the frequency of radiation delivery within a shorter period). Brachytherapy (option D) : Incorrect because brachytherapy is a type of radiotherapy where a radioactive source is placed directly inside or very close to the tumor. It is typically used for specific cancers (e.g., prostate, cervical) rather than the fractionated external beam therapy described in the question.



A flow diagram of the fractionated radiotherapy algorithm where initiation of treatment is followed by continual cell growth between subsequent treatment fractions

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Schematic illustration indicating the impact of different fractionation patterns on local control in hypoxic tumours

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References:

Combining spatially fractionated radiation therapy (SFRT) and immunotherapy opens new rays of hope for enhancing therapeutic ratio

A Century of Fractionated Radiotherapy: How Mathematical Oncology Can Break the Rules - PMC

The Quest for Optimal Fractionation Schedules in Stereotactic Radiotherapy - PMC

↑ *Back to this question in Part A*

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Q6: Radioactive isotope used for teletherapy? (Q860597)

A. Iridium-192

B. lodine-125

C. Cobalt-60

D. lodine-131

Correct Answer: C. Cobalt-60

Explanation: Cobalt-60 is the most commonly used radioactive isotope in teletherapy, a type of external beam radiotherapy. It emits high-energy gamma rays, which are effective for treating deep-seated tumors. Teletherapy (External beam radiation) It is a form of radiation therapy in which the radiation source is placed at a distance from the body, delivering high-energy radiation beams to treat tumors. External beam sources are: Betatron Cobalt Linear accelerator Neutron beam Photon beam Proton beam Spray radiation Stereotactic radiosurgery such as gamma knife X-ray Types of Beams Electrons Negatively charged particles Limited penetration Effective for tumors near the body surface (Skin tumors) Photons Can reach deep tumors Scatter radiation along the path Continue through normal tissue after reaching the tumor Made up of high energy: X-rays (LINAC- Linear accelerators) Gamma rays Protons Positively charged particles No radiation scatter Stop precisely at the tumor location cobalt 60 (Co 60) Linear accelerator The Cobalt machine produces an artificial radioisotope (Co) Advantage: Relative constancy of beam output Source replacement approximately every 4 to 5 years LINAC- Linear accelerators do not need a radioisotope The fast-moving electron beam generates radiation which is used in radiotherapy X-ray beams are produced A dvantages of External Beam Painless Do not require a hospital stay in most patients Most patients can continue with their normal daily activities Non-invasive Iridium-192 (Option A): Used in brachytherapy, especially for treating cancers of the cervix, breast, and prostate. Iodine-125 (Option B): Used in brachytherapy, particularly for prostate cancer and eye plaques (e.g., choroidal melanoma). Iodine-131 (Option D): Used in the treatment of thyroid cancer and hyperthyroidism but not in teletherapy.

References:

Perez & Brady’s Principles and Practice of Radiation Oncology, 7th edition- Pdf Page 96, 571, 572.

https://training.seer.cancer.gov/treatment/radiation/radiation-types.html#:~:text=*%20Electrons%20%E2%80%93%20negative%20charge%2C%20beams%20do,radiation%20along%20path%2C%20stops%20at%20tumor%20lo

cation.

↑ *Back to this question in Part A*

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Q7: Radioisotope used in PET-CT scan? (Q860579)

A. 18F-FDG

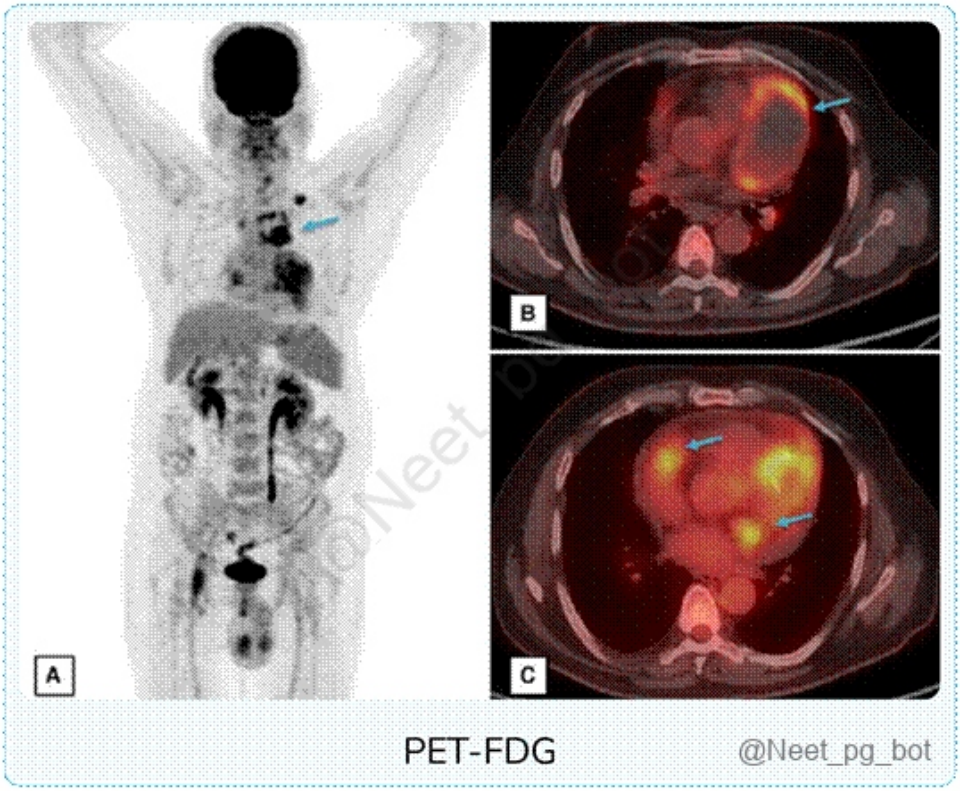
B. lodine

C. Radium

D. Cesium-131

Correct Answer: A. 18F-FDG

Explanation: 18F-FDG (Fluorodeoxyglucose) is the most commonly used radiotracer in PET-CT scans. It is a glucose analog labeled with the radioactive isotope Fluorine-18. It accumulates in tissues with high glucose metabolism, such as cancer cells, inflammation, or infection, making it highly useful for diagnosing and staging cancers, monitoring treatment response, and detecting recurrent disease. Fluorodeoxyglucose (FDG) positron-emission tomography (PET-FDG) Uptake of 18F-FDG (Analogue of endogenous glucose) in large quantities by cancer cells as compared to normal cells Application: Quantification of tumor metabolic activity Diagnosis (lung cancer) and Staging of cancer Assessing distant metastasis More sensitive in primary lung and oesophageal cancer metastatic disease Assessment of response to treatment A decrease in FDG uptake after chemotherapy indicates that the tumor is responding to treatment Routine surveillance following treatment- not commonly preferred. {{caption_text}} Not useful in the following situations: High Glycolytic Metabolism tissues: Central nervous system tumors. Inflammation vs. Cancer: Both conditions exhibit increased glucose metabolism. Movement disorders Coronary blood flow Warburg Effect Cancer cells prefer glycolysis over oxidative phosphorylation, even in the presence of oxygen. This leads to increased glucose uptake and lactate production , common in many cancers. 18F-fluorodeoxyglucose (18F-FDG) , a glucose analog used in PET imaging, helps study this effect. Mechanisms of 18F-FDG Accumulation Mechanism Description Aerobic Glycolysis Cancer cells rely heavily on glycolysis, increasing glucose and 18F-FDG uptake, even with oxygen. Transport & Trapping GLUT-1 transporters mediate glucose entry. 18F-FDG is phosphorylated and trapped inside cells. Tumor Heterogeneity Differences in tumor subtype, size, and microvasculature affect 18F-FDG uptake. Clinical Implications of 18F-FDG Implication Details Prognostic Indicator Higher 18F-FDG uptake correlates with worse prognosis (e.g., shorter DFS in invasive ductal carcinoma). Reverse Warburg Effect Cancer-associated fibroblasts (CAFs) increase glycolysis in tumor cells via metabolic coupling. Treatment Monitoring PET imaging tracks changes in 18F-FDG uptake, reflecting therapy responses targeting glycolysis or mitochondria. Iodine (Option B): Radioactive iodine (e.g., I-131 or I-123) is mainly used in thyroid imaging and treatment of thyroid disorders Radium (Option C): Radium-223 is used in the treatment of bone metastases (e.g., in prostate cancer) Cesium-131 (Option D): Cesium-131 is used in brachytherapy for localized radiation delivery (e.g., in prostate cancer)



References:

Grainger & Allison's Diagnostic Radiology 7th Edition- Page 1642, 1645, 1646, 1648.

https://www.sciencedirect.com/science/article/abs/pii/S0009926010001790

↑ *Back to this question in Part A*

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Q8: Which of the following is the most likely side effect of radioactive iodine (I-131) ablation therapy? (Q852581)

A. Acute Thyroiditis

B. Hypothyroidism

C. Hyperthyroidism

D. Thyroid Storm

Correct Answer: B. Hypothyroidism

Explanation: I-131 ablation therapy is commonly used for Graves' disease, toxic nodules, or thyroid cancer . Soon after I-131 ablation , residual thyroid tissue may release stored thyroid hormones, causing transient hyperthyroidism initially. Later , as the thyroid tissue is destroyed, the patient develops hypothyroidism , the main long-term side effect. Patients often require lifelong thyroid hormone replacement therapy (levothyroxine) . . Side Effects of I-131 Therapy Side Effect Mechanism Common in Hypothyroidism (Correct Answer) Destruction of thyroid tissue → ↓ T4, ↑ TSH Most patients post-I-131 therapy Acute Thyroiditis Radiation-induced inflammation → temporary thyroid pain, swelling Early post-treatment phase Hyperthyroidism Thyrotoxic phase due to sudden hormone release from damaged cells Rare, transient Thyroid Storm Massive release of thyroid hormones (life-threatening) Very rare, usually in untreated Graves'

References:

https://www.ncbi.nlm.nih.gov/books/NBK555978/ https://jnm.snmjournals.org/content/49/12/2012

↑ *Back to this question in Part A*

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Q9: What does a linear accelerator (LINAC) produce in radiation therapy? (Q866873)

A. Alpha and beta rays

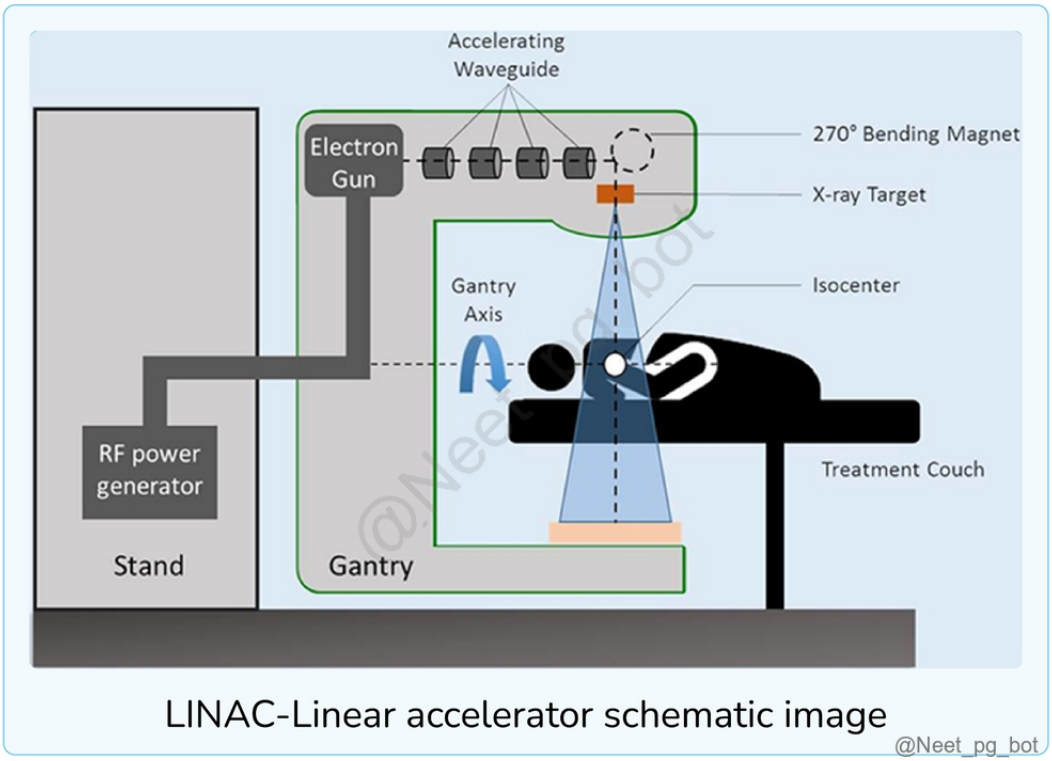
B. X-rays and gamma rays

C. X-rays and electrons

D. Neutrons and positrons

Correct Answer: C. X-rays and electrons

Explanation: A linear accelerator (LINAC) is the most commonly used device in external beam radiation therapy. It accelerates electrons to high energies using microwave technology. These high-energy electrons can be used directly to treat superficial tumors, or they can be directed onto a metal target to produce high-energy X-rays (photons) for treating deep-seated tumors. This allows precise targeting of malignant tissue while sparing surrounding normal structures. LINAC Machine: The overhead X-ray tube emits X-ray beams to the patient. It also has a movable arm that can be mobilized around the patient. The treatment head contains significant shielding material to minimize leakage radiation. Incorrect Options: Alpha and beta rays (Option A): Emitted from radioactive decay of certain isotopes, not generated by LINACs. X-rays and gamma rays (Option B): Gamma rays are emitted from radioactive isotopes like cobalt-60, not produced by a LINAC. Neutrons and positrons (Option D): Neutrons are used in specialized neutron therapy, and positrons are emitted in PET imaging; neither is produced by a LINAC.



LINAC-Linear accelerator schematic image

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References:

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↑ *Back to this question in Part A*

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Q10: Identify the marked blood vessel in this MR Angiogram. (Q852784)

A. Superficial temporal artery

B. Basilar artery

C. Middle meningeal artery

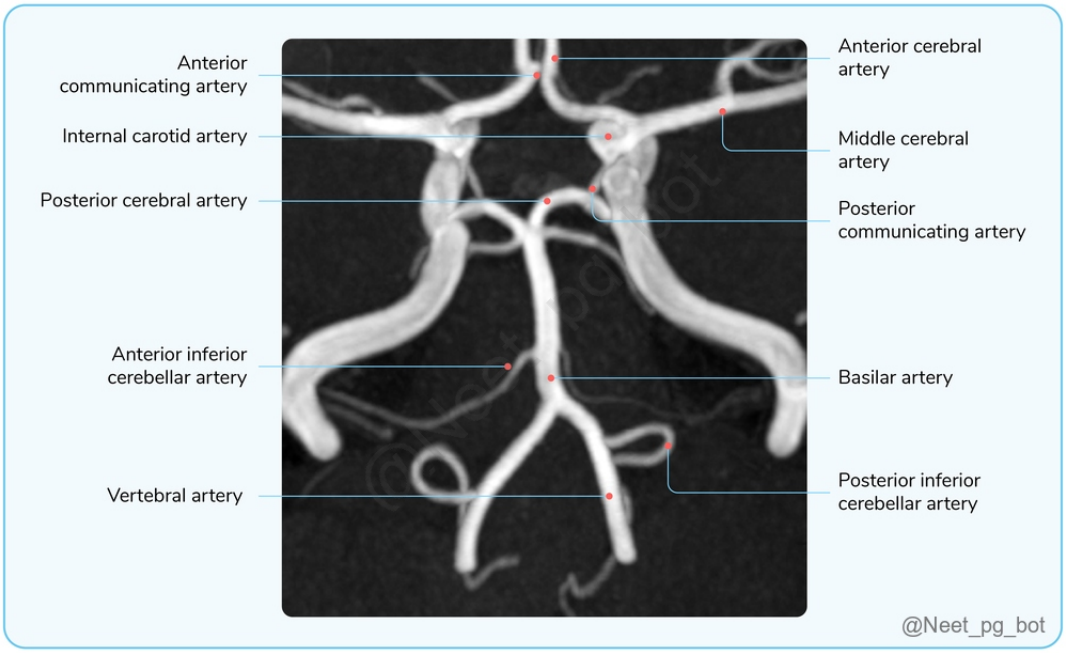
D. Occipital artery



Correct Answer: A. Superficial temporal artery

Explanation: This MR Angiogram highlights an extracranial artery marked by the arrow, which runs along the lateral aspect of the skull. The superficial temporal artery (STA) is a branch of the external carotid artery, supplying the scalp, temporalis muscle, and forehead. It is commonly seen in angiographic imaging due to its superficial location and prominent branching pattern. Magnetic Resonance Angiography (MRA) There are various types of MR angiograms based on different principles and can be classified into non-contrast and contrast enhanced methods. Non-contrast MRA Contrast enhanced (CE) MRA Time-of-flight (TOF) imaging: It is the most prevalent method for Magnetic Resonance Angiography (MRA) in clinical practice. Phase-contrast MRA: It is more sensitive for identifying slow blood flow and useful for imaging cerebral veins (MR venography or MRV).

Effective for detecting dural venous sinus thrombosis and venous stenoses. MRA combined with gadolinium-based contrast agents is called contrast-enhanced (CE) MRA. Excellent for quickly visualizing the carotid and vertebral arteries where a large field of view (FOV) is necessary. Reduces artifacts caused by turbulent or slow flow. Useful for assessing arteriovenous malformations (AVMs), aneurysms , and intracranial stenosis . Two types are: Elliptical-centric Multiphase techniques



References:

Grainger and Allison's Diagnostic Radiology a Textbook of Medical Imaging, 7th edition, Pages 1384, 1385.

https://www.ncbi.nlm.nih.gov/books/NBK558984/

↑ *Back to this question in Part A*

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Q11: Which of the following is the investigation of choice for spinal TB? (Q865265)

A. Ultrasound

B. MRI

C. CT scan

D. CBNAAT

Correct Answer: B. MRI

Explanation: Correct answer- Option B) MRI MRI(Option B) : Excellent for visualizing the extent of spinal TB, its complications, and planning treatment. Incorrect Options: Ultrasound(Option A ruled out) : Not effective for assessing spinal bone or intraspinal pathology in detail. CT scan(Option C ruled out): Good for bony detail and calcifications, and can guide biopsies, but less effective than MRI for soft tissue and spinal cord assessment. CBNAAT(Option D ruled out): A rapid and highly accurate molecular test for Mycobacterium tuberculosis from a sample, which is critical for confirming the diagnosis and detecting drug resistance

References:

Apley and Solomon's System of Orthopaedics and Trauma, Edition 10th- Page 508

Tuberculosis of the spine - PMC (nih.gov)

Pott's Spine: Diagnostic Imaging Modalities and Technology Advancements - PMC (nih.gov)

↑ *Back to this question in Part A*

@Neet_pg_bot

Q12: In which of the following scans does maximum radiation exposure occur? (Q859937)

A. X-ray abdomen

B. Chest X ray

C. IV pyelography

D. CT

Correct Answer: D. CT

Explanation: Among the given options, CT is associated with the highest radiation exposure. Tertiary diagnostic modalities like CT/radionuclide studies have high radiation exposures. Radiation Level associated with various imaging modalities & Level of Hazards: X-ray abdomen (Option A): Effective dose is ~0.7 mSv, higher than a chest X-ray but far lower than a CT scan. Chest X-ray (Option B): Lowest among the group (~0.02 mSv). Used as a reference for comparison ("1 CXR unit"). IV pyelography (Option C): Moderate radiation exposure (~3–5 mSv), but still much less than CT.

Radiation level associated with various imaging modalities & Level of Hazards:

Hazard Level	Modality	Investigation	Effective Dose (mSv)
DANGER	PET/CT/Radionuclide Studies	CT Abdomen	10
		CT Thorax	8
		PET	5
		Bone Scan	4
		CT Head	2-3.5
WARNING	Diagnostic procedures-multiple views	Barium Enema	7
		Barium Meal follow-through	3
		Barium Meal	2.6
		Barium Swallow	1.5
		Micturating Cystourethrogram (MCU)	1.2
SAFE	Spot radiographs: Only 1 or 2 X-ray exposures to the patient	X-ray Lumbar Spine	1-1.5
		X-ray Abdomen	0.7-1.2
		Hip joint	0.4
		Skull	0.06
		CXR (PA View)	0.02
		Limb & Joint (Except Hip)	<0.01

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References:

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2996147/

↑ *Back to this question in Part A*

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Q13: IOC for Ureteric calculi is? (Q852785)

A. USG

B. NC-CT

C. CE-CT

D. Ureteroscopy

Correct Answer: B. NC-CT

Explanation: Non-contrast CT (NC-CT) KUB is the investigation of choice (IOC) for ureteric calculi due to its high sensitivity (>95%) and specificity (>98%) in detecting even small stones. It provides detailed anatomical visualization without requiring contrast, making it the gold standard for urinary calculi evaluation. Radiographic Investigations: X-ray KUB: Detects 90% of calculi (radiopaque). Radiolucent stones (TIXU): Triamterene,

Indinavir, Xanthine, Uric acid. Ultrasound (USG): Screening tool for hydronephrosis and stones in the collecting system. Intravenous Pyelogram (IVP): Early films (1 & 5 min): Assesses contrast excretion & obstructions. Delayed films: Identifies the cause of delayed excretion. Non-contrast Spiral CT (NCCT) – Gold Standard: Most sensitive test for renal/ureteric calculi. Retrograde Pyelogram (RGP): Better anatomical delineation, especially for the distal ureter. Helps detect additional stones & coexisting ureteric diseases (e.g., strictures). USG (Option A): First-line for pregnant women and children, but misses small ureteric stones and lacks sensitivity for ureteral evaluation. CE-CT (Contrast-Enhanced CT) (Option C): Contrast can obscure stones, making it less effective for detecting calculi. Ureteroscopy (Option D): Used for diagnosis and treatment, but not the first-line investigation.

References:

https://www.ncbi.nlm.nih.gov/books/NBK560674/

↑ *Back to this question in Part A*

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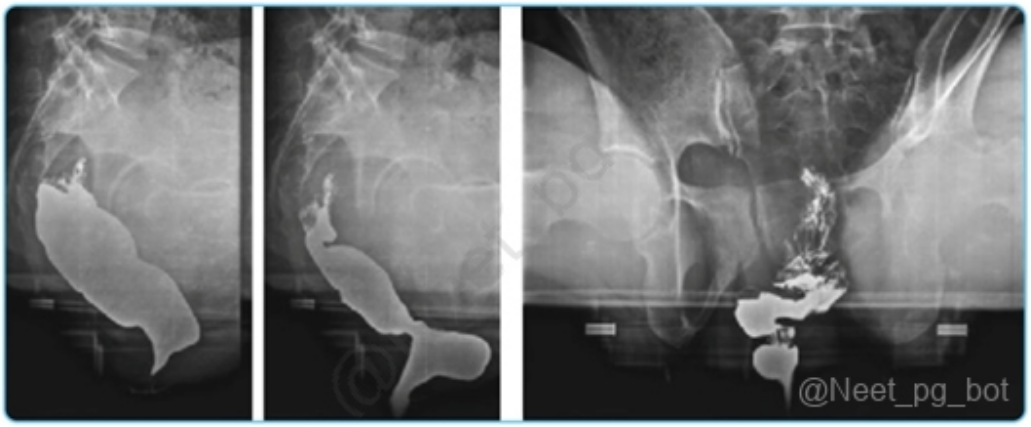
Q14: Which imaging modality is being used in the image shown below? (Q865272)

A. MRI Defecography

B. X-ray Defecography

C. CT abdomen

D. Barium Enema



Correct Answer: B. X-ray Defecography

Explanation: X-ray defecography (or defecating proctography) is a dynamic fluoroscopic study using barium paste to visualize anorectal function during simulated defecation. Key X-ray Findings: Anorectal Angle (ARA): Measured between the rectum and anal canal. Normally widens (becomes more obtuse) during defecation. Anismus shows paradoxical narrowing. Perineal Descent: Downward movement of the pelvic floor. Excessive descent indicates laxity/weakness. Rectal Emptying: Assesses completeness of barium expulsion. Incomplete

emptying suggests obstruction. Prolapse: Rectocele: Anterior rectal bulging into the vagina. Intussusception: Rectal wall telescoping into the lumen. Rectal Prolapse: Rectum extending into or outside the anal canal. Enterocele: Small bowel herniating into the rectovaginal space. Anal Canal: Assesses opening during evacuation and closure during contraction.

References:

David Sutton Textbook of Radiology and Imaging, Volume 1, 8th edition, Page 637, 654

↑ *Back to this question in Part A*

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Q15: Personal monitoring of radiation is done by: (Q858496)

A. TLD badge

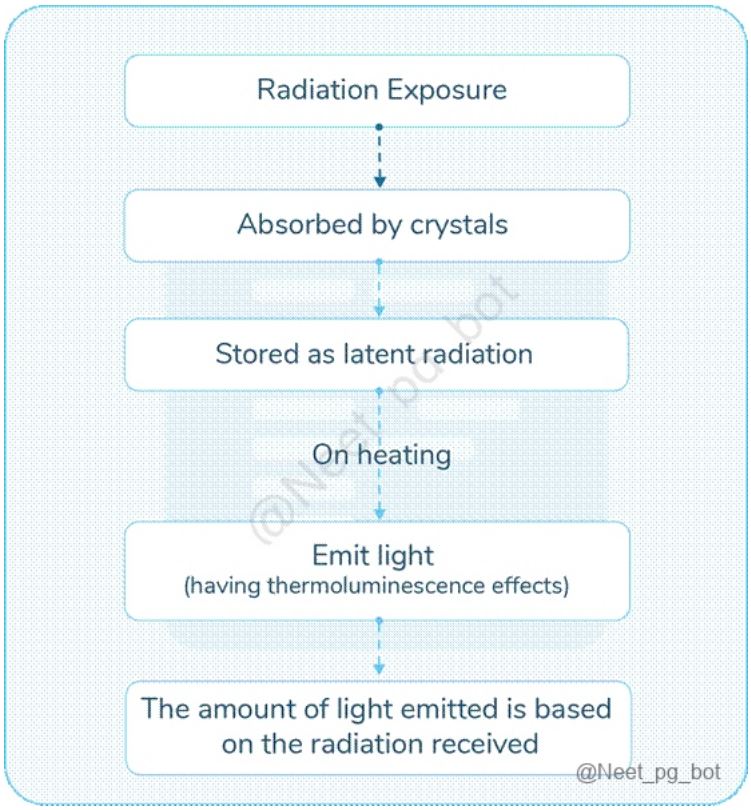
B. Collimators

C. Linear accelerator

D. Grid

Correct Answer: A. TLD badge

Explanation: Personal monitoring of radiation exposure is primarily done using thermoluminescent dosimeters (TLD badges). These devices measure the cumulative radiation dose received by an individual over time. The TLD contains a material (usually lithium fluoride) that absorbs radiation and emits light when heated, which is proportional to the amount of radiation exposure. TLD (Thermoluminescent Dosimeter) Badge Purpose It is worn by individuals in radiation-exposed environments, such as medical imaging or nuclear facilities, to track their radiation dose and ensure it stays within safe limits. Location Worn beneath the lead apron (as lead apron cuts off some radiation) Duration According to the Atomic Energy Regulatory Board (AERB) of India, TLD badges are generally replaced and analyzed every 3 months to assess cumulative radiation exposure. Composition Thermoluminescent phosphor crystals : Calcium sulfate dysprosium Lithium fluoride Lithium borate Berrylium oxide Principle Collimators (Option B): are devices used in imaging techniques like radiography, CT scans, and gamma cameras to shape and limit the radiation beam. They help in directing the radiation to a specific area of interest and reducing unnecessary radiation exposure to surrounding tissues. Linear accelerator (Option C): a device used in radiation therapy to deliver high-energy X-rays or electron beams to treat cancer. Grid (Option D): is a device used in radiography to reduce scattered radiation and improve image quality. It is placed between the patient and the image receptor.





References:

David Sutton’s Textbook of Radiology and Imaging, Volume I, 7th Edition, Page 463, 464

↑ *Back to this question in Part A*

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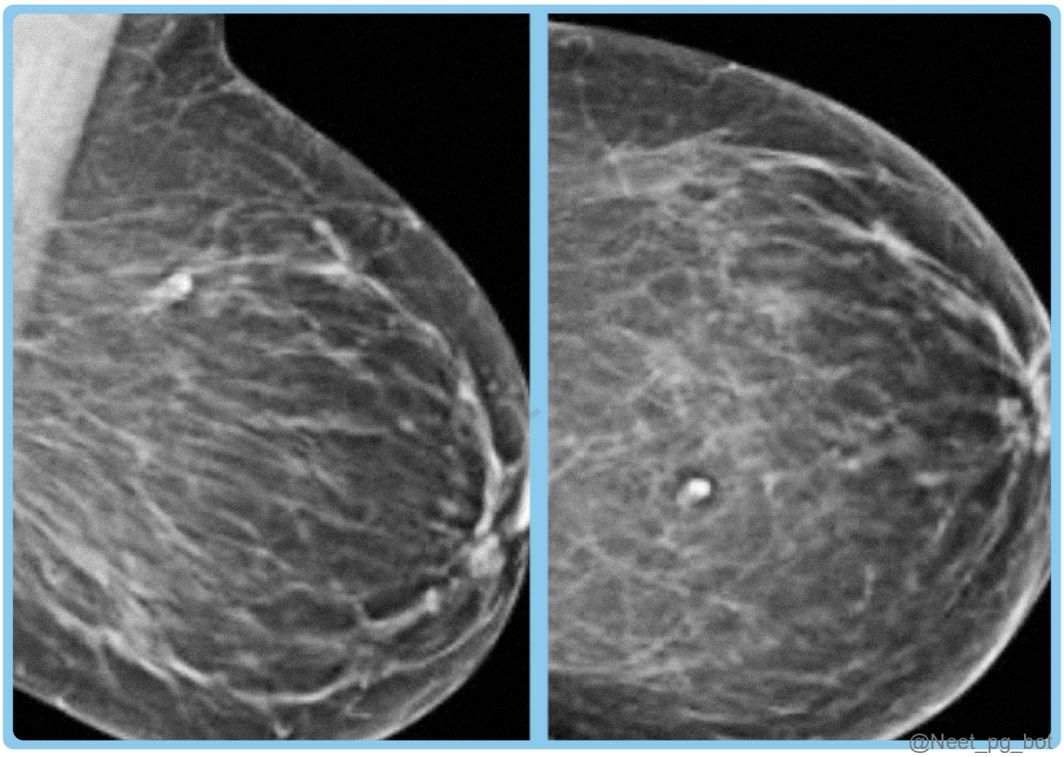
Q16: Identify the investigation shown in the image: (Q866871)

A. Mammography

B. CT

C. X-ray

D. MRI



Correct Answer: A. Mammography

Explanation: The image shows the two standard mammographic views used in breast cancer screening and diagnosis: Mediolateral Oblique (MLO) view – includes the upper outer quadrant and pectoralis muscle. Craniocaudal (CC) view – top-down view of the breast. Mammography is performed using low-dose X-rays with breast compression to improve resolution and detect abnormalities such as masses, architectural distortions, and microcalcifications.

References:

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↑ *Back to this question in Part A*

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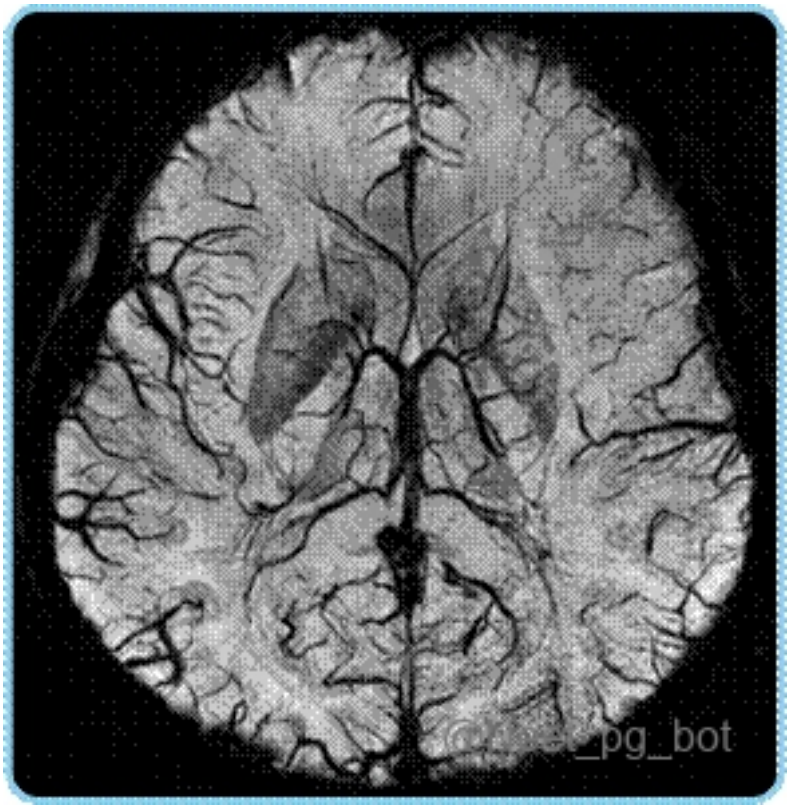
Q17: What type of MRI image is given below? (Q856681)

A. Proton density image

B. Susceptibility weighted image

C. Gradient echo image

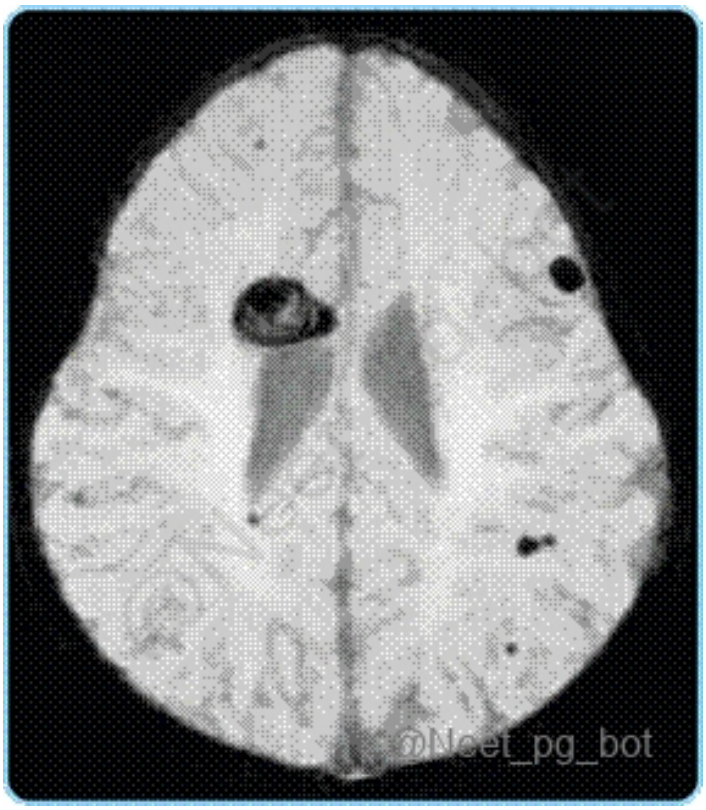
D. Inversion recovery image



Correct Answer: B. Susceptibility weighted image

Explanation: This MRI sequence is highly sensitive to magnetic susceptibility differences between tissues. It exploits differences in the magnetic properties of tissues or substances, such as blood products, calcium, or iron deposition. SWI is particularly useful for detecting microbleeds, haemorrhage, venous malformations, and calcifications. Susceptibility-weighted imaging (SWI) is an advanced MRI technique that enhances the visibility of tissues based on magnetic susceptibility differences. It is highly sensitive for detecting microbleeds (common in hypertension), iron deposits (seen in neurodegenerative diseases and hemorrhagic lesions), and calcifications. Black dots on SWI indicate areas of microbleeds/Iron deposition/Calcification. CSF appears dark, not bright. {{caption_text}} Proton density image (Option A): This is incorrect because proton density imaging emphasises

the number of hydrogen nuclei per tissue volume and is not sensitive to susceptibility differences. Gradient echo image (Option C): This is incorrect because while gradient echo sequences are somewhat sensitive to magnetic susceptibility, they lack the resolution and phase-processing techniques of SWI. Inversion recovery image (Option D): This is incorrect because inversion recovery sequences are used for suppressing specific tissue signals (e.g., fat or fluid) and are not focused on magnetic susceptibility differences.



References:

Grainger & Allison's Diagnostic Radiology, Volume 2, 7th Edition, Page 1375

↑ *Back to this question in Part A*

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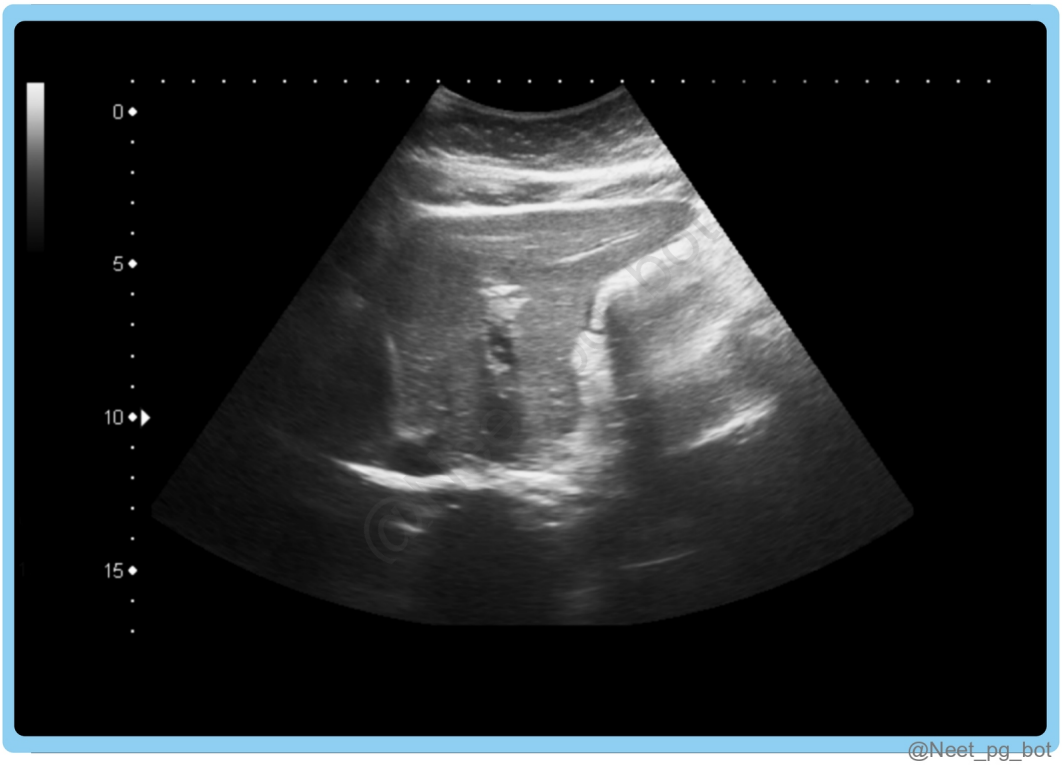
Q18: Identify the imaging modality given below. (Q858183)

A. USG

B. Fluoroscopy

C. X-Ray

D. MRI



Correct Answer: A. USG

Explanation: Ultrasound imaging (USG) is characterised by grey-scale images formed by sound waves that interact with tissues and reflect based on differences in echogenicity. The hallmark features of USG include: Real-time imaging. Presence of hypoechoic (dark) and hyperechoic (bright) areas based on tissue density. Ability to show structures like fluid collections, solid masses, or blood flow using Doppler. Ultrasound Gel Purpose of Gel Eliminates air pockets between probe and skin for effective sound transmission. Serves as a medium for sound and lubricant. Preferred Gel Hydrogel is preferred over Lipogel for easier cleaning. Ingredients Distilled water, carbomer, ethylenediaminetetraacetic acid (EDTA), propylene glycol, glycerin, trolamine, and occasionally contains blue colorant. Infection Control Cover transducer and skin with plastic for patients with open wounds or skin issues. ↓ Apply gel on both sides of the plastic. ↓ Clean transducer after each use Principle of USG : Ultrasound operates on the pulse-echo principle, utilizing piezoelectric materials found in the ultrasound probe's crystal. {{caption_text}} Types of Ultrasound Transducers/ Probes Linear Shape: Rectangular/parallelogram image Use: Vascular, high-resolution imaging {{caption_text}} Convex Shape: Sector image, curved top Use: Abdominal, OBS/ GYN {{caption_text}} Phased Array Shape: Sector image, pointed top Use: Cardiac (fits between ribs), endocavitary (like endovaginal), neonatal brain {{caption_text}} Vector/ Trapezoidal Shape: Trapezoidal image Use: Abdominal, cardiac, Doppler Features: Hybrid of linear & phased Fluoroscopy (option B) produces real-time X-ray images, usually with dynamic motion, such as during barium studies or catheter placements. It does not resemble static grey-scale USG images. X-Ray (option C): X-rays are static, high-contrast images displaying bones, air-filled spaces, or dense structures like metal. They do not provide grey-scale differentiation like USG. MRI (option D) produces highly detailed cross-sectional images with various sequences (T1, T2, etc.). It is more advanced than USG, often showing clear demarcation of soft tissues, which is not typical of the image described.

Electrical pulse applied to piezoelectric crystal

↓

Crystal deforms and vibrates

↓

sound beam generated

↓

Sound beam travels through tissues

↓

Sound beam encounters tissues and reflects echoes

↓

Reflected echoes reach the transducer

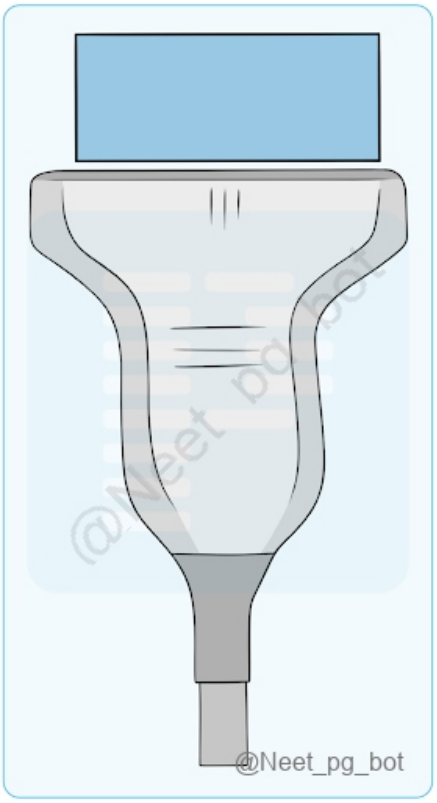
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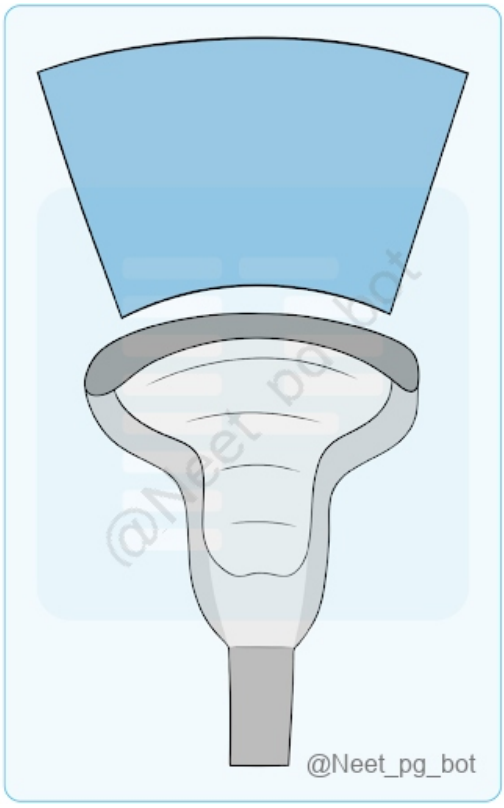
Transducer vibrates due to incoming echoes

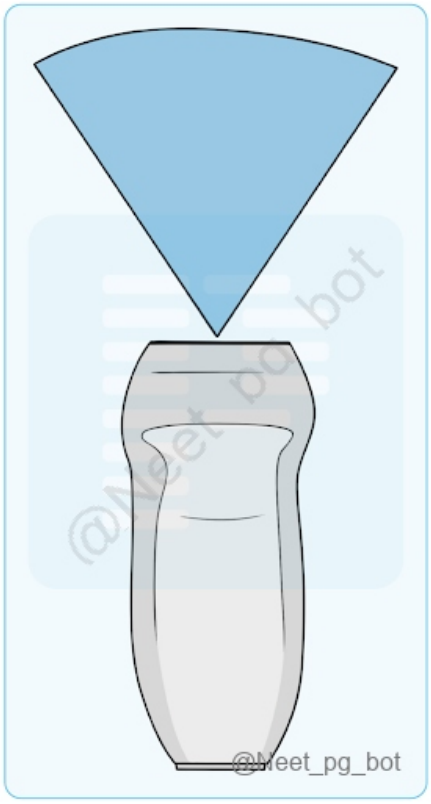
↓

Electrical voltage generated corresponding to echoes

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References:

David Sutton textbook of Radiology & Imaging Edition 8, Volume I, Page 197,198

↑ *Back to this question in Part A*

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Q19: The magnetic field in MRI machines is measured in which of the following units? (Q857618)

A. Tesla

B. HU

C. KHz

D. Hg

Correct Answer: A. Tesla

Explanation: The magnetic field strength in MRI machines is measured in Tesla (T) . Most clinical MRI scanners operate at 1.5T or 3T , while higher-field research scanners can go up to 7T or more . The Tesla unit measures the intensity of the magnetic field, which influences image resolution and signal-to-noise ratio. Radiological Units and Their Applications Unit Symbol Measurement Type Application Tesla T Magnetic field strength Used in MRI to measure magnetic field intensity (e.g., 1.5T, 3T, 7T MRI scanners) Gauss G Magnetic field strength Older unit for magnetic field strength (1T = 10,000G) Gray Gy Absorbed dose of radiation Measures energy absorbed per unit mass in radiotherapy Sievert Sv Biological effect of radiation Used in radiation safety to assess exposure risk Hounsfield Unit HU Tissue density in CT Used in CT scans to differentiate tissues (e.g., bone = +1000 HU, air = -1000 HU) Becquerel Bq Radioactive decay rate Used in nuclear medicine to measure radioactivity Curie Ci Radioactivity Older unit (1 Ci = 3.7 × 10¹■ Bq), used in nuclear imaging Roentgen R Ionization in air Used in older radiation exposure measurements Millisievert mSv Radiation dose Used for radiation protection , CT scan doses are often measured in mSv Electron Volt eV Energy of X-rays/Gamma rays Used in radiation physics to measure photon energy Kiloelectron Volt keV X-ray photon energy Important in X-ray and CT imaging for beam quality HU (Option B): Incorrect because Hounsfield Unit (HU) is used to measure tissue density in CT scans , not MRI. KHz (Option C): Incorrect because kilohertz (kHz) measures radiofrequency waves used in MRI but not the magnetic field strength. Hg (Option D): Incorrect because mercury (Hg) is used in measuring pressure (mmHg) , not magnetic fields.

References:

https://pmc.ncbi.nlm.nih.gov/articles/PMC2696677/

↑ *Back to this question in Part A*

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Q20: Which of the following is not included in the whole-body CT scan protocol for a trauma patient? (Q855082)

A. CT Head

B. CT Cervical spine

C. CT Limbs

D. CT Abdomen

Correct Answer: C. CT Limbs

Explanation: Whole-body CT protocols for trauma patients are designed to assess life-threatening injuries quickly. They focus on critical areas such as the head, cervical spine, chest, abdomen, and pelvis. CT scans of the limbs are not routinely included unless there is specific clinical suspicion of significant limb injuries. CT Head (option A): This is included to detect traumatic brain injuries, fractures, or haemorrhages, which are common in major trauma cases. CT Cervical spine (option B): This is included to evaluate for cervical spine fractures or ligamentous injuries, which are critical in trauma patients with suspected spinal injuries. CT Abdomen (option D): This is included to identify abdominal organ injuries, bleeding, or free fluid, which are crucial to diagnose promptly in trauma management.

References:

Diagnostic utility of whole-body computed tomography/pan-scan in trauma: a systematic review and meta-analysis study

↑ *Back to this question in Part A*

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Q21: Whole-body CT scan protocol for a trauma patient includes all, except (Q858232)

A. CT Head

B. CT Cervical spine

C. CT Limbs

D. CT Abdomen

Correct Answer: C. CT Limbs

Explanation: Whole-body CT protocols for trauma patients are designed to assess life-threatening injuries quickly. They focus on critical areas such as the head, cervical spine, chest, abdomen, and pelvis. CT scans of the limbs are

not routinely included unless there is specific clinical suspicion of significant limb injuries. CT Head (option A): This is included to detect traumatic brain injuries, fractures, or haemorrhages, which are common in major trauma cases. CT Cervical spine (option B): This is included to evaluate for cervical spine fractures or ligamentous injuries, which are critical in trauma patients with suspected spinal injuries. CT Abdomen (option D): This is included to identify abdominal organ injuries, bleeding, or free fluid, which are crucial to diagnose promptly in trauma management.

References:

Diagnostic utility of whole-body computed tomography/pan-scan in trauma: a systematic review and meta-analysis study

Refining the criteria for immediate total-body CT after severe trauma - PMC

↑ *Back to this question in Part A*

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Q22: The principle of Linear accelerators is utilized in the production of? (Q830816)

A. Protons

B. X-rays

C. Gamma rays

D. Neutrons

Correct Answer: B. X-rays

Explanation: Correct Option B - X-rays: Linear accelerators (LINACs) use the principle of accelerating electrons to produce X-rays. Electrons are accelerated in a linear path and directed to a target material, resulting in the generation of X-rays. Incorrect Options: Option A - Protons: Protons are accelerated in a cyclotron or synchrotron, not in a linear accelerator. Option C - Gamma rays: Gamma rays are electromagnetic radiation emitted during certain nuclear processes. While gamma rays are used in radiation therapy, they are not directly produced by linear accelerators. Option D – Neutrons: Neutrons are neutral particles and are not directly accelerated by linear accelerators. Neutron therapy, which uses neutrons for cancer treatment, is a distinct modality and typically involves reactors or accelerators that produce neutrons through nuclear reactions.

↑ *Back to this question in Part A*

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Q23: What statement accurately describes radiotherapy? (Q830807)

A. Intensity is inversely proportional to square of the distance

B. Vomiting is a late adverse reaction

C. Rapidly proliferating cells are most radioresistant

D. All the adverse effects are reversible

Correct Answer: A. Intensity is inversely proportional to square of the distance

Explanation: Correct Option A - Intensity is inversely proportional to square of the distance: According to the inverse square law, the intensity of radiation is inversely proportional to the square of the distance from the source. This means that as the distance from the radiation source increases, the intensity of the radiation decreases. Incorrect Options: Option B - Vomiting is a late adverse reaction: This statement is not accurate. Vomiting is usually an early adverse reaction to radiation therapy. Option C - Rapidly proliferating cells are most radioresistant: Rapidly proliferating cells are generally more radiosensitive, not radioresistant. Option D - All the adverse effects are reversible: Some adverse effects of radiotherapy may be reversible, but others can be permanent.

↑ *Back to this question in Part A*

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Q24: A 40-year-old female patient presents with complaints of abdominal pain; further investigations show elevated PTH levels and renal calculi. Which of the following investigations should be done next? (Q860281)

A. USG thyroid

B. TC 99m sestamibi scan

C. Dexa scan

D. Radioactive iodine uptake test

Correct Answer: B. TC 99m sestamibi scan

Explanation: The above scenario is suggestive of hyperparathyroidism. TC 99m sestamibi scan is used to confirm the diagnosis of hyperparathyroidism. Hyperparathyroidism Functions of the parathyroid gland Increase the level of calcium in the body (Subperiosteal bone resorption). Decrease the level of phosphorus in the body (Urinary excretion of phosphorus). Types Primary hyperparathyroidism (parathyroid adenoma and parathyroid hyperplasia) Secondary hyperparathyroidism Radiological features Subperiosteal resorption usually starts in the middle phalanx of the index finger's radial side, leading to a concavity of bone (the earliest bone change). {{caption_text}} The "salt and pepper" appearance, or pepper pot skull (lytic lesions in the skull). {{caption_text}} Brown tumor or osteitis fibrosa cystica: Cystic lesions resulting from excessive osteoclastic resorption appear as low-density, multiloculated cysts that can cause bone expansion, often accompanied by hemorrhage and granulation tissue

(more common in primary hyperparathyroidism). {{caption_text}} Rugger jersey spine: Characterized by alternating black and white striations, with sclerosed white end plates and black vertebral bodies; commonly seen in renal osteodystrophy (secondary hyperparathyroidism). {{caption_text}} USG thyroid, Dexa scan, and Radioactive iodine uptake tests (Options A, C, and D): are not used for Hyperparathyroidism




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References:

Grainger and Allison’s Diagnostic Radiology, 7th Edition, Pages 1104-1107.

David Sutton’s Textbook of Radiology and Imaging, Volume II, 7th Edition, Page 1062

↑ *Back to this question in Part A*

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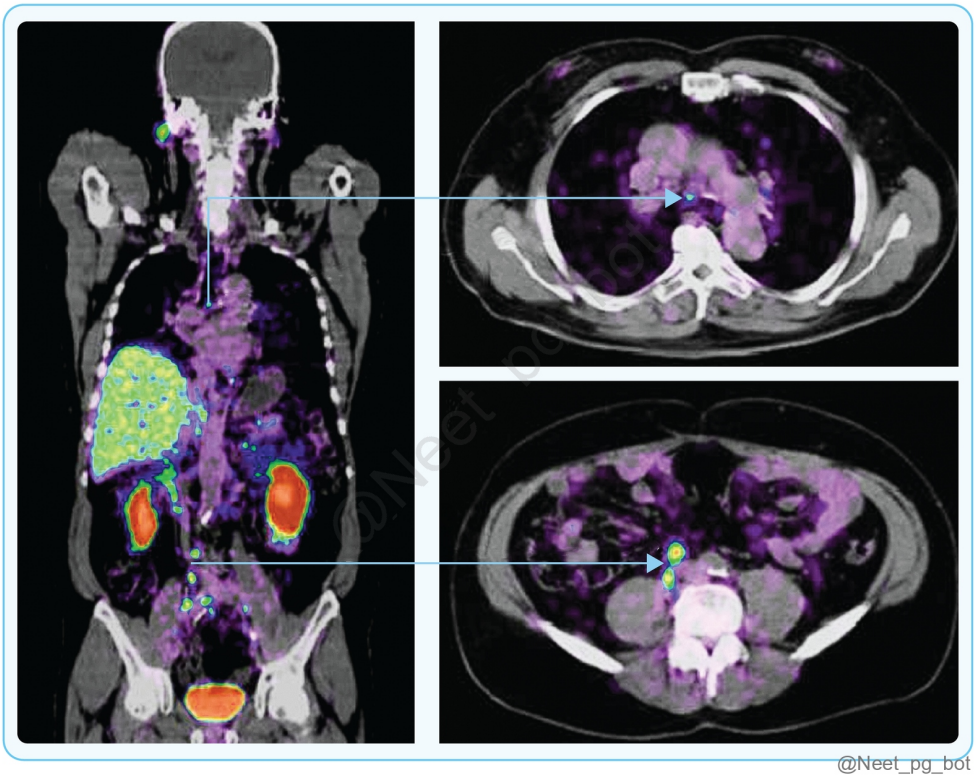
Q25: During the procedure shown below which one of the following substances is uptaken by the cancer cells? (Q860279)

A. Alanine

B. Glucose

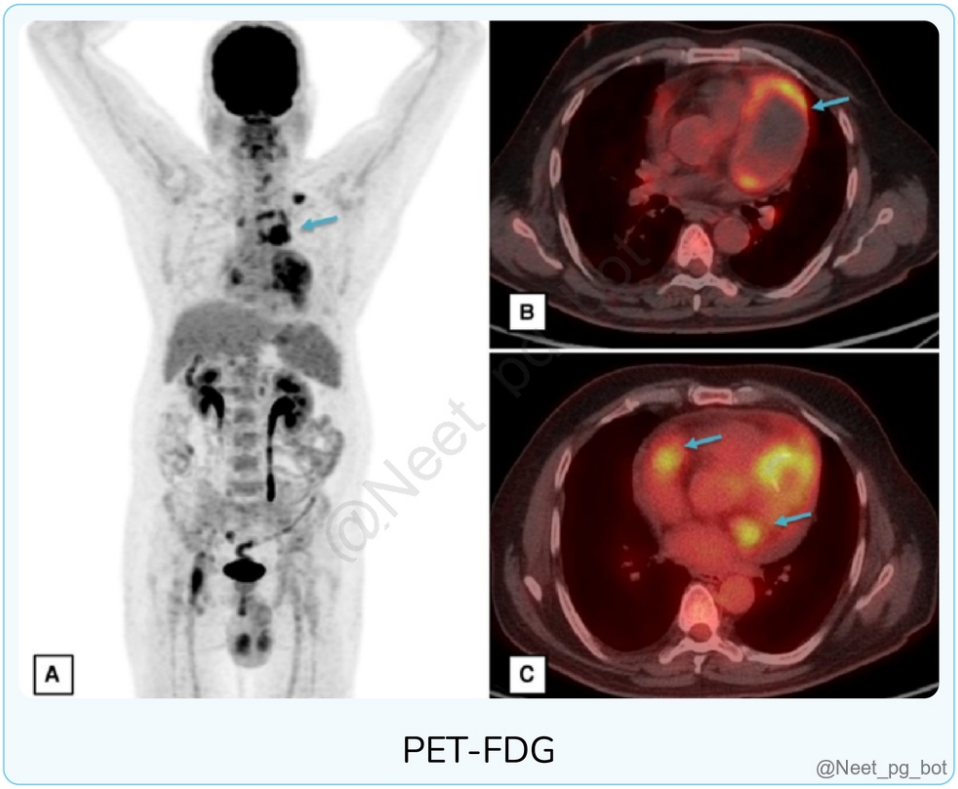
C. Sodium

D. Calcium



Correct Answer: B. Glucose

Explanation: FDG-PET scans use a radiolabeled form of glucose, known as Fluorodeoxyglucose (FDG), to assess glucose metabolism. Fluorodeoxyglucose (FDG) positron-emission tomography (PET-FDG) Uptake of 18F-FDG (Analogue of endogenous glucose) in large quantities by cancer cells as compared to normal cells Application: Quantification of tumor metabolic activity Diagnosis (lung cancer) and Staging of cancer Assessing distant metastasis More sensitive in primary lung and oesophageal cancer metastatic disease Assessment of response to treatment A decrease in FDG uptake after chemotherapy indicates that the tumor is responding to treatment Routine surveillance following treatment- not commonly preferred. {{caption_text}} Not useful in the following situations: High Glycolytic Metabolism tissues: Central nervous system tumors. Inflammation vs. Cancer: Both conditions exhibit increased glucose metabolism. Movement disorders Coronary blood flow Warburg Effect Cancer cells prefer glycolysis over oxidative phosphorylation, even in the presence of oxygen. This leads to increased glucose uptake and lactate production , common in many cancers. 18F-fluorodeoxyglucose (18F-FDG) , a glucose analog used in PET imaging, helps study this effect. Mechanisms of 18F-FDG Accumulation Mechanism Description Aerobic Glycolysis Cancer cells rely heavily on glycolysis, increasing glucose and 18F-FDG uptake, even with oxygen. Transport & Trapping GLUT-1 transporters mediate glucose entry. 18F-FDG is phosphorylated and trapped inside cells. Tumor Heterogeneity Differences in tumor subtype, size, and microvasculature affect 18F-FDG uptake. Clinical Implications of 18F-FDG Implication Details Prognostic Indicator Higher 18F-FDG uptake correlates with worse prognosis (e.g., shorter DFS in invasive ductal carcinoma). Reverse Warburg Effect Cancer-associated fibroblasts (CAFs) increase glycolysis in tumor cells via metabolic coupling. Treatment Monitoring PET imaging tracks changes in 18F-FDG uptake, reflecting therapy responses targeting glycolysis or mitochondria.



References:

Grainger & Allison's Diagnostic Radiology 7th Edition- Page 1642, 1645, 1646, 1648.

https://www.sciencedirect.com/science/article/abs/pii/S0009926010001790

↑ *Back to this question in Part A*

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Q26: Ga-68 PSMA PET scan is used to diagnose which of the following conditions? (Q860266)

A. Lung cancer

B. Prostate cancer

C. Colon cancer

D. Liver cancer

Correct Answer: B. Prostate cancer

Explanation: The Ga-68 PSMA PET scan is specifically designed to detect prostate cancer. PSMA stands for Prostate-Specific Membrane Antigen, which is a protein highly expressed on the surface of prostate cancer cells. The PET scan utilizes a radiotracer labeled with Gallium-68 to target and visualize these PSMA proteins, thus providing detailed imaging of prostate cancer. Advancements in Prostate Cancer Diagnosis: Prostate Cancer Statistics : Second most common cancer in men and the sixth leading cause of cancer-related death globally. Early detection leads to a cure rate of over 90%. Role of Molecular Imaging : Essential for individualized diagnosis and treatment of prostate cancer. Utilizes modalities like PET, SPECT, MRI, CT, ultrasound, and bioluminescence for non-invasive cellular and molecular imaging. Limitations of 18F-FDG PET : Not routinely used for early-stage prostate cancer due to its low metabolic activity in prostate cancer cells. Advancement with Ga-68 PSMA Imaging : A groundbreaking tool in nuclear medicine for managing metastatic prostate cancer, gaining global recognition. Ga-68 PSMA PET scan is a highly sensitive imaging modality primarily used for the detection and management of prostate cancer . It utilizes a radiotracer labeled with Gallium-68 that binds to Prostate-Specific Membrane Antigen (PSMA) , which is overexpressed in prostate cancer cells. Lung cancer (Option A): Imaging for lung cancer usually involves CT, PET-CT with FDG, or biopsy for diagnosis. Colon cancer (Option C): FDG PET-CT is used for staging and recurrence detection in colorectal cancer. Liver cancer (Option D): Diagnosis of liver cancer (e.g., HCC) relies on imaging modalities like multiphase CT or MRI; PET-CT may play a secondary role.

References:

https://www.cancer.gov/news-events/cancer-currents-blog/2020/prostate-cancer-psma-pet-ct-metastasis#:~:text

↑ *Back to this question in Part A*

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Q27: Which of the following is the best management of aneurysm by interventional radiologist? (Q840072)

A. Coiling

B. endothermal ablation

C. Bare stent placement

D. Sclerotherapy

Correct Answer: A. Coiling

Explanation: Correct Option A - Coiling: Coliling the best interventional procedure used for treating aneurysms. Depending on the vascular anatomy coils can be used. For E.g. a wide neck aneurysm can be occluded with coil. These techniques are of value when the parent vessel must remain patent. If the parent vessel can be sacrificed, coils may be placed across the neck, e.g. hepatic artery aneurysm when the portal vein is patent. Incorrect Options: Option B -Endothermal ablation : It has no role in the treatment of an aneurysm. Used for varicose veins. Option C - Bare stent placement: Bare stent placement can be performed, but it is not the best method of management. Option D - Sclerotherapy: Sclerotherapy has no role in the treatment of an aneurysm.

References:

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↑ *Back to this question in Part A*

@Neet_pg_bot

Q28: Which of the following contrast agents is safe to use in renal failure patients? (Q840069)

A. Gadolinium

B. Iodinated ionic contrast

C. Iodinated non-ionic contrast

D. USG contrast

Correct Answer: D. USG contrast

Explanation: Correct Option D - USG contrast: Contrast-enhanced USG uses microscopic gas bubbles, which cause a backscatter of sound. It is excreted by the lungs, and hence, it is safe to be used in renal failure patients. Incorrect Options: Option A - Gadolinium: Gadolinium is nephrotoxic which causes nephrogenic systemic fibrosis. Option B - Iodinated ionic contrast: Iodinated ionic contrast damages the kidney and is contraindicated in prerenal kidney diseases. Option C - Iodinated non ionic contrast: Iodinated non ionic contrast also damages the kidney and is contraindicated in prerenal kidney diseases.

References:

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↑ *Back to this question in Part A*

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Q29: Which of the following is true regarding CT scan? (Q840058)

A. CT score of water is 0

B. CT consists of unfiltered X-ray beams

C. It is the investigation of choice for Gallstones

D. The typical effective dose for a NCCT head scan is 20mSv

Correct Answer: A. CT score of water is 0

Explanation: Correct Option A - CT score of water is 0 CT score (Hounsfield Unit) of water is 0 → This is the reference point in CT imaging. Air: –1000 HU Fat: –100 to –50 HU Soft tissue: +20 to +60 HU Bone: +1000 HU Incorrect Options: Option B - An unfiltered X-ray beam is used: A Filtered X-ray beam is used to remove the low energy X-ray beams. Option C - It is the investigation of choice for Gallstones: Investigation of choice in gallstones is the USG abdomen. Option D - Typical effective dose for a NCCT head scan is 20mSv: Typical effective dose for a CT head scan is 2 mSv.

References:

.

↑ *Back to this question in Part A*

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Q30: Ideal thickness of lead aprons to be worn by workers working in radiology department? (Q860589)

A. 0.5mm

B. 1mm

C. 0.75mm

D. 2mm

Correct Answer: A. 0.5mm

Explanation: Lead aprons are used to protect from the radiation received during an invetigation The lead apron protects us from the scattered radiation that comes from the patient The minimum thickness of the lead apron recommended is 0.25 mm according to the Indian guidelines. 0.5 mm according to international guidelines In India, most commonly 0.5 mm thickness is preferred. Key Points on Lead Aprons and Radiation Protection Purpose of Lead Aprons: Used to protect healthcare workers and others from scattered radiation during medical investigations. Scatter radiation primarily arises from the patient and is caused by the Compton effect. Materials Used: Traditional lead aprons are heavy. Lightweight, lead-free aprons are now made using antimony and bismuth. Material Properties: Radiation shielding materials must have a high atomic weight to block high-energy radiation effectively. Thickness Guidelines: Indian Guidelines: Minimum lead thickness is 0.25 mm, with 0.5 mm preferred for better protection. International Guidelines: Recommend 0.5 mm lead thickness. Additional Protective Equipment: Lead gloves: Protect hands during procedures like fluoroscopy. Thyroid shields: Protect the thyroid gland, especially during radiation exposure. Radiation-Induced Thyroid Cancer: Papillary carcinoma is the most common thyroid cancer associated with radiation exposure. {{caption_text}}



References:

https://pmc.ncbi.nlm.nih.gov/articles/PMC6177538/#:~:text=1

↑ *Back to this question in Part A*

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Q31: Which among the following is most radiosensitive? (Q860578)

A. Testis

B. Bone

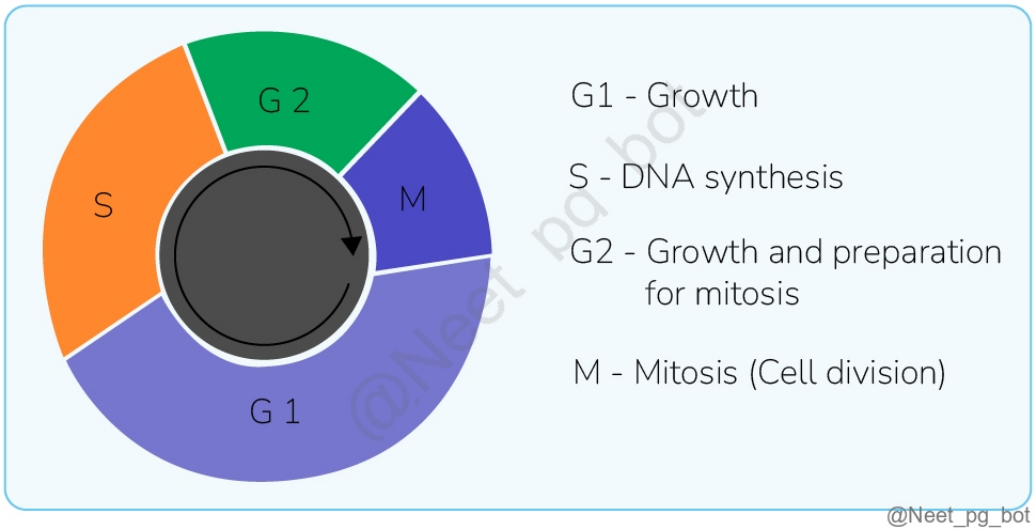
C. Nerve

D. Muscle

Correct Answer: A. Testis

Explanation: Radiosensitivity refers to the susceptibility of tissues or cells to damage from ionizing radiation. It is influenced by the Law of Bergonié and Tribondeau , which states that rapidly dividing, undifferentiated cells are more sensitive to radiation. Testis : Highly radiosensitive due to the presence of rapidly dividing spermatogonia in the germinal epithelium. Even low doses of radiation can impair spermatogenesis, making it the most

radiosensitive tissue among the options. According to the Law of Bergonie: The more the cells are rapidly dividing, the more they are sensitive to radiation. M-phase (dividing phase) is the most radiosensitive phase S-phase (Synthesizing phase) is the most radioresistant phase Most radiosensitive tissue in the body is Bone marrow (rapidly dividing). Most radioresistant tissue in the body is neurons (non-dividing). Most radiosensitive cells in the blood are lymphocytes. The most radioresistant cell in the blood is the platelet. The most radioresistant organ in the body is the vagina. Bone (Option B): Bones, especially mature ones, are relatively radioresistant due to low mitotic activity. Nerve (Option C): Nerve cells are highly differentiated and do not undergo cell division, making them radioresistant . Muscle (Option D): Muscle cells are also highly differentiated and have low mitotic activity, making them radioresistant like nerve tissue.



References:

https://pmc.ncbi.nlm.nih.gov/articles/PMC7312565/#:~:text

↑ *Back to this question in Part A*

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Q32: Which among the following radioactive isotopes is not employed in brachytherapy? (Q793101)

A. Iodine-125

B. Iodine-131

C. Cobalt-60

D. Iridium-192

Correct Answer: B. Iodine-131

Explanation: Correct Option B: Iodine-131 is used in Systemic Radiotherapy like Papillary Thyroid Carcinoma. I-131 is also used for the treatment of benign hyperthyroid conditions. It is, however, not used in any form of brachytherapy. Therefore, option b is the correct answer. In brachytherapy, a radiation source is placed inside the body of tumor tissue or on the body of tumor tissue. This minimizes radiation exposure to the persons handling it and also to the person who is receiving brachytherapy. Incorrect Options: Option A - Iodine- 125: I-125, with a half-life of 60 days, is the most common radioactive isotope used in permanent interstitial brachytherapy. Hence, it is an incorrect choice. Option B - Cobalt- 60: These radioactive isotopes are produced by neutron activation of stable cobalt-59. They have a half-life of 5.27 years. These have been used in intracavitary or HDR brachytherapy for a long. Therefore, it is an incorrect choice. Option D - Iridium-192: Iridium-192 is produced by neutron activation of stable Iridium-191. They have a half-life of 73.83 days. These radioactive isotopes are used in HDR brachytherapy.

References:

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↑ *Back to this question in Part A*

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• [02_Musculoskeletal Radiology] 005 Musculoskeletal Radiology - I

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[02_Musculoskeletal Radiology] 005 Musculoskeletal Radiology - I — Quick Jump

Q1 (p. 564)	*Q2 (p. 569)*	*Q3 (p. 575)*	*Q4 (p. 578)*	*Q5 (p. 582)*	*Q6 (p. 585)*
Q7 (p. 590)	*Q8 (p. 596)*	*Q9 (p. 601)*	*Q10 (p. 606)*	*Q11 (p. 609)*	*Q12 (p. 613)*
Q13 (p. 617)	*Q14 (p. 620)*	*Q15 (p. 623)*	*Q16 (p. 626)*	*Q17 (p. 627)*	*Q18 (p. 633)*
Q19 (p. 637)	*Q20 (p. 643)*	*Q21 (p. 649)*	*Q22 (p. 652)*	*Q23 (p. 655)*	*Q24 (p. 656)*
Q25 (p. 661)	*Q26 (p. 666)*				

Q1: A 47-year-old woman with a history of chronic kidney disease (CKD) from diabetic nephropathy has been on hemodialysis for three years. She reports persistent back pain and changes in posture. An X-ray shows specific findings, shown below. What is the most likely diagnosis? (Q853031)

A. Ankylosing spondylitis

B. Hyperparathyroidism

C. Osteoporosis

D. Osteoblastic metastases

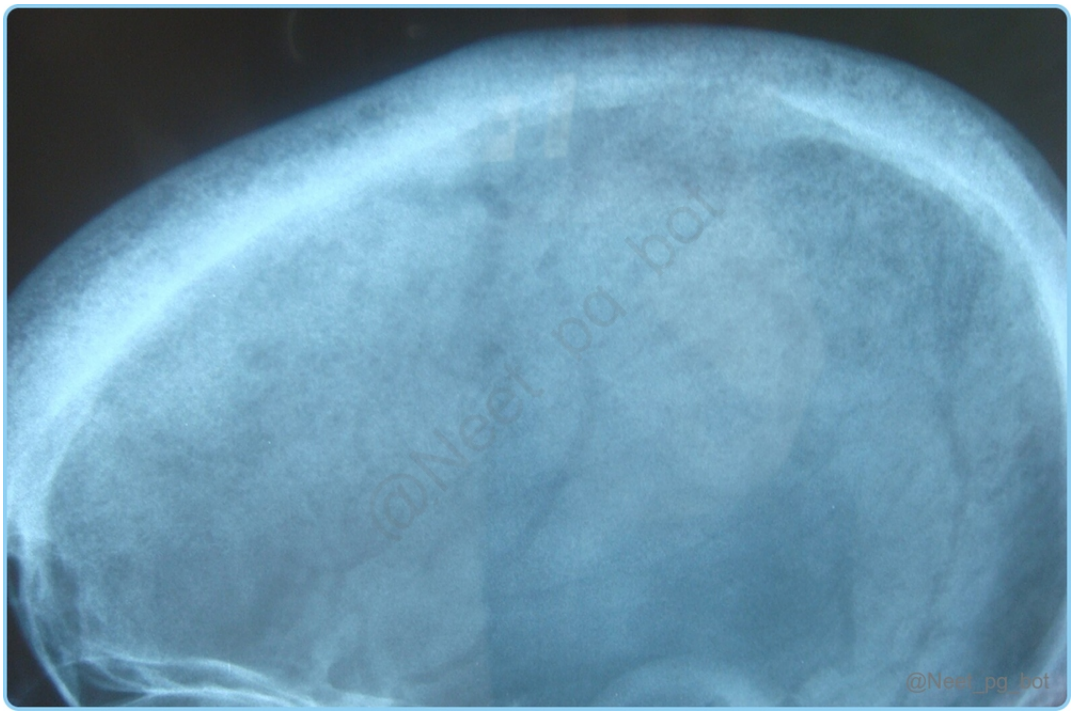


Correct Answer: B. Hyperparathyroidism

- *Listen (English)*
- *Listen (Hindi)*

Explanation: The scenario depicts a case of Renal osteodystrophy (Secondary Hyperparathyroidism), with the X-ray showing Rugger jersey spine. Radiological features of Hyperparathyroidism Subperiosteal resorption usually starts in the middle phalanx of the index finger's radial side, leading to a concavity of bone (the earliest bone change). The "salt and pepper" appearance, or pepper pot skull (lytic lesions in the skull). Brown tumor or osteitis fibrosa cystica: Cystic lesions resulting from excessive osteoclastic resorption appear as low-density, multiloculated cysts that can cause bone expansion, often accompanied by hemorrhage and granulation tissue (more common in primary hyperparathyroidism). Rugger jersey spine: Characterized by alternating black and white striations, with sclerosed white end plates and black vertebral bodies; commonly seen in renal osteodystrophy (secondary hyperparathyroidism). Ankylosing spondylitis (Option A) shows sacroiliac joint erosions, bamboo spine and dagger sign. Osteoporosis (Option C) show osteopenia and biconcave vertebrae, often referred to as codfish or fish-mouth vertebrae. Osteoblastic metastases (Option D) is characterised by increased density and sclerosis, commonly referred to as "ivory vertebra."

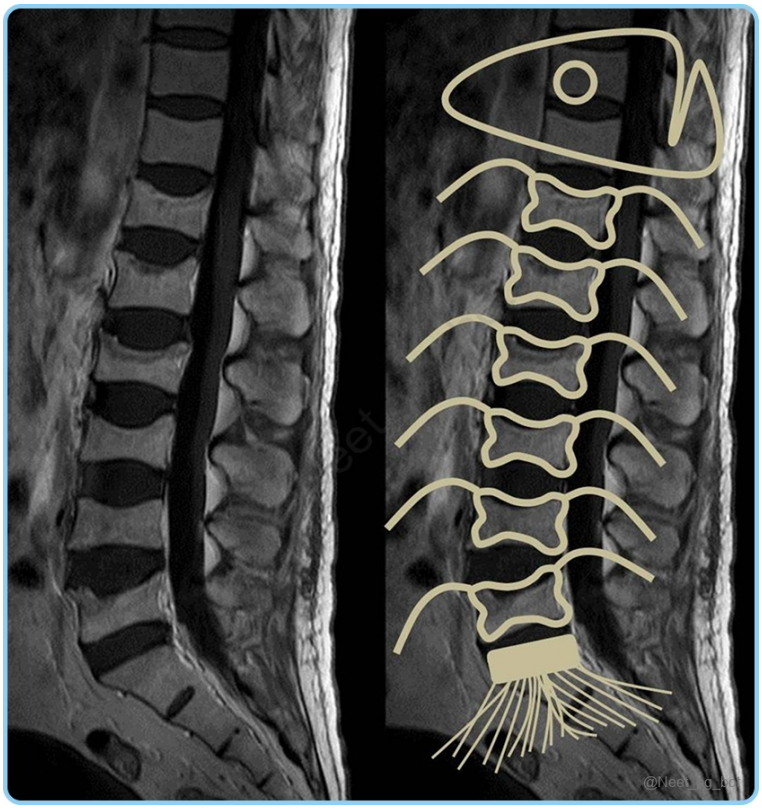

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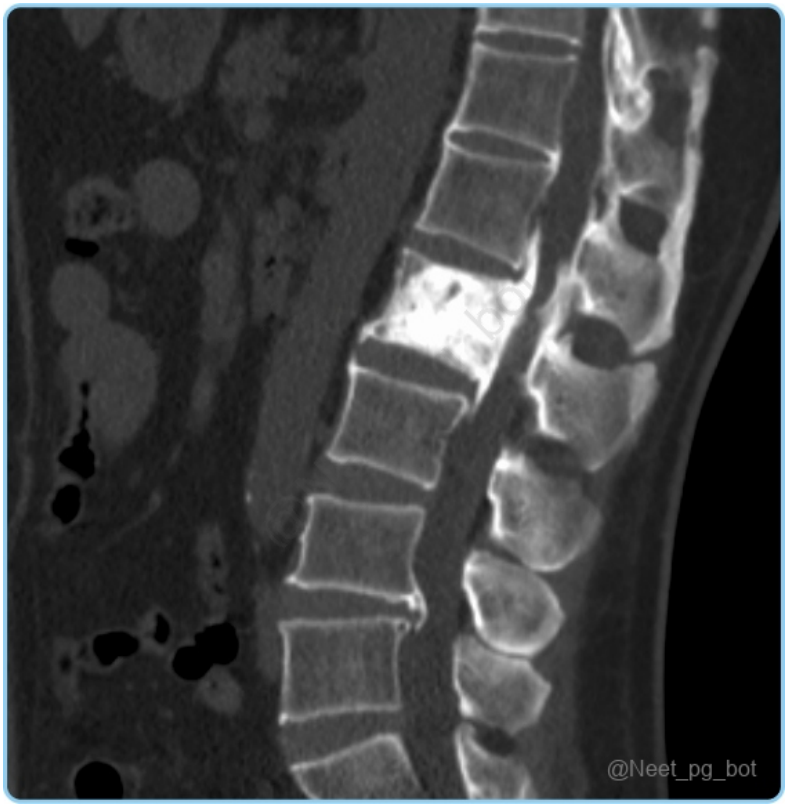

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References:

Grainger and Allison’s Diagnostic Radiology, 7th Edition, Pages 1104-1107.

David Sutton’s Textbook of Radiology and Imaging, Volume II, 7th Edition, Page 1062.

↑ *Back to this question in Part A*

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Q2: A 62-year-old man with a history of heart failure and sensorineural hearing loss presents with worsening bone pain in his pelvis and lower back, fatigue, heaviness in his legs, tibial deformities, and occasional headaches. Laboratory tests show elevated alkaline phosphatase (ALP) levels. Which radiographic finding is least likely associated with his condition? (Q853047)

A. Osteoporosis circumscripta

B. Tam O'Shanter sign

C. Candle flame sign

D. Champagne glass pelvis.

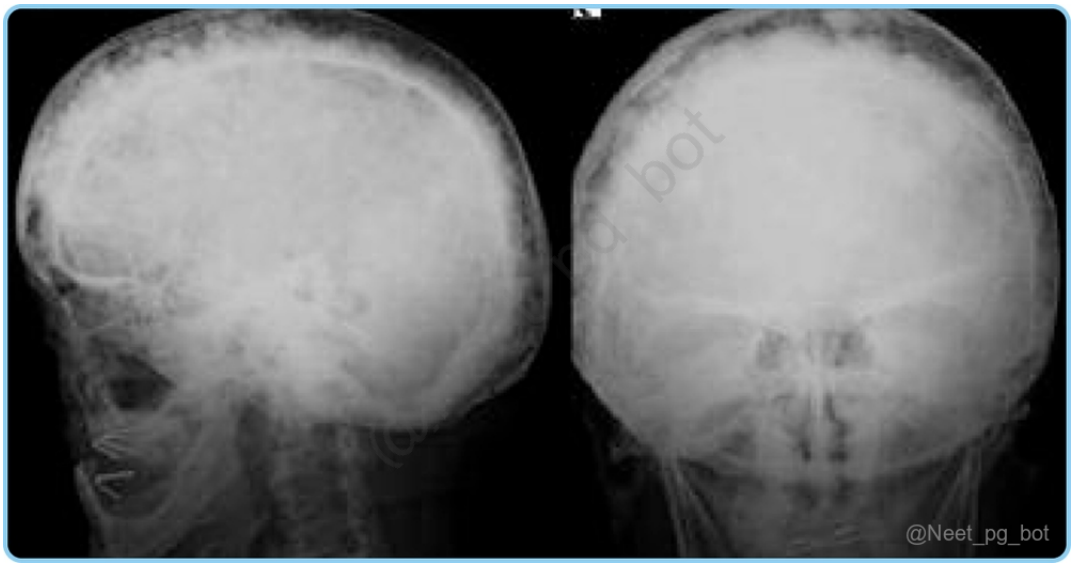
Correct Answer: D. Champagne glass pelvis.

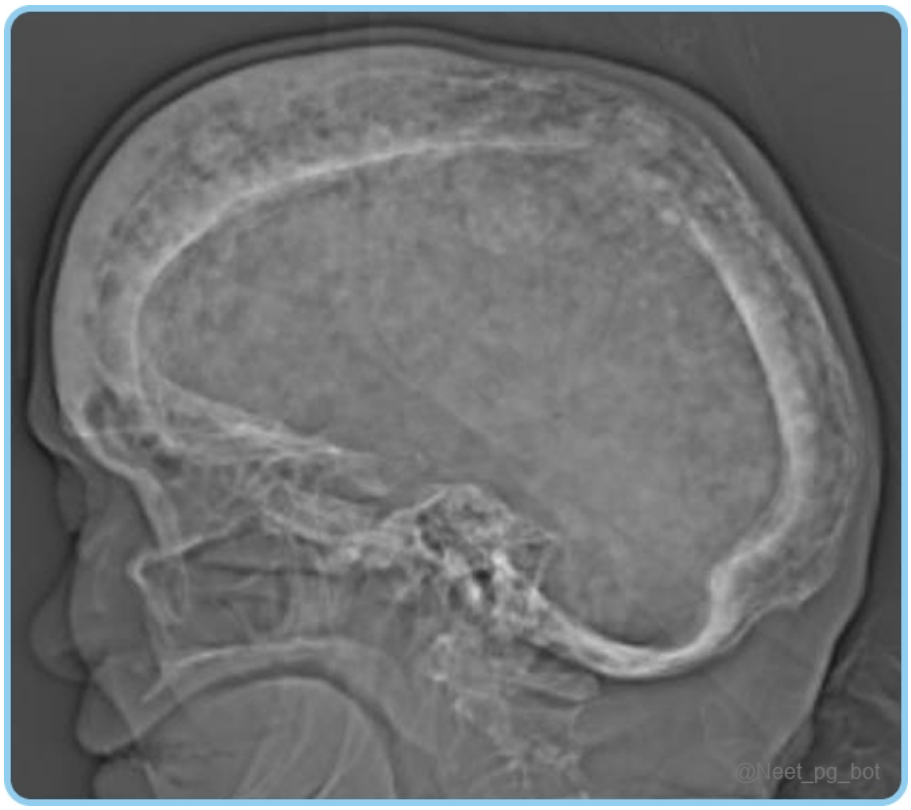
- *Listen (English)*
- *Listen (Hindi)*

Explanation: The scenario describes a case of Paget’s disease (osteitis deformans). The champagne glass pelvis (Option D) is typically observed in Achondroplasia and is not associated with Paget's disease. Paget’s disease (osteitis deformans): A non-neoplastic condition that is characterised by abnormal bone remodelling. Clinical features: Seen in elderly patients Presents with bone pain, sensorineural hearing loss (SNHL) (cranial nerve compression) Cardiac failure (hyperdynamic circulation) Raised alkaline phosphatase (ALP), but calcium and phosphorous levels are normal Radiological features: Osteoporosis circumscripta (Option A) : A circumscribed patch of osteoporosis in the skull. The cotton wool appearance of the skull (due to sclerosis) Tam O'Shanter sign : The skull's expansion and flattened base create the appearance of the skull tilting over the facial structures (due to the thickening of the frontal bone). (Option B) Blade of grass appearance or candle flame sign (Option C) : Flame-shaped lesion extending along the shaft of the bone. Picture frame vertebra: The vertebrae appear enlarged and have a thickened cortical bone due to excessive bone remodeling and disorganized osteoblastic activity. Ivory vertebra: Lincoln sign or Black Beard sign: Increased radiotracer uptake in the mandible gives it a distinctive black beard appearance that signifies abnormal bone metabolism in Paget’s disease. Banana fractures: Occur in a region of abnormal bone.



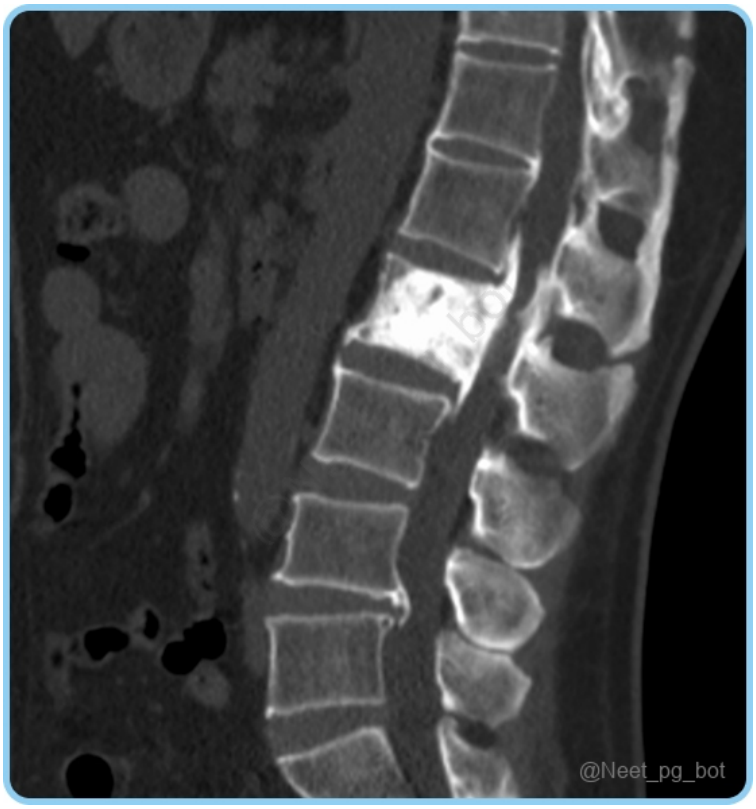

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References:

Grainger and Allison’s Diagnostic Radiology, 7th Edition, Page 1057.

David Sutton’s Textbook of Radiology and Imaging, Volume II, 7th Edition, Page 694.

Apley and Solomon’s System of Orthopaedics and Trauma, 10th Edition, Page 151, 152.

↑ *Back to this question in Part A*

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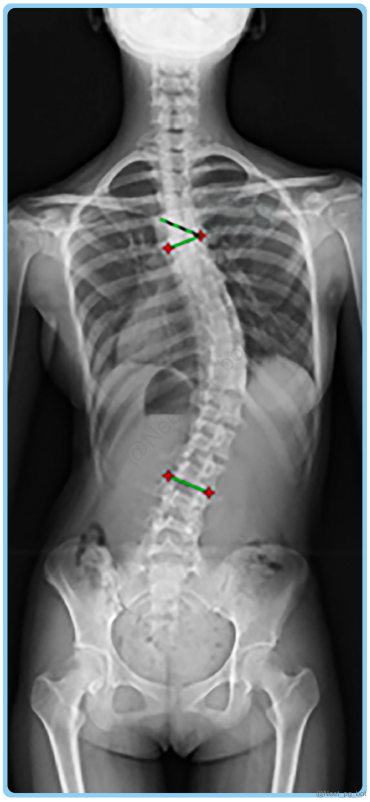
Q3: Which angle is typically used to measure the degree of spinal curvature? (Q853063)

A. Codman angle

B. Ferguson angle

C. Cobb angle

D. Q-angle

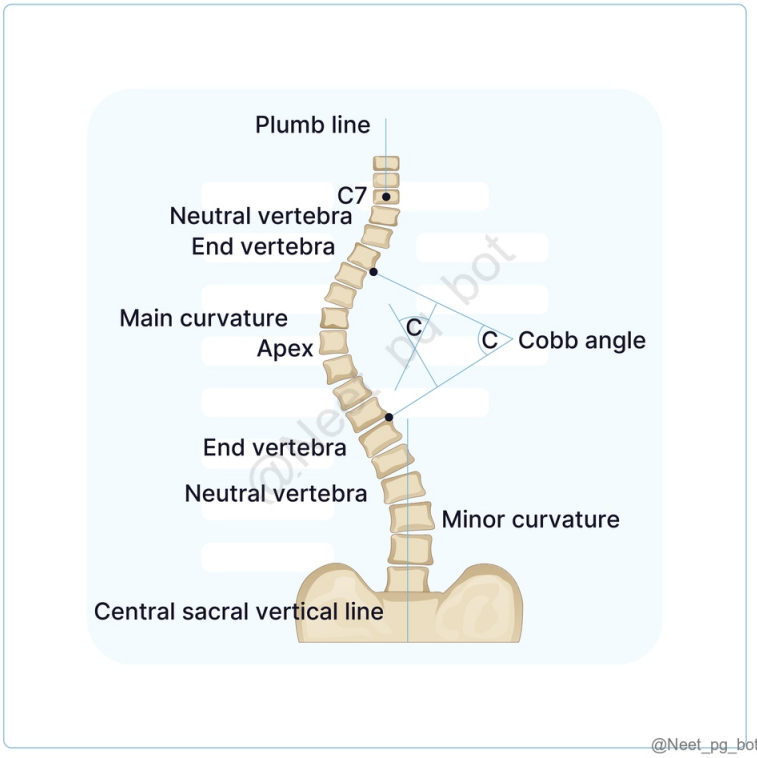


Correct Answer: C. Cobb angle

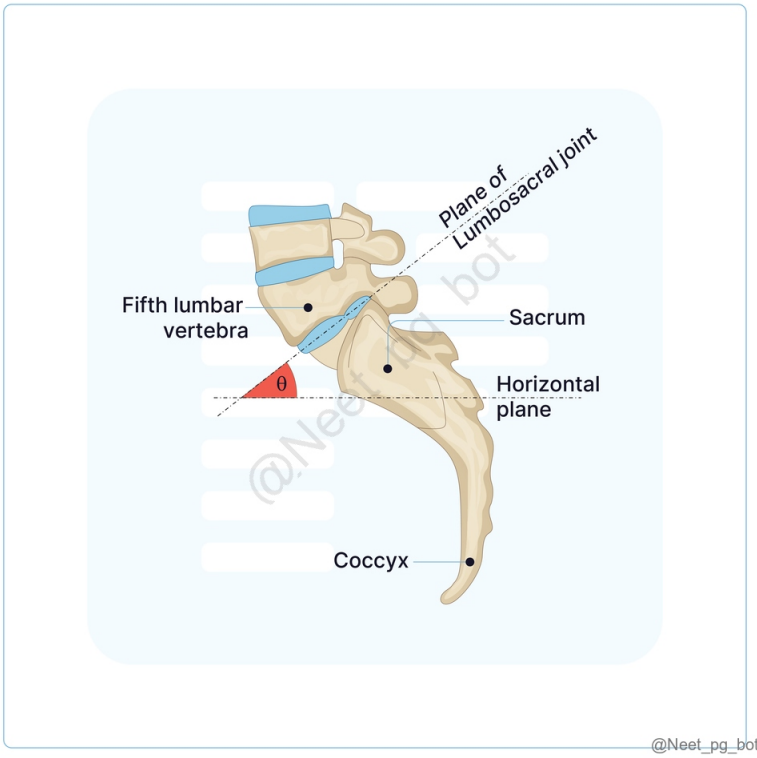
■ *Listen (English)*

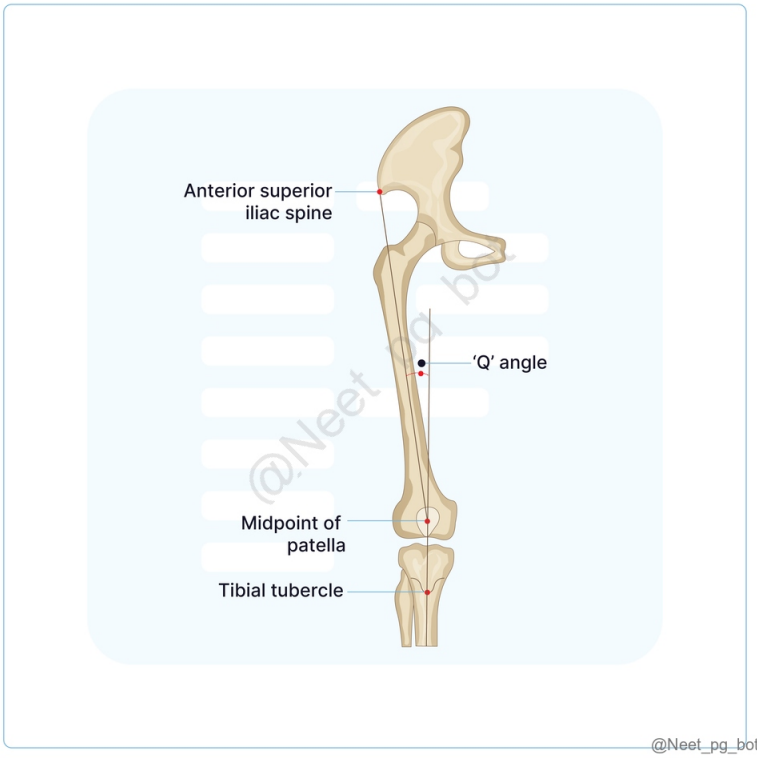
■ *Listen (Hindi)*

Explanation: The given X-ray finding suggests Scoliosis and Cobb Angle is used to assess the degree of curvature in this condition. Cobb Angle: It is measured by the intersection of perpendicular lines drawn to the end plates of the most tilted vertebrae in a spinal curve . A Cobb angle greater than 10° in the coronal plane indicates scoliosis. Codman Angle (Option A) is formed by the intersection of a line along the bone cortex and another line at the point where the periosteum is elevated. This is typically seen in conditions such as Ewing sarcoma and osteosarcoma. Ferguson Angle (Option C) is the angle formed between the plane of the sacral base (the upper surface of the sacrum) and the horizontal plane, used to assess lumbar lordosis. Q Angle (Option D) is formed by the intersection of a line drawn from the anterior superior iliac spine (ASIS) to the centre of the patella and a second line from the centre of the patella to the tibial tuberosity. The Q-angle assesses knee alignment and is used to evaluate patellofemoral dysfunction and ACL injury risk.




Codman triangle
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Plane of Lumbosacral joint
Fifth lumbar vertebra
Sacrum
θ
Horizontal plane
Coccyx
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References:

David Sutton's Textbook of Radiology and Imaging, Volume 2, 8th Edition, Page 1122

Grainger and Allison's Diagnostic Radiology, 7th Edition, Page 1265,1266

↑ *Back to this question in Part A*

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Q4: A 5-year-old boy presents with short stature and disproportionate limb length. His parents mention he has a broad forehead and has been slower to walk than peers & genetic testing reveals mutation in FGFR3 gene. Based on this presentation, which of the following radiological findings is least likely associated with his condition? (Q853090)

A. Bullet nose vertebrae

B. Tam o'shanter sign

C. Trident hand sign

D. Champagne glass pelvis

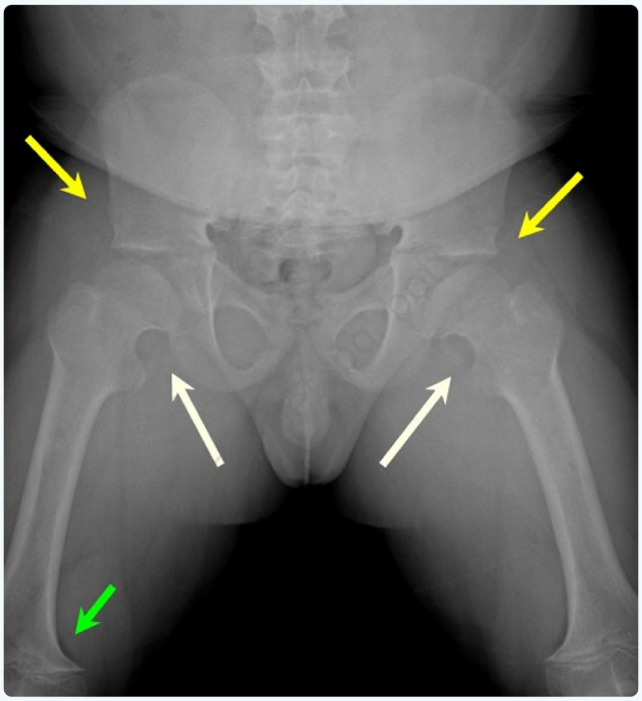
Correct Answer: B. Tam o'shanter sign

- *Listen (English)*
- *Listen (Hindi)*

Explanation: The clinical presentation along with FGFR3 gene mutation suggests Achondroplasia & tam o'shanter sign is not typically associated with this condition. It is associated with Paget’s disease. Achondroplasia Genetic condition caused by FGFR3 gene mutation featuring short stature and short proximal limbs, kyphosis, exaggerated lumbar lordosis Radiological findings: Trident hand sign (Option C) Pelvic champagne glass appearance (Option D) Tombstone appearance of the iliac blade Bullet nose vertebrae (Option A) Chevron sign

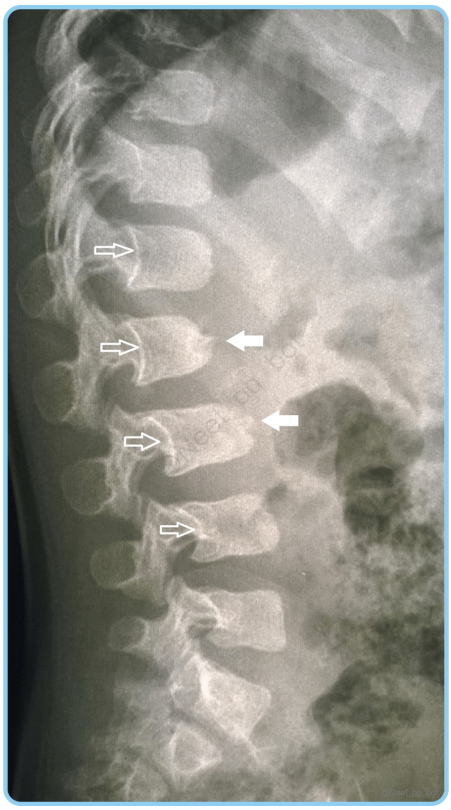


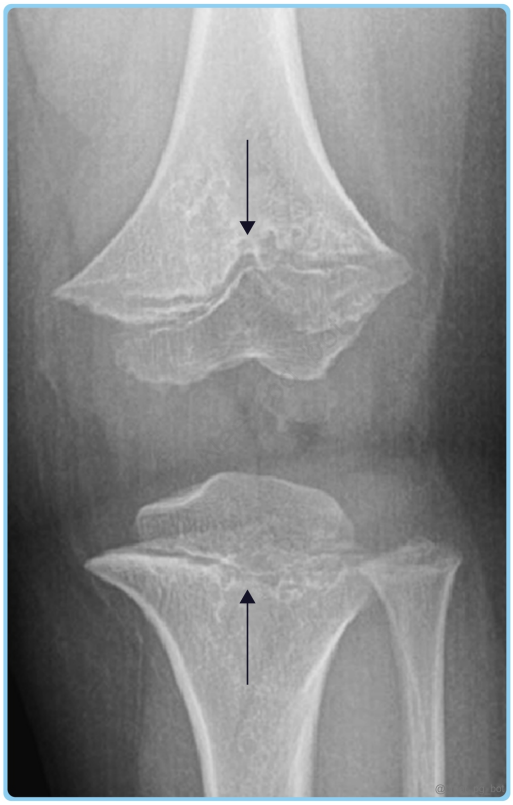




Tombstone appearance

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References:

Apley and Solomon’s System of Orthopaedics and Trauma, 10th Edition, Page 164,165

↑ *Back to this question in Part A*

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Q5: A 28-year-old female presents to the emergency department with sudden pain in her right foot after playing soccer. She reports hearing a "snap" when she landed awkwardly while attempting to head the ball. On examination, swelling and tenderness are noted. An X-ray is shown below. What is the most likely diagnosis? (Q853089)

A. Aviator fracture

B. Jones fracture

C. Pseudo-jones fracture

D. Lover’s fracture



Correct Answer: B. Jones fracture

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: The presented scenario, along with the X-ray findings, is diagnosed as a Jones fracture . Jones fracture Site Fracture of the base of the fifth metatarsal (extra-articular fracture) Mechanism It is caused by the pull exerted by the tendon of the peroneus brevis muscle inserted on it. X-ray Pseudo- jones Fracture (Option C): Intra-articular fracture at the base of 5th metatarsal . Aviator fracture (Option A) is the fracture of the neck of the talus resulting from forced dorsiflexion of the ankle. Lover's fracture (Option D) is a burst fracture of the calcaneus (heel bone) . It typically occurs when the heel is crushed under body weight, such as in a car accident or a fall from a height.




Jones Fx
Pseudo-Jones Fx
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References:

Apley and Solomon’s System of Orthopedics and Trauma, 10th Edition, Page 962

Essential Orthopaedics, by J. Maheshwari, 5th Edition, Page 166

↑ *Back to this question in Part A*

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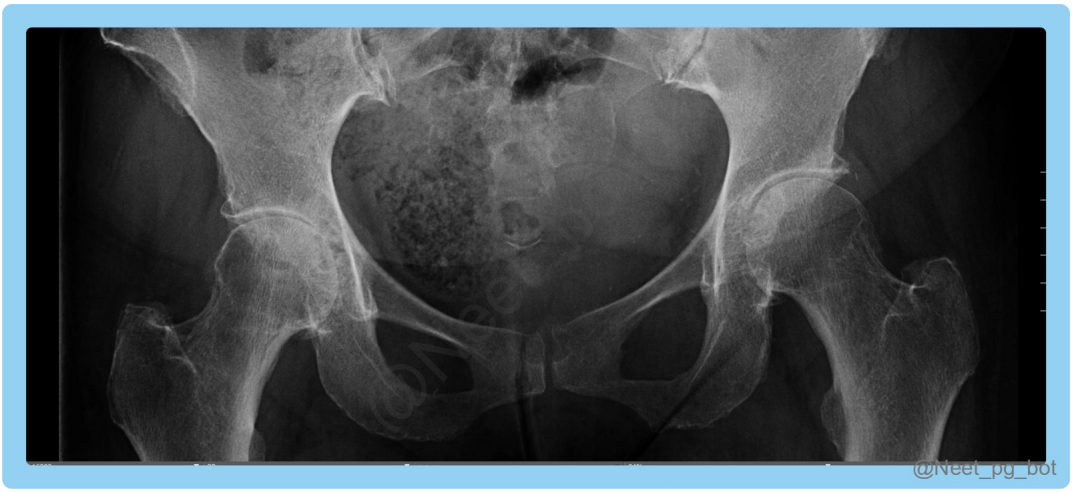
Q6: A 78-year-old woman presents to the emergency department with a sudden onset of severe left hip pain after falling in her living room. She reports losing her balance while trying to stand up from the couch. X-rays reveal disruption of Shenton's line. Based on the findings, which of the following conditions would most likely preserve Shenton's line? (Q853088)

A. Femoral neck fracture

B. Posterior hip dislocation

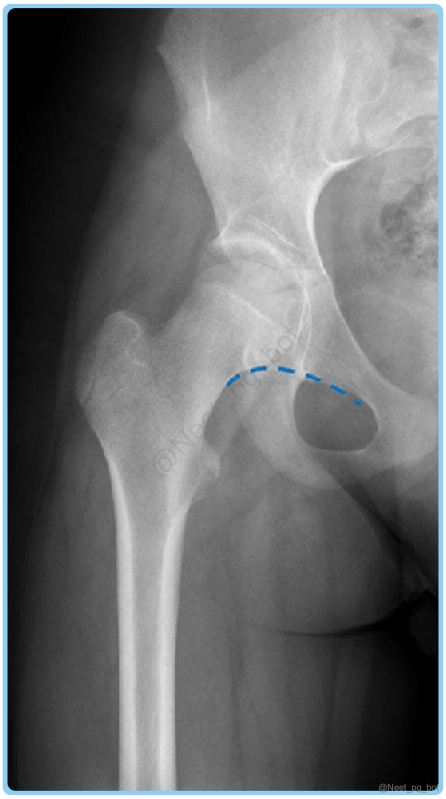
C. Intertrochanteric fracture

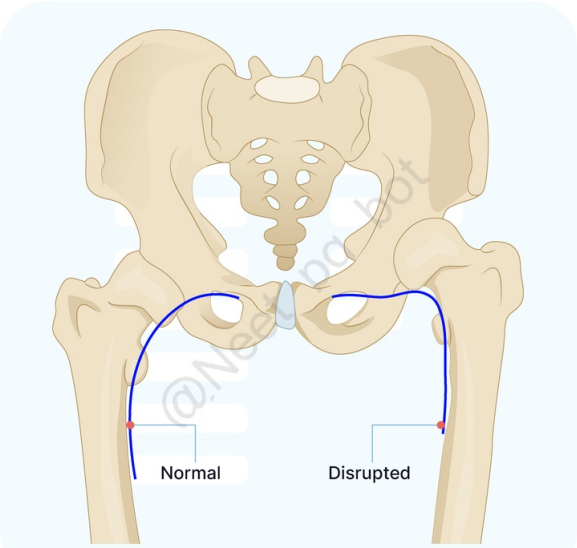
D. Osteoarthritis of the hip



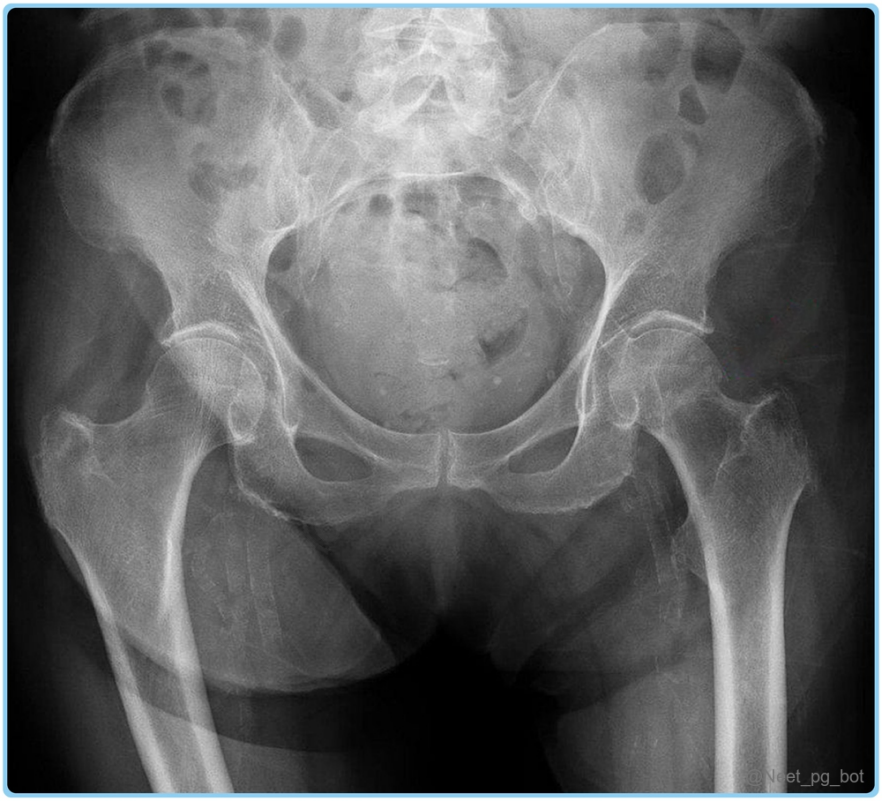
Correct Answer: D. Osteoarthritis of the hip

Explanation: In Osteoarthritis of the hip, Shenton's line is often preserved. It involves joint degeneration, which can lead to changes in joint space but does not typically displace the femoral head in a way that disrupts Shenton's line. Significance of Shenton’s line: The given X-ray indicates a disruption of Shenton's line , often seen in hip injuries involving femoral head displacement. It is a smooth curve (imaginary line) formed by the inferior border of the neck of the femur with the superior margin of the obturator foramen . It can be disrupted in various traumatic and pathological conditions of the hip joint, a few of which include: Condition X-ray Fracture neck of the femur (Option A) Posterior dislocation of the hip (Option B) Intertrochanteric fracture (Option C) Developmental dysplasia of the hip (DDH) Hip conditions with intact Shenton’s Line are: Conditions X-ray Normal hip joint Osteoarthritis of the hip joint (Early stage) (Option D) Tuberculosis of the hip joint

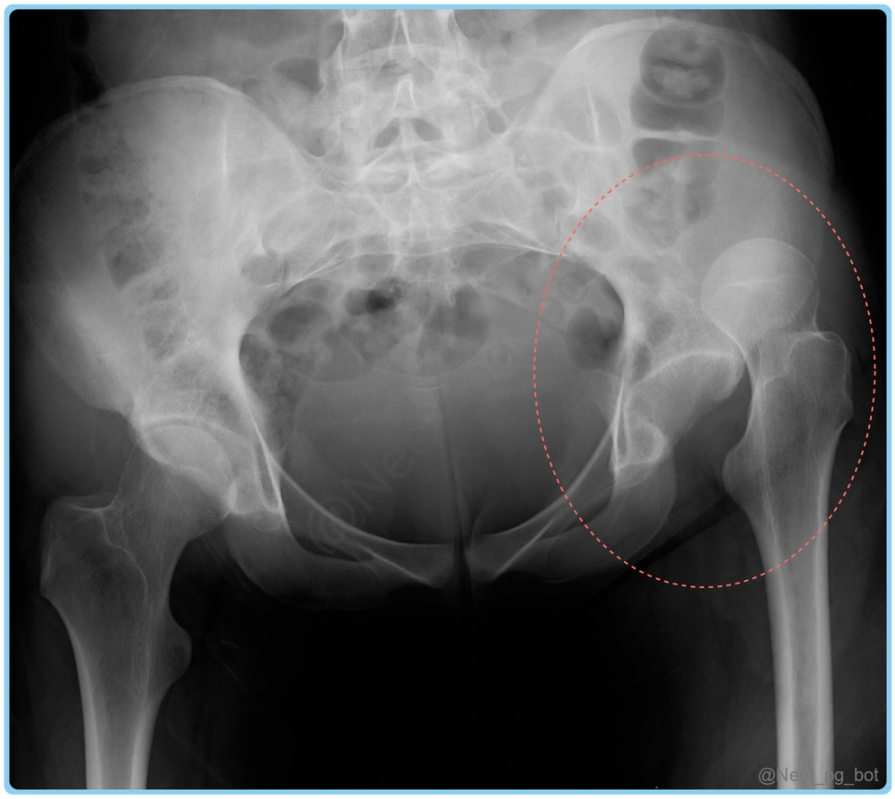


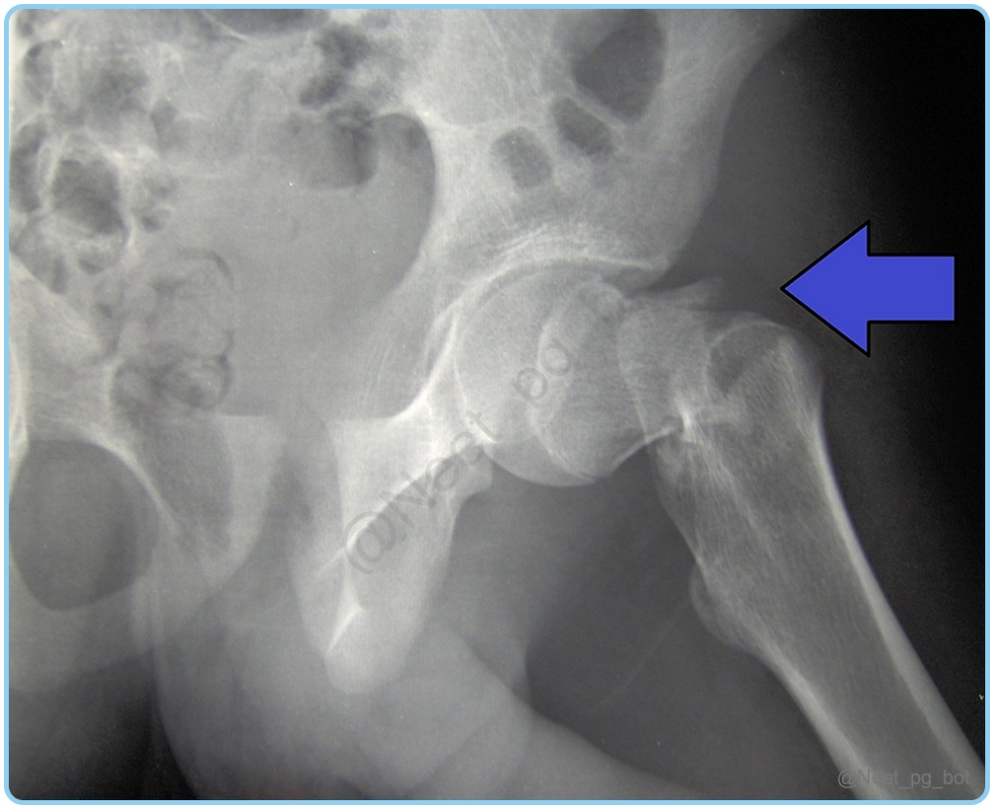


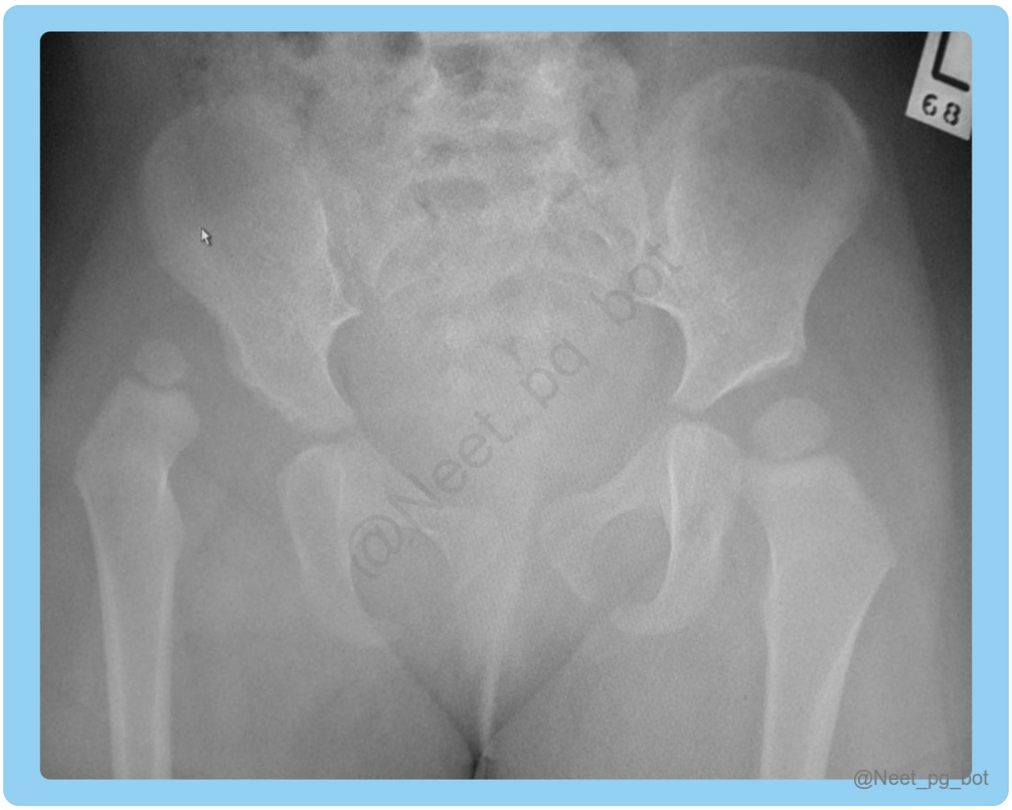
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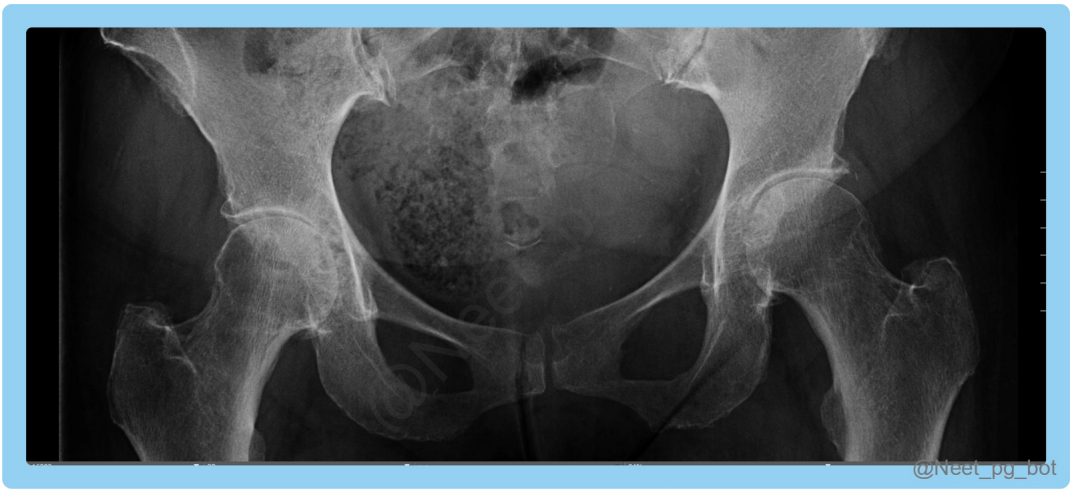
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References:

Essential Orthopaedics, by J. Maheshwari, 5th Edition, Page 130, 222.

Textbook of Orthopedics, by Ebenezer, 5th Edition, Page 479.

↑ *Back to this question in Part A*

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Q7: Match the following fractures with their radiographs: 1. Bennett's fracture a. 2. Rolando's fracture b. 3. Gamekeeper fracture c. 4. Boxer's fracture d. (Q853087)

A. 1-d, 2-c, 3-a, 4-b

B. 1-b, 2-d, 3-a, 4-c

C. 1-c, 2-a, 3-b, 4-d

D. 1-b, 2-a, 3-d, 4-c






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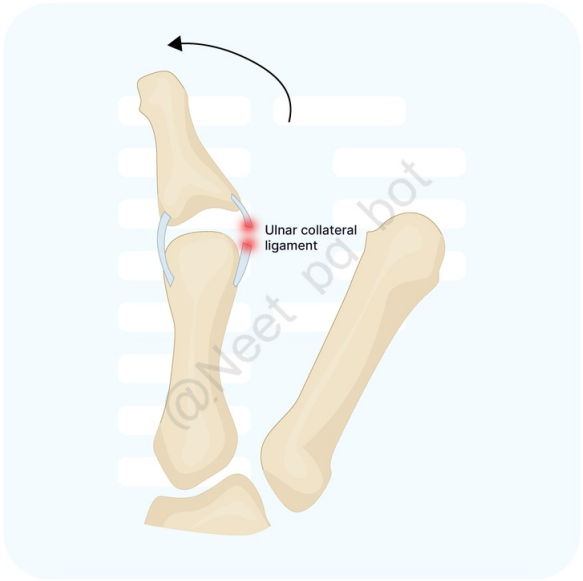
Correct Answer: B. 1-b, 2-d, 3-a, 4-c

- *Listen (English)*
- *Listen (Hindi)*

Explanation: Fracture Description X-ray Bennett’s fracture Oblique intra-articular fracture of the base of the first metacarpal with subluxation of the metacarpal. Rolando’s fracture A complete articular fracture (‘T' or 'Y' shaped) of the first metacarpal. Skier’s thumb or Gamekeeper’s thumb A tear of the ulnar collateral ligament in the metacarpophalangeal joint. Boxer’s fracture Fracture through the neck of the metacarpal (commonly the 5th metacarpal). Cause: Closed fist hits against a hard object







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References:

Apley and Solomon’s System of Orthopedics and Trauma, 10th Edition, Pages 817, 818, 824.

Essential Orthopaedics, by J. Maheshwari, Fifth Edition, Pages 3, 117, 118, 122.

↑ *Back to this question in Part A*

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Q8: A 25-year-old man presents with wrist pain and swelling following a fall while skiing and also reports difficulty moving his wrist. Based on the X-ray findings, what is the cause of his condition? (Q853086)

A. Avascular necrosis of Scaphoid

B. Scaphoid waist fracture line

C. Radial styloid fracture leading to carpal instability

D. Scapholunate ligament tear

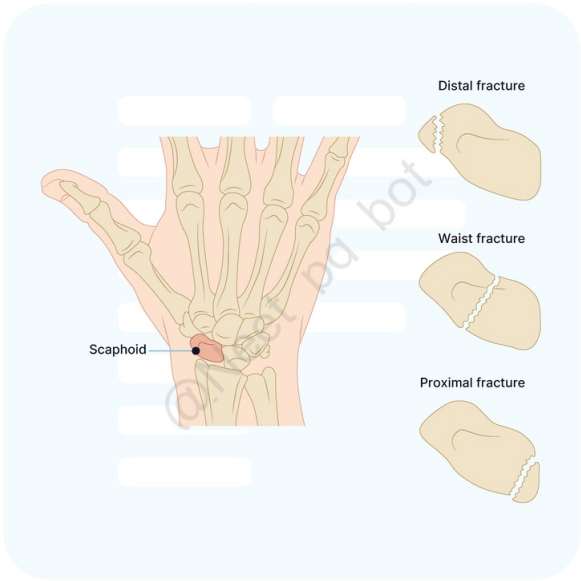


Correct Answer: D. Scapholunate ligament tear

■ *Listen (English)*

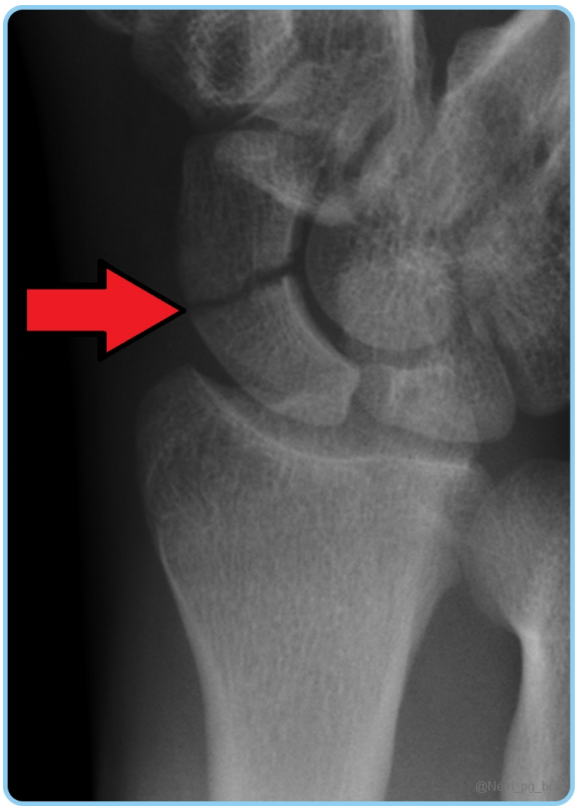
■ *Listen (Hindi)*

Explanation: The above radiograph shows Terry Thomas sign , i.e increased gap between the scaphoid and lunate bones which is indicative of Scapholunate ligament dissociation. This ligament tear commonly occurs after a fall onto an outstretched hand or may occur secondarily following a radial styloid fracture or a scaphoid fracture. Category Scapholunate dislocation Scaphoid fracture Definition This occurs when an injury disrupts the scapholunate ligament , leading to instability between the scaphoid and lunate bones. It can occur in 3 sites. • Distal tubercle • Waist (Common) • Proximal pole Mechanism of injury • Fall on the dorsi■exed hand • Fall on outstretched hand • Secondary to radial-styloid fracture Signs & Radiological findings Terry Thomas sign (increased gap between the scaphoid and lunate bones) • Tenderness over anatomical snuff box. • A ‘Humpback sign’ is observed in displaced fractures. Waistline fracture of scaphoid (Option B) Treatment • Early detection : Surgical repair with K-wire fixation is done • Chronic case (without arthritis): Ligament repair is preferred. • Chronic case (with arthritis): Proximal row carpectomy, four-corner fusion or radio scapholunate arthrodesis is preferred . • Immobilization with Scaphoid cast or Bohler-Gauntlet scaphoid cast for undisplaced fractures • ORIF with Herbert's screw. Complications • Carpal instability • Increased risk of osteoarthritis. • Avascular necrosis (Option A) is common in proximal pole fractures of the scaphoid due to the radial artery primarily supplying the distal pole. It may show a ground-glass appearance , increased bone density , and, occasionally, collapse and fragmentation on X-ray. • Non-union Radial styloid fracture, also known as a Chauffeur's fracture (Option C), is an intra-articular injury to the distal radius. The force responsible for this fracture may also cause a scaphoid fracture and damage to carpal ligaments, potentially leading to carpal instability.


Distal fracture
Waist fracture
Proximal fracture
Scaphoid

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References:

David Sutton Textbook of Radiology and Imaging, Volume 2, 8th edition, Page 3290

Maheshwari Essential Orthopedics, 5th Edition, Page 115

Apley and Solomon’s System of Orthopaedics and Trauma, 10th Edition, Page 807, 802, 800

radiopaedia.org/cases/scaphoid-fracture-with-avn-1

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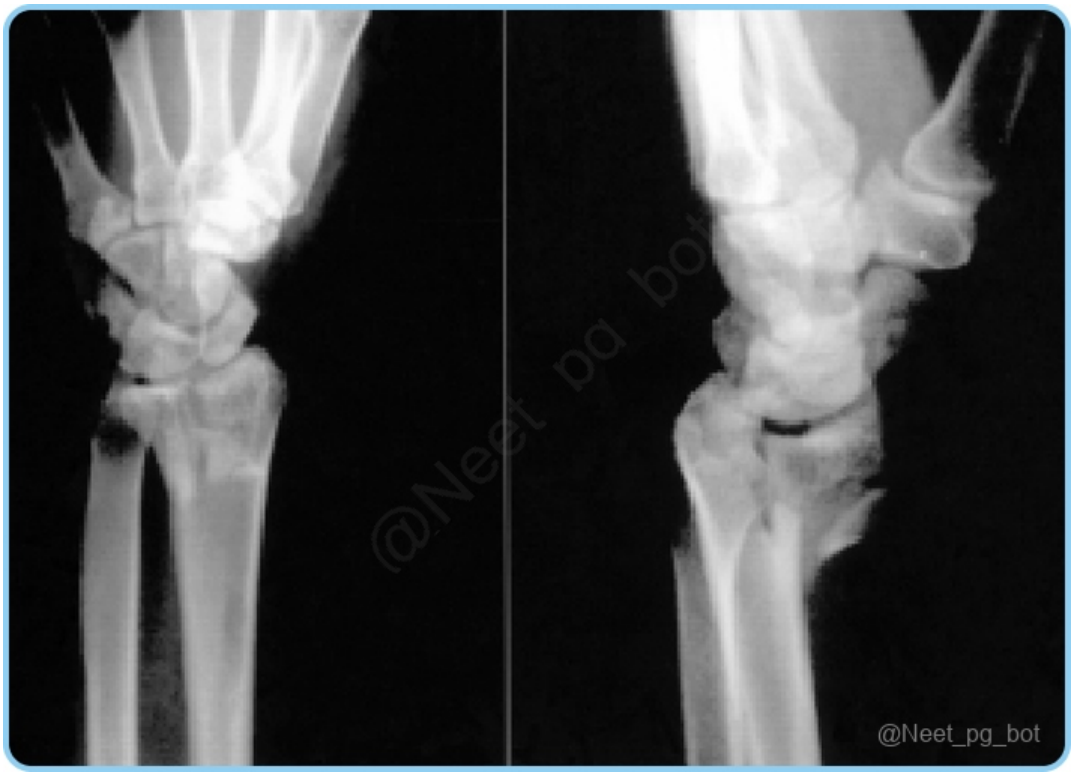
Q9: A 32-year-old woman presents with wrist pain and swelling after sustaining a fall on an outstretched hand. An X-ray is performed; what is the likely diagnosis based on the findings? (Q853084)

A. Hutchinson fracture

B. Colles fracture

C. Smith fracture

D. Barton’s fracture



Correct Answer: D. Barton’s fracture

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: The given X-ray depicts an intra-articular fracture of the distal radius, called Barton’s fracture. It is usually accompanied by a dislocation of the radiocarpal joint. Barton’s fracture Site Distal radius Mechanism of injury Fall on an outstretched hand Displacement Volar Barton’s fracture : Anterior displacement of the fracture fragment. Dorsal Barton’s fracture : Posterior displacement of the fracture fragment. Management Closed reduction Open Reduction and Internal Fixation (ORIF) X-ray Hutchinson fracture (Option A) , also called Chauffeur's fracture , is an intra-articular fracture of the radial styloid process at the distal radius caused by a fall or by direct impact in a car accident and commonly associated with carpal ligament injury. Colles fracture (Option B) is an extra-articular distal radius fracture characterised by dorsal angulation and displacement , caused by a fall on an outstretched hand and commonly present with Dinner-fork deformity. Smith fracture (Option C), also called Reverse-Colles fracture, involves a fracture of the distal radius with ventral displacement of the distal fragment. This fracture commonly occurs from a fall onto a flexed wrist, leading to a garden-spade deformity , along with wrist pain, swelling, and limited range of motion.

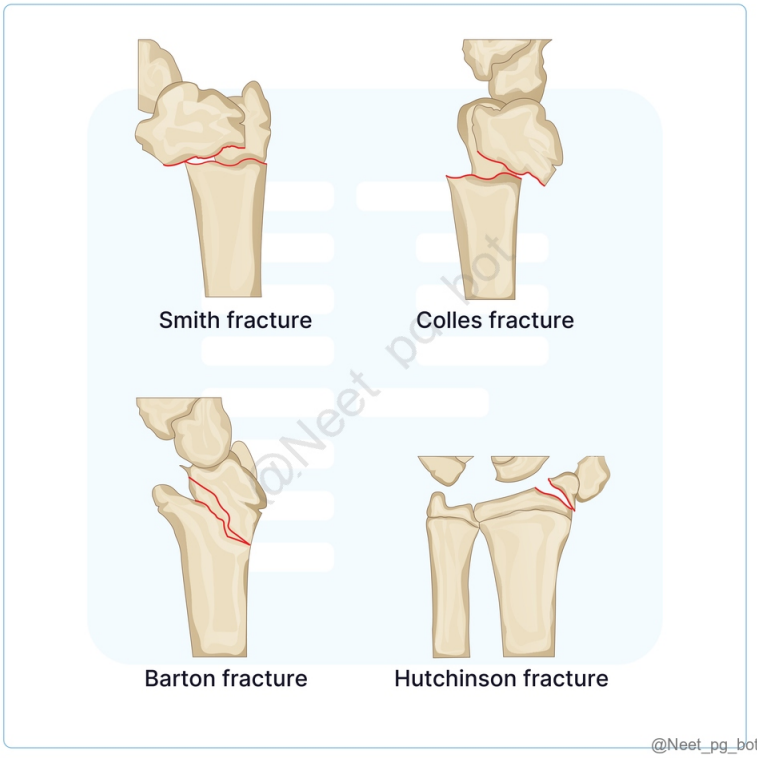




Dorsal displacement

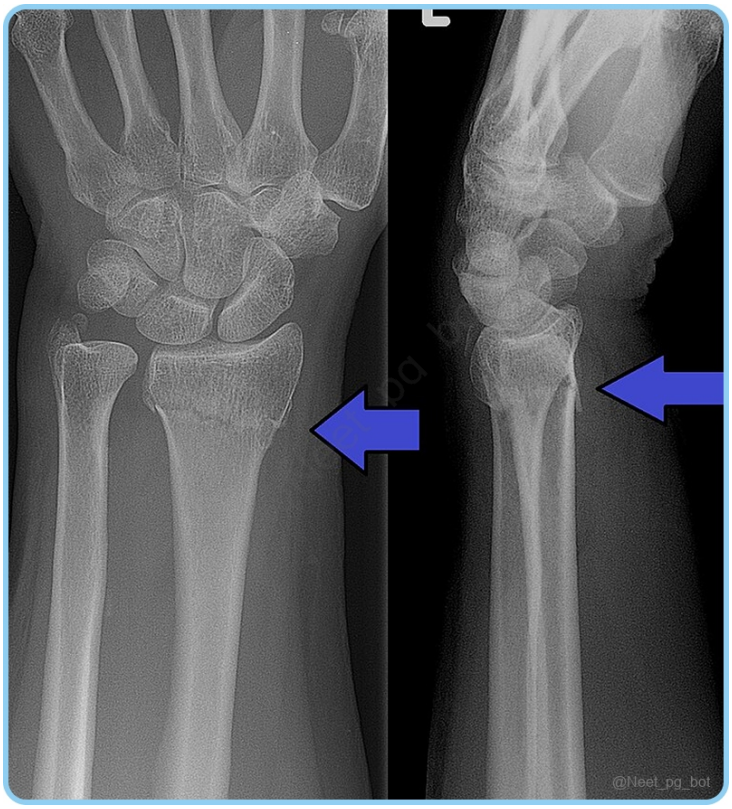
Ventral displacement

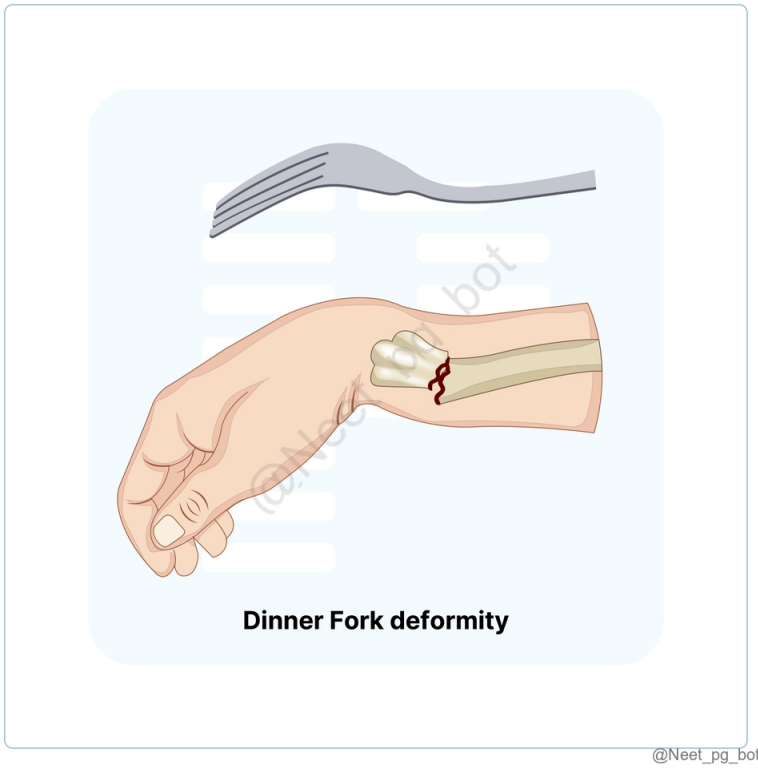
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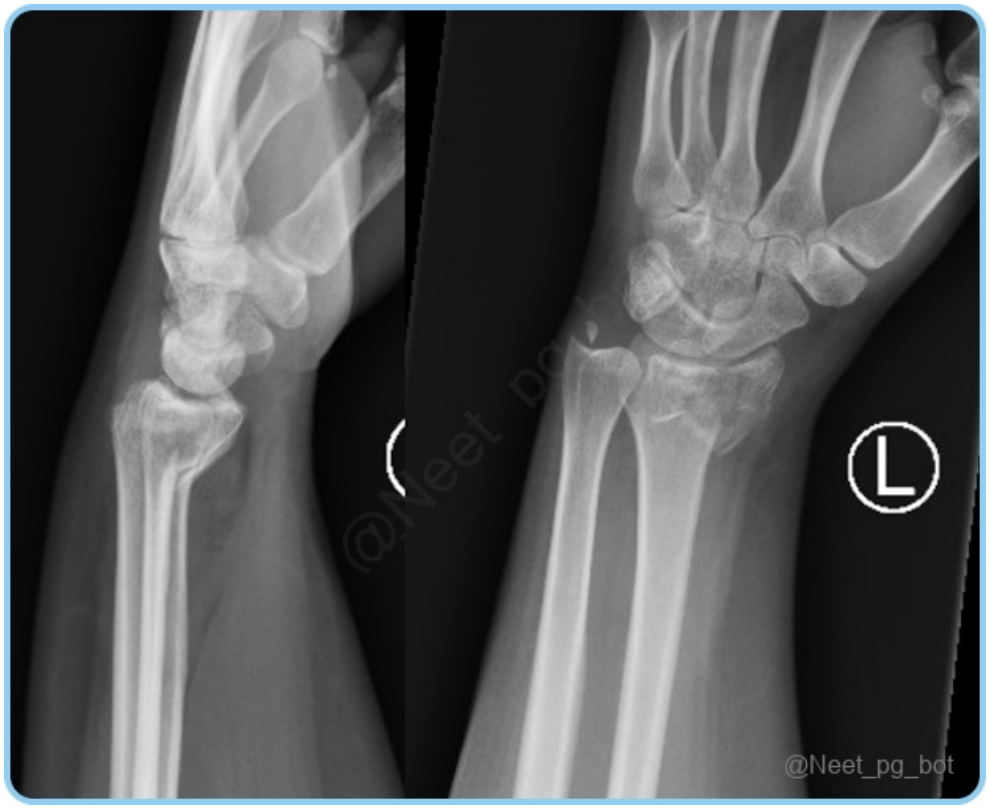


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References:

Maheshwari Essential Orthopedics, 5th Edition, Page 114, 112

David Sutton’s Textbook of Radiology and Imaging, Volume 2, 8th Edition, Page 3278, 3276, 3277, 3275

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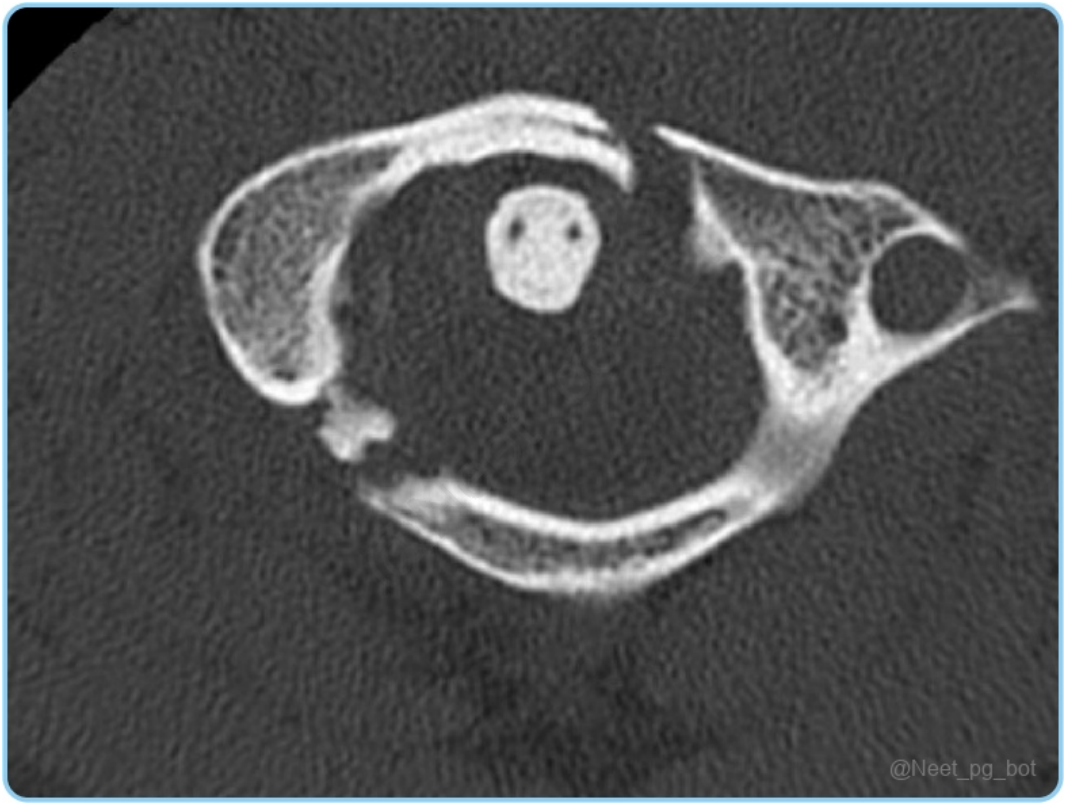
Q10: A 28-year-old man presents with severe neck pain and limited head movement after falling from a 13-foot building. Examination reveals tenderness and restricted motion in the cervical spine. Based on his radiological findings, what is the likely diagnosis? (Q853082)

A. Chance fracture

B. Hangman's fracture

C. Clay shoveller’s fracture

D. Jefferson fracture

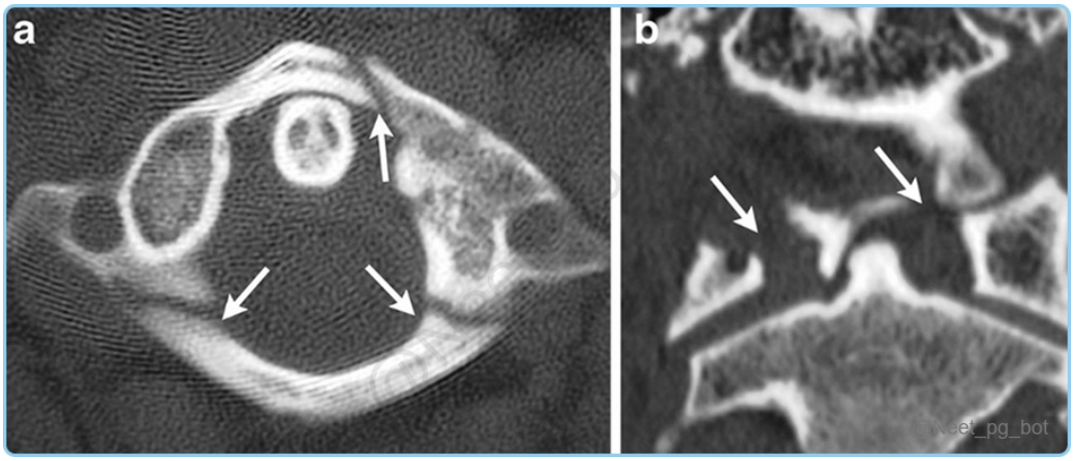


Correct Answer: D. Jefferson fracture

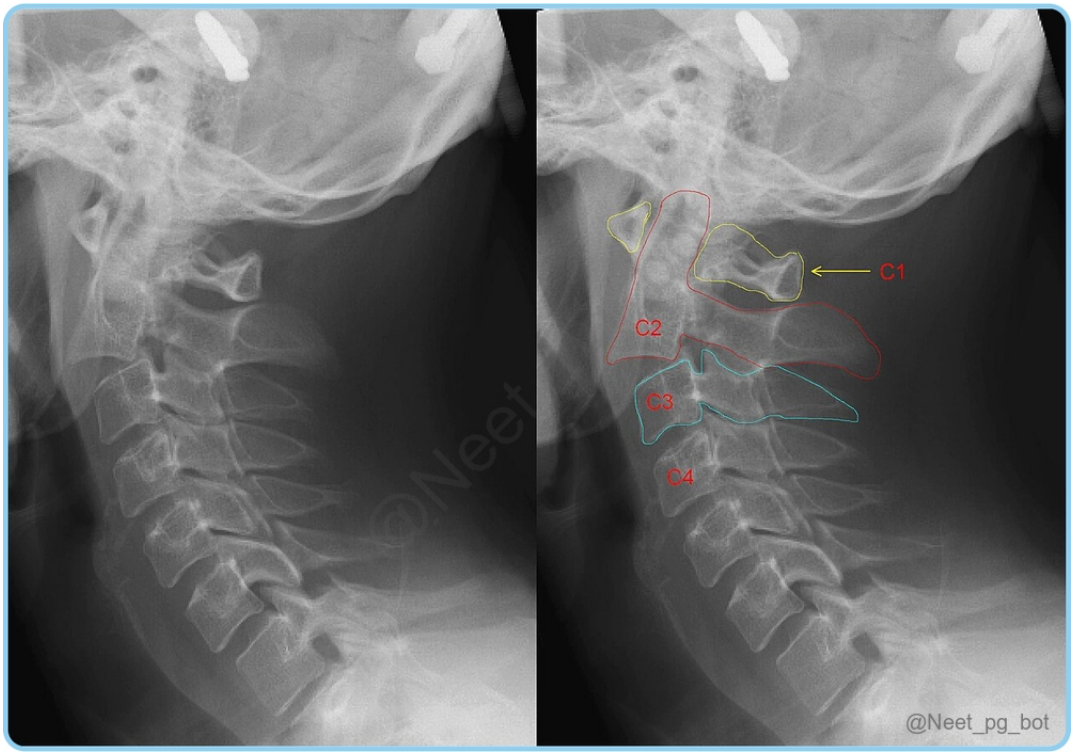
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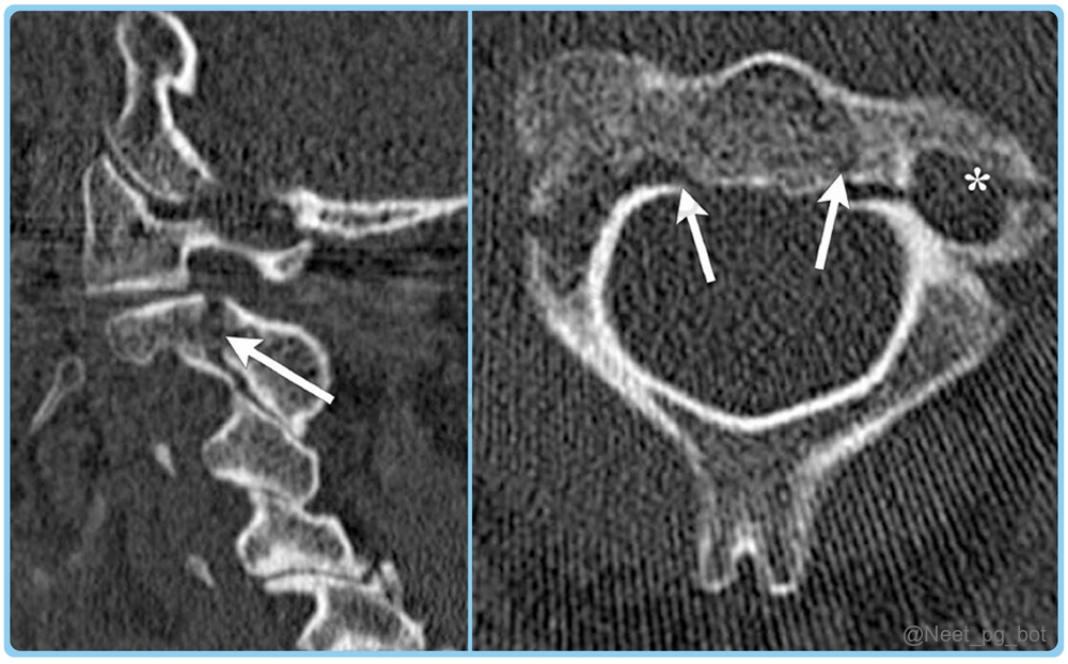
■ *Listen (Hindi)*

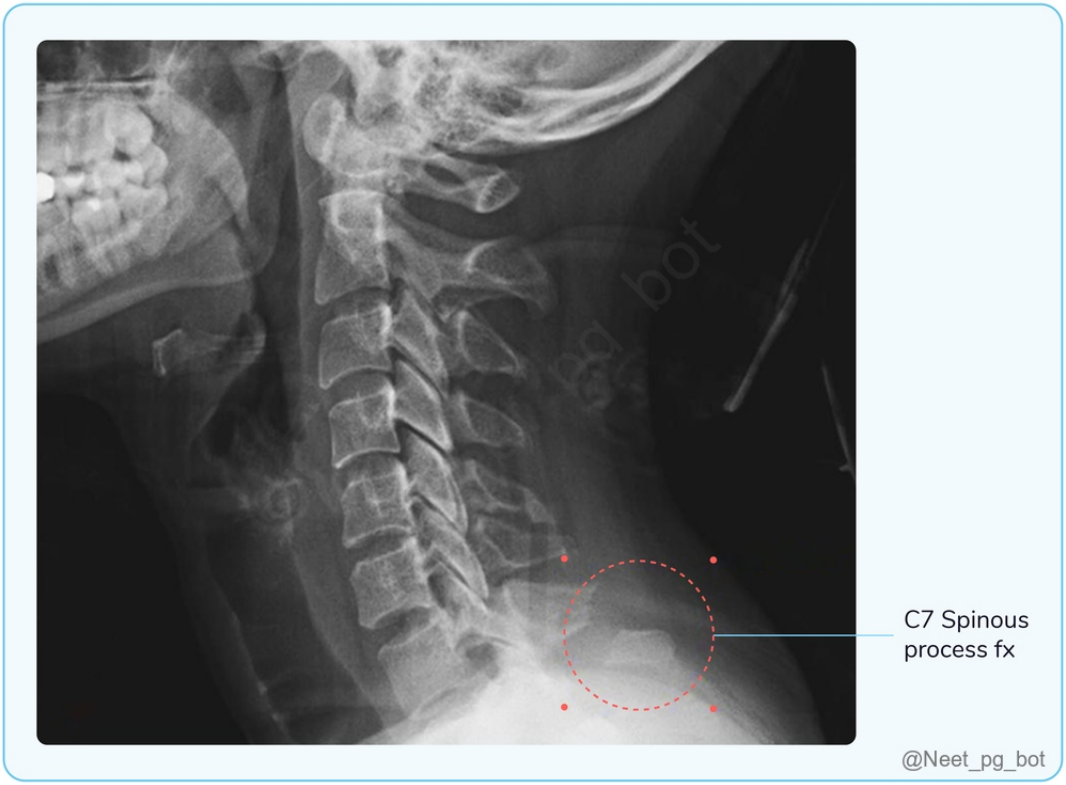
Explanation: The depicted radiograph is a CT scan of the cervical spine showing a Jefferson burst fracture of the C1 vertebra (atlas). This fracture typically results from an axial load, such as a fall onto the head or a direct blow, causing a burst-type injury. Features: Lateral displacement of the lateral masses of C1 relative to C2. Fracture lines in the anterior and posterior arches of C1. Potential instability if there is transverse ligament rupture. Unstable fractures: Posterior fixation with pedicle screw system Chance fracture (Option A) is a seatbelt injury that results from a flexion-distraction mechanism . It involves disruption of the posterior column structures and is frequently associated with intra-abdominal injuries. Radiographic findings show a horizontal fracture through the posterior elements or disruption of the facet joints and spinous processes. Hangman's fracture (Option B) refers to a bilateral fracture of the pedicles of the C2 vertebra caused by hyperextension and axial loading of the cervical spine. The lamina, pedicles, and other parts of the posterior axis may also be involved in this type of fracture. Clay shoveller’s fracture (Option C) is an avulsion fracture of the spinous process in the lower cervical or upper thoracic spine. It typically occurs due to sudden muscle contraction or direct trauma to the upper back.






C1
C2
C3
C4
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References:

Apley and Solomon’s System of Orthopaedics and Trauma, 10th Edition, Page 857, 856, 854, 845

David Sutton Textbook of Radiology and Imaging, Volume 2, 8th Edition, Page 3224

Maheshwari Essential Orthopedics, 5th Edition, Page 273

Radiopedia radiopaedia.org/articles/clay-shoveler-fracture-2

↑ *Back to this question in Part A*

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Q11: A 17-year-old male presents with a 3-month history of persistent pain and swelling above the left ankle, with constant and worsening discomfort, especially during physical activity. On examination, there is tenderness and a palpable mass over the lateral aspect of the distal fibula. An X-ray shows characteristic findings depicted in the image. What is the most likely diagnosis? (Q853077)

A. Ewing's Sarcoma

B. Osteosarcoma

C. Osteoblastoma

D. Osteochondroma



Correct Answer: B. Osteosarcoma

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: The clinical presentation and X-ray findings show increased density in the distal fibula due to tumour-induced bone production, along blood vessels creates a radiographic appearance resembling sun rays, which strongly suggests Osteosarcoma. It is the second most common and highly malignant primary bone tumor of mesenchymal cells. It commonly occurs in the metaphysis of the lower end of the femur, the upper end of the tibia, and the upper end of the humerus. Radiological Findings: Irregular destruction in the metaphysis, often with new bone formation. Periosteal reaction : Irregular, intense periosteal reaction distinct from the smooth, layered reaction seen in osteomyelitis. Codman's Triangle : A triangular area of subperiosteal new bone at the tumour-host cortex junction. Sun-Ray Appearance : New bone formation along blood vessels creates a radiographic appearance resembling sun rays. Ewing's Sarcoma (Option A) is an aggressive tumor that primarily affects children and presents as a diaphyseal lesion with an "onion peel" appearance on imaging. Osteoblastoma (Option C) is a benign tumor typically occurring in the jaw and spine, and in long bones, it is found in the diaphysis or metaphysis . Radiologically, it appears as a well-defined, expansile radiolucent bone lesion and won’t show a cortical reaction and aggressive features as in osteosarcoma. Osteochondroma (Option D) typically manifests as an exophytic growth from the bone surface.


Codman triangle
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References:

J.Maheshwari Essential Orthopaedics, 5th Edition, Page 239, 240

↑ *Back to this question in Part A*

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Q12: A 30-year-old patient presents with localized pain and swelling in the anterior tibia. X-ray findings reveal the characteristics shown in the image. Based on these imaging features, what is the most likely diagnosis? (Q853076)

A. Simple Bone Cyst

B. Giant Cell Tumor

C. Aneurysmal Bone Cyst

D. Adamantinoma

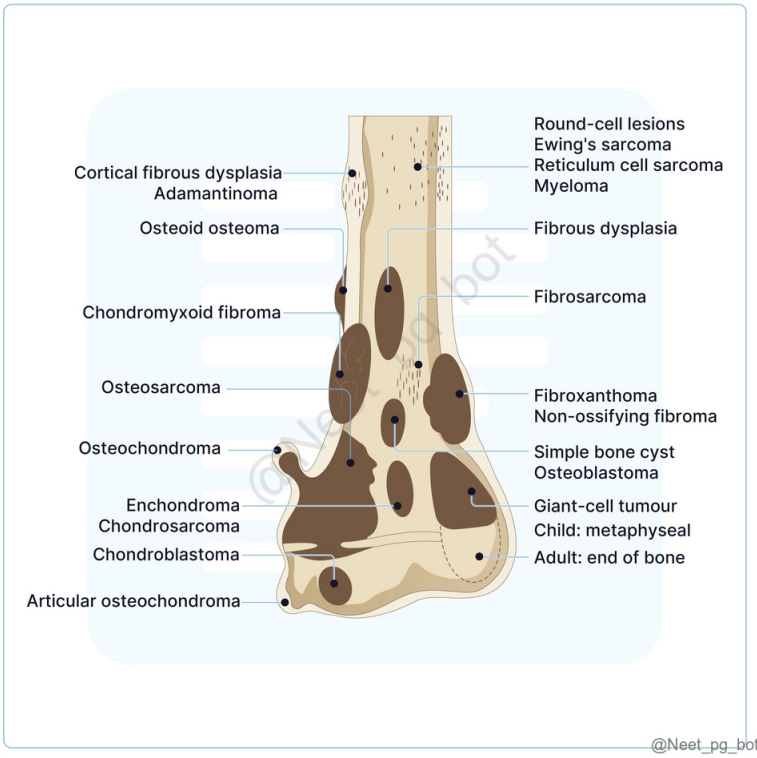


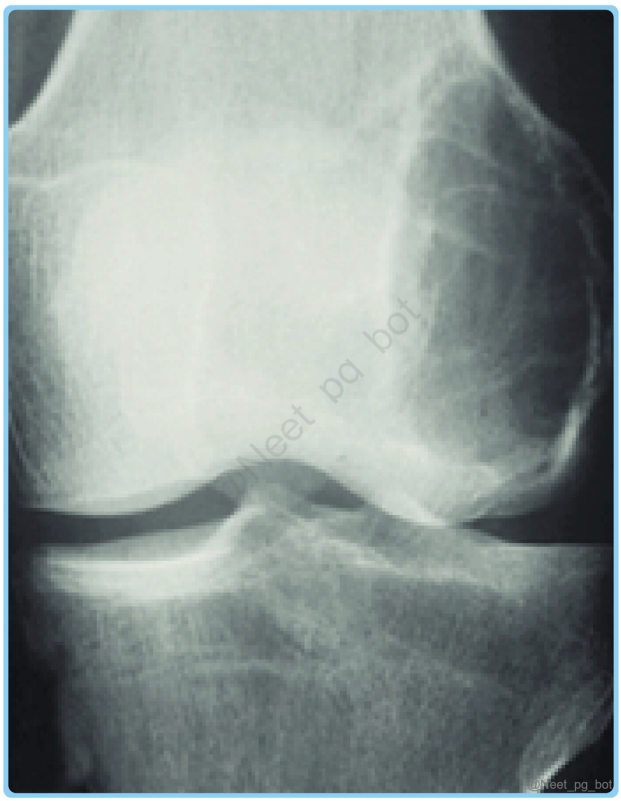
Correct Answer: D. Adamantinoma

- *Listen (English)*
- *Listen (Hindi)*

Explanation: The given clinical scenario, along with the X-ray finding showing lobulated lucent cystic lesions with disruption of the anterior cortex in the tibia, points towards Adamantinoma. Adamantinoma: (Rare, low-grade malignant tumor) It primarily affects the tibial diaphysis in up to 90% of cases. Commonly occurs in individuals aged 20 to 40 years Typically present with pre-tibial pain, swelling , and occasionally fractures. Radiological Features: Expansive, lobulated, lucent cystic lesion with disruption of the anterior cortex. Lytic Lesions : Characterized by multiple well-defined lucencies (Honeycomb-like Appearance) . Sclerosis : Interspersed sclerotic areas within the lytic regions. Extra-osseous Extension : 30% of cases Most Common Sites of Primary Bone Tumor: Epiphysis Metaphysis Diaphysis Chondroblastoma : Most common before puberty. Osteoclastoma/GCT(Giant Cell Tumor): Most common after puberty. Chondrosarcoma Osteochondroma Bone Cyst Enchondroma Osteosarcoma Osteoclastoma Ewing’s Tumor Lymphoma Multiple Myeloma Adamantinoma Osteoid Osteoma Giant Cell Tumor (Osteoclastoma) (Option B) typically occurs in the epiphyseal region of long bones, especially around the knee, after puberty. It is characterized by a distinct "soap-bubble appearance" on imaging due to multiloculated lytic lesions. Simple Bone Cyst (Option A) typically appears as a well-defined, unilocular lytic lesion with a thin, sclerotic border in the metaphysis of long bones. It does not disrupt the cortex or cause significant soft tissue mass. Aneurysmal Bone Cyst (Option C) appears as an expansile, lytic lesion with a "multilocular" appearance. It typically affects the metaphysis and may cause cortical thinning or disruption. MRI often shows a blood-filled cystic structure with fluid levels.


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Round-cell lesions
Ewing's sarcoma
Reticulum cell sarcoma
Myeloma
Cortical fibrous dysplasia
Adamantinoma
Osteoid osteoma
Fibrous dysplasia
Fibrosarcoma
Chondromyxoid fibroma
Osteosarcoma
Fibroxanthoma
Non-ossifying fibroma
Osteochondroma
Simple bone cyst
Osteoblastoma
Enchondroma
Chondrosarcoma
Giant-cell tumour
Child: metaphyseal
Chondroblastoma
Adult: end of bone
Articular osteochondroma
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References:

Apley and Solomon’s System of Orthopaedics and Trauma, 10th Edition, Page 219

J.Maheshwari’s Essential Orthopedics, 5th Edition, Page 244, 250

↑ *Back to this question in Part A*

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Q13: A 10-year-old patient presents with symptoms suggestive of osteomyelitis. An MRI is performed, and the radiologist notes a finding indicative of acute osteomyelitis. Which of the following findings is considered pathognomonic for this condition? (Q853074)

A. Penumbra sign

B. Bone marrow edema

C. Sequestrum

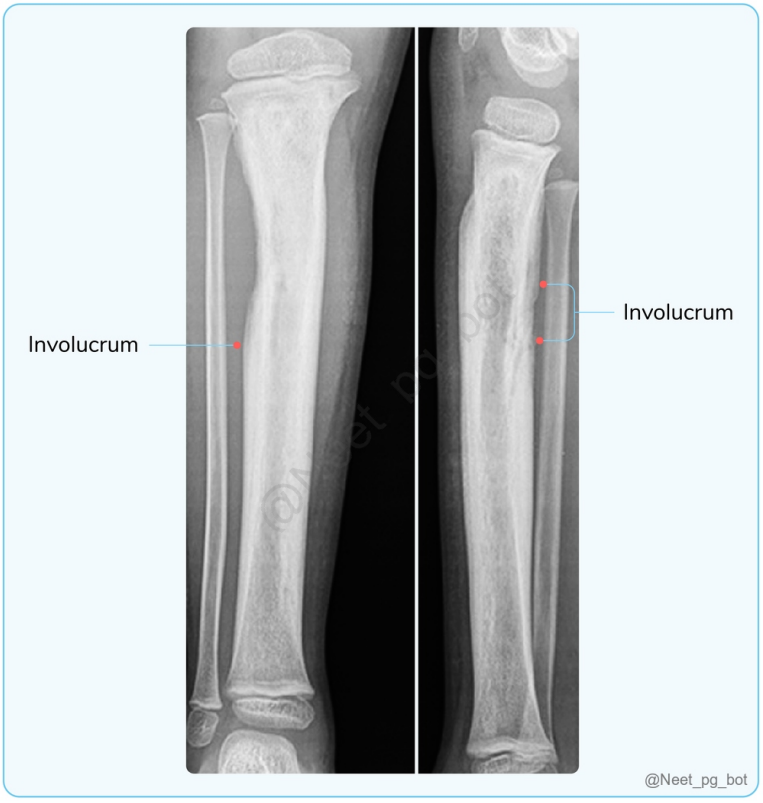
D. Involucrum

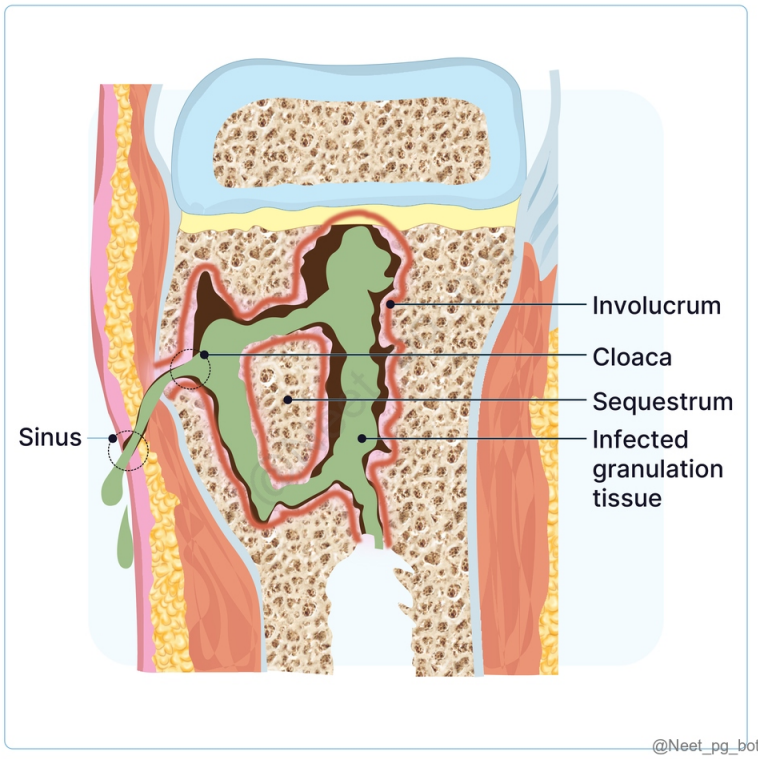
Correct Answer: B. Bone marrow edema

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: The pathognomonic MRI finding of acute osteomyelitis is bone marrow edema , which appears as high signal intensity on T2-weighted images and low signal intensity on T1-weighted images & is one of the earliest radiological signs and appears within 24 hours (Earliest- Bone scintigraphy) The penumbra sign (Option A) (Ring enhancement due to granulation tissue) is pathognomonic for subacute osteomyelitis , especially in cases of Brodie's abscess. Sequestrum (Option C) refers to a piece of dead bone that has separated from healthy bone, commonly seen in chronic osteomyelitis. Involucrum (Option D) is the new bone formation that develops around the sequestrum, indicative of chronic osteomyelitis. Characteristic Radiological Features of Osteomyelitis: Imaging Modality Acute Osteomyelitis Subacute Osteomyelitis Chronic Osteomyelitis Plain Radiograph Minimal findings Possible soft-tissue swelling (5-7 days to appear) Lucent/sclerotic lesions Periosteal reaction Soft-tissue swelling Bone sclerosis Cortical thickening Sequestrum Cloaca Bone destruction Computed Tomography Not Useful Cortical/marrow abnormalities Abscess Periosteal reaction Edema Superior to radiograph for showing: Cloaca/sequestrum Periosteal new bone formation Abscess MRI Early bone marrow edema (low T1, high T2) Bone marrow/cortical changes Increased T2 in soft tissues Abscess formation; Post-gadolinium T1 outlines the abscess cavity clearly Enhanced resolution for Sequestra & Cloaca Outline abscess/sinus tracts Bone scintigraphy Increased uptake Diabetic Foot Osteomyelitis : T1-weighted images show low signal intensity in the marrow near an ulcer or sinus tract as the main indicator of osteomyelitis. Brodie’s Abscess : Common in children and presents as a centrally located lesion aligned vertically along the bone's axis, characterized by a sclerotic margin.







References:

Grainger and Allison’s Diagnostic Radiology, 7th Edition, Page 1189,1191

↑ *Back to this question in Part A*

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Q14: A 10-year-old boy presents with mild left arm pain, which has worsened over the past few months, particularly after a recent fall while playing. There are no signs of infection or soft tissue involvement. An X-ray shows the findings depicted in the image. What is the most likely diagnosis? (Q853073)

A. Simple Bone Cyst

B. Aneurysmal Bone Cyst

C. Brodie Abscess

D. Sequestrum



Correct Answer: A. Simple Bone Cyst

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: The clinical scenario of left arm pain and swelling, along with an X-ray showing a well-defined, unilocular lytic lesion in the metaphysis of the left humerus, without infection or soft tissue involvement, suggests a diagnosis of a simple bone cyst. Fallen fragment sign: Features Simple Bone Cyst (SBC) (Option A) Aneurysmal Bone Cyst (ABC) (Option B ruled out) Nature Solitary, unilocular Benign, expansile, multi-cystic Fluid Content Serous or sero-sanguinous Blood-filled Age Group Children and adolescents Children and teenagers Locations Proximal humerus, femur, tibia Metaphysis of long bones, spine Symptoms Usually asymptomatic; pathological fracture Pain and swelling; possible neurological symptoms Imaging Well-defined, lytic lesions Poorly defined, eroding lesions X-ray Brodie Abscess (Option C) involves a chronic bone abscess where the body has contained an infection, resulting in pus or jelly-like granulation tissue, surrounded by a sclerotic zone & has associated features of infection. Sequestrum (Option D) is a piece of dead bone separated from living bone, often due to infection or chronic inflammation. On X-ray, it appears as a dense, irregularly shaped area within the bone, often surrounded by a zone of lucency. In cases of chronic osteomyelitis , an involucrum may form, which is new bone growth that encases the sequestrum. .




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References:

Apley and Solomon’s System of Orthopaedics and Trauma, 10th Edition, Page 201,202

↑ *Back to this question in Part A*

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Q15: A 30-year-old male presents with pain in the thigh and a noticeable deformity, as shown in the image. This deformity can be seen in all the following conditions except? (Q853065)

A. Paget's disease of bone

B. Osteogenesis imperfecta

C. Osteopetrosis

D. Fibrous dysplasia



Correct Answer: C. Osteopetrosis

- *Listen (English)*
- *Listen (Hindi)*

Explanation: The deformity described is the shepherd's crook deformity of the femur, characterized by a bowing of the proximal femur. It results in a reduction of the femoral neck angle to nearly 90°, leading to a coxa vara deformity. This is commonly seen in conditions like Paget's disease of bone, osteogenesis imperfecta, and fibrous dysplasia . However, osteopetrosis (Option C) , a condition marked by excessive bone density, is not typically associated with this deformity. Osteopetrosis is a condition characterized by excessive bone density and is typically associated with Erlenmeyer flask deformity, also known as metaphyseal flaring. Paget's disease of bone (Option A): This condition involves abnormal bone remodeling that can lead to softened, enlarged bones prone to bowing and the characteristic "shepherd's crook" deformity, especially in the femur. Osteogenesis imperfecta (Option B): Due to defective collagen, bones are brittle and prone to recurrent fractures and progressive bowing deformities, including the "shepherd's crook" shape, from normal weight-bearing. Fibrous dysplasia (Option D): Replacement of normal bone with fibrous tissue, particularly in the proximal femur, results in weakened areas that can progressively bow into the distinct "shepherd's crook" deformity under mechanical stress.


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References:

Grainger and Allison's Diagnostic Radiology, 7th Edition, Page 1038,1908
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10481680/

↑ *Back to this question in Part A*

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Q16: A 24-year-old male presents with persistent nocturnal pain in his right femur that is relieved by nonsteroidal anti-inflammatory drugs (NSAIDs). On examination, there is localised tenderness in the area & no history of trauma. The radiographic evaluation shows a small, well-defined lytic lesion with a central nidus. What is the investigation of choice to confirm the diagnosis? (Q853029)

A. X-ray of the femur

B. MRI of the femur

C. DEXA scan

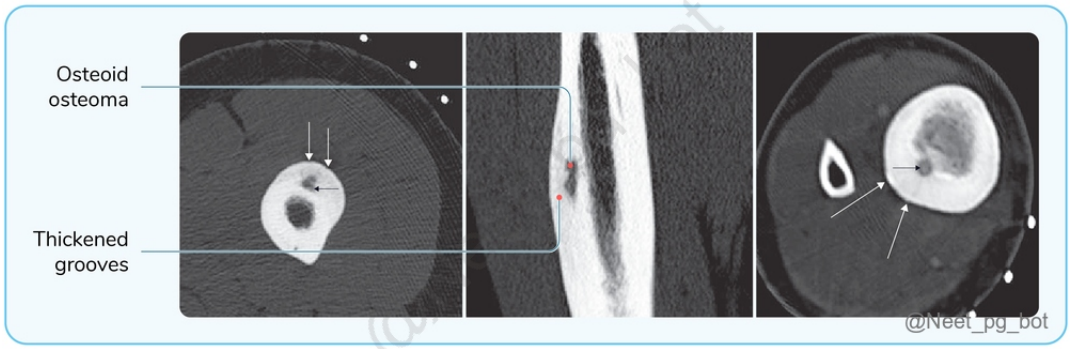
D. CT scan of the femur

Correct Answer: D. CT scan of the femur

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: The clinical presentation and radiographic findings suggest Osteoid osteoma , characterized by nocturnal pain that is relieved by NSAIDs. This benign bone tumor commonly affects young adults and is often located in the cortex of long bones, particularly the femur and tibia. Characterized by a nidus that secretes prostaglandins, leading to intense nocturnal pain. A CT scan is the investigation of choice (Osteoid osteoma is a cortical tumor. Hence, CT is superior to MRI which evaluates bone marrow & extent of tumors) , revealing a central radiolucent nidus accompanied by surrounding sclerosis and a Vascular groove sign (thin channel in the thickened bone around the nidus) It is managed by radiofrequency ablation. X-ray (Option A) is used to diagnose fractures, joint conditions, tumours, and chest issues, as well as in dental assessments. It also guides treatment. Though an X-ray is the initial test for osteoid osteoma, CT provides better visualisation and confirms the diagnosis. MRI (Option B) is used to diagnose soft tissue pathologies, bone marrow conditions, and neurological disorders, but it is not preferred for osteoid osteoma as it can obscure the nidus. DEXA scan (Option C) measures bone mineral density to diagnose osteoporosis and assess fracture risk but is not preferred for osteoid osteoma as it does not provide detailed visualization of the lesion.



References:

Maheshwari Essential Orthopaedics, 5th Edition, Pages 235, 309

Grainger and Allison’s Diagnostic Radiology, 7th Edition, Pages 1285, 1971

↑ *Back to this question in Part A*

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Q17: Match the following skull findings according to their respective conditions. S.No Finding Condition 1. a) Paget’s Disease 2. b) Hyperparathyroidism 3. c) Sickle Cell Anemia 4. d) Multiple Myeloma 5. e) Langerhans Cell Histiocytosis (Q853056)

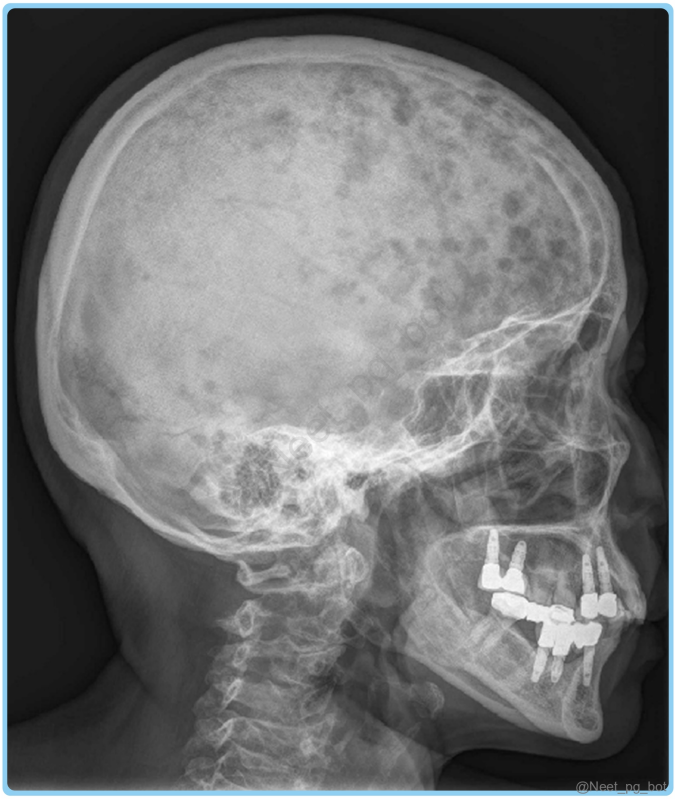
A. 1-b, 2-d, 3-a, 4-e, 5-c

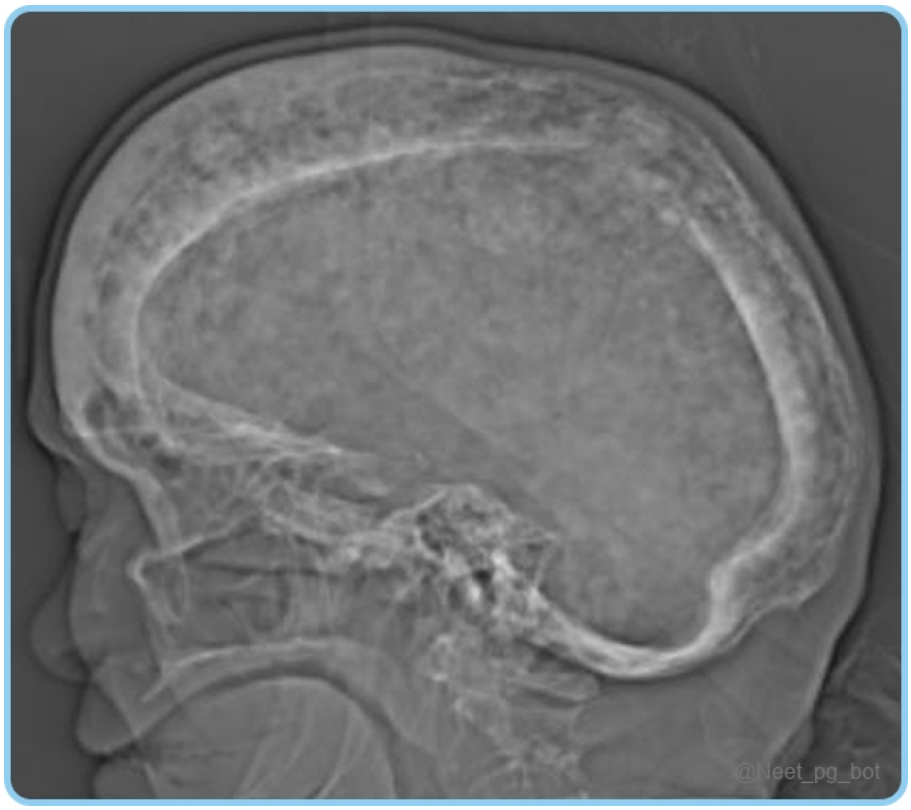
B. 1-c, 2-e, 3-b, 4-d, 5-a

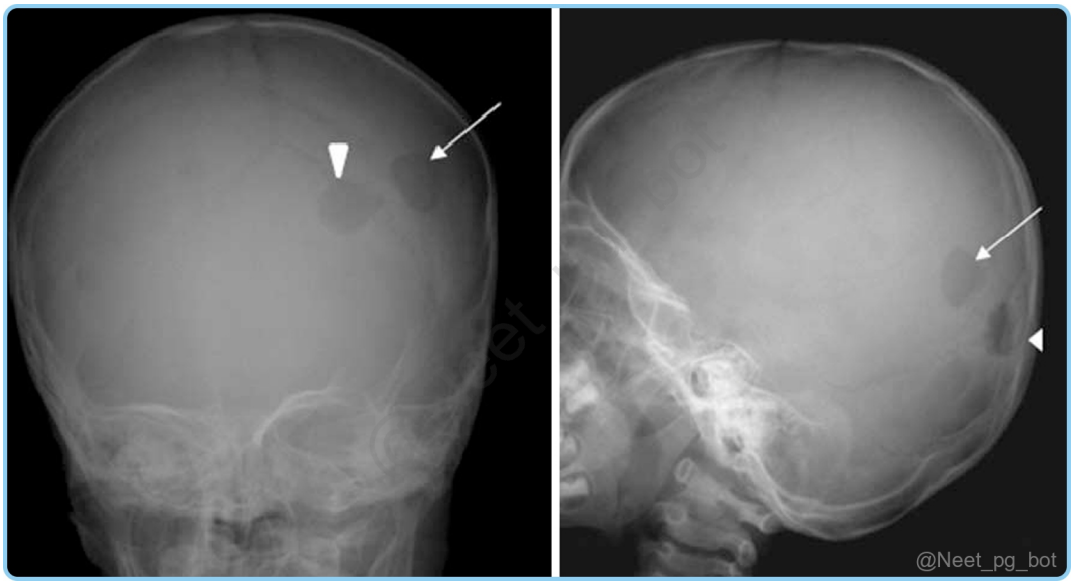
C. 1-e, 2-c, 3-d, 4-b, 5-a

D. 1-a, 2-b, 3-e, 4-c, 5-d






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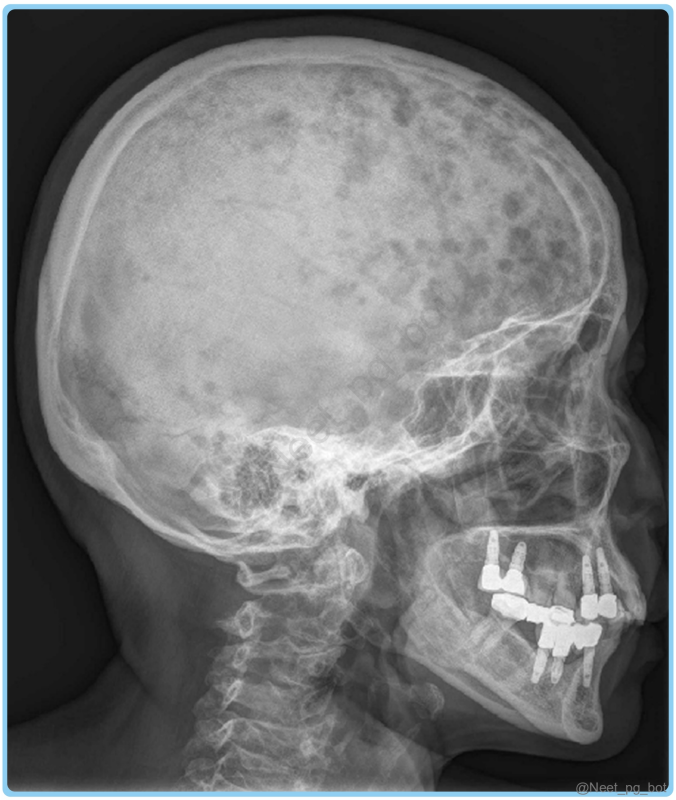


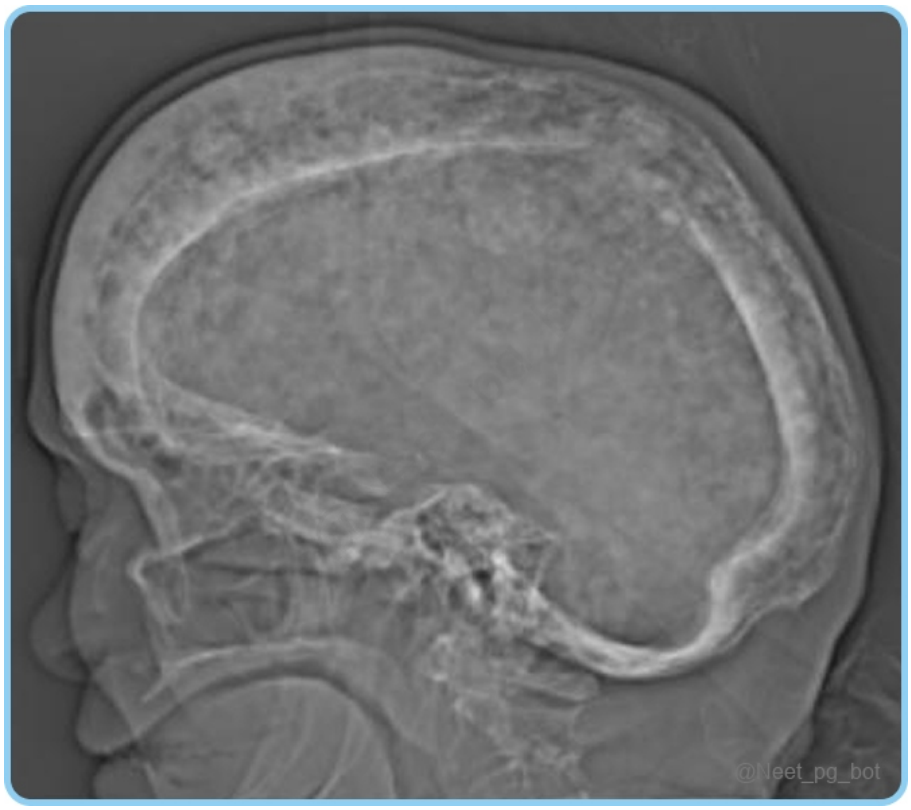
Correct Answer: A. 1-b, 2-d, 3-a, 4-e, 5-c

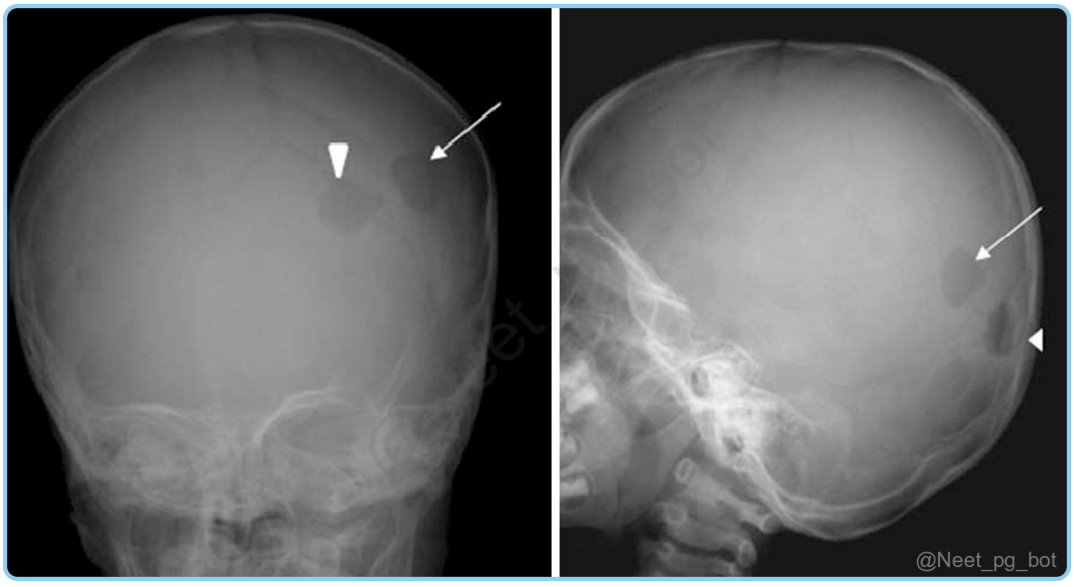
- *Listen (English)*
- *Listen (Hindi)*

Explanation: Radiological findings of the skull in different conditions Hyperparathyroidism: Salt and pepper appearance of the skull is due to lytic lesions caused by calcium resorption. Multiple Myeloma: Well-defined Punched-out lesions involving both the tables of the skull. Paget's Disease: Cortical Expansion Osteoporosis circumscripta: Focal areas of osteolytic lesions Tam'o Shanter Sign: Thickening of Frontal Bone. Cotton Wool Appearance of the Skull is also seen. Langerhans Cell Histiocytosis: Bevelled Lytic Lesion: Well-defined lytic lesion with sclerotic margin. Sickle Cell Anemia: Crew cut Appearance: Due to Extramedullary Hematopoiesis.


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References:

Grainger and Allison’s Diagnostic Radiology, 7th Edition, Page 1713,1977

David Sutton Textbook of Radiology and Imaging, Volume 2, 8th Edition, Page 1640

↑ *Back to this question in Part A*

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Q18: A 45-year-old woman presents with a 3-month history of bilateral wrist and knee pain, worse with inactivity and improving with movement. She reports morning stiffness lasting over an hour, fatigue, and low-grade fever. On examination, hand deformities are noted. All of the following are associated with her condition except: (Q853054)

A. Hitchhiker's thumb deformity

B. Boutonniere deformity

C. Swan neck deformity

D. Calcinosis cutis

Correct Answer: D. Calcinosis cutis

- *Listen (English)*
- *Listen (Hindi)*

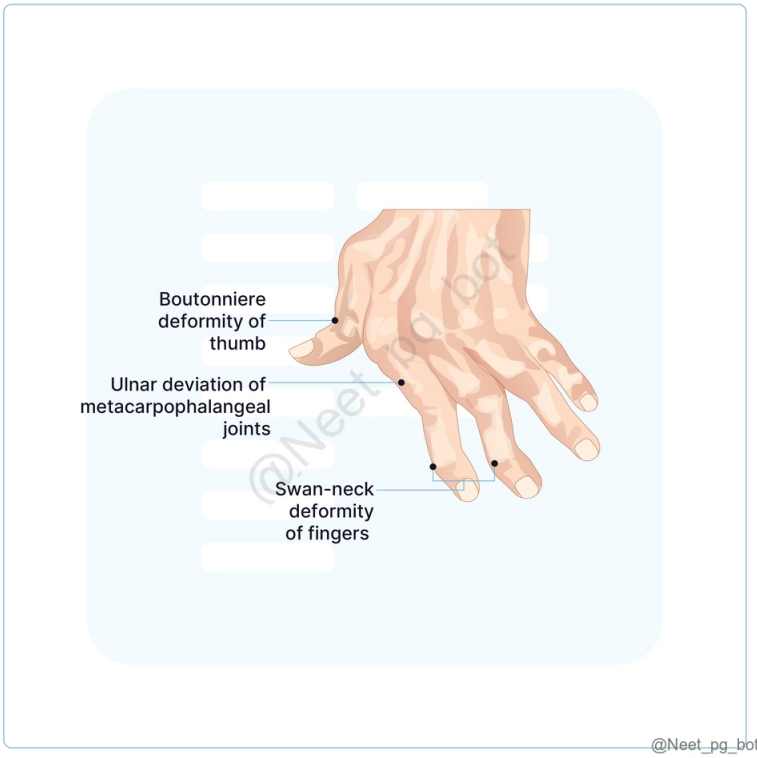
Explanation: The likely diagnosis is Rheumatoid arthritis (RA), a chronic inflammatory disease that typically presents with symmetrical joint involvement, prolonged morning stiffness, and systemic symptoms such as fatigue and low-grade fever. Symmetrical involvement of small joints, including the wrists, elbows, knees, ankles, metacarpophalangeal (MCP) and proximal interphalangeal (PIP) joints, with sparing of the distal interphalangeal (DIP) joints. RA commonly leads to characteristic hand deformities such as Boutonniere deformity (Option B) (flexion of the PIP joint and hyperextension of the DIP joint) Swan neck deformity (Option C) (hyperextension of the PIP joint and flexion of the DIP joint) Hitchhiker's thumb (or Z-deformity) (Option A) , involving a hyperextension of the thumb's first joint. Calcinosis cutis is the abnormal deposition of calcium salts in the skin and subcutaneous tissues, narrowing the joint spaces. It commonly occurs in CREST syndrome and is not related to Rheumatoid arthritis. Signs & radiological findings of Rheumatoid arthritis MCP joint’s subluxation Ball catcher's or Norgaard's view is used to evaluate the distal phalanx erosions. Hammer toe (due to extended DIP and flexed PIP of the toe) Hitchhiker's thumb (caused by extended IP and flexed MCP of thumb) Ulnar deviation of MCP Swan neck deformity (caused by extended DIP and flexed PIP) Boutonniere deformity (due to flexed PIP and extended DIP




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References:

David Sutton’s Textbook of Radiology and Imaging, Volume 2, 8th edition, Pages 91,92,94 Maheshwari Essential Orthopedics, 5th Edition, Pages 287, 288

↑ *Back to this question in Part A*

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Q19: Match the following X-rays with their corresponding diagnoses X-rays Diagnosis 1. A. Achondroplasia 2. B. Tuberculosis 3. C. Acromegaly 4. D. Crest Syndrome 5. E. Psoriatic Arthritis (Q853053)

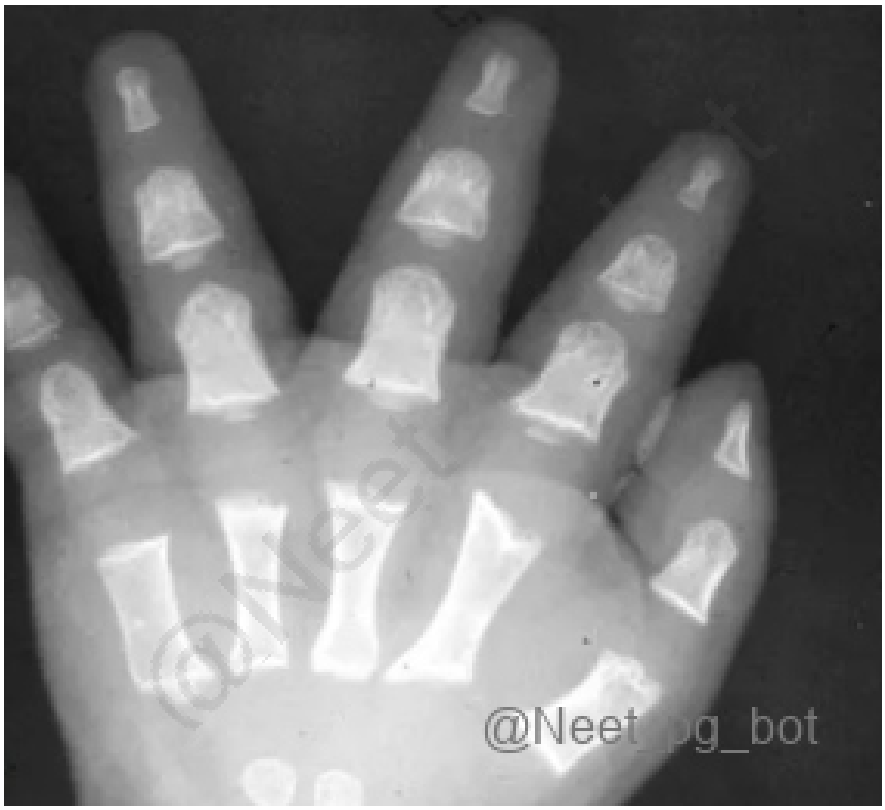
A. 1-B, 2-A, 3-D, 4-E, 5-C

B. 1-E, 2-C, 3-B, 4-A, 5-D

C. 1-D, 2-B, 3-E, 4-C, 5-A

D. 1-C, 2-A, 3-E, 4-B, 5-D




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Correct Answer: D. 1-C, 2-A, 3-E, 4-B, 5-D

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: Spade phalanx Acromegaly/ Gigantism X-ray findings include The distal phalanx is spade-shaped Increased heel pad thickness Wide joint spaces. Trident Hand sign Achondroplasia X-ray findings: Trident hand sign Pelvic champagne glass appearance Tombstone appearance of the iliac blade Bullet nose vertebrae Chevron sign Arthritis Mutilans Psoriatic Arthritis Extensive osteolysis of the Interphalangeal joints causing Arthritis Mutilans or opera glass hand deformity and pencil-in cup deformity Telescoping fingers and sausage digits can be seen. TB dactylitis Tuberculosis of Phalanx It shows Spina Ventosa or TB dactylitis, caused by the destruction of bone by a cyst-like cavity. Calcinosis Cutis CREST Syndrome It is caused by the abnormal deposition of calcium salts in the skin and subcutaneous tissues. Common in Scleroderma (Autoimmune condition)








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References:

David Sutton’s Textbook of Radiology and Imaging, Volume 2, 8th Edition, Page 3090, 226, 118, 119, 421.

Grainger and Allison’s Diagnostic Radiology, 7th edition, Page 1133.

↑ *Back to this question in Part A*

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Q20: A 52-year-old man presents with chronic joint pain, stiffness, and mottling of teeth. He has a history of living in a rural area for several decades. His X-ray reveals increased bone density and calcification of ligaments. Based on these findings, which condition is most likely responsible for his symptoms? (Q853051)

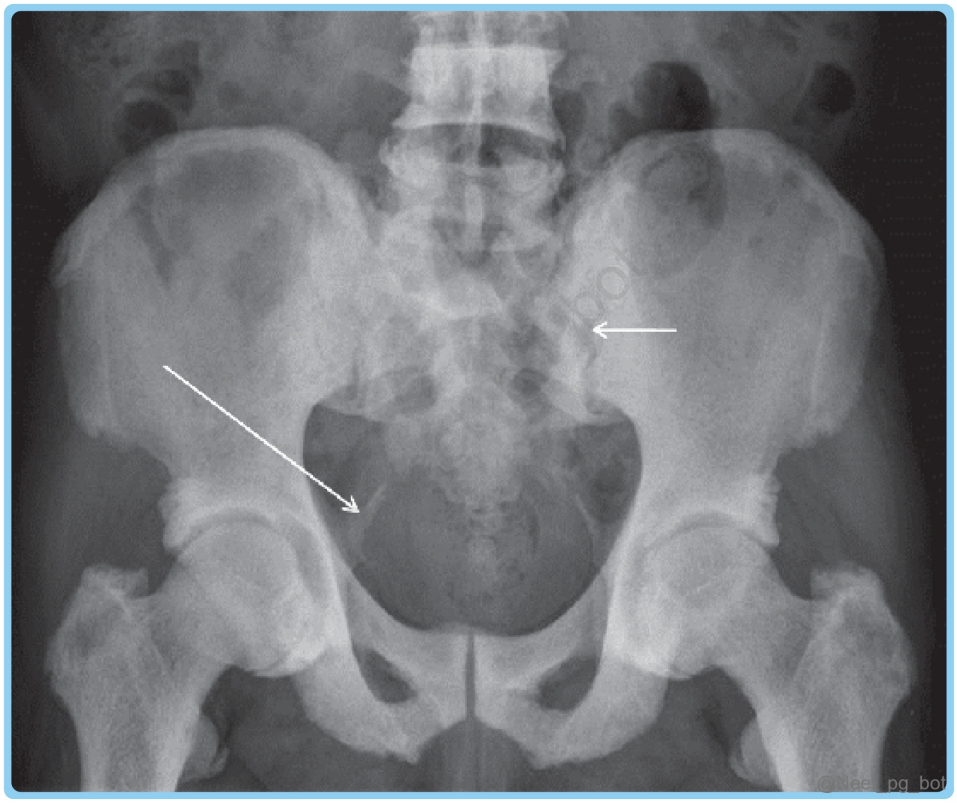
A. Accumulation of Homogentisic acid

B. Accumulation of Mucopolysaccharides

C. Excessive accumulation of Iron

D. Increased fluoride intake



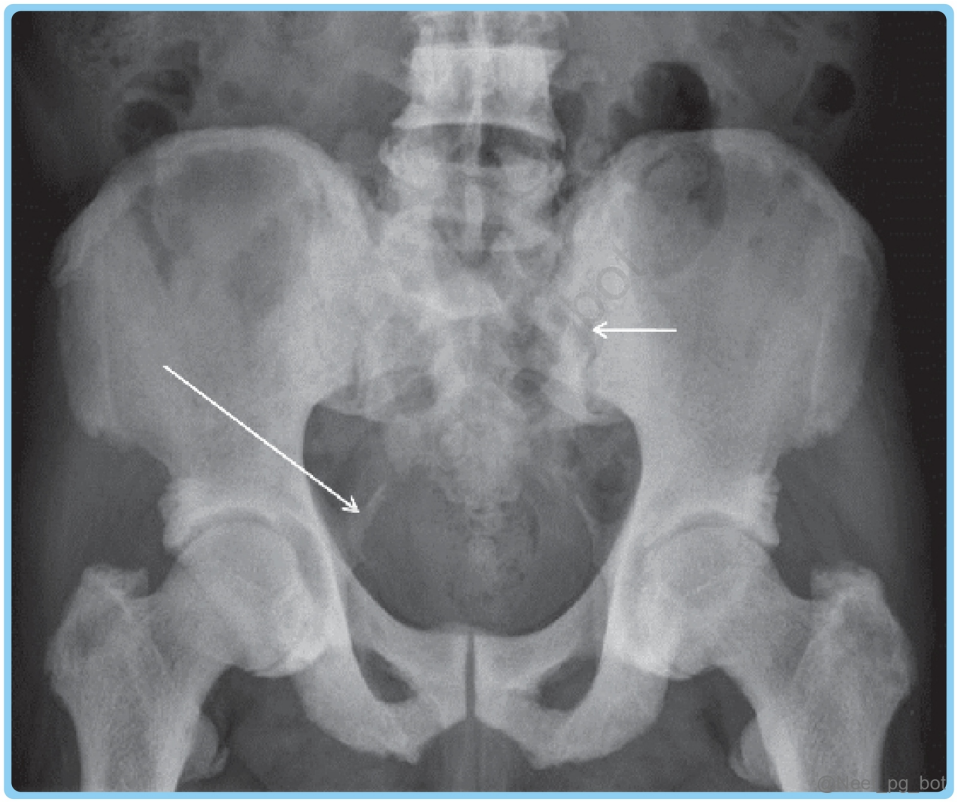


Correct Answer: D. Increased fluoride intake

- *Listen (English)*
- *Listen (Hindi)*

Explanation: The radiograph above shows bone fluorosis , which results from excessive fluoride intake. It results in back and joint pain and can lead to numbness and paresthesia of the lower limb due to spinal cord compression and anaemia. Early finding of this condition is mottling of the teeth enamel (Dental Fluorosis) X-ray findings are prevalent mostly in the vertebrae, forearm, leg and pelvis. Fluorosis X-ray findings Increased bone density Cortical thickening Osteosclerosis Calcification of ligaments Subperiosteal bone formation Interosseous membrane calcification Accumulation of Homogentisic acid (Option A) occurs in Ochronosis , a genetic condition caused by a deficiency of Homogentisic acid oxidase. Common radiological findings include intervertebral disc calcification, disc space narrowing, and osteoporosis. Accumulation of Mucopolysaccharides (Option B) is seen in Mucopolysaccharidosis, resulting in dysostosis multiplex. X-ray findings include wedge-shaped vertebral bodies with anterior beaking, platyspondyly, dorsal kyphosis, wide disc spaces, and spinal canal stenosis. Excessive accumulation of Iron (Option C) occurs in Hemochromatosis . Radiological findings include hooked osteophytes of the metacarpals , joint space narrowing, subchondral sclerosis, and subchondral cyst formation.



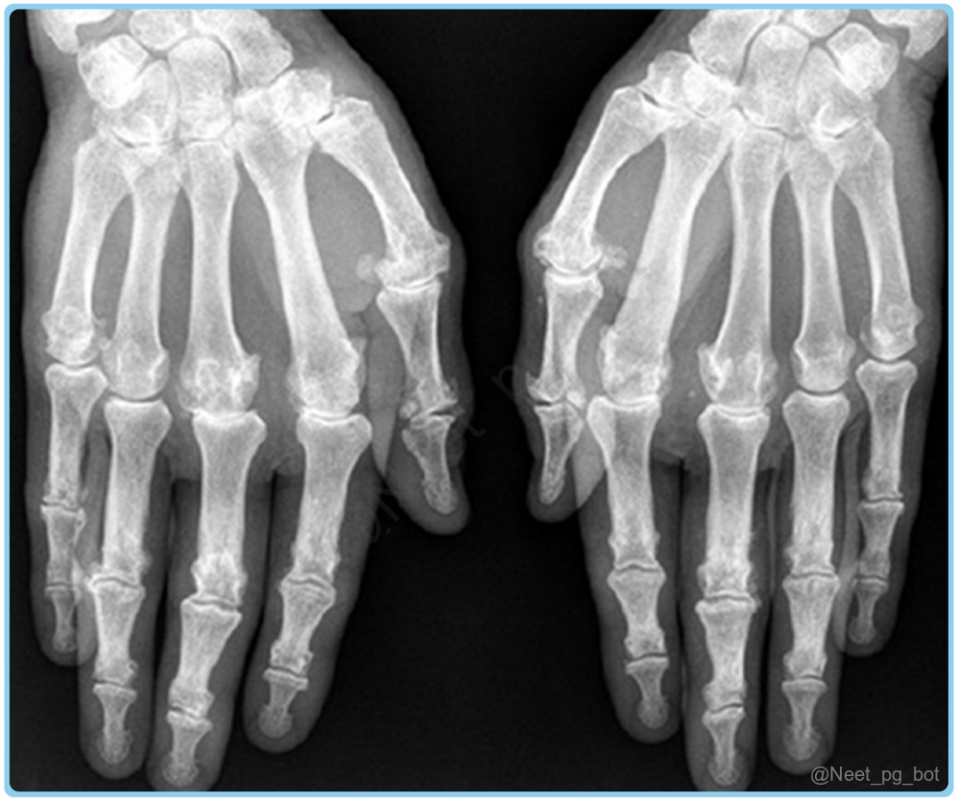





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References:

David Sutton Textbook of Radiology and Imaging, Volume 2, 8th Edition, Page 289, 168

Apley and Solomon's System of Orthopaedics and Trauma, 10th Edition, Page 172, 173

Maheshwari Essential Orthopedics, 5th Edition, Page 314

www.ncbi.nlm.nih.gov/pmc/articles/PMC3473658/

↑ *Back to this question in Part A*

Q21: "Scotty dog" sign is seen in? (Q853050)

A. Normal vertebral findings

B. Spondylolisthesis

C. Osteoporosis

D. Spondylolysis



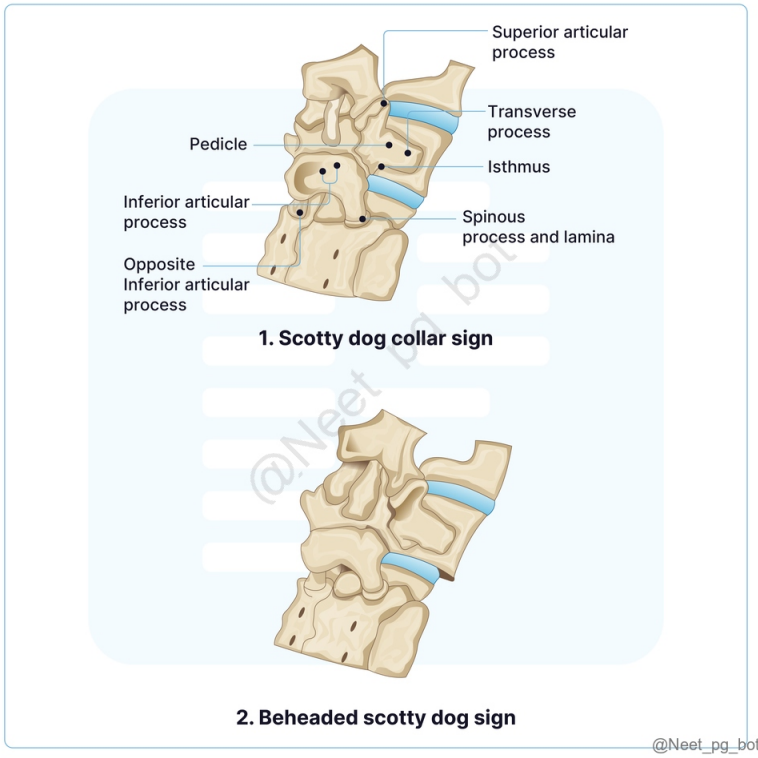
Correct Answer: A. Normal vertebral findings

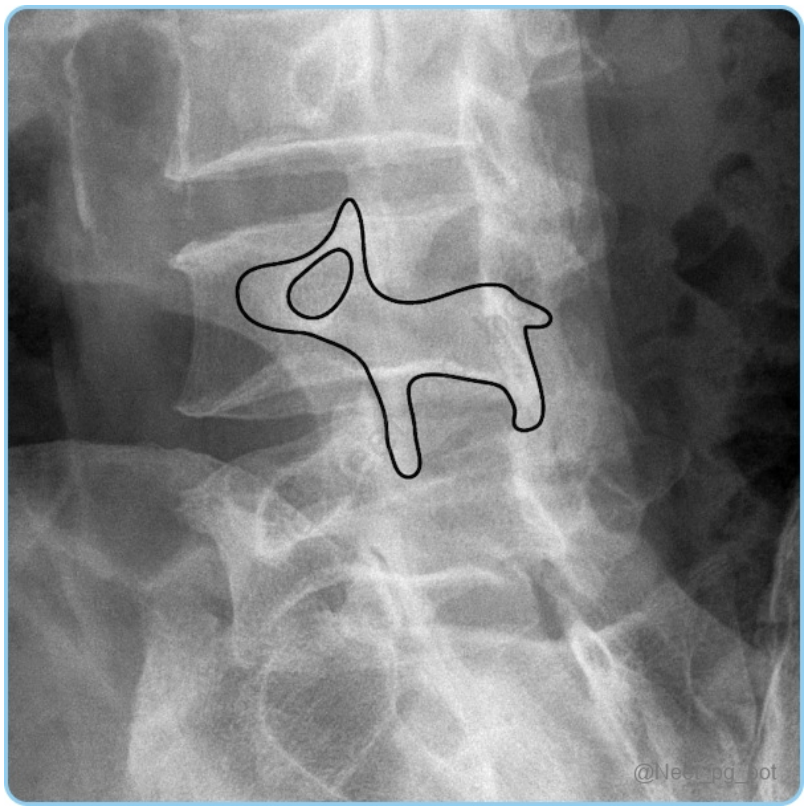
■ *Listen (English)*

■ *Listen (Hindi)*

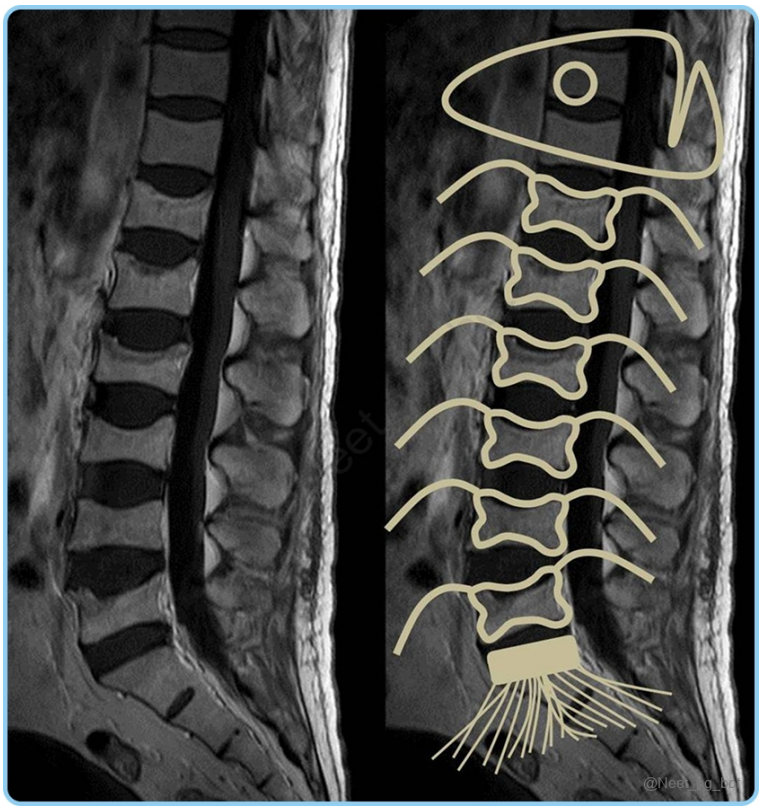
Explanation: The given X-ray of the lumbar spine shows a fracture of the pars interarticularis , commonly associated with Spondylolysis . This condition is characterised by the appearance of a "Scotty dog with a collar," which indicates a disruption of the Scotty dog appearance of normal lumbar vertebrae (Option A) Spine degeneration from wear and tear can cause back pain and may affect nearby nerves, resulting in radiating pain, numbness, or paresthesia along the corresponding dermatomes. This can lead to Stress fracture of Pars Interarticularis of vertebrae Spinal canal stenosis Spondylolisthesis Spondylolisthesis (Option B) occurs when a

vertebra slips forward over the one below it, often leading to lower back pain and potential nerve compression. It is identified on an anterior-posterior (AP) X-ray by the inverted Napoleon hat sign in L5-S1 involvement and by the beheaded Scotty dog sign in a lateral view X-ray. Osteoporosis (Option C) is characterised by reduced bone mass and density, which increases the risk of fractures. It presents with a "codfish" appearance due to increased vertebral concavity, decreased bone density, cortical bone thinning, reduced trabecular patterns, and potential vertebral compression fractures.




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References:

Apley and Solomon’s System of Orthopaedics and Trauma, 10th Edition, Page 522.

David Sutton’s Textbook of Radiology and Imaging, Volume 2, 8th Edition, Pages 2354, 207, 208.

↑ *Back to this question in Part A*

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Q22: A 15-year-old boy, notably taller than his peers, presents with lower back pain and has a history of frequent shoulder dislocations. Scoliosis is noted, and an MRI has been recommended for further evaluation. Which of the following conditions aligns with the given radiological finding? (Q853049)

A. Aortic aneurysm

B. Retroperitoneal lymphadenopathy

C. Down’s syndrome

D. Marfan syndrome



Correct Answer: D. Marfan syndrome

- *Listen (English)*
- *Listen (Hindi)*

Explanation: Scalloping of the vertebrae refers to the abnormal concave deformity observed on either the anterior or posterior aspect of the vertebral bodies. Causes of Vertebral scalloping: Posterior scalloping Anterior scalloping Neural Tumors and cysts Schwannoma Neurofibroma Lipoma Astrocytoma Acromegaly Achondroplasia Loeys-Dietz syndrome Marfan syndrome Mucopolysaccharidosis Osteogenesis imperfecta Neurofibromatosis Retroperitoneal lymphadenopathy (Option B) Abdominal aortic aneurysm (Option A) Down syndrome (Option C)





References:

Apley and Solomon’s System of Orthopaedics and Trauma, 10th Edition, Page 178, 164, 165.

David Sutton Textbook of Radiology and Imaging, Volume 2, 8th Edition, Page 338, 225

radiopaedia.org/articles/vertebral-scalloping

Grainger and Allison’s diagnostic radiology, 7th Edition, Page 1267,1887,1906,1920

Davidson’s principle and practice of medicine, 24th Edition, Page 1132

radiopaedia.org/articles/vertebral-scalloping

↑ *Back to this question in Part A*

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Q23: What is the most likely T-score that would confirm the diagnosis of osteoporosis? (Q853048)

A. >-1.0

B. -1.0 to -2.5

C. <-2.5

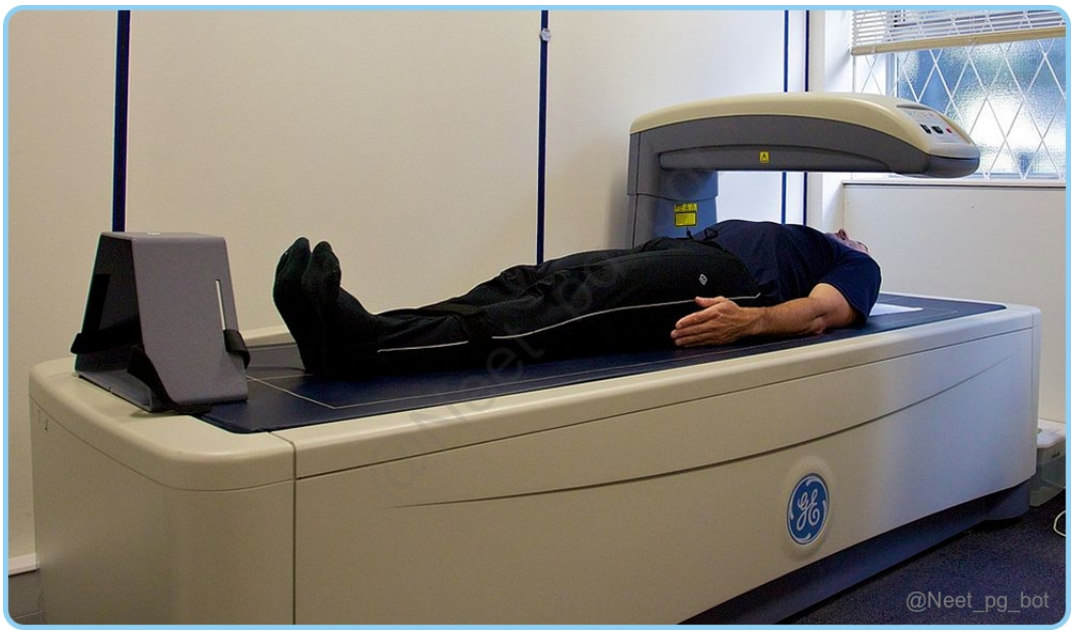
D. <-2.5 with fracture

Correct Answer: C. <-2.5

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: A Dual Energy X-ray absorptiometry (DXA) scan is primarily used to diagnose osteoporosis, assess fracture risk, and monitor drug therapy. The DXA scanner uses X-rays with two energy peaks, enabling the differential absorption of radiation by bone and soft tissue, which facilitates the calculation of bone mineral density (BMD). Interprets results using T-scores and Z-scores . T-score: It compares a patient's BMD to the average BMD of a healthy young adult of the same sex. It indicates how much the patient's bone density deviates from the optimal peak bone mass. WHO Criteria for Osteoporosis T score Interpretation >-1.0 (Option A) Normal BMD (bone mineral density) -1.0 to -2.5 (Option B) Osteopenia <-2.5 (Option C) Osteoporosis <-2.5 with fracture (Option D) Severe osteoporosis Z-score: It compares the patient's BMD to the average BMD of individuals of the same age and sex. It helps assess whether the bone density is within a normal range for that specific demographic group. Interpretation: A Z-score of -2.0 or lower may suggest significantly lower bone density compared to age-matched peers and may warrant further investigation into secondary causes of bone loss.



References:

Grainger and Allison’s Diagnostic Radiology, 7th Edition, Page 1099, 1100. David Sutton’s Textbook of Radiology and Imaging, Volume II, 7th Edition, Page 200.

↑ *Back to this question in Part A*

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Q24: Match the following radiological findings with their associated condition. Radiological finding Condition 1. a) Paget's disease 2. b) Vertebral hemangioma 3. c) Osteopetrosis 4. d) Ankylosing spondylitis (Q853046)

A. 1-c, 2-d, 3-b, 4-a

B. 1-c, 2-b, 3-a, 4-d

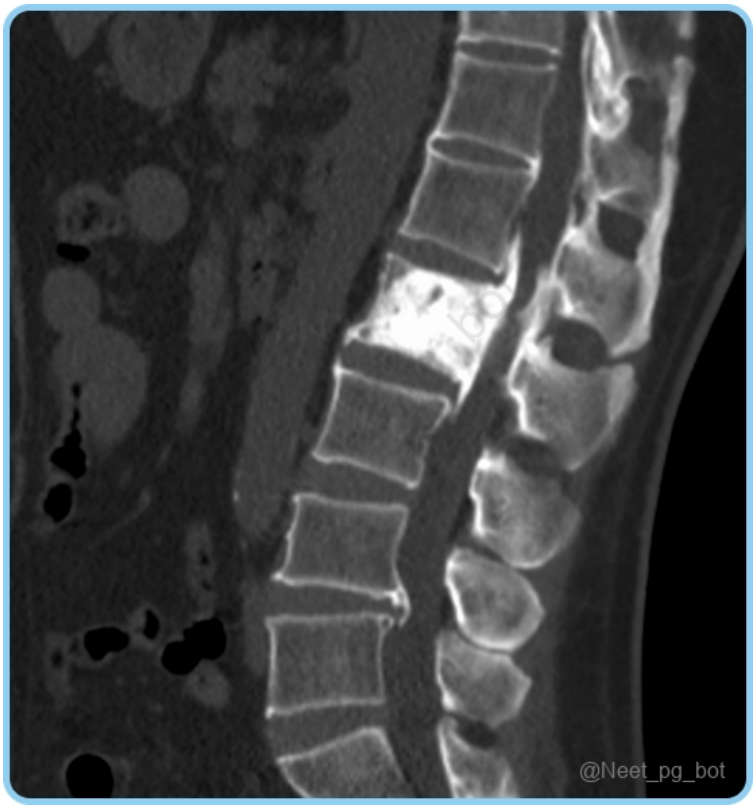
C. 1-d, 2-c, 3-a, 4-b

D. 1-b, 2-c, 3-d, 4-a


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Correct Answer: A. 1-c, 2-d, 3-b, 4-a

■ *Listen (English)*

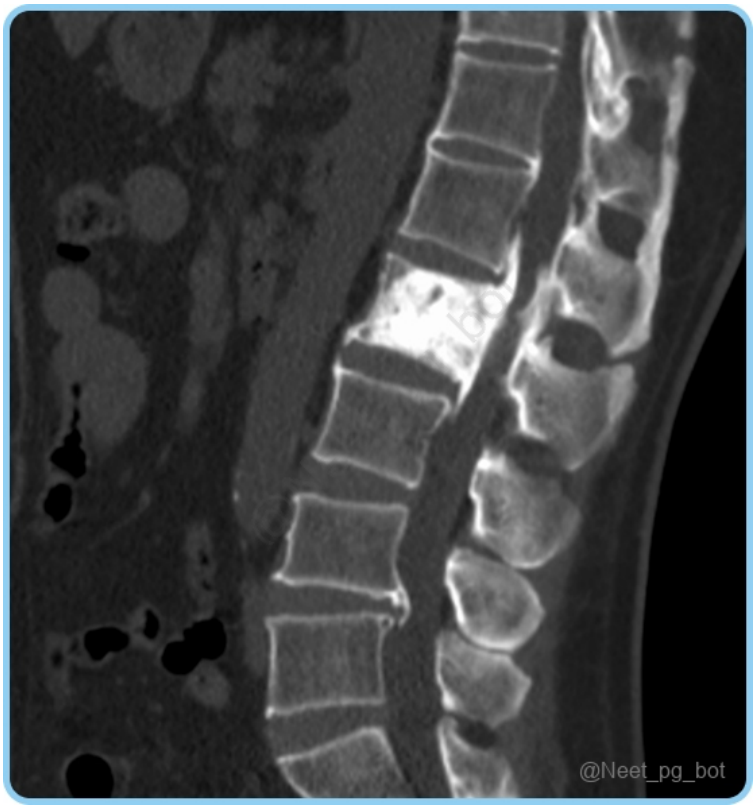
■ *Listen (Hindi)*

Explanation: Vertebral appearances Seen in Radiological image Bone within bone appearance Osteopetrosis (Marble bone disease) Bone within bone appearance Intervertebral Disc Calcification Ochronosis alkaptonuria Ankylosing spondylitis Polka Dot Appearance and Corduroy/Jail BarAppearance: Vertebral hemangioma Ivory Vertebrae Paget's disease Lymphoma Osteoblastic metastasis




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References:

Grainger and Allison's Diagnostic Radiology, 7th Edition, Pages 1730-1733.

David Sutton's Textbook of Radiology and Imaging, Volume II, 7th Edition, Pages 317-324

↑ *Back to this question in Part A*

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Q25: A 16-year-old girl with sickle cell anemia was diagnosed at birth. She recently went to the hospital due to severe back pain that worsens with activity, as well as numbness and tingling in her legs, difficulty walking, and occasional weakness in her lower extremities. Which option accurately represents the radiographic findings of her spine for her condition? (Q853032)

Correct Answer: Unknown

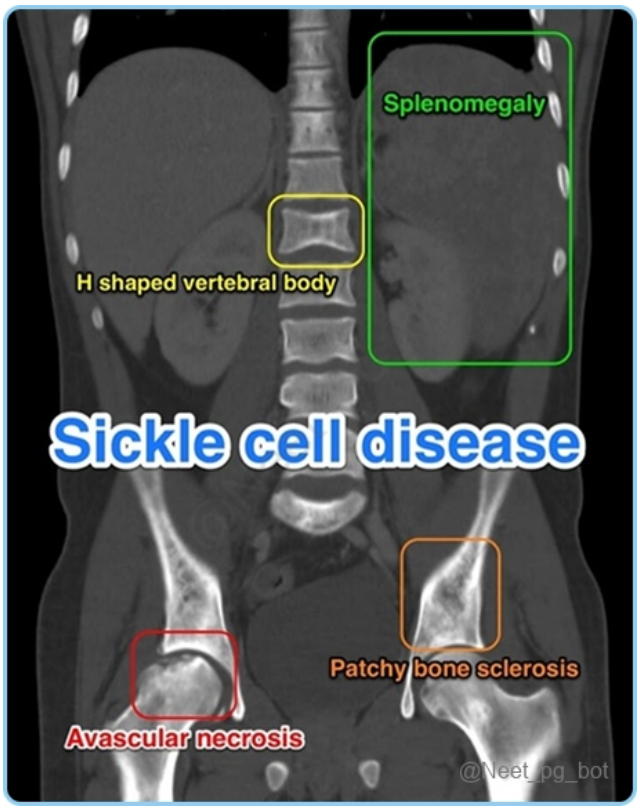
■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: The radiographic findings in Sickle Cell Anemia reveal bone infarcts due ischemia of end arteries that result in H-shaped or Lincoln Log vertebrae. Vertebral appearances and their associated diseases: Vertebral

appearances Seen in Radiological image Rugger Jersey Spine Renal osteodystrophy (Secondary hyperparathyroidism) Picture frame vertebra (Option A) Paget’s disease H-shaped appearance or Lincoln Log Vertebrae (Option C) Sickle cell anemia Biconcave Vertebrae (or) Codfish Vertebrae (or) Fish Mouth Vertebrae Osteoporosis Osteomalacia Sickle cell anemia (later stages) Vertebrae Plana (Option D) Trauma (most common cause in adults) Eosinophilic granuloma (Langerhans cell histiocytosis) Beaking of the Vertebrae Mucopolysaccharidosis (MPS) Hurler's syndrome (anterior beaking or bullet-shaped vertebrae) (Option B) Hunter's syndrome Morquio's syndrome (middle beaking) Vertebral Scalloping Posterior scalloping is seen in: Dural ectasia (Marfan's syndrome or Neurofibromatosis) Neurogenic tumors (e.g., schwannoma) Anterior scalloping seen in: Aortic aneurysm. Lymphadenopathy of retroperitoneal and paraaortic lymph nodes (Tuberculosis)

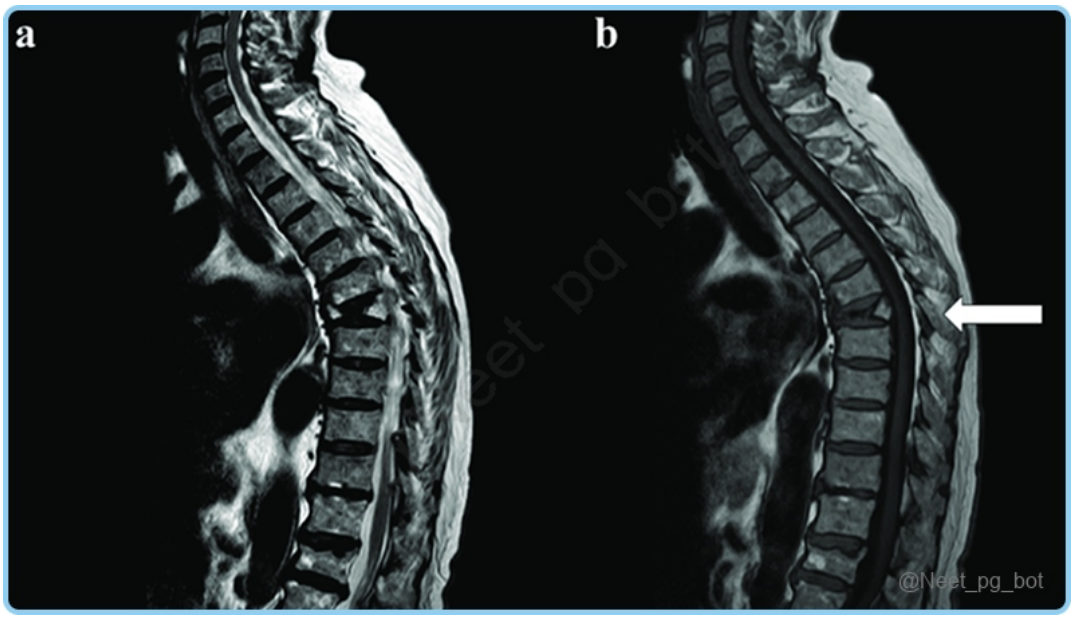


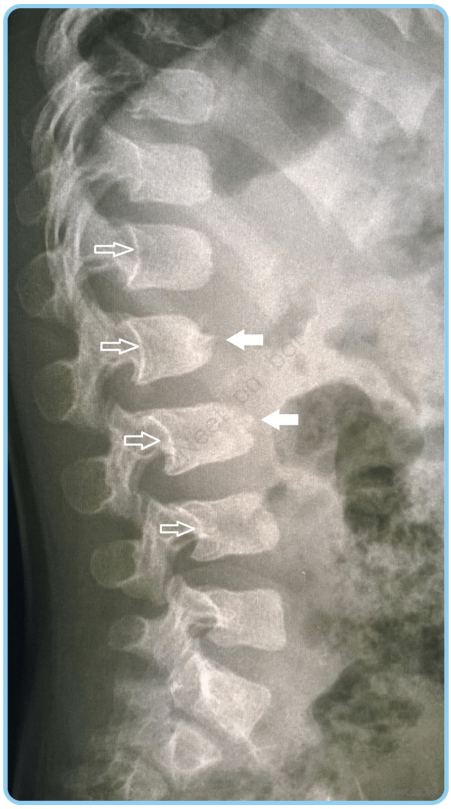

Splenomegaly
H shaped vertebral body
Sickle cell disease
Patchy bone sclerosis
Avascular necrosis
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a
b
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References:

Grainger and Allison's Diagnostic Radiology, 7th Edition, Pages 1730-1733

David Sutton's Textbook of Radiology and Imaging, Volume II, 7th Edition, Pages 317-324

↑ *Back to this question in Part A*

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Q26: A 3-year-old child presents with fatigue, swollen and bleeding gums, bruising, joint pain, and dry skin. After a dietary assessment, it is found that the child has been consuming a diet low in fruits and vegetables. Which radiographic feature is most indicative of the probable condition? (Q853030)

A. Widening of the growth plate

B. Cupping of the metaphysis

C. Wimberger's ring in the epiphysis

D. Absence of white line of Frankel

Correct Answer: C. Wimberger’s ring in the epiphysis

■ *Listen (English)*

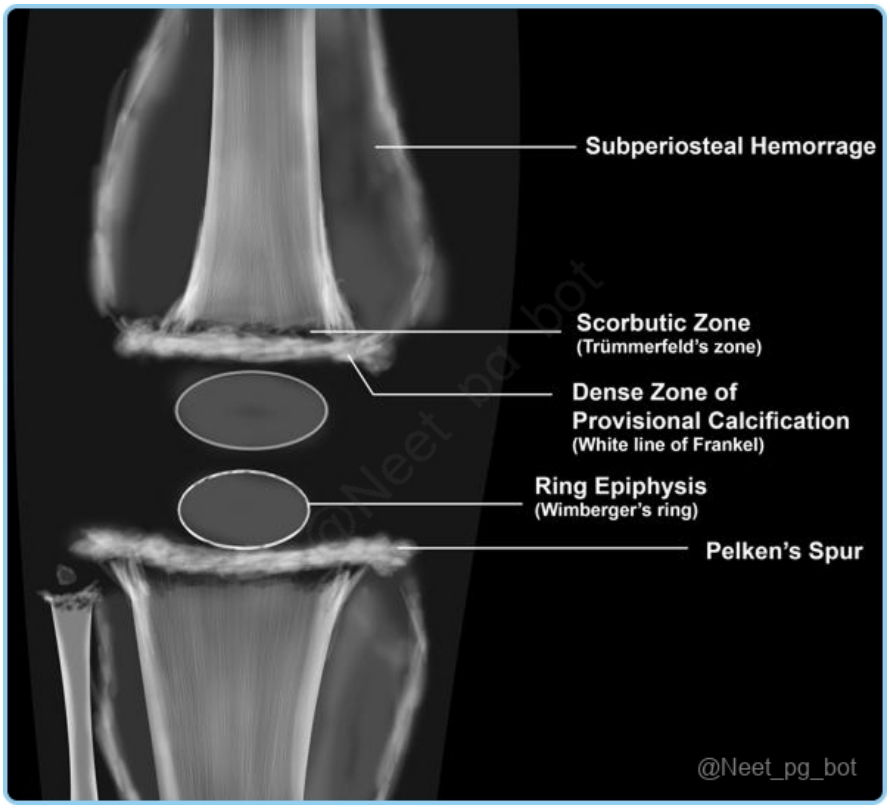
■ *Listen (Hindi)*

Explanation: The scenario describes a case of Scurvy , which is characterised radiologically by the presence of Wimberger’s ring (ring epiphysis). Scurvy Rickets Deficient vitamin Vitamin C Vitamin D Reduced levels of Collagen Calcium Clinical features Increased capillary fragility Appearance of petechiae on the skin Delayed wound healing Bleeding gums Perifollicular hemorrhage Frog-like posture (semiflexion at hips and knees): Due to the inability to move limbs due to pain (pseudoparalysis). Scorbutic rosary (angular swellings at the costochondral junction arising due to subperiosteal bleed) Genu varum (bow-legs) or Genu valgum (knock-knees) Double-malleoli sign: The lateral malleolus of the ankles has two bony prominences instead of one. Waddling gait Frontal bossing Delayed closure of anterior fontanelle Craniotabes (soft skull bones with ping-pong ball consistency) Delayed dentition and enamel hypoplasia. Rachitic rosary (anterior chest wall has a beaded appearance due to swelling of costochondral cartilage junctions) Harrison sulcus: Depression along the lower border of the chest at the site of insertion of the diaphragm. Deformity of the hips: Coxa valga (femoral neck-shaft angle is increased) or coxa vara (femoral neck-shaft angle decreased) Radiological features Pencil-thin cortex A white line of Frankel is present (dense zone of provisional calcification at the growing metaphysis, giving a white line) Trummerfeld’s zone or Scorbutic zone (black area adjacent to the white line of Frankel, due to lack of mineralisation of osteoid) Wimberger's ring (epiphysis is small with a well-defined sclerotic margin, ring-shaped) Pelkan's spur (extensions at the metaphysis) Widening of the growth plate (Option A) . White Line of Frankel: Absent in active rickets (Option D) ; present in healing rickets after treatment. Splaying (widening) of bones. Cupping (concavity) (Option B) and fraying or (irregular margin) of bone ends. Protrusio acetabuli and triradiate deformity of the pelvis.

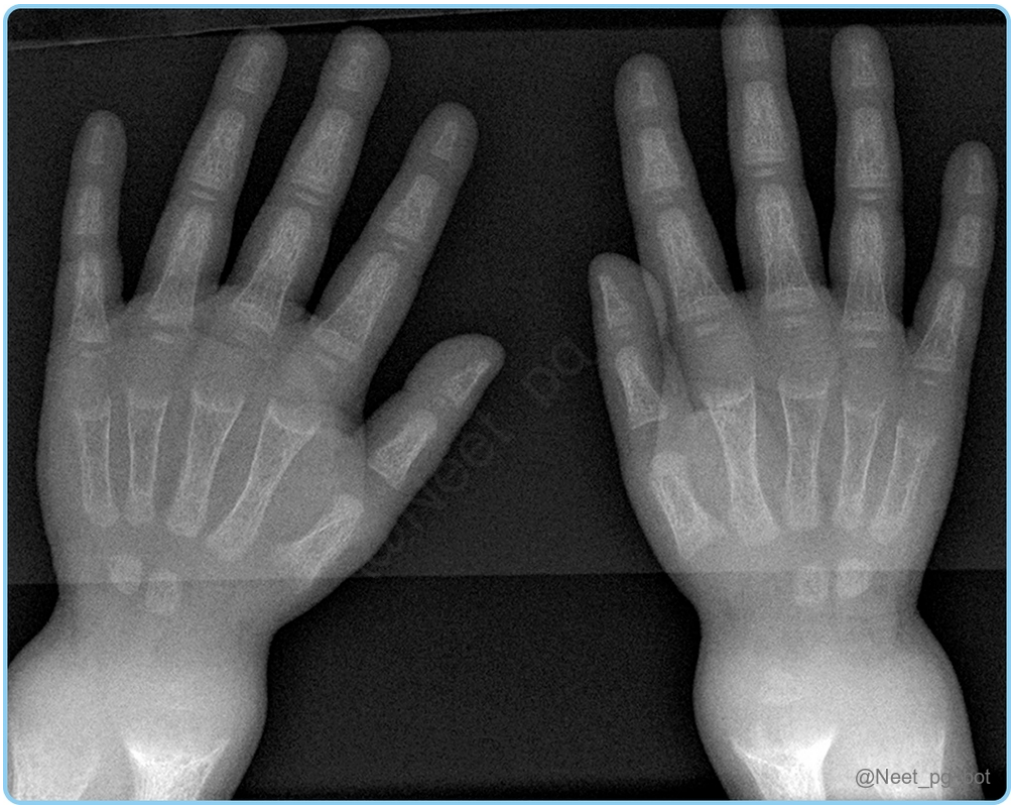



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Rachitic
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Subperiosteal Hemorrage
Scorbutic Zone
(Trümmerfeld's zone)
Dense Zone of
Provisional Calcification
(White line of Frankel)
Ring Epiphysis
(Wimberger's ring)
Pelken's Spur
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References:

Grainger and Allison’s Diagnostic Radiology, 7th Edition, Page, 1927. David Sutton’s Textbook of Radiology and Imaging, Volume II, 7th Edition, Page 242-244. O.P Ghai Essential Pediatrics, 10th Edition, Page 114.

↑ *Back to this question in Part A*

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• [02_Musculoskeletal Radiology] 006 Previous Year Questions

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[02_Musculoskeletal Radiology] 006 Previous Year Questions — Quick Jump

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Q7 (p. 681) *Q8 (p. 683)* *Q9 (p. 686)* *Q10 (p. 687)* *Q11 (p. 688)*

Q1: Identify the tarsal bone marked by the arrow in the given X-ray of the right foot. (Q866870)

A. Navicular

B. Cuboid

C. Intermediate cuneiform

D. Lateral cuneiform



Correct Answer: A. Navicular

Explanation: The navicular bone is a wedge-shaped tarsal bone located medially in the midfoot. It articulates proximally with the talus, distally with the three cuneiform bones, and laterally with the cuboid. On a dorsoplantar (DP) or oblique foot X-ray, it is seen on the medial side between the talus and cuneiforms. The arrow in this case points to its distinctive position and shape. Cuboid (Option B): Found on the lateral aspect of the foot between the calcaneus and 4th–5th metatarsals. Intermediate cuneiform (Option C): Located between medial and lateral cuneiforms, distal to the navicular. Lateral cuneiform (Option D): Positioned between the intermediate cuneiform and cuboid, articulating with the 3rd metatarsal.



References:

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↑ *Back to this question in Part A*

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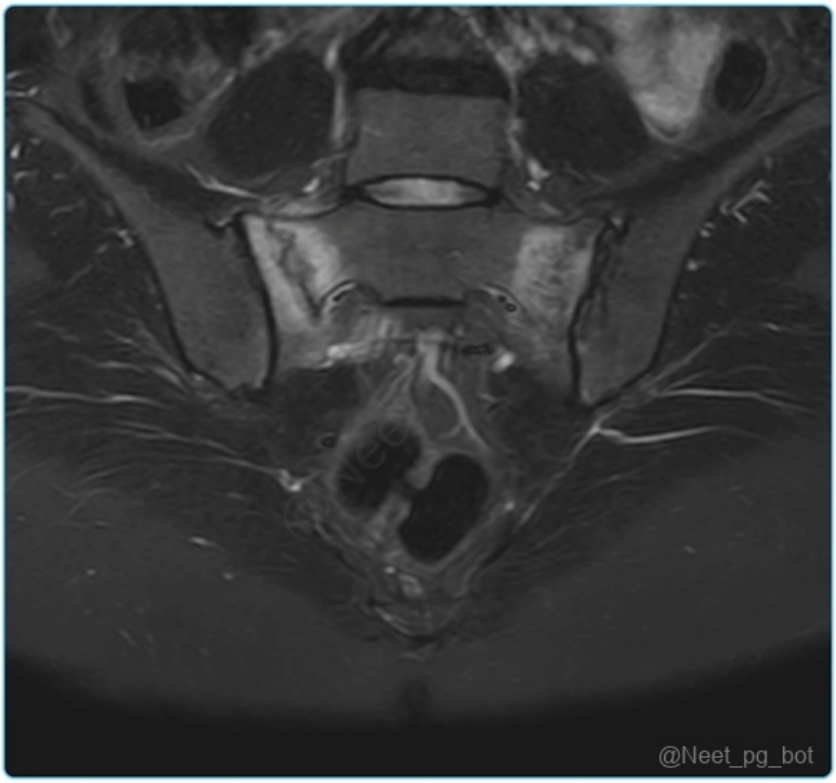
Q2: Identify the condition associated with the image shown below: (Q865269)

A. Sacral metastasis

B. Sacral insufficiency fracture

C. Transient edema of the sacroiliac joint

D. Infective sacroiliitis



Correct Answer: B. Sacral insufficiency fracture

Explanation: 1. Plain Radiographs (X-rays): Often Normal: Plain X-rays are notoriously insensitive for detecting acute sacral insufficiency fractures, especially in the early stages. The subtle nature of the fracture and overlying bowel gas can obscure them. Subtle Sclerosis: In later stages or chronic cases, a vague vertical band of increased bone density (sclerosis) may be noted in the sacral ala (wing) parallel to the sacroiliac joint. This represents healing bone or callus formation. 2. Bone Scintigraphy (Nuclear Medicine Bone Scan): Highly Sensitive: Bone scans (using technetium-99m methylene diphosphonate, 99mTc-MDP) are very sensitive for detecting SIFs, often showing uptake earlier than other modalities. "H-Sign" or "Honda Sign": This is a classic and highly characteristic finding, though not present in all cases (occurs in 20-78% of cases). It refers to a pattern of increased radionuclide uptake resembling the letter "H". 3. Computed Tomography (CT Scan): Better for Bony Detail : CT is superior to plain X-rays for visualizing subtle cortical breaks and fracture lines. Fracture Line : A low-attenuation (dark) fracture line may be seen, often with surrounding ill-defined sclerosis representing callus formation. Sclerosis : Broad regions of sclerosis adjacent to the fracture line can be present.

References:

Sacral insufficiency fracture

↑ *Back to this question in Part A*

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Q3: A 60-year-old patient presents with an inability to bear weight following a trivial trauma. X-rays of the pelvis and thigh reveal lytic lesions with cortical destruction. She has a history of weight loss. What is the most likely diagnosis? (Q852786)

A. Eosinophilic granuloma

B. Disseminated TB

C. Brown tumor

D. Metastasis





Correct Answer: D. Metastasis

Explanation: Metastatic bone disease is the most common cause of lytic bone lesions in elderly patients with a history of weight loss. The femur and pelvis are common sites for metastatic deposits, especially from primary malignancies like breast, lung, prostate, and renal cell carcinoma. Pathological fractures following trivial trauma are characteristic. The X-ray shows focal bony destruction of the acetabulum , causing abnormal joint orientation, but the femoral articular surface remains normal , suggesting a bone lesion rather than joint pathology . Metastatic Tumors to Bone Common Metastatic Tumors Lung carcinoma (male) Breast carcinoma (female) Prostate carcinoma (Osteoblastic) Thyroid carcinoma Clinical Features Known Primary Malignancy: Bone pain (common in spine, ribs, extremities) Pathological fracture (common in spine) Unknown Primary Malignancy: Bone pain leading to destructive lesion diagnosis Pathological fracture due to weakened bone Malignancies Presenting with Silent Primary Thyroid carcinoma Renal cell carcinoma Bladder carcinoma Common Sites of Metastasis Vertebral bodies Ribs Pelvis Humerus Femur Uncommon distal to elbow and knee Eosinophilic Granuloma (Option A): Primarily affects children, commonly involving the skull and vertebral bodies , not typical in elderly patients. Disseminated TB (Option B): Typically involves the hip joint (Tuberculous arthritis) , leading to joint space narrowing and articular surface destruction , which is not seen here . Brown Tumor (Option C): Seen in hyperparathyroidism , with multiple lytic lesions and associated systemic features, which are not mentioned in the case .

References:

Apley and Solomon’s System of Orthopaedics and Trauma, 10th Edition, Pages 220-227

↑ *Back to this question in Part A*

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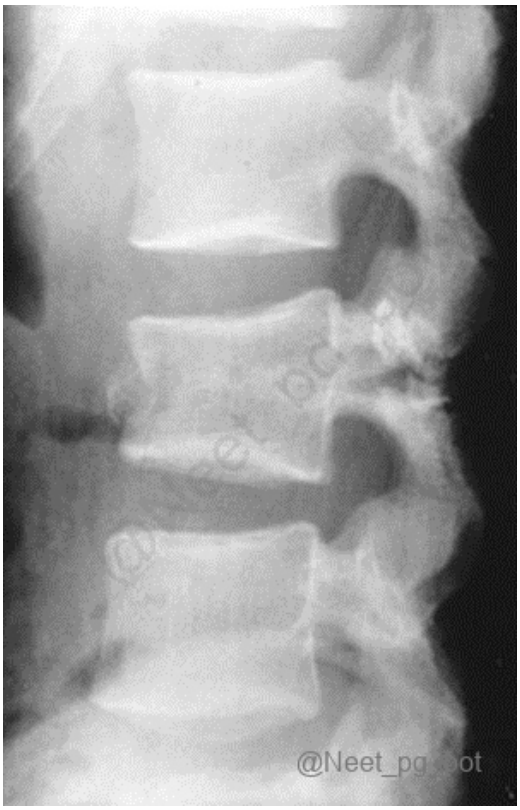
Q4: Identify the given fracture: (Q843929)

A. Burst fracture

B. Compression fracture

C. Chance fracture

D. Impacted fracture



Correct Answer: C. Chance fracture

Explanation: Correct Option C – Chance fracture: The given radiograph shows a chance fracture. Chance fracture usually occurs at the thoracolumbar junction (T10-L2). It is a horizontal fracture that extends through the spinous process, pedicles, and vertebral body, affecting the posterior and middle columns of the spine. It characteristically shows anterior compression of vertebral body, posterior distraction (splitting posterior elements horizontally) Incorrect Options: Option A - Burst Fracture: The vertebral body is shattered, with fragments extending into the spinal canal, potentially causing spinal cord compression. Axial loading fracture where vertebral body shatters and retropulses fragments into the canal Fracture lines are vertical, not horizontal Posterior elements are usually not distracted. Option B - Compression Fracture: The vertebral body becomes wedge-shaped due to the collapse of the anterior portion, with the posterior height usually preserved. Option D - Impacted fracture: Impacted Fracture shows overlapping bone fragments leading to increased density at the site of injury.

References:

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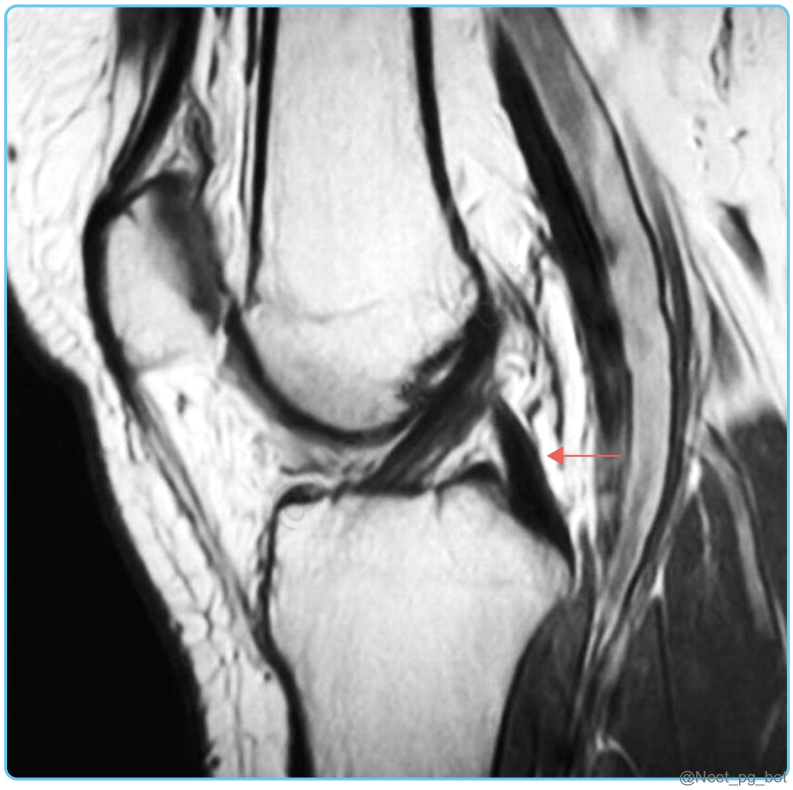
Q5: Identify the marked ligament? (Q857382)

A. PCL

B. ACL

C. Patellar tendon

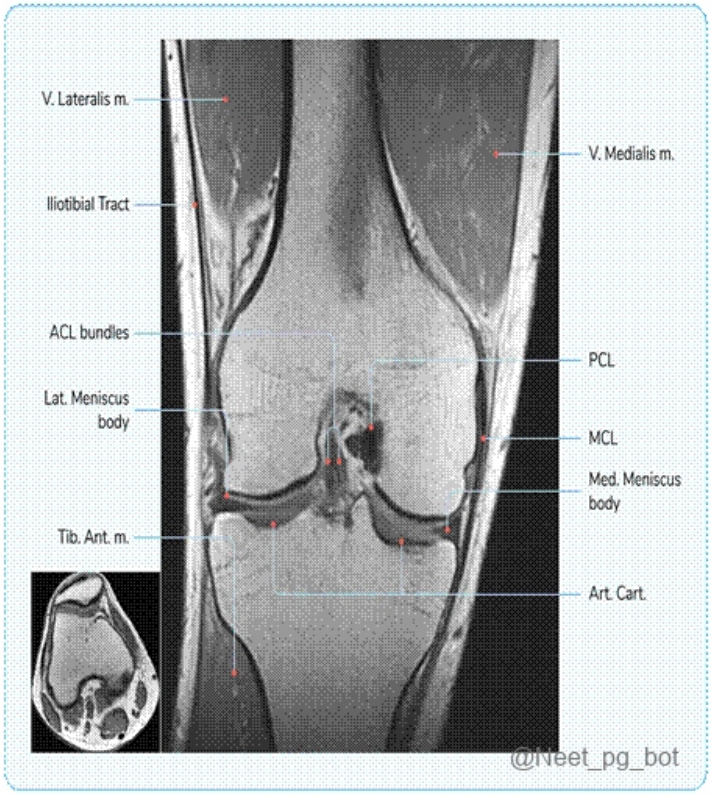
D. None of the above

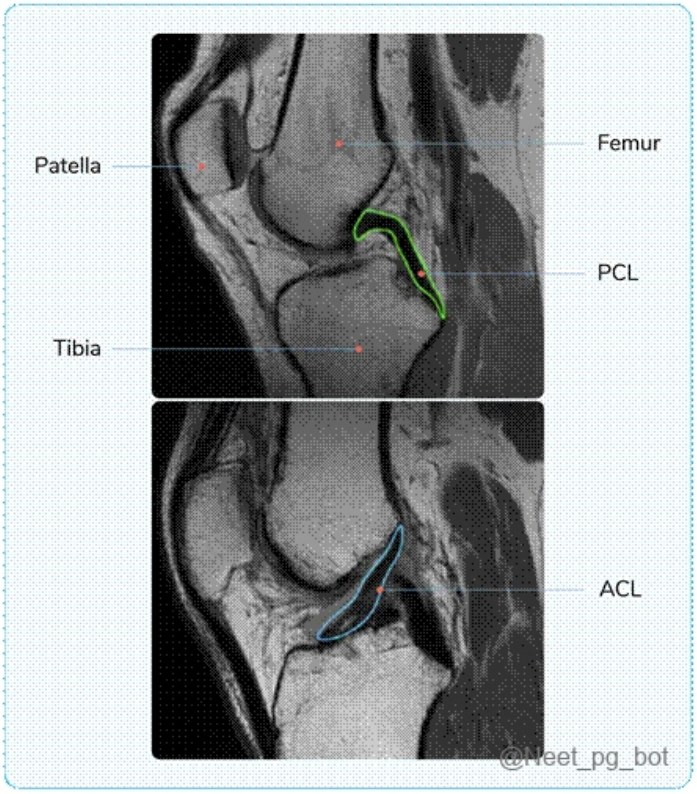


Correct Answer: A. PCL

Explanation: The posterior cruciate ligament (PCL) is a key ligament in the knee joint, located at the back of the knee. It prevents the tibia from sliding backward relative to the femur and provides stability, especially during activities like walking, running, and jumping. Knee Ligaments The knee joint is stabilized by several ligaments, including the PCL , ACL , and other supportive ligaments like the patellar tendon . Each of these ligaments plays

an important role in maintaining the structural integrity of the knee, facilitating movement, and preventing injury. Comparison of Knee Ligaments and Tendons Structure Location Function Injury Characteristics PCL (Posterior Cruciate Ligament) Back of the knee joint Prevents tibia from sliding backward, stabilizes knee Less common than ACL injury; caused by high-impact trauma (e.g., car accidents, contact sports); symptoms include instability, pain, and swelling ACL (Anterior Cruciate Ligament) Front of the knee joint Prevents tibia from sliding forward, controls rotational movement Common in sports with sudden stops, direction changes, or jumps (e.g., football, basketball, skiing); symptoms include pain, swelling, and functional loss Patellar Tendon Connects patella (kneecap) to tibia Enables knee extension during walking and running Injured due to trauma or overuse; symptoms include pain, swelling, and difficulty straightening the knee {{caption_text}} {{caption_text}} ACL (Option B) : The anterior cruciate ligament is located in the front of the knee, preventing excessive forward movement of the tibia. This is not the ligament in question here. Patellar Tendon (Option C) : The patellar tendon connects the patella to the tibia and does not function in the same way as the cruciate ligaments, which control the motion of the tibia in relation to the femur. None of the Above (Option D) : This option is incorrect because the marked ligament is clearly identified as the PCL .





↑ *Back to this question in Part A*

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Q6: What is the most radiosensitive tissue in our body? (Q857620)

A. Skin

B. Muscles

C. Bone marrow

D. Nervous tissue

Correct Answer: C. Bone marrow

Explanation: Bone marrow is the most radiosensitive tissue in the human body because it contains rapidly dividing hematopoietic stem cells , which are highly vulnerable to ionizing radiation. Radiation exposure can lead to pancytopenia , increasing the risk of infections, anemia, and bleeding. Radiosensitivity of Different Tissues Tissue Radiosensitivity Reason Bone marrow Highly radiosensitive Contains rapidly dividing stem cells for blood cell production Lymphoid tissue Highly radiosensitive Rapid cell turnover, easily damaged by radiation Gastrointestinal mucosa Moderately radiosensitive Epithelial cells divide rapidly Skin Moderate Basal layer is sensitive, but outer layers provide some protection Muscle Radioresistant Cells do not divide frequently Nervous

tissue Highly radioresistant Neurons are non-dividing cells and less affected by radiation Skin (Option A): Moderately radiosensitive due to the presence of basal cell layers, but not as sensitive as bone marrow. Muscles (Option B): Incorrect because muscle cells are highly radioresistant as they do not actively divide. Nervous tissue (Option D): Incorrect because neurons are non-dividing and among the most radioresistant cells in the body.

References:

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4892608/

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5822441/

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8836217/

↑ *Back to this question in Part A*

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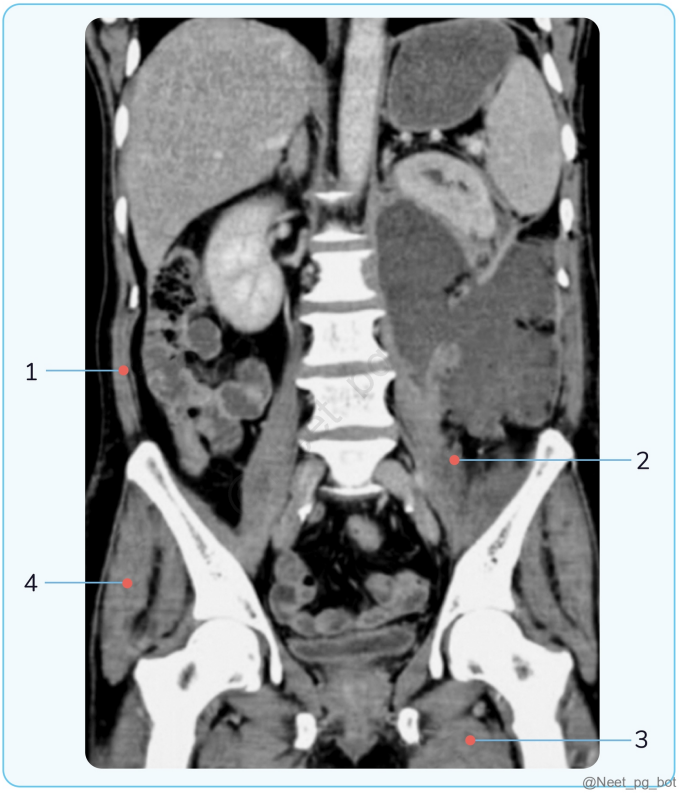
Q7: A 15-year-old patient with a history of spinal tuberculosis was brought to the hospital with low-grade fever, dull backache, and persistent flexion of the hip joint. Hip joint motion was limited and painful. Identify the muscle affected in the CT image. (Q856156)

A. 1

B. 2

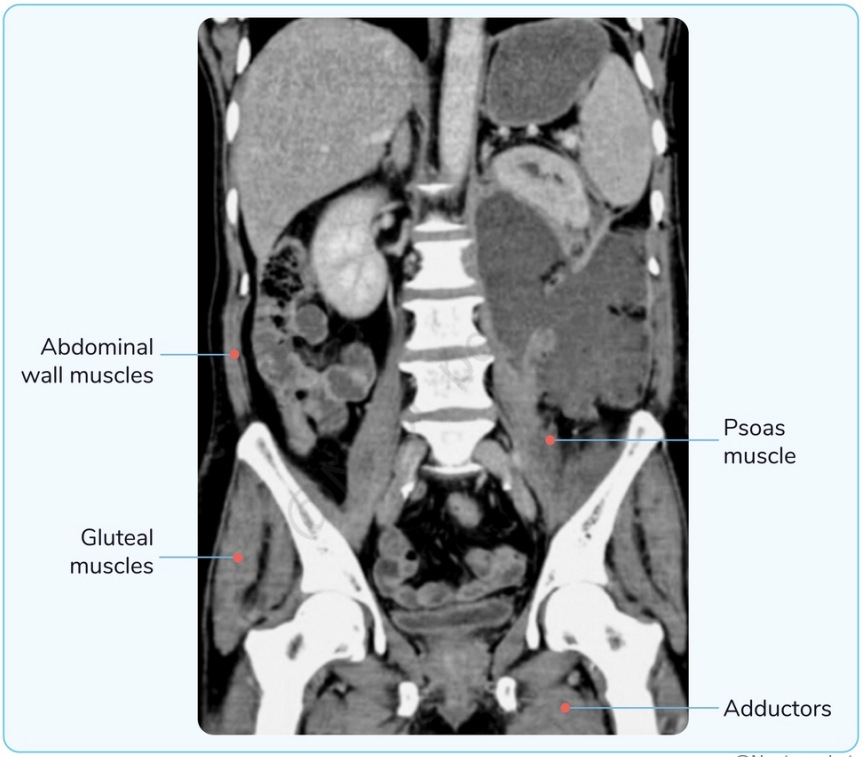
C. 3

D. 4



Correct Answer: B. 2

Explanation: The arrow marking as 2 is psoas muscles and in the context of a 15-year-old patient with a history of spinal tuberculosis and presenting with low-grade fever, dull backache, and persistent flexion of the hip joint, the involvement of the psoas muscle is highly suggestive of a psoas abscess. Muscle from anterior aspect crossing hip joint anteriorly - Iliopsoas muscle. Pulling the femur anteriorly causing the hip flexion- Iliopsoas muscle (Proximal muscle) - Chief muscle for hip flexion. The psoas muscle is a large muscle located in the lower back that plays a key role in hip flexion and stabilization of the spine. Psoas abscesses can occur as a complication of spinal tuberculosis, with the infection spreading from the vertebral column to the adjacent psoas muscle. {{caption_text}} Spinal TB (Pott's Disease) Involves lower thoracic and upper lumbar vertebrae in adults; and upper thoracic spine in children. Lesions spread to adjacent vertebrae and intervertebral disks. Advanced Disease Collapse of vertebrae leads to kyphosis (gibbus deformity) . Paravertebral cold abscesses: Upper spine: Abscess may penetrate the chest wall as a soft tissue mass. Lower spine: May track to the inguinal region or form a psoas abscess. Diagnosis of Spinal TB Imaging (CT/MRI): Shows characteristic lesions, suggesting TB aetiology. Differential Diagnosis: Includes tumours and infections like pyogenic bacterial osteomyelitis. Confirmation: Aspiration or biopsy confirms TB via positive cultures and typical histology. Complications Paraplegia : Due to abscess or spinal cord compression; requires emergency drainage if caused by a large abscess. 1 (Option A): Abdominal wall muscles, including the rectus abdominis, external oblique, internal oblique, and transversus abdominis, are responsible for core stability and movement of the trunk. In the given scenario, the symptoms and CT image findings are not indicative of abdominal wall muscle involvement. 3 (Option C): The adductor muscles, including the adductor longus, adductor brevis, and adductor magnus, are located in the inner thigh and are responsible for hip adduction. They are not directly related to the symptoms and CT findings described in the scenario. 4 (Option D): The gluteal muscles, including the gluteus maximus, gluteus medius, and gluteus minimus, are located in the buttocks and are responsible for hip extension, abduction, and rotation. Their involvement is not typically associated with the symptoms and CT image findings described in the given scenario.



References:

Harrison’s Principles of Internal Medicine, 21st Edition, Page 1365

Tuberculosis of the spine - PMC.

↑ *Back to this question in Part A*

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Q8: A 13-year-old boy presents to you with a limitation of abduction and internal rotation of the left hip. The x-ray appearance of his left hip joint is shown in the below image. What is the diagnosis of this patient? (Q859251)

A. Slipped capital femoral epiphysis

B. Perthes disease

C. Development of dysplasia of the hip

D. Ankylosing spondylitis



Correct Answer: A. Slipped capital femoral epiphysis

Explanation: Slipped capital femoral epiphysis (SCFE) is a disorder of adolescents in which the growth plate is damaged and the femoral head moves (“slips”) with respect to the rest of the femur. It results in a non-traumatic painful hip of adolescence. Usually, an anteroposterior view of the pelvis and frog lateral views of both hips helps in the diagnosis of SCFE. Frog Leg Lateral View: Indication: Used in the assessment of: Slipped capital femoral epiphysis Perthes disease Procedure: The patient is supine with the affected limb flexed at the knee approximately 30° to 40°, and the hip is abducted 45°. The beam is focused midway between the anterior superior iliac spine and the pubic symphysis. If it is a bilateral examination, both knees are to rest on sponges, giving the appearance of "frog legs." {{caption_text}} {{caption_text}} Perthes disease (Option B) is a childhood disease that occurs when the blood supply to the femoral head of the hip joint is temporarily interrupted and the bone begins to die. This can cause pain, limping, and limited movement of the hip joint. The early signs of Perthes disease may be joint effusion and widening of medial joint space. In the advanced burnt-out stage femoral head and neck deformity occur. Developmental dysplasia of the hip (DDH) (Option C) is a disorder that is due to abnormal development of the acetabulum with or without hip dislocation. This condition may occur at any time, from conception to skeletal maturity and the child may be born with dislocation or instability of the hip joint which then may result in hip dysplasia. Ankylosing spondylitis (Option D) is a chronic, inflammatory disease of the axial spine. There is a fusion of both SI joints and thin, symmetrical syndesmophytes bridging the Intervertebral disc spaces are seen as depicted in the x-ray of sacroiliac joints.





References:

Grainger and Allison's Diagnostic Radiology, 7th Edition, Page no: 230

↑ *Back to this question in Part A*

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Q9: 10-year-old girl presents to the OPD with a back deformity. What is the likely cause? (Q859949)

A. Congenital

B. NF1

C. Idiopathic

D. Neuromuscular



Correct Answer: C. Idiopathic

Explanation: Idiopathic scoliosis is the most common type of scoliosis, accounting for the majority of cases. It refers to scoliosis of unknown cause and typically develops during adolescence. The age of the patient in this scenario aligns with the typical onset of idiopathic scoliosis, making it the most likely cause. Scoliosis: Scoliosis is defined as a lateral curvature of the spine with a Cobb angle of >10°, as measured on a standing radiograph. It commonly develops during adolescence. Causes: Idiopathic Scoliosis: Most common, with no known cause. Typically develops in adolescence. Congenital Scoliosis: Results from abnormal fetal spinal development.

Neuromuscular Scoliosis: Associated with neurological or muscular disorders like cerebral palsy or muscular dystrophy. Degenerative Scoliosis: Caused by age-related degeneration, often seen in older adults. Types: Structural Scoliosis: Permanent curvature of the spine. Nonstructural Scoliosis: Functional or temporary, often corrects when lying down. Clinical Features: Uneven shoulders or hips. Leaning to one side due to spinal curvature. Prominent ribs or shoulder blade on one side. Asymmetrical back appearance, especially when bending forward. Muscle imbalances causing fatigue and discomfort. Back pain, especially during prolonged sitting or standing. Incorrect Options: Congenital (Option A): Congenital scoliosis occurs due to malformation of the vertebrae during fetal development and is usually detected much earlier (infancy or early childhood). NF1 (Option B): Neurofibromatosis type 1 can cause scoliosis, but it's associated with other features like café-au-lait spots, neurofibromas, or a family history. Neuromuscular (Option D): Neuromuscular scoliosis is seen in children with neurological or muscular disorders like cerebral palsy or muscular dystrophy, which would have associated clinical findings.

References:

David Sutton's Textbook of Radiology and Imaging, Volume 2, 8th Edition, Page 1122

Grainger and Allison's Diagnostic Radiology, 7th Edition, Page 1265,1266

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Q10: A 14-year-old boy presents with pain and swelling over the right humerus for 2 months. He also has a fever and raised ESR. Blood tests show leucocytosis with neutrophilia. An X-ray of the humerus is shown below. Which of the following is the next step for this patient? (Q878877)

A. Bone marrow biopsy

B. CT-guided biopsy

C. MRI of the affected limb

D. PET



Correct Answer: C. MRI of the affected limb

Explanation: In suspected Ewing sarcoma, MRI is the next step to assess extent of marrow and soft tissue involvement after an abnormal X-ray. It is a non-invasive test therefore, done before biopsy. Incorrect Options: Bone marrow biopsy (Option A): Used for hematologic disorders, not local bone lesions. CT-guided biopsy (Option B): Done after MRI to confirm diagnosis histologically. PET (Option D): Used for staging malignancy, not initial evaluation.

References:

Harrison’s principles of internal medicine, 21st Edition, Page 715.

Ewing sarcoma-1

Ewing sarcoma-2

↑ *Back to this question in Part A*

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Q11: Based on the provided image, what possible diagnosis can be determined? (Q793093)

A. Multiple myeloma

B. Ankylosing spondylitis

C. Pyogenic spondylitis

D. Pott’s spine



Correct Answer: D. Pott’s spine

Explanation: Correct Option D- Pott’s spine: The given MRI image is suggestive of changes corresponding to Potts's spine. It is suggestive of the Paradisaical type of Potts's spine as the infection is destroying adjacent vertebral bodies causing disc space narrowing and weakness of the spine. Therefore, option d is the correct choice. Pott’s spine is an extrapulmonary manifestation of TB. Disc Space Narrowing, paravertebral abscess, and vertebral lysis are common features observed in the case of Pott’s spine x-ray. Incorrect Options: Option A - Multiple Myeloma: It shows Cannon ball Metastasis, Decreased Bone thickness, usually present in the elderly age group. On MRI of the lumbosacral spine, collapsed vertebrae are observed. The sagittal T1 image of the lumbar spine should show a salt-and-pepper appearance of the vertebral marrow in the patient. Since none of them are observed, it is an incorrect choice. Option B - Ankylosis Spondylitis: It shows features of Sacroiliitis, i.e., inflammation of the sacroiliac joint on Radiology, which isn’t observed in the given MRI image. Thus, it is an incorrect choice. Option C - Pyogenic Spondylitis: It presents with an abscess in proximity to the spine. Regional osteopenia, new bone apposition, and peripheral sclerosis are some of the radiographic features. Since the given MRI doesn’t show any abscess, it is concluded that option c is an incorrect choice.

References:

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↑ *Back to this question in Part A*

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• [03_Thoracic Radiology] 007 Respiratory Radiology - I

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[03_Thoracic Radiology] 007 Respiratory Radiology - I — Quick Jump

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Q7 (p. 702)	*Q8 (p. 703)*	*Q9 (p. 705)*	*Q10 (p. 706)*	*Q11 (p. 707)*	*Q12 (p. 708)*
Q13 (p. 709)	*Q14 (p. 713)*	*Q15 (p. 714)*	*Q16 (p. 715)*	*Q17 (p. 716)*	*Q18 (p. 719)*
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Q43 (p. 785)					

Q1: A 35-year-old woman presents with B/L hilar lymphadenopathy without any significant lung parenchymal involvement. Her chest X-ray shows symmetric mediastinal and hilar lymphadenopathy in a "1-2-3" pattern. What is the most likely stage of sarcoidosis in this patient? (Q853232)

A. Stage 4

B. Stage 1

C. Stage 2

D. Stage 3

Correct Answer: B. Stage 1

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: Stage 1 sarcoidosis is characterized by hilar/mediastinal lymphadenopathy without lung parenchymal changes . The “1-2-3” pattern refers to bilateral hilar and right paratracheal lymphadenopathy. Sarcoidosis Sarcoidosis is a multisystem inflammatory disorder characterized by the formation of noncaseating granulomas, with an unknown cause. Staging of Sarcoidosis Stage 0 No visible abnormalities Stage 1 Hilar/mediastinal lymphadenopathy without lung parenchymal changes (Option B) Stage 2 Hilar/mediastinal lymphadenopathy with lung disease (Option C) Stage 3 Diffuse lung disease without lymphadenopathy (Option D) Stage 4 End-stage fibrosis (Option A)

References:

Grainger & Allison’s Diagnostic Radiology, 7th Edition, Page 216

David Sutton Textbook of Radiology & Imaging, 8th Edition, Volume 1, Page 1245, 1246

https://radiopaedia.org/articles/panda-sign-sarcoidosis

https://radiopaedia.org/articles/lambda-sign-sarcoidosis

https://link.springer.com/chapter/10.1007/978-981-99-6633-2_4

https://radiopaedia.org/articles/eggshell-calcification-lymph-nodes-1

↑ *Back to this question in Part A*

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Q2: A young male is brought for a medico-legal examination under court orders to determine his age for criminal liability for a rape case. Based on the given radiographic findings, what is the most likely age of the accused? (Q882196)

A. 12-14 years

B. 14-16 years

C. 16-18 years

D. 18+ years



Correct Answer: C. 16-18 years

Explanation: The acromion process of the scapula develops from multiple secondary ossification centers, which typically appear around 14–16 years and fuse between 18–25 years. The presence of a visible, unfused acromial epiphysis on radiography indicates that skeletal maturity has not yet been achieved, but the individual is older than mid-adolescence, placing the age most consistently in the 16–18 year range. 12–14 years (Option A): At this age, acromial ossification centers are usually not yet well formed. 14–16 years (Option B): Ossification begins in this period, but the degree of development seen here suggests a later adolescent stage. 18+ years (Option D): After 18 years, fusion of the acromial epiphysis begins, and a clearly separate ossification center would be less likely.

↑ *Back to this question in Part A*

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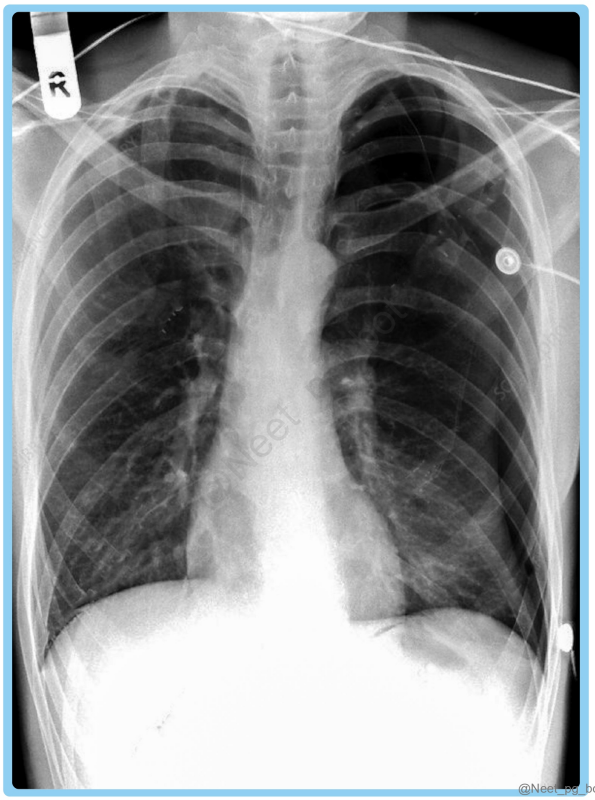
Q3: A 25-year-old tall, thin male with marfanoid features presents with a sudden onset of breathlessness. A chest radiograph is provided. What is the most likely diagnosis? (Q885219)

A. Pulmonary consolidation with air bronchogram

B. Primary spontaneous pneumothorax

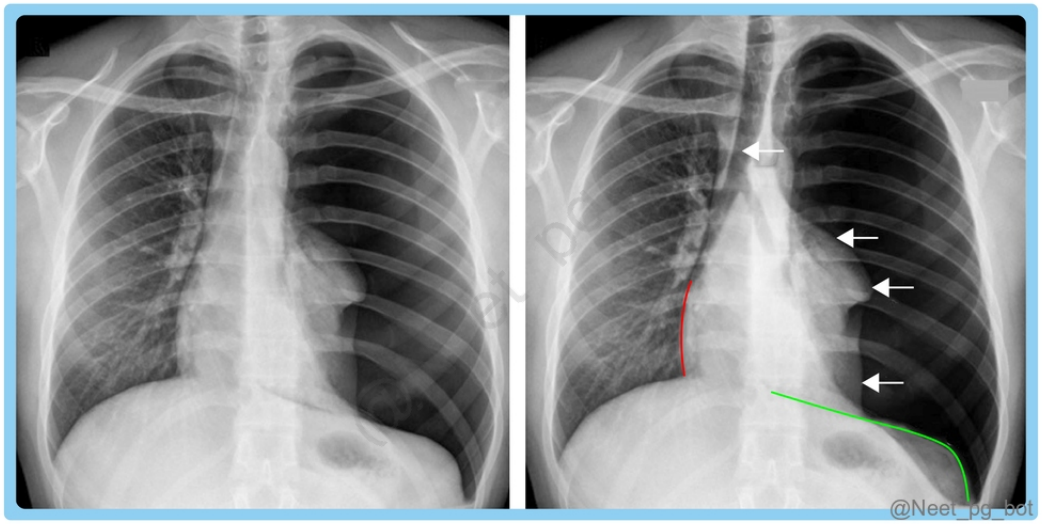
C. Massive pleural effusion with mediastinal shift

D. Interstitial pulmonary fibrosis



Correct Answer: B. Primary spontaneous pneumothorax

Explanation: In a young patient with marfanoid habitus, sudden acute dyspnoea is classically due to primary spontaneous pneumothorax caused by rupture of apical blebs. Marfan syndrome predisposes to: Apical subpleural blebs Spontaneous rupture leading to pneumothorax Presents with sudden breathlessness ± pleuritic chest pain Chest X-ray Features of Pneumothorax Thin visceral pleural line visible Absence of lung markings beyond this line Increased radiolucency of the affected hemithorax Possible mediastinal shift in tension pneumothorax Mechanism Air enters the pleural space and causes loss of negative pressure Partial or complete lung collapse Common in tall, thin young males and connective tissue disorders Incorrect Options: Pulmonary consolidation with air bronchogram (Option A): A high-yield sign of alveolar filling (e.g., pneumonia) showing air-filled bronchi against opaque alveoli, usually with fever and cough. Massive pleural effusion with mediastinal shift (Option C): Produces homogeneous opacity, meniscus sign, and contralateral mediastinal shift, not peripheral hyperlucency. Interstitial pulmonary fibrosis (Option D): Chronic condition with reticular opacities, honeycombing, and volume loss rather than acute presentation.



References:

Grainger & Allison's Diagnostic Radiology, 7th Edition, Page 52.

↑ *Back to this question in Part A*

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Q4: The most common HRCT finding in a patient with COVID-19 is: (Q853230)

A. Consolidation

B. Ground-glass opacities

C. Honeycombing

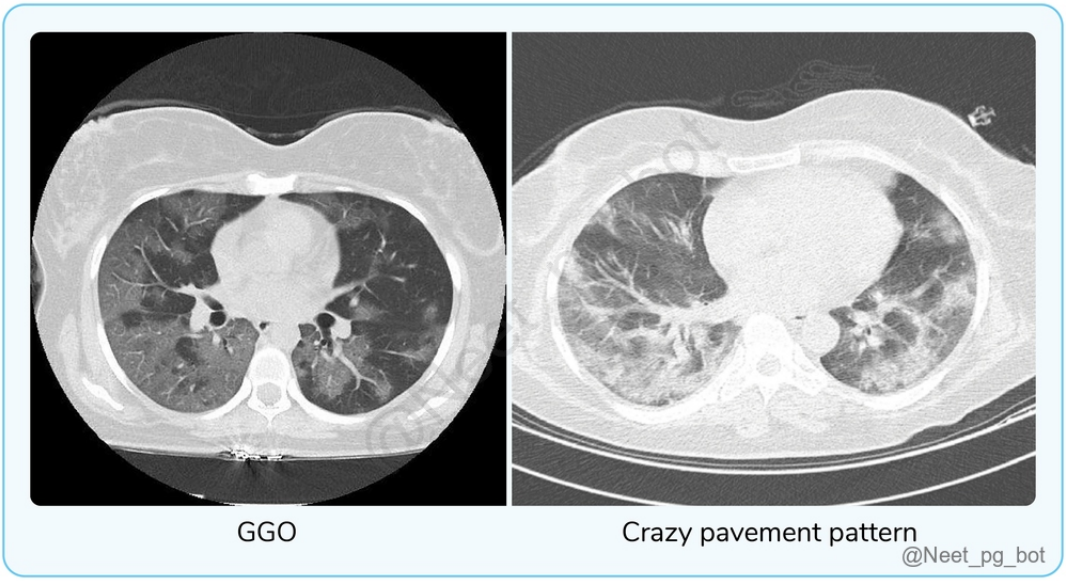
D. Pleural effusion

Correct Answer: B. Ground-glass opacities

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: The most common HRCT finding in COVID-19 is ground-glass opacities. CT Findings of COVID-19 : Common Findings: Ground-glass opacities (GGO) (M/c), consolidation , and reticulations . Characteristic Patterns : Bilateral peripheral and lower lobe predominance; features may resemble organizing pneumonia. A reversed halo sign, halo sign , reticulations, and nodules are uncommon and usually appear later . Other atypical findings can include cavitation, isolated lobar or segmental consolidation, lymphadenopathy, pneumothorax, pneumomediastinum, and pleural effusions.



References:

David Sutton Textbook of Radiology & Imaging, 8th Edition, Volume 1, Page 994, 996

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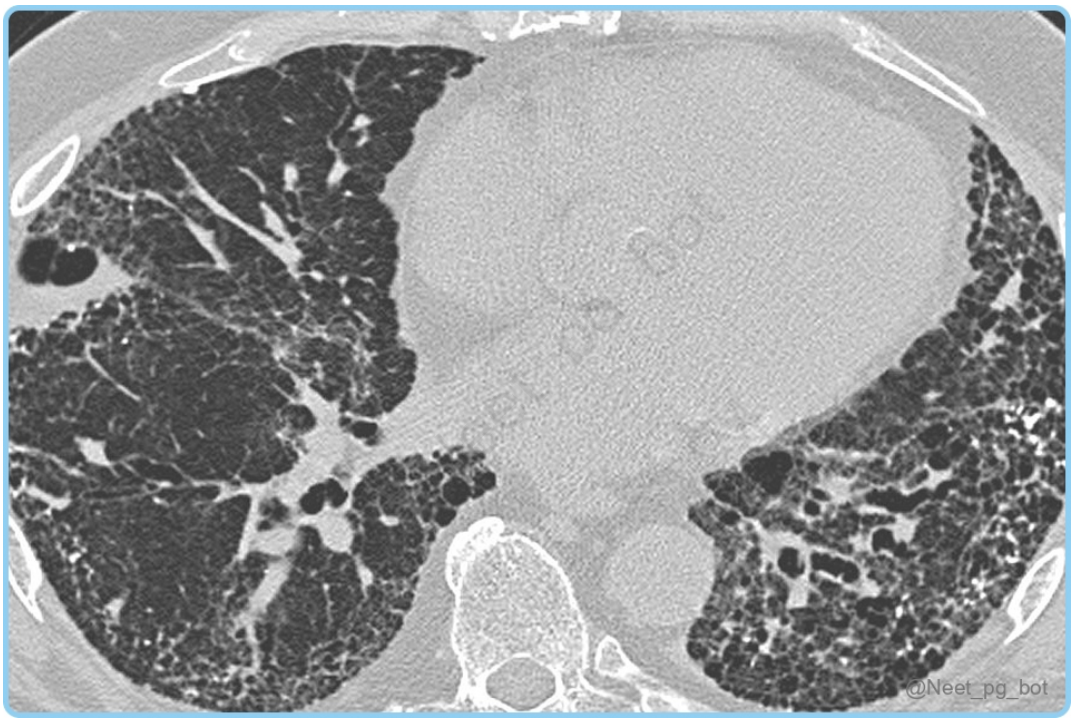
Q5: A 65-year-old male presents with progressive dyspnea, a dry cough, and weight loss over the past six months. On examination, clubbing of the fingers is noted. A chest CT scan reveals a predominantly subpleural reticular pattern with areas of honeycombing predominantly affecting the lower lobes. What is the most likely diagnosis? (Q853231)

A. Non-Specific Interstitial Pneumonia (NSIP)

B. Usual Interstitial Pneumonia (UIP)

C. Cryptogenic Organizing Pneumonia (COP)

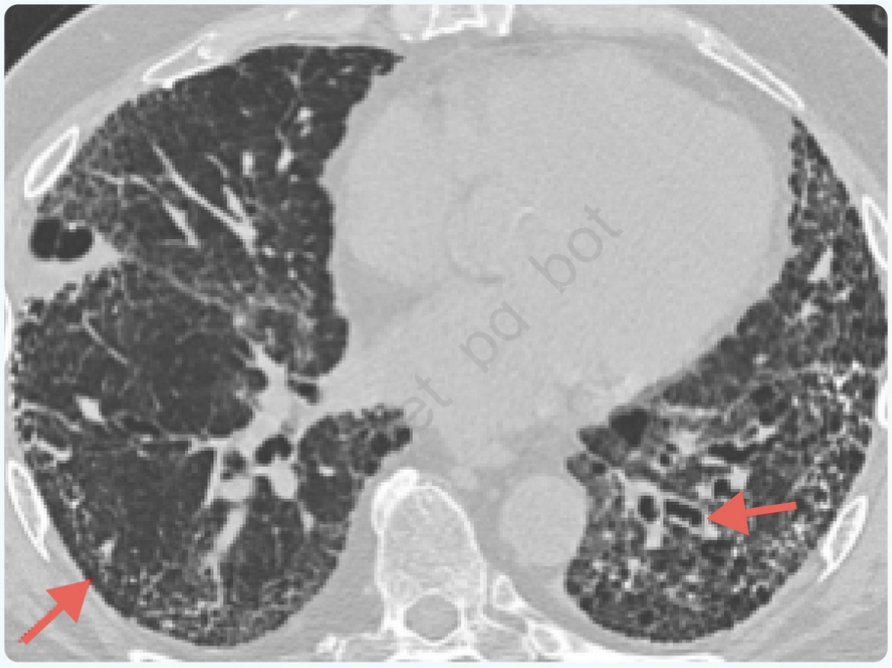
D. Sarcoidosis



Correct Answer: B. Usual Interstitial Pneumonia (UIP)

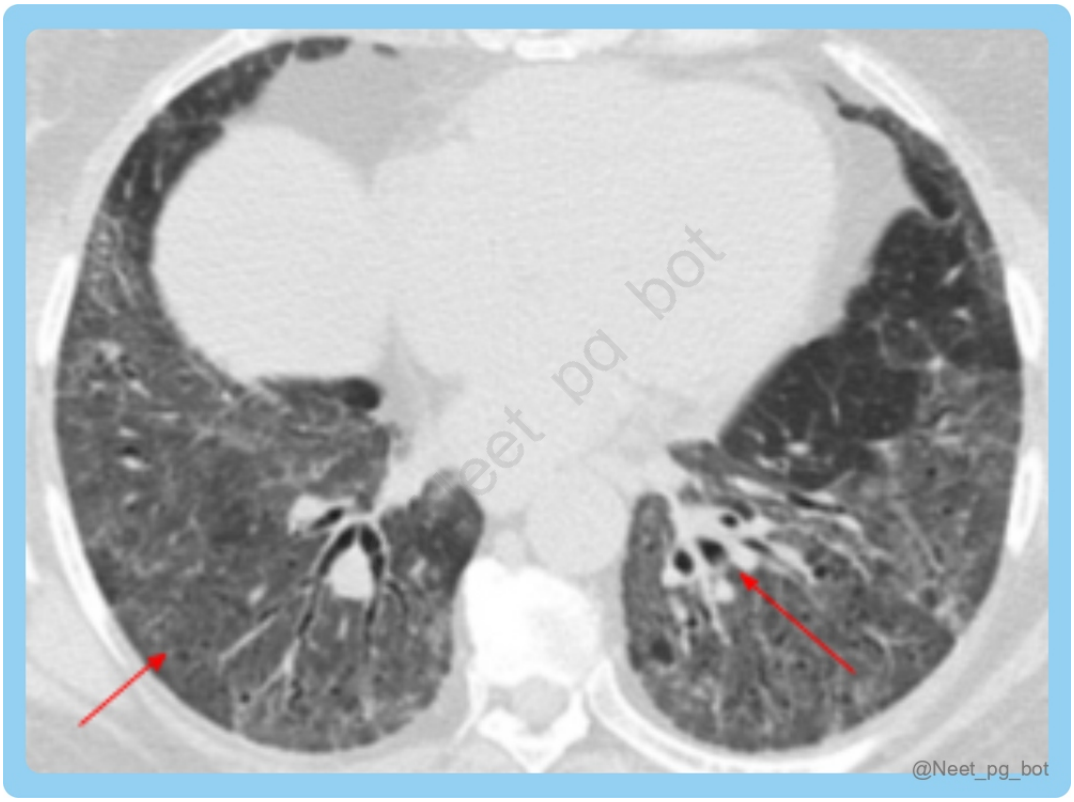
- *Listen (English)*
- *Listen (Hindi)*

Explanation: The clinical presentation includes progressive dyspnea, a dry cough, and clubbing, which are common in interstitial lung diseases , and the Predominantly subpleural reticular pattern with honeycombing , especially in the lower lobes confirm UIP. Usual Interstitial Pneumonia (UIP) Non-Specific Interstitial Pneumonia (NSIP) (Option A) {{caption_text}} {{caption_text}} It presents as a mainly subpleural bibasal reticular pattern with areas of honeycomb (subpleural cystic airspaces with discrete, thickened walls that are stacked or lined up in a row) destruction. As the disease advances, it tends to spread along the lung periphery , affecting the anterior parts of the upper lobes , referred to as the 'propeller blade distribution.' There are signs of traction bronchiectasis and bronchiolectasis. Ground-glass opacities are not predominant. Bilateral ground-glass opacities accompanied by fine reticular patterns . Primarily peripheral in distribution , but may also appear patchy or band-like. Minimal or absent honeycomb pattern. Presence of traction bronchiectasis and bronchiolectasis. Subpleural sparing is seen. Cryptogenic organizing pneumonia (Option C) {{caption_text}} Opacities may appear consolidative, ground-glass, nodular, or mass-like. Typical distribution is subpleural or peribronchovascular. A common appearance is the perilobular pattern, which features linear or band-like opacities arranged in an arcade or polygonal shape . The “atoll” or “reversed halo sign ” is characterized by central ground-glass opacity with a surrounding consolidative edge. Sarcoidosis generally features bilateral hilar lymphadenopathy with egg shell calcification of hilar lymph nodes and ground-glass opacities. (Option D)



Usual interstitial Pneumonia: Honey comb appearance

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References:

Grainger & Allison's Diagnostic Radiology, 7th Edition, Page 208, 210

David Sutton Textbook of Radiology & Imaging, 8th Edition, Volume 1, Page 1215

https://radiopaedia.org/articles/eggshell-calcification-lymph-nodes-1#

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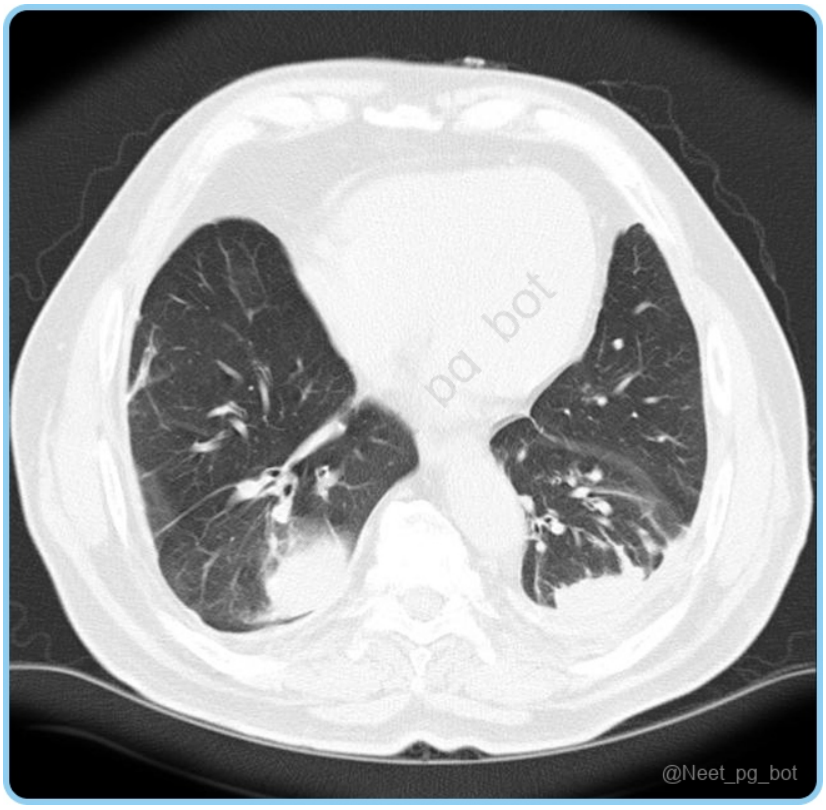
Q6: A 60-year-old man with a history of working as a shipyard worker presents with progressive dyspnea, a persistent dry cough, and chest tightness. He also reports recent weight loss and has experienced crackles upon auscultation. A CT scan of the chest reveals a distinct structure. What could be the underlying mechanism responsible for the observed sign on the CT image? (Q853234)

A. Round atelectasis causing a distinct pattern of lung collapse.

B. Calcified pleural plaques resulting in alterations in the pleural surface.

C. A large nodule surrounded by small nodules indicating a significant inflammatory process.

D. Interstitial fibrosis leading to a reticular pattern affecting lung architecture.

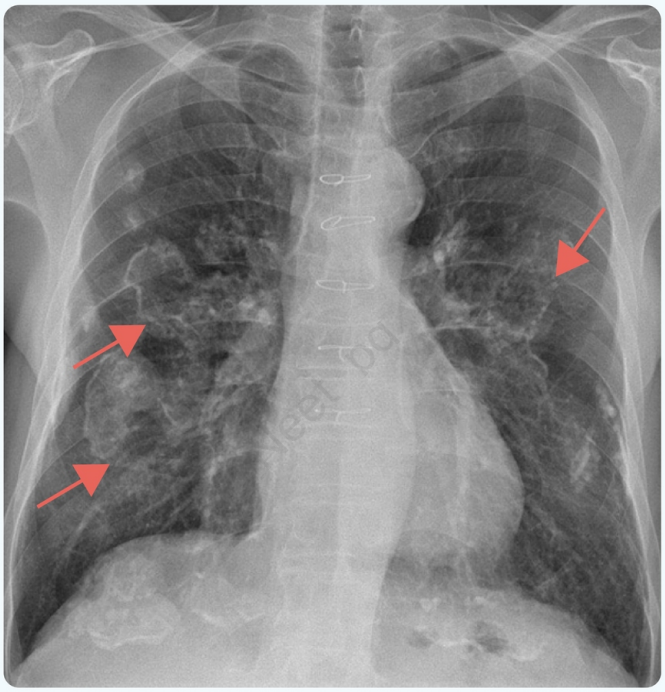


Correct Answer: A. Round atelectasis causing a distinct pattern of lung collapse.

■ *Listen (English)*

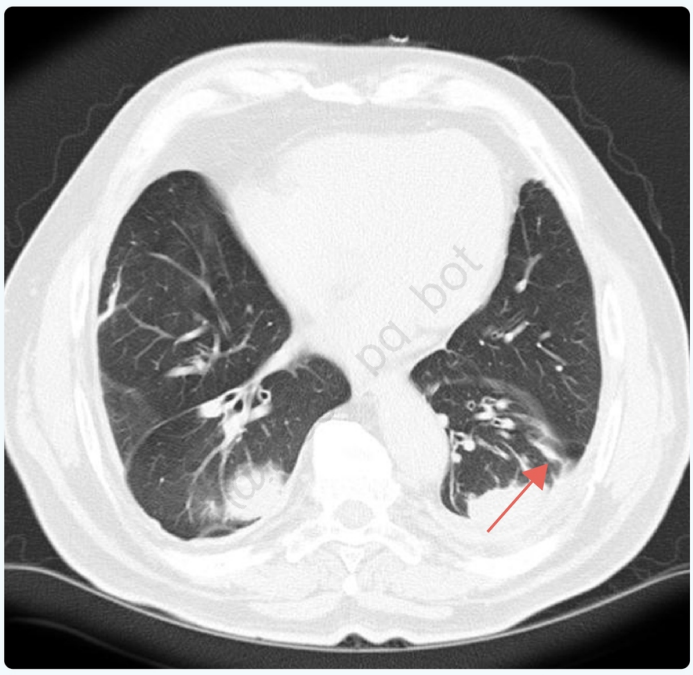
■ *Listen (Hindi)*

Explanation: Round atelectasis occurs when lung tissue collapses, resulting in the characteristic comet tail sign on CT due to the distinct radiographic appearance. Asbestosis Asbestosis is a chronic lung disease caused by the inhalation of asbestos fibers, primarily affecting workers in occupations such as plumbing, shipbuilding, and construction. It is classified as an occupational lung disease, characterized by progressive pulmonary fibrosis and pleural abnormalities. It affects lower lobes predominantly. Radiological Signs: Sign/Condition Features Pleural Plaques Holly Leaf Sign: Calcified pleural plaques, exhibiting irregular, thickened nodular edges that resemble the shape of a holly leaf. {{caption_text}} Mesothelioma Radiological Feature: Irregular thickening of the pleura, often involving the mediastinal pleura, leading to fibrothorax/ frozen. Comet Tail Sign (Crow's Feet Sign) Mechanism: Localized atelectasis with adjacent blood vessels and bronchi drawn towards the collapsed area. Appearance: Rounded opacity with curving vessels or bronchi radiating from it, resembling a comet’s tail or crow’s feet, visible on CT. {{caption_text}}



Holly leaf sign

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Comet tail sign

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References:

Grainger & Allison's Diagnostic Radiology, 7th Edition, Pages 227,228,229.

https://radiopaedia.org/articles/comet-tail-sign-chest-2https://radiopaedia.org/articles/comet-tail-sign-chest-2

https://radiopaedia.org/articles/asbestosi

↑ *Back to this question in Part A*

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Q7: A 55-year-old male presents with drooping of the right eyelid, a constricted right pupil, and lack of sweating on the right side of his face. He also reports weakness, pain, and numbness in his right arm. Chest x-ray reports an apical lung mass on the right side. What is the imaging modality of choice to identify the underlying cause of his symptoms? (Q853236)

A. Chest X-ray

B. MRI

C. CT Scan

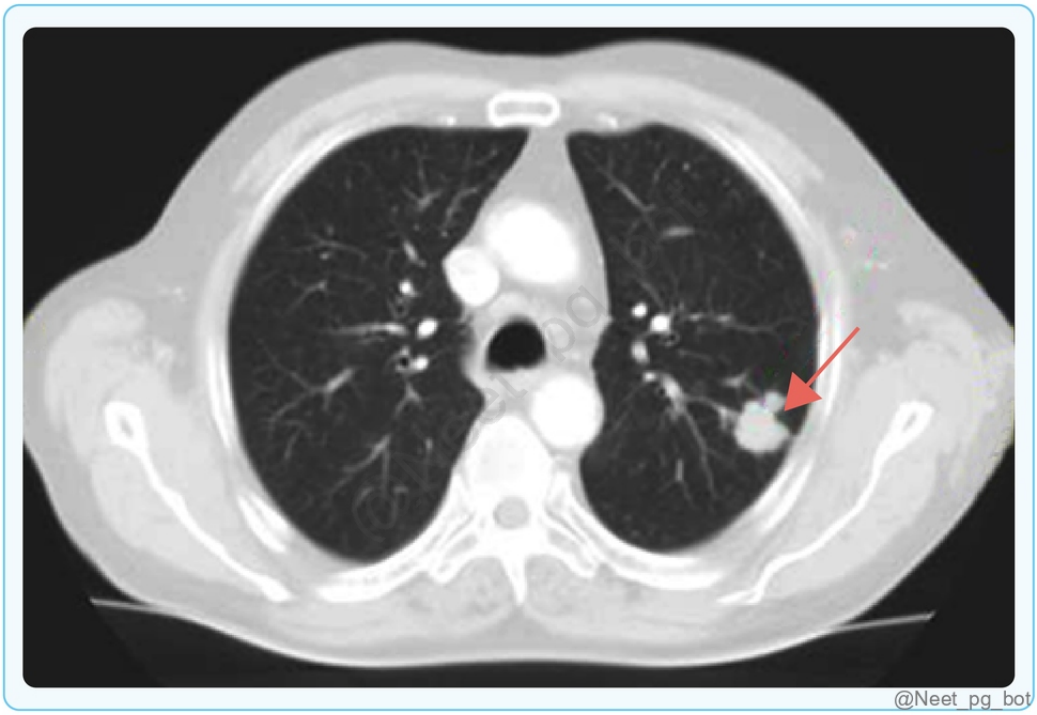
D. PET Scan

Correct Answer: B. MRI

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: The clinical features of Horner's syndrome (ptosis, miosis, anhidrosis) combined with brachial plexopathy (arm weakness, pain, and numbness) strongly suggest a Pancoast tumor, which is a lung apex tumor often affecting the sympathetic chain and brachial plexus. MRI is the preferred imaging modality as it provides detailed visualization of soft tissues, including the tumor’s invasion into surrounding structures like the brachial plexus. CT Scan (Computed Tomography): Modality of choice for the detailed evaluation of lung tumors. {{caption_text}} PET-CT (Positron Emission Tomography-CT): Modality of choice for staging and assessing metastatic spread , as malignant cells show increased glucose metabolism. Combines metabolic imaging (via PET) with anatomic detail (via CT). MRI (Magnetic Resonance Imaging): Not routinely used for lung tumors, but valuable in specific cases. Superior sulcus tumors (Pancoast tumors): Investigation of choice in pancoast tumors to assess brachial plexus involvement or spinal cord invasion. Chest X-ray (Option A): Incorrect — suggests the presence of mass but does not define nerve or soft tissue invasion. CT Scan (Option C): Incorrect — good for bony detail but not optimal for brachial plexus or sympathetic chain evaluation. PET Scan (Option D): Incorrect — useful for staging , not for assessing local neurological invasion .



References:

Grainger & Allison's Diagnostic Radiology, 7th Edition, Page 40-43.

Fred A. Mettler Essentials of Radiology, 4th Edition, Page 72-75.

https://www.ncbi.nlm.nih.gov/books/NBK556109/

↑ *Back to this question in Part A*

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Q8: A 45-year-old male presents with a chronic cough and mild chest discomfort. A chest X-ray reveals a mediastinal mass with well-defined margins and a paravertebral location, suggestive of a lesion arising from neural tissue. To confirm the diagnosis and further evaluate the mass, the physician orders additional imaging. What is the most appropriate imaging modality to confirm the diagnosis? (Q853237)

A. MRI of the chest

B. PET-CT scan

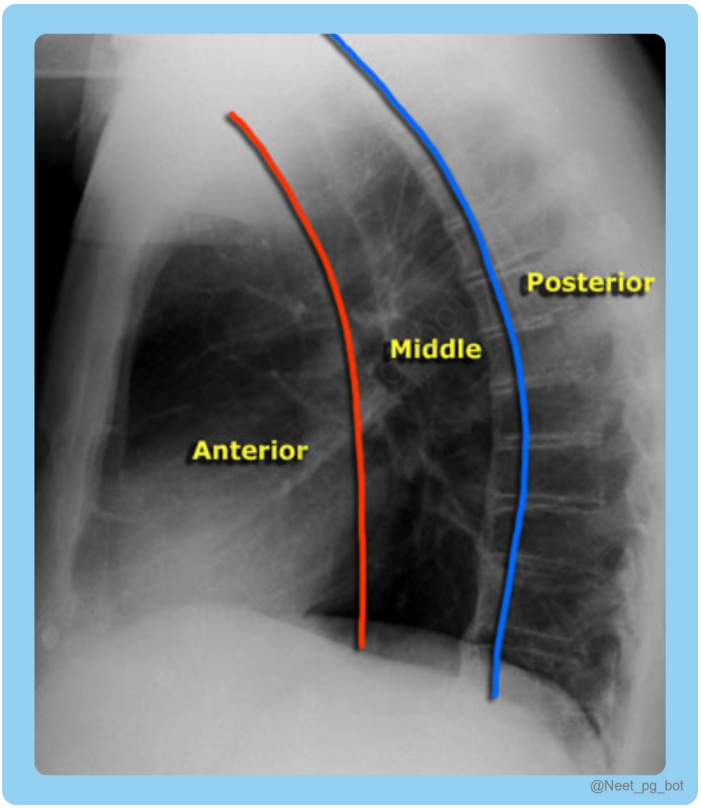
C. CT scan of the chest with contrast

D. Ultrasound

Correct Answer: A. MRI of the chest

- *Listen (English)*
- *Listen (Hindi)*

Explanation: MRI is the preferred imaging modality for posterior mediastinal masses, particularly those suspected to arise from neural structures. It provides excellent soft tissue contrast and allows detailed visualization of the mass and its relationship with surrounding tissues, making it ideal for evaluating neurogenic tumors. Felson classification of the mediastinum: Felson classification divides the mediastinum into three anatomical compartments to assist in the localization and diagnosis of mediastinal masses. These compartments are based on lateral chest radiographs. {{caption_text}} Compartment Boundaries Common Masses/Abnormalities Anterior (Prevascular) Posterior sternum to anterior heart and great vessels Thymic masses: Thymoma, thymic hyperplasia, thymic carcinoma Germ cell tumors: Teratoma Thyroid masses: Ectopic thyroid, substernal goiter Lymphoma: Hodgkin's, non-Hodgkin's Middle (Visceral) Between anterior and posterior compartments Contains heart, great vessels, trachea, esophagus, lymph nodes Bronchogenic cysts Pericardial cysts Lymphadenopathy (metastasis, lymphoma, sarcoidosis) Aortic aneurysms, vascular abnormalities Posterior (Paravertebral) Posterior heart and great vessels to anterior vertebrae Neurogenic tumors: Schwannomas, neurofibromas, ganglioneuromas Esophageal lesions: Tumors, diverticula Spinal abnormalities : Vertebral infections, hernias, masses



References:

Grainger & Allison's Diagnostic Radiology, 7th Edition, Page 69

Fred A. Mettler Essentials of Radiology, 4th Edition, Page 86-92.

↑ *Back to this question in Part A*

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Q9: A patient comes for a routine chest examination. Which X-ray projection is typically preferred for standard imaging? (Q885215)

A. Posteroanterior (PA) view

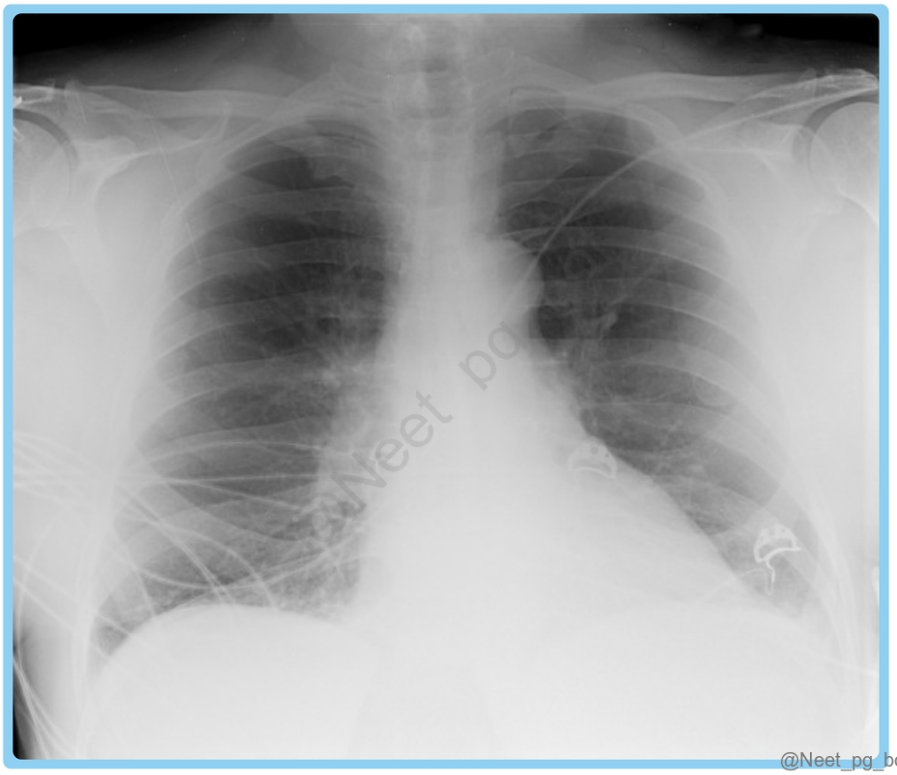
B. Anteroposterior (AP) view

C. Lateral view

D. Oblique view

Correct Answer: A. Posteroanterior (PA) view

Explanation: The posteroanterior (PA) view is the standard projection for routine chest X-rays because it provides optimal visualisation of the heart, lungs, and mediastinum with minimal magnification of cardiac structures. Principles of PA Chest X-ray The patient stands facing the detector with the chest against it The X-ray beam passes from posterior to anterior Scapulae are rotated out of the lung fields Provides a more accurate representation of heart size compared to AP Advantages Minimal magnification of the heart Clear lung fields for detecting infiltrates, masses, or pneumothorax Standard baseline for follow-up imaging Technique Notes Full inspiration is requested for maximum lung expansion Patient upright for better air-fluid level detection Incorrect Options: AP view (Option B): Used when patients cannot stand; the heart appears artificially enlarged. Lateral view (Option C): Provides additional information about retrosternal and retrocardiac areas, but not for routine baseline imaging. Oblique view (Option D): Rarely used; mainly for specific mediastinal or lung lesion localisation.



References:

David Sutton’s Textbook of Radiology and Imaging, Part 1, 7th Edition, Page 1.

↑ *Back to this question in Part A*

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Q10: Which oblique chest X-ray projection provides optimal visualisation of the right lung field? (Q885216)

A. Right anterior oblique

B. Left anterior oblique

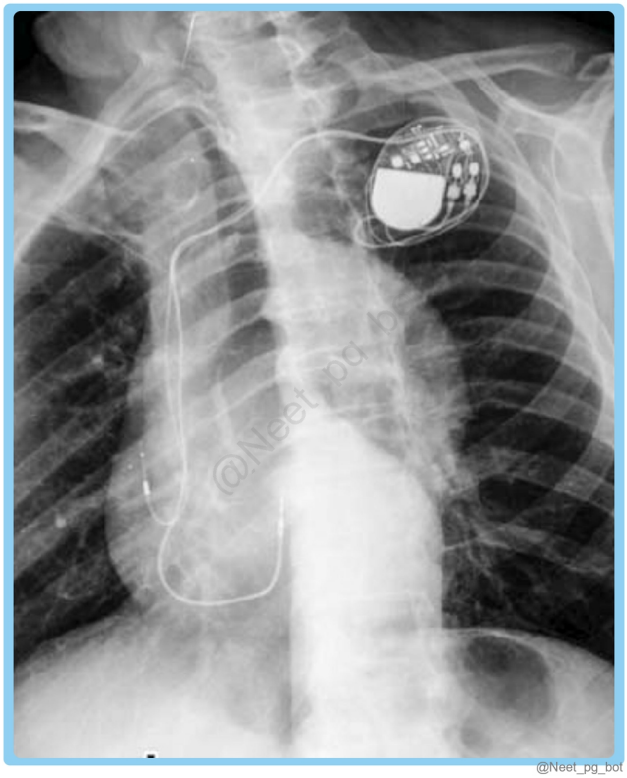
C. Right posterior oblique

D. Left posterior oblique

Correct Answer: B. Left anterior oblique

Explanation: The left anterior oblique (LAO) view is the preferred chest X-ray projection for optimal visualisation of the right lung , as it exposes the maximum area of the right lung field by rotating it away from the mediastinum.

Conversely, the right anterior oblique (RAO) view best demonstrates the left lung . In addition to lung assessment, the LAO view is useful for evaluating cardiac and mediastinal structures such as both ventricles, left atrium, aortic window, and the aorta , while the RAO view highlights the pulmonary artery, right atrium, and right ventricle . Both oblique projections are also routinely utilised during coronary angiographic evaluation for better anatomical delineation. Incorrect Options: Right anterior oblique (Option A) : This view demonstrates the maximum area of the left lung , not the right lung. It is mainly used to assess the right atrium, right ventricle, and pulmonary artery , making it unsuitable for optimal right lung visualisation. Right posterior oblique (Option C) : Posterior oblique views are not routinely used for targeted lung field assessment. They do not provide maximal exposure of the right lung compared to anterior oblique projections. Left posterior oblique(Option D) : Similar to other posterior oblique views, this projection does not adequately separate the right lung from mediastinal structures , resulting in suboptimal visualisation of the right lung field.



References:

https://www.hmpgloballearningnetwork.com/site/cathlab/clinical-editors-corner/chest-x-ray-interpretation-made-easy-understanding-cardiac

↑ *Back to this question in Part A*

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Q11: A patient is suspected of having a pathology involving the right middle lobe of the lung. Which chest X-ray projection is most useful for optimal visualisation?

(Q885217)

A. Lordotic view

B. PA view

C. Oblique view

D. Left anterior oblique view

Correct Answer: C. Oblique view

Explanation: The oblique chest view is the most useful projection for evaluating right middle lobe pathology , as it helps separate the middle lobe from overlapping lung segments. Radiographic Principle The right middle lobe is located anteriorly and medially , between the right upper and lower lobes. On a standard PA view, this lobe is frequently obscured by the heart and mediastinum . Role of the Oblique View Oblique positioning rotates the thorax, reducing overlap of lung fields. Enhances visualization of: Right middle lobe consolidation Collapse (middle lobe syndrome) Localized masses or infections Especially helpful when PAs' view findings are inconclusive. Incorrect Options: Lordotic view (Option A): Best for lung apices and clavicle-related pathology. PA view (Option B): Routine screening view, but limited for isolated middle lobe lesions. Left anterior oblique view (Option D): Primarily useful for left lung and cardiac border assessment.

References:

Grainger & Allison’s Diagnostic Radiology, 7th Edition, Page 171.

↑ *Back to this question in Part A*

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Q12: Popcorn calcification in lung is seen in: (Q853229)

A. Angioinvasive aspergillosis

B. Aspergillus mycetoma

C. Bacterial pneumonia

D. Pulmonary hamartoma

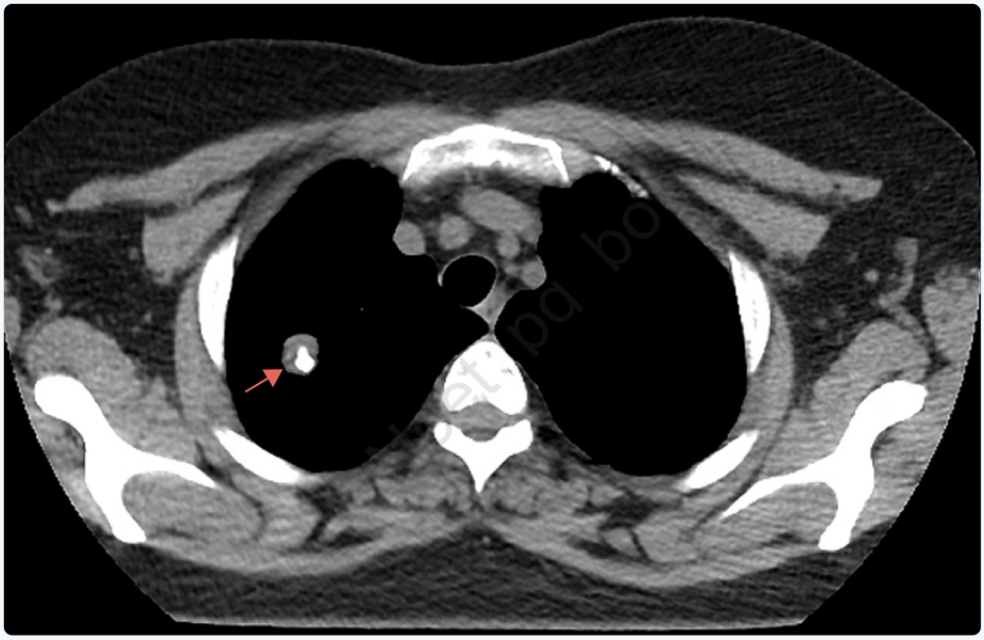
Correct Answer: D. Pulmonary hamartoma

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: Pulmonary Hamartoma: {{caption_text}} Hamartomas are the most common benign lung tumors, Generally asymptomatic and often discovered incidentally Radiographic Features: Typically present as a solitary

peripheral pulmonary nodule or mass. Size usually ranges from 1 to 4 cm. Well-circumscribed, round or oval shape with smooth or lobulated margins. Internal calcifications, often with a "popcorn" appearance CT scans effectively reveal internal fat , which is pathognomonic for hamartomas. Hamartomas may be multiple, grow slowly, and do not cavitate or invade adjacent structures.



Popcorn calcification: pulmonary hamartoma

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References:

Grainger & Allison's Diagnostic Radiology 7th Edition, Page 117, 118

David Sutton Textbook of Radiology & Imaging 8th Edition, Volume 1, Page 265,1056

https://www.ncbi.nlm.nih.gov/books/NBK542329/

https://link.springer.com/chapter/10.1007/978-3-031-24494-0_33

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Q13: A term neonate born by vacuum-assisted delivery developed mild respiratory distress 1 hour after birth. Arterial oxygen saturation remained >95% without supplemental oxygen. Chest radiography performed 6 hours after birth is given below. What is the diagnosis? (Q885220)

A. Pneumomediastinum

B. Pneumothorax

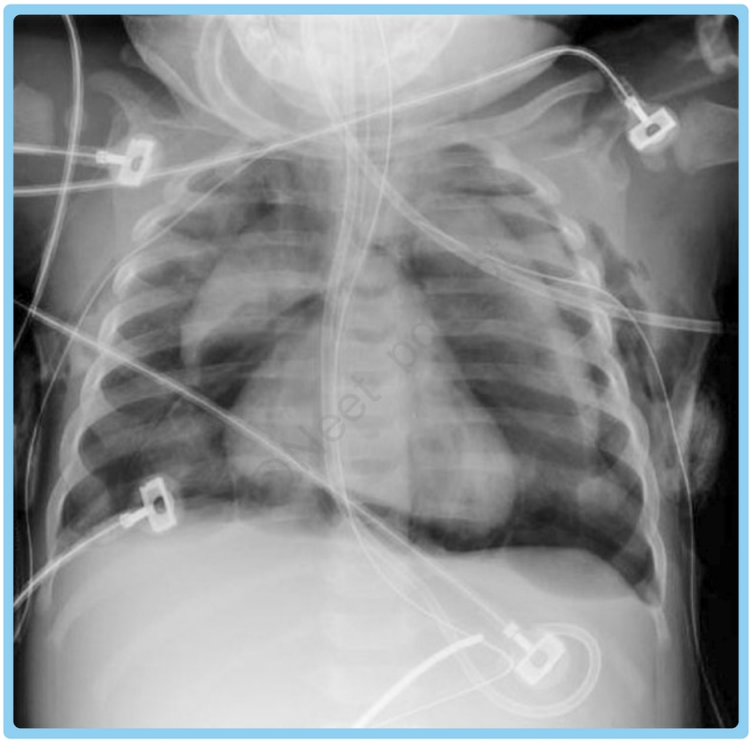
C. Pneumoperitoneum

D. Consolidation



Correct Answer: C. Pneumoperitoneum

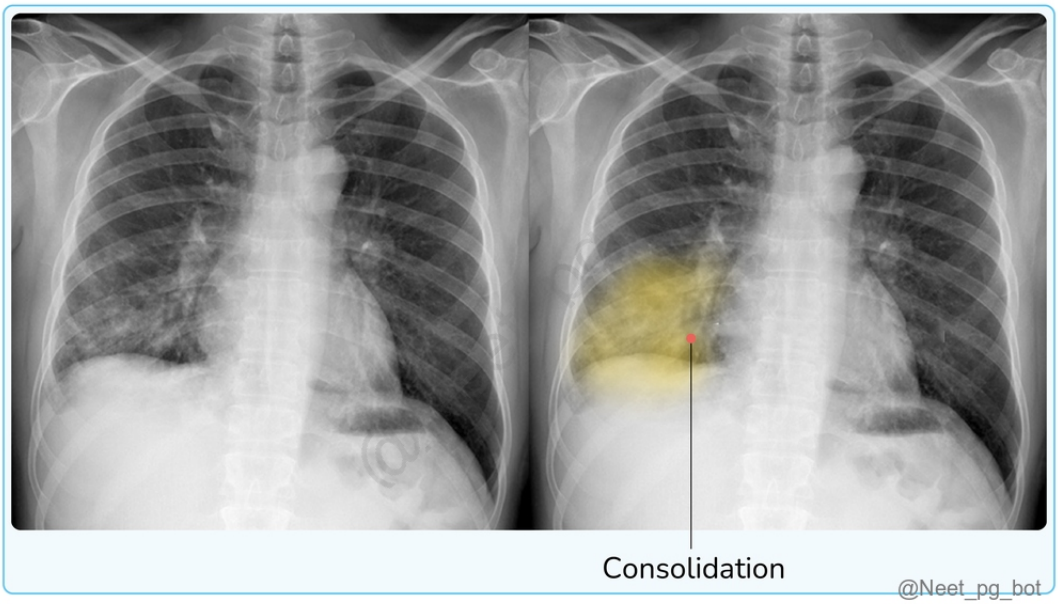
Explanation: Pneumomediastinum is the most likely diagnosis in a term neonate with mild respiratory distress and preserved oxygen saturation following assisted delivery. Pathophysiology and Mechanism Caused by alveolar rupture due to increased intrathoracic pressure during birth or initial breaths Escaped air tracks along bronchovascular sheaths into the mediastinum (Macklin effect) Commonly associated with vacuum or forceps-assisted deliveries Radiographic Features Air outlining mediastinal structures on chest X-ray Elevation and outlining of the thymus produces the classic “spinnaker sail sign.” Lungs remain expanded with no significant collapse Usually no significant cardiopulmonary compromise Clinical Course Typically benign and self-limiting Most neonates remain hemodynamically stable Managed conservatively with observation Incorrect Options: Pneumothorax (Option A): Shows peripheral hyperlucency with absent lung markings and lung collapse; often causes desaturation. Consolidation (Option B): Appears as alveolar opacities with air bronchograms; associated with infection and worsening respiratory distress. Pneumoperitoneum (Option D): Demonstrates free air under the diaphragm on erect films; related to gastrointestinal perforation, not primary respiratory symptoms.

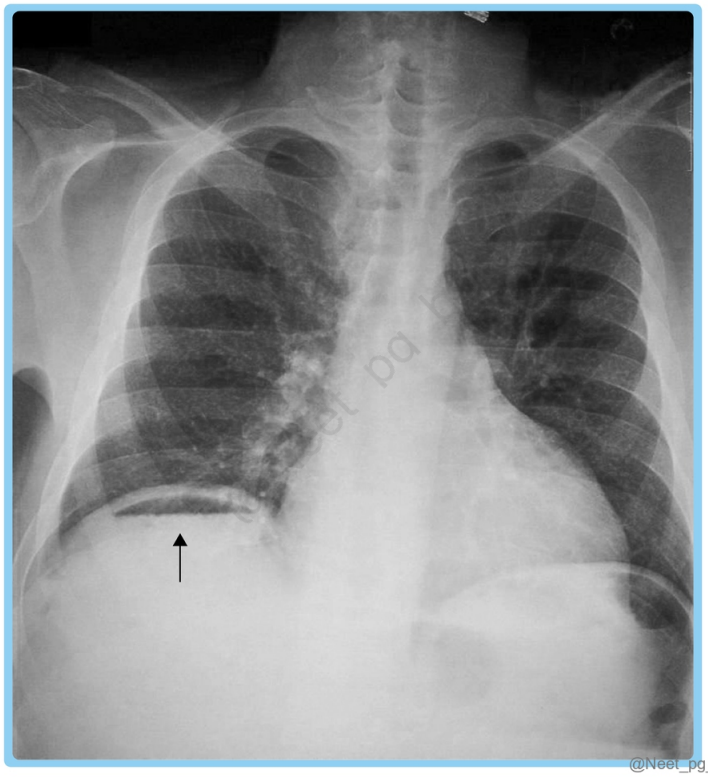


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References:

Grainger & Allison's Diagnostic Radiology, 7th Edition, Page 92.

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Q14: A 45-year-old man presents to the emergency department with acute pleuritic chest pain and reduced air entry over the right hemithorax on examination. A small pleural effusion is suspected clinically. Which chest X-ray vie (Q885221)

A. Lateral decubitus view

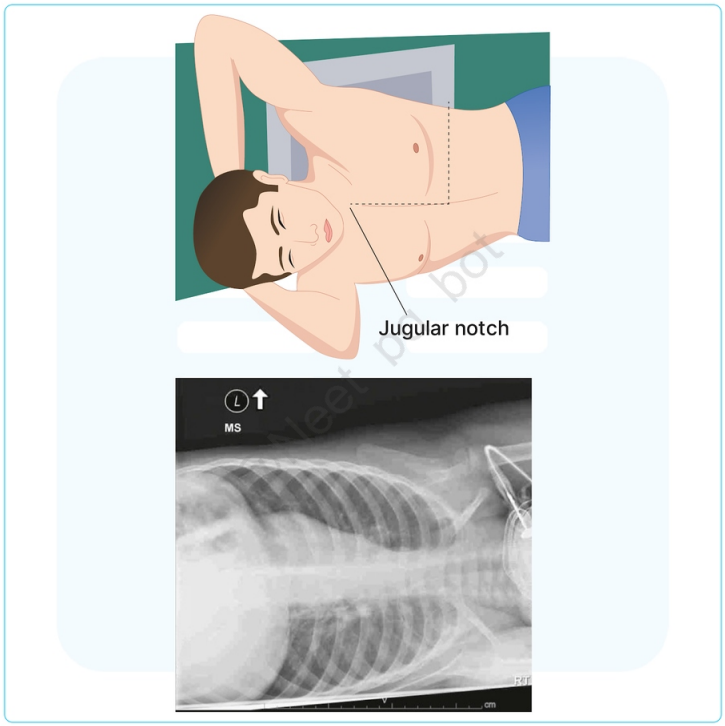
B. PA view

C. Left anterior oblique view

D. Right anterior oblique view

Correct Answer: A. Lateral decubitus view

Explanation: Pleural effusion is best demonstrated on a lateral decubitus chest radiograph because free pleural fluid layers dependently and become clearly visible even in small volumes. Radiographic Evaluation of Pleural Effusion Pleural effusion represents the accumulation of fluid in the pleural space. Small effusions may not be visible on a routine erect PA chest X-ray. Detecting fluid mobility helps differentiate free fluid from pleural thickening or consolidation. Lateral Decubitus View The patient lies on the suspected side with the X-ray beam horizontal. Free pleural fluid layers along the dependent chest wall. It can detect as little as 5-10 mL of pleural fluid. Also helps assess whether the effusion is free-flowing or loculated. Incorrect Options: PA view (Option B) Requires at least 200-300 mL of fluid to show costophrenic angle blunting. Less sensitive to small effusions. Left anterior oblique view (Option C) Primarily used to evaluate mediastinal structures and lung overlap. Not useful for detecting pleural fluid. Right anterior oblique view (Option D) Helps in assessing hilar or parenchymal lesions. Does not improve the detection of pleural effusion.



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References:

Grainger & Allison's Diagnostic Radiology, 7th Edition, Page 43.

↑ *Back to this question in Part A*

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Q15: A 55-year-old patient undergoes a chest X-ray for evaluation of chronic respiratory symptoms. Multiple pleural calcifications are noted. Which of the following conditions is least likely to present with pleural calcification? (Q885222)

A. Occupational exposure to asbestos

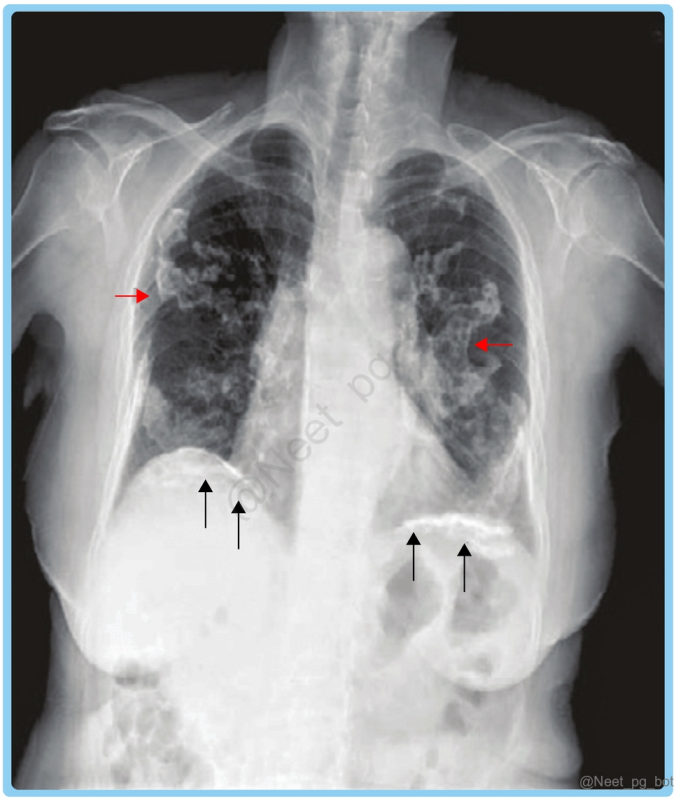
B. Previous hemothorax

C. Healed empyema

D. Sarcoidosis

Correct Answer: D. Sarcoidosis

Explanation: Pleural calcification occurs as a result of prior pleural injury, inflammation, or exposure. Sarcoidosis predominantly affects the lung parenchyma and mediastinal lymph nodes, and pleural involvement is rare and therefore, it is the least likely condition to present with pleural calcification. Radiographic Features On chest X-ray: Linear, focal, or diffuse pleural densities. Commonly along the lower lobes or parietal pleura. May be unilateral or bilateral. A CT scan is more sensitive, showing the extent of plaques and subtle calcifications. Clinical Relevance Suggests prior pleural insult such as infection, trauma, or occupational exposure. Usually asymptomatic, but recognising it is important for history-taking and differential diagnosis. Helps differentiate from other pleural or parenchymal diseases for proper management. Incorrect Options: Asbestosis (Option A): Classic cause of pleural calcification; pleural plaques are characteristic. Hemothorax (Option B): Calcification may occur as the pleura heals after blood accumulation. Healed empyema (Option C): Chronic infection or inflammation of the pleura leads to fibrosis and calcification .



References:

Grainger & Allison’s Diagnostic Radiology, 7th Edition, Page 82.

↑ *Back to this question in Part A*

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Q16: On a standard posteroanterior chest radiograph, which of the following structures does NOT normally contribute to the hilar shadow? (Q885237)

A. Bronchus

B. Pulmonary artery

C. Upper lobe veins

D. Lower lobe veins

Correct Answer: D. Lower lobe veins

Explanation: On a standard posteroanterior (PA) chest radiograph , the hilar shadows are formed mainly by the pulmonary arteries , with contribution from the upper lobe pulmonary veins . The lower lobe pulmonary veins do not normally contribute to the hilar shadow because they course inferiorly and medially toward the left atrium rather than forming part of the central hilar contour. Incorrect Options: Bronchus(Option A): Although bronchi are air-filled and usually not visible, they are anatomically located at the hilum and are considered part of the hilar structures rather than excluded from the concept. Pulmonary artery(Option B): This is the primary and dominant contributor to the hilar shadow on both sides. Upper lobe veins(Option C): These veins run horizontally and contribute to the upper portion of the hilar vascular shadow , especially on the right side.

References:

Grainger & Allison’s Diagnostic Radiology, 7th Edition, Page 25,26,27.

↑ *Back to this question in Part A*

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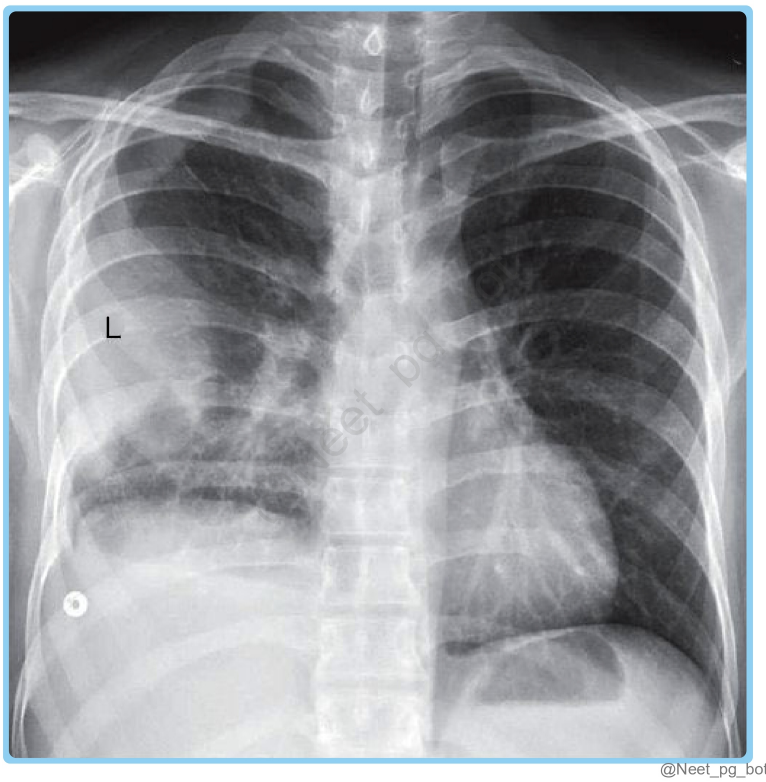
Q17: A 32-year-old male presents with persistent fever and sharp, pleuritic chest pain for one week. He has restricted chest movements on the affected side. Chest radiograph shows a non-dependent, lenticular opacity along the lateral chest wall with obtuse margins. What is the most likely diagnosis? (Q885238)

A. Loculated pleural effusion

B. Pneumothorax

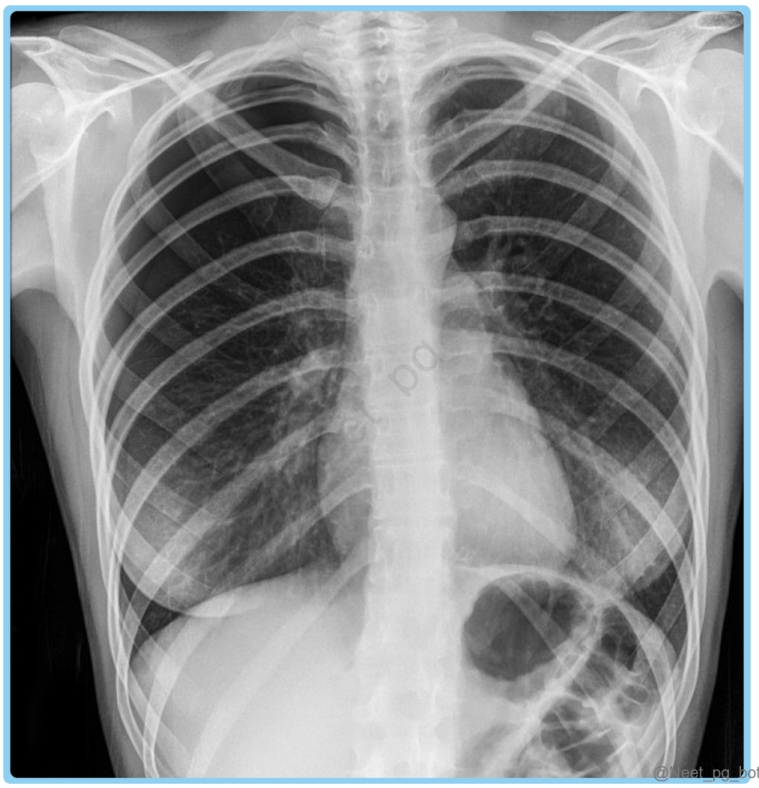
C. Consolidation

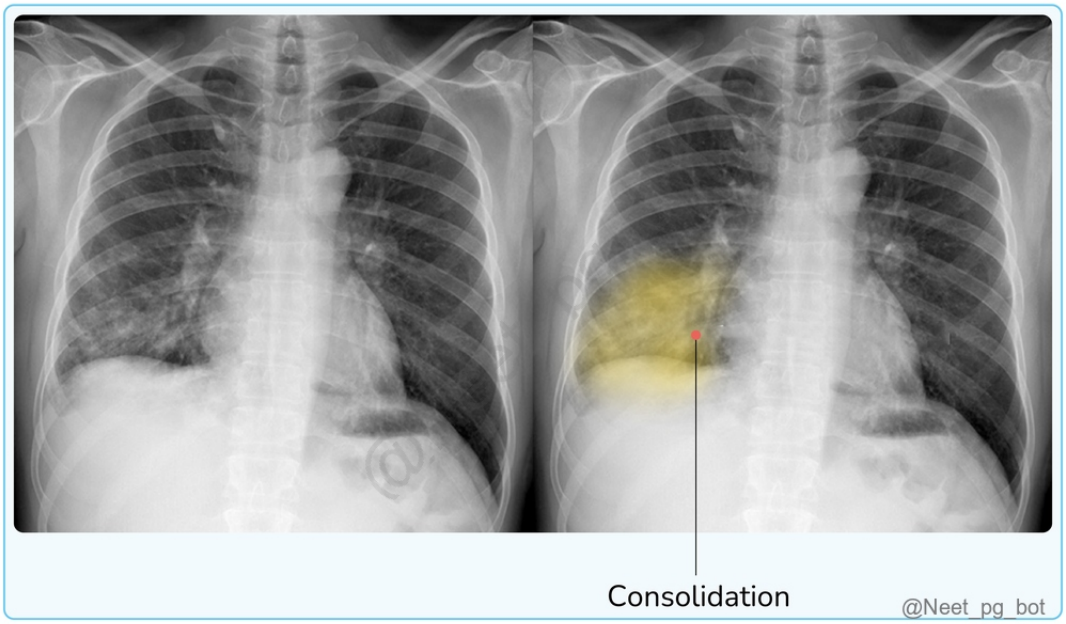
D. Fibrosis

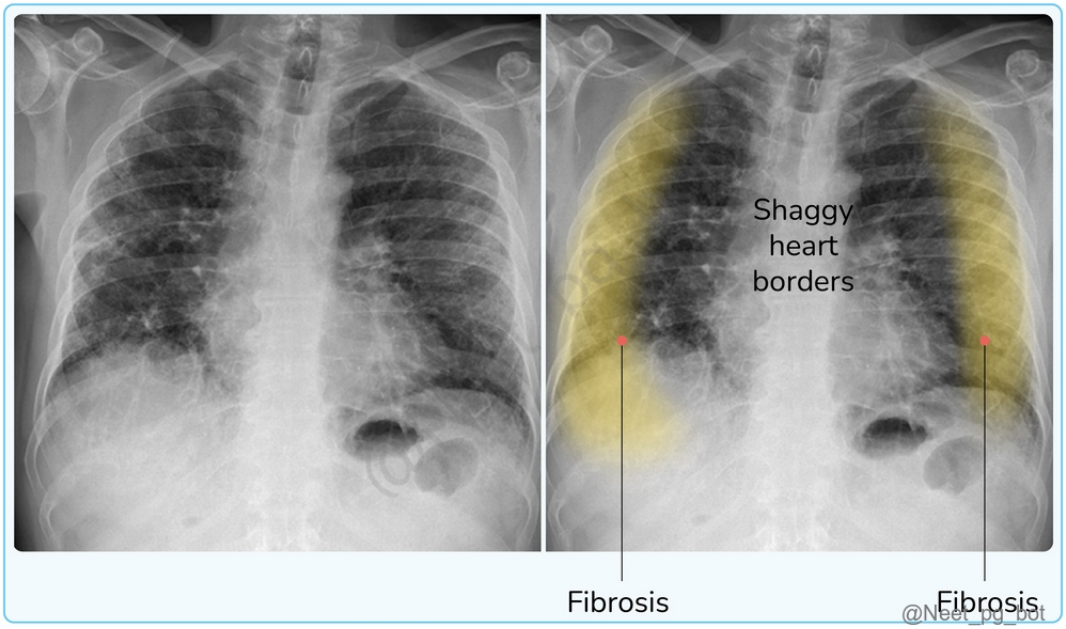


Correct Answer: A. Loculated pleural effusion

Explanation: A loculated pleural effusion is a collection of fluid trapped within pleural adhesions, commonly following infection or inflammation. Pathophysiology: Pleural inflammation (commonly from pneumonia or empyema) causes fibrin deposition. Fibrin forms septations within the pleural space, leading to loculated fluid collections. Loculated effusions do not freely move with the patient's position. Radiographic Features: On chest X-ray: Lenticular or biconvex opacity along the lateral chest wall. Margins are obtuse with the chest wall. May not change with decubitus positioning. The adjacent lung may be compressed, but no complete lung collapse. Lateral or oblique views can help localize effusion and confirm lack of mobility. Clinical Relevance: Often associated with pleuritic chest pain , fever , and restricted chest wall movement . Important to differentiate from pneumothorax or consolidation for management decisions. Incorrect Options: Pneumothorax (Option B): Shows a radiolucent area without lung markings; a sharply demarcated pleural line; fluid opacity is absent. Consolidation (Option C): Airspace opacity with air bronchograms; usually uniform in lung parenchyma; not lenticular or localized along pleural margins. Fibrosis (Option D): Chronic process with volume loss, reticular pattern, and possibly traction bronchiectasis; no acute fluid collection.


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Consolidation
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References:

Grainger & Allison's Diagnostic Radiology, 7th Edition, Page 1790.

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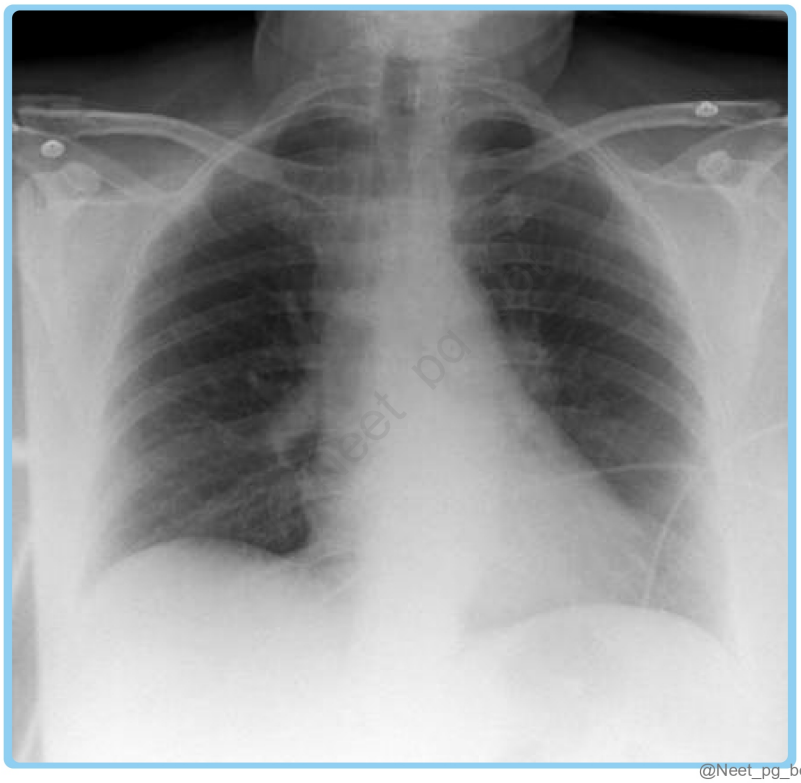
Q18: A 50-year-old woman develops sudden pleuritic chest pain and shortness of breath two days after a long-haul flight. A chest X-ray is performed. Which of the following radiologic signs is most suggestive of her condition? (Q885241)

A. Palla's sign

B. Sausage sign

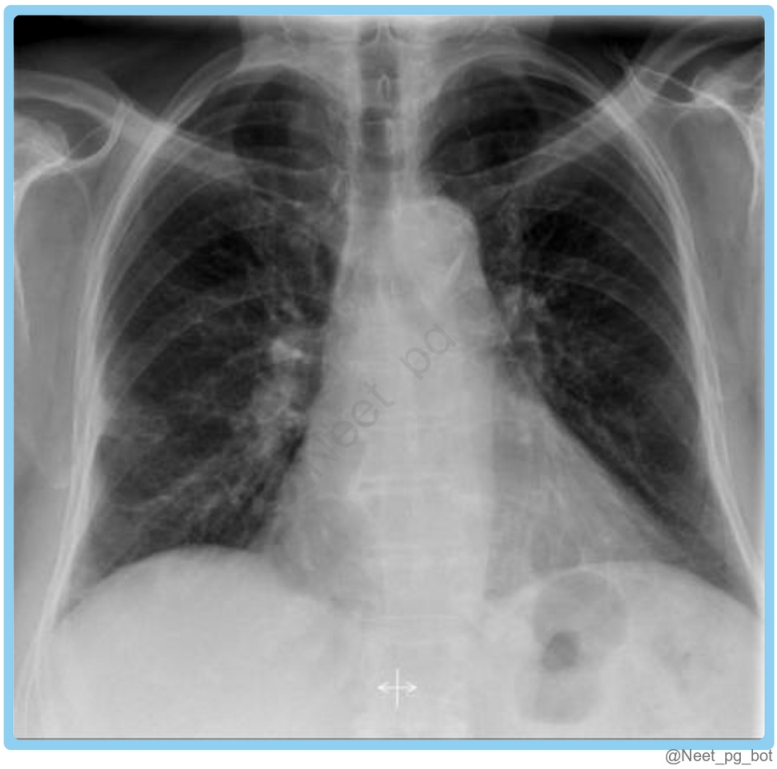
C. McConnell's sign

D. Westermark sign

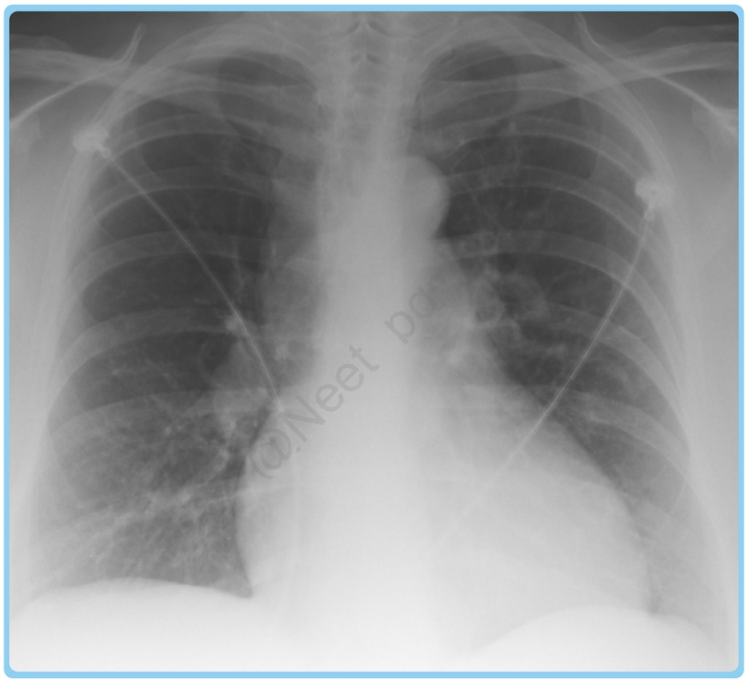


Correct Answer: D. Westermark sign

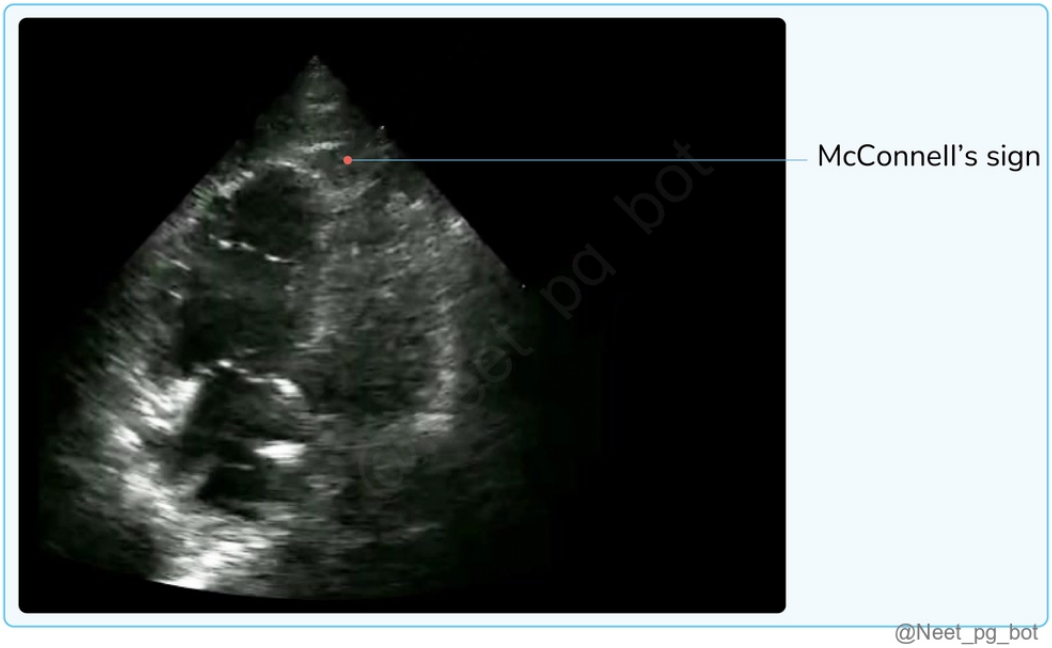
Explanation: Westermark sign is a focal oligemia (reduced blood flow) seen distal to a pulmonary embolism on chest X-ray. It is a classic radiologic sign of acute pulmonary embolism (PE), which often presents with sudden pleuritic chest pain and dyspnea, especially in patients with recent immobilisation, long-haul travel, or hypercoagulable states. Radiographic Features On chest X-ray: Focal area of decreased pulmonary vascular markings distal to the embolus. It may be subtle and often difficult to detect. Sometimes accompanied by Hampton hump (wedge-shaped infarct opacity). Usually unilateral, corresponding to the affected pulmonary artery. Clinical Relevance Seen in patients with acute PE , which is a life-threatening condition. Helps raise suspicion, but CT pulmonary angiography (CTPA) is the gold standard for diagnosis. Important for prompt anticoagulation or thrombolytic therapy to prevent morbidity and mortality. Incorrect Options: Palla's sign (Option A): Enlarged right descending pulmonary artery seen in pulmonary embolism; supportive but less specific. Sausage sign (Option B): Dilated pulmonary artery with thrombus; seen on imaging like CT. McConnell's sign (Option C): Regional right ventricular dysfunction seen on echocardiography .



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References:

Grainger & Allison's Diagnostic Radiology, 7th Edition, Page 412.

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Q19: A 28-year-old man is evaluated with a chest X-ray for abnormal lung findings. In which of the following conditions is a hypertranslucent lung least likely to be observed? (Q885246)

A. Asthma with air-trapping

B. Congenital lobar emphysema

C. Pulmonary fibrosis

D. Bullous emphysema

Correct Answer: C. Pulmonary fibrosis

Explanation: Hypertranslucent lungs on chest X-ray are seen when there is increased air content or decreased pulmonary vasculature. Pulmonary fibrosis involves interstitial scarring and decreased lung compliance, which usually leads to reticular opacities and volume loss, not hyperlucency. Radiographic Features Hypertranslucent lungs: Increased lucency, decreased vascular markings, may see lung overinflation or bullae. Pulmonary fibrosis:

Reticular or reticulonodular opacities, honeycombing, reduced lung volumes, and traction bronchiectasis. Clinical Relevance Recognizing hypertranslucent lungs helps identify conditions with air-trapping, emphysema, or congenital overinflation . Differentiates from fibrotic or restrictive lung diseases , which present with opaque, scarred lung fields . Important for guiding treatment and prognosis , e.g., bronchodilators for emphysema vs antifibrotic therapy for fibrosis. Incorrect Options: Asthma with air-trapping (Option A): Hyperlucency can occur in areas of air-trapping during an acute exacerbation. Congenital lobar emphysema (Option B): Overinflated lobe appears hyperlucent; vessels may be displaced. Bullous emphysema (Option D): Large bullae appear as focal hyperlucent areas with thin walls.

References:

Grainger & Allison's Diagnostic Radiology, 7th Edition, Page 208.

↑ *Back to this question in Part A*

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Q20: Which of the following correctly describes Kerley A lines on chest X-ray? (Q885247)

A. Short lines at the lung periphery that do not reach the pleura

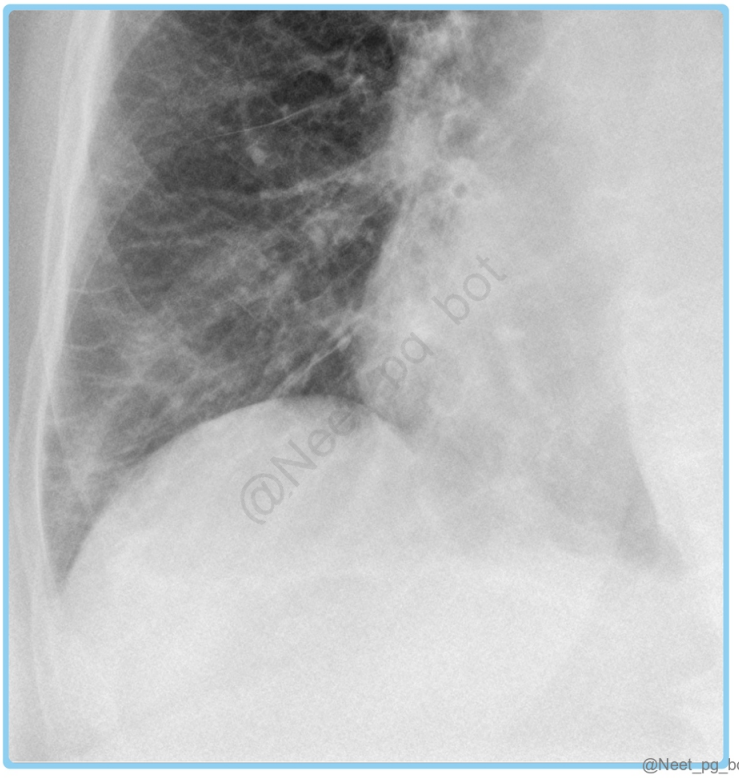
B. Lines radiating from the hilum toward the periphery of the lung

C. Lines running perpendicular to the pleural surface and extending to it

D. Fine interlacing lines giving a spider-web appearance

Correct Answer: B. Lines radiating from the hilum toward the periphery of the lung

Explanation: Kerley A lines are long, thin lines extending from the hilum toward the lung periphery, representing interstitial lymphatic engorgement, commonly seen in pulmonary oedema. Radiographic Features Oblique lines radiating from the hilum toward the periphery (2-6 cm). Do not reach the pleura . Best seen on a frontal chest X-ray . Clinical Relevance Indicative of interstitial pulmonary oedema and pulmonary venous hypertension . Helps differentiate cardiogenic pulmonary oedema from other lung pathologies. Incorrect Options: Short peripheral lines not reaching the pleura (Option A): These describe Kerley B lines, which are short (1-2 cm), horizontal lines seen at the lung bases, running perpendicular to the pleura and extending up to it. They represent interlobular septal thickening and are more commonly seen than Kerley A lines. Lines running perpendicular to the pleura(Option C): This again corresponds to Kerley B lines, a classic sign of interstitial pulmonary oedema, particularly in left-sided heart failure. Fine interlacing "spider-web" appearance(Option D): This describes Kerley C lines, which are caused by diffuse interstitial oedema and represent a network of superimposed Kerley A and B lines, producing a reticular or spider-web pattern.



References:

Grainger & Allison's Diagnostic Radiology, 7th Edition, Page 254.

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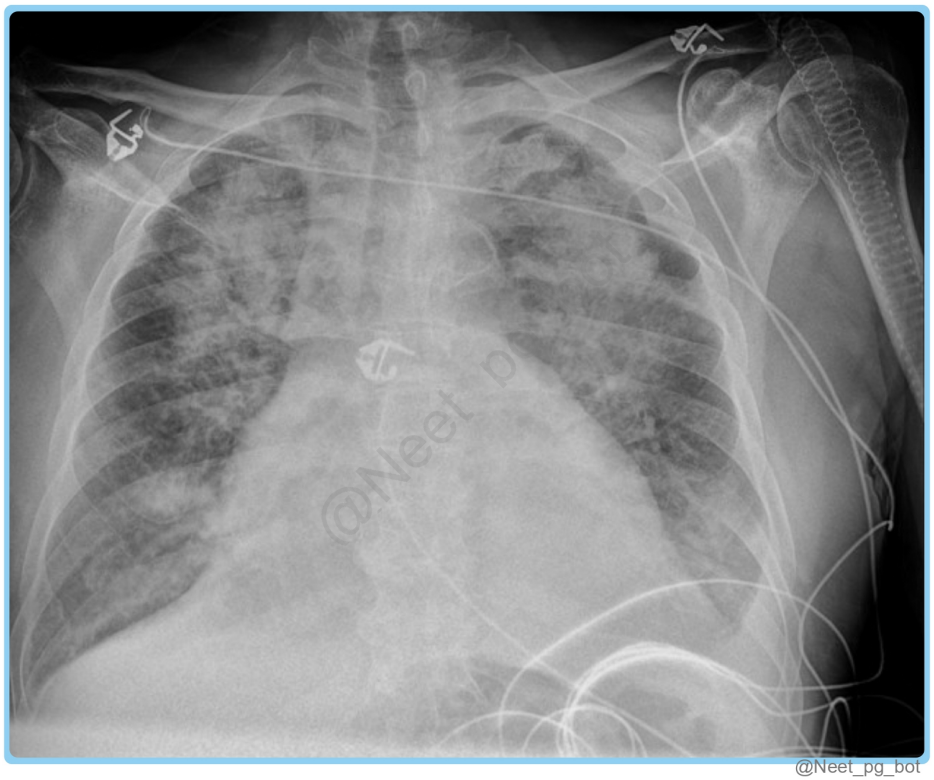
Q21: A patient presents with acute breathlessness and orthopnoea. Chest X-ray shows bilateral central alveolar opacities predominantly around the hila with relative peripheral sparing, producing a bat-wing distribution. This radiographic pattern is most suggestive of: (Q885249)

A. Pulmonary oedema

B. Sarcoidosis

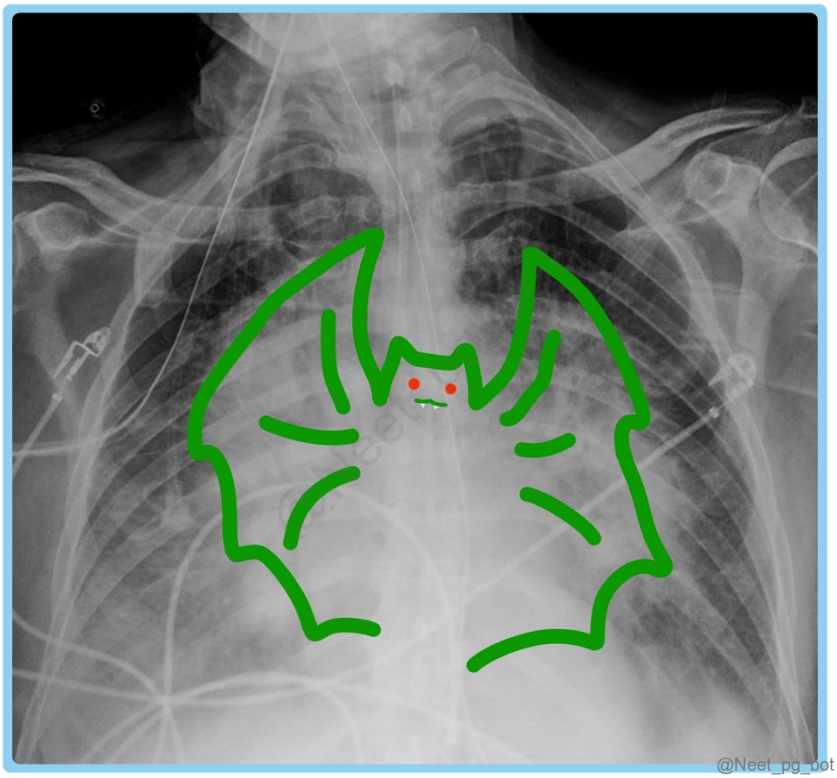
C. Pulmonary embolism

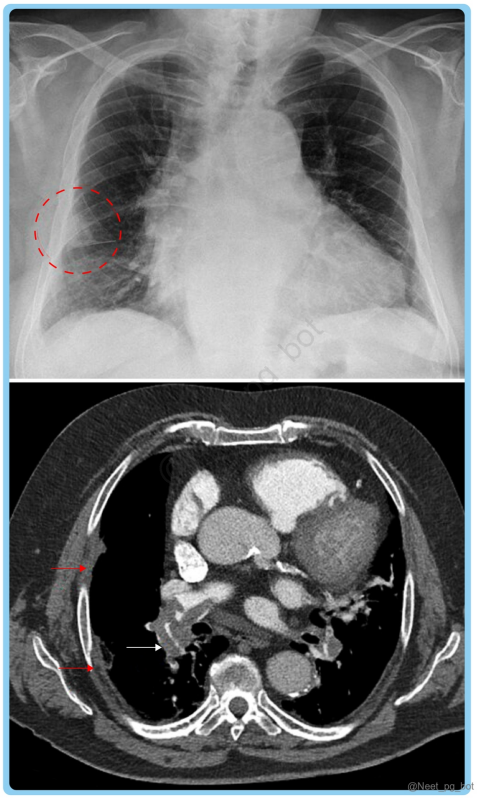
D. Pneumoconiosis

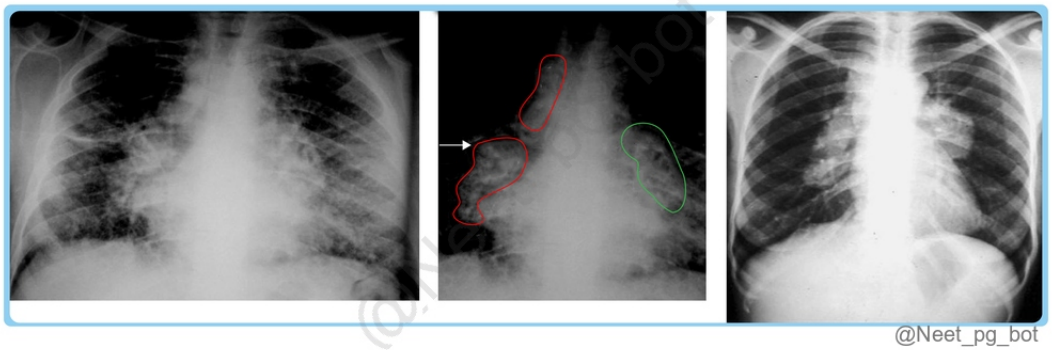


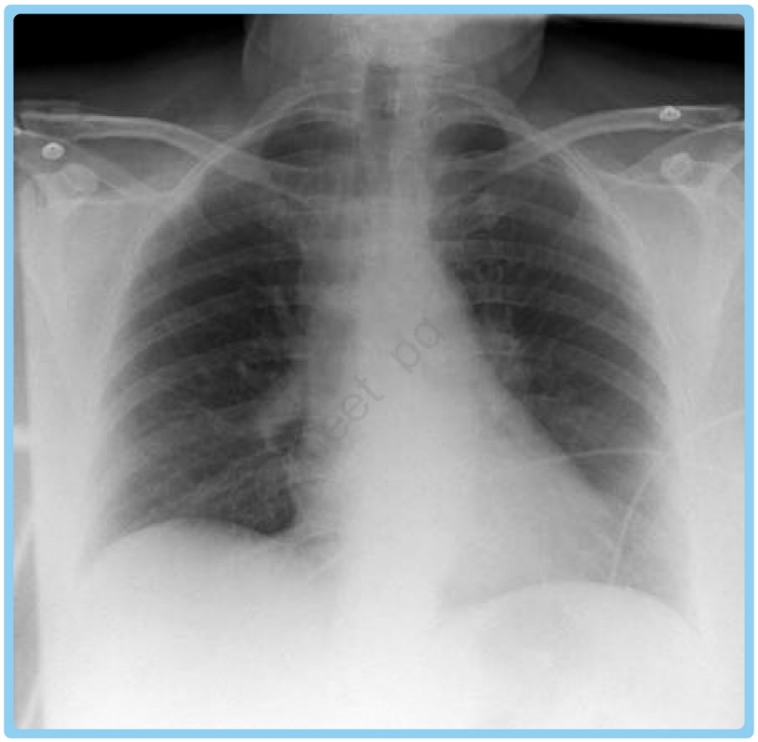
Correct Answer: A. Pulmonary oedema

Explanation: Pulmonary oedema produces bilateral, symmetrical perihilar alveolar opacities with relative peripheral sparing, creating the classic bat-wing appearance on chest X-ray. This pattern is due to alveolar flooding from raised pulmonary venous pressure, most commonly secondary to left ventricular failure. Key Radiological Features of Pulmonary Oedema: Central perihilar fluffy air-space opacities Symmetrical distribution Relative sparing of lung periphery Associated findings (cardiogenic): Cardiomegaly Kerley B lines (interstitial oedema) Pleural effusions Incorrect Options: Sarcoidosis (Option B): Classically shows bilateral hilar lymphadenopathy (1-2-3 sign) Upper lobe-predominant interstitial nodules Alveolar bat-wing pattern is not a feature Pulmonary embolism (Option C): Chest X-ray often normal Specific signs: Hampton hump - peripheral wedge-shaped opacity Westermark sign - focal oligemia Diagnosis confirmed on CT pulmonary angiography Pneumoconiosis (Option D): Chronic occupational lung disease Radiographic patterns: Small rounded nodules (silicosis, coal workers) Upper lobe fibrosis ± eggshell calcification Does not produce acute alveolar perihilar opacities


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References:

Grainger & Allison's Diagnostic Radiology, 7th Edition, Page 251

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Q22: Pulmonary sequestration most frequently involves which of the following lung segments? (Q885250)

A. Posterobasal segment of right lower lobe

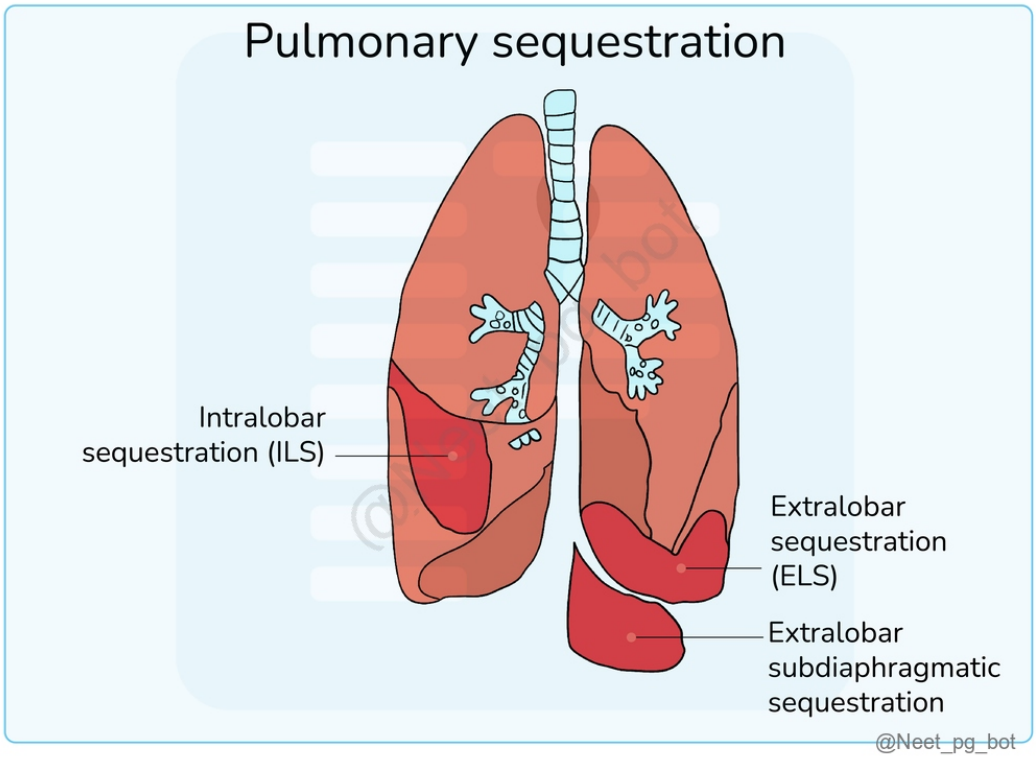
B. Apical segment of left upper lobe

C. Posterobasal segment of left lower lobe

D. Apical segment of right upper lobe

Correct Answer: C. Posterobasal segment of left lower lobe

Explanation: Pulmonary sequestration most commonly affects the posterobasal segment of the left lower lobe, due to its embryological origin from an accessory lung bud receiving systemic arterial supply. Pulmonary Sequestration A congenital lung anomaly characterized by non-functioning lung tissue Lacks normal tracheobronchial connection Receives systemic arterial supply , usually from the thoracic or abdominal aorta Most Common Site Posterobasal segment of the left lower lobe Seen in both intralobar (more common) and extralobar sequestration Left-sided predominance due to embryologic vascular development Radiological Importance Appears as a persistent basal opacity on chest X-ray CT angiography demonstrates: Aberrant systemic arterial supply Venous drainage into pulmonary veins (intralobar type) Incorrect Options: Posterobasal segment of right lower lobe (Option A): Can be involved but is significantly less common than the left side. Apical segment of left upper lobe (Option B): Upper lobe involvement is rare and not typical for sequestration. Apical segment of right upper lobe (Option D): Pulmonary sequestration almost never occurs in the upper lobes.



References:

https://radiopaedia.org/articles/pulmonary-sequestration

↑ *Back to this question in Part A*

Q23: A 30-year-old female presents with sudden-onset chest pain and difficulty breathing after a recent blunt trauma to the chest. Chest Xray is taken and is shown below. Which of the following radiological findings is not typically seen in this case? (Q853219)

A. Barcode sign

B. Tubular artery sign

C. Continuous diaphragm sign

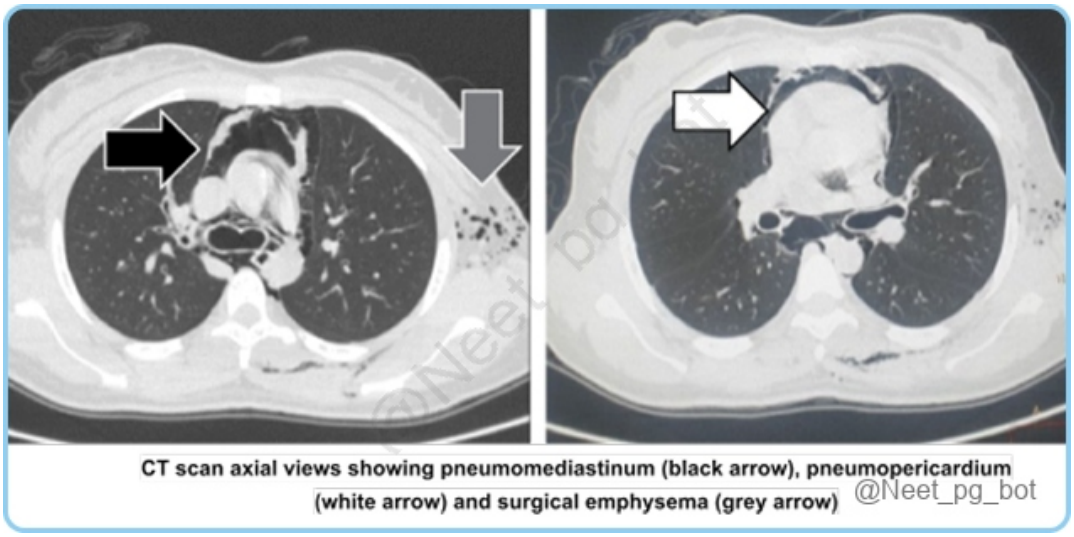
D. Double bronchial wall sign



Correct Answer: A. Barcode sign

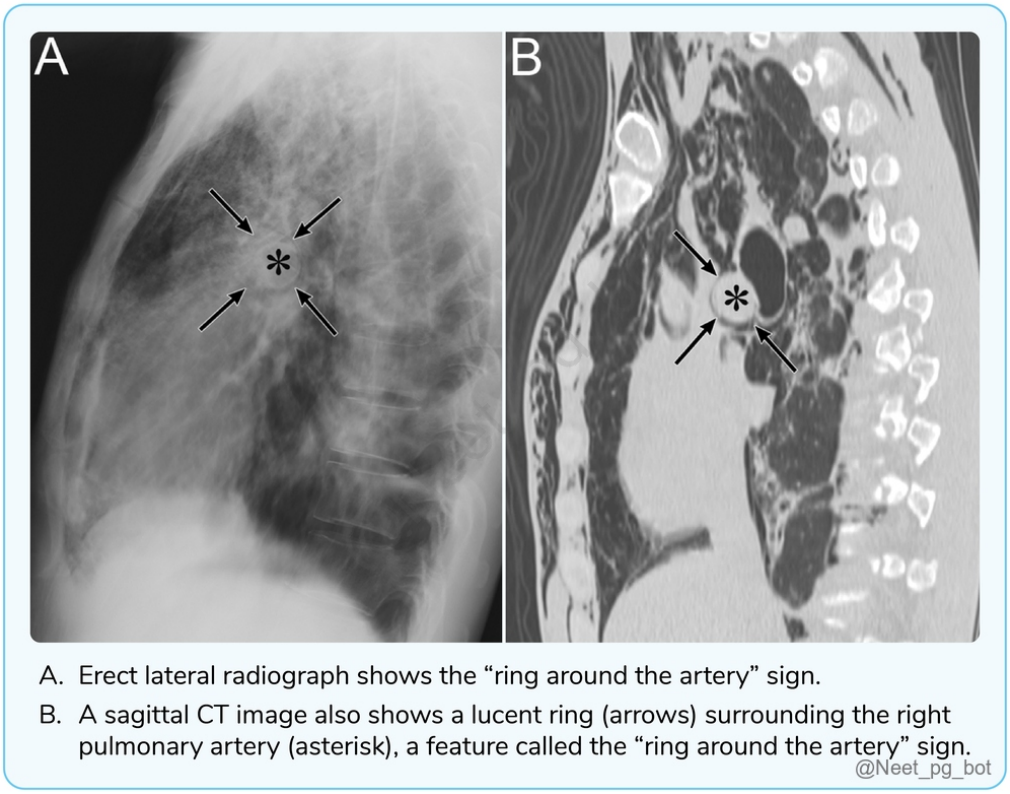
Explanation: Chest X ray reveals signs of pneumomediastinum with the presence of air adjacent to the bronchus highlighting the bronchial wall (double bronchial wall sign). Barcode or stratosphere sign is typically found in patients with pneumothorax, not pneumomediastinum. Pneumomediastinum: Presence of free air around mediastinal structures. Common Causes: Blunt or penetrating trauma. Esophageal perforation. {{caption_text}} Hamman's crunch sign: Unusual, adventitious sound heard on auscultation of the chest. Radiographic Signs: Ring

around the artery sign: Air around the pulmonary artery (usually the right) outlining the artery. {{caption_text}} Sail sign: Elevation of the thymus caused by air. {{caption_text}} Continuous diaphragm sign : Air trapped posterior to the pericardium, appearing as a continuous air collection on an AP projection. (Option C) {{caption_text}} Tubular artery sign : Air outlines the medial side of major aortic branches, with aerated lung outlining the lateral side. (Option A) {{caption_text}} Double bronchial wall sign : Air adjacent to the bronchus highlights the bronchial wall. (Option D) Naclerio V-sign: V-shaped air lucency in the left lower mediastinal area. {{caption_text}} Ginkgo leaf sign: Subcutaneous emphysema over anterior chest wall. {{caption_text}}



CT scan axial views showing pneumomediastinum (black arrow), pneumopericardium (white arrow) and surgical emphysema (grey arrow)

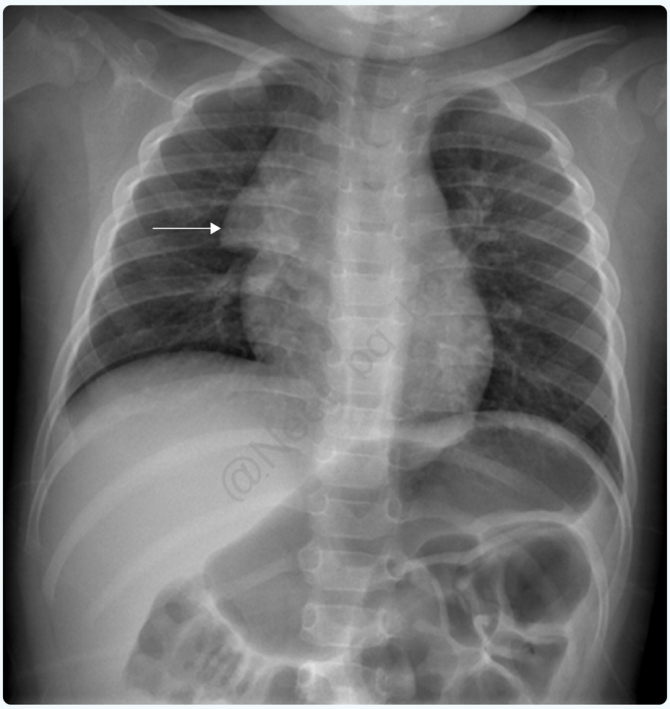
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A. Erect lateral radiograph shows the “ring around the artery” sign.

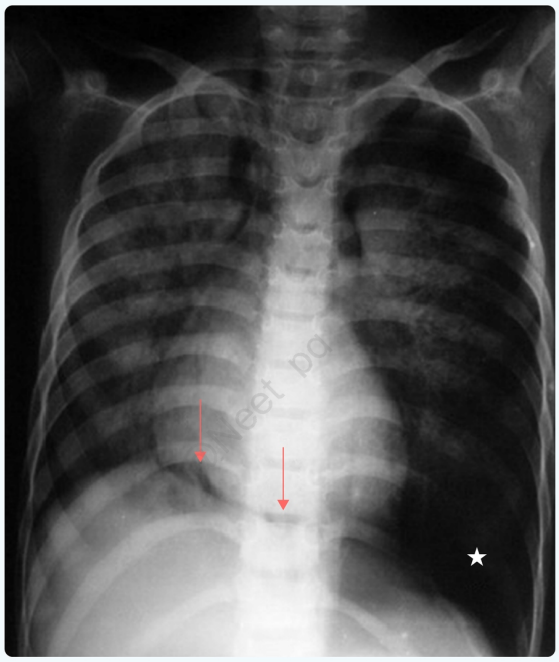
B. A sagittal CT image also shows a lucent ring (arrows) surrounding the right pulmonary artery (asterisk), a feature called the “ring around the artery” sign.

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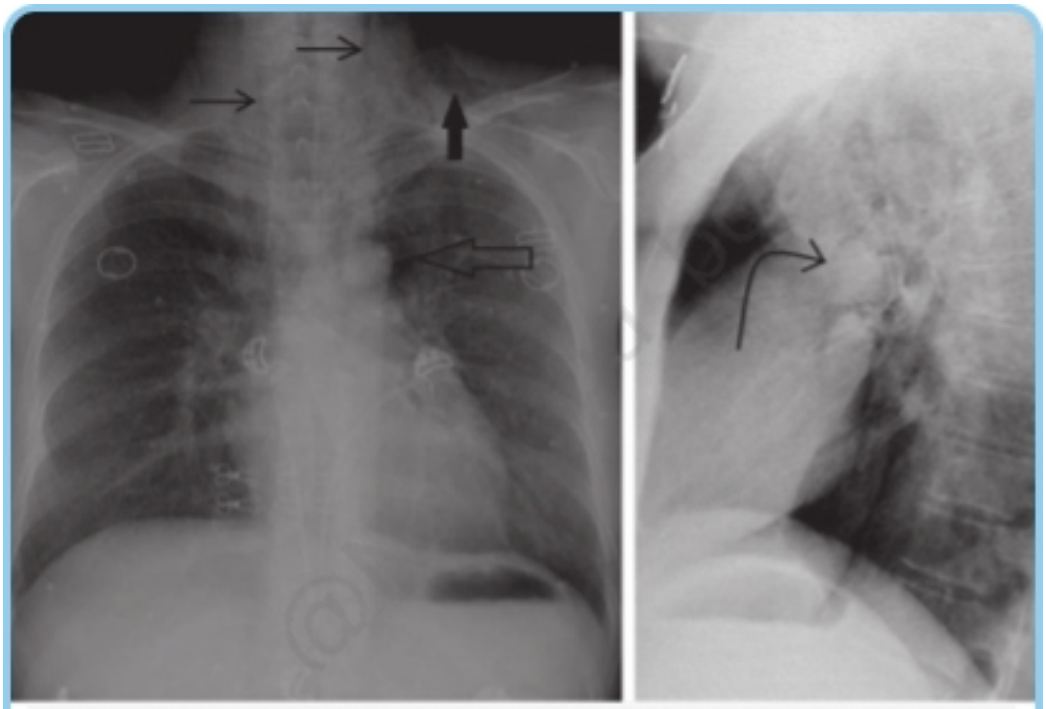
Frontal view X-Ray demonstrating thymic “Sail Sign" (Arrow)

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Chest x ray PA view showing left sided pneumothorax (star) with continuous diaphragm sign (thin red arrows) suggestive of pneumomediastinum.

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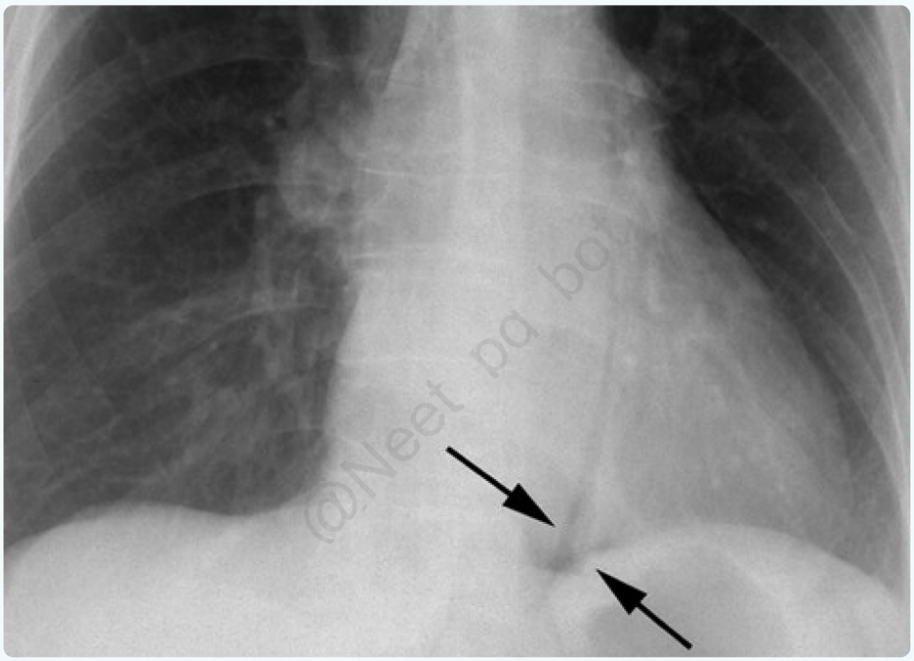
Chest X radiograph, PA and lateral views; Opacification in the parenchyma due to micronodules. Free air around the aortic knob and pulmonar artery (hollow arrow, curved arrow). Tubular vessel sign (thin arrow). Subcutaneous emphysema (filled arrow).

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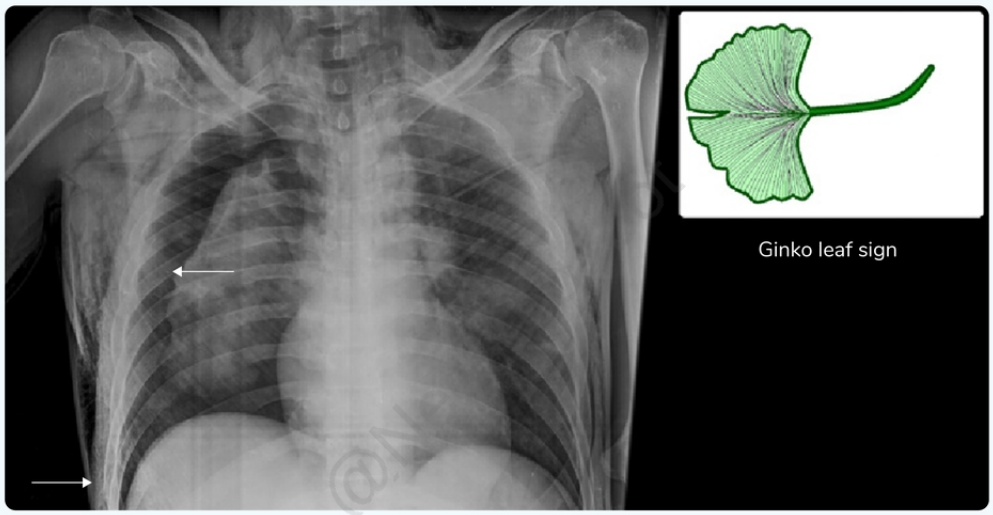
Subcutaneous emphysema (vertical lucent stripes into neck) and "double bronchial wall sign" suggesting pneumomediastinum

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The Naclerio's V sign seen on the frontal radiographs of the chest as a V-shaped air lucency in the left lower mediastinal segment

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Gingko Leaf Sign : Air outlines the fibers of the pectoralis major muscle. The upper arrow indicates a pneumothorax. Bottom arrow indicates SE on right chest

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References:

Grainger & Allison's Diagnostic Radiology, 7th Edition, Page 92, 94, 95

pubmed.ncbi.nlm.nih.gov/8126410/

radiopaedia.org/cases/pneumomediastinum-53

pubs.rsna.org/doi/abs/10.1148/radiol.2451042197?journalCode=radiology

www.researchgate.net/figure/Barcode-or-stratosphere-sign-typically-found-in-patients-with-pneumothorax-In-the_fig1_282608993

↑ *Back to this question in Part A*

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Q24: A 25-year-old male involved in a road traffic accident was stabilized in the field with needle decompression for severe shortness of breath, decreased breath sounds, and hyper-resonance on the right side of the chest. Upon arrival at the emergency department, he is hemodynamically stable. Which chest X-ray view is most appropriate to confirm the underlying condition? (Q853208)

A. Inspiration Chest X-ray

B. Expiration Chest X-ray

C. Lateral Decubitus Chest X-ray

D. Oblique Chest X-ray

Correct Answer: B. Expiration Chest X-ray

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: In expiration, the lung becomes white due to air exhaled out while pneumothorax remains black. So, white lung gives a good contrast to black pneumothorax in expiration. Chest X-ray in Inspiration: Chest X-rays are typically performed during the inspiration phase, which maximizes lung volume and provides a clearer view of the lung fields. During this phase, the lungs fill with air, and the air appears black on the X-ray due to its low density compared to surrounding tissues. {{caption_text}} Chest X-ray in Expiration: Expiratory chest X-rays are utilized for assessing small pneumothoraces and suspected inhaled foreign bodies, while inspiratory chest X-rays are performed in all other cases. {{caption_text}} Appearance During Expiration: When a foreign body obstructs the airway, air may become trapped in the lungs, preventing full exhalation. Consequently, during an expiratory X-ray, the obstructed lung appears black (due to retained air), indicating an obstruction on that particular side. A persistent black appearance in the affected lung can confirm an obstruction. Parameter Normal Lung Pneumothorax Inspiration Black Black Expiration White Black Inspiration Chest X-ray (Option A): Commonly used for general chest imaging but can miss small pneumothoraces since the lungs are fully expanded, hiding air in the pleural space. Lateral Decubitus Chest X-ray (Option C): Most sensitive chest x-ray view for pleural effusion. Oblique Chest X-ray (Option D): This view can be helpful for evaluating certain thoracic structures but is not typically used to assess pneumothorax.



Chest X-ray in inspiration

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Chest X-ray in expiration

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References:

Fred A. Mettler Essentials of Radiology, 4th Edition, Page 38,39.

https://radiopaedia.org/articles/chest-expiratory-view-2

https://pmc.ncbi.nlm.nih.gov/articles/PMC4050067/

https://radiopaedia.org/articles/chest-lateral-decubitus-view

↑ *Back to this question in Part A*

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Q25: Match the following chest pathologies and their corresponding imaging modalities. Chest Pathology Imaging Modality of Choice 1. Aortic aneurysm a. MRI 2. Pneumonia b. Ultrasound 3. Pleural Effusion c. CECT 4. Posterior mediastinal mass d. Chest X-ray (Q853209)

A. 1 - c, 2 - d, 3 - b, 4 - a

B. 1 - a, 2 - b, 3 - c, 4 - d

C. 1 - b, 2 - d, 3 - c, 4 - a

D. 1 - d, 2 - c, 3 - b, 4 - a

Correct Answer: A. 1 - c, 2 - d, 3 - b, 4 - a

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: Chest Pathology I-Imaging Modality of Choice Aortic aneurysm CECT Pneumonia Chest X-ray Pleural Effusion Ultrasound Posterior mediastinal mass MRI

References:

Grainger & Allison's Diagnostic Radiology, 7th Edition, Page 27-31,43

https://pmc.ncbi.nlm.nih.gov/articles/PMC4202880/#ref-list1

https://pmc.ncbi.nlm.nih.gov/articles/PMC4419420/#

https://pmc.ncbi.nlm.nih.gov/articles/PMC4202880/#ref-list1

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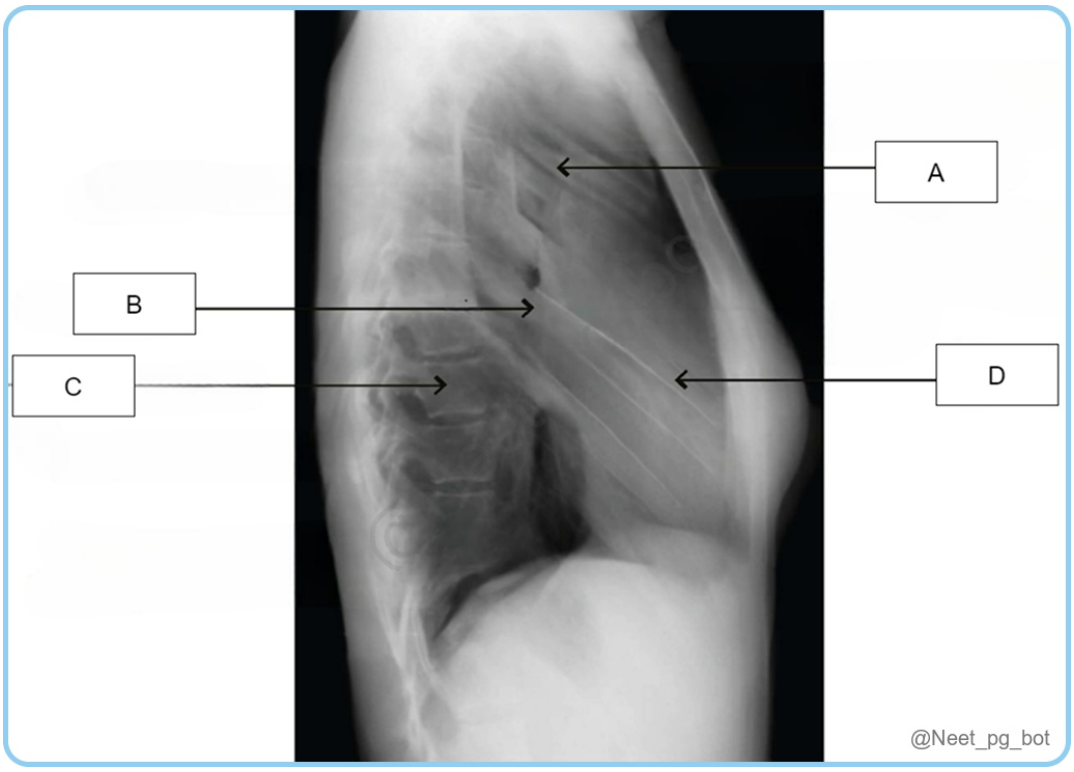
Q26: In a lateral chest X-ray, which area should you focus on to identify pathology in the hilar region? (Q853210)

A. A

B. B

C. C

D. D



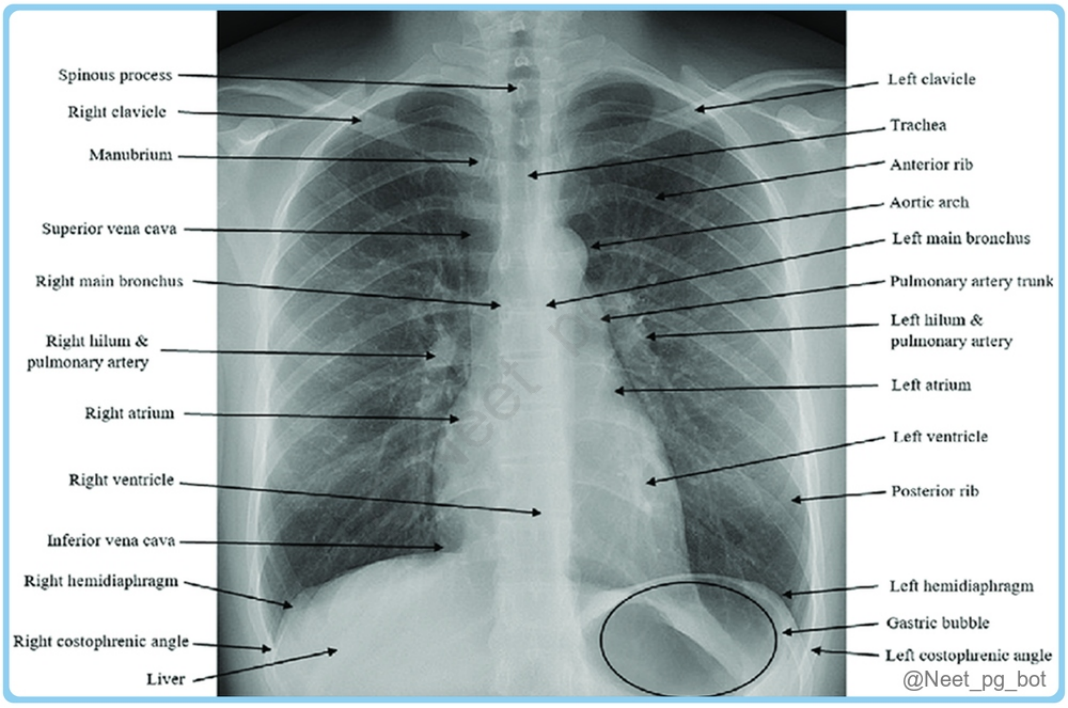
Correct Answer: B. B

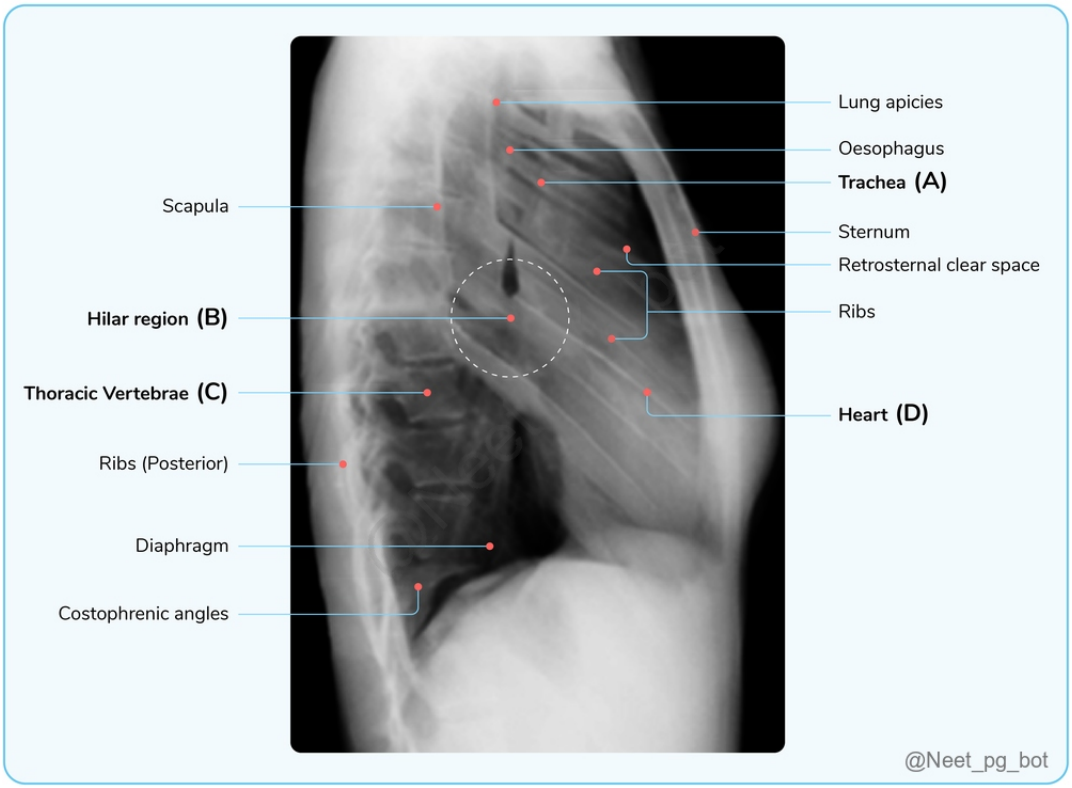
■ *Listen (English)*

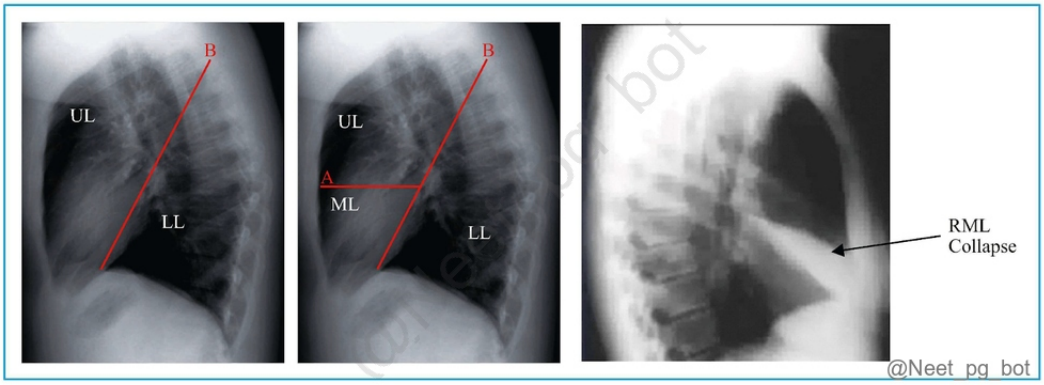
■ *Listen (Hindi)*

Explanation: B In a lateral chest X-ray, the hilar region is typically located posteriorly and laterally within the mediastinum. Focusing on area B allows for optimal visualization of structures such as the pulmonary arteries, veins, and lymph nodes, which are critical in identifying potential pathologies like tumors, infections, or vascular changes. Area B is best suited for assessing any abnormalities that may indicate underlying disease in the hilar region. Normal anatomy, Chest radiograph (PA View and Lateral View) Fissures of the Lung and Hemidiaphragm in Chest Radiography Lung Fissures in Chest Radiography Right Lung Left Lung Three lobes: Upper, Middle, Lower Two lobes: Upper, Lower Fissures: Horizontal fissure: Separates the upper and middle lobes. Oblique fissure: Separates the middle from the lower lobe, and also divides the upper from the lower lobe. Fissures: Oblique (major) fissure: Separates the upper from the lower lobe. Clinical Relevance: Right Middle Lobe (RML) Collapse: Seen as a wedge-shaped opacity overlying the heart on lateral X-ray. Lobar Pneumonia: Fissures

localize consolidation (e.g., obscured right heart border in RML pneumonia). Pleural Effusion: Blunts fissures due to fluid accumulation.







References:

Grainger & Allison's Diagnostic Radiology, 7th Edition, Page 61

↑ *Back to this question in Part A*

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Q27: A 55-year-old male presents with significant facial swelling, prominent neck veins, and difficulty breathing. These findings suggest an obstruction in the venous return from the head, neck, and upper limbs. A CT scan is conducted to assess the cause of these symptoms. In the diagram provided below, which of the following structures is most likely obstructed, leading to the clinical presentation observed in this patient? (Q853211)

A. A

B. B

C. C

D. D



Correct Answer: B. B

- *Listen (English)*
- *Listen (Hindi)*

Explanation: B Significant facial swelling, prominent neck veins, and difficulty breathing are characteristic of superior vena cava (SVC) syndrome. This condition arises due to obstruction of the SVC, impairing venous return from the head, neck, and upper limbs. The SVC is a major vein that collects blood from the upper body and returns it to the heart. When obstructed, venous pressure increases in the areas it drains, leading to facial and neck swelling (often with distended neck veins), dyspnea, and sometimes cyanosis. In the provided CT scan, structure B represents the SVC. Its obstruction results in the clinical manifestations of SVC syndrome. {{caption_text}}



References:

Grainger & Allison's Diagnostic Radiology, 7th Edition, Page 27-29.

↑ *Back to this question in Part A*

Q28: A patient presents to the clinic with the following anomalies of chest and hands. He has a history of having these anomalies since childhood but has no other symptoms. His chest X-ray shows a left hyperlucent lobe. Which other condition can show a similar chest X-ray picture? (Q853212)

A. Atelectasis of the entire lung

B. Pulmonary agenesis

C. Bullous emphysema

D. Large pleural effusion



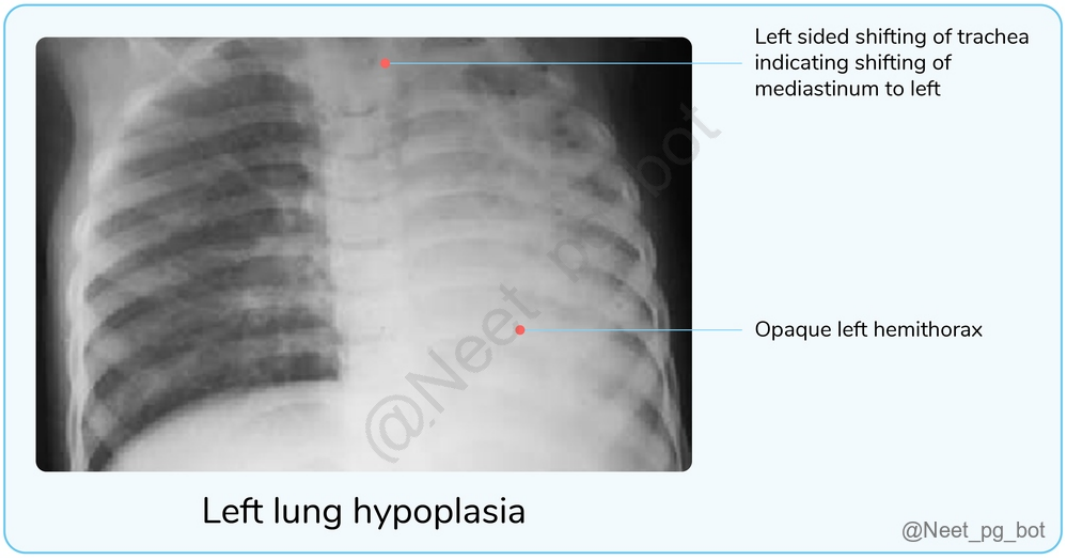
Correct Answer: C. Bullous emphysema

■ *Listen (English)*

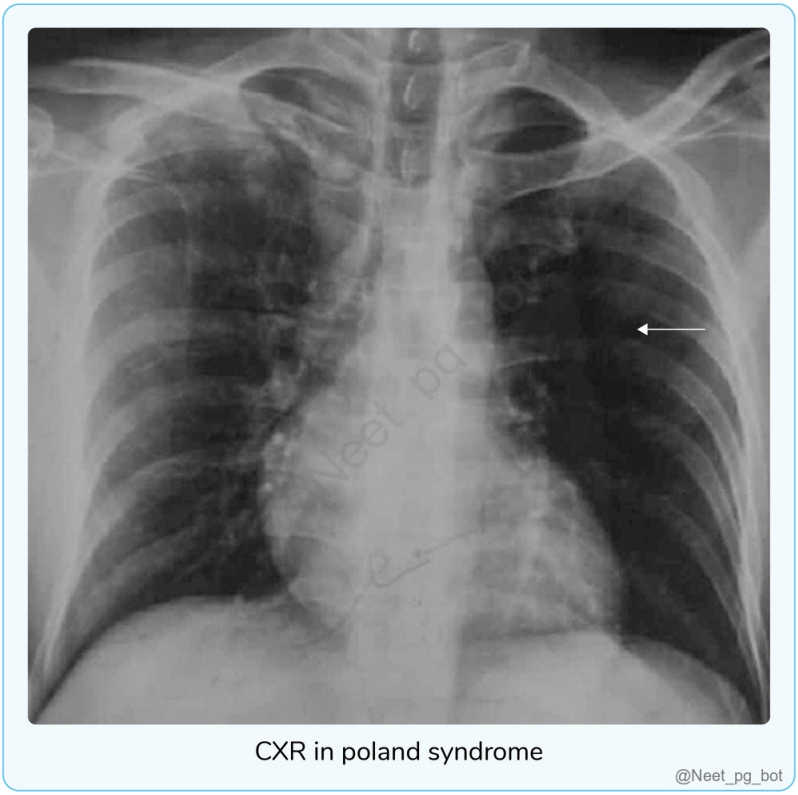
■ *Listen (Hindi)*

Explanation: he clinical scenario here points to the diagnosis of Poland syndrome, in which the chest radiograph shows a hyperlucent or blackout hemithorax of the affected side (left here), and this black-out lung finding is also found in other conditions like bullous emphysema. Whiteout hemithorax/Opacified hemithorax Blackout hemithorax/Hyperlucent hemithorax Differential diagnoses Differential diagnoses Atelectasis of the entire lung (Option A) Large pleural effusion (Option D) Pneumonia of the entire lung Postpneumonectomy appearance Large pulmonary, pleural, or chest wall mass like Ewing sarcoma, mesothelioma Pulmonary hypoplasia or agenesis (Option B) Radiologic technique errors Emphysema (bullous emphysema) Asymmetric chest wall soft tissue due to conditions like: Poland syndrome Unilateral mastectomy Some professions like butchers, carpenters, etc Atrophy of trapezius muscle after radical neck dissection Extrapulmonary air collection in pneumothorax and

subcutaneous emphysema Contralateral large pleural effusion (Pseudo hyperlucent appearance of opposite lung) Bronchial obstruction Foreign body in children Bronchial atresia Endobronchial tumor Broncholith Bronchiolitis obliterans in Swyer-James syndrome Congenital lobar hyperinflation Conditions affecting pulmonary vessels: Pulmonary agenesis or hypoplasia Proximal interruption of pulmonary artery Massive central pulmonary embolism (PE) leading to oligemia {{caption_text}} {{caption_text}}



Left lung hypoplasia



CXR in poland syndrome

References:

David Sutton Textbook of Radiology and Imaging, Volume 1, 8th Edition, Page 719-722.

https://www.ncbi.nlm.nih.gov/books/NBK532259/

↑ *Back to this question in Part A*

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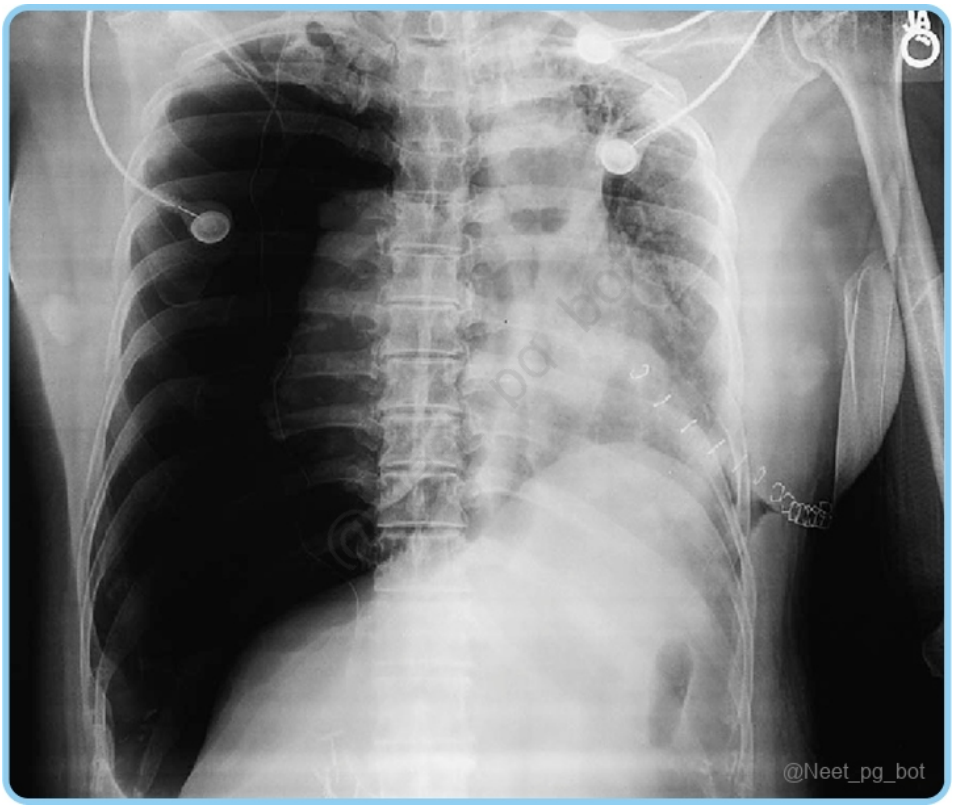
Q29: A patient is brought to the emergency after a fall from a tree. He developed shortness of breath and chest pain, is tachypneic, and has distended neck veins on examination. His chest X-ray: Which of the following is the correct finding here? (Q853214)

A. Ipsilateral deviation of mediastinum

B. Contralateral depression of hemidiaphragm

C. Collapsed lung

D. White-out lung

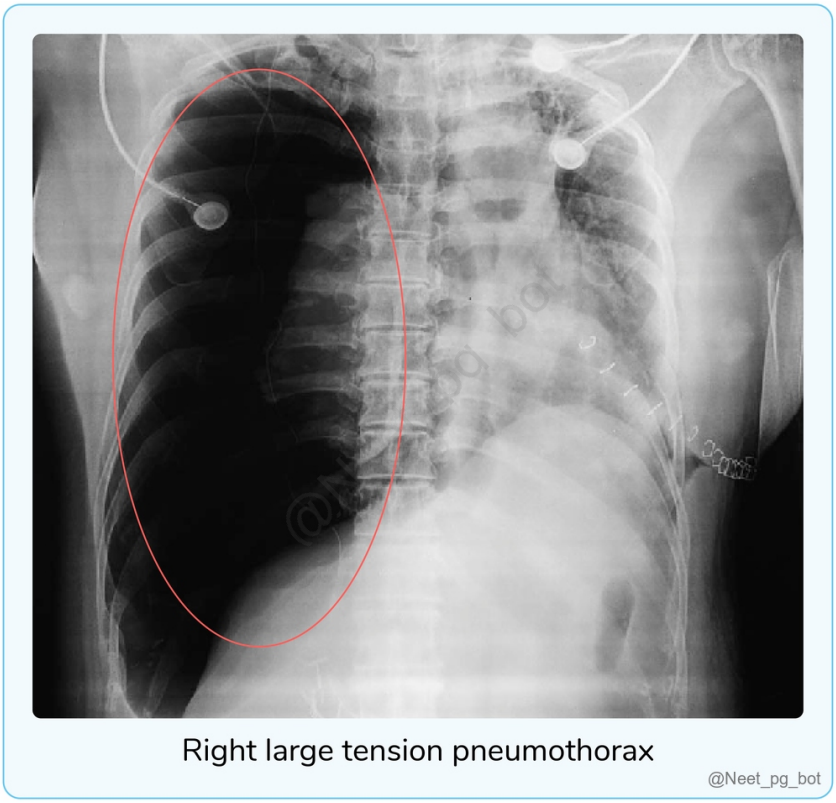


Correct Answer: C. Collapsed lung

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: he above clinical symptoms and the chest X-ray lead to the diagnosis of a right pneumothorax, which causes the lung to collapse and squished towards the hilum, ipsilateral depression of the hemidiaphragm, and contralateral deviation of the mediastinum. Pathophysiology: The pressure gradient in the thorax changes with pneumothorax. Normally, the pleural space is negative compared to atmospheric pressure. If air enters the pleural space through communication with the alveoli, it alters the pressure gradient, leading to lung collapse. Radiographic appearance of pneumothorax: Pneumothorax appears as a radiolucent area (black). Pneumothorax pushes the adjacent lung towards the hilum. A sharp radiopaque line separates the pneumothorax from the lung parenchyma. A closed pneumothorax is easily detectable in an expiratory X-ray, as there is a decrease in lung volume. However, the volume of the pneumothorax is not affected by respiration. Tension Pneumothorax Significant contralateral deviation of the mediastinum (vs Option A) Collapsed lung Depression of ipsilateral hemidiaphragm (vs Option B) {{caption_text}} White-out lung (Option D) refers to when there is complete opacification of an entire hemithorax. This is seen in conditions like pneumonia of the entire lung, a large mass in the lung or chest wall, large pleural effusion, etc., which increase the opacity of the lung.



References:

https://www.ncbi.nlm.nih.gov/books/NBK441885/

David Sutton Textbook of Radiology and Imaging, Volume 1, 8th Edition, Page 928-932.

https://pmc.ncbi.nlm.nih.gov/articles/PMC7390330/

↑ *Back to this question in Part A*

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Q30: A patient with a large tension pneumothorax after experiencing a fall is being examined with ultrasound. Which of the following findings will be present in this patient? (Q853215)

A. Sliding lung sign

B. Sea-shore sign

C. Pleural stripe

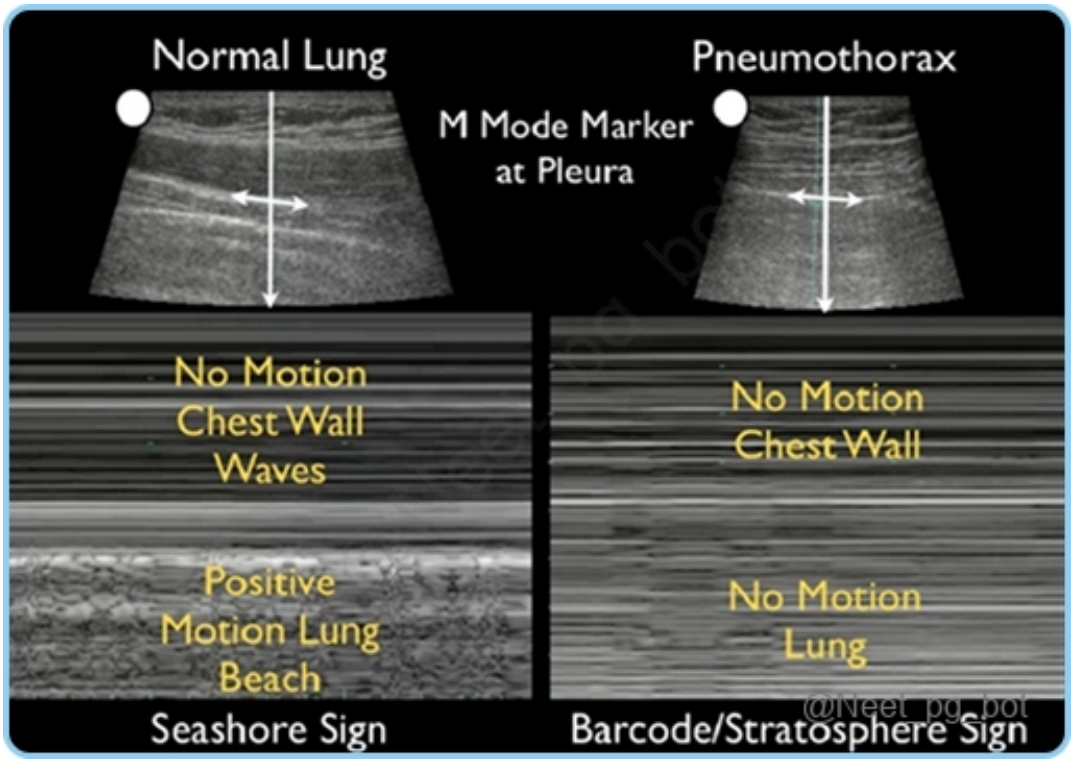
D. A-lines

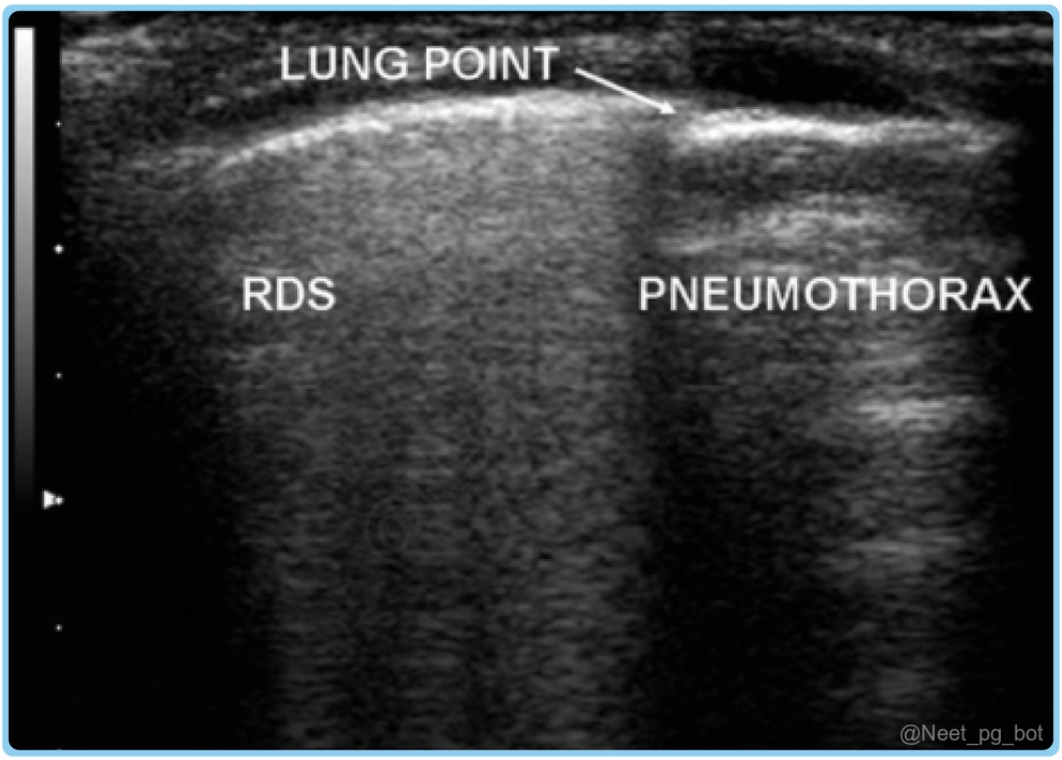
Correct Answer: D. A-lines

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: A-lines are horizontal reverberation artifacts seen in the presence of pneumothorax; all the other signs are absent in this case of pneumothorax. Ultrasound findings in pneumothorax Pleural stripe (Option C) The echogenic line known as the 'pleural stripe' reflects most of the acoustic energy at the air-pleural interface and is the normal pleura . Artefacts Vertical echogenic bands called 'comet tails' are absent in pneumothorax . ' A lines' are horizontal reverberation artefacts caused by reflection from the pleura in the presence of pneumothorax. Lung sliding (Option A) It is a normal finding seen due to the shimmering of the pleural stripe at the pleural surface. This sign disappears in pneumothorax . Lung point sign Indicates the border between sliding lung and pneumothorax which helps assess size. Barcode/ stratosphere sign In cases where lung sliding is absent , M-mode images show uniform horizontal straight lines known as the stratosphere sign or barcode sign. This is seen in pneumothorax. Normal lung shows Sea-shore sign (Option B). {{caption_text}} {{caption_text}}





References:

Grainger and Allison's Diagnostic Radiology a Textbook of Medical Imaging, 7th Edition, Page 51.

↑ *Back to this question in Part A*

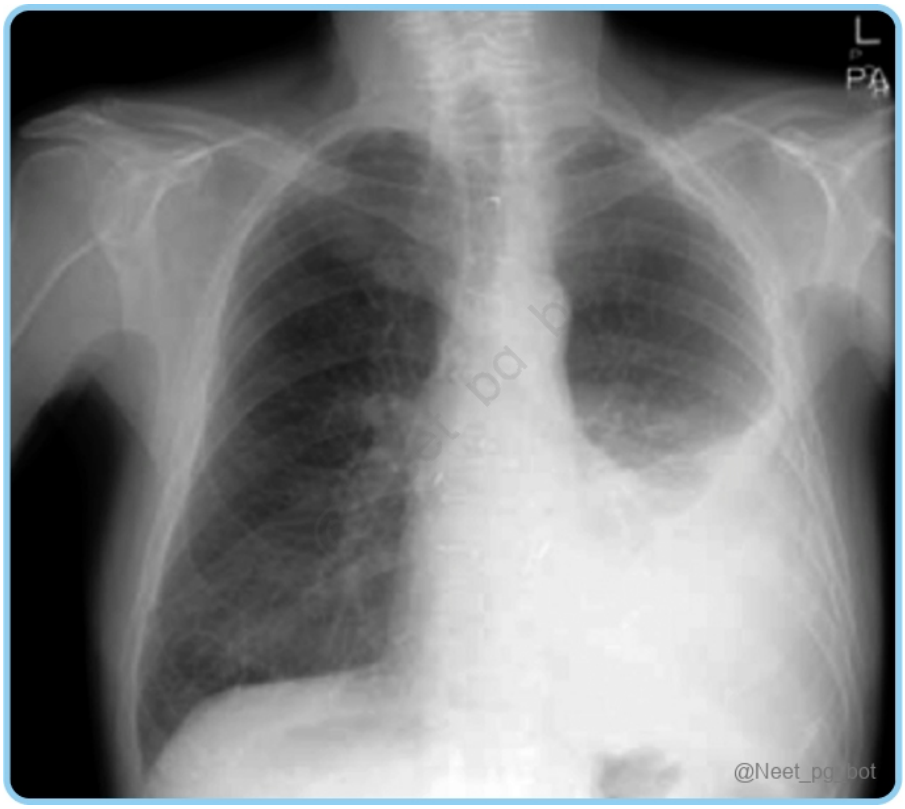
Q31: A 65-year-old male with a history of COPD presents with a 2-week history of increasing shortness of breath and a persistent cough. On examination, decreased breath sounds are noted on the left, and a chest X-ray is taken, which is shown below. What is the most likely diagnosis? (Q853216)

A. Lung abscess

B. Pneumothorax

C. Pleural effusion

D. Hydropneumothorax



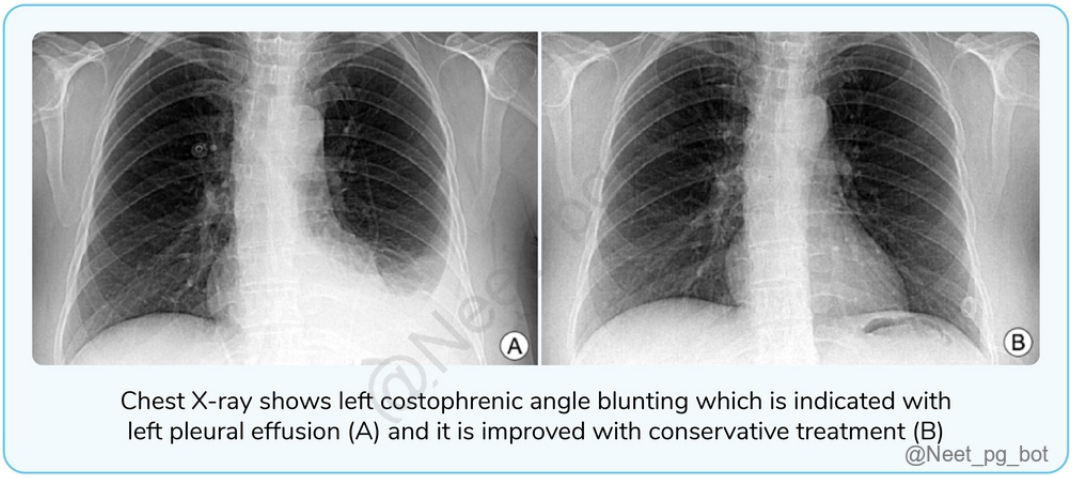
Correct Answer: C. Pleural effusion

■ *Listen (English)*

■ *Listen (Hindi)*

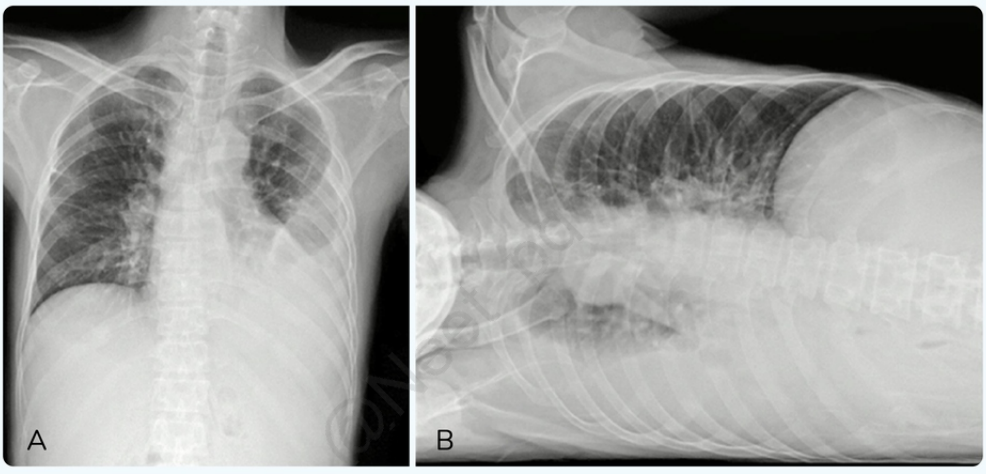
Explanation: Clinical features like breathlessness, cough, and decreased breath sound, along with X-ray findings of large pleural opacity and blunted costophrenic angle, indicate a diagnosis of Pleural effusion. Pleural Effusion: Pleural effusion is the accumulation of fluid in the pleural space. Effusion Progression: Blunting of costophrenic

angles starts at 200-500 mL. Classic signs include opacification of the lower chest with a concave superior margin. {{caption_text}} Massive Effusions: 1000 mL reaches the fourth anterior rib; cause dense opacification of the hemithorax with contralateral mediastinal shift. Diaphragmatic inversion may occur. Lateral decubitus X-rays: Increase sensitivity for small effusions as the pleural fluid moves with gravity and the lung effectively floats on the effusion. {{caption_text}} Subpulmonary Effusions: Appear as a "high hemidiaphragm" on x-rays, with an unusual contour that peaks laterally than usual. Ultrasound or CT confirms the diagnosis. In an upright PA view, the meniscus sign indicates the presence of a significant amount of pleural fluid, typically exceeding 200 mL and blunting the costophrenic angle. {{caption_text}} Lung abscess (Option A) typically presents with a cavitary lesion on imaging, often accompanied by a gas-fluid level, rather than a pleural opacity with a blunted costophrenic angle indicative of fluid accumulation seen in pleural effusion. {{caption_text}} Pneumothorax (Option B) shows a region of lucency (darkness) along the lung margin, typically more pronounced on an erect chest X-ray. In this case, symptoms of pleural effusion and x-ray findings suggest fluid rather than air, making pneumothorax unlikely. {{caption_text}} Hydropneumothorax (Option D) indicates the presence of both air and fluid in the pleural space, typically seen as an air-fluid level on an upright chest X-ray, which distinguishes it from a simple pleural effusion. {{caption_text}}



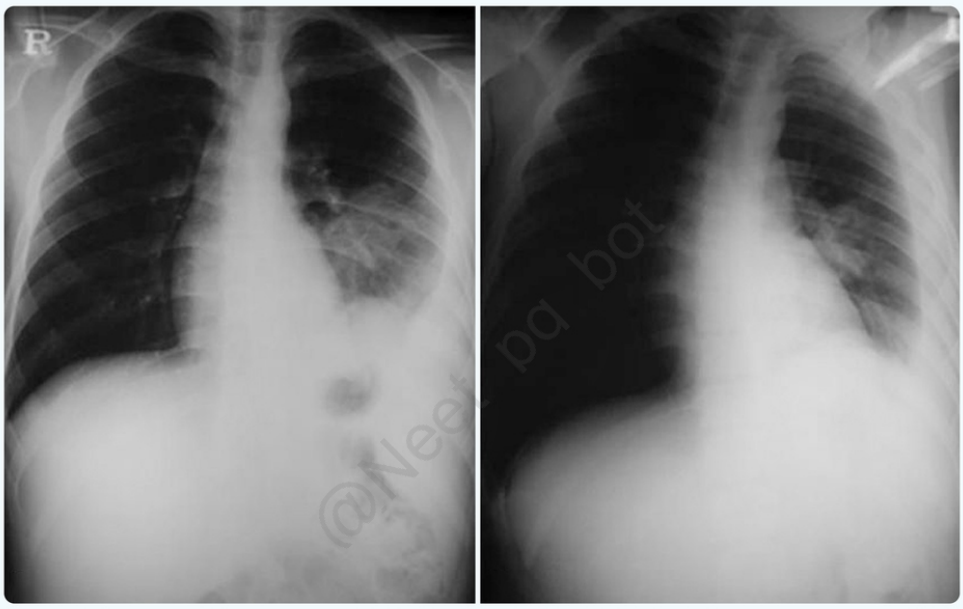
Chest X-ray shows left costophrenic angle blunting which is indicated with left pleural effusion (A) and it is improved with conservative treatment (B)

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Chest radiography with the patient in the PA upright (A) and left lateral decubitus (B) positions revealed massive left pleural effusion

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Chest PA shows a lateral meniscus sign and patchy consolidation on the lower left lung fields adjacent to the cardiac border.

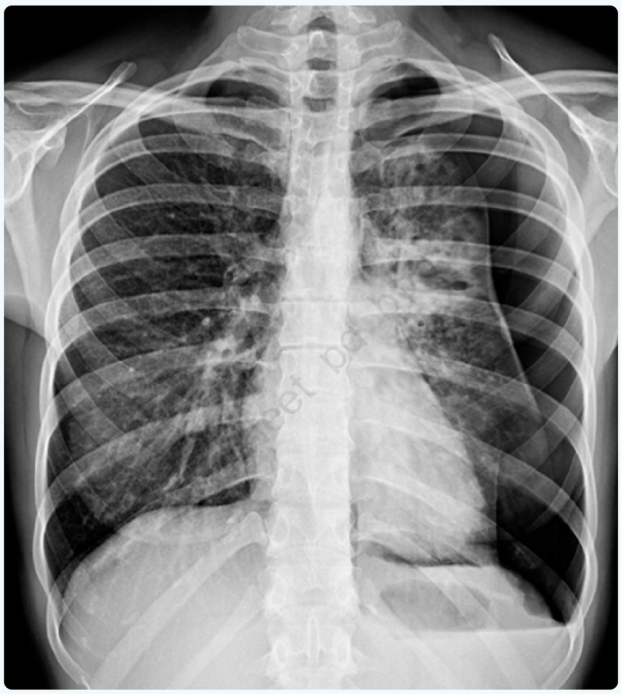
Left decubitus view shows left pleural fluid shifting.

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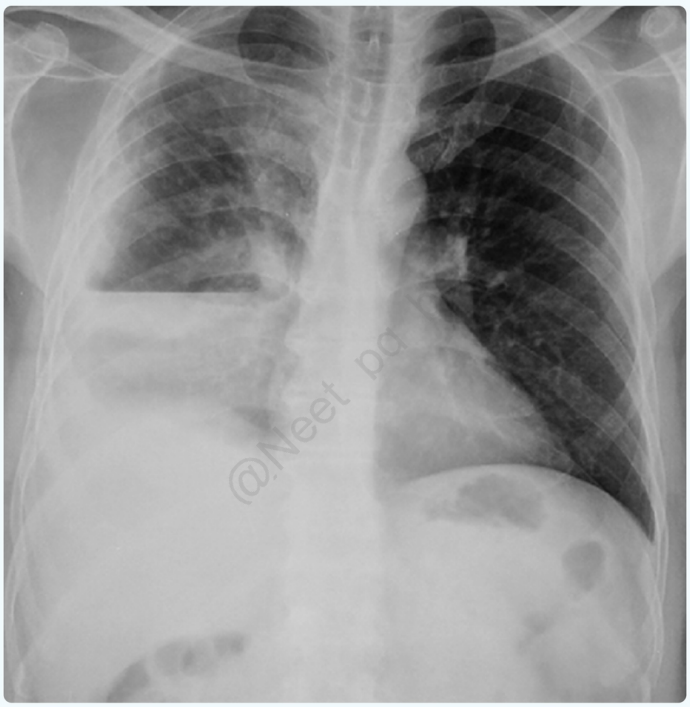
X-ray of right lung abscess

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Chest X-ray : Left pneumothorax

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Chest X-ray showing right hydro pneumothorax.

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References:

Grainger & Allison’s Diagnostic Radiology, 7th Edition, Page 43,44,45

David Sutton Textbook of Radiology and Imaging, Volume 2, 8th Edition, Section B Respiratory system, Chapter 12

https://www.ncbi.nlm.nih.gov/books/NBK448189/

https://www.researchgate.net/figure/A-Chest-radiograph-shows-a-left-side-partially-loculated-pleural-effusion-B-Chest_

https://radiopaedia.org/articles/lung-abscess

↑ *Back to this question in Part A*

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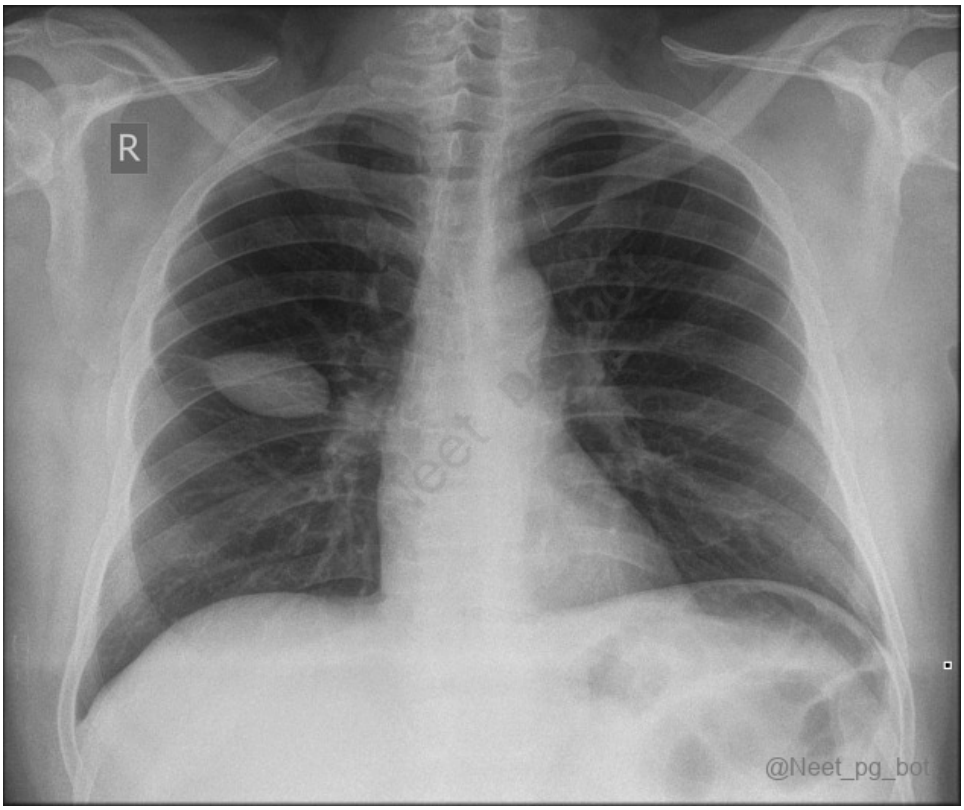
Q32: A 75-year-old male patient with a history of congestive heart failure presents with worsening shortness of breath and pleuritic chest pain. A chest X-ray PA view is taken, which is shown below. Which of the following statements about the finding on the chest X-ray is most accurate? (Q853217)

A. It is most commonly with effusion occupying the oblique fissure.

B. It may be mistaken for a lung mass due to its appearance.

C. It will typically require surgical intervention to resolve.

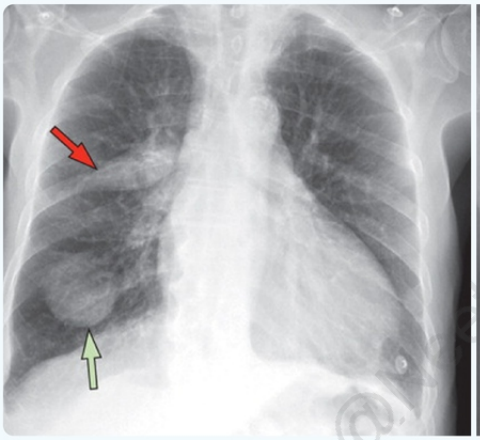
D. It is always associated with exudative pleural effusion.



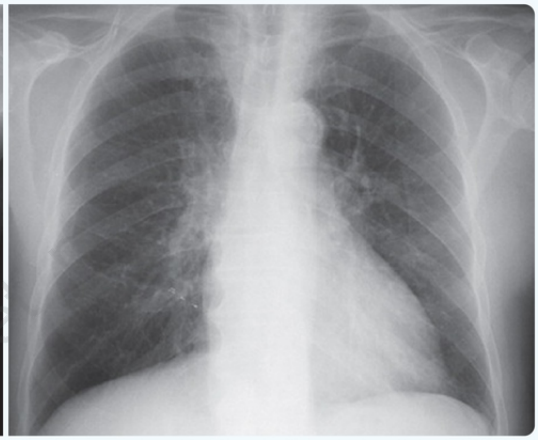
Correct Answer: B. It may be mistaken for a lung mass due to its appearance.

- *Listen (English)*
- *Listen (Hindi)*

Explanation: Chest X-ray reveals a well-defined homogeneous mass occupying the transverse fissure in the right middle lung field in a patient with heart failure, suggesting a diagnosis of a phantom tumor , which may be mistaken for a lung mass due to its mass-like radiologic appearance. Phantom Tumor/ Vanishing Tumor: A phantom tumor is a well-demarcated opacity resulting from pleural effusion. It is commonly associated with congestive heart failure. The effusion is typically transudative in nature. (Option D) The most commonly described appearance is a well-defined homogeneous mass, occupying the transverse fissure or sometimes the oblique interlobar fissures. (Option A) It may be mistaken for a lung mass or consolidation because of its radiologic appearance as a mass-like configuration in the lung. (Option B) It vanishes following mobilization of the fluid and effective diuresis. (Option C) {{caption_text}} Mostly seen in the geriatric population who have a higher incidence of congestive heart failure. Pathophysiology: In congestive heart failure, increased hydrostatic pressure on the right side of the lung interferes with venous and lymphatic drainage. This leads to a predominance of effusion on the right side. Pleuritis can cause obliteration of the pleural space, preventing the spread of fluid. Treatment: Diuretics



CXR showing two phantom tumors, in right inferior lobe(Green arrow) and horizontal fissure (red arrow)



CXR taken 2 days later, with absorption of pseudotumors

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References:

www.ncbi.nlm.nih.gov/pmc/articles/PMC5410121/

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3014119/

↑ *Back to this question in Part A*

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Q33: A 68-year-old male patient presents with cough, fever, and pleuritic chest pain. A contrast CT is taken and shown below. What is the most likely diagnosis for this patient? (Q853218)

A. Lobar Pneumonia

B. Empyema

C. Pleural Effusion

D. Lung Abscess



Correct Answer: B. Empyema

- *Listen (English)*
- *Listen (Hindi)*

Explanation: Clinical symptoms, including cough, fever, and pleuritic chest pain, along with the CT finding of a low-attenuating pleural fluid collection between the enhancing visceral (white arrow) and parietal pleura (black arrow), i.e., Split-pleura sign , confirm the diagnosis of Empyema. Image {{caption_text}} {{caption_text}} Lobar pneumonia (Option A) typically shows consolidation. Lung Abscess (Option D) typically appears as a localized, well-defined mass with an air-fluid level within the lung parenchyma rather than in the pleural space. {{caption_text}}



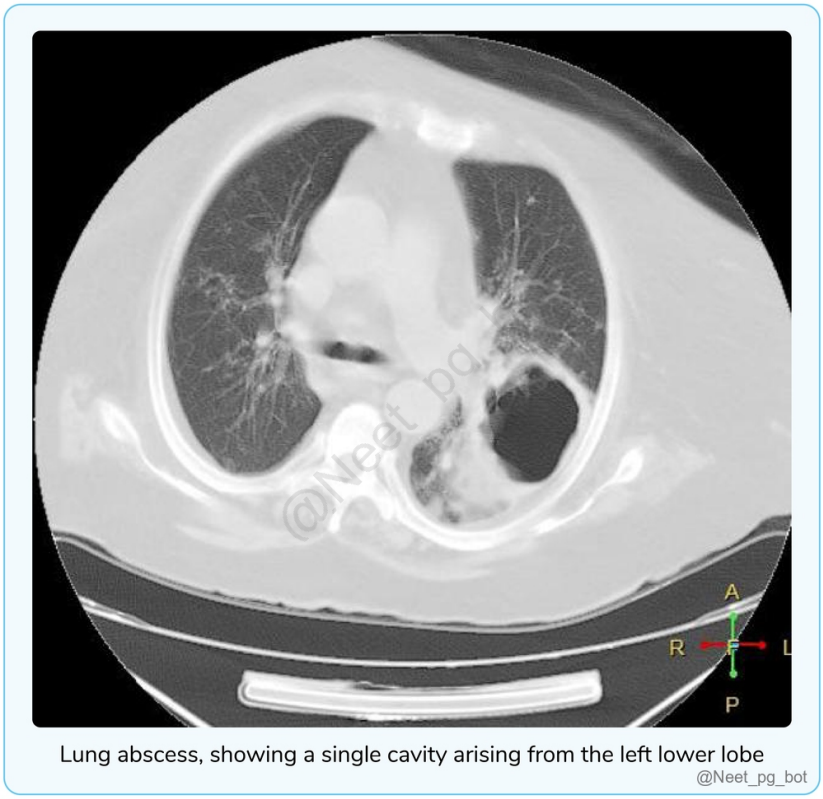
CT scan of chest showing left-sided pleural effusion

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Split pleura sign: Pleural fluid collection juxtaposed between the enhancing visceral (white arrow) and parietal (black arrow) pleura

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Lung abscess, showing a single cavity arising from the left lower lobe

References:

Grainger & Allison's Diagnostic Radiology, 7th Edition, Page 46, 49

David Sutton Textbook of Radiology and Imaging, Volume 1, Page 2528

https://ejournal.seaninstitute.or.id/index.php/healt/article/download/152/125

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4753987/

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https://radiopaedia.org/articles/pleural-empyema-1

https://radiopaedia.org/articles/empyema-vs-pleural-effusion-2?lang=us

↑ *Back to this question in Part A*

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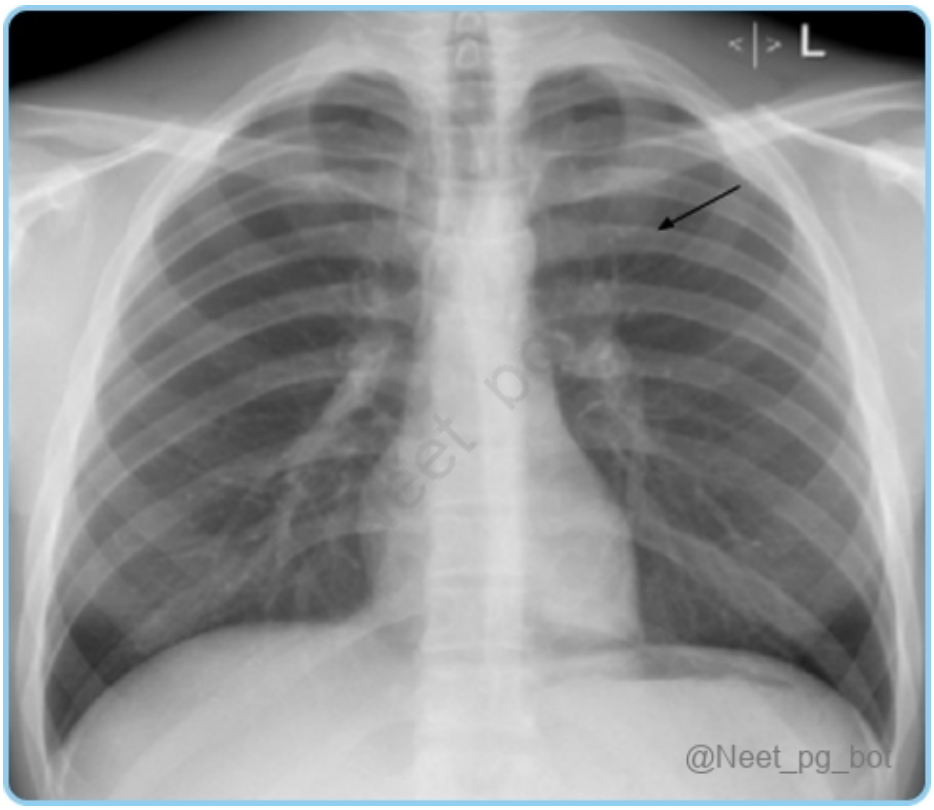
Q34: A medical student is learning to identify anterior and posterior ribs on a PA chest X-ray. Identify the marked rib shown below: (Q853206)

A. 5th Anterior rib

B. 5th Posterior rib

C. 6th Anterior rib

D. 6th Posterior rib

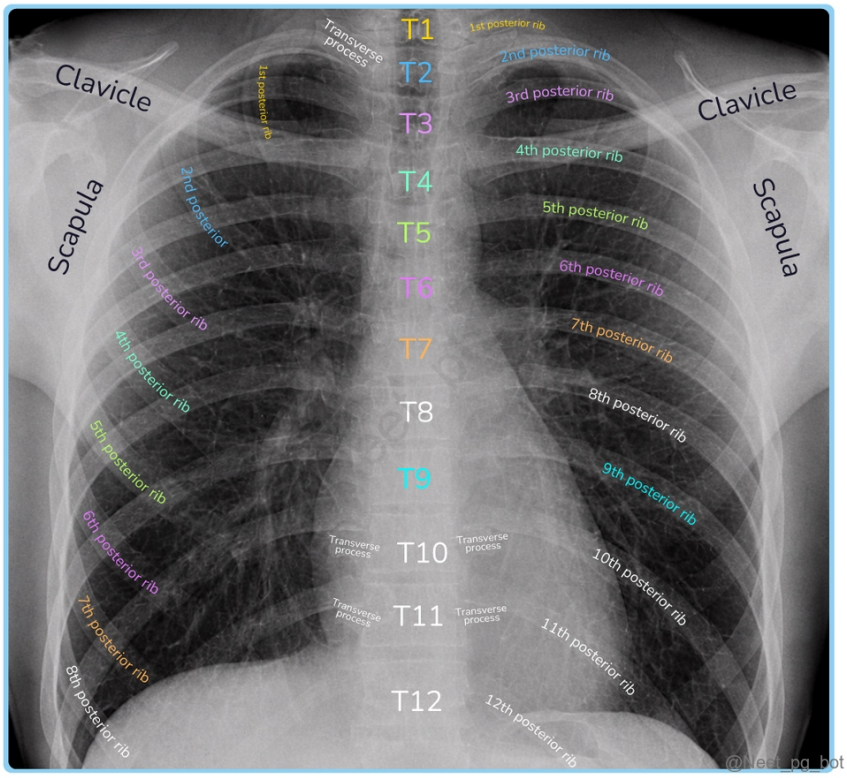


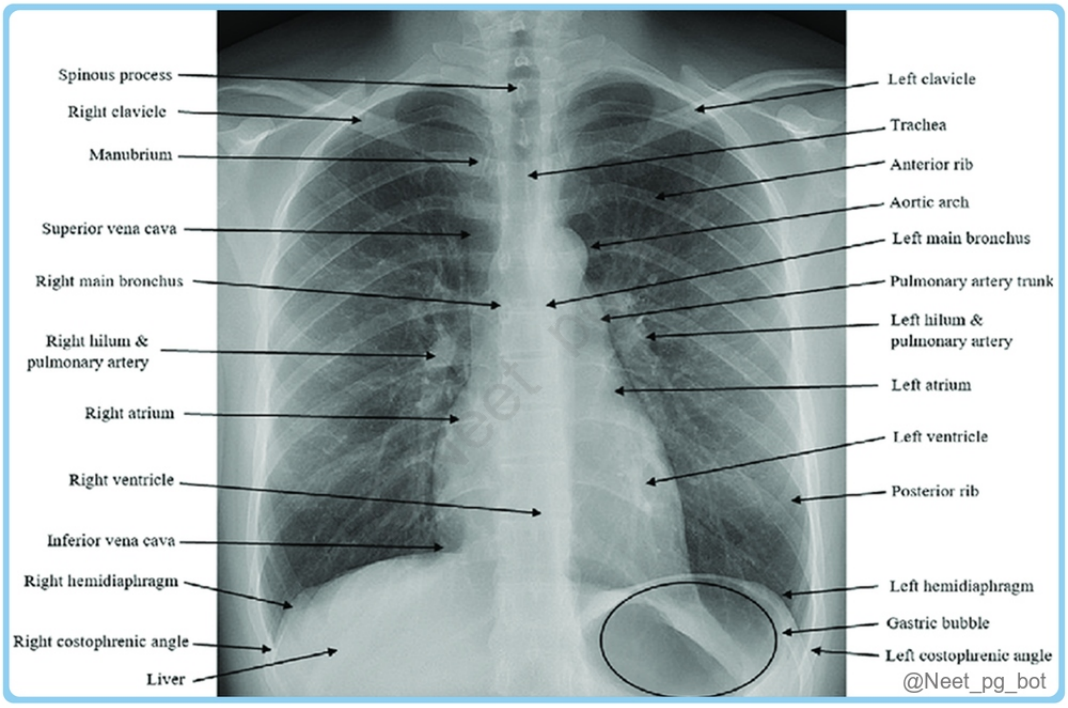
Correct Answer: D. 6th Posterior rib

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: The labelled rib is the 6 th posterior rib. Rib Counting in chest X-ray: Posterior ribs are more visible and appear horizontal. Anterior ribs are less visible and angle downwards. Identify the first rib, which may be difficult due to crowding at the apex. It’s easier to locate the anterior part of the first rib first. Follow this backward to find the posterior part of the first rib. Count the posterior ribs downward from the first rib. {{caption_text}}





References:

Fred A. Mettler, Jr. Essentials of Radiology, 4th Edition, Page 44

Jonathan Corne Chest X-Ray Made Easy, 4th Edition, Page 10,11

↑ *Back to this question in Part A*

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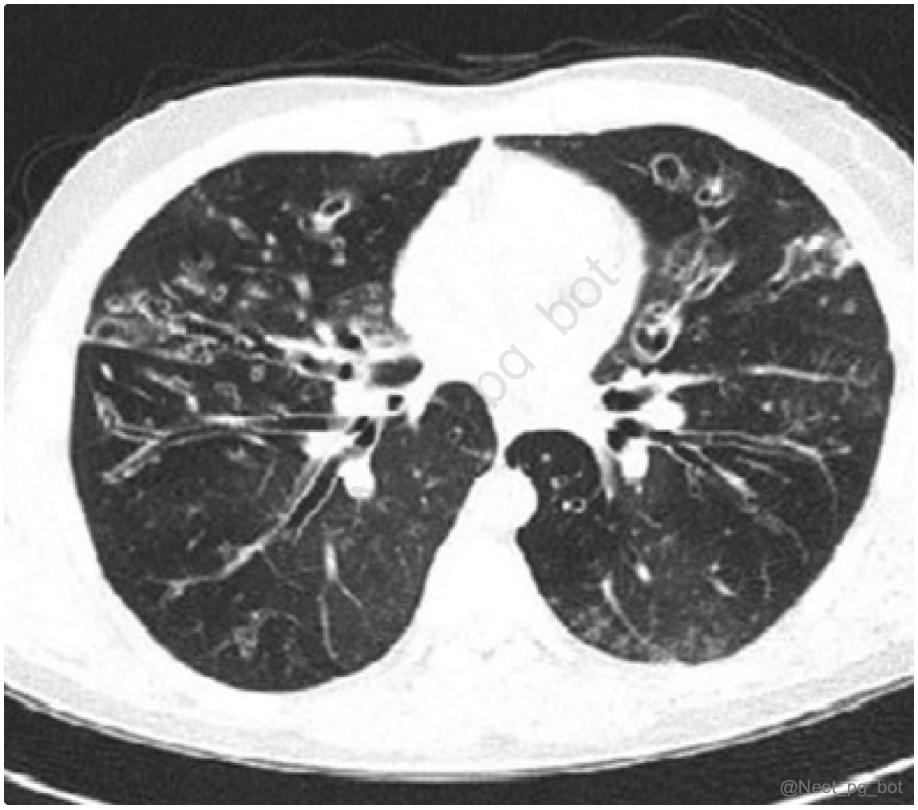
Q35: A 35-year-old woman presents with a chronic productive cough and recurrent episodes of foul-smelling sputum and hemoptysis. A high-resolution CT (HRCT) of the chest is shown below. Which of the following radiological signs is most characteristic of the condition seen in this image? (Q853220)

A. Tree-in-bud appearance

B. Ground-glass opacities

C. Tram track sign

D. Air bronchogram

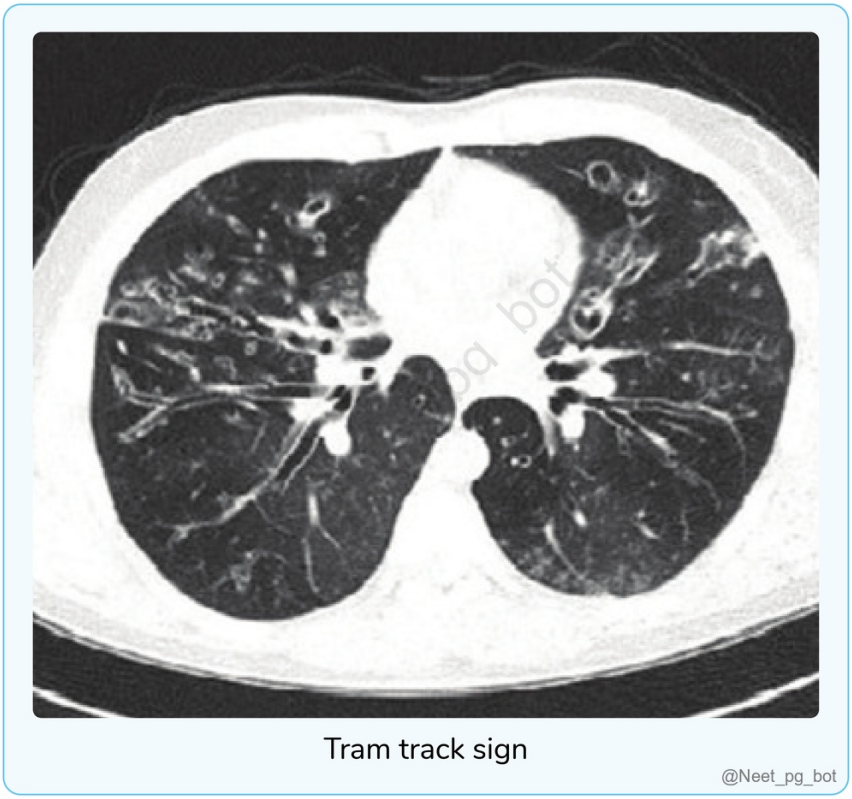


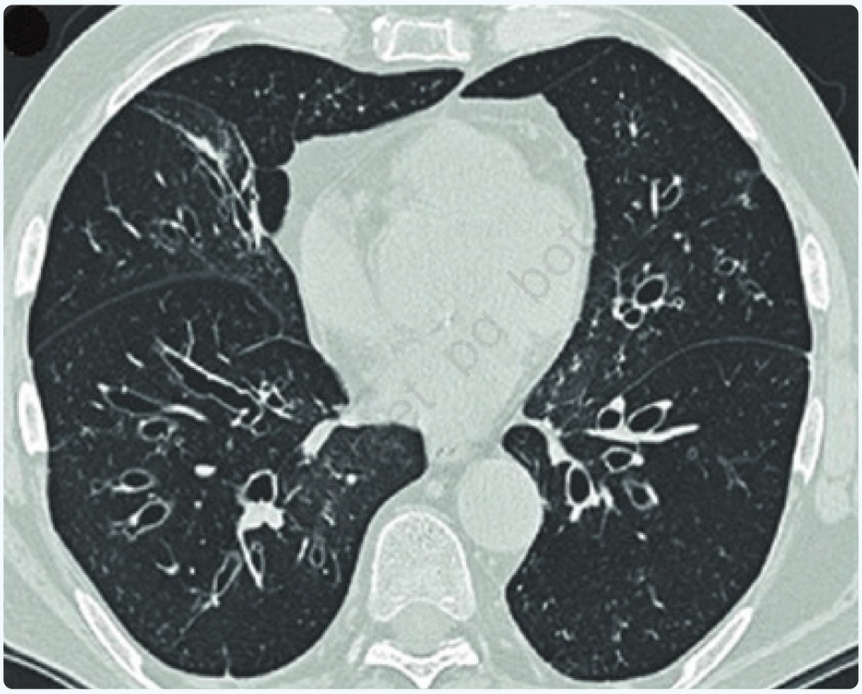
Correct Answer: C. Tram track sign

■ *Listen (English)*

■ *Listen (Hindi)*

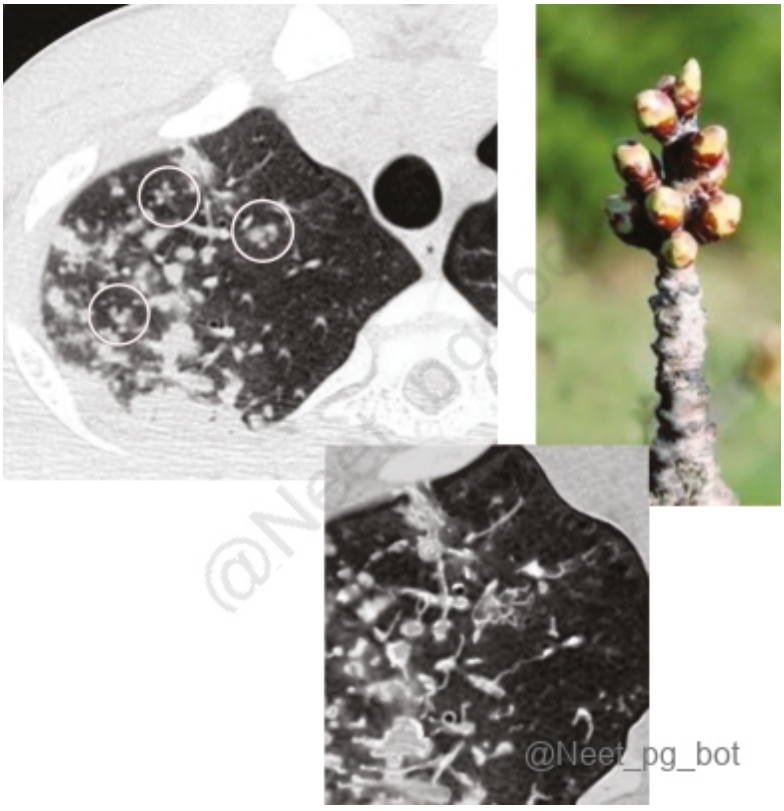
Explanation: The clinical feature of chronic productive cough with recurrent foul-smelling sputum and hemoptysis suggests chronic suppurative lung disease. This, along with the characteristic "tram track sign" seen on high-resolution CT, points towards a diagnosis of bronchiectasis . Radiographic Findings of Bronchiectasis: Tramline Sign/Tram track sign (Option C): Thickened bronchial walls seen as single thick lines or parallel line opacities. {{caption_text}} Cystic bronchiectasis: Multiple thin-walled ring shadows with air-fluid levels. Computed Tomographic (CT) Findings: Major sign: Bronchial dilation, with or without bronchial wall thickening. Lack of tapering of bronchial lumina. Signet ring sign: Bronchial diameter greater than the adjacent pulmonary artery. {{caption_text}} Glove-finger/V/Y-shaped densities: Represent mucus-filled dilated bronchi. Tree-in-bud sign (Option A): More commonly seen with endobronchial spread of tuberculosis. Also seen in bronchiolitis as small nodular and branching opacities. Ground-glass opacities (Option B) are hazy areas of increased lung opacity with preserved bronchial and vascular markings, typically seen in interstitial lung diseases, viral infections, or pulmonary edema, not in airway dilation. Air bronchogram (Option D) refers to air-filled bronchi visible within opacified alveolar regions, seen in alveolar consolidation such as pneumonia, not in bronchial wall thickening or dilation.



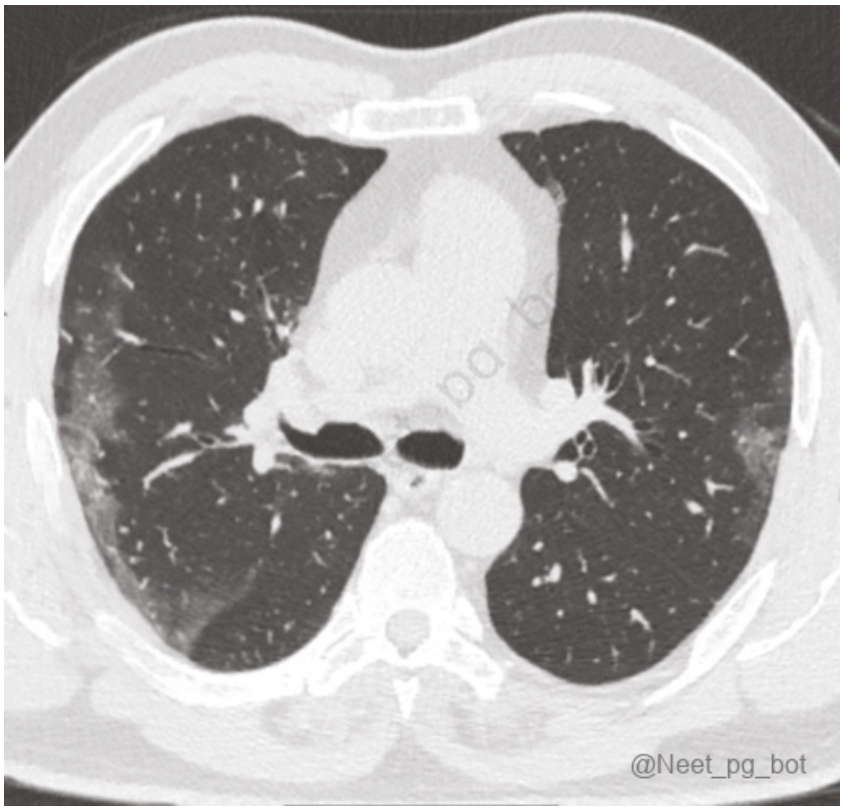


Signet ring sign

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References:

Grainger & Allison's Diagnostic Radiology, 7th Edition, Page 138,139,1341

https://www.ajronline.org/doi/10.2214/AJR.09.3401#

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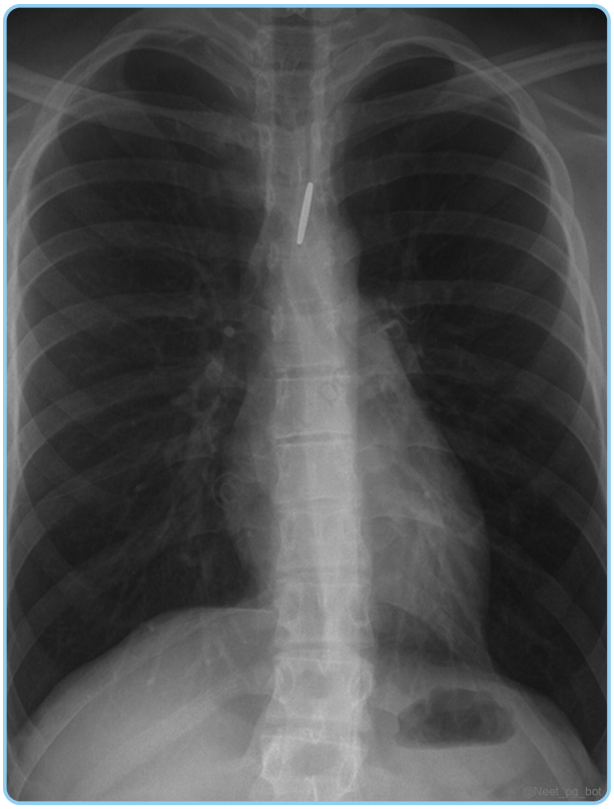
Q36: A 10-year-old child is brought to the emergency by her father after she accidentally swallowed a coin while playing. Her chest X-ray reveals the following findings: Identify the location of the foreign body. (Q853221)

A. At cricopharyngeus in esophagus

B. Larynx

C. At aortic arch in esophagus

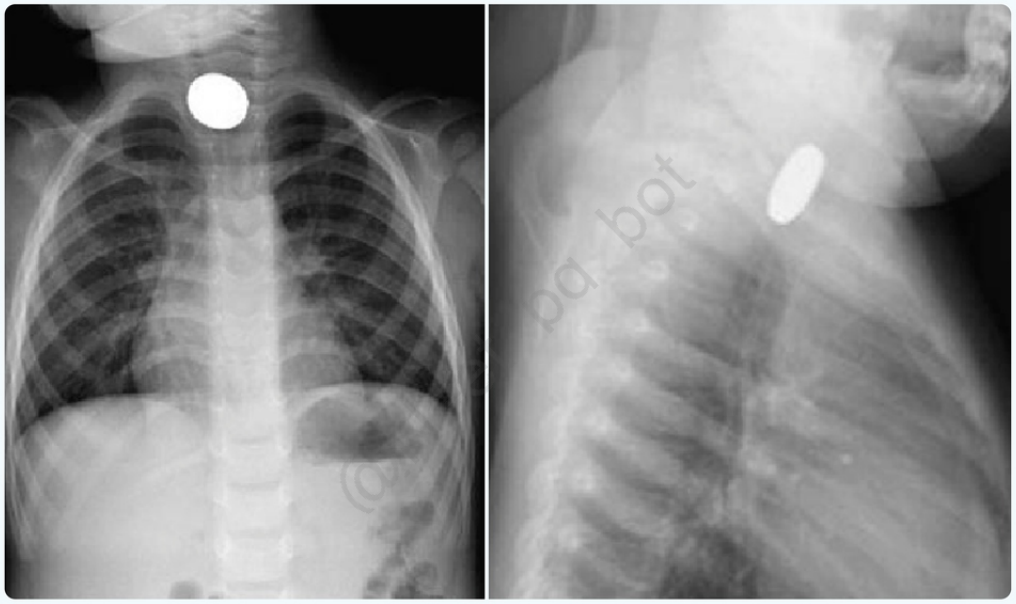
D. Trachea



Correct Answer: D. Trachea

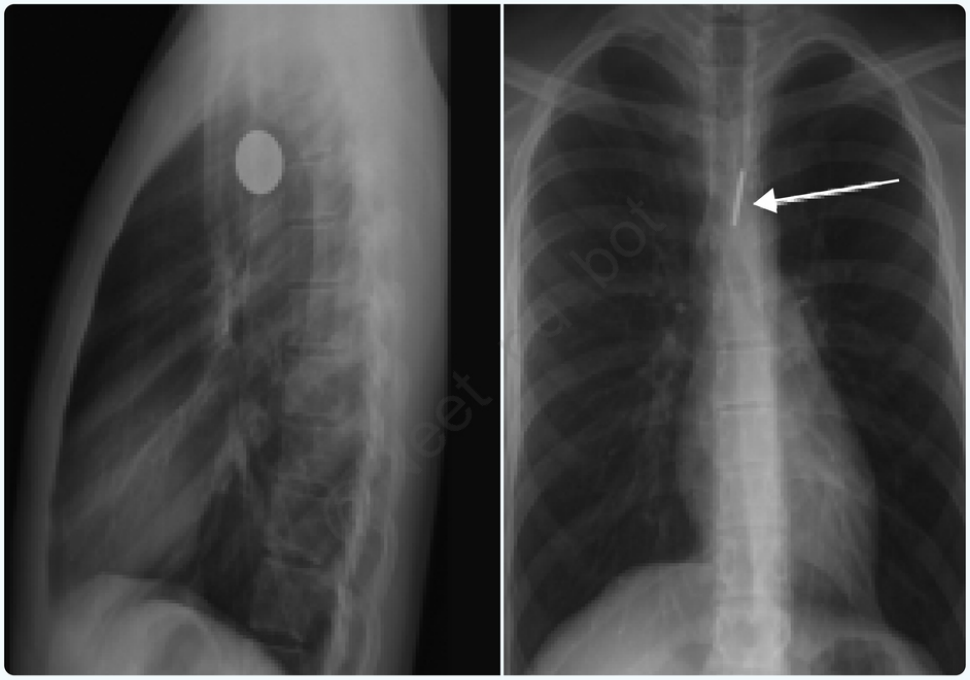
- *Listen (English)*
- *Listen (Hindi)*

Explanation: The foreign body in the given scenario is situated in the trachea at the aortic arch which can be identified by the sagittal arrangement of the coin in the frontal view of chest X-ray. Coin in esophagus Coin in trachea Detected using a chest X-ray, the following findings may be noted: The coin is arranged in the coronal plane of the esophagus. (Option A) The most common site of impaction is at the level of the cricopharyngeus muscle . Appears round on the frontal (posteroanterior) view. It appears tangentially in the lateral view. Chest x-ray findings: The coin is arranged in a sagittal plane. It appears tangentially in a frontal/PA view. Appears en face in lateral radiographs. {{caption_text}} {{caption_text}} Coin in the larynx (Option B) : appears in the sagittal plane but is present higher up in the chest X-ray. {{caption_text}} At aortic arch in the esophagus (Option C): a coin in the esophagus appears in the coronal plane and is seen as a round structure in the frontal view as below. Hence, even though the coin is at the level of the aortic arch, it is not in the esophagus in the given scenario. {{caption_text}}



Coin in esophagus

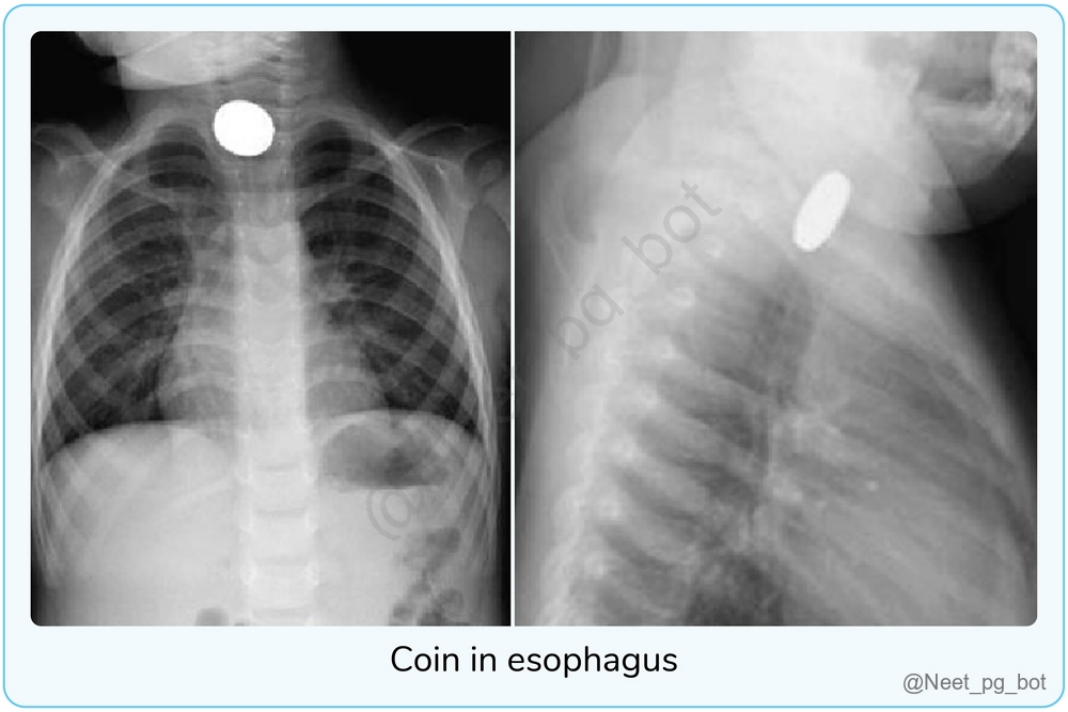
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Coin in trachea

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References:

David Sutton Textbook of Radiology and Imaging, Volume 1, 8th Edition, Page 2089

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↑ *Back to this question in Part A*

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Q37: A 65-year-old male presents with fever, cough, and pleuritic chest pain. X-ray chest is performed, revealing an air bronchogram. Which of the following conditions is characterized by the absence of air bronchograms? (Q853222)

A. Pleural effusion

B. Pulmonary consolidation

C. Adenocarcinoma of the lung

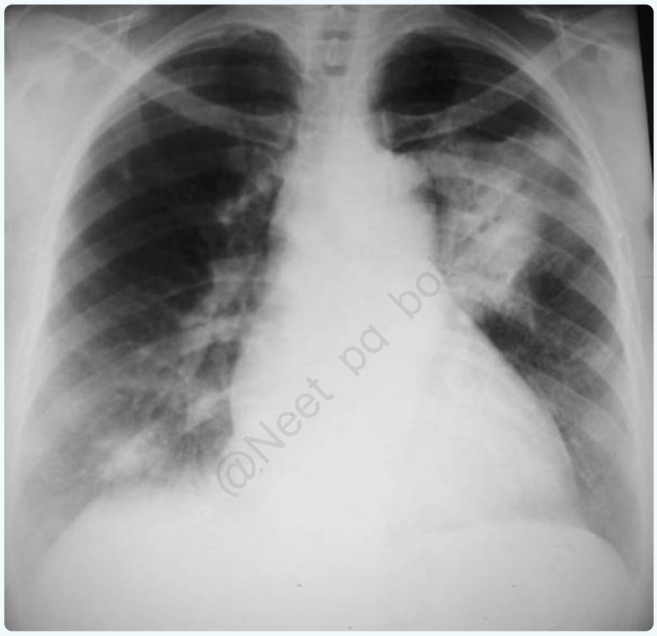
D. Severe interstitial lung disease

Correct Answer: A. Pleural effusion

■ *Listen (English)*

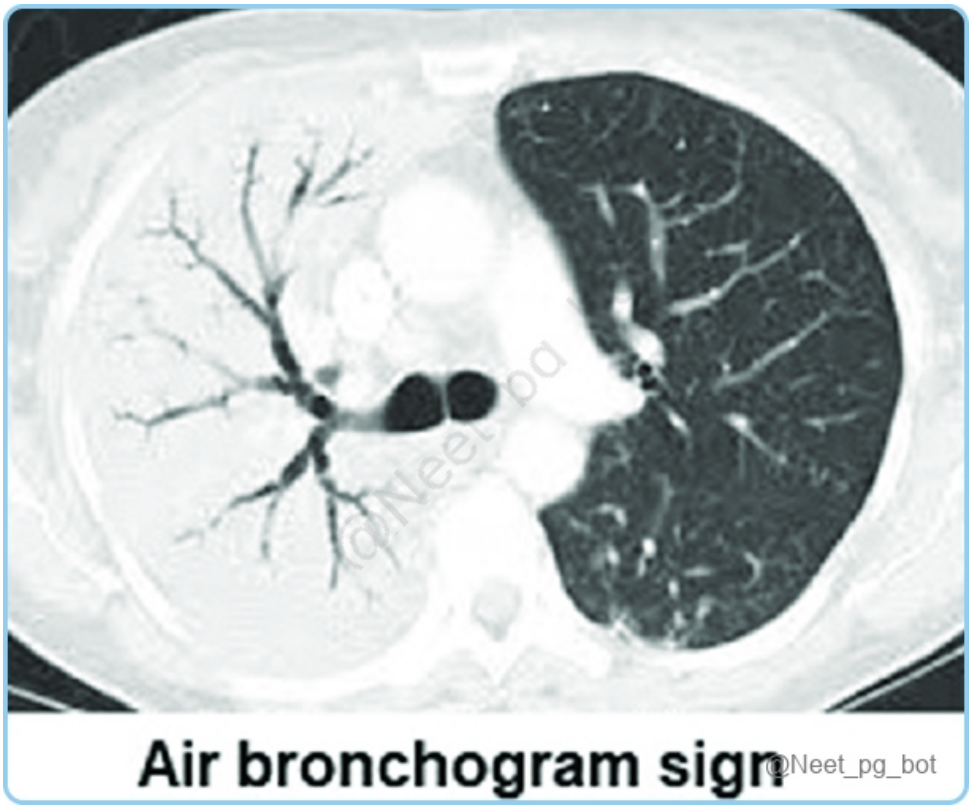
■ *Listen (Hindi)*

Explanation: Pleural effusion is least likely to demonstrate air bronchograms, as it involves fluid in the pleural space and does not typically affect the visibility of air-filled bronchi in the lung parenchyma. {{caption_text}} Air bronchogram: Pattern of air-filled (low-attenuation) bronchi on a background of opaque (high-attenuation) airless lung. Significance: Indicates patency of proximal airways. Suggests evacuation of alveolar air due to: Absorption (atelectasis). Replacement (e.g., pneumonia). Or a combination of these processes. Persistence of gas in the bronchi indicates patency of proximal airways. Seen in pulmonary parenchymal lesions and absent in extrapulmonary processes such as pleural effusion. (Option A) {{caption_text}} Seen in: Pulmonary consolidation (Option B ruled out) Pulmonary edema: Especially with alveolar edema Non-obstructive atelectasis Severe interstitial lung disease (Option D ruled out) Neoplasms: Adenocarcinoma; Pulmonary lymphoma (Option C ruled out) Pulmonary infarct Pulmonary hemorrhage



Chest X-ray shows a large consolidation with air bronchograms in the left lung, and a small area of consolidation in the lower region of the right lung.

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Air bronchogram sign

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References:

Grainger & Allison's Diagnostic Radiology, 7th Edition, Page 69

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↑ *Back to this question in Part A*

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Q38: A 45-year-old male presents with a cough, dyspnea, and fever. A chest radiograph shows loss of the right heart border. Which lung area is most likely affected? (Q853223)

A. Right upper lobe

B. Right middle lobe

C. Right lower lobe

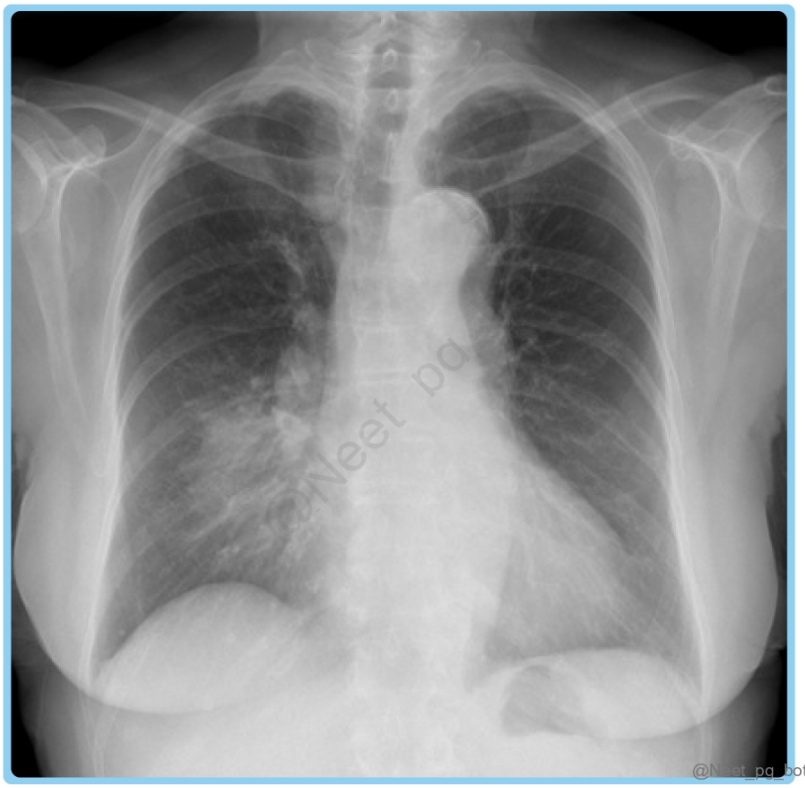
D. Left upper lobe

Correct Answer: B. Right middle lobe

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: The loss of the right heart border indicates pathology in the right middle lobe based on Silhouette sign. Silhouette Sign: Absence of the depiction of an anatomic soft-tissue border. Produced by an intrathoracic abnormality that touches the borders of the heart or aorta and obliterates those borders on the frontal chest radiograph. The sign actually refers to the absence of a silhouette. Silhouette sign helps localize airspace opacities, atelectasis, or masses in the lung. Loss of normal silhouettes on frontal chest radiographs indicates the site of pathology: Right paratracheal stripe : Right upper lobe (Option A) Right heart border : Right middle lobe or medial right lower lobe (Option B) Right hemidiaphragm : Right lower lobe (Option C) Aortic knuckle : Left upper lobe (Option D) Left heart border : Lingular segments of the left upper lobe Left hemidiaphragm or descending aorta : Left lower lobe



References:

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https://www.ncbi.nlm.nih.gov/medgen/1778950

https://www.sciencedirect.com/topics/medicine-and-dentistry/silhouette-sign#

↑ *Back to this question in Part A*

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Q39: Match the following: Disease Radiologic Finding A) Klebsiella Pneumonia 1) Reticular Shadows B) Aspergilloma 2) Air Bronchogram C) Staphylococcal Pneumonia 3) Bulging Fissure Sign D) Acute Epiglottitis 4) Air-Crescent Sign E) Pneumocystis carinii Pneumonia 5) Thumb Sign (Q853224)

A. A1, B2, C3, D4, E5

B. A3, B4, C2, D5, E1

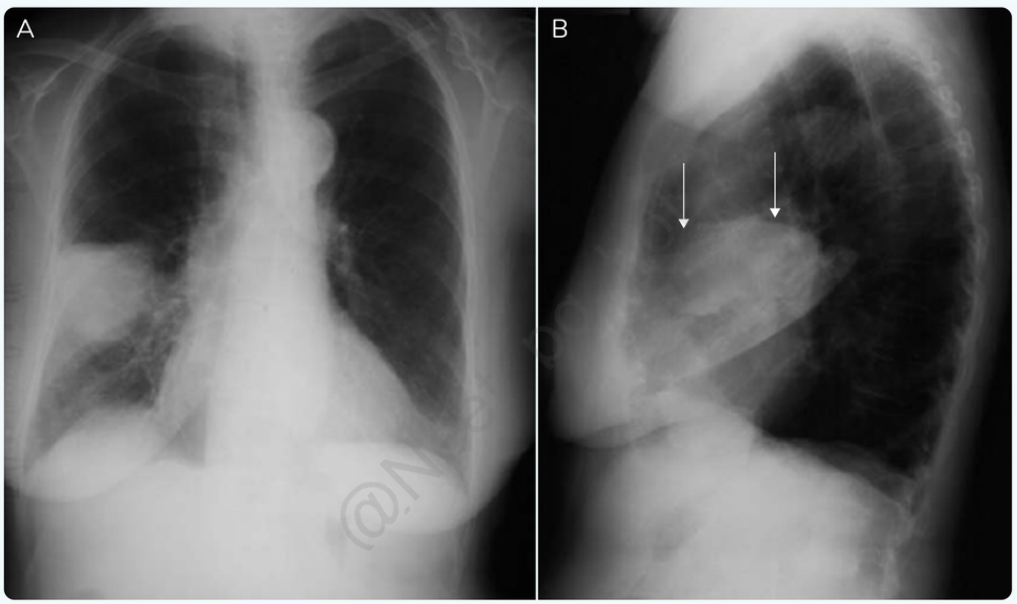
C. A2, B3, C1, D4, E5

D. A1, B4, C2, D3, E5

Correct Answer: B. A3, B4, C2, D5, E1

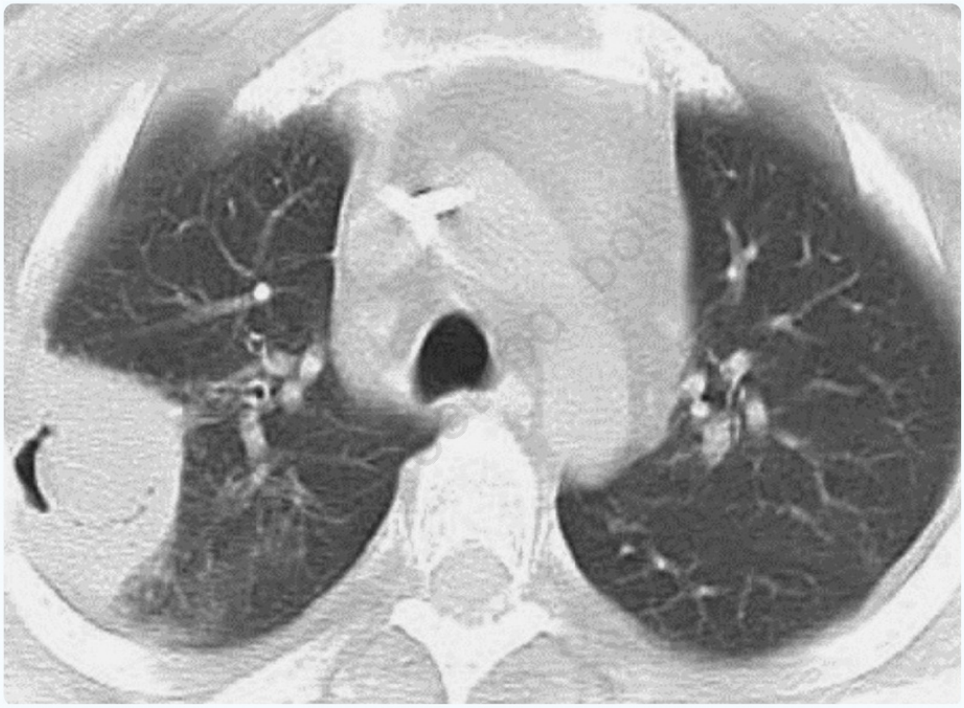
- *Listen (English)*
- *Listen (Hindi)*

Explanation: Klebsiella Pneumonia: Bulging fissure sign : Seen when lobar consolidation causes expansion of the affected lung, displacing adjacent fissures. Aspergilloma: Air-crescent sign: Typically indicates the presence of a fungal ball within a cavity. Staphylococcal Pneumonia: Air Bronchogram: Occurs when endobronchial air is visible against a background of increased lung opacity. Expulsion of gas from the parenchyma can be due to atelectasis and/ replacement by fluid, inflammatory cells, blood, tumor, or interstitial thickening. Persistence of gas in the bronchi implies patency of proximal airways. Acute Epiglottitis: Thumb sign: Refers to the appearance of an edematous and enlarged epiglottis seen on a lateral soft-tissue radiograph of the neck. {{caption_text}} Pneumocystis carinii Pneumonia: Reticular shadows/opacities: Caused by a decrease in the gas to soft tissue ratio due to a pathological process centered in or around the pulmonary interstitium. This includes thickening of interstitial compartments by blood, fluid, tumor, cells, fibrous tissue, or a combination of these factors.

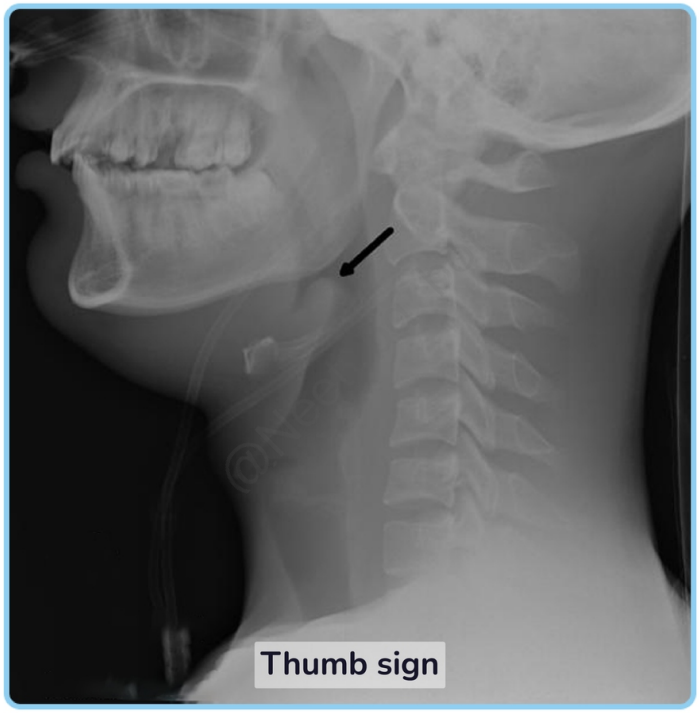


Bulging fissure sign. PA (A) and lateral (B) radiographs of the chest show dense consolidation of the right middle lobe secondary to Klebsiella pneumoniae.

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Air crescent sign in a patient with aspergilloma @Neet_pg_bot



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https://radiopaedia.org/articles/air-bronchogram#

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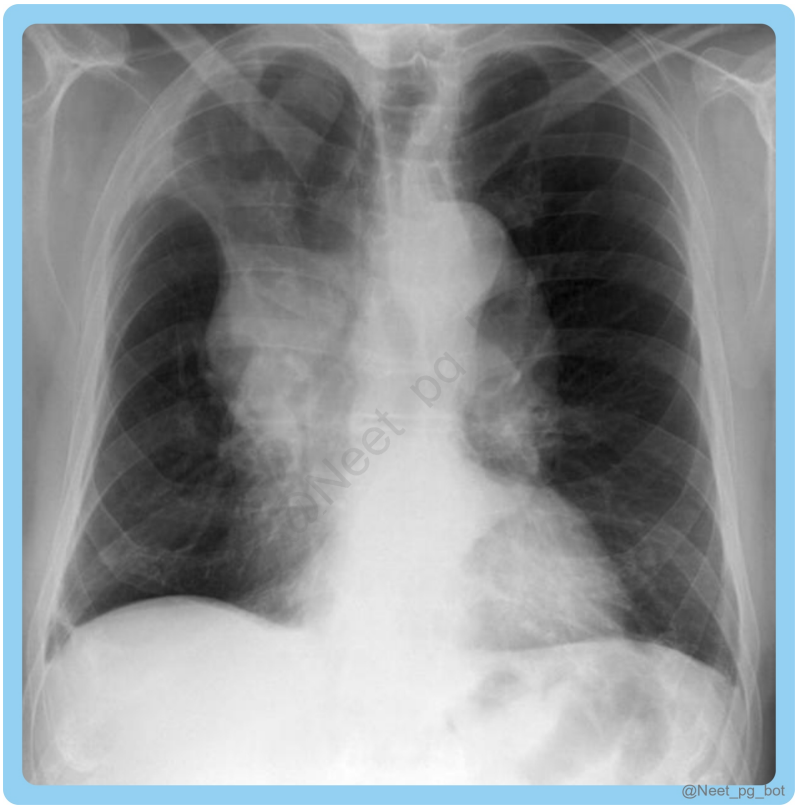
Q40: A 62-year-old male with a history of smoking presents to the emergency department with increased shortness of breath and fever. A chest X-ray is performed, as shown below. Which of the following radiological signs is seen in this case? (Q853225)

A. Luftsichel sign

B. Flat waist sign

C. Golden S sign

D. Superior triangle sign

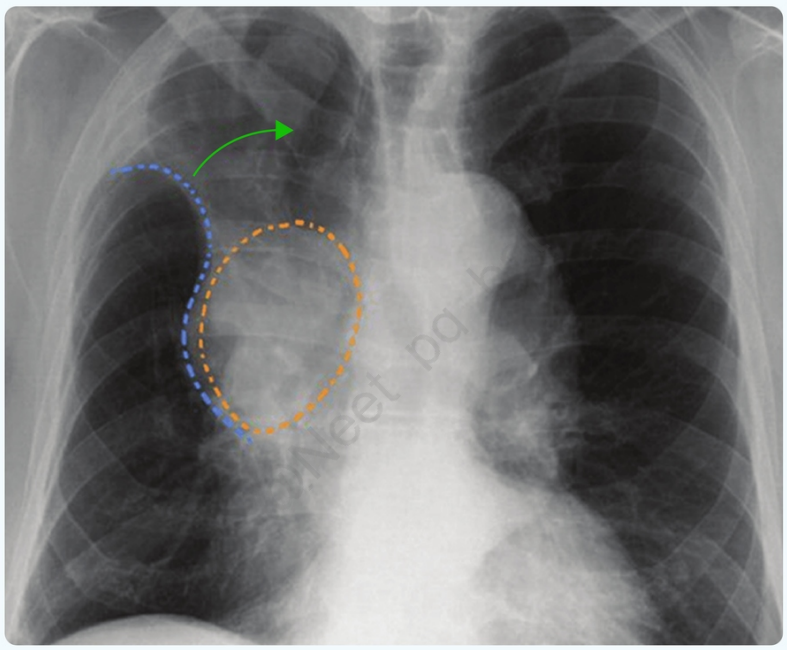


Correct Answer: C. Golden S sign

■ *Listen (English)*

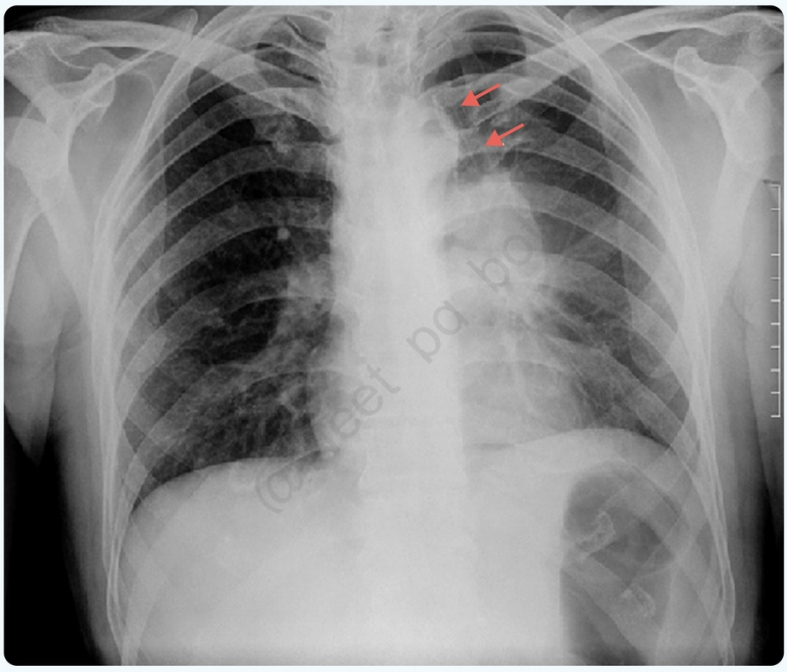
■ *Listen (Hindi)*

Explanation: The chest X-ray demonstrates RUL collapse , resulting in a downward concavity of the horizontal fissure and a triangular opacity at the hilum, which indicates the Golden S sign. Lobar Collapse: Direct Signs Indirect Signs Loss of aeration Displacement of fissures (most reliable and earliest sign) Crowding of pulmonary vessels and bronchi Hilar elevation on PA view: Sign of upper lobe collapse Hilar depression: Sign of lower lobe collapse Compensatory hyperinflation in adjacent lobes Mediastinal shift Vascular reorientation Tracheal shift Cardiac outline displacement Hemidiaphragm elevation Juxtaphrenic peak of diaphragm: Indicate upper lobe collapse Rib crowding Hilar displacement Right Upper Lobe (RUL) Collapse: Golden S sign/ Reverse S sign of Golden (Option C) Minor/Horizontal fissure distortion results from: Right upper lobe collapse: Lateral concavity Endobronchial pathology: Medial convexity An Endobronchial pathology/ central lung mass causes proximal upper lobe bronchus obliteration, leading to RUL collapse and horizontal fissure shifting upwards laterally. Both these together: Bronchial mass + RUL collapse lead to the Golden S sign. {{caption_text}} Left Upper Lobe (LUL) Collapse: Luftsichel sign (Option A) Represents the hyperexpanded superior segment of the left lower lobe interposed between the atelectatic left upper lobe and aortic arch, seen in LUL collapse. {{caption_text}} ■■■■■■■Lower Lobe Collapse: Superior triangle sign: (Option D) Seen in right lower lobe (RLL) collapse Occurs due to displacement of the anterior mediastinal structures to the right of the mediastinum causing a triangular density in the right upper zone. Flat waist sign: (Option B) Seen in left lower lobe (LLL) collapse Refers to flattening of the left heart border, specifically the contours of the aortic arch and adjacent pulmonary trunk.



Golden S sign : A central lung mass (orange) causing right upper lobe atelectasis (green arrow) with resultant concavity of the superolateral aspect of the minor fissure and convexity of its inferomedial aspect, which resembles a reverse letter 'S' (blue)

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Luftsichel sign

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References:

Grainger & Allison’s Diagnostic Radiology, 7th Edition, Page 164, 165

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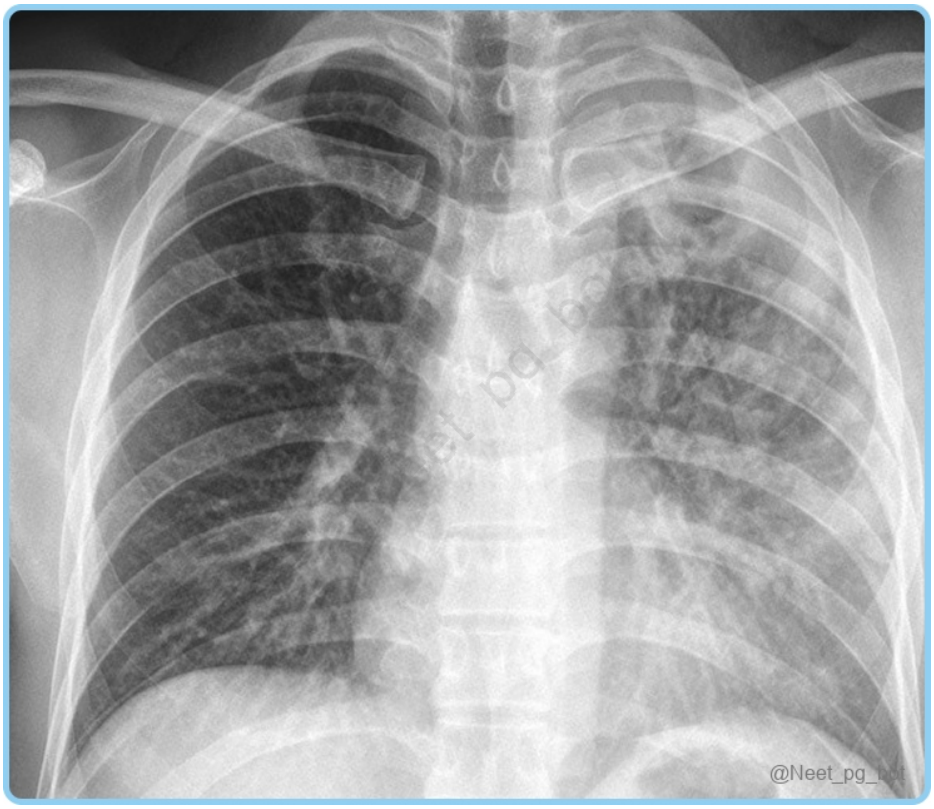
Q41: A 45-year-old female presents with a persistent cough, night sweats, and weight loss. The chest X-ray is taken and is shown below. What is the most probable diagnosis? (Q853226)

A. Lung Abscess

B. Solitary Cavitary Nodule

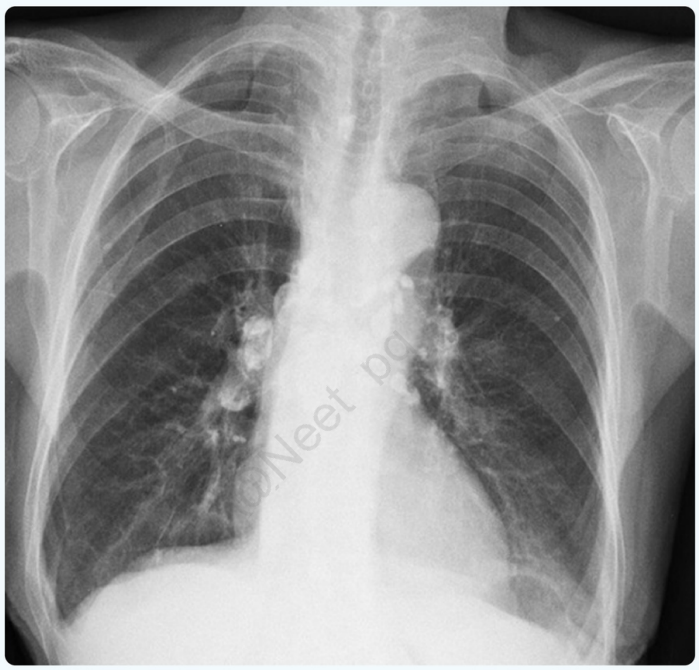
C. Invasive Aspergillosis

D. Active Pulmonary Tuberculosis



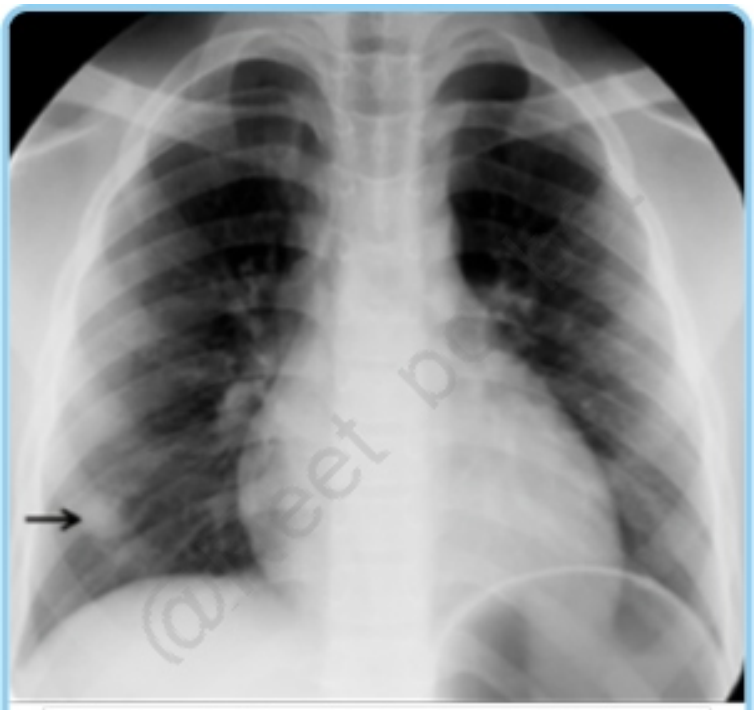
Correct Answer: D. Active Pulmonary Tuberculosis

Explanation: Clinical symptoms along with CXR chest X-ray showing ' left upper and middle lung zones show reticulonodular opacities and the left apical lung zone shows a cavitary lesion' indicate active pulmonary tuberculosis. Primary Tuberculosis: Pathology: Characterized by macrophage infiltration, monocytes, and inflammatory fluid in peripheral pneumonia. Spread to regional nodes and bodies occurs within 2 to 6 weeks. Chest X-ray: Homogeneous lobar consolidation (any lobe), often indistinguishable from other bacterial pneumonia. Lymphadenopathy is the most common manifestation. Ghon lesion or focus: Well-defined rounded or irregular (linear) opacity with or without calcification. Ranke complex: Combination of Ghon lesion and ipsilateral lymph node calcification. Reactivation and Reinfection of Tuberculosis Most cases result from reactivation of quiescent lesions, occasionally from new infections. Pathologically, the host's immune response leads to increased inflammatory response and caseous necrosis. Imaging: Absence of lymphadenopathy Frequent cavitation (indicates active disease) Predilection for upper lobes. Rasmussen aneurysm: Inflammatory pseudo-aneurysmal dilatation of a branch of pulmonary artery adjacent to a tuberculous cavity. Endobronchial spread: May cause "tree-in-bud" appearance on imaging. Healing leads to scar formation, volume loss, and pleural thickening. Tuberculoma: Localized parenchymal disease, usually calcifies and often remains stable for years, sometimes with satellite nodules. Lung Abscess (Option A) typically presents with larger cavities containing necrotic debris and often shows an air-fluid level, which is distinct from the thick-walled cavity and pericavity consolidation indicative of active pulmonary tuberculosis. Solitary Cavitary Nodule (Option B) suggests lung malignancy, characterized by round or irregular shapes and great variation in wall thickness. The presence of a thick-walled cavity with satellite nodules, along with systemic symptoms like night sweats and weight loss, is more consistent with active pulmonary tuberculosis. Invasive Aspergillosis (Option C) typically presents with the air-crescent sign, indicating a mass within a cavity and halo sign, indicating ground glass opacity surrounding a pulmonary nodule or mass and represents hemorrhage. However, this sign is most common in immunocompromised patients and does not align with the systemic symptoms of night sweats and weight loss seen in this case.



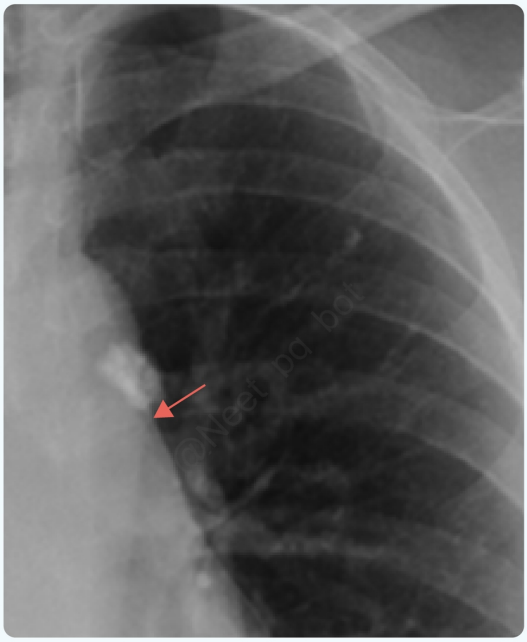
Primary pulmonary TB showing hilar adenopathy

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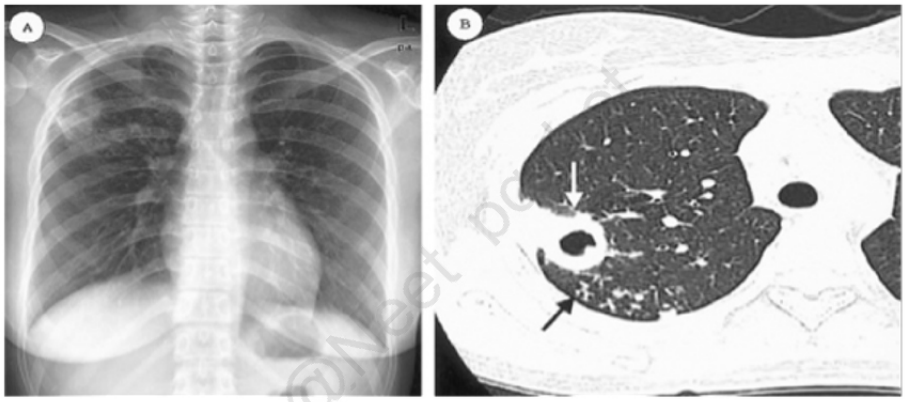
Anteroposterior chest radiograph shows a Ghon focus (arrow) in the right lower lobe

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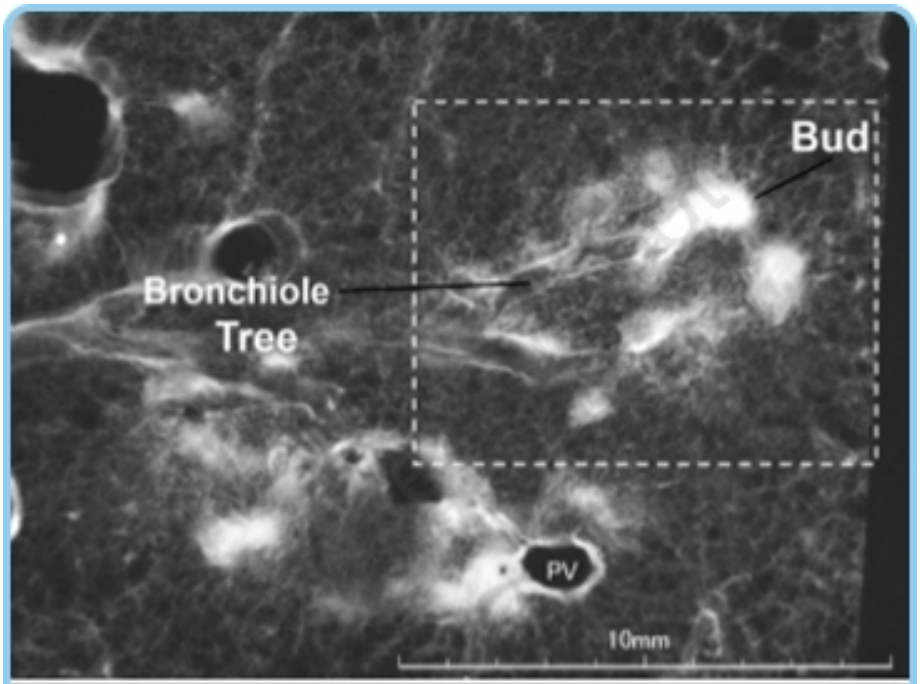
Ranke complex: Calcified nodule in the left upper zone with an ipsilateral calcified mediastinal lymph node

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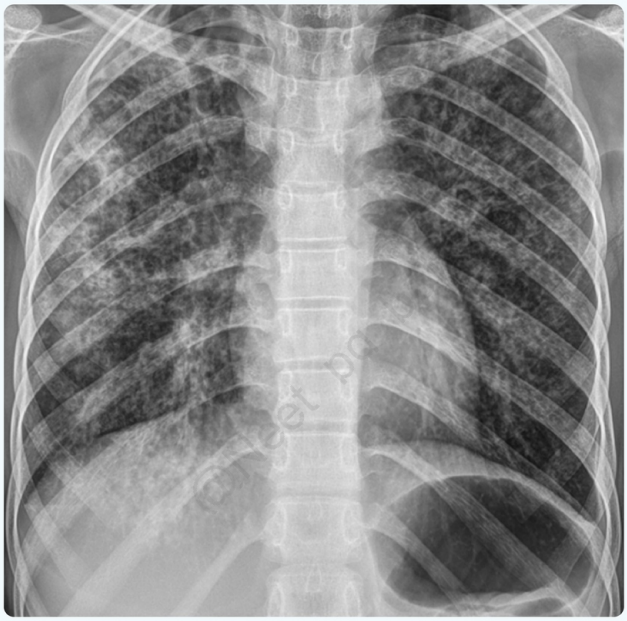
A) cavitatory lung lesion at RUL and B) Thick walled cavity at the posterior segment of RUL with tree in bud pattern (Black Arrow)

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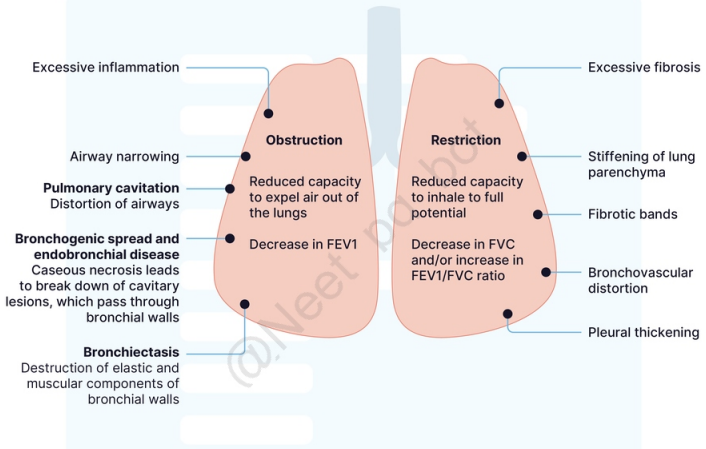
Post-mortem radiograph of patient with active pulmonary TB demonstrating tree-in-bud lesion (boxed area) with smooth marginated bronchiole (tree) and distal clubbed end (bud).

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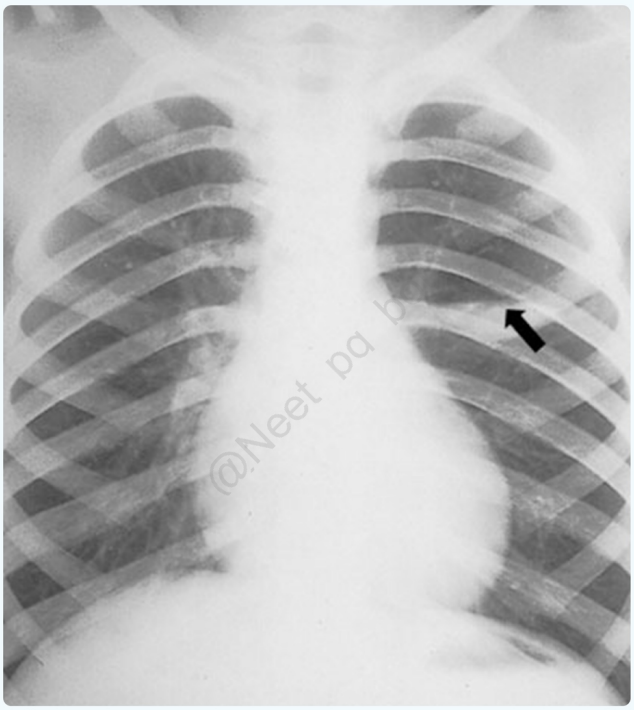
Chronic TB: Fibroproliferative lesions, Nodular opacities, coarse reticular areas and poorly marginated areas of increased densities

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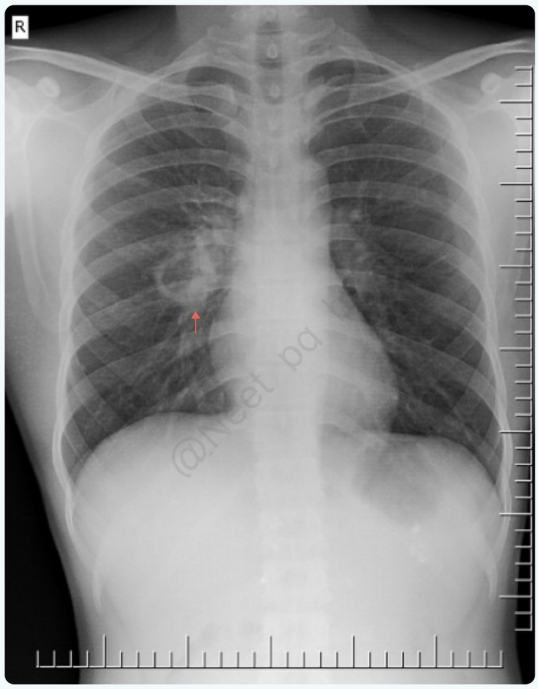
Mechanisms and radiographic features associated with airflow obstruction and restrictive ventilatory defects in patients with a history of TB

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Lung abscess : Round radiolucent lesion with an air fluid level

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Chest X-Ray showing a single Right cavitary nodule

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References:

Grainger & Allison's Diagnostic Radiology, 7th Edition, Page 116,117
https://www.ncbi.nlm.nih.gov/books/NBK555920/# https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6100641/
https://www.sciencedirect.com/topics/medicine-and-dentistry/air-crescent-sign
https://radiopaedia.org/articles/halo-sign-chest-3

↑ *Back to this question in Part A*

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Q42: A 30-year-old male presents with fever, cough, night sweats, and unintentional weight loss over the past month. X-ray chest is taken and is shown below. What is the most probable diagnosis? (Q853227)

A. Miliary Tuberculosis

B. Pulmonary Sarcoidosis

C. Mycoplasma Pneumonia

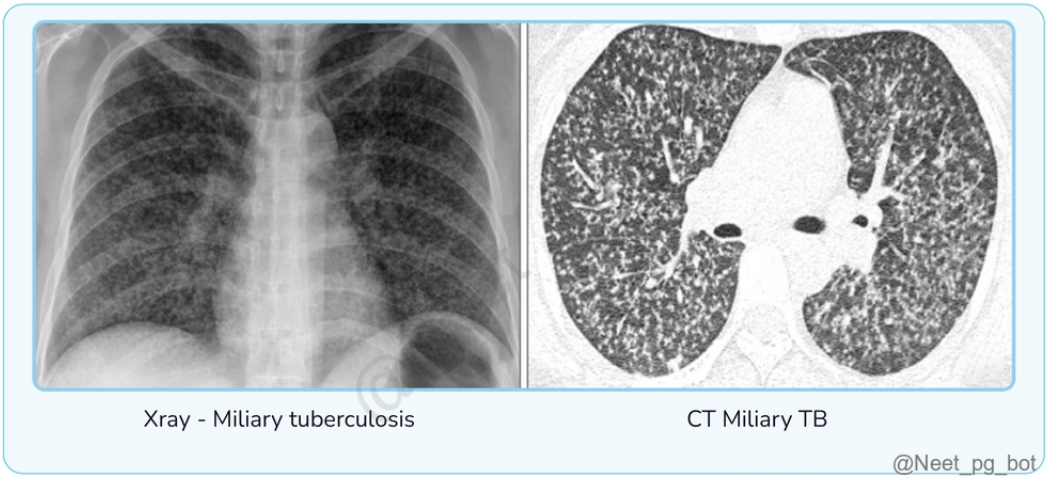
D. Metastatic Lung Disease

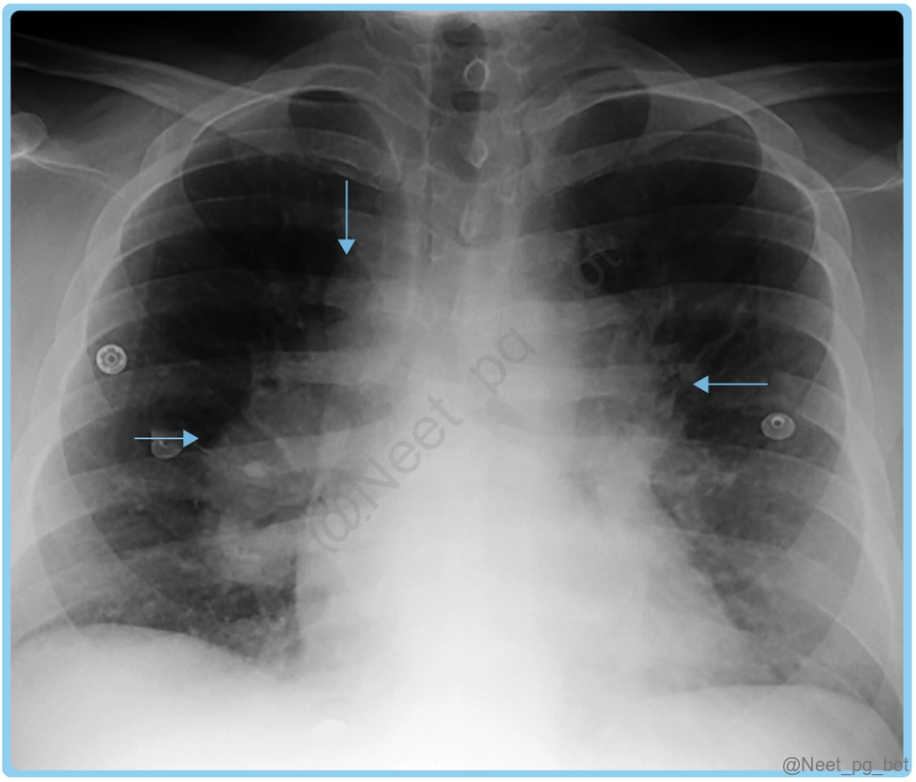


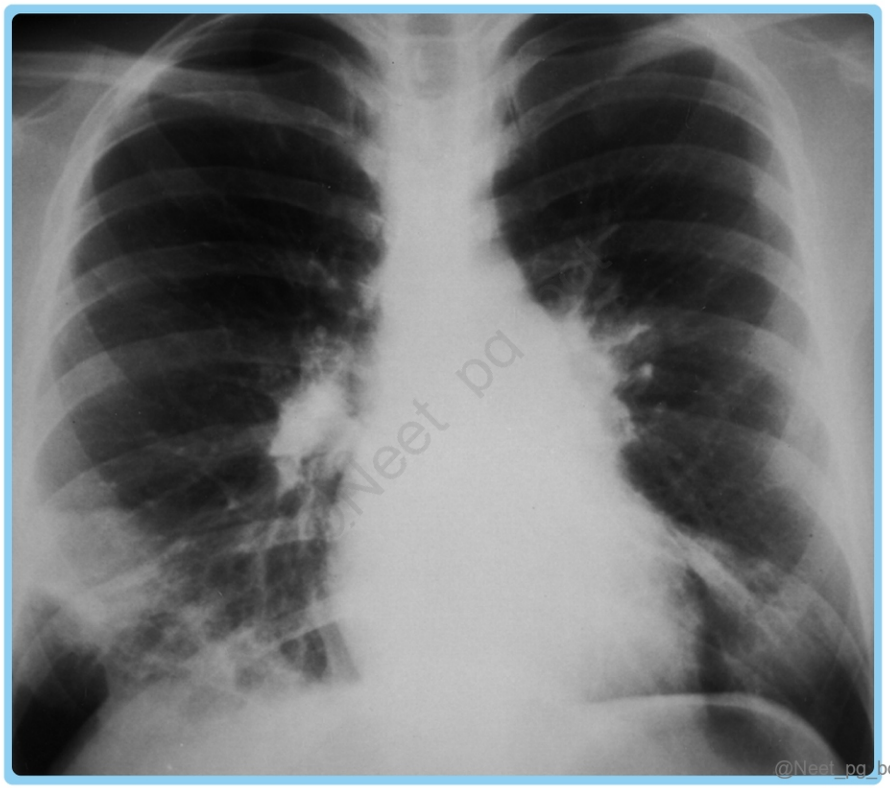
Correct Answer: A. Miliary Tuberculosis

Listen to Audio 1

Explanation: The presentation of fever, cough, night sweats, and weight loss, along with chest X-ray images showing pulmonary nodules scattered uniformly throughout the lungs, strongly indicates a diagnosis of Miliary tuberculosis. {{caption_text}} Typical radiographic findings: Small, discrete nodules measuring 1-2 mm in diameter, distributed evenly throughout both lungs. Chest CT: More sensitive than radiographs and reveals a random distribution of miliary nodules. Miliary nodules signify active infection and are associated with a poor prognosis. Differential Diagnosis Of Miliary nodules: Infections Neoplastic Cardiac Miscellaneous Tuberculosis Histoplasmosis Blastomycosis Coccidioidomycosis Mycoplasma pneumonia Nocardiosis Bronchoalveolar carcinoma Carcinoma lung with lymphangitis carcinomatosa Metastatic carcinoma Hemosiderosis in long standing condition, rheumatic heart disease, mitral stenosis Sarcoidosis Silicosis Tropical pulmonary eosinophilia Hypersensitivity pneumonitis Drug-induced interstitial lung disease (e.g., methotrexate, cyclophosphamide, nitrofurantoin) Pulmonary Sarcoidosis (Option B) is rare and typically shows peribronchovascular and perilymphatic nodules related to the secondary pulmonary lobule on HRCT. Mycoplasma Pneumonia (Option C) causes patchy interstitial infiltrates or reticulonodular shadows but not countless tiny uniform nodules across both lungs. Metastatic Lung Disease (Option D) may show “cannonball” lesions or multiple variable-sized nodules, but does not produce the classic miliary pattern unless very rare (e.g., thyroid or choriocarcinoma—but clinical picture differs).




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References:

David Sutton Textbook of Radiology and Imaging, Volume 1, 8th Edition, Page 186,1964

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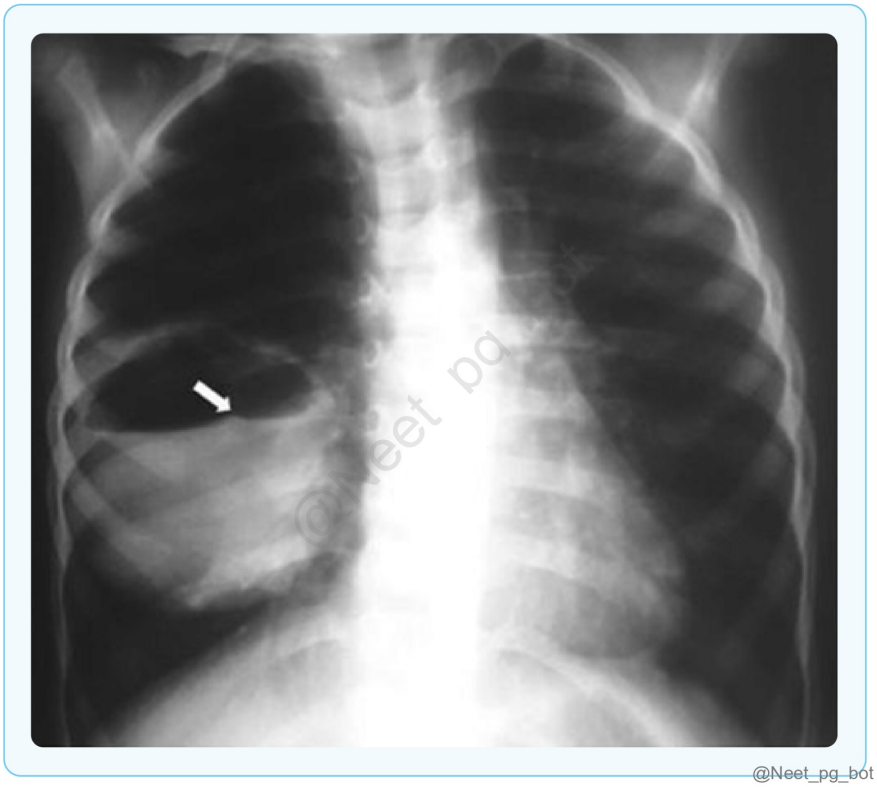
Q43: A 28-year-old shepherd presents with chronic cough and occasional hemoptysis. A chest X-ray is shown below. Which of the following radiological signs is most likely represented in this image? (Q853228)

A. Meniscus sign

B. Onion peel sign

C. Water lily sign

D. Cumbo sign

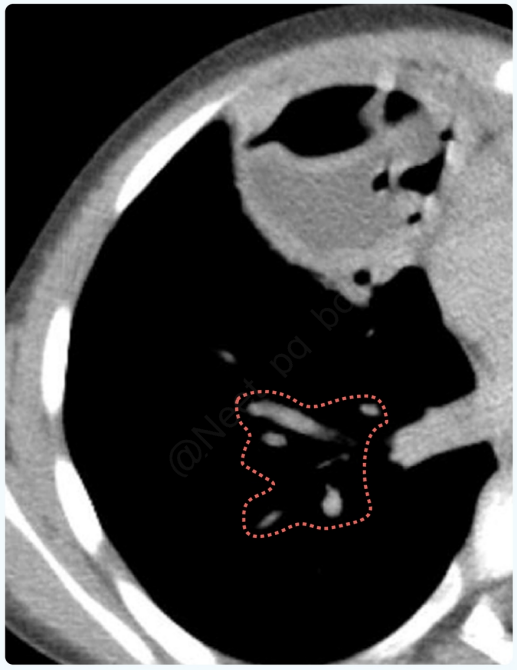


Correct Answer: C. Water lily sign

■ *Listen (English)*

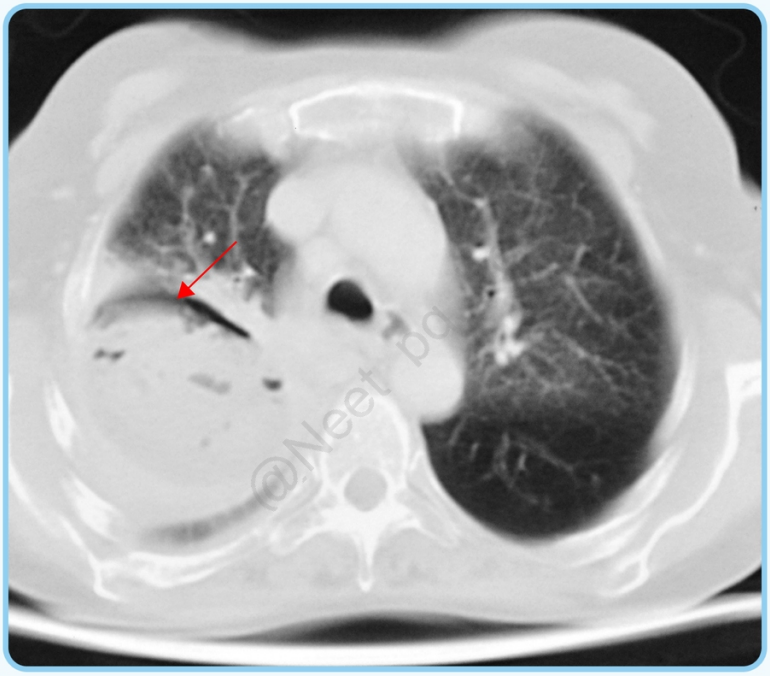
■ *Listen (Hindi)*

Explanation: The clinical feature of chronic cough with occasional hemoptysis in a patient with livestock exposure, along with the characteristic Water Lily sign on chest x-ray, points towards the diagnosis of a ruptured pulmonary hydatid cyst. Radiographic Findings of Hydatid Cyst : Uncomplicated cysts appear as thin-walled, round or oval masses with low-attenuation contents and a thin enhancing wall, up to 10 cm in size. {{caption_text}} {{caption_text}} {{caption_text}} {{caption_text}} Signs of Impending Rupture : Meniscus Sign : Air lucency between the pericyst and laminated membranes when cyst communicates with bronchioles. (Option A) Signs Associated with Cyst Rupture : Cumbo Sign or Onion Peel Sign : Indicates that the endocyst has shrunk and ruptured due to increasing air. Curvilinear membrane outlined by air both inside the endocyst and a crescent of air between the endocyst and pericyst. (Option B & D) Water Lily Sign : Also known as the camalote sign. Indicates that the endocyst membrane is detached; it will appear as a floating curvilinear structure (fluid-filled cyst) within an intact pericyst. This gives the appearance of a floating water lily. (Option C) Mass Within the Cavity : An endocyst floating in a completely fluid-filled cyst.



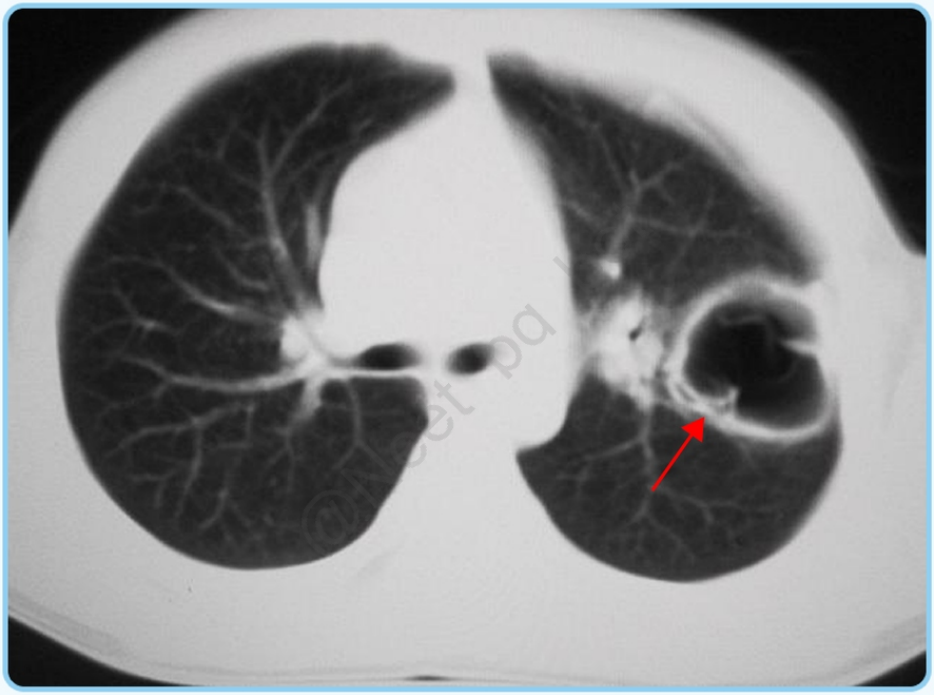
Cumbo sign

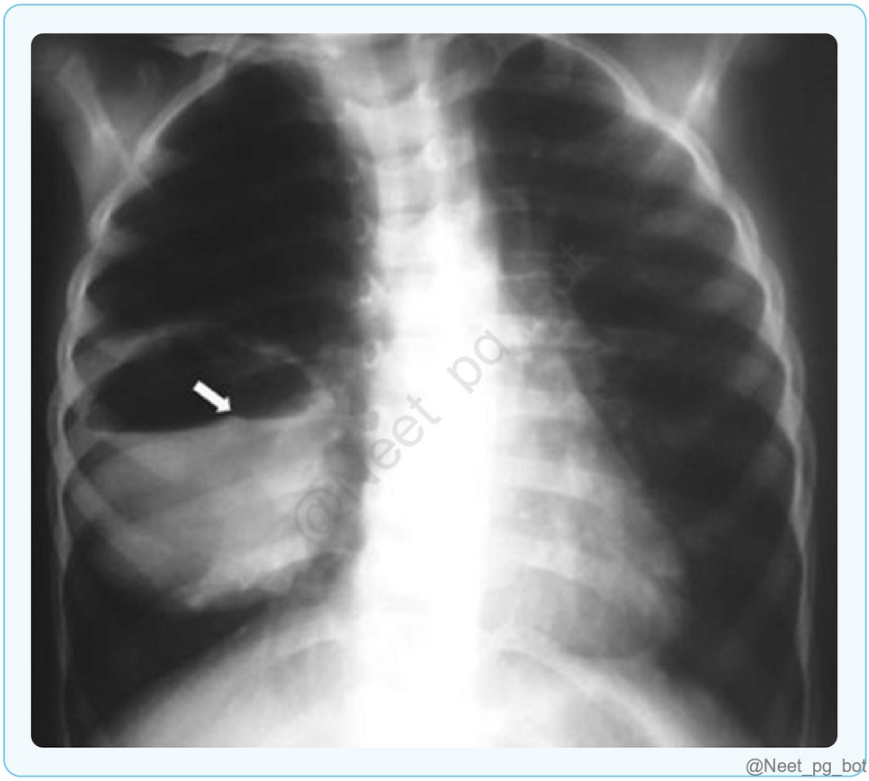
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Meniscus sign-hyatid cyst

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References:

David Sutton Textbook of Radiology & Imaging, 8th Edition, Volume 1, Page 1034

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• [03_Thoracic Radiology] 008 Previous Year Questions

« Back to Folder Directory

[03_Thoracic Radiology] 008 Previous Year Questions — Quick Jump

Q1 (p. 790)	*Q2 (p. 792)*	*Q3 (p. 794)*	*Q4 (p. 795)*	*Q5 (p. 799)*	*Q6 (p. 804)*
Q7 (p. 805)	*Q8 (p. 806)*	*Q9 (p. 810)*	*Q10 (p. 811)*	*Q11 (p. 814)*	*Q12 (p. 816)*
Q13 (p. 817)	*Q14 (p. 819)*	*Q15 (p. 825)*	*Q16 (p. 828)*	*Q17 (p. 831)*	*Q18 (p. 832)*
Q19 (p. 836)	*Q20 (p. 837)*	*Q21 (p. 838)*	*Q22 (p. 839)*	*Q23 (p. 843)*	*Q24 (p. 844)*
Q25 (p. 845)	*Q26 (p. 846)*	*Q27 (p. 849)*	*Q28 (p. 850)*	*Q29 (p. 851)*	*Q30 (p. 855)*
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Q37 (p. 876)	*Q38 (p. 880)*	*Q39 (p. 881)*	*Q40 (p. 886)*	*Q41 (p. 889)*	*Q42 (p. 890)*

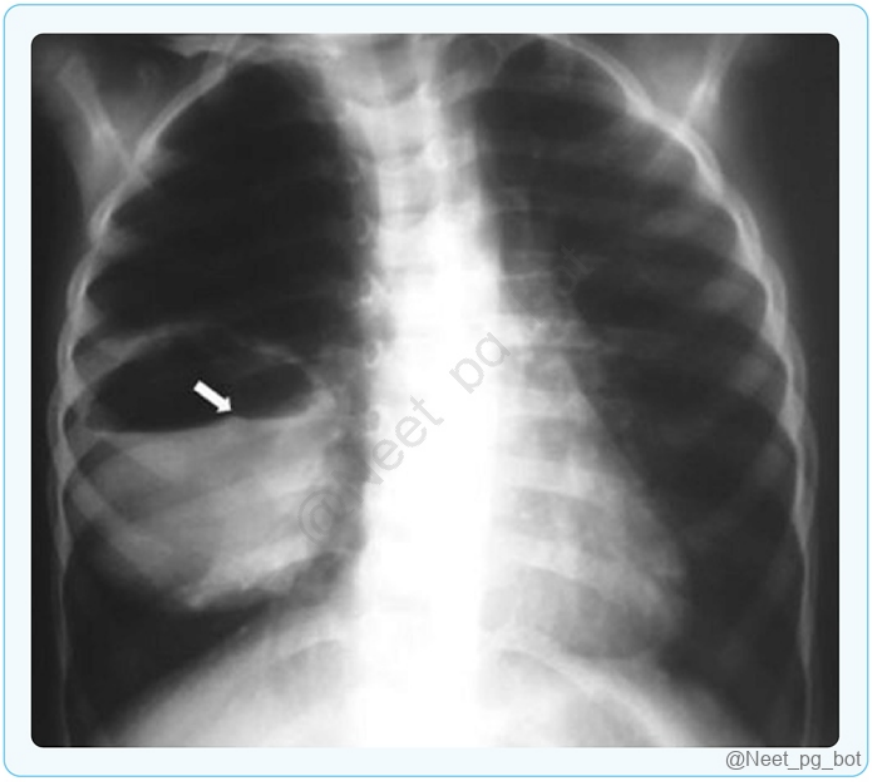
Q1: What is the probable diagnosis for a 36-year-old farmer who presented with a cough, chest pain lasting one week, fatigue persisting for a month, and a chest x-ray revealing the image provided below. (Q859236)

A. Hydatid cyst

B. Anthrax

C. Silicosis

D. Byssinosis



Correct Answer: A. Hydatid cyst

Explanation: The chest X-ray shows partially fluid-filled cyst with a floating endocyst that is ‘ Water lily sign ’ seen in hydatid cyst. Hydatid cyst Echinococcus granulosus (most common), E. multilocularis, and E. vogeli. Cause cystic lesions primarily in the liver and lungs . Dogs are the primary reservoir ; mammals serve as intermediate hosts . Unilocular Cystic Echinococcosis (E. granulosus): Pulmonary Involvement Can occur through diaphragm invasion or hematogenous spread . Lungs are the second most common site for hematogenous spread in adults and the primary site in children . Radiographic Findings : Uncomplicated cysts appear as thin-walled, round or oval masses with low-attenuation contents and a thin enhancing wall, up to 10 cm in size. {{caption_text}} Signs of Impending Rupture : Meniscus Sign : Air lucency between the pericyst and laminated membranes when cyst communicates with bronchioles. Signs Associated with Cyst Rupture : Cumbo Sign or Onion Peel Sign : Indicates that the endocyst has shrunk and ruptured due to increasing air. Curvilinear membrane outlined by air both inside the endocyst and a crescent of air between the endocyst and pericyst. Water Lily Sign : Also known as the camalote sign. Indicates that the endocyst membrane is detached, it will appear as a floating curvilinear structure (fluid-filled cyst) within an intact pericyst. This gives the appearance of a floating water lily. Mass Within the Cavity : An endocyst floating in a completely fluid-filled cyst. Other Radiographic and CT Findings : Possible pleural effusion, elevated hemidiaphragm, consolidation, basilar atelectasis, pleural cavity cysts, and superadded infections leading to empyema. Anthrax (Option B) is an infection caused by gram-positive, rod-shaped bacteria known as Bacillus Anthracis .It commonly affects domestic or wild animals. Animals become infected when they breathe or ingest contaminated soil, plants, or water. Humans become infected when they inhale spores or eat food contaminated with spores. Inhalation Anthrax is associated with pleural effusions and mediastinal widening Silicosis (Option C) is a chronic disease caused by inhaling large amounts of crystalline silica dust for many years. In chest radiography, it appears as small and large with irregular opacities, bilaterally symmetrical: commonly in the middle lung zone or peripheral ■ of the lung. Byssinosis (Option D) is a type of hypersensitivity pneumonitis that can result from exposure to cotton fibers. Chest x-ray examination may show

hyper translucency, diaphragm flattening, and emphysema. Ill-defined haziness can be seen in lower lung fields.



References:

David Sutton Textbook of Radiology & Imaging, 8th Edition, Volume 1, Page 1034

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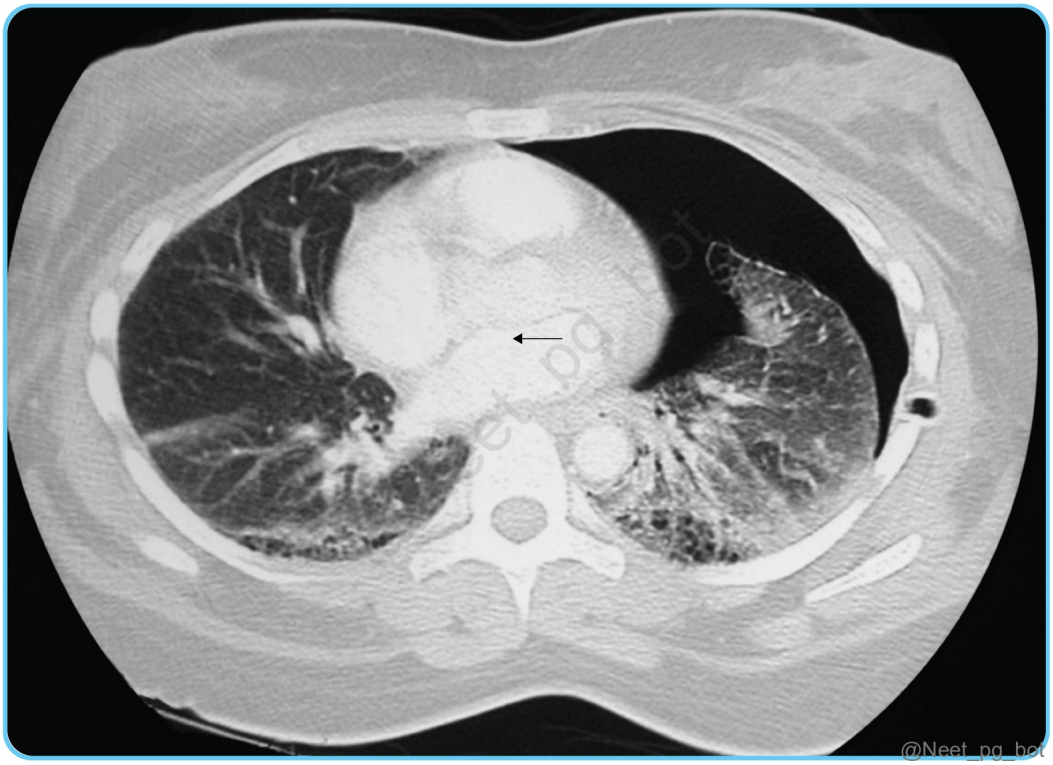
Q2: Identify the heart chamber marked in the given CT image {{caption_text}} (Q857196)

A. Right atrium

B. Right ventricle

C. Left ventricle

D. Left atrium



Correct Answer: D. Left atrium

Explanation: In cardiac CT imaging , the left atrium is best visualized posteriorly, near the esophagus. It receives oxygenated blood from the pulmonary veins and is located at the posterior aspect of the heart , superior to the left ventricle. Cardiac Chambers on CT Imaging Chamber Location on CT Key Features Right Atrium Anterior, right side Receives deoxygenated blood from IVC/SVC Right Ventricle Most anterior chamber Lies close to the sternum, pumps blood to pulmonary artery Left Atrium Posterior aspect Receives oxygenated blood from pulmonary veins Left Ventricle Left, inferior Thickest-walled chamber, pumps blood into aorta Right Atrium (Option A): Incorrect because it is anterior and right-sided , whereas the left atrium is posterior. Right Ventricle (Option B): Incorrect because it is the most anterior chamber , located near the sternum. Left Ventricle (Option C): Incorrect because it is larger and more inferior , with thick muscular walls for systemic circulation.

References:

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https://pmc.ncbi.nlm.nih.gov/articles/PMC4090749/

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Q3: In what situation is popcorn calcification observed? (Q857199)

A. Hodgkin’s lymphoma

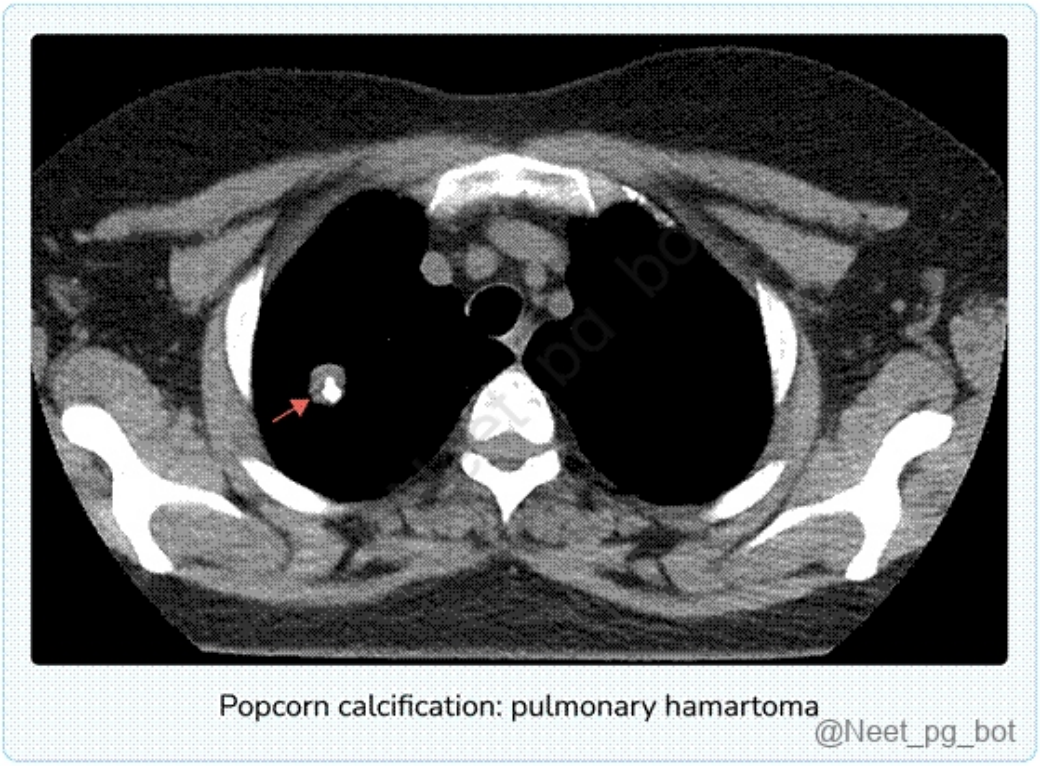
B. Pulmonary hamartoma

C. Metastasis

D. Fungal ball

Correct Answer: B. Pulmonary hamartoma

Explanation: Popcorn calcification is a characteristic finding on imaging, particularly CT scans , seen in pulmonary hamartomas . These are benign tumors of the lung, typically composed of cartilage, fat, and connective tissue. The calcifications often appear as popcorn-like due to the presence of calcified nodules or cystic components within the tumor. Pulmonary hamartoma {{caption_text}} Hamartomas are the most common benign lung tumors, Generally asymptomatic and often discovered incidentally Radiographic Features: Typically present as a solitary peripheral pulmonary nodule or mass. Size usually ranges from 1 to 4 cm. Well-circumscribed, round or oval shape with smooth or lobulated margins. Internal calcifications, often with a "popcorn" appearance CT scans effectively reveal internal fat , which is pathognomonic for hamartomas. Hamartomas may be multiple, grow slowly, and do not cavitate or invade adjacent structures. Hodgkin’s lymphoma (Option A): Incorrect because Hodgkin’s lymphoma may cause mediastinal masses but does not exhibit popcorn calcifications typically. Calcifications in lymphoma are more uniform and fine. Metastasis (Option C): Incorrect because metastatic lesions usually present as irregular nodules with variable densities. They do not typically show popcorn-like calcifications. Fungal Ball (Option D): Incorrect because fungal balls can calcify, but these calcifications are not typically of the popcorn type . They are more likely to appear as heterogeneous or mottled calcifications.



References:

Grainger & Allison's Diagnostic Radiology 7th Edition, Page 117, 118

David Sutton Textbook of Radiology & Imaging 8th Edition, Volume 1, Page 265,1056

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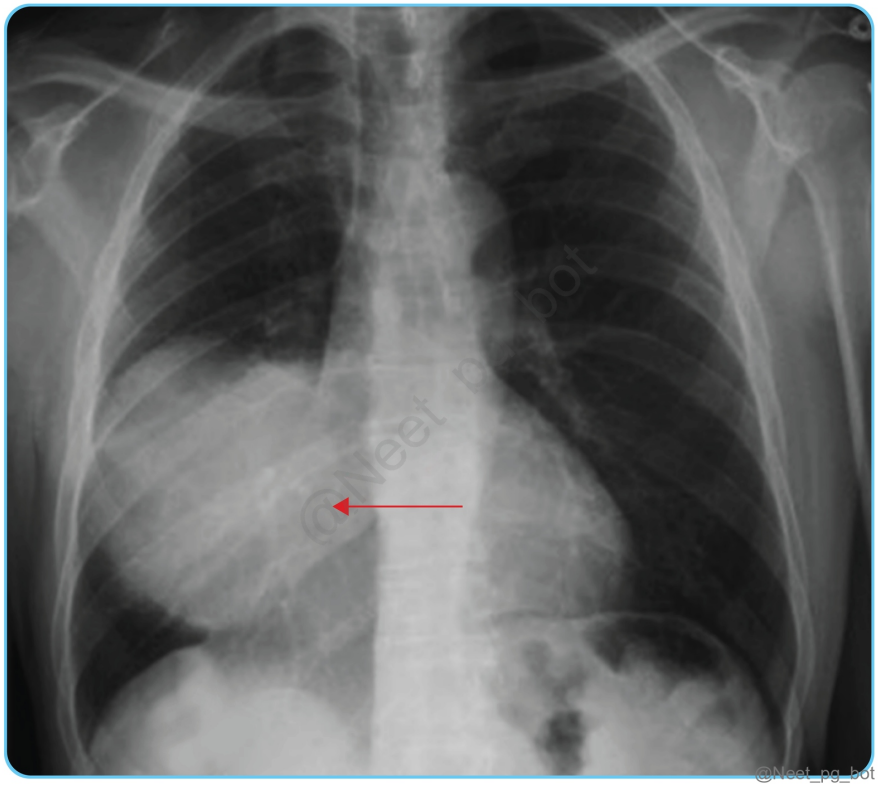
Q4: Obliteration of the right cardiac border on chest X-ray indicated pathology involving which of the following structures? (Q857609)

A. Right lower lobe

B. Right Atrium

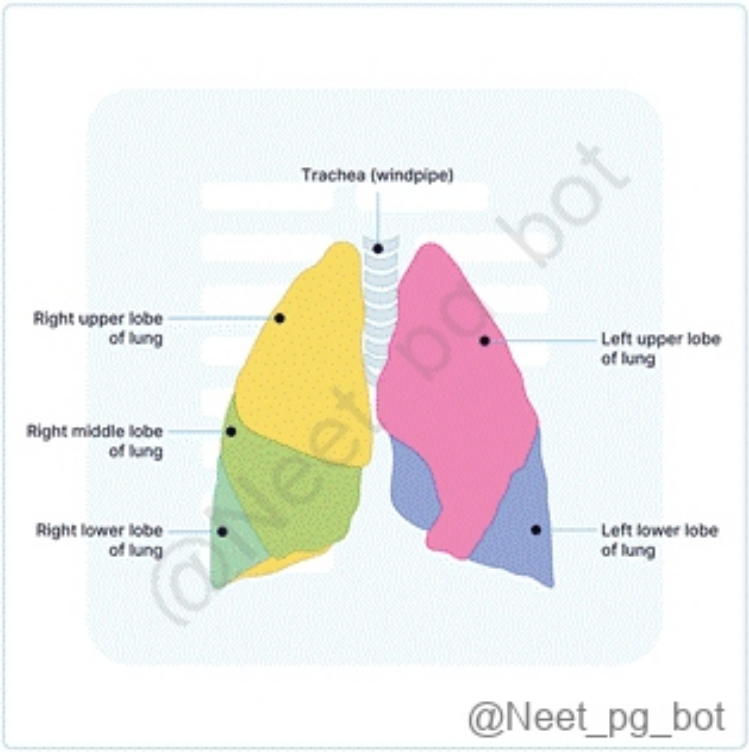
C. Right middle lobe

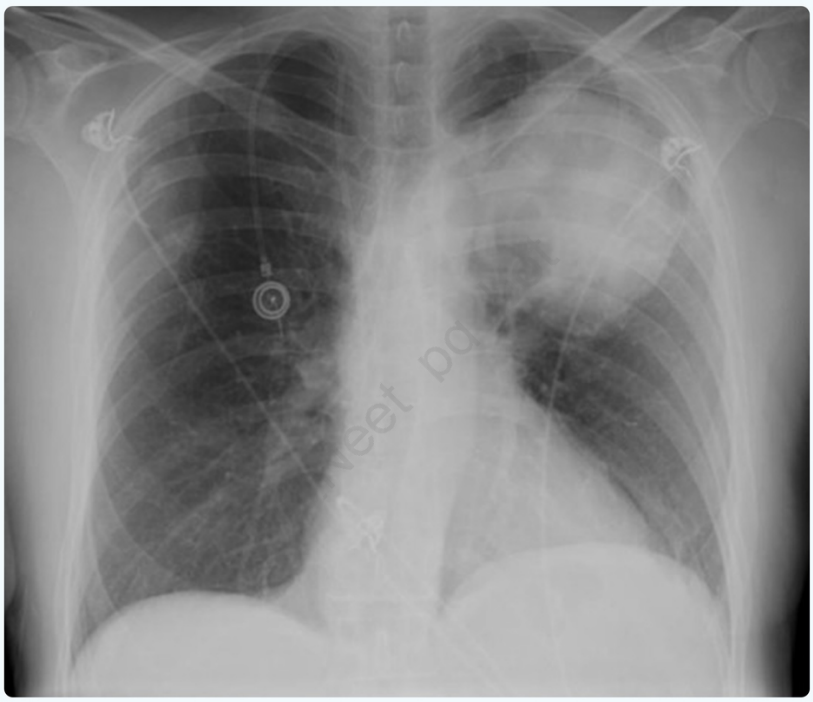
D. Right ventricle



Correct Answer: C. Right middle lobe

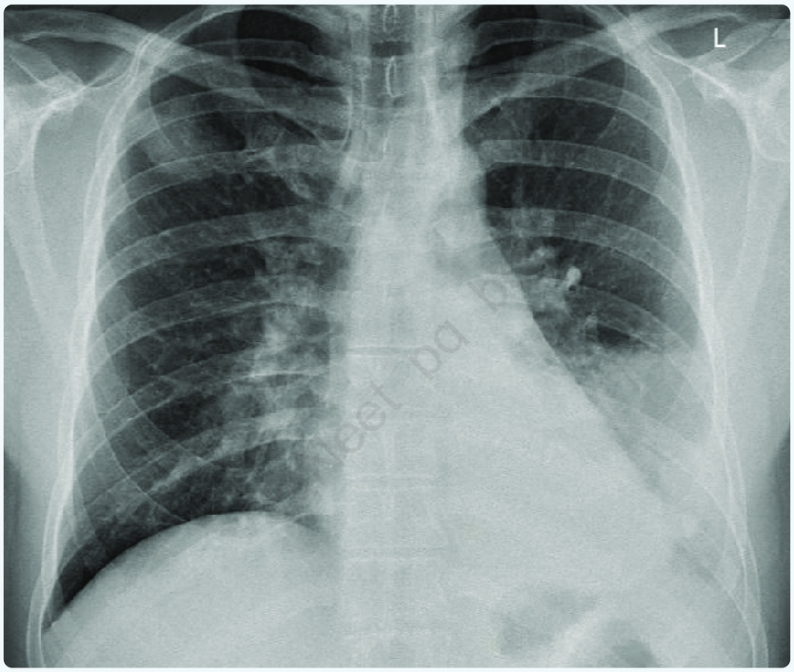
Explanation: On a chest X-ray , the right cardiac border is formed by the right atrium . The silhouette sign helps localize pathology: Obliteration of the right cardiac border occurs when a lesion in the right middle lobe is present, as the lobe lies adjacent to the right atrium. The loss of normal heart-lung interface suggests consolidation, atelectasis, or mass in the right middle lobe . Lobar Localization: Lateral radiograph: Right and left upper lobe bronchi can be seen as two circular radiolucent areas with the right above the left. PA view of the chest: Can locate any structure in the superoinferior dimension as well as the mediolateral dimension. Silhouette sign: Locate any structure in the posteroanterior dimension. {{caption_text}} Left Lung: Only has an oblique fissure, separating the left upper (LUL) and lower (LLL) lobes. Right Lung: Oblique and horizontal fissures separate the right lung's 3 lobes. Oblique fissure divides the RML and RLL. Horizontal fissure divides the RUL and RML. {{caption_text}} {{caption_text}} Silhouette Sign: Absence of the depiction of an anatomic soft-tissue border. Produced by an intrathoracic abnormality that touches the borders of the heart or aorta and obliterates those borders on the frontal chest radiograph. The sign actually refers to the absence of a silhouette. Silhouette sign helps localize airspace opacities, atelectasis, or masses in the lung. Localization Using the Silhouette Sign Obliterated Cardiac Border Likely Affected Lobe Right cardiac border (Right atrium) Right Middle Lobe Right hemidiaphragm Right Lower Lobe Left cardiac border (Left ventricle) Lingula (Left Upper Lobe) Left hemidiaphragm Left Lower Lobe {{caption_text}} {{caption_text}} Right Lower Lobe (Option A): Incorrect because pathology here would obscure the right hemidiaphragm, not the right cardiac border . Right Atrium (Option B): Incorrect because the right atrium itself is not a lung structure; it is obscured by pathology in the adjacent right middle lobe . Right Ventricle (Option D): Incorrect because the right ventricle is positioned more anteriorly and is not adjacent to the lung fields visualized on a standard PA chest X-ray .





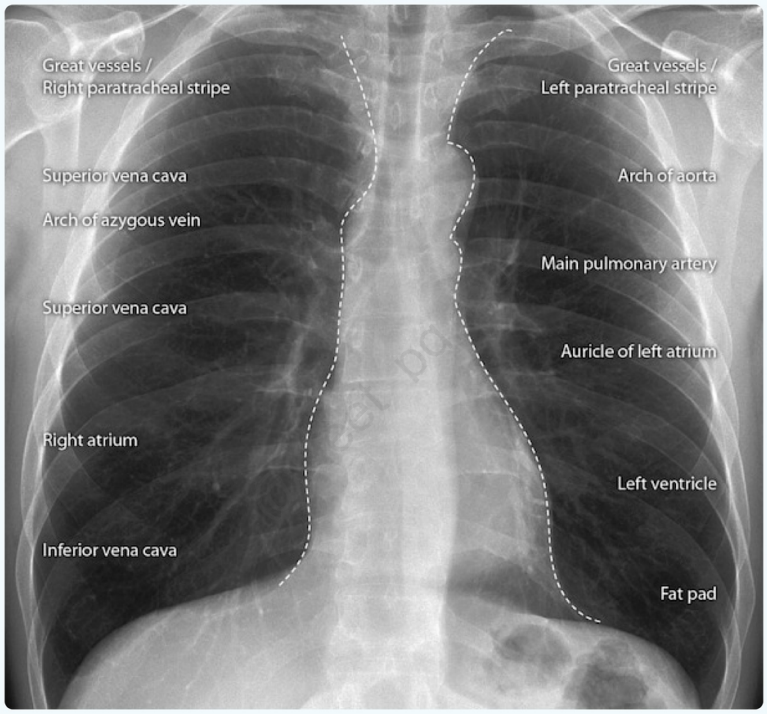
Chest X-ray showing the left upper lobe lung mass

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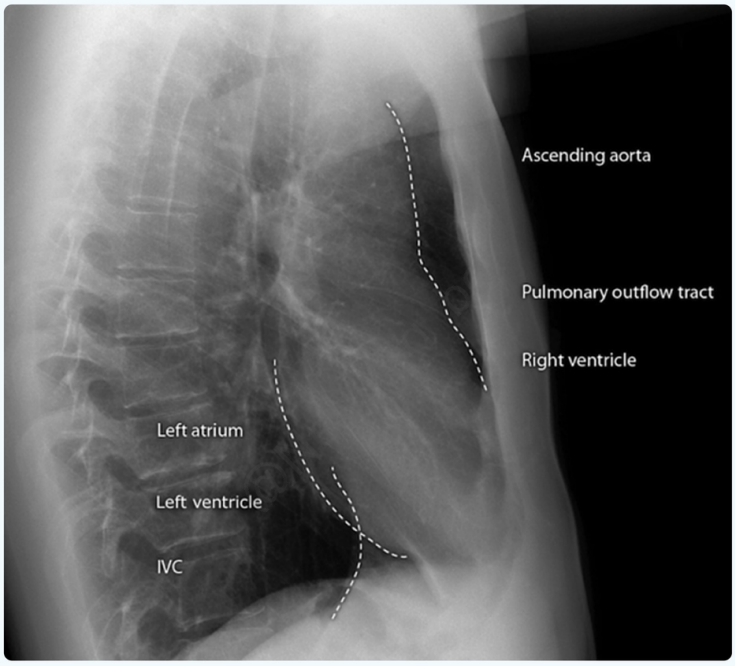
Left lung lower lobe infiltrates are shown, as well as a small amount of fluid in the left pleural cavity at X-ray scan

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Chest X-Ray showing Normal Cardiomediastinal outlines

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Chest X-Ray demonstrating normal Cardiomediastinal outlines

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https://www.ncbi.nlm.nih.gov/medgen/1778950

https://www.sciencedirect.com/topics/medicine-and-dentistry/silhouette-sign#

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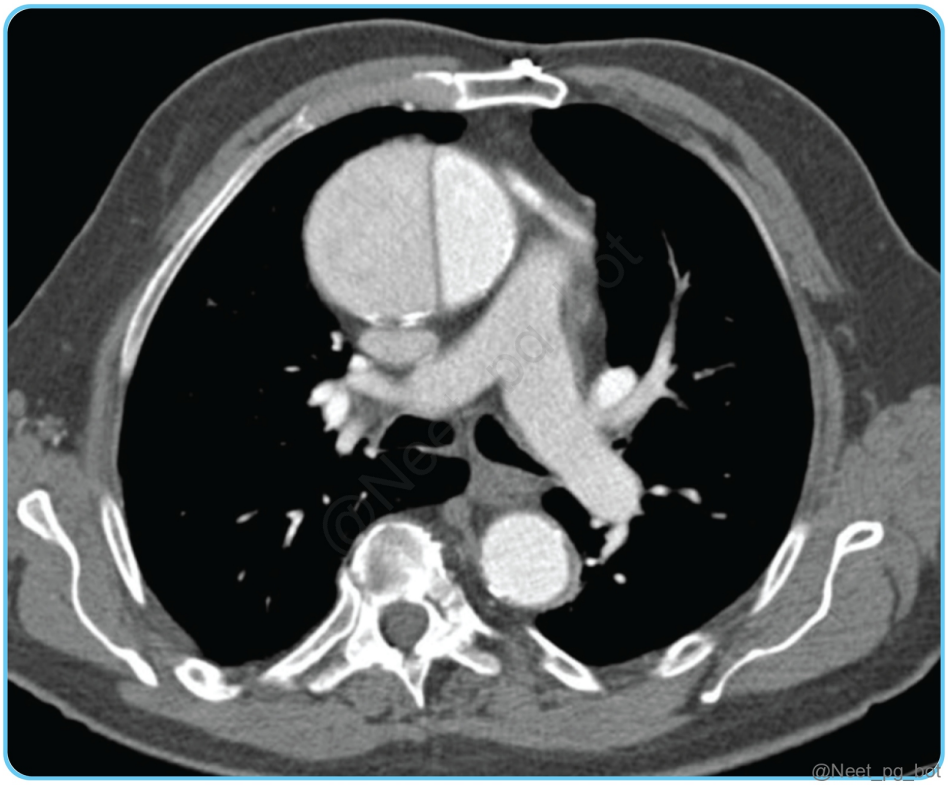
Q5: Comment on the diagnosis of CT chest shown below. (Q857621)

A. Aortic dissection

B. Pulmonary embolism

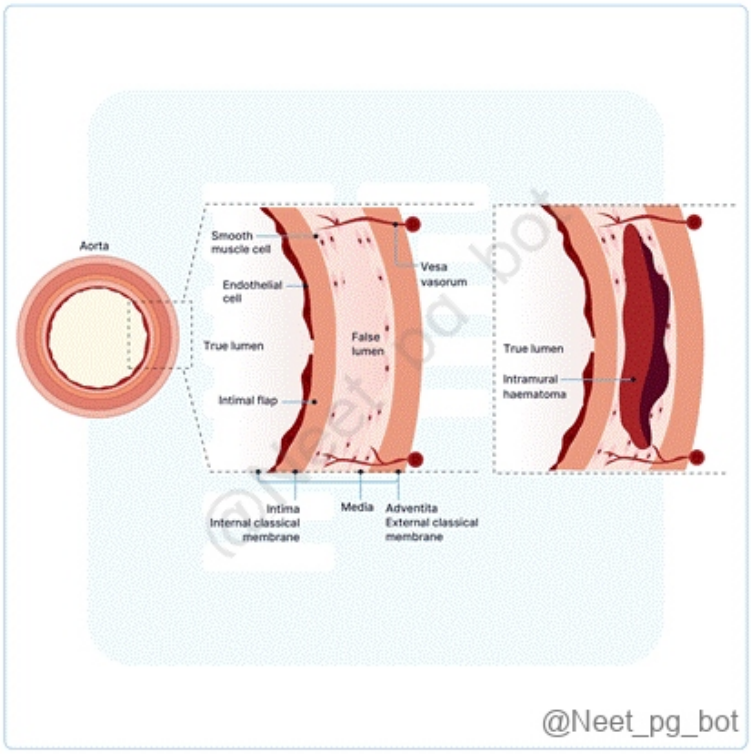
C. Cardiac myxoma

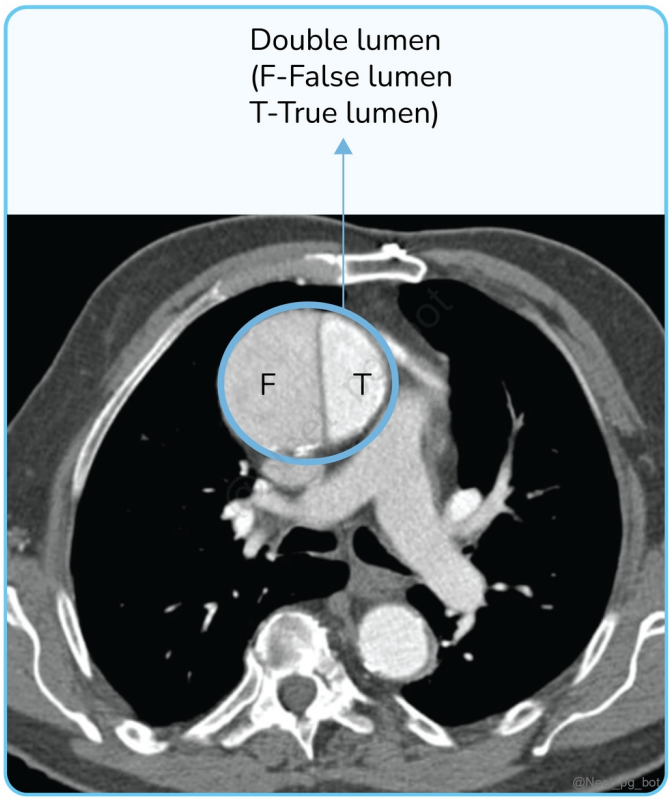
D. Aortic aneurysm



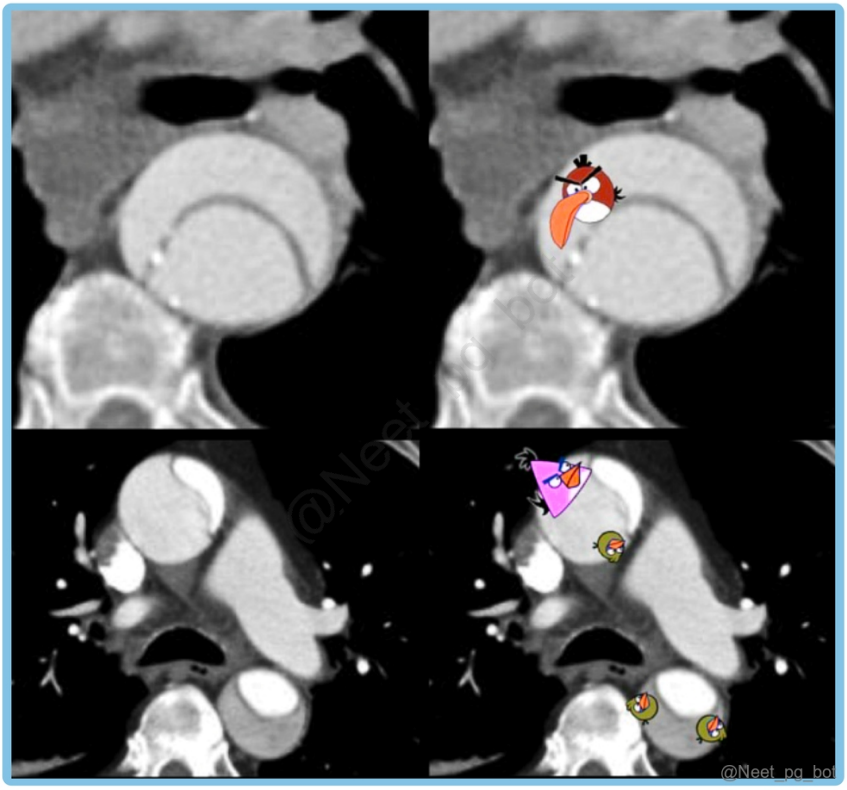
Correct Answer: A. Aortic dissection

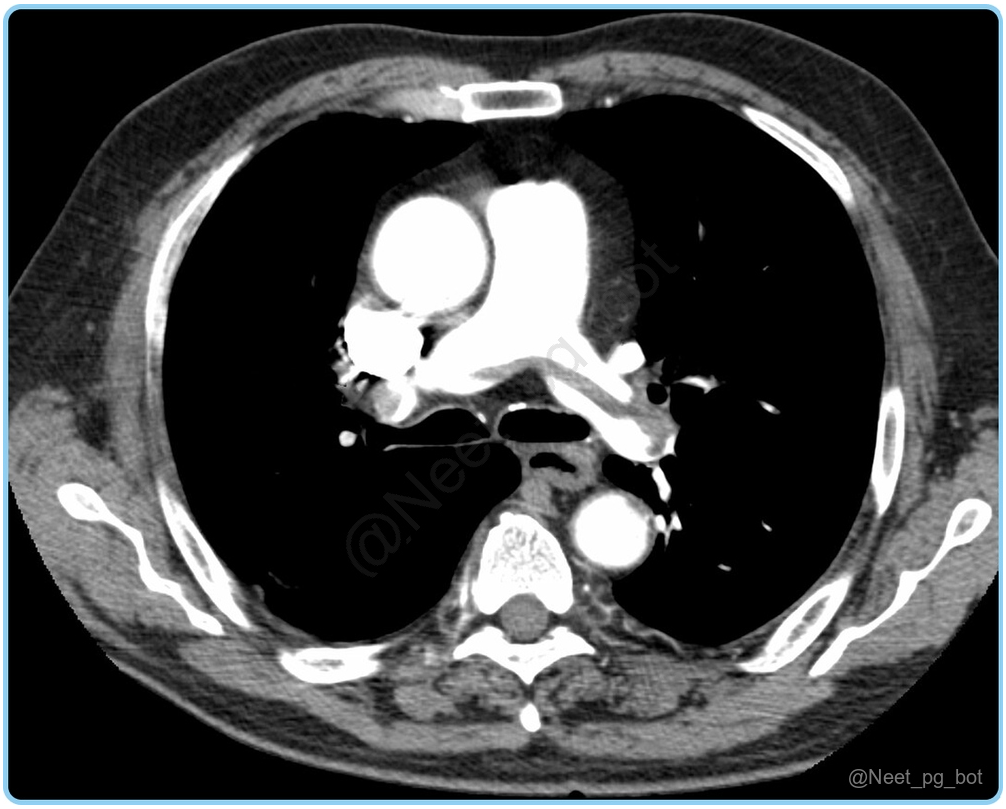
Explanation: The given CT shows an intimal tear in the aorta indicating an Aortic dissection. Aortic Dissection It occurs when a defect or a flap occurs in the aorta, resulting in blood tracking into aortic tissues, splitting the medial layer and creating a false lumen. {{caption_text}} Clinical features: Sudden onset of severe, tearing chest, radiating to the interscapular region Renal pain and renal failure Paraplegia Syncope Weakness Hypotension or shock Investigations: If the patient is stable, CT angiography is the standard investigation of choice. In the case of unstable patients (SBP<100 mm of HG, HR>100 bpm), the preferred investigation of choice will be TEE (TransEsophageal Echocardiography) MRI can also be done if CT is unequivocal. Chest x-ray reveals widening of mediastinum along with left-sided pleural effusion. {{caption_text}} Signs of FALSE LUMEN: Cobweb Sign: Irregularities of False lumen {{caption_text}} Beak Sign: False lumen forms acute angle with True lumen: {{caption_text}} Pulmonary embolism (Option B): Filling Defect seen in Pulmonary artery IOC for PE: CT Angiography {{caption_text}} Cardiac Myxoma (Option C): Low annotating hypodense lesion on the posterior most chamber of the heart (Left Atrium) MC primary Benign cardiac tumor in adults. Aortic aneurysm (Option D): Involve either ascending aorta, thoracic aorta & abdominal aorta Represents localized dilation of the aorta; while an aneurysm may predispose to dissection, an intimal tear specifically indicates dissection. M/C cause for abdominal & thoracic aortic aneurysm: Atherosclerosis {{caption_text}}

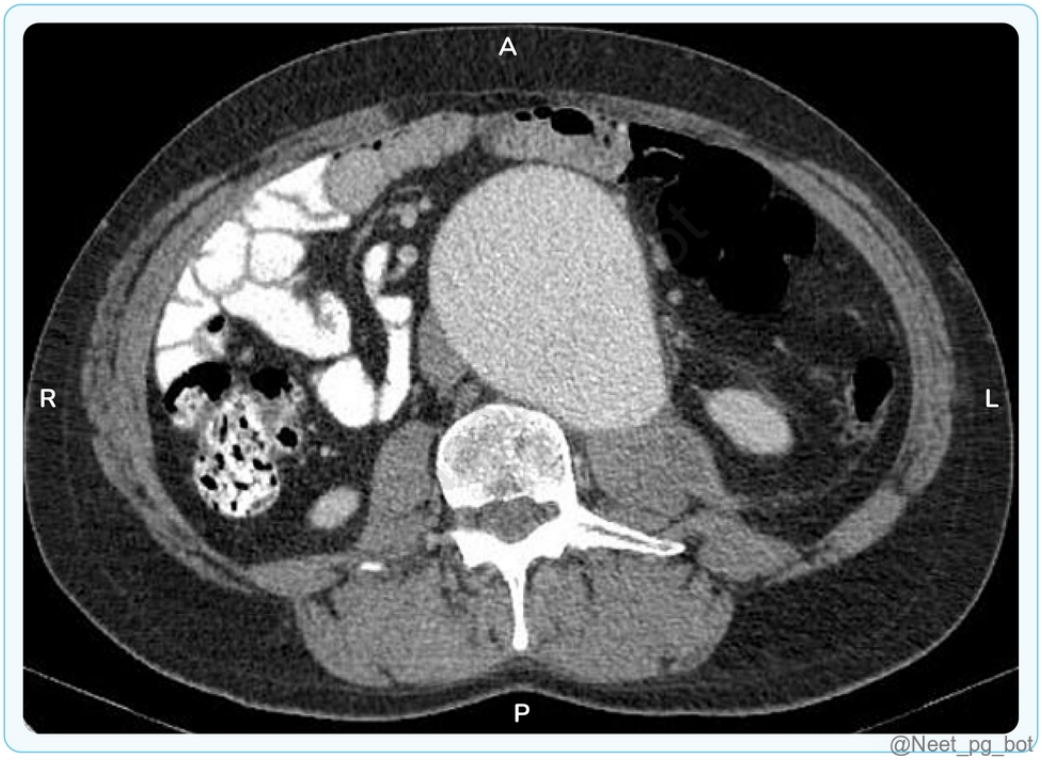

Aorta
Smooth muscle cell
Endothelial cell
True lumen
Intimal flap
False lumen
Vesa vasorum
True lumen
Intramural haematoma
Intima
Internal classical membrane
Media
Adventita
External classical membrane
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Double lumen
(F-False lumen
T-True lumen)
F
T


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References:

Bailey & Love's Short Practice of Surgery, 28th edition: pg 970, 971

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Q6: A 55 year old male patient presented with complaints of dyspnea with congestive heart failure. The clinician wants to know whether it's HF with preserved EF or reduced EF. Which of the below investigation is used for calculation of ejection fraction? (Q857624)

A. MUGA

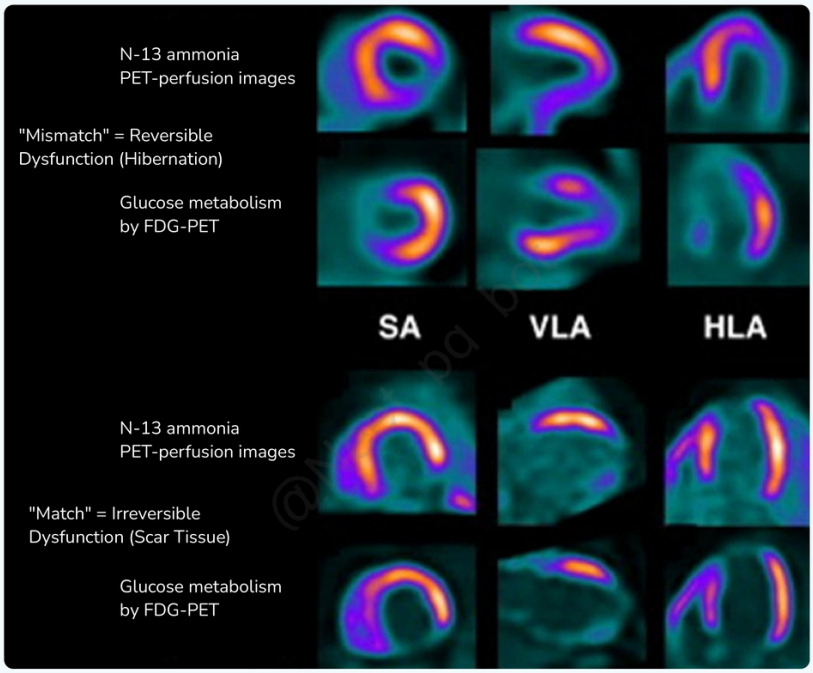
B. SPECT using thallium

C. PET myocardial perfusion imaging

D. Sestamibi scan with pharmacological stress

Correct Answer: A. MUGA

Explanation: Ejection fraction (EF) is a critical parameter for differentiating heart failure with preserved EF (HFpEF) from heart failure with reduced EF (HFrEF). MUGA scan is a non-invasive nuclear imaging test that accurately calculates EF by analyzing the motion of the heart's ventricles using a radioactive tracer and a gamma camera. Purpose Scan types For Myocardial Perfusion Assess ischemia Cold spot: decreased uptake in ischemic areas. Thallium scan (Commonly used) (Option B) Tetrofosmin Sestamibi scan (Option D) For Myocardial Infarction Assess infarct Hot spot in infarct area as pyrophosphate accumulates and is not metabolized. 99m Tc - Pyrophosphate scan. For Ventricular Function Evaluate ejection fraction MUGA (Multiple Gated Acquisition) scan (AKA nuclear ventriculography) Radiolabeled RBCs are used Most accurate for ventricular function - Cardiac MRI For Myocardial Viability Assess the viability of myocardium PETscan - Best investigation for myocardial viability. (Option C) Perfusion and metabolism mismatch are observed in the PET scan. Perfusion Agents :N-13 ammonia and Rubidium chloride. Metabolism Agent : FDG-PET is used for glucose metabolism. No FDG uptake indicates a normal heart or an infarct. FDG uptake is present: In the Ischemic Myocardium FDG-PET is combined with perfusion imaging for comprehensive assessment. Uptake in PET with low perfusion indicates reversible dysfunction (suggestive of hibernation). Irreversible dysfunction indicates the presence of scar tissue . Note: Hibernating myocardium is ischemic but viable. {{caption_text}} Myocardial Viability



Myocardial viability imaging with PET
Illustration showing a mismatch of resting MBF and glucose metabolism of the inferolateral wall indicating viable myocardium (top). A matched resting perfusion and glucose metabolism defect of the inferior wall, indicating nonviable myocardium is shown in the bottom image

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References:

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https://www.ncbi.nlm.nih.gov/books/NBK592410/

↑ *Back to this question in Part A*

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Q7: Which of the following statements is accurate concerning CORADS? CORADS: COVID-19 Reporting and Data System (Q856693)

A. CORADS- 0 indicates normal lung

B. CORADS-5 is typical of COVID- 19

C. Pleural thickening is typical of COVID-19

D. Lobar consolidation is typical of COVID-19

Correct Answer: B. CORADS-5 is typical of COVID- 19

Explanation: The COVID-19 Reporting and Data System (CORADS) is a standardized system for assessing the probability of COVID-19 pneumonia based on CT findings. CORADS-5 indicates a very high level of suspicion for COVID-19 , with features such as bilateral ground-glass opacities, crazy paving patterns, and subpleural involvement—typical imaging findings in COVID-19 pneumonia. CO-RADS (COVID-19 Reporting and Data System): Aspect Details Purpose Categorical assessment of chest CT scans for suspected COVID-19 cases Scale CO-RADS 1 (very low suspicion) to CO-RADS 5 (very high suspicion) Interobserver Agreement Moderate to substantial agreement among radiologists Discriminatory Power High accuracy in diagnosing COVID-19 Utility & Reliability Effective and standardized reporting tool CO-RADS-AI AI-based tool that automates CO-RADS scoring and CT severity assessment Accuracy Effective in high-prevalence areas Combination with Other Findings AUC value of 0.89 when used with RT-PCR and clinical findings CORADS-0 indicates normal lung (option A): This is incorrect because CORADS-0 is used when the scan is technically insufficient or of poor quality, and not for a normal lung.\ Pleural thickening is typical of COVID-19 (option C): This is incorrect because pleural thickening is not a typical finding in COVID-19 pneumonia; it is more common in chronic lung diseases or other infections. Lobar consolidation is typical of COVID-19 (option D): This is incorrect because lobar consolidation is more typical of bacterial pneumonia, whereas COVID-19 pneumonia usually shows patchy ground-glass opacities and consolidation.

References:

Automated Assessment of CO-RADS and Chest CT Severity Scores in Patients with Suspected COVID-19 Using Artificial Intelligence

CO-RADS – A categorical CT assessment scheme for patients with suspected COVID-19: definition and evaluation - PMC

Diagnostic performance and interobserver agreement of CO-RADS: evaluation of classification in radiology practice - PMC

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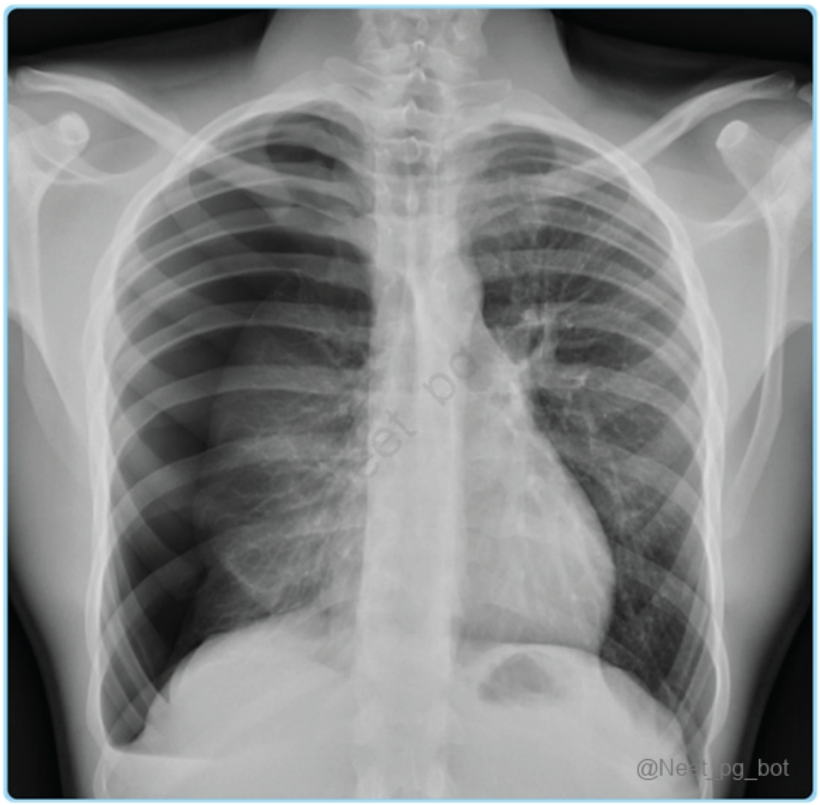
Q8: A 25-year-old male patient with Marfanoid features presented with a sudden onset of breathlessness. The chest X-ray is given below. What is the diagnosis? (Q856940)

A. Pneumothorax

B. Pleural effusion

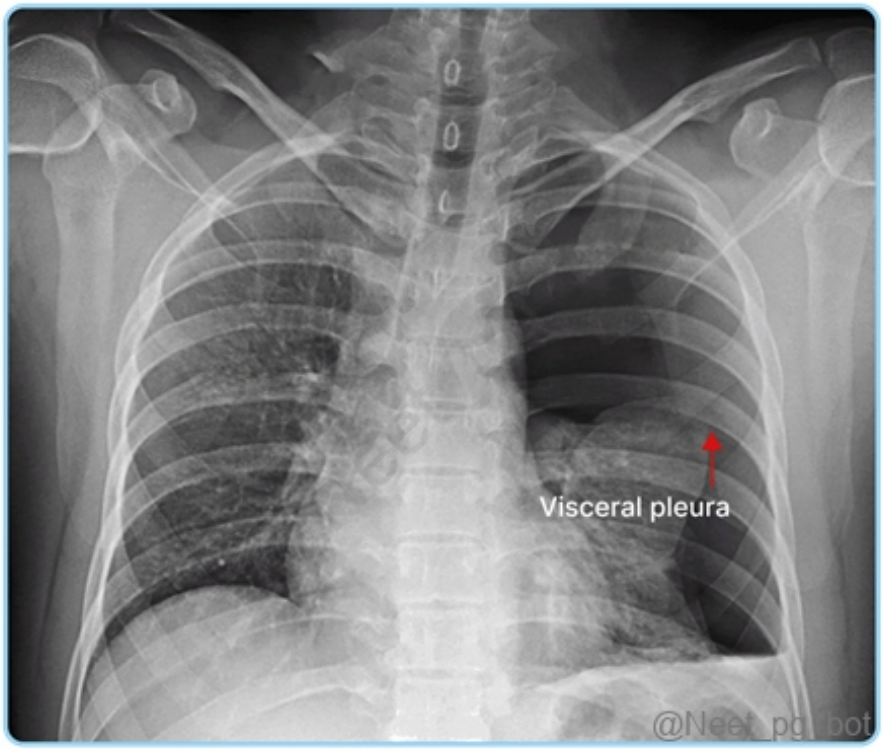
C. Consolidation

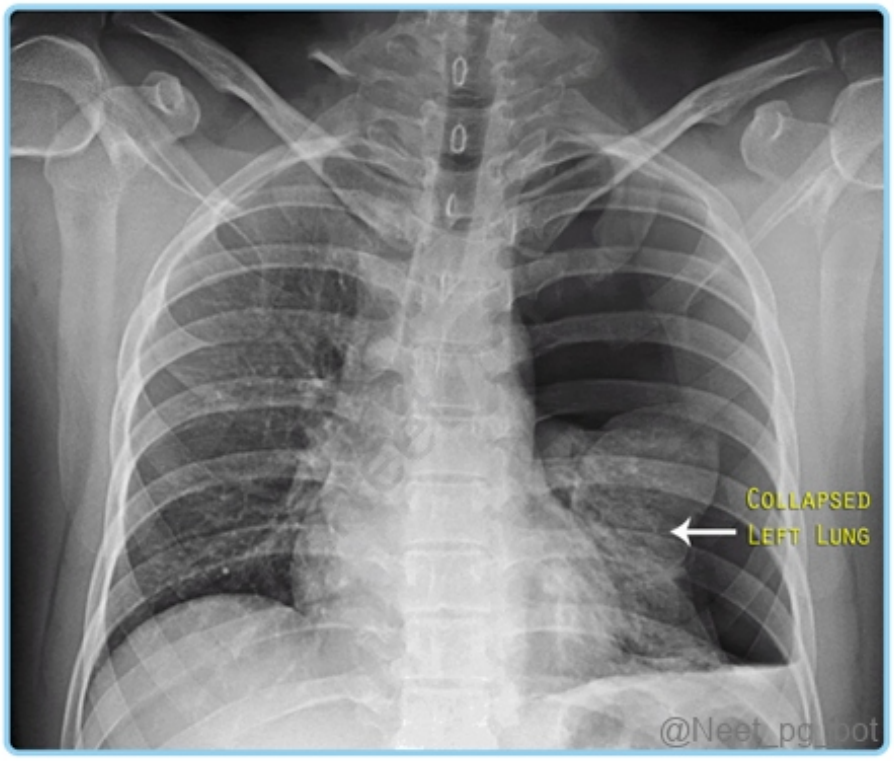
D. Fibrosis

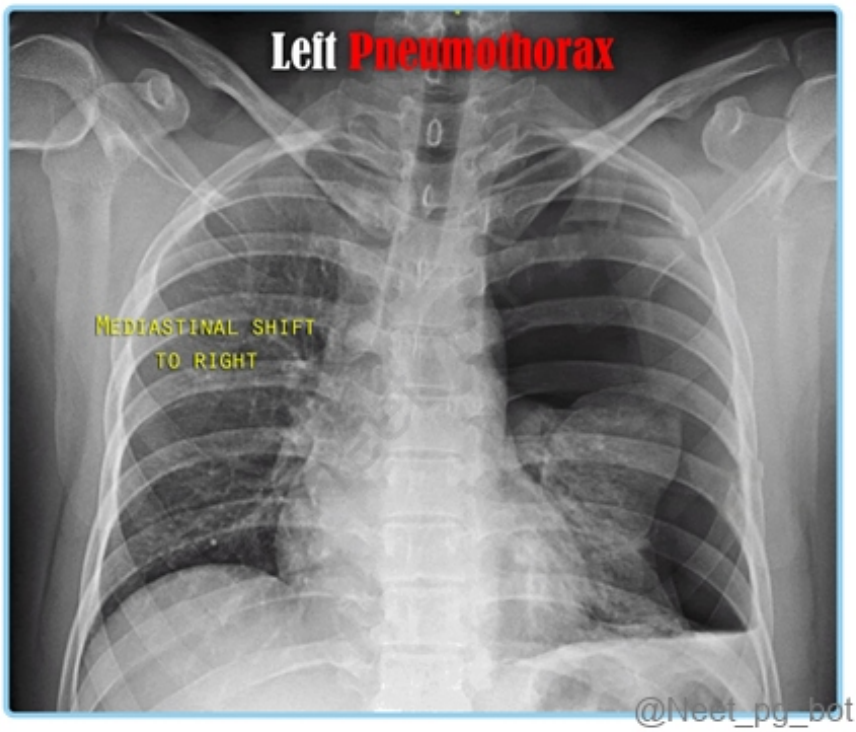


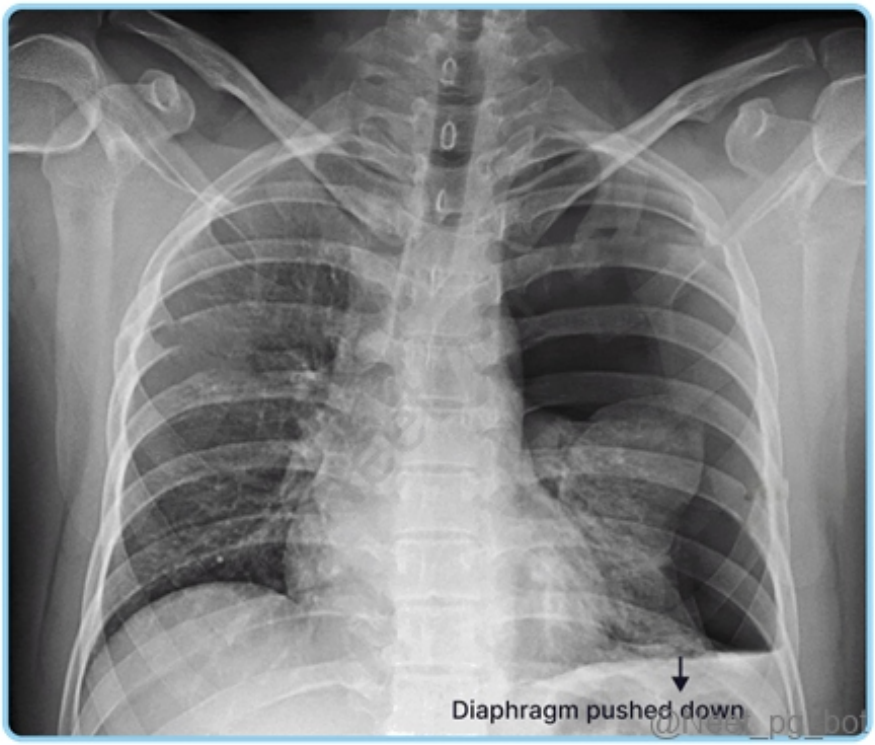
Correct Answer: A. Pneumothorax

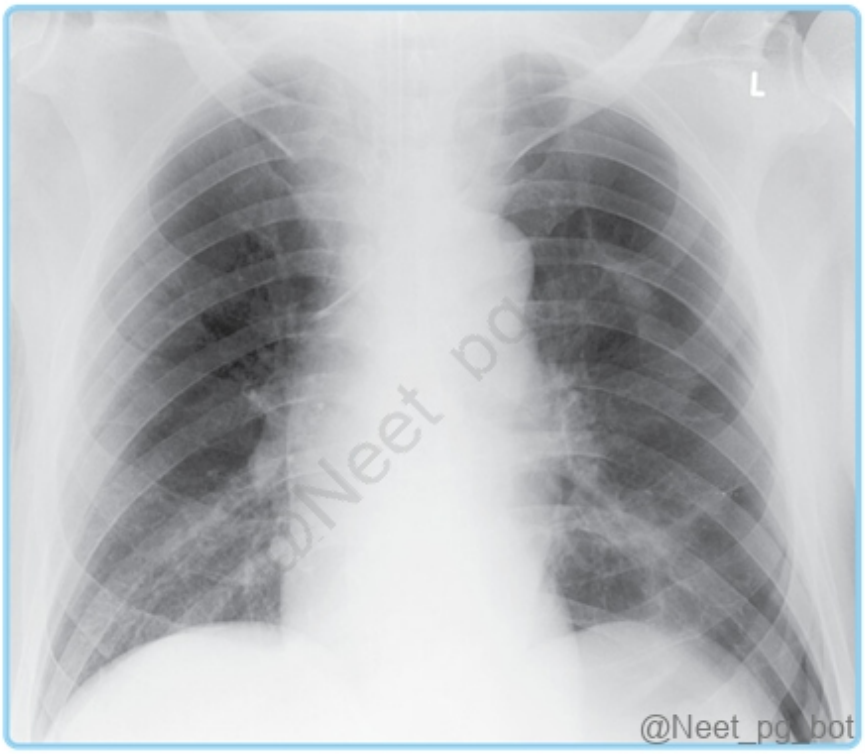
Explanation: A 25-year-old male with Marfanoid features presenting with sudden-onset breathlessness strongly suggests spontaneous pneumothorax , which is commonly seen in Marfan syndrome due to underlying connective tissue defects. Radiological Features (Chest X-ray): Absent lung markings in the affected area Hyperlucency due to air accumulation Collapsed lung margin Mediastinal shift (in tension pneumothorax) The classic association of Marfan syndrome with spontaneous pneumothorax makes this the most likely diagnosis. Spontaneous Pneumothorax Spontaneous pneumothorax occurs when air enters the pleural space without trauma. It is classified into: Type Features Primary No underlying lung disease, seen in tall, thin males (e.g., Marfan syndrome) Secondary Occurs in patients with underlying lung disease (e.g., COPD, tuberculosis) Tension Pneumothorax Air trapping leads to mediastinal shift , requiring emergency intervention Diagnosis: Confirmed by chest X-ray or CT scan . Management: Needle decompression for tension pneumothorax, followed by chest tube insertion for drainage. Radiological findings in pneumothorax Visible visceral pleural edge as a thin white line. Absent lung markings peripheral to this line. {{caption_text}} The affected side is radiolucent compared to the opposite side. Collapsed lung on the affected side. {{caption_text}} Contralateral mediastinal shift especially in massive pneumothoraces (tension pneumothorax). {{caption_text}} The diaphragm of the affected side is pushed down. {{caption_text}} The supine radiograph shows the deep sulcus sign. It shows a deep costophrenic angle extending towards the hypochondrium. {{caption_text}} Incorrect Options: Pleural effusion (Option B): Incorrect because pleural effusion presents with blunting of the costophrenic angle and meniscus sign , not hyperlucency. Consolidation (Option C): Incorrect because consolidation appears as opacification with air bronchograms , whereas pneumothorax shows increased radiolucency . Fibrosis (Option D): Incorrect because fibrosis presents with reticulonodular opacities and volume loss , not hyperlucency or lung collapse .


Visceral pleura
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Collapsed
Left Lung
@Neet_pg_bot


Left Pneumothorax
MEDIASTINAL SHIFT
TO RIGHT
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Diaphragm pushed down
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References:

Grainger & Allison's Diagnostic Radiology 7th edition • Page no. 50, 51, 52

Harrison's Principles of Internal Medicine, 20th Edition • Page No. 2008, 2009

↑ *Back to this question in Part A*

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Q9: Plethoric lung fields are seen in? (Q855007)

A. TAPVC

B. Tricuspid atresia

C. Ebstein anomaly

D. TOF

Correct Answer: A. TAPVC

Explanation: Plethoric lung fields are seen on chest X-ray when there is increased pulmonary blood flow. In TAPVC, pulmonary veins connect abnormally to the systemic venous circulation instead of the left atrium. This

results in mixing of oxygenated and deoxygenated blood, leading to increased pulmonary blood flow and congestion. Total Anomalous Pulmonary Venous Connection (TAPVC) Pathology Pulmonary veins drain into the right atrium directly or indirectly via an abnormal venous connection Not a ductal-dependent cyanotic lesion Sites of venous connection Supracardiac- superior vena cava (Most common) Cardiac-coronary sinus, right atrium Infracardiac Mixed Clinical presentation Cyanosis and congestive cardiac failure With ASD- wide and split S2 Chest X-ray Snowman or figure-8 configuration in supracardiac TAPVC {{caption_text}} Treatment Surgery No indication for prostaglandins (Not a ductal-dependent cyanotic lesion) Incorrect Options: Tricuspid atresia (Option B): is a congenital heart defect where the tricuspid valve is completely closed or absent. It leads to cyanosis and reduced pulmonary blood flow, which is typically associated with diminished pulmonary vascular markings rather than plethoric lung fields. Ebstein anomaly (Option C): is a rare congenital heart defect characterized by abnormal tricuspid valve anatomy. It results in a displacement of the tricuspid valve leaflets into the right ventricle, causing right atrial enlargement. Plethoric lung fields are not a characteristic radiological finding associated with this condition. TOF (Tetralogy of Fallot) (Option D): TOF is a congenital heart defect characterized by four specific abnormalities in the heart's structure. It includes a ventricular septal defect, pulmonary stenosis, overriding aorta, and right ventricular hypertrophy. While TOF can result in a right-to-left shunt and cyanosis, it typically leads to reduced pulmonary blood flow and diminished pulmonary vascular markings rather than plethoric lung fields.



References:

Partial and Total Anomalous Pulmonary Venous Connection - StatPearls - NCBI Bookshelf (nih.gov)

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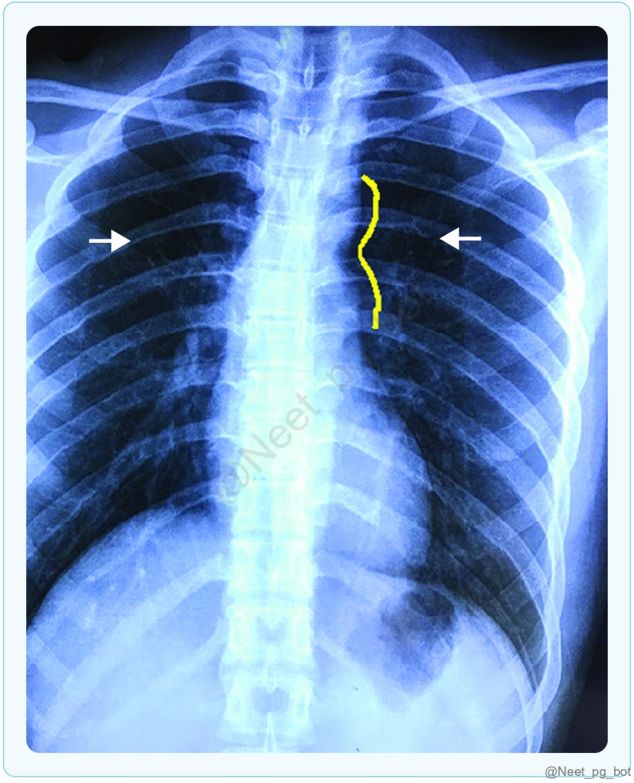
Q10: A 30-year-old woman presented with hypertension, chest pain, and cramping of the legs. A chest radiograph was taken which revealed the condition as shown in the image below. What is the likely cause of hypertension in this patient? (Q858499)

A. Coarctation of aorta

B. Essential hypertension

C. Aortic aneurysm

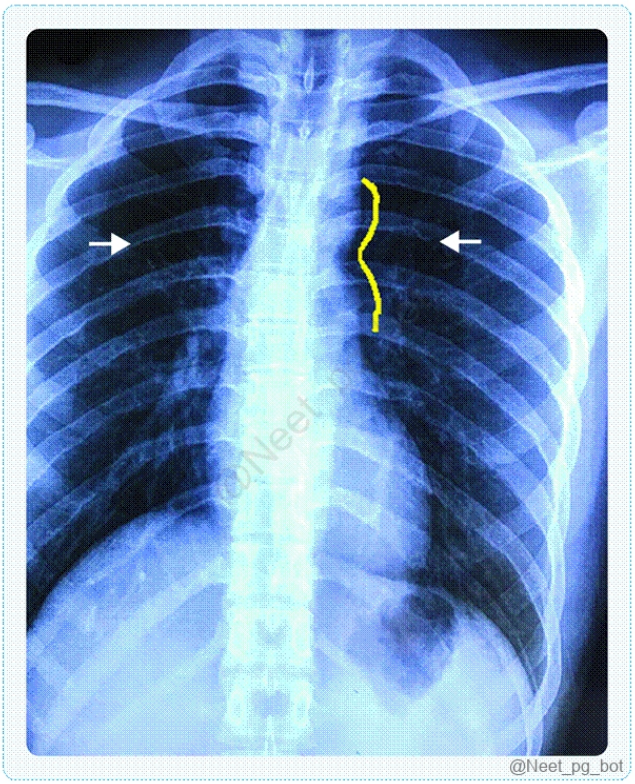
D. Aorta-arteritis

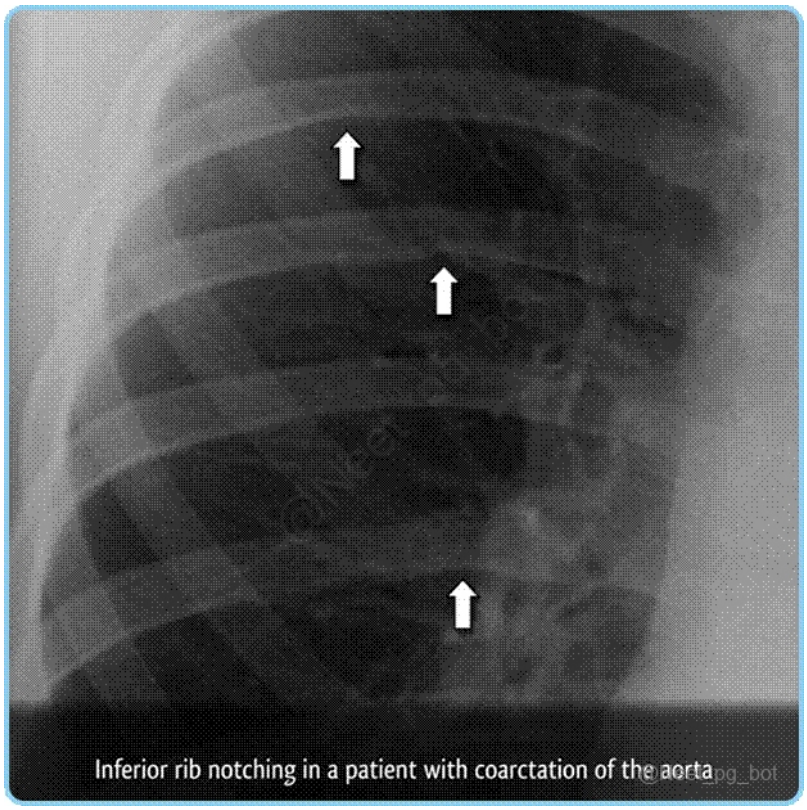


Correct Answer: A. Coarctation of aorta

Explanation: The presence of the Figure of 3 sign and rib notching on X-ray, along with symptoms of hypertension and chest pain, indicates coarctation of the aorta . These findings suggest narrowed aorta leading to collateral circulation and rib erosion, confirming the diagnosis. Figure of 3 sign: This sign indicates a contour abnormality of the aorta commonly associated with coarctation of the aorta. It is characterized by a distinctive "3" shape formed by the aorta and adjacent structures on the X-ray. {{caption_text}} Inferior rib notching: {{caption_text}} Radiographic Features of Coarctation of the Aorta (CoA) Plain Radiograph Findings Figure of 3 Sign Contour abnormality of the aorta, indicative of coarctation. Inferior Rib Notching (Roesler Sign) Erosion of the inferior margins of ribs (usually 4th–8th) by dilated intercostal collateral vessels. Seen in long-standing cases (70% of older children/adults). Rare in infancy or children <5 years. Collateral Pathways Increased subclavian artery flow promotes collateral formation via: Internal thoracic arteries Anterior and posterior intercostal arteries Rib Notching Patterns Bilateral Rib Notching : Coarctation distal to both subclavian arteries. Unilateral Right Rib

Notching : Coarctation between the brachiocephalic trunk and left subclavian artery, or Right-sided aortic arch with an aberrant left subclavian artery. Unilateral Left Rib Notching : Aberrant right subclavian artery arising post-coarctation, with collaterals on the left. Essential hypertension (Option B): refers to high blood pressure without a known underlying cause. It is typically a diagnosis of exclusion, meaning other identifiable causes of hypertension should be ruled out. In this case, the chest radiograph findings strongly suggest a specific underlying cause rather than essential hypertension. Aortic aneurysm (Option C): refers to a localized dilation or ballooning of the aorta. While it can lead to hypertension in some cases, the characteristic radiographic finding for aortic aneurysm would be an enlarged, bulging segment of the aorta rather than rib notching. Aorta-arteritis (Option D): Aorta-arteritis, such as Takayasu arteritis, refers to inflammation and narrowing of the large arteries, including the aorta. While it can cause hypertension, the specific radiographic finding associated with aorta-arteritis would be wall thickening or narrowing of the involved vessels rather than rib notching.





References:

Coarctation of the aorta | Radiology Reference Article | Radiopaedia.org

Grainger and Allison's Textbook of Diagnostic Radiology, 7th edition, Page 300

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Q11: The appearance of USG at saphenofemoral junction, showing common femoral vein, common femoral artery, and the great saphenous vein is called as: (Q858501)

A. Mickey Mouse sign

B. String sign

C. Tillaux sign

D. Stamers sign

Correct Answer: A. Mickey Mouse sign

Explanation: The appearance of the ultrasound (USG) at the saphenofemoral junction, showing the common femoral vein, common femoral artery, and the great saphenous vein, is referred to as the Mickey Mouse sign. In the Mickey Mouse sign, the common femoral vein represents the face of Mickey Mouse, and the common femoral artery and great saphenous vein represent the ears. This visual resemblance to the iconic Disney character gives rise to the term "Mickey Mouse sign." {{caption_text}} Radiological Sign Description Associated Pathology Classic Mickey Mouse Sign Refers to the appearance of bilateral cranial nerve (CN) VII and CN VIII enhancement, resembling Mickey Mouse's head. Acoustic neuroma Reverse Mickey Mouse Sign The reverse of the classic Mickey Mouse sign, where bilateral CN V and CN VI enhancement resemble Mickey Mouse's head. Trigeminal schwannoma Minnie Mouse Sign Refers to unilateral CN VII and CN VIII enhancement, resembling Minnie Mouse's head. Facial nerve schwannoma or hemangioma Mickey Mouse Ears Sign Describes bilateral globus pallidus hyperintensity on brain MRI, resembling the shape of Mickey Mouse's ears. Wilson’s disease or Carbon monoxide poisoning Mickey Mouse Glove Sign Characterized by symmetric calcification of basal ganglia structures on brain CT, resembling a Mickey Mouse glove. Fahr’s syndrome or Wilson’s disease String sign (Option B): is a term used in other medical imaging modalities, such as barium studies or endoscopy, to describe a thin, elongated appearance of a narrowed or strictured segment of the gastrointestinal tract. Tillaux sign (Option C): is a radiological finding observed in Salter-Harris III fractures of the distal tibia. It refers to the lateral displacement of the epiphysis in relation to the tibial metaphysis. Stamers sign (Option D): Stamers sign is not a recognized medical term or radiological finding in the context of the saphenofemoral junction or ultrasound imaging.



References:

https://radiopaedia.org/articles/mickey-mouse-sign-ultrasound

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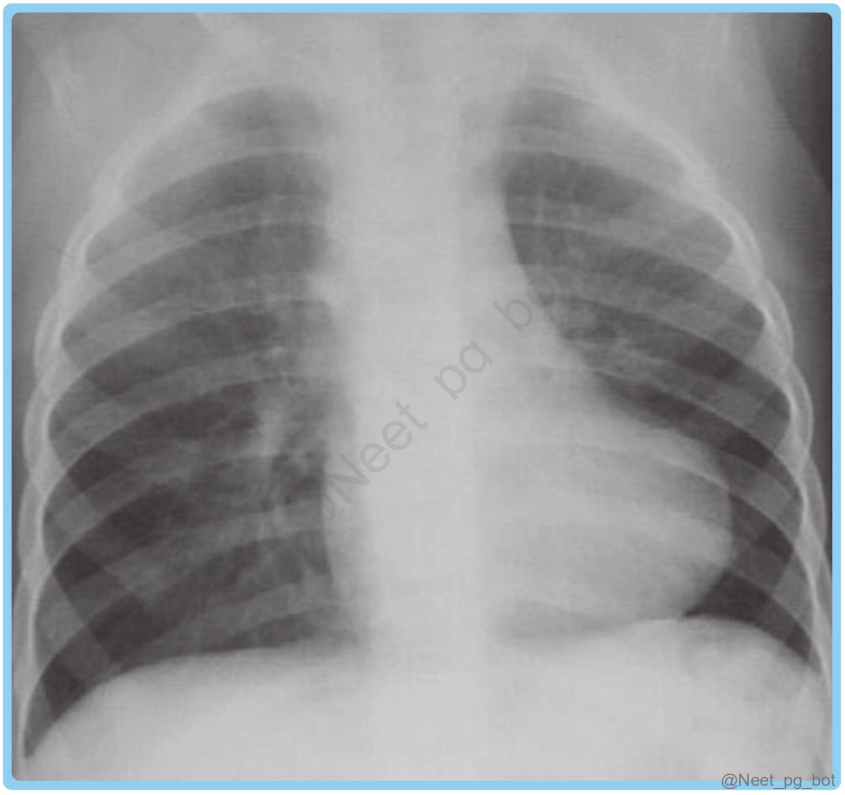
Q12: A child presents with cyanosis. His chest radiograph is shown below. What is the diagnosis? (Q855086)

A. Tetralogy of Fallot (TOF)

B. Ebstein’s anomaly

C. Transposition of great arteries (TGA)

D. Total anomalous pulmonary venous return (TAPVC)



Correct Answer: A. Tetralogy of Fallot (TOF)

Explanation: Tetralogy of Fallot (TOF): The "boot-shaped heart" (coeur en sabot) seen on a chest radiograph is a classic finding in TOF. It occurs due to: Right ventricular hypertrophy (RVH), which causes the apex of the heart to lift upward. Pulmonary artery hypoplasia or stenosis, which accentuates the shape. TOF is the most common cyanotic congenital heart defect, characterised by the four features: Pulmonary stenosis Right ventricular hypertrophy Ventricular septal defect (VSD) Overriding aorta Chest X-ray Imaging in TOF: The classic finding on a chest X-ray for TOF is the “boot-shaped” heart (also known as coeur en sabot), caused by right ventricular hypertrophy leading to an upward tilt of the cardiac apex. There is often a concave main pulmonary artery and decreased pulmonary vascular markings , reflecting the reduced blood flow through the pulmonary arteries due to

the RVOT obstruction. Some patients may also present with a right-sided aortic arch , which can be identified on the X-ray. {{caption_text}} Ebstein’s anomaly (option B): This is incorrect because the radiographic finding in Ebstein’s anomaly is an enlarged, "box-shaped" heart due to massive right atrial enlargement, not a boot shape. Transposition of great arteries (TGA) (option C): This is incorrect because TGA typically shows an "egg-on-string" appearance on chest X-ray, with a narrow mediastinum. Total anomalous pulmonary venous return (TAPVC) (option D): This is incorrect because TAPVC commonly shows a "snowman" or "figure-of-eight" sign due to dilated veins and a vertical vein, not a boot-shaped heart.



References:

Grainger & Allison’s Diagnostic Radiology, A Textbook of Medical Imaging, 7th Edition, Page. 304, 305

Textbook of Radiology & Imaging by David Sutton, 8th Edition, Chapter 82, Cyanotic Congenital Heart Disease - Tetralogy of Fallot.

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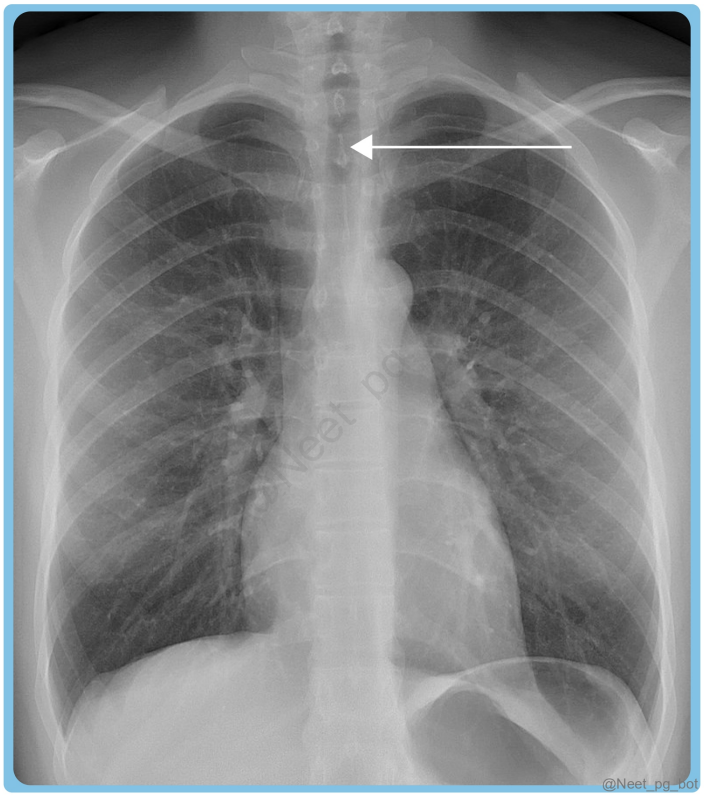
Q13: The structure marked with arrowhead is? (Q859941)

A. Esophagus

B. Pulmonary artery

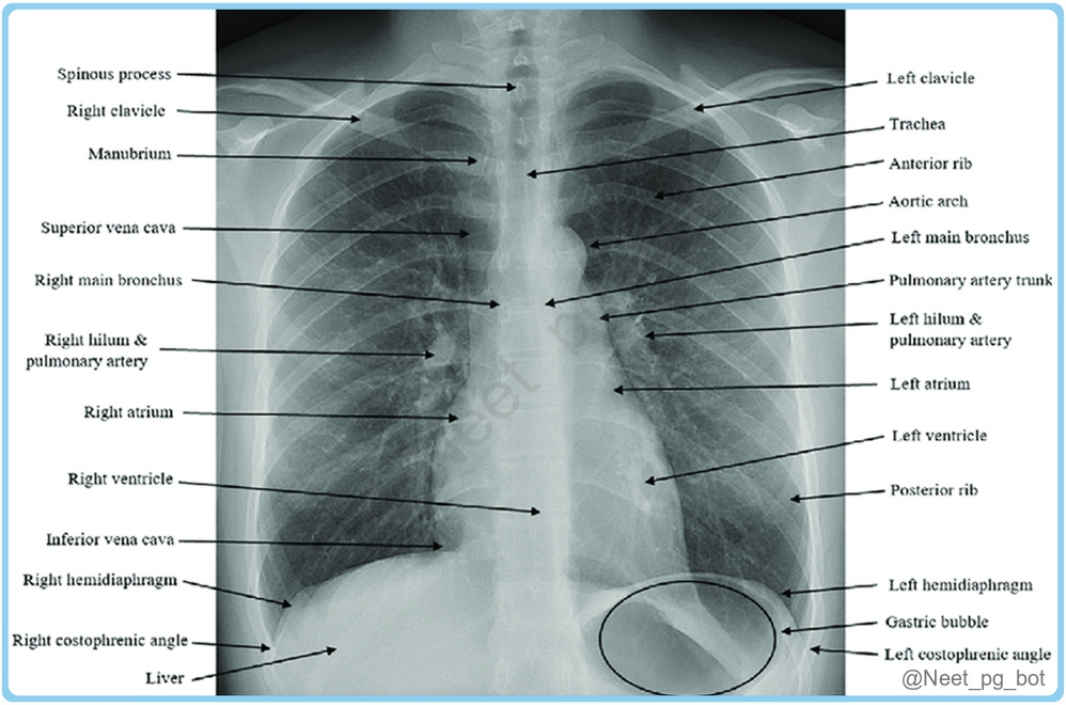
C. Trachea

D. Left atrium



Correct Answer: C. Trachea

Explanation: The arrowhead in the X-ray points to a midline, air-filled tubular structure. Based on the image, the structure is most consistent with the trachea . Normal Chest X Rays with marking: {{caption_text}} Incorrect Options: Esophagus (Option A): The esophagus is posterior to the trachea It does not appear as a dark, air-filled structure like the trachea in this image. Pulmonary artery (Option B): The pulmonary arteries are part of the hilar structures in the lungs. They are located lateral to the trachea and do not appear as a straight, air-filled structure on a chest X-ray. Left atrium (Option D): T he left atrium is part of the heart and is located in the lower part of the mediastinum. It is not a tubular structure and cannot appear as an air-filled space.



References:

https://radiopaedia.org/articles/chest-radiograph?lang=us

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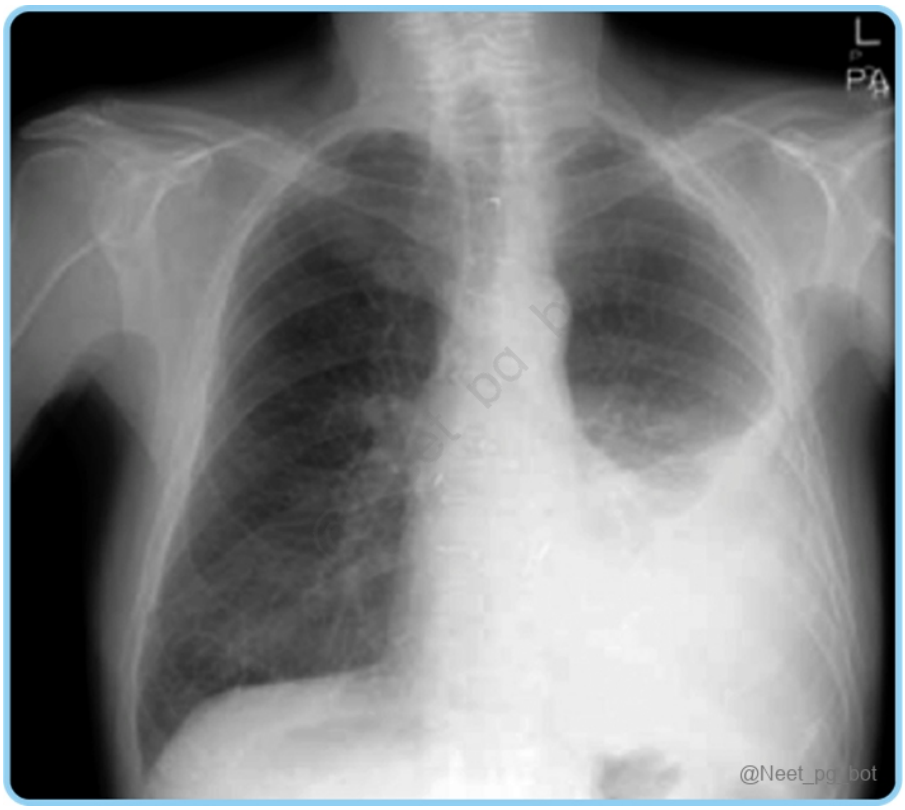
Q14: A patient presented with complaints of dyspnoea. The shown X-ray is suggestive of:- (Q859943)

A. Consolidation

B. Exudative pleural effusion

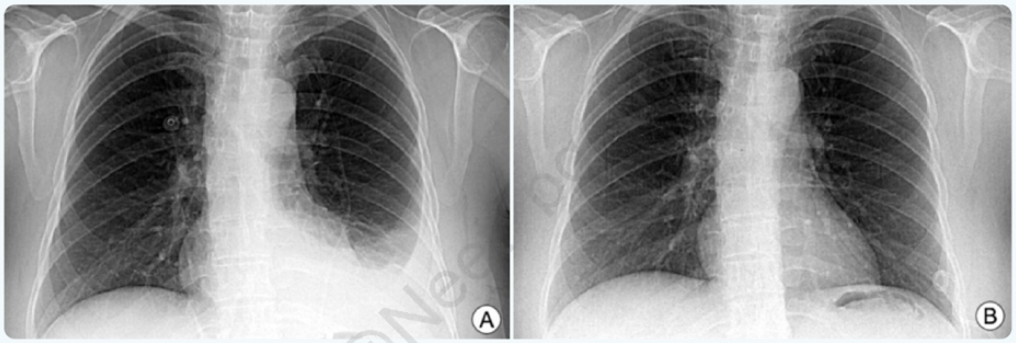
C. Pneumothorax

D. Hydropneumothorax



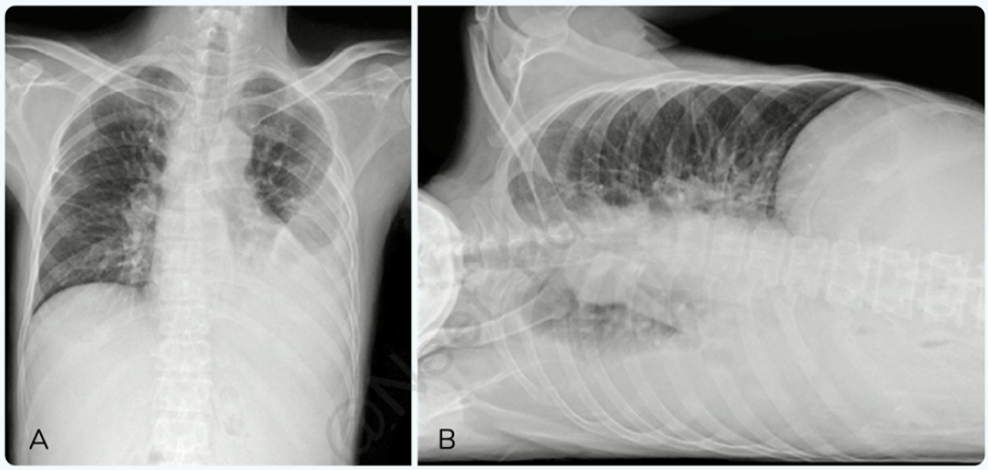
Correct Answer: B. Exudative pleural effusion

Explanation: Based on the description provided, the X-ray findings include obliteration of the costophrenic angle (CP angle) and an upward concave curve on the left side of the lung. These findings are suggestive of a pleural effusion. Pleural Effusion: Pleural effusion is the accumulation of fluid in the pleural space. Small Pleural Fluid: Often undetectable on PA chest x-rays; ultrasound or CT can detect small subpulmonary effusions. Effusion Progression: Blunting of costophrenic angles starts at 200-500 mL. Classic signs include opacification of the lower chest with a concave superior margin. {{caption_text}} Massive Effusions: 1000 mL reaches the fourth anterior rib; cause dense opacification of the hemithorax with contralateral mediastinal shift. Diaphragmatic inversion may occur. Lateral decubitus X-rays: Increase sensitivity for small effusions as the pleural fluid moves with gravity and the lung effectively floats on the effusion. {{caption_text}} Subpulmonary Effusions: Appear as a "high hemidiaphragm" on x-rays, with an unusual contour that peaks laterally than usual. Ultrasound or CT confirms the diagnosis. {{caption_text}} In an upright PA view, the meniscus sign indicates the presence of a significant amount of pleural fluid, typically exceeding 200 mL and blunting the costophrenic angle. {{caption_text}} Loculated (encysted, encapsulated) pleural fluid: Fluid can loculate between visceral pleural layers in fissures or between visceral and parietal layers, often against the chest wall. Commonly results from adhesions. Xray shows D sign. {{caption_text}} Consolidation (Option A): This would show more distinct lung tissue involvement with air bronchograms and possible increased density, but it wouldn’t obliterate the costophrenic angle as seen in pleural effusion. {{caption_text}} Pneumothorax (Option C) shows a region of lucency (darkness) along the lung margin, typically more pronounced on an erect chest X-ray. In this case symptoms of pleural effusion and x-ray findings suggest fluid rather than air, making pneumothorax unlikely. {{caption_text}} Hydropneumothorax (Option D) indicates the presence of both air and fluid in the pleural space, typically seen as an air-fluid level on upright chest X-ray, which distinguishes it from a simple pleural effusion. {{caption_text}}



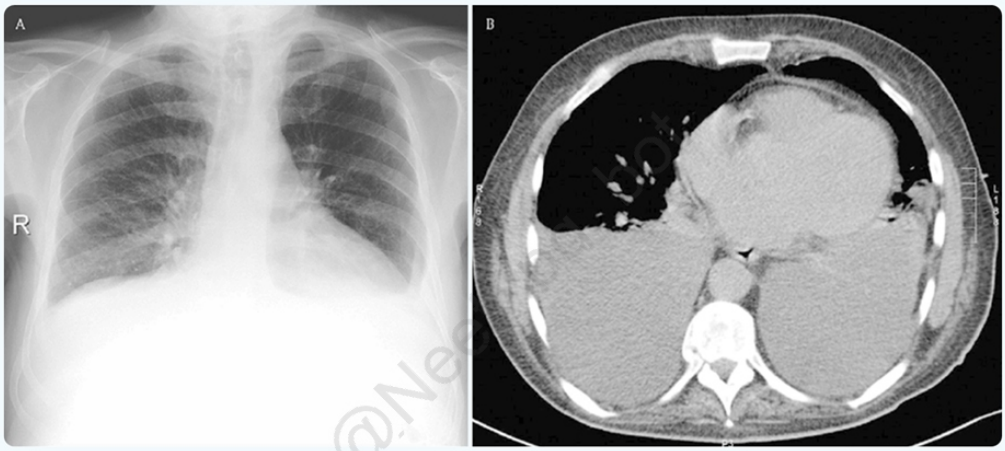
Chest X-ray shows left costophrenic angle blunting which is indicated with left pleural effusion (A) and it is improved with conservative treatment (B)

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Chest radiography with the patient in the PA upright (A) and left lateral decubitus (B) positions revealed massive left pleural effusion

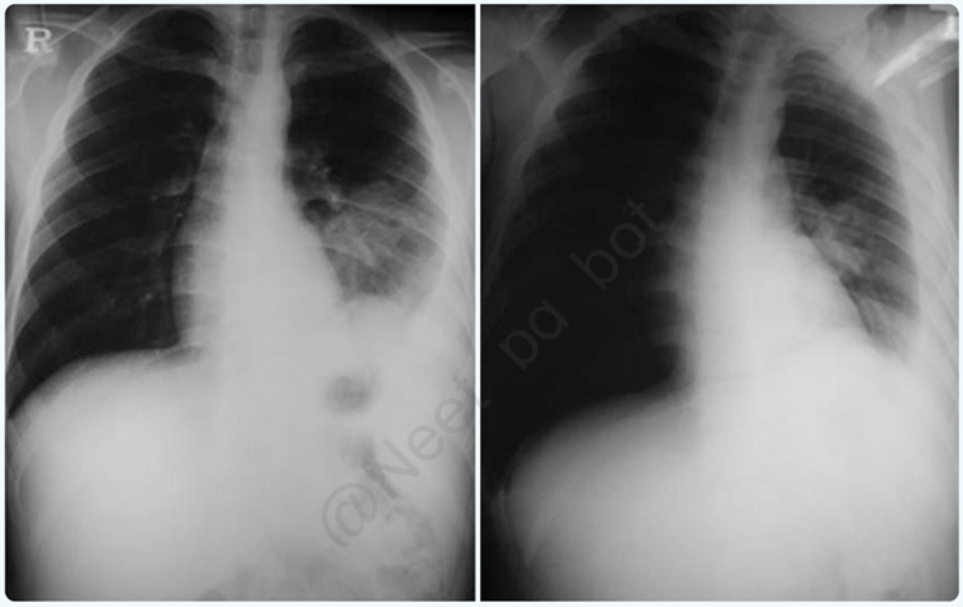
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Subpulmonary effusion - Frontal chest radiograph - showing elevation of Left and Right hemidiaphragm (Pseudo- diaphragm), Obliteration of Intrapulmonary blood vessels, Blunting of both costophrenic sulcus, Gastric air bubble not seen

Corresponding Axial CT Image

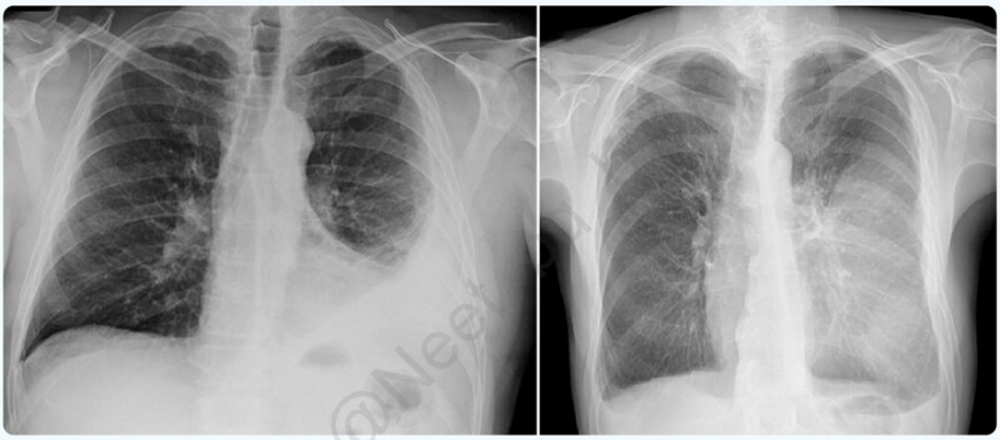
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Chest PA shows a lateral meniscus sign and patchy consolidation on the lower left lung fields adjacent to the cardiac border.

Left decubitus view shows left pleural fluid shifting.

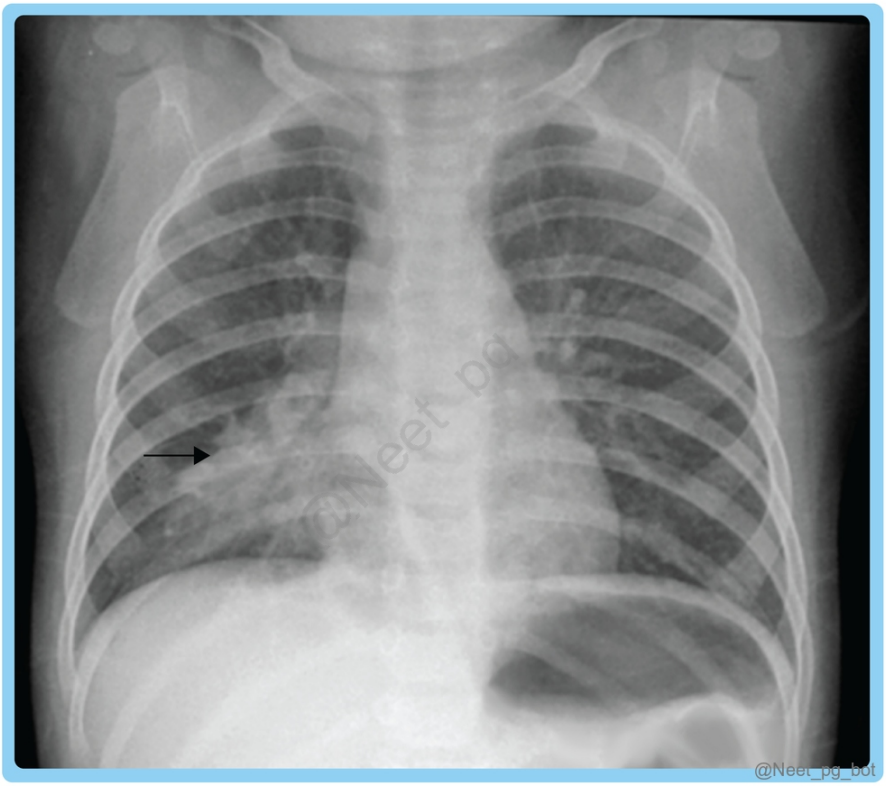
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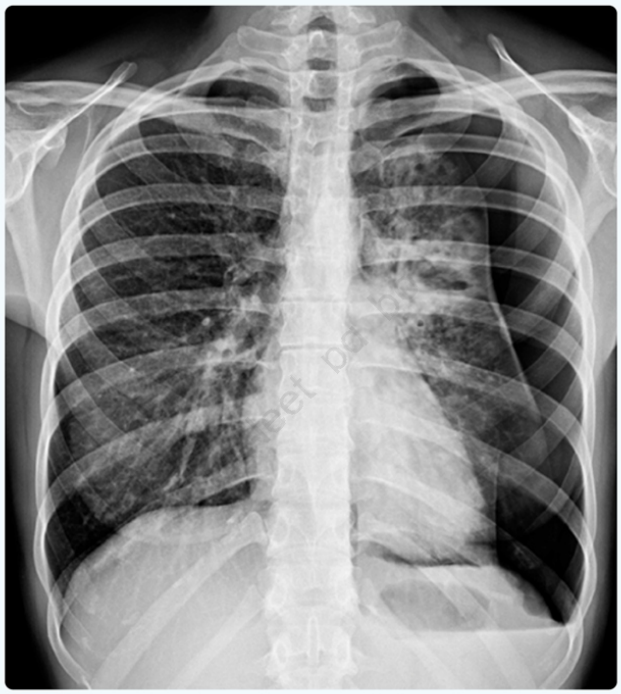
Chest radiograph shows a left-side partially loculated pleural effusion.

Chest radiograph shows the D sign at the left hemithorax, indicating a laterally loculated pleural effusion.

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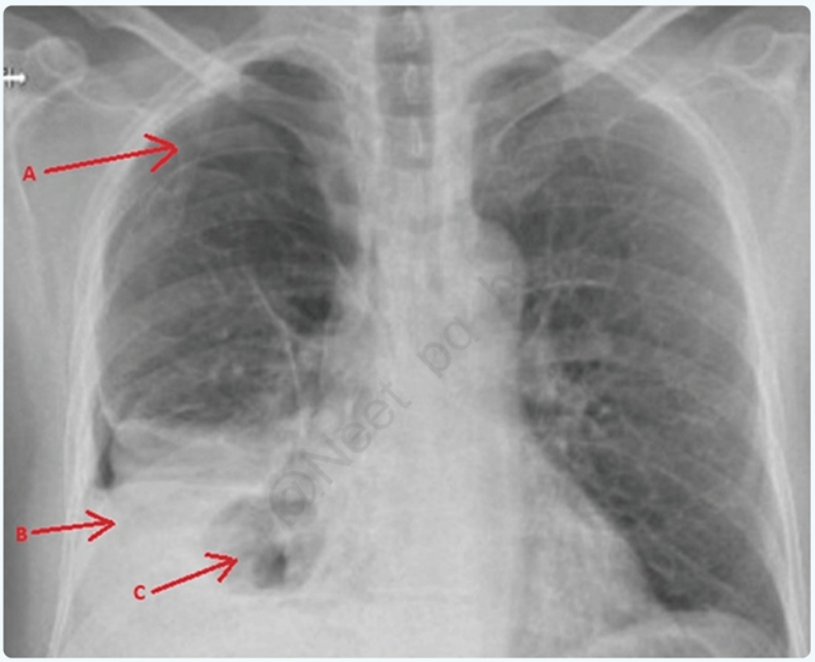


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Chest X-ray : Left pneumothorax

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Chest X-ray Right hydropneumothorax with collapse of the right lung (Arrow : A).
Consolidation is noted in the mid and lower zones of the right lung (Arrow: B).
A cavitating lesion was noted in the lower zone of the right lung (arrow: C)

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References:

Grainger & Allison's Diagnostic Radiology, 7th Edition, Page 43,44,45

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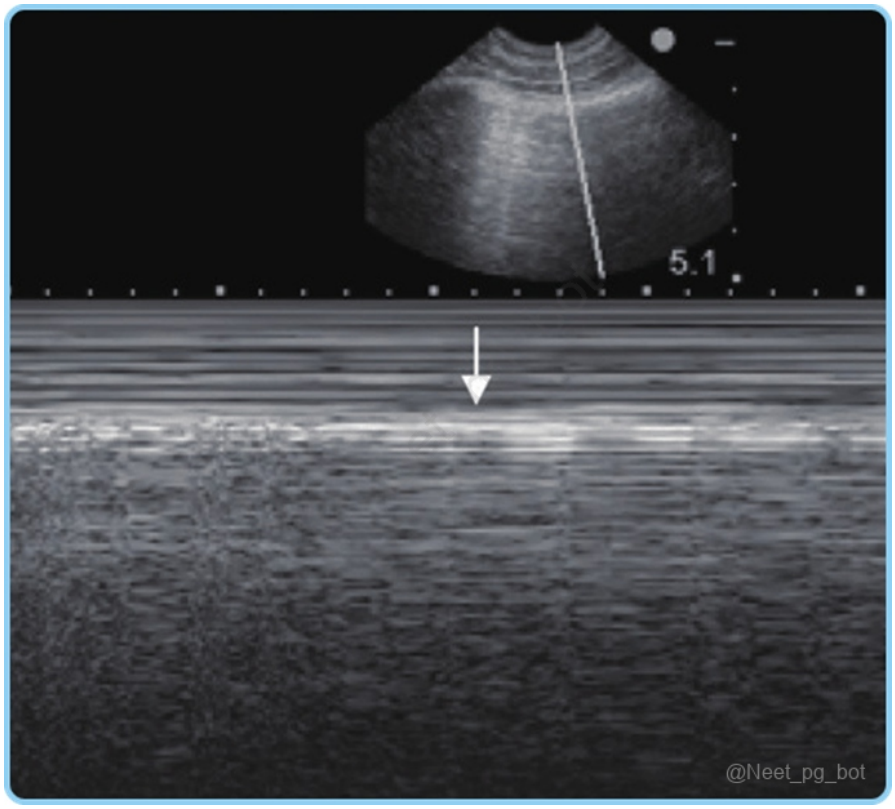
Q15: Identify the sign: {{caption_text}} (Q859944)

A. Seashore sign

B. Barcode sign

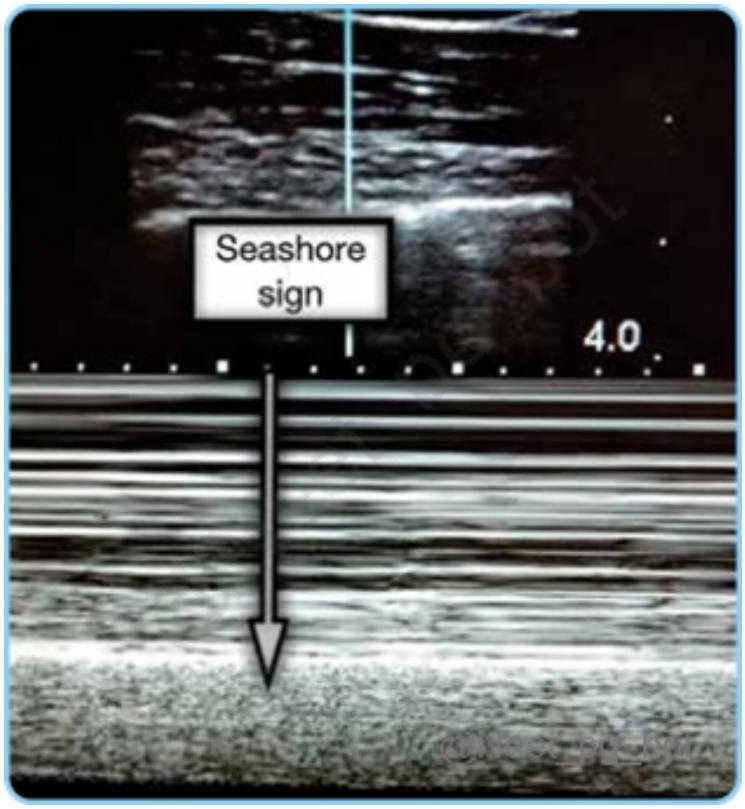
C. Stratosphere sign

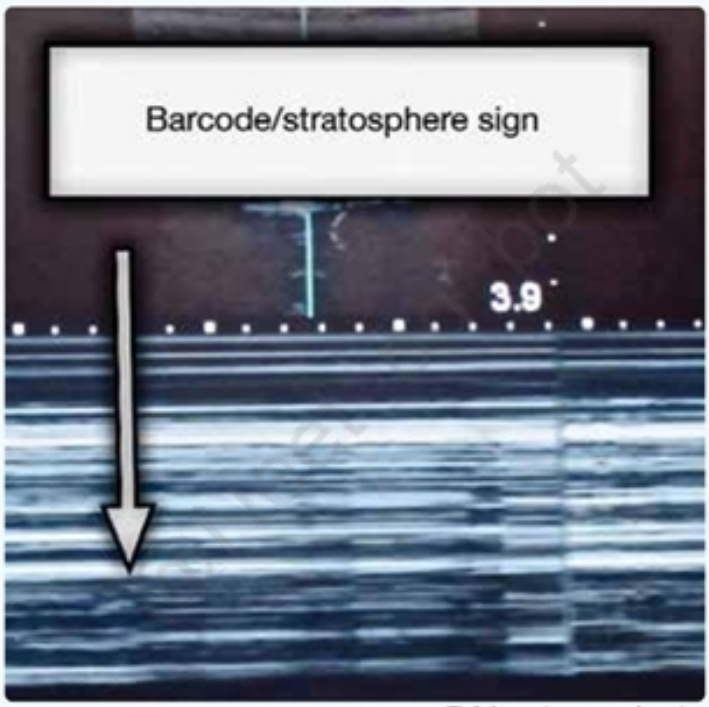
D. Deep sulcus sign



Correct Answer: A. Seashore sign

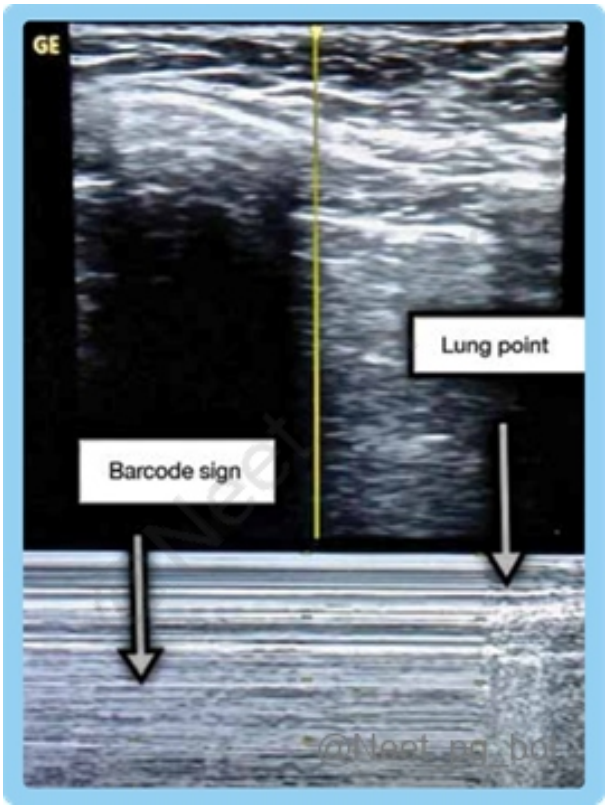
Explanation: The Seashore sign is an M ultrasound sign where pleural and structures above appear as horizontal echogenic (bright) lines, while the underlying lung shows a grainy or sandy texture, which represents lung sliding. This is commonly seen in normal lungs with adequate ventilation, differentiating lung sliding from pneumothorax where lung sliding is absent. Sea-shore sign: On M-mode images, lung sliding manifests as the sea-shore sign, where the pleura and structures above appear as horizontal echogenic lines . The underlying lung presents a grainy or sandy texture. The stratified appearance above the pleural line is due to the motionless chest wall , resembling sea waves , while below the pleural line, the lung movement creates a sandy pattern , akin to the shore . Barcode/stratosphere sign: (Option B, C) In cases where lung sliding is absent , M-mode images show uniform horizontal straight lines known as the stratosphere sign or barcode sign. The lack of a grainy or sandy appearance in these images indicates the absence of motion . The stratosphere sign suggests that pneumothorax may be a likely cause. Lung point sign: The border between the sliding lung and pneumothorax is referred to as the "lung point" sign. This sign can assist in estimating the size of the pneumothorax . It is important to note that the lung point is only observable if part of the lung is still in contact with the chest wall . The lung point sign is not present in large pneumothoraces . {{caption_text}} {{caption_text}} {{caption_text}} Deep sulcus sign (Option D): An X-ray sign where the costophrenic angle appears deepened in pneumothorax {{caption_text}}

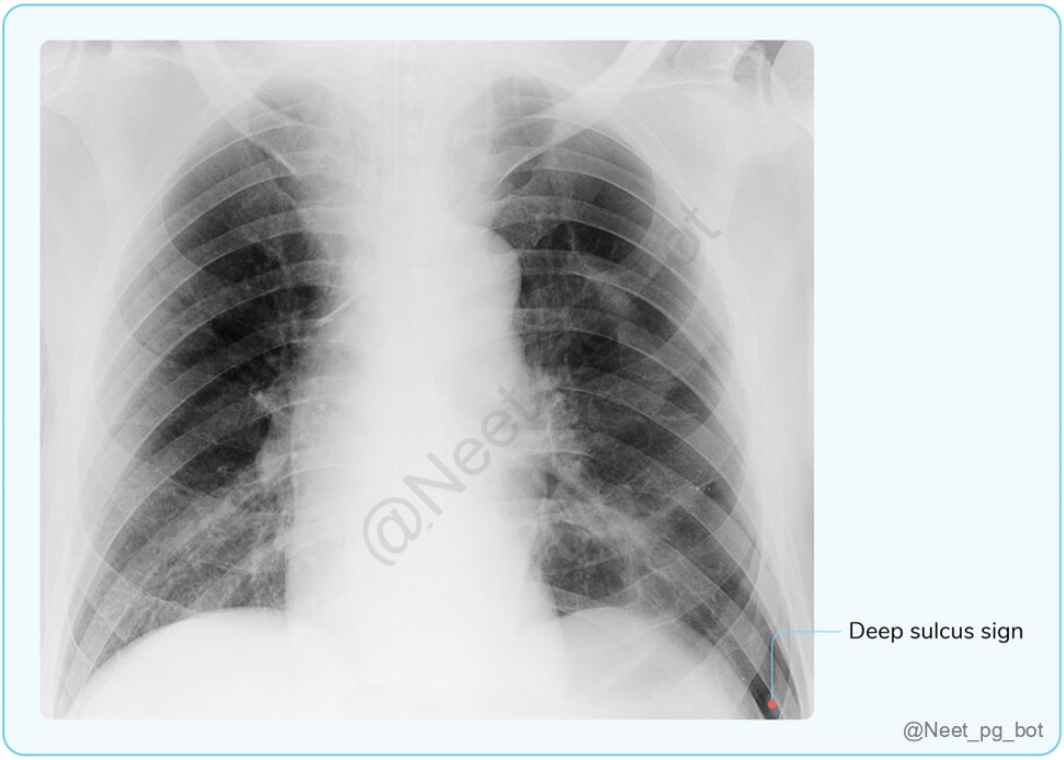




Ultrasound of Pneumothorax

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References:

David Sutton Textbook of Radiology and Imaging, Volume 1, 8th edition, Page 175, 1378, 3847.

Grainger and Allison's Diagnostic Radiology: A Textbook of Medical Imaging, 7th edition, page: 51.

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8439137/

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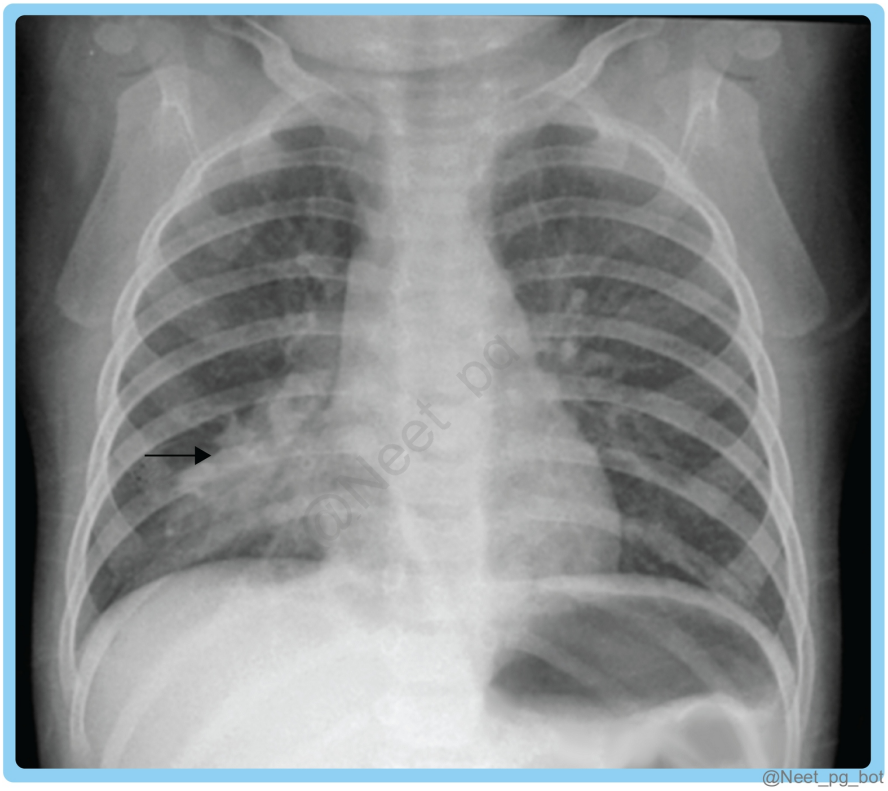
Q16: A 35-year-old male patient presented with a productive cough. He is a chronic smoker and alcoholic. CXR is shown below. What is the likely diagnosis? (Q859951)

A. Abscess

B. Consolidation

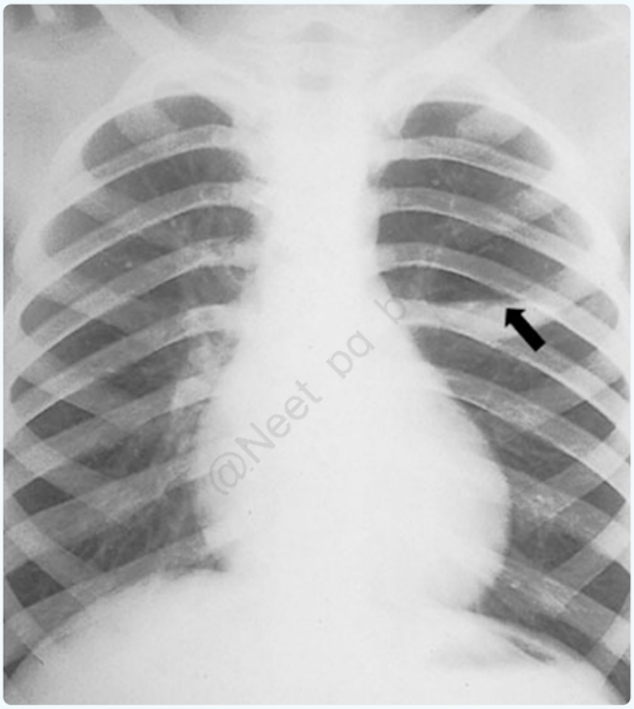
C. Cavity

D. Pleural effusion



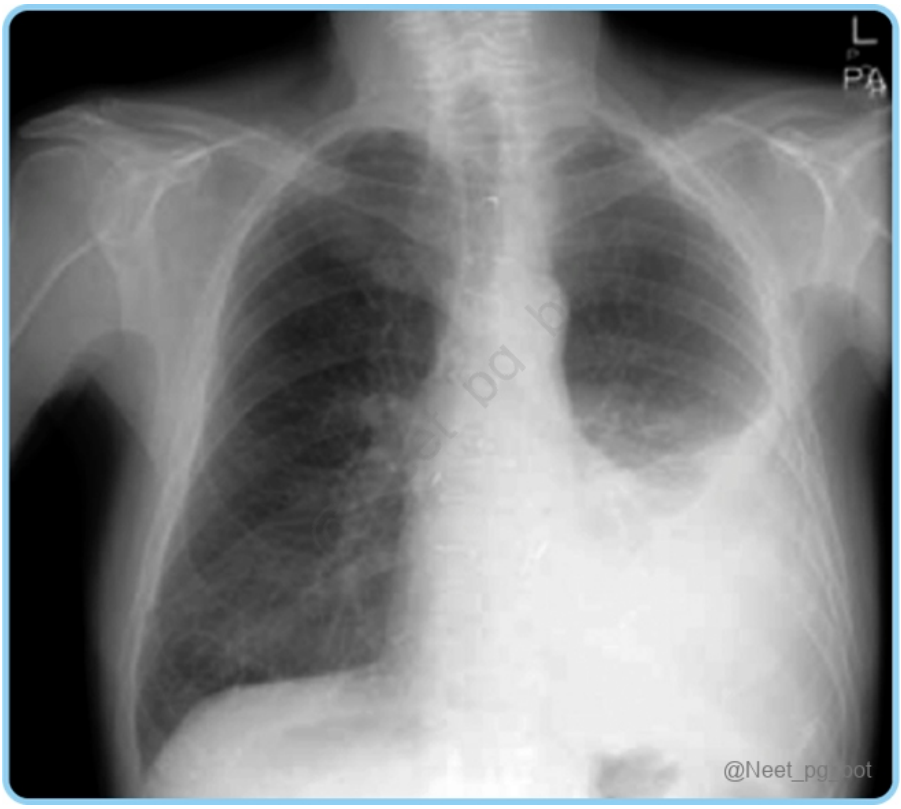
Correct Answer: B. Consolidation

Explanation: Consolidation refers to a condition in which the air spaces in the lungs fill with fluid, inflammatory exudates, or cellular infiltrates, leading to the loss of normal air-filled lung tissue. On chest X-ray (CXR), consolidation appears as an area of increased opacity due to the filling of alveoli with fluid, pus, or other substances. In this case, the patient's chronic smoking and alcoholism increase the risk of developing respiratory infections. CXR Radiological Findings Associated Diseases Consolidation Pneumonia, Lung abscess Infiltrates Pulmonary edema, ARDS Atelectasis Obstructive lung disease, Pneumothorax Blunting of the Costophrenic Angle Pleural effusion, Empyema Cavity Tuberculosis, Lung abscess Nodule/mass Lung cancer, Pulmonary metastasis Ground-glass opacities Interstitial lung diseases (e.g., Pulmonary fibrosis, Pneumoconiosis) Honeycombing Idiopathic pulmonary fibrosis, End-stage interstitial lung disease Air bronchograms Consolidation, Alveolar processes Mediastinal shift Pneumothorax, Large pleural effusion, Mediastinal mass Abscess (Option A): They would typically appear as a cavity with an air-fluid level, which is not mentioned here. {{caption_text}} Cavity filled with air & fluid Cavity (Option C): Cavities have distinct air-fluid levels and thin or thick walls, seen in tuberculosis. Pleural effusion (Option D): This would present with obliteration of the costophrenic angle and/or meniscus sign, not described in this case. {{caption_text}}



Lung abscess : Round radiolucent lesion with an air fluid level

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References:

https://pmc.ncbi.nlm.nih.gov/articles/PMC7123527/

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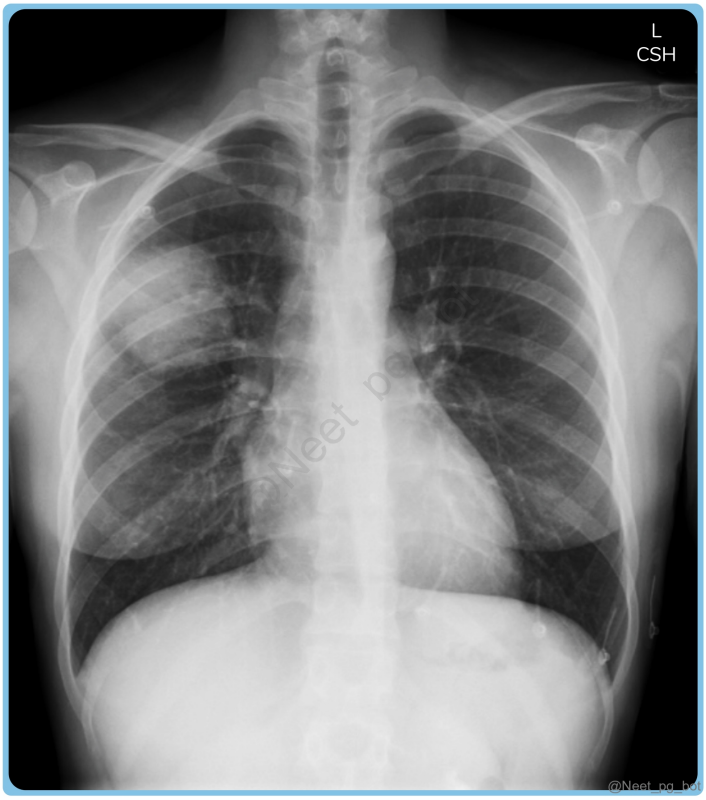
Q17: A patient presented with fever and cough with expectoration. The chest X-ray has been shown below. What is the likely causative organism? (Q859957)

A. Hemophilus influenza

B. Parainfluenza virus

C. Pneumococcus

D. S.aureus



Correct Answer: C. Pneumococcus

Explanation: The chest X-ray showed features of round pneumonia and the patient presented with fever and cough with expectoration, the likely causative organism is Streptococcus pneumoniae. Round pneumonia is a term used to describe a specific radiographic appearance of pneumonia caused by Streptococcus pneumonia. Disease Radiological Findings Staphylococcal Pneumonia (Option D) Air Bronchogram Mycoplasma Pneumonia Reticulonodular Markings Klebsiella Pneumonia Bulging Fissure Sign Legionella Pneumonia Bilateral Multifocal Consolidation Pneumocystis carinii Pneumonia Reticular Shadows and multiple cysts more often in the upper part

of the lungs. Lung Abscess Air-Fluid Level Aspergilloma Fungal ball/ Monad sign Allergic Bronchopulmonary Aspergillosis Gloved-Finger Sign Invasive Aspergillosis Air-Crescent Sign/ Halo sign Adenoid Hypertrophy Adenoid Enlargement Acute Epiglottitis Thumb Sign Croup (Parainfluenza) (Option B) Steeple Sign Mucormycosis Reverse halo sign/Bird nest sign/Atoll sign Haemophilus influenzae (Option A) Patchy or segmental consolidation, may have pleural effusion

References:

https://www.ncbi.nlm.nih.gov/books/NBK534295/

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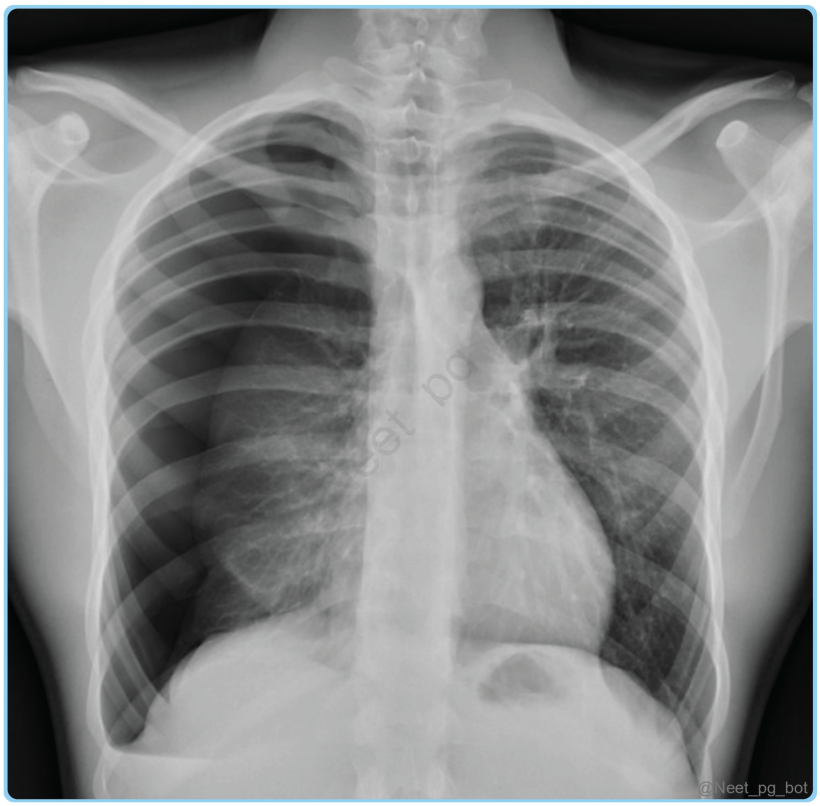
Q18: After a road traffic accident, a patient arrives at the emergency department. Upon examination, the patient is awake and alert, with a blood pressure of 90/60 mm Hg, a respiratory rate of 40 breaths per minute, and a pulse rate of 120 bpm. An X-ray is provided for evaluation. What would be the subsequent course of action in terms of treatment? (Q856059)

A. Chest tube insertion

B. Pericardiocentesis

C. Thoracotomy

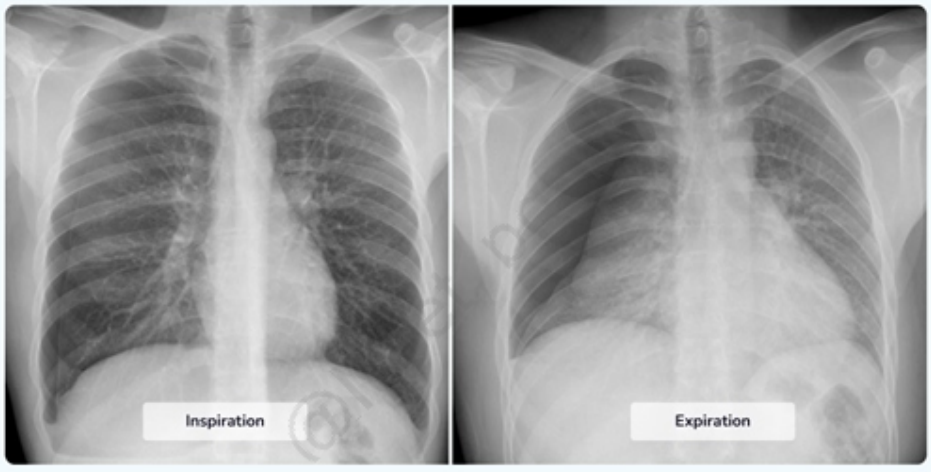
D. Pleurodesis



Correct Answer: A. Chest tube insertion

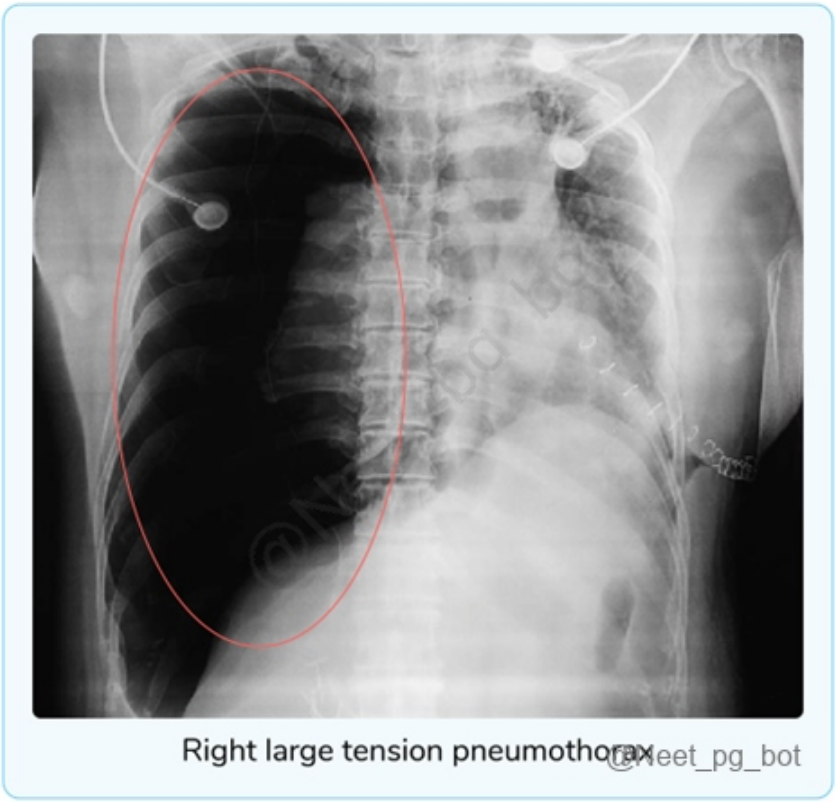
Explanation: The given X-ray shows a right-side pneumothorax and requires immediate intervention. The appropriate next step in management would be inserting a chest tube to decompress the pneumothorax and restore normal lung function. Comparison of Normal and Pneumothorax Lungs: {{caption_text}} {{caption_text}} Parameter Normal Lung Pneumothorax Lung Inspiration Black Black Expiration White Black Radiographic appearance of pneumothorax: Pneumothorax appears as a radiolucent area (black). Pneumothorax pushes the adjacent lung towards the hilum. A sharp radiopaque line separates the pneumothorax from the lung parenchyma. A closed pneumothorax is easily detectable in an expiratory X-ray, as there is a decrease in lung volume. However, the volume of the pneumothorax is not affected by respiration. Approach: Small pleural air is detected by a lateral decubitus radiograph with the non-dependant abnormal side. It is contraindicated for the patient to be positioned with the normal side down and the abnormal side up, as air in the pneumothorax will rise to the non-dependent areas of the thoracic cavity. A horizontal beam “shoot-through” lateral radiograph detects anterior pneumothorax in a supine patient. Tension pneumothorax Loculated pneumothorax Significant contralateral deviation of the mediastinum Collapsed lung Depression of ipsilateral hemidiaphragm {{caption_text}} Ovoid air collection Close to the chest wall Pleural adhesions are seen as line shadows {{caption_text}} Note: Chest X-rays are useful, but a CT scan is considered the most sensitive investigation/ investigation of choice for pneumothorax.

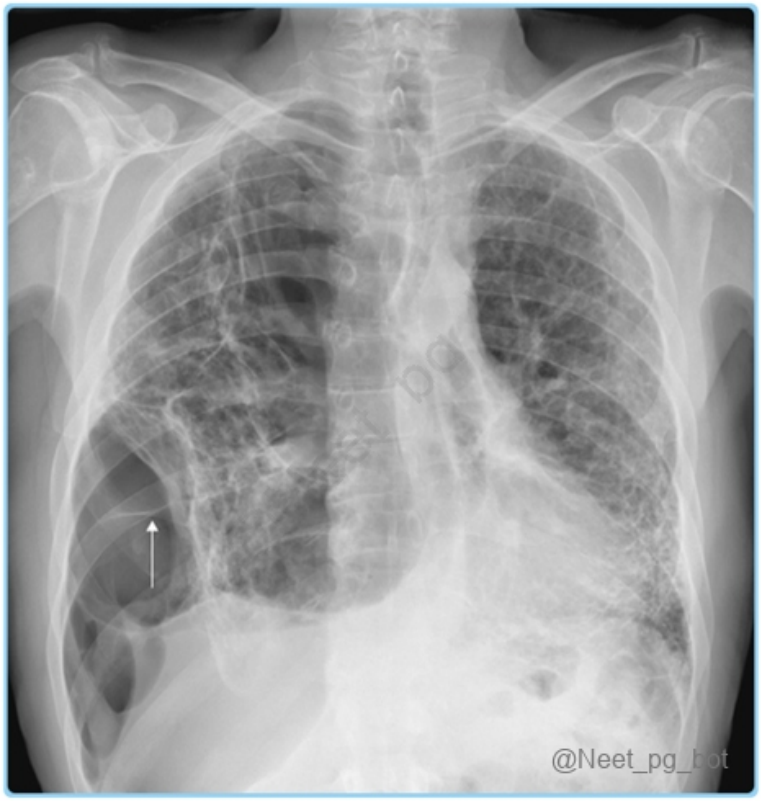




Right sided spontaneous pneumothorax

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References:

https://www.ncbi.nlm.nih.gov/books/NBK441885/

David Sutton Textbook of Radiology and Imaging, Volume 1, 8th edition, Page 928-932.

https://pmc.ncbi.nlm.nih.gov/articles/PMC7390330/

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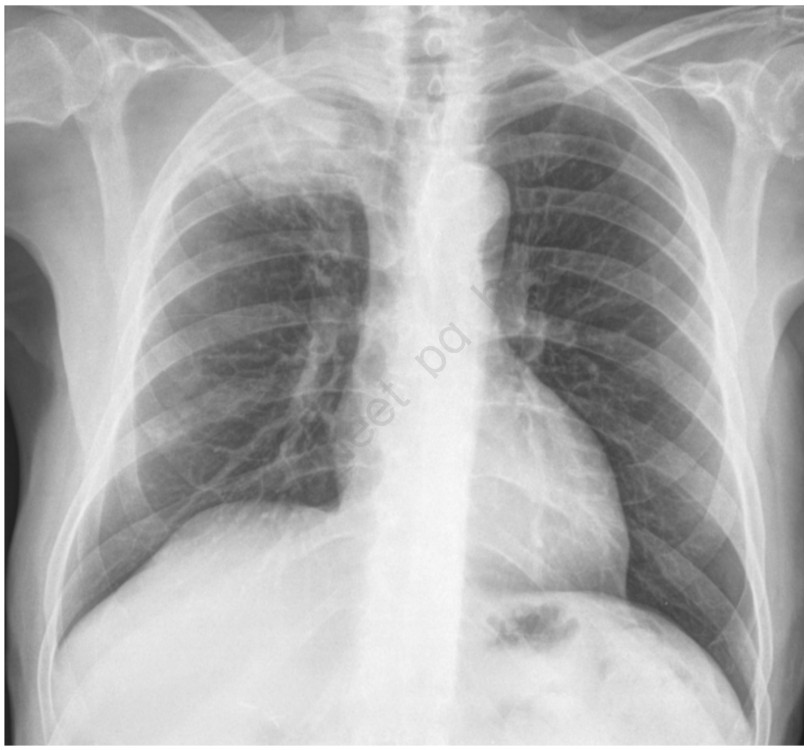
Q19: A 55 year old chronic smoker presents with drooping of the right eyelid, constricted pupil, and absence of sweating on the right side of the face. He also complains of shoulder pain and tingling sensation in the right arm. The chest x-ray of the patient is given below. Which of the following is the best investigation to confirm the diagnosis? (Q878942)

A. Sputum microscopy

B. CT scan-guided biopsy

C. Nerve conduction studies

D. Chest ultrasound



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Correct Answer: B. CT scan-guided biopsy

Explanation: The patient has Horner’s syndrome with shoulder pain , suggestive of Pancoast tumor (apical lung carcinoma) confirmed by CT-guided biopsy . Incorrect Options: Sputum microscopy (Option A): Detects central bronchogenic carcinoma , not apical lesions. Nerve conduction studies (Option C): Used for peripheral neuropathies , not tumor diagnosis. Chest ultrasound (Option D): Poor for evaluating apical lung masses .

References:

Harrison’s principles of internal medicine, 21st Edition, Page 598.

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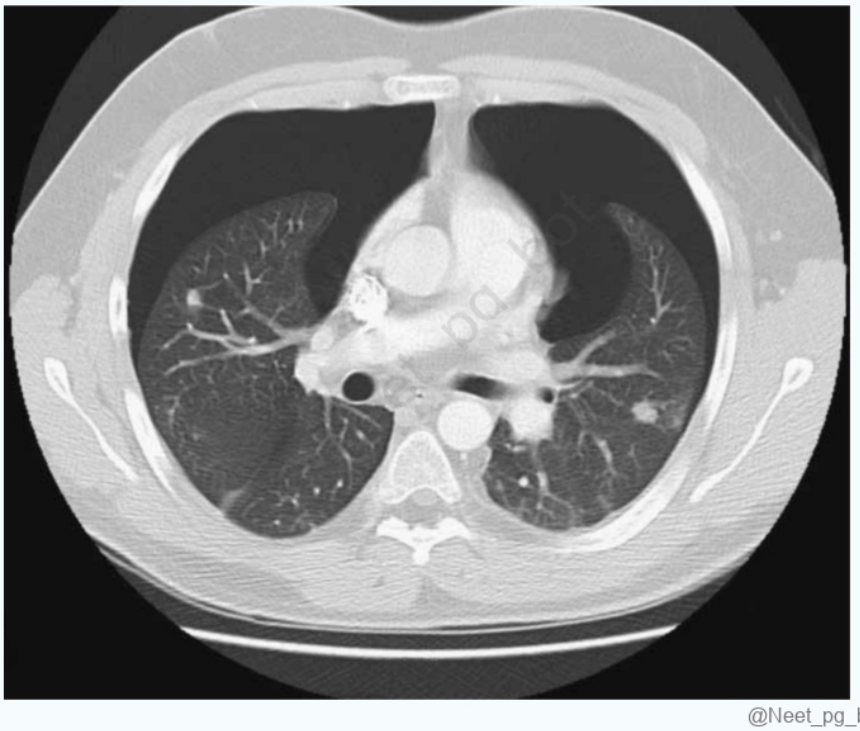
Q20: A 35 year old man presents to the emergency department with sudden onset shortness of breath. Below is the CT of the patient. What is the next best step in management? (Q878943)

A. Needle thoracostomy

B. Intercostal chest tube insertion

C. Sputum microscopy and culture

D. Thoracic ultrasound



Correct Answer: A. Needle thoracostomy

Explanation: The CT likely shows a tension pneumothorax (lung collapse with mediastinal shift). Immediate needle decompression is the lifesaving first step before inserting a chest tube. It rapidly relieves the positive intrathoracic pressure , preventing obstructive shock and cardiorespiratory arrest. Performed at the 2nd intercostal space, midclavicular line (or 5th intercostal space, anterior axillary line with large-bore cannula). Incorrect Options: Intercostal chest tube insertion (Option B) : Done after decompression, not as the initial step in tension pneumothorax. Sputum microscopy and culture (Option C): Not relevant in an acute emergency. Thoracic ultrasound (Option D): Used for diagnosis , not emergency management.

References:

Bailey & Love's short practice of Surgery, 28th Edition, Pages 373, 374.

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Q21: A 42-year-old man presents with a 3-month history of cough that has recently become productive. He also reports one episode of hemoptysis. Chest x -ray of the patient is shown below. Which of the following is the most likely diagnosis? (Q878944)

A. Lung abscess

B. Pulmonary tuberculosis

C. Metastatic carcinoma

D. Bronchiectasis



Correct Answer: B. Pulmonary tuberculosis

Explanation: The X-ray shows cavitary lesion in the upper lobe with surrounding infiltrates and history of cough with hemoptysis suggestive of reactivation (post-primary) tuberculosis . Incorrect Options: Lung abscess (Option A): Usually a single cavity with air–fluid level and acute presentation with high fever and foul sputum. Metastatic carcinoma (Option C): Shows multiple round nodules of varying sizes, not a single cavitary lesion. Bronchiectasis (Option D): Presents with bilateral cystic dilatation and " tram-track " shadows, not a localized upper-lobe cavity.

References:

Harrison's principles of internal medicine, 21st Edition, Pages 1362, 1363.

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Q22: A 25-year-old male presents with a history of low-grade fever and cough. Based on the provided Chest X-ray image, what is the most likely diagnosis? (Q860256)

A. Lung cancer

B. Miliary TB

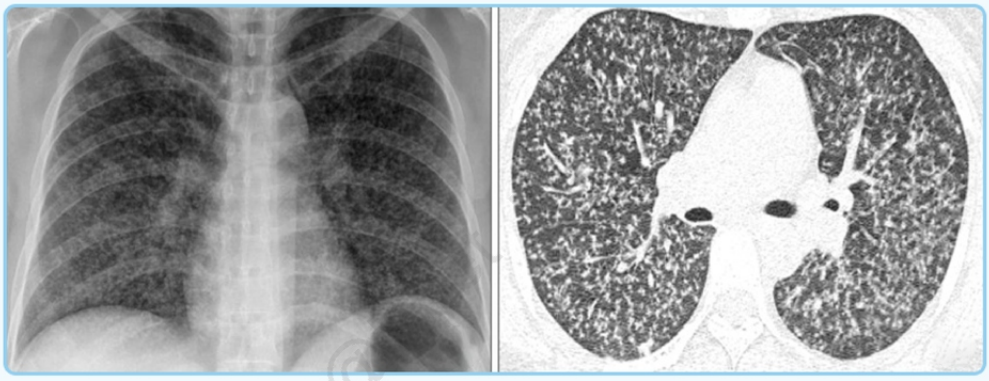
C. ARDS

D. Aspergilloma



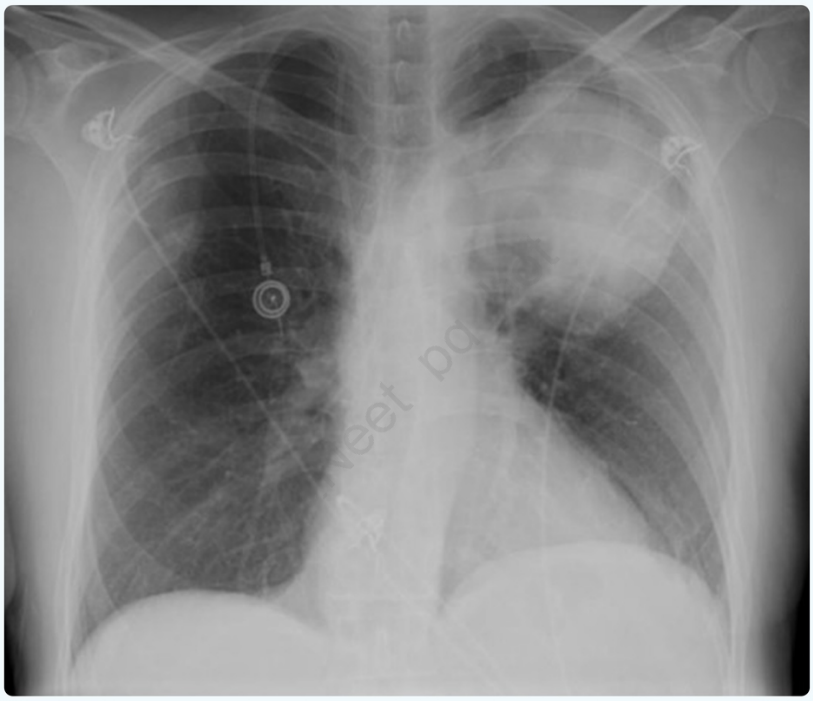
Correct Answer: B. Miliary TB

Explanation: Miliary mottling refers to opacities that resemble millet seeds and are seen in the above Chest X-ray, which are seen in miliary TB (not specific) It can also be seen in metastasis, pulmonary hemosiderosis, or silicosis. Miliary tuberculosis (TB): Severe and disseminated form of tuberculosis (TB), a condition arising from Mycobacterium tuberculosis infection. Results from hematogenous spread of the infection. It can occur in both primary and post-primary pulmonary TB (PTB). Clinically significant miliary TB affects 1% to 7% of all TB cases. Initial chest X-ray (CXR) may appear normal; hyperinflation can be the earliest sign. {{caption_text}} Typical radiographic findings: Small, discrete nodules measuring 1-2 mm in diameter, distributed evenly throughout both lungs. Tree-in-bud nodules are poorly defined and have a patchy distribution. Chest CT: More sensitive than radiographs and reveals a random distribution of miliary nodules. These nodules may enlarge and coalesce, forming focal or diffuse consolidation. They resolve slowly over 2-6 months with adequate treatment, typically without causing scarring or calcification. Miliary nodules signify active infection and are associated with a poor prognosis. Lung cancer (Option A): Typically presents as a solitary nodule or mass, not diffuse tiny nodules. {{caption_text}} ARDS (Option C): This would show bilateral diffuse alveolar infiltrates, not miliary nodules. {{caption_text}} Aspergilloma (Option D): Usually seen as a solid mass (fungus ball) in a pre-existing cavity, not diffuse nodules. A radiologic finding is the air crescent sign , a crescent-shaped radiolucency representing air surrounding the fungus ball within the cavity. {{caption_text}}



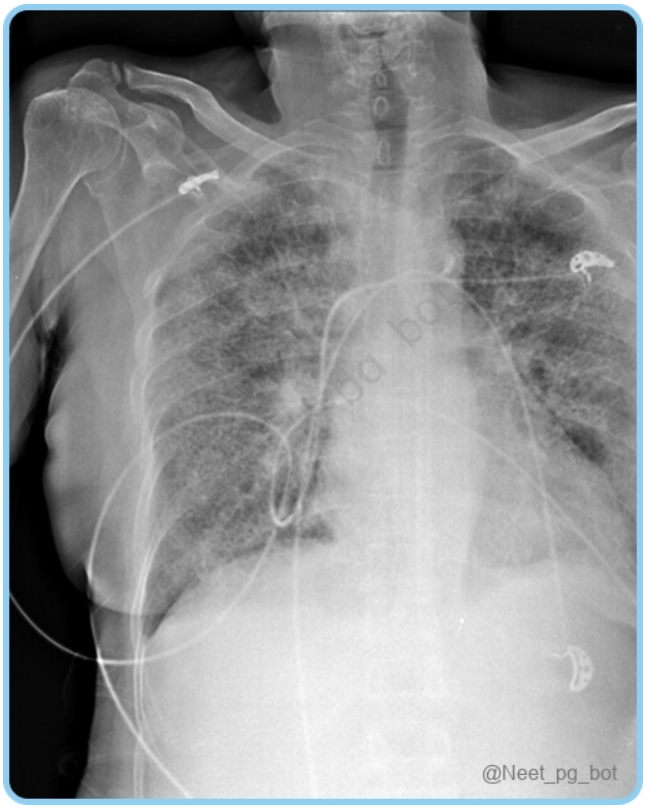
Xray - Miliary tuberculosis CT Miliary TB

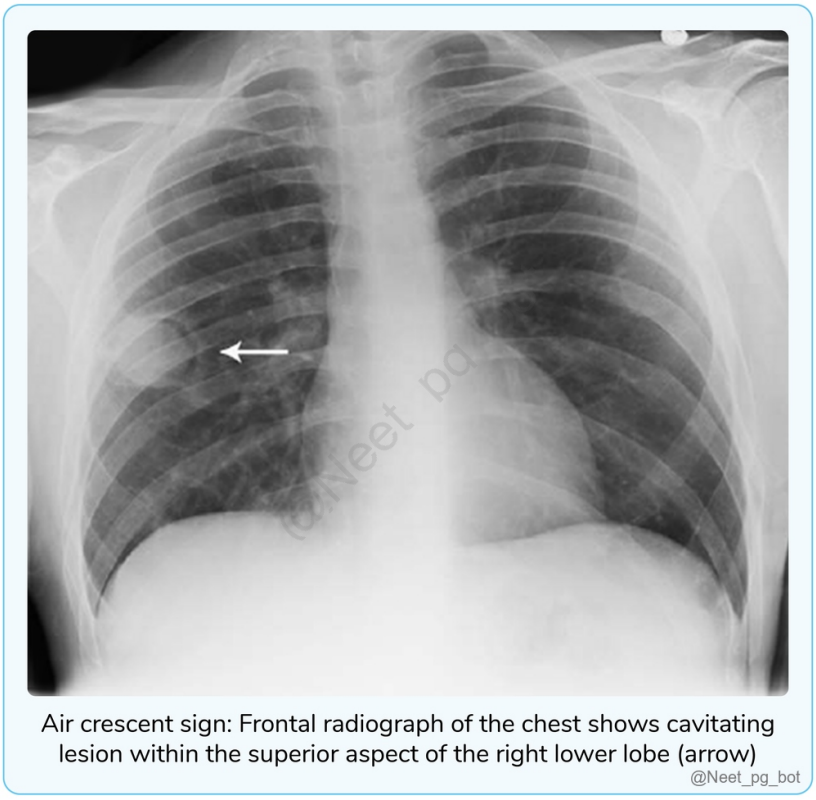
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Chest X-ray showing the left upper lobe lung mass

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Air crescent sign: Frontal radiograph of the chest shows cavitating lesion within the superior aspect of the right lower lobe (arrow)

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References:

David Sutton Textbook of Radiology and Imaging, Volume 1, Page 186,1964

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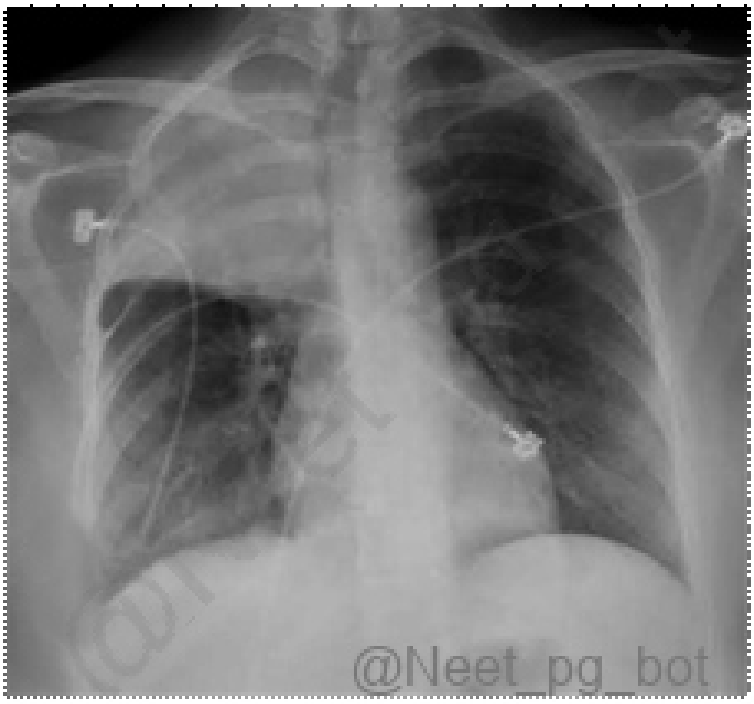
Q23: What is the most probable diagnosis based on the image provided? (Q866518)

A. RUL collapse

B. RUL consolidation

C. Bronchogenic carcinoma

D. Lung abscess



Correct Answer: A. RUL collapse

Explanation: The image shows a tracheal shift towards the right side , which indicates volume loss in the right lung. Right upper lobe (RUL) collapse causes ipsilateral mediastinal shift, elevation of the horizontal fissure, and crowding of ribs. Collapse (atelectasis) results in a "pull" effect, drawing the trachea towards the affected side - unlike a mass or effusion, which usually pushes it away. RUL consolidation (Option B): No significant volume loss, so trachea usually remains central or shifts away slightly if there is a large mass effect. Bronchogenic carcinoma (Option C): May cause collapse if obstructing bronchus, but the primary radiological sign here is collapse itself, not the mass. Lung abscess (Option D): Produces a cavity with air-fluid level but does not typically cause significant tracheal shift toward the lesion unless there is secondary collapse.

References:

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Q24: A 47-year-old diabetic patient presents with fever, malaise, and productive cough. Which of the following is an incorrect statement? (Q852787)

A. Patchy infiltrates are seen in pyogenic pneumonia

B. Interstitial infiltrates are seen in Mycoplasma pneumonia

C. Hilar lymphadenopathy with lung infiltrates is seen in malignancy

D. Aspiration pneumonia is more common in the posterior segment of the upper lobes and superior segment of the lower lobes

Correct Answer: A. Patchy infiltrates are seen in pyogenic pneumonia

Explanation: The most common cause of community-acquired pyogenic pneumonia is Streptococcus pneumoniae (pneumococcus). The most common imaging pattern seen on a chest X-ray for pneumococcal pneumonia is lobar consolidation; meaning a homogeneous consolidation affecting one or more lobes of the lung Patchy infiltrates are not typical for pyogenic pneumonia caused by Streptococcus pneumoniae. Classification of Pneumonia Based on Imaging Pattern: Lobar Pneumonia: Unifocal consolidation, most commonly caused by Streptococcus pneumoniae . In children under 8 years, may appear as “Round Pneumonia” with ill-defined margins. Air bronchograms are common due to patent airways and minimal volume loss. Bronchopneumonia (Lobular Pneumonia): Multifocal distribution, centered around distal airways. Heterogeneous scattered opacities along airway course, coalescing in severe cases. Air bronchogram absent due to airway involvement. Atypical Pneumonia: Features distinct from lobar or bronchopneumonia (discussed in the table below). Causative Agent Specific Imaging Features Streptococcus pneumoniae Most common cause of community-acquired lobar pneumonia in adults. Staphylococcus aureus Common in debilitated patients / superinfection in influenza / secondary to IV drug abuse. Cavitation common in later radiographs. Pneumatoceles (seen in children during recovery phase). Klebsiella pneumoniae Occurs in elderly and alcoholics, usually involves the right upper lobe (RUL). Bulging of fissures due to increased involved lung volume. Legionnaire’s disease (Legionella pneumophila) Rapidly spreading pneumonia from contaminated water sources (ACs, coolers, showers). Also presents with diarrhea, mental confusion (hyponatremia), and shock. Actinomycosis Can mimic bronchogenic carcinoma. Soft tissue/bone involvement (periostitis) – key differentiating feature. CT: Peripheral homogeneous consolidation with central low attenuation and pleural thickening (diagnostic feature). Atypical pneumonia (Most common cause: Mycoplasma pneumoniae) Atypical organism (lacks cell walls, resistant to penicillins). Fine reticular/nodular shadows in perihilar region early, which may progress to consolidation (rare lobar involvement). WBC count usually normal. Presents with non-productive cough, absent/minimal sputum. Not aspiration-related. Common in poorly maintained air-conditioned areas. Other viral causes: Influenza A & B, RSV, Adenovirus, Chlamydia psittaci, Coxiella burnetii (Q fever). Varicella pneumonia Predominantly nodular opacities (5–10 mm). If persistent, may calcify,

leading to miliary shadows on CXR. Interstitial infiltrates are seen in Mycoplasma pneumonia (Option B): Mycoplasma pneumonia typically causes atypical pneumonia , with interstitial infiltrates rather than lobar consolidation. Hilar lymphadenopathy with lung infiltrates is seen in malignancy (Option C): Lung cancer, especially small cell carcinoma and lymphoma , commonly presents with hilar lymphadenopathy along with parenchymal lung infiltrates. Aspiration pneumonia is more common in the posterior segment of the upper lobes and superior segment of the lower lobes (Option D): Aspiration pneumonia classically affects the dependent lung segments , particularly the posterior segment of the upper lobes and the superior segment of the lower lobes , especially in supine patients .

References:

https://radiopaedia.org/articles/lobar-pneumonia

https://ajronline.org/doi/10.2214/ajr.175.6.1751533#:~:text

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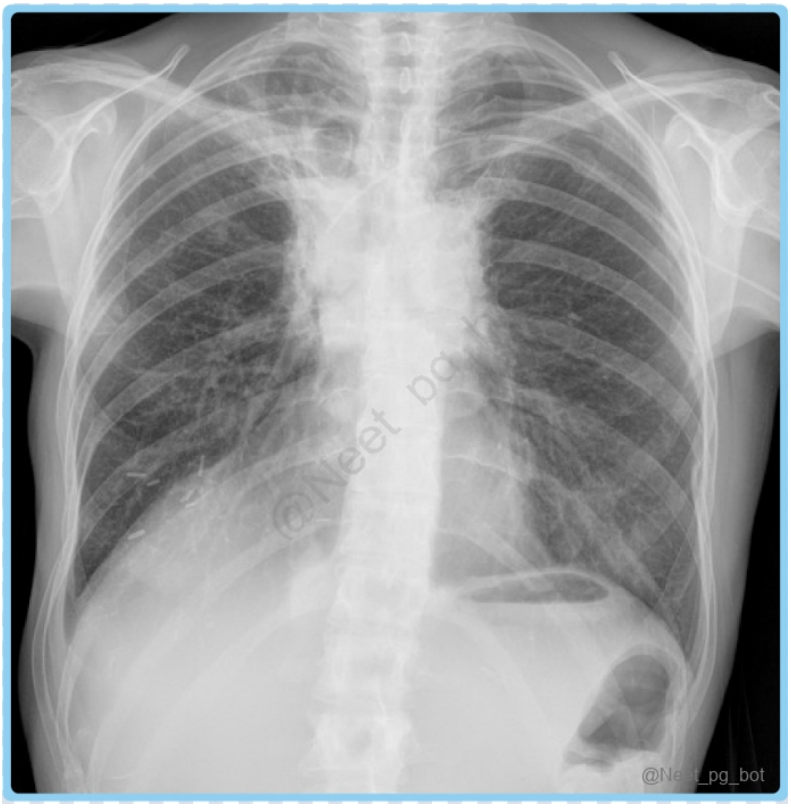
Q25: A patient with a history of breast cancer underwent Cobalt-60 radiotherapy. She now presents with respiratory distress, and imaging shows haziness in the left lung. What is the most likely diagnosis? (Q852579)

A. Radiation Pneumonitis

B. Recurrence of Breast Cancer

C. Pulmonary Embolism

D. Infective Pneumonia



Correct Answer: A. Radiation Pneumonitis

Explanation: History of Cobalt-60 Radiotherapy: The patient has undergone radiotherapy for breast cancer , which is a known risk factor for radiation pneumonitis . Symptoms of Respiratory Distress: Radiation pneumonitis typically presents weeks to months after radiotherapy with dyspnea, dry cough, and low-grade fever . Imaging Findings (Haziness in Left Lung): Chest X-ray or CT often shows hazy opacities in the irradiated lung field , which is characteristic of radiation-induced lung injury. Radiation Pneumonitis Feature Details Cause Radiation damage to lung tissue, commonly from breast, lung, or esophageal cancer radiotherapy Onset 4-12 weeks post-radiotherapy Symptoms Dry cough, dyspnea, low-grade fever, chest pain Imaging Hazy opacities in the irradiated lung field (CT: ground-glass opacities, consolidation) Treatment Corticosteroids (prednisone), supportive care Recurrence of Breast Cancer (Option B): Incorrect because recurrence usually presents with lung nodules or pleural effusion , not diffuse haziness. Pulmonary Embolism (Option C): Incorrect because PE typically presents with sudden pleuritic chest pain , clear lung fields on X-ray , and wedge-shaped infarcts on CT pulmonary angiography . Infective Pneumonia (Option D): Incorrect because pneumonia usually presents with fever, productive cough , and lobar consolidation , whereas radiation pneumonitis causes non-infective lung inflammation.

References:

Perez & Brady’s Principles and Practice of Radiation Oncology, 7th edition- Pdf Page 96, 571, 572.

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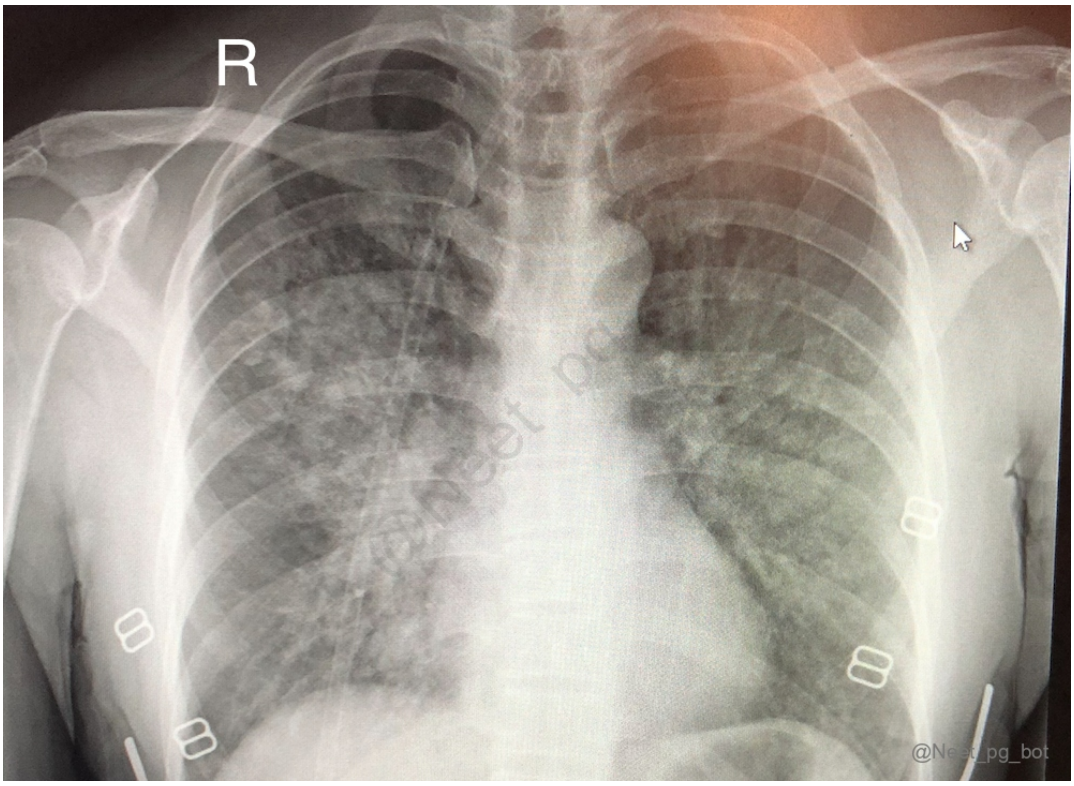
Q26: What is the most likely diagnosis? (Q852589)

A. Pulmonary oedema

B. Hydrothorax

C. Pleural effusion

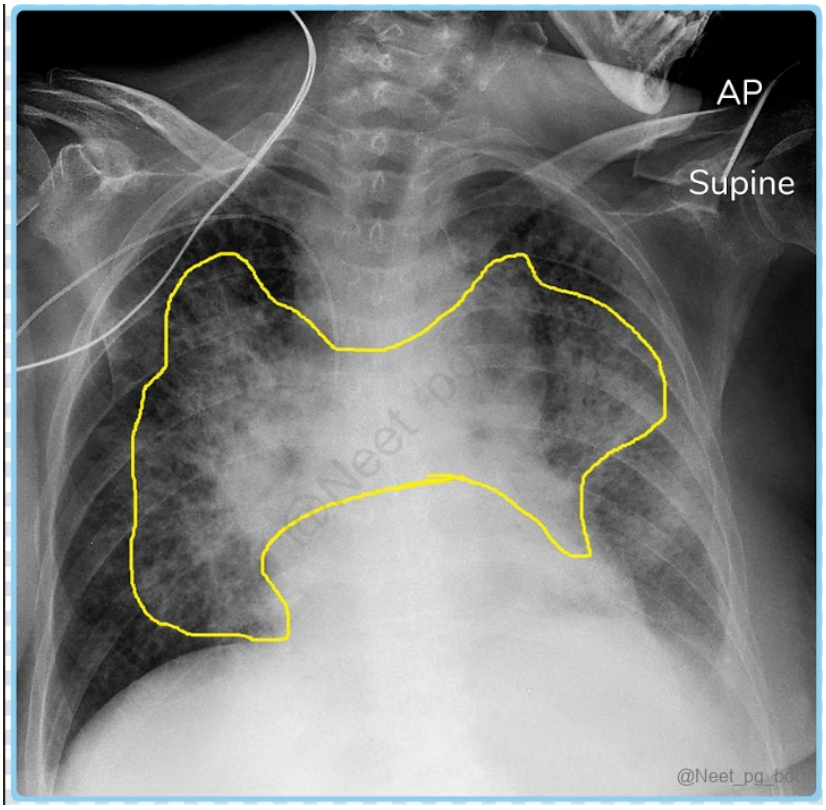
D. Pulmonary fibrosis

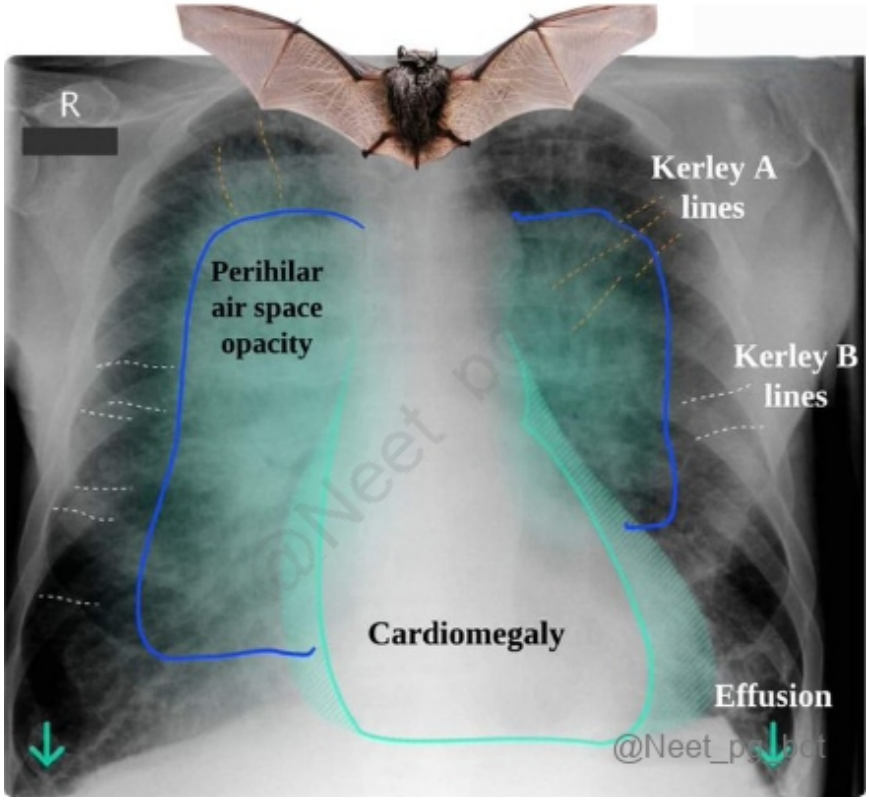


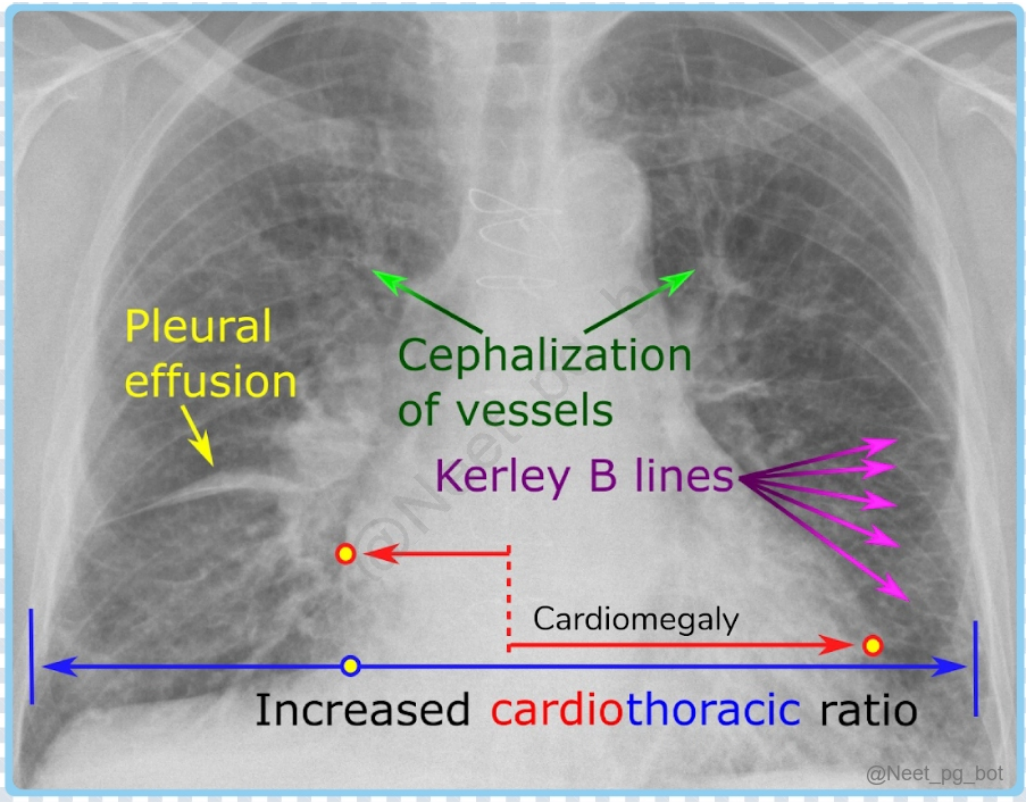
Correct Answer: A. Pulmonary oedema

Explanation: Pulmonary oedema Explaantion: The provided chest X-ray appears to show bilateral diffuse alveolar opacities , which are characteristic of pulmonary edema . Diffuse bilateral infiltrates in a butterfly or bat-wing pattern are seen, which suggests pulmonary edema. Engorgement of pulmonary vessels and Kerley B lines (septal lines) are often present. The presence of a central distribution of opacities sparing the periphery is highly suggestive. Cardiogenic pulmonary oedema often shows an enlarged cardiac silhouette , indicating heart failure as the underlying cause. Pulmonary Edema Feature Cardiogenic Pulmonary Edema Non-Cardiogenic Pulmonary Edema Cause Left heart failure, volume overload ARDS, infections, sepsis, toxins X-ray Findings A-A lveolar oedema (Bat wings) B- Kerley B lines C-C ardiomegaly D-D ilated Upper lobe vessels E -Pleural E ffusion Diffuse alveolar infiltrates, normal heart size Symptoms Dyspnea, orthopnea, pink frothy sputum Severe hypoxia, respiratory distress Treatment Diuretics, nitrates, and oxygen treat CHF Oxygen, and ventilatory support, treat the underlying cause Xray findings of Cardiogenic pulmonary edema: Chest X-ray showing Batwing appearance due to Alveolar edema Chest X-ray showing Kerley B lines, Cardiomegaly, Dilated vessels of upper lobe and mild pleural effusion. Hydrothorax (Option B): H ydrothorax refers to fluid in the pleural space (pleural effusion due to CHF, liver disease), which appears as a blunted costophrenic angle and fluid meniscus , not diffuse infiltrates.

Pleural Effusion (Option C): Pleural effusion appears as homogeneous opacity with meniscus sign rather than diffuse alveolar opacities. Pulmonary Fibrosis (Option D): Pulmonary fibrosis presents as reticular opacities, honeycombing, and reduced lung volumes , unlike the alveolar pattern seen here.







References:

Grainger and Allison's Textbook of Diagnostic Radiology. 7th edition. Page. 251- 256

↑ *Back to this question in Part A*

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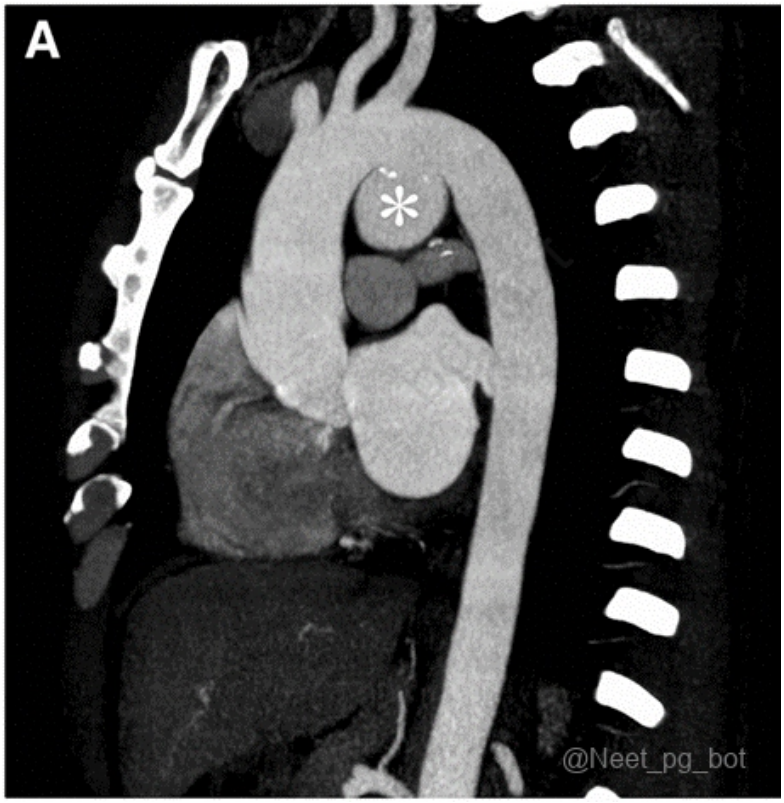
Q27: A 38-year-old patient presents with chest pain and hoarseness of voice for the past month. Based on the radiographic image provided, what is the most likely diagnosis? (Q843910)

A. Saccular aneurysm of the distal arch

B. Dissecting aneurysm of the arch of the aorta

C. Coarctation of the aorta

D. Stenosis of the aorta



Correct Answer: A. Saccular aneurysm of the distal arch

Explanation: Correct Option A - Saccular aneurysm of the distal arch: The clinical presentation and radiographic findings of a localized outpouching on the aorta are consistent with a saccular aneurysm of the aortic arch. The patient presents with chest pain and hoarseness of voice, which suggests the involvement of the left recurrent laryngeal nerve—a phenomenon known as Cardiovocal Syndrome (Ortner syndrome). Key features of Saccular Aneurysm: Focal, asymmetric outpouching from one side of the vessel wall Has a distinct neck Often occurs at the aortic arch, especially near the ligamentum arteriosum Can compress adjacent structures (recurrent laryngeal nerve → hoarseness) Higher risk of rupture than fusiform aneurysms Incorrect Options: Options B: Dissecting aneurysm: Would show an intimal flap separating true and false lumens, creating a "double-barrel" appearance - not seen here Option C: Coarctation of aorta: Shows focal narrowing typically at the aortic isthmus (just distal to left subclavian artery), often with "figure of 3" sign on X-ray - this shows dilatation, not narrowing Option D: Stenosis of aorta: Would show narrowing, not a saccular outpouching

References:

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↑ *Back to this question in Part A*

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Q28: A 45-year-old patient presents with ptosis and muscle weakness that improves with rest. She also complains of dysphagia and has engorged veins in her thorax.

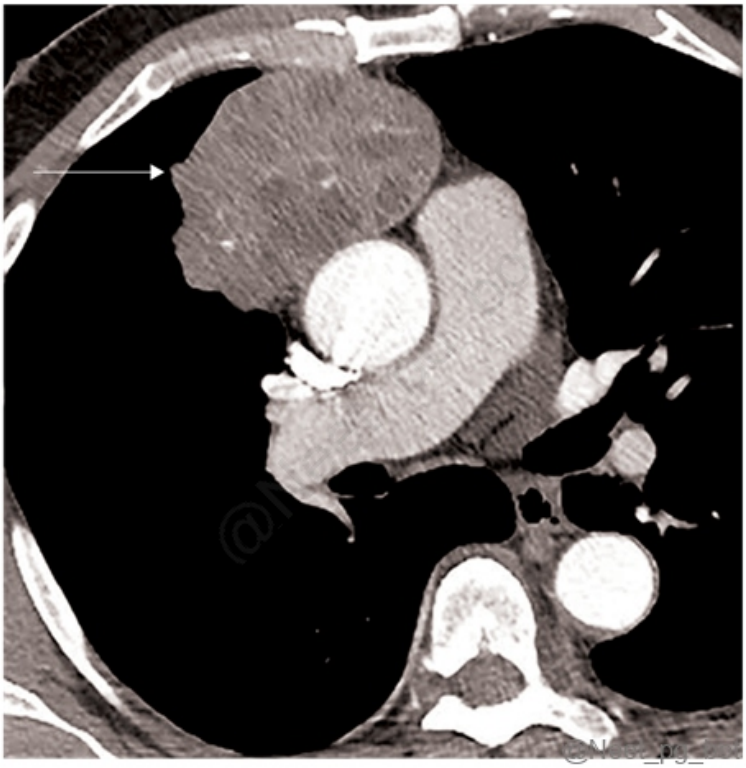
Based on the CT scan image provided, what is the most likely diagnosis? (Q843911)

A. Thymoma

B. Pancoast tumor

C. Adenocarcinoma

D. Small cell lung cancer



Correct Answer: A. Thymoma

Explanation: Correct Option A – Thymoma: Thymomas are the most common neoplasm of the thymus gland and typically present as anterior mediastinal mass. Myasthenia gravis is commonly associated with thymomas. Dysphagia and engorged thoracic veins suggest compression of the esophagus and superior vena cava. The CT also shows an anterior mediastinal mass, which supports the diagnosis. Incorrect Options: Options B, C, and D are not associated with the given findings.

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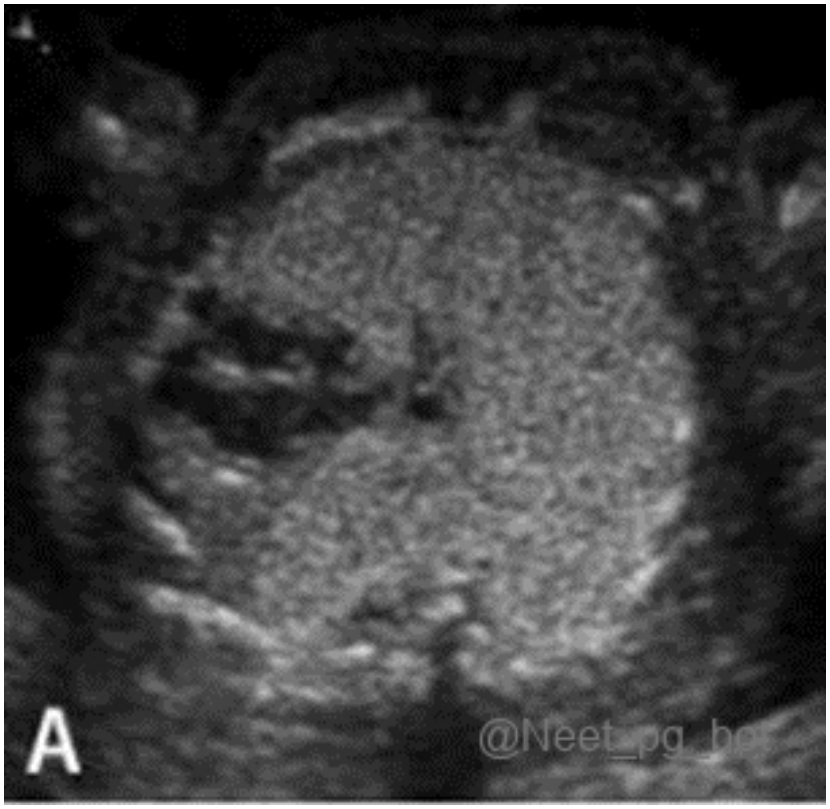
Q29: A 3-year-old child presents with respiratory distress and a history of recurrent respiratory infections. Based on the radiographs provided, what is the most likely diagnosis? (Q843928)

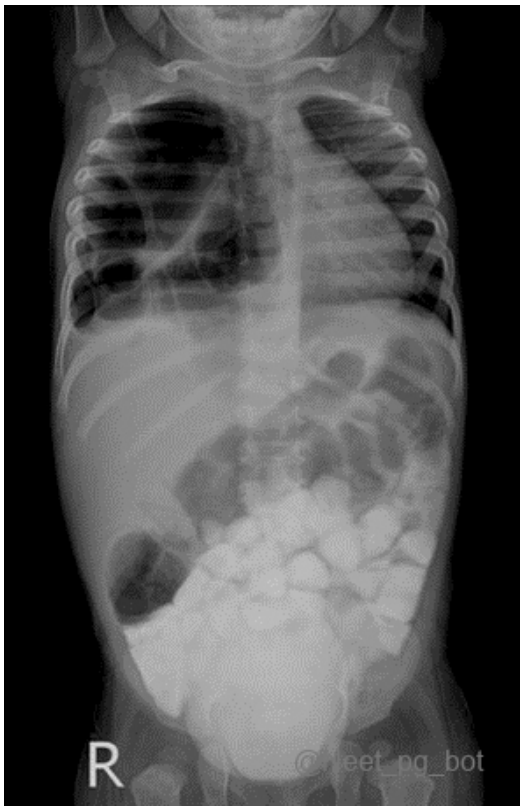
A. Lung abscess

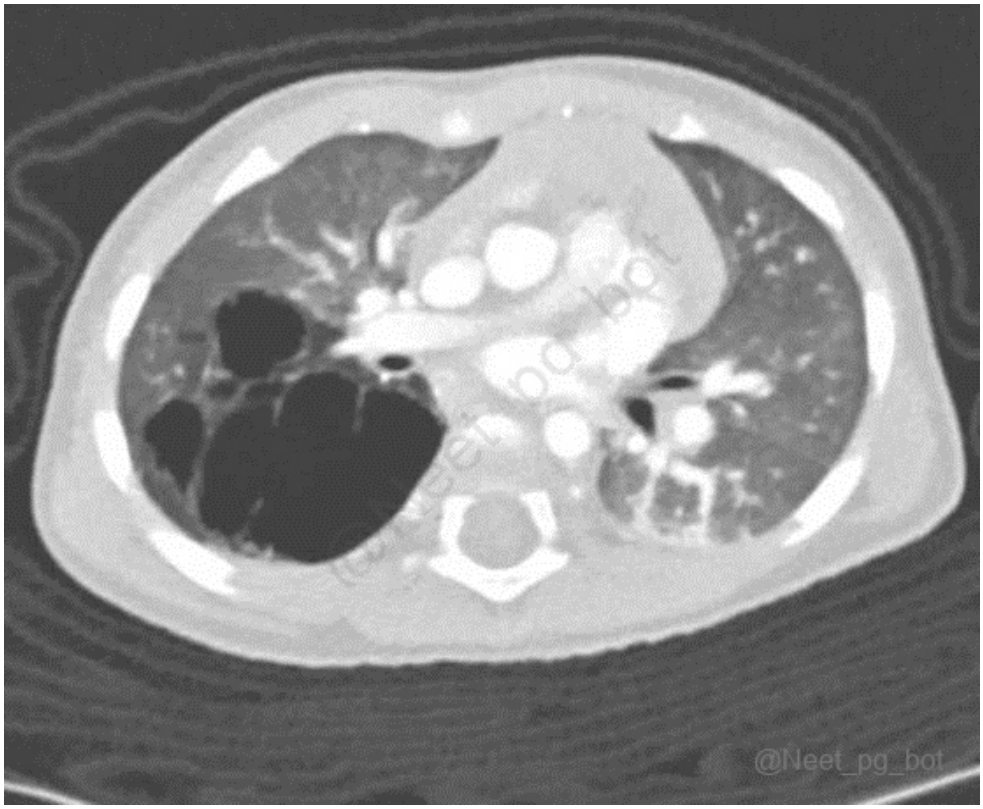
B. Congenital pulmonary airway malformation

C. Pyopneumothorax

D. Congenital diaphragmatic hernia

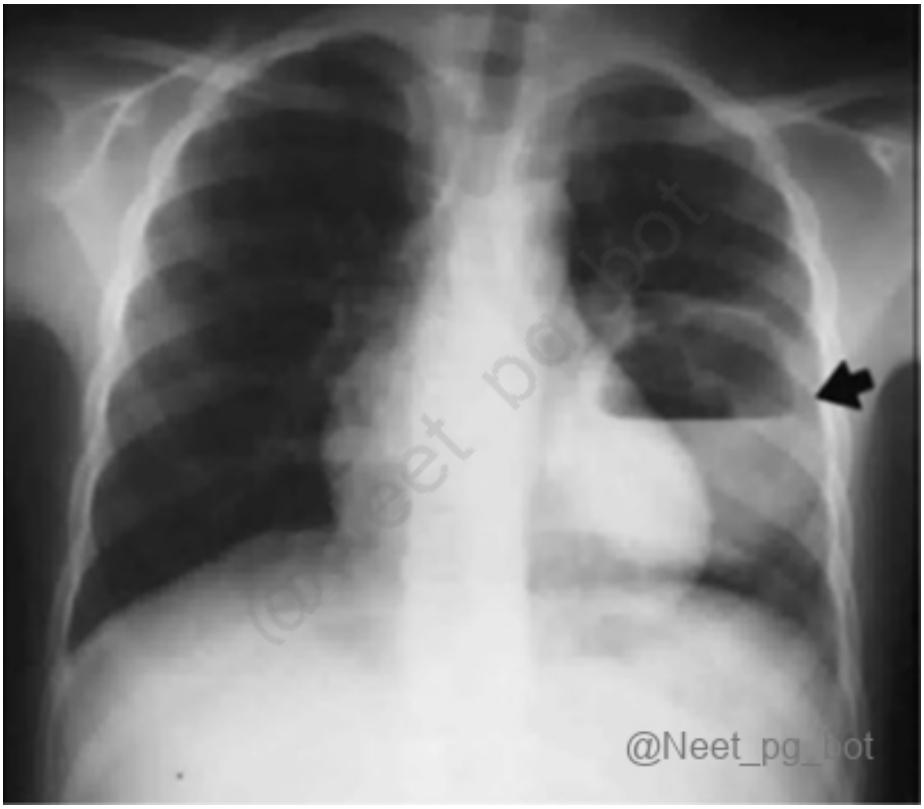


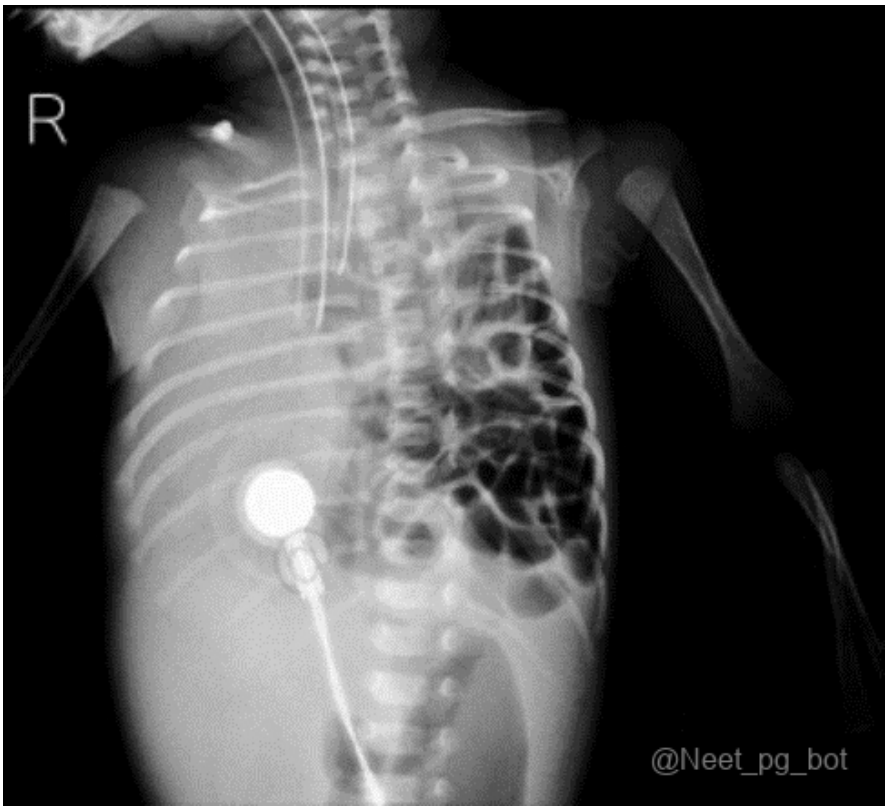




Correct Answer: B. Congenital pulmonary airway malformation

Explanation: Correct Option B - Congenital pulmonary airway malformation: Ultrasound: Shows a cystic lesion in the chest Chest X-ray: Shows multiple air-filled cysts in the left hemithorax with mediastinal shift CT scan: Shows multiple air-filled cysts of varying sizes in the left lung with normal right lung These findings along with the given clinical features are diagnostic of Congenital Pulmonary Airway Malformation (CPAM), formerly called Congenital Cystic Adenomatoid Malformation (CCAM) Key features of CPAM: Congenital abnormality with multiple cysts of varying sizes Can present in childhood with recurrent infections or respiratory distress Shows multiple air-filled cysts on imaging Usually unilateral and localized to one lobe or segment May have been detected on antenatal ultrasound Incorrect Options: Option A - Lung abscess: A lung abscess typically appears on imaging as a thick-walled cavity within the lung, often containing an air-fluid level. Option C – Pyopneumothorax: Pyopneumothorax will show an air-fluid level, and loss of silhouette with the dome of the diaphragm may be seen. Option D - Congenital diaphragmatic hernia: CDH occurs when abdominal organs herniate into the thoracic cavity due to a defect in the diaphragm.





References:

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↑ *Back to this question in Part A*

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Q30: A 25-year-old patient presented with acute epigastric pain and elevated serum lipase. He was stabilized after three days. What is the most common pathology associated with the chest X-ray obtained? (Q843948)

A. Acute Respiratory Distress Syndrome (ARDS)

B. Acute pulmonary edema

C. Pulmonary thromboembolism

D. Miliary tuberculosis (TB)



Correct Answer: A. Acute Respiratory Distress Syndrome (ARDS)

Explanation: The patient has acute pancreatitis (suggested by epigastric pain + elevated serum lipase). ARDS is a known pulmonary complication of acute pancreatitis , especially in severe cases due to inflammatory cytokine release. ARDS typically develops within a few days of the primary illness and can be seen on chest X-ray as bilateral diffuse alveolar infiltrates without cardiomegaly. Abdominal Pathology Causing Pulmonary Complications Condition Primary Event Lung Complication Time of Onset Imaging Finding Acute pancreatitis Inflammation, enzyme release ARDS Within 24–72 hours Bilateral infiltrates (non-cardiogenic) Heart failure Volume overload Pulmonary edema Variable Bilateral perihilar haziness + cardiomegaly Pulmonary embolism Thrombus in pulmonary arteries Infarcts, pleural-based opacities Sudden onset Wedge-shaped infarcts on CXR/CT Miliary TB Disseminated TB infection Miliary nodules throughout lung Subacute/chronic Uniform millet-sized nodules Acute pulmonary edema (Option B): Incorrect because this usually shows perihilar bat-wing pattern and is associated with cardiac causes , which are not suggested here. Pulmonary thromboembolism (Option C): Incorrect as there is no sudden-onset dyspnea, chest pain, or risk factors for DVT/PE ; and CT chest is usually needed, not just CXR. Miliary TB (Option D): Incorrect because miliary TB is chronic , not acute, and has constitutional symptoms (fever, weight loss) ; not consistent with acute pancreatitis history.

References:

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Q31: A patient presents with foul-smelling sputum, breathlessness, and fever. Based on the X-ray below, what is the most likely diagnosis? (Q843966)

A. Lung abscess

B. Pneumothorax

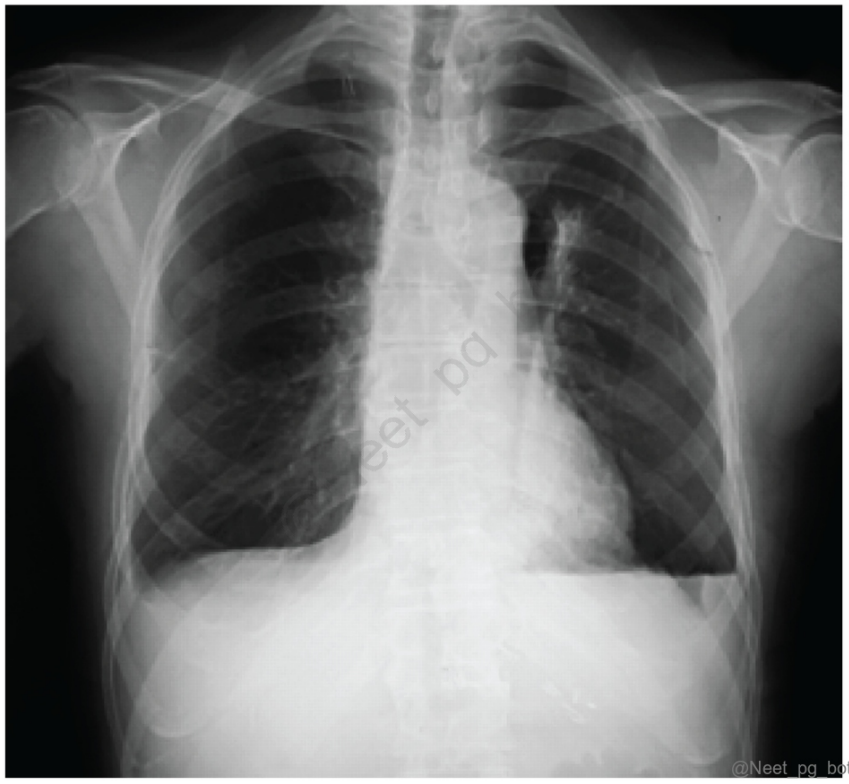
C. Pleural effusion

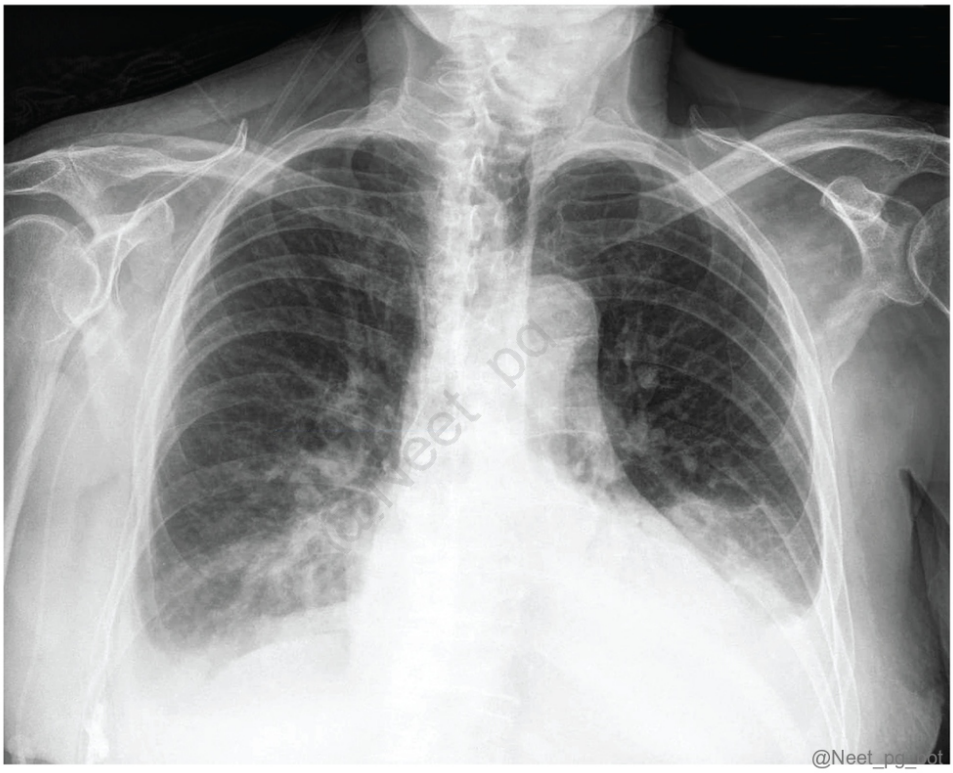
D. Pericardial effusion

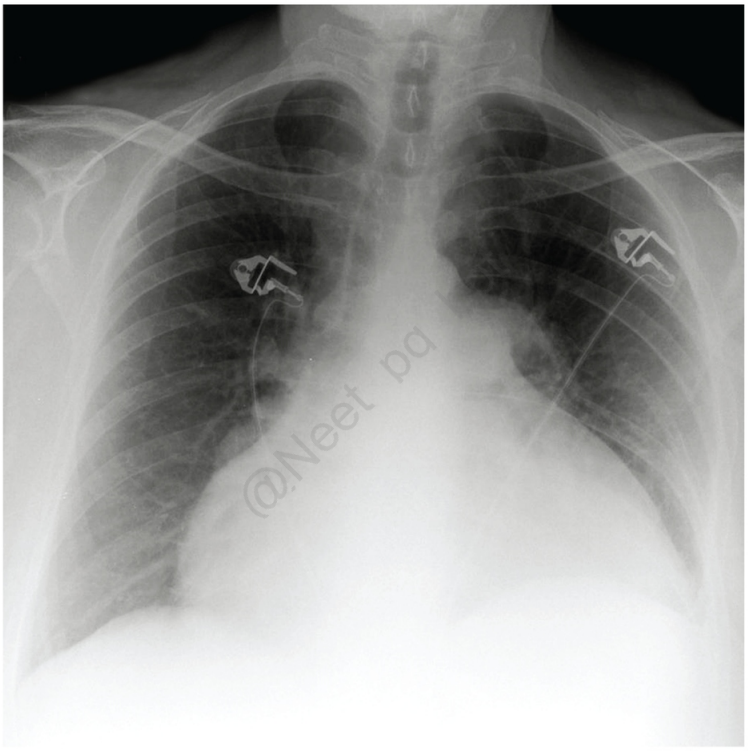


Correct Answer: A. Lung abscess

Explanation: Correct Option A - Lung abscess: The given image shows an abscess cavity with an air-fluid level. The clinical presentation and the x-ray findings suggest a lung abscess. Incorrect Options: Option B - Pneumothorax: It will appear black on X-ray. Option C - Pleural effusion: In the PA view, the fluid starts accumulating in the costophrenic angle (dependent part). So, blunting of the costophrenic angle is present. Option D - Pericardial effusion: Pericardial effusion will show water bottle configuration.


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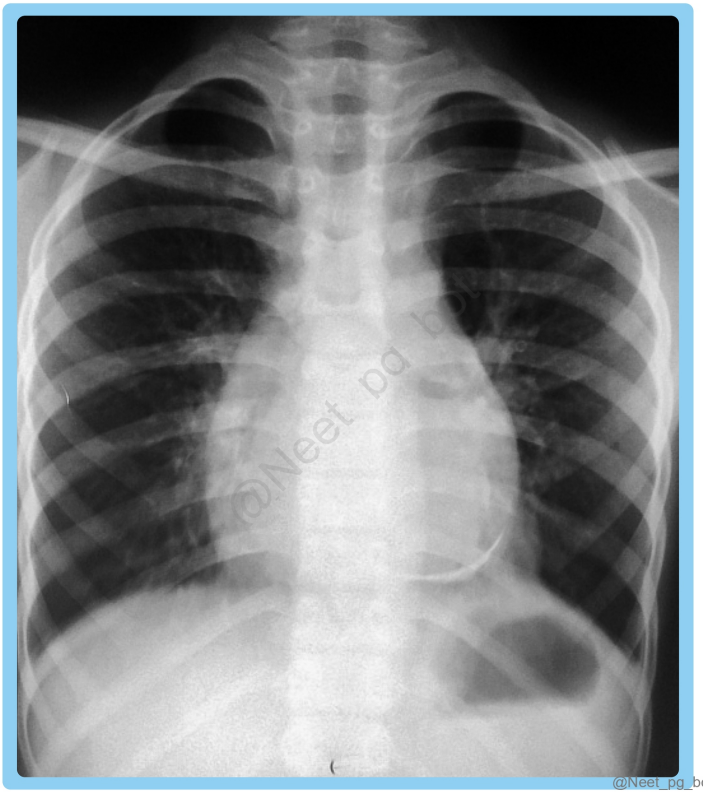
Q32: A patient complains of difficulty breathing, and fatigue. On examination, distended neck veins and muffled heart sounds were found. X-ray is shown below. Identify the disease. (Q860595)

A. Constrictive pericarditis

B. Bronchial asthma

C. Acute pericarditis

D. Atrial myxoma



Correct Answer: A. Constrictive pericarditis

Explanation: The X-Ray image is suggestive of Constrictive pericarditis and the clinical features are also consistent with Constrictive pericarditis. It is a condition in which granulation tissue formation in the pericardium results in loss of pericardial elasticity leading to restriction in the ventricular filling X-ray appearance: Egg in cup appearance IOC: CT scan Constrictive Pericarditis: Pathophysiology: Progressive thickening, fibrosis, and calcification of the pericardium restrict heart filling. Calcification can extend into the myocardium, impairing myocardial contraction. Restricted ventricular filling leads to elevated atrial pressures, causing: Atrial hypertrophy Atrial dilation Atrial fibrillation (common). Primarily manifests as systemic venous congestion (lung congestion is rare). Examination Findings: Finding Description Elevated JVP with rapid y descent Reflects rapid early diastolic filling of the right ventricle due to pressure gradient. Fatigue Caused by the heart's inability to meet circulatory demands. Rapid, low-volume pulse Restricted filling limits stroke volume, weakening the pulse. Pericardial knock A loud early S3 from the thickened pericardium during diastolic filling. Kussmaul's sign Paradoxical rise in JVP during inspiration. Hepatomegaly Liver enlargement due to i ncreased venous pressure. Ascites Abdominal fluid accumulation due to systemic venous congestion. Peripheral oedema Swelling in the extremities from fluid retention. Pulsus paradoxus A fall in systolic BP (10mm Hg) during inspiration, potentially impalpable pulse. Atrial fibrillation Common due to atrial hypertrophy and dilation. Investigations: Investigation Purpose/Details Chest X-ray Egg in a cup appearance Detects pericardial calcification, a key diagnostic clue. Echocardiography Visualises thickened pericardium and assesses cardiac function. CT scanning Helps in visualising pericardial calcification. Complex echo-Doppler and cardiac catheterisation Square root wave sign Used to differentiate constrictive pericarditis from restrictive cardiomyopathy when diagnosis is uncertain. Management: Management Type Treatment Purpose/Details Medical Management Diuretics (e.g., loop diuretics, spironolactone) Helps manage diastolic heart failure by reducing fluid overload. Surgical Management Pericardiectomy Definitive treatment through surgical removal of the diseased pericardium. Significant improvement is possible, but the procedure has high complication risk and suboptimal outcomes in up to 50% of patients. Bronchial asthma (Option

B): This can present as pulmonary hyperinflation, bronchial wall thickening and peribronchial cuffing Acute pericarditis (Option C): A flask shaped, enlarged cardiac silhouette will be observed in this condition. Atrial myxoma (Option D): This can present with cardiomegaly, left atrial enlargement, vascular redistribution, prominent pulmonary trunk

References:

Davidson’s Principles and Practice of Medicine, 24th Edition, Page 543, 544

↑ *Back to this question in Part A*

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Q33: Identify the condition shown in the chest X-ray of a sand mine worker. What is the most likely diagnosis? (Q866872)

A. Sarcoidosis

B. Tuberculosis

C. Silicosis

D. Pneumoconiosis due to asbestos



Correct Answer: C. Silicosis

Explanation: Silicosis is a pneumoconiosis caused by chronic inhalation of crystalline silica dust, common in occupations such as sand mining, stone cutting, and quarrying. Inhaled silica particles are phagocytosed by alveolar macrophages, leading to their death and the release of inflammatory mediators, which stimulate fibroblast proliferation and collagen deposition, resulting in progressive pulmonary fibrosis . On chest X-ray, the hallmark finding is "eggshell calcification" — a thin rim of calcification along the periphery of enlarged hilar lymph nodes. Parenchymal findings often include small rounded opacities (upper lobe–predominant nodules) that may coalesce over time, forming progressive massive fibrosis. Incorrect Options: Sarcoidosis (Option A): Bilateral hilar lymphadenopathy without eggshell calcification; may show parenchymal reticulonodular pattern. Tuberculosis (Option B): Can complicate silicosis (“silicotuberculosis”), but primary TB shows consolidation, cavitation, or miliary nodules, not classic eggshell calcification. Asbestosis (Option D): Lower lobe–predominant interstitial fibrosis with pleural plaques (often calcified), not hilar lymph node eggshell calcification.

References:

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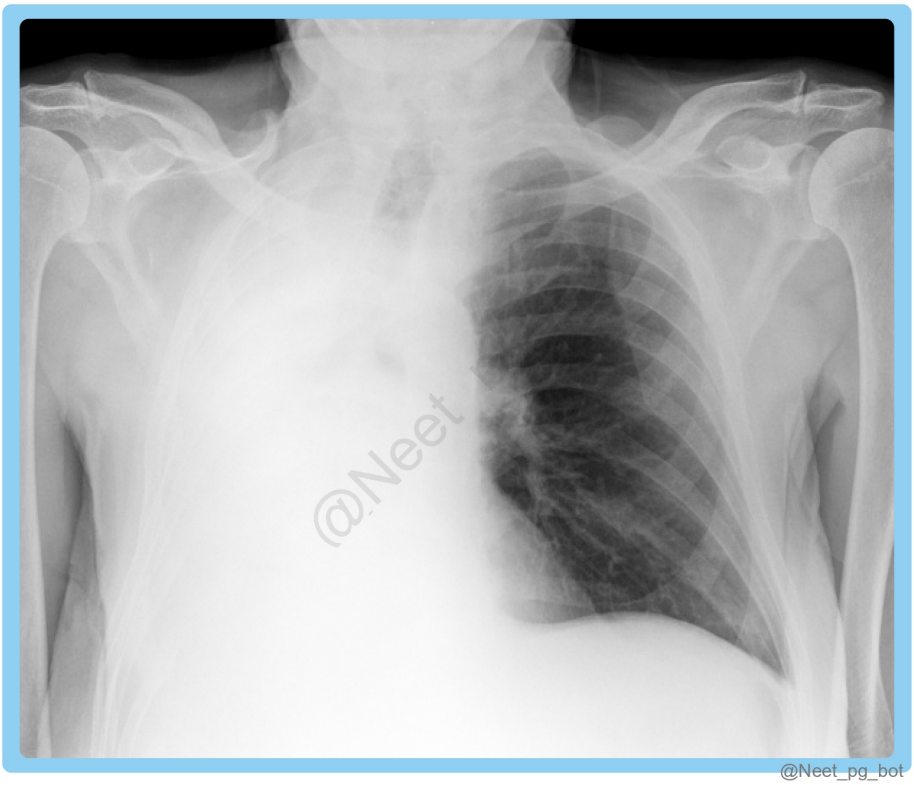
Q34: Which of the following conditions is not a potential cause for the radiological finding shown below? (Q860259)

A. Consolidation

B. Collapse

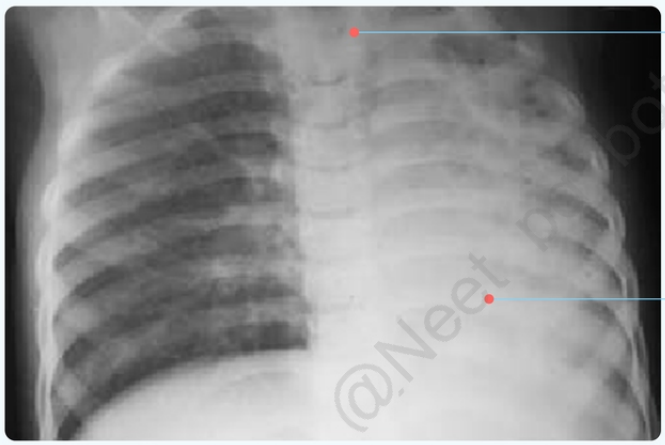
C. Pleural effusion

D. Foreign body



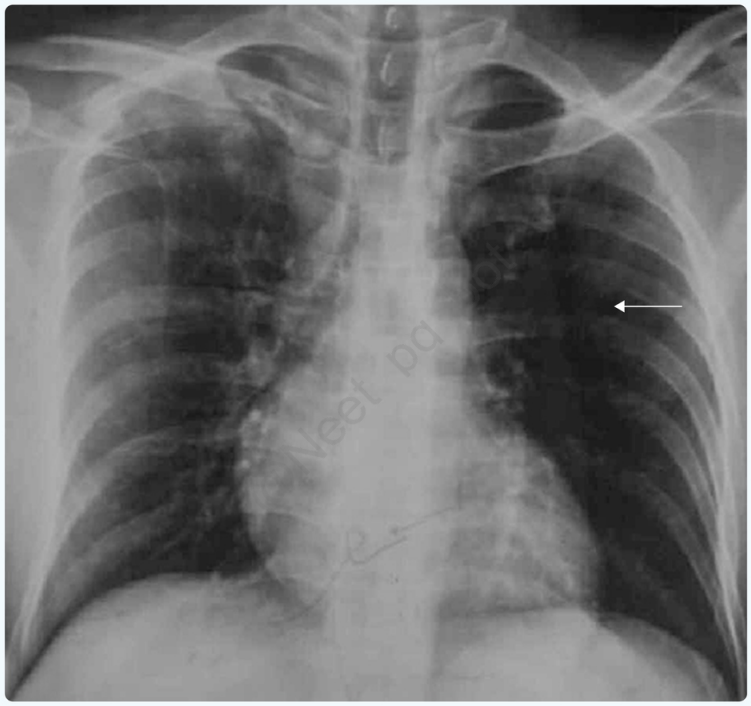
Correct Answer: D. Foreign body

Explanation: The foreign body does not intrinsically cause a white-out hemithorax; it may lead to secondary effects (e.g., collapse), which would then result in the finding. However, as an independent cause, it is not directly responsible. Whiteout hemithorax/Opacified hemithorax Blackout hemithorax/Hyperlucent hemithorax This refers to when there is complete opacification of an entire hemithorax. Clinical information and other radiological findings are important to make a definite diagnosis. This refers to an entire hyperlucent hemithorax. It results from various congenital and acquired conditions of the pulmonary parenchyma, airway, pulmonary vasculature, pleural space, and chest wall. Differential diagnoses Differential diagnoses Atelectasis of the entire lung Large pleural effusion (Option C) Pneumonia of the entire lung Postpneumonectomy appearance Large pulmonary, pleural, or chest wall mass in diseases like Ewing sarcoma, mesothelioma Pulmonary hypoplasia or agenesis Consolidation (Option A) Collapse (Option B) Radiologic technique errors Emphysema (bullous emphysema) Asymmetric chest wall soft tissue due to conditions like: Poland syndrome Unilateral mastectomy Some professions like butchers, carpenters, etc Atrophy of trapezius muscle after radical neck dissection Extrapulmonary air collection in pneumothorax and subcutaneous emphysema Contralateral large pleural effusion (Pseudo hyperlucent appearance of opposite lung) Bronchial obstruction Foreign body in children Bronchial atresia Endobronchial tumor Broncholith Bronchiolitis obliterans in Swyer-James syndrome Congenital lobar hyperinflation Conditions affecting pulmonary vessels: Pulmonary agenesis or hypoplasia Proximal interruption of pulmonary artery Massive central pulmonary embolism (PE) leading to oligemia {{caption_text}} {{caption_text}} {{caption_text}} {{caption_text}} {{caption_text}}



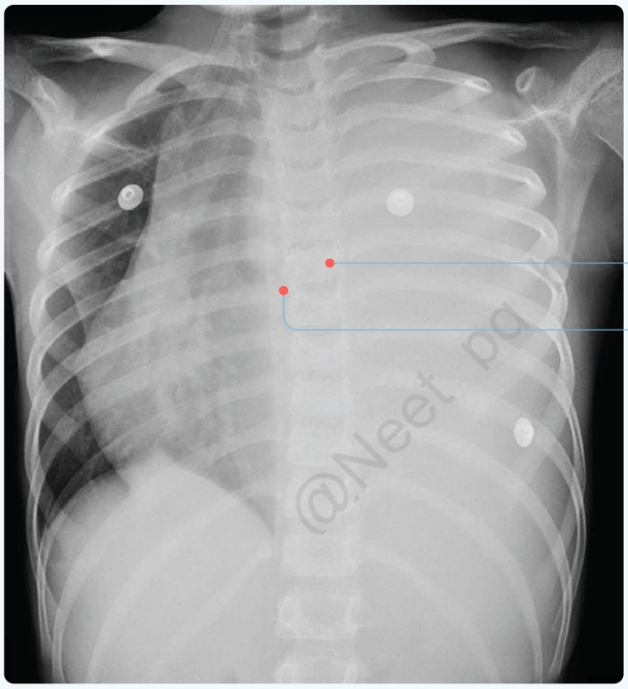
Left lung hypoplasia

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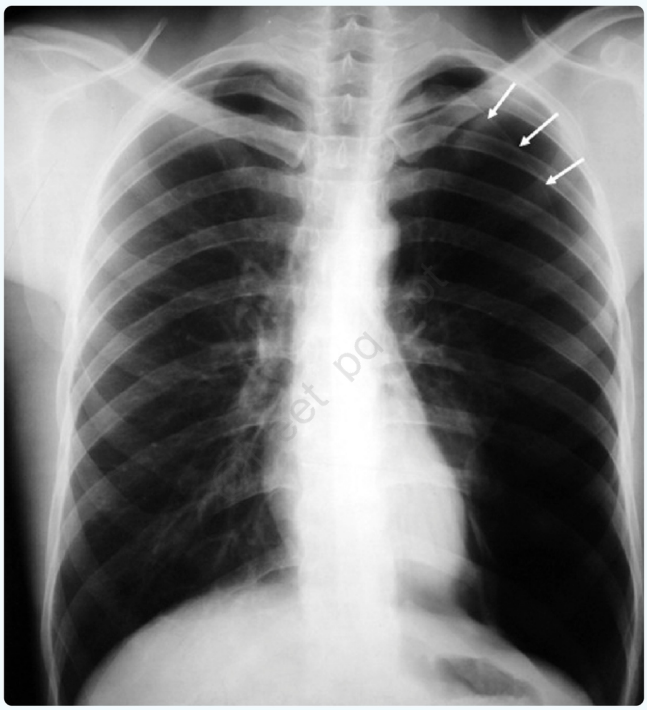
CXR in poland syndrome

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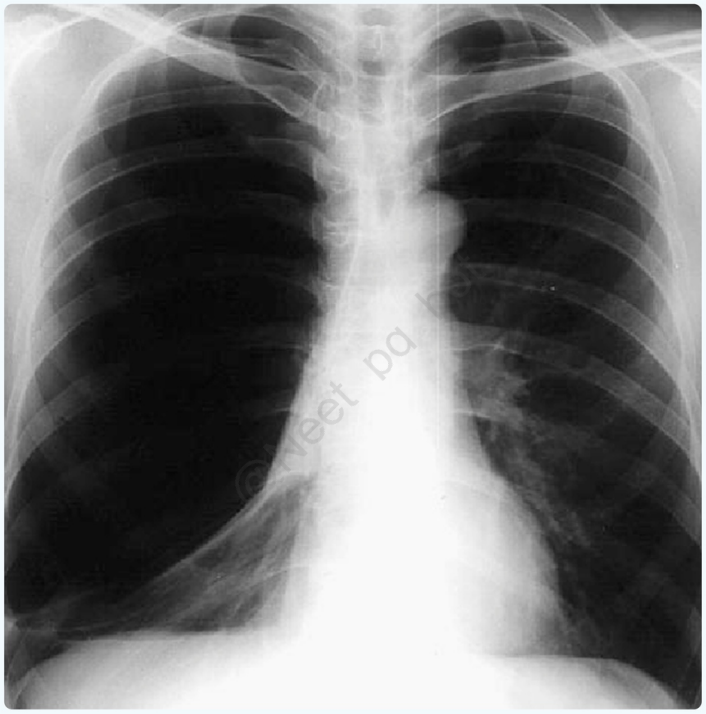
Left ewing sarcoma causing opacity

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Pneumothorax

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Bullous emphysema

References:

David Sutton Textbook of Radiology and Imaging, Volume 1, 8th edition, Page 719-722.

https://www.ncbi.nlm.nih.gov/books/NBK532259/

↑ *Back to this question in Part A*

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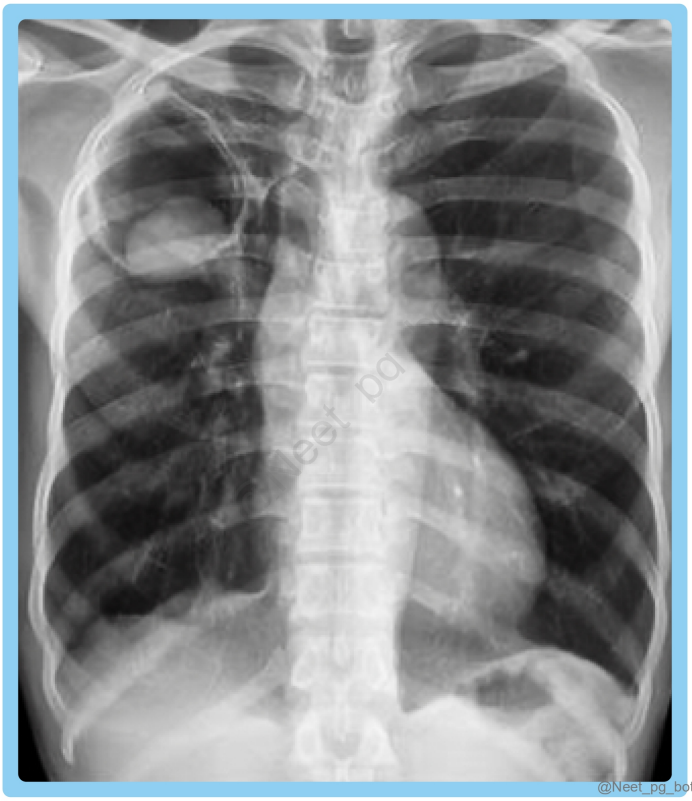
Q35: A patient who has been treated for TB in the past now presented with hemoptysis. Make a diagnosis based on the given X-ray. (Q860288)

A. Bronchogenic carcinoma

B. Aspergilloma

C. Hydatid cyst

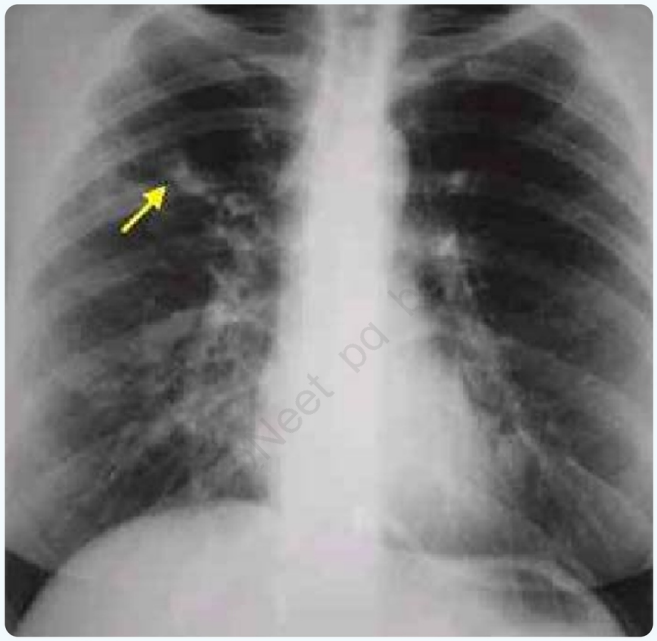
D. Lung abscess



Correct Answer: B. Aspergilloma

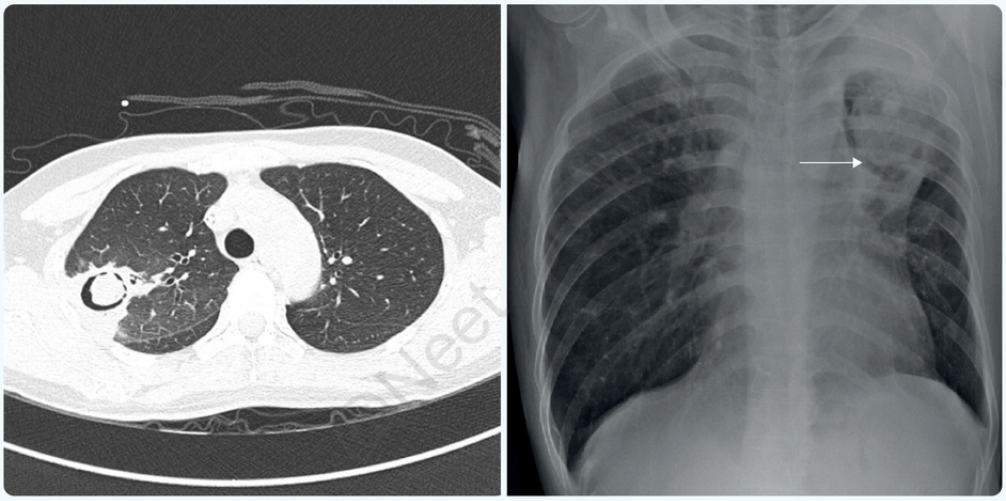
Explanation: The above image shows the air crescent sign or the monod sign and along with the clinical presentation of the patient suggests aspergilloma. Aspergilloma is seen in conditions with pre-existing lung cavities, such as Tuberculosis. Allergic Bronchopulmonary Aspergillosis (ABPA) {{caption_text}} ABPA is a hypersensitivity reaction affecting the major upper lobe airways leading to upper lobe bronchiectasis. It is associated with Elevated serum IgE levels, Positive serum precipitins for Aspergillus, Respiratory symptoms similar to asthma, Skin reactivity to Aspergillus Radiographic Findings : Non-segmental opacities primarily in the upper lobes Lobar collapse Branching thick tubular opacities due to mucus and fungus (known as the "finger-in-glove sign" or "Y" shape) Occasional pulmonary cavitation Aspergillus Mycetomas/ Aspergilloma/ Fungal Ball {{caption_text}} Aspergillus mycetomas are saprophytic growths that inhabit preexisting lung cavities , These are predominantly found in the upper lobes and superior segments of the lower lobes . CT Characteristics : Appears as a mass with soft-tissue attenuation within a lung cavity. The mass is usually separated from the cavity wall by an airspace, known as the "Air crescent" or Monod sign . The position of the mass may change between prone and supine orientations, demonstrating its mobility. Angioinvasive Aspergillosis {{caption_text}} Fig: Halo sign Primarily occurs in immunocompromised individuals, Involves invasion and blockage of small to medium pulmonary arteries. Leads to the formation of necrotic hemorrhagic nodules or infarcts. CT Findings : Commonly presented as multiple nodules surrounded by a halo of ground-glass attenuation "halo sign" or pleural-based wedge-shaped consolidations. (Option A) The bronchial cut-off sign indicates central necrosis . Nodular opacities tend to be widespread across several lung lobes, unlike the clustered peribronchial opacities seen in bacterial infections. Bronchogenic carcinoma (Option A): Typically appears as a mass or nodule, often without the "fungus ball" appearance. Hemoptysis can occur, but a history of TB and cavity formation points more to aspergilloma. {{caption_text}} Hydatid cyst (Option C): Seen in echinococcosis, it presents as a well-defined cystic lesion, sometimes with the "water-lily sign," not a mobile fungus ball. {{caption_text}} {{caption_text}} {{caption_text}} {{caption_text}} Lung abscess (Option D): Appears as a cavity with an

air-fluid level, not a distinct fungus ball. {{caption_text}}



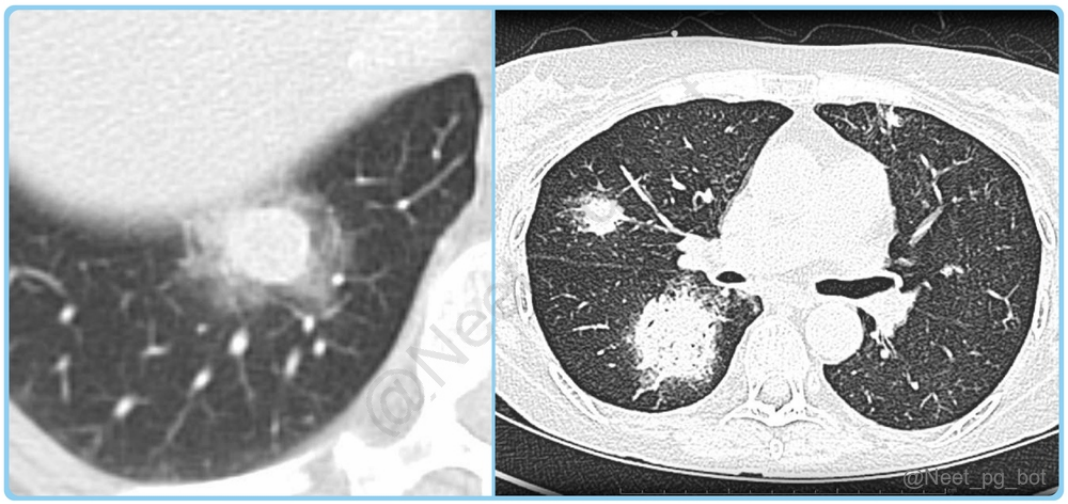
Glove finger shadow (arrow) and nodular opacities in the right middle third

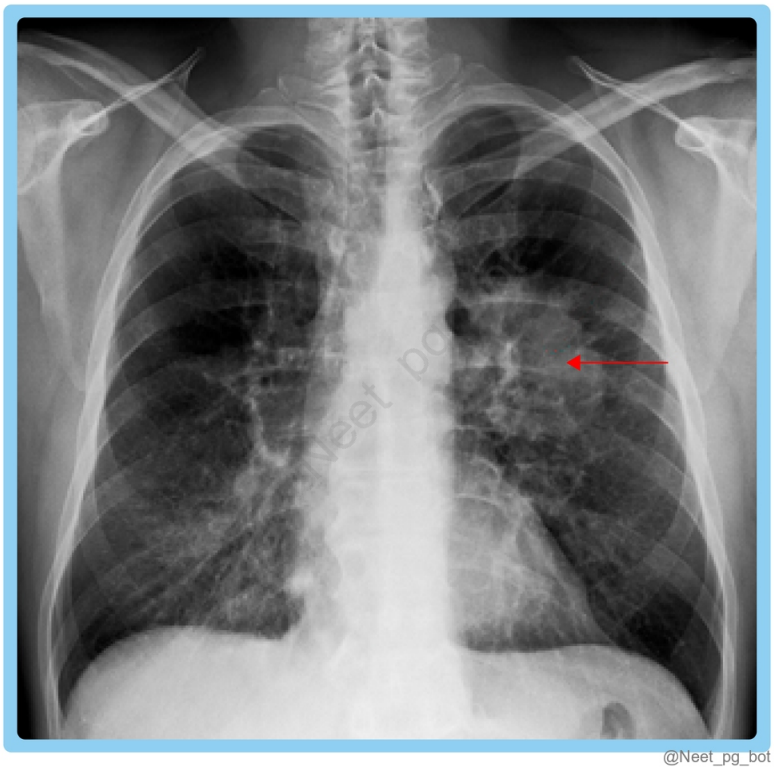
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Crescent/ Monod sign

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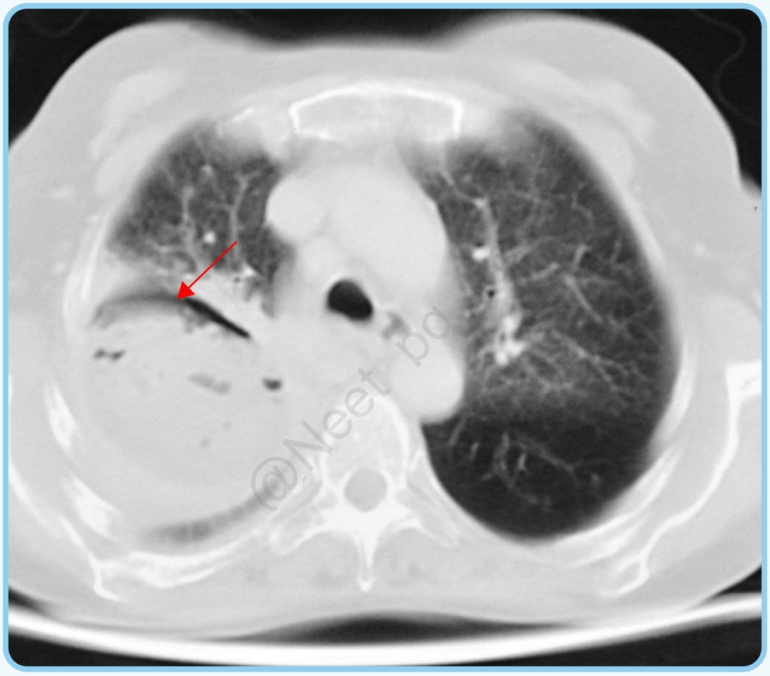

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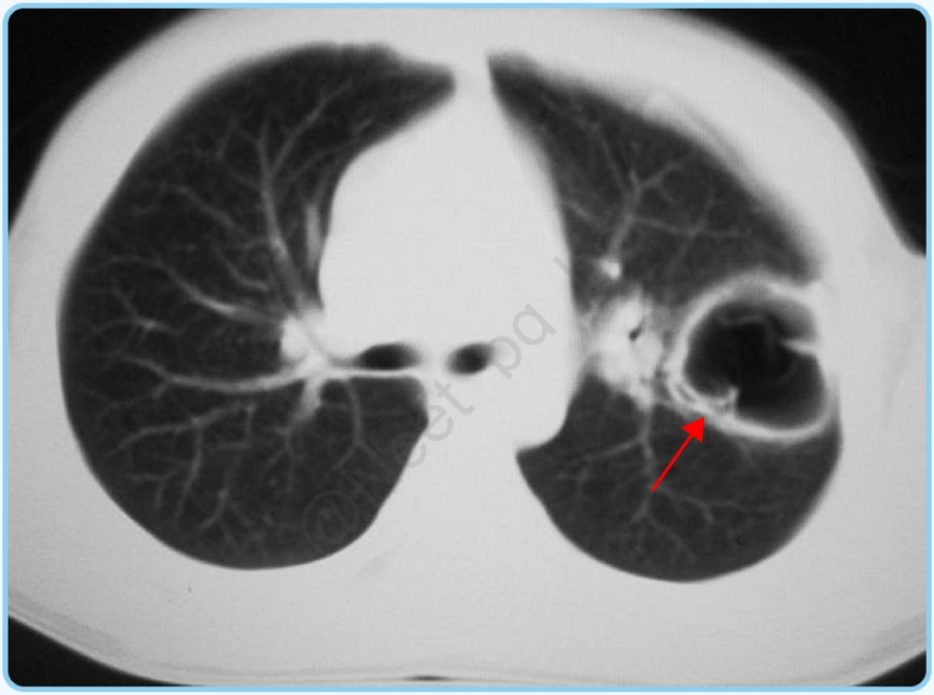
Cumbo Sign

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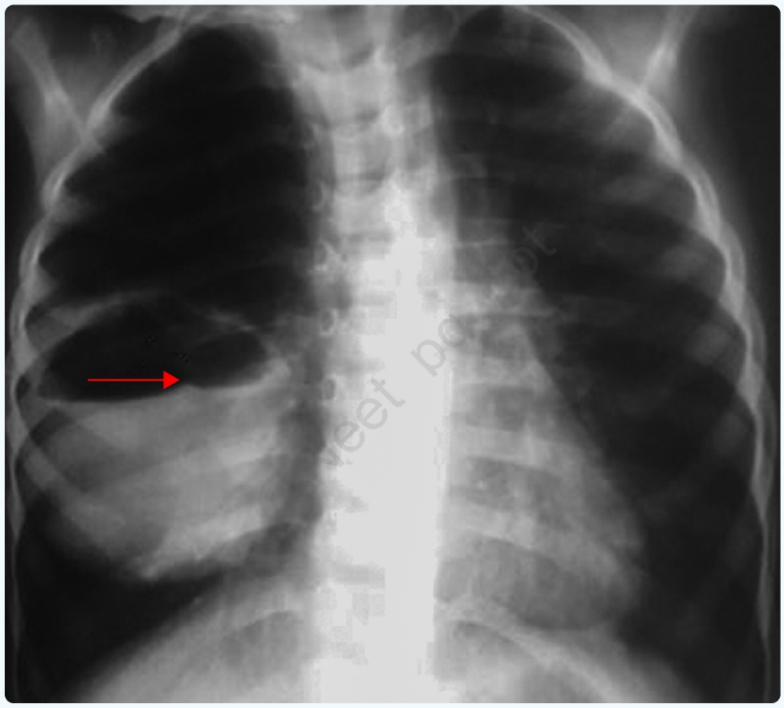
Meniscus sign-hyatid cyst

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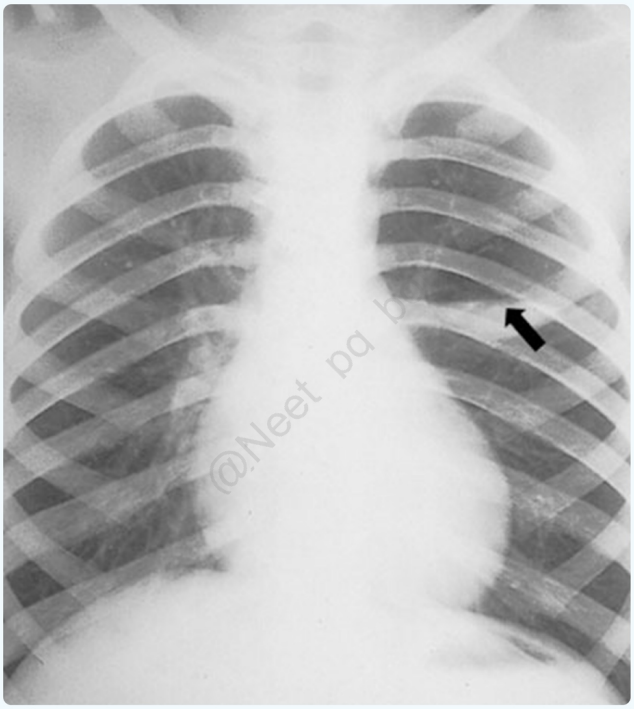
Water lily sign

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Water lily sign

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Lung abscess : Round radiolucent lesion with an air fluid level

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References:

Grainger & Allison's Diagnostic Radiology 7th Edition, Page 117, 118

David Sutton Textbook of Radiology & Imaging 8th Edition, Volume 1, Page 265,1056

https://www.ncbi.nlm.nih.gov/books/NBK542329/

https://link.springer.com/chapter/10.1007/978-3-031-24494-0_33

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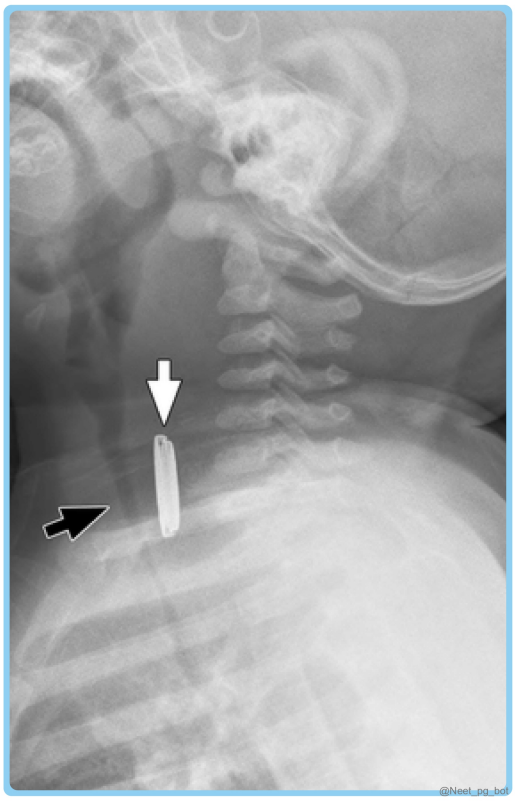
Q36: A child presents with breathlessness. On chest x-ray, the following object is seen. Identify the object. (Q854732)

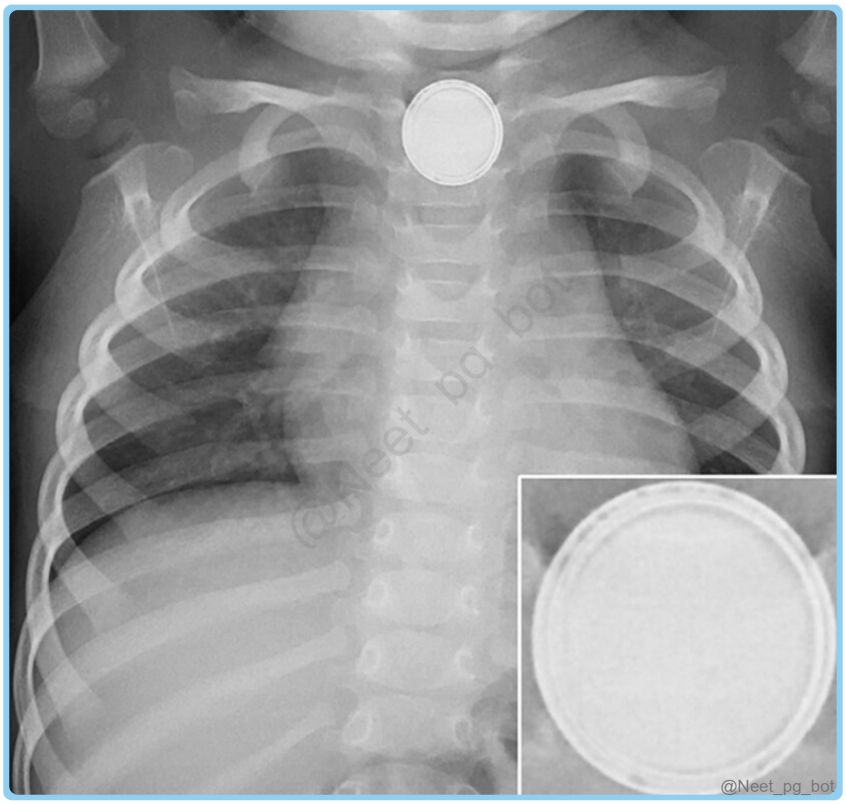
A. Button battery

B. Coin

C. Ball

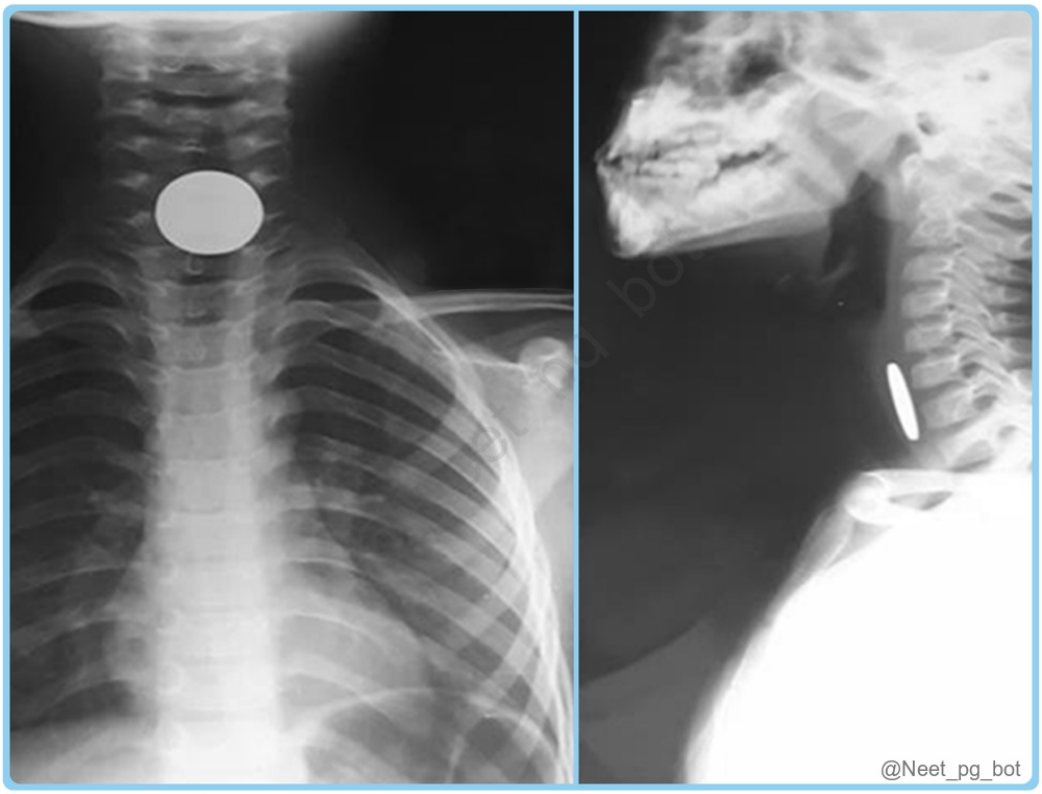
D. Bottle cap

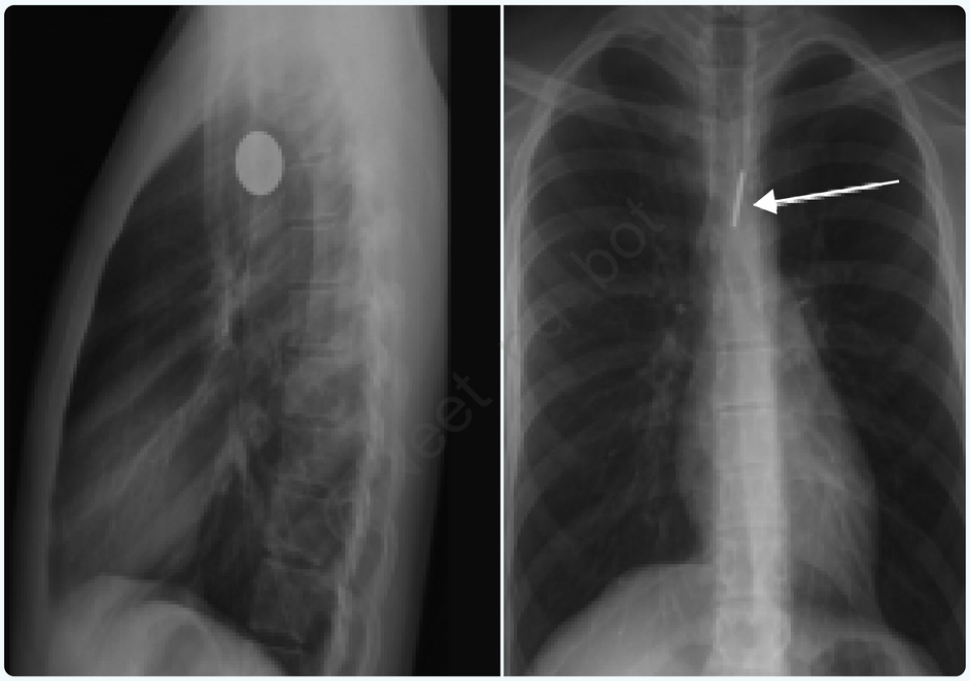




Correct Answer: A. Button battery

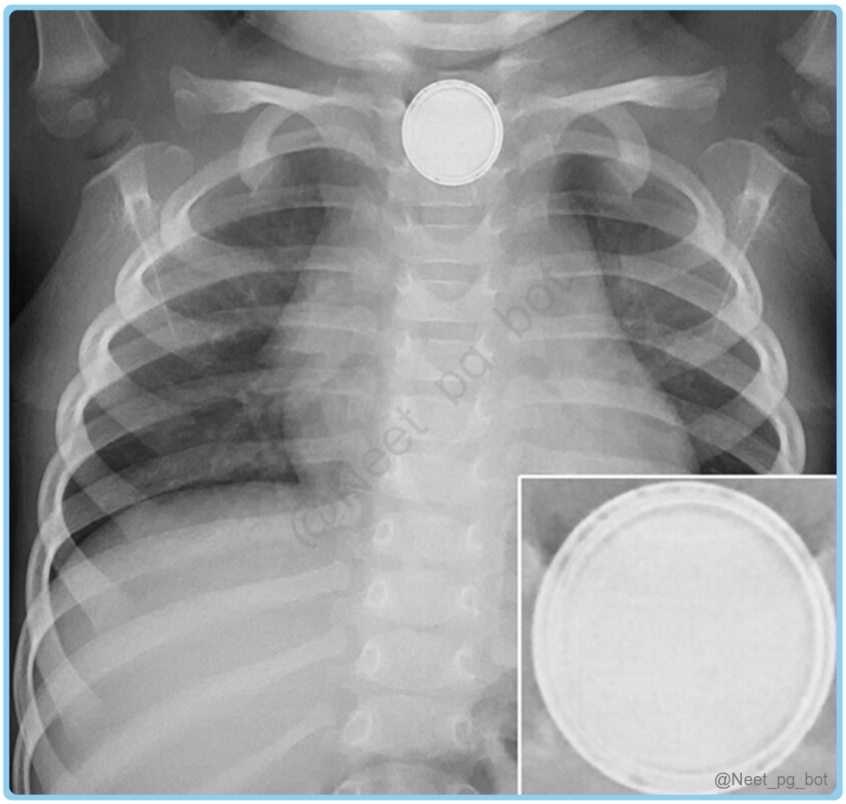
Explanation: Button batteries, particularly when ingested or aspirated by children, are a serious medical emergency. On chest X-ray, a button battery typically appears as a circular object with a characteristic double ring sign (due to the metal casing and the central core). If lodged in the airways or gastrointestinal tract, it can lead to severe complications such as mucosal damage, chemical burns, or even perforation. This is a well-known radiological finding in pediatric cases. Radiological Features of Foreign Body Ingestion Foreign Body AP View Lateral View Key Feature Coin in Esophagus {{caption_text}} Circular opacity Slit-like appearance Common in children, lodges at cricopharyngeal junction Coin in Trachea {{caption_text}} Slit-like appearance Circular opacity High risk of airway obstruction Button Battery in Esophagus {{caption_text}} {{caption_text}} Circular opacity with halo sign Double contour ring Can cause tissue necrosis, urgent removal needed Coin (Option B) : While a coin may appear on chest X-ray and be ingested or aspirated, it lacks the characteristic double ring appearance of a button battery. Coin ingestion can also cause blockage or discomfort but is less dangerous in comparison to button batteries. Ball (Option C) : Balls, especially small ones, can be ingested or aspirated, but they typically don't present with the distinct radiological appearance that button batteries do. Balls might also be seen on X-ray but lack the same level of concern for chemical or electrical burns. Bottle cap (Option D) : Bottle caps can be ingested or aspirated as well, but they do not present with the specific double ring sign of a button battery. While they can cause obstruction, they are generally less hazardous than button batteries.

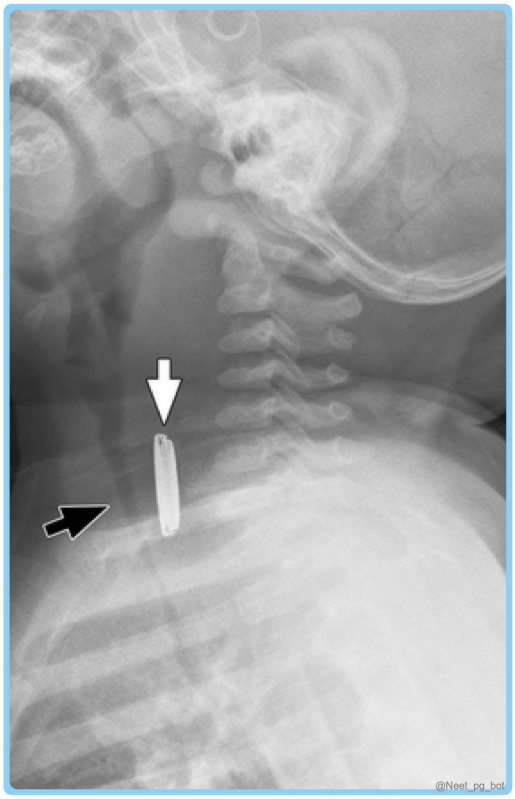




Coin in trachea

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References:

Online Resource •Radiopaedia - Button Battery Oesophageal Impaction

Grainger & Allison's Diagnostic Radiology 7th edition • Page No. 1790

Nelson Textbook of Pediatrics 20th Edition • Page No. 672

https://radiopaedia.org/cases/oesophageal-foreign-body-coin

https://www.ncbi.nlm.nih.gov/books/NBK470298/

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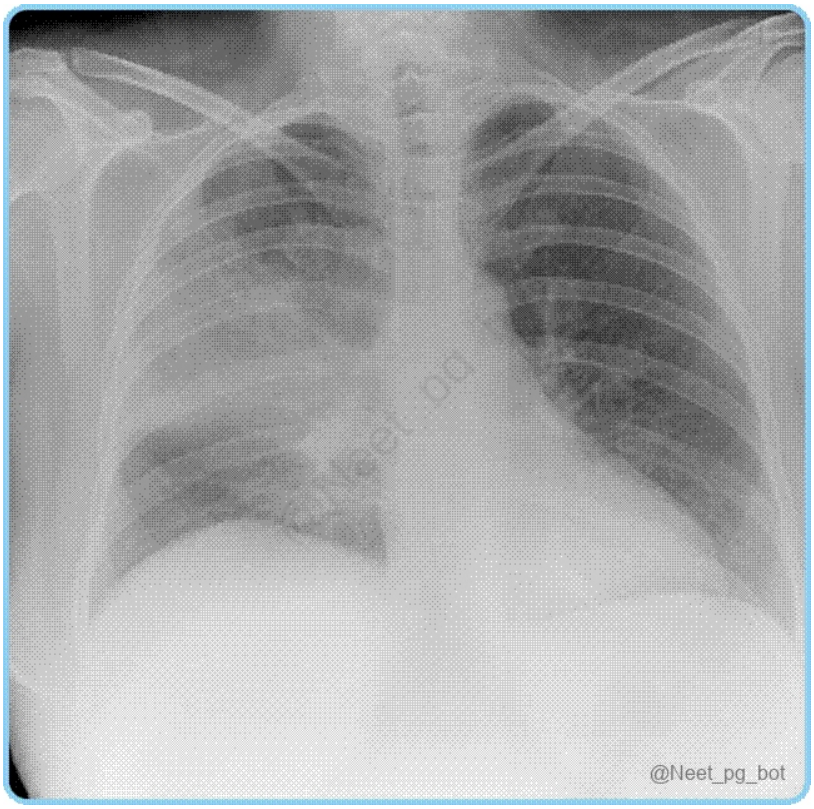
Q37: The patient has a history of fever and cough for the last 5 days. The examination findings show crepitations, and a chest X-ray is shown below. Based on these details, what is the likely diagnosis for this patient? (Q855486)

A. Apical segment of Right lower lobe consolidation

B. Right middle lobe consolidation

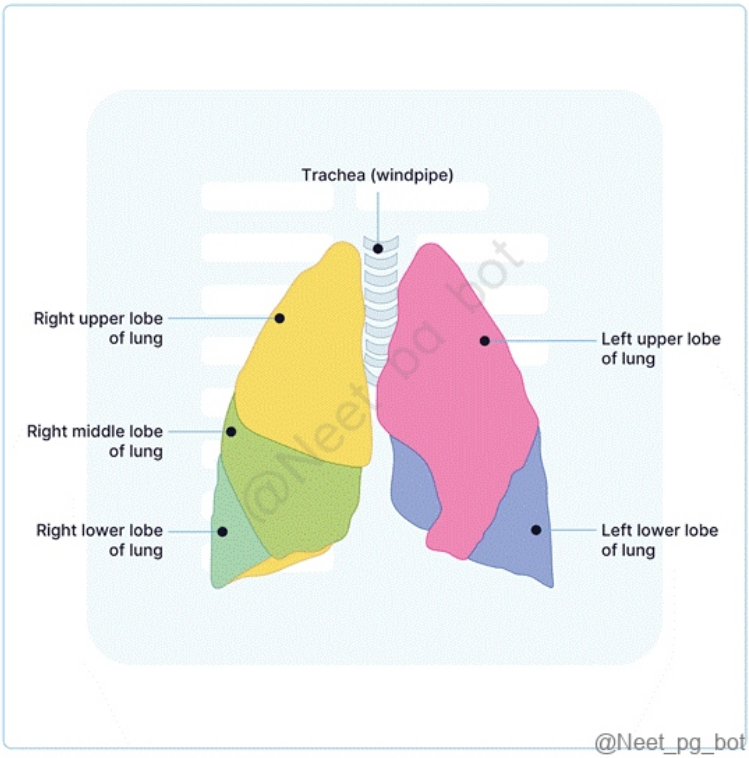
C. Posterior segment of right lower lobe consolidation

D. Loculated pleural effusion

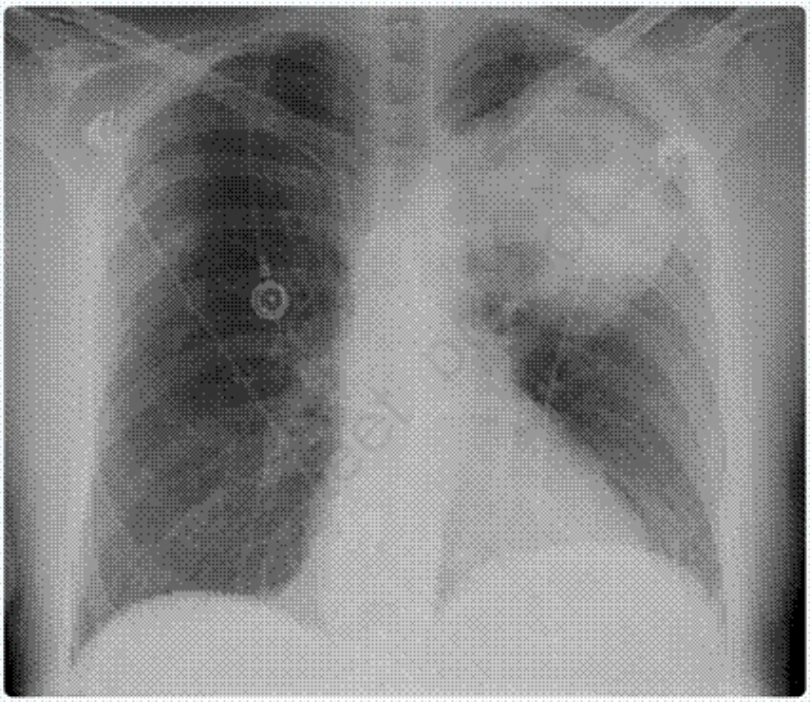


Correct Answer: B. Right middle lobe consolidation

Explanation: The X-ray image shows a well-defined opacity in the right middle lobe, which is consistent with the description of pneumonia in the scenario. The loss of the right heart border indicates pathology in the right middle lobe or medial right lower lobe. Pneumonia is typically associated with fever, cough, and crepitations on examination, which match the clinical picture given in this question. The loss of clear demarcation between the surrounding structures and normal lung is called silhouette sign. Lobar Localization: Lateral radiograph: Right and left upper lobe bronchi can be seen as two circular radiolucent areas with the right above the left. PA view of the chest: Can locate any structure in the superoinferior dimension as well as the mediolateral dimension. Silhouette sign: Locate any structure in the posteroanterior dimension. {{caption_text}} Left Lung: Only has an oblique fissure, separating the left upper (LUL) and lower (LLL) lobes. Right Lung: Oblique and horizontal fissures separate the right lung's 3 lobes. Oblique fissure divides the RML and RLL. Horizontal fissure divides the RUL and RML. {{caption_text}} {{caption_text}} Silhouette Sign: Absence of the depiction of an anatomic soft-tissue border. Produced by an intrathoracic abnormality that touches the borders of the heart or aorta and obliterates those borders on the frontal chest radiograph. The sign actually refers to the absence of a silhouette. Silhouette sign helps localize airspace opacities, atelectasis, or masses in the lung. Loss of normal silhouettes on frontal chest radiographs indicates the site of pathology: Right paratracheal stripe : Right upper lobe Right heart border : Right middle lobe or medial right lower lobe (Option B) Right hemidiaphragm : Right lower lobe Aortic knuckle : Left upper lobe Left heart border : Lingular segments of the left upper lobe Left hemidiaphragm or descending aorta : Left lower lobe {{caption_text}} {{caption_text}}

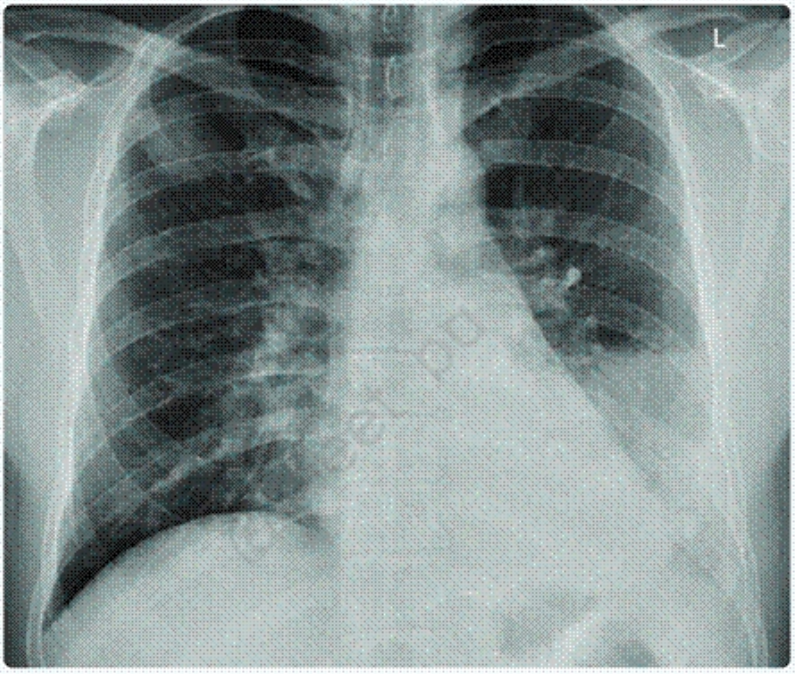


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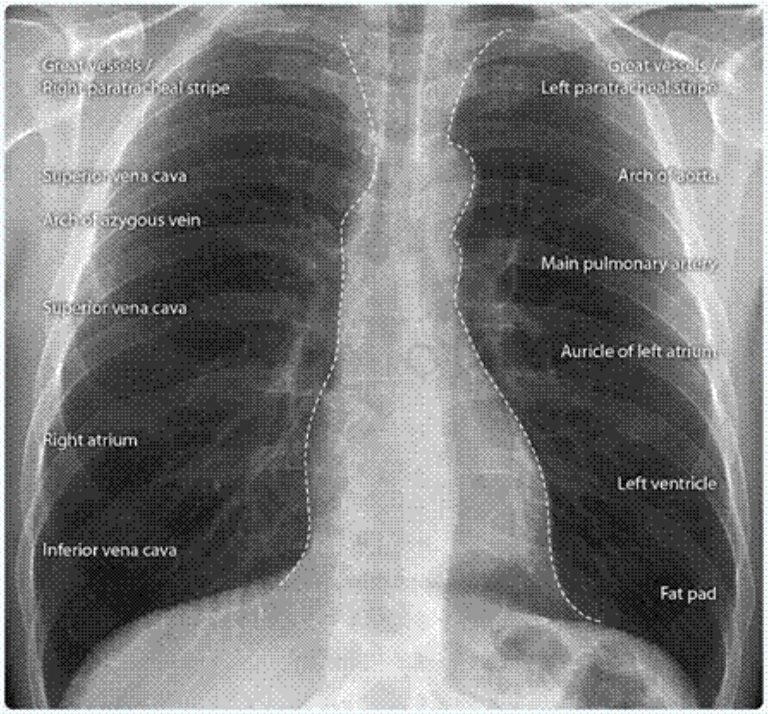


Chest X-ray showing the left upper lobe lung mass

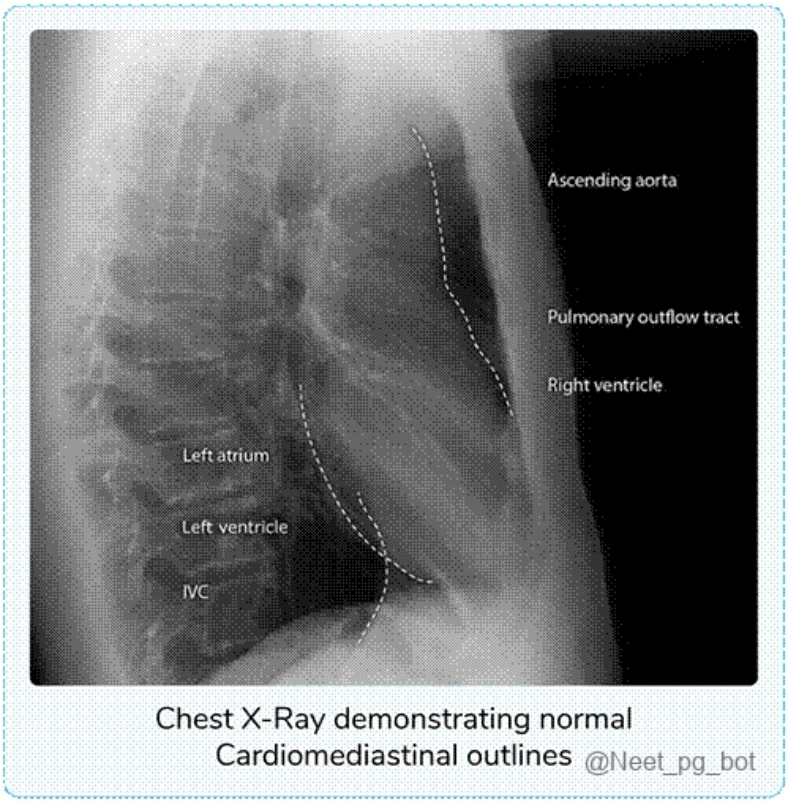
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Left lung lower lobe infiltrates are shown, as well as a small amount of fluid in the left pleural cavity on X-ray scan



Chest X-Ray showing Normal Cardiomediastinal outlines



Chest X-Ray demonstrating normal Cardiomediastinal outlines @Neet_pg_bot

References:

https://www.ncbi.nlm.nih.gov/books/NBK370/#:~

https://www.ncbi.nlm.nih.gov/books/NBK470197/#

https://www.ncbi.nlm.nih.gov/medgen/1778950

https://www.sciencedirect.com/topics/medicine-and-dentistry/silhouette-sign#

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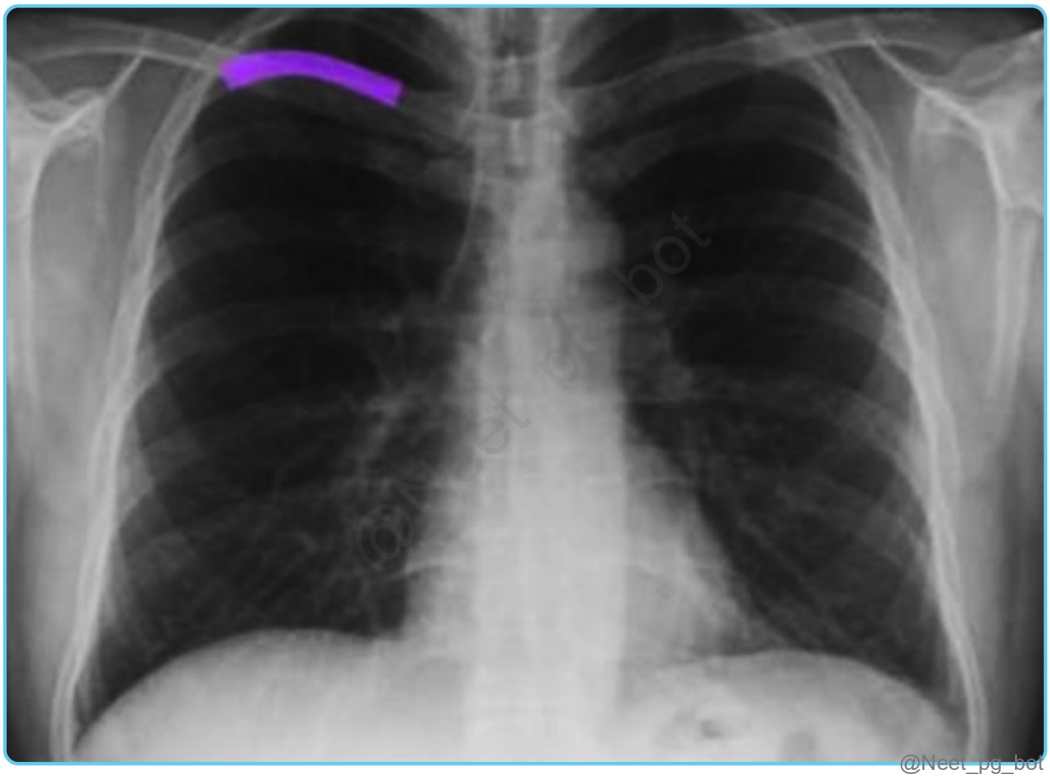
Q38: Please identify the rib that is shown in the X-ray. (Q858143)

A. 3rd rib anterior part

B. 3rd rib posterior part

C. 4th rib anterior part

D. 1st rib anterior part



Correct Answer: B. 3rd rib posterior part

Explanation: 3rd rib posterior part : The posterior part of the rib is typically identified by its position relative to the spine and the more horizontal orientation in an X-ray, especially when taken from a lateral view. The posterior part of the rib will be closer to the vertebrae and typically appears more curved and parallel to the spine on the X-ray. The highlighted structure in the image is consistent with this description, which is why the 3rd rib posterior part is the correct answer. 3rd rib anterior part (option A) : Incorrect because the anterior part of the 3rd rib would be closer to the sternum, with a more forward and downward orientation on an X-ray. The posterior part is more visible in this case. 4th rib anterior part (option C) : Incorrect because the 4th rib would be located further down than the 3rd rib, and its anterior part would be closer to the sternum. This option doesn't match the positioning seen in the image. 1st rib anterior part (option D) : Incorrect because the 1st rib is positioned more superiorly, closer to the clavicle. Its anterior part would be located near the sternum, and this is not consistent with the rib shown in the image.

References:

Rib radiographs for trauma: useful or wasteful? - PubMed

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Q39: Hamman sign is seen in (Q858212)

A. Pneumoperitoneum

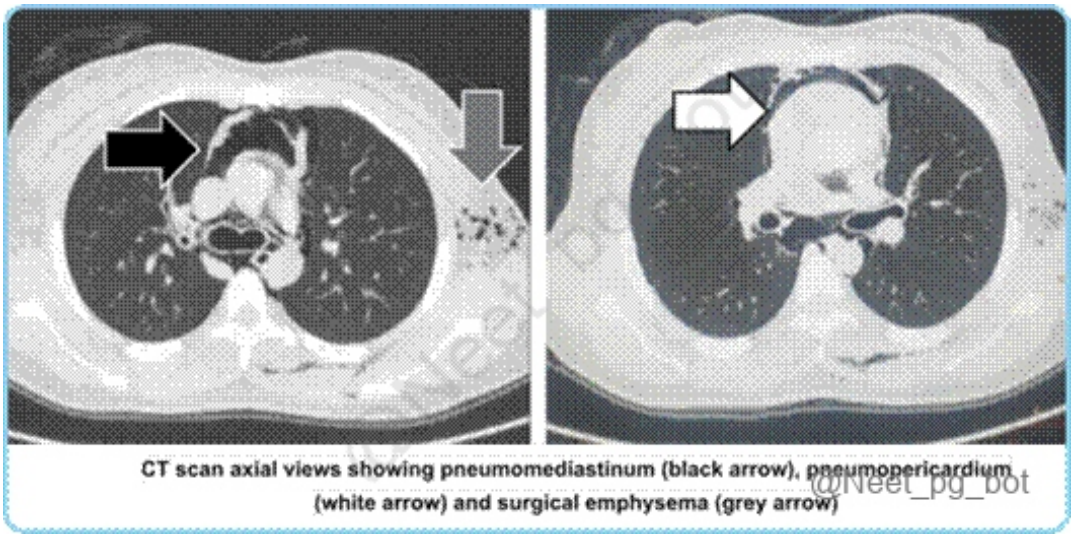
B. Pneumopericardium

C. Pneumomediastinum

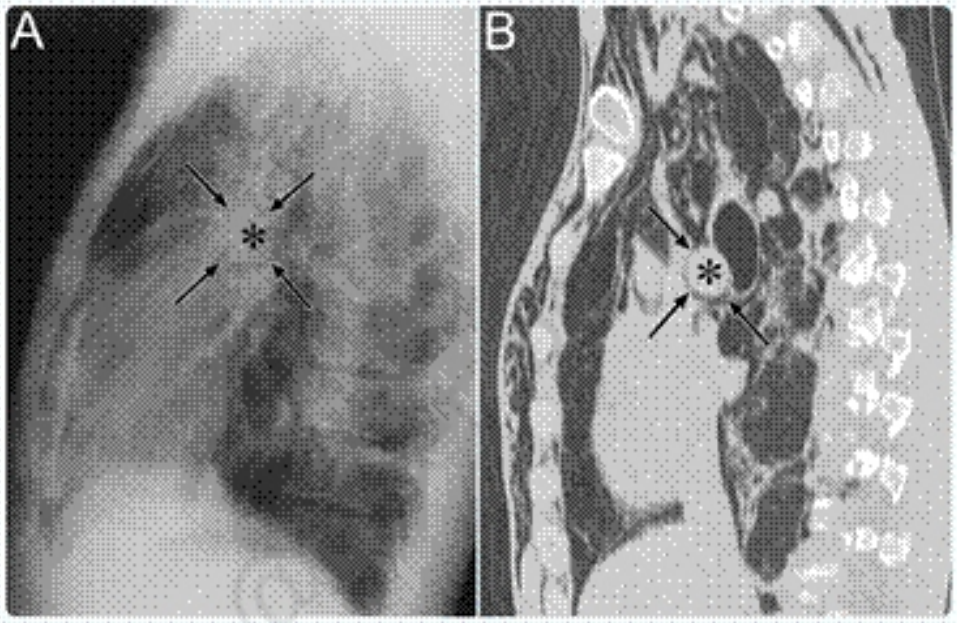
D. Hydropneumothorax

Correct Answer: C. Pneumomediastinum

Explanation: Pneumomediastinum : Hamman sign is a characteristic physical finding heard on auscultation. It is described as a crunching sound or synchronous clicking sound with the heartbeat, often heard in the precordial area . It is typically associated with pneumomediastinum , where air is present in the mediastinal space, often due to esophageal rupture or trauma. The air in the mediastinum creates a distinctive sound when it moves with the heartbeats, producing the Hamman sign. Pneumomediastinum: Presence of free air around mediastinal structures. Common Causes: Blunt or penetrating trauma. Esophageal perforation. Recent interventions in the esophageal or tracheobronchial tree. Pulmonary infections. Gas-forming infections in the mediastinum. Cocaine inhalation. Extension of air from a pneumothorax. {{caption_text}} Hamman's crunch sign: Unusual, adventitious sound heard on auscultation of the chest. Radiographic Signs: Ring around the artery sign: Air around the pulmonary artery (usually the right) outlining the artery. {{caption_text}} Sail sign: Elevation of the thymus caused by air. {{caption_text}} Continuous diaphragm sign: Air trapped posterior to the pericardium, appearing as a continuous air collection on an AP projection {{caption_text}} Tubular artery sign: Air outlines the medial side of major aortic branches, with aerated lung outlining the lateral side. {{caption_text}} Double bronchial wall sign: Air adjacent to the bronchus highlights the bronchial wall. {{caption_text}} Naclerio V-sign: V-shaped air lucency in the left lower mediastinal area. {{caption_text}} Pneumoperitoneum (option A) : Incorrect because pneumoperitoneum refers to air in the peritoneal cavity , usually caused by gastrointestinal perforation. It does not typically produce the Hamman sign. Instead, it is more commonly detected through radiological imaging (e.g., abdominal X-ray) showing air under the diaphragm. Pneumopericardium (option B) : Incorrect because pneumopericardium is the presence of air in the pericardial sac around the heart, which may lead to cardiac tamponade . While it can cause a clinical presentation of chest pain or dyspnoea, it is not typically associated with the Hamman sign. Hydropneumothorax (option D) : Incorrect because hydropneumothorax refers to the accumulation of both air and fluid in the pleural cavity , commonly due to trauma or infection. While it may cause dyspnoea and chest pain , it does not produce the characteristic Hamman sign.



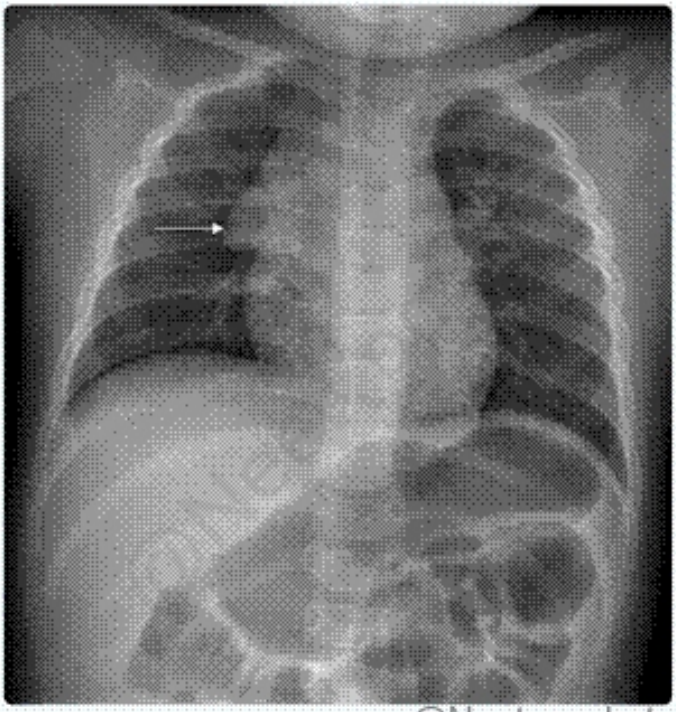
CT scan axial views showing pneumomediastinum (black arrow), pneumopericardium (white arrow) and surgical emphysema (grey arrow)



A. Erect lateral radiograph shows the "ring around the artery" sign.

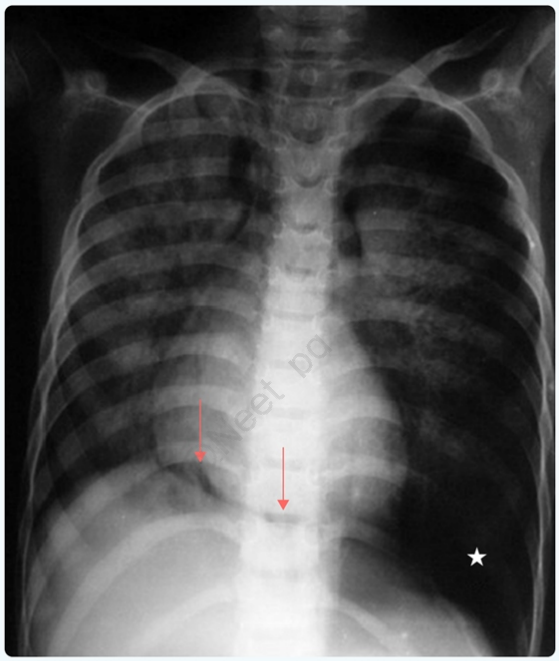
B. A sagittal CT image also shows a lucent ring (arrows) surrounding the right pulmonary artery (asterisk), a feature called the "ring-around-the-artery" sign.

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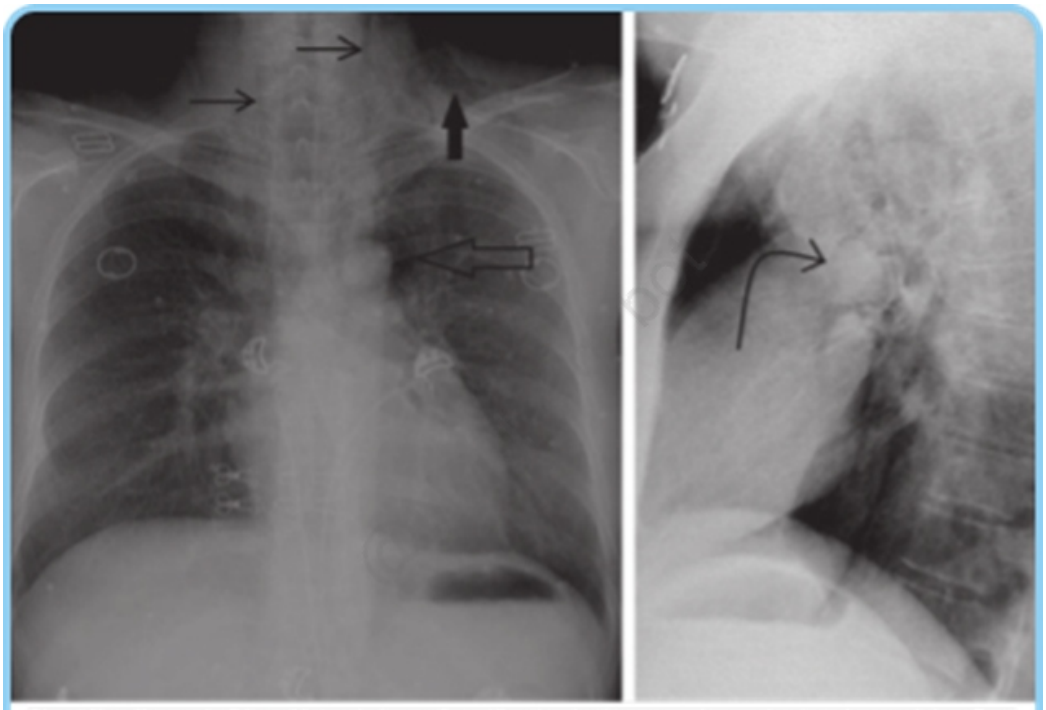
Frontal view X-Ray demonstrating thymic "Sail Sign" (Arrow)

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Chest x ray PA view showing left sided pneumothorax (star) with continuous diaphragm sign (thin red arrows) suggestive of pneumomediastinum.

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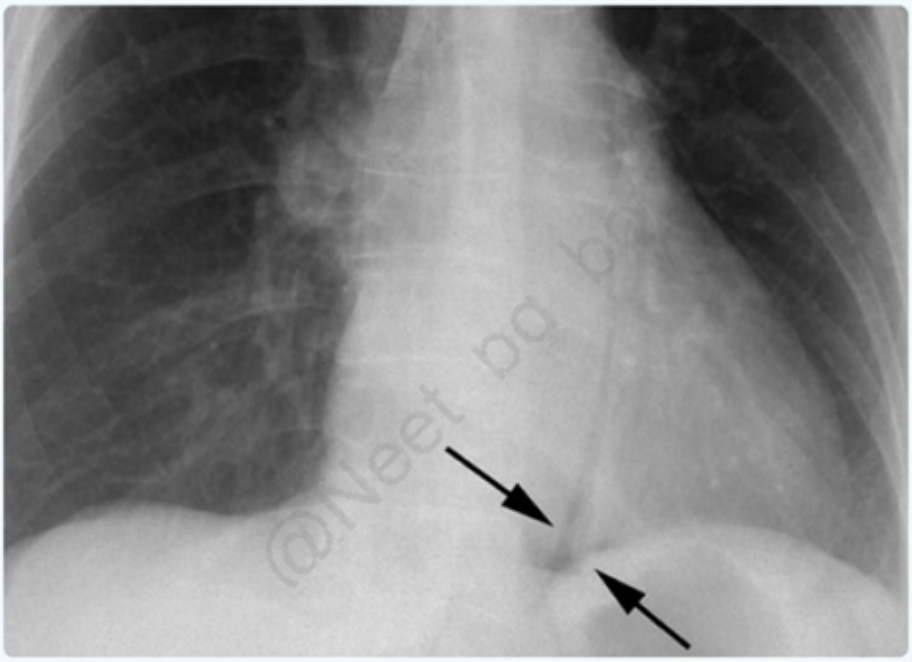
Chest X radiograph, PA and lateral views; Opacification in the parenchyma due to micronodules. Free air around the aortic knob and pulmonar artery (hollow arrow, curved arrow). Tubular vessel sign (thin arrow). Subcutaneous emphysema (filled arrow).

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Subcutaneous emphysema (vertical lucent stripes into neck) and "double bronchial wall sign" suggesting pneumomediastinum

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The Naclerio's V sign seen on the frontal radiographs of the chest as a V-shaped air lucency in the left lower mediastinal segment

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References:

Grainger & Allison’s Diagnostic Radiology, 7th Edition, Page 92,94,95

https://pubmed.ncbi.nlm.nih.gov/8126410/

https://radiopaedia.org/cases/pneumomediastinum-53

https://pubs.rsna.org/doi/abs/10.1148/radiol.2451042197?journalCode=radiology

https://www.researchgate.net/figure/Barcode-or-stratosphere-sign-typically-found-in-patients-with-pneumothorax-In-the_fig1_282608993

↑ *Back to this question in Part A*

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Q40: Which of the following findings are seen in a high-resolution CT scan of fungal pneumonia? 1. Interlobular septations 2. Peripheral wedge-shaped consolidation 3. Pleural effusion 4. Cavitatory lesions with surrounding ground glass opacities (Q855084)

A. 1,2,4

B. 1,3,4

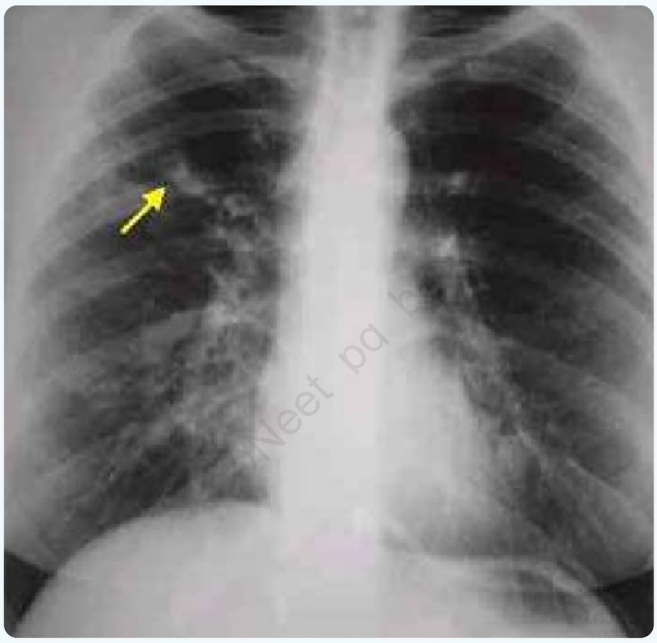
C. 1,2,3

D. 2,3,4

Correct Answer: A. 1,2,4

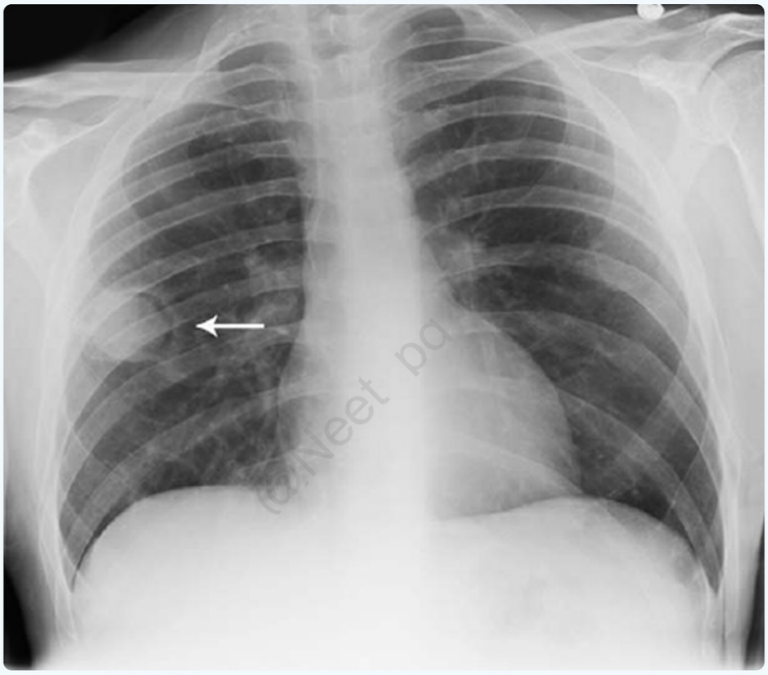
Explanation: Interlobular septations (1): Fungal pneumonia can cause thickening of interlobular septa due to inflammation or oedema, particularly in invasive fungal infections like mucormycosis or aspergillosis. Peripheral wedge-shaped consolidation (2): A hallmark of angioinvasive fungal infections (e.g., Aspergillus) is peripheral, wedge-shaped areas of consolidation due to vascular infarction. Cavitatory lesions with surrounding ground-glass opacities (4): Known as the "halo sign," this finding is common in invasive aspergillosis, where necrosis leads to cavitation surrounded by haemorrhage. Allergic Bronchopulmonary Aspergillosis (ABPA) {{caption_text}} • ABPA is a hypersensitivity reaction affecting the major upper lobe airways leading to upper lobe bronchiectasis. • It is associated with Elevated serum IgE levels, Positive serum precipitins for Aspergillus, Respiratory symptoms similar to asthma, Skin reactivity to Aspergillus Radiographic Findings : • Non-segmental opacities primarily in the upper lobes • Lobar collapse • Branching thick tubular opacities due to mucus and fungus (known as the "finger-in-glove sign" or "Y" shape) • Occasional pulmonary cavitation Aspergillus Mycetomas/ Aspergilloma/ Fungal Ball {{caption_text}} {{caption_text}} • Aspergillus mycetomas are saprophytic growths that inhabit preexisting lung cavities , • These are predominantly found in the upper lobes and superior segments of the lower lobes . CT Characteristics : • Appears as a mass with soft-tissue attenuation within a lung cavity. • The mass is usually separated from the cavity wall by an airspace, known as the "Air crescent" or Monod sign . • The position of the mass may change between prone and supine orientations, demonstrating its mobility. Angioinvasive Aspergillosis {{caption_text}} • Primarily occurs in immunocompromised individuals, ■ Involves invasion and blockage of small to medium pulmonary arteries. ■ Leads to the formation of necrotic hemorrhagic nodules or

infarcts. CT Findings : • Commonly presented as multiple nodules surrounded by a halo of ground-glass attenuation "halo sign" or pleural-based wedge-shaped consolidations. • The bronchial cut-off sign indicates central necrosis . • Nodular opacities tend to be widespread across several lung lobes, unlike the clustered peribronchial opacities seen in bacterial infections. Pleural effusion (3): This is uncommon in fungal pneumonia and is not a typical feature. It is more often associated with bacterial pneumonia or empyema.



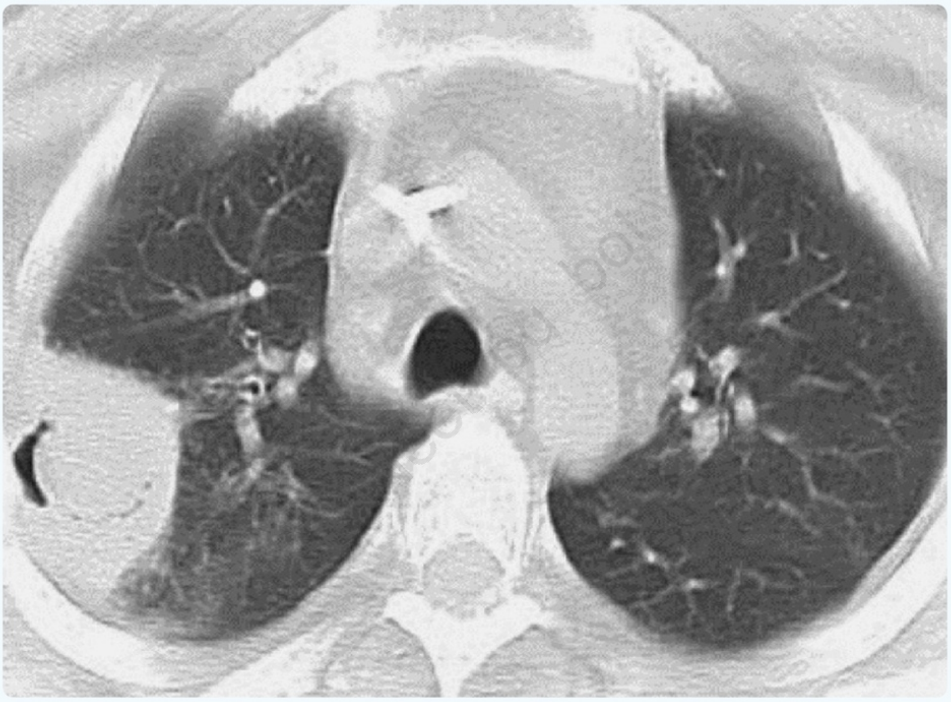
Glove finger shadow (arrow) and nodular opacities in the right middle third

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Air crescent sign: Frontal radiograph of the chest shows cavitating lesion within the superior aspect of the right lower lobe (arrow)

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Air crescent sign in a patient with invasive aspergillosis

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HALO SIGN: Multiple pulmonary round infiltrates with surrounding ground glass opacity (Arrow)

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References:

Grainger & Allison's Diagnostic Radiology 7th Edition, Page 117, 118

David Sutton Textbook of Radiology & Imaging 8th Edition, Volume 1, Page 265,1056

Allergic Bronchopulmonary Aspergillosis - StatPearls - NCBI Bookshelf

Reversed Halo or Atoll Sign and Bird's Nest Sign (Vogelnest) | SpringerLink

↑ *Back to this question in Part A*

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Q41: What is the diagnosis of a 74-year-old man, who comes to the outpatient department (OPD) with a history of substantial unintentional weight loss, lack of appetite, and iron deficiency anemia, after a chest x-ray was performed and the results are provided below? (Q793094)

A. Bronchogenic carcinoma

B. Mesothelioma

C. Metastasis

D. Pneumoconiosis



Correct Answer: C. Metastasis

Explanation: Correct Option C: Given X-ray image is suggestive of Cannon Ball Metastasis to the Lungs. This can be seen in different types of malignancies. Cannonball Metastasis is seen in choriocarcinoma because of the rich vascular supply, due to which metastasis occurs via the vascular route to the lungs. These cannonball metastases appear on chest X-rays as multiple white opacities like the fire of cannonballs. All these white opacities represent metastatic deposits. White opacities are clearly observed in the given X-ray, indicating option c as the correct choice. Incorrect Options: Option A: Bronchogenic Carcinoma is associated with increased vascularity and mass in the lung that may abut the vessels, and it may be associated with central necrosis and cavitation. It can also be associated with hypercalcemia and calcification deposits in the lungs. So, the X-ray shows central necrosis, cavitation, and hypercalcemia in a patient, which is not observed in the given case. Therefore, option A is an incorrect choice. Option B: Mesothelioma is associated with pleural plaques and deposits over pleura, which is not seen in the given X-rays, making it an incorrect choice. Option D: Pneumoconiosis is seen in X-rays in different patterns depending upon the type of pneumoconiosis. For example, in asbestosis, multiple pleural plaques are observed. Coal worker pneumoconiosis can present with emphysema, multiple pneumoconiotic changes, and hyperinflation. All these changes are not seen in the given x-ray. Thus, option d is incorrect.

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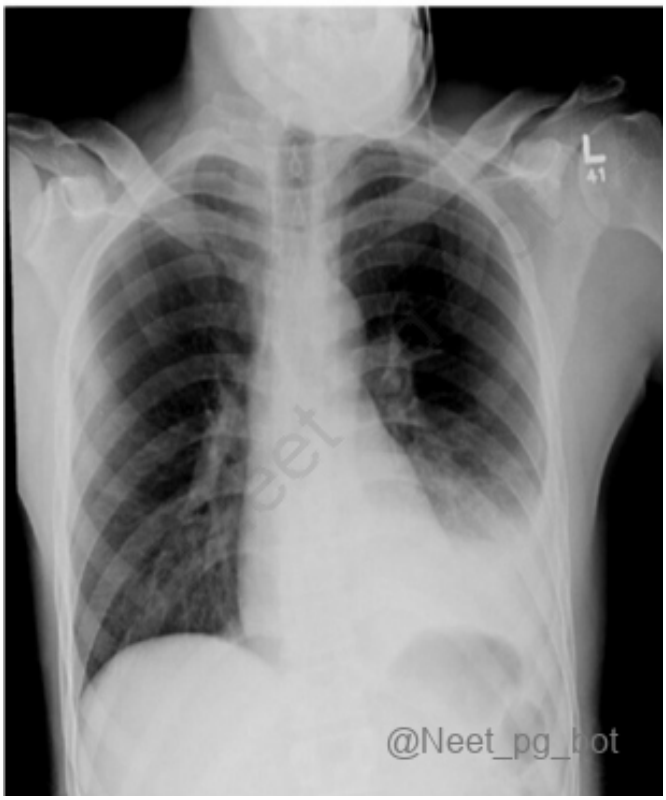
Q42: What is the subject matter of the X-ray image below? (Q793097)

A. Emphysema

B. Tension pneumothorax

C. Pleural effusion

D. Bronchiectasis



Correct Answer: C. Pleural effusion

Explanation: Correct Option C: The X-ray is suggestive of pleural effusion. The given chest X-ray shows obliteration of the left costophrenic angle with a wide pleural-based dome-shaped opacity projecting into the lung noted tracking along the CP angle and lateral chest wall. Incorrect Options: Option A - Tension Pneumothorax: It has air filling in the pleural cavity causing compression over lung parenchyma resulting in a Visceral pleural line sign which is not seen in the above image. Hence, an incorrect choice. Option B - Emphysema: It would show air trapping along with hyperinflation of alveoli resulting in decreased opacity and increased translucency with hyper-inflated lungs, which is not seen in the above image. Hence, an incorrect choice. Option D - Bronchiectasis: It is associated with a signet ring sign along with dilated central and peripheral airways, which is not seen in the above image. Hence, an incorrect choice.

References:

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• [04_Gastrointestinal Radiology] 009 Git Radiology-I

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[04_Gastrointestinal Radiology] 009 Git Radiology-I — Quick Jump

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Q7 (p. 911) *Q8 (p. 914)* *Q9 (p. 917)* *Q10 (p. 921)* *Q11 (p. 923)* *Q12 (p. 928)*
Q13 (p. 931) *Q14 (p. 932)* *Q15 (p. 934)* *Q16 (p. 936)* *Q17 (p. 937)* *Q18 (p. 940)*
Q19 (p. 942)

Q1: A 55-year-old woman presents with complaints of chronic heartburn, regurgitation, and chest discomfort, especially after meals. A barium swallow study is performed, and the following radiograph is obtained. What is the most likely diagnosis based on the image findings? (Q853515)

A. Paraesophageal hernia (Type II)

B. Sliding hiatal hernia (Type I)

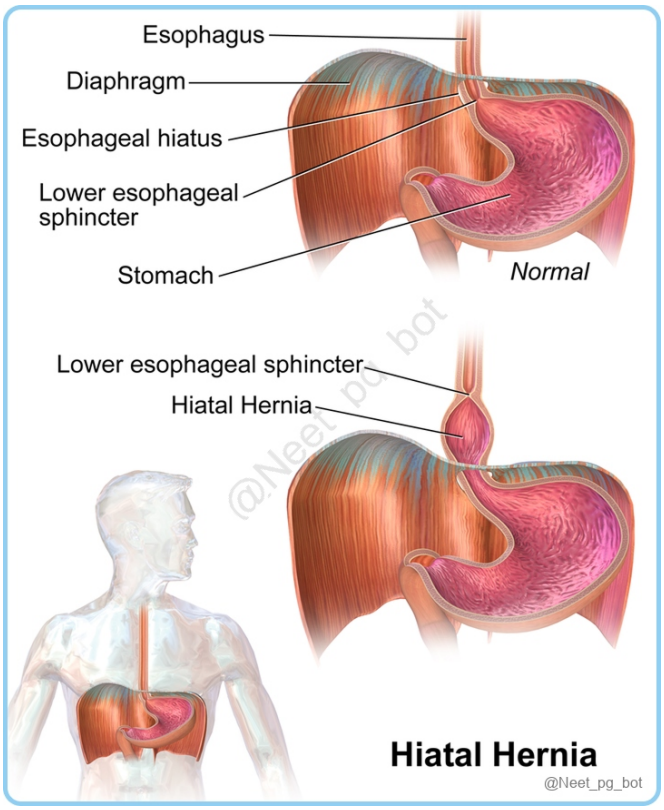
C. Mixed (Type III) hernia

D. Intrathoracic stomach (Type IV)

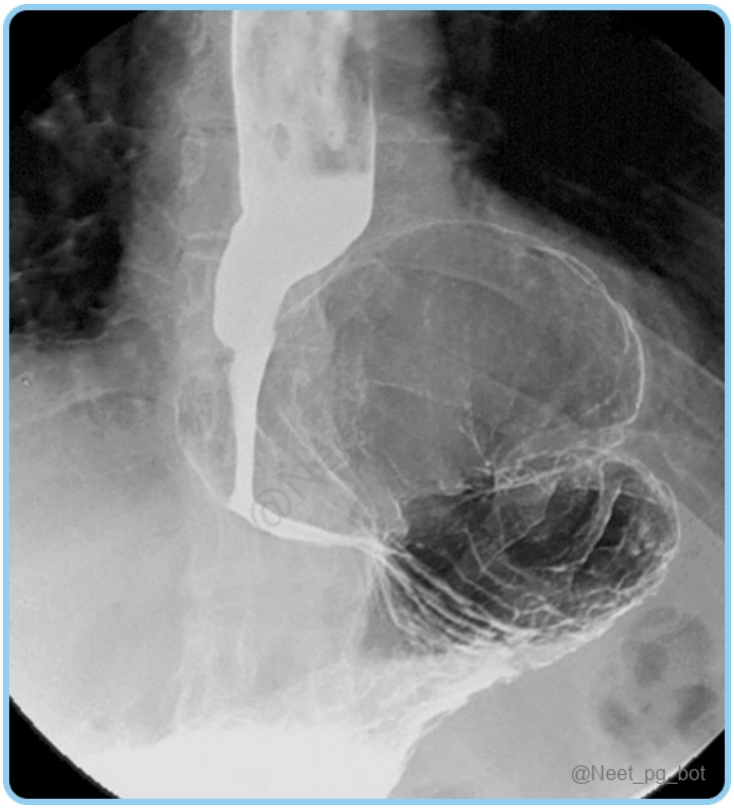


Correct Answer: B. Sliding hiatal hernia (Type I)

Explanation: Hiatal Hernia: Herniation of abdominal organs through the esophageal hiatus into the thoracic cavity. Commonly herniated organs include the stomach and esophagus. Types of Hiatal Hernias : Type I (Sliding Hiatal Hernia) : Most common (80-90% of cases). The gastroesophageal junction (GEJ) and part of the stomach slide above the diaphragm. On barium swallow, gastric rugae or the esophageal B ring (squamo-columnar junction) is seen above the diaphragm. Present as gastroesophageal reflux disease (GERD) . Type II (Paraesophageal Hernia) : The gastric fundus herniates above the diaphragm, but the GEJ remains below it. Can progress to gastric volvulus , with risks of obstruction or infarction. Best visualized on fluoroscopy or CT . Type III : A combination of both sliding and paraesophageal elements, with both the GEJ and a portion of the stomach herniating above the diaphragm. Type IV : Involves mixed type along with the herniation of other abdominal organs. Radiological Findings : Plain radiographs : Hiatal hernias may appear as retrocardiac soft tissue opacities with or without air-fluid levels . Barium swallow : Shows superior displacement of the GEJ in sliding hernias and the gastric fundus herniating through the hiatus in paraesophageal hernias. Sliding Hiatal Hernia Paraesophageal Hernia High-resolution manometry: Gold standard for diagnosing small (<2cm) hiatal hernias. CT : To detect larger hernias or complex cases involving multiple organs. Endoscopy : Can reveal displacement of the GEJ and herniation of the stomach, confirming the diagnosis in larger hernias.


Esophagus
Diaphragm
Esophageal hiatus
Lower esophageal sphincter
Stomach
Normal
Lower esophageal sphincter
Hiatal Hernia
Hiatal Hernia
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References:

Grainger & Allison’s Diagnostic Radiology, A Textbook of Medical Imaging, 7th Edition, Page. 492, 493.

Textbook of Radiology & Imaging by David Sutton, 8th Edition, Chapter 28, Mechanical Esophageal Disorders - Hernias.

↑ *Back to this question in Part A*

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Q2: A term neonate presents with failure to pass meconium within the first 48 hours of life. Imaging shows a narrow distal bowel segment with proximal colonic dilatation. The Barium Enema image of the neonate is given below. What is the most likely condition affecting this neonate? (Q853525)

A. Hirschsprung disease

B. Toxic megacolon

C. Crohn's disease

D. Ulcerative colitis



Correct Answer: A. Hirschsprung disease

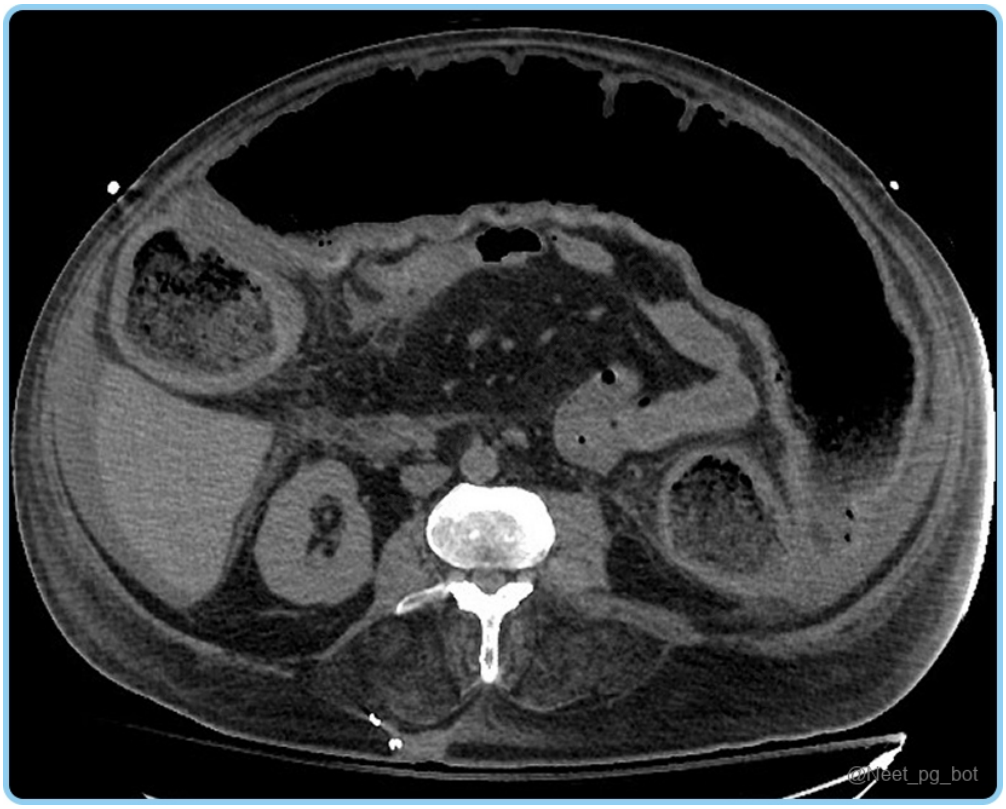
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Explanation: Hirschsprung disease: Characterized by aganglionosis of the distal colon, typically presenting in neonates with failure to pass meconium. Radiographic findings show a narrow aganglionic segment with proximal dilatation. Hirschsprung Disease Hirschsprung disease is characterized by the absence of ganglion cells (aganglionosis) in the distal colon and rectum. This condition may result from a failure of neural crest neuroblasts to migrate into bowel segments or the degeneration of already migrated neuroblasts. It impacts both the myenteric and submucosal plexuses. Hirschsprung disease typically presents in term neonates with failure to pass meconium within 1-2 days after birth. About 75% of cases present within the first 6 weeks, and over 90% present by age 5, though rare adult cases occur. In delayed cases with constipation, manometry can help differentiate short/ultrashort segment Hirschsprung from other causes. Definitive diagnosis is made via full-thickness rectal biopsy (taken 2 cm above the dentate line). Radiologic Findings for Hirschsprung Disease: Plain Radiograph : Findings resemble bowel obstruction with a smaller caliber affected bowel and varying degrees of colonic distension. Severe cases may lead to dilatation, enterocolitis, and perforation. Fluoroscopy (Contrast Enema) : Essential for diagnosis and determining bowel involvement. Shows a narrow aganglionic segment with proximal dilatation and a saw-tooth pattern. Delayed evacuation of contrast and the transition zone is depicted but not accurate for ganglion cell presence. Ultrasound : Can reveal fetal colonic dilatation in some cases. Toxic Megacolon (Option B ruled out): Acute complications associated with inflammatory bowel disease (IBD) and less commonly with infectious colitis and other colitides; characterized by severe colonic dilatation and risk of perforation due to loss of neurogenic tone. Radiographic Features: Plain Radiograph: Transverse colon dilated to at least 6 cm (3-6-9 rule) ; signs of pneumoperitoneum may indicate perforation. CT Scan: Shows loss of haustral markings, pseudopolyps, thumbprinting, and pericolic fat stranding due to mucosal edema. Barium studies and colonoscopy are

contraindicated due to perforation risk. Crohn's disease (Option C): A chronic inflammatory bowel disease that can affect any gastrointestinal tract area. It usually presents in older children and adults with abdominal pain and diarrhea, not typically causing meconium passage issues in neonates. Ulcerative colitis (Option D): Primarily affects the colon, leading to symptoms like bloody diarrhea and abdominal pain. It generally occurs in older children and adults and does not present with the specific failure to pass meconium seen in Hirschsprung disease.







References:

radiopaedia.org/articles/hirschsprung-disease

radiopaedia.org/articles/toxic-megacolon

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Q3: A 40-year-old male presents with abdominal pain, weight loss, and chronic diarrhea. Radiologic studies reveal skip lesions in the ileum and cecum with a cobblestone appearance and deep ulcers. Which of the following radiologic signs is most consistent with this patient's diagnosis? (Q853524)

A. Lead pipe colon

B. Collar button ulcers

C. String sign of Kantor

D. Loss of haustrations

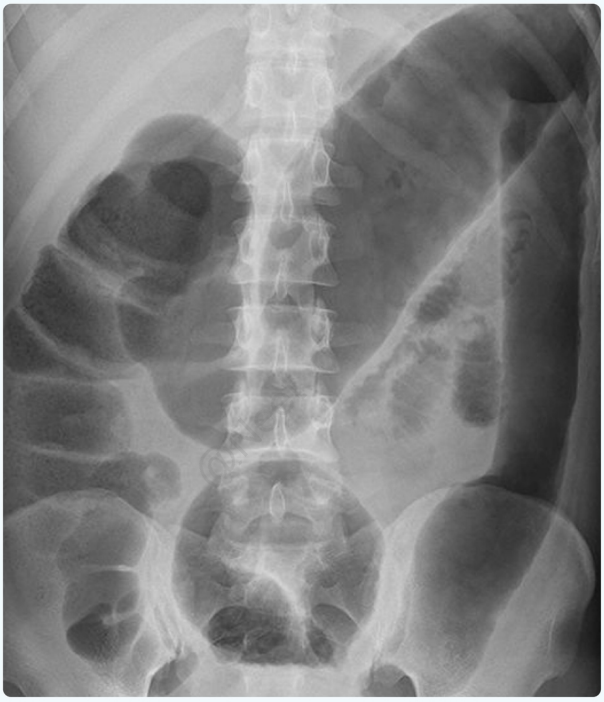
Correct Answer: C. String sign of Kantor

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: The clinical scenario describes skip lesions , cobblestone appearance, and asymmetric mural thickening with deep ulcers , which are hallmark features of Crohn’s disease . The string sign of Kantor is seen in Crohn’s disease and refers to the beaded, string-like appearance of the bowel due to multifocal narrowing from strictures. Crohn’s Disease Ulcerative Colitis Skip lesions ; ileum and caecum involved; rectum relatively spared. Transmural; leads to ulceration, fissures, abscesses. Bowel wall may be affected asymmetrically with sacculations. Continuous colonic involvement; rectal in 95% of cases. Mucosal and submucosal; less severe. Fissure and abscess are not common. Circumferential bowel wall symmetry is usually maintained. 1. Fluoroscopy (Barium Studies) Mucosal abnormalities: Thickened, nodular folds and a "cobblestone" pattern due to a combination of longitudinal and transverse ulcers. Aphthous ulcers: Appear as areas of barium collection within the swollen mucosa. Shows deep ulcers, fistulae (e.g., enteroenteric, enterocolonic), and sinus tracts. Chronic disease features: Strictures, stenosis, and wall sacculations. String sign of Kantor: A beaded string-like appearance due to multifocal bowel narrowing from strictures. 2. Ultrasonography Concentric mural thickening of the bowel wall. Hyperemia within the inflamed segments. Increased echogenicity of surrounding fat. 3. CT and MRI Enterography Asymmetric Mural thickening Ulcerations: Seen as air or contrast extending into the bowel wall. Strictures Mesenteric changes: Comb sign: Engorgement of the vasa recta. Mesenteric fat stranding, edema, and reactive adenopathy. MRI-specific findings: T2 hyperintense signal: Indicates mural edema, best seen with fat-saturated sequences. Diffusion restriction: Suggestive of active inflammation. Active inflammation shows hyperenhancement in arterial and post-contrast phases. 1. Radiographs Bowel perforation and toxic megacolon: Radiographs (upright and supine) help screen for these conditions. Toxic megacolon: Detected by colonic distension >6 cm, typically in the transverse colon. Fig. Toxic megacolon in Ulcerative colitis Other findings: Air-fluid levels, loss of colonic haustrations, mucosal islands, and absence of formed stool. 2. Fluoroscopy

(Barium Enema) Mucosal abnormalities: Granular and stippled mucosa, with superficial erosions and ulcers. Collar button ulcers: Deeper ulcers extending into the submucosa. (Option B ruled out) Pseudopolyps Chronic disease features: Lead pipe colon: Luminal narrowing and loss of haustrations in the colon. (Option A & C ruled out) Patulous ileocecal valve (IC valve): With granular terminal ileum, indicative of backwash ileitis. 3. CT and MRI Enterography Active phase: Mural hyperenhancement: Concentric mural thickening with stratification. Submucosal edema: Seen as T2 hyperintensity on MRI. Pseudopolyps Chronic phase: Lead pipe colon: Concentric mural thickening with luminal narrowing and loss of haustrations. Submucosal fat deposition Presacral space widening due to perirectal fat. Post Inflammatory pseudopolyps Comb Sign in active Crohn’s disease Leadpipe appearance in Ulcerative colitis String sign of Kantor and rectovaginal fistula Inflammatory Pseudopolyps





Comb Sign in Active Crohn's Disease

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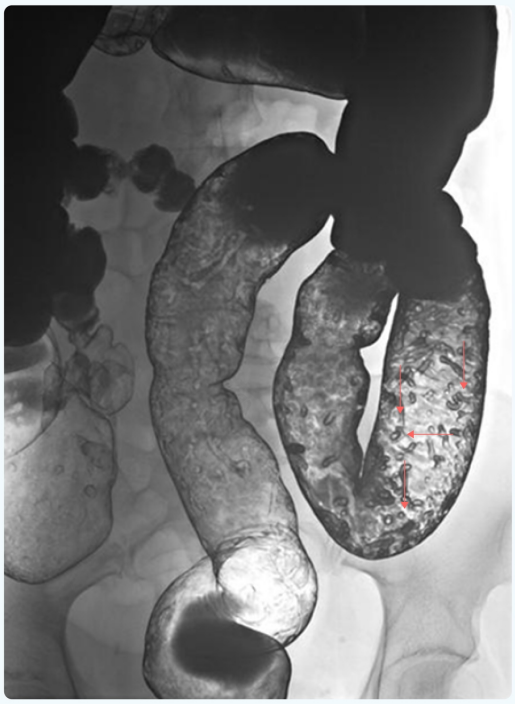
Leadpipe appearance in Ulcerative colitis (Arrows)

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String sign of Kantor and rectovaginal fistula

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Inflammatory Pseudopolyps

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References:

David Sutton Textbook of Radiology and Imaging, Volume 1, 8th edition, Page 2226- 2247

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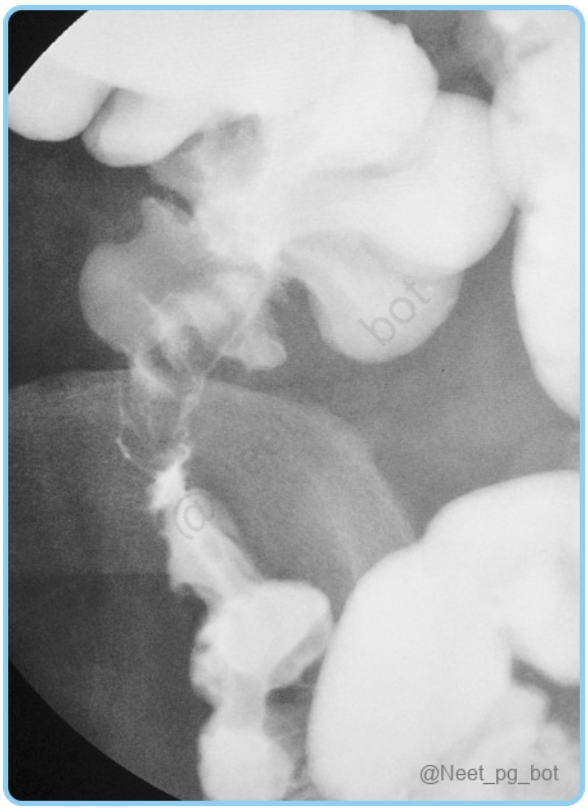
Q4: A 35-year-old male presents to the emergency department with chronic abdominal pain, fever, and unintentional weight loss over the past month. He reports altered bowel habits and has a history of exposure to individuals with tuberculosis. A small bowel follow-through imaging is provided below. Based on the clinical presentation and the attached imaging, which of the following features is not typically seen in the patient? (Q853523)

A. Spasm and edema at the ileocecal valve

B. Uniform thickening of the entire colon

C. Presence of mesenteric adenopathy

D. Stierlin Sign with rapid barium emptying

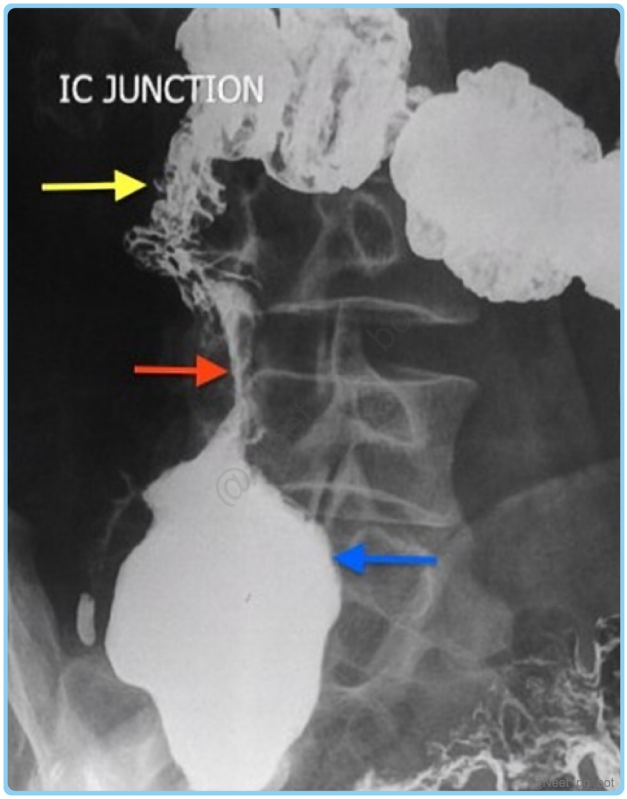


Correct Answer: B. Uniform thickening of the entire colon

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■ *Listen (Hindi)*

Explanation: The patient's features including chronic abdominal pain, fever, and weight loss, with a history of exposure to tuberculosis and the small bowel follow-through image showing a circumferential mass effect at the ileocecal valve are characteristic of ileocecal tuberculosis . In ileocecal tuberculosis, there is typically localized thickening (circumferential) rather than uniform thickening of the entire colon. Ileocecal Tuberculosis: Tubercular bacilli enter the GI tract via infected sputum or milk, leading to mucosal invasion and formation of tubercles in lymphoid tissue. The ileocecal region is most commonly affected due to its abundant lymphoid tissue, with isolated colonic involvement in about 10% of cases, particularly in immunocompromised individuals. Symptoms include chronic abdominal pain, fever, weight loss, and altered bowel habits. Common complications are bowel obstruction and perforation. Differential Diagnosis includes Crohn’s disease, lymphoma, amoebiasis, and cecal malignancy. Imaging Features of Ileocecal Tuberculosis: Radiographs : May show enteroliths, bowel obstruction with air-fluid levels, and signs of pneumoperitoneum in cases of perforation. Small bowel follow-through : Spasm and edema at the ileocecal valve and terminal ileum, leading to thickening and ulceration. (Option A) Stierlin Sign : Rapid barium emptying in inflamed segments with normal barium column in adjacent segments. (Option D) Features like hypersegmentation (chicken intestine), flocculation, and precipitation may be seen. The inflammation and involvement of the cecum can lead to structural changes, resulting in retraction or elevation of the cecum, which is known as “Pulled up cecum” Contrast-enhanced CT : Circumferential thickening of the terminal ileum and cecum and asymmetric thickening of the ileocecal valve. Pathognomonic associated mesenteric adenopathy (Option C) with characteristic central low attenuation due to caseous necrosis. Chronic stages may present multifocal strictures and diffuse narrowing, with signs like the Fleischner or inverted umbrella sign (thickened ileocecal valve lips with narrowed terminal ileum).



References:

David Sutton Textbook of Radiology and Imaging, Volume 1, 8th edition, Page 2254- 2258

Ileocecal tuberculosis | Radiology Reference Article | Radiopaedia.org

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Q5: A 60-year-old female presents to the emergency department with severe abdominal pain, bloating, and vomiting. On examination, her abdomen is distended, and bowel sounds are decreased. A radiograph abdomen of the patient is given below. Which of the following is not a feature of the patient's condition? (Q853522)

A. Arises in the pelvis, specifically the left lower quadrant

B. Maintains a colonic haustral pattern

C. Causes whirlpool sign

D. Characterized by the coffee-bean sign

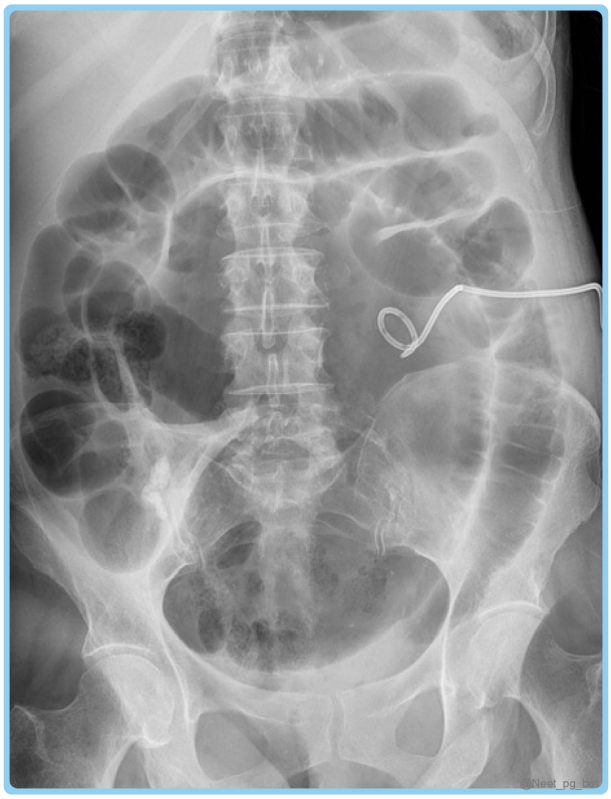


Correct Answer: B. Maintains a colonic haustral pattern

Explanation: Sigmoid volvulus is characterized by a twisting of the sigmoid colon, leading to obstruction of the distal large bowel and resulting in a distended abdomen. The "coffee-bean sign" is an X-ray feature that shows a

distended sigmoid loop with an inverted U shape, indicative of the condition. Sigmoid volvulus typically has an ahaustral appearance, whereas maintaining a colonic haustral pattern is a feature of cecal volvulus. Sigmoid Volvulus Caecal Volvulus Sigmoid volvulus arises in the pelvis, specifically the left lower quadrant. (Option A ruled out) It extends towards the right upper quadrant. It has an ahaustral appearance (lack of haustra). Causes obstruction of the distal large bowel, leading to dilation of the ascending, transverse, and descending colon. A few gas-fluid levels may be seen. Coffee-Bean Sign : The condition is characterized by a distended sigmoid loop with an inverted U shape, known as the coffee-bean sign (or kidney bean sign). (Option D ruled out) Whirlpool Sign : The whirl, or whirlpool sign is observed when the bowel rotates around its mesentery, resulting in whirls of the mesenteric vessels. (Option C ruled out) The torsion is located in the ascending colon above the ileocecal valve. Caecal volvulus arises in the right lower quadrant. It extends towards the epigastrium or left upper quadrant. The colonic haustral pattern is maintained. The distal colon is usually collapsed, and the small bowel is distended. One gas-fluid level may be seen. Definitive Sign : Upward displacement of the appendix and obstruction of the large bowel is a definitive sign of cecal volvulus. May show a U-shaped distended bowel segment and signs of ischemia, including mural thickening, infiltration of the mesenteric fat, and pneumatosis intestinalis. Whirlpool Sign : A whirl sign may be apparent due to tight torsion of the mesentery from a twist between the afferent and efferent loops. Coffee Bean Appearance : A "coffee bean" appearance may be seen in a loop of transverse colon. Bird's Beak Sign : Abrupt cut-off with “bird's beak” tapering at the distal cecum is characteristic. Central appendix sign : Abnormal appendix position near midline.





References:

radiopaedia.org/articles/sigmoid-volvulus-vs-caecal-volvulus-1

emedicine.medscape.com/article/373585-overview

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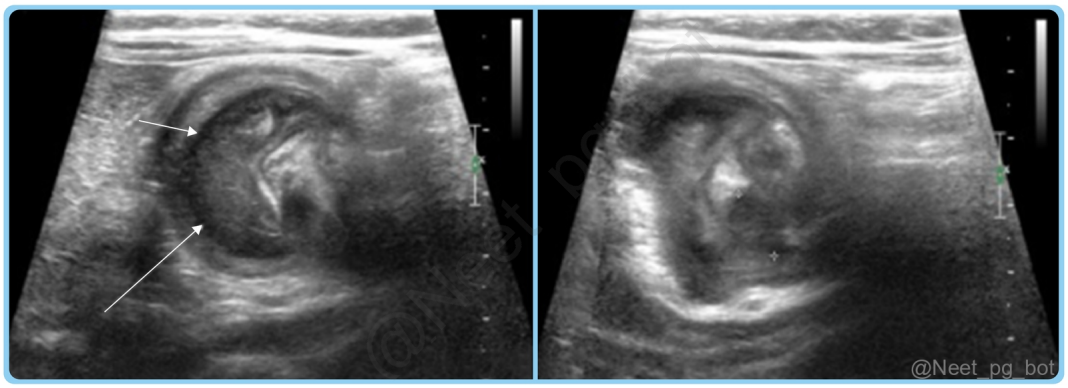
Q6: A 7-year-old girl with a known H/o lymphoma is brought to the ER for evaluation of severe abdominal pain and intermittent vomiting. Her parents report that she has recently passed currant jelly stools. O/E, a palpable abdominal mass is noted in the RUQ. An abdominal ultrasound is given below. Based on the clinical presentation and the ultrasound findings, what is the most likely diagnosis? (Q853521)

A. Acute appendicitis

B. Intussusception

C. Sigmoid Volvulus

D. Cecal Volvulus



Correct Answer: B. Intussusception

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- *Listen (Hindi)*

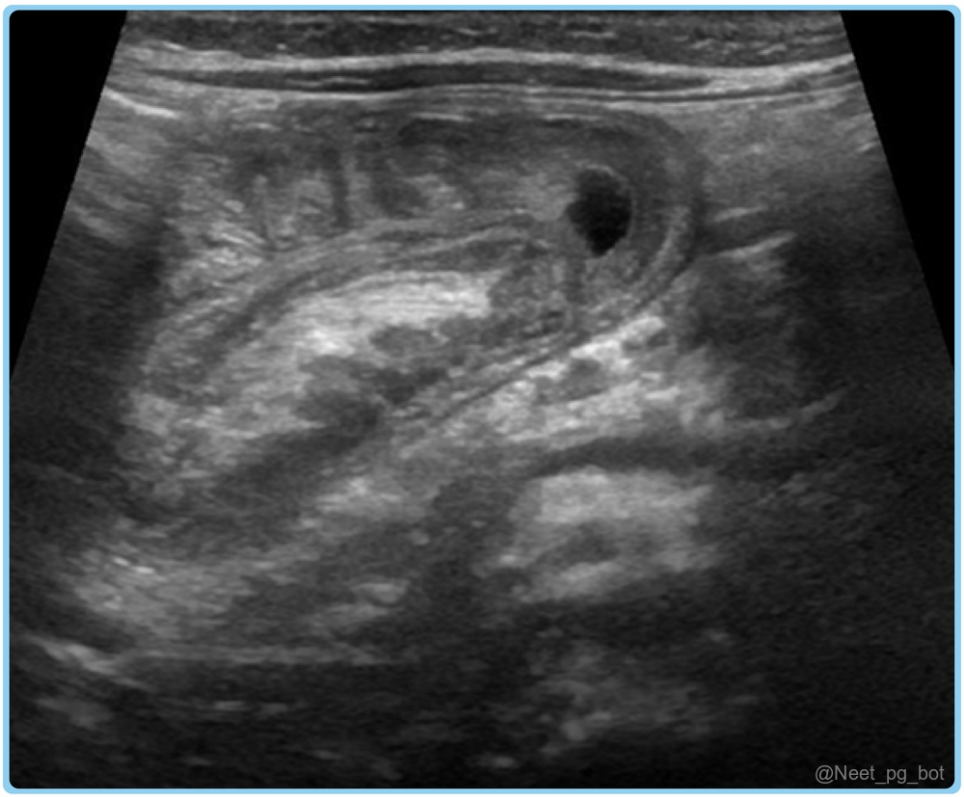
Explanation: Intussusception occurs when one segment of the bowel telescopes into another, often due to a lead point, such as a lymphoma in this case. The ultrasound findings showing a target sign are classic for intussusception. The patient's symptoms of severe abdominal pain, vomiting, and currant jelly stools further support this diagnosis. Plain Radiograph: Elongated soft tissue mass in the upper right quadrant. Bowel obstruction with air-fluid levels and proximal bowel dilation. Possible absence of gas in the distal collapsed bowel. Fluoroscopy: Gold standard is the contrast enema, showing the intussusception as an occluding mass. Characteristic "coiled spring sign." Fig. Coiled spring sign Ultrasound: Target sign (doughnut sign)- Concentric alternating echogenic and hypoechoic bands are observed, where the echogenic bands represent the serosa and submucosa, flanking the hypoechoic muscularis propria. Pseudokidney sign- Longitudinal ultrasound appearance of the intussuscepted segment of bowel which mimics a kidney Crescent in a doughnut sign. Absence of blood flow in the intussusceptum (contraindication for enema). Features favoring ileocolic intussusception: hyperechoic core, thicker outer hypoechoic wall, larger anteroposterior diameter, and presence of lymph nodes. CT Scan: Characteristic "bowel-within-bowel" configuration. Concentric rings of bowel on axial images, and sausage-shaped mass on longitudinal images. Visualization of the lead point if present, with surrounding mesenteric fat and vessels. Acute Appendicitis (Option A): Typically presents with right lower quadrant pain, nausea, and fever. It wouldn't show a target sign on imaging, and currant jelly stools are not associated with this condition. Sigmoid Volvulus (Option C): Involves twisting of the sigmoid colon, presenting with abdominal distension and constipation. It would show a "coffee bean" sign rather than a target sign. Cecal Volvulus (Option D): Similar to sigmoid volvulus, but involves the cecum. It typically shows signs of obstruction like “bird beak sign” but not the target sign on ultrasound.



Coiled spring sign

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References:

radiopaedia.org/articles/intussusception

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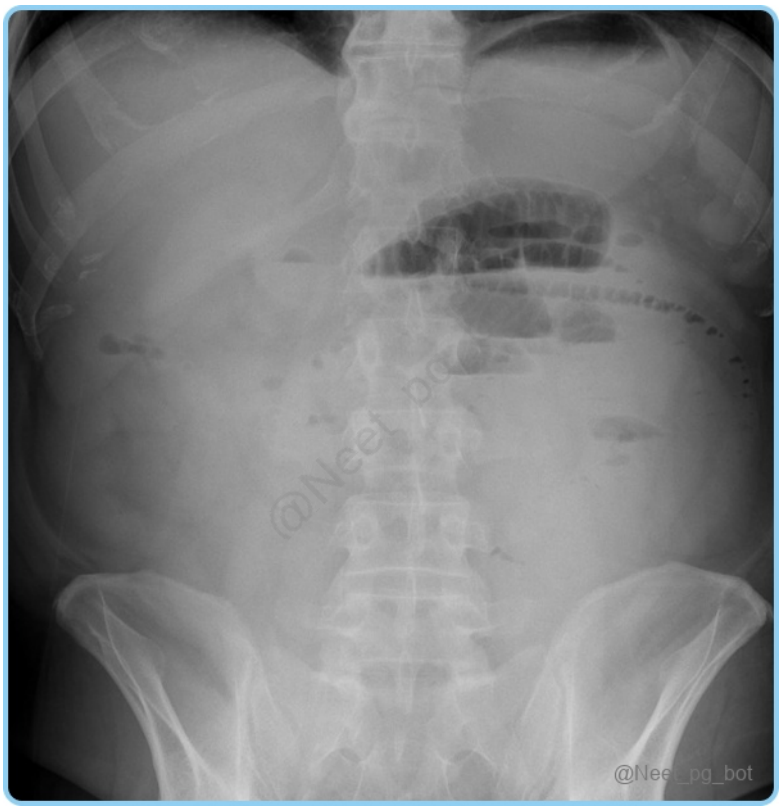
Q7: A 45-year-old male presents to the emergency department with severe abdominal pain, vomiting, and a distended abdomen. On examination, his bowel sounds are diminished. An abdominal radiograph is given below. What is the most likely diagnosis for this patient based on the given findings? (Q853520)

A. Mesenteric ischemia

B. Small bowel obstruction

C. Acute gastroenteritis

D. Saline catharsis

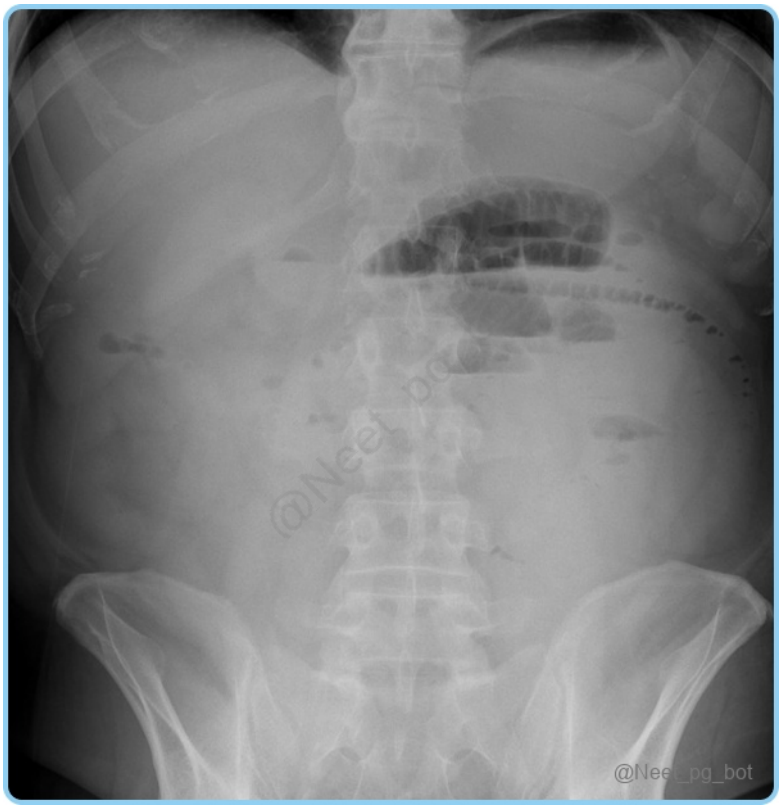


Correct Answer: B. Small bowel obstruction

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- *Listen (Hindi)*

Explanation: Small bowel obstruction is characterized by the accumulation of gas and fluid in the intestine due to a blockage. The string of pearls sign, which appears as a row of small gas bubbles along the bowel wall, is virtually diagnostic of this condition, particularly in the context of the patient's symptoms. String of Pearls Sign: The string of pearls sign consists of a row of small gas bubbles in the abdomen, typically seen obliquely or horizontally. These gas bubbles are trapped along the superior wall of the small bowel, between the valvulae conniventes. The inferior margins of the bubbles have an ovoid appearance due to the meniscal effect of intraluminal fluid. It can be observed on upright or decubitus abdominal radiographs and on CT scans. Clinical Significance : When present in the appropriate clinical context, it is virtually diagnostic of small bowel obstruction . Other Conditions : It may also be seen very rarely in adynamic ileus, acute gastroenteritis, and saline catharsis. (Options A, C & D ruled out) Adynamic ileus: Unlike a mechanical obstruction, where there is a physical blockage in the intestines, adynamic ileus results from impaired neural or muscular activity of the gut. Abdominal X-rays or CT scans show diffuse bowel dilation without specific air-fluid levels or a transition point, which distinguishes ileus from mechanical bowel obstruction. Fibromuscular Dysplasia (FMD): This non-atherosclerotic, non-inflammatory disease of blood vessels (often affecting renal or carotid arteries) produces alternating stenotic and aneurysmal segments, leading to a classic "string of beads" appearance on angiography. Mesenteric ischemia (Option A): This condition presents with severe abdominal pain and distension due to reduced blood flow to the intestines. However, it usually does not show the characteristic air-fluid levels seen in small bowel obstruction and may include signs of ischemia. Acute gastroenteritis (Option C): Unlikely, as it often presents with hyperactive bowel sounds, diarrhea, and cramping rather than the severe pain and diminished bowel sounds seen here. Saline catharsis (Option D): Unlikely, as it typically causes loose stools and abdominal cramping but not severe abdominal pain or radiographic

findings of distension.





References:

String of pearls sign (gastrointestinal) | Radiology Reference Article

David Sutton Textbook of Radiology and Imaging, Volume 1, 8th edition, Page 2268

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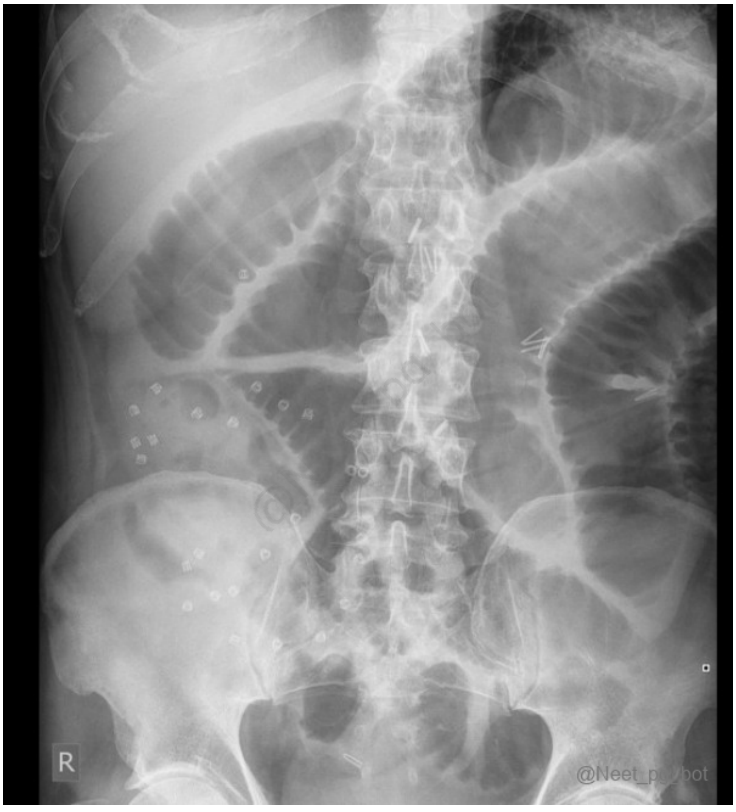
Q8: A 65-year-old male presents with colicky abdominal pain, distension, vomiting, and absolute constipation for the past 48 hours. He has a history of prior abdominal surgery. On physical examination, his abdomen is distended with high-pitched bowel sounds. An abdominal X-ray is obtained and shows the following features. What is the most likely diagnosis based on the clinical presentation and radiographic findings? (Q853519)

A. Small bowel obstruction

B. Large bowel obstruction

C. Sigmoid volvulus

D. Paralytic ileus

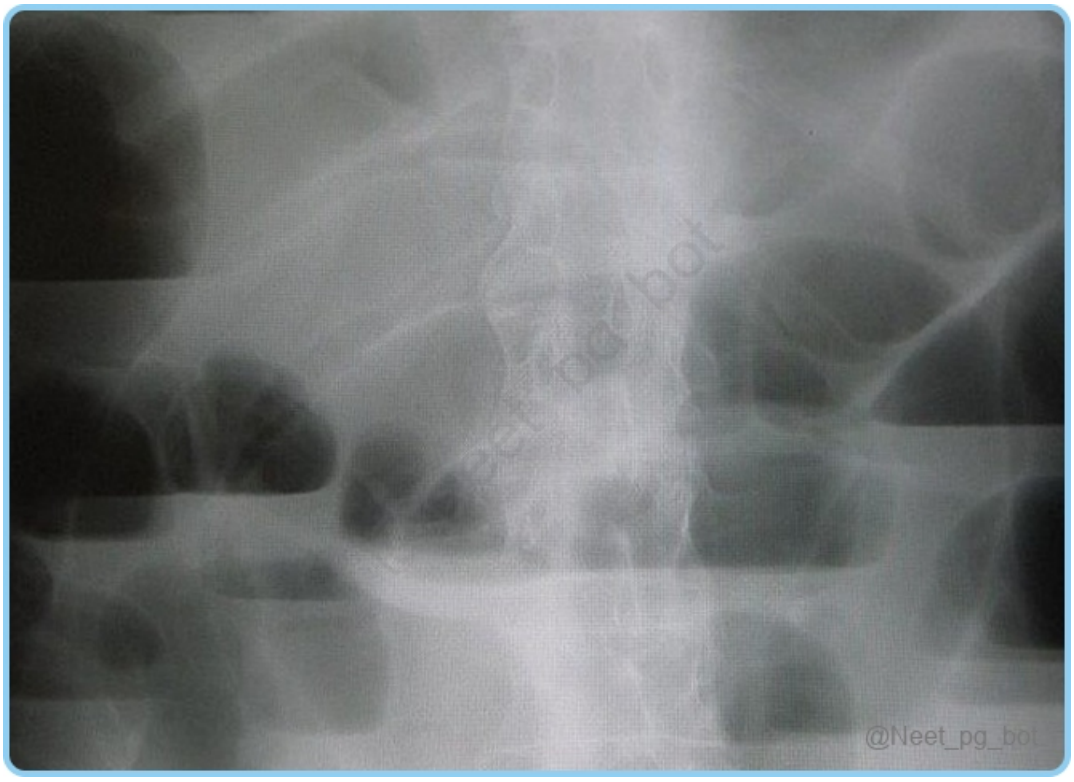


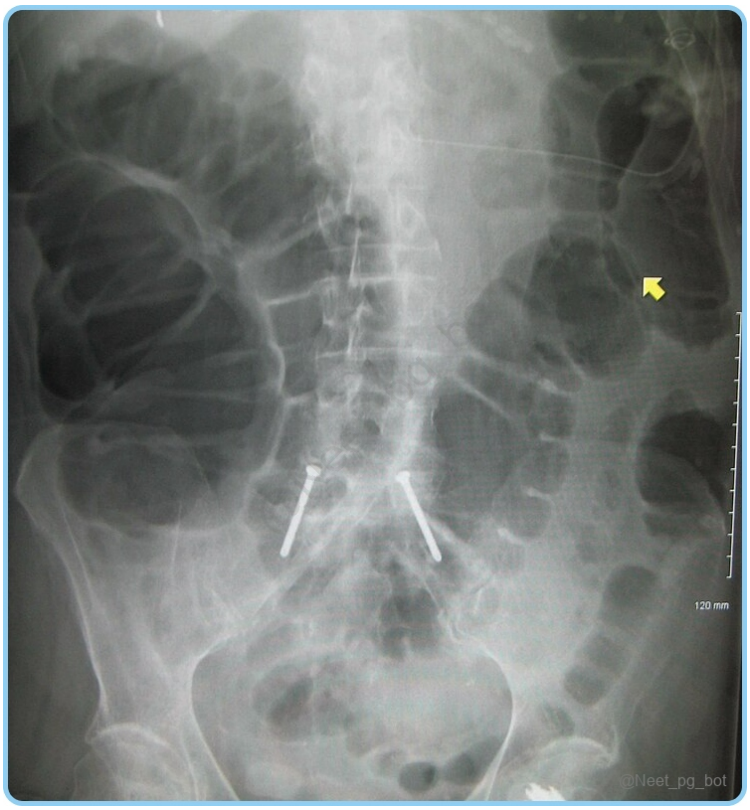
Correct Answer: A. Small bowel obstruction

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: This patient’s symptoms of colicky abdominal pain, vomiting, distension, and the presence of high-pitched bowel sounds are characteristic of a mechanical obstruction. The radiographic findings show dilated loops of the bowel with valculae conniventes , suggestive of small bowel obstruction. The small bowel loops are identified by their location in the central abdomen and their smaller diameter (3–5 cm). Additionally, the presence of previous abdominal surgery is a risk factor for adhesions, which are the most common cause of small bowel obstruction. Differentiating Features Between Small Bowel and Large Bowel Obstruction: Feature Small Bowel Large Bowel Number of loops Many loops visible Few loops visible Position of loops Central abdomen Peripheral (framing the small bowel) Wall/Mucosal pattern Valvulae conniventes (complete circular folds) Haustra (incomplete bands) Diameter >3 cm >6 cm (Caecum >9 cm) Gas Pattern Multiple air-fluid levels, "string of beads" Distended colon, air-fluid levels Large bowel obstruction (Option B) : Typically shows more peripheral bowel dilatation, with larger loop diameters (usually >6 cm), and haustral folds that do not completely extend across the bowel lumen. Sigmoid volvulus (Option C) : This presents with the "coffee bean" sign on abdominal X-ray and is associated with large bowel obstruction, often seen in elderly patients. The absence of such a sign and the presence of small bowel dilatation make this unlikely. Fig. Coffee bean with Coffee bean sign Paralytic ileus (Option D) : In paralytic ileus, the X-ray typically shows diffuse bowel dilatation without clear air-fluid levels. The high-pitched bowel sounds and specific dilated loops of the small bowel point toward a mechanical obstruction rather than a functional one.




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References:

Grainger & Allison's Diagnostic Radiology, A Textbook of Medical Imaging, 7th Edition, Page 544

Textbook of Radiology & Imaging by David Sutton, Vol I, 8th Edition, Chapter 29 Imaging of Small and Large Bowel, Specific Small Bowel Abnormalities - Small Bowel Obstruction, Specific Large Bowel Abnormalities - Large Bowel Obstruction.

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Q9: A 1-day-old neonate presents with bilious vomiting and abdominal distension. An abdominal X-ray is performed and is given below. Which of the following is the most likely diagnosis? (Q853518)

A. Pyloric atresia

B. Duodenal atresia

C. Jejunal atresia

D. Ileal atresia



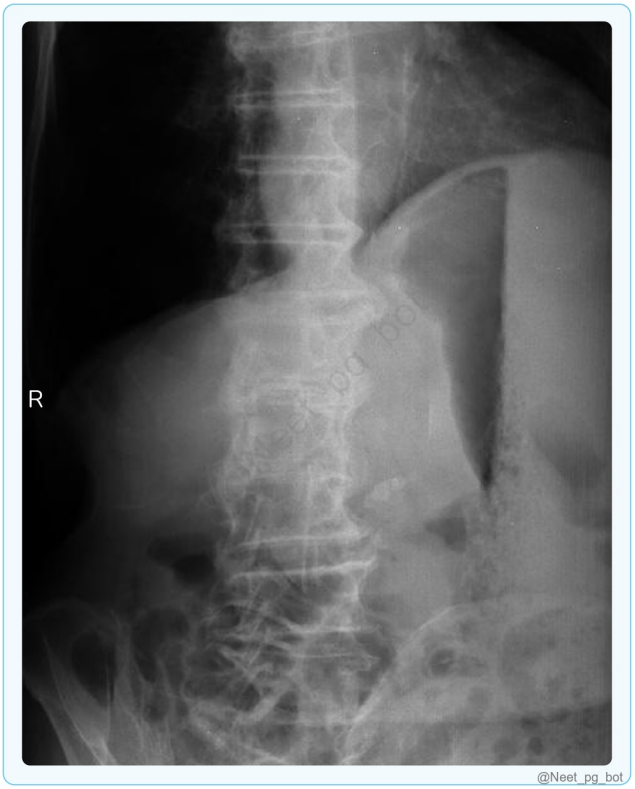
Correct Answer: C. Jejunal atresia

■ *Listen (English)*

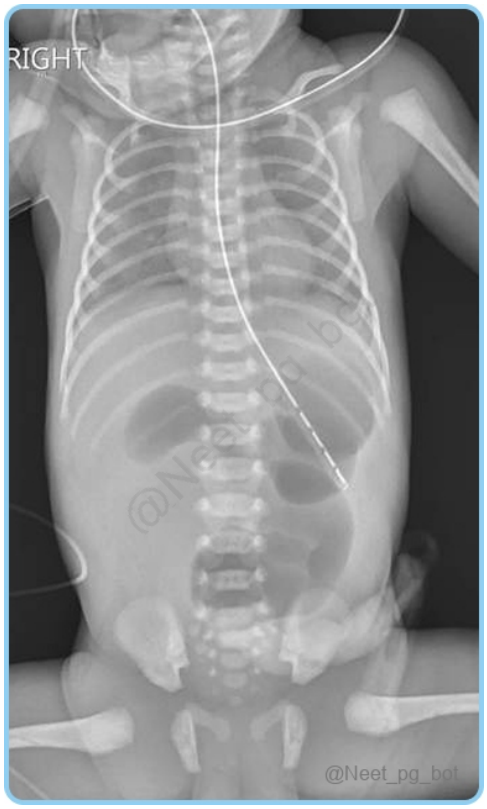
■ *Listen (Hindi)*

Explanation: Jejunal atresia is characterized by a "triple bubble" sign on an abdominal X-ray. This appearance results from gas trapped in three distended proximal bowel loops: the stomach, duodenum, and proximal jejunum , with no distal gas beyond the atresia. This condition is caused by intrauterine vascular insult leading to segmental bowel absence or occlusion. Various Bubble signs of the abdomen: Condition Radiological Sign


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References:

Grainger & Allison’s Diagnostic Radiology, A Textbook of Medical Imaging, 7th Edition, Page. 266

Textbook of Radiology & Imaging by David Sutton, Vol I, 8th Edition, Chapter 27, Gastric dilatation.

Textbook of Radiology & Imaging by David Sutton, Vol II, 8th Edition, Chapter 84, Pediatric Gastrointestinal Tract and Hepatobiliary System, Upper Gastrointestinal Tract Anomalies - Duodenal Obstruction and Lower Gastrointestinal Tract Anomalies - Jejunoileal Atresia.

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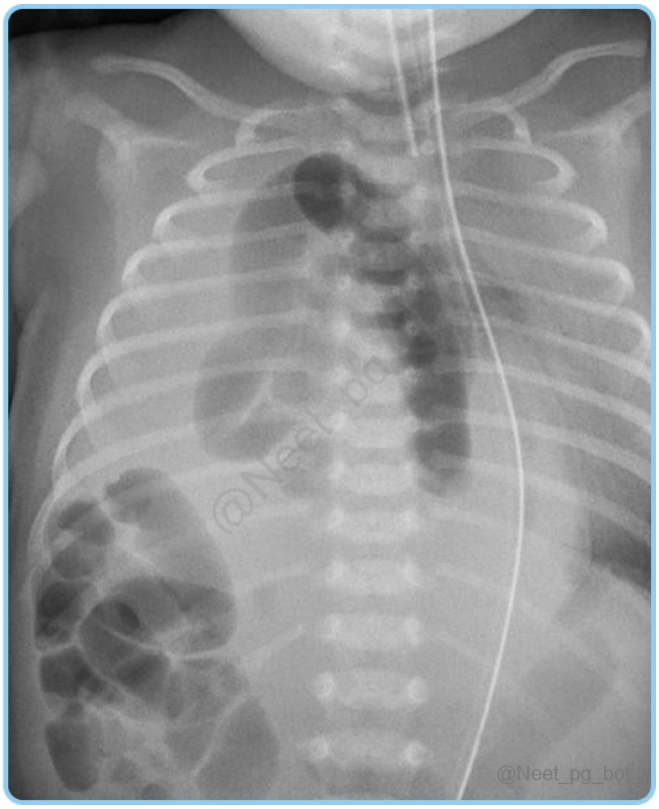
Q10: A 1-day-old newborn presents with respiratory distress. A chest X-ray is performed and is given below. Based on the findings, what is the most likely diagnosis? (Q853517)

A. Congenital Diaphragmatic Hernia

B. Esophageal atresia with tracheoesophageal fistula

C. Pulmonary sequestration

D. Congenital pulmonary airway malformation (CPAM)

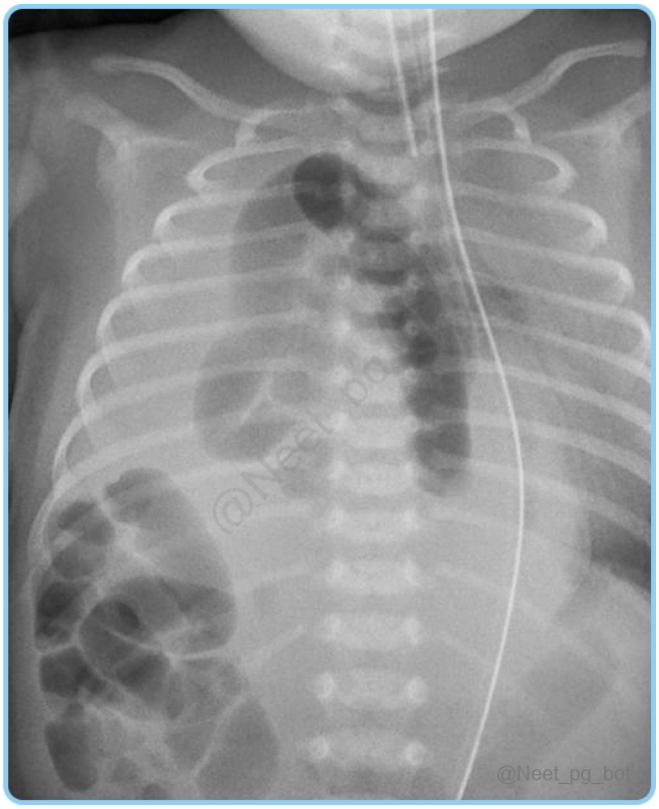


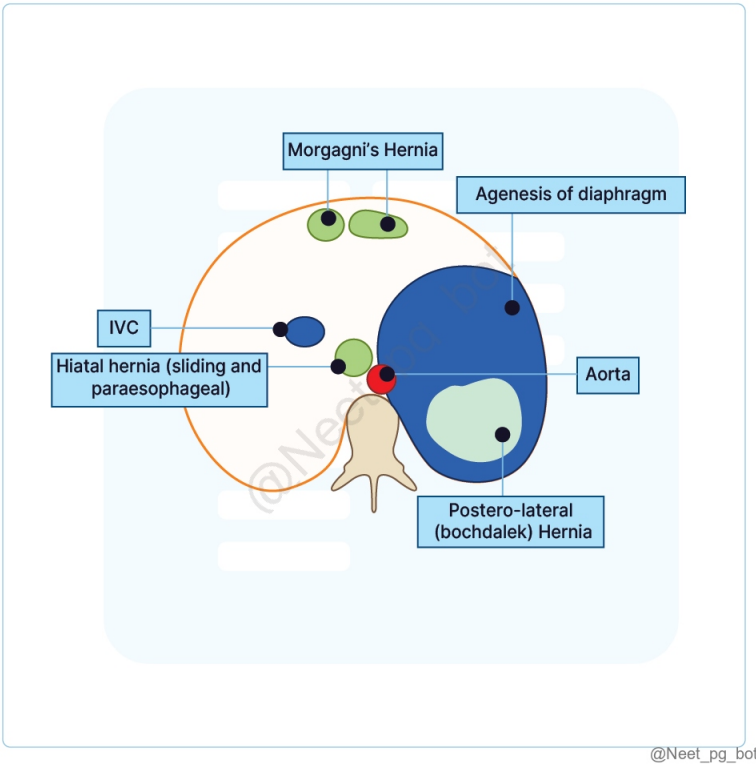
Correct Answer: A. Congenital Diaphragmatic Hernia

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: The given chest x-ray shows loops of bowel in the right thoracic cavity, mediastinal shift to the left, and decreased right lung aeration, which is consistent with Congenital Diaphragmatic Hernia. Congenital Diaphragmatic Hernia (CDH): CDH is the intrathoracic herniation of abdominal contents due to congenital defects in the diaphragm. Types of CDH : Bochdalek Hernia : Occurs through the posterolateral pleuroperitoneal canal, most commonly on the left side . Morgagni Hernia : Anterior hernia located at the right cardiophrenic angle. Fig. Schematic representation of CDH Radiologic Features : Chest Radiograph (CXR): Bochdalek hernia: Dome-shaped soft tissue opacity in the posterolateral thorax, often left-sided . May show gas-filled bowel loops or fat content in the thoracic cavity. Mediastinal shift away from the herniation due to mass effect. On the lateral view , hernias appear above the posterior costophrenic recess . CT/MRI : Visualizes herniation of fat, bowel, spleen, or kidney through a diaphragmatic defect. Important for distinguishing from other masses like cystic adenomatoid malformation or pericardial cyst . CT provides clearer differentiation of soft-tissue or fatty mass protruding through the diaphragm. Complications : Associated with hypoplasia of the ipsilateral lung , leading to respiratory distress, especially in neonates. Neonates may present with respiratory distress and mediastinal deviation. Esophageal atresia with tracheoesophageal fistula (Option B) : The primary abnormality may show air in the esophagus or stomach (if a fistula is present) and sometimes an absence of gas in the abdomen if there is no fistula. This condition doesn't present with bowel loops in the thorax or a large diaphragmatic defect. Pulmonary sequestration (Option C): It presents as a mass in the lower lobe of the lung, often with an abnormal vascular supply seen on advanced imaging like CT angiography. No bowel loops or significant mediastinal shift would be seen. Congenital pulmonary airway malformation (CPAM) (Option D) appears as cystic masses within the lung, but the cysts are within the lung parenchyma, not abdominal contents in the thorax.





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References:

Grainger & Allison's Diagnostic Radiology, A Textbook of Medical Imaging, 7th Edition, Page. 62, 63.

Textbook of Radiology & Imaging by David Sutton, 8th Edition, Chapter 14: Pleura, Diaphragm, and Chest Wall - The Diaphragm - Hernias of the Diaphragm.

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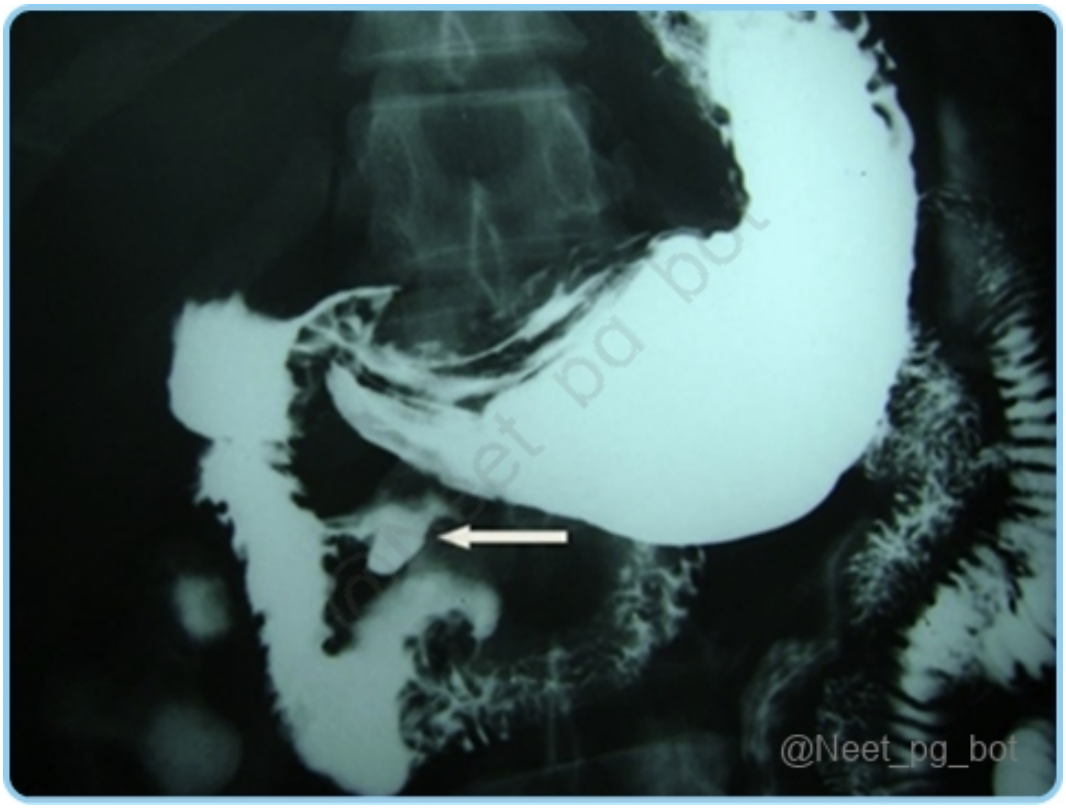
Q11: Match the following: Barium swallow a) 2.Barium meal b) 3.Barium follow through c) 4.Barium enema d) (Q853495)

A. 1-b, 2-d, 3-a, 4-c

B. 1-c, 2-a, 3-d, 4-b

C. 1-a, 2-c, 3-b, 4-d

D. 1-b, 2-a, 3-d, 4-c


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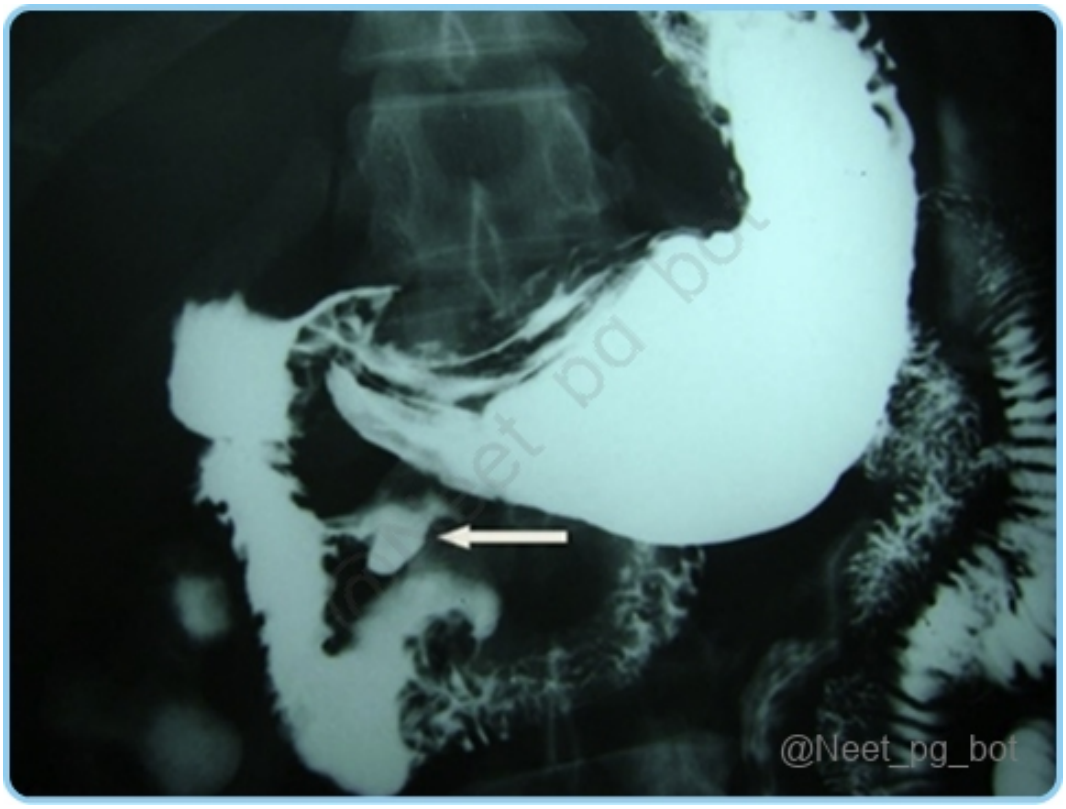
Correct Answer: B. 1-c, 2-a, 3-d, 4-b

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: Barium Studies Barium swallow Test of the pharynx, esophagus, and proximal stomach Contraindicated in any GI perforation- Esophageal or intestinal and Tracheo-esophageal fistula There are three indentations in the esophagus : 1st indentation- at the level of the Aortic Arch 2nd indentation- at the level of Bronchus 3rd indentation- at the level of the Left Atrium. Barium meal Tests the esophagus, stomach, and duodenum (the first part of the small intestine) Barium follow through Identify issues in the small intestine by tracking the passage of barium after ingestion. After drinking a barium liquid, there is a 10-15 minute wait before X-rays are taken every 30 minutes until the barium reaches the large intestine. Barium enema Barium is given Transrectally. Double-contrast (Barium + Air) Positive contrast - Barium (white) Negative contrast - Air (black) Tests the pathologies of the large intestine- rectum, sigmoid colon and ascending, transverse and descending colon.




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References:

radiopaedia.org/articles/barium-swallow

pgblazer.com/normal-indentations-on-the-esophagus-in-barium-swallow-right-anterior-oblique-view-chest-x-ray/

www.cancer.gov/publications/dictionaries/cancer-terms/def/barium-meal-photofluorography

patient.info/digestive-health/acid-reflux-and-oesophagitis/barium-tests-swallow-meal-follow-through

radiopaedia.org/articles/double-contrast-barium-enema-technique

Grainger and Allison's Textbook of Diagnostic Radiology, 7th Edition, Page 483

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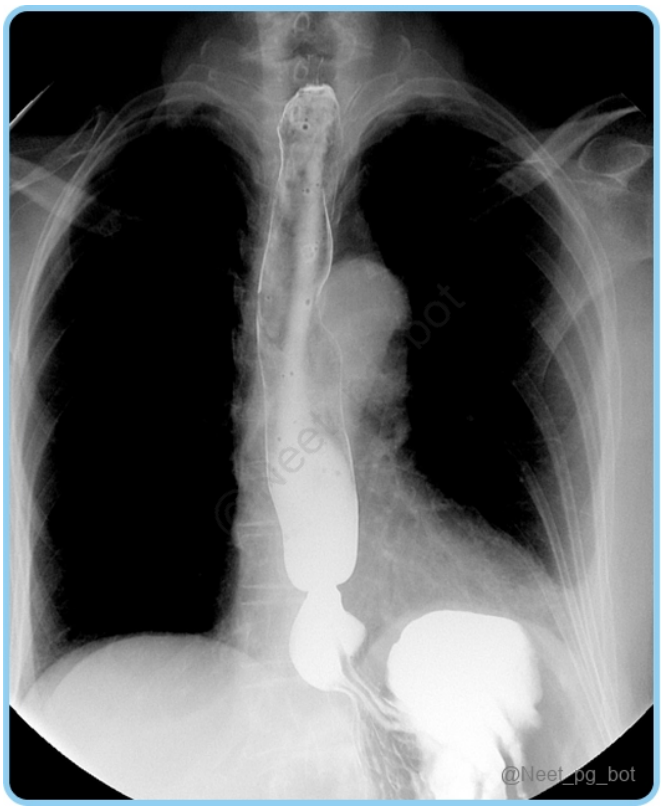
Q12: A 45-year-old woman presents with intermittent dysphagia to solids but not liquids. A barium swallow study is performed, as shown below. Which of the following is the most likely diagnosis based on the radiological findings? (Q853514)

A. Schatzki ring

B. Plummer-Vinson syndrome

C. Diffuse esophageal spasm

D. Achalasia



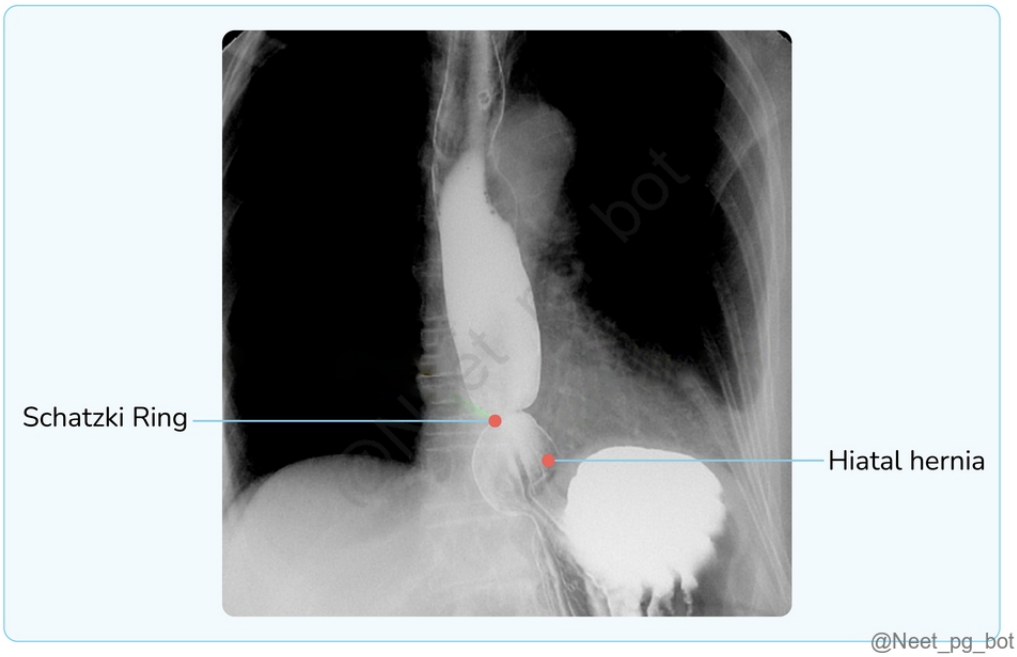
Correct Answer: A. Schatzki ring

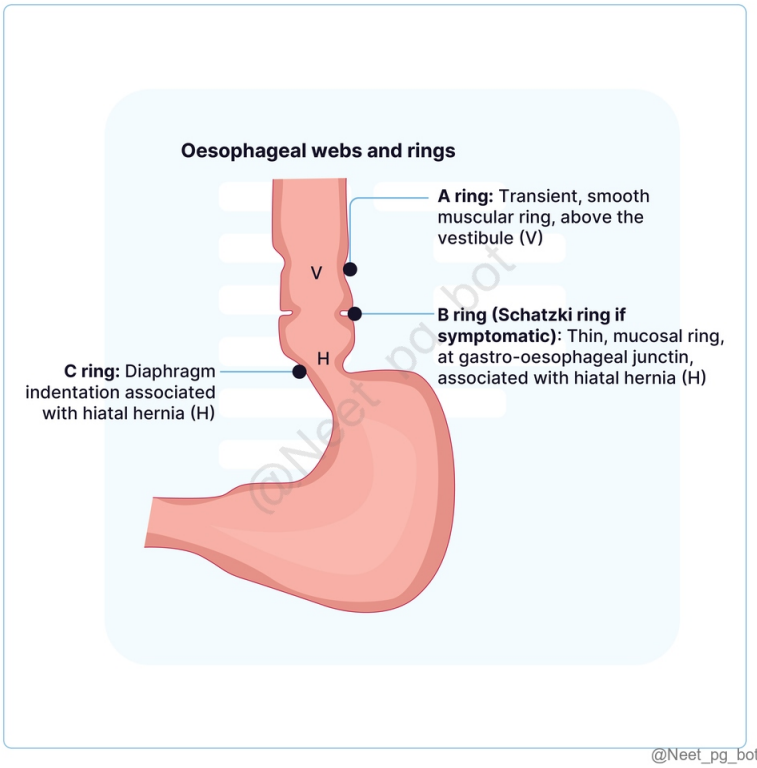
■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: The radiological finding shown is a thin, smooth, circumferential narrowing at the distal esophagus, which is characteristic of a Schatzki ring. It causes intermittent dysphagia and is often seen in older adults. Esophageal Rings: Types: A Rings B Rings C Rings Muscular rings formed due to hypertrophy of smooth muscle in the distal esophagus. Covered in squamous epithelium. Transient and result from active muscle contraction. Asymptomatic and incidentally noted during esophagography. Lower esophageal rings - fixed, mucosal rings located at the squamocolumnar junction. Commonly found just above a hiatal hernia. Symptomatic B rings - Schatzki Rings (diameter <13 mm) may cause dysphagia, especially when food passes through the narrowed area. Located distal to the squamocolumnar junction. Covered by squamous epithelium. Least common and asymptomatic. Represent diaphragmatic indentation of the esophagus Imaging Features : Best visualized on esophagography (barium swallow) with full barium distension of the esophagus. A rings appear superior to B rings. B rings present as concentric, fixed narrowing, seen during a barium swallow in the right anterior oblique position . Fig. Esophageal rings Plummer-Vinson syndrome (Option B) : It is associated with esophageal webs in the upper esophagus, not lower, along with iron deficiency anemia. The barium swallow in this condition usually shows a web-like filling defect in the cervical esophagus rather than a ring at the gastroesophageal junction. Diffuse esophageal spasm (Option C) : It is characterized by uncoordinated, simultaneous contractions of the

esophagus. On a barium swallow, this typically produces a " corkscrew " appearance rather than a circumferential ring-like narrowing. Achalasia (Option D): It involves failure of the lower esophageal sphincter to relax, leading to progressive dysphagia for both solids and liquids. Radiologically, a barium swallow shows a " bird-beak " appearance in the distal esophagus and dilatation of the proximal esophagus.





References:

Textbook of Radiology & Imaging by David Sutton, 8th Edition, Chapter 28, Mechanical Esophageal Disorders - Esophageal Webs, Esophageal Rings

www.ncbi.nlm.nih.gov/books/NBK539771/

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Q13: A 55-year-old patient presents with intermittent chest pain and dysphagia. A barium swallow study is performed as part of the diagnostic workup. Which of the following radiographic findings is most characteristic of diffuse esophageal spasm (DES) as shown in the image? (Q853503)

A. Bird-beak appearance of the distal esophagus

B. Corkscrew or rosary bead appearance of the esophagus

C. Smooth, tapered narrowing of the mid-esophagus

D. Saccular outpouchings along the entire length of the esophagus



Correct Answer: B. Corkscrew or rosary bead appearance of the esophagus

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: The image shows corkscrew or rosary bead appearance of esophagus. This appearance of the esophagus, although seen in less than 5% of cases, is a characteristic finding of diffuse esophageal spasm (DES) on barium swallow studies. Diffuse esophageal spasm (DES)- Radiographic findings Imaging Modality Radiographic Findings Description Fluoroscopy (Barium Swallow) "Corkscrew esophagus" or "rosary bead esophagus" Non-peristaltic contractions pushing contrast in two directions Normal appearance possible 60% show abnormalities <5% show "corkscrew esophagus" Non-peristaltic contractions may be the only feature in some cases CT Circumferential wall thickening of the distal 5 cm of the esophagus Seen in 20% of patients Wall thickening ranges from 5 to 15 mm Simultaneous contractions in the distal esophagus Normal peristalsis interrupted by non-propulsive contractions Gold standard for diagnosis Not strictly a radiographic modality, but included for completeness Manometry pressures of various motility disorders: Esophageal Motility Disorder LES Resting Pressure LES Relaxation Peristalsis Contraction Amplitude Normal 10-45 mmHg Complete relaxation occur i.e ≤8 mmHg) Coordinated peristalsis throughout Normal amplitude is <180 mmHg Achalasia Elevated (>45 mmHg) Incomplete relaxation (>8 mmHg) Absent in the esophageal body N/A Diffuse Esophageal Spasm (DES) Normal (≤45 mmHg) Normal (≤8 mmHg) Uncoordinated in >20% of swallows Often high (>180 mmHg) in distal esophagus Nutcracker Esophagus (Jackhammer Esophagus) Normal (≤45 mmHg) Normal (≤8 mmHg) Normal Very high (>220 mmHg) Bird-beak appearance (Option A) is more characteristic of achalasia. Smooth, tapered narrowing (Option C) is not typically associated with DES and might suggest a benign stricture. Saccular outpouching along the entire esophagus (Option D) suggests diffuse esophageal diverticulosis. It is not a characteristic finding of DES, although some sacculations may be present.

References:

radiopaedia.org/articles/diffuse-oesophageal-spasm#

emedicine.medscape.com/article/1891791-overview?form=fpf

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Q14: A 55-year-old patient presents with progressive dysphagia, initially for solids and later for liquids. A barium swallow study is performed, and two different radiographic findings are shown below. Which of the following statements correctly differentiates between these images? (Q853502)

A. Image 1 shows achalasia cardia with a "bird beak" sign, while Image 2 shows carcinoma esophagus with irregular narrowing

B. Image 1 shows carcinoma esophagus with smooth narrowing, while Image 2 shows achalasia cardia

C. Both images show achalasia cardia

D. Both images show carcinoma esophagus affecting different parts of the esophagus



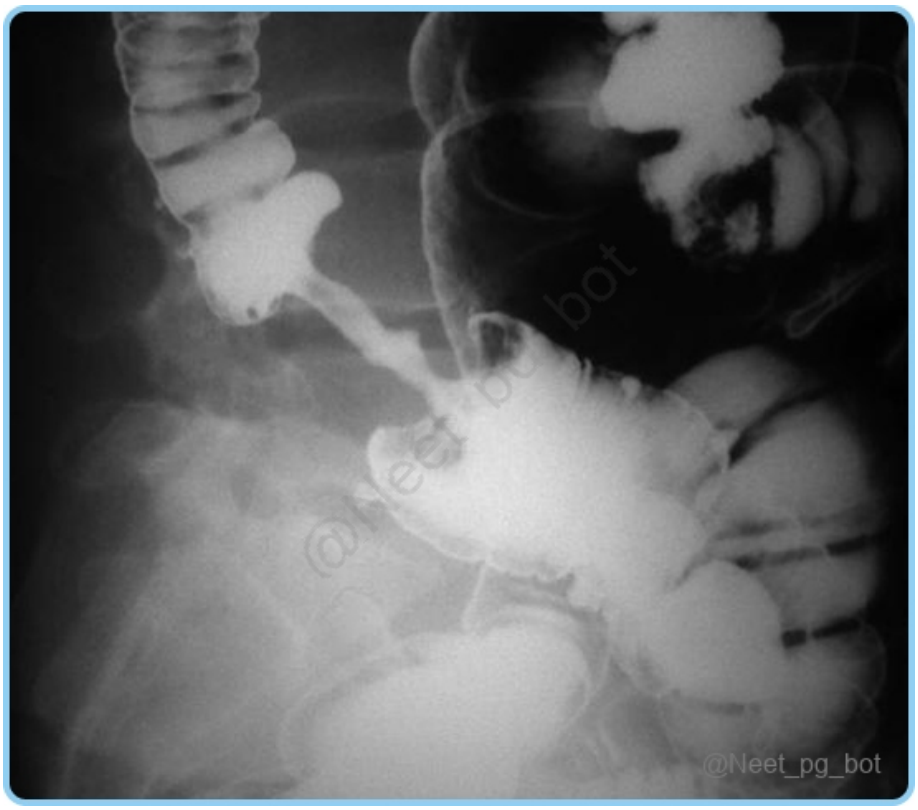


Correct Answer: A. Image 1 shows achalasia cardia with a "bird beak" sign, while Image 2 shows carcinoma esophagus with irregular narrowing

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: Image 1 clearly shows the characteristics of achalasia cardia: Image 2 demonstrates features consistent with carcinoma esophagus: Massively dilated esophagus with a narrow lower end "Bird beak" sign due to the contraction of the lower esophageal sphincter Smooth tapering at the distal end Irregular narrowing of the esophagus Malignant stricture in the mid-esophagus Abrupt, irregular contour changes Radiological findings in Achalasia cardia and Carcinoma Esophagus Feature Achalasia Cardia (Image 1) (Option C) Carcinoma Esophagus (Image 2) (Option D) Esophageal Appearance Massively dilated esophagus Irregular narrowing of esophagus Distal Esophagus (Option B) Narrow lower end ("bird beak" sign) Malignant stricture Location Affects lower esophageal sphincter Mid-esophagus in this case Contour Smooth tapering at distal end Irregular, abrupt narrowing Additional Features Proximal esophagus is dilated May show shouldering or "apple core" appearance (not visible in this image) Fig. Apple core appearance



References:

radiopaedia.org/articles/oesophageal-carcinoma-1

radiopaedia.org/articles/achalasia

radiopaedia.org/articles/bird-beak-sign-oesophagus?lang=us

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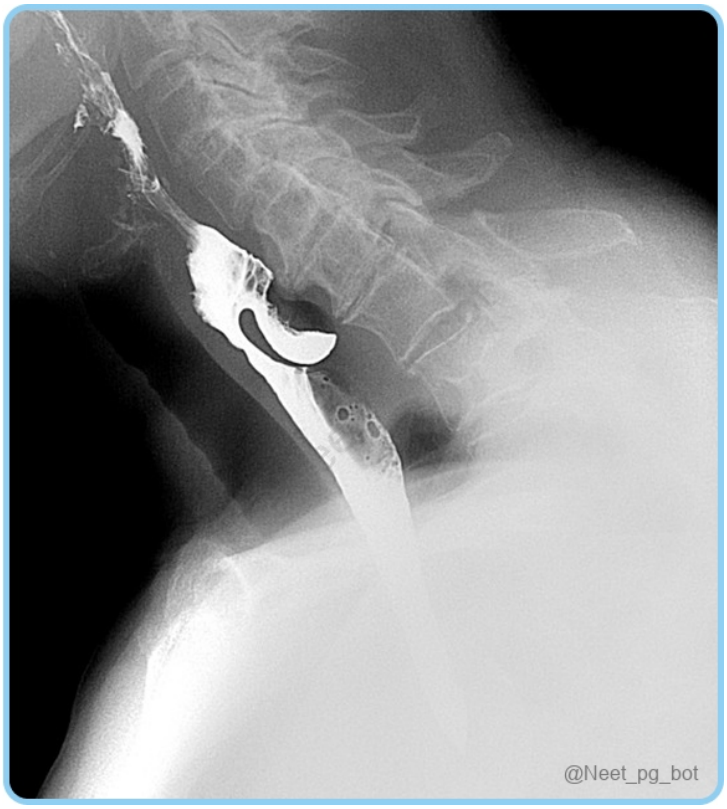
Q15: A 72-year-old man presents with dysphagia, regurgitation, and halitosis. A barium swallow examination is performed which is given below. Which of the following radiological findings is most consistent with the presentation? (Q853501)

A. An outpouching arising from the anterior wall of the proximal esophagus

B. Multiple small diverticula along the length of the esophagus

C. A diverticulum arising from the midline of the posterior wall of the distal pharynx

D. A smooth narrowing of the distal esophagus



Correct Answer: C. A diverticulum arising from the midline of the posterior wall of the distal pharynx

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: The radiological image shows a diverticulum arising from the midline of the posterior wall of the distal pharynx . This is the characteristic radiological finding of a Zenker's diverticulum on a barium swallow examination. Zenker’s Diverticulum- Radiological Findings: Imaging Modality Key Findings Barium Swallow (Fluoroscopy) Diverticulum arising from the midline of the posterior wall of the distal pharynx Located near the pharyngoesophageal junction Best identified during swallowing Best seen on lateral view Typically noted at the C5-6 level May be transient (referred to as a "pharyngeal pouch") Additional Findings ~90% of patients also show a hiatal hernia and gastro-esophageal reflux The distended sac may compress the cervical esophagus

References:

radiopaedia.org/articles/zenker-diverticulum-1

www.ncbi.nlm.nih.gov/books/NBK499996/

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Q16: A 58-year-old man presents to the emergency department with acute onset of severe abdominal pain and distension. An abdominal X-ray is performed, showing free air in the peritoneal cavity. Which of the following signs represents free air outlining the lateral umbilical ligaments? (Q853500)

A. Ligamentum sign

B. Inverted V sign

C. Telltale triangle sign

D. Doge cap sign

Correct Answer: B. Inverted V sign

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: In cases of pneumoperitoneum, the radiological sign that is specifically associated with free air outlining the lateral umbilical ligaments is Inverted V sign. The inverted "V" sign, also known as the lateral umbilical ligament sign , is a sign of pneumoperitoneum manifested by the visualization of an inverted "V" shape in the pelvis on supine view of abdominal radiographs. It represents free gas outlining the lateral umbilical ligaments . In infants, the lateral umbilical ligaments contain the umbilical arteries, while in adults, they contain the inferior epigastric vessels. Pneumoperitoneum- Various signs seen on X-ray Sign Description Decubitus abdomen sign Free air between the abdominal wall and the liver on left lateral decubitus view Ligament sign (Falciform ligament sign) (Option A ruled out) Visualization of the falciform ligament due to free air on both sides Inverted V sign Air surrounding the lateral umbilical ligaments Telltale sign (Triangle sign) (Option C ruled out) Triangular accumulation of air between bowel loops Doge cap sign (Option D ruled out) Air in Morrison's/hepatorenal pouch

References:

Grainger & Allison’s Diagnostic Radiology, A Textbook of Medical Imaging, 7th Edition, Page. 463, 464 & 465

radiopaedia.org/articles/pneumoperitoneum

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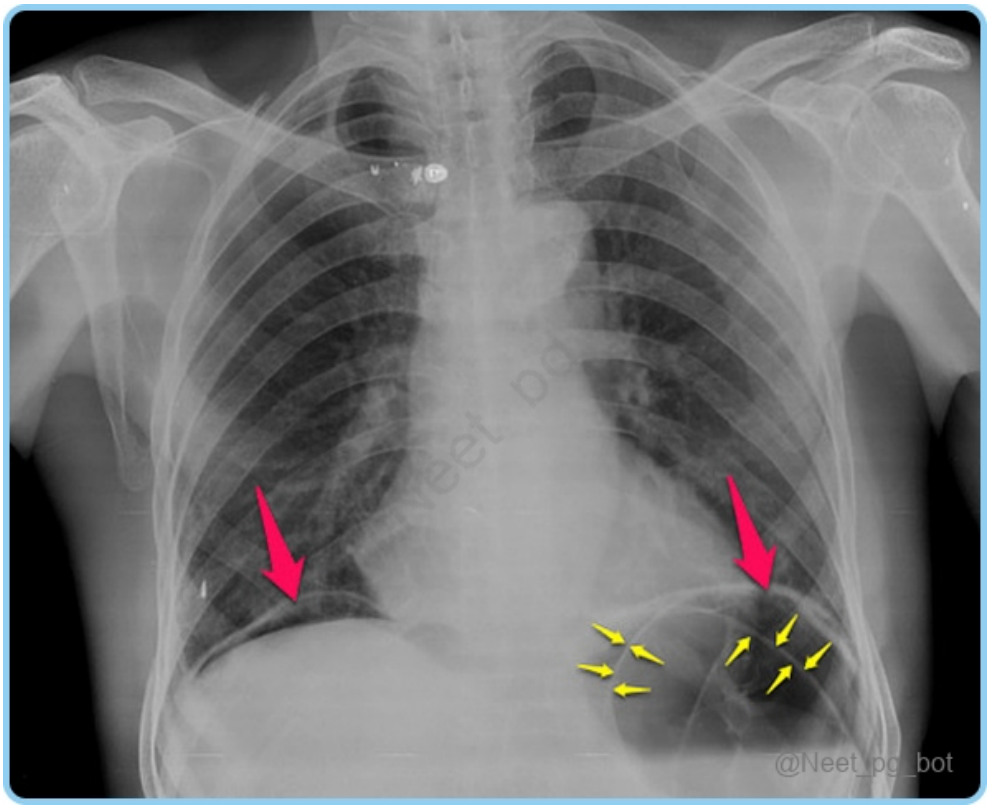
Q17: A 72-year-old woman presents to the emergency department with sudden onset of severe abdominal pain and distension. An upright chest X-ray is performed, showing the following finding: Which of the following is the most likely diagnosis based on this radiographic finding? (Q853499)

A. Bowel obstruction

B. Pneumoperitoneum

C. Subphrenic abscess

D. Pneumatosis intestinalis



Correct Answer: B. Pneumoperitoneum

■ *Listen (English)*

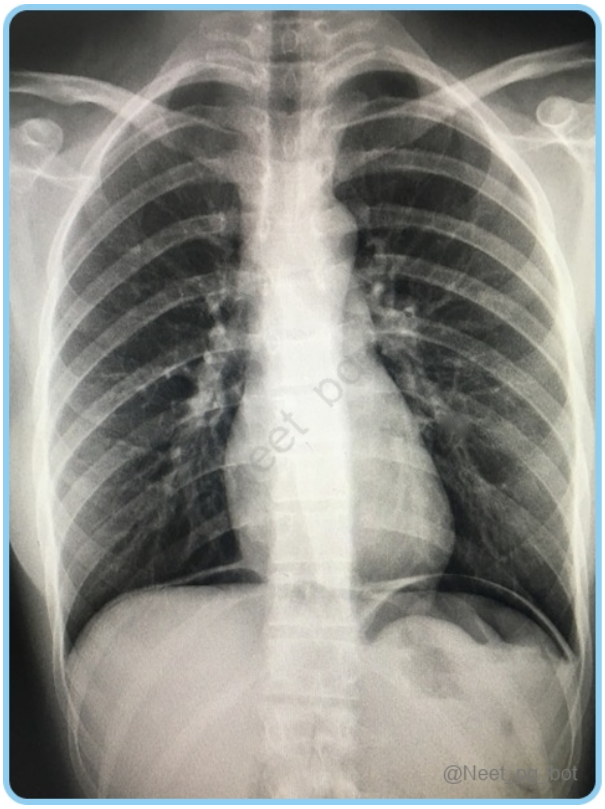
■ *Listen (Hindi)*

Explanation: The clinical presentation and radiological image indicate pneumoperitoneum, which can be identified by the classical Rigler sign (yellow arrows) seen in the given X-ray, also known as the double-wall sign , which is seen when gas outlines both sides of the bowel wall, i.e., gas within the bowel's lumen and gas within the

peritoneal cavity. Red arrows in the X-ray show gas under the diaphragm. Pneumoperitoneum refers to the presence of free air in the peritoneal cavity , often indicating a perforated hollow viscus. Pneumoperitoneum- Radiological findings Imaging Modality Key Findings of Pneumoperitoneum Upright Chest X-ray Subdiaphragmatic free gas Continuous diaphragm sign Supine Abdominal X-ray Rigler's sign (gas within the bowel's lumen and gas within the peritoneal cavity) Cupola sign (air beneath the dome of the diaphragm) Football sign (oval-shaped collection of air in the upper abdomen) Triangular air collection in Morrison's pouch Rigler sign Cupola sign







References:

Grainger & Allison’s Diagnostic Radiology, A Textbook of Medical Imaging, 7th Edition, Page. 463, 464, 465,

Radiopedia

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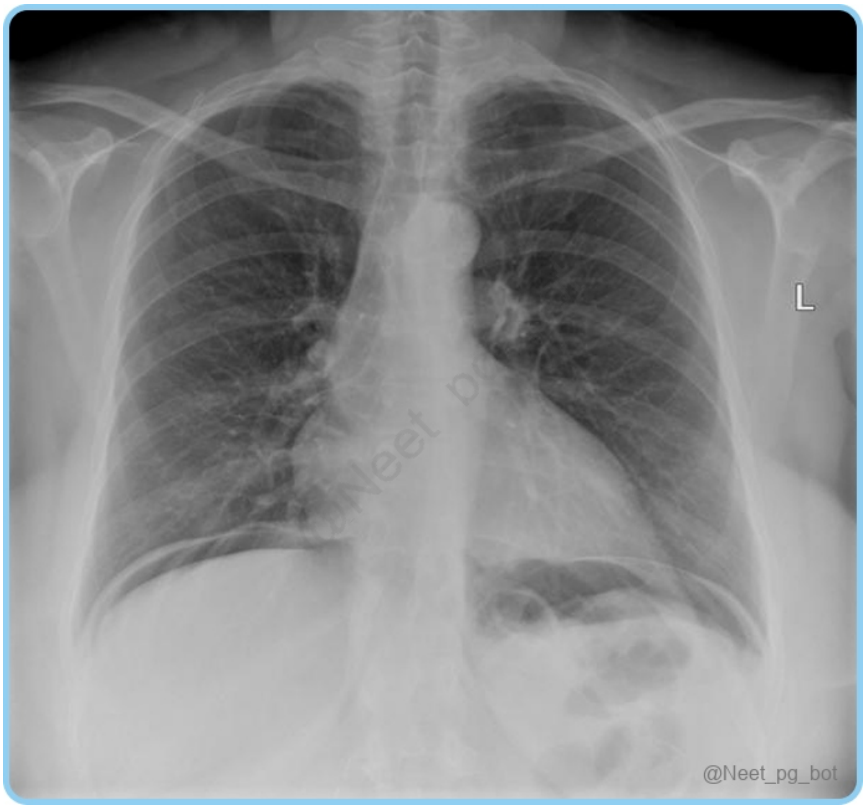
Q18: A 65-year-old man presents with sudden, severe abdominal pain and a rigid abdomen. He has a history of peptic ulcer disease. An erect chest X-ray is given below. Which of the following radiological signs is NOT expected in this case? (Q853498)

A. Cupola sign

B. Rigler's sign

C. Free gas under the right hemidiaphragm

D. Chilaiditi sign

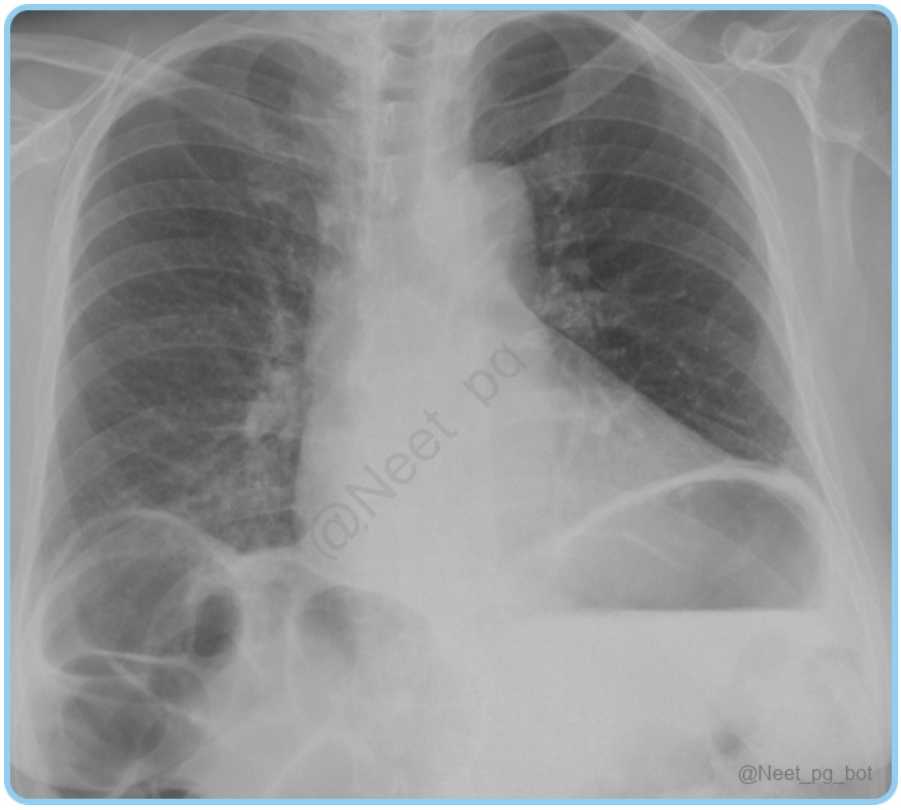


Correct Answer: D. Chilaiditi sign

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: In this clinical scenario, the presence of free air under the right hemidiaphragm on an erect chest X-ray suggests pneumoperitoneum, which commonly indicates a perforated viscus, such as a peptic ulcer. The cupola sign and Rigler's sign further support the diagnosis, as they reveal free gas and an outline of the bowel wall. Chilaiditi sign represents a pseudo-pneumoperitoneum where the intestine (usually colon) is interposed between the liver and diaphragm, mimicking free air but not representing true pneumoperitoneum. Therefore, it must not be present in this scenario. Fig. Chailaiditi sign Pneumoperitoneum Pneumoperitoneum refers to the presence of free gas in the peritoneal cavity, typically indicating a perforated viscus (e.g., perforated peptic ulcer). Causes: Common: Perforated peptic ulcers, bowel obstruction, inflammatory conditions, ischemia, injury during colonoscopy. Other causes without peritonitis: Postoperative (up to 7 days), peritoneal dialysis, sealed perforation, and tracking from pneumomediastinum. Diagnosis on Imaging: Erect CXR: Free gas seen under the right hemidiaphragm (cupola sign) , difficult to differentiate on the left due to gastric or colonic gas. (Option A & C ruled out) Supine AXR: Right upper quadrant gas in the perihepatic, subhepatic space, Morrison's pouch, and ligament visualization (e.g., falciform ligament). Rigler's Sign: Visualization of both sides of the bowel wall due to surrounding gas. (Option B ruled out) CT Scan: Most sensitive; small volumes of gas seen in the liver or peritoneal recesses, often using broad window settings. Pseudo-pneumoperitoneum: Conditions mimicking free gas such as Chilaiditi syndrome (intestine between liver and diaphragm), subphrenic abscess, or subdiaphragmatic fat. Pneumoperitoneum may be clinically silent, especially in elderly, steroid-treated, unconscious, or critically ill patients.



References:

Grainger and Allison's Textbook of Diagnostic Radiology, 7th edition, Page 463-465

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Q19: A newborn is diagnosed with an anorectal malformation (imperforate anus) on physical examination. Given the high association with VACTERL anomalies, the medical team decides to conduct a series of radiographic studies to assess for potential associated conditions. Which of the following is a key imaging modality in the evaluation of a neonate with imperforate anus? (Q853496)

A. Plain abdominal X-ray

B. Invertogram

C. Abdominal ultrasound

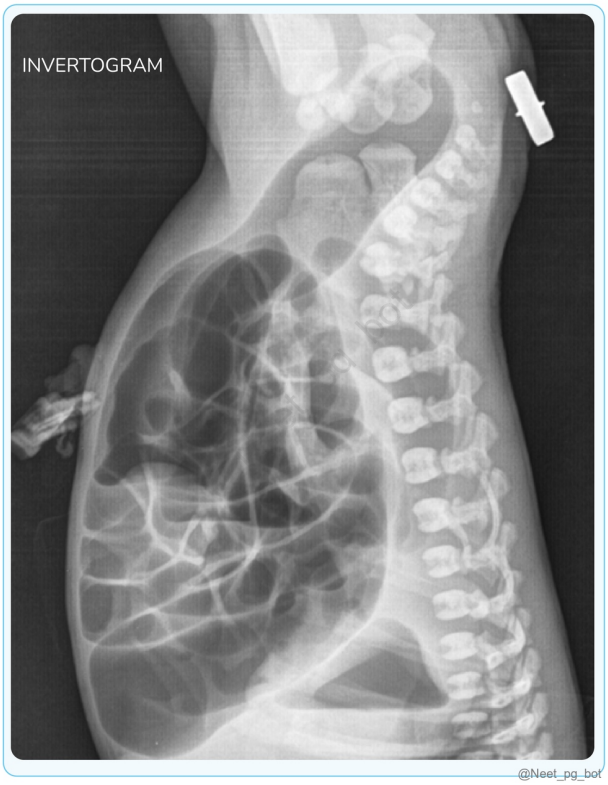
D. Distal colostogram

Correct Answer: B. Invertogram

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: The invertogram is crucial for assessing the most distal level of the bowel in male patients with imperforate anus, particularly when meconium is present on the perineum without an apparent perineal fistula. Proper positioning is essential for accurate evaluation. Invertogram Used to classify anal atresia in neonates by visualizing the distance between the gas bubble in the terminal colon and the perineal skin. Typically performed 24 hours after birth to allow for small fistulas to become apparent. The newborn is inverted from the lower limbs, with careful positioning to avoid hip and shoulder rotation. Remove any radiopaque items and ensure the X-ray is taken during full inspiration. Can cause discomfort and crying, which may lead to misleading results; a prone cross-table lateral view can be a more comfortable alternative. Invertogram image showing anal atresia Plain abdominal X-ray (Option A): While useful for ruling out esophageal atresia and other anomalies, it does not provide specific information about the anatomy or level of the anorectal malformation. Abdominal ultrasound (Option C): This is important for evaluating hydrocolpos and hydronephrosis in females with cloacal anomalies but does not assess the anorectal malformation itself. Distal colostogram (Option D): This test can evaluate the distal bowel but is typically performed after a colostomy has been created, making it less relevant for initial assessment in a newborn with an imperforate anus.



References:

www.ncbi.nlm.nih.gov/books/NBK542275/

www.ncbi.nlm.nih.gov/books/NBK549784/

radiopaedia.org/articles/paediatric-abdomen-invertogram-view

↑ *Back to this question in Part A*

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• [04_Gastrointestinal Radiology] 010 Previous Year Questions

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[04_Gastrointestinal Radiology] 010 Previous Year Questions — Quick Jump

Q1 (p. 944)	*Q2 (p. 947)*	*Q3 (p. 949)*	*Q4 (p. 952)*	*Q5 (p. 953)*	*Q6 (p. 958)*
Q7 (p. 962)	*Q8 (p. 965)*	*Q9 (p. 966)*	*Q10 (p. 968)*	*Q11 (p. 970)*	*Q12 (p. 972)*
Q13 (p. 975)	*Q14 (p. 978)*	*Q15 (p. 979)*	*Q16 (p. 982)*	*Q17 (p. 985)*	*Q18 (p. 990)*
Q19 (p. 994)	*Q20 (p. 995)*	*Q21 (p. 1000)*	*Q22 (p. 1002)*	*Q23 (p. 1004)*	*Q24 (p. 1005)*
Q25 (p. 1005)	*Q26 (p. 1007)*	*Q27 (p. 1008)*	*Q28 (p. 1010)*	*Q29 (p. 1012)*	

Q1: What could be the most probable diagnosis for an elderly woman who is experiencing abdominal pain and swelling, considering her past medical history of scoliosis? Please refer to the provided X-ray image of the woman's upright abdomen for further information. (Q855870)

A. Large bowel obstruction due to sigmoid volvulus

B. Large bowel obstruction due to faecolith

C. Cecal volvulus

D. Small bowel obstruction due to bowel perforation

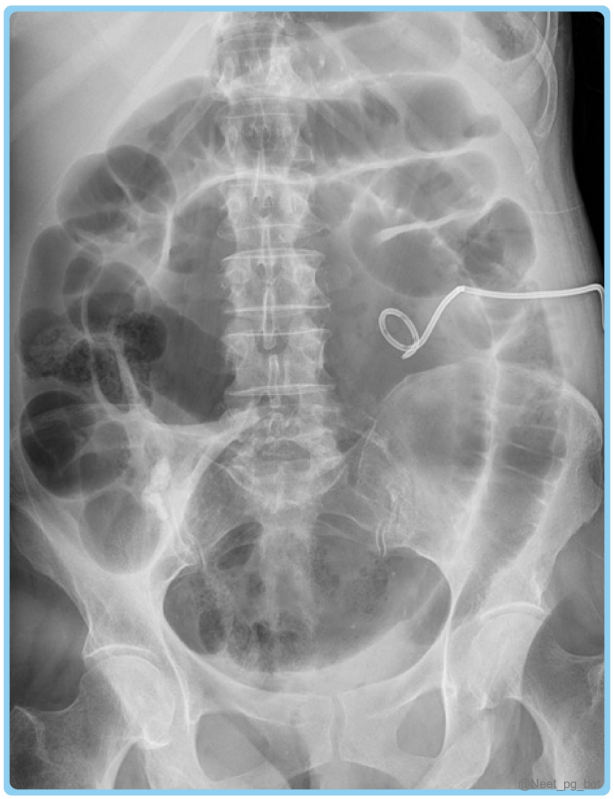


Correct Answer: A. Large bowel obstruction due to sigmoid volvulus

Explanation: The Omega sign , coffee bean sign , or bent tube sign on a plain abdominal X-ray is classic for sigmoid volvulus. It results from twisting of the sigmoid colon, leading to a large, dilated, U-shaped loop with an apex pointing toward the diaphragm. Sigmoid volvulus is common in elderly patients, especially those with a history of chronic constipation or conditions like scoliosis, which may cause colonic redundancy or altered anatomy. Sigmoid Volvulus Caecal Volvulus Sigmoid volvulus arises in the pelvis, specifically the left lower quadrant. It extends towards the right upper quadrant. It has an ahaustral appearance (lack of haustra). Causes obstruction of the distal large bowel, leading to dilation of the ascending, transverse, and descending colon. A few gas-fluid levels may be seen. Coffee-Bean Sign : The condition is characterized by a distended sigmoid loop with an inverted U shape, known as the coffee-bean sign (or kidney bean sign). Whirlpool Sign : The whirl, or whirlpool sign is observed when the bowel rotates around its mesentery, resulting in whirls of the mesenteric vessels. The torsion is located in the ascending colon above the ileocecal valve. Caecal volvulus arises in the right lower quadrant. It extends towards the epigastrium or left upper quadrant. The colonic haustral pattern is maintained. The distal colon is usually collapsed, and the small bowel is distended. One gas-fluid level may be seen. Definitive Sign : Upward displacement of the appendix and obstruction of the large bowel is a definitive sign of cecal volvulus. May show a U-shaped distended bowel segment and signs of ischemia, including mural thickening, infiltration of the mesenteric fat, and pneumatosis intestinalis. Whirlpool Sign : A whirl sign may be apparent due to tight torsion of the mesentery from a twist between the afferent and efferent loops. Coffee Bean Appearance : A "coffee bean" appearance may be seen in a loop of transverse colon. Bird's Beak Sign : Abrupt cut-off with “bird's beak” tapering at the distal cecum is characteristic. Central appendix sign : Abnormal appendix position near midline. {{caption_text}} {{caption_text}} Large bowel obstruction due to faecolith (Option B): This is incorrect because faecoliths are typically seen as radio-opaque masses in the colon and do not produce the characteristic "coffee bean sign." Cecal volvulus (Option C): This is incorrect because cecal volvulus shows a dilated cecum displaced to the midline or left upper quadrant, not the classic U-shaped appearance of sigmoid

volvulus. Small bowel obstruction due to bowel perforation (Option D): This is incorrect because small bowel obstruction typically shows multiple air-fluid levels and dilated loops of the small intestine. A perforation would present with free air under the diaphragm on an upright X-ray, not a coffee bean sign.





References:

Sigmoid volvulus vs cecal volvulus | Radiology Reference Article | Radiopaedia.org

Sigmoid Volvulus Imaging

Cecal Volvulus Imaging and Diagnosis: Practice Essentials, Radiography, Computed Tomography

↑ *Back to this question in Part A*

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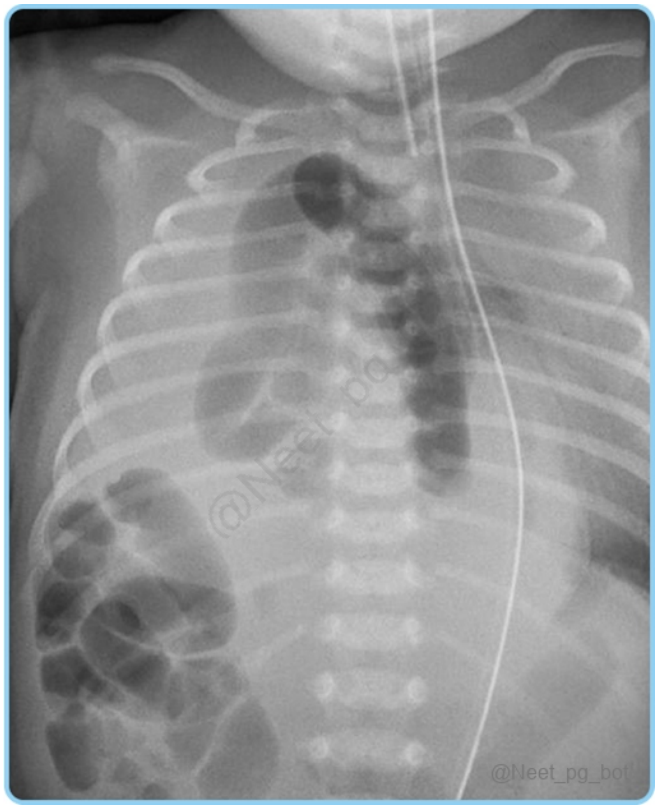
Q2: Which of the following images accurately represents the medical condition described in the given scenario? (Q859934)

A. Diaphragmatic hernia

B. Intestinal obstruction

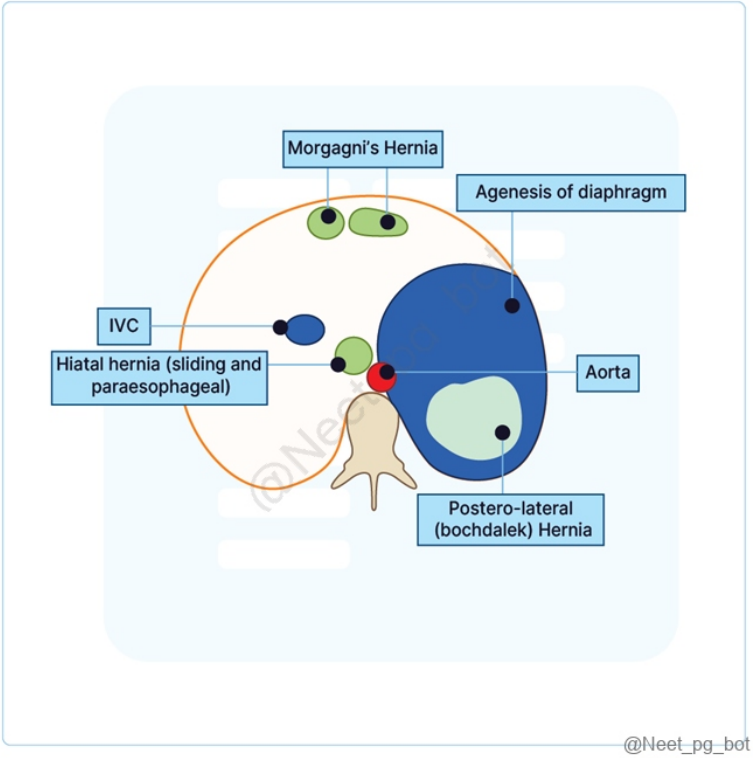
C. Pleural effusion

D. Pneumonia



Correct Answer: A. Diaphragmatic hernia

Explanation: The given chest x-ray shows loops of bowel in the right thoracic cavity, mediastinal shift to the left, and decreased right lung aeration, which is consistent with Congenital Diaphragmatic Hernia. Congenital Diaphragmatic Hernia (CDH): 1. CDH is the intrathoracic herniation of abdominal contents due to congenital defects in the diaphragm. 2. Types of CDH : Bochdalek Hernia : Occurs through the posterolateral pleuroperitoneal canal, most commonly on the left side . Morgagni Hernia : Anterior hernia located at the right cardiophrenic angle. 3. Radiologic Features : Chest Radiograph (CXR): Bochdalek hernia: Dome-shaped soft tissue opacity in the posterolateral thorax, often left-sided . May show gas-filled bowel loops or fat content in the thoracic cavity. Mediastinal shift away from the herniation due to mass effect. On the lateral view , hernias appear above the posterior costophrenic recess . CT/MRI : Visualizes herniation of fat, bowel, spleen, or kidney through a diaphragmatic defect. Important for distinguishing from other masses like cystic adenomatoid malformation or pericardial cyst . CT provides clearer differentiation of soft-tissue or fatty mass protruding through the diaphragm. 4. Complications : Associated with hypoplasia of the ipsilateral lung , leading to respiratory distress, especially in neonates. Neonates may present with respiratory distress and mediastinal deviation. Incorrect Options: Intestinal obstruction (Option B): Typically presents with dilated bowel loops confined to the abdominal cavity. Does not involve bowel loops appearing in the chest on imaging. Pleural effusion (Option C): Characterized by fluid collection in the pleural space. May show blunting of the costophrenic angle or fluid layering but no bowel loops. Pneumonia (Option D): Presents as patchy or lobar opacities in the lung parenchyma. Does not involve bowel loops in the thoracic cavity.



References:

Grainger & Allison's Diagnostic Radiology, A Textbook of Medical Imaging, 7th Edition, Page. 62, 63.

Textbook of Radiology & Imaging by David Sutton, 8th Edition, Chapter 14: Pleura, Diaphragm, and Chest Wall - The Diaphragm - Hernias of the Diaphragm.

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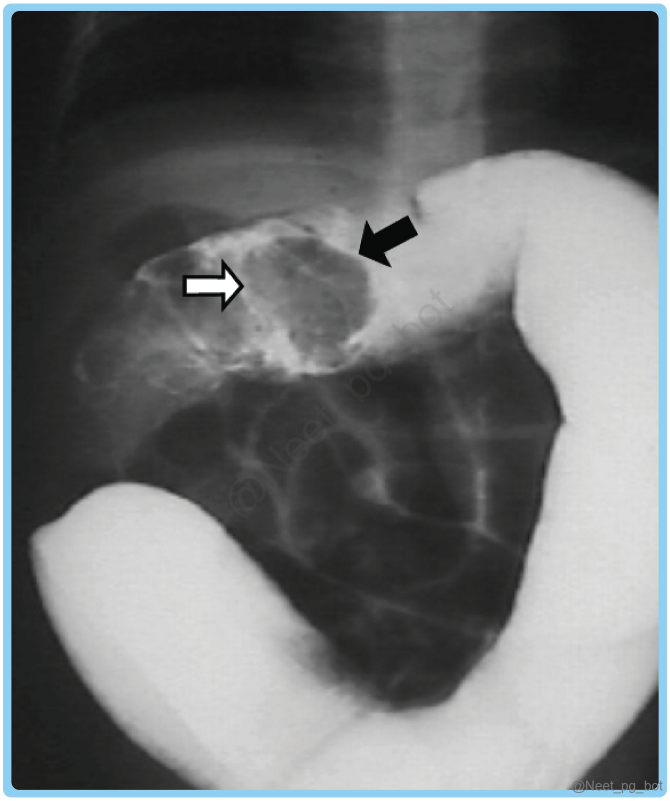
Q3: A 51-year-old man complains of abdominal pain and blood-stained stools. The X ray of his intestines shows the following finding. What is the most likely diagnosis? (Q859323)

A. Intussusception

B. Volvulus

C. Diverticulitis

D. Ulcerative colitis



Correct Answer: A. Intussusception

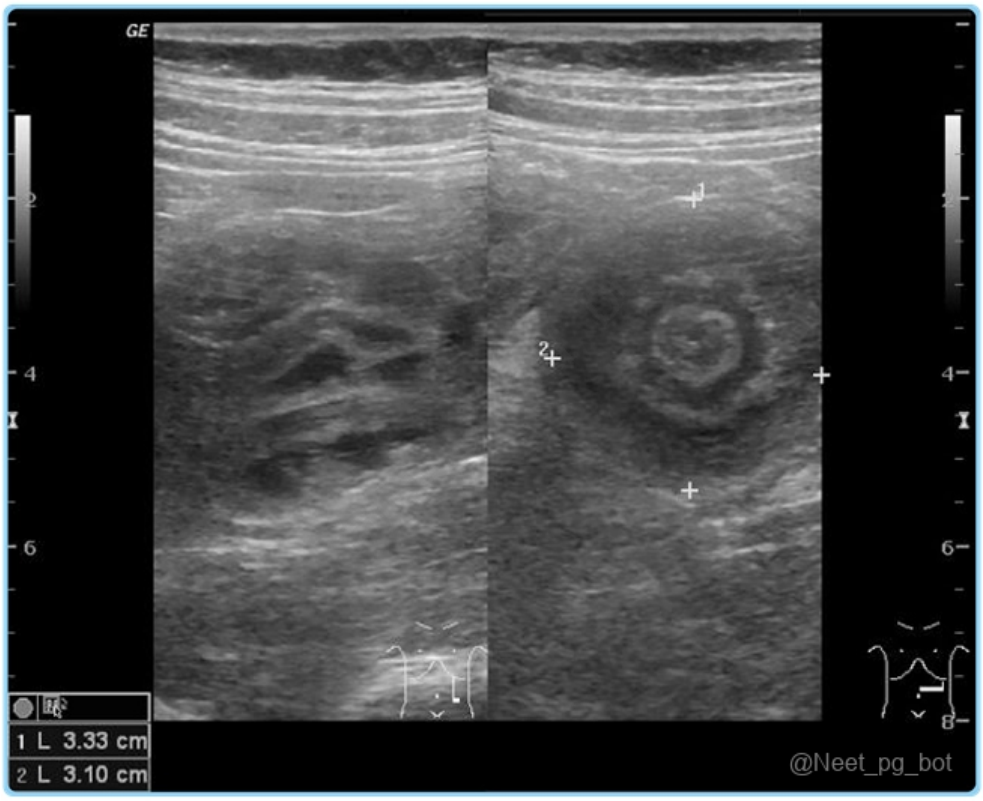
Explanation: Intussusception is a medical condition in which one segment of the intestine telescopes into another segment, causing an obstruction. In a barium enema procedure (as shown in the image), intussusception may

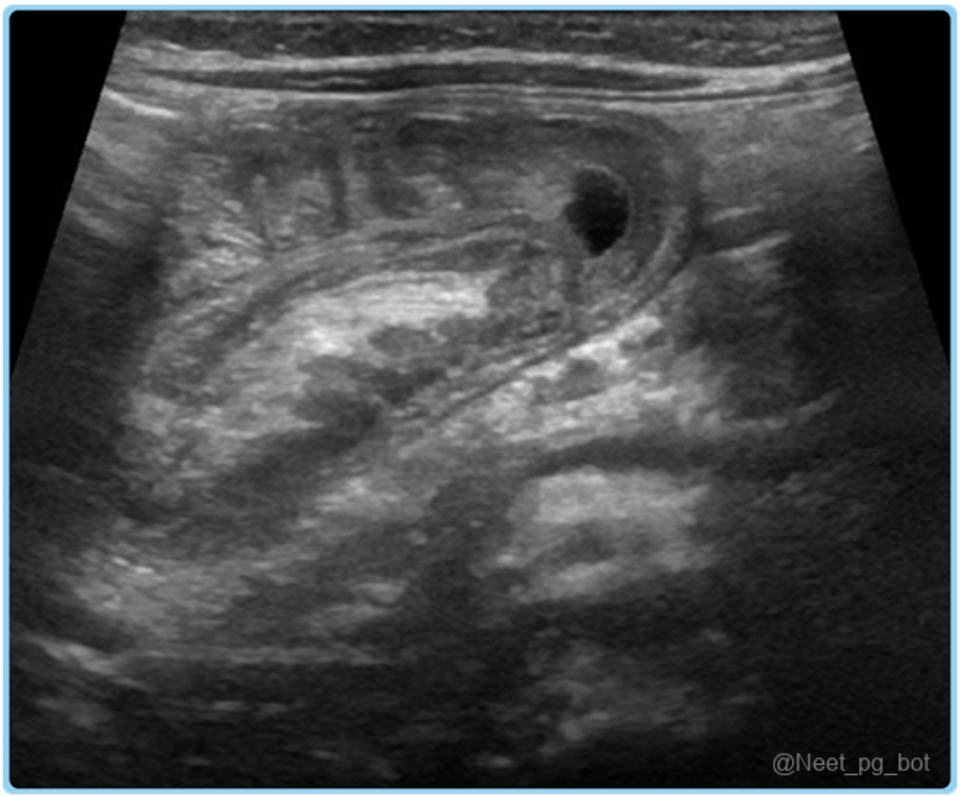
appear as a characteristic ‘claw sign’ appearance, where the affected segment of the intestine invaginates into the adjacent segment. This is due to the filling defect it creates for the enema. Intussusception Intussusception occurs when one segment of the bowel is pulled into another, often leading to bowel obstruction and ischemia. It is a common cause of acute abdomen in children, while in adults, it is typically associated with a focal lesion acting as a lead point. The classic clinical presentation of intussusception in children may include intermittent abdominal pain, vomiting, and a palpable "sausage-like" mass in the right upper quadrant, although these symptoms occur in less than 20% of cases. Parents may also report "currant jelly" stools , indicating bowel ischemia, and approximately 15% of patients may present without abdominal pain. Plain Radiograph: Elongated soft tissue mass in the upper right quadrant. Bowel obstruction with air-fluid levels and proximal bowel dilation. Possible absence of gas in the distal collapsed bowel. Fluoroscopy: Gold standard is the contrast enema, showing the intussusception as an occluding mass. Characteristic "coiled spring sign." {{caption_text}} Fig. Coiled spring sign Ultrasound: Target sign (doughnut sign)- Concentric alternating echogenic and hypoechoic bands are observed, where the echogenic bands represent the serosa and submucosa, flanking the hypoechoic muscularis propria. {{caption_text}} Pseudokidney sign- Longitudinal ultrasound appearance of the intussuscepted segment of bowel which mimics a kidney {{caption_text}} Crescent in a doughnut sign. Absence of blood flow in the intussusceptum (contraindication for enema). Features favoring ileocolic intussusception: hyperechoic core, thicker outer hypoechoic wall, larger anteroposterior diameter, and presence of lymph nodes. CT Scan: Characteristic "bowel-within-bowel" configuration. Concentric rings of bowel on axial images, and sausage-shaped mass on longitudinal images. Visualization of the lead point if present, with surrounding mesenteric fat and vessels. Volvulus (Option B) refers to the twisting or rotation of a portion of the intestine, leading to obstruction of the blood supply and potential bowel strangulation. In a barium enema, volvulus may appear as a characteristic "bird's beak" or "corkscrew" appearance. Diverticulitis (Option C) is the inflammation or infection of small pouches called diverticula that can develop in the colon. During a barium enema, diverticulitis may present as localized outpouching or sac-like structures filled with barium. Inflammation and thickening of the bowel wall may be visible, and in severe cases, abscesses or fistulas may be observed. Ulcerative Colitis (Option D) is a chronic inflammatory bowel disease that primarily affects the colon and rectum. In a barium enema, ulcerative colitis may show diffuse inflammation and ulceration of the colonic mucosa. The bowel wall may appear thickened, with loss of haustral markings (the characteristic folds of the colon) and a coarse or granular appearance. The extent and severity of the disease can be evaluated using barium enema imaging.



Coiled spring sign

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References:

Grainger and Allison's Diagnostic Radiology, 7th Edition, Page no: 678

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Q4: What is the likely diagnosis for a 20-year-old male who presents with pain in the right flank, along with fever and chills? The patient experiences pain when the hip is passively extended on the right side. Lab tests indicate an increased white blood cell count, and a CT scan reveals specific findings. (Q859264)

A. Pyelonephritis

B. Psoas abscess

C. Appendicitis

D. Torsion of right undescended testis



Correct Answer: B. Psoas abscess

Explanation: A psoas abscess is the pus collection which is located in the iliopsoas compartment. The classical presentation is back pain, fever, and limping. The pain on passive extension occurs due to muscles causing friction against inflamed tissue. The CT scan demonstrates abnormal fluid collection surrounded by irregular rim enhancement. Pyelonephritis (Option A) is a bacterial infection causing inflammation of the kidney. It can cause fever and back pain but not limping. The pain will not be present on the passive extension of the hip. CT findings are enlargement of the kidney with thickened parenchyma and an Impairment of corticomedullary differentiation. Appendicitis (Option C) is an inflammation of the appendix. It causes pain in your lower right abdomen CT findings are dilated appendix with the wall thickening and adjacent mesenteric fat stranding. Torsion of right undescended testis (Option D) clinical symptoms include nonspecific abdominal pain, poor oral intake, vomiting, and restlessness.CT shows a well-circumscribed, isodense, or hetero-dense mass and had proper fine anatomic detail in locating the undescended testis.

References:

Grainger and Allison’s Diagnostic Radiology, 7th Edition, Page no: 876

↑ *Back to this question in Part A*

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Q5: A 51-year-old man complains of abdominal pain and blood-stained stools. The barium study of his intestines shows the following finding. What is the most likely

diagnosis? (Q854996)

A. Intussusception

B. Volvulus

C. Diverticulitis

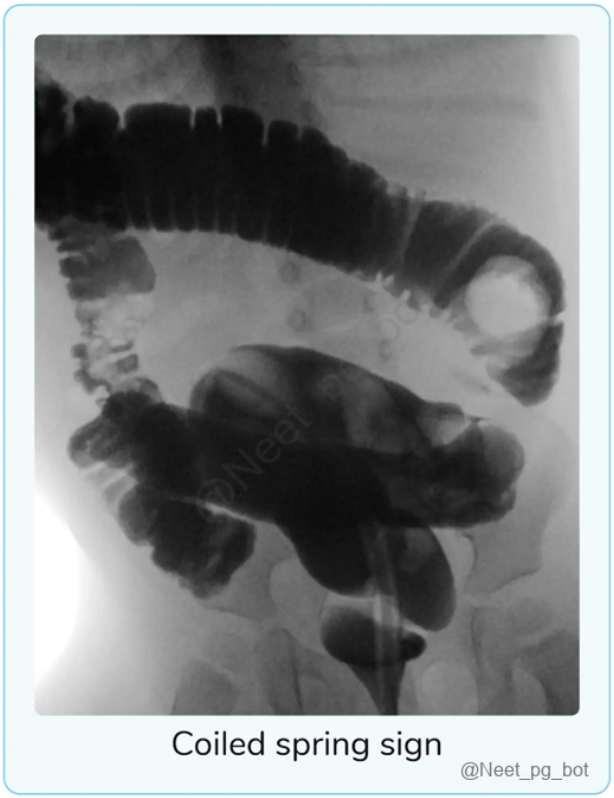
D. Ulcerative colitis



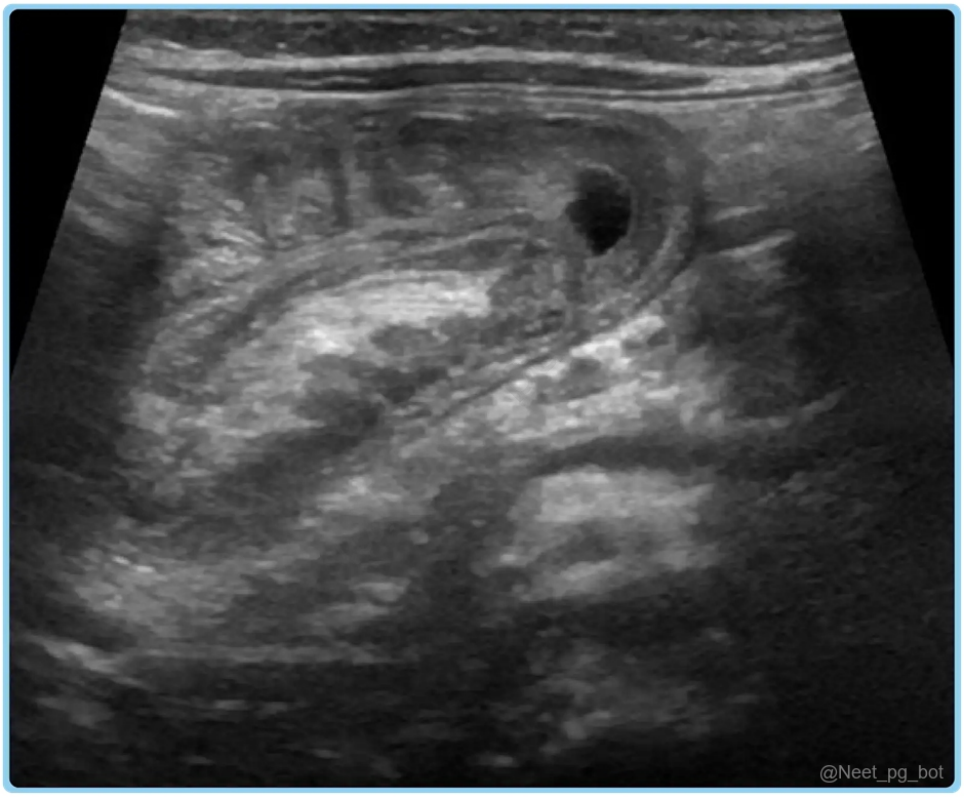
Correct Answer: A. Intussusception

Explanation: The barium study findings shows barium in the lumen of the intussusception, intramural space, and an occluding mass prolapsing into the lumen, are consistent with intussusception. The description of a "coiled spring appearance" is a classic radiological finding associated with Intussuseption. Intussusception Intussusception occurs when one segment of the bowel is pulled into another, often leading to bowel obstruction and ischemia. It is a common cause of acute abdomen in children, while in adults, it is typically associated with a focal lesion acting as a lead point. The classic clinical presentation of intussusception in children may include intermittent abdominal pain, vomiting, and a palpable "sausage-like" mass in the right upper quadrant, although these symptoms occur in less than 20% of cases. Parents may also report "currant jelly" stools , indicating bowel ischemia, and approximately 15% of patients may present without abdominal pain. Plain Radiograph: Elongated soft tissue mass in the upper right quadrant. Bowel obstruction with air-fluid levels and proximal bowel dilation. Possible absence of gas in the distal collapsed bowel. Fluoroscopy: Gold standard is the contrast enema, showing the intussusception as an occluding mass. Characteristic "coiled spring sign." {{caption_text}} Ultrasound: Target sign (doughnut sign)- Concentric alternating echogenic and hypoechoic bands are observed, where the echogenic

bands represent the serosa and submucosa, flanking the hypoechoic muscularis propria. {{caption_text}} Pseudokidney sign- Longitudinal ultrasound appearance of the intussuscepted segment of bowel which mimics a kidney {{caption_text}} Crescent in a doughnut sign. Absence of blood flow in the intussusceptum (contraindication for enema). Features favoring ileocolic intussusception: hyperechoic core, thicker outer hypoechoic wall, larger anteroposterior diameter, and presence of lymph nodes. CT Scan: Characteristic "bowel-within-bowel" configuration. Concentric rings of bowel on axial images, and sausage-shaped mass on longitudinal images. Visualization of the lead point if present, with surrounding mesenteric fat and vessels. Incorrect Options: Volvulus (Option B): This is twisting of a bowel loop, typically causing a "bird beak" or "coffee bean" appearance on imaging, not a coiled spring pattern. {{caption_text}} Diverticulitis (Option C): This involves inflammation of diverticula. Imaging may show thickened bowel walls or abscesses but does not produce a coiled spring appearance. Ulcerative colitis (Option D): This causes continuous inflammation of the colonic mucosa with findings such as lead pipe appearance on barium studies, not a coiled spring pattern. {{caption_text}}




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Toxic Megacolon in Ulcerative Colitis

References:

https://radiopaedia.org/articles/intussusception

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Q6: A 56-year-old female patient presented with progressive dysphagia for solids, loss of weight, and loss of appetite. A barium swallow done is given below. What is the most probable diagnosis (Q854992)

A. Carcinoma esophagus

B. Diffuse esophageal spasm

C. Esophageal leiomyoma

D. Esophageal web



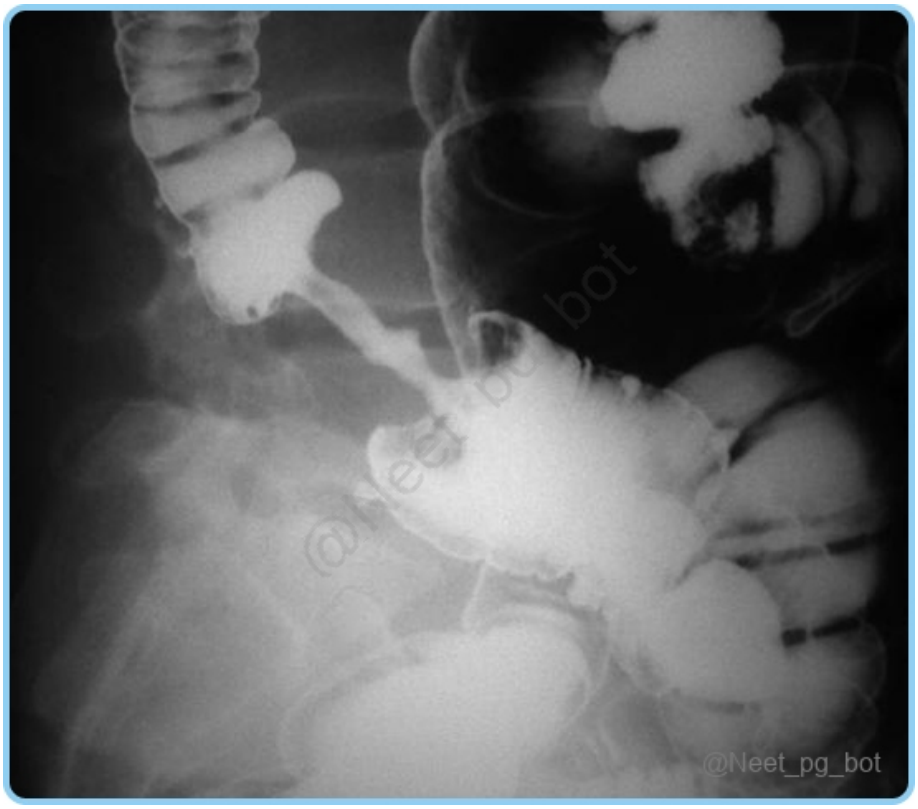
Correct Answer: A. Carcinoma esophagus

Explanation: The provided barium swallow findings of irregular narrowing, mucosal destruction, and shouldered margins are highly indicative of carcinoma of the esophagus. It is often associated with symptoms such as dysphagia (difficulty swallowing), weight loss, and loss of appetite. Radiological findings in Achalasia cardia and Carcinoma Esophagus Feature Achalasia Cardia Carcinoma Esophagus Esophageal Appearance Massively dilated esophagus Irregular narrowing of esophagus Distal Esophagus Narrow lower end ("bird beak" sign)

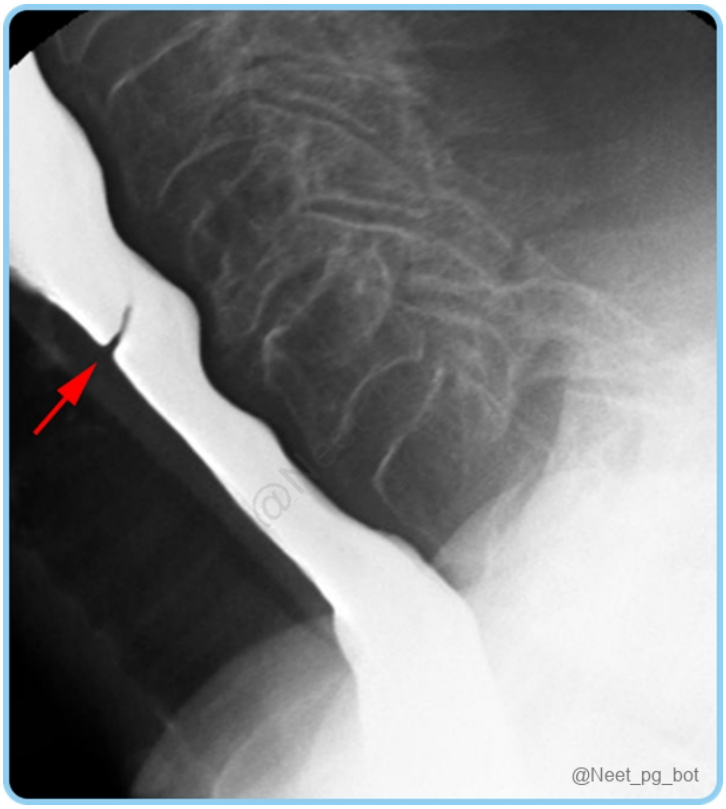
{{caption_text}} Malignant stricture Location Affects lower esophageal sphincter Mid-esophagus in this case Contour Smooth tapering at distal end Irregular, abrupt narrowing Additional Features Proximal esophagus is dilated May show shouldering or "apple core" appearance (not visible in this image) {{caption_text}} Fig. Apple core appearance Incorrect Options: Diffuse esophageal spasm (Option B) : This condition causes a "corkscrew esophagus" or "rosary bead" appearance on barium swallow {{caption_text}} Esophageal leiomyoma (Option C) : This benign tumor might appear as a smooth, localized filling defect on barium studies Esophageal web (Option D) : Seen in conditions like Plummer-Vinson syndrome, it presents as a thin, membranous structure causing dysphagia. {{caption_text}}




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References:

1. Radiopedia 2. Radiopedia 3. Radiopedia

↑ *Back to this question in Part A*

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Q7: Which of the options below represents a characteristic observed in cases of large bowel obstruction? (Q856414)

A. Dilated loops of the intestine with plica circulars

B. Dilated loops with haustrations

C. String of pearls sign

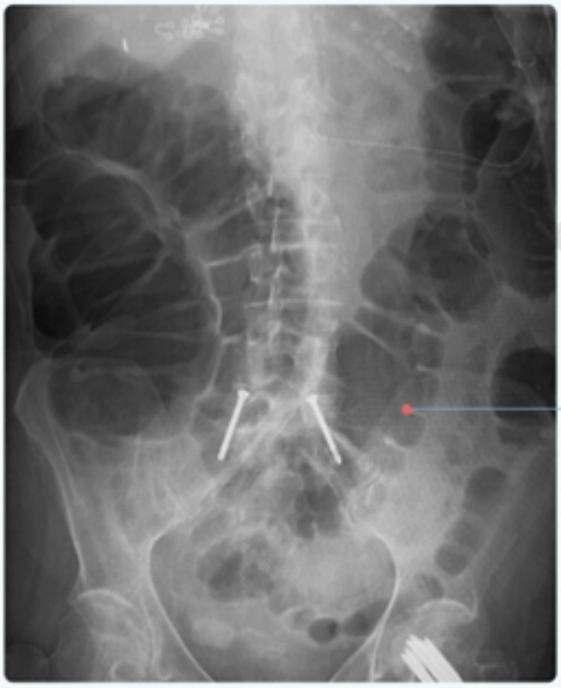
D. Central dilated bowel loops

Correct Answer: B. Dilated loops with haustrations

Explanation: Large bowel obstruction (LBO) typically presents with dilated loops of the colon showing prominent haustra , which are incomplete and widely spaced folds. Unlike small bowel obstruction (SBO), haustral markings do not extend across the entire lumen. Radiological Features of Bowel Obstruction Feature Small Bowel Obstruction (SBO) Large Bowel Obstruction (LBO) Dilated loops Central, thin-walled Peripheral, thick-walled Folds Plica circulares (valvulae conniventes) {{caption_text}} Haustrations (do not extend completely across the lumen) {{caption_text}} "String of pearls" sign Yes (air-fluid levels in SBO) {{caption_text}} String of pearl appearance {{caption_text}} No Transition point Small bowel Colon or rectosigmoid region Dilated loops of the intestine with plica circularis (Option A): Incorrect because plicae circulares are characteristic of small bowel obstruction (SBO) , not LBO. String of pearls sign (Option C): Incorrect because this is seen in small bowel obstruction , representing multiple small gas bubbles trapped in fluid-filled loops. Central dilated bowel loops (Option D): Incorrect because small bowel obstructions usually present with centrally dilated loops, whereas large bowel obstructions show peripheral dilation.

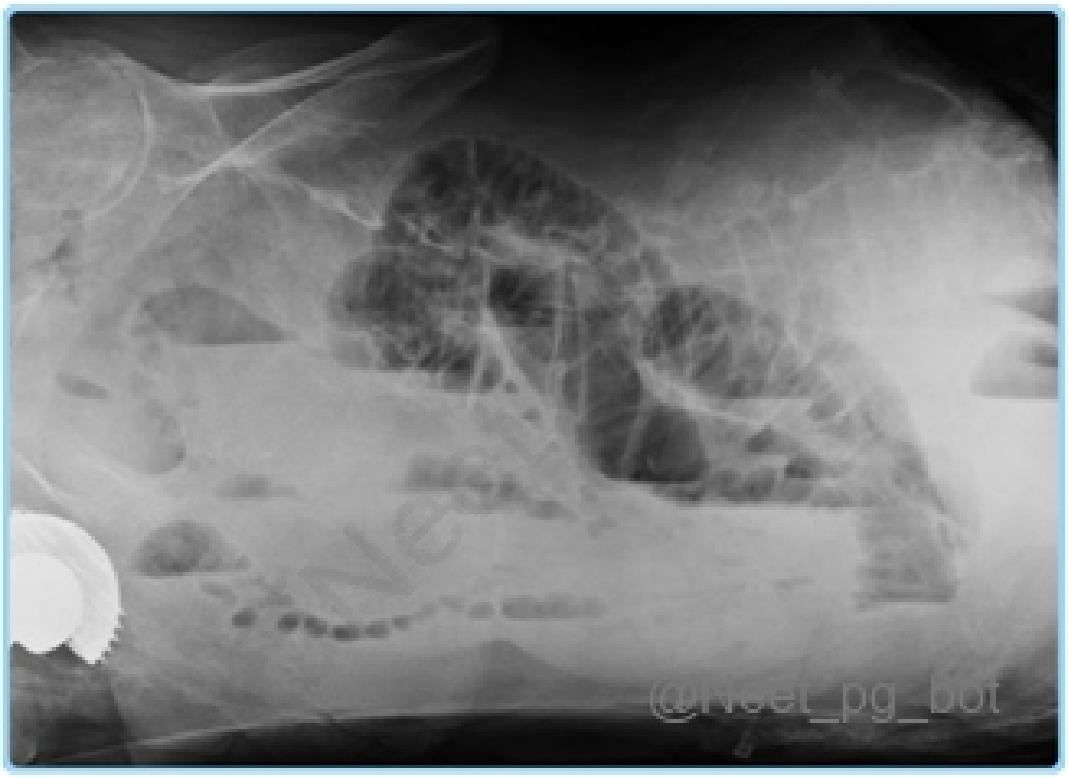


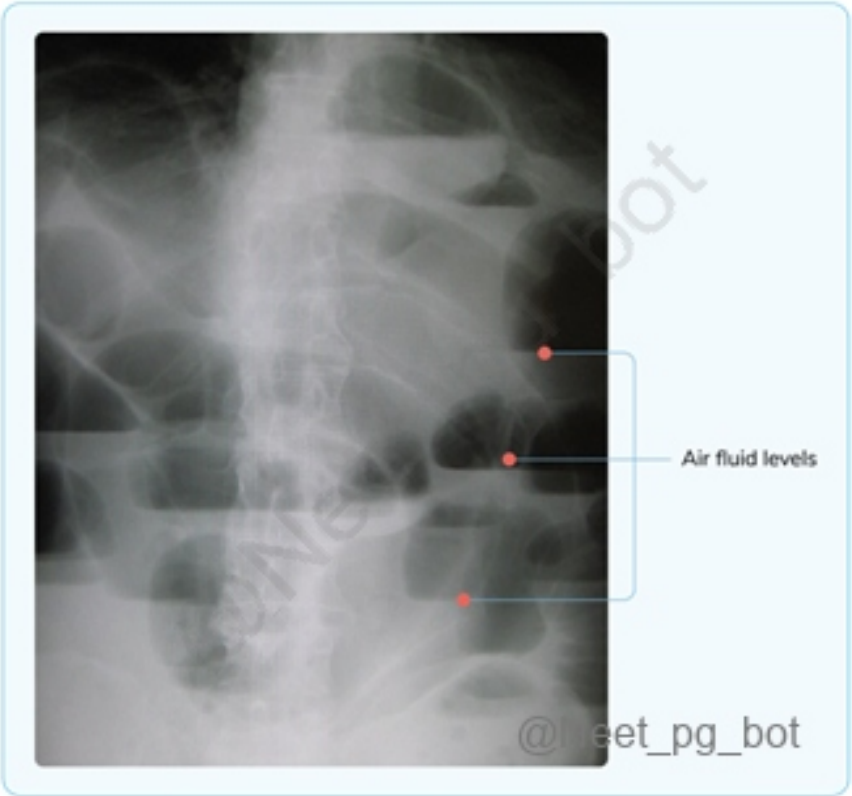
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Large bowel

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References:

Bailey & Love's Short Practice of Surgery, 27th Edition • Page no 1288

Grainger & Allison's Diagnostic Radiology 6th edition • Page nos 601-603

Small Bowel Obstruction

String of Pearls Sign

↑ *Back to this question in Part A*

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Q8: A patient presents with abdominal pain and distension. An X-ray was taken which showed dilated bowel loops as given in the image below. Identify the segment involved. (Q856170)

A. Jejunum

B. Ileum

C. Duodenum

D. Transverse colon



Correct Answer: A. Jejunum

Explanation: The clinical scenario and the X-ray findings of dilated bowel loops with visible valvulae conniventes suggest small bowel obstruction involving the jejunum. Valvulae conniventes (or plicae circulares): These are mucosal folds that run transversely across the lumen of the jejunum and proximal ileum. They are most prominent in the jejunum and appear as complete lines spanning the width of the bowel on X-ray. Incorrect Options: Option B) Ileum – Incorrect; Has sparse, short folds that do not completely cross the lumen, unlike the dense plicae circulares seen here. Option C) Duodenum – Incorrect; Usually not markedly dilated on abdominal X-ray and follows a fixed C-loop, not multiple central dilated loops. Option D) Transverse colon – Incorrect; Shows haustra that are widely spaced and do not cross the entire lumen, unlike the full-width folds in the image.

References:

Bailey & Love's Short Practice of Surgery, 28th Edition, pg 1384.

SRB’s Manual of Surgery, 6th Edition, pg 912-914.

↑ *Back to this question in Part A*

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Q9: A patient following a skid resulting in a motor traffic accident was brought to the emergency room 2 hours later. On examination, he was stable with GCS 15/15. The pupil was reactive to light. Tenderness and bruising over the left lower chest wall with petechiae were seen. Severe tenderness was elicited in the left hypochondriac region and BP-90/50 mm of Hg. What is the best investigation used in the ER? GCS: Glasgow coma scale FAST: Focused Assessment with Sonography for Trauma (Q856166)

A. FAST

B. X-ray

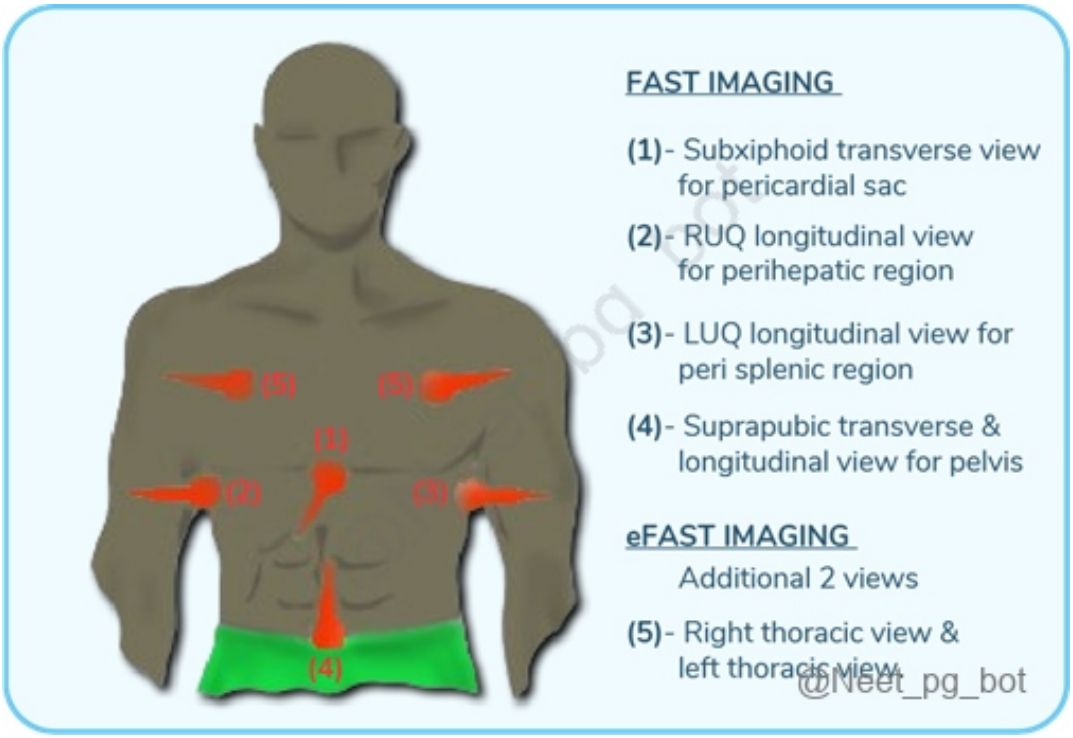
C. Diagnostic peritoneal lavage

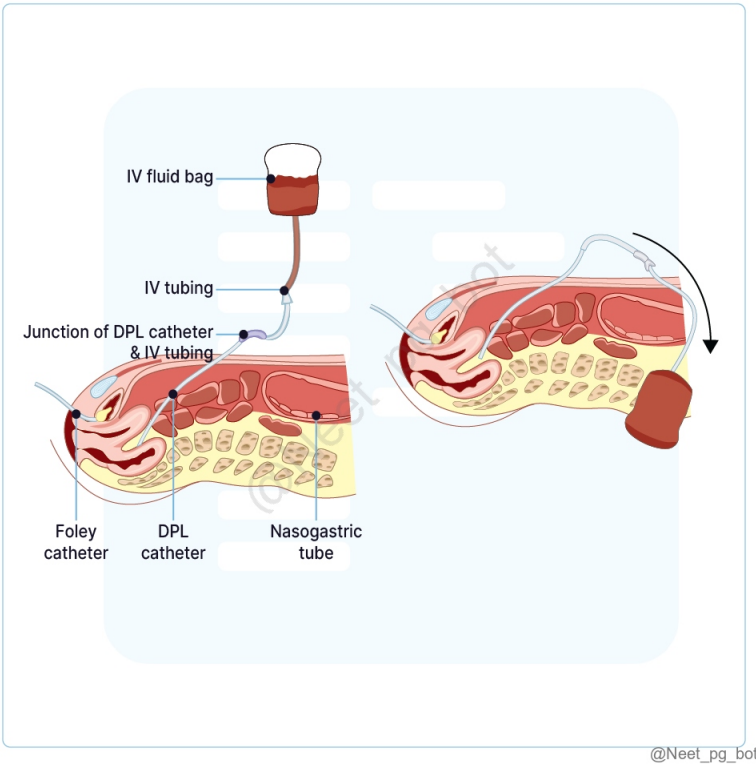
D. CT scan

Correct Answer: A. FAST

Explanation: In the given scenario, the best investigation to be used in the emergency room is FAST (Focused Assessment with Sonography for Trauma). FAST is a rapid bedside ultrasound examination that is commonly used in the emergency setting to evaluate patients with suspected abdominal or thoracic trauma. It is a non-invasive and relatively quick procedure that can provide valuable information about potential injuries and guide further management. FAST (Focused Abdominal Sonography for Trauma) and eFAST (Extended FAST) : Purpose : Assess for free fluid in the abdominal cavity, thoracic cavities, and pericardium. Nature of Injury : Not used to determine the specific nature or extent of injury. Advantages : Rapid, reproducible, portable, and non-invasive bedside test. Can be performed simultaneously with resuscitation. Accurate at detecting >100 mL of free blood. Limitations : Operator-dependent and may be unreliable in obese patients or when the bowel is full of gas. Low

sensitivity (29–35%) for detecting hollow viscus or solid organ injuries without haemoperitoneum. Unreliable for excluding injuries in penetrating trauma. Requires repeat or supplementary investigations if needed. Unreliable for assessing retroperitoneum. {{caption_text}} Diagnostic Peritoneal Lavage (DPL): (Option C) Purpose : Assess for the presence of blood or contaminants in the abdomen, valuable in resource-limited settings. Procedure : Nasogastric tube and urinary catheter placement. Cannula insertion below the umbilicus for aspiration and fluid infusion. The positive result is if Frank blood or contaminants are present, or If laboratory results show >100,000 red cells/µL or >500 white cells/µL or Amylase levels in the fluid of more than 175 IU/dl. Drainage of lavage fluid via a chest drain indicates diaphragm penetration. Limitations : Largely replaced by eFAST but remains the standard in some settings where eFAST is unavailable or unreliable. Contraindications: When laparotomy is indicated Previous laparotomy Pregnancy Obesity X-ray (Option B): are less sensitive in detecting injuries to internal organs. Therefore, it may not be the best initial investigation for this patient. CT scan (Option B): Gold standard for detailed assessment but requires a stable patient. This patient is hypotensive, making CT less ideal initially.





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References:

Bailey and Love's Short Practice of Surgery (28th Edition) page 378, 379

SRB's Manual of Surgery (6th Edition) page 139, 140

↑ *Back to this question in Part A*

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Q10: What is the diagnosis of a young child who is experiencing mild intermittent upper abdominal pain and has an X-ray shown below? (Q858225)

A. Bochdalek hernia

B. Morgagni hernia

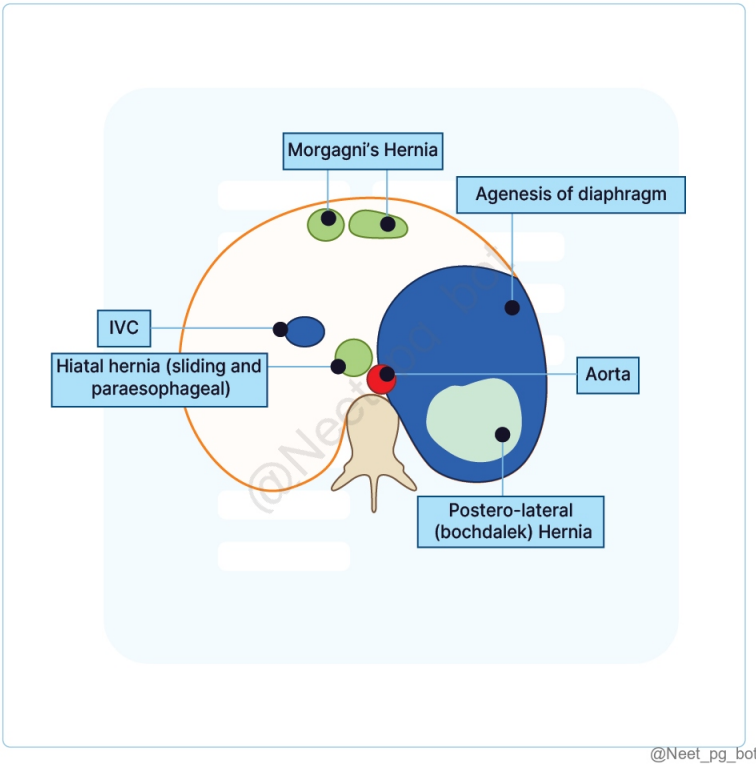
C. Gastric volvulus

D. Eventration of diaphragm



Correct Answer: B. Morgagni hernia

Explanation: A Morgagni hernia is a rare type of diaphragmatic hernia where abdominal contents herniate into the thoracic cavity through the foramen of Morgagni (anterior defect of the diaphragm). Clinical features : Often presents with mild, intermittent abdominal pain, respiratory symptoms, or may be asymptomatic. X-ray findings : On a chest X-ray, the herniated bowel loops may appear as air-filled structures in the anterior mediastinum, often on the right side near the heart. Congenital Diaphragmatic Hernia (CDH): CDH is the intrathoracic herniation of abdominal contents due to congenital defects in the diaphragm. Types of CDH : Bochdalek Hernia : Occurs through the posterolateral pleuroperitoneal canal, most commonly on the left side . Morgagni Hernia : Anterior hernia located at the right cardiophrenic angle. {{caption_text}} Fig. Schematic representation of CDH Radiologic Features : Chest Radiograph (CXR): Bochdalek hernia: Dome-shaped soft tissue opacity in the posterolateral thorax, often left-sided . May show gas-filled bowel loops or fat content in the thoracic cavity. Mediastinal shift away from the herniation due to mass effect. On the lateral view , hernias appear above the posterior costophrenic recess . CT/MRI : Visualizes herniation of fat, bowel, spleen, or kidney through a diaphragmatic defect. Important for distinguishing from other masses like cystic adenomatoid malformation or pericardial cyst . CT provides clearer differentiation of soft-tissue or fatty mass protruding through the diaphragm. Complications : Associated with hypoplasia of the ipsilateral lung , leading to respiratory distress, especially in neonates. Neonates may present with respiratory distress and mediastinal deviation. Bochdalek hernia (option A) : Incorrect because a Bochdalek hernia is a posterior diaphragmatic hernia, typically found on the left side. It is more common in neonates and is not located anteriorly. Gastric volvulus (option C) : Incorrect because gastric volvulus involves twisting of the stomach, often leading to acute severe pain and vomiting, which does not match the mild, intermittent pain described here. X-ray would show a "double bubble" or distended stomach with air-fluid levels. Eventration of diaphragm (option D) : Incorrect because eventration refers to abnormal elevation of the diaphragm, often involving one hemidiaphragm, but does not involve herniation of bowel loops into the thoracic cavity.



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References:

Grainger & Allison's Diagnostic Radiology, A Textbook of Medical Imaging, 7th Edition, Page. 62, 63.

Textbook of Radiology & Imaging by David Sutton, 8th Edition, Chapter 14: Pleura, Diaphragm, and Chest Wall - The Diaphragm - Hernias of the Diaphragm

↑ *Back to this question in Part A*

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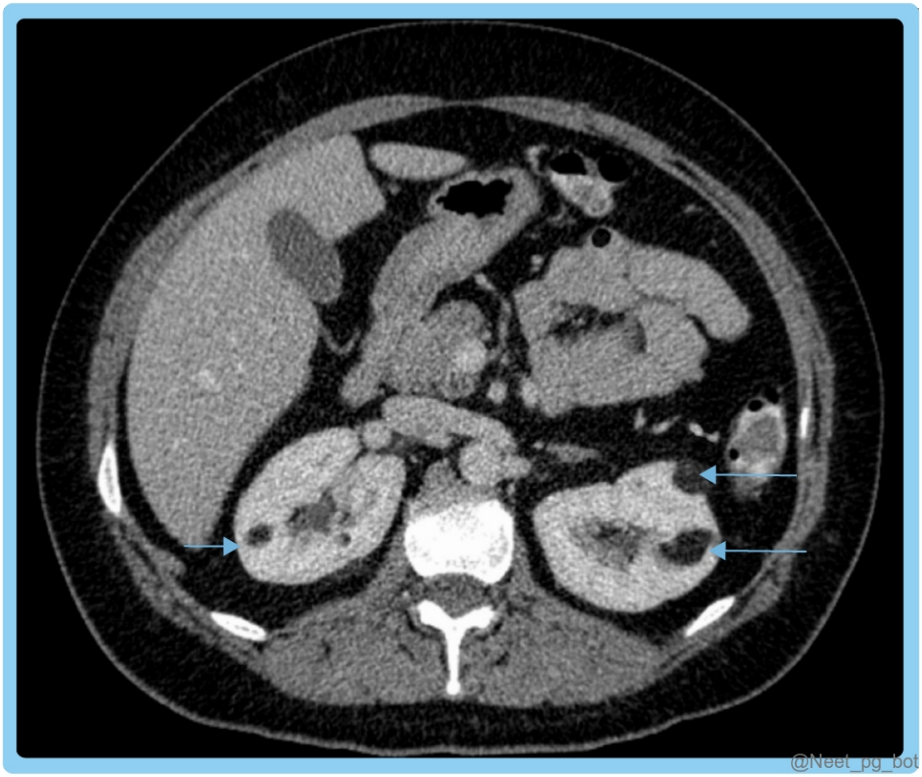
Q11: A 45-year-old patient presented with vague abdominal pain. What is the diagnosis? (Q858177)

A. RCC

B. Renal oncocytoma

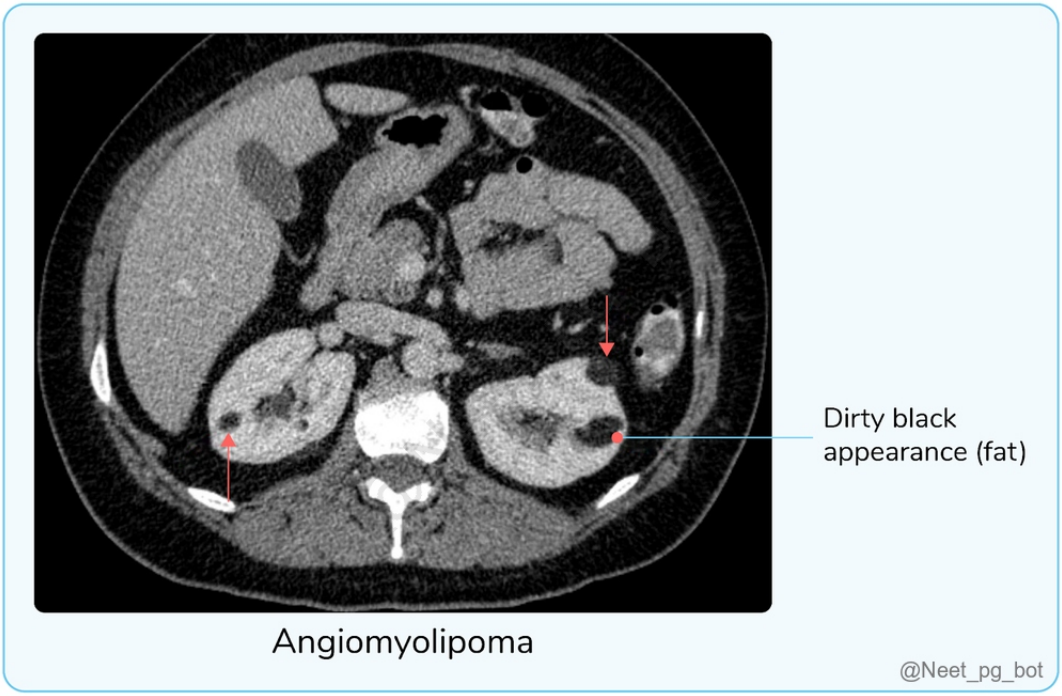
C. Renal Angiomyolipoma

D. Renal cyst



Correct Answer: C. Renal Angiomyolipoma

Explanation: Angiomyolipoma is a benign renal tumour composed of fat, blood vessels, and smooth muscle. On CT, it is characterised by fat density (-10 to -100 Hounsfield units) within the lesion, which is a hallmark feature. It is most commonly seen in middle-aged individuals and is associated with tuberous sclerosis in some cases. {{caption_text}} Angiomyolipoma in both kidneys (arrows) in computer tomography. The tumours are hypodense (dark) due to fat content. RCC (Renal Cell Carcinoma) (option A): RCC typically presents as an enhancing mass on CT without significant fat density. It may show irregular enhancement due to necrosis but does not have fat as a primary feature. Renal Oncocytoma (option B): Renal oncocytoma is a benign tumour and appears as a homogeneously enhancing mass on CT but does not exhibit fat density. Renal Cyst (option D): Renal cysts appear as well-defined, non-enhancing lesions with water density (0-20 Hounsfield units) on CT, without fat.



References:

Renal angiomyolipoma: a radiological classification and update on recent developments in diagnosis and management - PMC

↑ *Back to this question in Part A*

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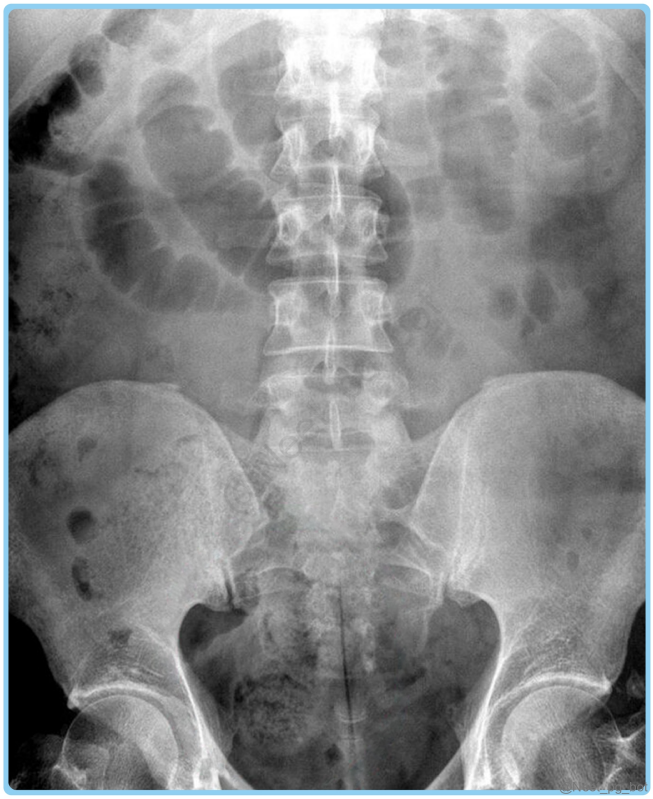
Q12: A patient presents with abdominal pain and distension. An x-ray was taken which showed dilated bowel loops as given in the image below. Identify the segment involved. (Q857607)

A. Jejunum

B. Ileum

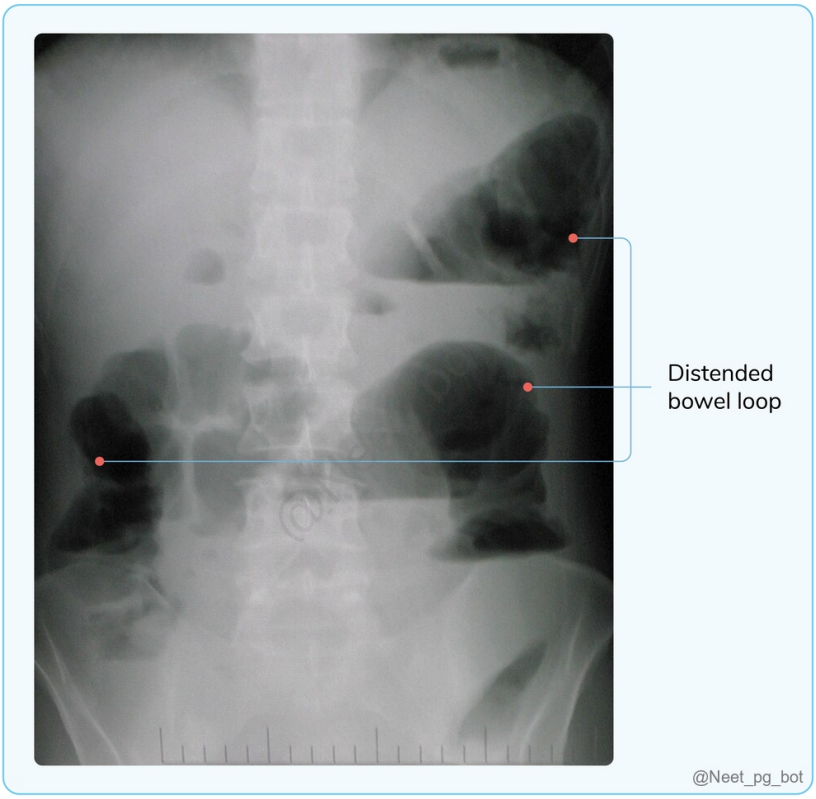
C. Duodenum

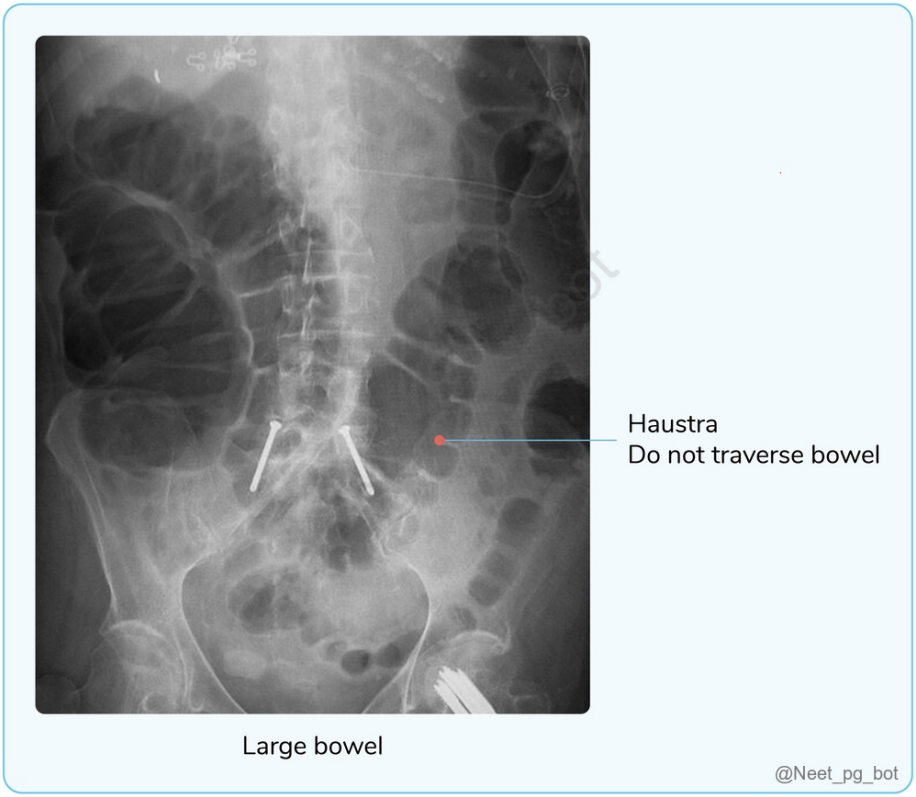
D. Transverse colon



Correct Answer: A. Jejunum

Explanation: The x-ray shows dilated bowel loops with valvulae conniventes (plicae circulares), which are seen throughout the lumen , indicating jejunal obstruction . These folds are closely spaced and extend across the entire diameter of the bowel, a hallmark feature of the jejunum on imaging. Radiological Features of Bowel Obstruction Segment Radiological Features Jejunum Valvulae conniventes (plicae circulares) seen throughout the bowel, giving a stacked coin or coiled spring appearance. Ileum Less prominent valvulae conniventes, fewer folds , and a featureless appearance compared to the jejunum. Duodenum Dilated duodenum in proximal obstruction , "double bubble" sign in duodenal atresia . Transverse Colon Haustral markings (do not completely cross the lumen), wider spacing than jejunal folds. Differentiating Features Between Small Bowel and Large Bowel Obstruction: Feature Small Bowel Large Bowel Number of loops Many loops visible Few loops visible Position of loops Central abdomen Peripheral (framing the small bowel) Wall/Mucosal pattern Valvulae conniventes (complete circular folds) Haustra (incomplete bands) Diameter >3 cm >6 cm (Caecum >9 cm) Gas Pattern Multiple air-fluid levels, "string of beads" Distended colon, air-fluid levels {{caption_text}} {{caption_text}} Ileum (Option B): Incorrect because ileal loops have fewer mucosal folds (valvulae conniventes are less prominent), and the dilatation does not show the characteristic stacked-coin appearance of the jejunum . Duodenum (Option C): Incorrect because duodenal obstruction typically shows a "double bubble" sign in congenital cases or proximal dilatation with stomach involvement . Transverse Colon (Option D): Incorrect because haustral markings do not completely cross the lumen and are more widely spaced, unlike valvulae conniventes of the jejunum .





References:

Bailey & Love's Short Practice of Surgery, 27th Edition • Page no 1288

Grainger & Allison's Diagnostic Radiology, A Textbook of Medical Imaging, 7th Edition, Page. 544

Textbook of Radiology & Imaging by David Sutton, Vol I, 8th Edition, Chapter 29 Imaging

↑ *Back to this question in Part A*

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Q13: Identify the investigation shown below which is the investigation of choice in distal bowel tumors. (Q857200)

A. Enteroclysis

B. Barium meal

C. Barium meal follow-through

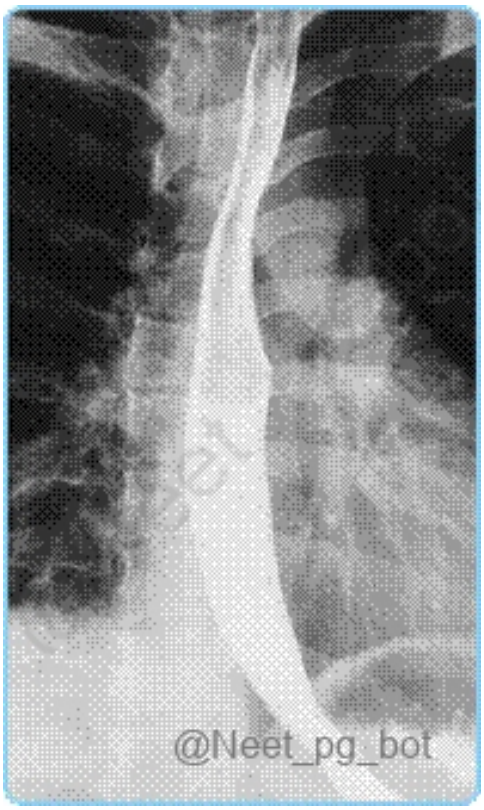
D. Barium enema



Correct Answer: D. Barium enema

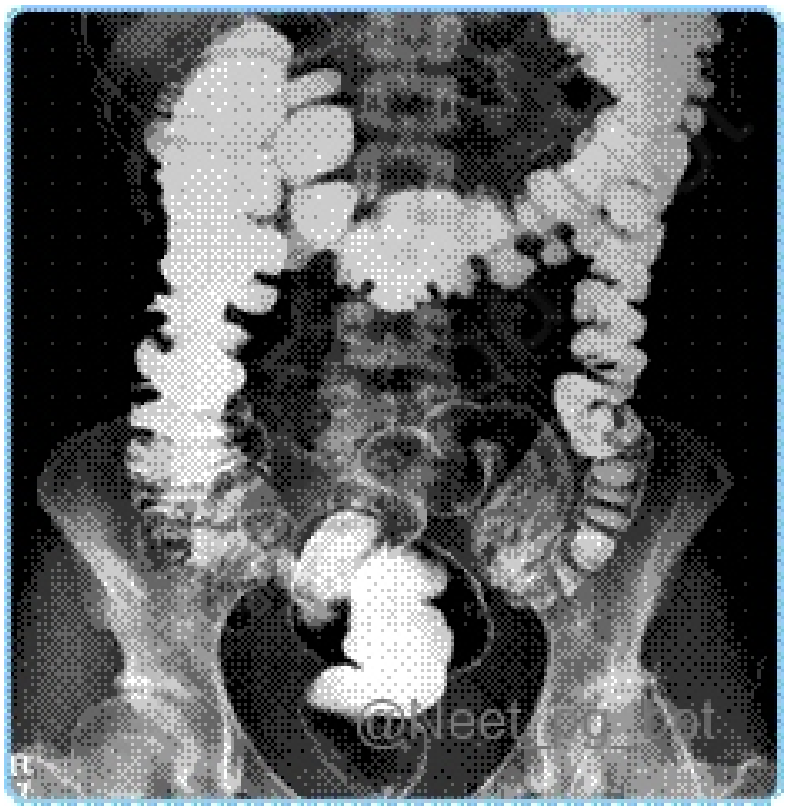
Explanation: Barium enema is the investigation of choice for distal bowel tumors as it provides a detailed view of the colon and rectum by instilling barium contrast via the rectum. It helps detect colorectal masses, strictures, and mucosal irregularities, making it ideal for evaluating distal bowel pathology . Barium Studies in Gastrointestinal

Imaging Investigation Indication Best for Barium Swallow {{caption_text}} Oropharyngeal and esophageal disorders Esophageal stricture, achalasia, tumors Barium Meal {{caption_text}} Upper GI tract evaluation (stomach, duodenum) Peptic ulcer disease, gastric tumors Barium Meal Follow-through {{caption_text}} Small bowel imaging Crohn’s disease, malabsorption syndromes Enteroclysis Detailed small bowel study Subtle small bowel lesions Barium Enema {{caption_text}} Colon and rectal pathology Distal bowel tumors, polyps, IBD Enteroclysis (Option A): Incorrect because it is used for small bowel evaluation, not for distal bowel tumors. It requires nasojejunal intubation and is ideal for conditions like Crohn’s disease or malabsorption syndromes . Barium Meal (Option B): Incorrect because it mainly assesses the stomach and duodenum and is not used for detecting distal colon tumors. Barium Meal Follow-through (Option C): Incorrect because it is designed for small bowel evaluation and is used for conditions like submucosal tumors or Crohn’s disease , rather than distal colon tumors .




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References:

Barium swallow | Radiology Reference Article | Radiopaedia.org

Normal indentations on the esophagus in barium swallow

Definition of barium-meal photofluorography - NCI Dictionary of Cancer Terms

Barium Tests (Barium Meal, Swallow, Follow Through)

Double contrast barium enema technique | Radiology Reference Article

Grainger and Allison's Textbook of Diagnostic Radiology, 7th edition, Page 483

↑ *Back to this question in Part A*

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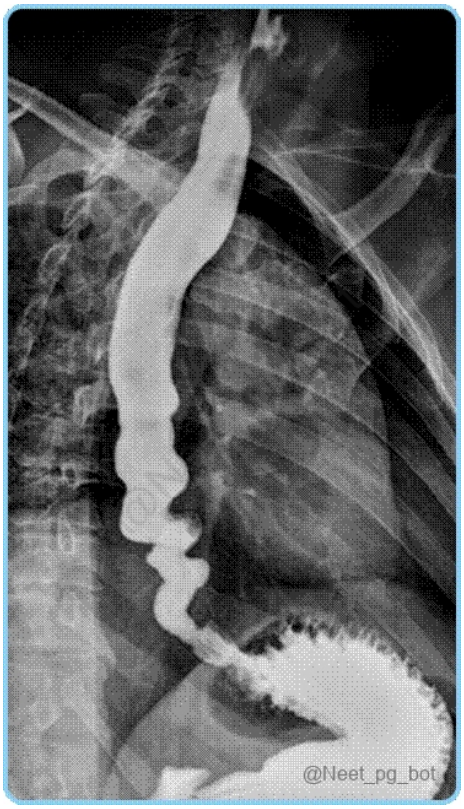
Q14: The characteristic appearance of the esophagus on barium swallow, as shown in the image below, is seen in which of the following conditions? (Q857181)

A. Diffuse oesophageal spasm

B. Esophageal carcinoma

C. Esophageal ulcer

D. Achalasia cardia



Correct Answer: A. Diffuse oesophageal spasm

Explanation: The barium swallow image in diffuse esophageal spasm (DES) classically shows a "corkscrew" or "rosary bead" appearance due to uncoordinated, simultaneous esophageal contractions . This condition presents with intermittent dysphagia and chest pain , often mimicking cardiac conditions. Radiological Features of Esophageal Conditions Condition Barium Swallow Appearance Key Features Diffuse esophageal spasm (DES) Corkscrew or rosary bead esophagus Uncoordinated contractions, chest pain, intermittent dysphagia Esophageal carcinoma Irregular filling defect, apple-core lesion Progressive dysphagia, weight loss Esophageal ulcer Niche or crater-like defect Associated with reflux or malignancy Achalasia cardia Bird’s beak appearance Failure of LES relaxation, progressive dysphagia Esophageal carcinoma (Option B): Incorrect because it shows an irregular filling defect or apple-core lesion , not a corkscrew pattern. Esophageal ulcer (Option C): Incorrect because it presents as a localized crater-like defect in the esophagus, unlike diffuse spasm. Achalasia cardia (Option D): Incorrect because it shows a bird’s beak appearance due to failure of lower esophageal sphincter (LES) relaxation.

References:

Radiopedia

↑ *Back to this question in Part A*

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Q15: Match the following: 1. Football sign a. Hypertrophic pyloric stenosis 2. String sign b. Achalasia cardia 3. Rat tail sign c. Ileocecal TB 4. Inverted umbrella sign d. Pneumoperitoneum (Q855875)

A. 1-b, 2-d, 3-a, 4-c

B. 1-c, 2-a, 3-b, 4-d

C. 1-d, 2-b, 3-a, 4-c

D. 1-d, 2-a, 3-b, 4-c

Correct Answer: D. 1-d, 2-a, 3-b, 4-c

Explanation: Football sign (d): Pneumoperitoneum Seen on abdominal X-rays, the football sign indicates free intraperitoneal air outlining the peritoneal cavity, creating the appearance of an "American football." {{caption_text}} String sign (a): Hypertrophic pyloric stenosis Refers to a thin, elongated pyloric canal seen on upper GI contrast studies, characteristic of hypertrophic pyloric stenosis. {{caption_text}} Rat tail sign (b): Achalasia cardia A tapering of the distal oesophagus with smooth narrowing on barium swallow, resembling a rat tail, is indicative of achalasia. {{caption_text}} Inverted umbrella sign (c): Ileocecal tuberculosis A deformity of the ileocecal region with contracted cecum and pulled-up ileum, resembling an inverted umbrella, is typical of ileocecal TB. {{caption_text}}




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References:

Nelson Textbook of Pediatrics, 21st edition, Page 1947

Grainger and Allison's Textbook of Diagnostic Radiology, 7th edition, Page 463-465

Achalasia | Radiology Reference Article | Radiopaedia.org

David Sutton Textbook of Radiology and Imaging, Volume 1, 8th edition, Page 2254-

↑ *Back to this question in Part A*

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Q16: The following radiological image was taken to assess the urinary tract. Identify the investigation shown below. (Q866869)

A. Intravenous pyelogram (IVP)

B. Pelvic X-ray

C. Retrograde pyelogram

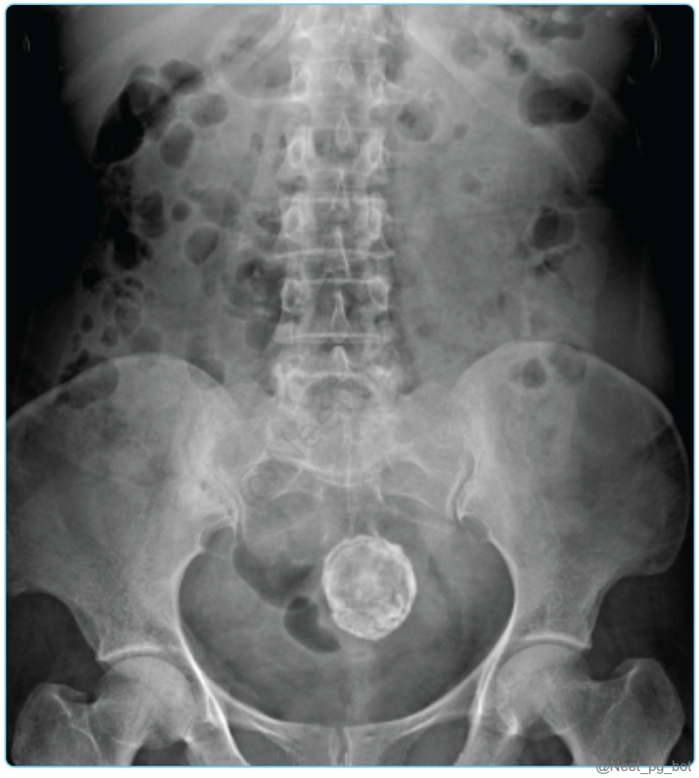
D. Micturating cystourethrogram (MCUG)

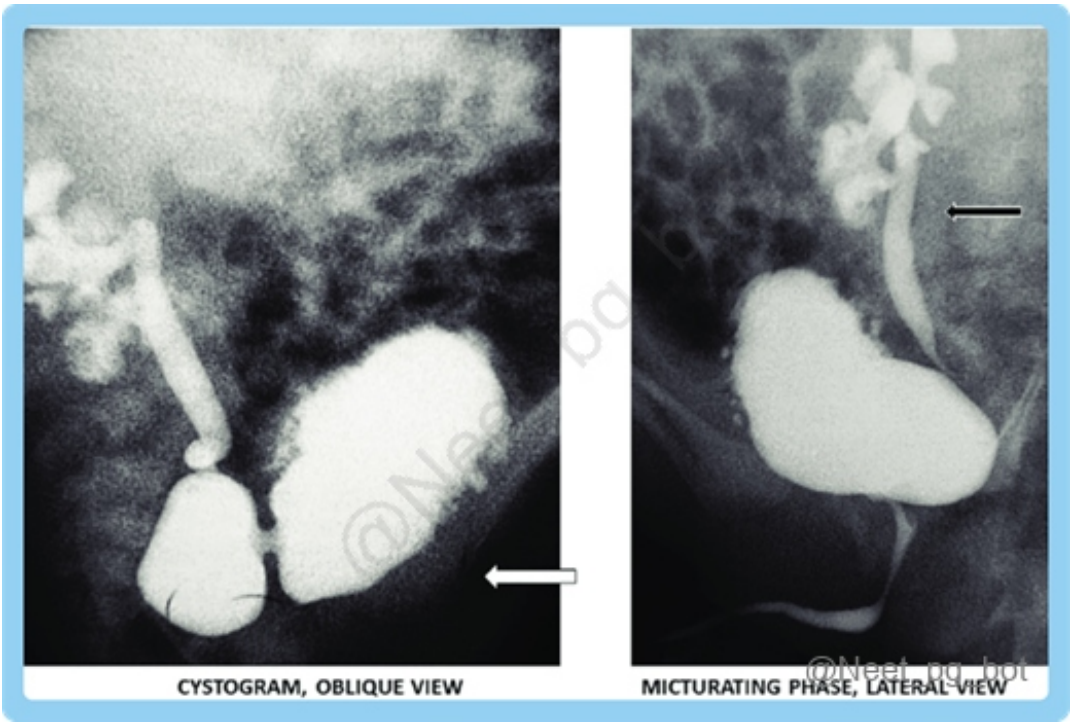


Correct Answer: A. Intravenous pyelogram (IVP)

Explanation: An Intravenous pyelogram (IVP) is a contrast-based radiological investigation used to visualize the anatomy and function of the urinary tract, including kidneys, ureters, and bladder. Iodinated contrast is injected intravenously, filtered by the kidneys, and excreted into the collecting system, allowing sequential imaging to assess drainage and detect structural abnormalities such as calculi, strictures, or masses. The image typically shows contrast-filled calyces, pelvis, ureters, and bladder in a single study. Incorrect Options: Pelvic X-ray (Option B): Plain film without contrast; only bony pelvis and gross calcifications visible. Retrograde pyelogram (Option C): Contrast introduced via catheter through the urethra and bladder directly into ureters; used if IV contrast is contraindicated. Micturating cystourethrogram (MCUG) (Option D): Contrast instilled into bladder via catheter, with imaging during urination; used for vesicoureteral reflux evaluation.







References:

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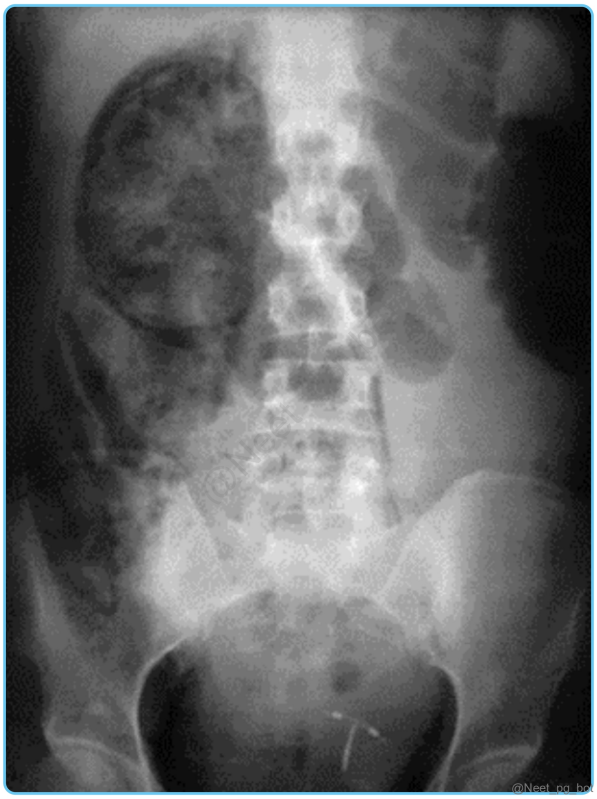
Q17: A 55-year-old female patient presents to the emergency department with chills and rigors. She has acute pain in the right flank region. The imaging is shown below. What is the most likely diagnosis? (Q858202)

A. Cholecystitis

B. Emphysematous pyelonephritis

C. Small bowel obstruction

D. Volvulus

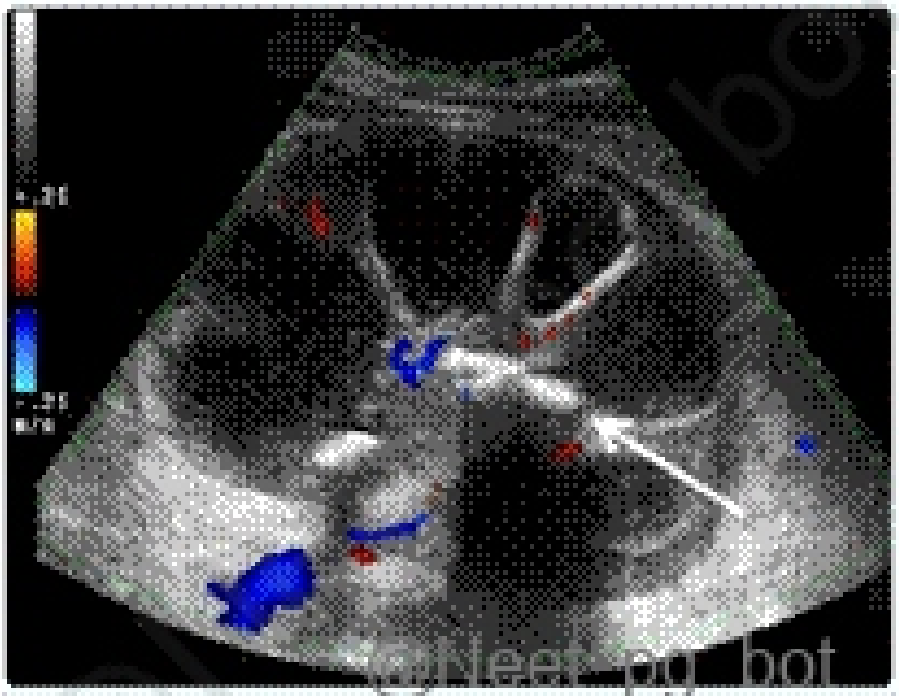


Correct Answer: B. Emphysematous pyelonephritis

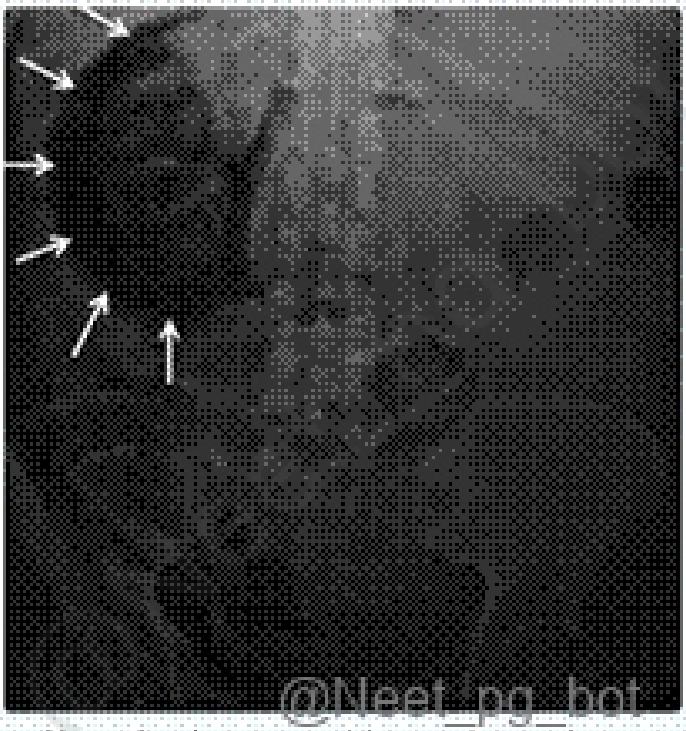
Explanation: Emphysematous Pyelonephritis : This is a severe, necrotizing infection of the kidney, typically caused by gas-producing organisms (e.g., E. coli , Klebsiella). The hallmark imaging feature in CT scan would be the presence of gas in the renal parenchyma or renal collecting system . Symptoms typically include flank pain, fever, chills, and rigors , and it is commonly seen in diabetic patients or those with immunocompromised states. The radiological finding of gas within the renal parenchyma on the CT scan supports this diagnosis. Acute Pyelonephritis Xanthogranulomatous Pyelonephritis Emphysematous Pyelonephritis Ultrasound (USG): This may show kidney enlargement, reduced echogenicity, and dilated collecting systems. {{caption_text}} Ultrasound (USG): Shows an enlarged kidney with echogenic staghorn calculi and hypoechoic masses replacing renal parenchyma. {{caption_text}} Plain Abdominal X-ray: Detects gas in the kidney region in about 70% of cases. {{caption_text}} Contrast-enhanced CT: Most sensitive, showing wedge-shaped hypodense areas, striated nephrograms, and pelvic wall thickening. {{caption_text}} CT Scan reveals a non-functioning kidney, staghorn calculus, expanded calyces, and inflammatory changes . A characteristic bear paw sign is noted. {{caption_text}} CT: Gold standard, reveals gas within the kidney, renal enlargement, perinephric stranding and abscesses. Helps classify into Type 1 (gas without fluid) or Type 2 (gas with fluid). {{caption_text}} Acute infection of the kidney involving the renal parenchyma and collecting system is usually caused by ascending bacteria. It is a chronic granulomatous response to recurrent renal infection - that leads to the destruction of renal parenchyma and its replacement by lipid-laden foamy macrophages. Destruction spreads from the renal pelvis→medulla→ cortex. Usually, staghorn calculus is present in the pelvis. Severe necrotizing infection with gas accumulation in and around the kidney, primarily in diabetic patients. Cholecystitis (option A) : Incorrect because cholecystitis is an inflammation of the gallbladder , typically presenting with right upper quadrant pain , fever , and nausea . The imaging would show gallstones and a thickened gallbladder wall rather than gas in the renal system. Small bowel obstruction (option C) : Incorrect because small bowel obstruction presents with symptoms of vomiting , abdominal distension , and failure to pass flatus or stool . Imaging would typically show dilated loops of bowel and

air-fluid levels, not gas in the kidney or renal system. Volvulus (option D) : Incorrect because volvulus refers to the twisting of the bowel, leading to bowel obstruction. It would cause abdominal distension , pain , and vomiting , with imaging showing distended loops of bowel and sometimes a twisted mesenteric root . There would be no gas in the kidney or renal parenchyma.

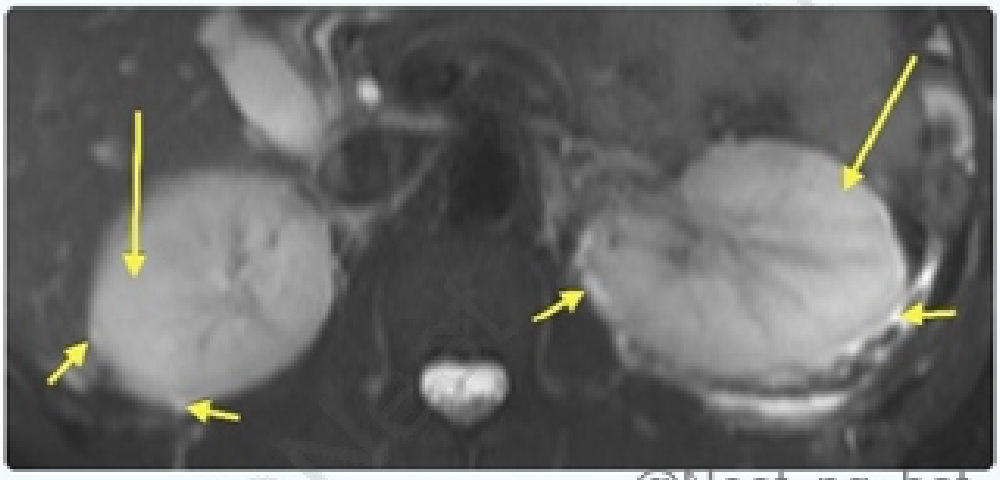




Dilated fluid-filled spaces and calculi (white arrow)

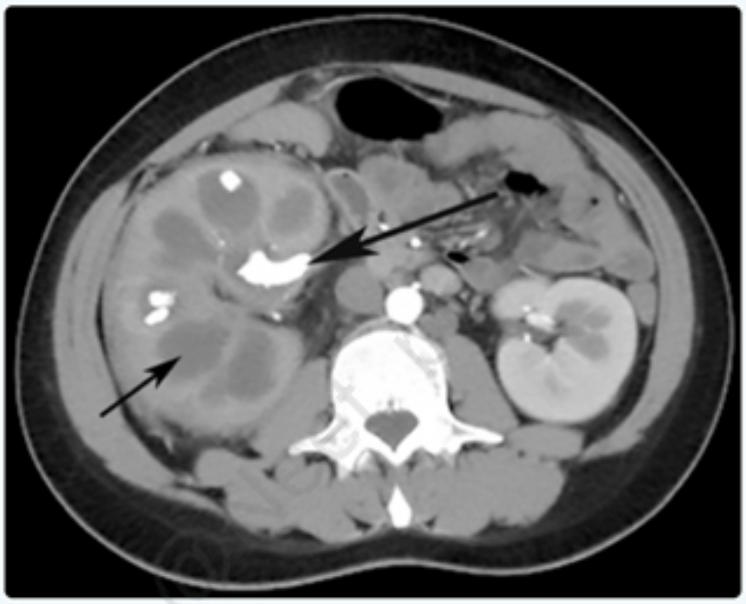


X-ray showing gas overlying renal parenchyma



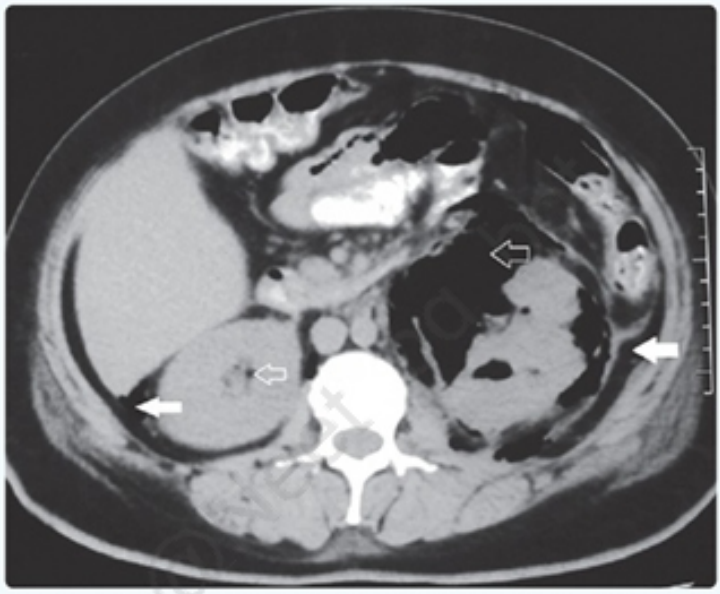
CECT showing striated nephrogram

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"Bear paw sign": multiple, rounded, low density areas with enhancing rings arranged in a hydronephrotic pattern and hypoenhancement of the renal parenchyma (Small arrow). Multiple renal pelvis stones (Big arrow)

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CT abdomen showing enlargement, distortion of architecture, and loss of corticomedullary differentiation of left kidney along with presence of extensive gas and necrotic tissue (hollow white arrow). Few areas of gas are also seen in the collecting system of right kidney (hollow white arrow). There is evidence of extension of gas into bilateral perinephric and paranephric tissue (solid white arrows)

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References:

Grainger and Allison's Diagnostic Radiology, 7th Edition, Page 736, 739

Textbook of Radiology and Imaging, David Sutton, 8th Edition, Volume 1, Page 2933, 2934, 2935, 2938, 2939, 2940

↑ *Back to this question in Part A*

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Q18: Please identify the section of the intestine shown in the barium study provided. (Q858197)

A. Ileum

B. Transverse colon

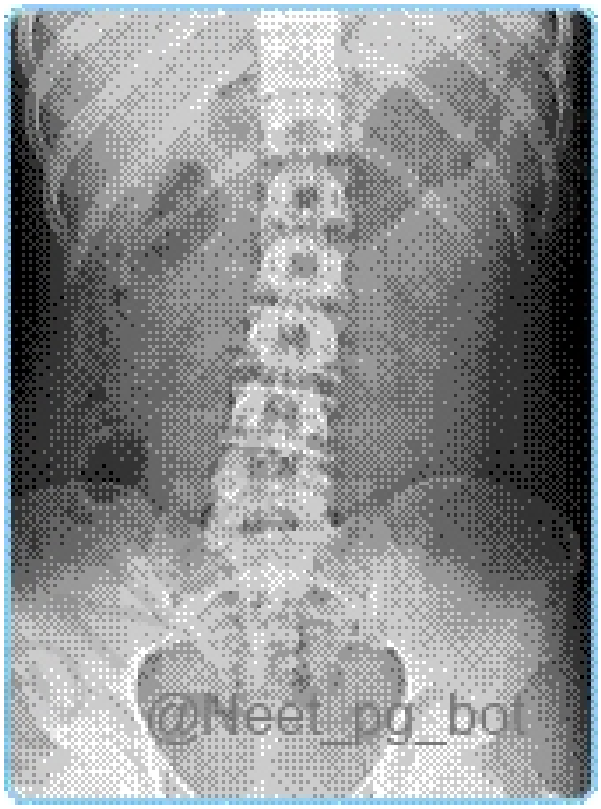
C. Jejunum

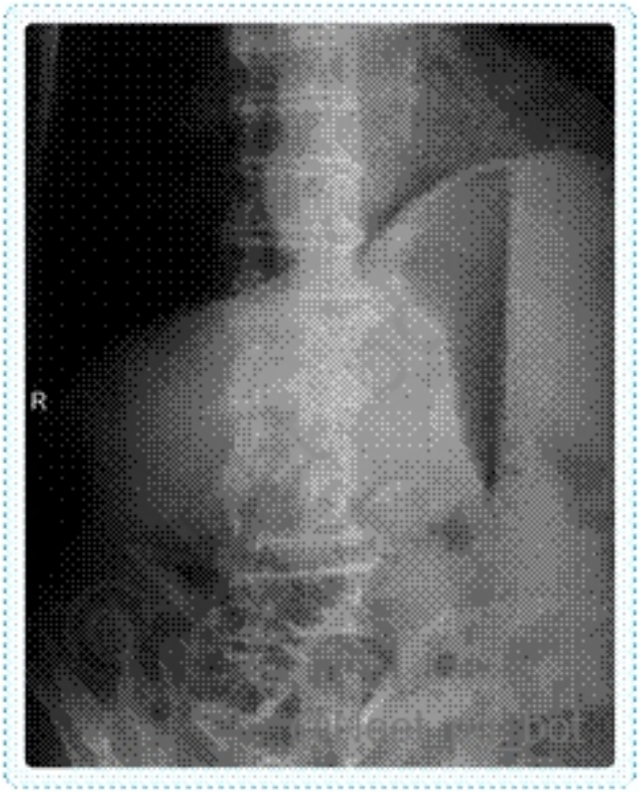
D. Splenic flexure

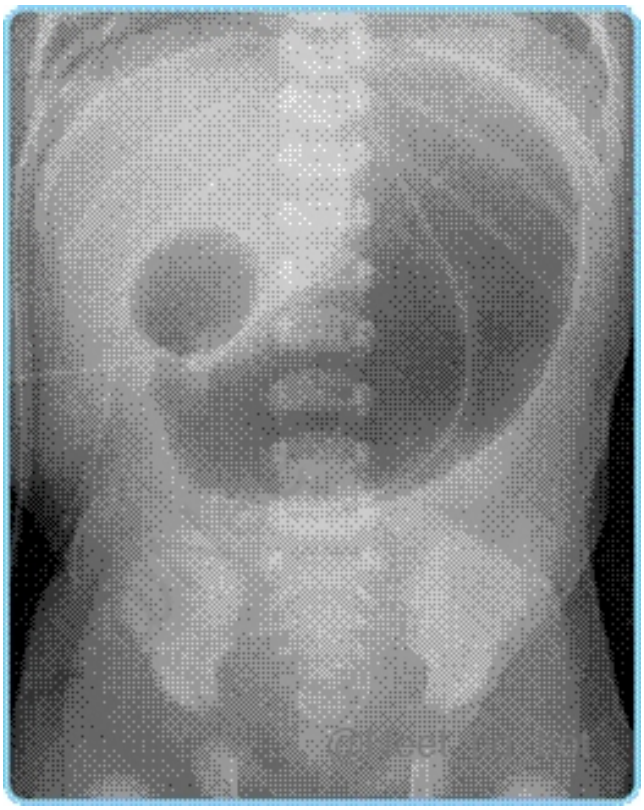


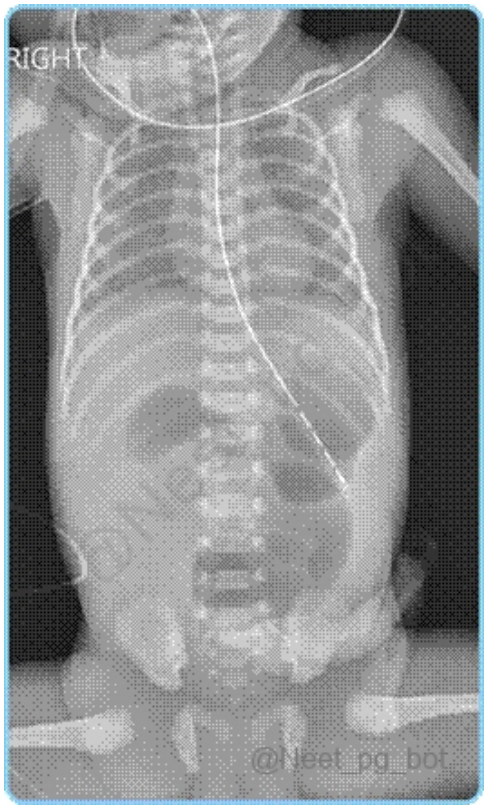
Correct Answer: C. Jejunum

Explanation: The jejunum is the second part of the small intestine, following the duodenum and preceding the ileum. It is typically characterized by: A thicker, more vascular wall compared to the ileum. Plicae circulares (circular folds) are prominent in the jejunum, and the mucosal surface appears folded in the barium study. The barium study would show coarse, dense mucosal folds which is a distinctive feature of the jejunum. Various Bubble signs of the abdomen: Condition Radiological Sign


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References:

Grainger & Allison’s Diagnostic Radiology, A Textbook of Medical Imaging, 7th Edition, Page. 266

Textbook of Radiology & Imaging by David Sutton, Vol I, 8th Edition, Chapter 27, Gastric dilatation.

Textbook of Radiology & Imaging by David Sutton, Vol II, 8th Edition, Chapter 84, Pediatric Gastrointestinal Tract and Hepatobiliary System, Upper Gastrointestinal Tract Anomalies - Duodenal Obstruction and Lower Gastrointestinal Tract Anomalies - Jejunoileal Atresia.

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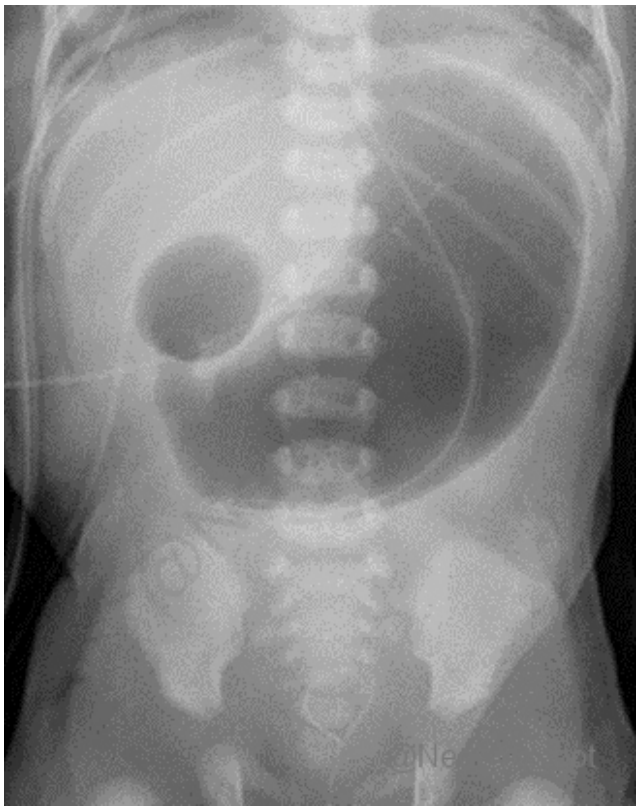
Q19: A newborn presents with bilious vomiting. Which sign is depicted in the following radiograph? (Q820181)

A. Double bubble sign

B. Air crescent sign

C. Cupola sign

D. Triple bubble sign:



Correct Answer: A. Double bubble sign

Explanation: Correct option A - Double bubble sign: The double bubble sign is a radiological finding seen on an abdominal X-ray or ultrasound in cases of duodenal atresia or stenosis. It is characterized by the presence of two distinct air-filled bubbles in the abdomen: one representing the stomach and the other representing the dilated portion of the proximal duodenum. Incorrect options: Option B - Air crescent sign: The air crescent sign is typically seen in radiological imaging of patients with invasive pulmonary aspergillosis. It appears as a crescent-shaped pocket of air surrounding a lung nodule or cavity. Option C - Cupola sign: The cupola sign is seen on a supine chest or abdominal radiograph in the presence of pneumoperitoneum. It refers to non-dependent gas that rises within the abdominal cavity of the supine patient to accumulate underneath the central tendon of the diaphragm in the midline. Option D - Triple bubble sign: The triple bubble sign is the classic radiographic appearance observed in jejunal atresia. The appearance is due to a proximal obstruction caused by the atretic jejunum.

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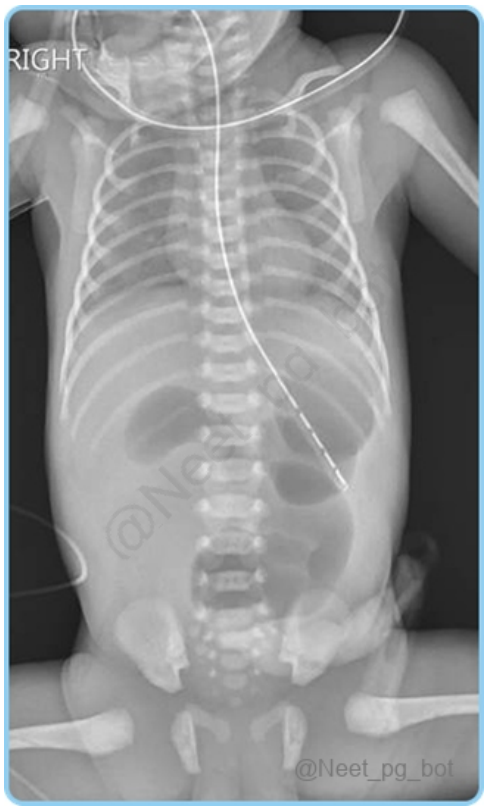
Q20: Identify the condition in the image shown below: (Q860270)

A. Duodenal atresia

B. Jejunal atresia

C. Small bowel obstruction

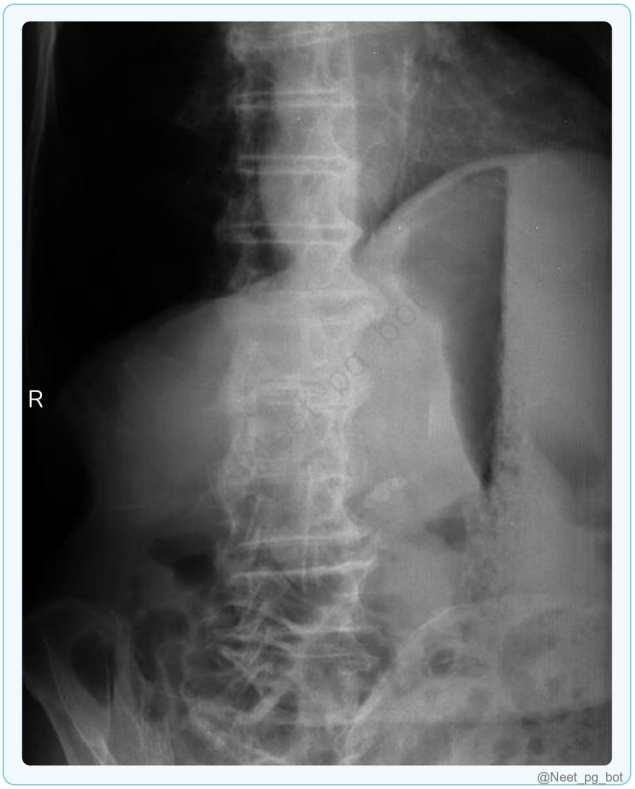
D. Ileal atresia



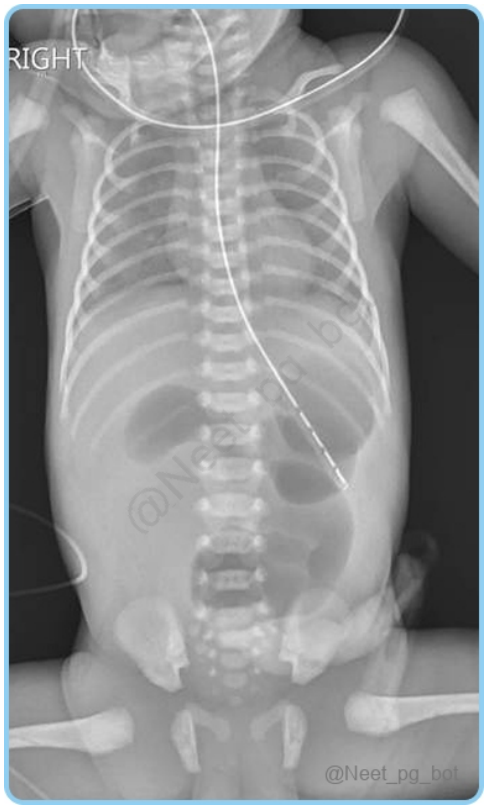
Correct Answer: B. Jejunal atresia

Explanation: Jejunal atresia is characterized by a triple bubble sign, as shown in the X-ray. It also shows an apple peel appearance. Various Bubble signs of the abdomen: Condition Radiological Sign


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References:

Grainger & Allison’s Diagnostic Radiology, A Textbook of Medical Imaging, 7th Edition, Page. 266

Textbook of Radiology & Imaging by David Sutton, Vol I, 8th Edition, Chapter 27, Gastric dilatation.

Textbook of Radiology & Imaging by David Sutton, Vol II, 8th Edition, Chapter 84, Pediatric Gastrointestinal Tract and Hepatobiliary System, Upper Gastrointestinal Tract Anomalies - Duodenal Obstruction and Lower Gastrointestinal Tract Anomalies - Jejunoileal Atresia.

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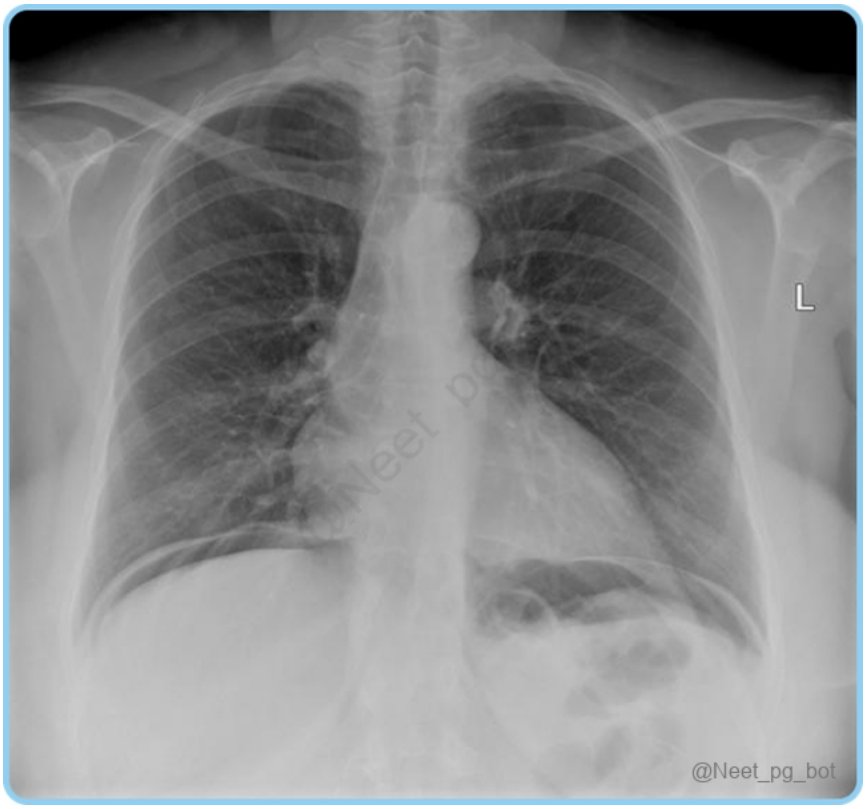
Q21: A 45-year-old male presented with severe abdominal pain following alcohol intake. Make a diagnosis based on the given X-ray. (Q860264)

A. Pneumoperitoneum

B. SBO

C. Esophageal perforation

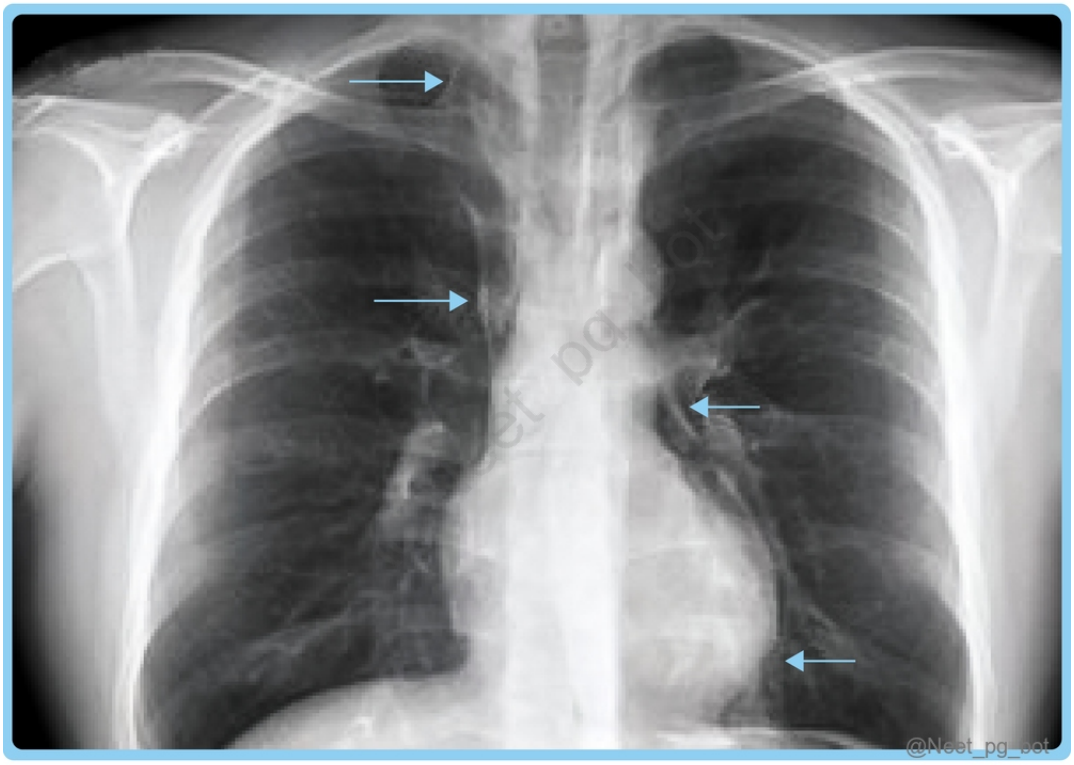
D. Pneumomediastinum



Correct Answer: A. Pneumoperitoneum

Explanation: The X-ray given above shows the presence of air under the diaphragm without any visible bowel markings, which is indicative of pneumoperitoneum. Pneumoperitoneum Pneumoperitoneum refers to the presence of free gas in the peritoneal cavity, typically indicating a perforated viscus (e.g., perforated peptic ulcer). Causes: Common: Perforated peptic ulcers, bowel obstruction, inflammatory conditions, ischemia, injury during colonoscopy. Other causes without peritonitis: Postoperative (up to 7 days), peritoneal dialysis, sealed perforation, and tracking from pneumomediastinum. Diagnosis on Imaging: Erect CXR: Free gas seen under the right hemidiaphragm (cupola sign) , difficult to differentiate on the left due to gastric or colonic gas. Supine AXR: Right upper quadrant gas in the perihepatic, subhepatic space, Morrison's pouch, and ligament visualization (e.g., falciform ligament). Rigler's Sign: Visualization of both sides of the bowel wall due to surrounding gas. CT Scan: Most sensitive; small volumes of gas seen in the liver or peritoneal recesses, often using broad window settings. Pseudo-pneumoperitoneum: Conditions mimicking free gas such as Chilaiditi syndrome (intestine between liver and diaphragm), subphrenic abscess, or subdiaphragmatic fat. Pneumoperitoneum may be clinically silent, especially in elderly, steroid-treated, unconscious, or critically ill patients. Small bowel obstruction (SBO) (Option B): typically presents with dilated bowel loops, air-fluid levels, and no free air under the diaphragm. {{caption_text}} Esophageal perforation (Option C): While it can lead to air escaping into surrounding areas, it more commonly results in pneumomediastinum or subcutaneous emphysema rather than free air under the diaphragm. Pneumomediastinum (Option D): Air in the mediastinum is seen along the heart border and mediastinal structures, not under the diaphragm. {{caption_text}}





References:

Grainger and Allison's Textbook of Diagnostic Radiology, 7th edition, Page 463-465

↑ *Back to this question in Part A*

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Q22: Identify pancreas, liver, and spleen? (Q860593)

A. A-liver, B-pancreas, C-spleen

B. A-Kidney, B-liver, C-pancreas

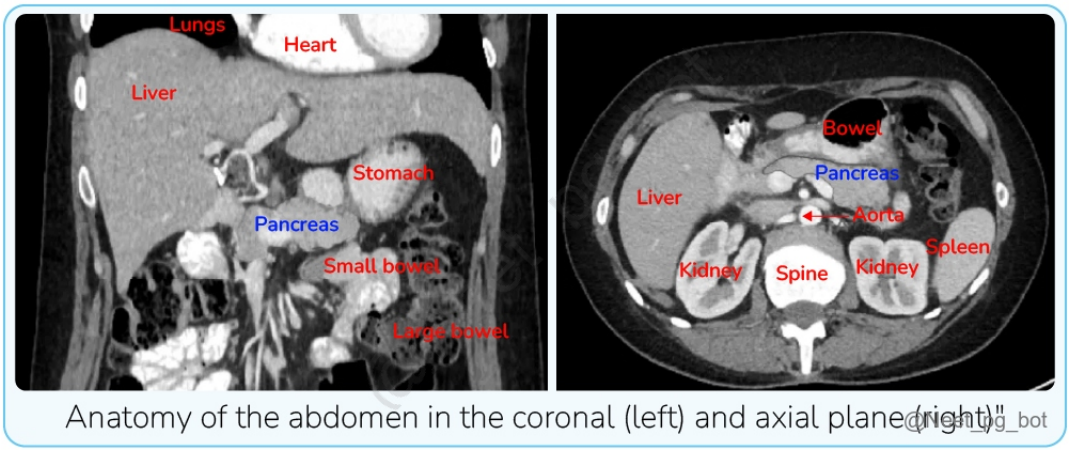
C. A-pancreas, B-liver, C-spleen

D. A-spleen, B-kidney, C-liver



Correct Answer: A. A-liver, B-pancreas, C-spleen

Explanation: In the given radiological image, the stomach is identified based on the fluid presence (hypodense region). Rightside to the stomach is the liver, which extends upto the anterior abdominal wall. Leftside to the stomach, the spleen in located more in the posterior position The pancreas is located immediately posterior to the stomach in the given image. {{caption_text}} Anatomy of the abdomen in the coronal (left) and axial plane (right)



References:

https://www.ncbi.nlm.nih.gov/books/NBK553104/

↑ *Back to this question in Part A*

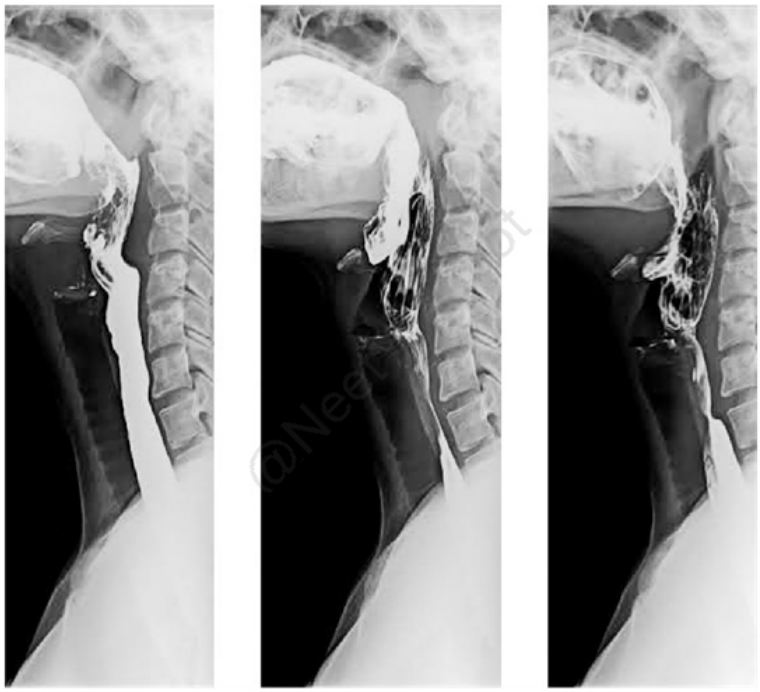
Q23: What investigation is being performed in the image below? (Q843952)

A. Fluoroscopy

B. Barium swallow

C. X-ray for alkali ingestion

D. X-ray for acid ingestion



Correct Answer: B. Barium swallow

Explanation: Correct Option B - Barium swallow: The given image sequence shows barium swallow. Incorrect Options: Option A – Fluoroscopy: Fluoroscopy is depicted in a video or movie form. Options C and D are not depicted in the image.

References:

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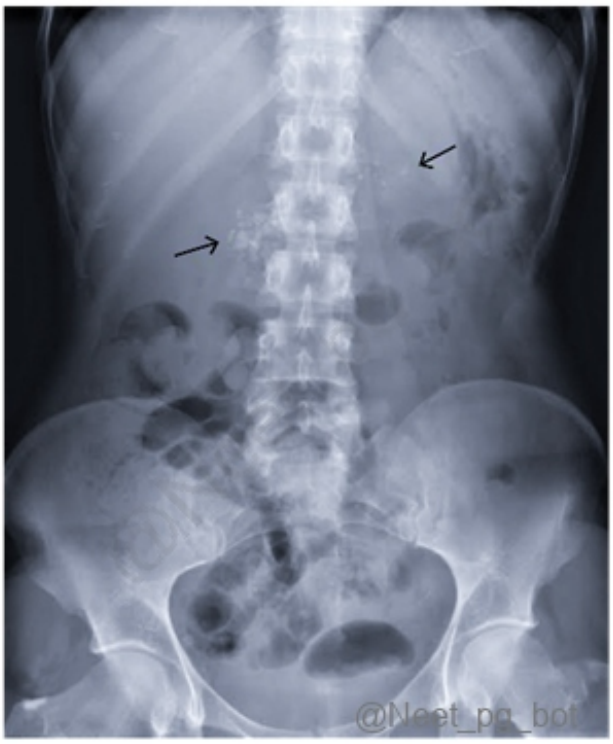
Q24: Identify the condition depicted in the radiograph below. (Q843938)

A. Pancreatic calcification

B. Mesenteric calcification

C. Horseshoe kidney

D. Jejunal fecolith



Correct Answer: A. Pancreatic calcification

Explanation: Correct Option A - Pancreatic calcification: The radiograph shows small, scattered calcifications typically associated with chronic pancreatitis. These calcifications are due to long-term inflammation and damage to the pancreas, leading to the deposition of calcium within the pancreatic ducts. Incorrect Options: Options B, C, and D are not seen in the given radiograph.

↑ *Back to this question in Part A*

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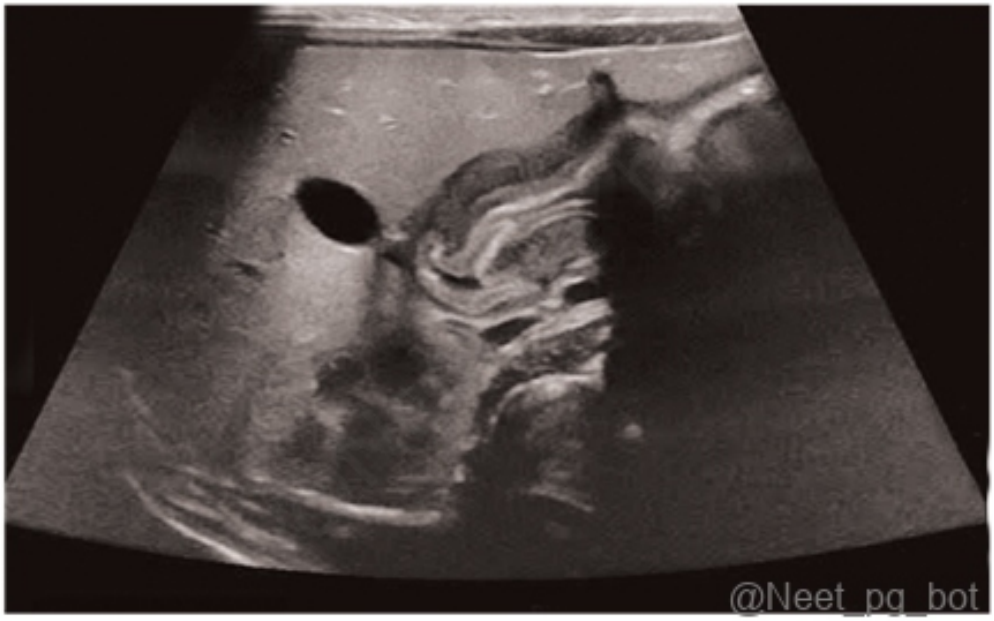
Q25: A 6-week-old child is brought to the emergency department with recurrent projectile, non-bilious vomiting. Based on the radiograph provided, what is the most likely diagnosis? (Q843914)

A. Annular pancreas

B. Congenital Hypertrophic Pyloric Stenosis

C. Duodenal atresia

D. Meckel’s diverticulum



Correct Answer: B. Congenital Hypertrophic Pyloric Stenosis

Explanation: Correct Option B - Congenital Hypertrophic Pyloric Stenosis: The given radiograph shows an elongated and thickened pylorus, and the clinical presentation suggests congenital hypertrophic pyloric stenosis. Incorrect Options: Option A - Annular pancreas: The annular pancreas will present with non-bilious vomiting and is associated with Down's syndrome and Duodenal atresia, but the radiograph is suggestive of CHPS. Option C - Duodenal atresia: Duodenal atresia will present with bilious vomiting and show a double bubble sign. Option D - Meckel’s diverticulum: In Meckel’s diverticulum, the most common presentation is bleeding, not vomiting.



↑ *Back to this question in Part A*

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Q26: A patient presents with a history of dysphagia, which is more pronounced for liquids than solids. Which radiological sign is most likely to be seen? (Q852583)

A. Rat-tail sign

B. Filling defect

C. Corkscrew esophagus

D. Apple-core lesion

Correct Answer: A. Rat-tail sign

Explanation: Dysphagia that is more pronounced for liquids than solids suggests achalasia , a motility disorder of the esophagus. Achalasia is characterized by failure of the lower esophageal sphincter (LES) to relax , leading to progressive dilation of the esophagus with tapering at the gastroesophageal junction. On barium swallow , achalasia classically shows a "Rat-tail sign" —a smooth, gradual narrowing at the distal esophagus due to the non-relaxing LES. Radiological Signs in Esophageal Disorders Radiological Sign Associated Condition Appearance Rat-tail sign (Correct Answer) Achalasia Smooth tapering of the esophagus at the LES Filling defect Esophageal tumors, strictures Irregular defect in the barium column Corkscrew esophagus Diffuse esophageal spasm (DES) Multiple non-peristaltic contractions creating a "corkscrew" pattern Apple-core lesion Esophageal or

colonic cancer Constricted lumen with irregular edges, resembling an apple core Filling defect (Option B) is incorrect because a filling defect is a non-specific radiological finding seen in conditions like oesophageal tumours, varices, or strictures . It does not typically present with dysphagia that is worse for liquids. Corkscrew oesophagus (Option C) is incorrect because it is seen in diffuse oesophageal spasm (DES) , which presents with intermittent chest pain and dysphagia for both solids and liquids , rather than a progressive pattern. Apple-core lesion (Option D) is incorrect because it is a characteristic finding in colorectal cancer , not an oesophageal disorder.



References:

Nelson Textbook of Pediatrics, 21st edition, Page 1947 Grainger and Allison's Textbook of Diagnostic Radiology, 7th edition, Page 463-465

↑ *Back to this question in Part A*

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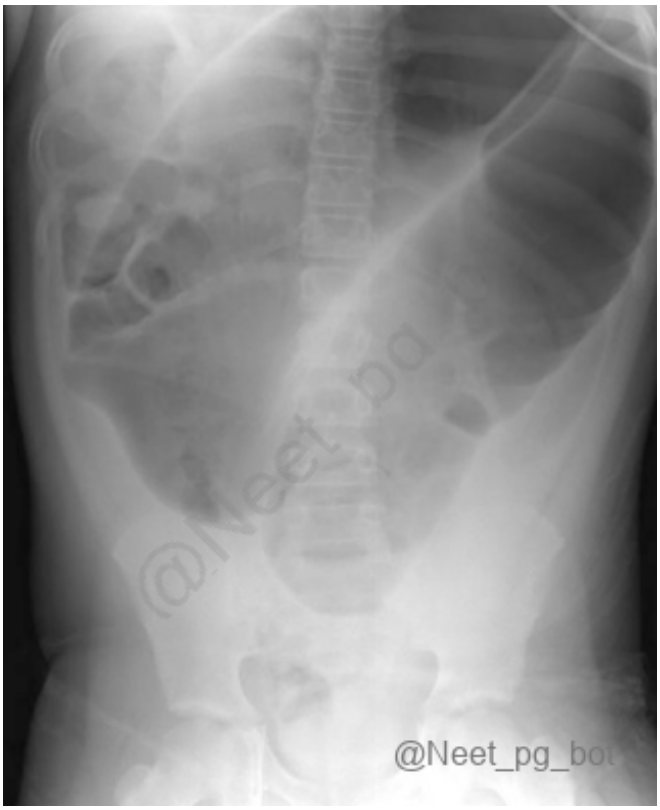
Q27: A 70-year-old patient presents with absolute constipation and abdominal distension. And the X-ray abdomen is given below. What is the most likely diagnosis? (Q852591)

A. Caecal Volvulus

B. Sigmoid Volvulus

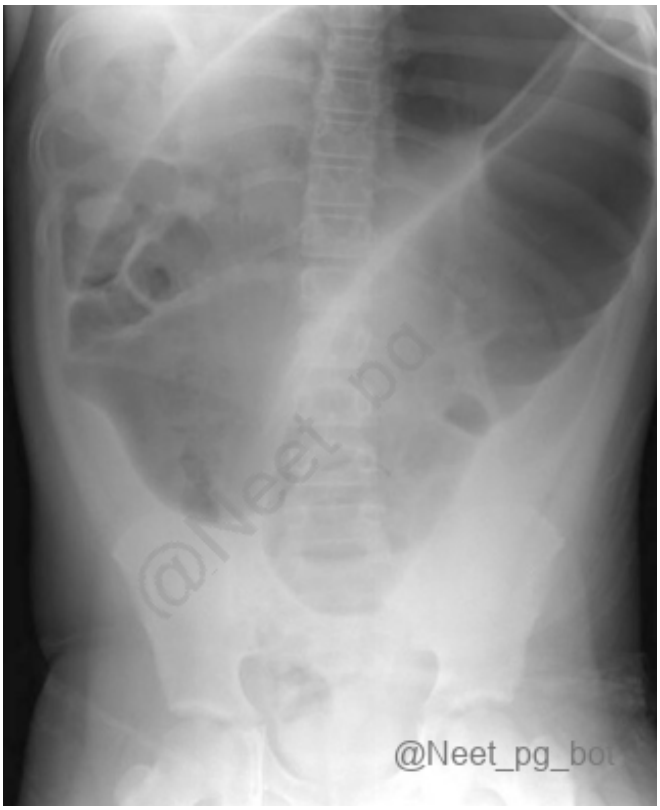
C. Intestinal Obstruction

D. Small Bowel Volvulus



Correct Answer: B. Sigmoid Volvulus

Explanation: X-ray shows a characteristic "coffee bean sign" - a large, dilated loop of bowel with an inverted U-shape, which is highly suggestive of sigmoid volvulus. Clinical presentation of absolute constipation and abdominal distension is typical of large bowel obstruction. Sigmoid volvulus is common in elderly patients, especially those with chronic constipation, neurological disorders, or bed-ridden status. The transition point is usually at the sigmoid colon, without gas in the rectum. Sigmoid Volvulus Feature Sigmoid Volvulus Etiology Chronic constipation, long redundant sigmoid colon Radiological Sign Coffee bean sign on X-ray, bird’s beak sign on contrast enema Symptoms Abdominal distension, pain, absolute constipation, vomiting Treatment Endoscopic detorsion (if no gangrene), surgery for recurrent cases Caecal Volvulus (Option A): Incorrect because caecal volvulus shows a kidney-shaped distended caecum displaced to the upper abdomen, often with small bowel dilatation. Intestinal Obstruction (Option C): Incorrect because intestinal obstruction is a broad term that includes various causes, whereas the X-ray here is specific for sigmoid volvulus. Small Bowel Volvulus (Option D): Incorrect because small bowel volvulus presents with central dilated loops with air-fluid levels rather than the classical coffee bean sign.



References:

Bailey & Love's Short Practice of Surgery- 28th Edition, Page 1293, 1380, 1383, 1385, 1390 SRB’s Manual of Surgery- 6th Edition, Page 922, 923.

↑ *Back to this question in Part A*

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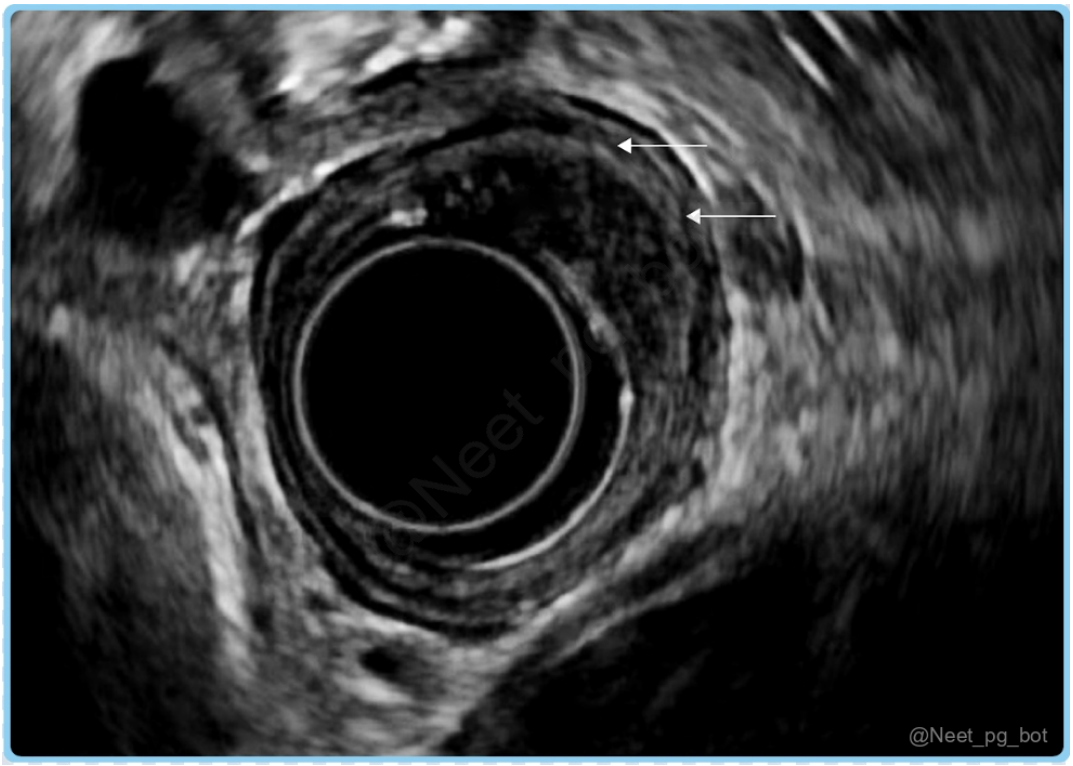
Q28: Which of the following is a primary use of this imaging modality? (Q852585)

A. Staging of esophageal cancer

B. Evaluation of gastroesophageal reflux disease (GERD)

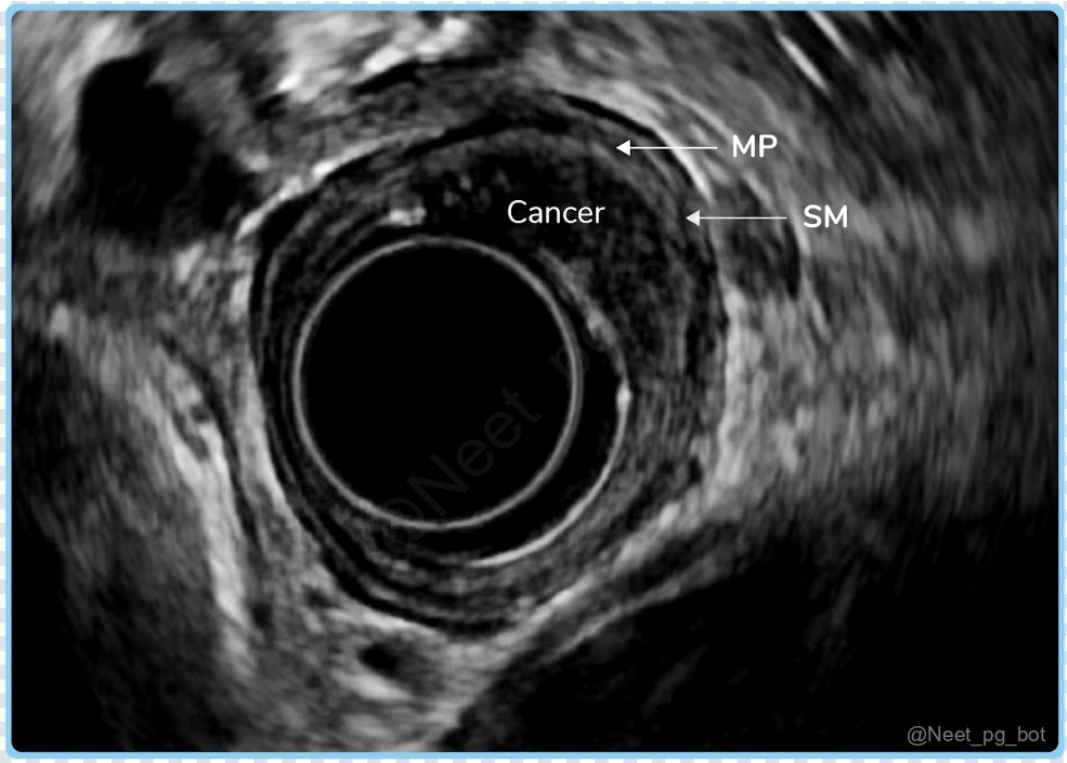
C. Identifying the cause of dysphagia

D. Assessing cardiac and aortic pathology



Correct Answer: A. Staging of esophageal cancer

Explanation: Endoscopic ultrasound (EUS) is a high-resolution imaging modality that combines endoscopy with ultrasonography to provide detailed images of the gastrointestinal (GI) wall and adjacent structures. It is primarily used for staging esophageal cancer , allowing assessment of: Depth of tumor invasion (T stage) Involvement of regional lymph nodes (N stage) Adjacent mediastinal structures EUS-guided fine-needle aspiration (FNA) can help in obtaining tissue samples from suspicious lymph nodes for accurate staging. Applications of Endoscopic Ultrasound (EUS) Application Primary Use Staging of esophageal cancer (Correct Answer) Evaluates tumor depth and lymph node involvement Pancreatic lesions Detects and biopsies pancreatic cysts, tumors, or chronic pancreatitis Subepithelial GI tumors Differentiates between leiomyomas, GISTs, and neuroendocrine tumors Biliary pathology Detects choledocholithiasis and bile duct strictures Rectal cancer staging Determines depth of invasion and lymph node involvement Evaluation of GERD (Option B): Incorrect because GERD is typically assessed with pH monitoring, manometry, or upper endoscopy , not EUS. Identifying the cause of dysphagia (Option C): Incorrect because barium swallow or esophagogastroduodenoscopy (EGD) are first-line tests; EUS is used mainly for cancer staging or assessing submucosal lesions . Assessing cardiac and aortic pathology (Option D): Incorrect because transesophageal echocardiography (TEE), not EUS , is preferred for cardiac/aortic evaluation.



References:

Bailey & Love's Short Practice of Surgery (28th Edition), Page:1135,1136,1137,1138,1139

↑ *Back to this question in Part A*

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Q29: A 26-year-old male presents with complaints of lower abdominal pain, and passage of blood mixed with stools for the past 3 months. Based on his radiological findings, what is the most likely diagnosis? (Q865267)

A. Ulcerative colitis

B. Pseudomembranous colitis

C. Crohn’s disease

D. Intestinal TB



Correct Answer: A. Ulcerative colitis

Explanation: Option A - Ulcerative Colitis (UC) - Symptoms: Lower abdominal pain: Common in UC, often colicky or cramping. Passage of blood mixed with stools: A cardinal symptom of UC, as the inflammation primarily affects the superficial mucosal lining, leading to friability and bleeding. 3 months duration: Fits the chronic, relapsing-remitting nature of IBD. 26-year-old male: UC commonly presents in young adults. Ulcerative Colitis (UC) - Xrays Loss of haustral markings ("lead pipe" or "garden hose" appearance): This is a classic sign of chronic UC due to continuous inflammation and fibrosis. Incorrect Options: Option B - Pseudomembranous Colitis (PMC) - X-rays: Often non-specific in early or mild cases. Colonic dilatation: Can be diffuse or segmental. Nodular haustral thickening / "Thumbprinting" : This is a relatively classic finding, representing prominent edema and thickening of the haustral folds, and is often more pronounced than in UC. It can also be seen in ischemic colitis. Option C - Crohn's Disease - X-rays: Often normal. Dilated loops of small bowel with air-fluid levels: Suggestive of small bowel obstruction, a common complication due to strictures. "String sign" : Severe narrowing of a segment of bowel, often the terminal ileum, appearing as a thin, continuous string of barium. This indicates a stricture. " Skip lesions ": Inflamed areas separated by normal bowel, a characteristic feature. Difficult to see on plain X-ray, more apparent on barium studies. Option D - Intestinal Tuberculosis (TB) - X-rays: Often non-specific. Ascites: Can be present, especially in peritoneal TB. Absence of gas shadows in the right iliac fossa: Due to thickened, matted bowel loops in the ileocecal region.

References:

David Sutton Textbook of Radiology and Imaging, Volume 1, 8th edition, Page 2226- 2247

↑ *Back to this question in Part A*

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• [05_Hepatobiliary Radiology] 011 Hepatobiliary And Pancreatic Radiology

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[05_Hepatobiliary Radiology] 011 Hepatobiliary And Pancreatic Radiology — Quick Jump

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Q7 (p. 1031)	*Q8 (p. 1033)*	*Q9 (p. 1037)*	*Q10 (p. 1038)*	*Q11 (p. 1039)*	*Q12 (p. 1040)*
Q13 (p. 1043)	*Q14 (p. 1043)*	*Q15 (p. 1045)*	*Q16 (p. 1046)*	*Q17 (p. 1047)*	*Q18 (p. 1049)*
Q19 (p. 1050)	*Q20 (p. 1051)*	*Q21 (p. 1054)*	*Q22 (p. 1059)*	*Q23 (p. 1061)*	*Q24 (p. 1063)*
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Q31 (p. 1083)	*Q32 (p. 1085)*	*Q33 (p. 1086)*	*Q34 (p. 1089)*	*Q35 (p. 1092)*	*Q36 (p. 1092)*

Q1: A 35 y/o woman presents with an incidental liver mass found on ultrasound. Further imaging with CT and MRI is performed, revealing a well-defined mass with a central scar which is hyperintense on T2w MRI. The lesion shows hot spot on sulphur colloid scan. Which of the following diagnoses is most likely? (Q852898)

A. Hepatic adenoma

B. Hepatocellular carcinoma

C. Focal nodular hyperplasia (FNH)

D. Fibrolamellar carcinoma (FLC)

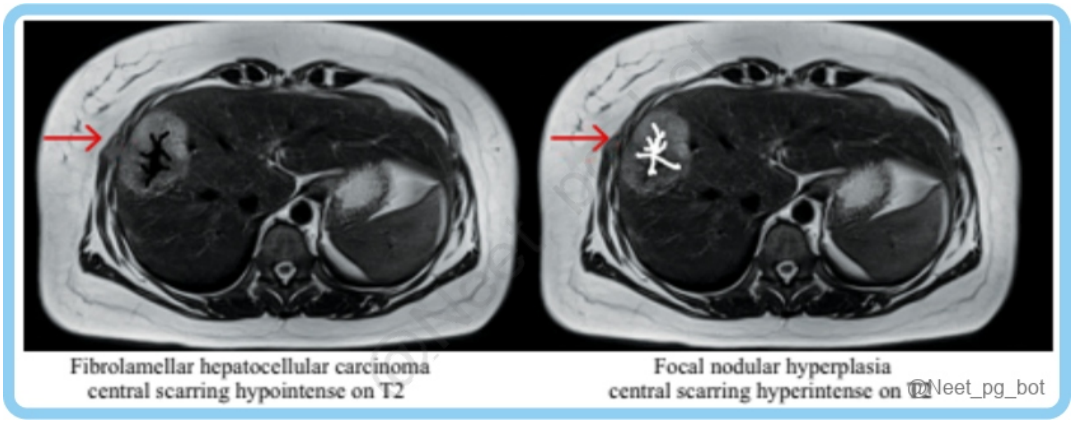
Correct Answer: C. Focal nodular hyperplasia (FNH)

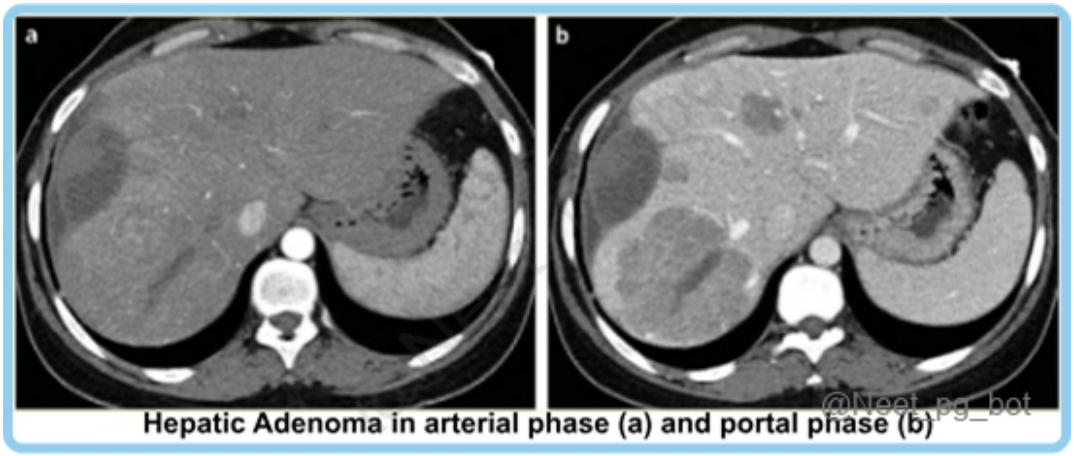
■ *Listen (English)*

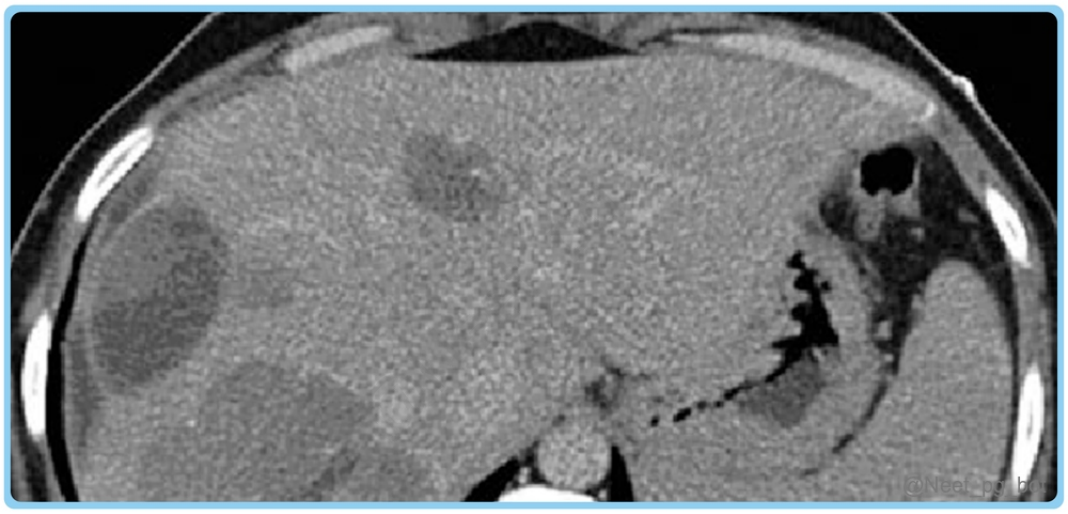
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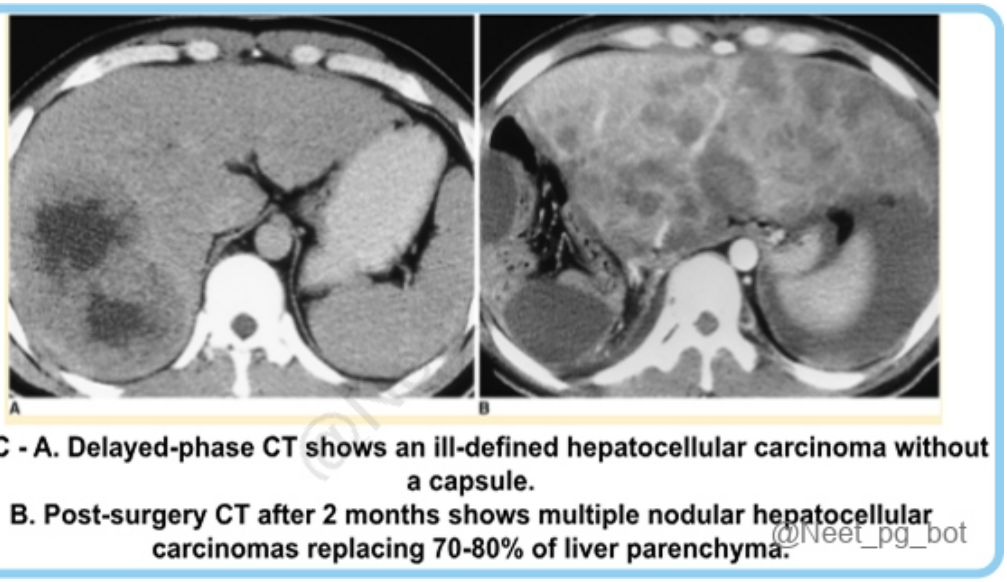
Explanation: Correct Option: C) Focal Nodular Hyperplasia FNH is a benign liver lesion commonly found in women and is characterised by a well-defined mass with a central stellate scar, which can sometimes contain calcifications. The presence of these features on imaging is highly suggestive of FNH. Radiological Comparison of Focal Nodular Hyperplasia and Fibrolamellar Carcinoma: Feature FNH FLC Ultrasound It is difficult to detect as it has similar reflectivity to the liver. Solid, hyperechoic lesions, central scar and calcification may be seen CT Well-defined lobulated mass, isoattenuating to liver parenchyma; marked homogeneous enhancement in the arterial phase with a central low-attenuation scar, mass effect visible. (Option C) Well-defined mass, often hyperattenuating; may enhance the arterial phase (Option D ruled out) MRI Isointense on T1, hyperintense on T2; central scar hypointense on T1 Hyperintense on T1 if fat-containing, significant enhancement on arterial phase. Key Differentiator Central stellate scar: Enhances on CT/MRI; no calcification Scar+ , calcification more common

Hepatic adenoma (Option A) : This is usually a hypervascular lesion without a central scar or calcifications.
Hepatocellular carcinoma (Option B) : Although it can present with heterogeneity and arterial phase enhancement, a central scar with calcifications is not characteristic.









HCC - A. Delayed-phase CT shows an ill-defined hepatocellular carcinoma without a capsule.
B. Post-surgery CT after 2 months shows multiple nodular hepatocellular carcinomas replacing 70-80% of liver parenchyma.

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References:

Grainger & Allison's Diagnostic Radiology, 7th Edition, Page 616, 618, 633

↑ *Back to this question in Part A*

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Q2: A 48-year-old man presents with a sudden onset of severe epigastric pain radiating to the back, associated with repeated vomiting. The pain worsens after meals and is partially relieved by leaning forward. X-ray findings are shown below. What is the most likely diagnosis? (Q887943)

A. Large bowel obstruction

B. Acute pancreatitis

C. Sigmoid volvulus

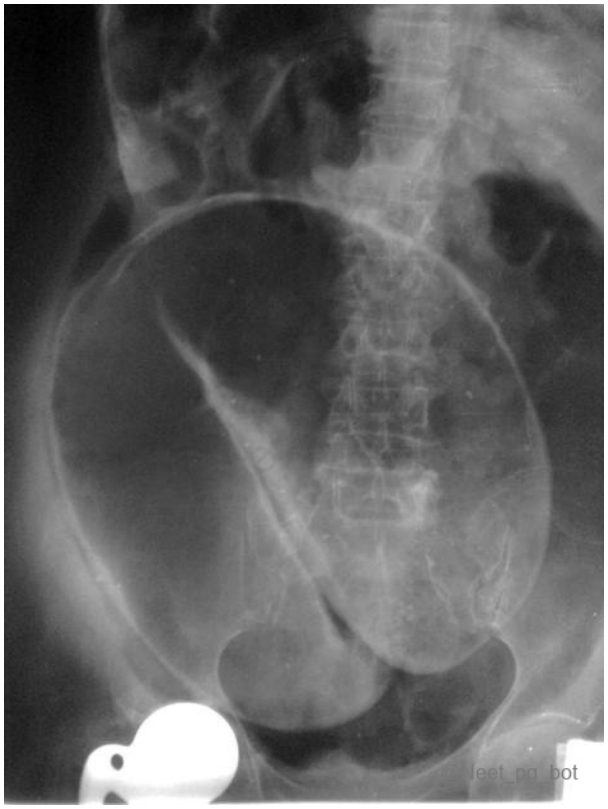
D. Diverticulitis



Correct Answer: B. Acute pancreatitis

Explanation: The above clinical features and an erect abdominal X-ray showing a colon cut-off sign in a patient with an acute abdomen are suggestive of acute pancreatitis . The colon cut-off sign refers to the sudden cessation of gas in the colon, typically at the splenic flexure . In acute pancreatitis, inflammation spreads from the pancreas to the transverse mesocolon and phrenicocolic ligament , leading to functional spasm of the splenic flexure , producing this characteristic radiographic appearance. Although initially described on plain radiographs, this sign can also be seen on contrast studies and CT. Acute pancreatitis: Acute inflammatory condition of the pancreas due to premature activation of pancreatic enzymes . Most common causes: Gallstones and alcohol . Clinical Features Sudden, severe epigastric pain radiating to the back . Associated with nausea and vomiting . Pain is relieved by sitting forward . Pathophysiology Inflammation spreads to adjacent tissues. Causes localised paralytic ileus of the transverse colon near the splenic flexure. Large bowel obstruction (Option A): Shows generalised colonic dilatation with multiple air-fluid levels extending up to the site of obstruction, rather than abrupt gas cut-off at the splenic flexure. Sigmoid volvulus (Option C): Characterised by a massively dilated sigmoid colon with a classic coffee-bean or inverted U sign , usually arising from the pelvis. Diverticulitis (Option D): Primarily a CT diagnosis; plain X-ray findings are nonspecific and do not show a colon cut-off sign.





References:

Bailey & Love's Short Practice of Surgery, 28th Edition, Page 1272.

↑ *Back to this question in Part A*

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Q3: A 60 y/o man presents with recurrent abdominal pain and jaundice. A CT abdomen reveals a "sausage-shaped" pancreas and long segmental pancreatic duct strictures. What is the most likely diagnosis? (Q852915)

A. Chronic pancreatitis

B. Autoimmune pancreatitis

C. Necrotizing pancreatitis

D. Pancreatic pseudocyst



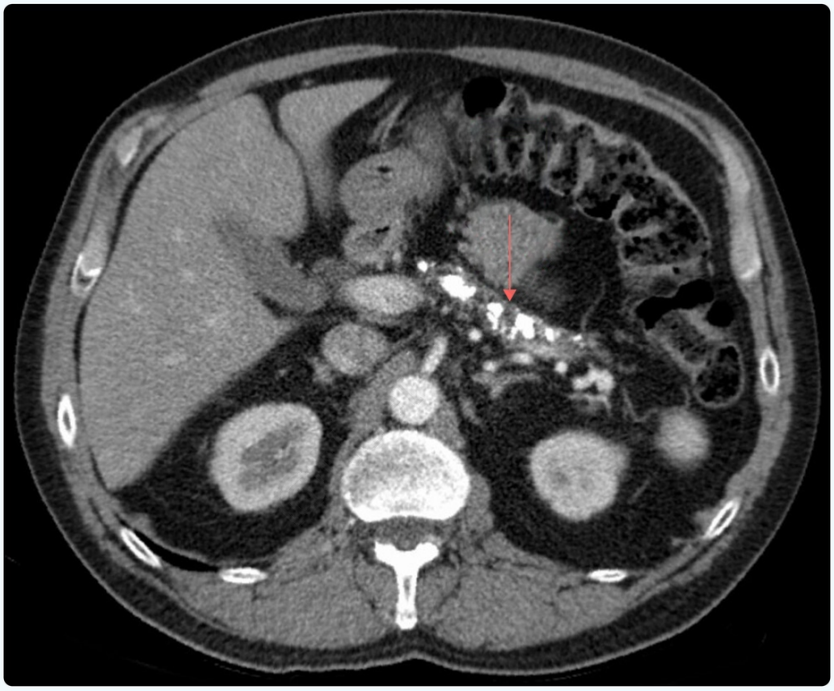
Correct Answer: B. Autoimmune pancreatitis

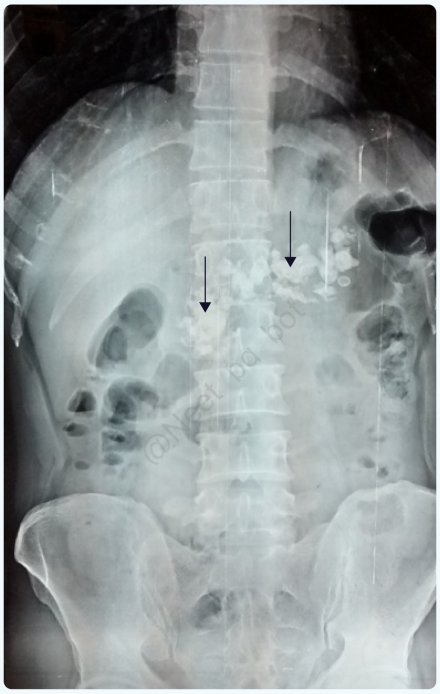
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Explanation: The hallmark "sausage-shaped" pancreas on imaging is a key finding in autoimmune pancreatitis, along with long segmental ductal strictures. The pancreas may appear diffusely enlarged, and ductal strictures without significant calcification or atrophy help differentiate this from chronic pancreatitis. Imaging Modality Chronic pancreatitis Autoimmune Pancreatitis CT scan • Calcifications within the pancreas. • Pancreatic atrophy

with dilated ductal system. • Irregularities or strictures of the pancreatic duct. • Diffuse pancreatic enlargement (" sausage-shaped " appearance). • Homogeneous delayed enhancement of the pancreas. • Capsule-like rim of low density, suggesting peripancreatic inflammation or fibrosis. • Ductal narrowing or strictures MRCP • Characteristic " chain of lakes " appearance due to alternating strictures and dilatation of the pancreatic duct. Chronic pancreatitis (Option A) typically shows ductal dilations and calcifications, but the "sausage-shaped" pancreas is more specific for autoimmune pancreatitis. Necrotising pancreatitis (Option C) is usually associated with severe acute inflammation, necrosis, and fluid collections, not strictures. Pancreatic pseudocyst (Option D) refers to a fluid collection following pancreatitis but does not cause "sausage-shaped" pancreatic enlargement or strictures.





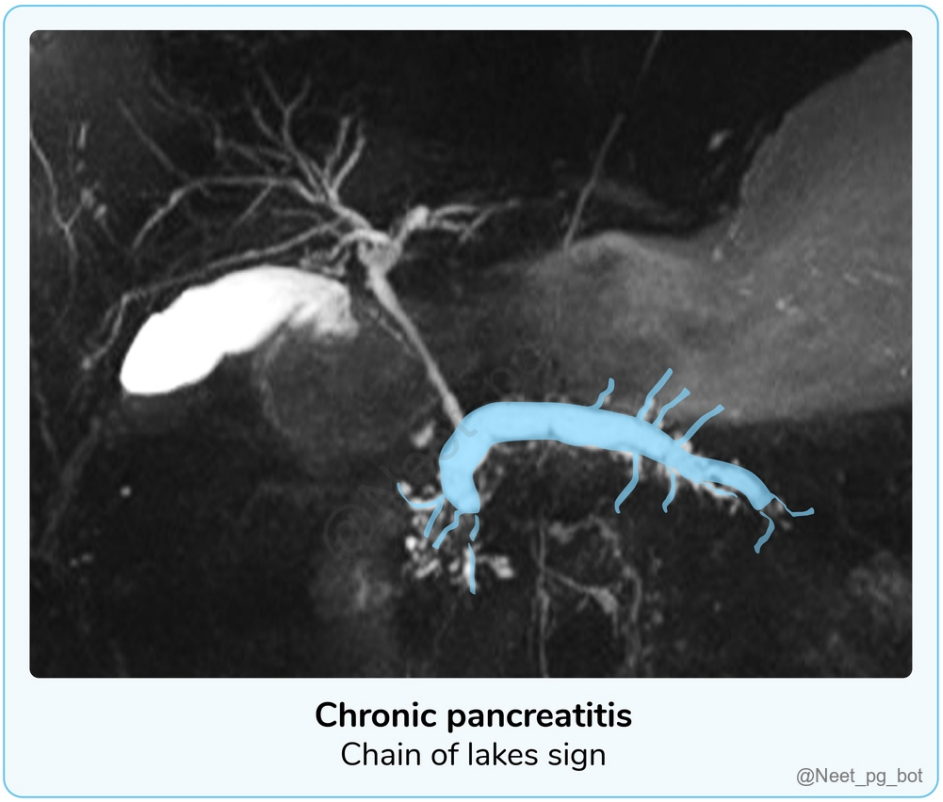
Multiple coarse calcifications visible on X-ray

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CT abdomen with contrast demonstrating a diffusely enlarged, hypoattenuating pancreas with a capsule-like rim

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References:

Grainger and Allison's Diagnostic Radiology, 7th Edition, Page 690,692,694,698

Textbook of Radiology and Imaging, David Sutton, 8th Edition, Volume 1, Page 2735-2742

↑ *Back to this question in Part A*

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Q4: A 62-year-old male presents with painless progressive jaundice and a palpable gallbladder. Contrast-enhanced CT shows a hypoattenuating, ill-defined mass in the pancreatic head, with simultaneous dilation of the common bile duct and pancreatic duct. What is the most likely radiological sign indicated, and the probable diagnosis? (Q852925)

A. Corkscrew sign- Cholangiocarcinoma

B. Double duct sign - Carcinoma of the head of pancreas

C. Apple core lesion- Duodenal carcinoma

D. Inverted umbrella sign - Ampullary carcinoma

Correct Answer: B. Double duct sign - Carcinoma of the head of pancreas

Explanation: Double duct sign is classic for pancreatic head carcinoma and involves simultaneous dilation of both the common bile duct and the pancreatic duct. The presence of a hypoattenuating ill-defined mass in the pancreatic head , with Courvoisier sign (palpable gallbladder + painless jaundice) supports this. Most characteristic imaging modality: CECT . Radiological Features: Carcinoma of Pancreatic Head vs Periampullary Carcinoma vs Pancreatic Adenocarcinoma: Feature Carcinoma of Pancreatic Head Periampullary Carcinoma Pancreatic Adenocarcinoma (PDAC) Imaging Modality CECT, MRI/MRCP CECT, MRI/MRCP, EUS CECT, MRI, EUS Typical CT/MRI Look Hypoattenuating, ill-defined; T1/T2 hypointense; double duct, inverted 3 sign Variable: hypoattenuating mass, ductal dilatation if ampullary Ill-defined hypoattenuating mass; double duct sign if head Distinctive Signs Double duct, inverted 3 sign, Courvoisier sign, duct cutoff, distal atrophy Double duct sign, duct dilatation (if ampullary/head) Double duct sign, duct cutoff, distal atrophy Vessel Involvement Frequent; SMA, SMV, portal vein invasion assessed Considered if head or ampulla involved Frequent; SMA, SMV, portal vein involvement assessed EUS Utility Detects small lesions, guides biopsy, evaluates nodes Same as left column Same as left column Common Metastases Liver, peritoneum, lung Liver, peritoneum, lung (if invasive) Liver, peritoneum, lung Imaging Highlights and Features by Tumor Type Carcinoma of the Head of Pancreas Double duct sign: Simultaneous dilation of bile and pancreatic ducts. Inverted "3" sign: Duodenal wall indentation seen on barium study. Courvoisier sign: Enlarged, painless gallbladder with jaundice. CT/MRI findings: Poorly defined hypoattenuating lesion; low T1/T2 signal. Other signs: Abrupt duct cutoff, distal gland atrophy. Periampullary Carcinoma Anatomic range: Tumors at ampulla, distal CBD, duodenum, and sometimes pancreatic head. Imaging variability: May resemble pancreatic head tumors if arising nearby. Important findings: Double duct sign (ampullary/head), duct dilatation depending on site. EUS role: Especially useful for ampullary and small tumors. Pancreatic Ductal Adenocarcinoma (PDAC) Location: Anywhere in the pancreas (commonly head). Imaging: Hypoattenuating mass with duct obstruction and atrophy. MRI: Ill-defined, low T1/T2 signal, poor enhancement. Signs (if in head): Double duct, abrupt cutoff, distal atrophy. Metastatic spread: Liver, peritoneum, lung. Corkscrew sign - Cholangiocarcinoma (Option A): Incorrect because corkscrew appearance refers to twisted bile ducts, seen in sclerosing cholangitis , not associated with double duct sign or pancreatic head mass. Apple core lesion - Duodenal carcinoma (Option C): Incorrect because apple core lesions indicate constrictive colonic or duodenal growth, not ductal dilatation. Inverted umbrella sign- Ampullary carcinoma (Option D): Incorrect as this is not a recognized or standard radiological sign for ampullary carcinoma. Ampullary carcinoma may cause double duct sign but is less commonly associated with a palpable gallbladder.

References:

https://pmc.ncbi.nlm.nih.gov/articles/PMC7183518/

https://pmc.ncbi.nlm.nih.gov/articles/PMC3461371/

https://pmc.ncbi.nlm.nih.gov/articles/PMC10887967/

Textbook of Radiology and Imaging, David Sutton, 8th Edition, Volume 1, Page 2745-2748,2753

↑ *Back to this question in Part A*

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Q5: A 55 y/o perimenopausal woman presents with vague abdominal pain. A CT scan of the abdomen reveals a large, multilocular cystic lesion in the tail of the pancreas with thick septations and peripheral calcifications. Lab results show elevated CEA levels. What is the most likely diagnosis? (Q852926)

A. Pseudocyst

B. Mucinous Cystic Neoplasm (MCN)

C. Serous Cystic Neoplasm (SCN)

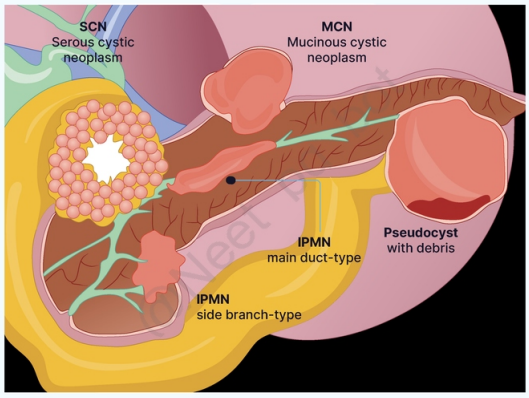
D. Intraductal Papillary Mucinous Neoplasm (IPMN)

Correct Answer: B. Mucinous Cystic Neoplasm (MCN)

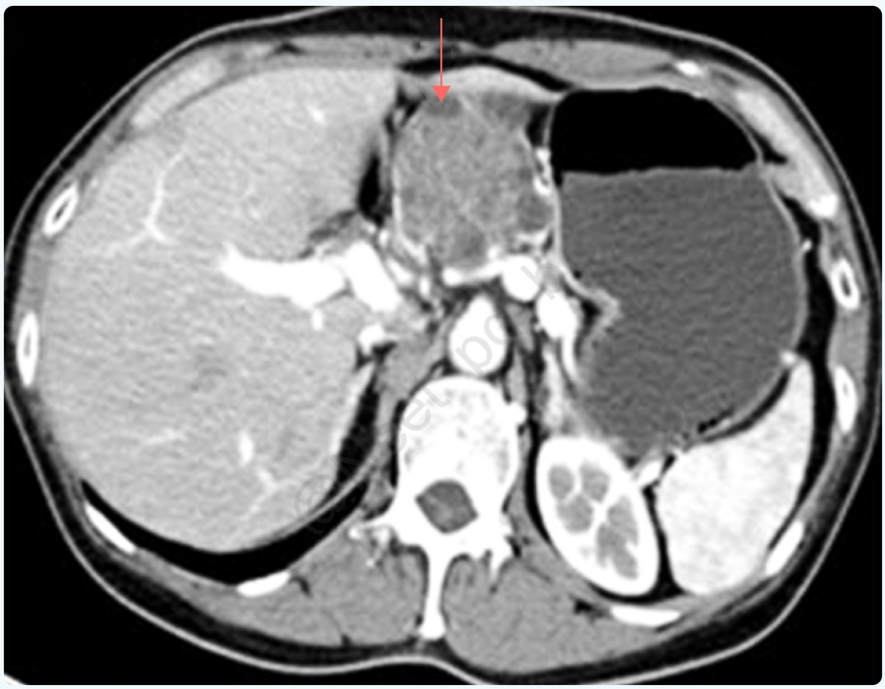
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■ *Listen (Hindi)*

Explanation: Mucinous Cystic Neoplasm (MCN) is correct as it presents as a large, multilocular cystic mass in the pancreatic tail with malignant potential, common in perimenopausal women. Cystic Pancreatic Lesions Pseudocysts • Fluid contains high amylase • Post-inflammatory, non-neoplastic. Serous Cystic Neoplasm (SCN) • Common Site: Head of the pancreas. • Imaging Features : Multiple small cysts, sometimes with central scar calcification.Honeycomb pattern, possible stellate scar. • Benign : Rarely malignant. • Common in : Older women in their 6-s-70s - hence called grandmother tumour. Mucinous Cystic Neoplasm (MCN) • Common Site: Tail of the pancreas. • Imaging Features : Large, multilocular, thick septations, peripheral calcifications, and sometimes solid components. • Risk : Malignant transformation • Common in : Perimenopausal women (40-60 years-Mother tumour.) Intraductal Papillary Mucinous Neoplasm (IPMN) • Types : Main duct, branch duct, mixed. • Common Site: Ductal origin—main duct or branch duct. • Risk : Higher malignancy risk in main duct type. • Main duct IPMNs : Show cystic dilatation of the main duct, enhancing mural nodules , and viscid mucus causing obstruction. • Protruding ampulla of Vater-Fish mouth appearance Solid Pseudopapillary Tumor (SPT) : • Imaging Features : Large, encapsulated, solid and cystic mass, often with haemorrhage &necrosis. • Demographics : Young women (Daughter tumour), particularly in Asian and African-American populations.

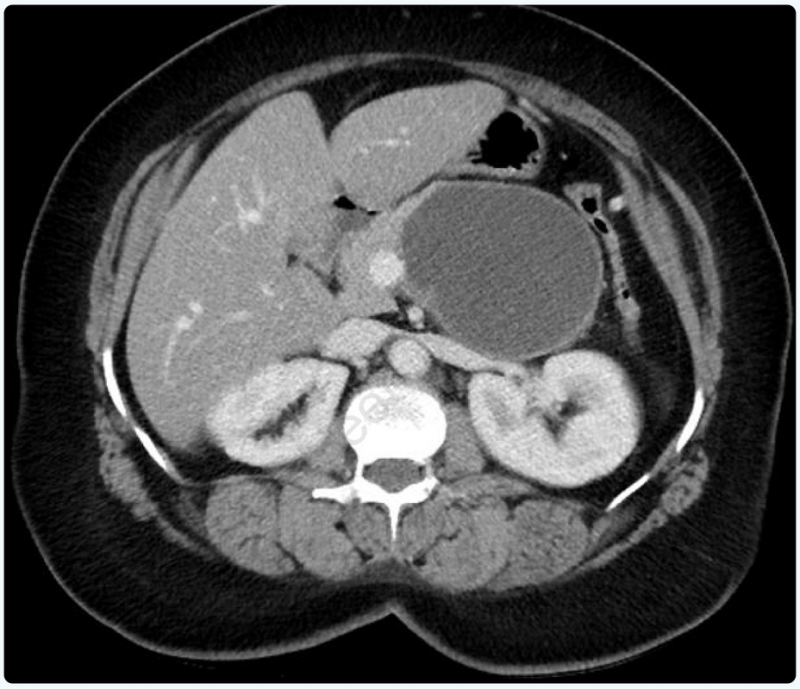


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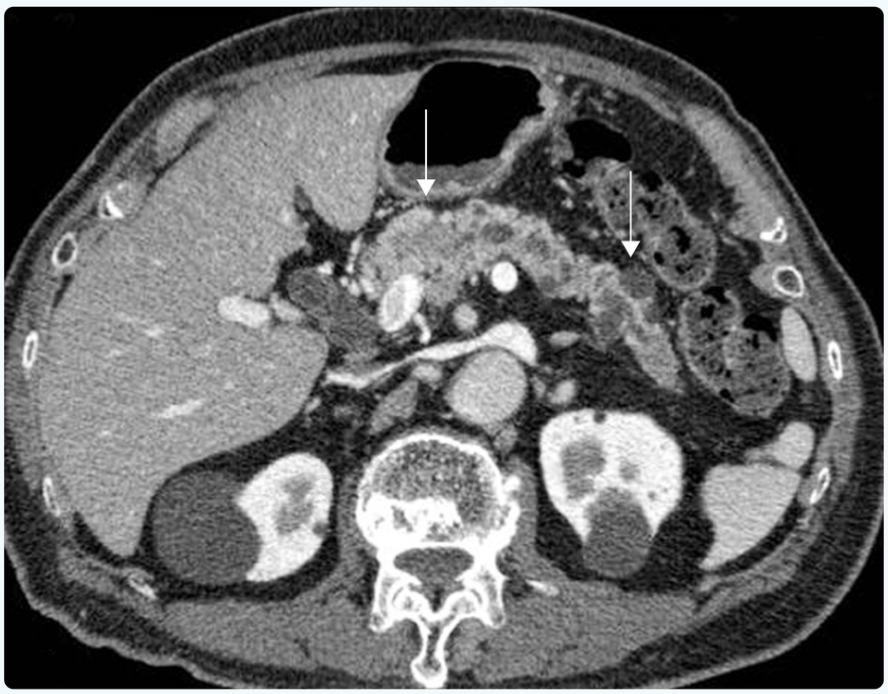
CT showing Serous Cystic Neoplasm (SCN)

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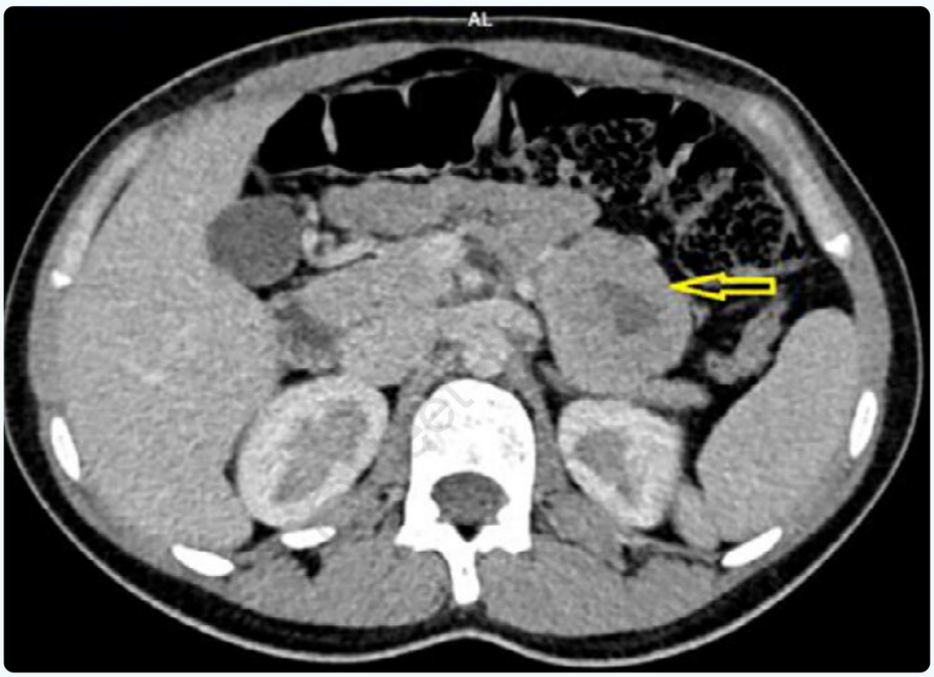
CT showing Mucinous Cystic Neoplasm (MCN)

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Intraductal Papillary Mucinous Neoplasm (IPMN)

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CT showing Solid Pseudopapillary Tumor (Arrow)

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References:

Grainger and Allison's Diagnostic Radiology, 7th Edition, Page 707,708,711,713

Textbook of Radiology and Imaging, David Sutton, 8th Edition, Volume 1, Page 2762-2769

www.ncbi.nlm.nih.gov/pmc/articles/PMC3959499/

link.springer.com/article/10.1007/s00261-019-02266-y

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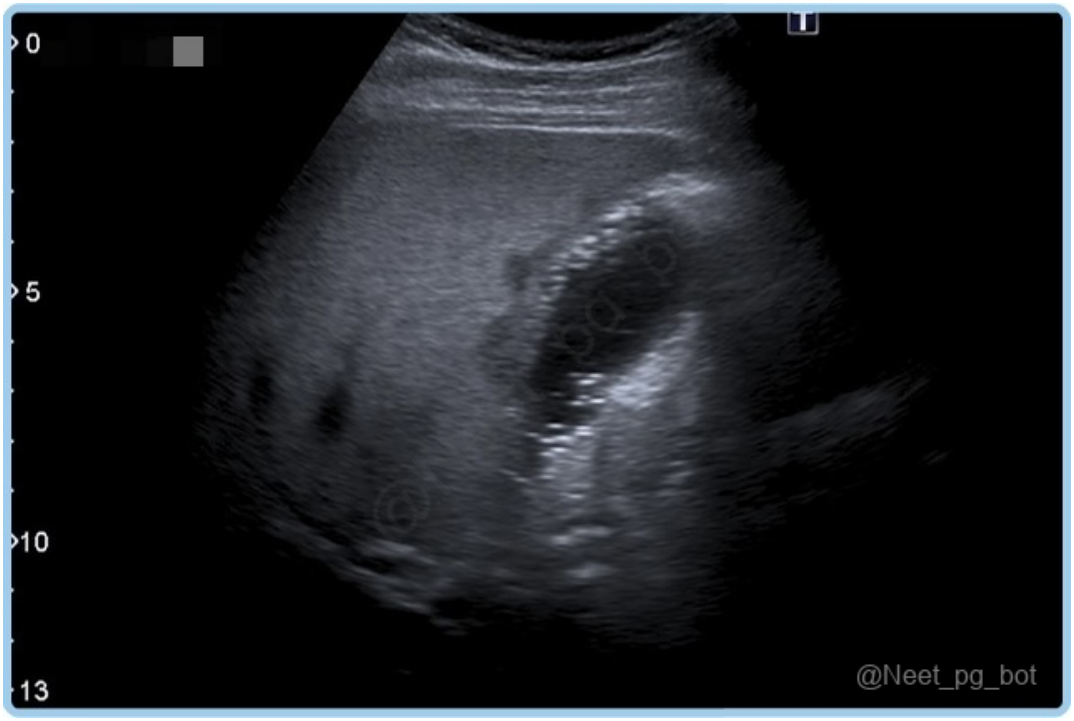
Q6: A 65 y/o diabetic male presents with severe right upper quadrant pain, fever, and signs of sepsis. A USG reveals highly echogenic reflectors with dirty shadowing and ring-down artefacts in the gallbladder. Subsequent CT imaging demonstrates gas within the gallbladder wall and pneumoperitoneum. What is the most likely diagnosis? (Q852927)

A. Chronic cholecystitis

B. Acute calculous cholecystitis

C. Emphysematous cholecystitis

D. Gallbladder adenocarcinoma

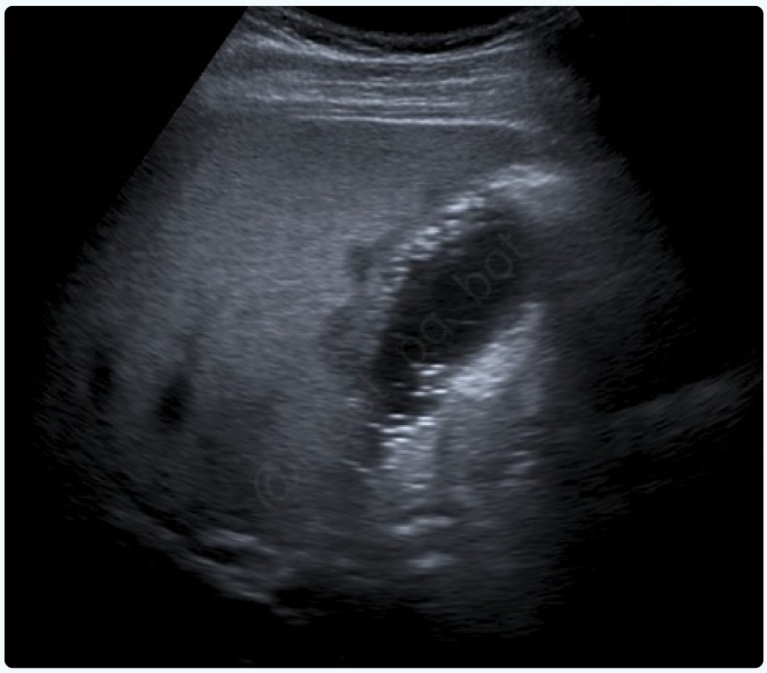


Correct Answer: C. Emphysematous cholecystitis

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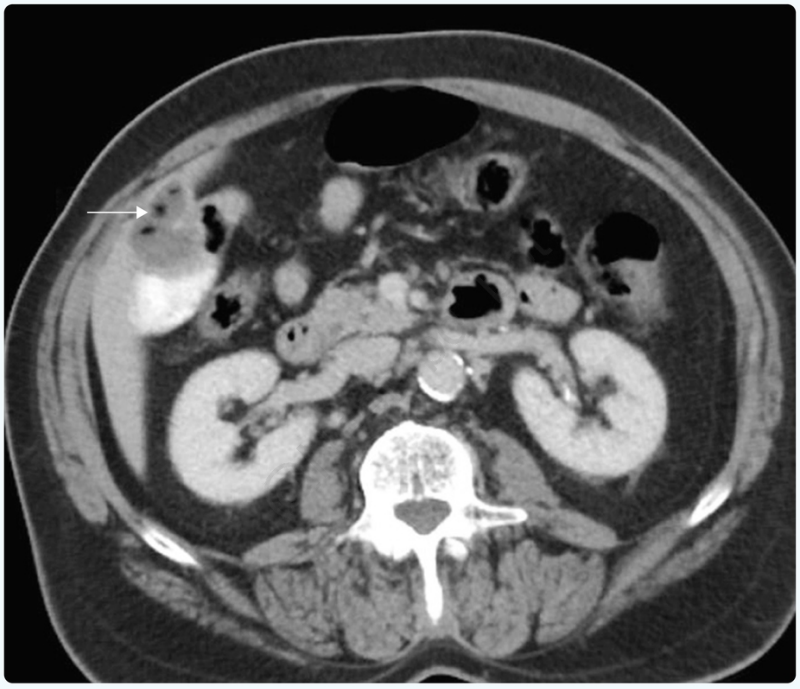
■ *Listen (Hindi)*

Explanation: The patient’s presentation, gas in the gallbladder wall, and pneumoperitoneum on CT are hallmark findings of emphysematous cholecystitis, especially in a diabetic patient with high sepsis risk. Emphysematous Cholecystitis Definition : A rare, severe form of acute cholecystitis with gallbladder wall necrosis causing gas formation within the lumen or wall; surgical emergency due to high risk of gangrene and perforation. Radiographic Diagnosis : Air detected in the gallbladder wall or bile ducts without any abnormal communication to the GI tract. Ultrasound Features : Highly echogenic reflectors with low-level posterior shadowing and reverberation artefact (dirty shadowing and ring-down artefact). Champagne Sign : Pathognomonic sign showing non-shadowing echogenic foci rising from the dependent portion of the gallbladder, resembling bubbles in champagne. CT Imaging : The most sensitive and specific modality for detecting gas within the gallbladder wall or lumen. Pneumoperitoneum on CT suggests gallbladder perforation. Chronic cholecystitis (Option A) and Acute calculous Cholecystitis (Option B) are less likely as they do not usually feature gas in the gallbladder wall or pneumoperitoneum. Gallbladder Adenocarcinoma (Option D) is unlikely since gallbladder adenocarcinoma rarely presents with intramural gas or signs of acute infection.



USG showing Champagne sign

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CT showing air bubbles in gallbladder (Arrow)

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References:

radiopaedia.org/articles/emphysematous-cholecystitis

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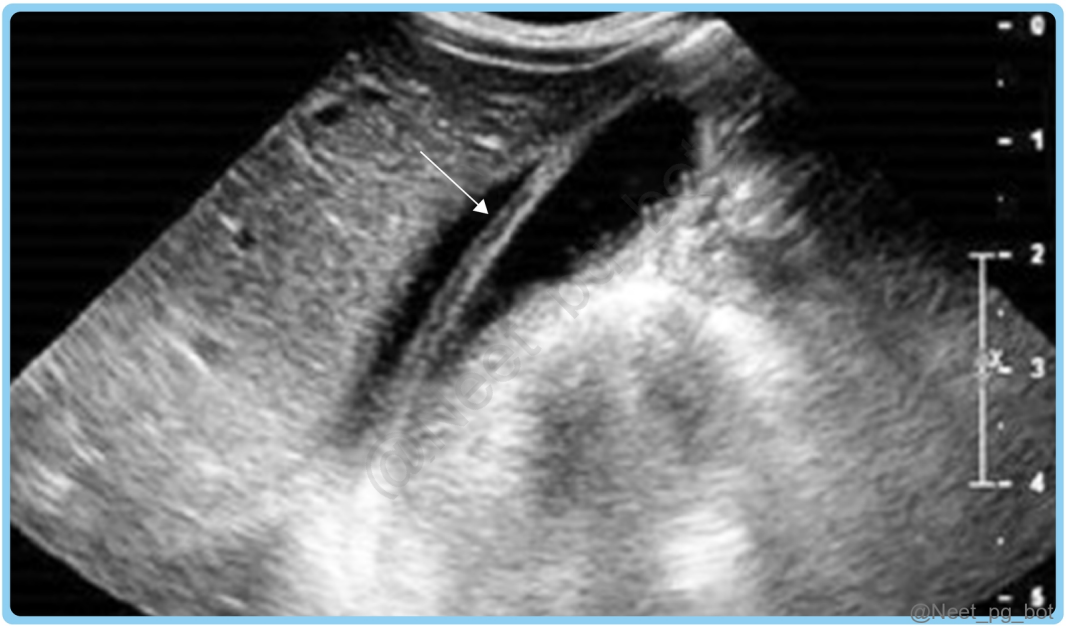
Q7: A 35 y/o woman from a rural area presents with severe right upper quadrant pain, fever, and jaundice. She reports intermittent episodes of abdominal discomfort. Laboratory tests reveal an elevated bilirubin level, and an ultrasound shows a long, echogenic structure within the common bile duct with a hypoechoic centre. What imaging modality is preferred for non-invasively confirming the diagnosis? (Q852942)

A. Fluoroscopy

B. CT

C. MRCP

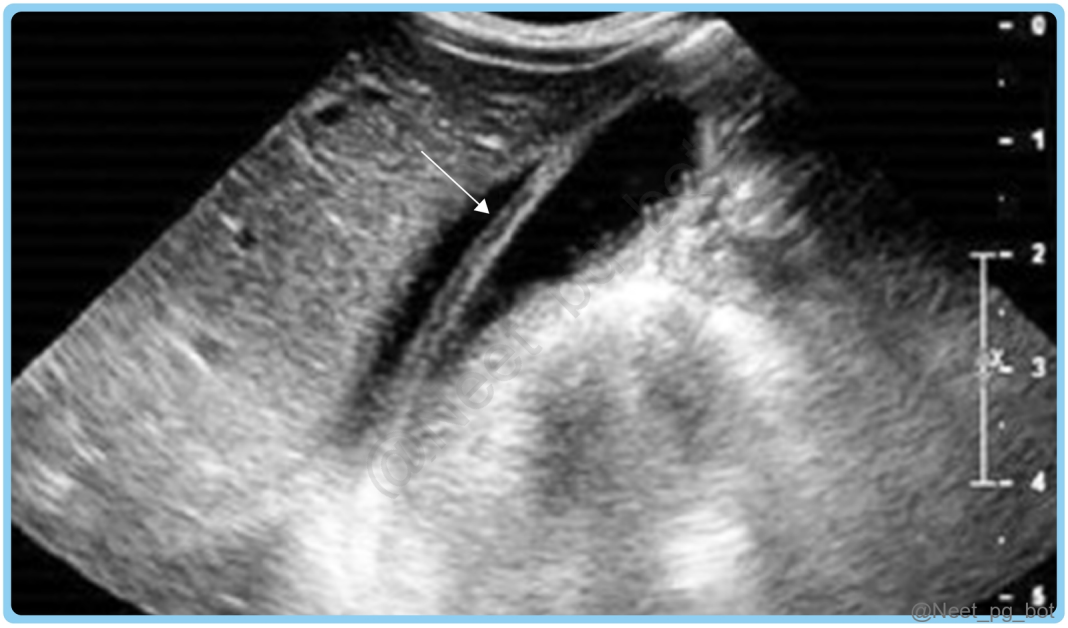
D. ERCP

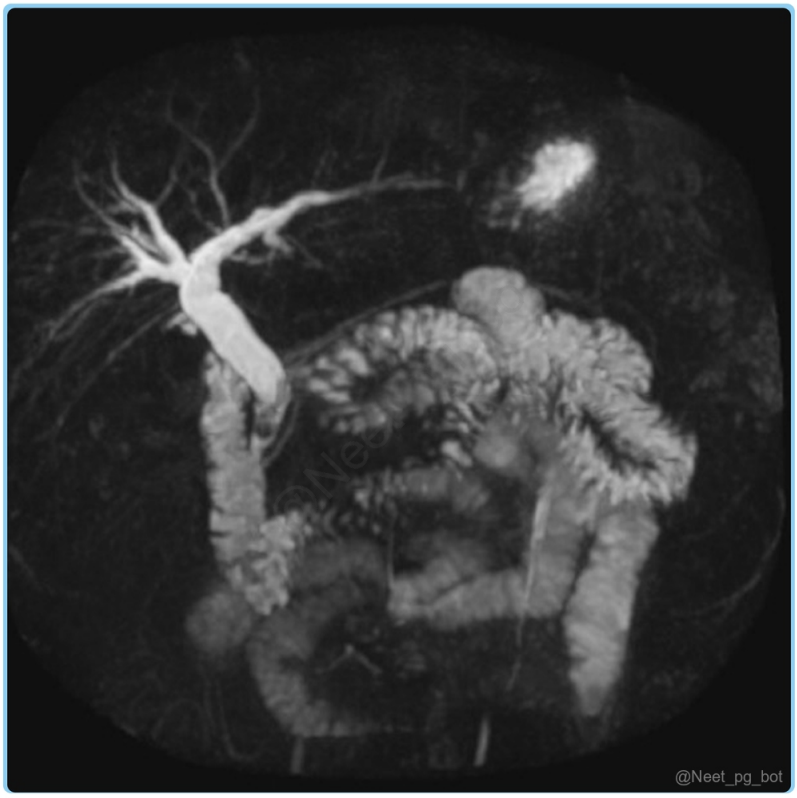


Correct Answer: C. MRCP

Explanation: MRCP is correct because it non-invasively identifies the worm as a hypointense structure in the hyperintense CBD, with the distinctive "three-line sign" on 3T MRI. Biliary Ascariasis Common helminthic infection from Ascaris lumbricoides affects about 1 billion people worldwide. Fluoroscopy: The worm appears as a longitudinal or curved filling defect in the intestinal lumen during contrast studies. Ultrasonography: Shows a long, hyperechoic structure with a central hypoechoic line within the liver. CT Imaging: Dilated CBD with a curved, hyperdense structure (worm) showing central hypodensity; appears as a filling defect in the contrast-filled intestinal lumen. MRCP: Preferred non-invasive method; worm appears hypointense within hyperintense CBD.

"Three line sign" on 3T MRI confirms the diagnosis. ERCP: Gold standard but invasive; used both for diagnosis and CBD worm extraction. USG showing ascaris in gallbladder MRCP shows a “three-line” appearance in the dilated common bile duct (arrows), filing defect in the dilated cystic duct (arrow) and ascites (arrowheads). Fluoroscopy (Option A): While it can identify the worm as a filling defect in the intestine, it is less commonly used for biliary ascariasis specifically. CT (Option B) may show a dilated CBD with the worm as a hyperdense structure but lacks the non-invasive specificity of MRCP for biliary duct visualization. ERCP (Option D) is the gold standard for both diagnosis and treatment but is invasive and usually reserved for therapeutic intervention.





References:

Biliary ascariasis

↑ *Back to this question in Part A*

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Q8: A 55-year-old male with a history of chronic hepatitis presents with abdominal discomfort. Ultrasound shows a heterogeneous liver mass with a "nodule-in-nodule" appearance. CT reveals a hypervascular lesion with mosaic enhancement and washout on delayed phases. MRI demonstrates decreased T1 and increased T2 signal intensities with late arterial enhancement. Based on the imaging findings, what is the most likely diagnosis? (Q852943)

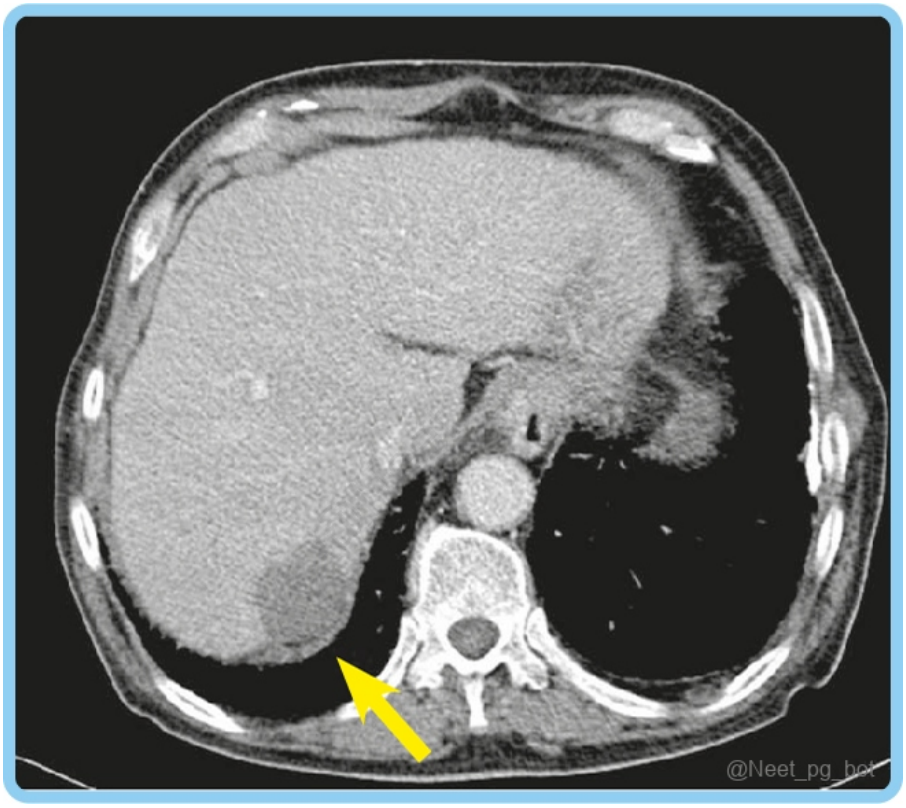
A. Focal Nodular Hyperplasia (FNH)

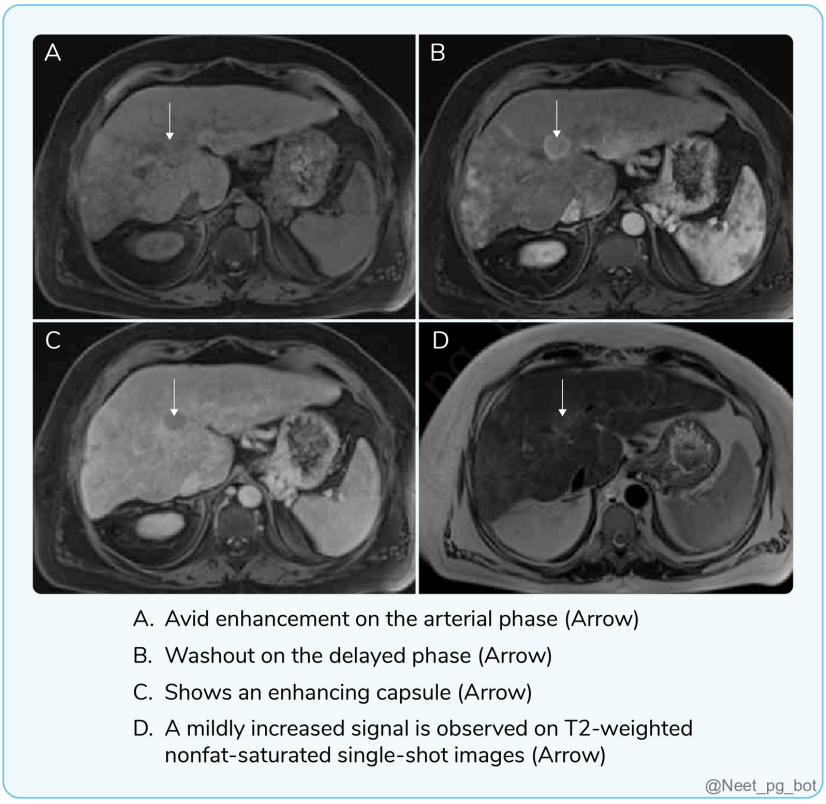
B. Hepatocellular Carcinoma (HCC)

C. Hepatic Adenoma

D. Metastatic Liver Disease





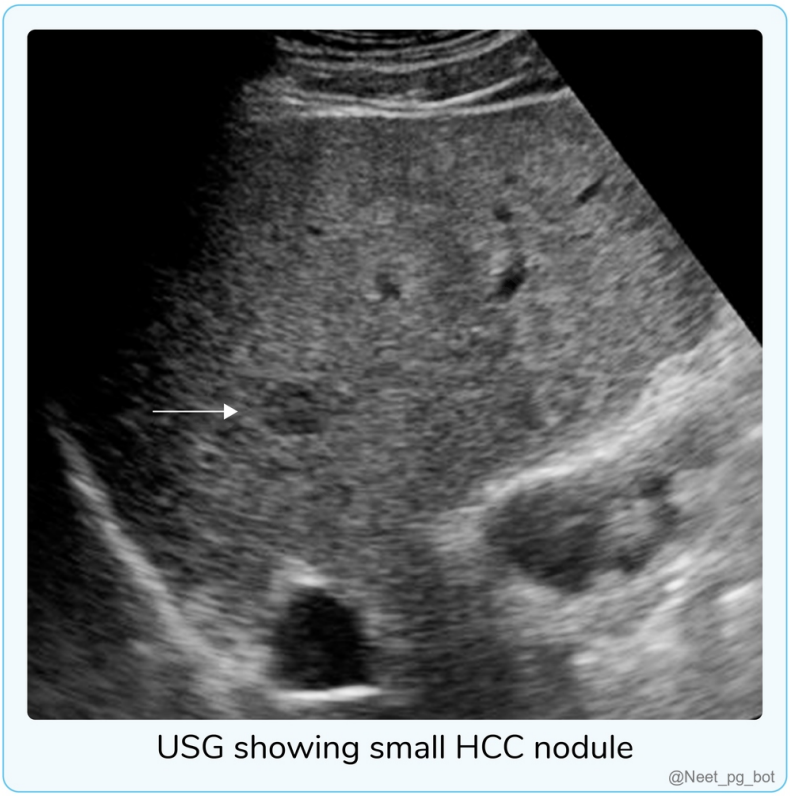


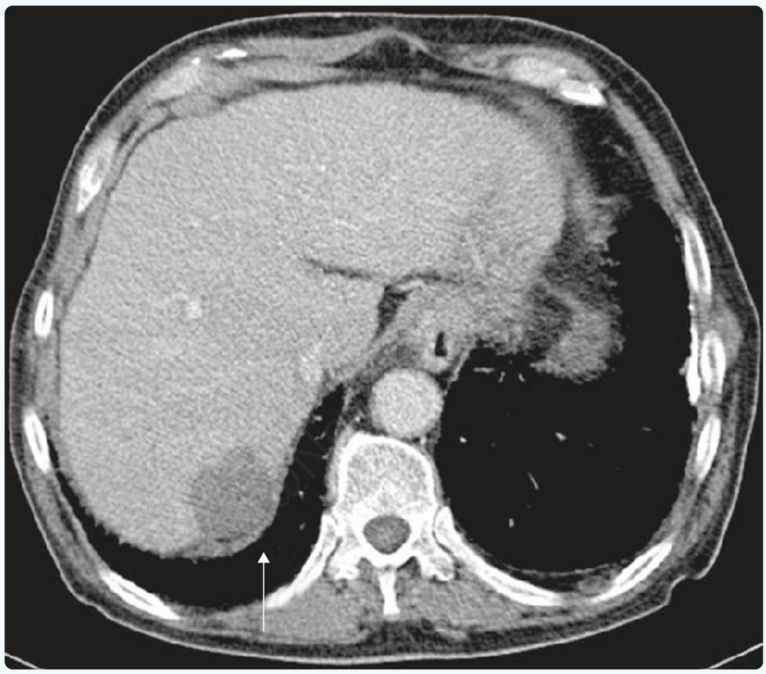
Correct Answer: B. Hepatocellular Carcinoma (HCC)

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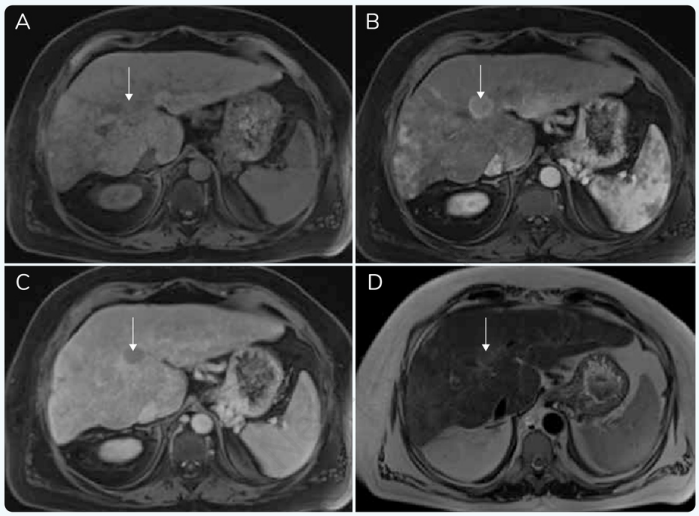
Explanation: The imaging findings of a hypervascular liver lesion with mosaic enhancement, washout on delayed phases, and characteristic "nodule-in-nodule" appearance are strongly indicative of HCC. Hepatocellular Carcinoma (HCC) Radiographic Features Ultrasound (USG) CT MRI • Heterogeneous mass appearance. • May display a "nodule-in-nodule" pattern. • Hypervascular with mosaic enhancement. • Washout of contrast observed in the portal venous or delayed phases. • T1: Decreased signal intensity. • T2: Increased signal intensity. • Contrast Phases: ■ Late arterial phase: Hyperenhancement. ■ Portal venous/delayed phase: Washout, indicating malignancy. Focal Nodular Hyperplasia (FNH) (Option A): FNH typically shows a central scar and does not exhibit the washout pattern seen in HCC, distinguishing it from the described imaging findings. Hepatic Adenoma (Option C): Hepatic adenomas usually appear as hypervascular lesions but lack the mosaic pattern and washout phases distinctive of HCC. Metastatic Liver Disease (Option D): Liver metastases commonly show peripheral rim enhancement rather than the described central hyperenhancement and washout pattern, which is more typical of HCC.





CT scan of hepatocellular carcinoma
in right lobe of the liver (Arrow)

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MRI

A. Avid enhancement on the arterial phase (Arrow)
B. Washout on the delayed phase (Arrow)
C. Shows an enhancing capsule (Arrow)
D. A mildly increased signal is observed on T2-weighted nonfat-saturated single-shot images (Arrow)

All these features are characteristic of HCC

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References:

Grainger & Allison’s Diagnostic Radiology, 7th Edition, Page 628, 629

↑ *Back to this question in Part A*

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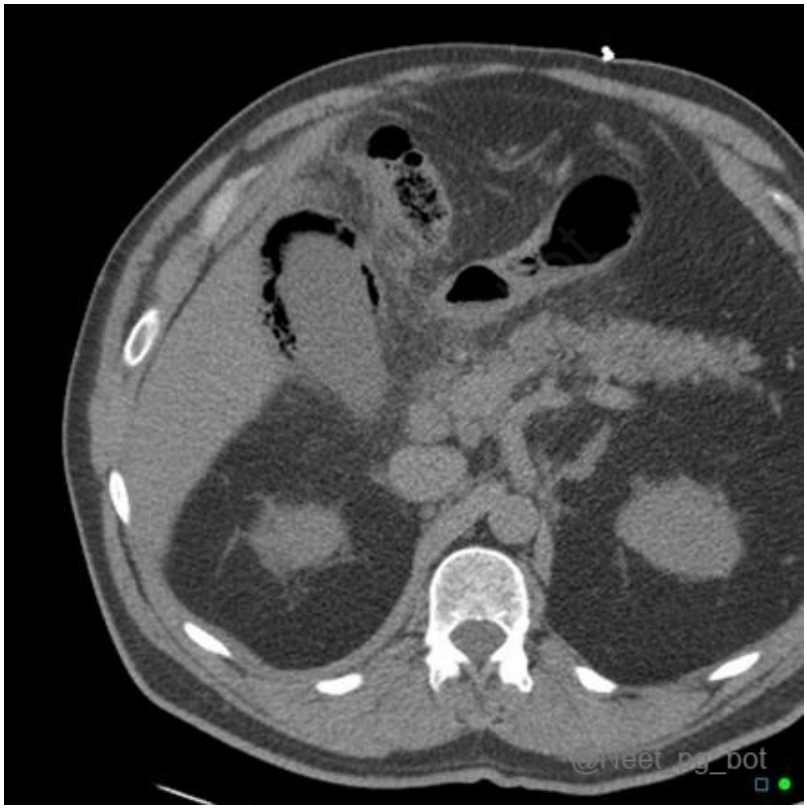
Q9: A patient presents with acute right upper quadrant pain and systemic toxicity. CT abdomen shows air within the gallbladder wall without evidence of biliary-enteric communication. What is the most likely diagnosis? (Q887937)

A. Acute pancreatitis

B. Emphysematous cholecystitis

C. Choledocholithiasis

D. Calculous cholecystitis



Correct Answer: B. Emphysematous cholecystitis

Explanation: The presence of air within the gallbladder wall on CT is diagnostic of emphysematous cholecystitis , a rare but life-threatening variant of acute cholecystitis. Etiology: It occurs due to ischemia and necrosis of the gallbladder wall , followed by infection with gas-forming organisms such as Clostridium perfringens and E. coli. Risk factors : This condition is classically seen in elderly patients and diabetics Complications: High risk of gangrene, perforation, and sepsis Treatment: Emergency cholecystectomy with broad-spectrum intravenous

antibiotics. Acute pancreatitis (Option A): CT shows pancreatic enlargement, peripancreatic fat stranding, and fluid collections. Gas in the gallbladder wall is not a feature . Choledocholithiasis (Option C): Characterised by stones in the common bile duct with biliary dilatation. Intramural gallbladder gas is absent . Calculous cholecystitis (Option D): Results from cystic duct obstruction by gallstones. Imaging may show gallstones and wall thickening, but air in the gallbladder wall is not seen .

References:

https://www.ncbi.nlm.nih.gov/books/NBK448099/

↑ *Back to this question in Part A*

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Q10: A neonate presents with persistent jaundice and pale stools since birth. Ultrasound abdomen shows an echogenic triangular structure anterior to the right portal vein at the porta hepatis. What is the most likely diagnosis? (Q887941)

A. Galactosemia

B. Hemangioma

C. Biliary atresia

D. Caroli’s disease

Correct Answer: C. Biliary atresia

Explanation: The ultrasound finding described represents the triangular cord sign , which corresponds to a fibrous remnant of the obliterated extrahepatic bile duct . This sign is highly suggestive of biliary atresia , a progressive obliterative cholangiopathy affecting both intrahepatic and extrahepatic bile ducts. Biliary atresia commonly presents with persistent neonatal jaundice, clay-colored stools, and hepatomegaly . If left untreated, it rapidly progresses to biliary cirrhosis, portal hypertension, and liver failure . Ultrasound may show an absent or hypoplastic gallbladder along with the triangular cord sign. Early diagnosis is critical, as timely Kasai portoenterostomy improves survival. Galactosemia (Option A): A metabolic disorder presenting with jaundice, hepatomegaly, and hypoglycemia. Imaging does not show biliary ductal abnormalities or the triangular cord sign. Hemangioma (Option B): A vascular liver lesion that appears as a well-defined hyperechoic mass on ultrasound. It does not cause biliary obstruction or fibrotic changes at the porta hepatis. Caroli’s disease (Option D): A congenital disorder characterised by segmental dilatation of intrahepatic bile ducts , producing the central dot sign on imaging, not the triangular cord sign.



References:

Grainger & Allison's Diagnostic Radiology, 7th Edition, Pages 1838, 1839

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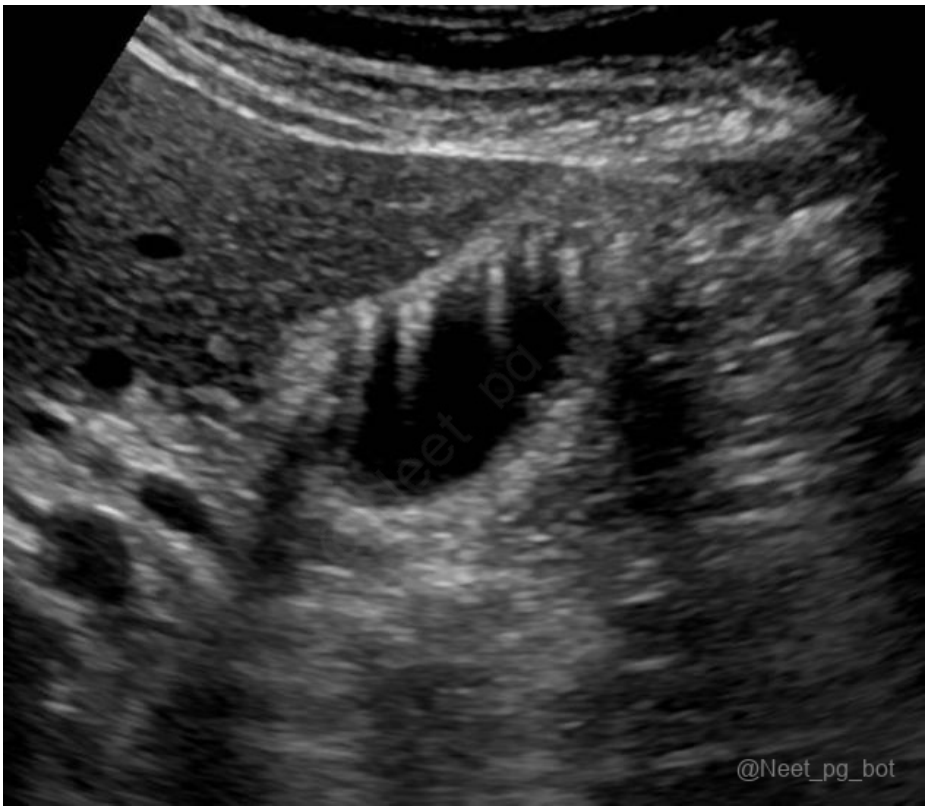
Q11: A 54-year-old man complains of episodic right upper quadrant discomfort without fever or jaundice. Ultrasound examination of the gallbladder shows localised mural thickening with intramural echogenic foci producing a comet-tail artefact. No gallstones are seen. What is the most likely diagnosis? (Q887942)

A. Porcelain gallbladder

B. Gallbladder adenomyomatosis

C. Acute calculous cholecystitis

D. Gallbladder carcinoma



Correct Answer: B. Gallbladder adenomyomatosis

Explanation: The comet-tail artefact on ultrasound is a characteristic finding of gallbladder adenomyomatosis , caused by reverberation from cholesterol crystals trapped within Rokitansky-Aschoff sinuses . These sinuses represent cystic invaginations of the mucosa into a thickened gallbladder wall. Gallbladder adenomyomatosis: Also known as adenomyomatous hyperplasia or cholecystitis glandularis proliferans , is a benign condition characterised by epithelial and smooth muscle hyperplasia. Sites: It most commonly involves the fundus of the gallbladder and is often an incidental finding, though patients may present with biliary-type pain. Benign condition ; does not require surgery unless symptomatic. Porcelain gallbladder (Option A): Characterised by calcification of the gallbladder wall . Appears as a hyperechoic rim with shadowing . Acute calculous cholecystitis (Option C): Characterised by gallbladder distension, wall thickening, pericholecystic fluid, and a positive sonographic Murphy sign, rather than ring-down artefacts. Gallbladder carcinoma (Option D): Shows an irregular mass, asymmetric wall thickening, and possible liver invasion.

References:

Grainger & Allison’s Diagnostic Radiology, 7th Edition, Pages 662, 664.

↑ *Back to this question in Part A*

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Q12: A 45 y/o woman with a history of acute pancreatitis presents with persistent abdominal pain and weight loss. A CT scan performed 5 weeks after her initial

episode shows a thick-walled fluid collection containing gas bubbles. What is the most likely diagnosis? (Q852914)

A. Pancreatic pseudocyst

B. Walled-off necrosis

C. Abscess

D. Interstitial edematous pancreatitis



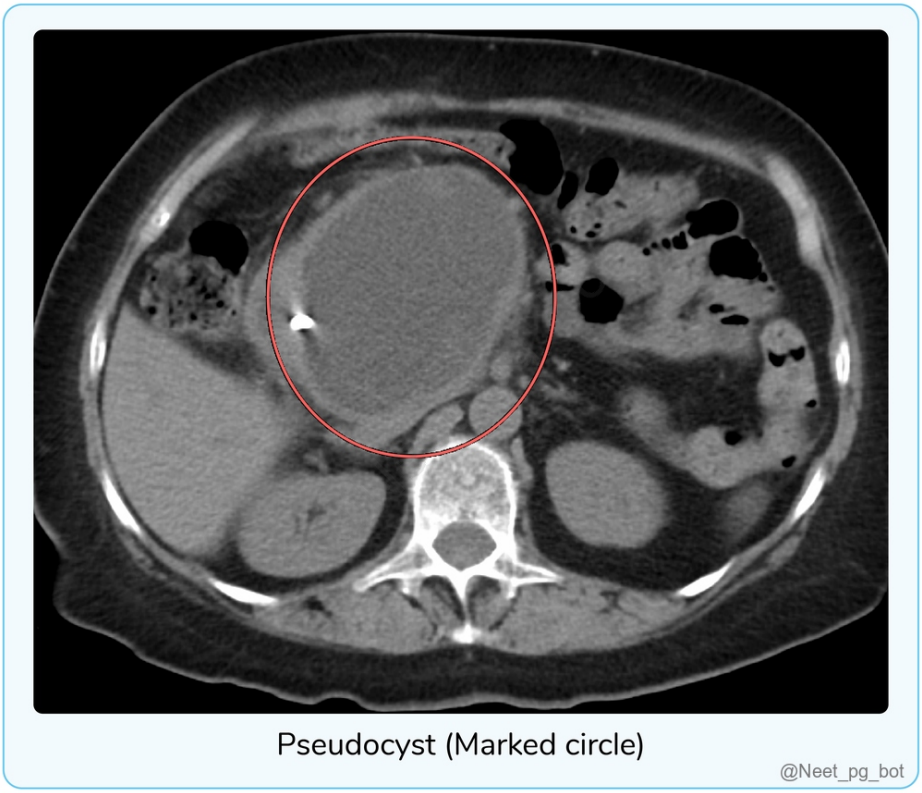
Correct Answer: B. Walled-off necrosis

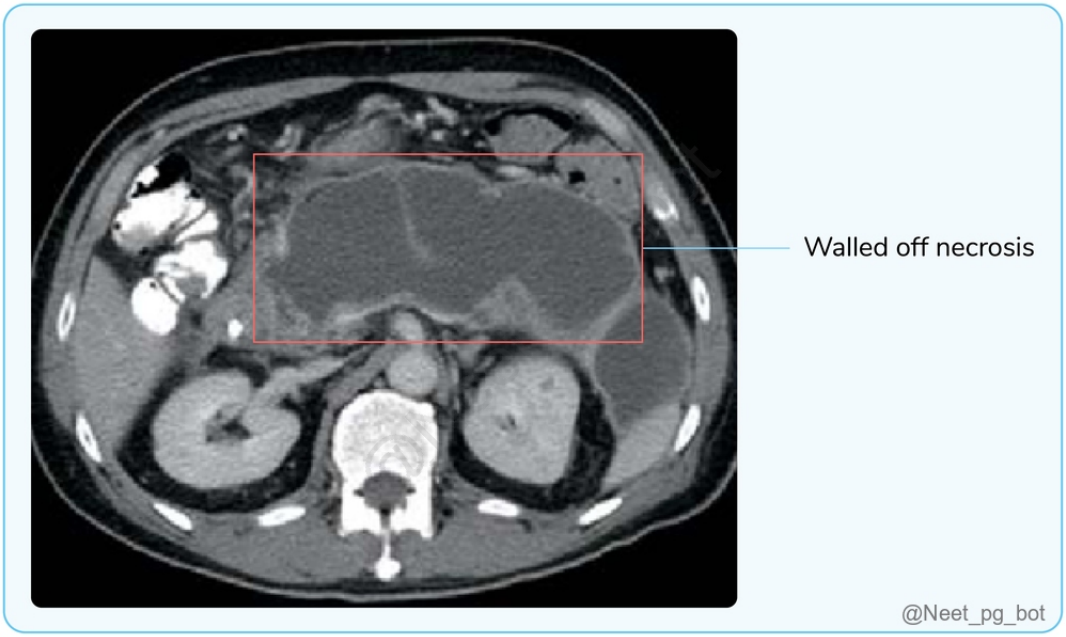
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■ *Listen (Hindi)*

Explanation: The presence of gas bubbles in a thick-walled collection indicates necrotic material, suggesting walled-off necrosis. (Option B) Feature Pseudocyst (Option A) Walled-off Necrosis (Option B) Definition Encapsulated fluid collection that develops more than 4 weeks after acute pancreatitis. Encapsulated collection of necrotic material , which develops after 4 weeks in necrotising pancreatitis Gas Presence No gas (Option A ruled out) Gas bubbles may indicate infection Location Peripancreatic space (may extend to mediastinum) Pancreatic and/or peripancreatic tissues Imaging findings Homogeneous low-attenuation fluid with capsule CT showing pseudocyst Thick-walled collection may show gas on CT CT Showing “walled off necrosis” Resolution Most resolve spontaneously. If more than 5 cm or recurrent, cystogastrostomy is done Often requires drainage or necrosectomy if infected Abscess (Option C): While an abscess may also contain gas, it is generally associated

with infection and may not specifically relate to pancreatitis. Interstitial edematous pancreatitis (Option D): This diagnosis involves swelling of the pancreas without a necrotic collection and would not explain the thick-walled fluid collection observed on the CT scan





References:

Grainger and Allison’s Diagnostic Radiology, 7th Edition, Page 686,688

Textbook of Radiology and Imaging, David Sutton, 8th Edition, Volume 1, Page 2725

www.wjols.com/doi/WJOLS/pdf/10.5005/jp-journals-10007-1024

↑ *Back to this question in Part A*

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Q13: A patient diagnosed with acute pancreatitis is being evaluated for disease severity and prognosis after initial stabilisation. Which imaging modality is most appropriate to assess pancreatic necrosis and predict outcome in this patient? (Q887948)

A. Endoscopic ultrasound (EUS)

B. Contrast-enhanced CT (CECT)

C. Magnetic resonance cholangiopancreatography (MRCP)

D. Endoscopic retrograde cholangiopancreatography (ERCP)

Correct Answer: B. Contrast-enhanced CT (CECT)

Explanation: The investigation of choice for prognostic assessment in acute pancreatitis is contrast-enhanced CT (CECT) , as it allows evaluation of pancreatic necrosis, peripancreatic collections, and complications that directly influence outcome. CECT is used to calculate the Modified CT Severity Index (MCTSI) , which incorporates the extent of pancreatic inflammation, necrosis, and extrapancreatic complications. It is the most reliable imaging modality for risk stratification and prognosis , rather than initial diagnosis. The optimal timing for CECT is after 72 hours from symptom onset, as imaging done earlier may underestimate the degree of necrosis. CECT is particularly indicated in patients with severe acute pancreatitis, organ failure, sepsis, or clinical deterioration despite treatment . Plain abdominal radiographs and an erect chest X-ray have no prognostic role and are used only to exclude differentials such as perforation or obstruction. Endoscopic ultrasound (EUS) (Option A): Useful for detecting gallstones and microlithiasis, but does not assess severity or prognosis in acute pancreatitis. MRCP (Option C): Helpful for evaluating biliary and pancreatic ductal anatomy, especially in suspected biliary pancreatitis, but not used for prognostic scoring . ERCP (Option D): Primarily a therapeutic procedure indicated in gallstone pancreatitis with cholangitis or persistent obstruction; it has no role in prognostic assessment .

References:

Grainger & Allison’s Diagnostic Radiology, 7th Edition, Pages 686-688

↑ *Back to this question in Part A*

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Q14: A patient presents with progressive painless jaundice, anorexia, and weight loss. The MRCP performed for biliary evaluation is shown below. What is the most likely diagnosis? (Q887954)

A. Choledocholithiasis

B. Chronic cholecystitis

C. Pancreatic head carcinoma

D. Primary sclerosing cholangitis



Correct Answer: C. Pancreatic head carcinoma

Explanation: The given clinical presentation with MRCP demonstrating simultaneous dilatation of the common bile duct and pancreatic duct (double duct sign) is most suggestive of carcinoma of the head of the pancreas . The double duct sign refers to the concurrent dilatation of the common bile duct and the pancreatic duct , indicating an obstructing lesion at or near the pancreatic head or ampulla . On MRCP, additional findings such as dilatation of pancreatic duct side branches further support a malignant obstructive process , commonly pancreatic head carcinoma. Pancreatic head carcinoma typically presents with painless obstructive jaundice, anorexia, weight loss, and pruritus . As an anatomical sign, the double duct sign can be visualised on ultrasound, CT, MRI, MRCP, and ERCP , but MRCP provides excellent non-invasive ductal delineation. Choledocholithiasis (Option A): An impacted distal CBD stone can occasionally cause a double duct appearance due to oedema, but pancreatic duct side-branch dilatation and progressive painless jaundice favour malignancy. Chronic cholecystitis (Option B): Primarily a gallbladder disease associated with wall thickening and gallstones; it does not cause pancreatic duct

dilatation or a double duct sign. Primary sclerosing cholangitis (Option D): Characterised by multifocal strictures and a beaded appearance of intra- and extrahepatic bile ducts, not by isolated double duct dilatation.

References:

Grainger & Allison's Diagnostic Radiology, 7th Edition, Page 666

↑ *Back to this question in Part A*

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Q15: A middle-aged man presents with progressive weight loss, anorexia, and upper abdominal discomfort. A barium meal study of the patient is given below. What is the most likely diagnosis? (Q887956)

A. Malignant duodenal ulcer

B. Crohn's disease

C. Carcinoma of the pylorus

D. Carcinoma head of the pancreas



Correct Answer: D. Carcinoma head of the pancreas

Explanation: The clinical features of anorexia and weight loss, combined with a barium study showing widening of the duodenal loop with the inverted "3 sign" (Frostberg sign) , are characteristic of carcinoma of the head of the pancreas . Pancreatic ductal adenocarcinoma most commonly arises from the head of the pancreas . On barium

examination, a pancreatic head mass causes external compression and oedema of the medial wall of the second part of the duodenum , leading to effacement of mucosal folds and the classic Frostberg's inverted "3" sign . This may also be associated with widening of the duodenal C-loop . Clinically, pancreatic head carcinoma often presents with weight loss, anorexia, abdominal pain , and early biliary obstruction with jaundice due to proximity to the common bile duct. Malignant duodenal ulcer (Option A): Typically shows an irregular ulcer crater with mucosal destruction on barium study rather than smooth extrinsic compression or C-loop widening. Crohn's disease (Option B): Involves skip lesions, string sign, and mucosal ulceration, commonly affecting the terminal ileum rather than producing an inverted "3" sign in the duodenum. Carcinoma of the pylorus (Option C): Causes gastric outlet obstruction with pyloric narrowing and delayed gastric emptying, not medial duodenal wall compression.

References:

Grainger & Allison's Diagnostic Radiology, 7th Edition, Page 714

↑ *Back to this question in Part A*

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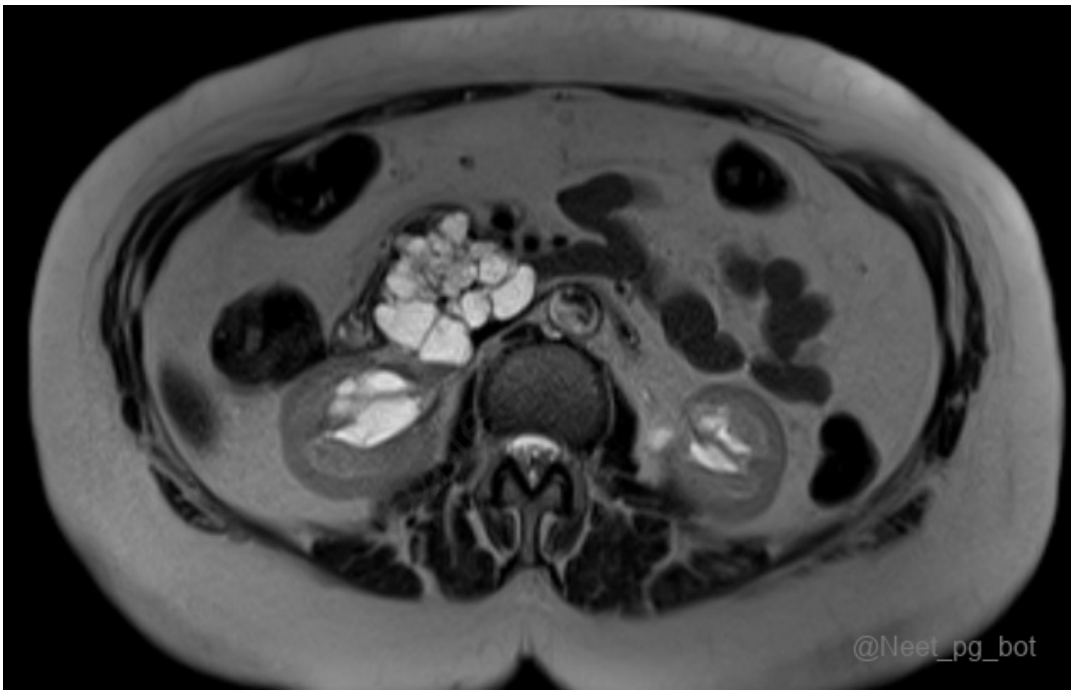
Q16: A contrast-enhanced CT abdomen of a patient is given below. Which diagnosis best fits this imaging description? (Q887960)

A. Serous cystadenoma of the pancreas

B. Pancreatic adenocarcinoma

C. Adenosquamous carcinoma

D. Mucinous cystadenocarcinoma



Correct Answer: A. Serous cystadenoma of the pancreas

Explanation: The presence of a spongy or microcystic pancreatic mass with a central sunburst (stellate) calcification on CT is characteristic of a serous cystadenoma of the pancreas , a benign cystic neoplasm. Serous cystadenoma typically appears on CT as a multicystic, lobulated lesion , often described as a “bunch of grapes” , most commonly involving the pancreatic head . A central fibrous scar may be present, which can show stellate or sunburst calcification in approximately 20% of cases. The lesion enhances due to its vascular septae, helping differentiate it from other cystic pancreatic tumours. These tumours are usually benign, slow-growing, and often incidentally detected. Pancreatic adenocarcinoma (Option B): Typically presents as a solid hypodense mass with pancreatic ductal dilatation and vascular encasement; cystic spongy appearance and central calcification are not features. Adenosquamous carcinoma (Option C): An aggressive variant of pancreatic carcinoma presenting as a solid infiltrative mass without a microcystic or sunburst calcification pattern. Mucinous cystadenocarcinoma (Option D): Usually a unilocular or macrocystic lesion with thick walls and peripheral calcification, most commonly in the pancreatic body or tail, not central stellate calcification.

References:

https://radiopaedia.org/articles/serous-cystadenoma-of-the-pancreas-1

↑ *Back to this question in Part A*

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Q17: A child presents with jaundice and intermittent right upper quadrant abdominal pain. Contrast-enhanced CT abdomen of the patient is given below. What is the most likely diagnosis? (Q887961)

A. Caroli’s disease

B. Hepatoma

C. Hydatid cyst

D. Hepatic hemangioma



Correct Answer: A. Caroli’s disease

Explanation: The above clinical scenario with CT imaging demonstrating the central dot sign is characteristic of Caroli’s disease . The central dot sign represents an enhancing fibrovascular bundle containing portal vein radicles , seen centrally within a focally dilated intrahepatic bile duct , producing a dot-in-cyst appearance on contrast CT. Caroli’s disease is a congenital disorder of intrahepatic bile ducts , leading to non-obstructive saccular or fusiform dilatation. Patients typically present in childhood with recurrent abdominal pain, jaundice, and cholangitis . CT and MRCP are key imaging modalities for diagnosis. Hepatoma (Option B): Usually appears as a solid enhancing hepatic mass with arterial hyperenhancement and washout, not cystic bile duct dilatation. Hydatid cyst (Option C): Shows well-defined cysts with daughter cysts, calcified walls, or water-lily sign; does not show a central enhancing dot. Hepatic hemangioma (Option D): Classically demonstrates peripheral nodular enhancement with centripetal fill-in on contrast imaging, without bile duct involvement.

References:

Grainger & Allison’s Diagnostic Radiology, 7th Edition, Page 673

↑ *Back to this question in Part A*

Q18: A young female patient with a history of long-term oral contraceptive use undergoes abdominal imaging that is given below. What is the most likely diagnosis? (Q887974)

A. Hepatic hemangioma

B. Hepatic adenoma

C. Metastatic liver deposits

D. Hepatocellular carcinoma



Correct Answer: B. Hepatic adenoma

Explanation: The above clinical scenario with imaging findings points towards the diagnosis of hepatic adenoma . Hepatic adenoma is a benign liver tumour strongly associated with oral contraceptive use , particularly in young women of reproductive age. Estrogen exposure plays a key role in its pathogenesis, leading to hepatocellular proliferation. On imaging, hepatic adenomas typically appear as well-circumscribed lesions , often solitary, and may show heterogeneous attenuation or signal intensity due to intralesional fat, haemorrhage, or necrosis. They are usually hypervascular in the arterial phase and may show washout on delayed phases. These lesions carry a risk of

spontaneous haemorrhage and malignant transformation , especially when large. Discontinuation of oral contraceptives can lead to regression of smaller adenomas, while larger or symptomatic lesions often require surgical resection. Hepatic hemangioma (Option A): This is the most common benign liver tumour, typically unrelated to oral contraceptive use. Imaging classically shows peripheral nodular enhancement with centripetal fill-in on delayed phases. Metastatic liver deposits (Option C): Usually present as multiple lesions in patients with a known primary malignancy. Imaging often shows variable enhancement patterns rather than a solitary, well-defined lesion. Hepatocellular carcinoma (Option D): Commonly arises in the background of chronic liver disease or cirrhosis and is associated with risk factors such as hepatitis B, hepatitis C, and alcoholism, rather than oral contraceptive use.

References:

Grainger & Allison's Diagnostic Radiology, 7th Edition, Page 618

↑ *Back to this question in Part A*

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Q19: Following blunt abdominal trauma, a patient is suspected to have splenic injury. Which of the following findings is least likely to be identified on a plain abdominal or chest radiograph? (Q887976)

A. Elevation of the left hemidiaphragm

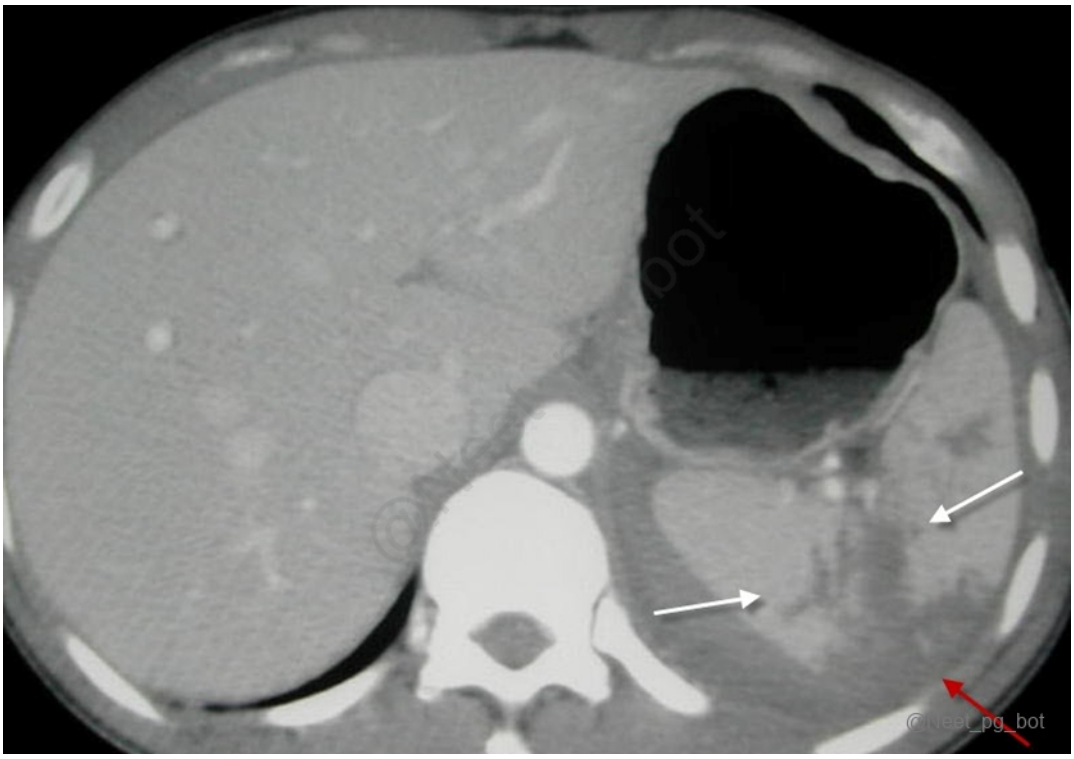
B. Obliteration of the splenic outline

C. Kehr's sign

D. Loss of the left psoas shadow

Correct Answer: C. Kehr's sign

Explanation: The above clinical context relates to suspected splenic rupture , most commonly seen after blunt abdominal trauma. On plain radiographs , indirect signs of splenic injury may be present due to associated hemoperitoneum and local inflammatory changes. Kehr's sign , however, is not a radiographic sign . It is a clinical finding , referring to referred pain at the tip of the left shoulder caused by diaphragmatic irritation from intraperitoneal blood accumulating beneath the left hemidiaphragm. It may also be elicited by elevating the left leg. Radiographic findings that support splenic rupture are indirect and include displacement or obscuration of normal anatomical shadows. Definitive diagnosis and grading of splenic injury are performed using contrast-enhanced CT (CECT) , which demonstrates splenic lacerations as linear low-attenuation defects, usually accompanied by hemoperitoneum. Elevation of the left hemidiaphragm (Option A): Seen due to subphrenic blood collection or splenic enlargement following rupture. Obliteration of the splenic outline (Option B): Occurs because of adjacent hemoperitoneum and loss of normal soft-tissue planes. Loss of the left psoas shadow (Option D): Results from retroperitoneal or intraperitoneal bleeding obscuring the psoas margin.



References:

Grainger & Allison's Diagnostic Radiology, 7th Edition, Page 2140

↑ *Back to this question in Part A*

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Q20: A 45-year-old woman presents with intermittent right upper quadrant pain. An ultrasound shows echogenic foci with posterior acoustic shadowing. What is the most likely diagnosis? (Q852902)

A. Gallbladder polyp

B. Gallbladder calculus

C. Gallbladder adenomyomatosis

D. Porcelain gallbladder

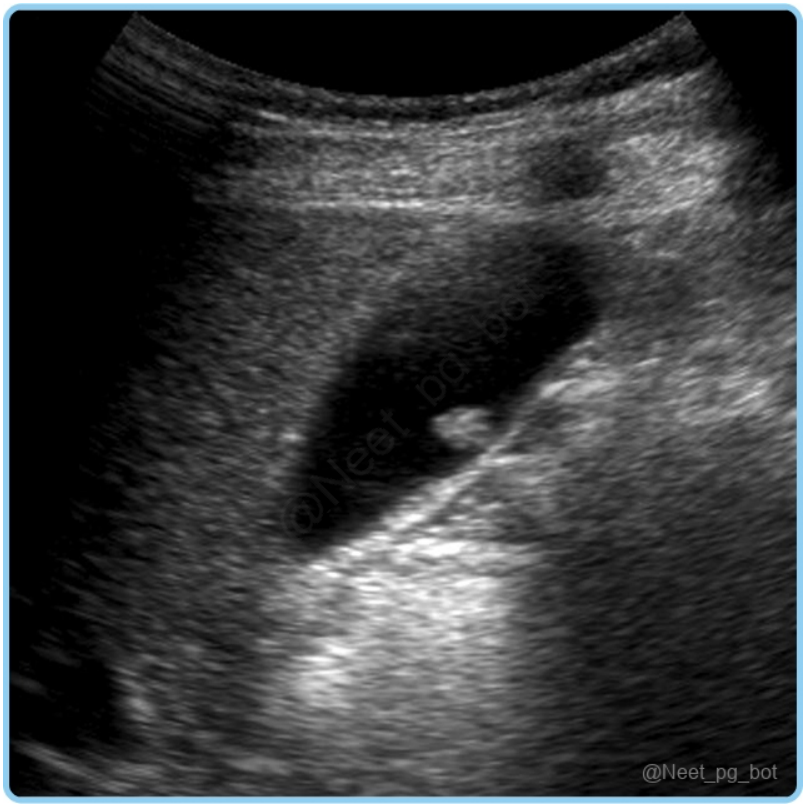
Correct Answer: B. Gallbladder calculus

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: Gallbladder Condition Radiology Gallbladder calculus (Option B) • Gallstones, or GB calculi, are the most likely diagnosis in this case, as they typically appear as echogenic foci on ultrasound and produce posterior acoustic shadowing. • This shadowing is caused by the solid nature of the stones, which block the transmission of sound waves. USG Gallbladder polyp (Option A ruled out) • They are typically small masses that protrude into the lumen of the gallbladder. • On ultrasound, they generally appear as smooth, hyperechoic intraluminal lesions without posterior acoustic shadowing, unlike gallstones. USG Gallbladder adenomyomatosis (Option C ruled out) • This is characterised by thickening of the gallbladder wall, often due to cholesterol crystals or small stones in the Rokitansky-Aschoff sinuses. • On ultrasound, adenomyomatosis presents with a distinctive comet-tail ring-down artefact (due to reverberation from the cystic spaces), which differentiates it from simple shadowing seen with gallstones. USG Porcelain gallbladder (Option D ruled out) • Porcelain gallbladder refers to a calcified gallbladder wall, which appears as a dense shadowing structure on imaging, typically seen on plain radiographs or CT scans. • It is associated with gallbladder carcinoma. • Ultrasound findings of porcelain GB can resemble emphysematous cholecystitis or large stones, but the condition is characterised by the absence of the double-arc shadow sign seen with gallstones. CT




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References:

Grainger and Allison's Diagnostic Radiology, 7th Edition, Page 659, 661, 662, 663, 664, 665

Textbook of Radiology and Imaging, David Sutton, 8th Edition, Volume 1, Page 2641

↑ *Back to this question in Part A*

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Q21: Which of the following statements about imaging modalities for the gallbladder is TRUE ? (Q852888)

A. CT-IVC is commonly used to diagnose jaundiced patients.

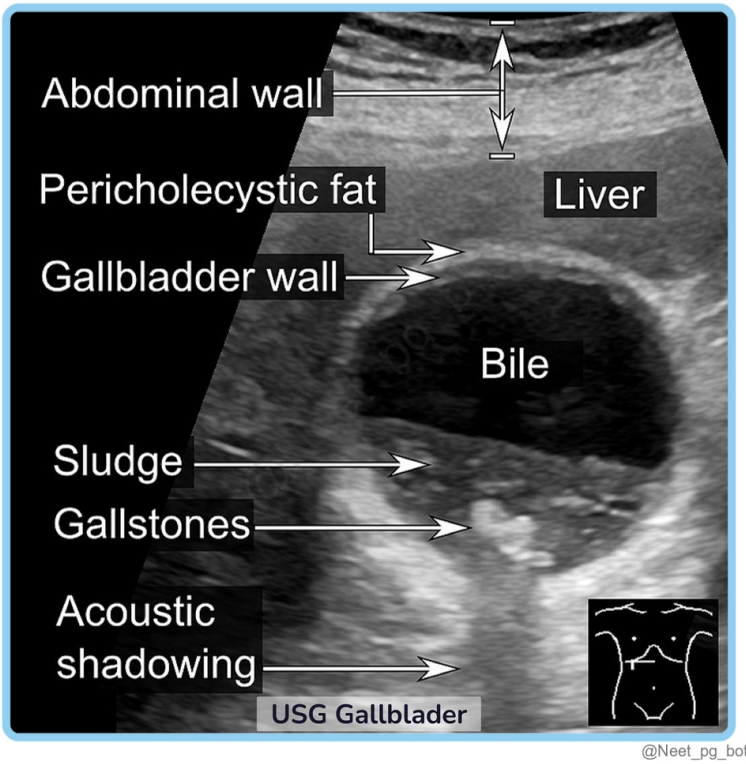
B. ERCP has a low complication rate and is only diagnostic.

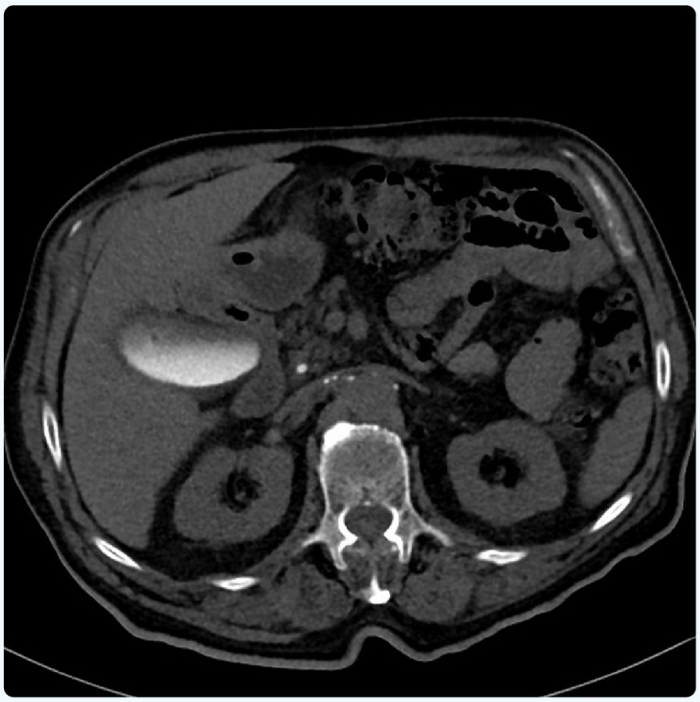
C. USG is less accurate than CT for diagnosing acute biliary diseases.

D. T-tube cholangiography assesses stone clearance post-CBD exploration.

Correct Answer: D. T-tube cholangiography assesses stone clearance post-CBD exploration.

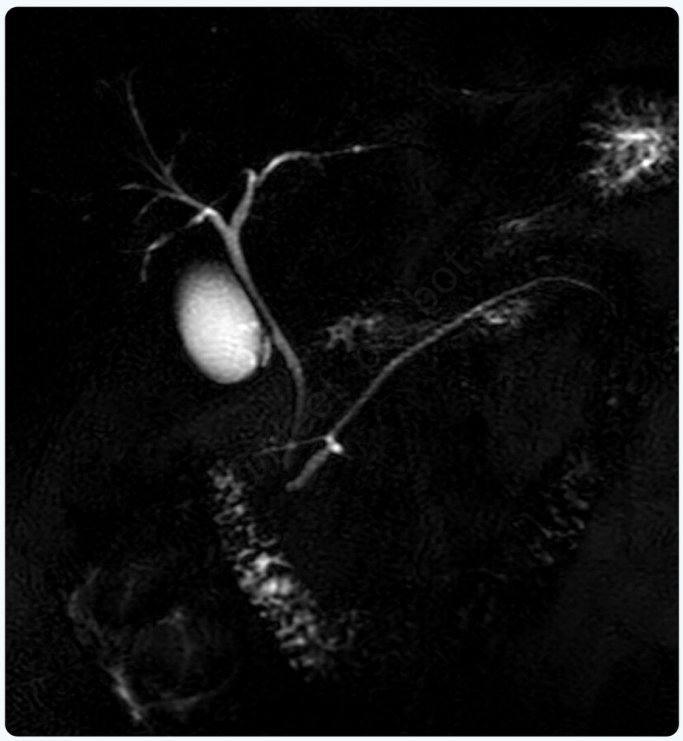
Explanation: T-tube cholangiography is specifically performed after exploring the common bile duct (CBD) during cholecystectomy. It evaluates whether stones have been cleared and ensures that the contrast medium passes freely into the duodenum, confirming the procedure’s effectiveness. Imaging Modalities for Gallbladder Ultrasound • Transabdominal US is the first choice for hepatobiliary issues, outperforming CT for acute biliary disease (Option C ruled out) , and useful for detecting stones, and polyps, and assessing vascularity with Doppler. • CEUS enhances detail in cases like cholecystitis perforation and cholangiocarcinoma. Normal gallbladder and common bile duct as seen on abdominal USG Computed Tomographic Cholangiography (CT-IVC) • CT-IVC with iodinated contrast provides high-resolution images of bile duct obstructions and leaks but is ineffective in jaundiced patients due to its dependence on normal liver function. (Option A ruled out) Magnetic Resonance Cholangiopancreatography (MRCP) • MRCP, using T2-weighted sequences, is preferred over ERCP and PTC for imaging bile ducts in jaundiced patients. • Contrast-enhanced MR adds functional imaging, though with lower spatial resolution than CT-IVC. Endoscopic Retrograde Cholangiopancreatography (ERCP) • ERCP offers direct bile duct imaging and interventions like stone removal, with a high success rate (92%–97%) but carries a risk of complications, primarily pancreatitis. (Option B ruled out) T- Tube Cholangiography • Performed after CBD exploration to check for residual stones by confirming contrast passage into the duodenum; careful injection prevents air bubbles.. Percutaneous Transhepatic Cholangiography (PTC) • Primarily for biliary interventions as its diagnostic role is now largely replaced by ERCP and MRCP; requires a 22-G needle for intrahepatic duct access and coagulation correction. Hepatobiliary Scintigraphy (HIDA) • HIDA with technetium-99m evaluates bile duct function and gallbladder patency, effective only with near-normal bilirubin, though some agents can work with mild elevations. Endoscopic Ultrasound (EUS) • EUS provides detailed imaging and Doppler assessment of the biliary tree and pancreas, enabling both diagnostic and therapeutic interventions like fine-needle aspiration and biliary drainage. Porcelain Gallbladder on EUS





CT Cholangiography

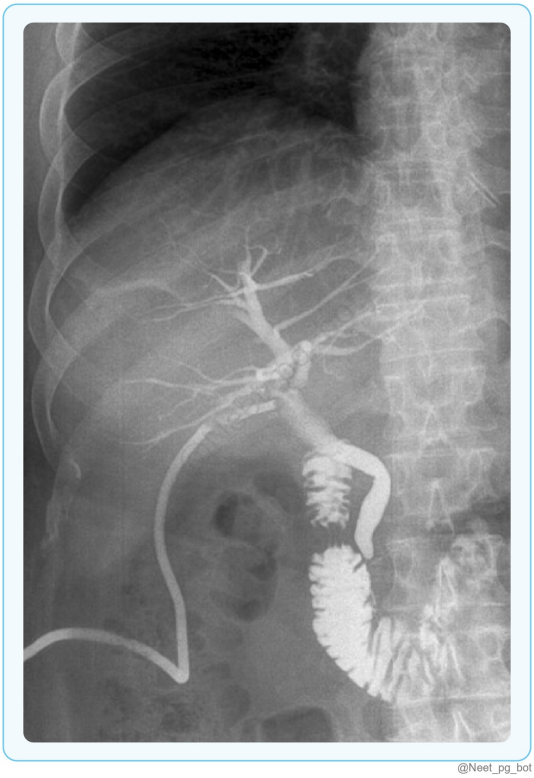
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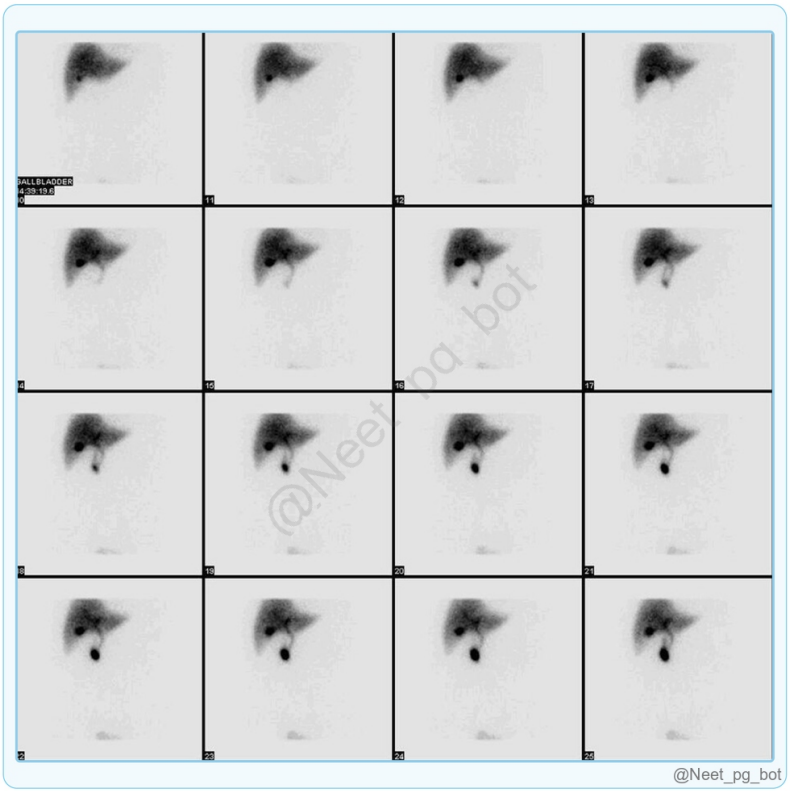


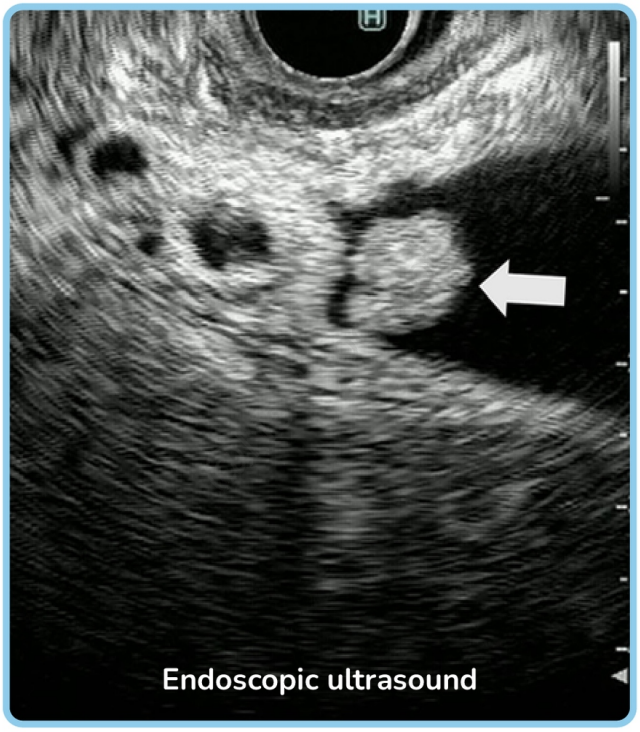
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GALLBLADDER
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References:

Grainger and Allison's Textbook of Diagnostic Radiology, 7th Edition, Pages 657-659

David Sutton Textbook of Radiology and Imaging, Volume 1, 8th Edition, Page 2587-2605

↑ *Back to this question in Part A*

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Q22: A 65 y/o male presents with severe abdominal pain and elevated liver enzymes. After imaging, he is found to have a suspected bile duct obstruction due to a stone. The physician plans to both visualize and potentially treat the obstruction. Which imaging modality should be chosen? (Q852893)

A. Magnetic Resonance Cholangiopancreatography

B. Endoscopic Retrograde Cholangiopancreatography

C. Ultrasound

D. Computed Tomography

Correct Answer: B. Endoscopic Retrograde Cholangiopancreatography

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: Endoscopic Retrograde Cholangiopancreatography (ERCP) is the most appropriate choice in this scenario because it allows for direct visualization of the bile ducts and allows for simultaneous treatment of obstructions, such as stone removal. Feature Magnetic Resonance Cholangiopancreatography (MRCP) Endoscopic Retrograde Cholangiopancreatography (ERCP) Indications • Indications include suspected bile duct calculus, cholestasis, pre-surgical biliary evaluation, biliary leak, unknown aetiology sclerosing cholangitis, and unsuccessful or contraindicated ERCP. • Not typically used for interventions. (Option A ruled out) • It allows for visual assessment of the duodenum and ampulla of Vater. • Allows biopsies, stone extraction, and other Interventional procedures like sphincterotomy, biliary stenting, and biliary stricture dilation. Suitability for Jaundice More Suitable for jaundiced patients Less suitable for jaundiced patients as it is invasive Imaging Type Provides anatomical and functional information Provides dynamic information during contrast introduction Success Rate Substantially replaces PTC and ERCP Success rates of 92%–97% Complication Rates Lower complications; no specified rates Complication rates of 0.9% to 2.3% (severe) Resolution Lower spatial and contrast resolution compared to CT-IVC High spatial resolution for detailed imaging Image Ultrasound (Option C) can help identify biliary obstruction and is a good first-line imaging tool, but it does not provide therapeutic options. Computed Tomography (Option D) can show obstructions and related complications but does not allow for therapeutic interventions. It may be used as a supplementary tool, but ERCP is the preferred option when immediate treatment of a suspected obstruction is necessary.





References:

David Sutton Textbook of Radiology and Imaging, Volume 1, 8th edition, Page 2596, 2597, 2603

Grainger and Allison's Textbook of Diagnostic Radiology, 7th edition, Page 658

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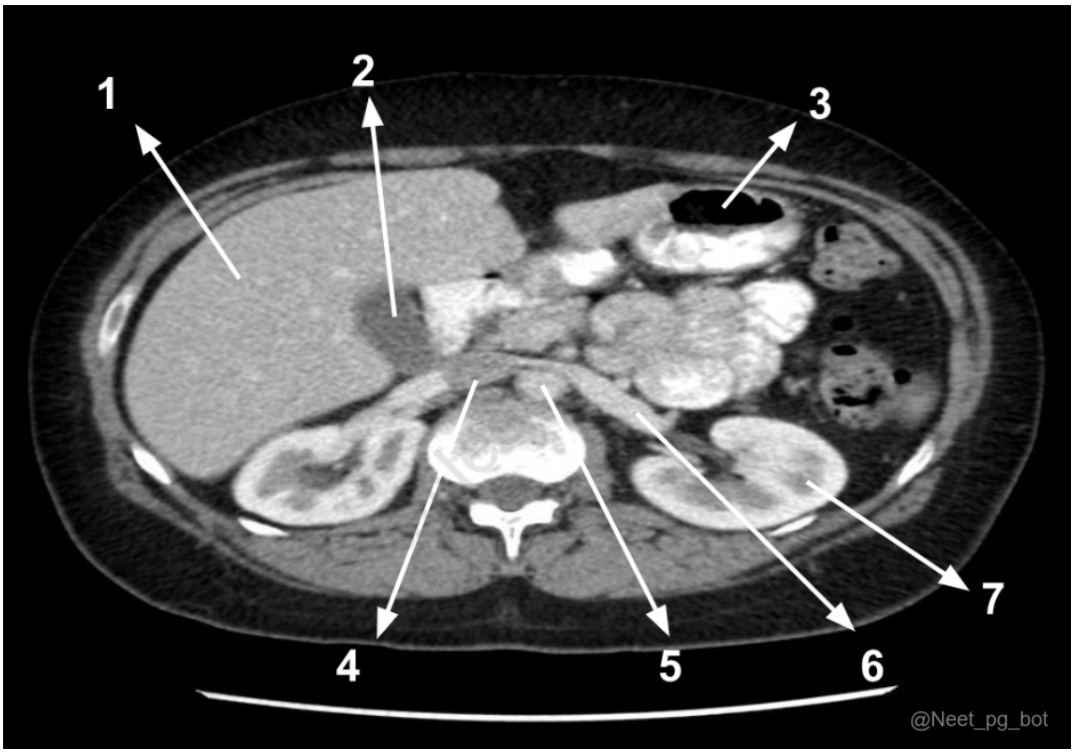
Q23: From the CT abdomen given below identify the labeled structures. (Q852894)

A. 1- Liver, 2- IVC, 7- Right kidney

B. 4- Aorta, 5- IVC, 7- Left kidney

C. 3- Stomach, 4- IVC, 7- Spleen

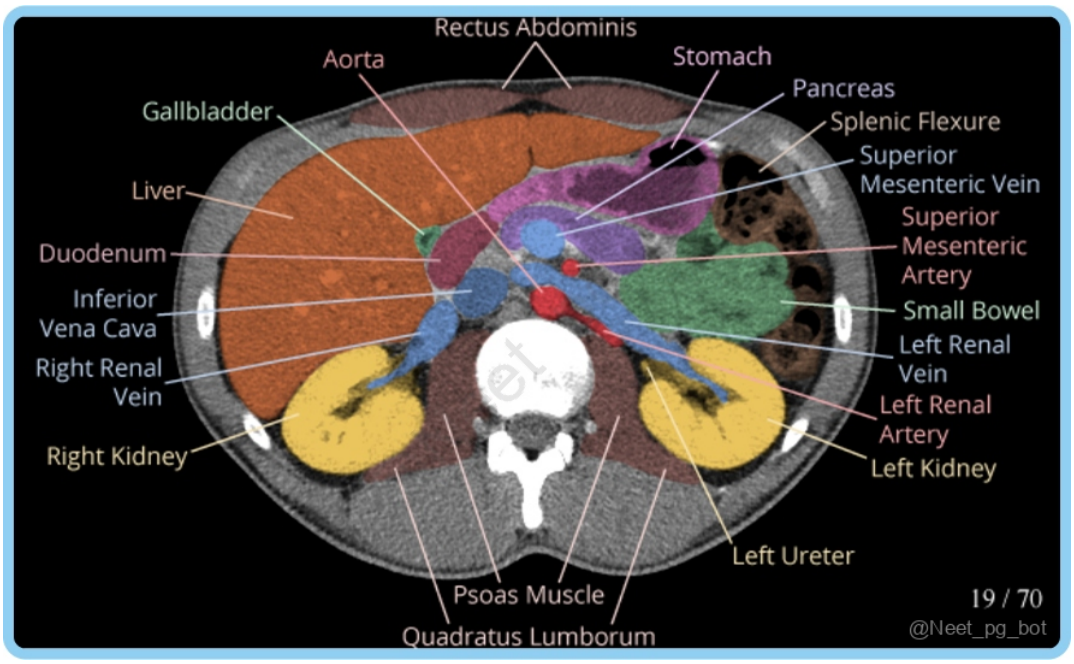
D. 2- Gallbladder, 5- Aorta, 6- Left Renal Vein



Correct Answer: D. 2- Gallbladder, 5- Aorta, 6- Left Renal Vein

- *Listen (English)*
- *Listen (Hindi)*

Explanation: From the Ct Abdomen given: 1- Liver 2- Gallbladder 3- Stomach 4- Inferior Vena Cava 5- Aorta 6- Left Renal Vein 7- Left Kidney



References:

Mettler Jr. Essentials of Radiology, 4th Edition, Page 127, 128

↑ *Back to this question in Part A*

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Q24: A 45-year-old female presents to the hospital for evaluation of recurrent abdominal discomfort over the past few months. She has a history of autosomal dominant polycystic kidney disease. An abdominal MRI reveals multiple irregularly delineated hyper-intense cystic nodules in the liver that do not communicate with the biliary tree. Which of the following statements is true regarding the diagnosis suggested by the MRI findings? (Q852895)

A. Very commonly associated with malignant transformation.

B. Typically asymptomatic and often found incidentally.

C. Characterized by enhancement on contrast CT.

D. Not associated with Caroli's disease.



Correct Answer: B. Typically asymptomatic and often found incidentally.

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: The MRI findings suggest Von Meyenberg complexes (VMCs), which are small, typically asymptomatic lesions in the liver resulting from ductal plate malformations. They are often discovered incidentally during imaging and can be associated with conditions like autosomal dominant polycystic kidney disease. Von Meyenberg complex (Bile Duct Microhamartomas) Small (<1.5 cm), usually multiple greyish nodular lesions in the liver due to ductal plate malformations. Associated with autosomal dominant polycystic kidney disease, Caroli's disease, and congenital hepatic fibrosis. (Option D ruled out) Histology: Cystically dilated bile ducts lined by a single layer of cuboidal epithelium in a collagenous stroma. Clinical Presentation Generally asymptomatic; Incidental findings during laparoscopic procedures or autopsies. Can present with non-specific abdominal discomfort or episodes of cholangitis. Imaging Modalities and Findings Ultrasound: Multiple hyper- or hypoechoic areas with comet tail echoes. CT Scan: Multiple irregular small low-attenuated areas, typically without enhancement on contrast injection. (Option C ruled out) MRI/MRCP: Multiple irregularly delineated hyper-intense cystic nodules, not communicating with the biliary tree. Gadolinium contrast enhances differentiation from Caroli's disease. Rare malignant transformation to cholangiocarcinoma. (Option A ruled out) VMCs are rare liver findings with distinct MRI features. They typically cause no symptoms but can occasionally lead to abdominal discomfort or liver infections.



References:

The clinical presentation of Von Meyenburg complexes - PMC

Von Meyenberg complex

↑ *Back to this question in Part A*

Q25: Match the following with their respective radiologic images Radiological Imaging Diagnosis a. 1. Caroli's Disease b. 2. HCC c. 3. Hepatic Cyst d. 4. Hepatic Hemangioma (Q852896)

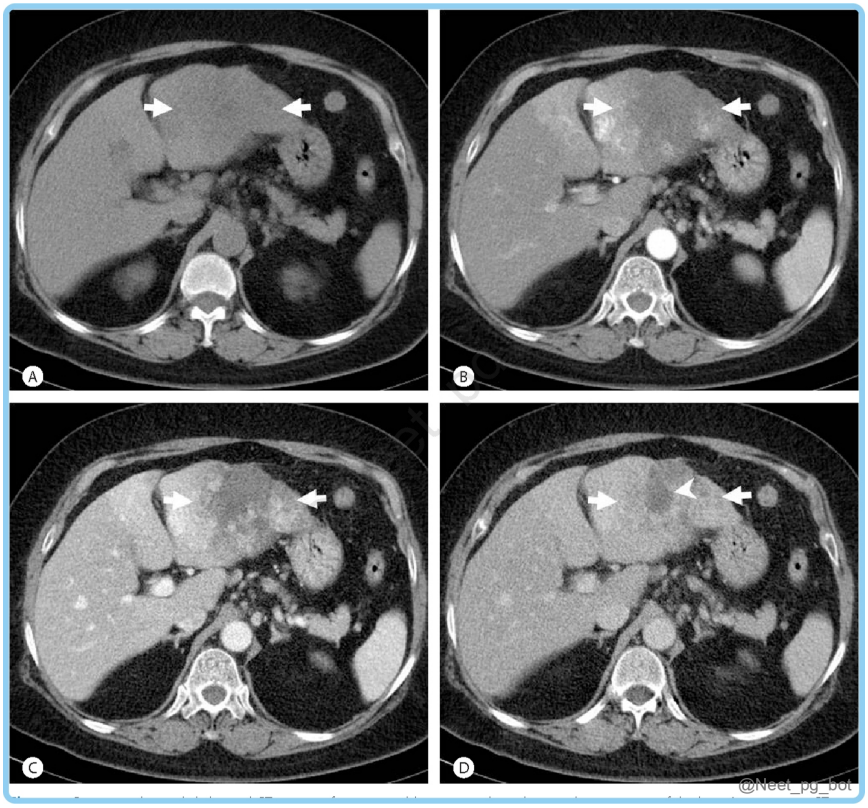
A. a-2; b-3; c-4; d-1

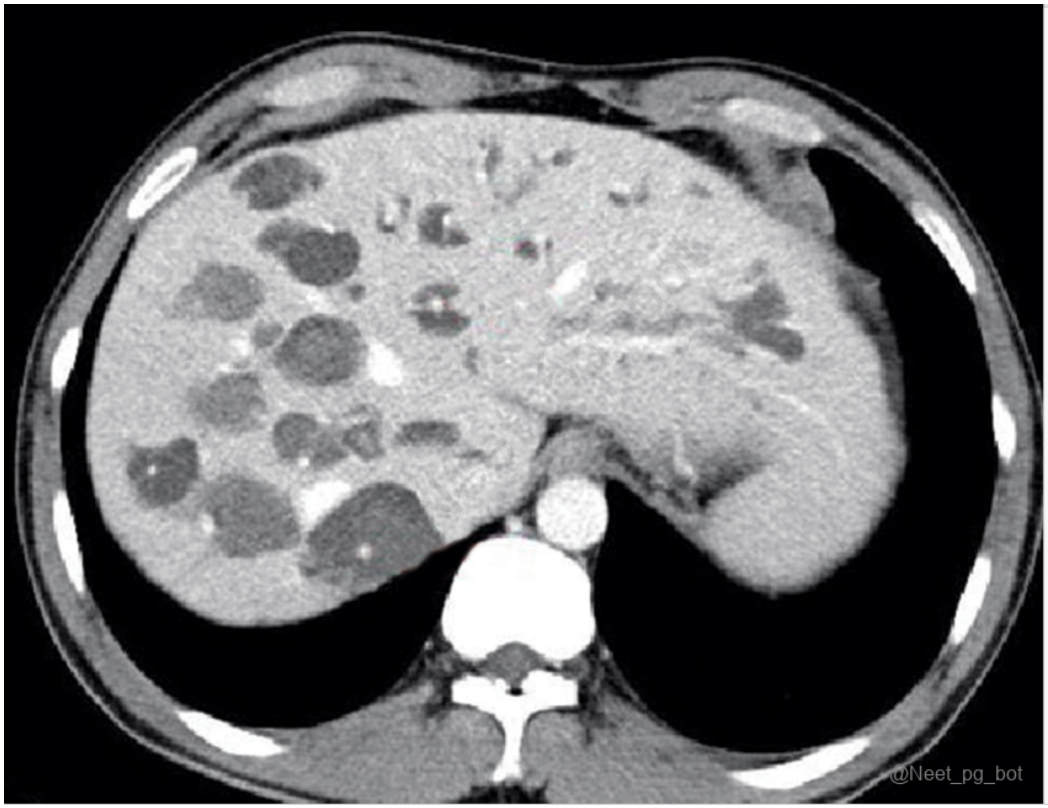
B. a-3; b-4; c-1; d-2

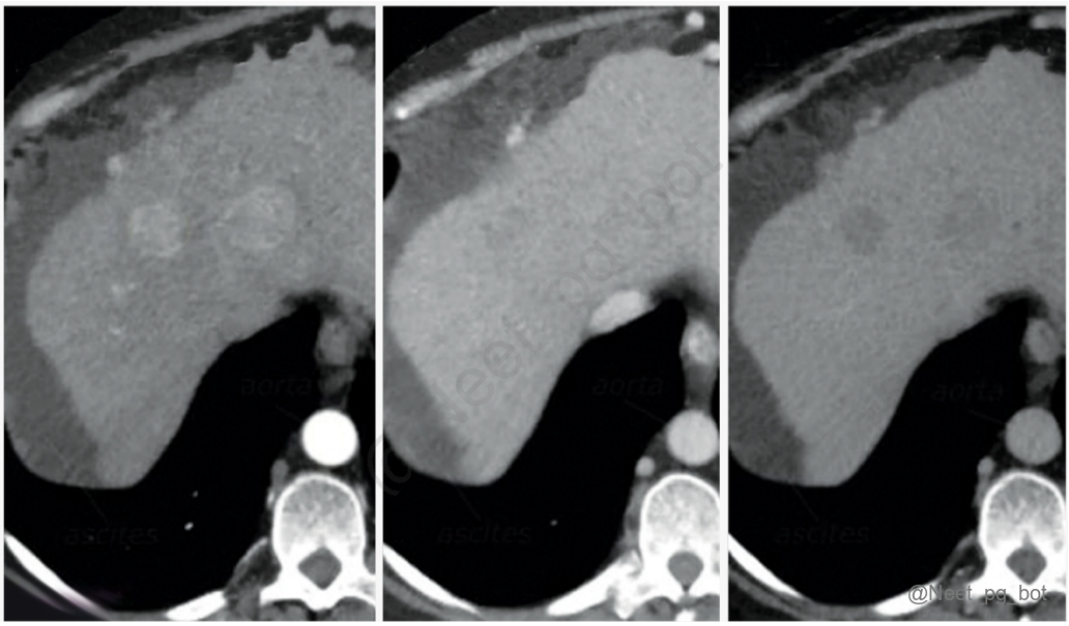
C. a-4; b-3; c-1; d-2

D. a-1; b-4; c-3; d-2




A
B
C
D
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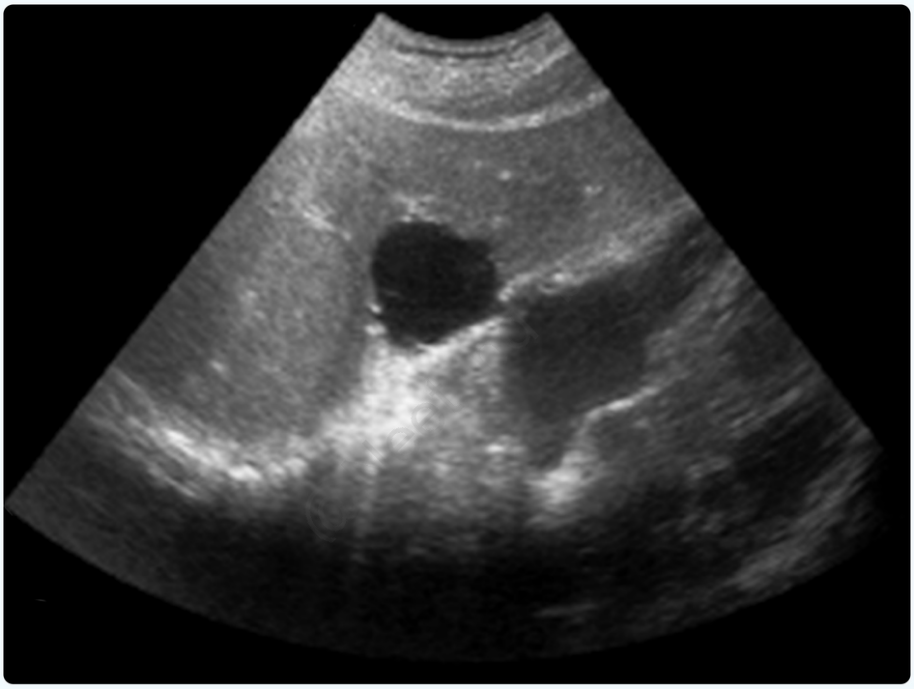

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Correct Answer: B. a-3; b-4; c-1; d-2

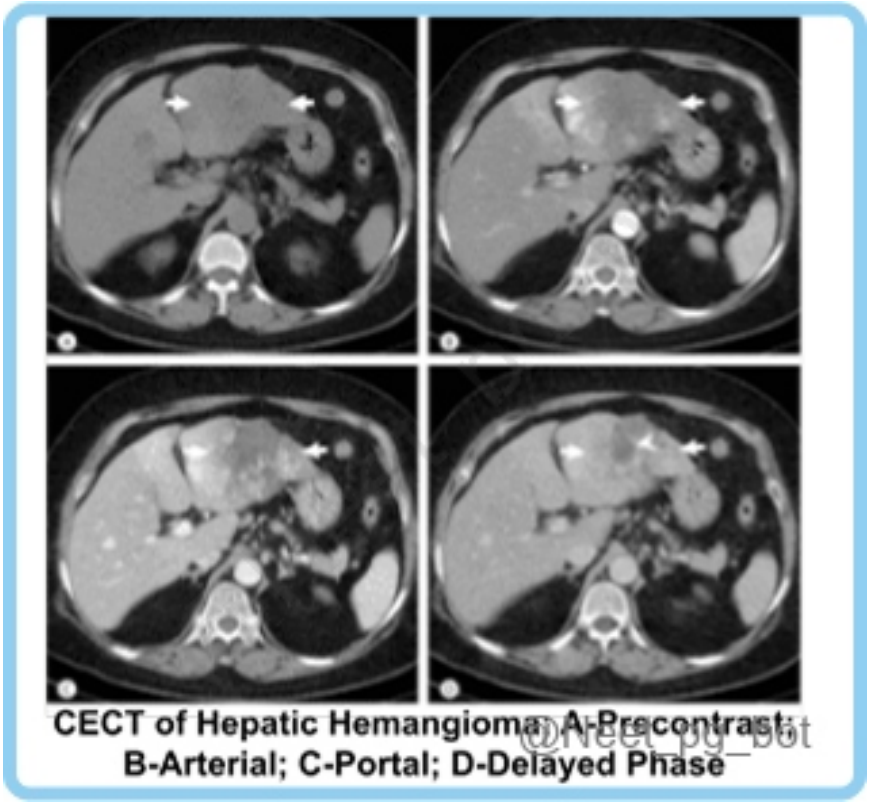
- *Listen (English)*
- *Listen (Hindi)*

Explanation: Correct answer- B) a-3; b-4; c-1; d-2 Condition Ultrasound CT MRI Hepatic Cysts Spherical, homogenous, no echoes or Doppler 0-10 HU, no enhancement on IV contrast, high attenuation if an infection is present. Hypointense on T1, hyperintense on T2, no enhancement with IV Gd-DTPA Hepatic Hemangiomas Well-defined, echogenic, no Doppler signal Well-defined, lobulated lesions. Peripheral enhancement, centripetal filling. Most sensitive. Hyperintense on T2, peripheral nodular enhancement. Caroli's Disease Show hepatolithiasis as ductal dilatation with stones, which lack shadowing. Communication between bile ducts and cysts seen on CT Contrast-enhanced MRCP shows bile duct-cyst communication HCC Variable echogenicity, Hypervascular on Doppler Arterial hyperenhancement, Washout in portal/delayed phase T1 hypointense, T2 mildly hyper, Washout + capsule; hypointense on hepatobiliary phase Hepatic Adenoma Usually appears as a solitary, well-demarcated heterogeneous mass. Variable echogenicity: Hypoechoic halo (focal fatty sparing) is often seen. Variable attenuation is influenced by haemorrhage (hyperattenuating) or fat content (hypoattenuating). Typically well-marginated and isoattenuating; May show calcifications in cases of prior hemorrhage. T1: Variable intensity (hyper-, iso-, or hypointense); often hyperintense if non-hemorrhagic. T2: Mildly hyperintense. IP/OP: Fat presence can cause signal dropout on out-of-phase imaging Caroli's disease (Above picture) HCC



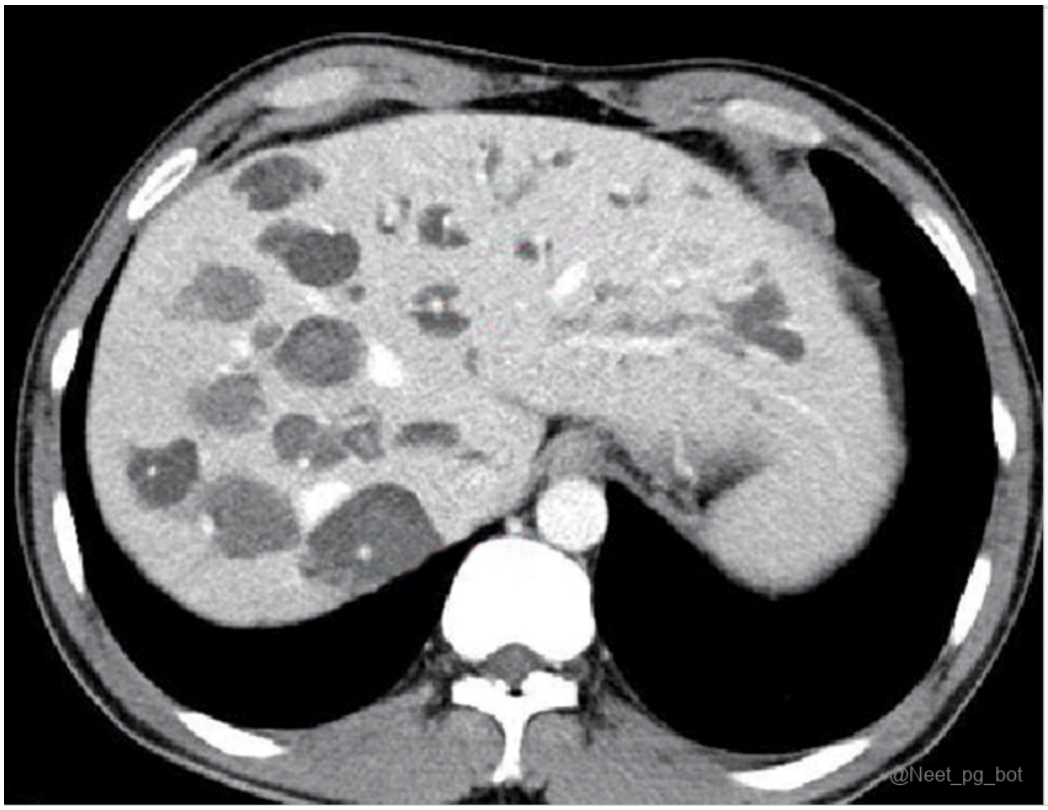
USG of Hepatic Cyst

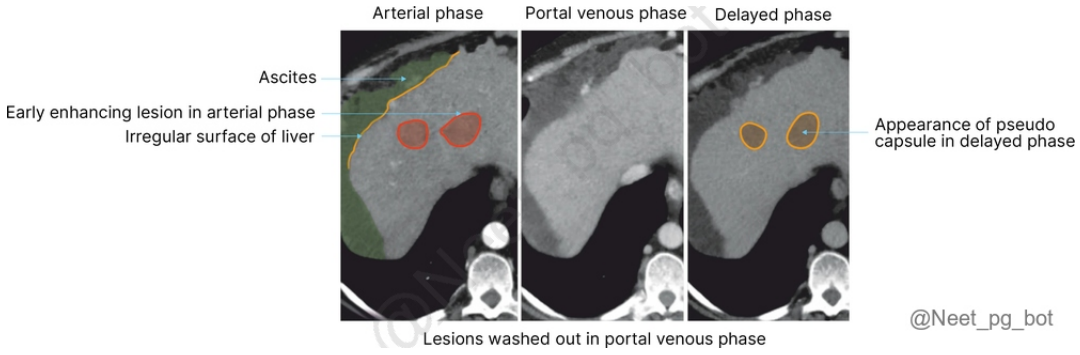
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CECT of Hepatic Hemangioma: A-Precontrast; B-Arterial; C-Portal; D-Delayed Phase

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References:

Grainger & Allison's Diagnostic Radiology, 7th Edition, Page 612, 613, 615, 628, 629, 673

radiopaedia.org/articles/hepatic-adenoma

↑ *Back to this question in Part A*

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Q26: A 45 y/o man from an endemic region presents with abdominal pain. An ultrasound reveals a cyst with multiple septations, resembling a honeycomb. Based on the WHO classification, which of the following stages does this hydatid cyst most likely

represent? (Q852899)

A. CE1

B. CE2

C. CE3a

D. CE5

Correct Answer: B. CE2

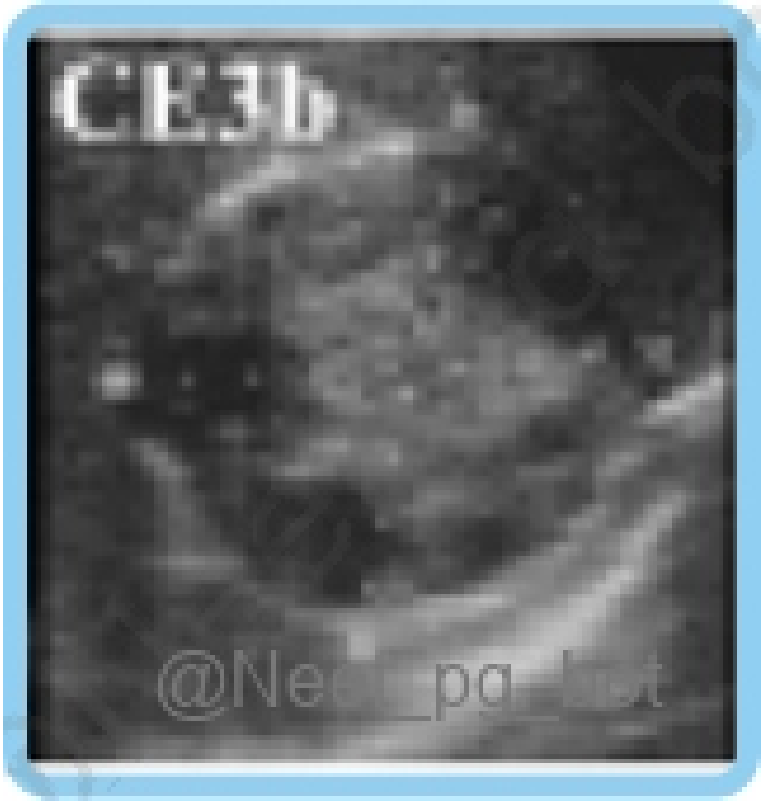
- *Listen (English)*
- *Listen (Hindi)*

Explanation: CE2 cysts are characterised by multiple septations, giving them a honeycomb appearance, which is seen in this patient. WHO Classification of Hydatid Cysts (Cystic Echinococcosis): The WHO classification is based on ultrasound findings, helping in diagnosing and managing cystic echinococcosis. WHO Classification Gharbi classification Classification Description Imaging Stage Classification CE1 (Option A ruled out) Unilocular anechoic lesion with a 'double line' sign. Active Type I CE2 (Option B) Cyst with multiple septations, resembling a honeycomb. Active Type III CE3a (Option C ruled out) Unilocular cyst with detached membranes and 'water-lily' sign. Transitional Type II CE3b Cyst with daughter cysts in a solid matrix. Transitional Type III CE4 Heterogeneous echogenicity, no daughter cysts indicating degeneration. Inactive Type IV CE5 (Option D ruled out) Calcified cyst, indicating inactivity. Inactive Type V Imaging: Ultrasound: Primary modality for evaluating hydatid cysts. Identifies key features like floating membranes and daughter cysts. CT and MRI: Used for detecting complications (e.g., cyst rupture, infection).


CE1
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CE2
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CE3a
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CE3b





References:

Hydatid cysts - WHO classification

Gharbi

↑ *Back to this question in Part A*

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Q27: Which of the following statements about gallstones is correct? (Q852900)

A. Cholesterol stones are typically radiopaque and easily visible on X-rays.

B. The Mercedes-Benz sign refers to a star-shaped pattern of gas fissuring in gallstones seen on imaging.

C. Pigment stones are primarily composed of cholesterol and easily visible on X-ray.

D. All gallstones require immediate surgical intervention.

Correct Answer: B. The Mercedes-Benz sign refers to a star-shaped pattern of gas fissuring in gallstones seen on imaging.

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: The Mercedes-Benz sign is a radiological finding that appears in some gallstones. It is characterised by a triradiate pattern created by gas fissures within the gallstones, which resemble the three-pointed star logo of the Mercedes-Benz automobile. Ultrasound Findings of Gallstones: Appearance: Bright (echogenic) foci with acoustic shadowing. False Negatives: Common due to small stones or poor acoustic access. Differentiation from Polyps: Mobility or acoustic shadowing helps. Double-Arc Shadow Sign: Seen with a gallbladder full of stones, showing two echogenic lines and dense shadowing. Mercedes-Benz Sign in Gallstones: A star-shaped pattern of gas-fissuring within gallstones. It is observed in about 50% of gallstones; often fluid-filled, with some containing nitrogen gas. Indicates potential complications such as cholecystitis, emphasising the need for detailed imaging. Gallstone vs Renal stone: Gallstones Renal Stones Composed of cholesterol, bilirubin, and calcium salts. Comprises various minerals: calcium oxalate, uric acid, struvite, and cystine. Gallstones are better visualised on USG. Renal stones are better seen on CT Cholesterol stones may be hard to see on X-rays but are identifiable via ultrasound due to acoustic shadows. (Option A ruled out) Uric acid stones require non-contrast CT for detection, as they may not show on X-rays. Diagnostic Imaging Techniques Gallstones Renal Stones USG: Commonly used; no ionising radiation. USG: Limited use. CT Scans: Highly sensitive for both stones. CT Scans: Highly sensitive, detects small/radiolucent stones. X-rays: Limited effectiveness. X-rays: Effective for calcium oxalate stones. Pigment stones are primarily composed of cholesterol and easily visible on X-ray (Option C ruled out): Pigment stones are primarily composed of bilirubin and calcium salts, and they might be visible on X-rays. All gallstones require immediate surgical intervention (Option D ruled out): Many gallstones are asymptomatic and do not require immediate surgical intervention unless complications arise.



Ultrasound of biliary sludge, gallstones and borderline thickening of the gallbladder wall (3 mm).

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References:

radiopaedia.org/articles/mercedes-benz-sign-gallbladder

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Grainger & Allison’s Diagnostic Radiology, 7th Edition, Page 659

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pubs.rsna.org/doi/abs/10.1148/radiographics.20.3.g00ma16751

↑ *Back to this question in Part A*

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Q28: A 45 y/o woman presents with right upper quadrant pain and fever. Ultrasound shows gallbladder wall thickening, gallstones, and pericholecystic fluid. Which of the following findings would most likely suggest chronic cholecystitis rather than acute cholecystitis? (Q852901)

A. Positive sonographic Murphy sign

B. Absence of pericholecystic fluid

C. High-density bile on CT

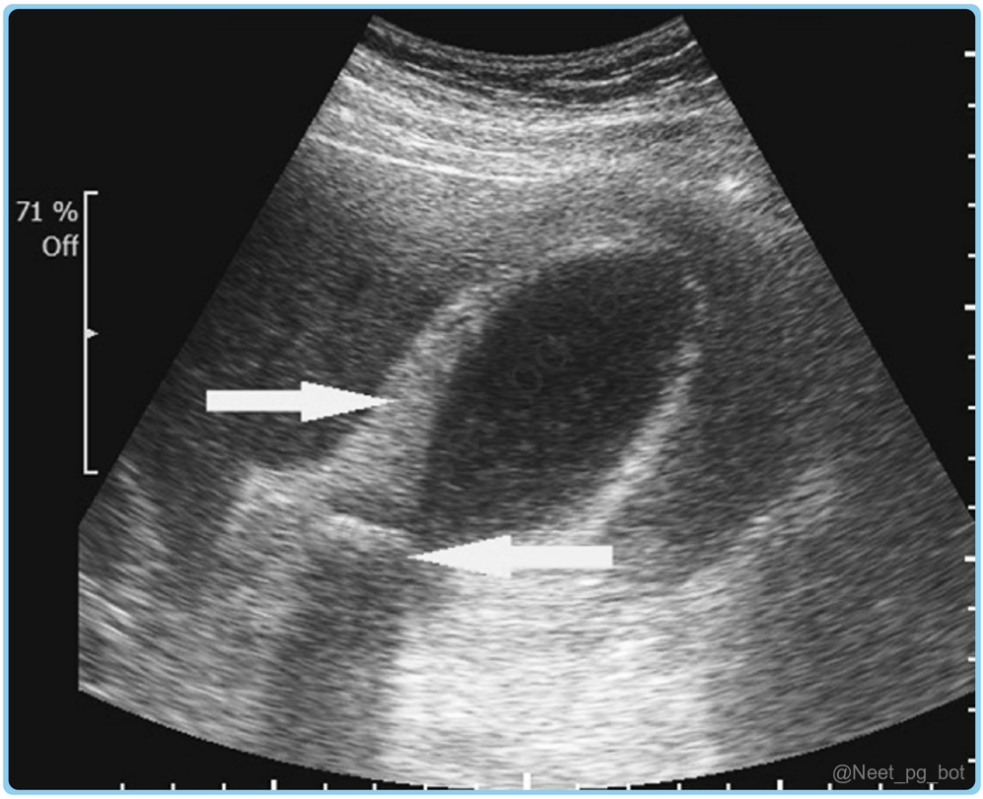
D. Gallbladder distension on computed tomography (CT)

Correct Answer: B. Absence of pericholecystic fluid

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: The absence of pericholecystic fluid is more indicative of chronic cholecystitis, as acute cholecystitis often shows pericholecystic fluid due to active inflammation. Radiological Differentiation of Acute and Chronic Cholecystitis: Acute Cholecystitis: Ultrasound (US): Gallstones + sonographic Murphy sign (tenderness) (Option A ruled out) Gallbladder wall thickness > 3 mm Gallbladder distension (> 5 cm) Pericholecystic fluid CT Scan: Gallbladder wall thickening Subserosal oedema Gallbladder distension (Option D ruled out) High-density bile (Option C ruled out) Pericholecystic fluid Inflammatory fat stranding Chronic Cholecystitis: Ultrasound (US): Gallbladder wall thickening (without gallstones in many cases) Consider other causes of wall thickening Key Distinguishing Features: Feature Acute Cholecystitis Chronic Cholecystitis Gallstones Present Absent Gallbladder Wall Thickening Pronounced Mild Pericholecystic Fluid/Inflammation Common Rare (Option B) Functional Imaging (CCK-Cholescintigraphy) Not commonly used Impaired contractility (<35% EF) is diagnostic.





References:

Grainger & Allison’s Diagnostic Radiology, 7th Edition, Page 660, 661

↑ *Back to this question in Part A*

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Q29: Which of the following statements about imaging modalities used in the liver is FALSE? (Q852882)

A. USG is the first-line investigation for hepatic disorders.

B. T1-weighted images show a normal liver as hypointense compared to the spleen and kidney.

C. CT allows multiphasic examinations, including arterial, portal, and delayed phases.

D. Digital Subtraction Angiography (DSA) is primarily reserved for therapeutic purposes.

Correct Answer: B. T1-weighted images show a normal liver as hypointense compared to the spleen and kidney.

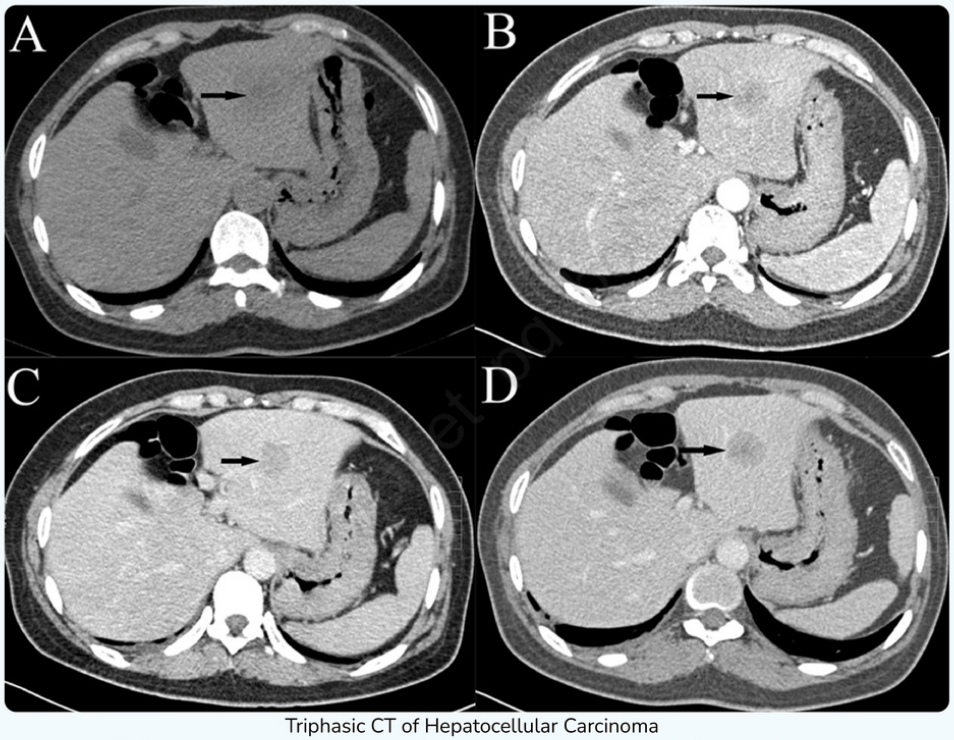
■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: Normal liver parenchyma appears hyperintense on T1-weighted images compared to the spleen, kidney, and pancreas. Imaging Techniques of Liver Ultrasonography • First-line investigation for hepatic disorders. (Option A ruled out) • Cost-effective and useful for repeated follow-up. • Elastography quantifies liver stiffness. • Contrast-enhanced USG evaluates vascularity without radiation exposure. • Colour Doppler assesses hepatic vessel flow and patency. Computed Tomography • Investigation of choice for vascular anatomical assessment. • It is less expensive and more accessible than MRI. • Excellent for volumetry and surgical feasibility evaluation. • Allows Triple-phase examinations, including: ■ Arterial Phase ■ Portal Phase ■ Delayed Phase (Option C ruled out) • If the lesion is enhanced in the arterial phase, it is hepatocellular carcinoma. Magnetic Resonance Imaging • Best for assessing liver parenchyma and biliary system. • Excellent soft tissue resolution. • Effective in evaluating diffuse liver conditions like steatosis and fibrosis. • Uses gadolinium-based contrast agents (e.g., Gd-DTPA, Gd-DOTA) for T1 enhancement. • Breath-hold 3D T1 weighted sequences allow multiphasic examinations similar to CT. • Hepatobiliary-specific agents target the reticulo-endothelial system (RES) or hepatocytes. • T1-Weighted Images ■ Normal Liver Parenchyma: Hyperintense compared to muscle, spleen, and kidney. ■ Pathological Lesions: Typically T1 hypointense due to higher water or cellular density. • T2-Weighted Images ■ Normal Liver Signal: Hypointense compared to spleen, kidney, and pancreas. ■ Lesions: Usually hyperintense, aiding in detection. MRI revealed multiple metastatic liver tumours A- T1 MRI, B- T2 MRI Digital Subtraction Angiography • Largely reserved for therapeutic purposes. (Option D ruled out) • Has been superseded by CT and MR angiographies for diagnostics.

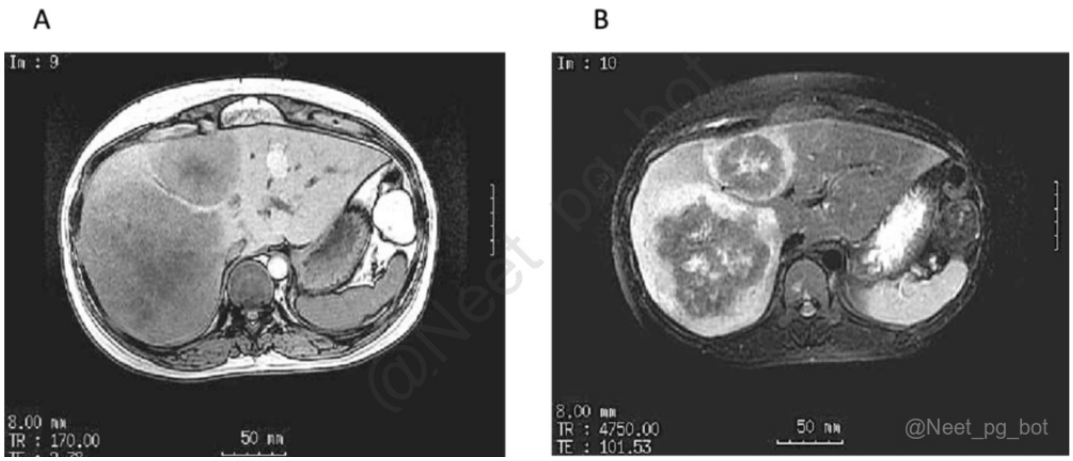


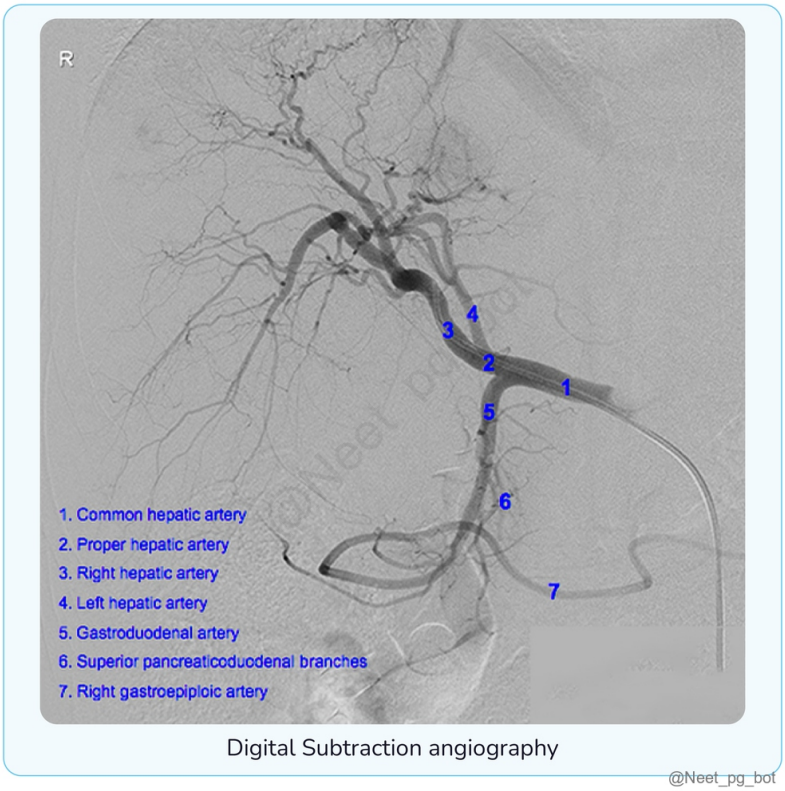
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Triphasic CT of Hepatocellular Carcinoma
A- Non-contrast phase, B - Arterial Phase, C - Portal Phase, D - Delayed Phase

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References:

David Sutton Textbook of Radiology and Imaging, Volume 1, 8th edition, Page 2355- 2357

Grainger and Allison's Textbook of Diagnostic Radiology, 7th edition, Page 599-606

CT triple-phase liver (protocol) | Radiology Reference Article | Radiopaedia.org

↑ *Back to this question in Part A*

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Q30: A 60 y/o jaundiced patient presents with upper abdominal pain. Ultrasound reveals a dilated bile duct, but the cause of obstruction is unclear. What would be the next best non-invasive imaging technique to evaluate this condition? (Q852903)

A. Magnetic Resonance Cholangiopancreatography (MRCP)

B. Endoscopic Retrograde Cholangiopancreatography (ERCP)

C. Ultrasound with colour Doppler

D. Plain radiography



Correct Answer: A. Magnetic Resonance Cholangiopancreatography (MRCP)

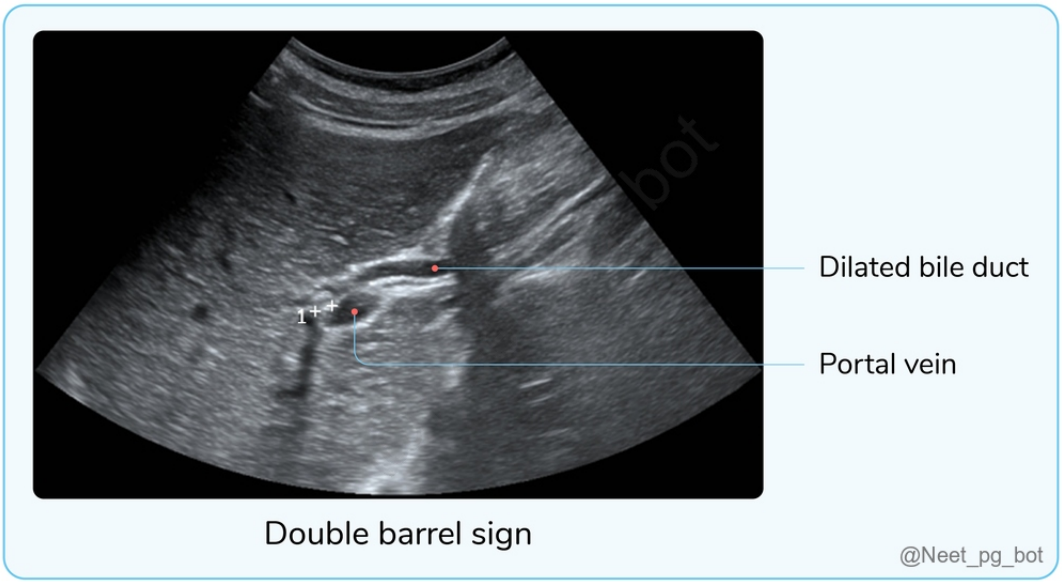
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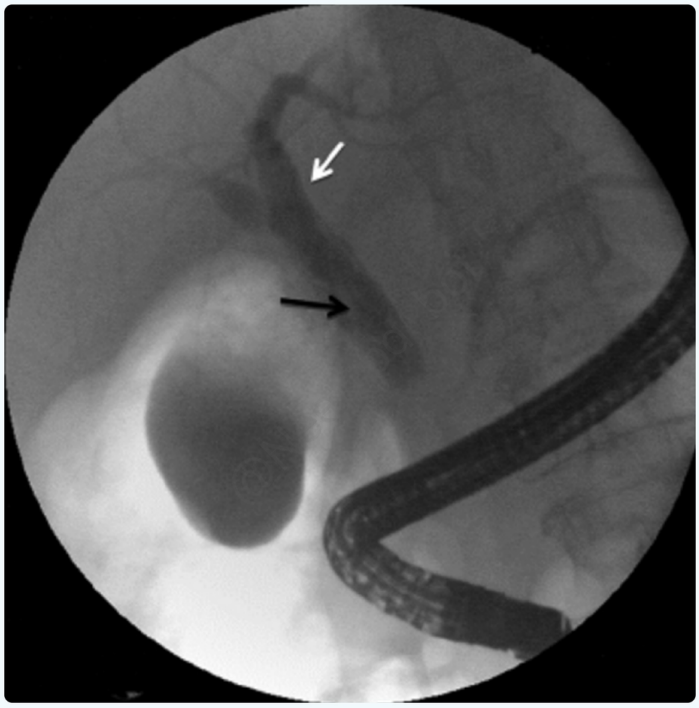
■ *Listen (Hindi)*

Explanation: MRCP is a non-invasive imaging method that provides a detailed view of the biliary system and is particularly effective for diagnosing bile duct obstructions. It also does not rely on the excretion of contrast agents. It is the preferred next step when further non-invasive evaluation is needed after ultrasound, as it can detect stones, strictures, or masses causing the bile duct dilation. MRCP showing common bile duct dilation USG showing double barrel sign Endoscopic Retrograde Cholangiopancreatography (ERCP) (Option B): While ERCP is highly effective for diagnosing and treating bile duct obstructions, it is an invasive procedure. It involves the insertion of an endoscope and contrast injection into the bile ducts, which carries risks like pancreatitis and infection. Though very useful when intervention is required, ERCP is not considered a non-invasive technique, making it less appropriate. ERCP showing dilation of the common bile duct (white arrow) Ultrasound with colour Doppler

(Option C): Although a repeat ultrasound with colour Doppler can help distinguish bile ducts from blood vessels by detecting blood flow, it does not provide detailed information on the cause of the dilation. Plain radiography (Option D): Plain X-rays provide minimal information about the biliary system. They may show calcifications, but they cannot assess soft tissues or provide detailed views of the bile ducts







ERCP showing Dilation of Common bile duct (Arrows)

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References:

Grainger and Allison’s Diagnostic Radiology, 7th Edition, Page 658, 666

Textbook of Radiology and Imaging, David Sutton, 8th Edition, Volume 1, Page 2596

↑ *Back to this question in Part A*

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Q31: Which of the following is the hallmark radiological feature of primary sclerosing cholangitis (PSC) on MRCP? (Q852904)

A. Diffuse dilation of bile ducts

B. Beaded appearance due to alternating strictures and dilations

C. A single long stricture in the common bile duct

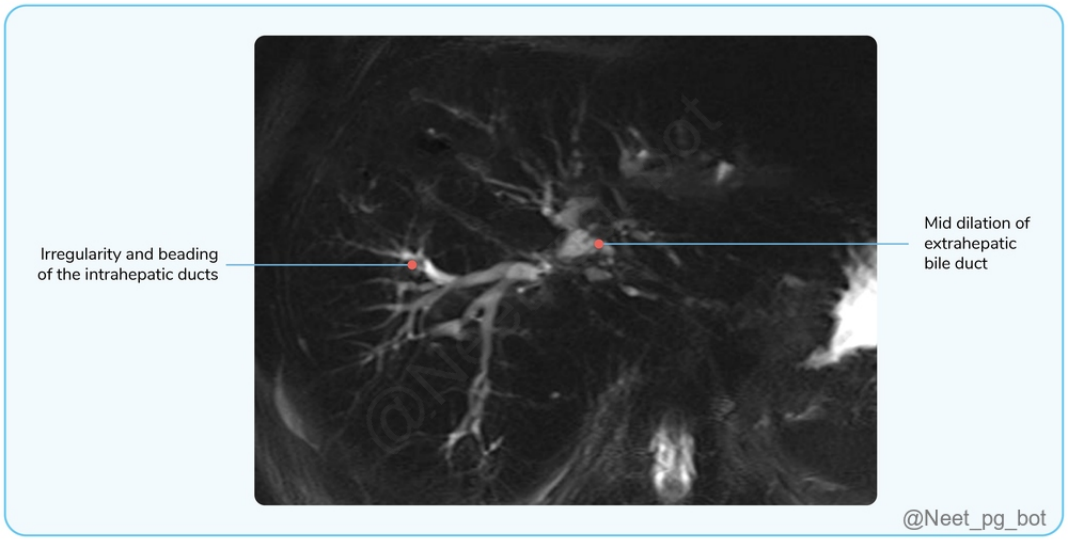
D. Multiple large masses in the liver

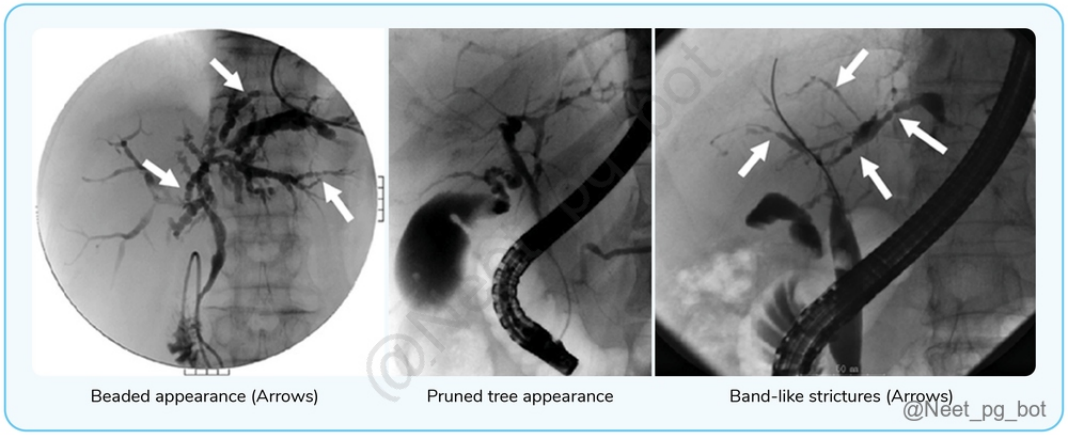
Correct Answer: B. Beaded appearance due to alternating strictures and dilations

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: Beaded appearance due to alternating strictures and dilations is the hallmark finding of PSC on MRCP The alternating areas of narrowing and dilation give the bile ducts a characteristic "beaded" or string-of-pearls appearance This pattern reflects the chronic, patchy inflammation and fibrosis that affects both intrahepatic and extrahepatic bile ducts in PSC, making it a key diagnostic feature for this condition. There is also obliteration of the peripheral portions of the ducts, giving it the “pruned tree” appearance. MRCP showing a beaded appearance of dilated intrahepatic bile ducts in PSC ERCP showing: A) Beaded appearance, B) Pruned tree appearance, C) Band-like strictures Diffuse dilation of bile ducts (Option A): PSC does not cause uniform dilation throughout the bile ducts. Instead, the disease leads to segmental areas of narrowing (strictures) and dilations, which result from progressive inflammation and fibrosis of the bile ducts. A single long stricture in the common bile duct (Option C): A single long stricture would be more indicative of cholangiocarcinoma or a malignant obstruction, rather than PSC. Multiple large masses in the liver (Option D): The presence of large masses in the liver would suggest a different pathology, such as metastatic liver disease or advanced hepatocellular carcinoma, rather than PSC.





References:

Grainger and Allison’s Diagnostic Radiology, 7th Edition, Page 670

Textbook of Radiology and Imaging, David Sutton, 8th Edition, Volume 1, Page 2662, 2663

↑ *Back to this question in Part A*

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Q32: A 2-month-old infant presents with persistent jaundice and pale stools. An ultrasound reveals no biliary dilation but shows the "triangular cord sign." Which condition is most likely suggested by this finding? (Q852905)

A. Choledochal Cyst

B. Biliary Atresia

C. Neonatal Hepatitis

D. Caroli’s Disease

Correct Answer: B. Biliary Atresia

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: The "triangular cord sign" is a hallmark finding on ultrasound in biliary atresia . This sign represents a fibrotic remnant of the bile ducts near the porta hepatis. Other ultrasound findings include an absent/abnormal gallbladder and a wide hepatic artery. Biliary atresia also presents with persistent jaundice and pale stools in infancy, which further supports this diagnosis. Triangular cord sign on USG Other Investigations: HIDA Scan: Lack of tracer in the duodenum after 24 hours suggests biliary atresia. Radioisotope Studies: Highly sensitive to biliary atresia but poor specificity due to other conditions affecting bile excretion (e.g., infections, metabolic diseases). Preoperative percutaneous transhepatic cholecysto-cholangiography combined with liver biopsy has 100% sensitivity Definitive diagnosis: Intraoperative cholangiography Choledochal Cyst (Option A): They are characterized by abnormal dilation of the bile ducts, which is absent in this case. Ultrasound in choledochal cysts typically shows prominent bile ducts and potential cystic formations, thus making it an unlikely diagnosis. Neonatal Hepatitis (Option C): Feature Biliary Atresia Neonatal Hepatitis Nature Extrahepatic obstruction Hepatocellular inflammation Onset Persistent jaundice >2 weeks Similar presentation Stool color Acholic (clay-colored) Usually pigmented (may be pale sometimes) GGT Markedly elevated Mild/moderate elevation Ultrasound Absent/small GB, triangular cord sign Normal GB HIDA Scan No excretion into intestine Delayed but present excretion Liver biopsy Bile duct proliferation, fibrosis Giant cell transformation, hepatocyte injury Treatment Kasai surgery Supportive, nutritional therapy Caroli’s Disease (Option D): This is a rare condition associated with segmental dilation of the intrahepatic bile ducts, leading to bile duct cyst formation. The absence of bile duct dilation in this case makes Caroli’s disease an unlikely diagnosis.



Triangular cord sign on USG

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References:

Grainger and Allison's Diagnostic Radiology, 7th Edition, Page 1819, 1822, 1823, 1840

Textbook of Radiology and Imaging, David Sutton, 8th Edition, Volume 1, Page 2600

↑ *Back to this question in Part A*

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Q33: Which investigation is most sensitive for detecting bile leakage but does not provide information about the exact location of the leak? (Q852906)

A. HIDA Scan

B. CECT

C. MRI with Hepatobiliary Contrast

D. Percutaneous Transhepatic Cholangiography

Correct Answer: A. HIDA Scan

■ *Listen (English)*

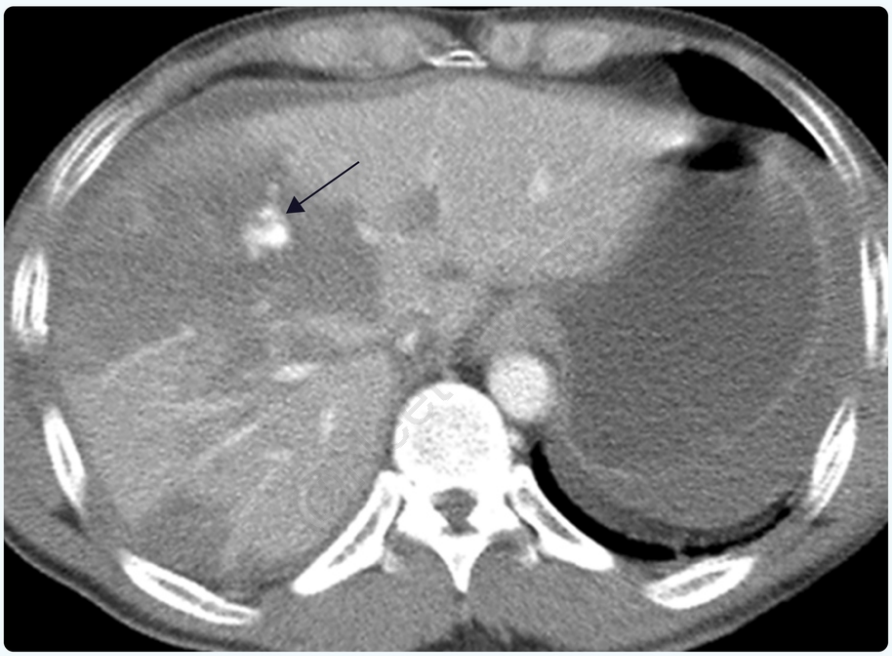
■ *Listen (Hindi)*

Explanation: A Hepatobiliary Iminodiacetic Acid (HIDA) scan is nearly 100% sensitive, for detecting bile leaks. It works by injecting a radioactive tracer that travels through the biliary system, highlighting any bile leakage. However, it cannot precisely identify the origin of the leak, making it less useful for surgical planning or pinpointing the exact location. HIDA scan: Most sensitive for bile leak (gold standard is ERCP) Most accurate for acute cholecystitis (IOC- USG) Best investigation to rule out EHBA (gold standard - PTC) CECT (Option B): CECT is the initial imaging study used in patients with suspected postoperative complications. It is useful for identifying localized fluid collections such as bilomas (encapsulated bile) or abscesses. While it can indicate the presence of fluid that might suggest a bile leak, it is less sensitive than HIDA for confirming the leak itself and may miss smaller leaks. MRI with Hepatobiliary Contrast (Option C): MRI with hepatobiliary-specific contrast agents, like gadoxetate disodium, effectively visualises the anatomy of the biliary system and can identify the exact location of a leak by showing contrast extravasation, but it is not sensitive in detecting leaks as compared to HIDA scan. Percutaneous Transhepatic Cholangiography (Option D): PTC is a specialized imaging technique where a contrast dye is injected directly into the bile ducts through a needle inserted into the liver. While it can provide details of the biliary anatomy, it is not typically the first choice for detecting leaks and is used more often when ductal injury is suspected.



HIDA scan showing biliary leak (Arrow)

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CECT showing bile leak (Arrow)

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MRI showing bile leak (Arrows)

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References:

Grainger and Allison’s Diagnostic Radiology, 7th Edition, Page 673

Textbook of Radiology and Imaging, David Sutton, 8th Edition, Volume 1, Page 2602, 2669

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emedicine.medscape.com/article/171886-workup#

pmc.ncbi.nlm.nih.gov/articles/PMC4035350/

ajronline.org/doi/10.2214/AJR.10.5180

↑ *Back to this question in Part A*

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Q34: A 50 y/o man presents with severe epigastric pain radiating to the back for the past two days. His serum lipase is elevated to five times the normal limit. An abdominal X-ray shows a dilated loop of small intestine near the pancreas. Which of the following is the most likely imaging sign observed on the X-ray in this patient? (Q852907)

A. Colon cut-off sign

B. Pneumoperitoneum

C. Sentinel loop sign

D. Ground-glass opacity



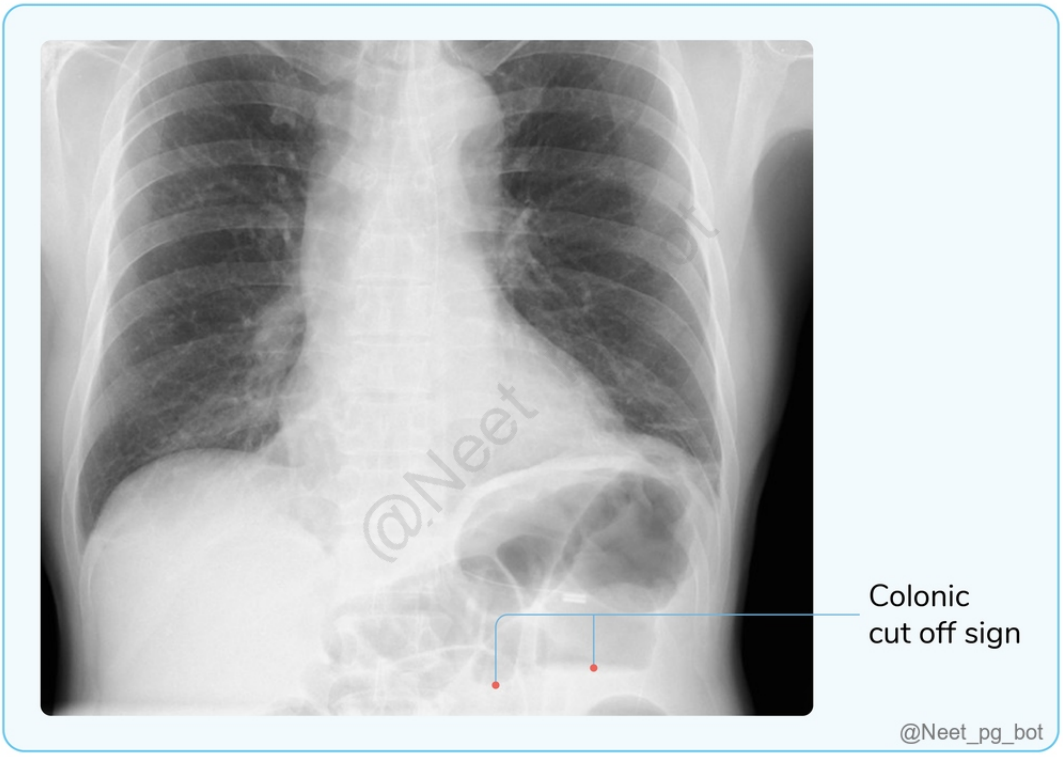
Correct Answer: C. Sentinel loop sign

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: The patient’s clinical presentation of severe epigastric pain radiating to the back and elevated lipase levels strongly suggests acute pancreatitis . Sentinel loop sign is a classic X-ray finding in acute pancreatitis, showing a dilated loop of the small intestine near the pancreas due to localized ileus caused by the inflammation. Acute Pancreatitis Clinical Diagnosis (Requires 2 of 3): Abdominal pain is strongly suggestive of acute pancreatitis. Serum amylase and/or lipase level at least 3 times the upper limit of normal. Imaging findings characteristic of acute pancreatitis. X-ray Features • Sentinel loop sign (Option C) : ■ Dilated loop of small intestine near the inflamed pancreas due to localized ileus. ■ Significance : Early indicator of acute pancreatitis on X-ray. Sentinel loop sign • Colon cut-off sign : ■ Abrupt termination of gas in the colon at the splenic flexure, with collapsed distal colon loops. ■ Significance : Suggests localized pancreatic inflammation, causing colonic spasm as an indirect sign of acute pancreatitis Investigations of Choice: Contrast-enhanced CT (CECT) : Primary tool for assessing pancreatic necrosis, peripancreatic inflammation, fluid collections, and complications. Most reliable for staging and detecting complications. May underestimate necrosis if done in the first 24 hours. Morphological Types (Revised Atlanta Classification 2008): Interstitial oedematous pancreatitis :: Mild form with pancreatic oedema and swelling but no necrosis. Necrotising pancreatitis : Severe form involving pancreatic parenchymal necrosis, associated with higher morbidity and mortality. Colon cut-off sign (Option A) : Seen in acute pancreatitis, it indicates abrupt gas cut-off in the colon at the splenic flexure but doesn't explain small intestine dilation abdominal X-ray findings. Pneumoperitoneum (Option B) : Refers to free air under the diaphragm, often due to bowel perforation, and is not linked to acute pancreatitis. Ground-glass opacity (Option D) : Typically seen in lung imaging (e.g., pneumonia, ARDS), not related to pancreatitis or abdominal X-ray findings.





References:

Grainger and Allison’s Diagnostic Radiology, 7th Edition, Page 680,684,685

Textbook of Radiology and Imaging, David Sutton, 8th Edition, Volume 1, Page 2022,2023,2725

↑ *Back to this question in Part A*

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Q35: A 50-year-old male presents with severe epigastric pain radiating to his back, ongoing for four days. Serum lipase is elevated. A contrast-enhanced CT scan reveals over 30% pancreatic necrosis, multiple peripancreatic fluid collections, and bilateral pleural effusions. Based on the Modified CT Severity Index (MCTSI) for acute pancreatitis, how would you grade this patient's condition? (Q852909)

A. Mild

B. Moderate

C. Severe

D. Very severe

Correct Answer: C. Severe

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: Answer: C) Severe The Modified CT Severity Index (MCTSI) helps to assess the severity of acute pancreatitis based on imaging findings. The patient has: Pancreatic/peripancreatic fluid collections and fat necrosis (4 points) Pancreatic necrosis (>30%) (4 points) Extrapancreatic complications (bilateral pleural effusions) (2 points) Total points: 10 , which classifies the condition as severe according to MCTSI (8-10 points). Modified CT Severity Index for Acute Pancreatitis Pancreatic inflammation Points Normal Pancreas 0 Intrinsic pancreatic abnormalities with/without inflammatory changes in peripancreatic fat 2 Pancreatic or peripancreatic fluid collection or peripancreatic fat necrosis. 4 Pancreatic necrosis:- None 0 ≤30% 2 >30% 4 Extrapancreatic complications (pleural effusion, ascites, vascular complications, GI tract involvement) 2 Total 0-2 Points = Mild 4-6 = Moderate 8-10 = Severe

References:

Grainger and Allison's Diagnostic Radiology, 7th Edition, Page 684

↑ *Back to this question in Part A*

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Q36: A 52 y/o man diagnosed with necrotizing pancreatitis presents with worsening abdominal pain. A CT scan on day 3 of his illness is performed. What is the most likely imaging finding seen on day 3 in this patient? (Q852912)

A. Bulky pancreas with mild thickening

B. Parenchymal calcifications

C. Non-enhancing areas in the pancreatic body and tail

D. Homogeneous enhancement of the pancreas

Correct Answer: C. Non-enhancing areas in the pancreatic body and tail

■ *Listen (English)*

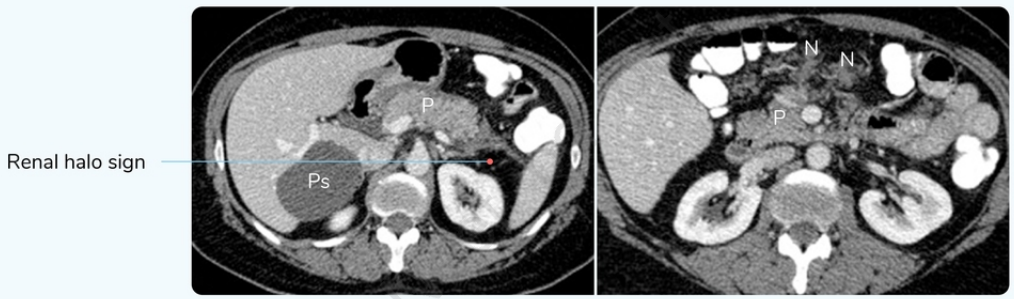
■ *Listen (Hindi)*

Explanation: By day 3 of necrotizing pancreatitis , areas of non-enhancement are observed on imaging due to tissue necrosis. Features of Acute Pancreatitis Interstitial edematous pancreatitis: Swollen pancreas with intact microcirculation, showing homogeneous contrast enhancement, often with mild peripancreatic fat stranding and fluid. Necrotizing pancreatitis: Disruption of microcirculation leads to nonenhancement of necrotic pancreatic tissue, with time-dependent pancreatic and peripancreatic inflammatory changes. Imaging Findings in Acute Pancreatitis Bulky Pancreas • Enlarged pancreas with heterogeneous enhancement. • Mild thickening of pancreatic tissue. • Indicative of oedema in acute interstitial edematous pancreatitis. CECT revealing bulky pancreas Renal halo sign: • The "renal halo" sign presents as a high-density outline around the kidney indicating the inflammatory process in acute pancreatitis extending toward the left pancreatic tail and left pararenal space CECT revealing Renal halo sign CT Findings Day 1: • Normally enhancing pancreas Day 3: • Significant necrosis observed. • The greater part of the pancreatic body and tail shows no enhancement. Post 2 weeks: • Gas bubbles in the peripancreatic collection are consistent with an infected acute necrotic collection. Features of chronic pancreatitis Parenchymal calcifications Ductal dilatation Parenchymal atrophy due to fibrosis and chronic damage. Cystic lesions Bulky pancreas with mild thickening (Option A) : This finding is characteristic of interstitial edematous pancreatitis , not necrotizing pancreatitis. Parenchymal calcifications (Option B) indicate chronic changes and are not typically seen in acute necrotizing pancreatitis. Homogeneous enhancement of the pancreas (Option D) : This finding suggests intact microcirculation and is typical of early interstitial edematous pancreatitis , not necrotizing pancreatitis.



Bulky pancreas in Acute pancreatitis

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Renal halo sign- radiographic appearance of
a radiolucent (darker) halo around the kidneys

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Showing normal enhancing pancreas

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Dual phase CT showing necrosis on day 3

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Infected acute necrotic collection-Post 2 week (Arrows)

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References:

CT changes

Bulky pancreas

Imaging findings

Grainger and Allison’s Diagnostic Radiology, 7th Edition, Page 692

Textbook of Radiology and Imaging, David Sutton, 8th Edition, Volume 1, Page 2724

↑ *Back to this question in Part A*

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• [05_Hepatobiliary Radiology] 012 Previous Year Questions

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[05_Hepatobiliary Radiology] 012 Previous Year Questions — Quick Jump

Q1 (p. 1097) *Q2 (p. 1098)* *Q3 (p. 1099)* *Q4 (p. 1104)*

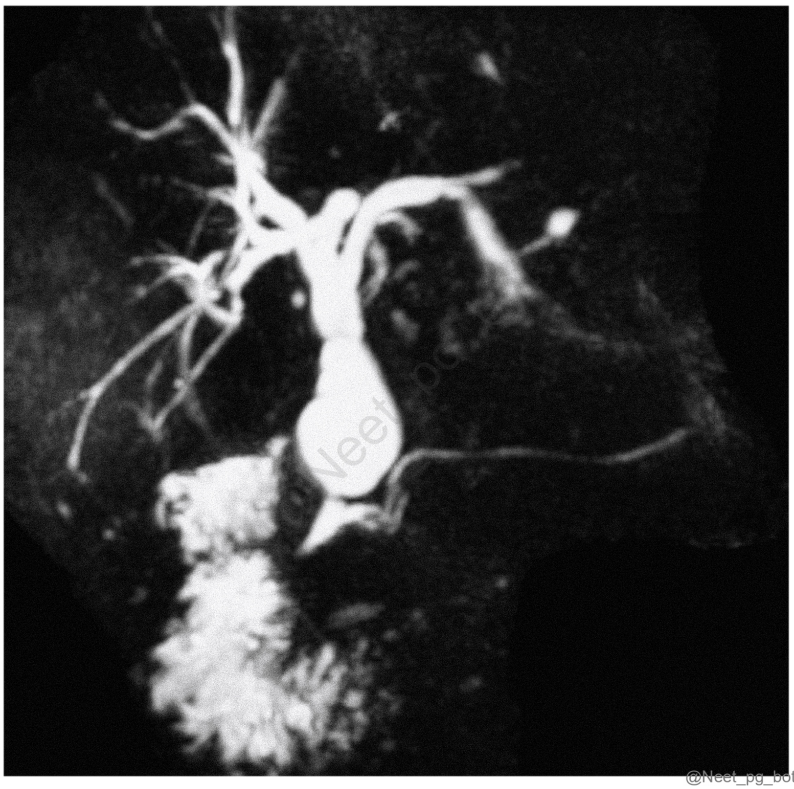
Q1: What condition is indicated by the MRCP image below? (Q843963)

A. Choledochal cyst

B. Cholangiocarcinoma

C. Cholelithiasis

D. Choledocholithiasis



Correct Answer: A. Choledochal cyst

Explanation: Correct Option A - Choledochal cyst: The given MRCP image shows a fusiform dilatation of the common hepatic and common bile ducts. Fusiform dilatation of the extrahepatic biliary ducts on MRCP is the classic hallmark of a Type I choledochal cyst , the most common subtype (≈70–80%). Type I involves smooth,

uniform enlargement of the CHD and CBD, and MRCP is the investigation of choice for defining ductal anatomy. It is characterized by the dilatation of bile duct It is a congenital anomaly of the bile duct It is more common in children and females CECT of choledochal cyst: Central dot sign (in Caroli's disease-type V) Incorrect Options: Option B: Cholangiocarcinoma Typically causes irregular, asymmetric ductal narrowing or the shouldering sign , not smooth fusiform dilatation Option C: Cholelithiasis Gallstones appear as echogenic foci with acoustic shadowing on USG; MRCP does not show fusiform dilatation of the entire extrahepatic system. Option D: Choledocholithiasis Causes obstructive biliary duct dilatation , but it is proximal to the level of the stone , and not smooth, uniform fusiform dilatation of the entire ductal length.

References:

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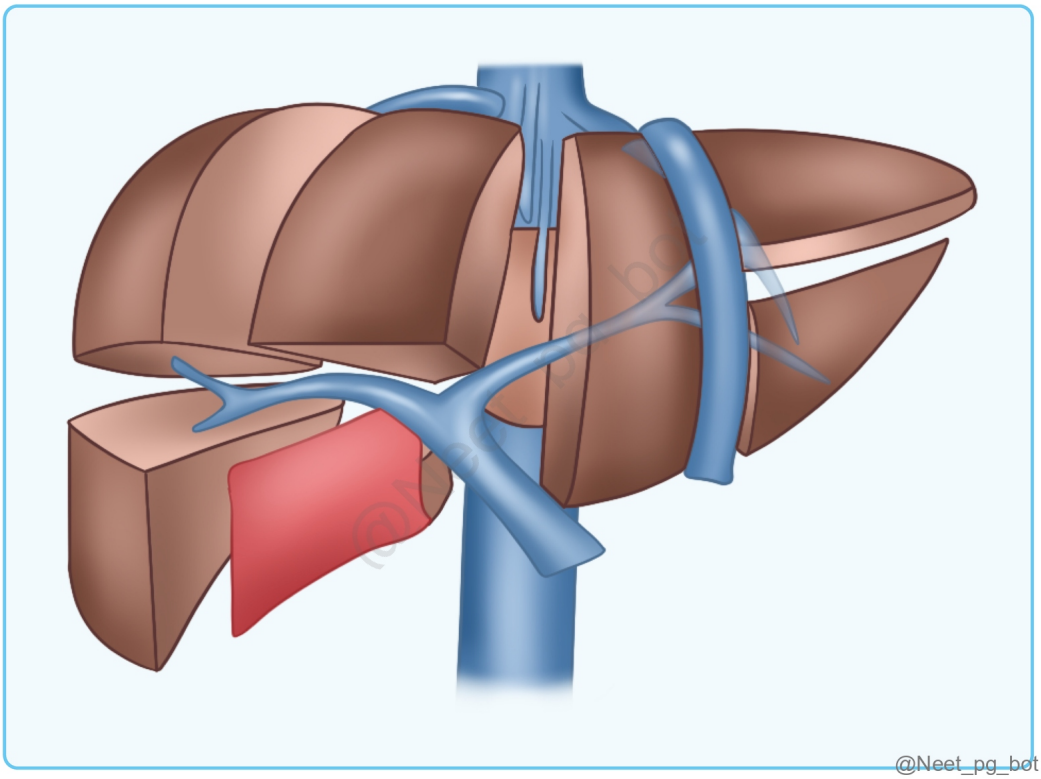
Q2: Please determine the segment of the liver that is highlighted in red in the provided image. (Q858192)

A. V

B. IVa

C. VII

D. III



Correct Answer: A. V

Explanation: Segment V : The segment highlighted in red is segment V , which is a part of the liver . In liver segmental anatomy, segment V corresponds to the anterior inferior segment of the right lobe . This segment is situated near the right hepatic vein and is typically visualized on imaging studies like CT or MRI scans. IVa (option B) : Incorrect because segment IVa is part of the left lobe of the liver, specifically the anteromedial portion. It is not located in the area highlighted in red in the image. VII (option C) : Incorrect because segment VII is located in the posterior part of the right lobe of the liver, typically near the right hepatic vein but further back compared to segment V. III (option D) : Incorrect because segment III is part of the left lobe of the liver and located in the posterior part of the left lobe, closer to the left hepatic vein , which does not match the highlighted segment.

References:

Normal liver anatomy - PMC

↑ *Back to this question in Part A*

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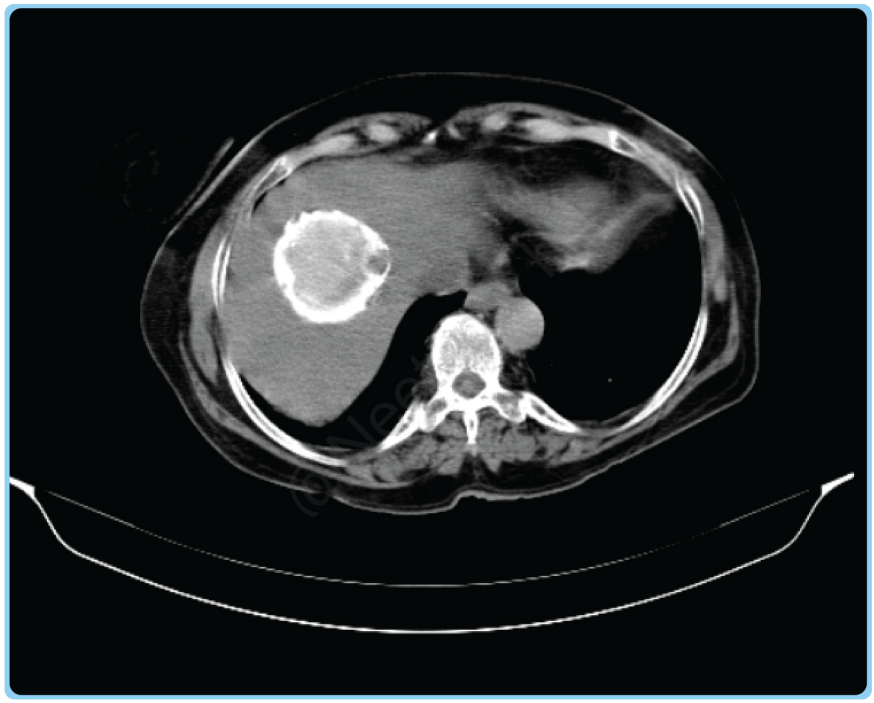
Q3: Identify the condition based on the non-contrast CT scan of a patient given below: (Q855072)

A. Hepatocellular carcinoma

B. Fibronodular hyperplasia

C. Liver abscess

D. Hydatid cyst

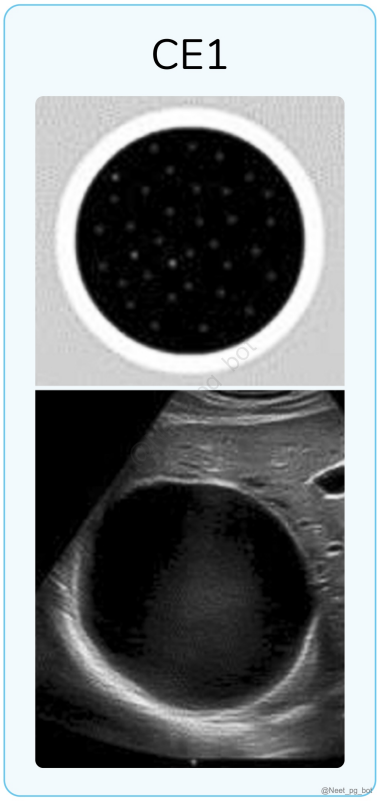


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Correct Answer: D. Hydatid cyst

Explanation: A calcified cyst on a non-contrast CT scan is characteristic of a hydatid cyst caused by Echinococcus granulosus . The calcification indicates a chronic or resolved infection, typical in the late stage of a hydatid cyst. Hydatid cyst is caused by infection with Echinococcus granulosus or Echinococcus multilocularis . The disease progresses through stages: cyst formation, growth, and eventual calcification. On a non-contrast CT scan , calcified hydatid cysts appear as well-defined, round or oval lesions with peripheral or complete calcification. This calcification signifies a chronic or inactive cyst. The cyst's "water lily sign" or "daughter cysts" (when present) are specific features but are better visualised on other imaging modalities. In endemic areas, calcified hydatid cysts are diagnostic of previous or resolved hydatid disease. WHO Classification of Hydatid Cysts (Cystic Echinococcosis): The WHO classification is based on ultrasound findings, helping in diagnosing and managing cystic echinococcosis. WHO Classification Gharbi classification Classification Description Imaging Stage Classification CE1 Unilocular anechoic lesion with a 'double line' sign. {{caption_text}} Active Type I CE2 Cyst with multiple septations, resembling a honeycomb. {{caption_text}} Active Type III CE3a Unilocular cyst with detached membranes and 'water-lily' sign. {{caption_text}} Transitional Type II CE3b Cyst with daughter cysts in a solid matrix. {{caption_text}} Transitional Type III CE4 Heterogeneous echogenicity, no daughter cysts indicating degeneration. {{caption_text}} Inactive Type IV CE5 Calcified cyst, indicating inactivity. {{caption_text}} Inactive Type V Imaging: Ultrasound: Primary modality for evaluating hydatid cysts. Identifies key features like

floating membranes and daughter cysts. CT and MRI: Used for detecting complications (e.g., cyst rupture, infection).



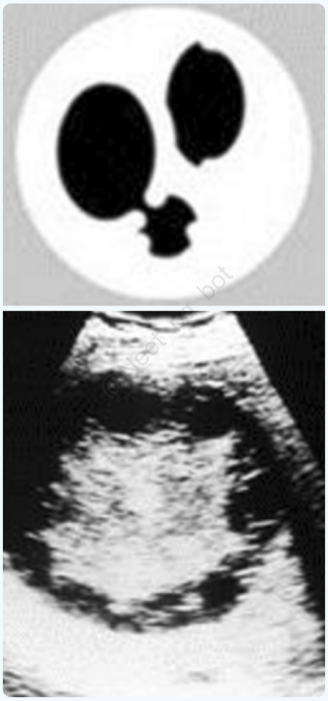


CE3a

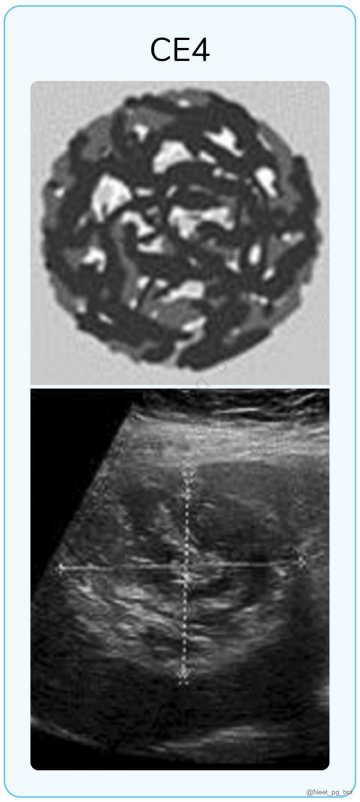


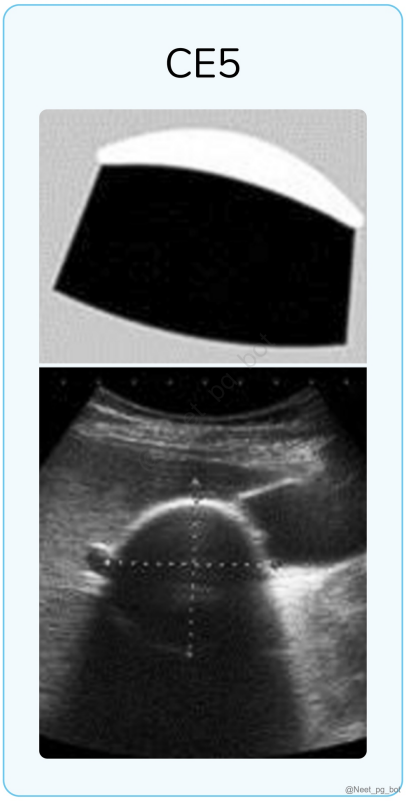
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CE3b



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References:

Hydatid cysts - WHO classification

Gharbi

↑ *Back to this question in Part A*

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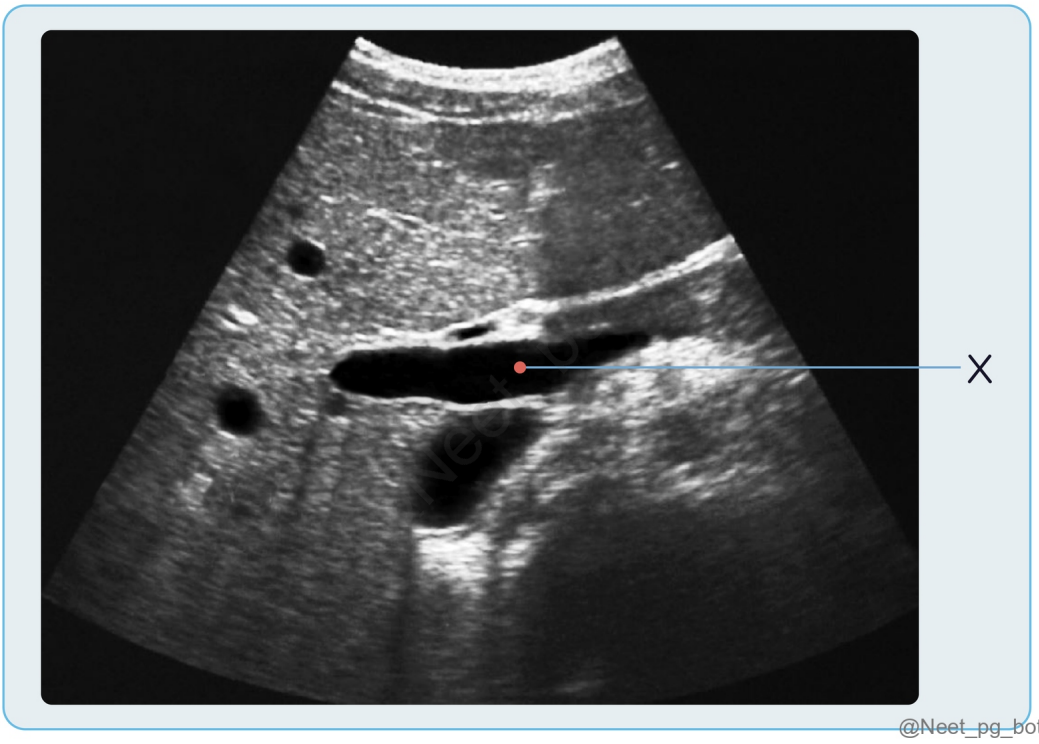
Q4: Please identify the structure labelled 'X' in the given ultrasound image of the liver. ■ (Q859278)

A. Portal vein

B. Hepatic artery

C. Hepatic vein

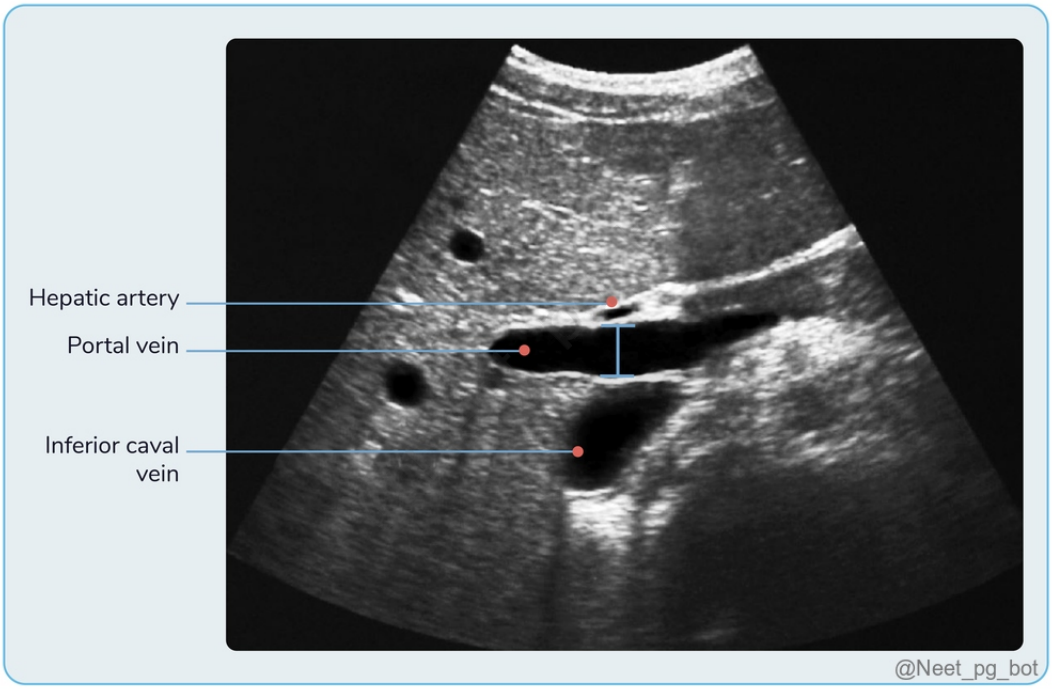
D. Inferior vena cava

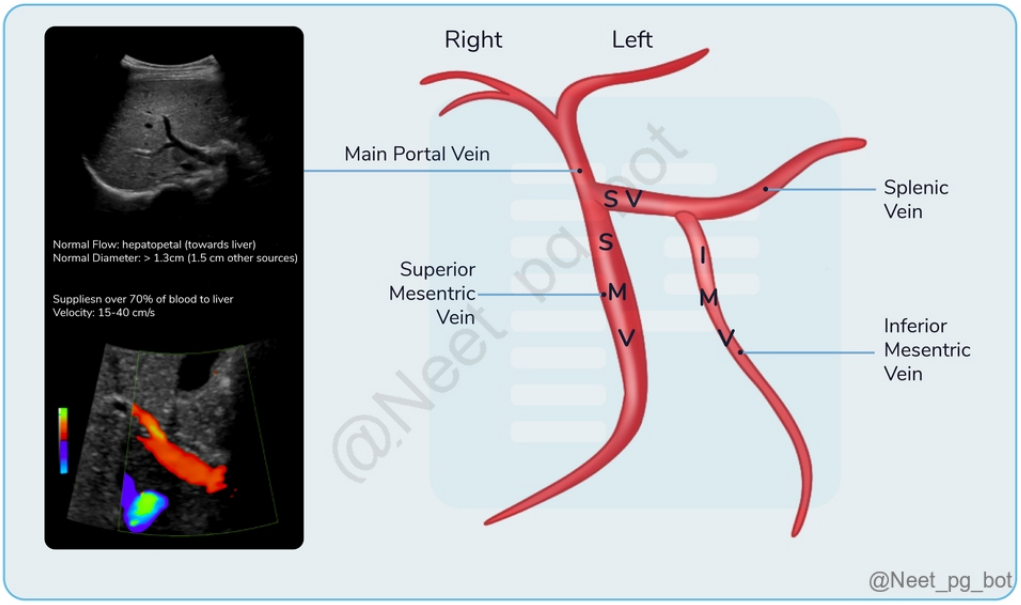


Correct Answer: A. Portal vein

Explanation: In an ultrasound of the liver, the portal vein appears as a tubular structure running through the liver tissue. It can be visualized as a hypoechoic (darker) tube with a characteristic branching pattern. The portal vein plays a crucial role in delivering nutrients and substances absorbed from the digestive system to the liver for processing and detoxification. {{caption_text}} {{caption_text}} Hepatic Artery (Option B): The hepatic artery is a blood vessel that supplies oxygenated blood to the liver. In an ultrasound of the liver, the hepatic artery may be visualized as a smaller, pulsatile vessel alongside the portal vein. It appears as a hyperechoic (brighter) tube with a

pulsating motion. The hepatic artery delivers oxygenated blood to the liver cells for their metabolic needs. Hepatic Vein (Option C): The hepatic veins are blood vessels that drain deoxygenated blood from the liver and carry it back to the heart via the inferior vena cava. In an ultrasound of the liver, the hepatic veins can be seen as hypoechoic (darker) tubular structures that converge and eventually merge into a single vessel known as the main hepatic vein. The hepatic veins drain blood from the liver and play a role in the liver's excretory function. Inferior Vena Cava (Option B): The inferior vena cava (IVC) is a large vein that receives deoxygenated blood from the lower body and carries it to the right atrium of the heart. In an ultrasound of the liver, the IVC is typically visualized as a larger, hypoechoic (darker) vessel located posterior to the liver. It can be observed entering the liver at the level of the main hepatic vein. The IVC acts as the final drainage pathway for blood leaving the liver through the hepatic veins.





References:

Grainger and Allison’s Diagnostic Radiology, 7th Edition, Page no: 1456

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• [06_OBGy Imaging] 013 Obstetrics Gynaecology And Breast Imaging

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[06_OBGy Imaging] 013 Obstetrics Gynaecology And Breast Imaging — Quick Jump

Q1 (p. 1107)	*Q2 (p. 1109)*	*Q3 (p. 1112)*	*Q4 (p. 1117)*	*Q5 (p. 1118)*	*Q6 (p. 1120)*
Q7 (p. 1120)	*Q8 (p. 1125)*	*Q9 (p. 1126)*	*Q10 (p. 1129)*	*Q11 (p. 1130)*	*Q12 (p. 1131)*
Q13 (p. 1133)	*Q14 (p. 1137)*	*Q15 (p. 1139)*	*Q16 (p. 1142)*	*Q17 (p. 1144)*	*Q18 (p. 1146)*
Q19 (p. 1149)	*Q20 (p. 1154)*	*Q21 (p. 1157)*			

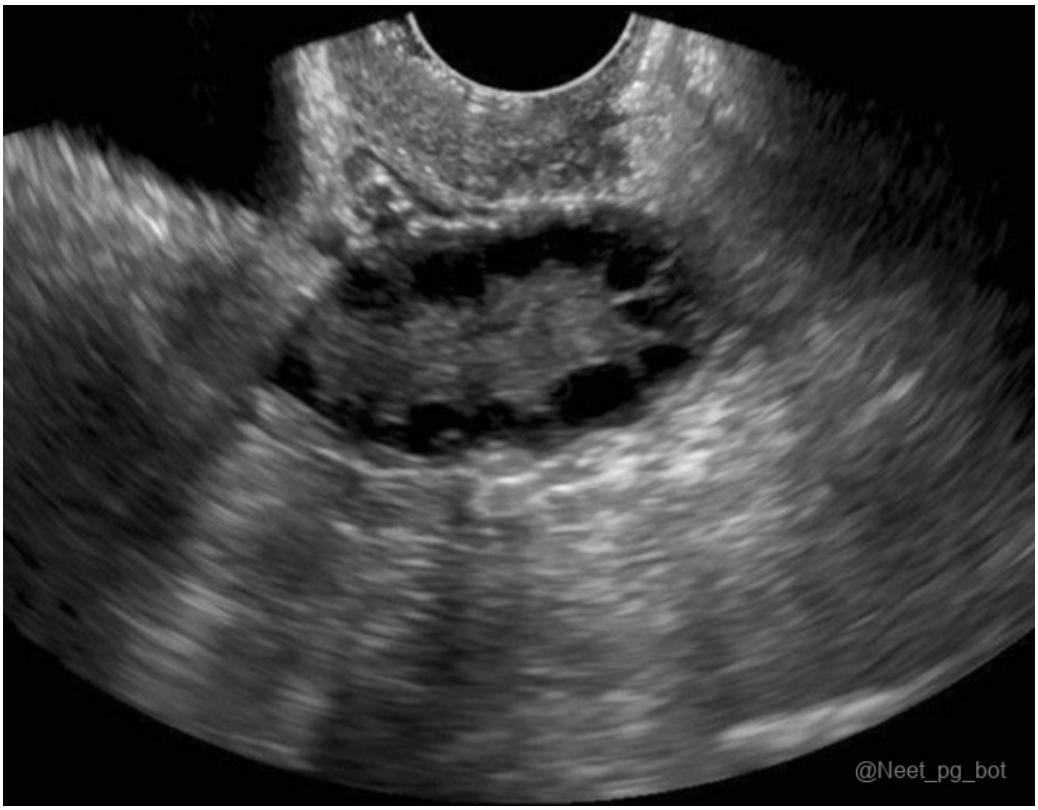
Q1: Based on the given ultrasound of the ovary, which radiological pattern is observed? (Q882193)

A. Chocolate cyst

B. String of pearls sign

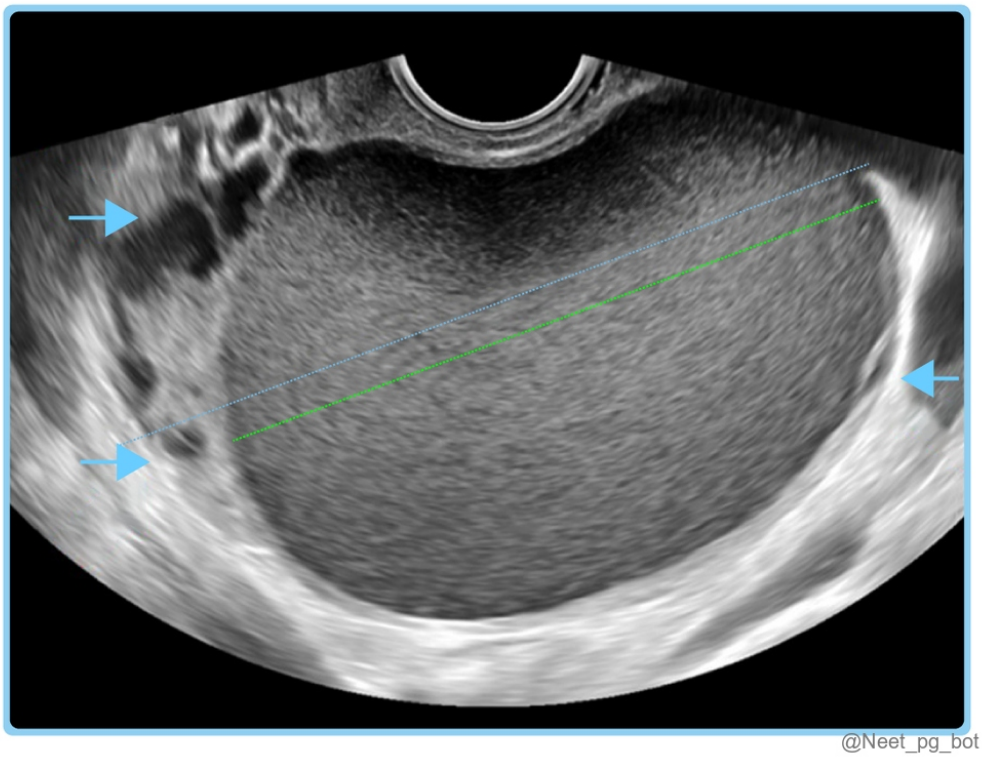
C. Honeycomb appearance

D. Ground-glass appearance



Correct Answer: B. String of pearls sign

Explanation: The string of pearls sign refers to the peripheral arrangement of multiple small follicles (2–9 mm) around the ovary with increased central stromal echogenicity, a classic ultrasound feature of polycystic ovary syndrome. This appearance reflects arrested follicular development and is a key imaging criterion used in PCOS evaluation. Chocolate cyst (Option A) refers to ovarian endometrioma, which shows a homogenous low-level internal echo pattern rather than peripheral follicles. Honeycomb appearance (Option C) is typically described in hydatidiform mole or certain cystic lesions, not ovarian follicular distribution. Ground-glass appearance (Option D) is seen in endometriomas, characterized by diffuse low-level internal echoes, not multiple discrete follicles.



References:

Williams Textbook of Gynecology, 4th Edition, Pages 490–491

Grainger & Allison's Diagnostic Radiology, 7th Edition, Volume 2, Pages 2124–2125

↑ *Back to this question in Part A*

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Q2: A 32-year-old woman presents for a routine ultrasound at 28 weeks of gestation. The obstetrician notes an abnormal S/D ratio in the umbilical artery Doppler assessment. Which of the following implications is most likely associated with this finding? (Q853430)

A. Low S/D ratio reflects increased resistance in placental blood flow

B. Increased resistance to blood flow in the placenta, indicating potential placental insufficiency

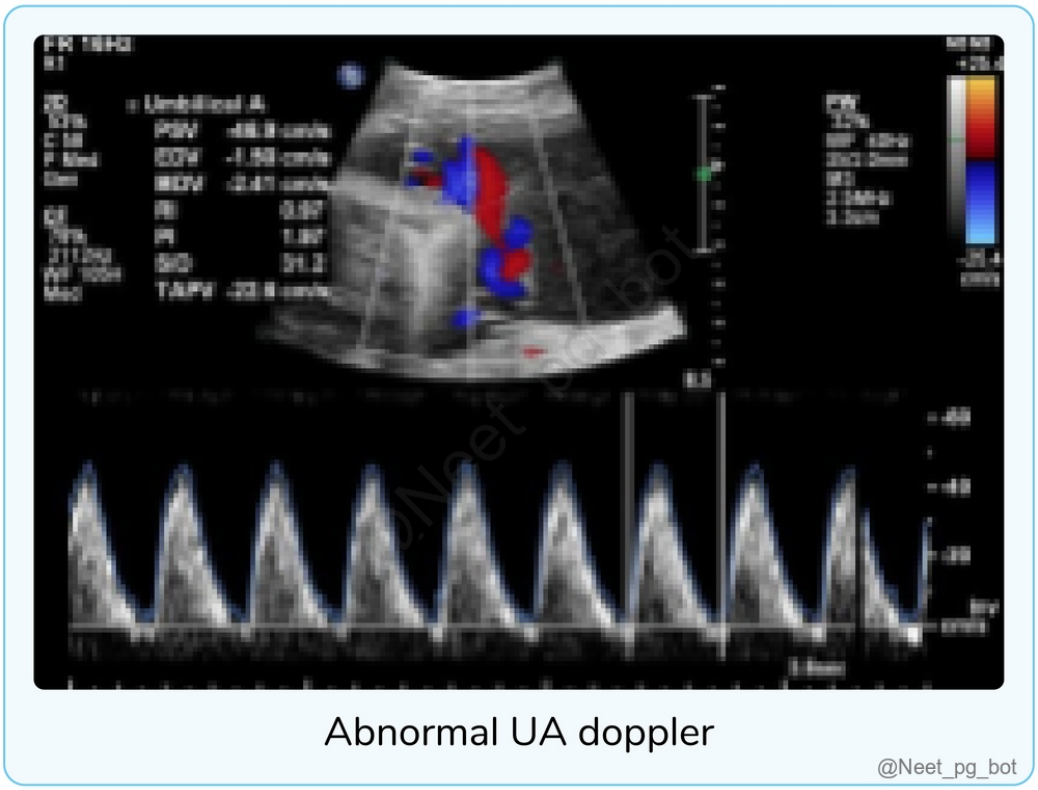
C. Fetal anemia requiring immediate intervention

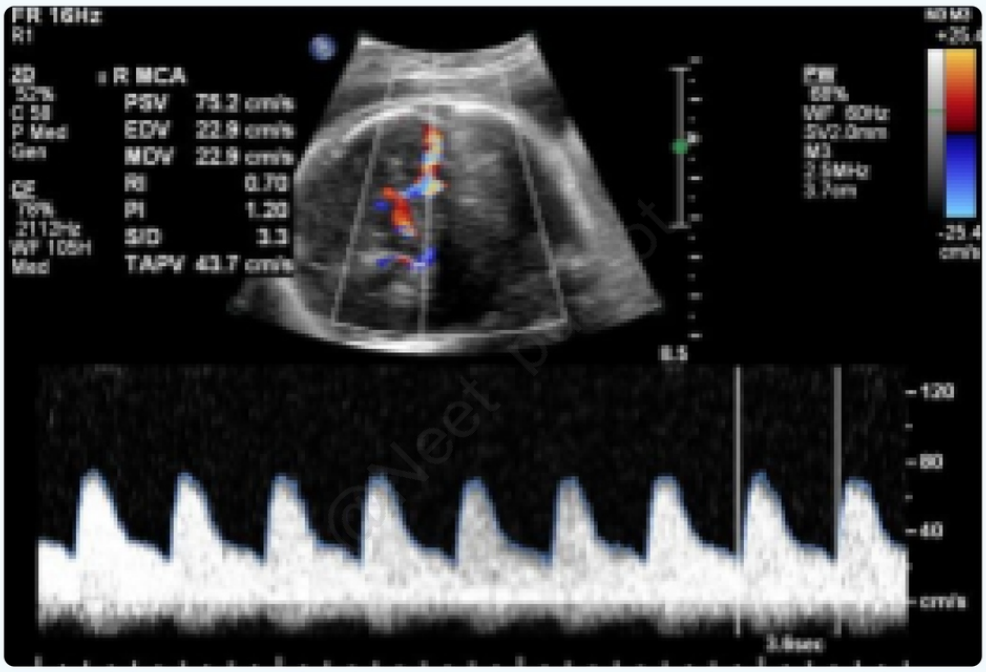
D. Indicated fetal distress and warrants delivery

Correct Answer: B. Increased resistance to blood flow in the placenta, indicating potential placental insufficiency

- *Listen (English)*
- *Listen (Hindi)*

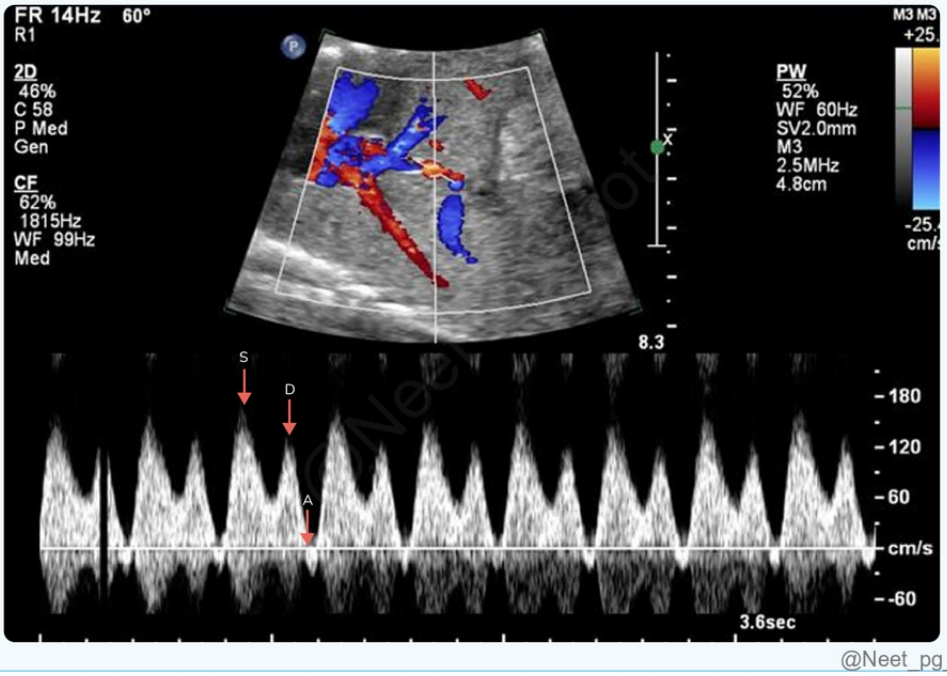
Explanation: An abnormal S/D ratio indicates increased resistance in placental blood flow, which may affect fetal growth and necessitate closer monitoring. Obstetric Doppler Applications Fetal Well-Being Assessment Crucial for evaluating blood flow in the fetus and placenta. An abnormal S/D ratio in umbilical artery Doppler indicates possible placental insufficiency and necessitates further evaluation. (Option B) High S/D ratio reflects increased resistance in placental blood flow, potentially affecting fetal growth. (Option A ruled out) S/D ratio>3 beyond 28 weeks is a marker of uteroplacental insufficiency Detection of Fetal Anemia Doppler assessment of middle cerebral artery (MCA) blood flow can indicate fetal anaemia. (Option B ruled out) MCA peak systolic velocity (>1.5 MoM) predicts moderate-to-severe fetal anemia Particularly relevant in blood-group allo-immunization cases, where fetal anemia is a severe risk. MCA Doppler in Growth Restriction While helpful for detecting fetal anaemia, its role in managing fetal growth restriction is unclear. An abnormal cerebroplacental ratio may indicate fetal distress, but its impact on delivery timing is not yet established as standard practice. (Option D ruled out) Ductus Venosus Assessment Like MCA Doppler, ductus venosus evaluation has not shown significant benefits in perinatal outcomes. Offers insights into cardiac dysfunction in severe growth restriction but is not routinely recommended for clinical management. Guiding Prenatal Procedures Doppler is instrumental in guiding prenatal interventions, including procedures like cordocentesis.





Abnormal MCA doppler in severe IUGR

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References:

Williams Obstetrics, 26th Edition, Page 261-263

DC Dutta's Textbook of Obstetrics, 9th Edition, Page 604

↑ *Back to this question in Part A*

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Q3: A 30-year-old female patient presents with infertility and undergoes radiological evaluation. Hysterosalpingography (HSG) reveals a "tobacco pouch" appearance and beaded fallopian tubes. Which of the following conditions is most likely responsible for these findings? (Q853432)

A. Hydrosalpinx

B. Endometriosis

C. Female Genital Tuberculosis (FGTB)

D. Ovarian Cyst

Correct Answer: C. Female Genital Tuberculosis (FGTB)

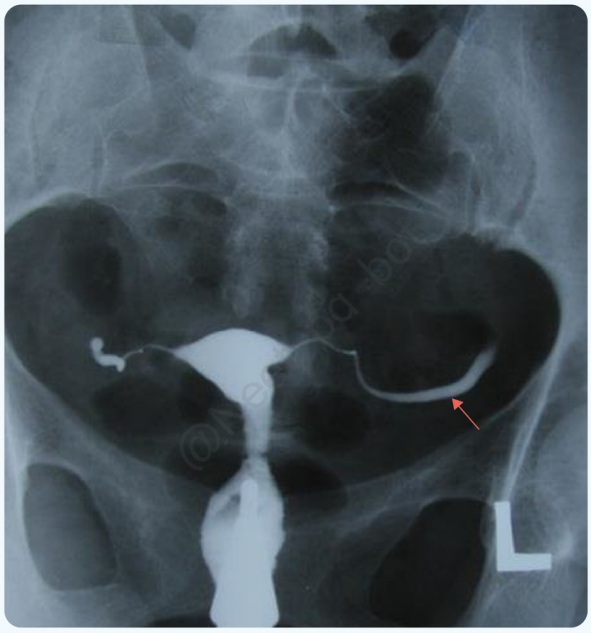
■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: Female Genital Tuberculosis (FGTB) is characterized by a "tobacco pouch" appearance on HSG. Radiological Findings in FGTB Tobacco pouch appearance Pipe stem appearance Beaded appearance Golf club appearance Cogwheel appearance In hydrosalpynx : Dilated fallopian tube with no granulomatous changes Absence of beading or cobblestone patterns.

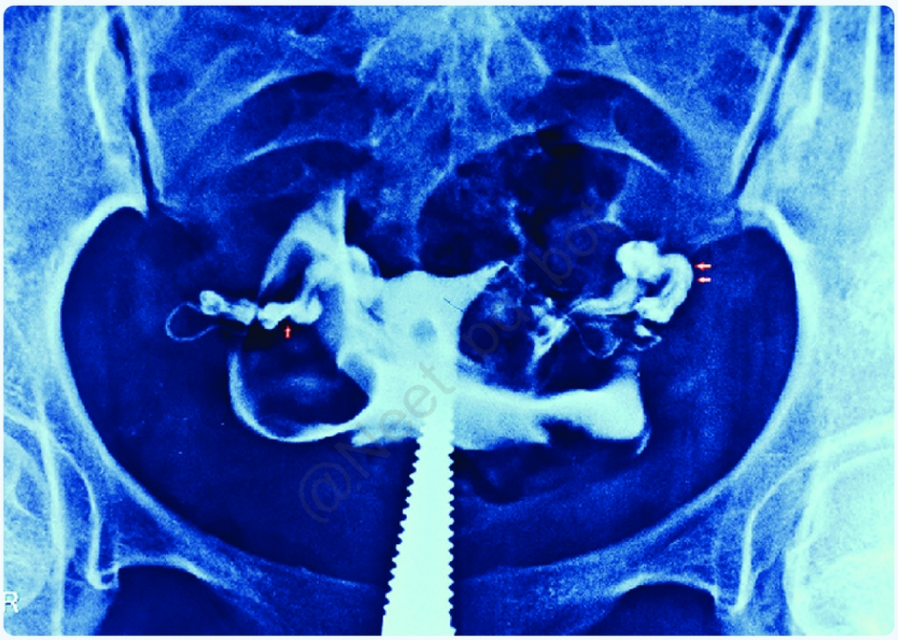


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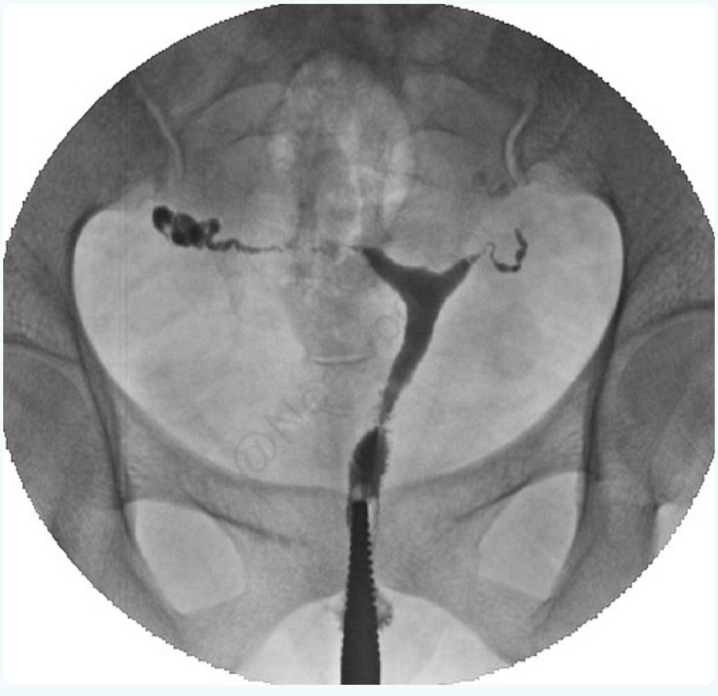
Pipe stem appearance

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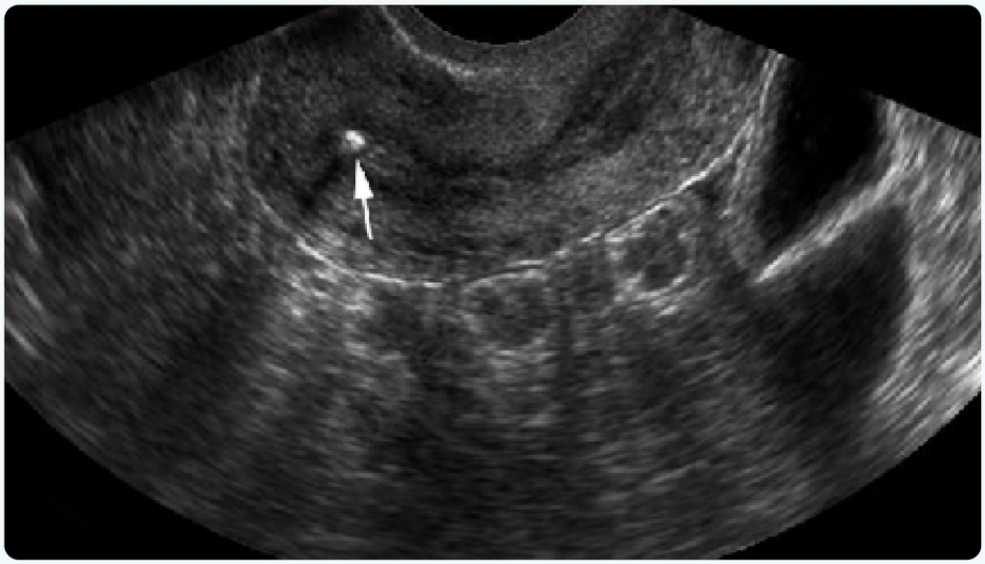


HSG showing Right-sided beaded tube (Arrow)

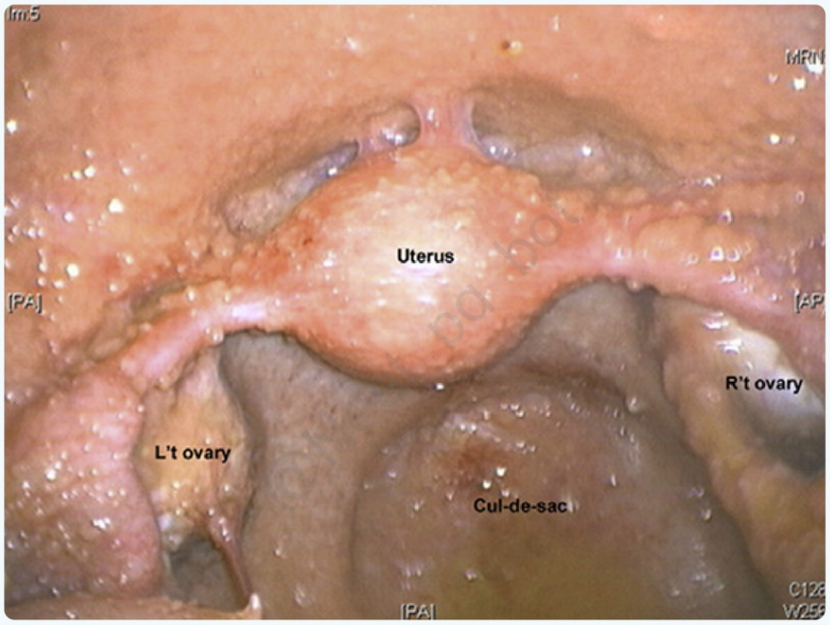
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Laparoscopy of Genital TB showing adhesions and nodules

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References:

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4515237/

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4463353/

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9527183/

Various hysterosalpingography findings of female genital tuberculosis: A case series - PMC

↑ *Back to this question in Part A*

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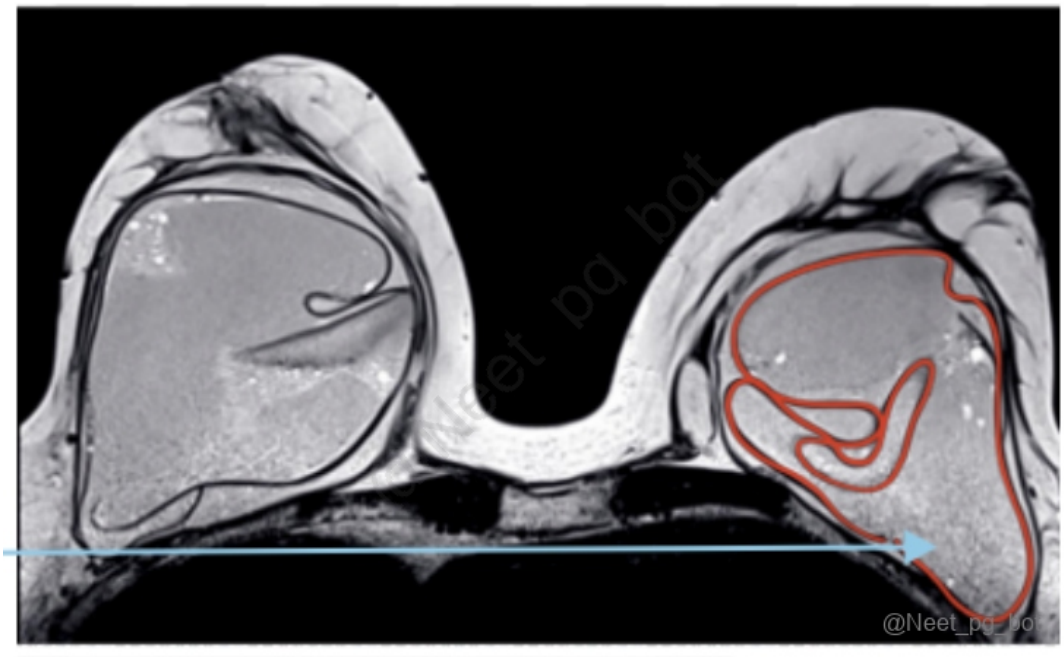
Q4: The following sign in breast MRI is characteristic of: (Q853441)

A. Fibrocystic breast disease

B. Intracapsular breast implant rupture

C. Extracapsular breast implant rupture

D. Fat necrosis of the breast



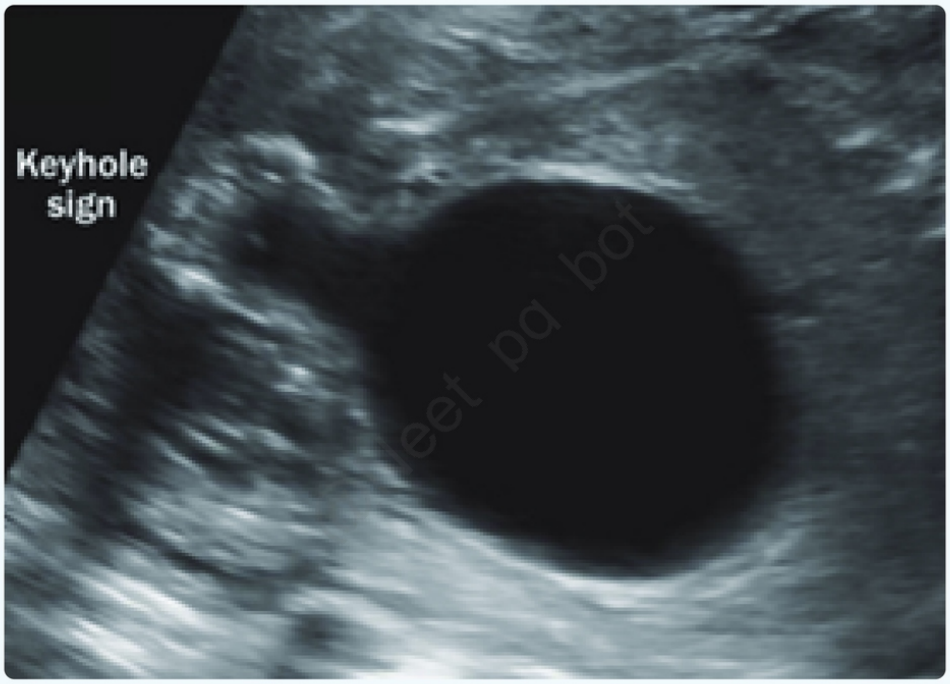
Correct Answer: B. Intracapsular breast implant rupture

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: The "Linguine Sign" is a characteristic MRI finding of an intracapsular breast implant rupture . Intracapsular Rupture : The implant shell breaks, but the fibrous capsule remains intact, preventing silicone from leaking out. On MRI, the collapsed shell appears as multiple wavy lines, resembling linguine. On USG, it appears

a stepladder appearance. Extracapsular Rupture : Silicone escapes beyond the fibrous capsule, often seen as the "Snowstorm Sign" on ultrasound. (Option C) Other MRI Signs: "Keyhole Sign" / "Teardrop Sign" : Silicone on both sides of a radial fold suggests rupture. "Salad Oil Sign" : Seen in double-lumen implant rupture with mixing of saline and silicone. Management: Surgical removal is recommended to prevent silicone migration and complications. Fibrocystic breast disease (Option A) : Benign condition with lumpy, painful breasts. Common imaging findings include cystic changes, fibrosis, and adenosis . Fat necrosis of the breast (Option D) : Occurs due to trauma or surgery, presenting as oil cysts, calcifications, or irregular masses on mammography or ultrasound.



Ultrasound showing keyhole sign

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References:

https://radiopaedia.org/articles/breast-implant-rupture?lang=us

↑ *Back to this question in Part A*

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Q5: A 17-year-old male presents to the emergency department with a sudden onset of severe left scrotal pain radiating to the groin. He describes nausea but denies any trauma. On examination, the left testis is high-riding, and there is tenderness upon palpation. Which imaging modality is preferred in this scenario? (Q853440)

A. Computed Tomography

B. Magnetic Resonance Imaging

C. Ultrasonography

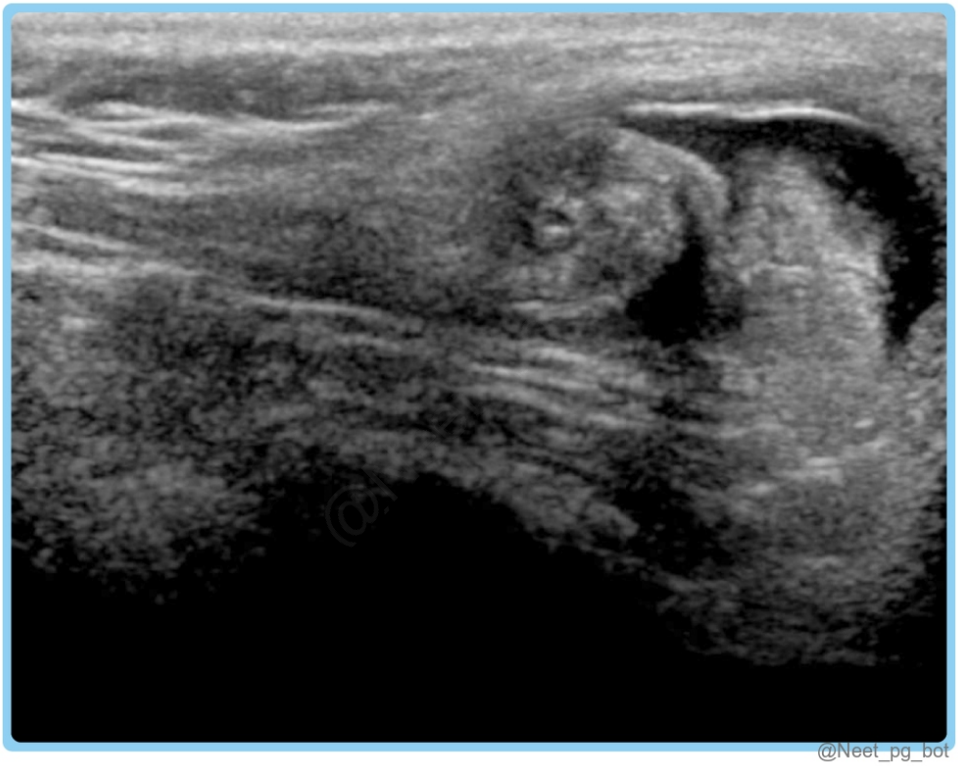
D. X-ray of the pelvis

Correct Answer: C. Ultrasonography

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: Ultrasonography is the preferred modality for assessing acute scrotal pain. Testicular Imaging Ultrasonography (US) Magnetic Resonance Imaging (MRI) Preferred Modality (Option C) Advantages: Non-invasive, well-tolerated, readily available, no ionizing radiation. Doppler Imaging: Essential for assessing blood flow In cases of suspected torsion or infection. Limitations: Longer exam times (Option B ruled out) Less portable Often unavailable Used in equivocal cases. Computed Tomography (Option A): It is less effective at evaluating blood flow compared to ultrasound. X-ray of the pelvis (Option D) : Not useful for evaluating soft tissue structures like the testis or epididymis.



References:

https://geiselmed.dartmouth.edu/radiology/wp-content/uploads/sites/47/2019/07/Avery-Scrotal-emergencies-Radics.pdf

↑ *Back to this question in Part A*

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Q6: Scrotal pain with the whirlpool sign on ultrasound is suggestive of: (Q853439)

A. Torsion

B. Epididymo-orchitis

C. Varicocele

D. Hydrocele

Correct Answer: A. Torsion

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: Whirlpool Sign : A twisted spermatic cord appearing as a spiral of hypoechoic and hyperechoic layers on color Doppler ultrasound . It is a hallmark sign of testicular torsion , where the spermatic cord twists, cutting off blood supply. Testicular torsion is a urological emergency, requiring immediate detorsion and surgery to prevent testicular loss. Testicular torsion: Finding Incomplete Torsion Complete Torsion Whirlpool Sign A most specific and sensitive sign Present Present Doppler Blood flow is reduced or absent Reduced Absent Elevated Resistive Index (RI) RI > 0.75 indicates compromised blood flow Elevated (RI > 0.75) Not applicable Size Increase Enlargement of the testis and epididymis. Not typically observed Present Echotexture Changes Homogeneous: Early finding (before necrosis) Heterogeneous: Late finding (after 24 hours), suggests necrosis. Typically homogeneous Heterogeneous (after 24 hours) Necrosis Indicators Hypoechoic: represents necrosis. Hyperechoic Regions: represent haemorrhage (if reperfused). Not applicable Present Epididymo-orchitis (Option B) : Shows increased blood flow (hyperemia) , not a whirlpool sign. Feature Epididymo-Orchitis Testicular Torsion Definition Inflammation of the epididymis ± testis Twisting of the spermatic cord leading to ischemia Testis Position Normal lie High-riding, horizontal lie Cremasteric Reflex Present Absent (early sign) Prehn’s Sign (Pain relief on elevation) Positive (relief) Negative (no relief) Tenderness Posterior (epididymal) first Diffuse severe tenderness Doppler USG ↑ Blood flow (hyperemia) ↓/Absent blood flow TWIST Score Low High Treatment Antibiotics, NSAIDs, scrotal support Immediate surgical exploration & fixation Varicocele (Option C) : Dilated, tortuous veins with a "bag of worms" appearance on Doppler. Hydrocele (Option D) : Simple fluid collection around the testis, anechoic on ultrasound , with no vascular compromise.

References:

https://radiopaedia.org/articles/whirlpool-sign-testicular-torsion

↑ *Back to this question in Part A*

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Q7: A 35-year-old woman presents to the clinic with a palpable lump in her right breast that she first noticed two weeks ago. The lump is round, mobile, and non-tender

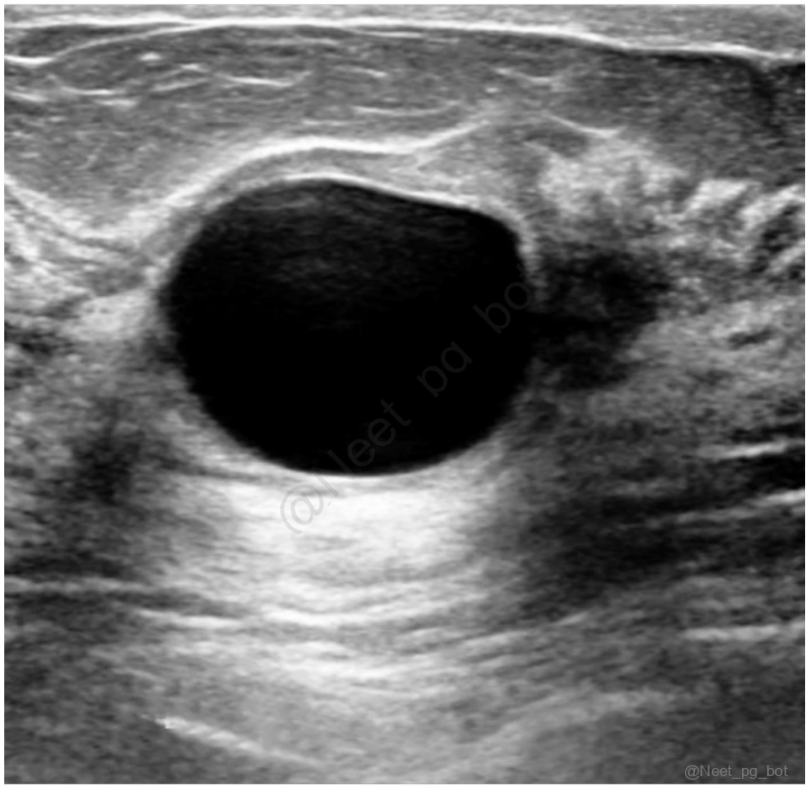
on examination. An ultrasound image is given below. What is the most likely diagnosis? (Q853438)

A. Simple cyst

B. Complex cyst

C. Complicated cyst

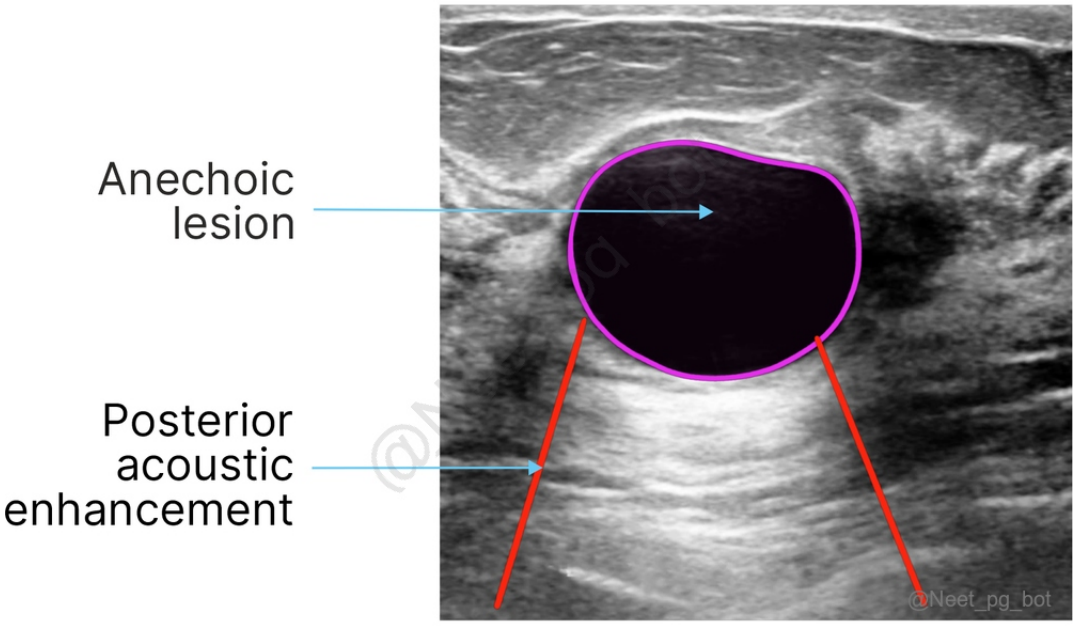
D. Breast cancer

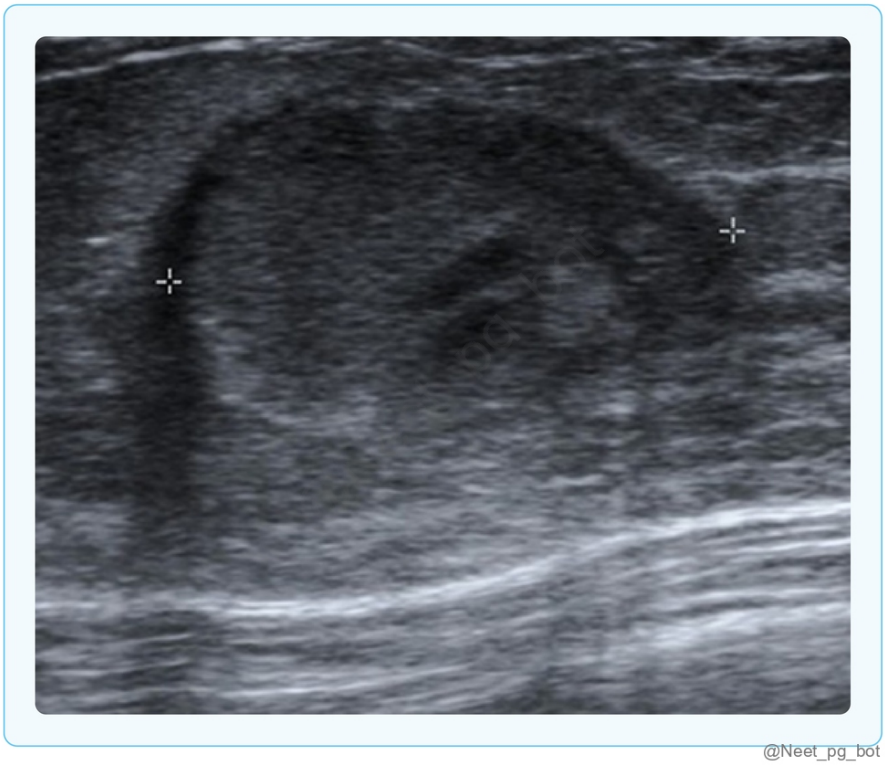


Correct Answer: A. Simple cyst

- *Listen (English)*
- *Listen (Hindi)*

Explanation: The ultrasound findings of a round, anechoic lesion with a smooth hyperechoic wall and posterior acoustic enhancement are characteristic of a simple cyst. Breast pathology USG-findings USG Simple cyst (Option A) Anechoic with posterior acoustic enhancement Round or ovoid with a smooth hyperechoic wall Complicated cyst (Option C ruled out) Internal echoes Fat-fluid level Oil cyst, galactocoel Internal contents move with change in the position of the breast Complex cyst (Option B ruled out) Hyperechoic thin septations BI-RADS 3:Probably benign, needs follow-up Abscess Ill-defined or well-defined outline Maybe anechoic or low-level internal echoes and posterior enhancement BI-RADS 4/5/6 (Option D ruled out) Hypoechoic mass with irregular wall (spiculated) Taller than wide orientation Intraductal papilloma Dilated duct Well defined nodule BI-RADS 4A/4B/4C: suspicious for malignancy, biopsy advised

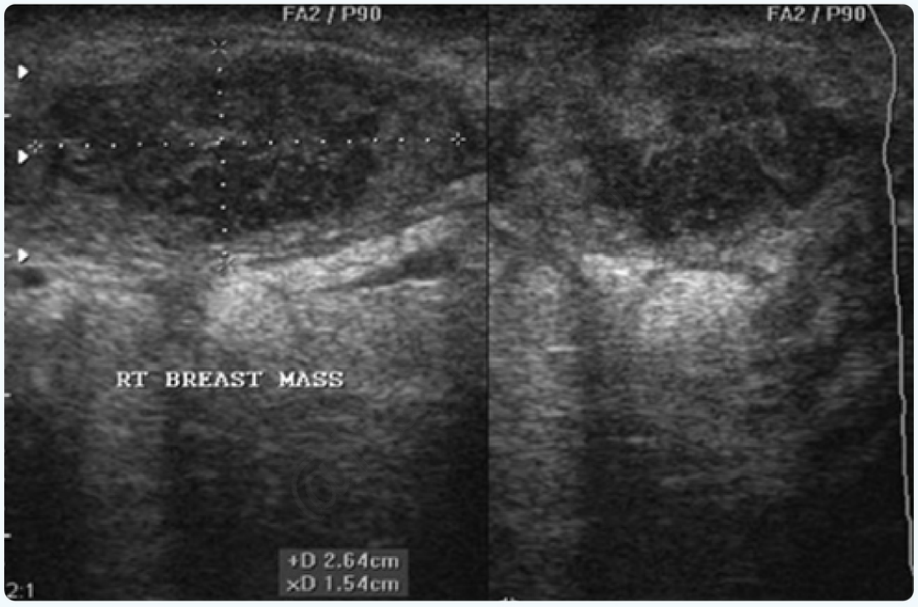

Anechoic lesion
Posterior acoustic enhancement
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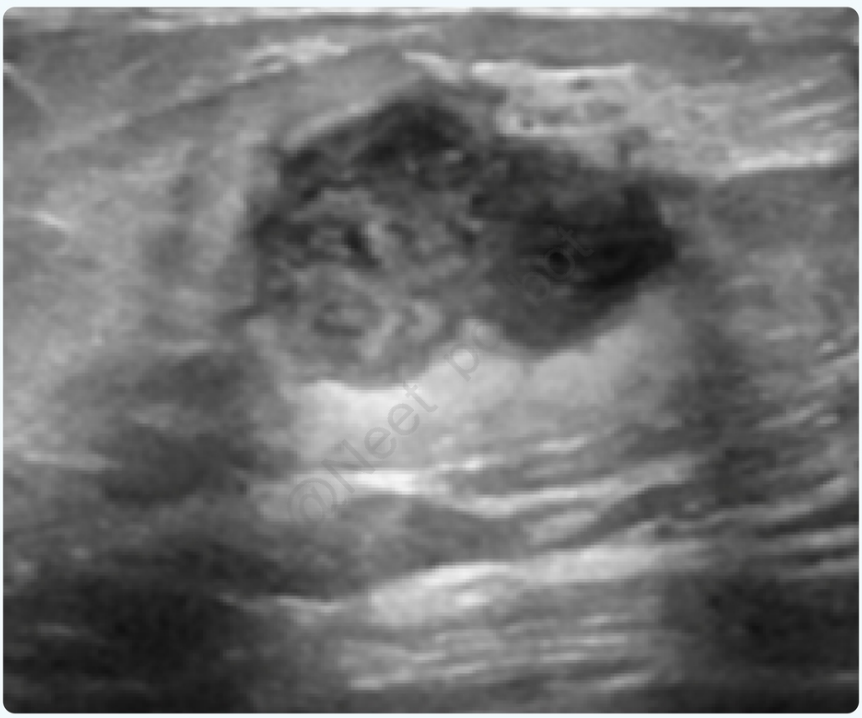
Complicated cyst

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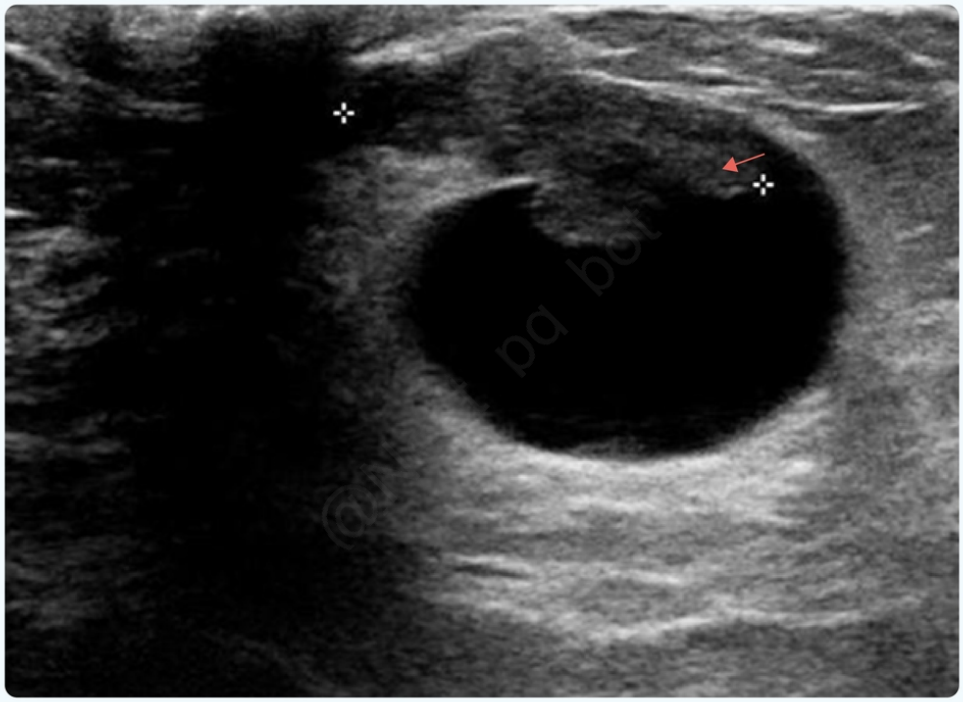
Abscess

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Malignant

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Intraductal papilloma (Arrow)

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References:

https://radiologyassistant.nl/breast/ultrasound/ultrasound-of-the-breast

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2766883/

↑ *Back to this question in Part A*

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Q8: A 52-year-old woman undergoes routine mammography screening. The report indicates a 1.5 cm spiculated mass with irregular borders in the upper outer quadrant of the right breast. The radiologist assigns it a BIRADS 5 category. Which of the following best describes the implication of a BIRADS 5 category on mammography? (Q853437)

A. Highly suggestive of malignancy, >95% chance

B. Probably benign, <2% chance of malignancy

C. Highly suggestive of malignancy, <95% chance

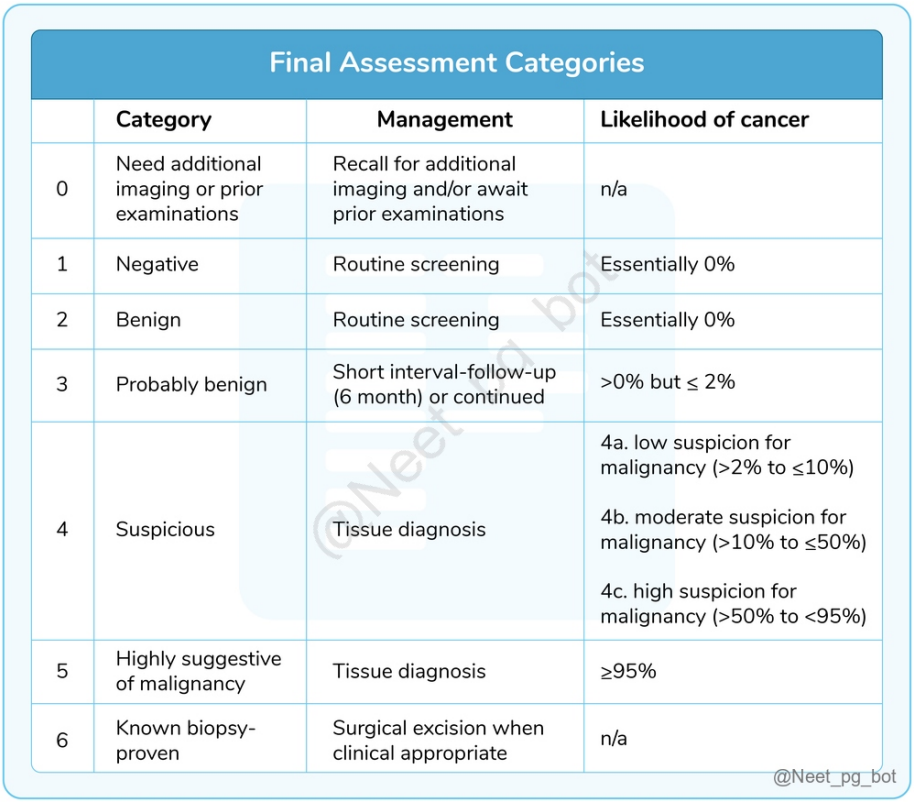
D. Benign finding, no follow-up required

Correct Answer: A. Highly suggestive of malignancy, >95% chance

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: BIRADS 5 is defined as a finding that is highly suggestive of malignancy with a greater than 95% chance of cancer. Urgent biopsy and further management are required.



Final Assessment Categories

	Category	Management	Likelihood of cancer
0	Need additional imaging or prior examinations	Recall for additional imaging and/or await prior examinations	n/a
1	Negative	Routine screening	Essentially 0%
2	Benign	Routine screening	Essentially 0%
3	Probably benign	Short interval-follow-up (6 month) or continued	>0% but ≤ 2%
4	Suspicious	Tissue diagnosis	4a. low suspicion for malignancy (>2% to ≤10%) 4b. moderate suspicion for malignancy (>10% to ≤50%) 4c. high suspicion for malignancy (>50% to <95%)
5	Highly suggestive of malignancy	Tissue diagnosis	≥95%
6	Known biopsy-proven	Surgical excision when clinical appropriate	n/a

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References:

https://radiologyassistant.nl/breast/bi-rads/bi-rads-for-mammography-and-ultrasound-2013

↑ *Back to this question in Part A*

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Q9: Match the following: Disease Mammography features a. Fibroadenoma (i) Eggshell calcification b. Fat Necrosis (ii) Broken-needle appearance c. Duct ectasia (iii) Teacup calcification d. Fibrocystic disease (iv) Popcorn calcifications (Q853436)

A. a-iv, b-i, c-ii, d-iii

B. a-ii, b-iii, c-iv, d-i

C. a-iii, b-ii, c-iv, d-i

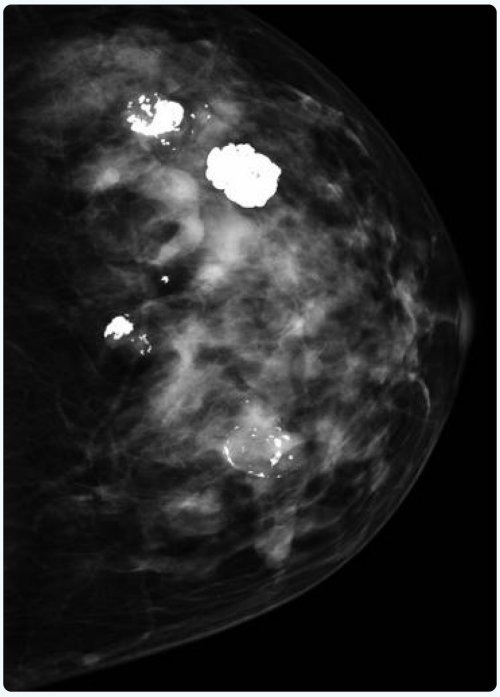
D. a-iii, b-iv, c-i, d-ii

Correct Answer: A. a-iv, b-i, c-ii, d-iii

■ *Listen (English)*

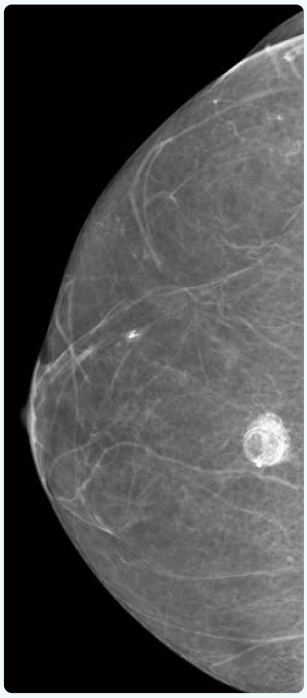
■ *Listen (Hindi)*

Explanation: Findings of various conditions on mammography Condition Mammographic Findings Fibroadenoma Round, well-circumscribed mass with smooth borders; "popcorn" calcifications in older lesions. Benign. Fat Necrosis Irregular, spiculated mass with calcifications; central fat density - Eggshell calcification . Often mimics malignancy. Ductal Carcinoma in Situ (DCIS) Microcalcifications (Segmental distribution of pleomorphic microcalcifications) , often linear or branching, are associated with malignancy. Invasive Ductal Carcinoma Irregular, spiculated mass with poorly defined margins. Microcalcifications and architectural distortion. Fibrocystic disease Teacup calcification represents the layering out of calcific material in the dependent portion of microcysts on a lateral magnification view. Duct ectasia Broken-needle appearance , typical of duct ectasia. Sometimes thicker, more localized calcifications can be seen, giving a ‘lead-pipe’ appearance.



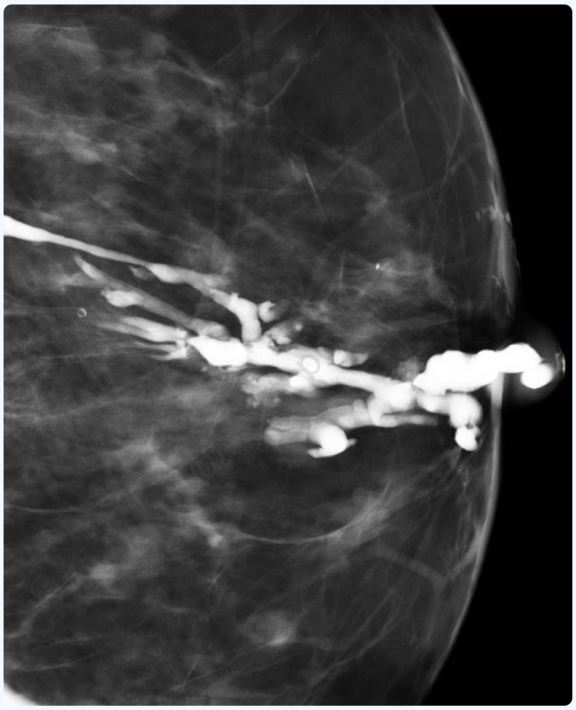
Fibroadenoma breast calcification

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Eggshell calcification
of fat necrosis

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Duct ectasia - broken needle appearance

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References:

Grainger and Allison's Diagnostic Radiology, 7th Edition, Pages 1663,1666,1667,1668

↑ *Back to this question in Part A*

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Q10: A 28-year-old woman is evaluated for a pelvic mass. An ultrasound shows a complex ovarian mass with a Rokitansky nodule and areas of calcification. What is the most likely diagnosis? (Q853435)

A. Endometrioma

B. Serous cystadenoma

C. Ovarian dermoid

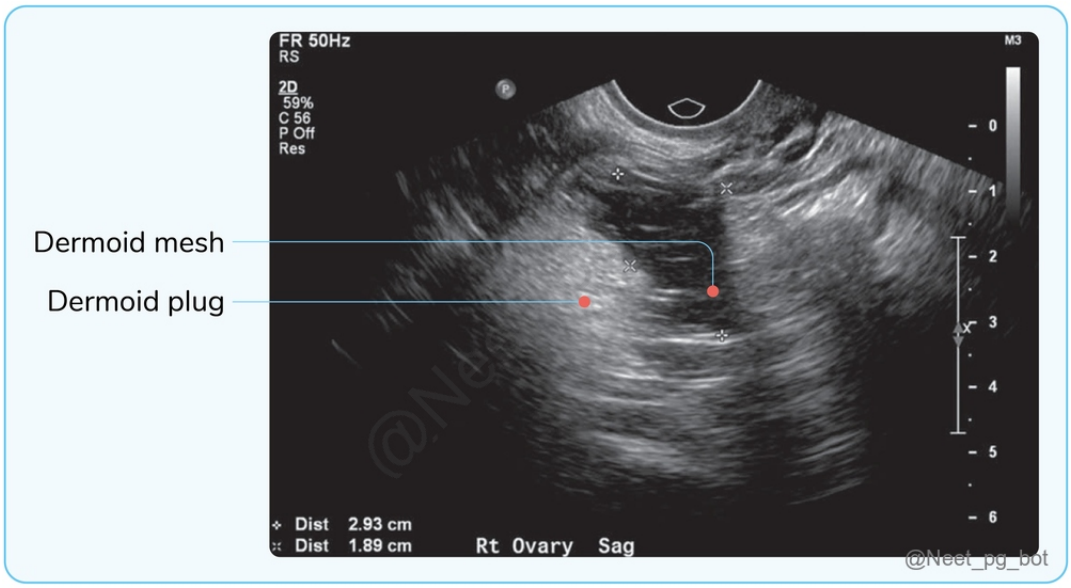
D. Ovarian carcinoma

Correct Answer: C. Ovarian dermoid

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: Ovarian dermoids (mature cystic teratomas) often present with characteristic findings such as a Rokitansky nodule (echogenic structure projecting into the cyst) and calcifications (e.g., teeth or bones). They may also show fat-fluid levels or acoustic shadows due to sebaceous material or hair. Imaging findings of dermoid cyst Imaging Modality Key Features Ultrasound (US) Cystic mass with an echogenic nodule (Rokitansky nodule) projecting into the lumen. Predominantly echogenic mass with posterior sound attenuation (tip of the iceberg sign) due to sebaceous material and hair. Cystic mass with fine internal echogenic lines (Dot and dash appearance) representing hair. Fluid-fluid level representing sebaceous material floating on fluid. Computed Tomography (CT) Presence of fat and calcifications (e.g., teeth, bones). Magnetic Resonance Imaging (MRI) Sensitive to fat Fat-fluid and fluid-fluid levels, low signal intensity calcifications (e.g., teeth). Rokitansky nodule/dermoid plug attached to the cyst wall. Endometrioma (Option A) typically presents as a homogenous, low-level echogenic cyst ("chocolate cyst"). Serous cystadenoma (Option B) usually appears as a simple, thin-walled, anechoic cyst. Ovarian carcinoma (Option D) presents with solid components, and irregular walls, and may involve ascites, but doesn't show features typical of dermoids such as fat or calcification.



References:

Grainger and Allison Diagnostic Radiology, Ed.7, page 910.

↑ *Back to this question in Part A*

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Q11: A 35-year-old woman presents with heavy menstrual bleeding and pelvic pressure. An ultrasound reveals a well-circumscribed, hypoechoic, solid uterine mass with shadowing. What is the most likely imaging diagnosis? (Q853434)

A. Endometrial carcinoma

B. Uterine fibroid (leiomyoma)

C. Ovarian cyst

D. Adenomyosis

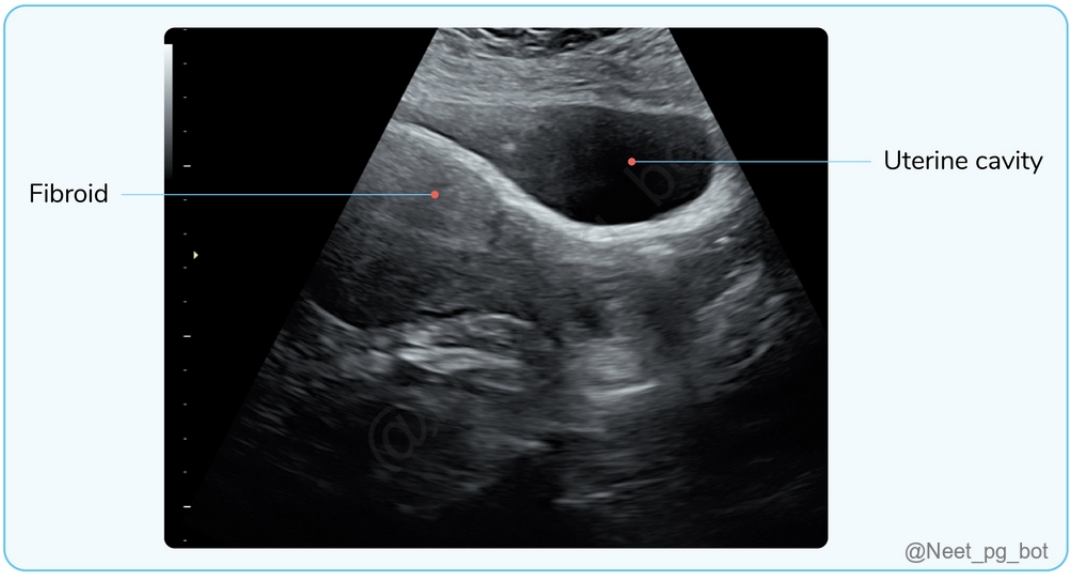
Correct Answer: B. Uterine fibroid (leiomyoma)

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: Uterine fibroids (leiomyomas) typically appear as well-circumscribed, hypoechoic (or heterogeneous), solid masses with posterior shadowing on ultrasound . They may also cause non-tender uterine enlargement and distortion of the uterine contour. Note: Tender enlargement is seen in adenomyosis Endometrial carcinoma (Option A) presents as an irregular mass within the endometrium, often with increased blood flow. An

ovarian cyst (Option C) is typically an anechoic structure and doesn't present as a solid mass within the uterus. Adenomyosis (Option D) often shows a thickened, heterogeneously echogenic myometrium with small cysts rather than a well-circumscribed mass.



References:

Grainger and Allison Diagnostic Radiology, Edtion7, Pages 896, 897

↑ *Back to this question in Part A*

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Q12: A 42-year-old woman presents with chronic pelvic pain, dysmenorrhea, and menorrhagia. Transvaginal ultrasound shows an enlarged, symmetrical uterus with sub-endometrial linear striations, 3-mm cysts, and a "rain shower" appearance. What is the most likely diagnosis? (Q853433)

A. Uterine fibroids

B. Endometrial polyp

C. Adenomyosis

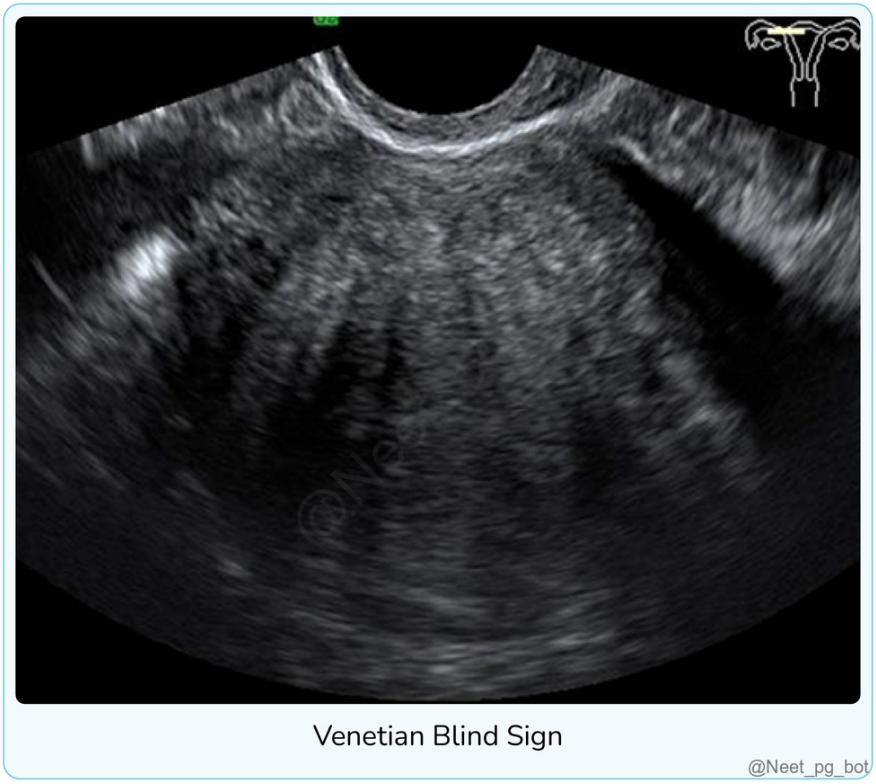
D. Endometriosis

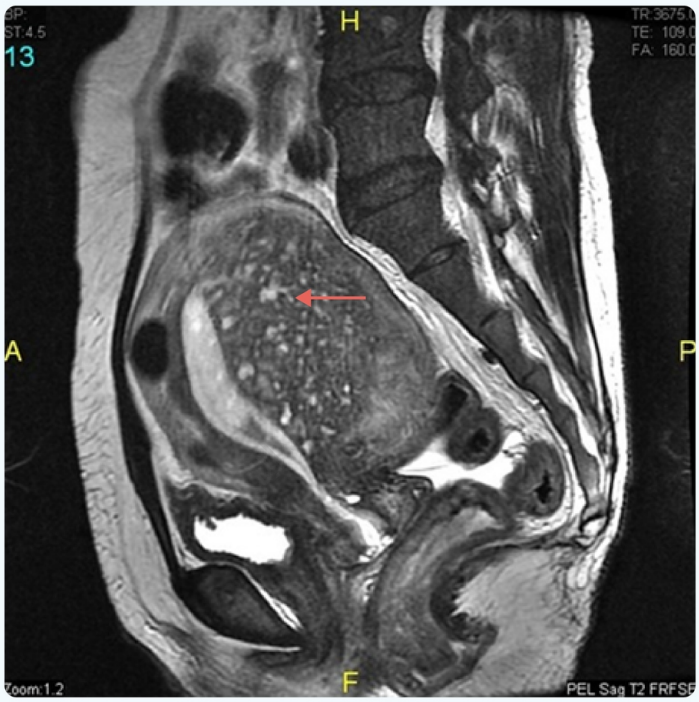
Correct Answer: C. Adenomyosis

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: The clinical scenario and imaging findings showing Enlarged, symmetrical uterus Sub-endometrial linear striations (Venetian blind sign) A "rain shower" appearance is suggestive of adenomyosis. Imaging findings in Adenomyosis: Imaging Modality Findings in Adenomyosis Ultrasound (TVUS) Enlarged, globular uterus with asymmetry of the anterior and posterior uterine walls (asymmetrical myometrial thickening) Diffuse echogenic nodules Subendometrial echogenic linear striations (Venetian blind sign) Subendometrial cysts (2-6 mm), seen in 50% of cases Endometrial pseudo widening Poor definition of the endo-myometrial interface Multiple fine areas of attenuation (‘rain shower’ appearance) A speckled pattern of increased vascularity on Color Doppler MRI (T2-weighted images) Ill-defined areas of low myometrial signal intensity due to smooth muscle hyperplasia Diffuse or focal thickening of the junctional zone (JZ) JZ ≥12 mm strongly predicts adenomyosis; JZ ≤8 mm excludes it High T2 signal intensity foci within low signal myometrium (ectopic endometrial tissue or cystic gland dilatation) (Salt and Pepper appearance) High T2 signal linear striations (finger-like projections) extending from the endometrium into myometrium MRI (T1-weighted images) High T1 signal intensity foci represent small punctate haemorrhages, with a 95% positive predictive value for adenomyosis Uterine fibroids (Option A) typically present as well-circumscribed, solid masses on ultrasound, not associated with the "rain shower" appearance or sub-endometrial cysts. Endometrial polyp (Option B) usually shows a feeder vessel sign (a single feeding artery to the poly that's visible on an USG), but not the sub-endometrial changes seen in adenomyosis. Endometriosis (Option D) involves ectopic endometrial tissue outside the uterus, often associated with ovarian cysts (endometriomas), and does not cause the specific ultrasound features of adenomyosis.





Salt and Pepper Appearance

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References:

Grainger and Allison Diagnostic Radiology, Ed.7, page 901, 902

Feeding artery sign (endometrial polyp) | Radiology Reference Article | Radiopaedia.org

↑ *Back to this question in Part A*

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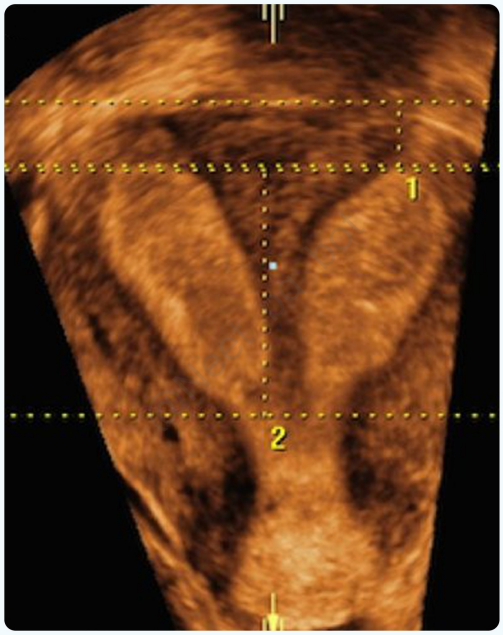
Q13: A 35-year-old woman with a history of infertility is undergoing evaluation. The scan image is shown below. What is the most likely diagnosis? (Q853422)

A. Septate uterus

B. Arcuate uterus

C. Bicornuate uterus

D. Unicornuate uterus

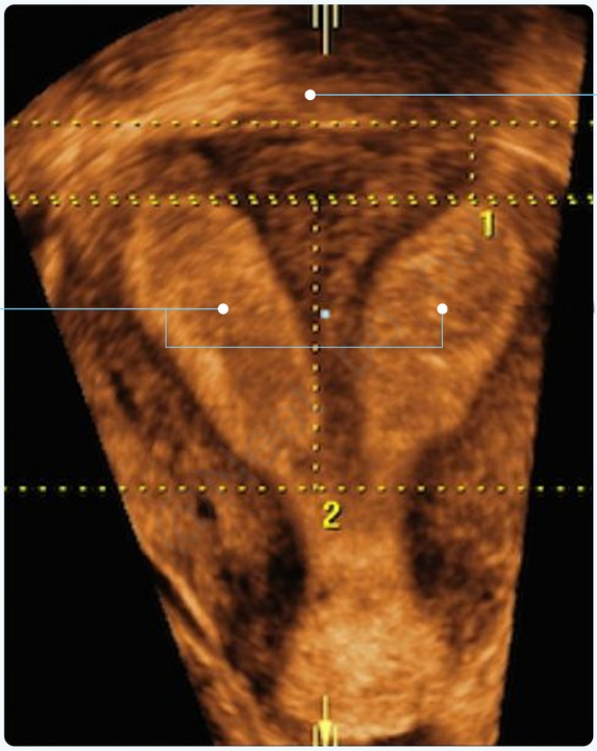


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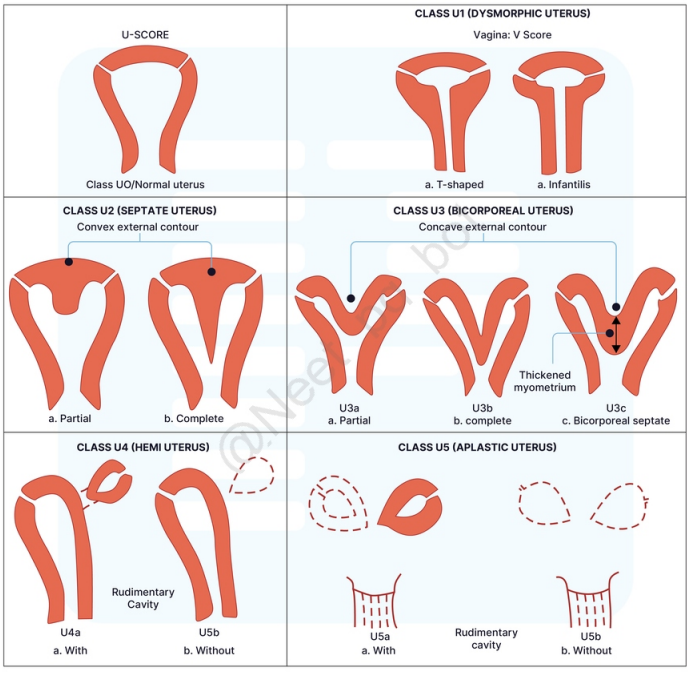
Correct Answer: A. Septate uterus

- *Listen (English)*
- *Listen (Hindi)*

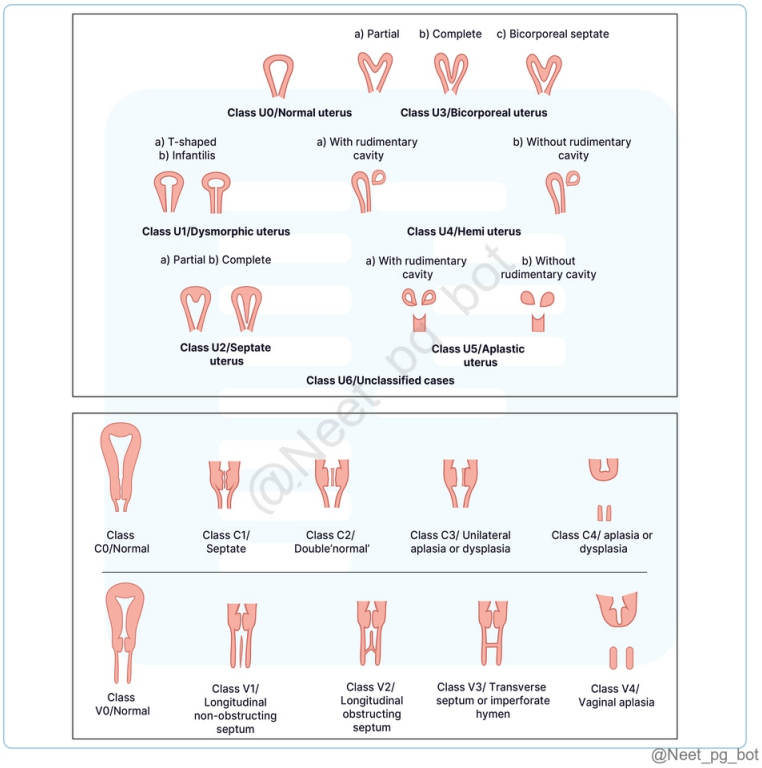
Explanation: The scanned image that is provided in this stem is a 3D ultrasound of a uterus. The most likely diagnosis is a septate uterus. On 3D ultrasound, this condition typically shows two endometrial cavities with a normal external uterine contour. This condition is associated with an increased risk of infertility and pregnancy complications, making it a likely cause of this patient's history of infertility. 3D ultrasound for uterine anomalies: It simultaneously visualizes both the external (serosal surface) and internal (endometrial) contours of the uterine fundus due to its ability to see the coronal view of the uterus , allowing for accurate classification of uterine anomalies. European Society of Human Reproduction and Embryology (ESHRE) and the European Society for Gynaecological Endoscopy (ESGE) classification of uterine anomalies: (Image A) A normal uterus (Image B) A partial septate uterus (Image C) A complete septate uterus (Image D) A bicorporeal septate uterus Arcuate uterus (Option B): It is a congenital anomaly where there is a slight indentation of the endometrium at the fundus but no division into separate cavities. The external contour is also normal. This option is incorrect. Bicornuate uterus (Option C): Characterized by the division of the uterine cavity with a partial or complete division of the uterine horns. There is a concave external contour at the fundal region. This option is incorrect. Unicornuate uterus (Option D): Characterized by the asymmetrical appearance of the uterus, with only one functional cavity with or without a rudimentary cavity on the other side. This option is incorrect.

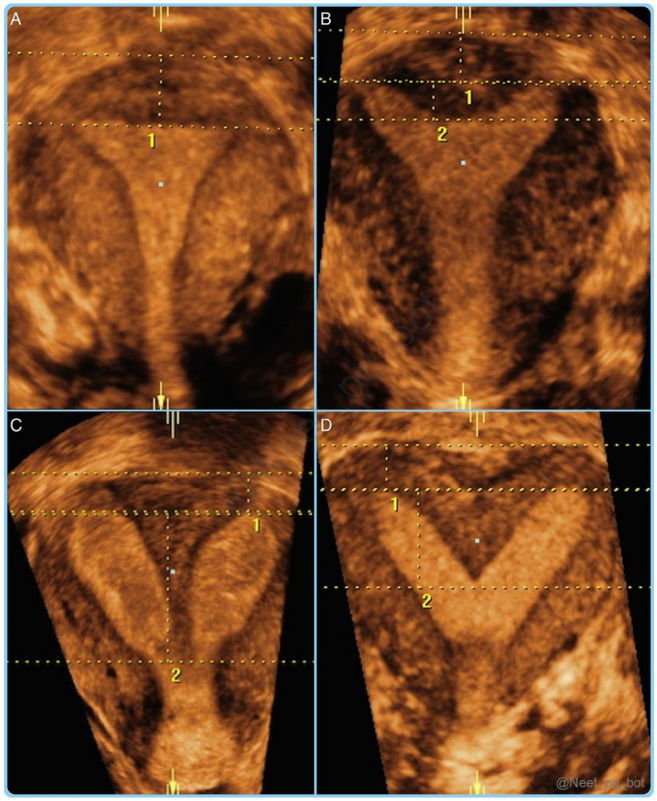


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References:

www.ncbi.nlm.nih.gov/pmc/articles/PMC8911320/

↑ *Back to this question in Part A*

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Q14: A 30-year-old woman undergoing controlled ovarian hyperstimulation for in vitro fertilization presents with abdominal pain and significant distension. Which of the following is the most likely finding on an ultrasound seen in this patient that helps differentiate it from PCOS? (Q853431)

A. Echogenic stroma

B. Ovarian volume >10 ml

C. Presence of ascites

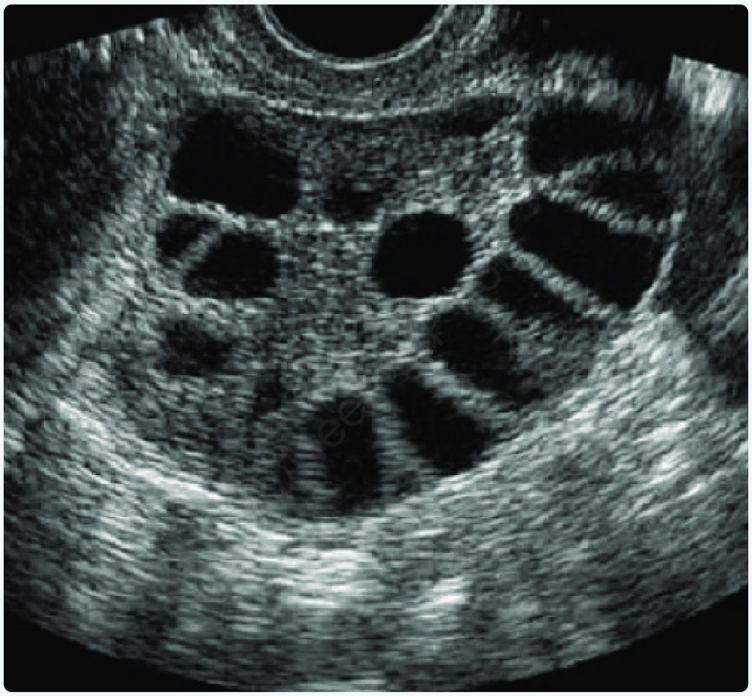
D. Multiple cysts measuring 2-9 mm

Correct Answer: C. Presence of ascites

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: The presence of ascites is a hallmark of Ovarian Hyperstimulation Syndrome and is indicative of fluid overload in the abdominal cavity, while others are typical of Polycystic Ovary Syndrome . Ovarian Hyperstimulation Syndrome (OHSS) Ultrasound Findings : Ovaries are markedly enlarged (5-12 cm) with multiple large cysts (theca lutein cysts). Ascites are frequently observed, indicating abdominal fluid accumulation. (Option C) Severe cases may show pleural effusion and signs of fluid overload. Polycystic Ovary Syndrome (PCOS) Ultrasound Findings : Ovaries exhibit multiple small cysts (2-9 mm) with a "String of pearls " appearance. (Option D ruled out) Ovarian volume typically exceeds 10 mL . (Option B ruled out) Stroma may appear echogenic due to elevated androgen levels. (Option A ruled out)



USG of PCOS

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Axial T2-weighted MRI showing PCOS

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References:

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7808280/

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3919333/

↑ *Back to this question in Part A*

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Q15: Which of the following is not typically associated with IUFD as observed on ultrasound? (Q853429)

A. Maceration

B. Spalding sign

C. Increased amniotic fluid volume

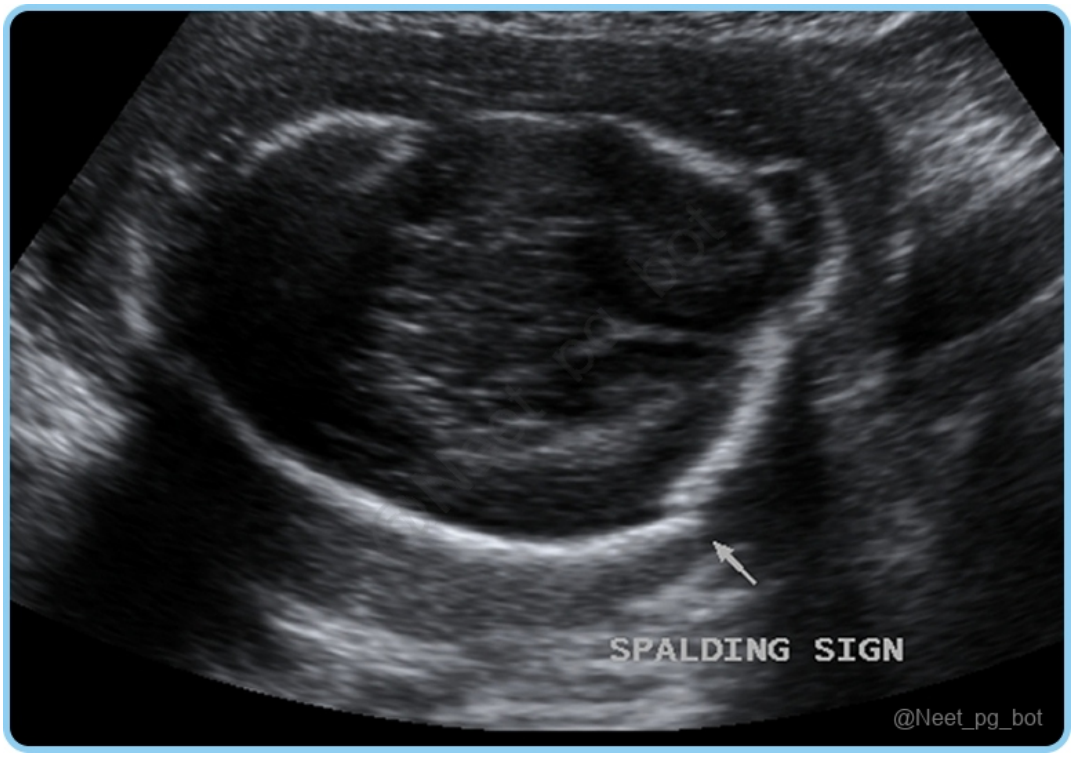
D. Presence of soft tissue edema

Correct Answer: C. Increased amniotic fluid volume

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: Increased amniotic fluid volume is not typically associated with IUFD; it may be normal or reduced in such cases. Ultrasound Imaging in Intrauterine Fetal Demise (IUFD) Key Findings : Absent fetal heartbeat (definitive sign of IUFD) Absent fetal movements (strong indicator) Roberts sign: Gas shadow in the heart or great vessels due to postmortem blood degeneration, typically appearing 12–48 hours after death Spalding Sign : Overlapping skull bones suggesting fetal death (Option B ruled out) Maceration : Distortion of fetal anatomy due to decomposition (Option A ruled out) Soft Tissue Edema : Notable when skin thickness exceeds 5 mm (Option D ruled out) Echogenic Amniotic Fluid : Presence of debris in amniotic fluid MRI Imaging Additional Details : Useful when ultrasound findings are unclear. Key Signs : Constricted heart (poorly defined cardiac chambers, abnormal heart signal) Brain ischemia (global ischemic changes in brain tissue) Abnormal globes and effusions (indicate systemic effects) Cord thrombosis (thrombus in the umbilical cord)





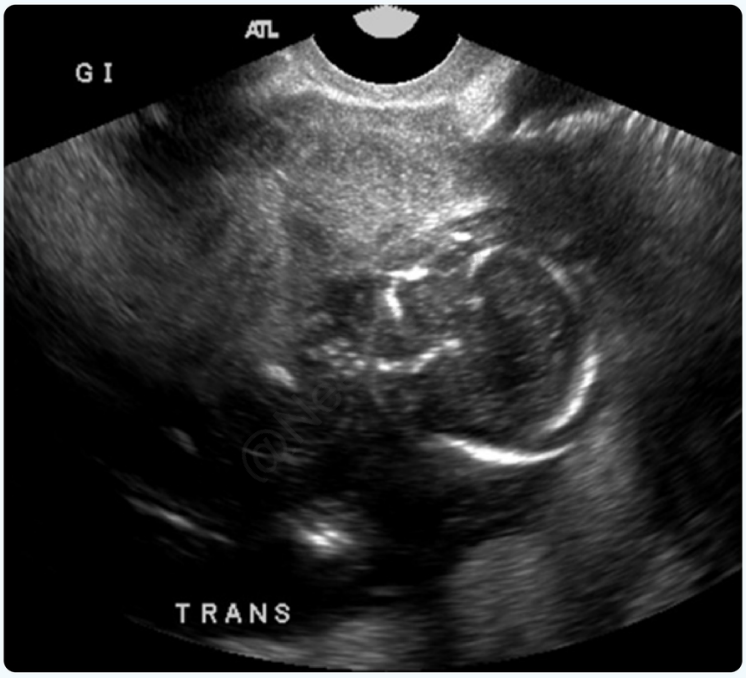
Liver calcification in a 17-week foetus with intrauterine death and foetal retention. Anteroposterior radiograph shows maceration (soft-tissue loss, disrupted knee joints and skull) but otherwise normal skeletal appearances. There is bizarre calcification over the right upper quadrant, shown at autopsy to be subcapsular liver calcification.

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Severe thickening of scalp tissue due to edema is noticeable

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References:

radiopaedia.org/articles/fetal-death-in-utero-1

https://pubmed.ncbi.nlm.nih.gov/33715028/

↑ *Back to this question in Part A*

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Q16: A 12-week pregnant patient presents with a nuchal translucency (NT) measurement of 3.2 mm during her first-trimester ultrasound. What is the most appropriate follow-up ultrasound examination to assess for potential anomalies? (Q853428)

A. Second-trimester anatomy scan at 20 weeks

B. Fetal echocardiography

C. Nuchal translucency re-evaluation at 16 weeks

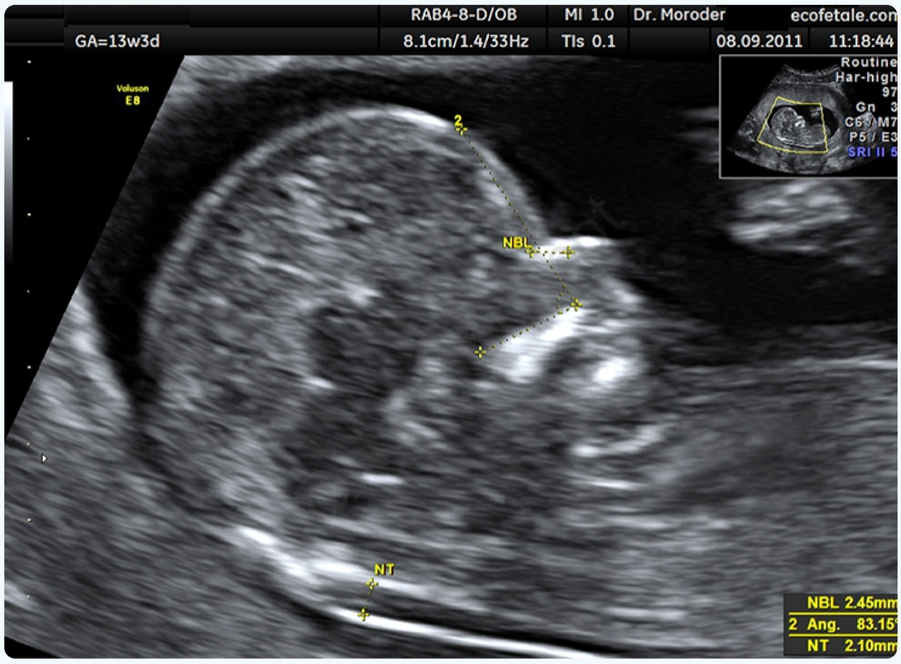
D. Doppler ultrasound of the umbilical artery

Correct Answer: A. Second-trimester anatomy scan at 20 weeks

■ *Listen (English)*

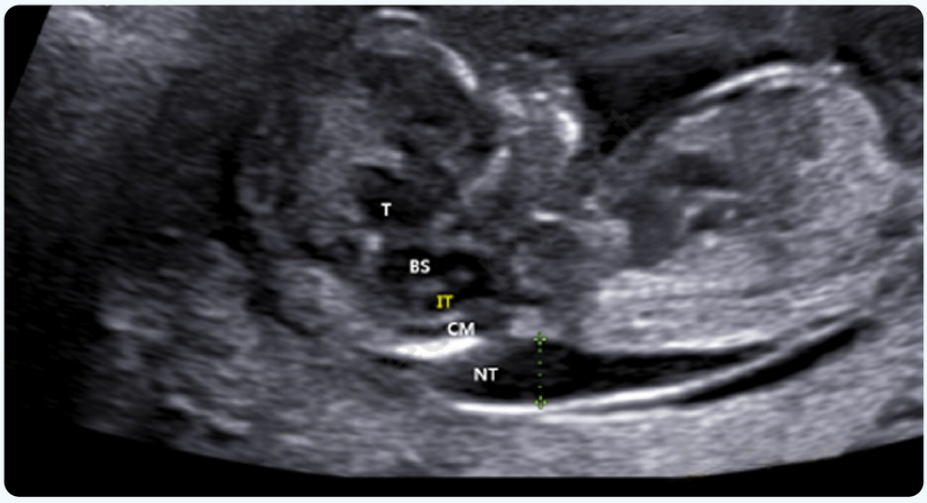
■ *Listen (Hindi)*

Explanation: Second-trimester anatomy scan (aka TIFFA-Targeted imaging for fetal anomalies) at 20 weeks (anomaly scan) is a comprehensive ultrasound essential for evaluating fetal anatomy and detecting potential structural anomalies, especially in cases with increased NT. Nuchal Translucency (NT) Definition: NT refers to the fluid-filled space between the fetal skin and soft tissue at the back of the neck. Measurement: Conducted via ultrasound between 11-14 weeks of gestation in a sagittal plane. Accurate measurement follows specific criteria. Significance: Increased NT: Linked to higher risks of: Fetal Aneuploidy (abnormal chromosome number). Trisomy 21(most common) >monosomy X>Trisomy 18 and 13 Structural Anomalies (especially fetal heart defects). Screening Role: NT is part of first-trimester aneuploidy screening. Threshold for Concern: NT ≥ 3 mm is abnormal and requires further investigation (detailed fetal anatomy survey/ anomaly scan). (Option A) Outcome: As the fetus develops into the second trimester, nuchal translucency might either: Regress Evolve into: Nuchal edema Cystic hygroma Combined test: (β-hCG + PAPP-A + NT) Tests Dual test [free b-hCG and PAPP-A (Pregnancy Associated Plasma Protein-A)] + NT scan Time: 11-14 weeks of gestation Anomaly to detect: Down's syndrome Fetal echocardiography (Option B) is a specialized exam for assessing cardiac structure but is usually performed later if there are specific concerns identified during the anatomy scan. Nuchal translucency re-evaluation at 16 weeks (Option C) is not standard practice; once NT is measured, the focus shifts to the anatomical survey in the second trimester. Doppler ultrasound of the umbilical artery (Option D) primarily detects IUGR in 3rd trimester.



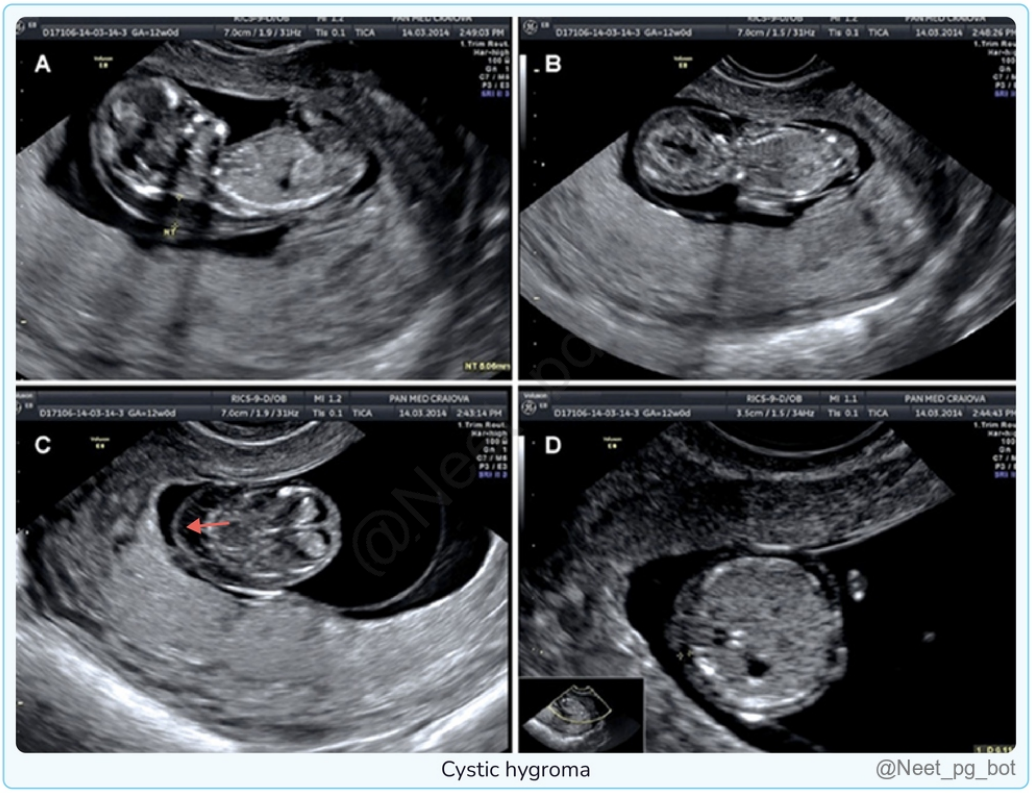
Nuchal translucency (NT)

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Increased fetal nuchal translucency (NT)

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Cystic hygroma @Neet_pg_bot

References:

Williams Obstetrics, 26th Edition, Page 249, 250

↑ *Back to this question in Part A*

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Q17: An ultrasound scan image of a 30-year-old woman who presented for a routine ultrasound at 6 weeks of gestation is shown below. What is the most significant ultrasound finding in this case? (Q853427)

A. T-sign

B. Lambda sign

C. Snowstorm appearance

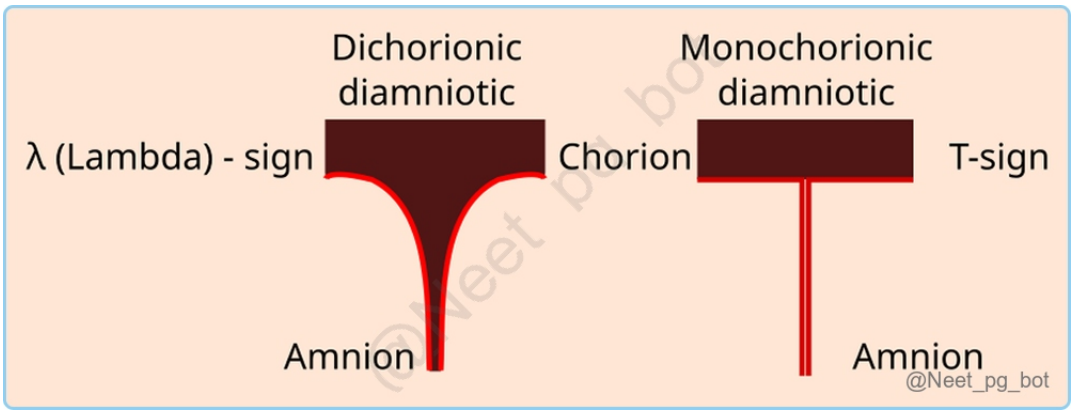
D. Pseudogestational sac

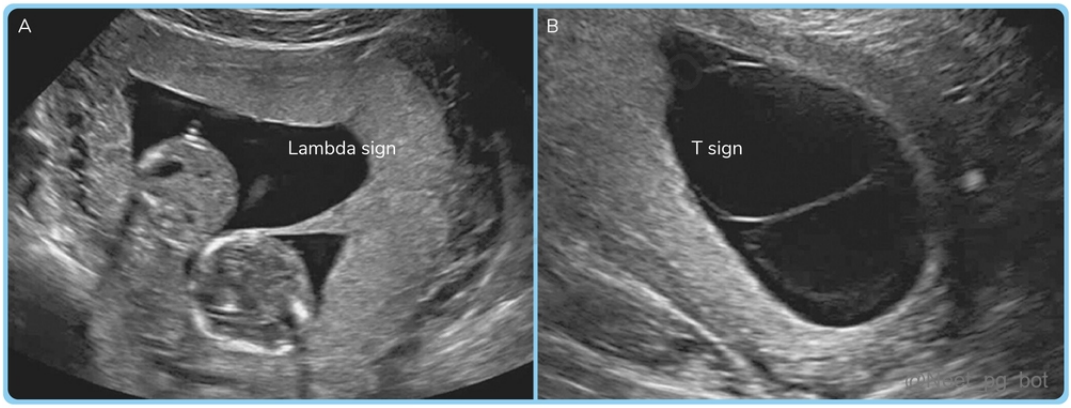


Correct Answer: B. Lambda sign

- *Listen (English)*
- *Listen (Hindi)*

Explanation: USG shows the lambda sign or twin peak sign, which is characterized by two gestational sacs separated by a thick membrane, and a prominent triangular extension of the chorionic tissue at the junction of the two sacs. This finding is indicative of a dichorionic-diamniotic twin pregnancy . Twin pregnancy: Placenta's membrane status Timing of cleavage Diamniotic–Dichorionic < 72 hours Diamniotic–Monochorionic Days 4–7 Monoamniotic–Monochorionic Days 8–12 Conjoined Day >13 Note: In dichorionic twin- The lambda sign or twin peak sign is seen. (Option A ruled out) Snowstorm appearance (Option C): It is typically associated with a molar pregnancy. Pseudogestational sac (Option D): It appears as a fluid-filled structure within the uterus that lacks the double decidua sign and typically has an irregular outline. It is commonly associated with ectopic pregnancies or early pregnancy loss. Hence, this option is incorrect.





References:

DC Dutta's Textbook of Obstetrics, Edition 9th- Page 191, 192, 601

William's Gynecology Edition 4th- Page 777

↑ *Back to this question in Part A*

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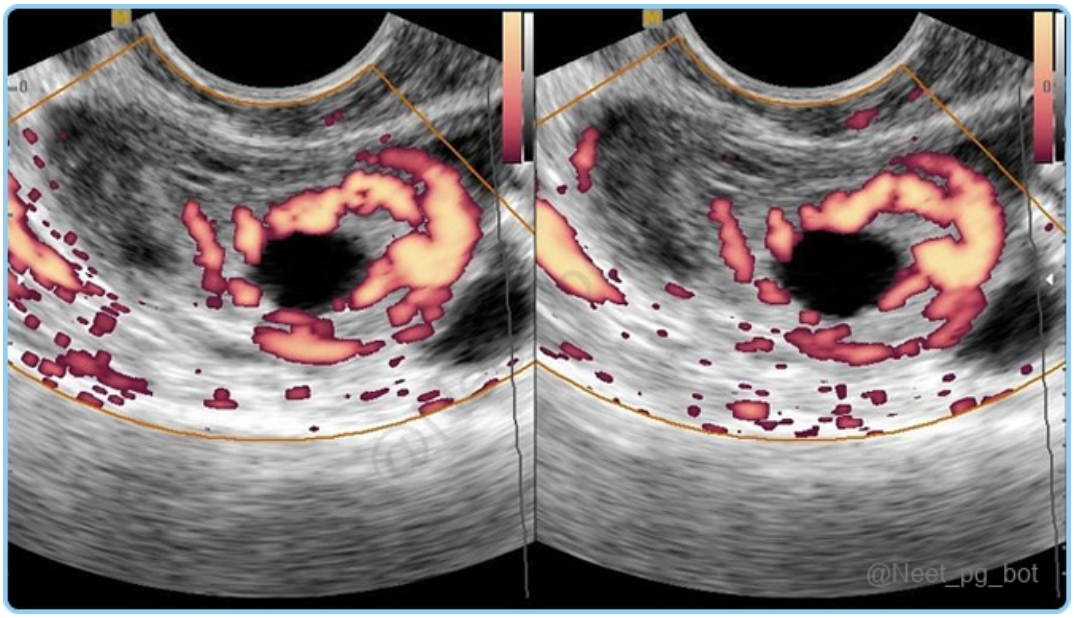
Q18: A 33-year-old woman with a history of tubal ligation presents with sudden lower abdominal pain and vaginal bleeding. She has a positive serum hCG, and transvaginal ultrasound is shown below. What is the most definitive radiological feature confirming the diagnosis of ectopic pregnancy in this case? (Q853426)

A. Ring of fire appearance

B. Lambda sign

C. Trilaminar appearance

D. Double decidual sac sign



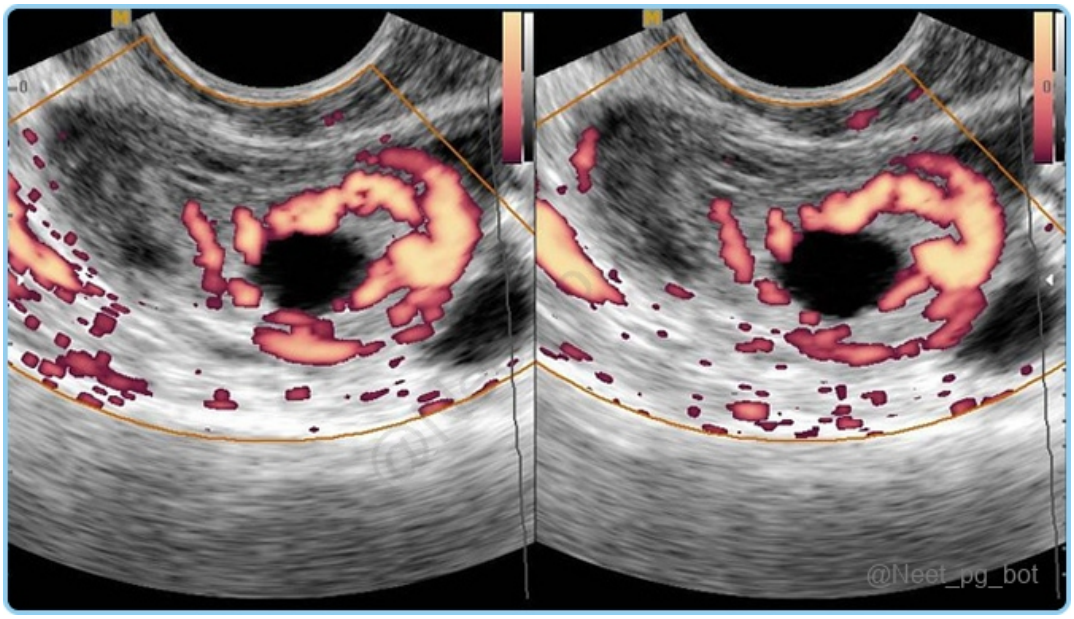
Correct Answer: A. Ring of fire appearance

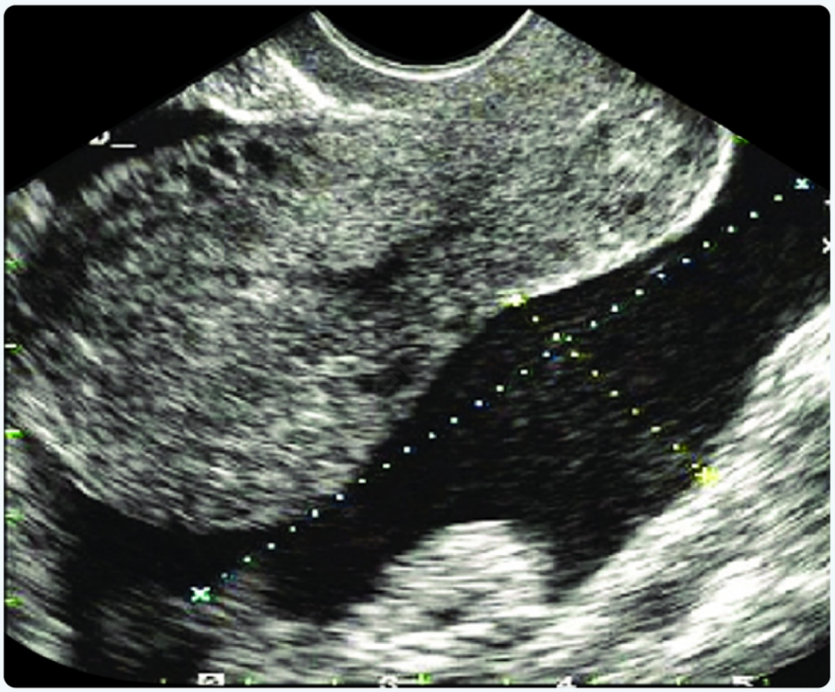
- *Listen (English)*
- *Listen (Hindi)*

Explanation: The "ring of fire" appearance on Doppler ultrasound refers to the increased peripheral vascularity surrounding an extrauterine mass or gestational sac. The presence of this peripheral vascularity, along with the absence of an intrauterine pregnancy, is a definitive radiologic feature of an ectopic pregnancy. Ectopic Pregnancy: Empty extrauterine sac with a hyperechoic ring. Extrauterine yolk sac and/or fetal pole with or without cardiac activity. Inhomogeneous adnexal mass or extrauterine halo-like structure - a probable ectopic pregnancy. Colour Doppler imaging: Placental blood flow within the periphery of an ectopic pregnancy - ring of fire appearance . (Option A) In ruptured ectopic, blood is present in the pouch of Douglas , which shows echoes on USG because of the presence of hemoperitoneum. Lambda sign (Option B): It is seen in dichorionic diamniotic twin pregnancies. Trilaminar appearance (Option C): The trilaminar appearance of the endometrium is normally seen in the late proliferative phase of the menstrual cycle. Double decidual sac sign (Option D): This sign confirms the presence of an intrauterine pregnancy and is not seen in ectopic pregnancy.



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References:

William's Gynecology, 4th Edition, Page 164-66.

DC Dutta's Textbook of Obstetrics, 9th Edition, Page 192, 601.

↑ *Back to this question in Part A*

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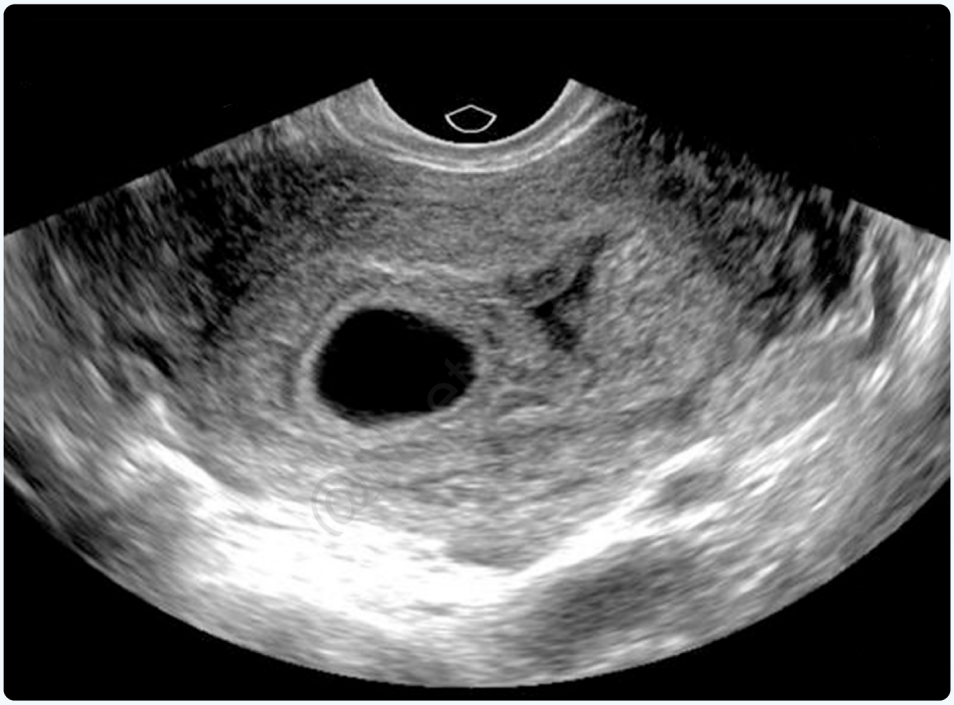
Q19: A 30-year-old woman with a history of recurrent pregnancy loss presents to the Obstetrics clinic at 4.5 weeks gestation for her ultrasound scanning appointment. An image of the transvaginal ultrasound is shown below. shows a well-defined gestational sac with the double decidual sac sign, but no yolk sac or fetal pole is visible. What is the significance of this ultrasound finding? (Q853425)

A. High likelihood of ectopic pregnancy

B. Accurate measurement of gestational age

C. Indicative of an intrauterine pregnancy

D. Suspicious for a molar pregnancy



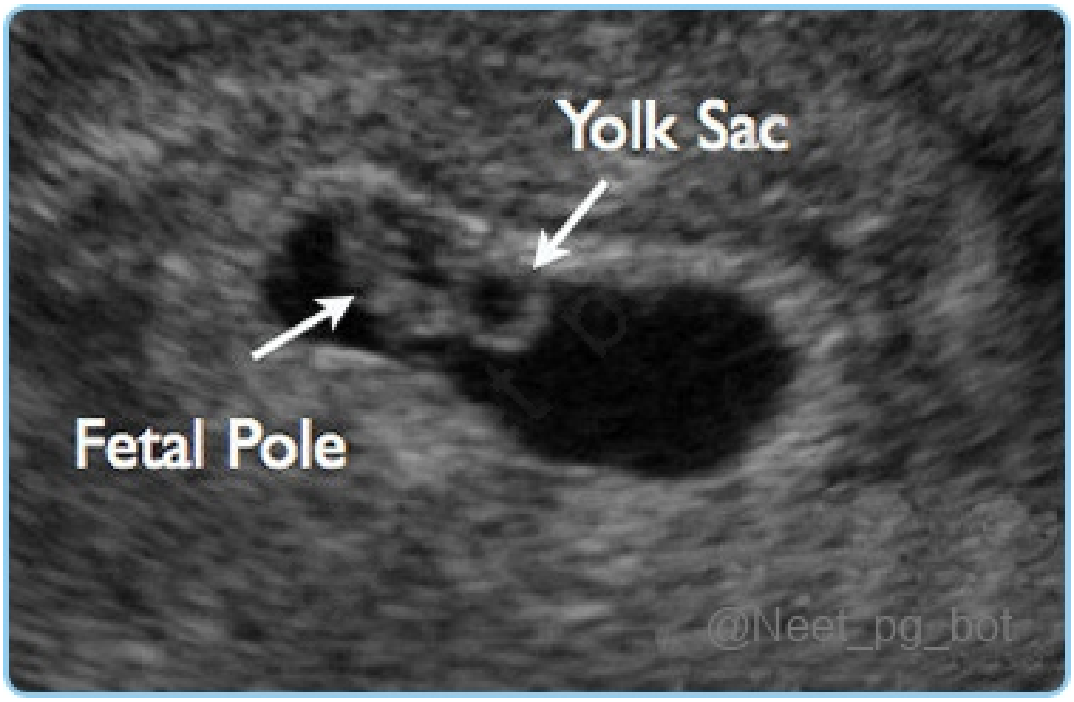
Correct Answer: C. Indicative of an intrauterine pregnancy

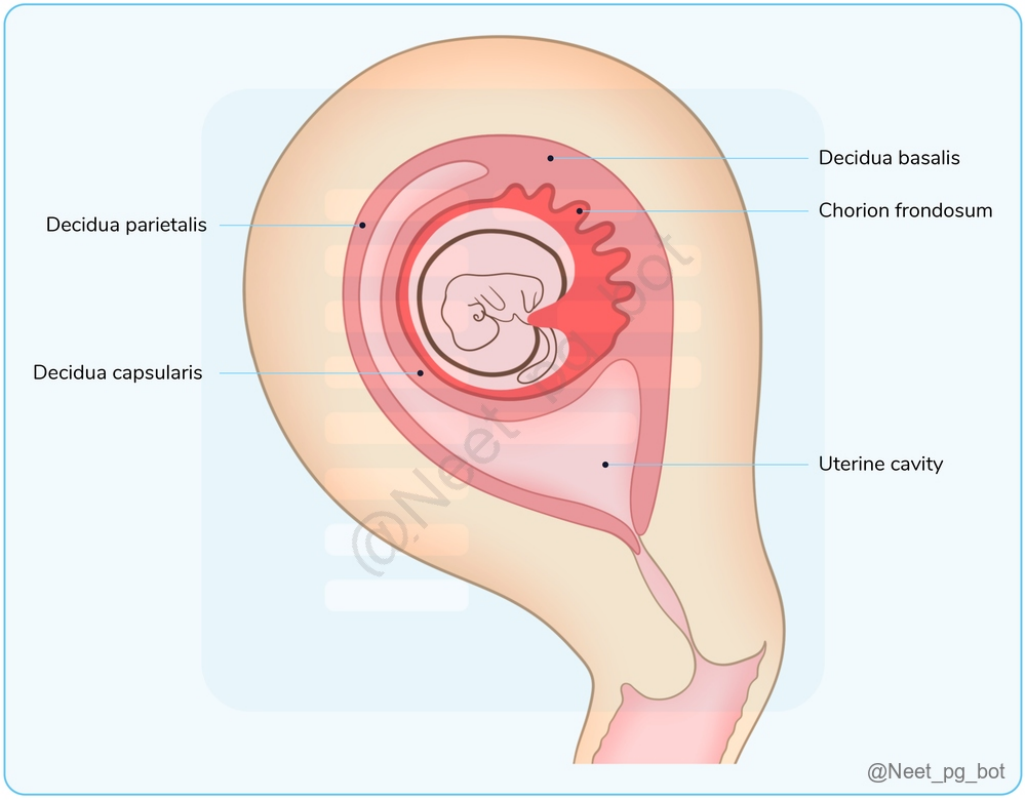
- *Listen (English)*
- *Listen (Hindi)*

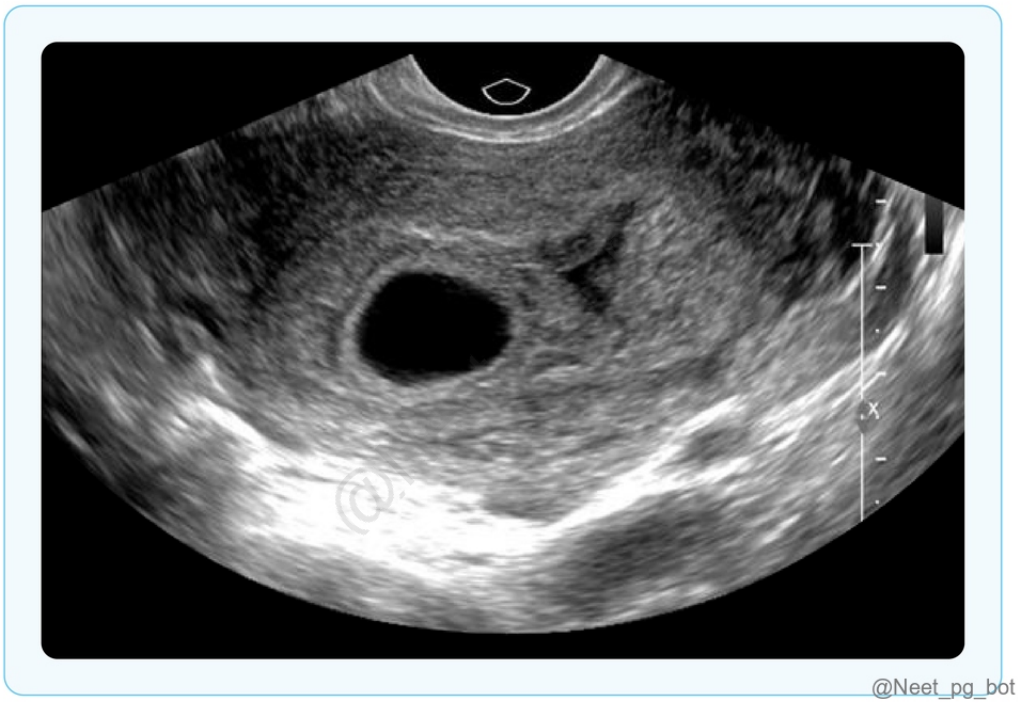
Explanation: The double decidual sac sign suggests an intrauterine pregnancy. At 5 weeks gestation, it is normal to see a gestational sac without the yolk sac or fetal pole, as these structures typically become visible by 5 to 6 weeks. Double decidual sac sign : (Option C) Suggestive of intrauterine pregnancy. (Option A ruled out) Two echogenic rings are seen surrounding the gestational sac, an inner decidua capsularis and an outer decidua parietalis. In between the two decidua is the uterine cavity. Early Pregnancy Ultrasound: Ultrasound is the imaging method of choice. In early pregnancy, transvaginal is more sensitive than trans-abdominal. Decidua is first formed as the thick hyperechoic endometrium. Structures visualized Gestational age (TVS) Key features Gestational sac 4.5 to 5 weeks First sign of pregnancy in an ultrasound Yolk sac 5 to 6 weeks First definitive sign of an intrauterine pregnancy. Fetal heartbeat 5.5 to 6 weeks M-mode is preferred for the assessment of cardiac activity. Note: Doppler is contraindicated in 1st trimester, as it can increase the temperature and damage the embryo . First definitive sign of an intrauterine pregnancy is the yolk sac inside the gestational sac. Double decidual sac sign : (Option C) Suggestive of intrauterine pregnancy. (Option A ruled out) Two echogenic rings are seen surrounding the gestational sac, an inner decidua capsularis and an outer decidua parietalis. In between the two decidua is the uterine cavity. Pseudogestational sac is irregular in outline, usually centrally located in the uterus, has no double decidua sign and the sac remains empty.

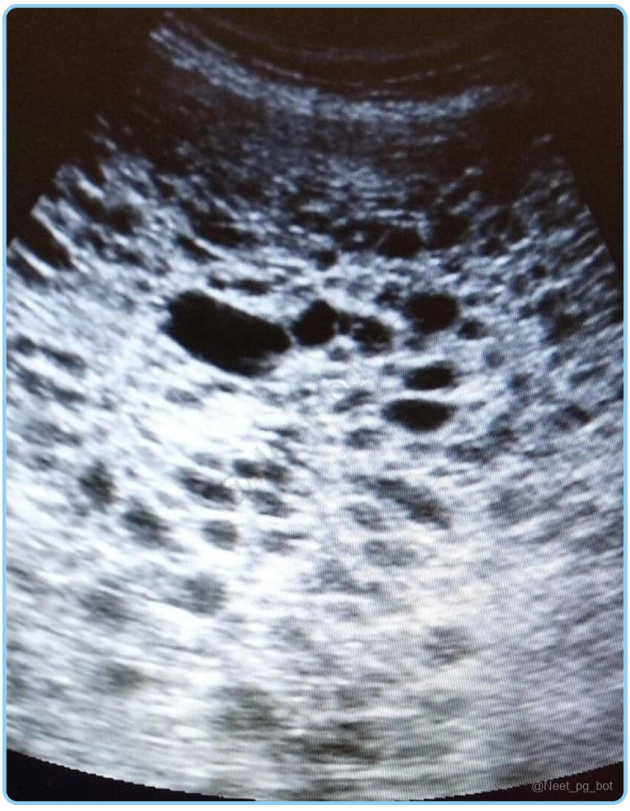

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Yolk Sac
Fetal Pole
@Neet_pg_bot


Decidua basalis
Chorion frondosum
Decidua parietalis
Decidua capsularis
Uterine cavity
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References:

DC Dutta’s Textbook of Obstetrics, Edition 9th- Page 601

Fred A. Mettler, Jr, Essentials of Radiology, Edition 4th- Page 191-93

William’s Gynecology Edition 4th- Page 164, 777

Sonography 1st Trimester Assessment, Protocols, and Interpretation - StatPearls - NCBI Bookshelf (nih.gov)

↑ *Back to this question in Part A*

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Q20: A 32-year-old woman with a history of infertility and recurrent pelvic discomfort is undergoing further evaluation with imaging. She has no history of recent infections but had an episode of acute pelvic inflammatory disease (PID) 5 years ago that was treated with antibiotics. The radiological image is shown below. What is the most likely diagnosis? (Q853424)

A. Hydrosalpinx

B. Ovarian cyst

C. Uterine adhesions

D. Right Cornual obstruction



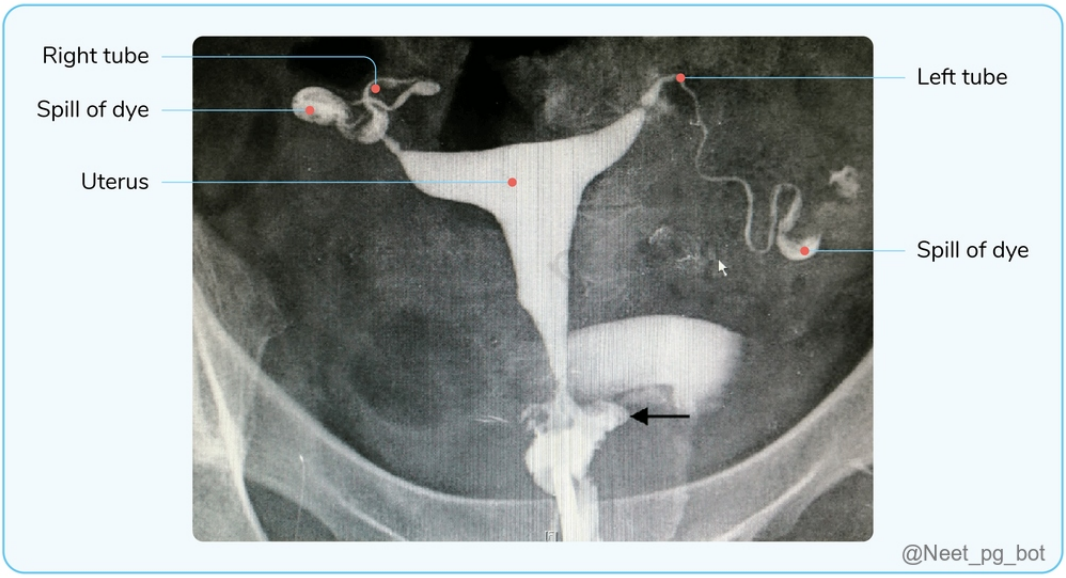
Correct Answer: A. Hydrosalpinx

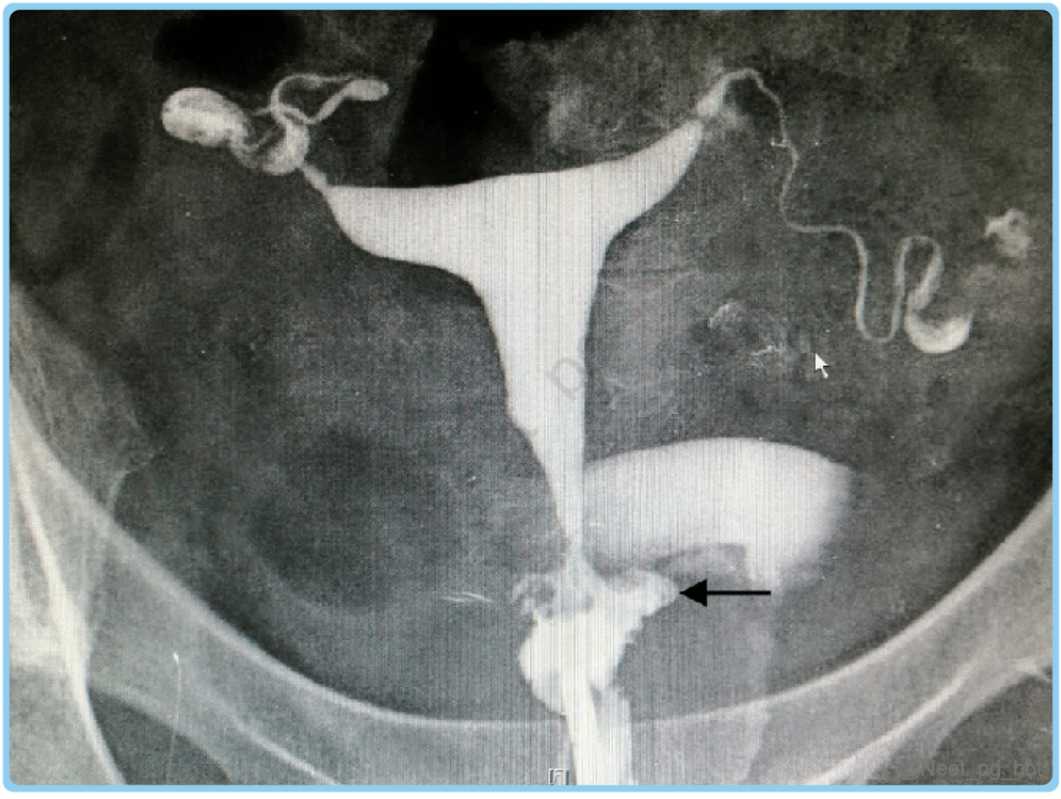
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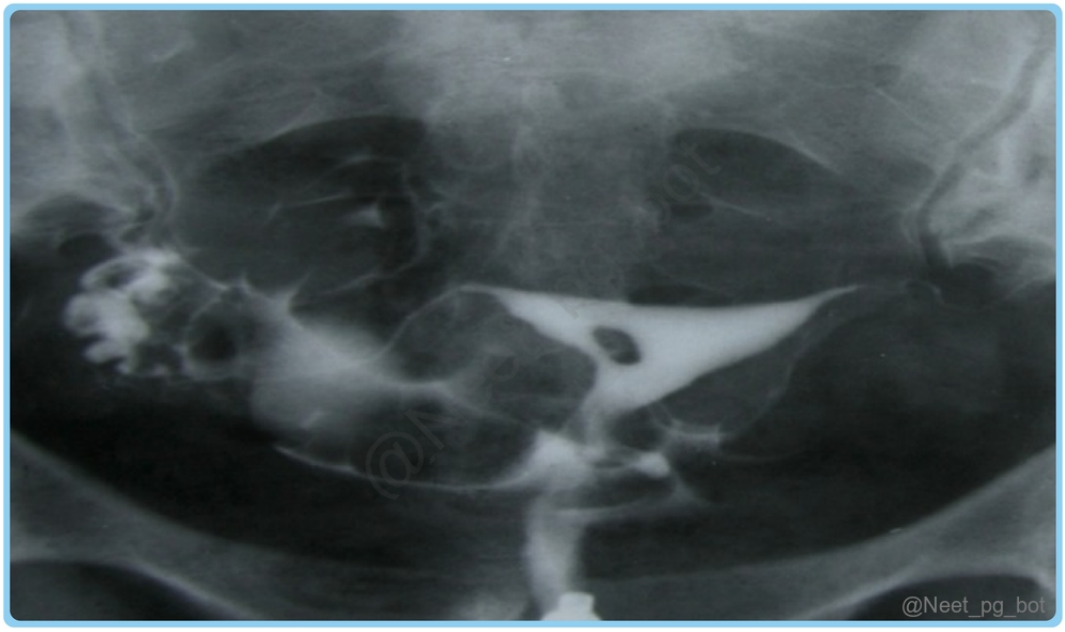
■ *Listen (Hindi)*

Explanation: The provided radiological image is from a Hysterosalpingography (HSG), showing a right-side dilated, tortuous right fallopian tube with no contrast spillage into the peritoneal cavity. The contrast remains confined within the tube, indicating distal blockage. The most likely diagnosis is right hydrosalpinx. Hysterosalpingography It is a radiographic imaging technique Indication: Infertility evaluation to assess the endocervical canal, the endometrial cavity, and the fallopian tube lumina and patency. Procedure: Radiopaque contrast material is injected through the cervical canal It is performed between cycle days 5 and 10 Normal findings: The spill of contrast from the tubes into the peritoneal cavity suggests patency of the fallopian tubes. The endometrial cavity is usually triangular and has a smooth contour. Contraindications: Acute pelvic infection Active uterine bleeding Pregnancy Iodine allergy Images: Normal uterine cavity with contrast extravasation through a posterior cervical canal (black arrow). a: Right hydrosalpinx b: Block at right cornua (No distention of the tube) (Option D ruled out) Small filling defect: Uterine adhesions (Option C ruled out) Ovarian cyst (Option B): It is a fluid-filled sac within the ovary. Since the contrast does not enter the cyst, it is not directly visualized in HSG. In this case, a dilated right fallopian tube with contrast accumulation within the fallopian tube and the lack of spillage of contrast is consistent with the hydrosalpinx picture. Hence, this option is incorrect.




Right tube
Spill of dye
Uterus
Left tube
Spill of dye
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References:

William's Gynecology, 4th Edition, Page 45, 44

www.ncbi.nlm.nih.gov/books/NBK560541/

↑ *Back to this question in Part A*

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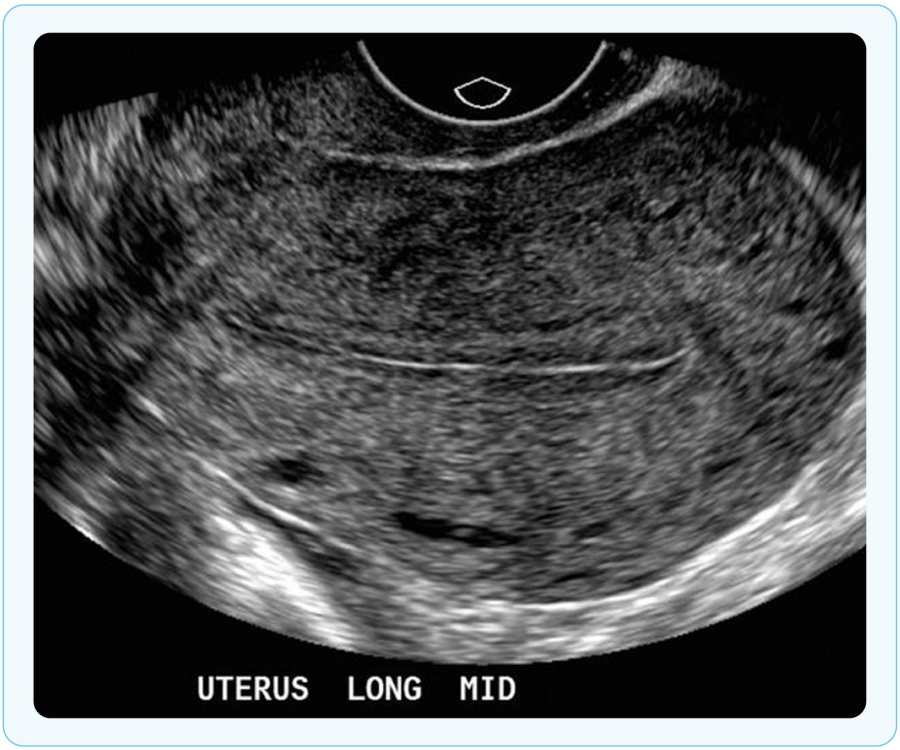
Q21: A 34-year-old woman is undergoing a fertility evaluation. The transvaginal USG image is shown below. Which phase of the menstrual cycle is she most likely in? (Q853423)

A. Menstrual phase

B. Early proliferative phase

C. Late proliferative phase

D. Secretory phase

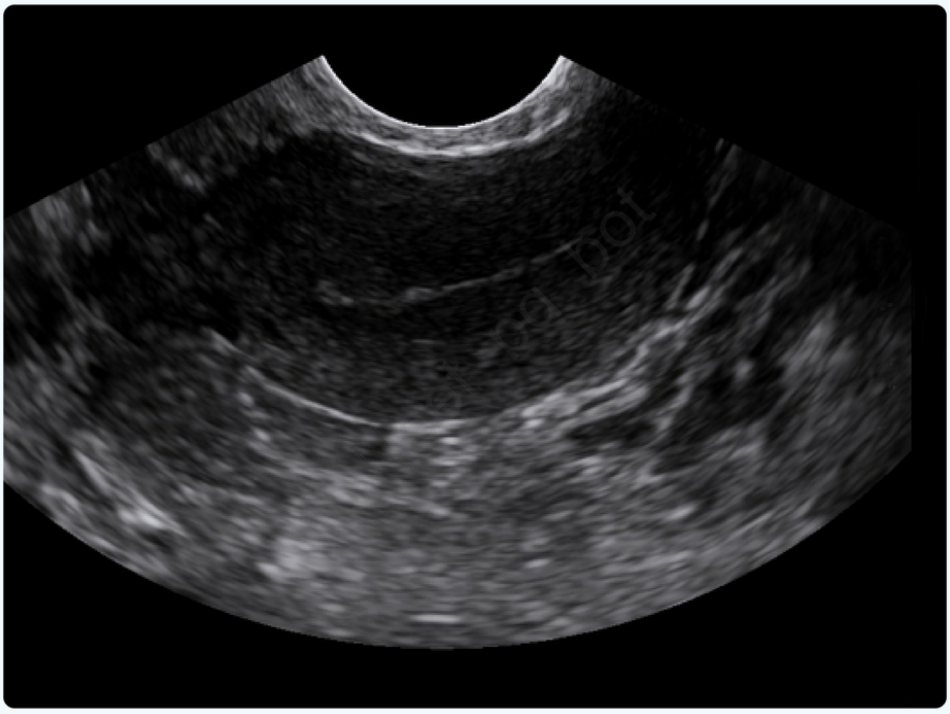


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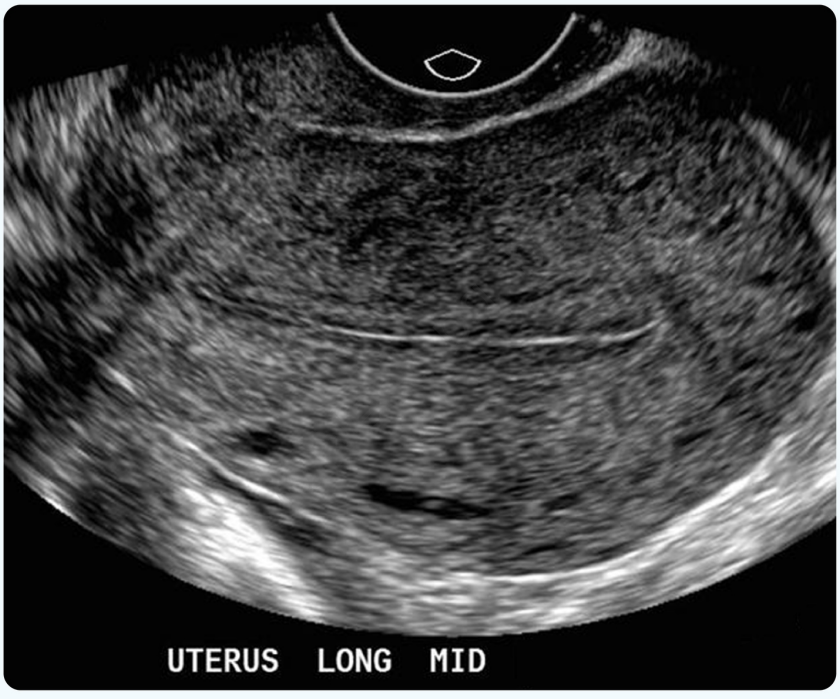
Correct Answer: C. Late proliferative phase

- *Listen (English)*
- *Listen (Hindi)*

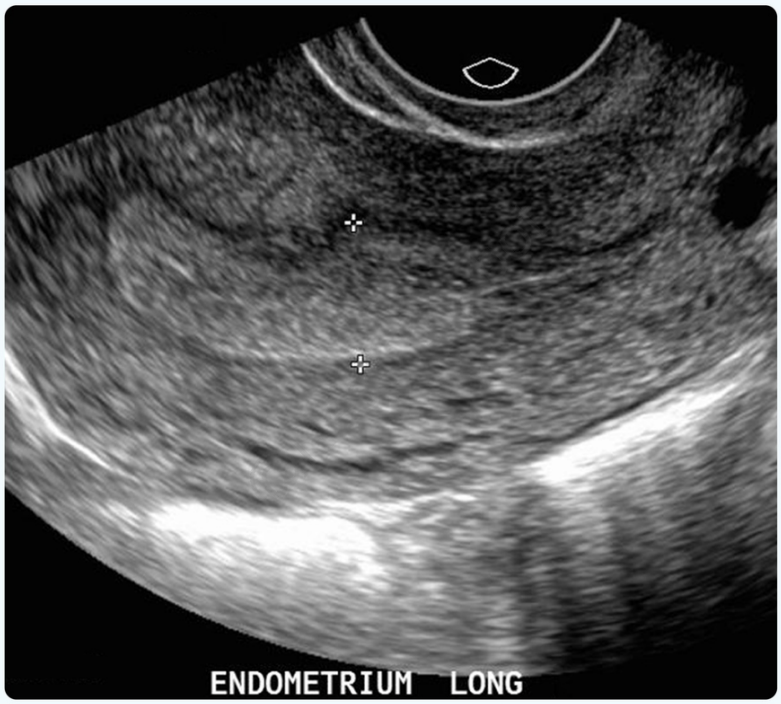
Explanation: The late proliferative phase shows the typical trilaminar appearance of the endometrium. Appearances of Endometrium in Various Phases of the Menstrual Cycle Menstrual and early proliferative phase: (Options A & B ruled out) Thin and brightly echogenic stripe. Late proliferative phase: (Option C) Trilaminar appearance (outer echogenic basal layer, middle hypoechoic functional layer, and an inner echogenic stripe at the central interface) Secretory phase: (Option D ruled out) The thickest can be up to 16 mm. Uniformly echogenic.



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References:

Endometrial thickness | Radiology Reference Article | Radiopaedia.org

↑ *Back to this question in Part A*

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• [06_OBGy Imaging] 014 Previous Year Questions

« Back to Folder Directory

[06_OBGy Imaging] 014 Previous Year Questions — Quick Jump

Q1 (p. 1161) *Q2 (p. 1162)* *Q3 (p. 1162)* *Q4 (p. 1163)* *Q5 (p. 1171)* *Q6 (p. 1174)*

Q1: Fetal anaemia is primarily determined by Doppler assessment of which artery? (Q866874)

A. Middle cerebral artery

B. Umbilical artery

C. Ductus venosus

D. Uterine artery

Correct Answer: A. Middle cerebral artery

Explanation: Fetal anemia is best assessed by Doppler measurement of the peak systolic velocity (PSV) in the Middle Cerebral Artery (MCA) . In fetal anemia, the blood's oxygen-carrying capacity is reduced, so the fetus compensates with increased cardiac output and decreased blood viscosity. This leads to faster blood flow in the MCA , which can be picked up on Doppler. An MCA-PSV > 1.5 multiples of the median (MoM) for gestational age strongly suggests moderate-to-severe anemia. Other vessels like the umbilical artery or ductus venosus are more useful for assessing placental insufficiency or cardiac compromise, not specifically anemia. Uterine artery Doppler is about maternal blood flow to the placenta, not fetal hemoglobin status. Incorrect Options: Umbilical artery (Option B): Umbilical artery doppler is primarily assesses placental resistance and fetal well-being in cases of suspected intrauterine growth restriction (IUGR) or placental insufficiency. High placental resistance → reduced diastolic flow → high systolic/diastolic (S/D) ratio, abnormal pulsatility index (PI), or even absent/reversed end-diastolic flow (AEDF/REDF) In anemia, the problem is low hemoglobin, not placental resistance. Umbilical artery flow may still appear normal until the fetus is severely compromised. Ductus venosus (Option C): Ductus venosus doppler is used to Evaluates fetal cardiac function and central venous pressure. The ductus venosus shunts oxygen-rich blood from the umbilical vein directly to the heart. Abnormal waveforms (especially reversal of the "a" wave) suggest right heart dysfunction , myocardial compromise , or severe hypoxia/acidosis . DV changes appear late in fetal compromise, often after hypoxia and cardiac decompensation have already set in. It's more of a late sign in severe anemia, not a screening or early diagnostic tool. Uterine artery (Option D): Uterine artery doppler is used to assess maternal blood flow to the placenta and screens for risk of preeclampsia and IUGR. Persistent high resistance with an early diastolic notch in the waveform after mid-pregnancy suggests abnormal trophoblastic invasion → risk of placental insufficiency. This tells us about maternal vascular resistance , not fetal red blood cell status. A fetus can be severely anemic with a perfectly normal uterine artery Doppler.

↑ *Back to this question in Part A*

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Q2: Which investigation is contraindicated in pregnancy? (Q865259)

A. CT scan

B. MRI

C. Ultrasound

D. Doppler

Correct Answer: A. CT scan

Explanation: CT scans (Option A) use X-rays, which are a form of ionizing radiation. In early pregnancy, radiation exposure, especially during organogenesis (weeks 3-8 post-conception), can lead to teratogenic effects (e.g., congenital anomalies), increased risk of miscarriage, or even fetal growth restriction. Incorrect Options: MRI (Magnetic Resonance Imaging) (Option B ruled out): MRI uses strong magnetic fields and radio waves, not ionizing radiation. Ultrasound (Option C ruled out): Ultrasound uses high-frequency sound waves to create images. Doppler (Option D ruled out): Doppler ultrasound is a specific type of ultrasound that measures blood flow.

References:

DC Dutta’s Textbook of Obstetrics, 9th Edition, Page 606

↑ *Back to this question in Part A*

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Q3: Which of the following methods is used to measure fetal anemia? (Q852578)

A. Umbilical artery Doppler

B. Cord blood sampling

C. Chorionic villus sampling

D. Peak systolic velocity in the fetal middle cerebral artery (MCA)

Correct Answer: D. Peak systolic velocity in the fetal middle cerebral artery (MCA)

Explanation: Non-invasive method for detecting fetal anemia: MCA peak systolic velocity (MCA-PSV) is the gold standard for detecting fetal anemia, especially in cases of Rh isoimmunization or parvovirus B19 infection .

Principle: In fetal anemia, the blood viscosity decreases , leading to increased blood flow velocity in the MCA due to compensatory mechanisms. Doppler ultrasound measurement: MCA-PSV is measured using Doppler ultrasonography and compared with MoM (multiples of the median) values to determine anemia severity. Assessment of Fetal Anemia Method Utility Invasiveness MCA-PSV Doppler (Correct Answer) Gold standard for non-invasive detection of fetal anemia Non-invasive Umbilical artery Doppler Assesses placental insufficiency (not fetal anemia) Non-invasive Cord blood sampling (PUBS - Percutaneous Umbilical Blood Sampling) Directly measures fetal hemoglobin and hematocrit but has high risk of complications Invasive Chorionic villus sampling (CVS) Used for genetic testing in the first trimester, not fetal anemia Invasive Umbilical artery Doppler (Option A) is incorrect because it primarily assesses placental insufficiency and fetal hypoxia rather than fetal anaemia. Cord blood sampling (Option B) is incorrect because, although it provides direct measurement of fetal haemoglobin, it is invasive and associated with procedure-related risks. Chorionic villus sampling (Option C) is incorrect because it is used for early genetic testing, not for evaluating fetal anaemia.

References:

https://pubmed.ncbi.nlm.nih.gov/18226612/ https://pmc.ncbi.nlm.nih.gov/articles/PMC5533518/

↑ *Back to this question in Part A*

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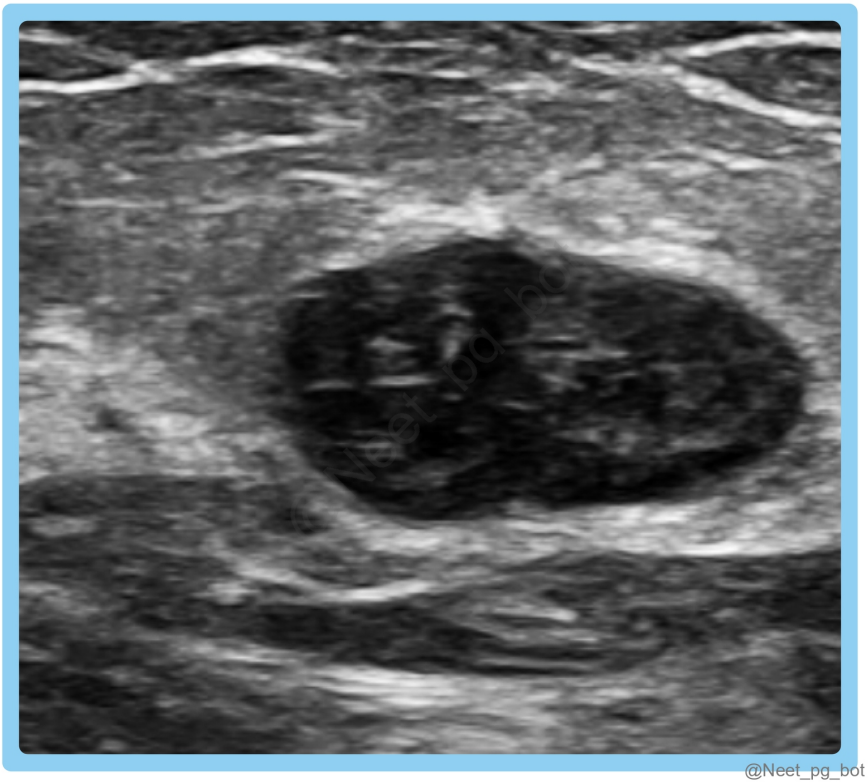
Q4: Which of the following is most likely to show the following finding on USG? (Q860590)

A. Fibroadenoma

B. Breast cyst

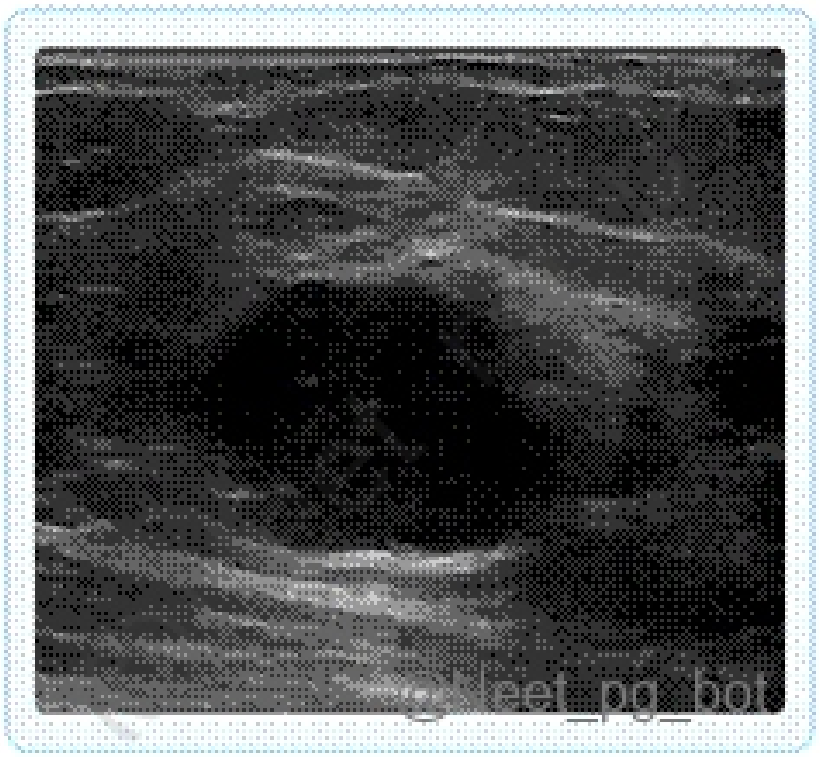
C. Breast carcinoma

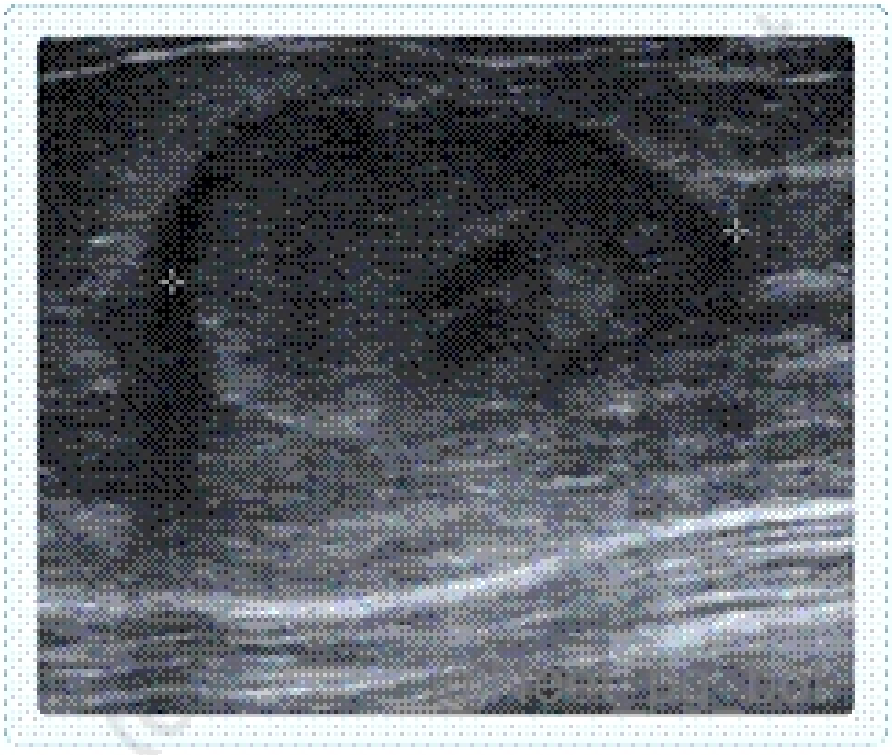
D. Metastasis to the breast from another primary site

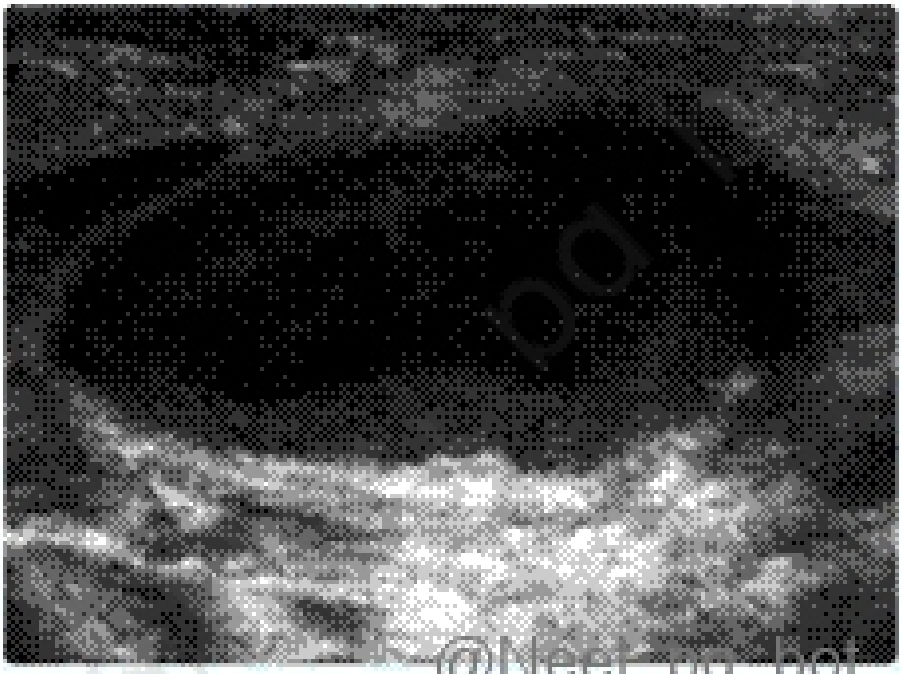


Correct Answer: A. Fibroadenoma

Explanation: The ultrasound features—round/ovoid hypoechoic mass, parallel orientation (wider than tall)—are classic findings associated with a fibroadenoma, which is a benign breast lesion. Breast pathology USG-findings USG Simple cyst (Option B) Anechoic with posterior acoustic enhancement Round or ovoid with a smooth hyperechoic wall {{caption_text}} Complicated cyst Internal echoes Fat-fluid level Oil cyst, galactocoel Internal contents move with change in the position of the breast {{caption_text}} Complex cyst Hyperechoic thin septations BI-RADS 3:Probably benign, needs follow-up {{caption_text}} Abscess Ill-defined or well-defined outline Maybe anechoic or low-level internal echoes and posterior enhancement {{caption_text}} Fibrocystic disease Prominent fibro glandular tissue in the area of a palpable nodule; however, no discernible mass small cysts in the mammary zone {{caption_text}} Fibroadenoma Round/ovoid hypoechoic mass May have a hyperechoic rim (pseudo capsule) Parallel orientation(wider than tall) May have calcifications {{caption_text}} Cystosarcoma phyllodes Inhomogeneous, solid-appearing mass is the (most common) A solid mass containing single or multiple, round or cleft-like cystic spaces and demonstrating posterior acoustic enhancement {{caption_text}} Fat necrosis Acute New lesion Hyperechoic due to edema BI-RADS 3 Late 1.5 years or more Calcified walls causing a posterior acoustic shadow BI-RADS 3 {{caption_text}} BI-RADS 4/5/6 (Option C,D) Hypoechoic mass with irregular wall (spiculated) Taller than wide orientation {{caption_text}} Intraductal papilloma Dilated duct Well defined nodule BI-RADS 4A/4B/4C: suspicious for malignancy, biopsy advised {{caption_text}} Duct ectasia Dilated ducts with branching tubular anechoic structures Diametre >2 mm {{caption_text}} Implant rupture Step ladder sign: linear horizontal hyperechoic bands representing folds in collapsed shell Suggests intracapsular rupture {{caption_text}} Silicone granuloma Snowstorm sign: Hyperechoic and well-circumscribed superficial border with dirty posterior acoustic shadow Suggests extracapsular rupture {{caption_text}}

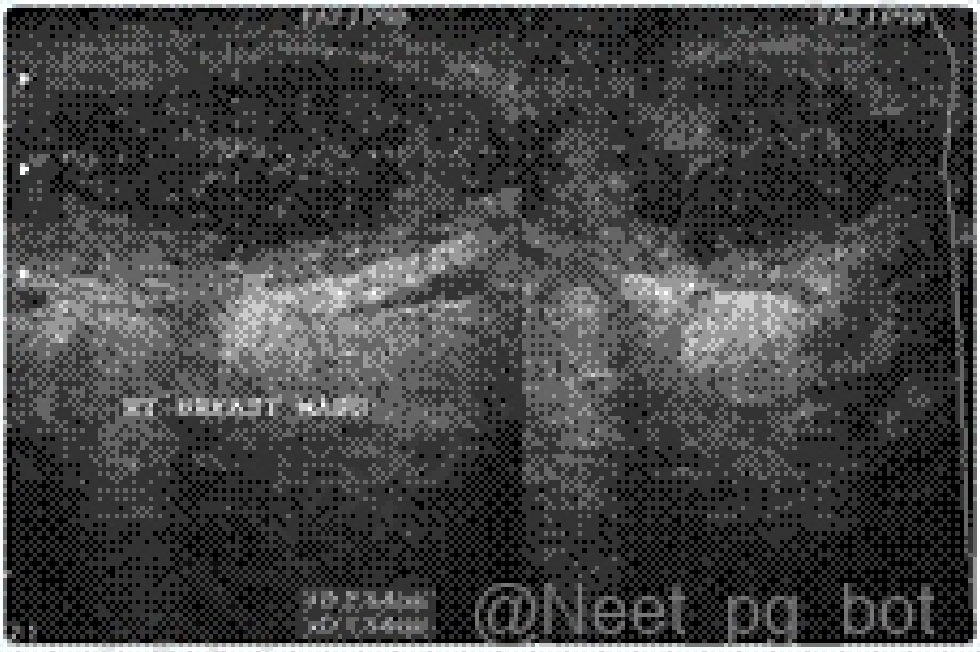




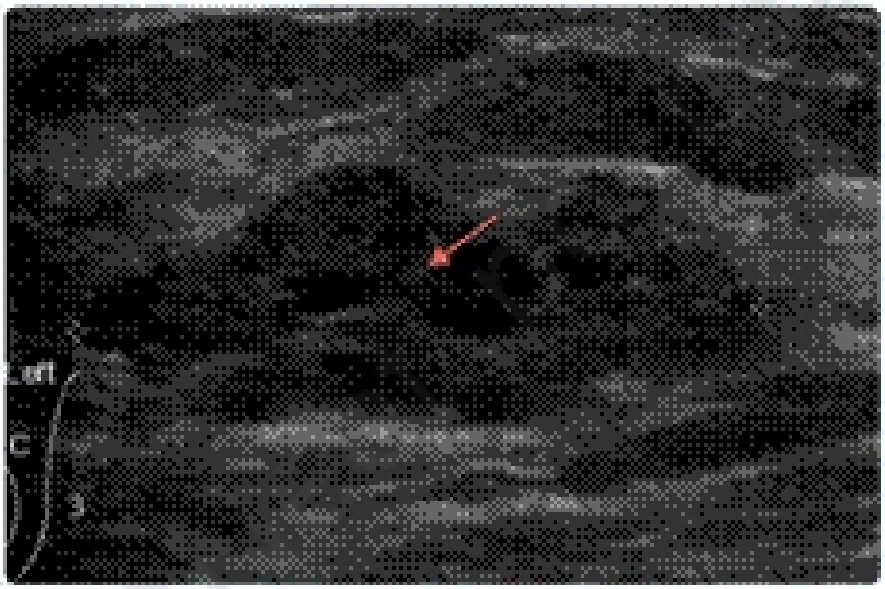


Complex cyst

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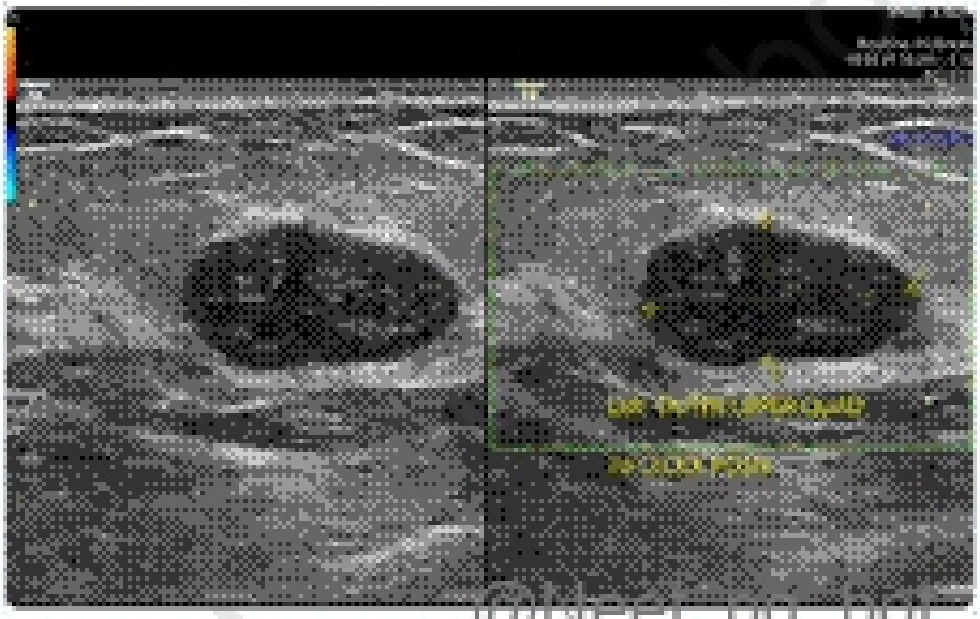


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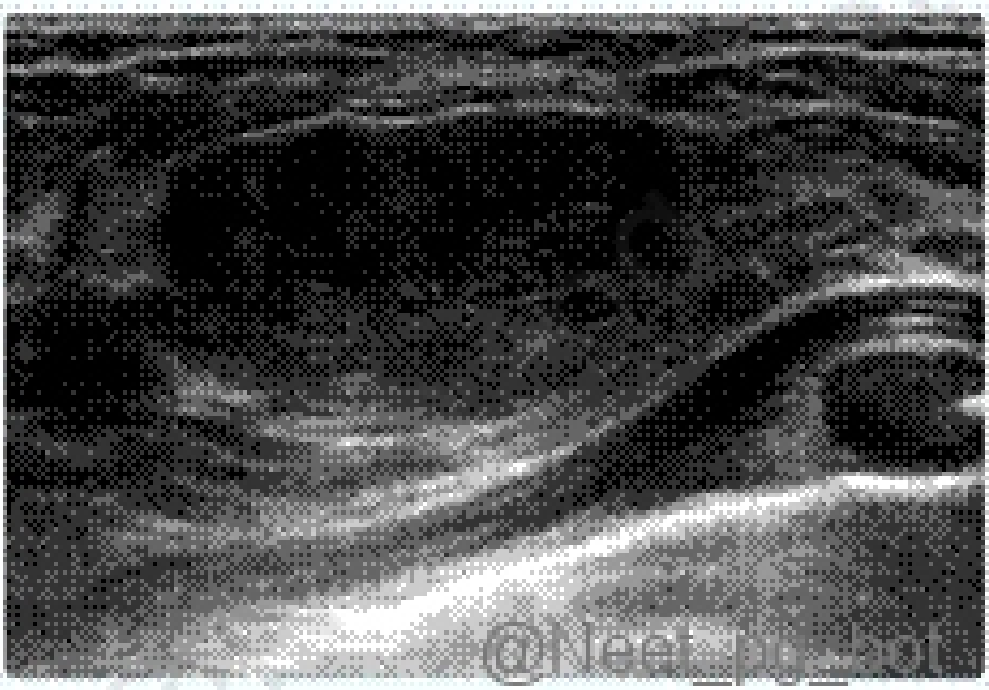
Fibrocystic disease (Arrow)

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Fibroadenoma

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Cystosarcoma phyllodes



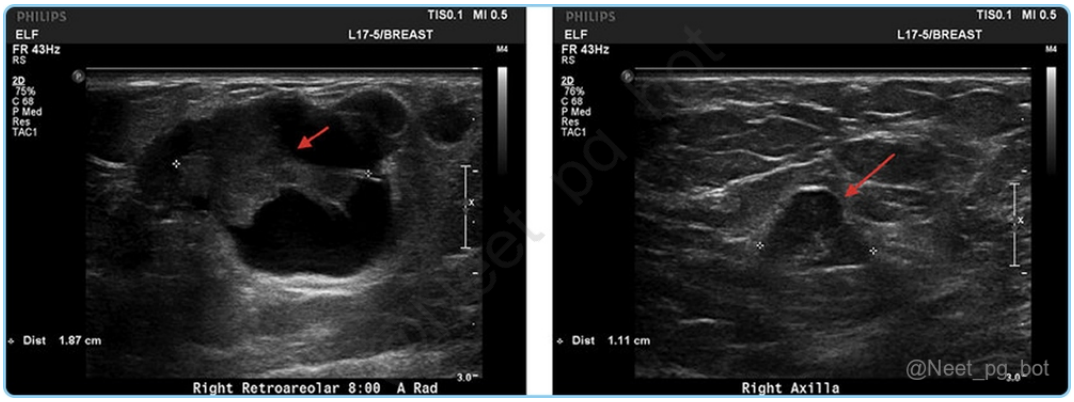
Fat necrosis

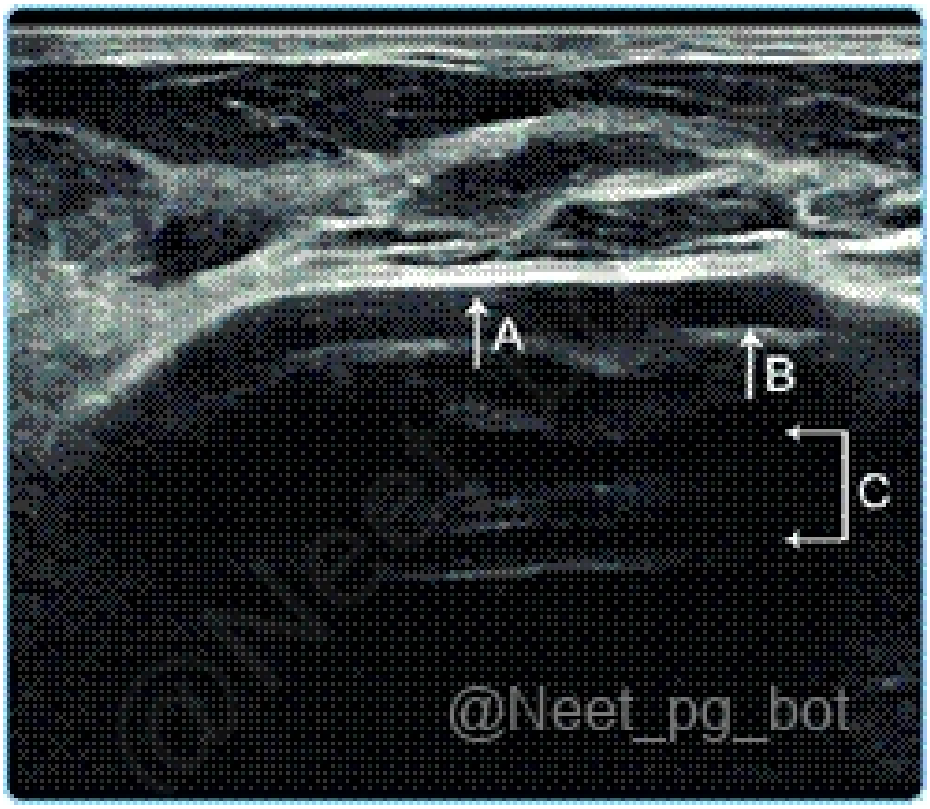


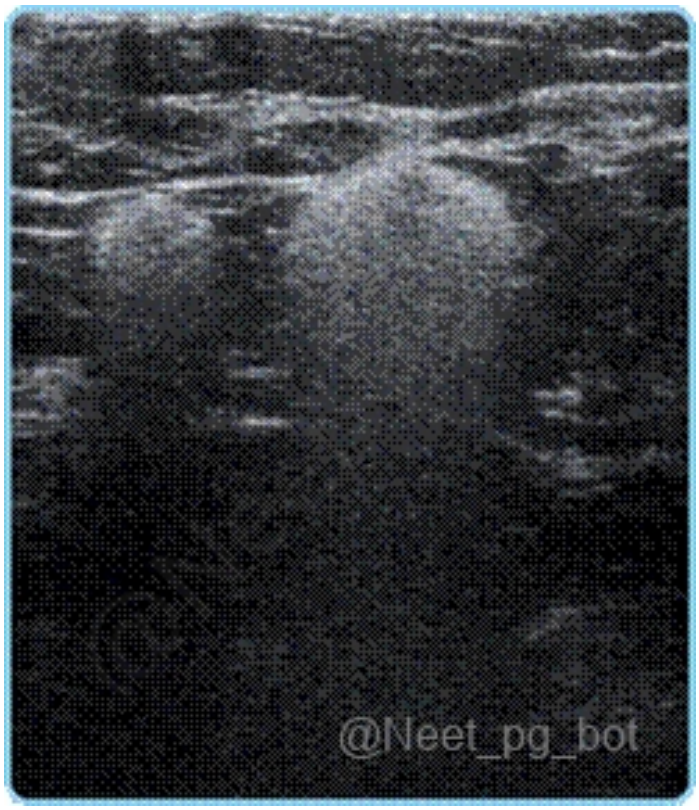
Malignant



Intraductal papilloma (Arrow)


PHILIPS
TIS0.1 MI 0.5
ELF
L17-5/BREAST
FR 43Hz
RS
2D
75%
C 68
P Med
Res
TAC1
M4
Dist 1.87 cm
Right Retroareolar 8:00 A Rad
PHILIPS
TIS0.1 MI 0.5
ELF
L17-5/BREAST
FR 43Hz
RS
2D
76%
C 68
P Med
Res
TAC1
M4
Dist 1.11 cm
Right Axilla
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A
B
C
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https://radiologyassistant.nl/breast/ultrasound/ultrasound-of-the-breast

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2766883/

↑ *Back to this question in Part A*

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Q5: Banana sign on USG is seen in which of the following conditions? (Q857384)

A. Omphalocele

B. Spina bifida

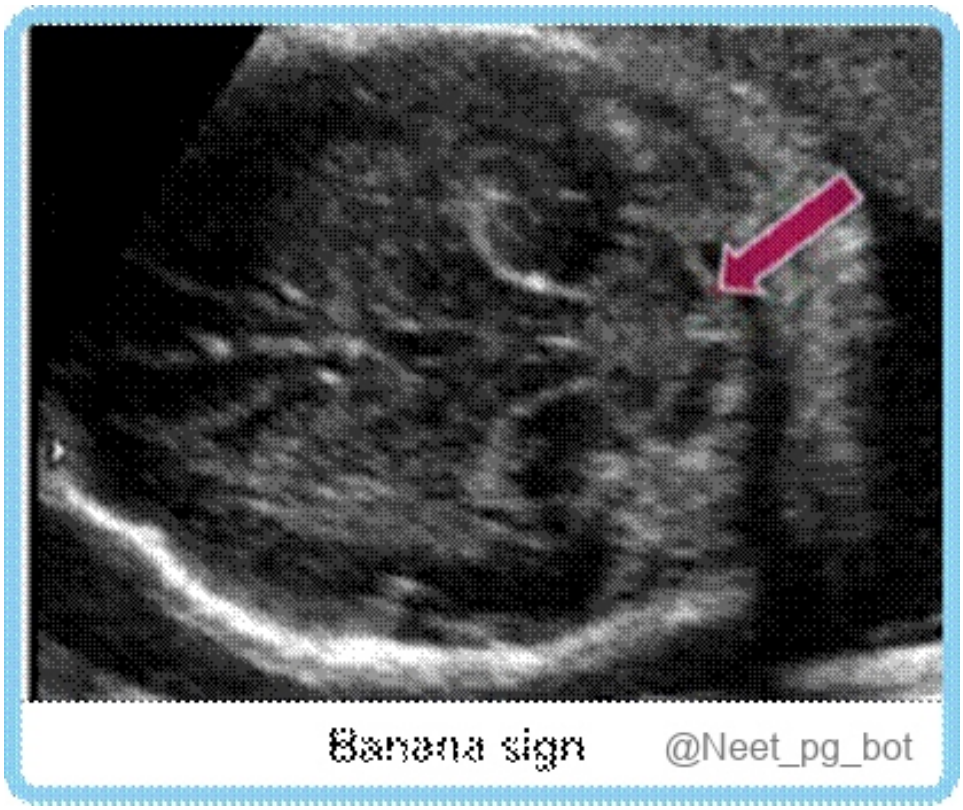
C. Anencephaly

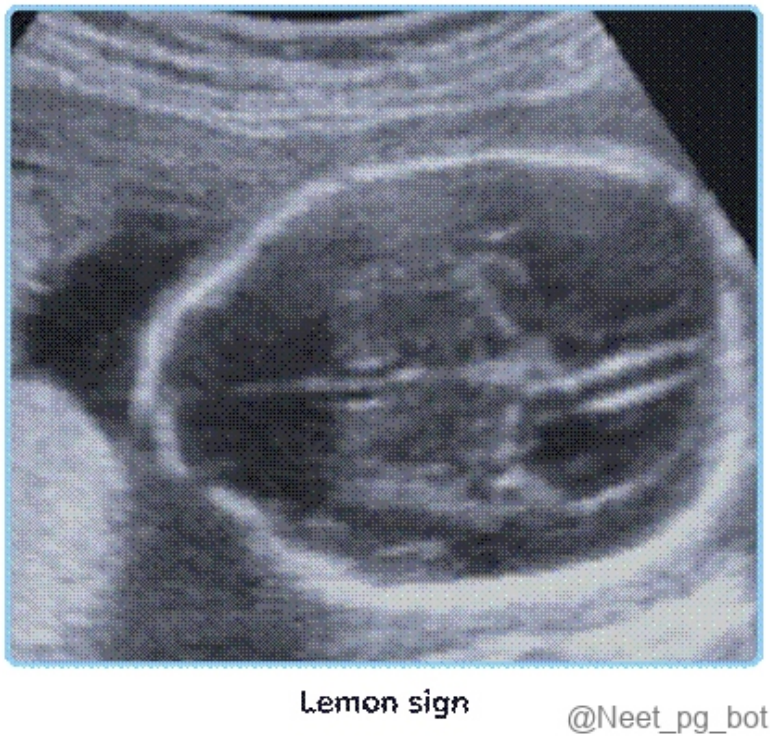
D. Encephalocele



Correct Answer: B. Spina bifida

Explanation: The Banana sign is a term used in ultrasound (USG) to describe a specific appearance seen in spina bifida , a neural tube defect. It is characterized by the shape of the cerebellum , which appears curved or banana-shaped due to caudal displacement of the cerebellum and tethering of the spinal cord . This sign is typically seen in fetal ultrasound and is a key indicator of spina bifida, particularly in cases of myelomeningocele , a type of open spina bifida. Neural Tube Defects: Condition Description Spina Bifida (Myelomeningocele) The cerebellum appears flattened and curled at the base, creating a "banana" shape due to tethering of the spinal cord. {{caption_text}} A lemon sign indicates a flattened frontal bone often seen in spina bifida. {{caption_text}} Omphalocele Abdominal organs protrude through the umbilical cord, covered by a membrane. Anencephaly The brain and skull fail to develop fully, leading to severe neural tube defects. Absence of the brain , with partial or total lack of the skull. Encephalocele Brain tissue protrudes through a skull defect, forming a sac-like structure. Omphalocele (Option A) : This is a defect of the abdominal wall and does not show the banana sign. Anencephaly (Option C) : This condition involves the absence of the brain and skull and is not associated with the banana sign. Encephalocele (Option D) : This involves a protrusion of brain tissue through an opening in the skull, and does not show the banana sign.





References:

Williams Obstetrics 25th Ed • Page no: 193

DC Dutta's Textbook of Obstetrics - 8th edition • Page no: 375, 377, 471, 567, 570, 736

https://www.ncbi.nlm.nih.gov/books/NBK559265/

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7864317/#B33

↑ *Back to this question in Part A*

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Q6: Which of the following is not a benefit of ultrasound (USG) compared to mammography? (Q857385)

A. USG can be used to detect calcifications, asymmetries, and distortions better than mammography

B. Can be used for guided biopsy

C. In young females with dense breasts

D. Can be used to differentiate solid VS cystic

Correct Answer: A. USG can be used to detect calcifications, asymmetries, and distortions better than mammography

Explanation: Mammography is superior to USG in detecting microcalcifications, architectural distortions, and asymmetries , which are key features of early breast malignancies . Ultrasound is not effective in detecting tiny microcalcifications (seen in DCIS) because it relies on sound waves rather than X-rays . Mammography remains the gold standard for breast cancer screening, especially in women >40 years . Comparison of USG vs. Mammography Feature Ultrasound (USG) Mammography Microcalcifications detection Poor Excellent Architectural distortion Poor Good Best for dense breasts Yes (young females) Limited sensitivity Solid vs. cystic differentiation Excellent Poor Guided biopsy Yes Yes (stereotactic) Radiation exposure None Yes (low dose) Can be used for guided biopsy (Option B) : Ultrasound is excellent for guided biopsies , as it provides real-time imaging, allowing accurate needle placement for tissue sampling. In young females with dense breasts (Option C) : Ultrasound is particularly useful in young women with dense breasts because mammography may not clearly differentiate between benign and malignant masses in dense tissue, whereas ultrasound can. Can be used to differentiate solid vs cystic (Option D) : Ultrasound is effective in distinguishing between solid tumors and fluid-filled cysts , which helps avoid unnecessary biopsies in cystic cases.

References:

Sutton's Radiology and Imaging for Medical Students 7th edition • Page no: 1475

https://www.uptodate.com/contents/breast-imaging-for-cancer-screening-mammography-and-ultrasonography

↑ *Back to this question in Part A*

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• [07_Nuclear Medicine] 015 Nuclear Medicine And Radiotherapy

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[07_Nuclear Medicine] 015 Nuclear Medicine And Radiotherapy — Quick Jump

Q1 (p. 1176)	*Q2 (p. 1177)*	*Q3 (p. 1178)*	*Q4 (p. 1179)*	*Q5 (p. 1180)*	*Q6 (p. 1182)*
Q7 (p. 1184)	*Q8 (p. 1188)*	*Q9 (p. 1189)*	*Q10 (p. 1192)*	*Q11 (p. 1195)*	*Q12 (p. 1197)*
Q13 (p. 1198)	*Q14 (p. 1199)*	*Q15 (p. 1201)*	*Q16 (p. 1202)*	*Q17 (p. 1204)*	*Q18 (p. 1209)*
Q19 (p. 1211)	*Q20 (p. 1214)*	*Q21 (p. 1217)*	*Q22 (p. 1218)*	*Q23 (p. 1221)*	

Q1: A 62-year-old female with a history of hypertension and diabetes presents to the emergency department with new-onset chest pain and fatigue. An electrocardiogram shows ST-segment changes suggestive of ischemia. Which scan type should be prioritized in this case? (Q853407)

A. Thallium scan

B. Pyrophosphate scan

C. MUGA scan

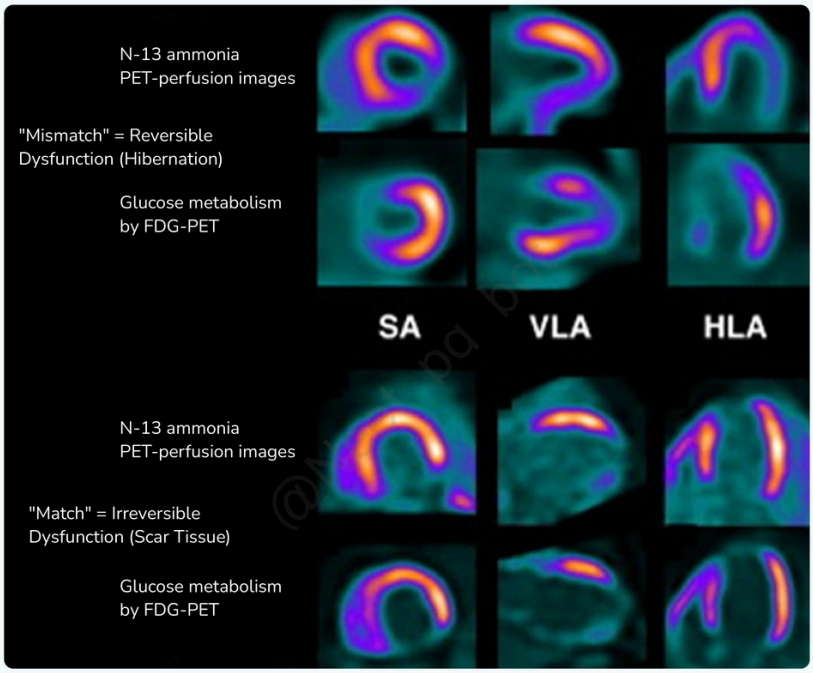
D. PET scan

Correct Answer: A. Thallium scan

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: This scan specifically evaluates areas of decreased blood flow, making it the most suitable choice given the patient's symptoms and EKG findings suggestive of ischemia. Purpose Scan types For Myocardial Perfusion Assess ischemia Cold spot: decreased uptake in ischemic areas. Thallium scan (Commonly used) Tetrofosmin Sestamibi scan. For Myocardial Infarction (Option B ruled out) Assess infarct Hot spot in infarct area as pyrophosphate accumulates and is not metabolized. 99m Tc - Pyrophosphate scan. For Ventricular Function (Option C ruled out) Evaluate ejection fraction MUGA (Multiple Gated Acquisition) scan (AKA nuclear ventriculography) Radiolabeled RBCs are used Most accurate for ventricular function - Cardiac MRI For Myocardial Viability (Option D ruled out) Assess the viability of myocardium PETscan - Best investigation for myocardial viability. Perfusion and metabolism mismatch are observed in the PET scan. Perfusion Agents :N-13 ammonia and Rubidium chloride. Metabolism Agent : FDG-PET is used for glucose metabolism. No FDG uptake indicates a normal heart or an infarct. FDG uptake is present: In the Ischemic Myocardium FDG-PET is combined with perfusion imaging for comprehensive assessment. Uptake in PET with low perfusion indicates reversible dysfunction (suggestive of hibernation). Irreversible dysfunction indicates the presence of scar tissue . Note: Hibernating myocardium is ischemic but viable. {{caption_text}}



Myocardial viability imaging with PET
Illustration showing a mismatch of resting MBF and glucose metabolism of the inferolateral wall indicating viable myocardium (top). A matched resting perfusion and glucose metabolism defect of the inferior wall, indicating nonviable myocardium is shown in the bottom image

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References:

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https://www.amjmed.com/article/S0002-9343(21)00224-2/pdf

https://www.ncbi.nlm.nih.gov/books/NBK592410/

↑ *Back to this question in Part A*

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Q2: A 65-year-old man with a suspicion of lung cancer is being evaluated with an FDG PET scan to guide his treatment plan. Which of the following is NOT a typical use of FDG PET in clinical practice? (Q853410)

A. Evaluating the presence of distant metastasis from the primary lung tumor

B. Differentiating between benign inflammatory conditions and malignant lesions

C. Assessing the effectiveness of chemotherapy

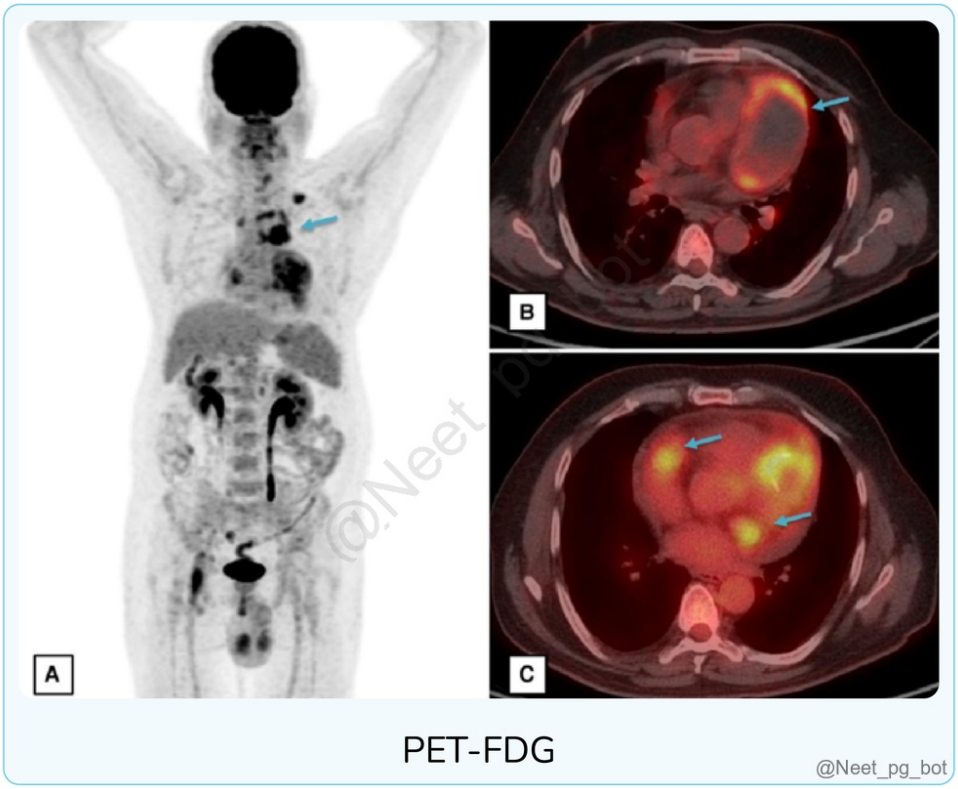
D. Staging the extent of lung cancer prior to treatment

Correct Answer: B. Differentiating between benign inflammatory conditions and malignant lesions

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: Fluorodeoxyglucose (FDG) positron-emission tomography (PET-FDG) Uptake of 18F-FDG (Analogue of endogenous glucose) in large quantities by cancer cells as compared to normal cells Application: Quantification of tumor metabolic activity Diagnosis (lung cancer) and Staging of cancer (Option D ruled out) Assessing distant metastasis (Option A ruled out) More sensitive in primary lung and oesophageal cancer metastatic disease Assessment of response to treatment (Option C ruled out) A decrease in FDG uptake after chemotherapy indicates that the tumor is responding to treatment Routine surveillance following treatment- not commonly preferred. {{caption_text}} Not useful in the following situations: High Glycolytic Metabolism tissues: Central nervous system tumors. Inflammation vs. Cancer: Both conditions exhibit increased glucose metabolism. (Option B) Movement disorders Coronary blood flow



References:

Grainger & Allison’s Diagnostic Radiology, 7th Edition, Page 1642, 1645, 1646, 1648.

https://www.sciencedirect.com/science/article/abs/pii/S0009926010001790

↑ *Back to this question in Part A*

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Q3: A 65-year-old patient with a history of smoking undergoes a positron emission tomography (PET) scan for suspected lung cancer. The scan shows increased radiotracer uptake in the right lung. However, further investigation reveals no malignancy. Which of the following is the most likely cause of this false positive result? (Q853421)

A. Low metabolic activity of the tumor

B. Physiological uptake due to muscle activity

C. Small size of the tumor

D. Inflammation from a recent pneumonia infection

Correct Answer: D. Inflammation from a recent pneumonia infection

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: Inflammatory conditions, such as pneumonia, can lead to increased uptake of the radiotracer in PET scans, mimicking cancerous activity. This is a common cause of false positive results, where the scan suggests malignancy when there is none. Challenges in PET Scans: False Positive Results ■■■■■■: Indication of cancer activity when there is none. Common Causes : Cause Description Inflammation and Infection Conditions like pneumonia, sarcoidosis, and infections (e.g., tuberculosis) cause increased FDG uptake. Post-Surgical Changes Inflammatory responses post-surgery may yield false positives if scans are done too soon. Benign Tumors High FDG uptake can occur in benign lesions like granulomas or abscesses. Physiological Uptake Normal activities (muscle use, brown fat metabolism) may mimic malignancy. (Option B ruled out) False Negative Results : Failure to detect existing cancer Common Causes : Cause Description Low Metabolic Activity Tumors Cancers like bronchioalveolar carcinoma may show minimal FDG uptake. (Option A ruled out) Small Tumors Tumors smaller than detection thresholds may be missed. (Option C ruled out) Timing of Scans Timing relative to treatment affects uptake; treated tumors may show reduced FDG levels despite viable cancer.

References:

https://pmc.ncbi.nlm.nih.gov/articles/PMC9983352/

↑ *Back to this question in Part A*

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Q4: A 55-year-old male patient diagnosed with nasopharyngeal carcinoma (NPC) is being considered for radiotherapy. Which of the following statements regarding the radiosensitivity of NPC is correct? (Q853420)

A. Low radiosensitivity, high failure rates.

B. Highly radiosensitive; 70% to 98% control with IMRT.

C. EMT promotes radiosensitivity.

D. High RPA1 expression indicates sensitivity.

Correct Answer: B. Highly radiosensitive; 70% to 98% control with IMRT.

Explanation: NPC is classified as highly radiosensitive, with locoregional control rates of 70% to 98% when treated with intensity-modulated radiotherapy (IMRT). Radiosensitive Tumors Definition : Tumors that respond well to radiation, leading to significant shrinkage or eradication. Examples : Nasopharyngeal Carcinoma (NPC) : Highly radiosensitive; 70–98% control rates with IMRT. (Option A ruled out) Chemotherapy enhances outcomes. HPV-positive Oropharyngeal Carcinoma : Excellent cure rates post-radiotherapy. Mechanisms : Immune Activation : High levels of CD8+ T cell infiltration increase radiation response. Gene Profiles : Radiosensitive tumors exhibit favorable gene expression for radiation efficacy. Radioresistant Tumors Definition : Tumors with low response to radiation, often leading to recurrence or treatment failure. Examples : Subtypes of Breast Cancer & Glioblastomas : Challenging to treat with radiotherapy. NPC (Subset) : Some cases show resistance due to molecular factors. Mechanisms : Gene Expression : High levels of RPA1 linked to poor survival after radiotherapy in NPC. (Option D ruled out) Epithelial-Mesenchymal Transition (EMT) : Promotes resistance by increasing invasiveness. (Option C ruled out) Biomarkers & Targeted Strategies : Biomarkers (e.g., MLKL pathway) guide therapy and improve sensitivity in resistant tumors.

References:

https://pmc.ncbi.nlm.nih.gov/articles/PMC9250625/

https://pmc.ncbi.nlm.nih.gov/articles/PMC7661868/

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5822441/

↑ *Back to this question in Part A*

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Q5: Which of the following factors is most likely associated with increased radiosensitivity in tumor cells? (Q853419)

A. Efficient DNA double-strand break (DSB) repair mechanisms

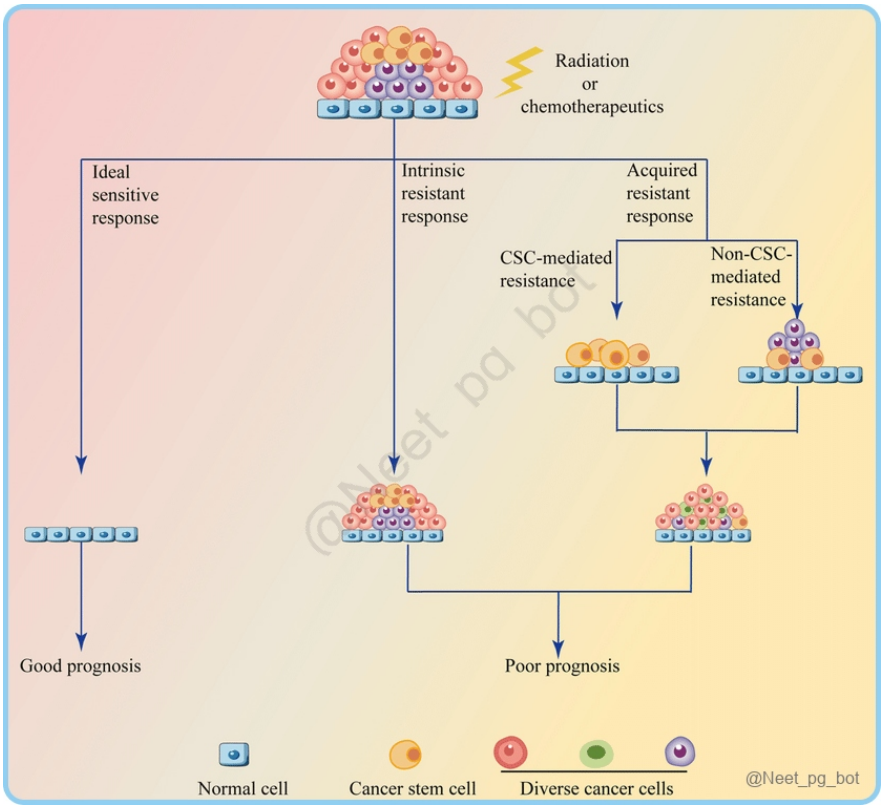
B. Low apoptosis rates in response to radiation

C. High levels of γ-H2AX foci indicating unrepaired DNA damage

D. High proportion of cancer stem cells (CSCs) within the tumor

Correct Answer: C. High levels of γ-H2AX foci indicating unrepaired DNA damage

Explanation: High levels of γ-H2AX foci suggest inefficient DNA repair mechanisms, which is associated with increased radiosensitivity, as the cells struggle to repair radiation-induced damage. Intrinsic Radiosensitivity: Sensitive vs. Resistant Tumors Intrinsic radiosensitivity refers to a tumor's natural ability to respond to radiation, which varies between and within tumors. This variability impacts the effectiveness of radiotherapy. Key Insights on Radiosensitivity Tumor Type Variations Radiosensitivity differs widely across tumor types and even among the same tumor cells. A study on 27 canine cancer cell lines showed survival fractions (SF2) ranging from 0.19 to 0.93, indicating that factors beyond tumor type, like cellular traits, influence radiosensitivity. Cellular Factors Influencing Radiosensitivity DNA Repair Efficiency Tumors with poor DNA double-strand break (DSB) repair mechanisms, indicated by high residual γ-H2AX foci, are more radiosensitive. (Option A ruled out) Apoptosis Rates Tumors with higher rates of apoptosis (e.g., lymphoid tumors) respond better to radiation. (Option B ruled out) Tumor Microenvironment Tumors with lower radiosensitivity scores often have higher immune activation, suggesting a more immune-active environment can improve radiation response. Intra-Tumor Heterogeneity Different cell types within a tumor show varying radiosensitivity, with cancer stem cells (CSCs) being more resistant (Option D ruled out) , compared to ordinary cancer cells (OCCs), leading to recurrence after radiotherapy. Treatment Implications Personalized Radiotherapy Assessing a tumor's radiosensitivity helps tailor radiation doses and schedules, optimizing treatment outcomes. Overcoming Resistance Targeting mechanisms of radioresistance can help in developing therapies that sensitize resistant tumors, enhancing treatment effectiveness. radiotherapy and chemotherapy" data-author="Chaochu Cui, Jianbo Yang, Xiao Li, Dongling Liu, Li-Wu Fu, Xianwei Wang" data-hash="8213" data-license="CC BY 4.0" data-source="" data-tags="April2025" src="" /> {{caption_text}}



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https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8836217/

↑ *Back to this question in Part A*

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Q6: A 55-year-old male is undergoing fractionated radiotherapy for the treatment of a large head and neck tumor. The radiation oncologist opts for a standard fractionation schedule. Which of the following principles is not part of the "5 Rs of Radiobiology" that underlie the rationale for fractionation? (Q853418)

A. Radiosensitivity

B. Repair

C. Radioresistance

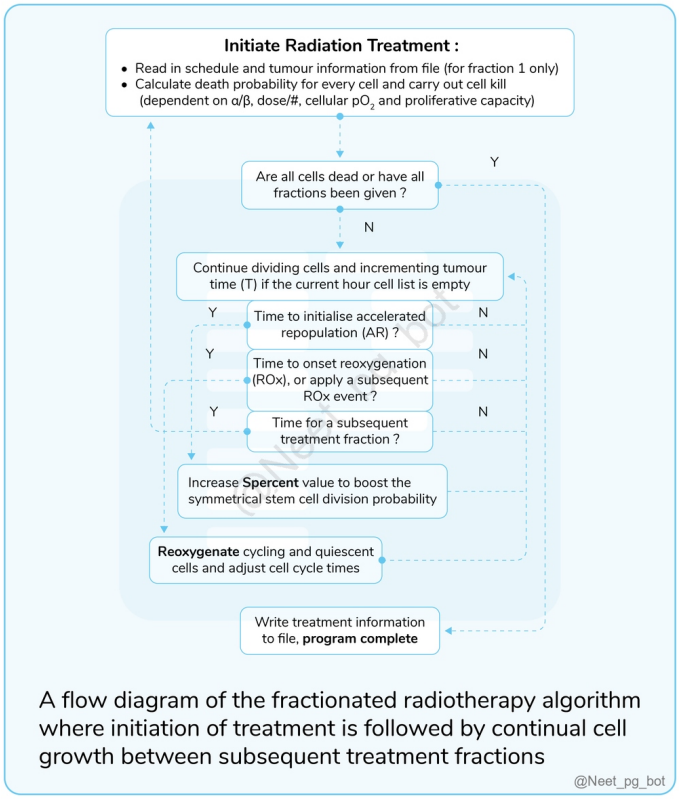
D. Reoxygenation

Correct Answer: C. Radioresistance

■ *Listen (English)*

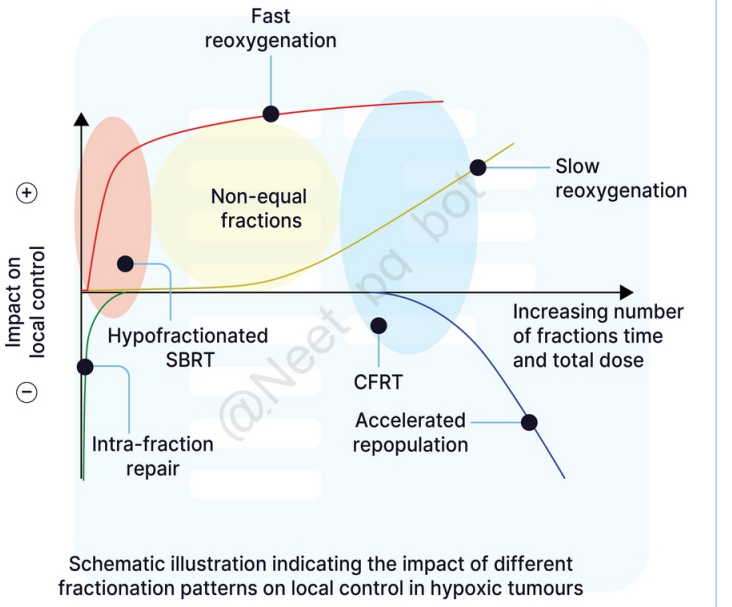
■ *Listen (Hindi)*

Explanation: Radioresistance is not one of the "5 Rs of Radiobiology." Instead, radioresistance generally refers to the inherent resistance of certain tumor cells to the effects of radiation, which is not a principle underlying fractionation. Fractionated Radiotherapy Definition : Treatment in multiple smaller doses (fractions) to enhance tumor control and protect normal tissue. Key Principles Therapeutic Window : Balances damage to tumor vs. normal tissue using the "5 Rs of Radiobiology": Radiosensitivity : Tumor cells are more sensitive to radiation. (Option A ruled out) Repair : Normal tissue repairs better between treatments. (Option B ruled out) Reoxygenation : Hypoxic tumor cells reoxygenate, increasing sensitivity. (Option D ruled out) Redistribution : Cells cycle through phases of varying sensitivity. Repopulation : Normal tissue regeneration, affecting treatment outcomes. Fraction Size and Dose : Standard doses are 1.8-2 Gy per session, totaling 50-66 Gy over weeks. Advances in Fractionation Technique Key Features Spatially Fractionated Radiation Therapy (SFRT) Delivers heterogeneous doses to spare normal tissue, effective in bulky tumors. Hyperfractionation More frequent, smaller doses to enhance local control. Accelerated Fractionation Shortens overall treatment time, maintaining or enhancing efficacy. Challenges Radioresistance : Tumors may develop resistance, requiring careful dose planning. Scheduling : Ideal fractionation depends on tumor type, size, and location; research is ongoing



A flow diagram of the fractionated radiotherapy algorithm where initiation of treatment is followed by continual cell growth between subsequent treatment fractions

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Schematic illustration indicating the impact of different fractionation patterns on local control in hypoxic tumours

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References:

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10684810/

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8836217/

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7041652/

↑ *Back to this question in Part A*

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Q7: A 60-year-old male with localized prostate cancer is referred for radiotherapy. The oncologist wants to use a technique that provides superior dose conformity to the tumor, reduces treatment time, and limits radiation exposure to surrounding healthy tissues. Which of the following radiotherapy techniques would be most appropriate for this patient? (Q853417)

A. VMAT

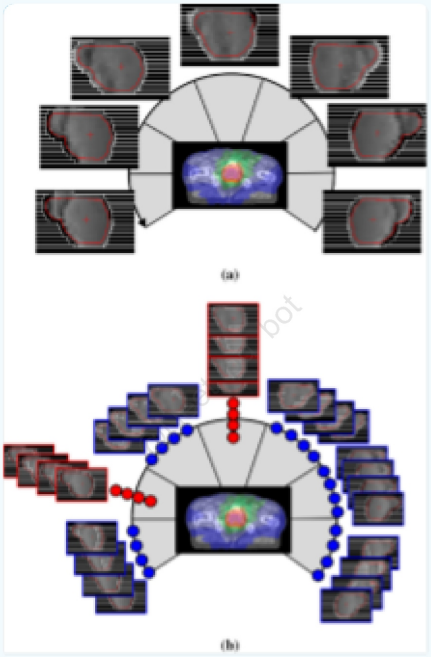
B. IGRT

C. CyberKnife

D. NCT

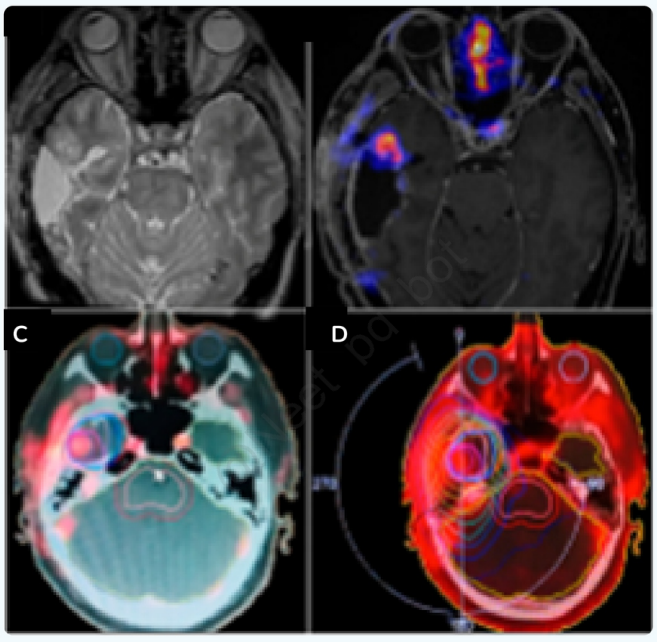
Correct Answer: A. VMAT

Explanation: VMAT is ideal in this case because it delivers radiation in a shorter time while offering superior dose conformity, minimizing the exposure of surrounding healthy tissues. Volumetric Modulated Arc Therapy (VMAT) (Option A) Type : Advanced IMRT technique Efficiency : Faster than traditional IMRT, delivering radiation in arcs Conformity : Superior dose conformity with reduced healthy tissue exposure Evidence : Comparable or better results than CyberKnife in sparing organs at risk (OARs) and ensuring tumor coverage. {{caption_text}} arc therapy-VMAT" data-author="Antonella Castellano, Michele Bailo, Francesco Cicone, Luciano Carideo, Natale Quartuccio, Pietro Mortini, Andrea Falini, Giuseppe lucio Cascini, Giuseppe Minniti" data-hash="8206" data-license="CC BY 4.0" data-source="" data-tags="April2025" src="" /> {{caption_text}} Image-Guided Radiation Therapy (IGRT) (Option B ruled out) Type : Imaging-assisted radiation therapy Precision : Uses cone-beam CT, MRI to adjust for movement, enhancing accuracy Personalization : Real-time imaging for individualized treatment plans VMAT Integration : Optimizes precision of VMAT delivery {{caption_text}} {{caption_text}} CyberKnife (Option C ruled out) Type : Robotic system for high-dose radiation Precision : Non-isocentric, highly conformal treatment delivery Advantages : Suitable for complex tumors with excellent OAR sparing Drawback : Longer treatment time compared to VMAT {{caption_text}} Non-Coplanar Treatment (NCT) (Option D ruled out) Type : Radiation from multiple angles, not confined to one plane Benefit : Enhanced targeting, reduced exposure to healthy tissues Integration : Often combined with IGRT for precise delivery {{caption_text}}



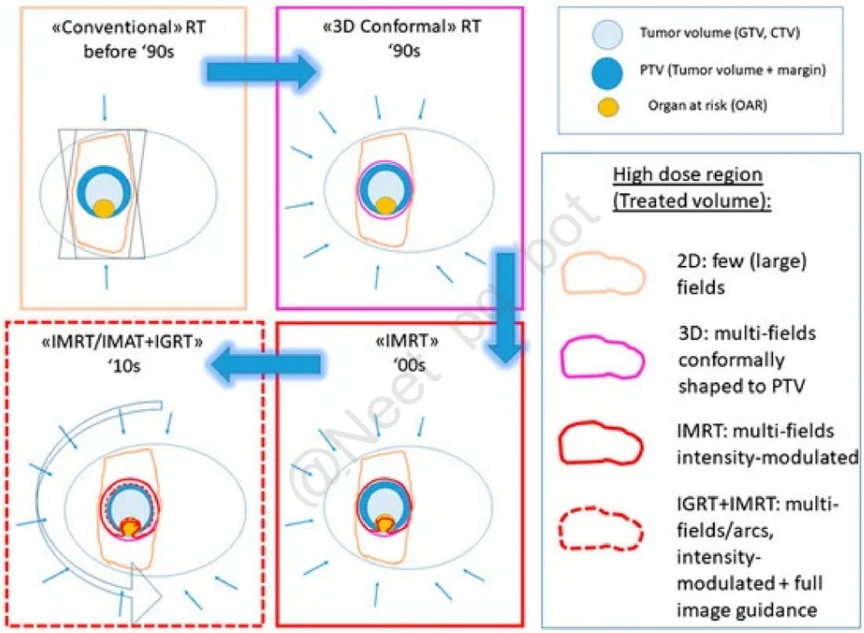
Schematic diagram showing the concept of hybrid IMRT and VMAT optimisation and delivery

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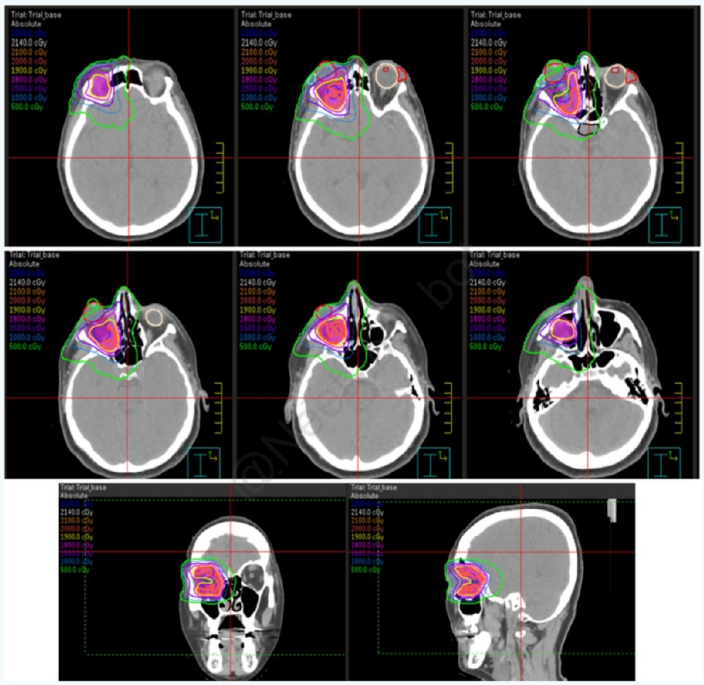
Example of a volumetric modulated arc therapy (VMAT) sequential boost of radiation to hypoxia-positive recurrent GBM.

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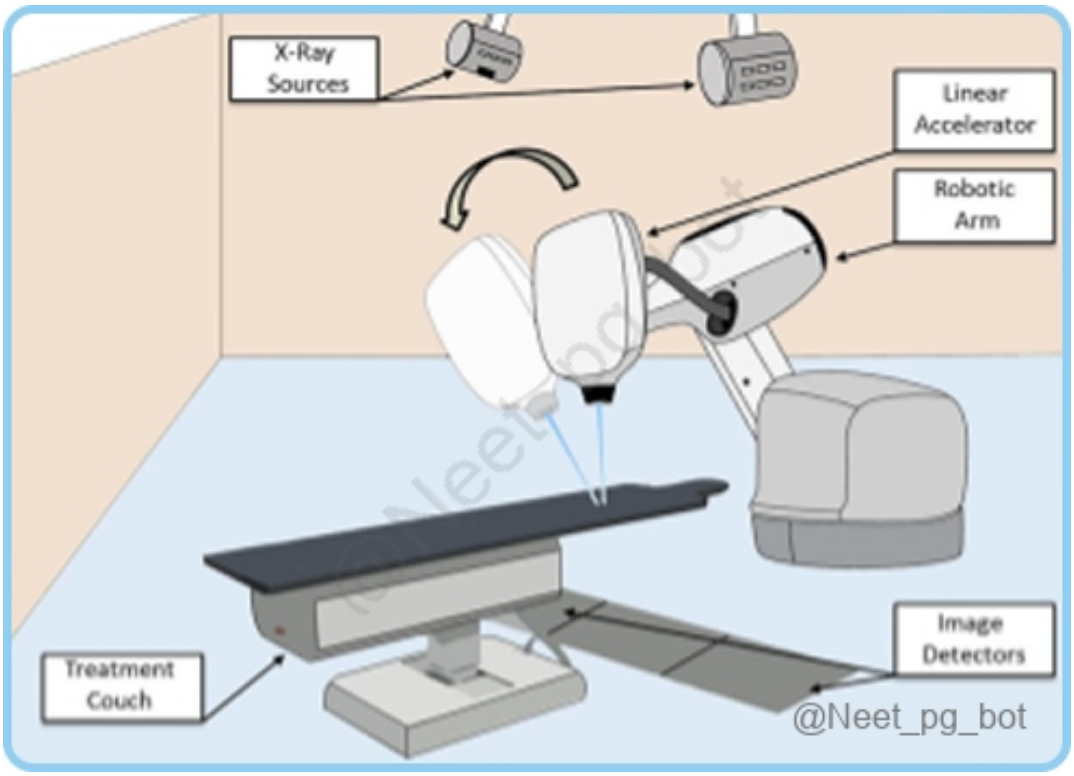
Schematic plot of the impact of technology in the last decades in delivering dose distributions more tailored to GTV/CTV in a typical case of tumor next to an organ at risk

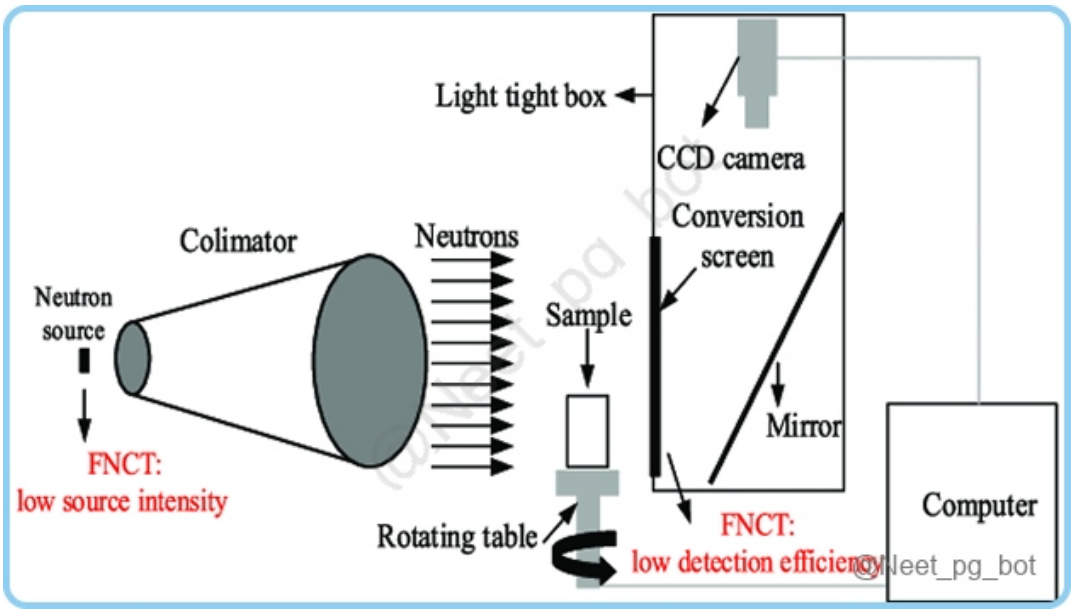
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VMAT-IGRT Technique. High precision X photons delivery with advanced Volumetric Modulated Arc Image-Guided Radiation Therapy

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References:

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7738085/

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9122296/

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10162061/

↑ *Back to this question in Part A*

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Q8: A 65-year-old patient with a lung tumor is undergoing radiation therapy. The radiation oncologist decides to implement a gating technique to minimize damage to surrounding healthy tissue. What is the primary advantage of using gating for this patient? (Q853416)

A. It shapes the radiation dose to match the tumor's irregular shape

B. It prevents the tumor from moving during treatment by immobilizing the patient

C. It directs radiation beams from different angles to target the tumor

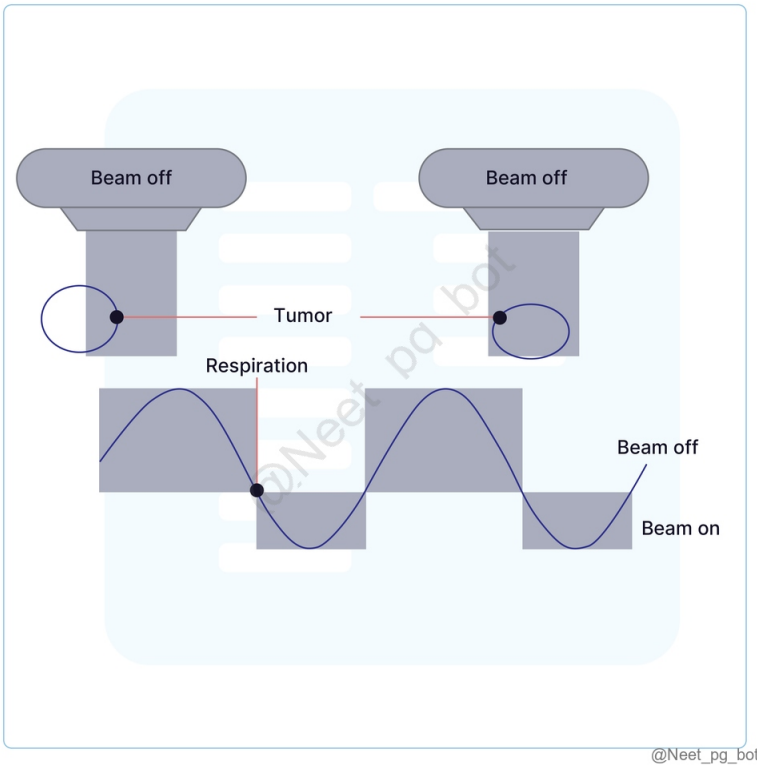
D. Synchronizes radiation delivery with the tumor's position during the respiratory cycle

Correct Answer: D. Synchronizes radiation delivery with the tumor's position during the respiratory cycle

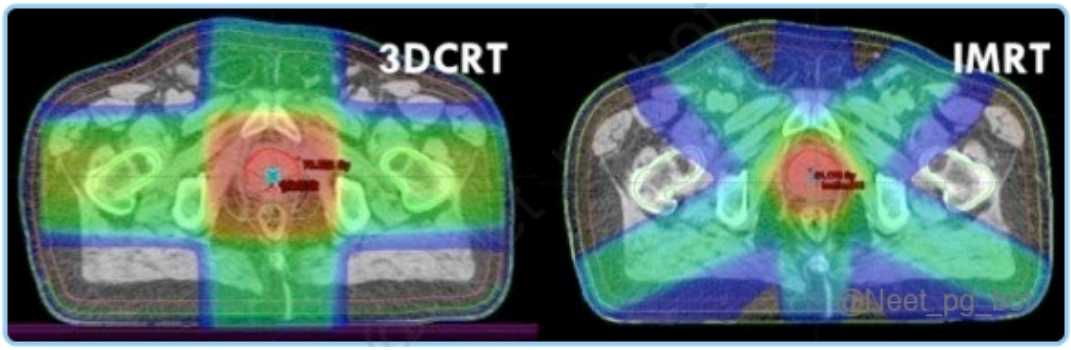
■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: Gating: It is a technique used to reduce the damage to normal tissues. Monitor and correct organ motion during treatment. It is used for tumors in the lungs, chest, and abdomen, where the tumor can move during treatment due to breathing. The tumor moves with respiration. (Option B ruled out) Radiation is produced only when the tumor is in the line of the beam. If the tumor goes off the beamline, radiation stops. 3DCRT (3 Dimensional Conformal Radiation Therapy) : It is a technique used to reduce the damage to normal tissues. CT scans create a 3D image of the tumor, which then directs radiation beams from different angles to target the tumor. (Option C ruled out) {{caption_text}} IMRT (Intensity Modulated Radiation Therapy): It is a technique used to reduce the damage to normal tissues. It is better than 3DCRT. Used for tumors with an irregular shape. Uses 3D CT images to calculate the radiation dose and shape it to the tumor's 3D shape. (Option A ruled out) Complex patterns of multiple radiation beams from different angles of varying intensity change throughout the treatment to conform to the tumor. (Option D)



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References:

Perez & Brady's Principles and Practice of Radiation Oncology, 7th edition, Page: 961, 963, 965, 980, 850, 867, 863-66

↑ *Back to this question in Part A*

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Q9: A 9-year-old patient is undergoing proton therapy for a localized brain tumor located near critical structures like the optic nerve and brainstem. The radiation oncologist uses proton therapy to take advantage of the Bragg peak. What is the primary benefit of using proton therapy with the Bragg peak in this scenario?

(Q853415)

A. Uniform radiation delivery to both the tumor and surrounding brain tissues.

B. Deliver the highest dose of radiation at the tumor site while sparing the optic nerve and brainstem.

C. Greater radiation scatter, which is ideal for treating tumors near critical structures.

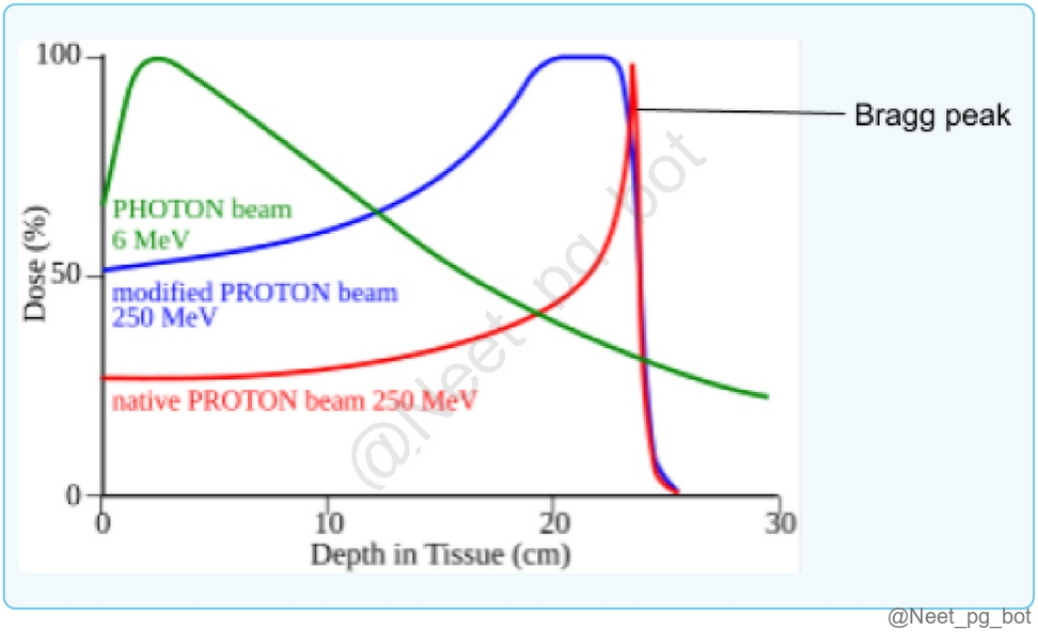
D. Photon therapy provides better tissue sparing than proton therapy.

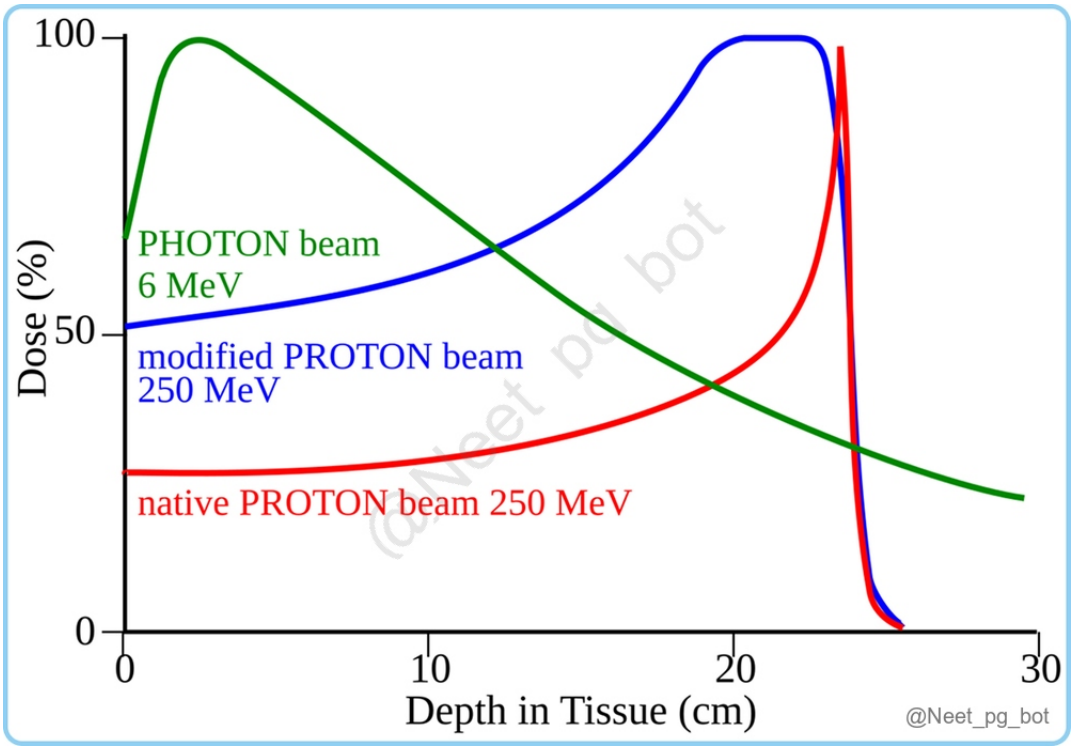
Correct Answer: B. Deliver the highest dose of radiation at the tumor site while sparing the optic nerve and brainstem.

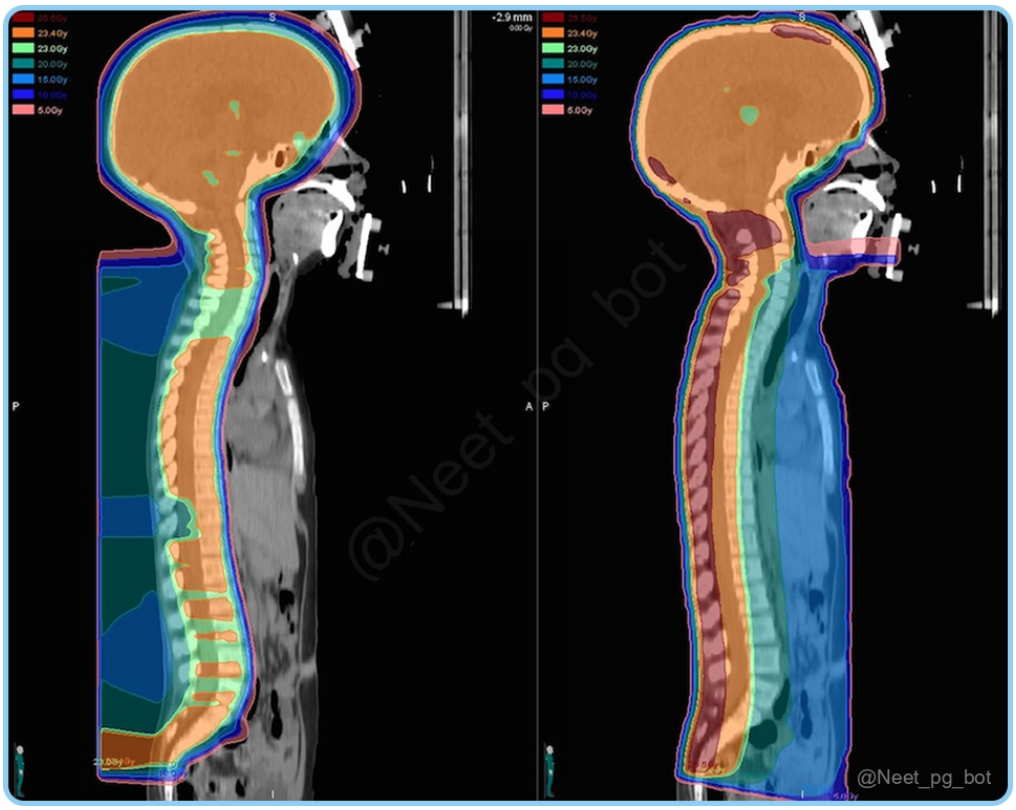
■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: The Bragg peak is a distinctive property of protons that allows them to deposit most of their energy directly at the tumor site and significantly less radiation to the surrounding critical structures like the optic nerve and brainstem. Protons slow down faster as they travel through tissues and release more energy as they decelerate, culminating in the Bragg peak . Bragg peak: It is a distinct property of protons that describes the point at which a proton beam deposits the maximum amount of energy. Protons, unlike x-rays, slow down faster as they travel through tissues and release more energy as they decelerate, culminating in the Bragg peak. This peak allows the majority of radiation to be focused on the target with minimal scatter to surrounding tissues. (Option A & C ruled out) The proton beam can be shaped to match the tumor, delivering most radiation to the tumor while sparing nearby normal tissues. (Option B) Compared to photon beam therapy (X-ray or gamma ray), proton therapy minimizes radiation scatter. (Option D ruled out) {{caption_text}} {{caption_text}} {{caption_text}} Dose distributions for a proton (left) and photon (right) craniospinal plan. The proton craniospinal plan considerably spares the normal tissues anterior to the spinal canal and delivers a significantly reduced total integral dose to the patient.


100
50
0
Dose (%)
PHOTON beam
6 MeV
modified PROTON beam
250 MeV
native PROTON beam 250 MeV
Bragg peak
0
10
20
30
Depth in Tissue (cm)
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100
50
0
Dose (%)
PHOTON beam
6 MeV
modified PROTON beam
250 MeV
native PROTON beam 250 MeV
0
10
20
30
Depth in Tissue (cm)
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References:

https://www.samhs.org.au/Virtual%20Museum/xrays/Braggs-peak-rxth/braggpeakrxth.htm

Perez & Brady's Principles and Practice of Radiation Oncology, 7th Edition, Page 567-68, 844-45, 6175

↑ *Back to this question in Part A*

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Q10: In the image, applicators have been placed on a 58-year-old woman who is undergoing high-dose interstitial brachytherapy for early-stage breast cancer. Which of the following advantages does afterloading provide in this scenario? {{caption_text}} (Q853414)

A. Eliminates the need for imaging confirmation before placing the radioactive seeds.

B. Minimizes radiation exposure to healthcare workers during seed placement.

C. It enhances the mobility of radioactive seeds for more uniform dose distribution.

D. Allows for real-time radiation delivery without the use of encapsulated seeds.



Correct Answer: B. Minimizes radiation exposure to healthcare workers during seed placement.

- *Listen (English)*
- *Listen (Hindi)*

Explanation: Afterloading techniques involve placing applicators into the tissue before inserting radioactive sources. The radioactive material is then loaded after applicators are correctly positioned, typically using a remote-controlled or computer-assisted system, which helps minimize direct radiation exposure to healthcare workers. Interstitial Brachytherapy: Interstitial brachytherapy is the placement of radioactive sources directly into the tissues. It uses a higher total dose of radiation to treat a smaller area than external beam radiation therapy. Examples: Breast cancer, soft tissue sarcoma. Brachytherapy may be temporary or permanent. Radiation source is encapsulated within a non-radioactive metallic capsule which is referred to as a "seed." This helps prevent the material from moving to other parts of the patient's body. (Options C & D ruled out) Imaging (CT or ultrasound) is used to confirm the accurate placement of applicators before radioactive seeds are inserted. (Option A ruled out) Afterloading: (Option B) After the implant's position is confirmed, the radioactive material is inserted by a process called afterloading. In high-dose brachytherapy, afterloading is done using a computer-controlled machine to reduce manual handling of the radiation. In low-dose brachytherapy, afterloading is done manually by the healthcare worker. {{caption_text}} {{caption_text}}





References:

https://www.radiologyinfo.org/en/info/brachy

Perez & Brady’s Principles and Practice of Radiation Oncology, 7th edition, Page 96, 150, 151.

https://www.ncbi.nlm.nih.gov/books/NBK562190/

↑ *Back to this question in Part A*

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Q11: Which of the following statements is NOT true regarding the use of linear accelerators (LINAC) in radiotherapy? (Q853413)

A. The X-ray beam used for treatment is generated by an overhead X-ray tube.

B. LINACs do not require the use of radioisotopes for radiation production.

C. LINACs are commonly used in brachytherapy procedures.

D. Microwave energy is used to accelerate electrons within the LINAC.

Correct Answer: C. LINACs are commonly used in brachytherapy procedures.

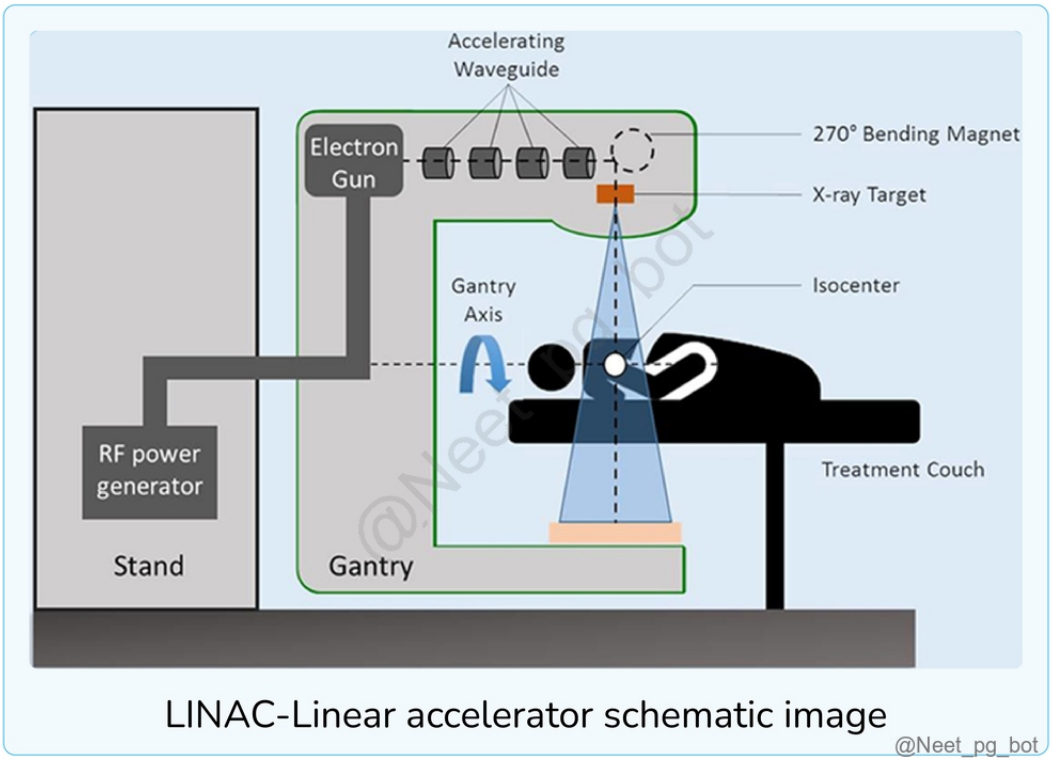
■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: LINACs are used for external beam radiotherapy, while brachytherapy involves placing radioactive sources directly inside or near the tumor. LINAC (Linear accelerator) I n teletherapy (External beam radiotherapy), a cobalt machine and LINAC (linear accelerator) are used. (Option C) LINAC- Linear accelerators do not need a radioisotope. (Option B ruled out) LINACs generate photon x-rays by accelerating electrons to a high speed using microwave energy. Once the X-ray beam is formed, it is shaped and aimed at the target. (Option D ruled out) X-rays generated by LINAC have various energies. LINAC Machine: Overhead X-ray tube emits X-ray beams to the patient. (Option A ruled out) It also has a movable arm that can be mobilized around the patient. The treatment head contains significant shielding material to minimize leakage radiation. {{caption_text}} {{caption_text}}



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LINAC-Linear accelerator schematic image

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References:

https://www.sciencedirect.com/topics/nursing-and-health-professions/linear-accelerator

oncologymedicalphysics.com/introduction-to-clinical-linear-accelerators/

Perez & Brady’s Principles and Practice of Radiation Oncology, 7th edition, Page 96, 104, 576-80.

↑ *Back to this question in Part A*

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Q12: External beam radiation therapy is planned for a 58-year-old woman with a diagnosis of superficial basal cell carcinoma on her forehead as she refused surgical intervention Considering the characteristics of various radiation modalities, which type of beam would be the most appropriate for achieving effective treatment while minimizing damage to the underlying tissues? (Q853412)

A. X-ray

B. Photon beams

C. Electron beams

D. Gamma rays

Correct Answer: C. Electron beams

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: Electron beams are ideal for treating superficial skin tumors because they have limited penetration and deposit most of the energy superficially, minimizing damage to underlying healthy tissue. Therefore, it is effective for tumors near the body surface like in this scenario- Skin tumor (basal cell carcinoma). Teletherapy (External beam radiation) It is a form of radiation therapy in which the radiation source is placed at a distance from the body, delivering high-energy radiation beams to treat tumors. External beam sources are: Betatron Cobalt Linear accelerator Neutron beam Photon beam Proton beam Spray radiation Stereotactic radiosurgery such as gamma knife X-ray Types of Beams Electrons (Option C) Negatively charged particles Limited penetration Effective for tumors near the body surface (Skin tumors) Photons (Option B ruled out) Can reach deep tumors Scatter radiation along the path Continue through normal tissue after reaching the tumor Made up of high energy: X-rays (LINAC- Linear accelerators) (Option A ruled out) Gamma rays (Option D ruled out) Protons Positively charged particles No radiation scatter Stop precisely at the tumor location cobalt 60 (Co 60) Linear accelerator The Cobalt machine produces an artificial radioisotope (Co) Advantage: Relative constancy of beam output Source replacement approximately every 4 to 5 years LINAC- Linear accelerators do not need a radioisotope The fast-moving electron beam generates radiation which is used in radiotherapy X-ray beams are produced A dvantages of External Beam Painless Do not require a hospital stay in most patients Most patients can continue with their normal daily activities Non-invasive

References:

Perez & Brady’s Principles and Practice of Radiation Oncology, 7th Edition, Page 96, 571, 572.

https://training.seer.cancer.gov/treatment/radiation/radiation-types.html

↑ *Back to this question in Part A*

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Q13: A 65-year-old man has metastatic castration-resistant prostate cancer (mCRPC). Which of the following agents would be most suitable for palliative treatment? (Q853411)

A. Phosphorus-32

B. Radium-223

C. Electron beams

D. None of the above

Correct Answer: B. Radium-223

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: Radium-223 is useful in metastatic castration-resistant prostate cancer as it is Chemically similar to calcium. Agents used in radiotherapy: Agents Key features Photon beams External beam radiation therapy Made up of high energy: X-rays (LINAC- Linear accelerators) Gamma rays Proton beams Positively charged particles Bragg peak Electron beams (Option C ruled out) Negative charged particles. Skin tumors located superficially (they can’t travel deeply into tissue) Radium-223 dichloride (223Ra) (Optin B) Bone metastases in metastatic castration-resistant prostate cancer (mCRPC) Chemical similarity to calcium Strontium-89 (89Sr) Beta emitter Painful metastatic castrate-resistant prostate cancer Samarium-153 Beta emitters Osseous metastases for primary osteosarcomas Osteosarcoma Phosphorus-32 (Option A ruled out) Beta emitters Chronic myelogenous leukemia Polycythemia vera Epithelial tumors (ovarian) Craniopharyngioma Primary pericardial tumors- palliative therapy Iodine 131 Beta and gamma emitters Thyroid cancers: Follicular, papillary, and Hürthle cell carcinoma

References:

Perez & Brady’s Principles and Practice of Radiation Oncology, 7th Edition, Page 96, 571, 580, 2079-81.

https://en.wikipedia.org/wiki/External_beam_radiotherapy

https://my.clevelandclinic.org/health/treatments/24008-external-beam-radiation-therapy-ebrt

↑ *Back to this question in Part A*

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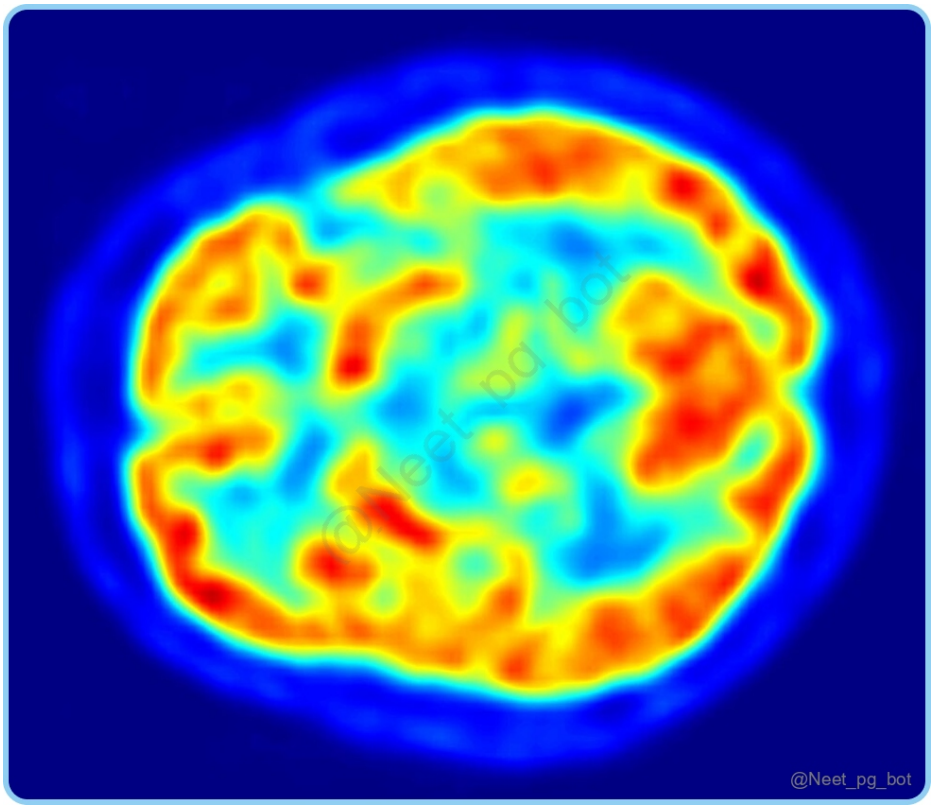
Q14: Which of the following is an incorrect statement about this scan? {{caption_text}} (Q853399)

A. Uses F-18 fluorodeoxyglucose

B. Doesn't show metabolic changes

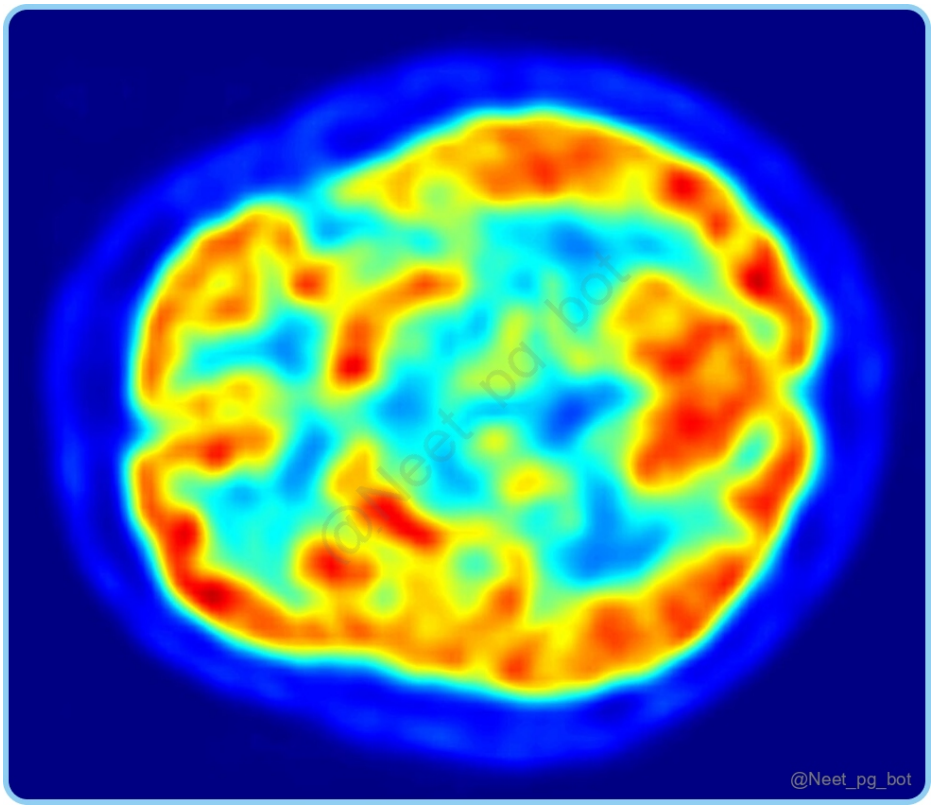
C. Uses a ring of multiple detectors

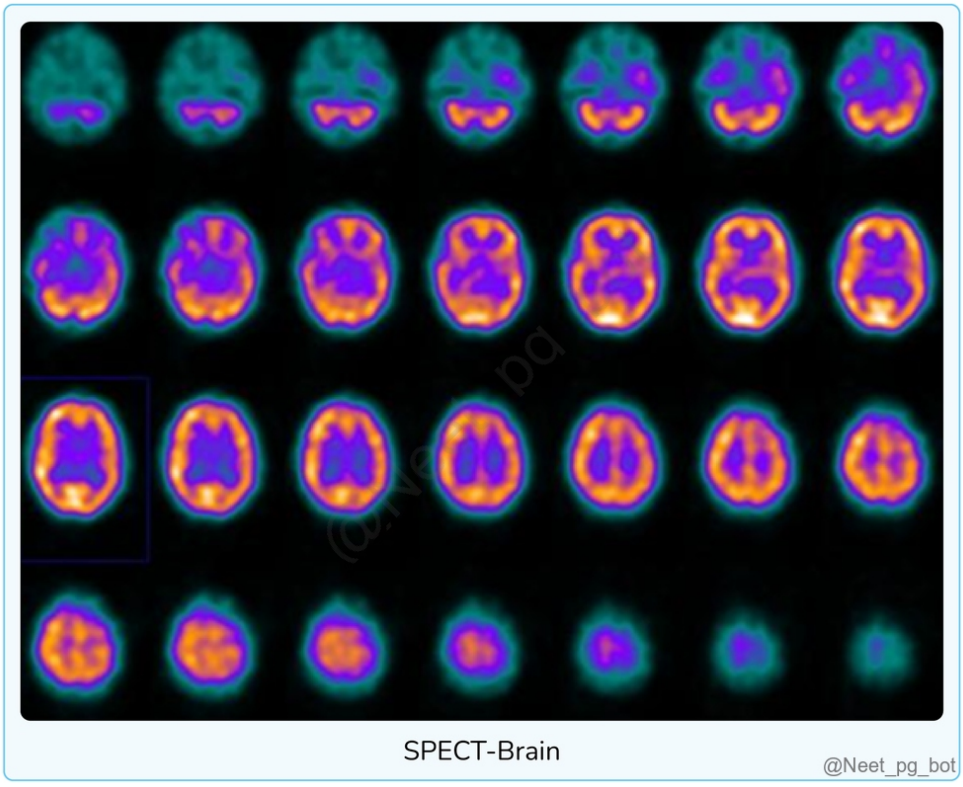
D. Very expensive



Correct Answer: B. Doesn't show metabolic changes

Explanation: The given image is a PET scan of the human brain A PET scan is specifically designed to show metabolic changes in the body, particularly by tracking the uptake of radioactive tracers like F-18 fluorodeoxyglucose (FDG). Feature PET SPECT Cost Very expensive (Option D) Less expensive Radioactive Tracers Uses positron-emitting radioisotope (tracer): F-18 fluorodeoxyglucose (FDG) (Option A) Uses gamma-emitting radioisotopes (tracers): technetium-99m, iodine-123, iodine-131 Detector Design Ring of multiple detectors (Option C) Usually one large crystal-based detector Image Quality Better contrast and spatial resolution Poor contrast and spatial resolution Functionality Shows metabolic changes Doesn't show metabolic changes Sensitivity More sensitive Less sensitive; fewer events detected. Imaging {{caption_text}} {{caption_text}}





References:

https://www.nibib.nih.gov/science-education/science-topics/nuclear-medicine

↑ *Back to this question in Part A*

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Q15: Which liver lesion shows hot spot on the sulphur colloid scan? (Q853409)

A. Hepatic hemangioma

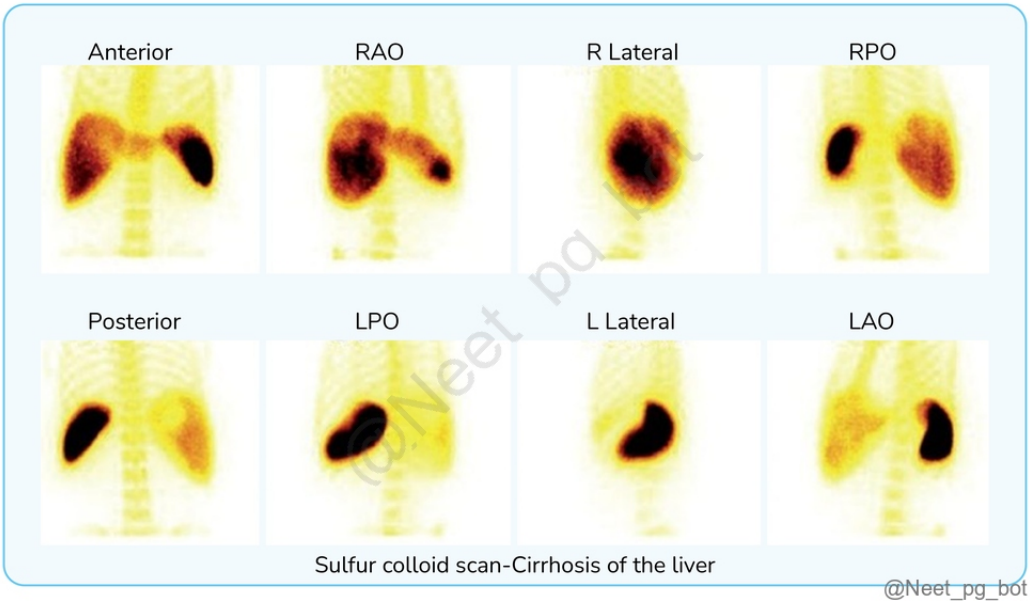
B. Hepatocellular carcinoma

C. Focal nodular hyperplasia

D. Hepatic cyst

Correct Answer: C. Focal nodular hyperplasia

Explanation: The liver lesion that shows a hot spot on a sulfur colloid scan is: Focal Nodular Hyperplasia (FNH) Technetium-99m sulfur colloid scan is taken up by Kupffer cells (reticuloendothelial cells) in the liver. The behavior of lesions on this scan depends on whether they contain functional Kupffer cells: Lesion Kupffer Cells Sulfur Colloid Uptake Scan Appearance Focal Nodular Hyperplasia (FNH) (Option C) Present Increased uptake Hot spot Hepatic hemangioma (Option A) Absent No uptake Cold spot Hepatocellular carcinoma (HCC) (Option B) Often reduced/absent No uptake Cold spot Hepatic cyst (Option D) Absent No uptake Cold spot Sulfur colloid scan It is a nuclear medicine imaging study to assess the liver and spleen. Technetium-99m sulfur-colloid is used. The reticuloendothelial system takes up the sulfur colloid, which includes the Kupffer cells in the liver, spleen, and bone marrow. HCC (Hepatocellular carcinoma) does not have Kupffer cells, it does not show a hot spot on the Sulphur colloid scan. (Option B) {{caption_text}}



References:

Nuclear Medicine Liver/Spleen Test - StatPearls - NCBI Bookshelf (nih.gov)

Bailey & Love Short practice of surgery, 28th Edition, Page 1213, 1214

↑ *Back to this question in Part A*

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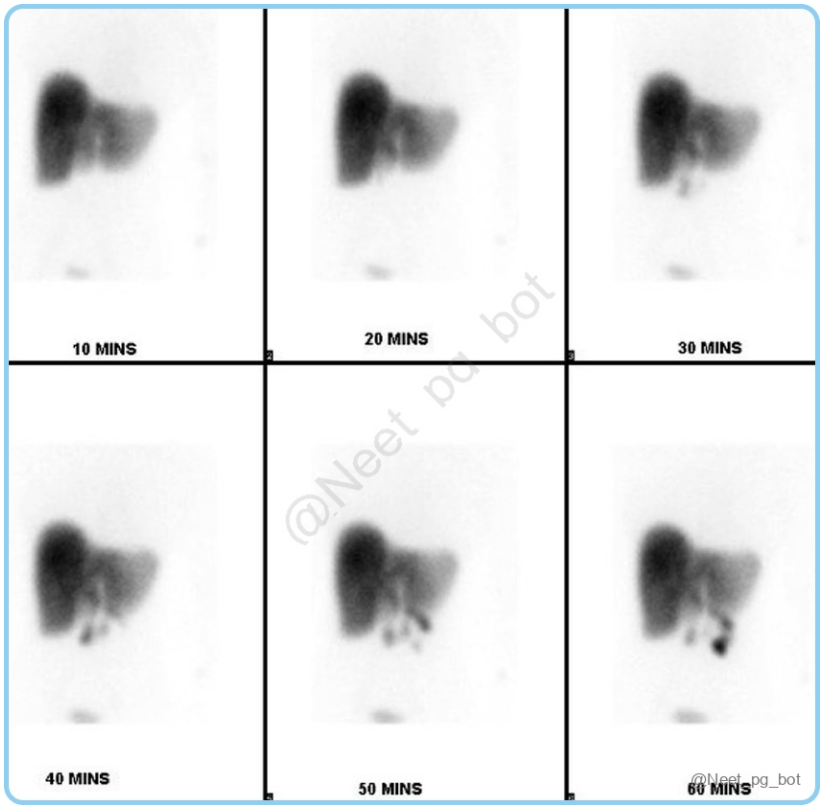
Q16: Hepatic hot rim sign is seen in which of the following? {{caption_text}} (Q853408)

A. Chronic cholecystitis

B. Acute cholecystitis

C. Bile leak

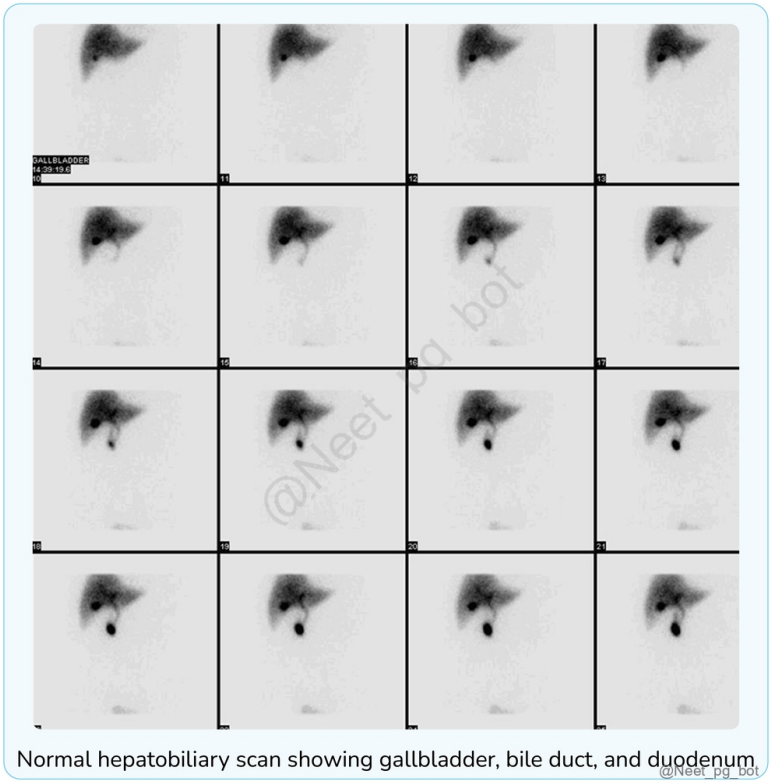
D. Gallbladder dyskinesia



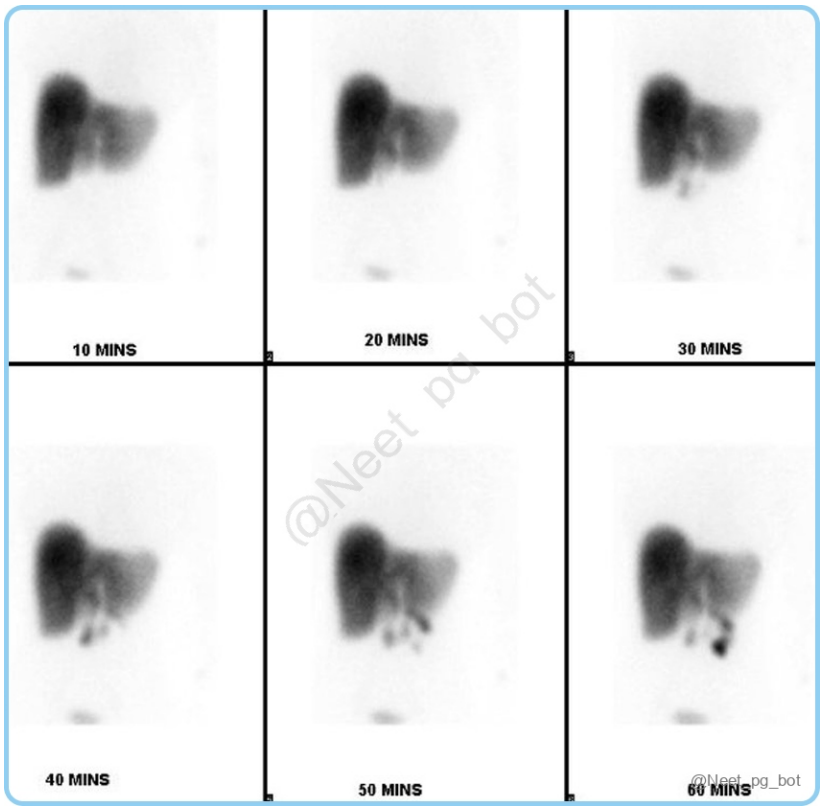
Correct Answer: B. Acute cholecystitis

Explanation: The hepatic hot rim sign refers to increased radiotracer uptake in the liver parenchyma adjacent to the gallbladder fossa on a HIDA scan (hepatobiliary scintigraphy) . It indicates hyperemia and inflammation of the liver tissue surrounding an inflamed gallbladder . The image shown is a HIDA scan. In acute cholecystitis, the

gallbladder fails to fill with the radiotracer due to obstruction of the cystic duct as seen in the image, often caused by a gallstone or edema in the cystic duct. HIDA scan (Hepatobiliary iminodiacetic acid scan) Nuclear imaging test to evaluate the function of the liver, gallbladder, bile ducts, and small intestine. Technetium-99m (99mTc)-labeled derivatives of iminodiacetic acid is used. Mechanism: Radiotracer follows the bilirubin metabolic pathway (excreted into the bile). This will allow visualization of the biliary tree, gallbladder, and bowel. Application: Disease/Diagnosis Findings Acute cholecystitis (Option B) Non-visualisation of the gallbladder Hot rim sign - inflammation around the gallbladder Chronic cholecystitis (Option A ruled out) Visualization is reduced or delayed (due to contracted gallbladder) Gallbladder dyskinesia (Option D ruled out) Low gallbladder ejection fraction Others Bile leaks Biliary obstruction (patency of the intra- and extrahepatic biliary system) Patency of a bilioenteric anastomosis. Biliary atresia {{caption_text}} HIDA scan showing non-accumulation of the isotope within the gallbladder. (suggestive of Acute Cholecystitis): {{caption_text}} Bile leak (Option C): HIDA scan would show radiotracer pooling in areas where bile leakage occurs, which is not consistent with the image shown here. Hence, this option is incorrect.



Normal hepatobiliary scan showing gallbladder, bile duct, and duodenum



References:

Bailey & Love's Short Practice of Surgery, 28th Edition, Pages 1235, 1236, 1197.

Amber IB, Leighton J, Li SY, Greene GS. The hot rim sign on hepatobiliary scintigraphy (HIDA) with CT correlation. Case Reports. 2012 Jan 19;2012:bcr0920114778.

↑ *Back to this question in Part A*

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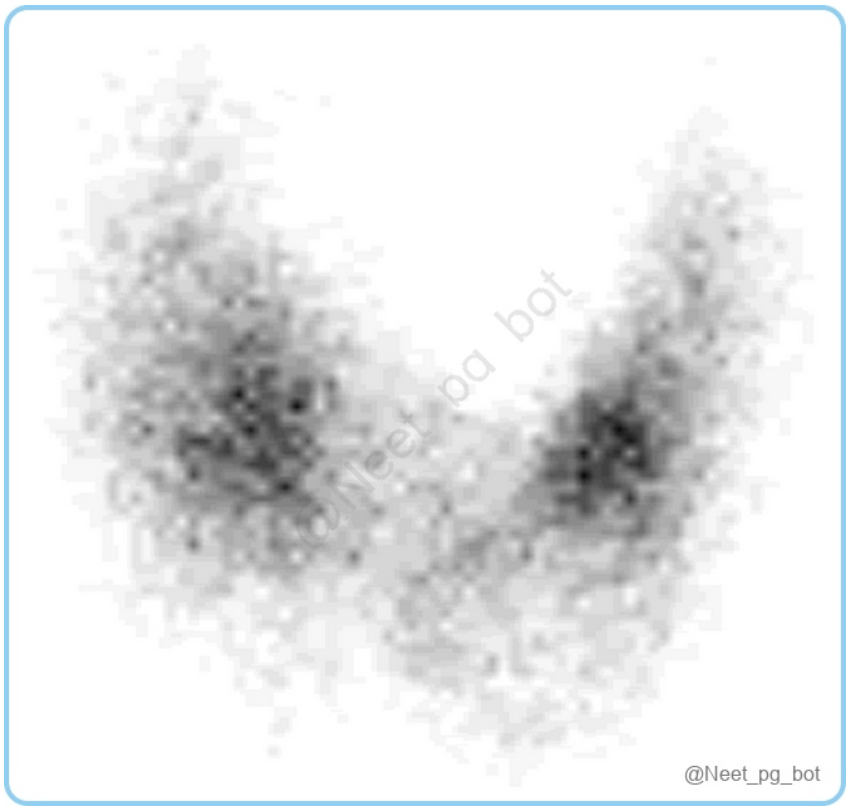
Q17: A 42-year-old woman presents with concerns about a lump on her neck that she first noticed approximately three weeks ago. A scan was performed as shown in the image. Which of the following is incorrect for this scan? {{caption_text}} (Q853406)

A. I-123 is the most commonly used

B. There is an increased uptake of tracer in one area

C. 99mTc-sestamibi can be used for this scan

D. Half-life of the most common tracer is 13.2 hours



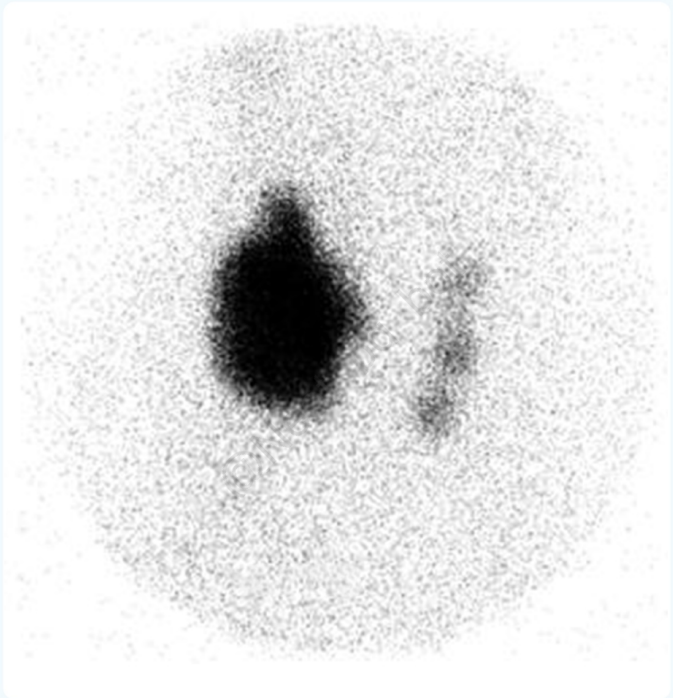
Correct Answer: B. There is an increased uptake of tracer in one area

- *Listen (English)*
- *Listen (Hindi)*

Explanation: The given image shows a RAIU scan of the thyroid gland The image shows a cold nodule in which there is a decreased uptake of radioactive iodine in one nodule compared to surrounding tissue. Isotope Half-Life Uses Type of Emission Iodine-127 Stable Natural iodine, essential for thyroid function Not radioactive Iodine-123 13.2 hours (Option D) Diagnostic imaging Gamma rays Iodine-125 60.14 days Brachytherapy (permanent implant) Gamma rays Iodine-131 8.04 days Radioablation of thyroid Beta and gamma rays Thyroid scan Purpose Diagnostic tool for assessing thyroid function and identifying pathologies Procedure Involves administering a radioactive trace A probe measures the amount of iodine uptake by the thyroid gland The scan checks for the even distribution of the tracer within the gland Radioactive Tracers Commonly used tracer s Iodine Isotopes: I-123: Preferred for less radiation exposure; shorter half-life (Most commonly used) (Option A) I-131: Longer half-life; used less frequently 99m-Technetium Pertechnetate: (2nd most commonly used) An analog of iodine is transported to the thyroid similarly to iodine. Less commonly used tracers: 111In-pentoxide Thallium-201 (201Tl) 99mTc-sestamibi (Option C) 99mTc-tetrofosmin Condition Description Radioactive Iodine Uptake RAIUS Normal Nodule Normal appearance of a thyroid nodule on a radioactive thyroid scan. Normal uptake Hot Nodule Increased uptake of radioactive iodine in one nodule compared to surrounding tissue. Increased uptake {{caption_text}} Cold Nodule Decreased uptake of radioactive iodine in one nodule compared to surrounding tissue. Increased risk of malignancy Decreased uptake {{caption_text}} Grave's Disease Also known as diffuse toxic goiter Characterized by diffusely increased uptake of iodine. Diffuse increased uptake {{caption_text}} Toxic MNG Presence of both hot and cold nodules Hot nodules appear black and cold nodules appear white. Mixed uptake {{caption_text}} Thyroiditis Inflammation and follicular destruction leading to significantly decreased uptake. < 5% uptake {{caption_text}}

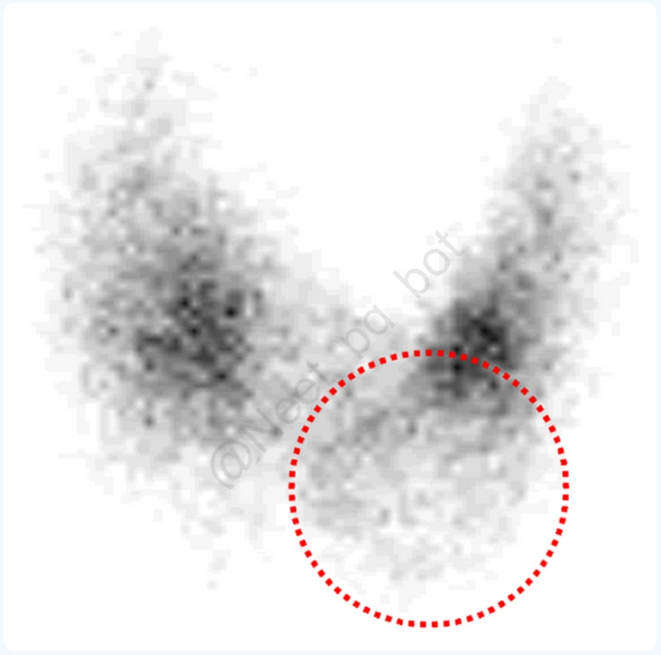


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Radioactive iodine uptake- Hot nodule

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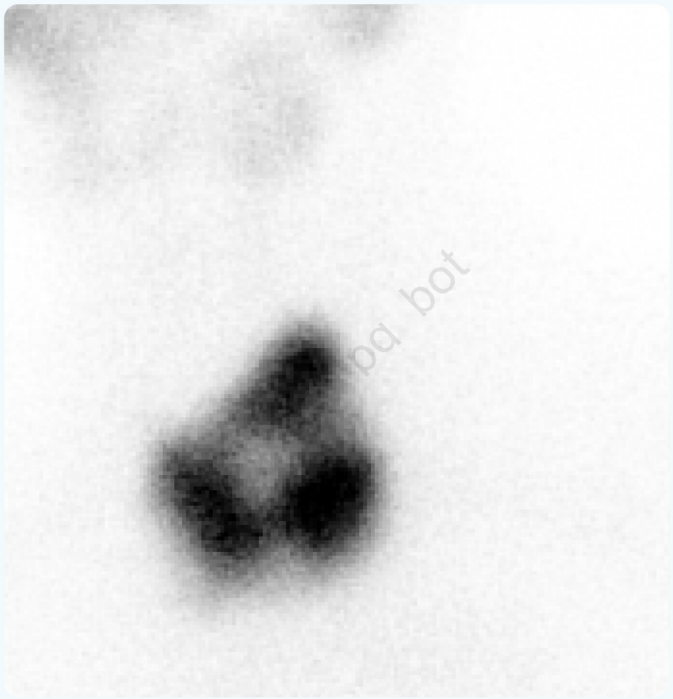
Radioactive iodine uptake- Cold nodule

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Radioactive iodine uptake- Grave's disease

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Radioactive iodine uptake- Toxic Multinodular Goitre

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Radioactive iodine uptake- Thyroiditis

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References:

https://www.ncbi.nlm.nih.gov/books/NBK555978/

https://jnm.snmjournals.org/content/49/12/2012

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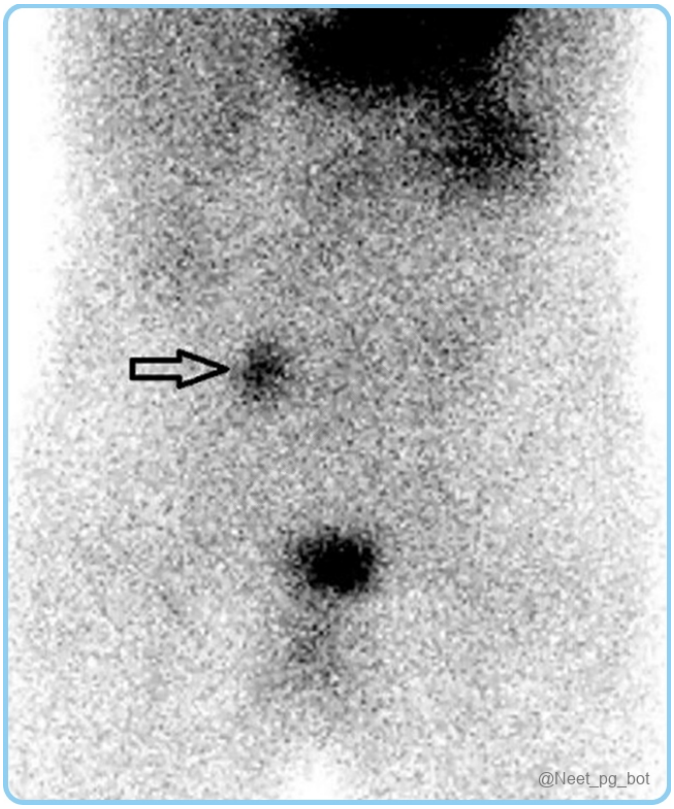
Q18: A 2-year-old boy presents with intermittent right lower quadrant pain and hematochezia. His parents report he has been irritable for the past few weeks. A scan is performed as given below. Which of the following is not a false positive for such type of scans? {{caption_text}} (Q853405)

A. Chron’s disease

B. Appendicitis

C. Intussusception

D. Warthin’s tumor

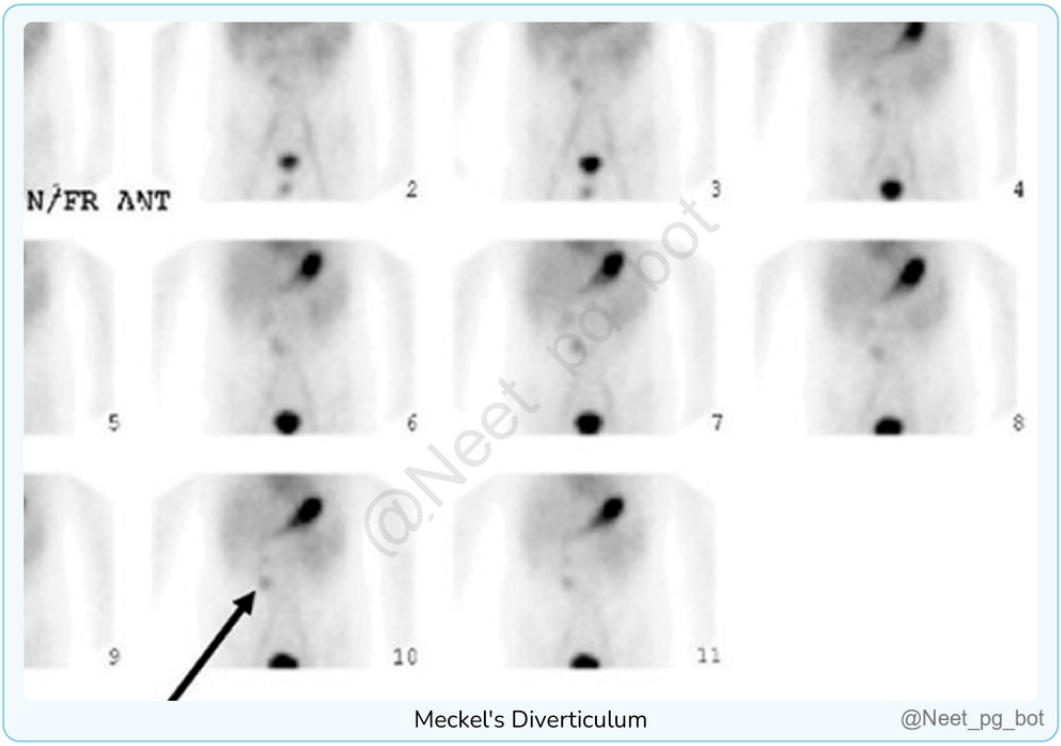


Correct Answer: D. Warthin’s tumor

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: The image shows a 99m Tc pertechnetate scan showing a focal area of intense abnormal tracer accumulation in the right iliac fossa (arrow) There is gastric mucosa uptake, suggestive of functioning Meckel's diverticulum. All options mentioned except Warthin's tumor can show false positive results on a 99m Tc pertechnetate scan Tc-99m Pertechnetate Pertechnetate scan is the diagnostic imaging modality of choice to detect ectopic gastric mucosa (sensitivity 95%). False-positive pertechnetate studies may occur in (Option A, B, and C ruled out) Crohn disease Appendicitis Intussusception Abscess Properties Emits gamma radiation for imaging. Applications 1. Thyroid imaging: Increased uptake: Graves' disease Hashitoxicosis Normal uptake: Hashimoto disease Decreased uptake: Following I-131 therapy Subacute thyroiditis Excess iodine intake (amiodarone, high iodine diet, iodinated contrast) 2. Gastric imaging: Detects ectopic gastric mucosa (e.g., Meckel's diverticulum). Note: Not all cases show positive results. {{caption_text}} 3. Colon imaging: Visualizes abnormalities related to ectopic gastric mucosa. 4. Bladder imaging: Vesicoureteral reflux (VUR): Detects abnormal urine flow from the bladder to the kidneys. Noninvasive procedure to evaluate urinary tract abnormalities. 5. Salivary gland Imaging: Warthin tumors: Typically, they appear as hot nodules. Important for preoperative diagnosis. Other salivary gland tumors may show cold spots.



References:

https://www.ncbi.nlm.nih.gov/books/NBK559013/

https://www.sciencedirect.com/science/article/abs/pii/S0162013410001534?via%3Dihub

https://www.sciencedirect.com/topics/medicine-and-dentistry/pertechnetate

↑ *Back to this question in Part A*

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Q19: Which of the following is incorrect about this scan? {{caption_text}} (Q853404)

A. Fibrous cortical defects show hot spot

B. Tracer in the bladder is physiological

C. In cellulitis tracer does not show prolonged retention in delayed phase

D. Superscan is seen in hyperparathyroidism

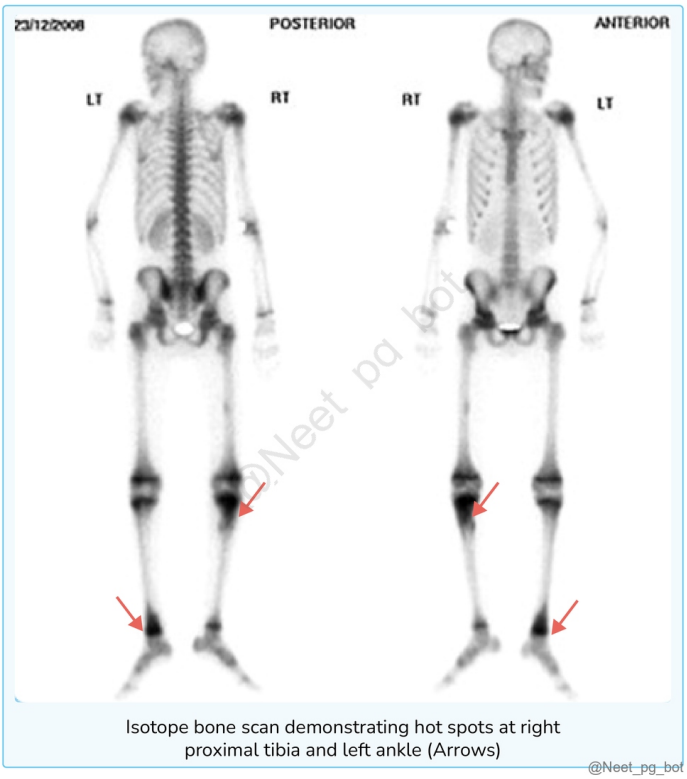


Correct Answer: A. Fibrous cortical defects show hot spot

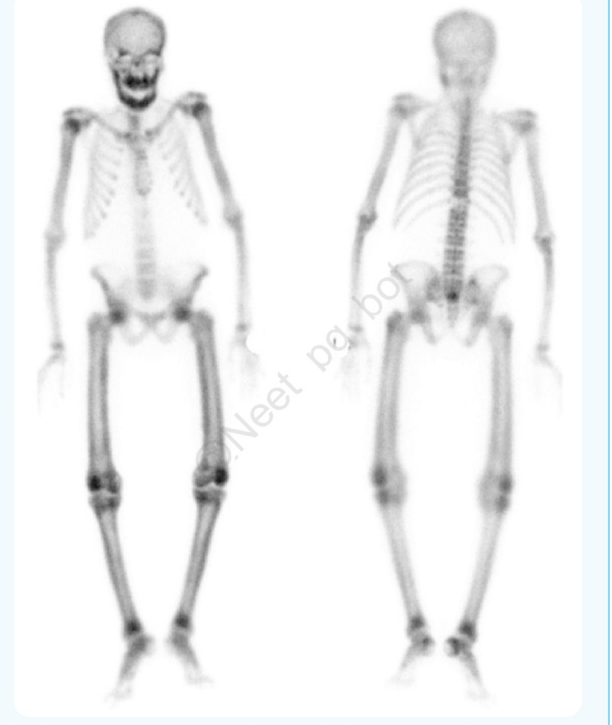
- *Listen (English)*
- *Listen (Hindi)*

Explanation: The given image is of a Bone scan Fibrous cortical defects show a cold spot Bone scan: Definition Nuclear medicine study using technetium-99m (Tc-99m-MDP) Absorption ~50% of the injected dose absorbed by bones (2-6 hours post-injection) Phases of Study 1. Immediate phase 2. Blood pool phase 3. Delayed phase 4. Optional delayed phase Indications Detection and follow-up of skeletal metastases Radiographically occult fractures (e.g., stress fractures) Osteomyelitis Complex regional pain syndrome Evaluation of hip joint prosthesis for infection or loosening Paget disease Patient Preparation Optimal hydration Remove metal objects Void before study Conditions Affecting Uptake Increased uptake in kidneys/liver in conditions like thalassemia and hemochromatosis Poor image quality with reduced renal function Tracer Dose 740 - 925 Mbq (20 - 25 mCi) administered intravenously in adults Renal Uptake Useful for detecting renal abnormalities; faint/absent uptake is

commonly due to renal insufficiency Results Normal : If the radiotracer is present evenly throughout all the bones. Abnormal: Will show hot spots or cold spots as compared to the surrounding bone. Hot spots are areas where there is an increased collection of radioactive material. Cold spots are areas that have taken up less of the radioactive material. Hot Spots Areas of new bone formation are seen in: Fractures Osteomyelitis Osteoblastic bone metastasis Cold Spots Seen in: Multiple myeloma (normal alkaline phosphatase) Fibrous cortical defects (VS fibrous dysplasia shows hot spots) Physiological Presence Tracer present in the bladder due to renal excretion (Option B) {{caption_text}} Superscan: Multiple bones show hot spots without kidney uptake. Seen in conditions that affect multiple bones, like hyperparathyroidism and renal failure. (Option D) {{caption_text}} Triple-Phase Bone Scan: {{caption_text}} Criteria Osteomyelitis Cellulitis Delayed Phase Imaging Tracer retained in the bone (hot spot) The tracer does not show prolonged retention in the bone (Option C) Blood Pool Imaging Increased uptake can occur Increased uptake can also occur

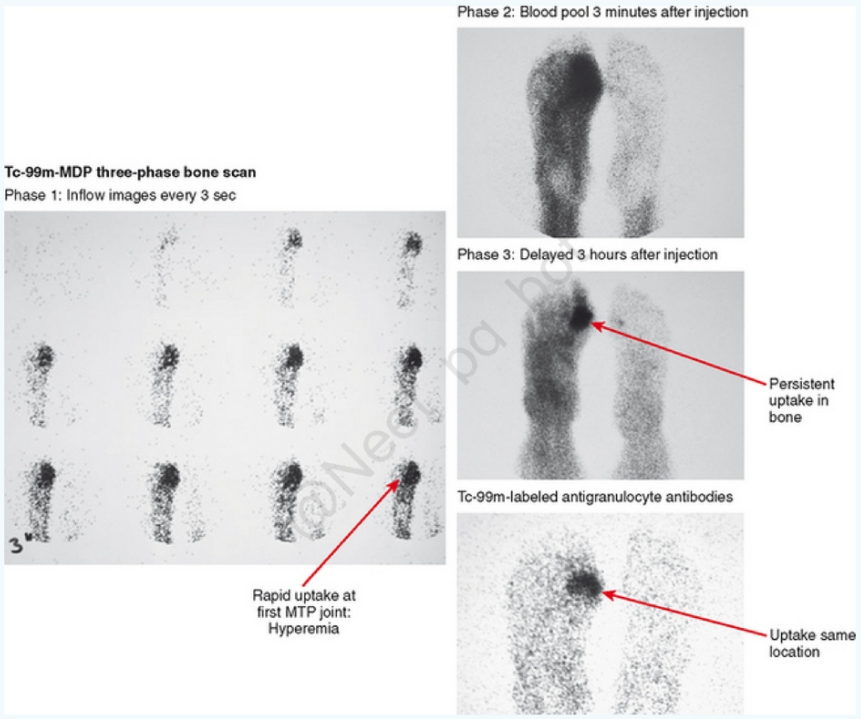


Isotope bone scan demonstrating hot spots at right proximal tibia and left ankle (Arrows)



Bone scan showing Absent bladder and renal activity

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Osteomyelitis at MTP joint shown in three phases

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References:

https://pubs.rsna.org/doi/10.1148/rg.232025103

https://jnm.snmjournals.org/content/26/7/711.long

↑ *Back to this question in Part A*

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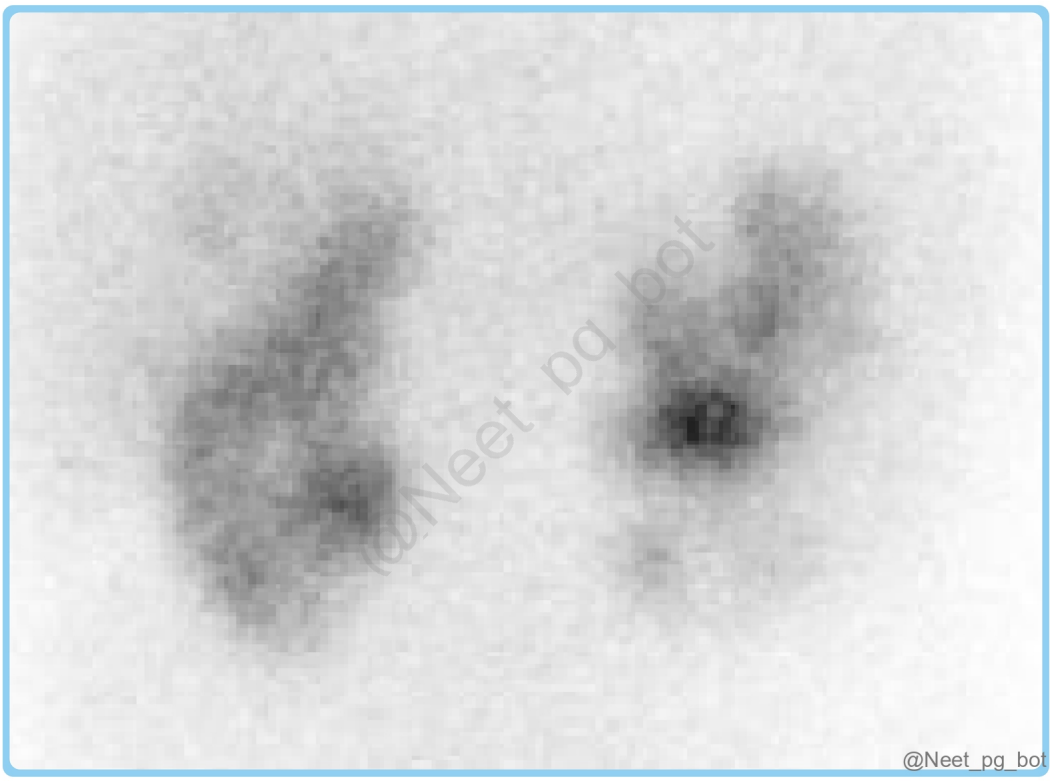
Q20: A 35-year-old female presents with fever, flank pain, and dysuria. A renal scan was performed as shown with the marked defect is given below. For this condition, what other pattern can be encountered on the scan? {{caption_text}} (Q853403)

A. A single area of decreased cortical uptake

B. Multiple unilateral or bilateral defects

C. Diffuse involvement of an entire kidney

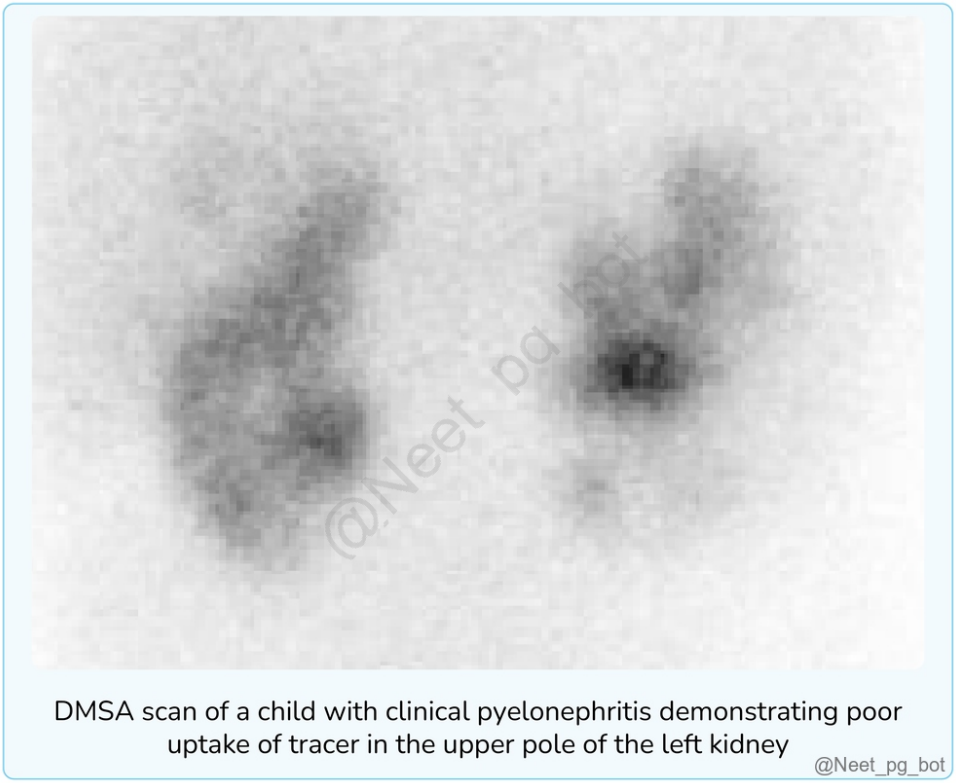
D. All of the above



Correct Answer: D. All of the above

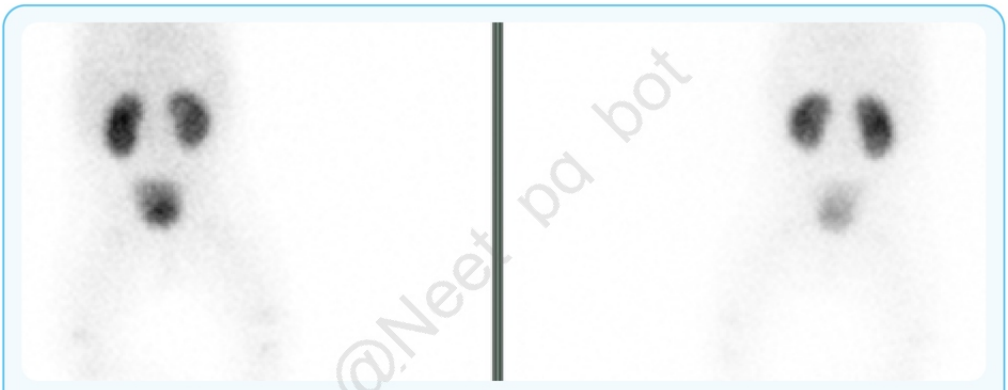
Explanation: Given image shows a DMSA scan and the presentation is consistent with acute pyelonephritis Three abnormal patterns can be encountered in DMSA in pyelonephritis A single area of decreased cortical uptake (as is shown in the image by an arrow) Multiple unilateral or bilateral defects Diffuse involvement of an entire kidney uptake of tracer " data-author="Enrico Vidal, Elisabetta Miorin, Pietro Zucchetta, Elisa Benetti, Germana Longo,

Davide Meneghesso, Mattia Parolin, Luisa Murer" data-hash="8156" data-license="CC BY-NC 4.0" data-source="" data-tags="April2025" src="" /> {{caption_text}} DM S A Scan Radiotracer: Technetium-99m DMSA (Di mercapto succinic acid) Types: Morphological Static Procedure The radiotracer is injected intravenously. It takes approximately 3 hours for the tracer to bind to the kidneys before imaging can commence. Clinical Indications: Assessment of Renal S carring Urinary Tract Infection Pyelonephritis Renal Infarct Horseshoe Kidney Ectopic Kidney DMSA scan in both kidneys" data-author="Yusra Sheikh" data-hash="8157" data-license="NA" data-source="" data-tags="April2025" src="" /> {{caption_text}} {{caption_text}} kidney agenesis-Tc-99m DMSA" data-author="Ammar Ashraf" data-hash="8159" data-license="NA" data-source="" data-tags="April2025" src="" /> {{caption_text}} {{caption_text}}



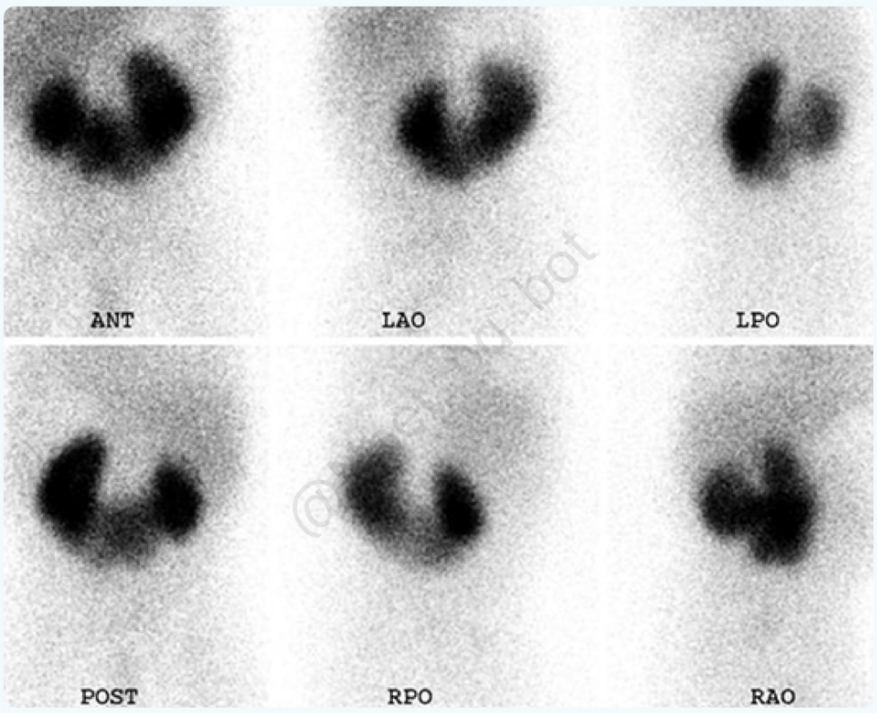
DMSA scan of a child with clinical pyelonephritis demonstrating poor uptake of tracer in the upper pole of the left kidney

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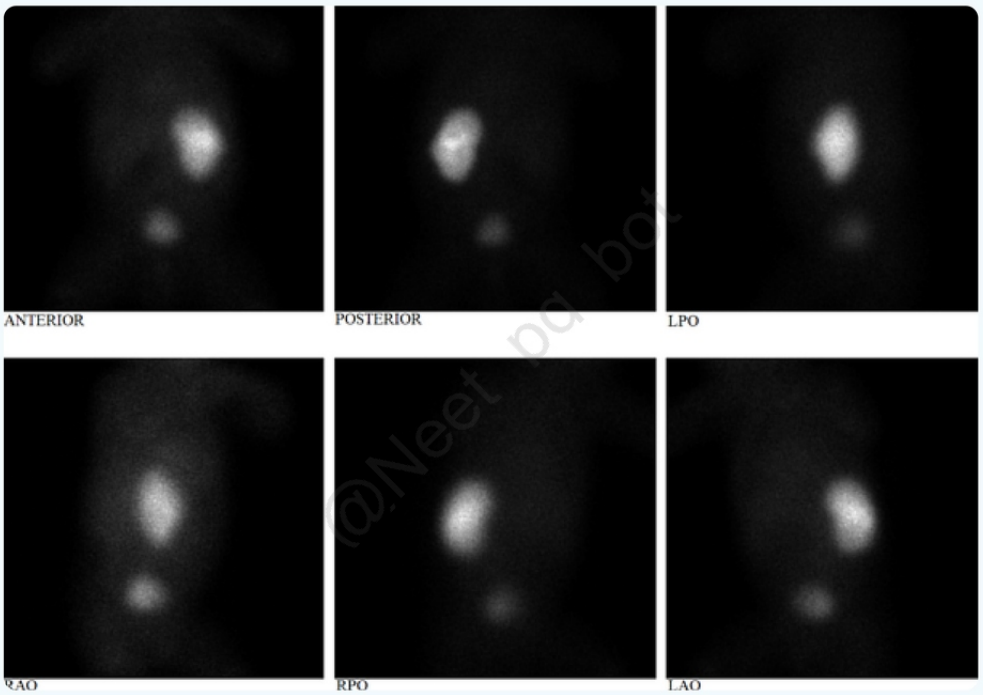
Normal DMSA scan in both kidneys

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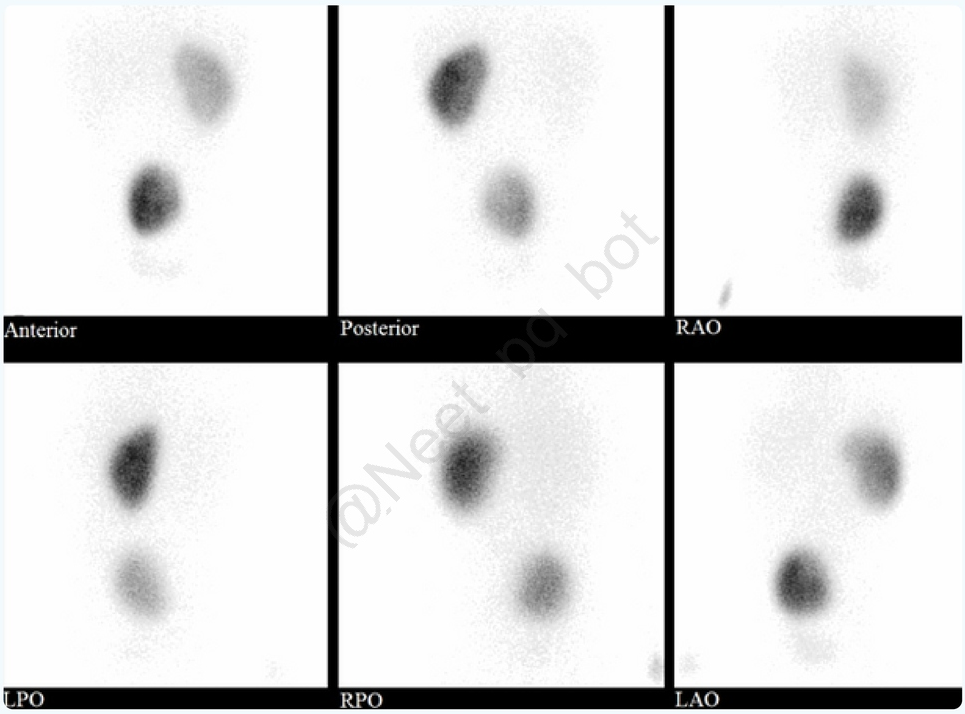
Tc-99m DMSA-Horseshoe kidney

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Tc-99m DMSA- Unilateral kidney agenesis

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Tc-99m DMSA- Pelvic kidney

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References:

https://www.ajronline.org/doi/10.2214/AJR.08.2187

https://jnm.snmjournals.org/content/52/2/318

↑ *Back to this question in Part A*

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Q21: A 6-year-old patient is referred for a renal scan to assess for potential scarring or morphological changes in the kidneys due to a history of recurrent urinary tract infections. Which of the following scans would be the most appropriate for evaluating the kidneys in this scenario? (Q853402)

A. DTPA Scan

B. MAG3 Scan

C. DMSA Scan

D. Captopril DTPA Scan

Correct Answer: C. DMSA Scan

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: It is specifically designed to assess renal morphology and can identify structural abnormalities such as scarring, ectopic kidneys, and damage from conditions like vesicoureteral reflux (VUR). It provides a static image of the kidneys, making it particularly useful for evaluating potential damage related to recurrent urinary tract infections. Renal Scan Purpose Type Key Points DMSA Assess scar or morphological changes in kidneys (e.g., VUR) Morphological/Static Scintigraphy Identifies abnormalities (e.g., ectopic kidney) IOC for VUR is VCUG/MCU DTPA (Option A) Assess kidney function (GFR) Dynamic Scintigraphy Estimates GFR Excreted by glomerular filtration, not tubular secretion MAG3 (Option B) Evaluate overall renal function Dynamic Scintigraphy Assesses GFR and tubular function Diuretic Renography Assess obstruction in pelvi-ureteric junction Dynamic Scintigraphy Rule in/out PUJ obstruction in hydronephrosis without hydroureter Captopril DTPA (Option D) Evaluate renal artery stenosis and other renovascular diseases. Dynamic Scintigraphy A significant GFR decrease indicates RAAS dependence Contraindicated in renal artery stenosis

References:

https://www.ncbi.nlm.nih.gov/books/NBK562236/

↑ *Back to this question in Part A*

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Q22: A 45-year-old male presents to the emergency department with a 12-hour history of severe right upper quadrant pain. A scan is performed after the injection of a radiopharmaceutical as shown below. Which of the following findings is not consistent with the image shown? {{caption_text}} (Q853401)

A. Cystic duct obstruction

B. Prompt excretion into the bile ducts

C. Tracer activity was seen in the gallbladder

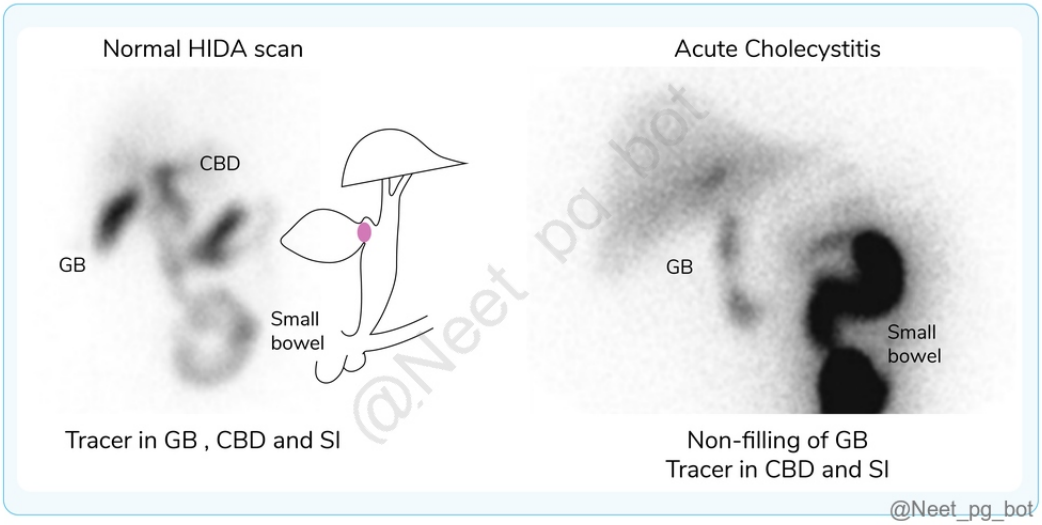
D. Radioisotope used is 99mTc.

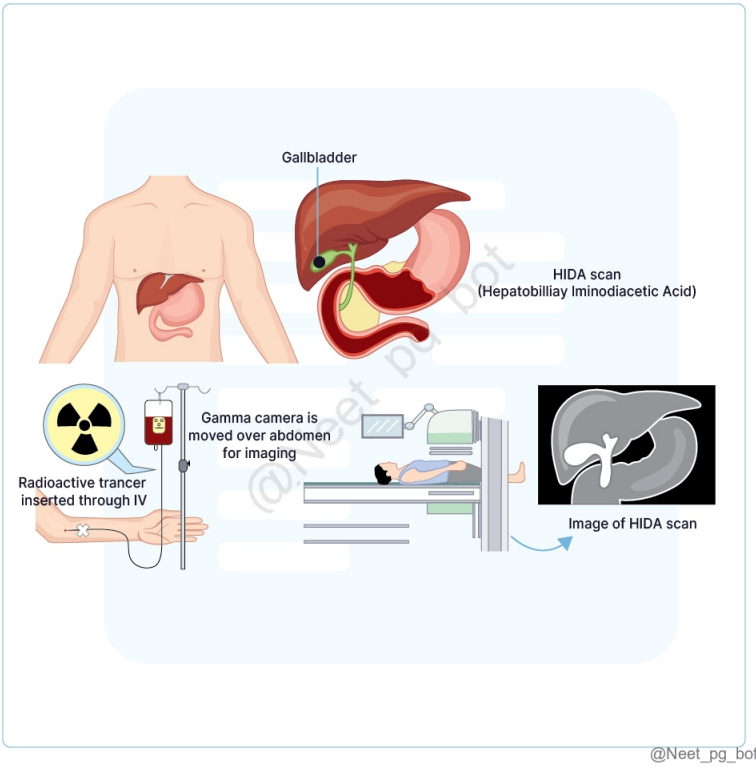


Correct Answer: A. Cystic duct obstruction

■ *Listen to Audio 1*

Explanation: The given image shows a normal Hepatobiliary Iminodiacetic Acid scan (HIDA scan) A normal HIDA scan indicates that there is no obstruction. If the cystic duct were obstructed, the gallbladder would not be visualized. {{caption_text}} Scintigraphy principle: 1. Radiopharmaceutical Injection A radioactive tracer (e.g. iminodiacetic acid) is injected through IV. This tracer is taken up by the liver and biliary tract. 2. Gamma Ray Detection As the tracer moves from the liver to the gallbladder and then to the duodenum, it emits gamma rays, which are detected by a gamma camera. 3. Image Creation The gamma camera is moved over the abdomen to capture images, allowing visualization of the liver, gallbladder, and biliary tract, revealing their structure and function. Prompt excretion into the bile ducts (Option B) : This finding is consistent with a normal scan. Tracer activity was seen in the gallbladder (Option C) : This finding aligns with a normal HIDA scan, where the tracer is taken up by the gallbladder. Radioisotope used is 99mTc (Option D) : This is accurate and consistent, as technetium-99m is the standard radioisotope used in HIDA scans.





References:

https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/scintigraphy#

https://www.meddean.luc.edu/lumen/meded/radio/curriculum/procedures/hida_scan1.htm

↑ *Back to this question in Part A*

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Q23: Which of the following best describes the Warburg effect in cancer cells? (Q853400)

A. Cancer cells prefer oxidative phosphorylation under anaerobic conditions

B. Tumor cells primarily use glycolysis even in the presence of oxygen

C. Lactate production occurs only under hypoxic conditions in tumors

D. Mitochondrial function is absent in cancer cells

Correct Answer: B. Tumor cells primarily use glycolysis even in the presence of oxygen

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: Warburg effect : Cancer cells shift to glycolysis for energy production, even with sufficient oxygen, supporting rapid proliferation. This results in increased glucose uptake and lactate production , a hallmark of many tumors. Warburg Effect Cancer cells prefer glycolysis over oxidative phosphorylation, even in the presence of oxygen. This leads to increased glucose uptake and lactate production , common in many cancers. 18F-fluorodeoxyglucose (18F-FDG) , a glucose analog used in PET imaging, helps study this effect. Mechanisms of 18F-FDG Accumulation Mechanism Description Aerobic Glycolysis Cancer cells rely heavily on glycolysis, increasing glucose and 18F-FDG uptake, even with oxygen. Transport & Trapping GLUT-1 transporters mediate glucose entry. 18F-FDG is phosphorylated and trapped inside cells. Tumor Heterogeneity Differences in tumor subtype, size, and microvasculature affect 18F-FDG uptake. Clinical Implications of 18F-FDG Implication Details Prognostic Indicator Higher 18F-FDG uptake correlates with worse prognosis (e.g., shorter DFS in invasive ductal carcinoma). Reverse Warburg Effect Cancer-associated fibroblasts (CAFs) increase glycolysis in tumor cells via metabolic coupling. Treatment Monitoring PET imaging tracks changes in 18F-FDG uptake, reflecting therapy responses targeting glycolysis or mitochondria. Cancer cells prefer oxidative phosphorylation under anaerobic conditions (Option A): Oxidative phosphorylation is suppressed, not preferred, in cancer cells. Lactate production occurs only under hypoxic conditions in tumors (Option C): Lactate is produced even in oxygen-rich environments, not just under hypoxia. Mitochondrial function is absent in cancer cells (Option D): Mitochondrial function is reduced but not completely absent.

References:

https://pmc.ncbi.nlm.nih.gov/articles/PMC6898688/

https://pmc.ncbi.nlm.nih.gov/articles/PMC2481565/

↑ *Back to this question in Part A*

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• [07_Nuclear Medicine] 016 Previous Year Questions

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[07_Nuclear Medicine] 016 Previous Year Questions — Quick Jump

Q1 (p. 1222) *Q2 (p. 1223)* *Q3 (p. 1224)*

Q1: What is the investigation of choice for the diagnosis of a parathyroid adenoma? (Q854735)

A. Tc99-Sestamibi scan

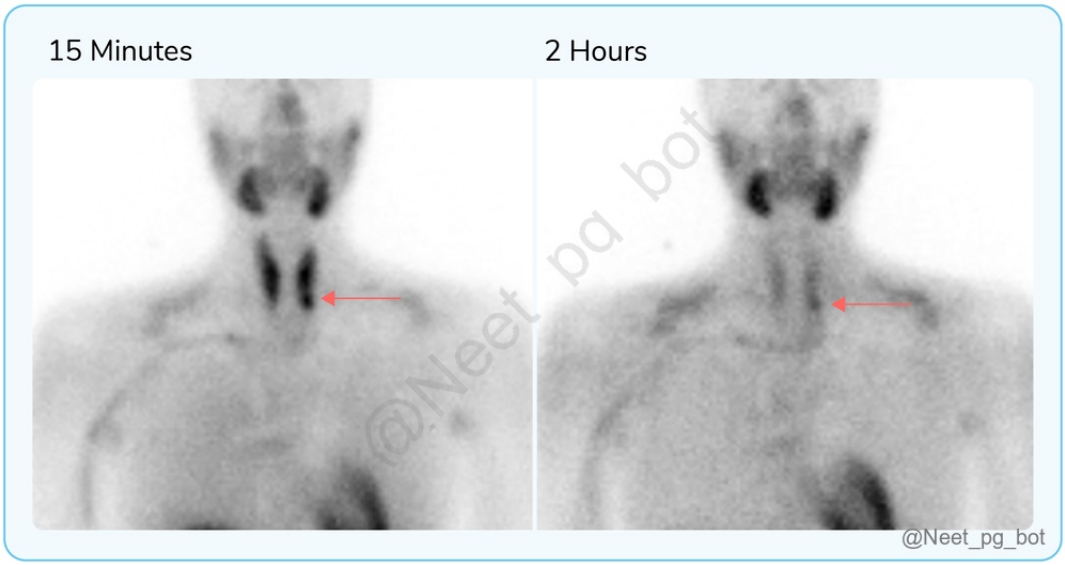
B. Sestamibi SPECT

C. USG

D. CT

Correct Answer: B. Sestamibi SPECT

Explanation: The investigation of choice for diagnosing and localizing a parathyroid adenoma is Tc-99m Sestamibi scan combined with SPECT imaging (Sestamibi SPECT). While a plain Tc-99m Sestamibi scan (Option A) can detect overactive parathyroid tissue, SPECT adds 3-dimensional anatomical localization , increasing accuracy - especially when the abnormal gland is: Small Ectopic (mediastinum, thymus) Posterior or deep-seated {{caption_text}} Diagnosis of Parathyroid Adenoma A parathyroid adenoma is a benign tumor of the parathyroid gland that can cause primary hyperparathyroidism due to excess production of parathyroid hormone (PTH). The most common symptoms are related to hypercalcemia, such as kidney stones, osteoporosis, and fatigue. Imaging is crucial to identify the adenoma, which guides the surgical treatment. Imaging in Parathyroid Adenoma Investigation Role Accuracy Tc99-Sestamibi Scan (Option A ruled out) Functional imaging Good but less precise localization Sestamibi SPECT Functional + anatomical localization Best (gold standard) Ultrasound (USG) (Option C ruled out) Adjunct; helps evaluate neck lesions Useful but operator-dependent. First-line for initial screening, but less sensitive than Sestamibi. CT (4D-CT preferred) (Option D ruled out) Not first line; used if ectopic or re-operative cases Lower sensitivity



References:

https://pubmed.ncbi.nlm.nih.gov/32193593/

Harrison’s Principles of Internal Medicine, 21st Edition, Volume I, Page 31776-3178.

Davidson’s Principles and Practice of Medicine, 24th Edition, Page 663, 664.

↑ *Back to this question in Part A*

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Q2: Most common radio-isotope in pet scan : (Q857203)

A. 13C

B. 14C

C. 18F

D. All of the above

Correct Answer: C. 18F

Explanation: Positron Emission Tomography (PET) scans use radioisotopes that emit positrons , which are detected to create high-resolution images of metabolic activity in tissues. Fluorine-18 (¹■F) is the most commonly used radioisotope in PET scans. It is incorporated into Fluorodeoxyglucose (¹■F-FDG) , a glucose analogue that helps in imaging cancer, brain disorders, and cardiac viability . Half-life of ¹■F: ~110 minutes → Ideal for clinical imaging. 13C (Carbon-13) (Option A) It is not a positron emitter, but it is used in stable isotope metabolic studies rather than PET scans. Commonly used in breath tests (e.g., H. pylori urea breath test). 14C (Carbon-14) (Option

B) A beta-emitting isotope used in radioactive labelling, but not PET imaging. Used in carbon dating and metabolic studies. All of the Above (Option D) is incorrect, as only ¹■F is commonly used in PET scanning.

References:

https://www.hopkinsmedicine.org/health/treatment-tests-and-therapies/positron-emission-tomography-pet

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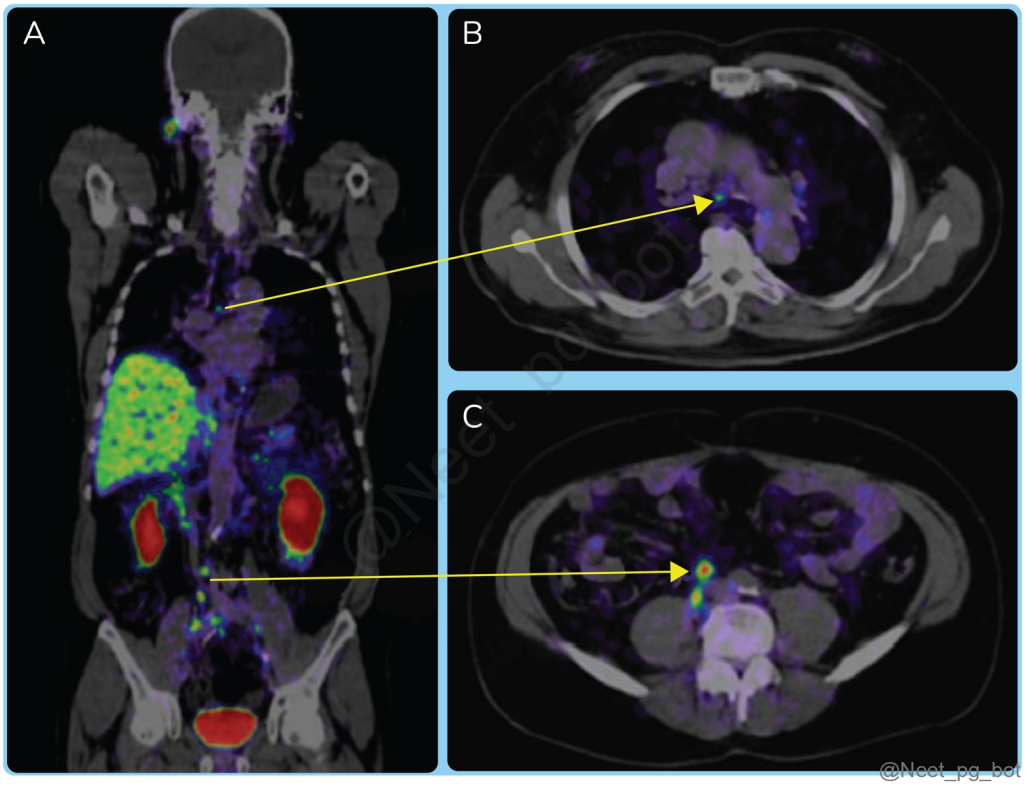
Q3: Identify the image modality given below. (Q856046)

A. Cerebral blood flow scan

B. Sestamibi scan

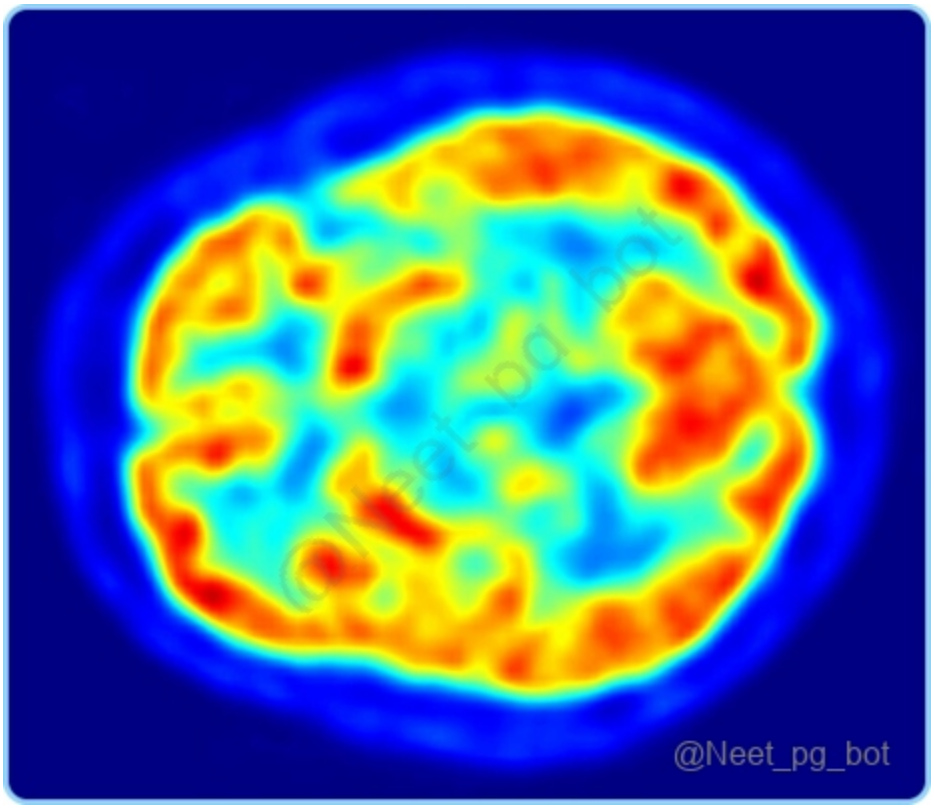
C. PET CT

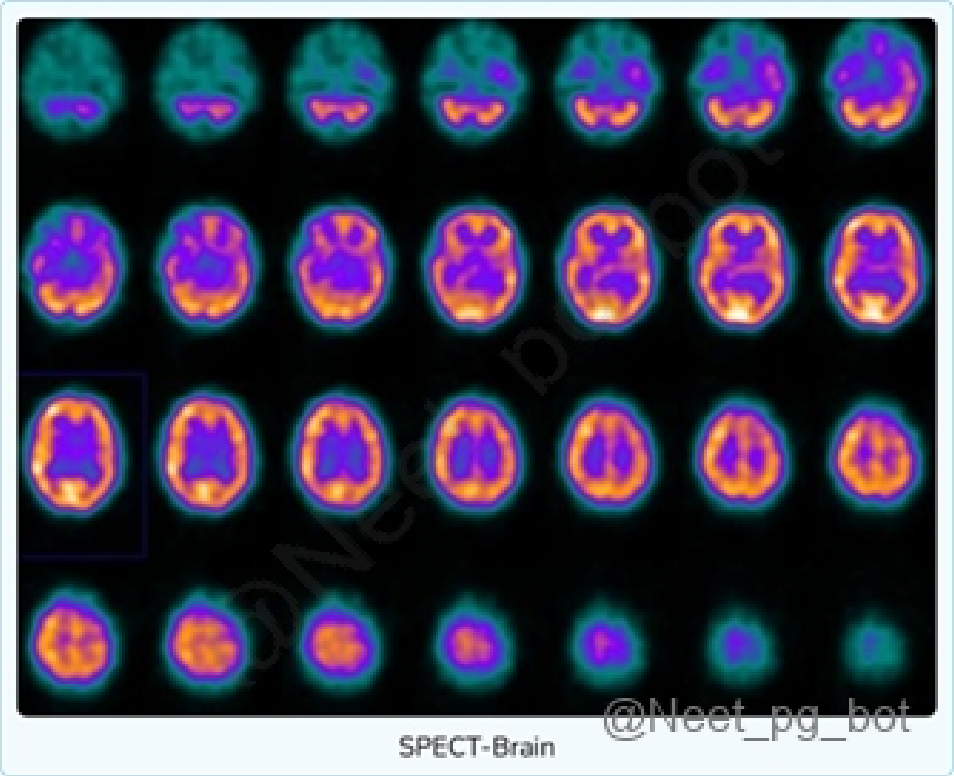
D. Full body MDCT



Correct Answer: C. PET CT

Explanation: It is a type of imaging that combines positron emission tomography (PET) and computed tomography (CT) into a single machine. PET scans measure metabolic activity in the body by detecting the distribution of a radioactive tracer. A PET scan is specifically designed to show metabolic changes in the body, particularly by tracking the uptake of radioactive tracers like F-18 fluorodeoxyglucose (FDG). while CT scans provide detailed images of the anatomy. Feature PET SPECT (Option A ruled out) Cost Very expensive Less expensive Radioactive Tracers Uses positron-emitting radioisotope (tracer): F-18 fluorodeoxyglucose (FDG) Uses gamma-emitting radioisotopes (tracers): technetium-99m, iodine-123, iodine-131 Detector Design Ring of multiple detectors Usually one large crystal-based detector Image Quality Better contrast and spatial resolution Poor contrast and spatial resolution Functionality Shows metabolic changes Doesn't show metabolic changes Sensitivity More sensitive Less sensitive; fewer events detected. Imaging {{caption_text}} {{caption_text}} Sestamibi scan (Option C): It is a type of nuclear medicine scan that is used to image the heart, parathyroid gland, and breast. It uses the radiotracer technetium-99m sestamibi and a gamma camera to produce images. Full body MDCT (Option D): MDCT stands for multi-detector computed tomography, which is a type of CT that uses multiple rows of detectors to produce detailed 3D images of the body. It is commonly used to detect cancers, injuries, and other abnormalities in the body.





References:

https://www.nibib.nih.gov/science-education/science-topics/nuclear-medicine#:~:text=The%20main%20difference%20between%20SPECT,an%20electron%20but%20oppositely%20charged .

↑ *Back to this question in Part A*

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• [08_Head _ Neck Imaging] 017 Head And Neck Radiology

« Back to Folder Directory

[08_Head _ Neck Imaging] 017 Head And Neck Radiology — Quick Jump

Q1 (p. 1227) *Q2 (p. 1229)* *Q3 (p. 1232)* *Q4 (p. 1234)* *Q5 (p. 1237)* *Q6 (p. 1241)*
Q7 (p. 1244) *Q8 (p. 1246)* *Q9 (p. 1251)* *Q10 (p. 1256)* *Q11 (p. 1258)* *Q12 (p. 1261)*
Q13 (p. 1267) *Q14 (p. 1270)* *Q15 (p. 1273)* *Q16 (p. 1274)* *Q17 (p. 1276)* *Q18 (p. 1280)*
Q19 (p. 1281)

Q1: A 35-year-old male presents with complaints of nasal obstruction, more prominent on the right side, and recurrent nasal discharge over the past six months. He also reports occasional headaches and mouth breathing but denies any facial pain or fever. On nasal endoscopy, a smooth, pale, pedunculated mass is seen originating from the maxillary sinus and extending into the nasopharynx. A CT scan reveals a soft tissue mass filling the left maxillary sinus.What is the most likely diagnosis? (Q853176)

A. Mucus retention cyst

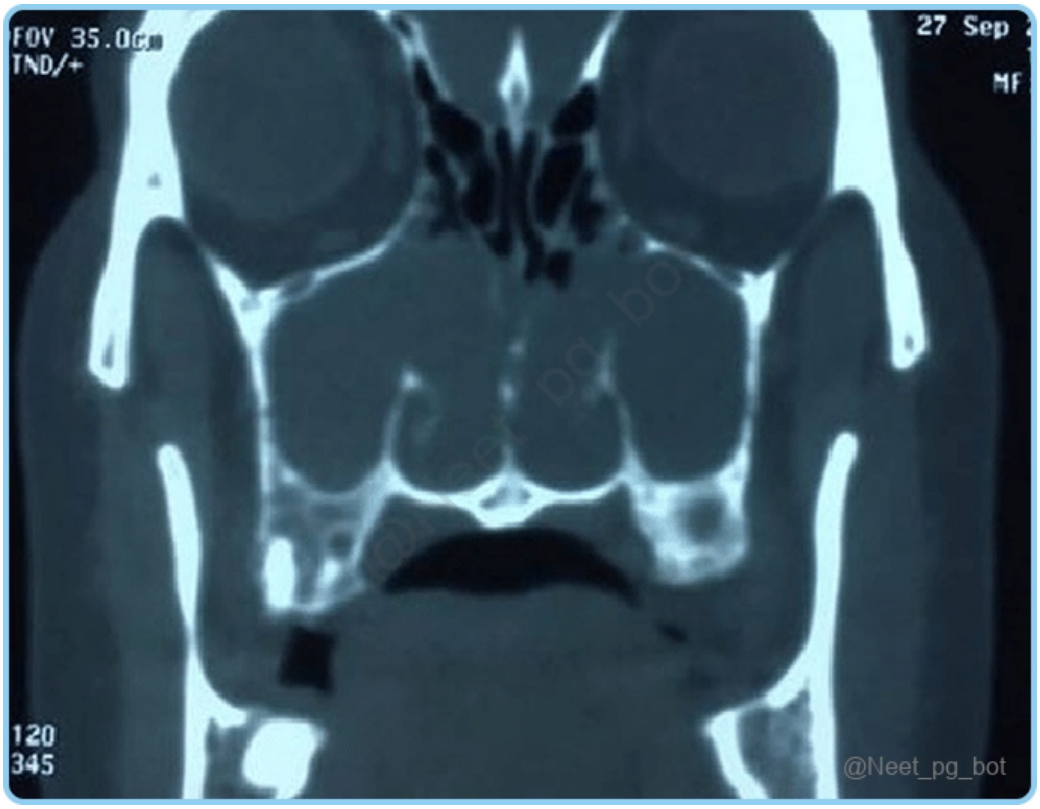
B. Antrochoanal polyp

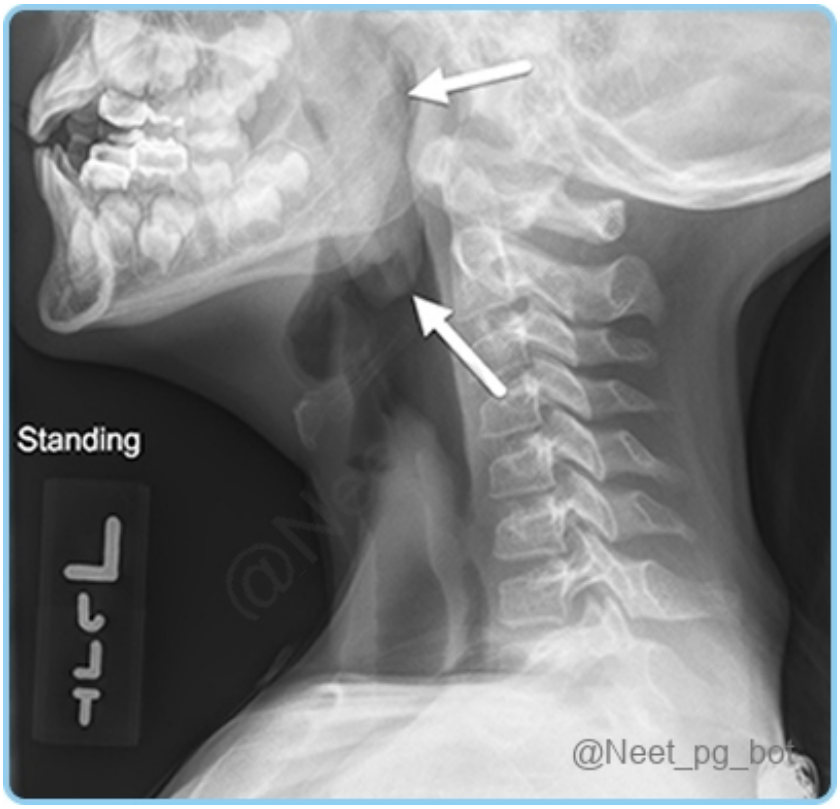
C. Mucocele

D. Juvenile angiofibroma

Correct Answer: B. Antrochoanal polyp

Explanation: Antrochoanal polyp is a benign polyp originating from the maxillary sinus, extending through the choana into the nasopharynx, causing unilateral nasal obstruction and discharge. Antrochoanal polyp: Imaging: X-ray lateral view skull: Dodd (or) Crescent sign (crescent of air between polyp and posterior pharyngeal wall present) CT Scan: Shows a soft tissue mass originating from the maxillary sinus and extending through the choana. No bony destruction is seen (helps differentiate from other conditions like mucocele or tumors). Treatment : Functional Endoscopic sinus surgery (FESS) is commonly performed to remove the polyp and ensure adequate sinus drainage. Simple polypectomy and Caldwell Luc procedure were the previously preferred methods. Mucus retention cyst(Option A): These are cysts filled with mucus, typically confined within the sinus itself. They do not extend into the choana. Mucocele(Option C): Expansile, mucus-filled lesion that can cause bony erosion and displacement of structures, but it does not present as a pedunculated mass extending into the nasopharynx. Juvenile angiofibroma(Option D): This is a vascular tumor typically seen in adolescent males, characterized by recurrent nosebleeds and aggressive growth. It is not pedunculated and usually causes epistaxis.





References:

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Q2: Following an RTA, a patient's CT is as follows What is the likely fracture? (Q853181)

A. Le Fort I

B. Le Fort II

C. Le Fort III

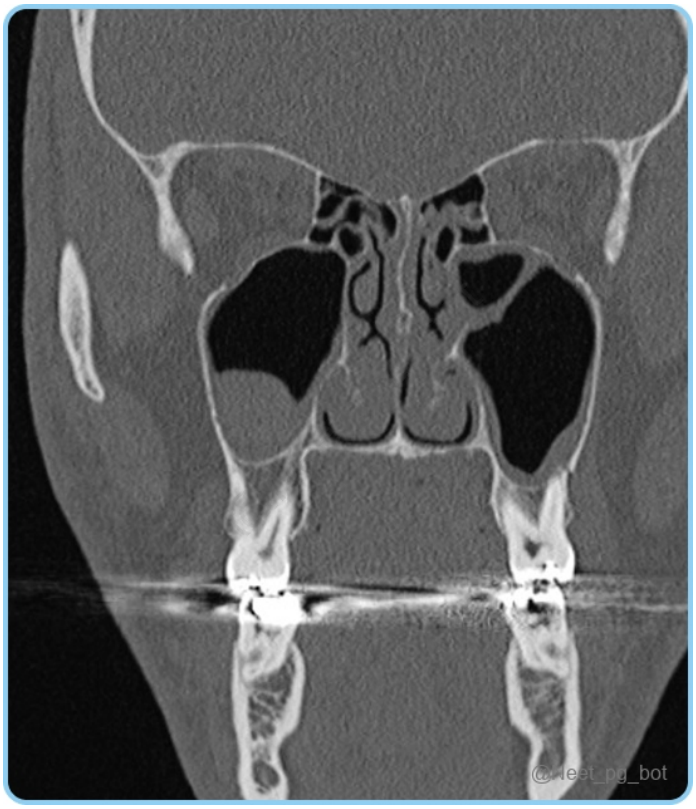
D. Jarjaway fracture



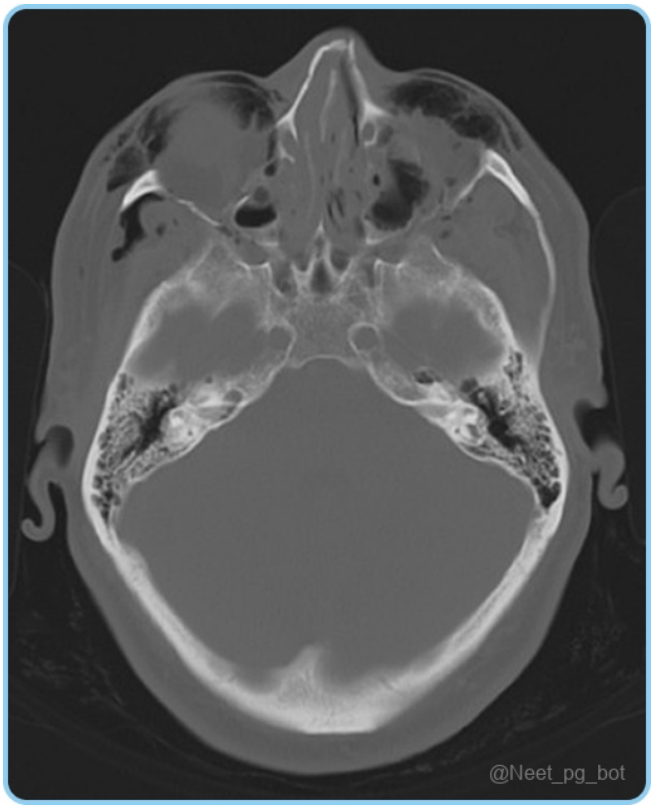
Correct Answer: B. Le Fort II

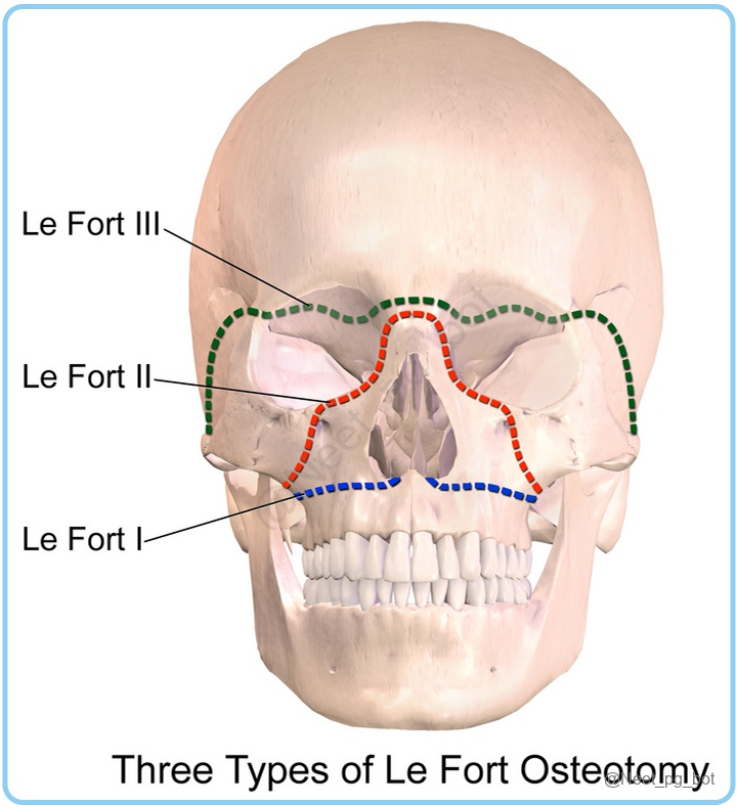
Explanation: Fracture of the pyramid that passes through the root of the nose, floor of orbit, upper part of maxillary sinus is suggestive of Le Fort II fracture . Fractures of Maxilla: Le Fort I (Transverse) Runs above and parallel to the palate. Crosses over the lower part of nasal septum, maxillary antrum and pterygoid plate. Floating palate sign + , Guerin sign + Le Fort II (Pyramidal) Passes through root of nose, lacrimal bone, floor of orbit, upper part of maxillary sinus and pterygoid plates CSF rhinorrhea may be present Le Fort III (Cranio-facial disjunction) Complete separation of facial bones from the cranial bones . The fracture line passes through the root of the nose,

ethmoid-frontal junction, superior orbital fissure, lateral wall of orbit, frontozygomatic and temporozygomatic sutures and the upper part of pterygoid plates. CSF rhinorrhea may be present Jarjaway fracture (Option D): Horizontal fracture of nasal septum , more appreciable on X-ray lateral view.






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Le Fort III
Le Fort II
Le Fort I
Three Types of Le Fort Osteotomy

References:

Diseases of ENT and Head & Neck surgery by PL Dhingra pages- 215,216.

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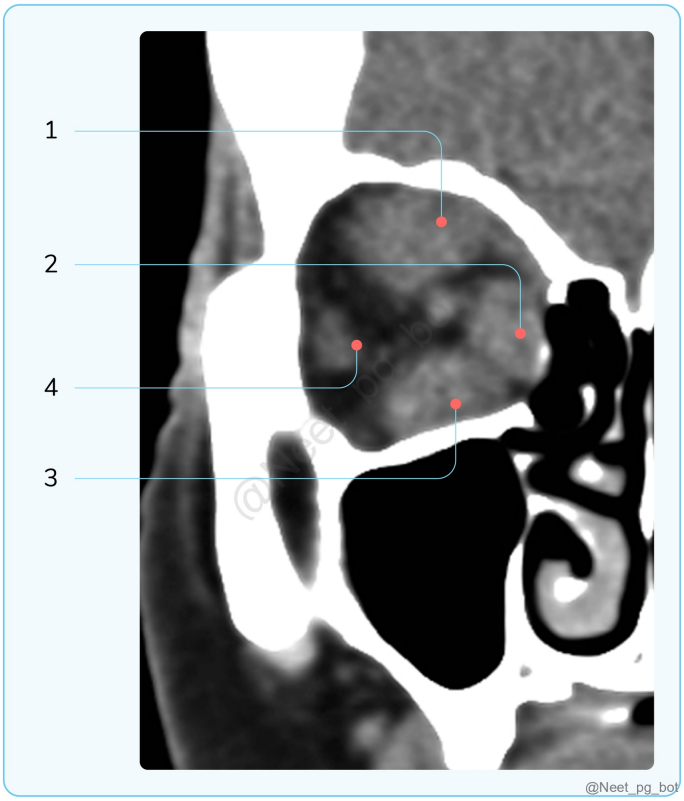
Q3: A 30-year old female visited an Ophthalmology clinic with complaints of proptosis, difficulty in eye mobility and redness of eyes. Her TFT values were T3/T4-high, TSH-low. Which of the following structures shown in the right orbit is first to be affected first in her condition? (Q853195)

A. 1

B. 2

C. 3

D. 4

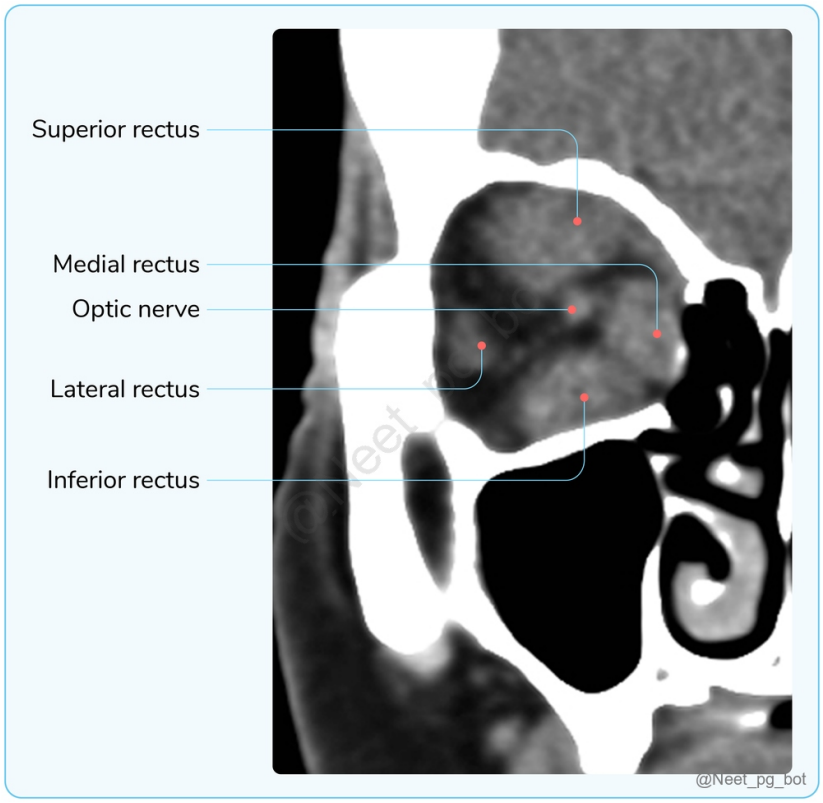


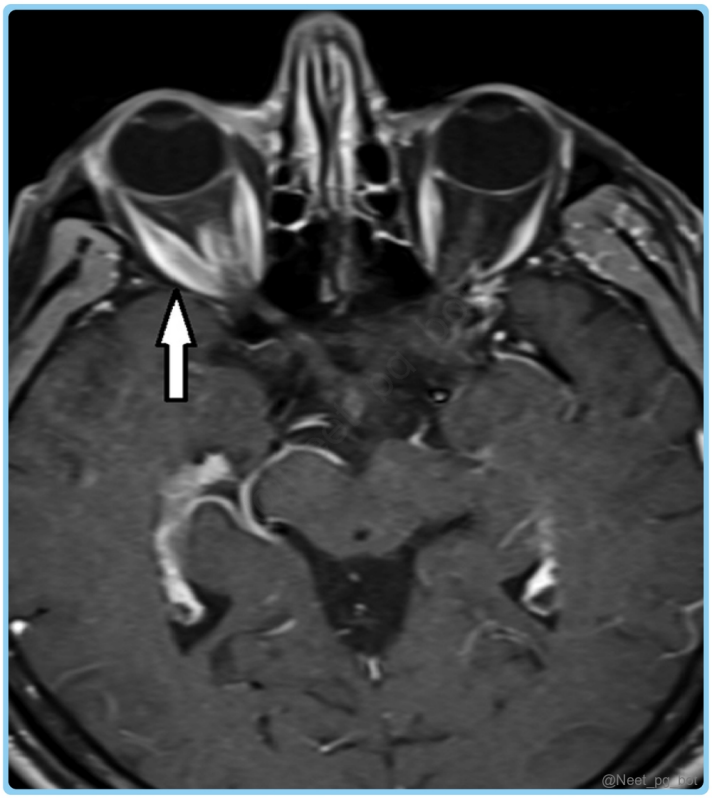
Correct Answer: C. 3

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: First and most common muscles to be affected in Thyroid ophthalmoplegia are the recti in this order: Inferior rectus (3) > Medial rectus (2) > Superior rectus (1) > Lateral rectus (4). CT image shows Right orbit with Extraocular muscles - enlarged Inferior and medial rectus is seen. MRI: T1WI shows Coke bottle sign in the axial view Differential diagnoses: Thyroid eye disease Pseudotumor of orbit Tolosa hunt syndrome Tendon is spared Tendon is involved Painful ophthalmoplegia with associated Sensory symptoms (Optic nerve/Trigeminal nerve +/- Cavernous sinus involvement)





References:

Comprehensive Ophthalmology by AK Khurana pages- 431,432. David Sutton textbook of Radiology & Imaging 8th edition Vol-2 pages- 1572,1573.

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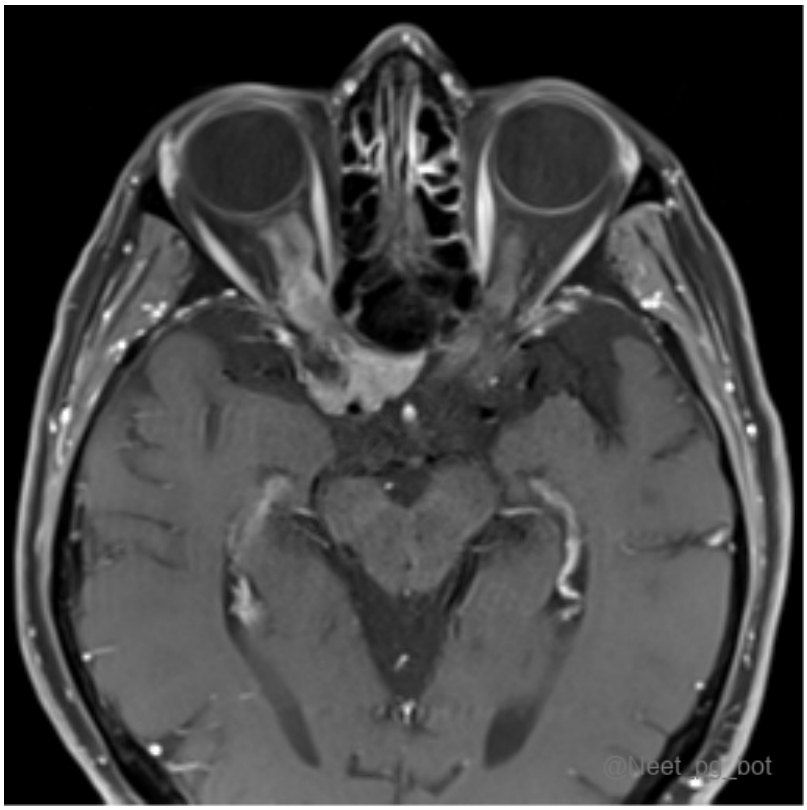
Q4: The MRI images below display a "tram-track" sign, characterized by enhancement surrounding the optic nerve. This radiological feature is most indicative of which condition? (Q853193)

A. Optic neuritis

B. Optic nerve sheath meningioma

C. Optic nerve glioma

D. Orbital pseudotumor

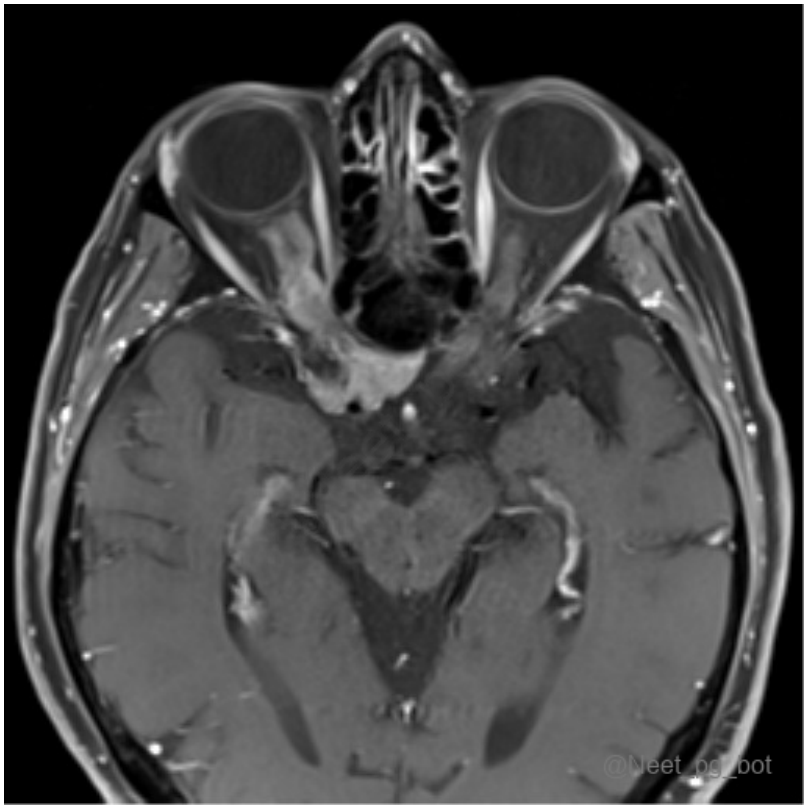


Correct Answer: B. Optic nerve sheath meningioma

- *Listen (English)*
- *Listen (Hindi)*

Explanation: Image is that of a FLAIR-MRI showing tram-track sign due to thickening of meninges, suggestive of Optic sheath meningioma (not Glioma) (Option C) Optic sheath meningioma & Optic nerve glioma: Optic nerve glioma Optic sheath meningioma Fusiform swelling of the optic nerve (option B ruled out) Tram-track sign (thickening of meninges) Associated with NF-1 Associated with NF-2 Optic neuritis (Option A): typically presents with diffuse enlargement and enhancement of the optic nerve itself due to inflammation. Orbital pseudotumor (Option B) can involve various orbital structures and often presents with a more diffuse, infiltrative mass without the distinct "tram-track" enhancement pattern.





References:

Grainger & Allison’s Diagnostic Radiology 7th edition pages- 1577. David Sutton textbook of Radiology & Imaging 8th edition Vol-2 pages - 1562,1574,1579,1580. Comprehensive Ophthalmology by AK Khurana pages- 329,437,542

↑ *Back to this question in Part A*

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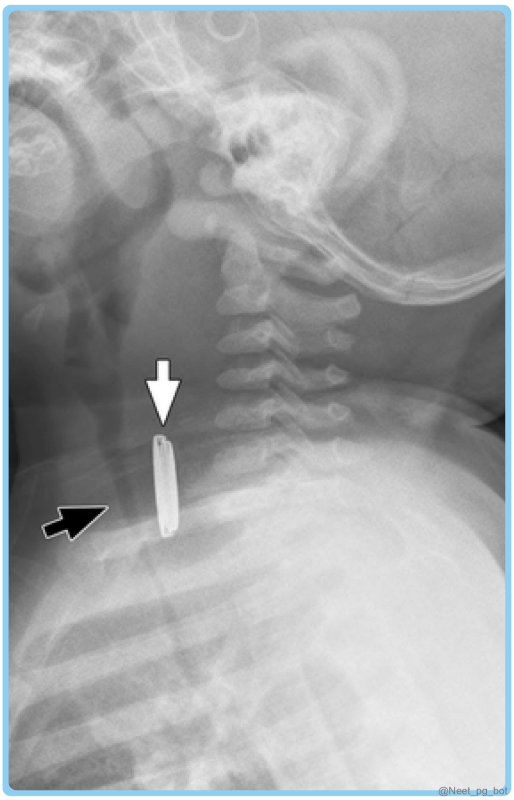
Q5: Match the following X-rays with the corresponding pathologies: 1) a) Coin in trachea 2) b) Coin in esophagus c) Button battery in esophagus d) Button battery in trachea (Q853192)

A. 1d, 2a

B. 1d, 2b

C. 1a, 2b

D. 1c, 2b

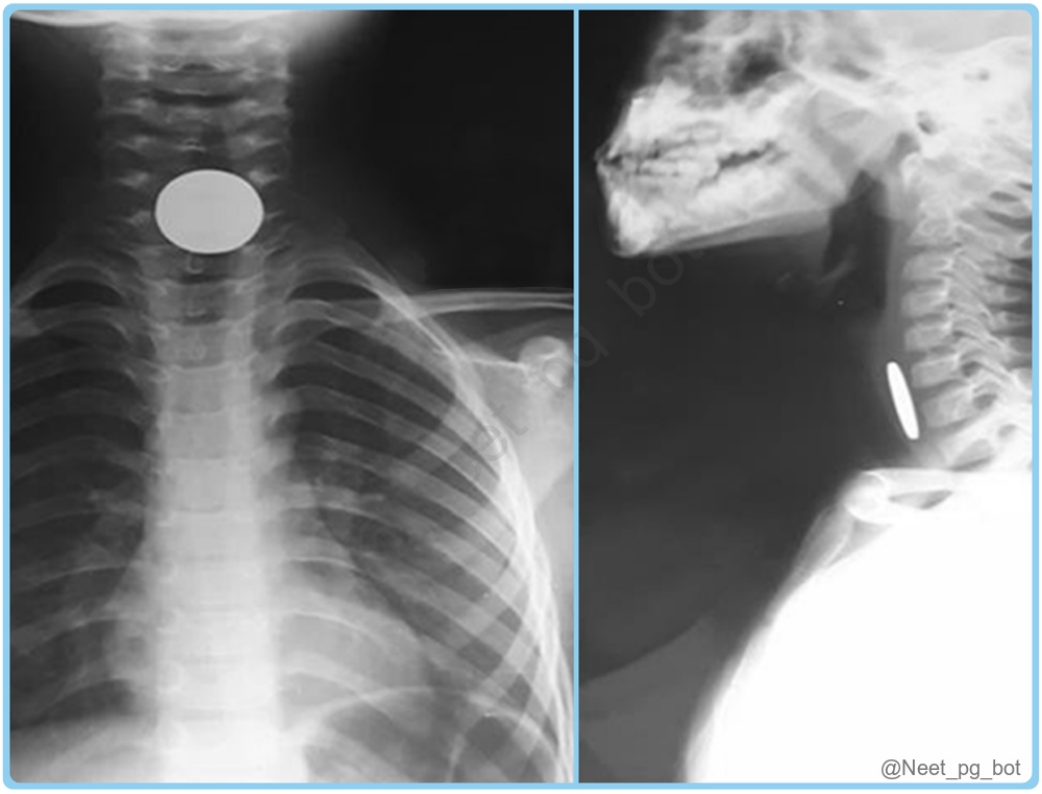




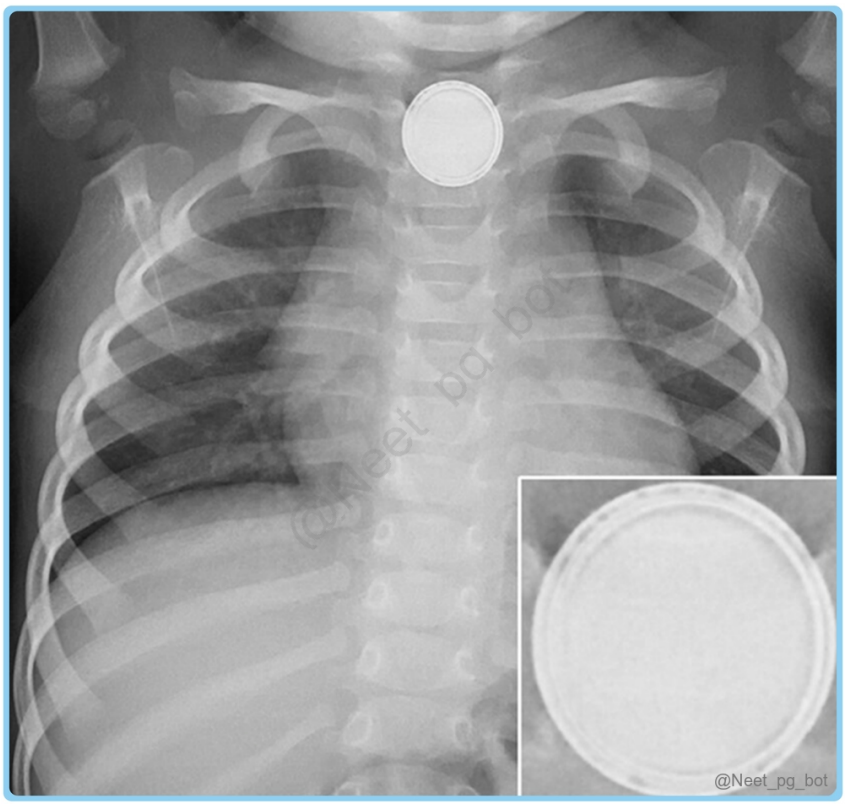
Correct Answer: D. 1c, 2b

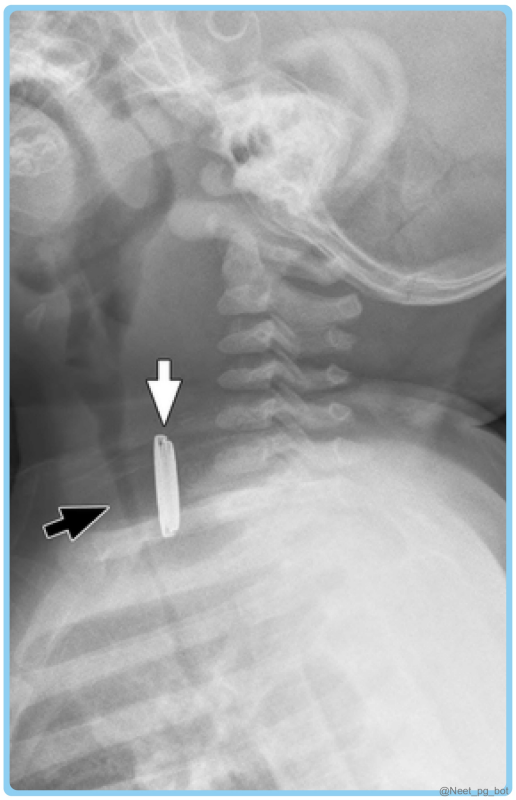
- *Listen (English)*
- *Listen (Hindi)*

Explanation: A coin in the esophagus is identified by a circular-shaped opacity seen on AP view and appears slit-like on the lateral view . Coin in trachea: Slit-like on AP view and Circular opacity on lateral view. Button battery: Can get dislodged in the esophagus following accidental ingestion. Peripheral double contour ring (or) Halo sign seen with step off on X-ray distinguishes button battery from coin in esophagus.


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References:

https://radiopaedia.org/cases/oesophageal-foreign-body-coin

https://www.ncbi.nlm.nih.gov/books/NBK470298/

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Q6: Young female with lower jaw swelling, X-ray showed the following. What is the likely diagnosis (Q853190)

A. Pindborg tumor

B. Adamantinoma

C. Sialolithiasis

D. Ranula



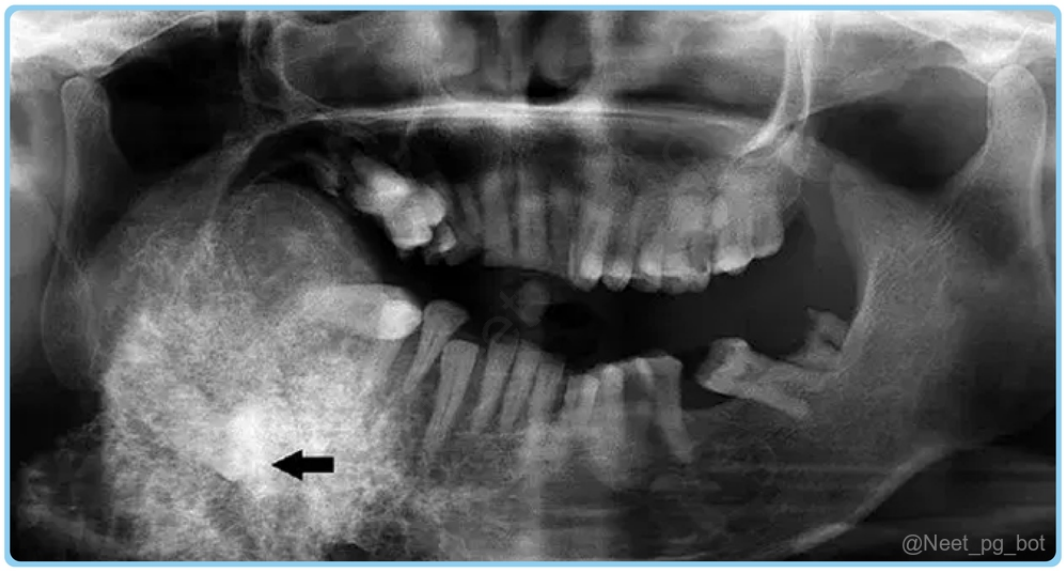
Correct Answer: B. Adamantinoma

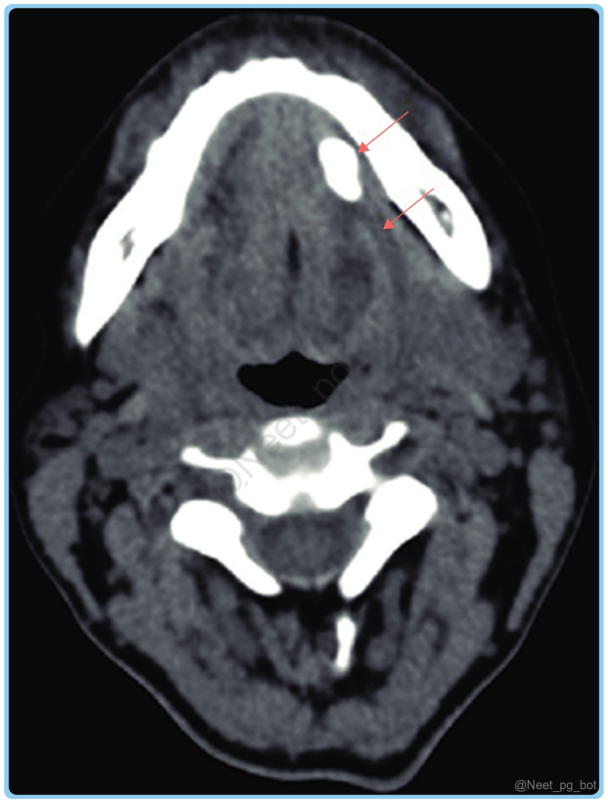
■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: Soap bubble appearance in the lower jaw is suggestive of Adamantinoma . Adamantinoma: Also known as ameloblastoma. X-ray: soap bubble lesion (no matrix calcification) Differential diagnoses for jaw lesions: 1) Pindborg tumor: Calcifying epithelial odontogenic tumor . More common in the premolar and molar region of the lower jaw. Radiology: X-ray: shows snow driven appearance. CT: Radiolucent with scattered areas of calcification. Confirmation of diagnosis is done by Biopsy (gold standard) . 2) Sialolithiasis: Calculi of the salivary gland ducts - submandibular gland is involved most commonly. Radiology: >80% of the stones are radiopaque , hence X-ray/CT is preferred over USG. Sialography: useful in localizing the stone in the duct. 3) Ranula: Mucous extravasation cyst secondary to obstruction of minor salivary glands . Origin: Sublingual space - floor of mouth. Can complicate into Plunging ranula (retention cyst) . Radiology: CT.


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References:

David Sutton textbook of Radiology & Imaging 8th edition Vol-2 pages - 1210-1213.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3343415/

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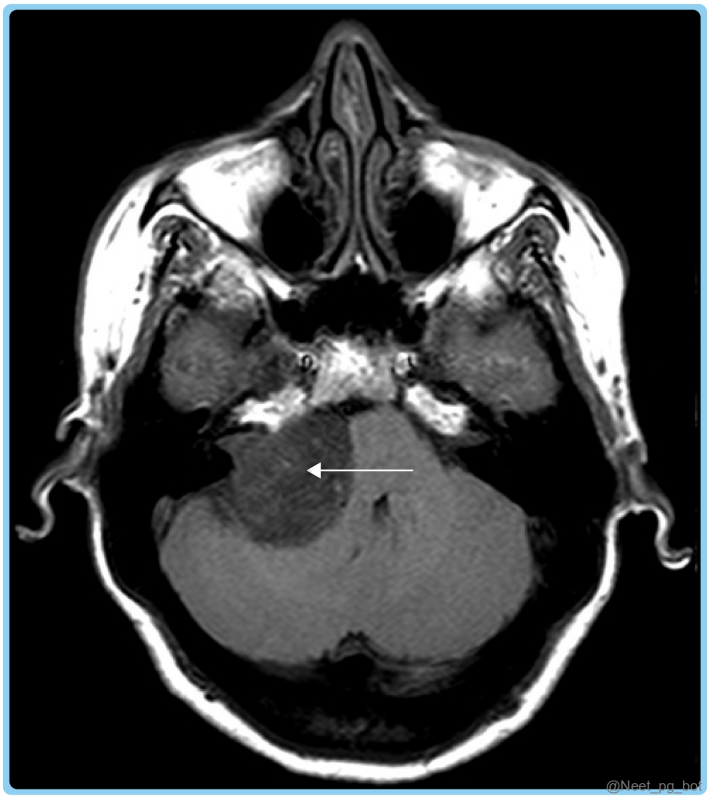
Q7: An elderly male presented with unilateral hearing loss associated with tinnitus came. Investigation done showed the following appearance. What is the investigation of choice for this condition? (Q853189)

A. MRI without contrast

B. MRI with contrast

C. CT without contrast

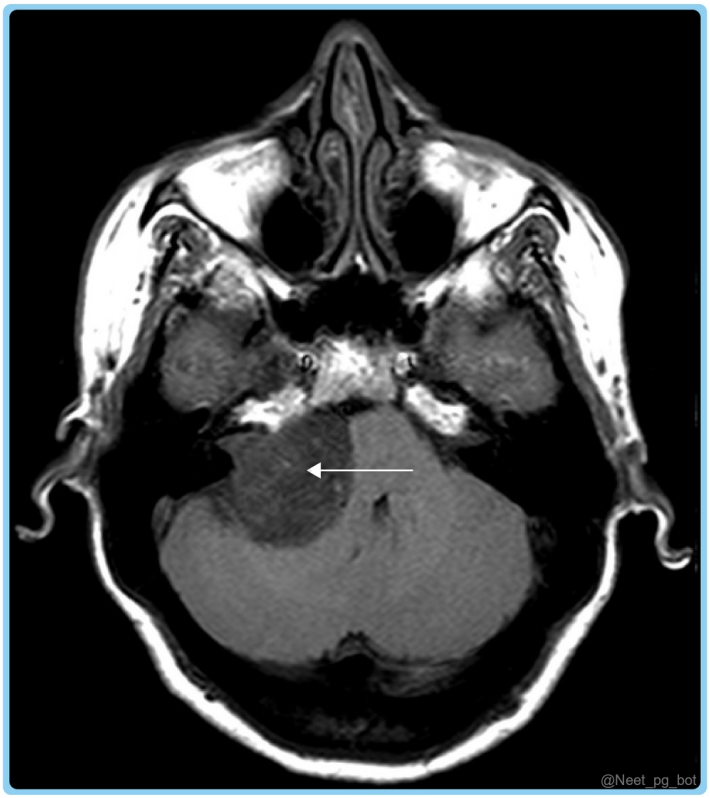
D. Vertebral Angiography



Correct Answer: B. MRI with contrast

- *Listen (English)*
- *Listen (Hindi)*

Explanation: The clinical scenario is suggestive of Vestibular schwannoma (also known as) Acoustic neuroma. Vestibular schwannoma: Radiology Investigation of choice/Gold standard: MRI with Gadolinium contrast - ice cream cone appearance seen on CP angle . Other investigations: CT (with/without contrast): done when MRI is not feasible Vertebral Angiography: though helps in localizing the tumor, it is not the investigation of choice.



References:

Grainger & Allison's Diagnostic Radiology 7th edition pages- 1607-1609. Diseases of ENT and Head & Neck surgery by PL Dhingra pages- 128,132-134.

↑ *Back to this question in Part A*

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Q8: Following sign was seen while performing a radiological investigation Identify the investigation and the corresponding diagnosis. (Q853187)

A. MR Angiogram- Glomus jugulare

B. Digital subtraction Angiography-glomus jugulare

C. Digital subtraction Angiography- Carotid body tumor

D. MR Angiogram- Carotid body tumor



Correct Answer: C. Digital subtraction Angiography- Carotid body tumor

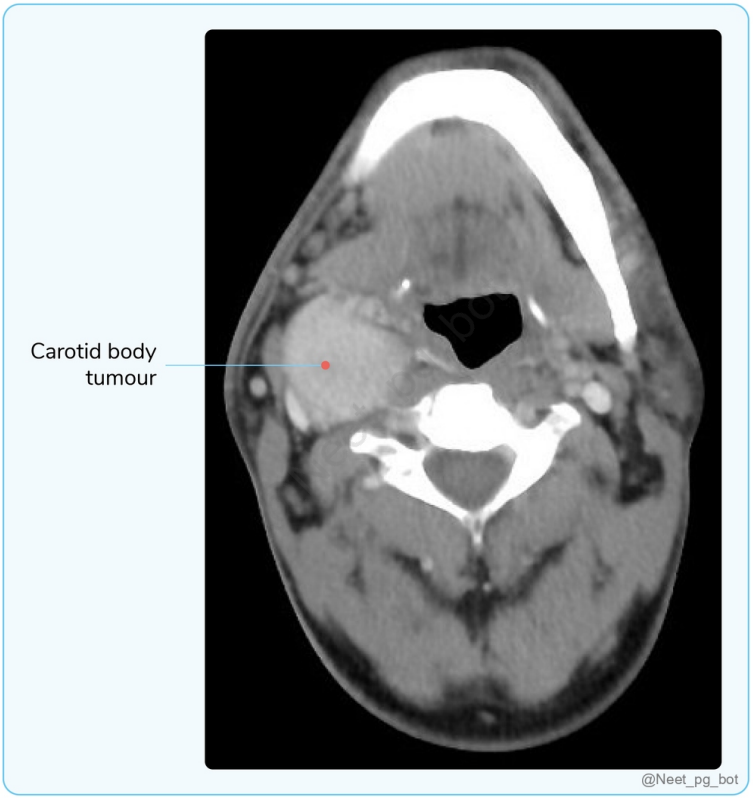
- *Listen (English)*
- *Listen (Hindi)*

Explanation: Investigation shown is Digital Subtraction Angiography (DSA) and Lyre sign is seen at the carotid bifurcation, which is suggestive of Carotid body tumor - a type of Paraganglioma. Radiological findings in carotid body tumor: NCCT Large well-defined mass seen over the carotid bifurcation CECT Well-defined peripherally enhancing lesion at the carotid bifurcation MRI (T2-weighted) Mass splaying the carotid bifurcation is seen MR Angiogram Bilateral carotid body tumor seen Digital Subtraction Angiography (DSA) {{caption_text}} Lyre sign positive (Option C) MR Angiogram- Glomus jugulare (Option A): The image is clearly a Digital Subtraction Angiography (DSA) due to the sharp, flow-related contrast and bone subtraction, not an MRA. A Glomus jugulare tumor is located in the jugular foramen, superior to the carotid bifurcation shown here. Digital subtraction Angiography-glomus jugulare (Option B): While the imaging modality is correctly identified as DSA, the location and "splaying" appearance are characteristic of a carotid body tumor, not a glomus jugulare, which arises from the jugular bulb. MR Angiogram- Carotid body tumor (Option D): The diagnosis of a Carotid body tumor is consistent with the image findings, but the imaging modality depicted is a Digital Subtraction Angiography, not an MR Angiogram.





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Carotid body
tumour
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References:

David Sutton textbook of Radiology & Imaging, 8th edition, Volume 2, Pages 1385-1389

Grainger & Allison's Diagnostic Radiology, 7th edition, Pages 1609, 1610, 1629

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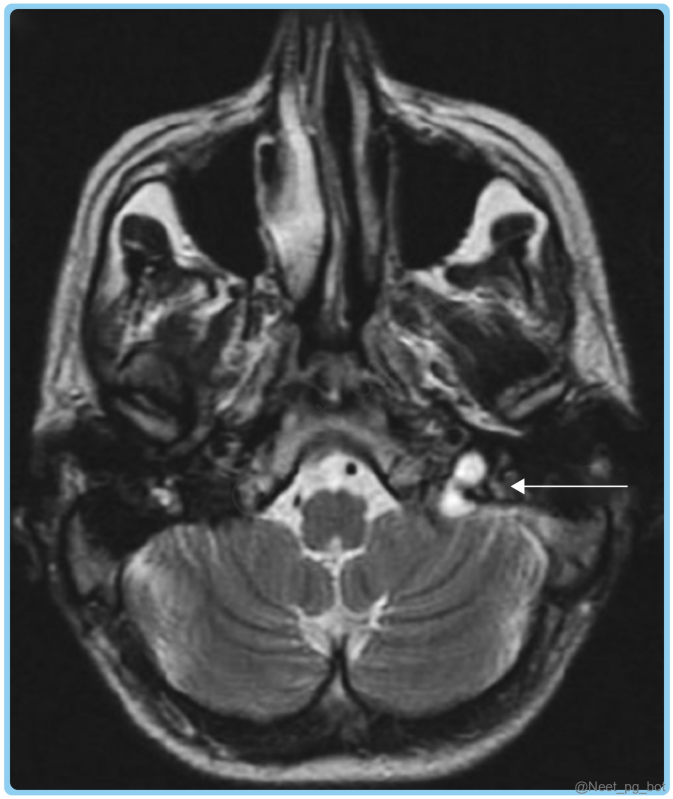
Q9: A 20-weeks primigravida complaints of severe headache, nausea and vomiting. MRI done showed the following. Which of the following combinations of diagnosis and investigation of choice is most appropriate? (Q853186)

A. Tortuous internal carotid artery; CT angiogram

B. Sigmoid sinus thrombosis;NCCT

C. Tortuous internal carotid artery; CECT

D. Sigmoid sinus thrombosis; MR venogram



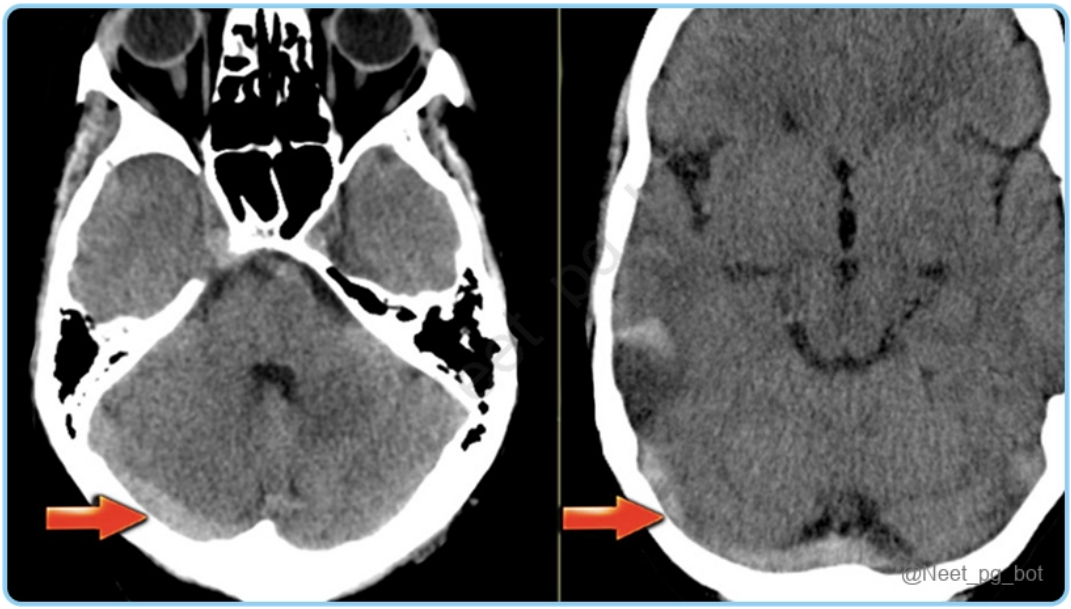
Correct Answer: D. Sigmoid sinus thrombosis; MR venogram

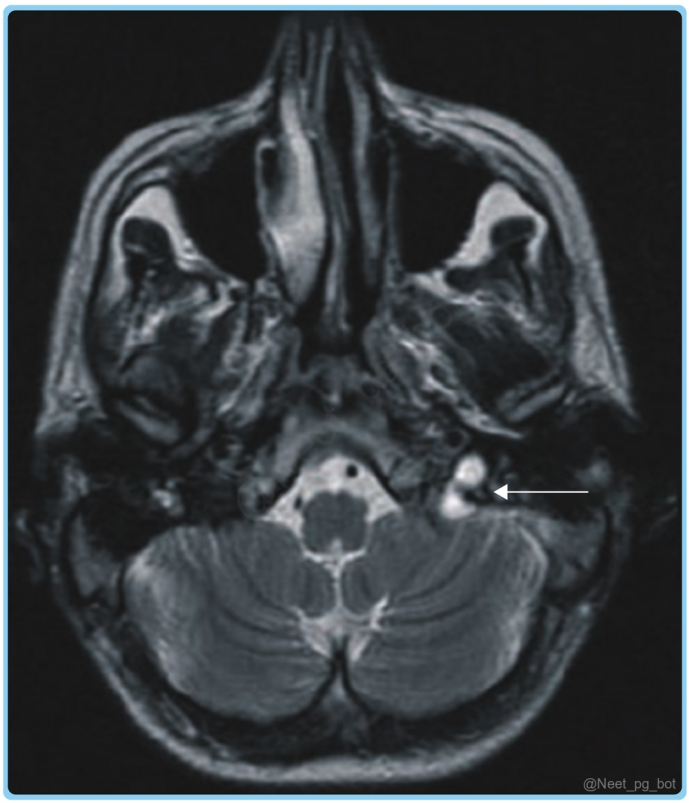
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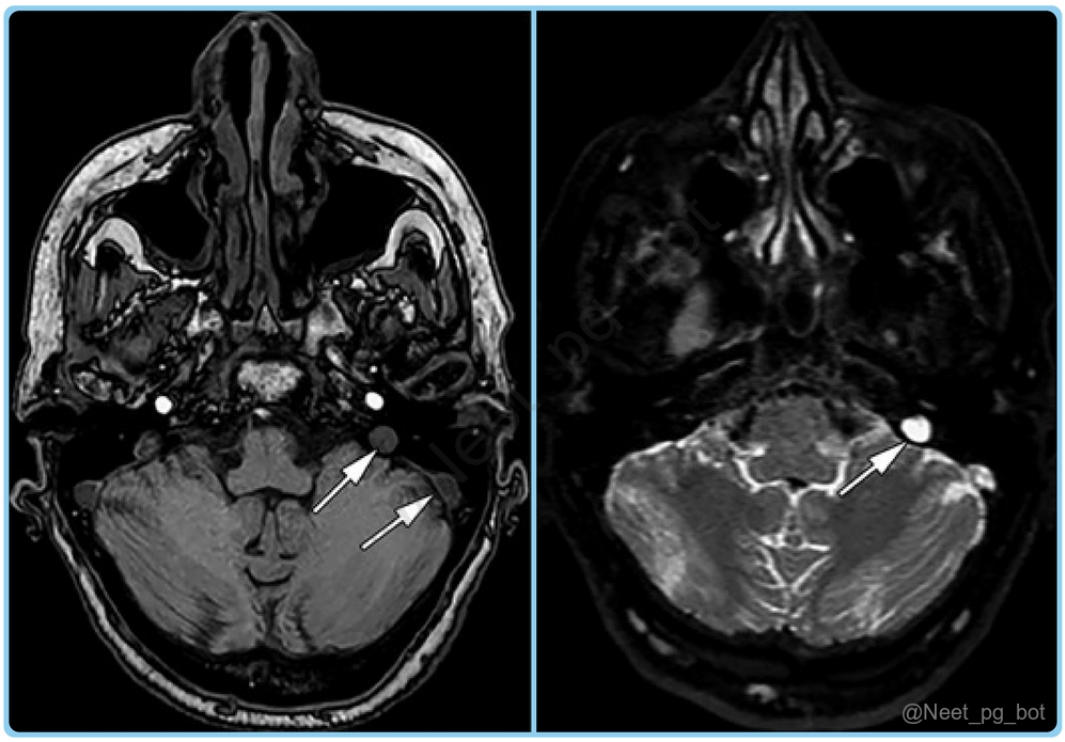
Explanation: A pregnant female with severe headache associated with nausea/vomiting with thrombosis present over sigmoid sinus and absent flow void (as seen in MRI) is diagnostic of Sigmoid Sinus thrombosis . MR venogram is the investigation of choice for diagnosing sigmoid sinus thrombosis, as it provides detailed visualization of venous structures and can accurately detect thrombi. Sigmoid sinus thrombosis: Risk factors Females on OCPs, pregnancy . Hypercoagulable states: Protein-C, S deficiency, Factor-V leiden mutation. Complication of CSOM/Mastoiditis Trauma Clinical features Severe headache, nausea, vomiting Radiology CECT: Non-opacification of the sigmoid sinus Empty delta sign : (seen with contrast) NCCT: Cord sign: Hyperdense vessel (attenuation) secondary to thrombosis Delta sign: seen in CT without contrast (NCCT) MRI (T2-weighted): Absent flow void with associated thrombosis seen CE-MRI: Filling defect with thrombus seen (a-T1 ; b-T2 weighted image) MR Venogram: Best investigation for localization Tortuous internal carotid artery; CT angiogram (Option A): Tortuous ICA (Internal Carotid Artery) is not suggested by the MRI findings. CT angiogram is typically used to evaluate arterial abnormalities, not venous thrombosis. Sigmoid sinus thrombosis; NCCT (Option B): While sigmoid sinus thrombosis is the correct diagnosis, Non-Contrast CT (NCCT) is less sensitive in detecting venous sinus thrombosis compared to MR venography. Tortuous internal carotid artery; CECT (Option C): Tortuous ICA is not indicated by the MRI findings, and Contrast-Enhanced CT (CECT) is more suited for arterial pathologies rather than venous thrombosis.


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References:

https://radiopaedia.org/articles/dural-venous-sinus-thrombosis

https://radiopaedia.org/cases/sigmoid-sinus-thrombosis

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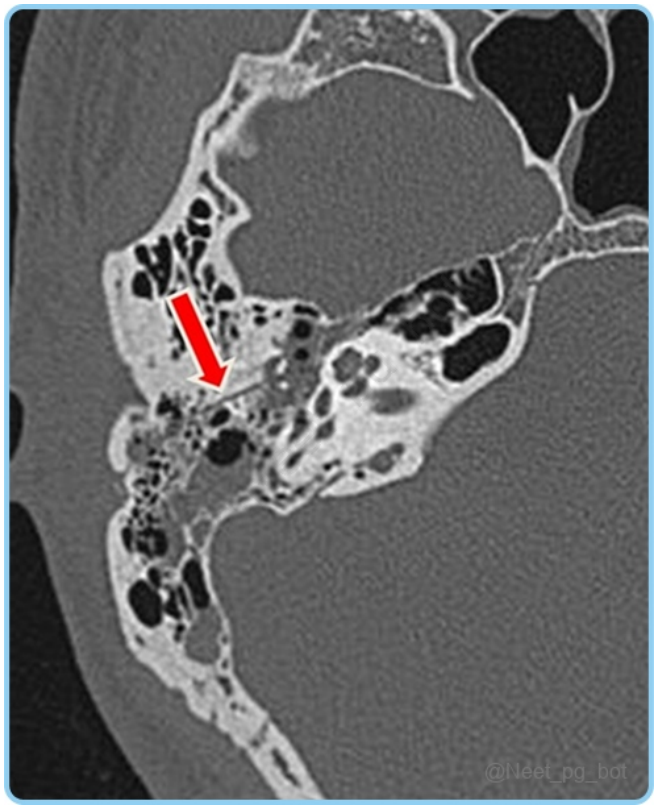
Q10: A 30-year-old female presents with right ear bleeding and conductive hearing loss (Rinne negative, Weber lateralized to right following head trauma.CT findings as shown as below.What is the most likely diagnosis? (Q853185)

A. Longitudinal fracture- Left temporal bone

B. Longitudinal fracture- Right temporal bone

C. Transverse fracture- Left temporal bone

D. Transverse fracture- Right temporal bone



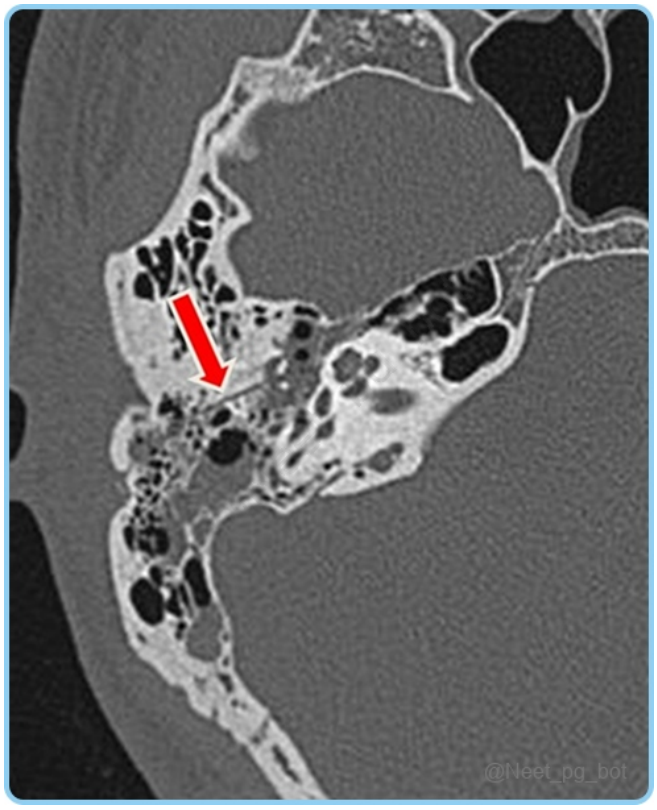
Correct Answer: B. Longitudinal fracture- Right temporal bone

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: Longitudinal temporal bone fractures, typically resulting from lateral head trauma, often present with ear bleeding and conductive hearing loss with CT image showing a fracture line along the long axis of the

temporal bone is suggestive of Longitudinal fracture of Right temporal bone. Temporal Bone fracture types: Longitudinal fracture Transverse fracture Description Fracture line across the/parallel to the long axis of the temporal bone. Fracture line perpendicular to the long axis of temporal bone. Incidence More common Less common Mode of injury Trauma to temporal/parietal region Trauma to frontal/occipital region Hemotympanum / TM rupture Common Rare CSF Otorrhea Common Rare Facial nerve damage Rare Common Hearing loss Conductive Sensorineural Injury to labyrinth/ VIII nerve Rare Common Radiology (CT)





References:

David Sutton textbook of Radiology & Imaging 8th edition Vol-2 pages - 3360-3366. Diseases of ENT and Head & Neck surgery by PL Dhingra pages- 114-116.

↑ *Back to this question in Part A*

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Q11: Daniel, a 60 year old male presented with complaints of nasal obstruction and epistaxis. MRI Head showed the following. What is the likely diagnosis? (Q853184)

A. Juvenile nasopharyngeal angiofibroma

B. Inverted papilloma

C. Esthesioneuroblastoma

D. Antrochoanal polyp



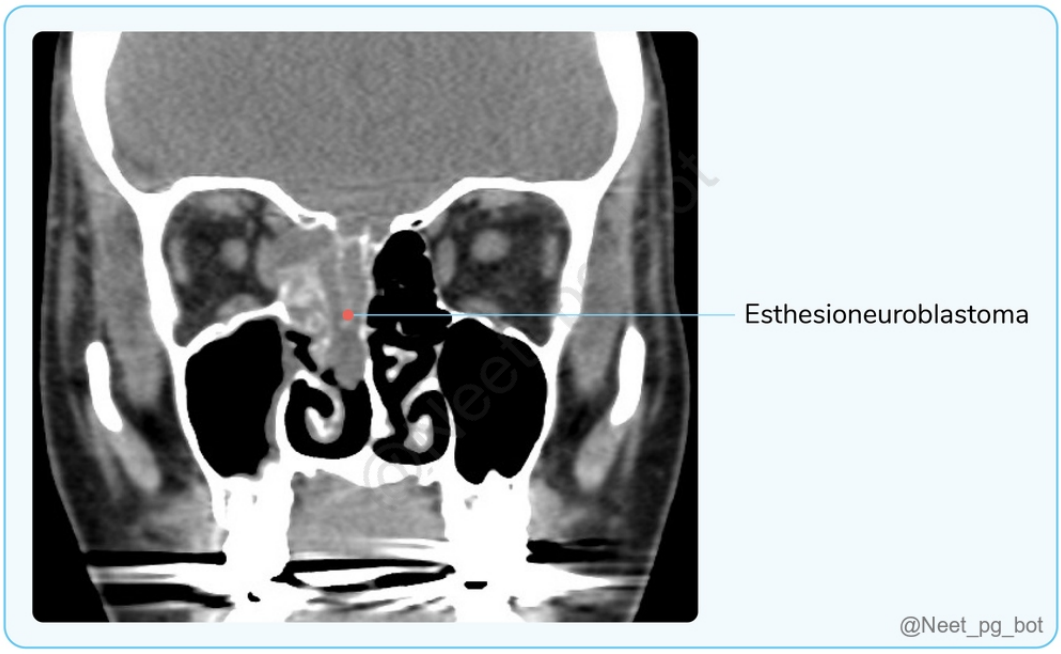
Correct Answer: B. Inverted papilloma

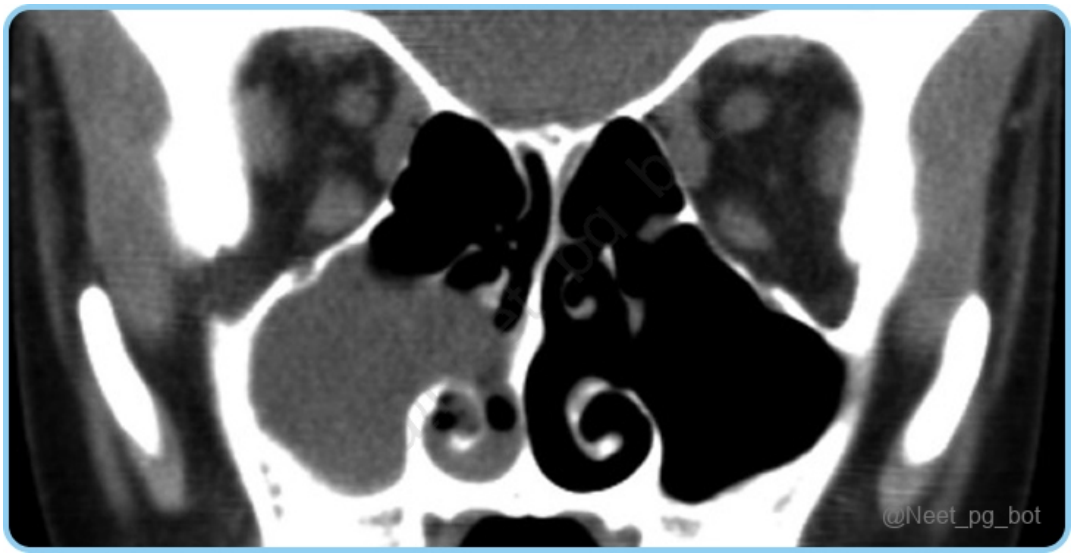
- *Listen (English)*
- *Listen (Hindi)*

Explanation: An elderly male with unilateral obstruction with epistaxis and MRI showing cerebriform appearance arising from lateral wall of nose is suggestive of Inverted papilloma. Inverted papilloma: (aka) [Transitional cell papilloma (or) Ringertz tumor] Description Tumor of non-olfactory mucosa of nose and paranasal sinus. Radiology Radiological IOC: MRI > CT - shows cerebriform appearance (Option B) Other options: Juvenile nasopharyngeal angiofibroma (Option A) IOC: Contrast enhanced CT scan (CECT) shows Holman miller sign (also known as) Antral sign - anterior bowing of posterior wall of maxillary sinus. Esthesio- neuroblastoma (Option C) IOC: MRI >> CT, ‘Figure of 8’ appearance with waist over cribriform plate is seen in MRI. Antrochoanal polyp (Option D) IOC: CECT - shows mass arising from maxillary sinus extending into the nasal cavity with widening of osteomeatal complex.


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References:

David Sutton textbook of Radiology & Imaging 8th edition Vol-2 pages - 1245,1246,1526,1527,1535,1536,2559,2560. Diseases of ENT and Head & Neck surgery by PL Dhingra pages- 200,236,289-294,430

↑ *Back to this question in Part A*

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Q12: Which view will best assess the maxillary sinus for potential fractures? (Q853168)

A. Waters' view

B. Caldwell's view

C. Lateral view

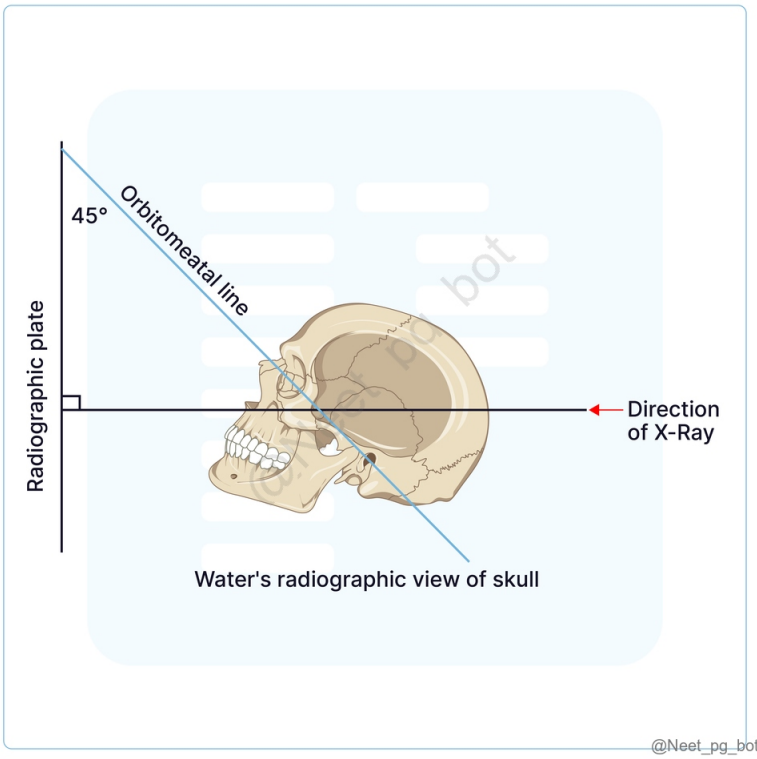
D. Submentovertex view

Correct Answer: A. Waters' view

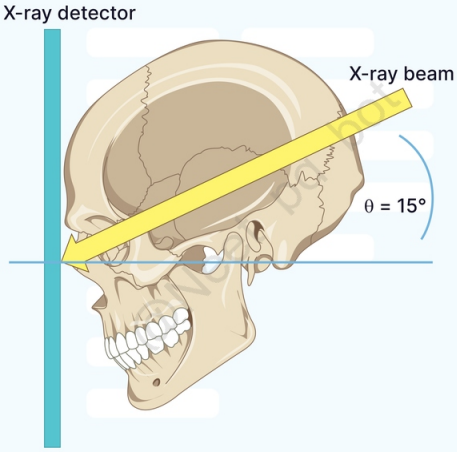
■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: Waters' view is commonly used to assess the maxillary sinuses and the structures of the mid-face, often involved in facial trauma like Le Fort fractures. PNS and Orbit X-Ray views: Views Position X-ray & structure/disease used Waters' View (Option A) Maxillary sinus Partially frontal sinus Caldwell's View (Option B) Frontal sinus (mainly) Ethmoid sinus Lateral View (Option C) All sinuses visible Mastoid antrum/air cells Submentovertex View (Option D) Sphenoid sinus (from the base of skull) Towne's View (AP Axial) Occipital bone fractures Posterior cranial fossa pathologies

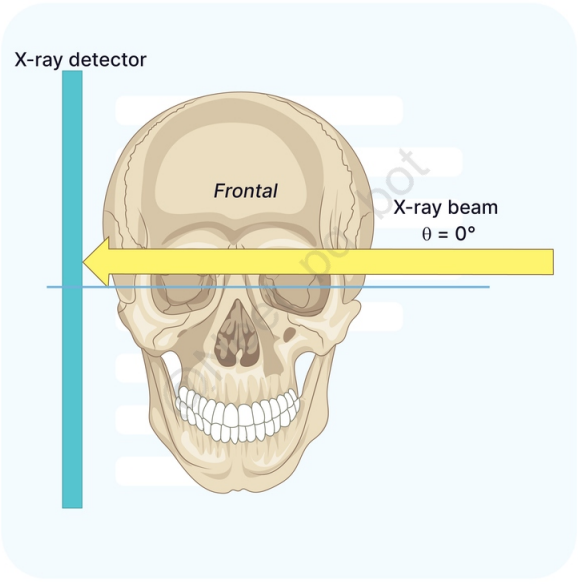






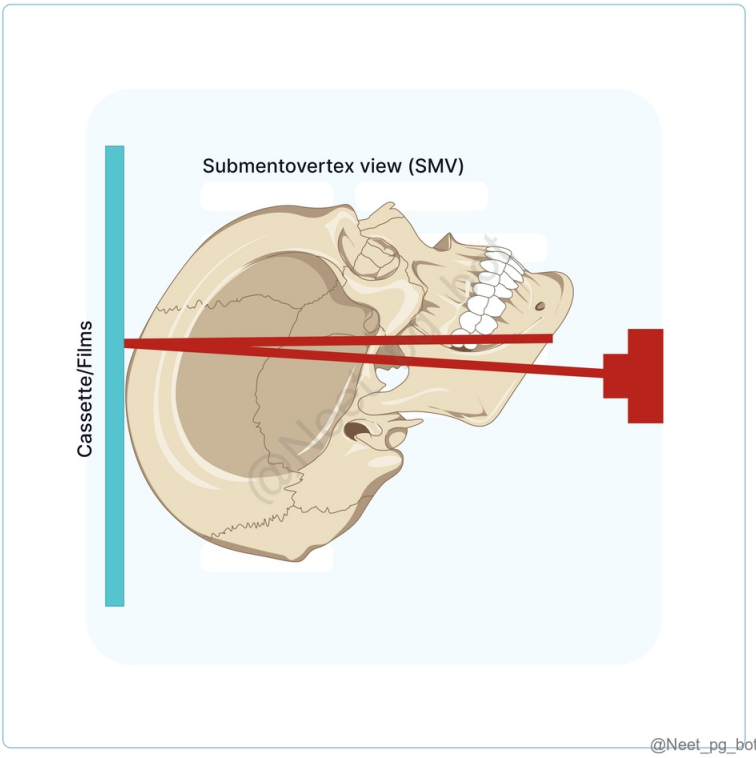
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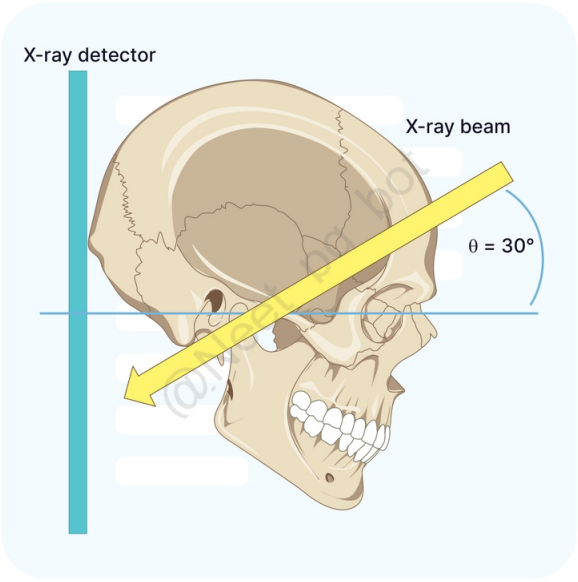


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Submentovertex view (SMV)
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References:

Mettler Essentials of Radiology edition 4, page 29. Towne view

↑ *Back to this question in Part A*

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Q13: Following a fall, a 20 year old male patient developed bleeding from the nose associated with pain and swelling. X-ray done is shown below. What is the most likely injury? (Q853179)

A. Cribriform plate fracture

B. Chevallet fracture

C. Jarjaway fracture

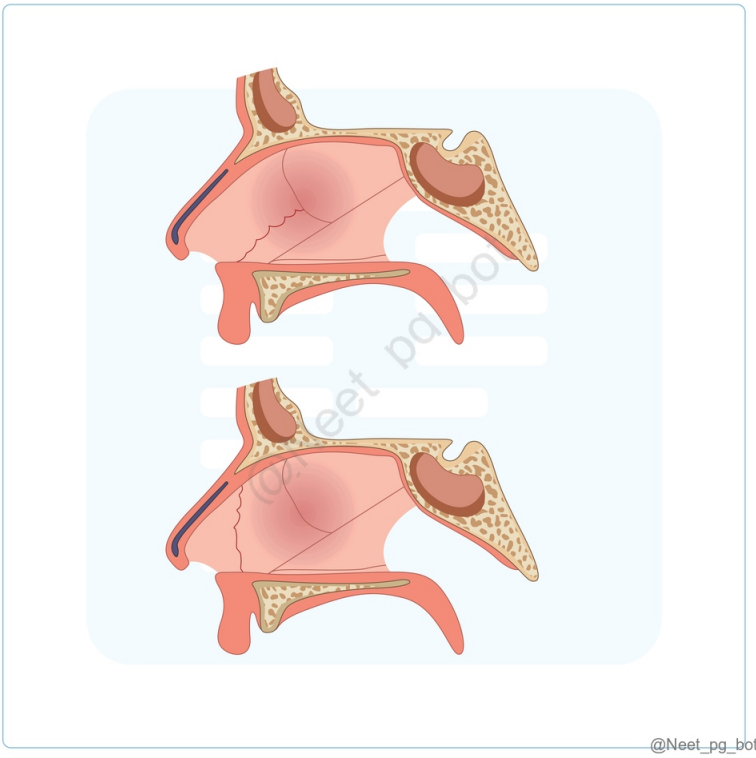
D. Deviated nasal septum



Correct Answer: B. Chevallet fracture

Explanation: Fracture line as seen on the x-ray is a vertical line over the nasal septum - suggestive of Chevallet fracture. Nasal septal fracture: Types Chevallet fracture: Vertical fracture line from anterior nasal spine (upwards) to bony-cartilaginous junction of septum. Trauma mechanism: blows from below Jarjaway fracture: Horizontal fracture line extending from just above the anterior nasal spine (anteriorly) to septal cartilage of vomer (posteriorly) Trauma mechanism: blows from front Treatment Closed/open reduction with nasal packing Complications Septal hematoma: I & D should be done as early as possible Deviated nasal septum Cribriform plate fracture (Option A): Presents with CSF Rhinorrhea , the fracture line is more superior to the nasal pyramid. Filter paper test (or) Beta-2-transferrin assay is used to confirm CSF and HRCT is the radiological IOC . Deviated nasal septum (Option D): Usually presentation is unilateral obstruction associated with anosmia, rarely bilateral DNS can present with dyspnoea. X-ray done shows deviation of the midline. X-ray AP/basal view is required to demonstrate DNS (not lateral view).





References:

Diseases of ENT and Head & Neck surgery by PL Dhingra pages- 170-172

↑ *Back to this question in Part A*

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Q14: A 20-year old male, following a fist fight where he got hit over his front face presented with pain and swelling over his nose. A leak from the nasal cavity was noted, watery in consistency. What is the initial investigation of choice to localize the site of leak? (Q853178)

A. X-ray PNS

B. Beta-2 transferrin assay

C. HRCT

D. CT Angiography

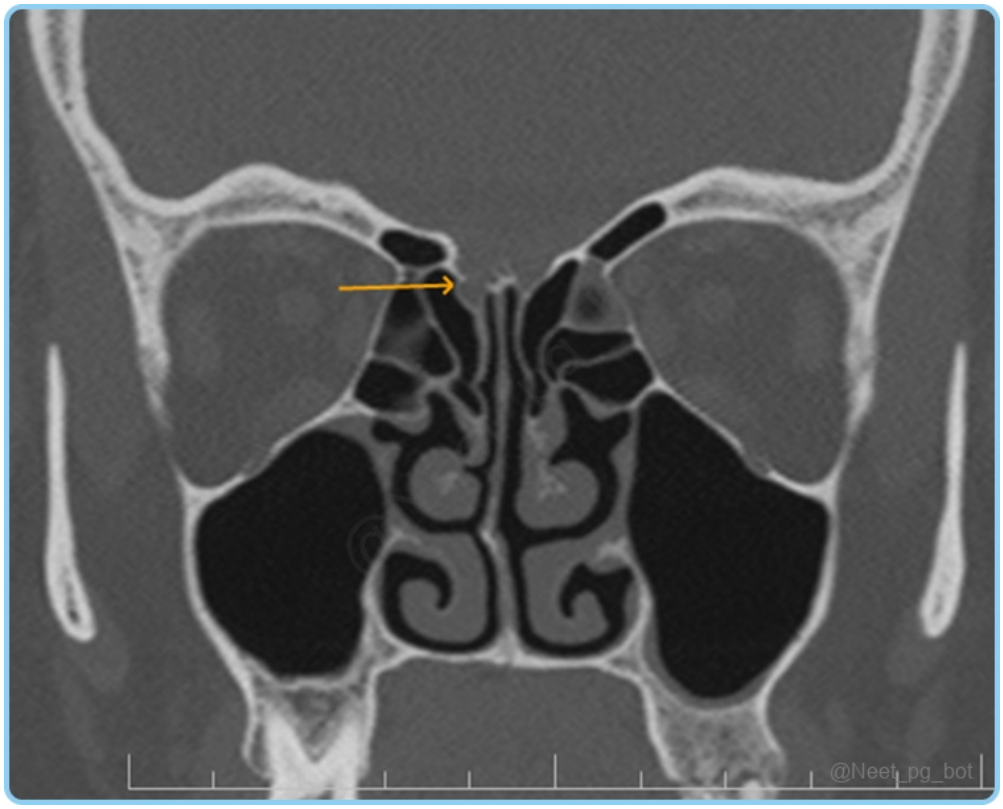
Correct Answer: C. HRCT

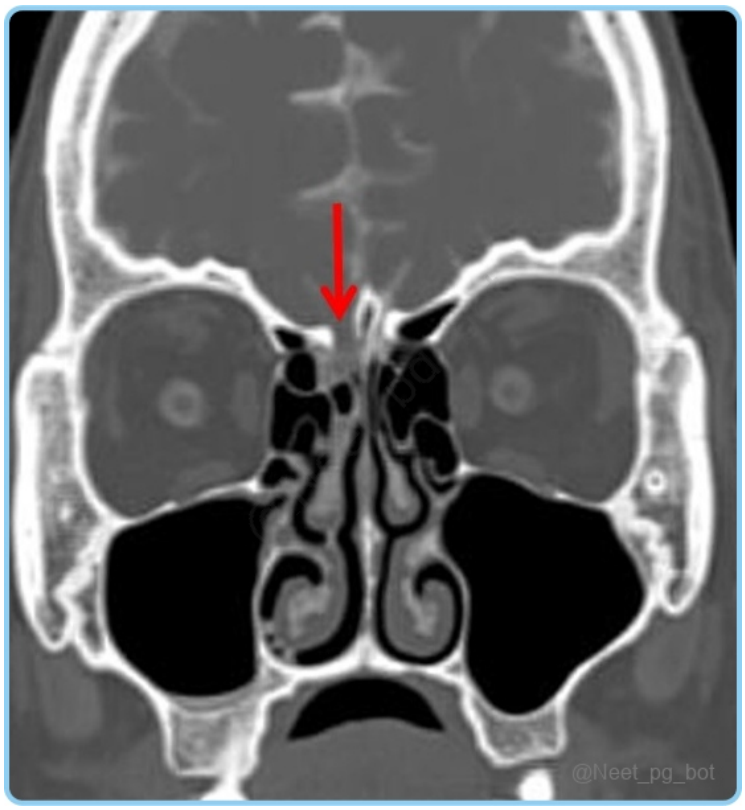
■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: This is a case of nasal bone fracture (history of trauma to front) with CSF rhinorrhea (leak-watery in consistency). Beta-2-transferrin assay (Option B): IOC for CSF Rhinorrhea HRCT (Option C): Radiological IOC for localization of leak CT Cisternography (can be combined with MR Cisternography) can be done when HRCT is inconclusive. CSF Rhinorrhea: Filter paper test: Double halo sign/ Target sign Beta-2-transferrin assay: Confirms presence of CSF Glucose estimation: around 60 mg/dL - suggests presence of CSF Other laboratory tests: Beta-trace proteins, Intrathecal fluorescein test HRCT: CT Cisternography: Nasal Bone fracture: X-ray lateral view: X-ray PNS (Option A): Though done commonly, is not an useful investigation for localizing the site of leak. CT Angiography (Option D): Arteries are nowhere related to CSF Rhinorrhea and hence not used. Learning objective: Kero's classification: Radiological classification used to determine the height of Olfactory fossa based on the height of lateral lamella of cribriform plate (evaluated in CT). Three categories: Type-I 1-3 mm depth Type-II 4-7 mm depth (most common type) Type-III ≥ 8 mm depth (↑ risk of CSF rhinorrhea)


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References:

https://radiopaedia.org/articles/csf-rhinorrhoea David Sutton textbook of Radiology & Imaging Vol-2 8th edition pages - 1715-1717. https://pmc.ncbi.nlm.nih.gov/articles/PMC8935634/

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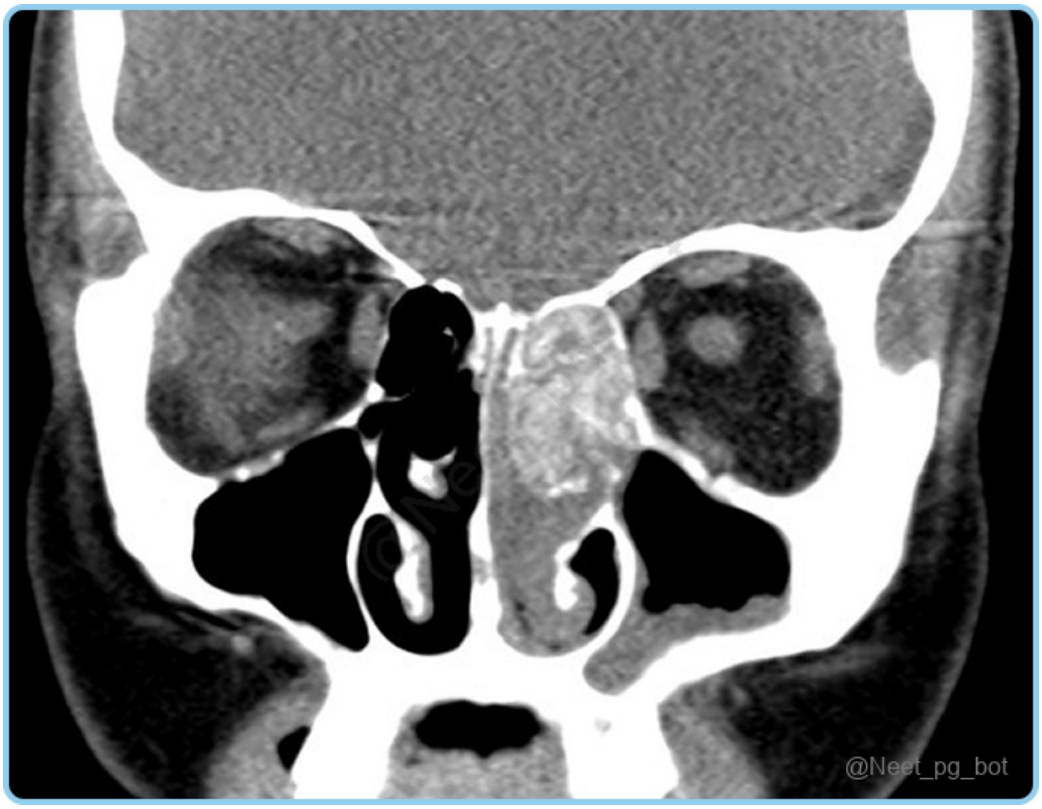
Q15: The imaging below shows a double density sign in the paranasal sinuses. What is the most likely diagnosis? (Q853175)

A. Acute Bacterial sinusitis

B. Carcinoma- Maxillary sinus

C. Chronic Bacterial sinusitis

D. Allergic fungal sinusitis

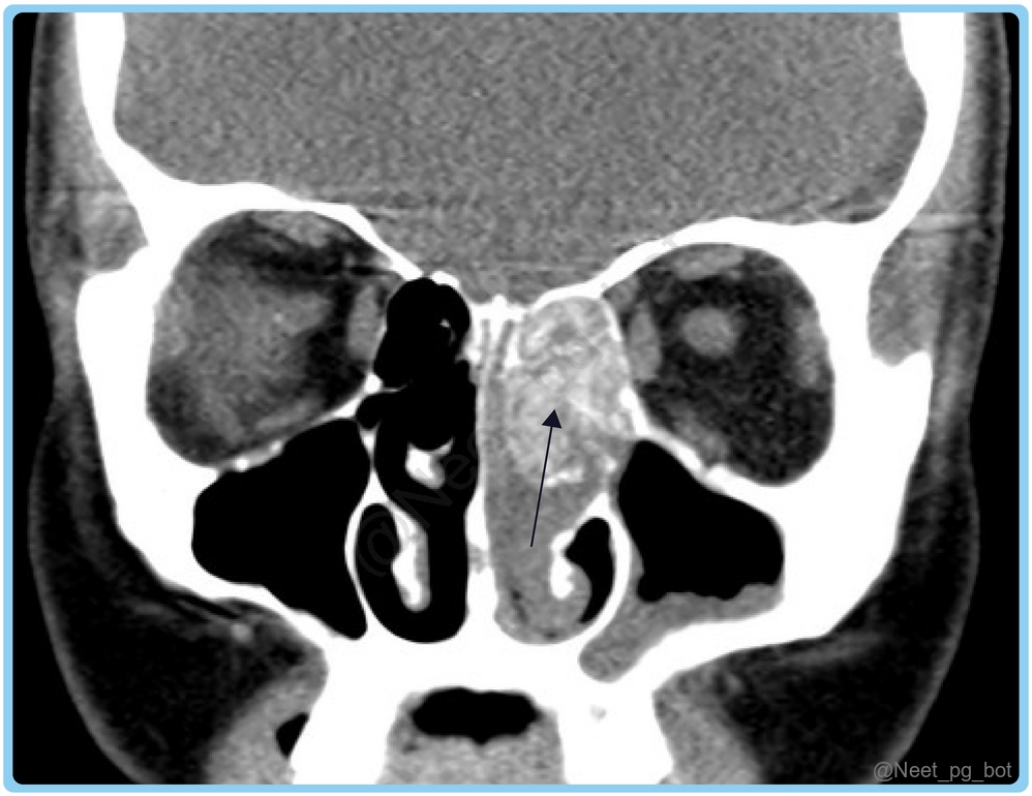


Correct Answer: D. Allergic fungal sinusitis

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: The double density sign on CT imaging of the paranasal sinuses is characteristic of allergic fungal sinusitis, indicating the presence of centrally hyperdense fungal material within the sinuses. Allergic fungal sinusitis: Etiopathogenesis Allergic reaction to fungal organism (usually Aspergillus) Clinical presentation Age: 20-40 year females B/L nasal polyposis : causing nasal obstruction Characteristic peanut butter discharge: due to thick eosinophilic mucus Bent & Kuhn criteria (used for Diagnosis) Major criteria Minor criteria Type-I Hypersensitivity Nasal polyposis Characteristic CT findings Eosinophilic mucin Positive fungal stain Asthma Unilateral disease Bone erosion (X-ray) Serum eosinophilia Positive fungal culture Charcot-leyden crystals Radiology CT: Double density sign



References:

Diseases of ENT and Head & Neck surgery by PL Dhingra page- 229.
https://pmc.ncbi.nlm.nih.gov/articles/PMC7817427/

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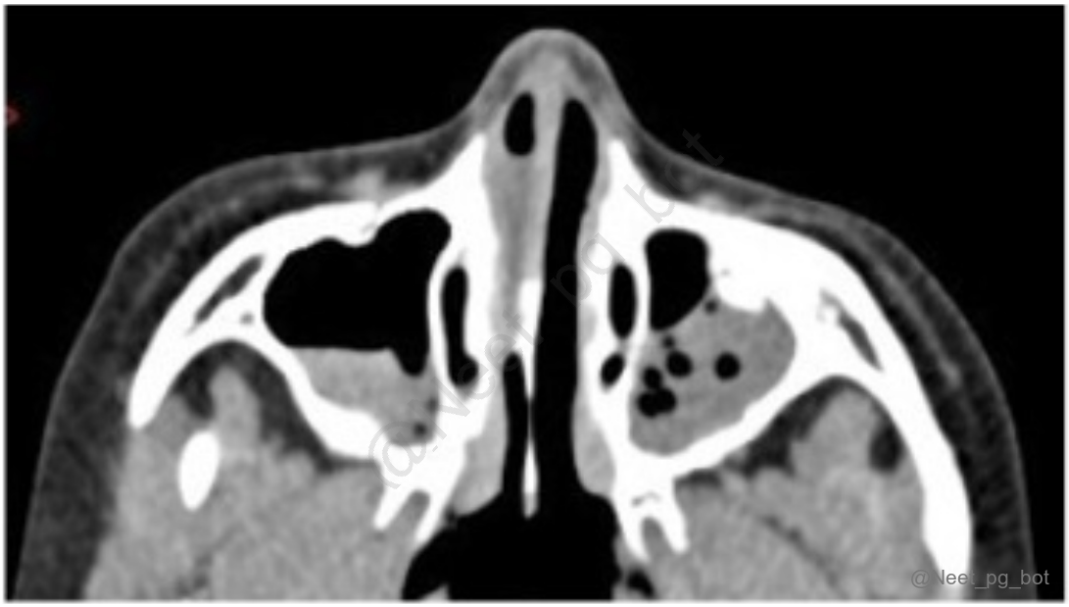
Q16: A 28-year-old male presents with persistent nasal congestion, facial pain exacerbated by bending forward, thick yellow nasal discharge, and reduced olfaction for two weeks. CT imaging reveals abnormalities in the paranasal sinuses. What is the most likely diagnosis? (Q853174)

A. Viral rhinitis

B. Allergic rhinitis

C. Sinusitis

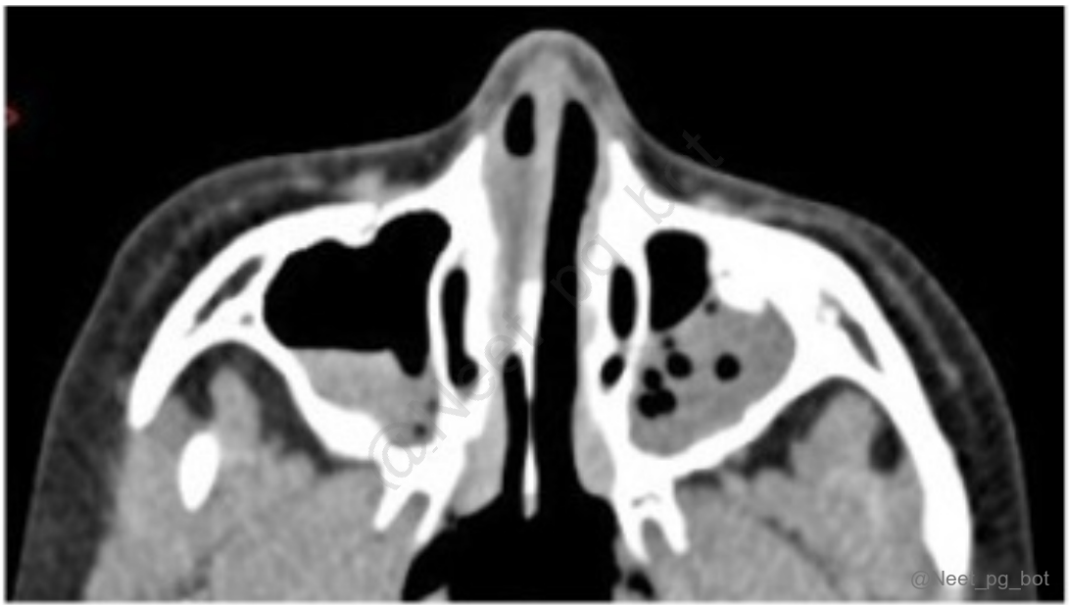
D. Nasal polyps



Correct Answer: C. Sinusitis

- *Listen (English)*
- *Listen (Hindi)*

Explanation: The patient’s symptoms of nasal congestion, facial pain localized to the cheeks, thick yellowish nasal discharge, and the findings on CT imaging showing sinus mucosal thickening and frothy fluid appearnace indicate maxillary sinusitis. Sinusitis: Inflammation of the mucosal lining of the paranasal sinuses, often associated with infection/allergy. Acute Sinusitis Symptoms lasting less than 4 weeks CT: Frothy appearance due to presence of bubbles in fluid Treatment Most cases resolve spontaneously; symptomatic relief with nasal decongestants, saline nasal sprays, and analgesics. Antibiotics if bacterial infection is suspected (typically after 7-10 days of symptoms). Subacute sinusitis Symptoms lasting 4 to 12 weeks. Chronic sinusitis Symptoms lasting longer than 12 weeks. CT: Bony sclerosis is seen and no air. Treatment Intranasal corticosteroids to reduce inflammation. Saline irrigation. Antibiotics for bacterial exacerbations. Surgery (e.g., functional endoscopic sinus surgery) in refractory cases to improve drainage. Viral rhinitis (Option A) presents with clear nasal discharge and lacks significant mucosal thickening or air-fluid levels on imaging. Allergic rhinitis (Option B) is characterized by clear rhinorrhea, nasal itching, and sneezing, without purulent discharge or air-fluid levels. Nasal polyps (Option D) may cause nasal obstruction but are not typically associated with acute purulent discharge or air-fluid levels on imaging.





References:

www.ncbi.nlm.nih.gov/books/NBK470383/

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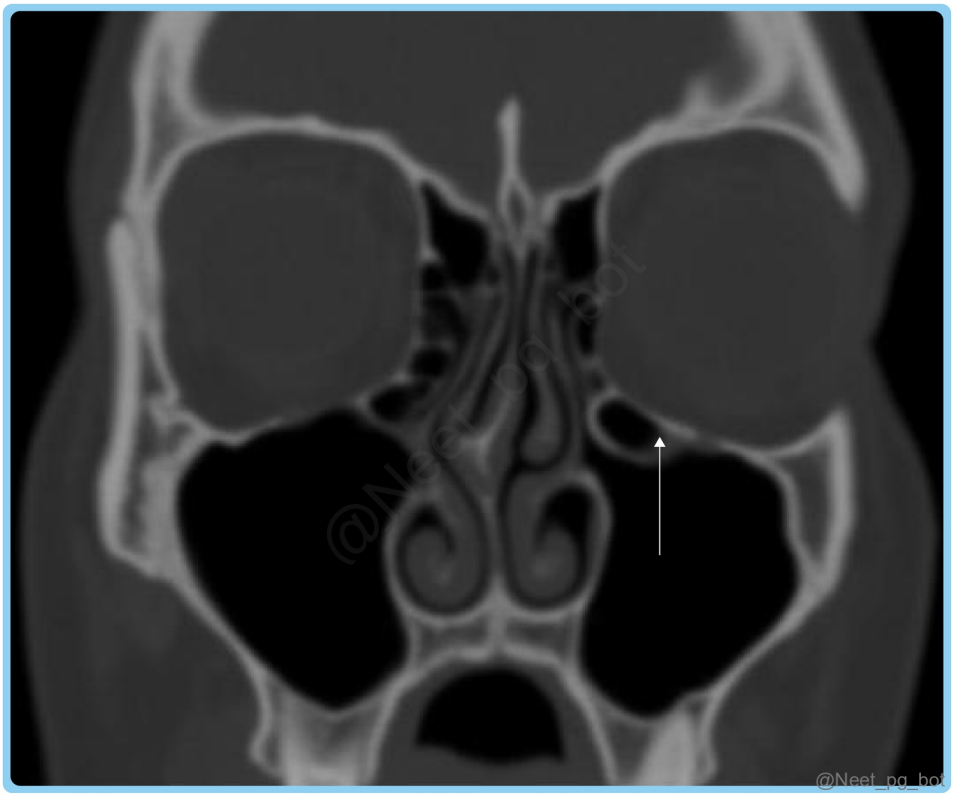
Q17: Following CT image is kept as a spotter in your final year exam viva. What is the marked structure? (Q853172)

A. Concha bullosa

B. Agger nasi cell

C. Pneumatized superior turbinate

D. Haller cell

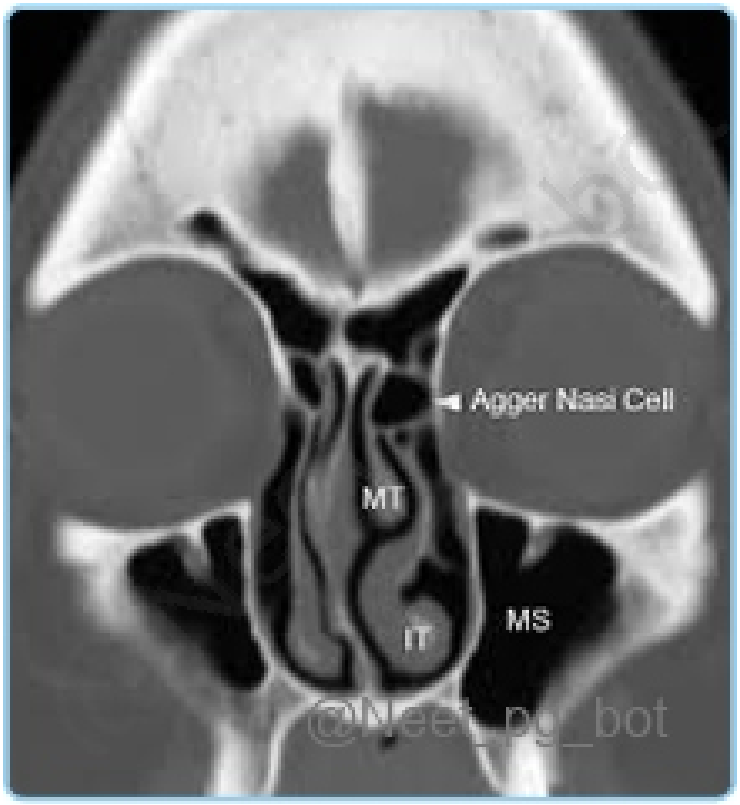


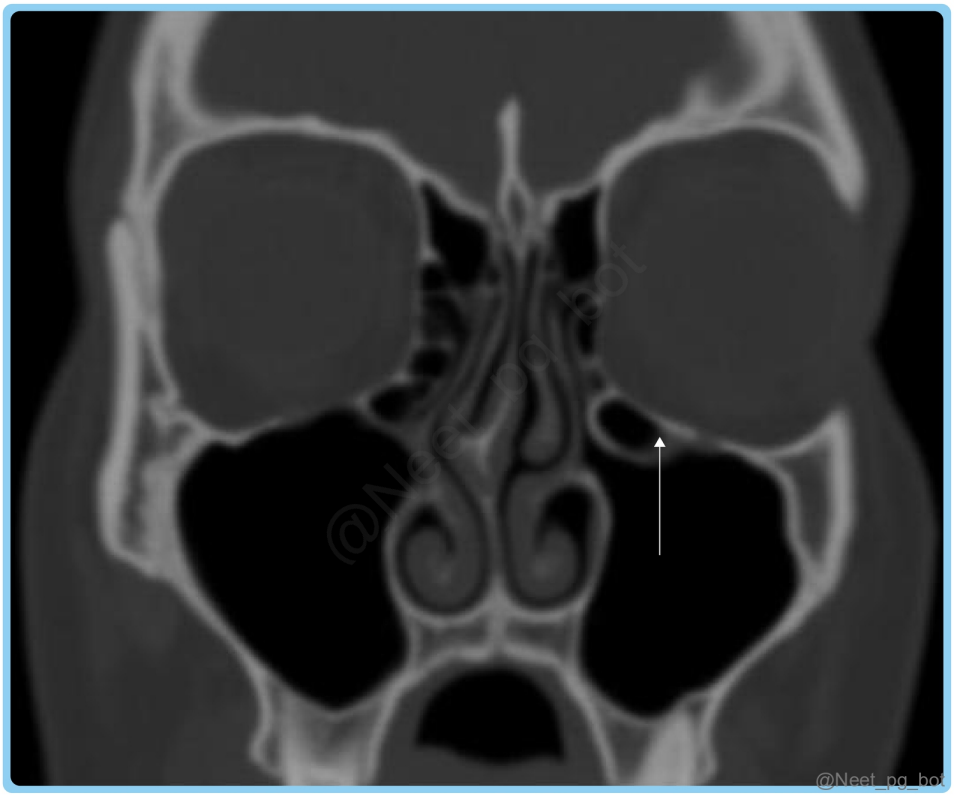
Correct Answer: D. Haller cell

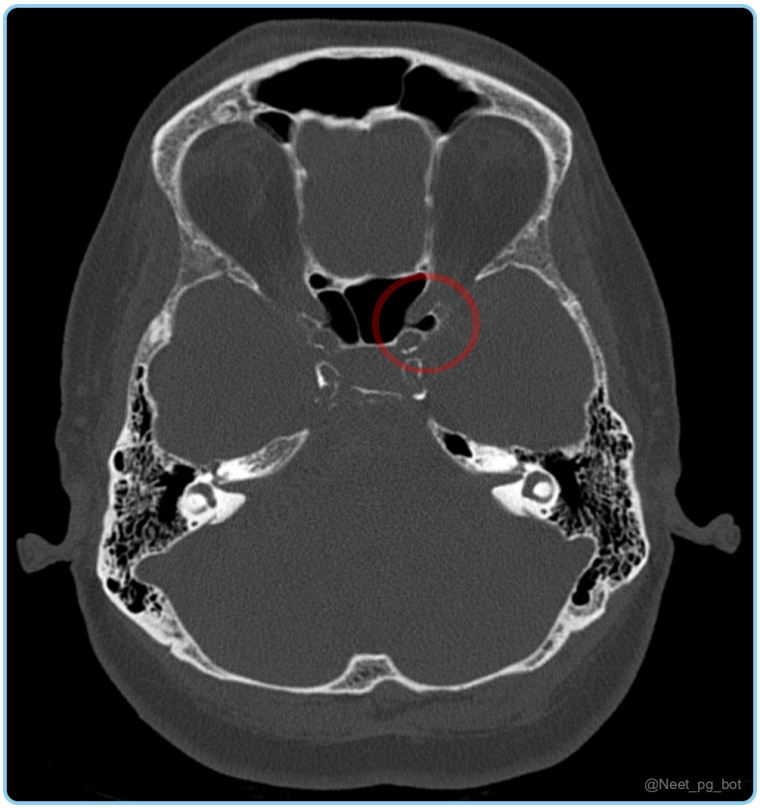
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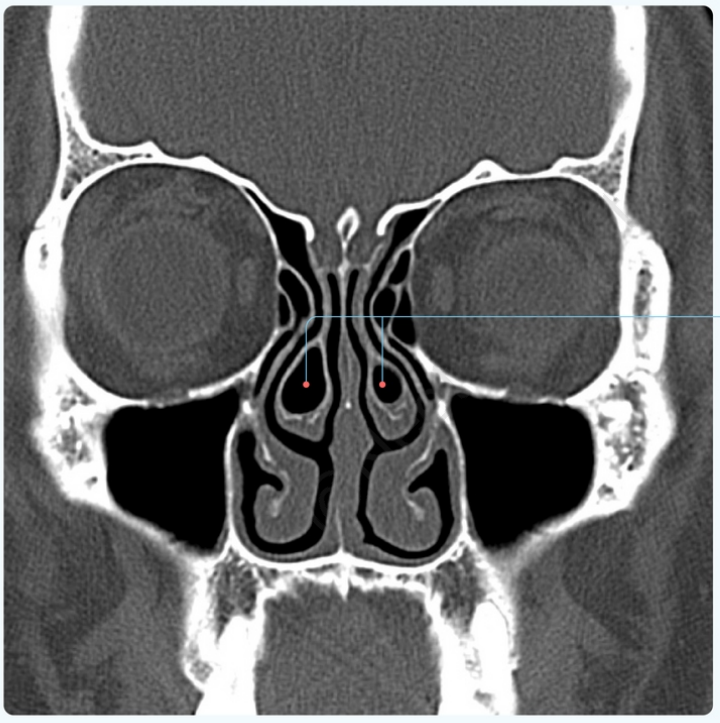
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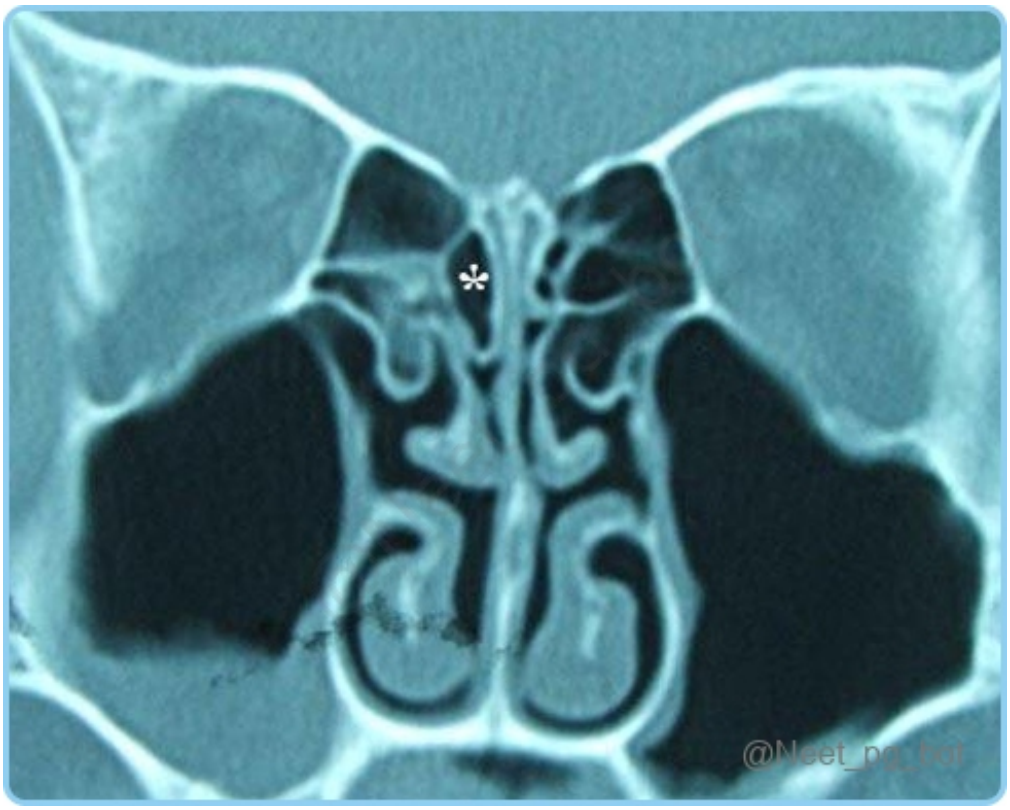
Explanation: Marked cell located between floor of orbit and superior boundary of maxillary sinus is known as Haller cell - an example of anterior ethmoidal air cell . Ethmoidal air cells: Anterior Air cells: Agger Nasi Anterior most air cell of Ethmoid sinus Site: Within the Lacrimal bone in the medial side of the Orbit Relation: Anterolateral and inferior to the frontal recess Haller cell Infraorbital ethmoid air cell Site: Present between floor of orbit and upper boundary of maxillary sinus Bulla ethmoidalis Most consistent and largest ethmoid air cell Located just posterior to the Agger nasi Posterior Air cells: Onodi cell Also known as spheno-ethmoidal air cell Close proximity to Optic nerve and Internal carotid artery Better appreciable on CT- axial view Concha bullosa (Option A): Pneumatization of middle turbinate Most common deformity seen in nose, non-pathological CT: Pneumatized superior turbinate (Option C): Occasionally the superior turbinate can undergo pneumatization CT:


Agger Nasi Cell
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Concha bullosa
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References:

David Sutton textbook of Radiology & Imaging Vol-2 8th edition pages - 1474-1476, 1715-1717.

↑ *Back to this question in Part A*

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Q18: Which of the following arteries does NOT supply the ethmoidal air cells? (Q853171)

A. Supraorbital artery

B. Posterior ethmoidal artery

C. Temporal artery

D. Sphenopalatine artery

Correct Answer: C. Temporal artery

Explanation: The temporal artery primarily supplies the lateral aspect of the head and does not supply the ethmoidal air cells. Air cells in CT PNS The ethmoidal air cells are an important component of the paranasal sinus

system, located within the ethmoid bone. Situated between the nasal cavity and the orbits. The ethmoid bone is a complex structure located at the roof of the nasal cavity and between the eyes. Types of Ethmoidal Air Cells: Anterior Ethmoidal Air Cells: Located superior to the maxillary sinus. Drain into the middle meatus of the nasal cavity via the frontonasal duct. Middle Ethmoidal Air Cells: Larger cells that also drain into the middle meatus. Often included in the ethmoidal bulla structure. Posterior Ethmoidal Air Cells: Located posteriorly, behind the middle cells. Drain into the superior meatus of the nasal cavity. Blood supply: From the ophthalmic branch of the internal carotid artery , the supraorbital , anterior and posterior ethmoidal arteries supply the ethmoid air cells with the sphenopalatine artery (a branch of the maxillary artery) also contributing. Innervation : A nterior and posterior ethmoidal and supraorbital nerves. Frontal recess cells: Anterior ethmoid air cells pneumatize the frontal recess . Their clinical relevance lies in their potential to obstruct the frontal recess outflow. Agger nasi cells: Most anterior ethmoidal air cells lying anterolateral and inferior to the frontal recess. Ethmoid bulla : Also known as bulla ethmoidalis, is the largest and most consistent air cell of the anterior ethmoidal air cells . It is a component of the ostiomeatal complex . Haller cells also known as infraorbital ethmoidal air cells and Onodi air cells also known as Sphenoethmoidal air cells are important due to their close proximity to optic nerve and internal carotid artery. Supraorbital artery (Option A): Supplies the frontal sinus and contributes to the supply of the ethmoidal air cells through its branches. Posterior ethmoidal artery (Option B): Supplies the posterior ethmoidal air cells directly. Sphenopalatine artery (Option D): Although it supplies the nasal cavity and contributes to the vascularization of the maxillary sinus, it does not directly supply the ethmoidal air cells.

References:

Air cells in CT PNS

↑ *Back to this question in Part A*

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Q19: Which of the following sinuses does NOT drain through the osteomeatal unit? (Q853169)

A. Maxillary sinus

B. Frontal sinus

C. Anterior ethmoid sinus

D. Posterior ethmoidal sinus

Correct Answer: D. Posterior ethmoidal sinus

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: The posterior ethmoidal sinus drains into the superior meatus , not through the osteomeatal unit. Osteomeatal Unit (OMU): Key structure in the middle meatus of the nasal cavity, serving as the drainage pathway for the frontal, anterior ethmoid, and maxillary sinuses. It is a crucial region because blockages here often lead to chronic or recurrent sinusitis. Components of the Osteomeatal Unit: Uncinate Process: A thin, curved bone that is

part of the lateral nasal wall which serves as a boundary for the drainage pathways of the sinuses. Semilunar Hiatus: A crescent-shaped groove located beneath the middle nasal turbinate.It is the primary drainage pathway for the frontal, maxillary, and anterior ethmoidal sinuses. Ethmoidal Bulla: A prominent ethmoid air cell located just above the semilunar hiatus.It is the largest of the anterior ethmoid air cells and plays a role in sinus drainage. Infundibulum : A funnel-shaped passage that connects the maxillary sinus to the semilunar hiatus.

References:

radiopaedia.org/articles/paranasal-sinuses

radiopaedia.org/articles/ostiomeatal-complex

↑ *Back to this question in Part A*

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• [08_Head _ Neck Imaging] 018 Previous Year Questions

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[08_Head _ Neck Imaging] 018 Previous Year Questions — Quick Jump

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Q13 (p. 1308)	*Q14 (p. 1309)*	*Q15 (p. 1317)*	*Q16 (p. 1319)*	*Q17 (p. 1320)*	*Q18 (p. 1323)*
Q19 (p. 1326)	*Q20 (p. 1328)*	*Q21 (p. 1329)*	*Q22 (p. 1330)*		

Q1: Identify the structure marked in the image given below. (Q858136)

A. External capsule

B. Internal Capsule

C. Caudate nucleu

D. Putamen



Correct Answer: B. Internal Capsule

Explanation: Internal Capsule: The internal capsule is a white matter structure in the brain that separates the caudate nucleus (medially) from the putamen and globus pallidus (laterally) . It contains major ascending and descending tracts, including corticospinal and corticobulbar tracts , which are responsible for motor and sensory functions. In the given image, the structure appears as a dense white matter band in the coronal plane, consistent with the location of the internal capsule. External capsule (option A): Incorrect because the external capsule is a thin white matter layer located lateral to the putamen, separating it from the claustrum. It is not the structure shown in this image. Caudate nucleus (option C): Incorrect because the caudate nucleus is located medial to the internal capsule , near the lateral ventricles. It appears as a grey matter structure and is not consistent with the marked region. Putamen (option D): Incorrect because the putamen is located lateral to the internal capsule and is part of the basal ganglia. It appears as a grey matter structure and does not match the highlighted structure.

References:

Fred A. Mettler Essentials of Radiology, 4th Edition, Page: 21,22

https://www.ncbi.nlm.nih.gov/books/NBK470242/

↑ *Back to this question in Part A*

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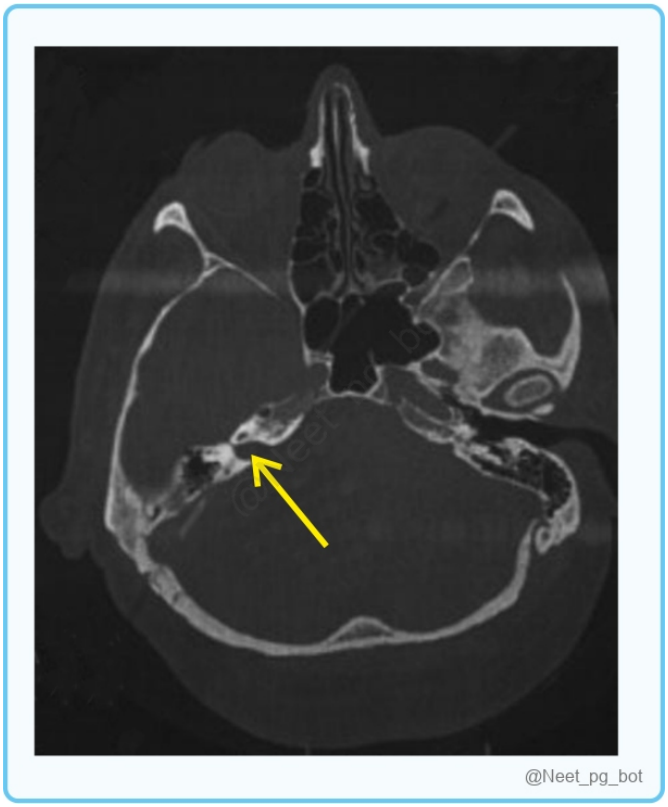
Q2: Identify the marked structure in the below image. (Q878947)

A. External auditory meatus

B. Internal auditory meatus

C. Carotid canal

D. Vestibular aqueduct



Correct Answer: B. Internal auditory meatus

Explanation: The arrow points to a canal in the petrous part of the temporal bone transmitting the facial (VII) and vestibulocochlear (VIII) nerves- the internal auditory meatus . Incorrect Optons: External auditory meatus (Option A): Opens externally; does not lie within the petrous temporal bone. Carotid canal (Option C): Located anteromedially and transmits the internal carotid artery , not cranial nerves. Vestibular aqueduct (Option D): Much smaller and positioned posterior to the internal auditory meatus.

References:

Internal auditory meatus-1

Internal auditory meatus-2

↑ *Back to this question in Part A*

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Q3: What is the probable diagnosis for a 50-year-old female patient who shows a progressive decline in visual clarity in her eye? A post-contrast CT scan of her head indicates the presence of thickening in a specific structure, in the image. (Q859291)

A. Optic nerve sheath meningioma

B. Optic nerve glioma

C. Retinoblastoma

D. Rhabdomyosarcoma



Correct Answer: A. Optic nerve sheath meningioma

Explanation: The image given shows thickening around the optic nerve making the most likely diagnosis an Optic Nerve Sheath Meningioma. Optic nerve sheath meningioma (ONSM) is a rare, benign tumor that originates from the meninges, the protective layers surrounding the optic nerve. It typically involves the optic nerve sheath and can lead to vision loss due to compression of the optic nerve. Radiological Findings: MRI : The most common imaging modality for diagnosing ONSM. Key findings include: Isointense or mildly hyperintense lesion on T1-weighted images. Hyperintense lesion on T2-weighted images. Contrast enhancement : The tumor usually enhances after gadolinium administration, especially in the meningothelial regions. Enlargement of the optic nerve : The optic nerve may appear thickened and "sharply delineated," with the tumor surrounding it. CT : Less sensitive than MRI, but may show bone changes (hyperostosis of the optic canal) and optic nerve enlargement . 'Tram-track' appearance caused by thickening and enhancement around the optic nerve. Optic nerve glioma (Option B): is incorrect because this tumor is more common in children and is associated with neurofibromatosis type 1 (NF1) . It presents with fusiform optic nerve enlargement , not optic sheath thickening. Retinoblastoma (Option C): is incorrect because it occurs in children , typically under 5 years old, and presents with leukocoria (white pupillary reflex) rather than progressive vision loss. Rhabdomyosarcoma (Option D): is incorrect because it is a highly malignant soft tissue tumor seen in children , presenting with rapid-onset proptosis and orbital swelling , unlike the slow progression seen in ONSM.

References:

Grainger and Allison's Diagnostic Radiology, 7th Edition, Page no: 987

↑ *Back to this question in Part A*

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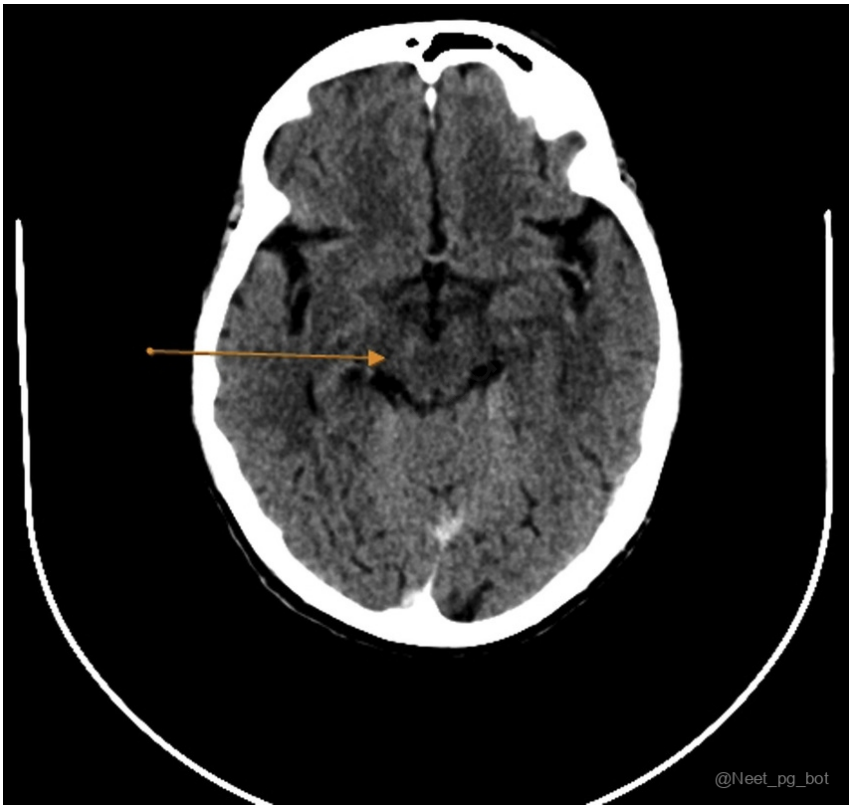
Q4: Identify the labelled structure in the image? (Q859269)

A. Midbrain

B. Pons

C. Medulla

D. Cerebellum



Correct Answer: A. Midbrain

Explanation: The midbrain is a region of the brain located between the pons and the diencephalon. In a CT scan image, the midbrain appears as a centrally located structure, typically exhibiting a more dense and compact appearance compared to the surrounding brain tissue. And in the above CT axial image of brain at the level of midbrain (arrow), there is a hypodensity consistent with acute brainstem infarction. Pons (Option B): The pons is a part of the brainstem located above the medulla and below the midbrain. In a CT scan image, the pons appears as a rounded structure situated anterior to the cerebellum. It has a slightly lighter density compared to the adjacent

brain tissue, and its size and shape can vary among individuals. The pons serves as a communication pathway, relaying signals between the cerebrum, cerebellum, and other parts of the central nervous system. Medulla (Option C): The medulla, also known as the medulla oblongata, is tmhe lowermost part of the brainstem. In a CT scan image, the medulla appears as a tapered structure at the base of the brain, just below the pons. It has a similar density to the adjacent brain tissue. The medulla plays a crucial role in controlling vital functions such as breathing, heart rate, blood pressure, and reflexes. Cerebellum (Option D): The cerebellum is a region located at the back of the brain, below the occipital lobes of the cerebrum. In a CT scan image, the cerebellum appears as a distinct structure with a granular appearance. It is characterized by its distinctive lobes and folia (ridged surface). The density of the cerebellum is similar to that of other brain tissues. The cerebellum is involved in coordinating voluntary movements, balance, posture, and motor learning.

References:

Grainger and Allison's Diagnostic Radiology, 7th Edition, Page no: 765

↑ *Back to this question in Part A*

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Q5: A patient complains of neck stiffness and severe headache. The CT image shown below is suggestive of which of the following conditions? (Q855010)

A. Meningitis

B. Subarachnoid hemorrhage

C. Intraparenchymal hemorrhage

D. Hemorrhagic stroke



Correct Answer: B. Subarachnoid hemorrhage

Explanation: The presence of blood in the cisterns on a CT scan is a hallmark of a subarachnoid hemorrhage (SAH). SAH occurs due to bleeding into the subarachnoid space, often caused by the rupture of an aneurysm or trauma. Subarachnoid Hemorrhage (SAH) Definition Presence of blood in the subarachnoid space, typically from a ruptured cerebral aneurysm or trauma. Clinical Features Sudden, severe headache (often described as a "thunderclap headache") Worst headache ever experienced by the patient. Etiology Traumatic: Head injuries causing bleeding in the subarachnoid space. Non-Traumatic: Most commonly due to rupture of a cerebral aneurysm. Initial Imaging Non-Contrast CT (NCCT): First-line imaging for suspected SAH, effective in the acute setting. Radiological Findings (NCCT) Appearance of Blood: Hyperdense (white) compared to surrounding cerebrospinal fluid (CSF). Common Sites for Blood Accumulation: Interhemispheric Fissure Sylvian Fissure Suprasellar Cistern Perimesencephalic Cistern Distinctive Shape: Blood may take on a pentagon or star shape, referred to as the " Star of Death." {{caption_text}} Additional Investigations CT Angiography: Visualizes potential aneurysms or vascular malformations; useful for rupture suspicion. Digital Subtraction Angiography (DSA): Gold standard for diagnosing cerebral aneurysms; provides detailed vascular images and therapeutic options (e.g., endovascular coiling). Incorrect Options: Meningitis (Option A): Presents with headache, neck stiffness, and fever but does not show blood on CT. Meningitis may show leptomeningeal enhancement on MRI or CT with contrast. Intraparenchymal hemorrhage (Option C): Blood would appear within the brain parenchyma, not in the cisterns. Common causes include hypertension or trauma. Hemorrhagic stroke (Option D): While hemorrhagic strokes can include intraparenchymal or subarachnoid hemorrhages, the specific finding of blood in the cisterns points more specifically to subarachnoid hemorrhage.



References:

Grainger & Allison's Diagnostic Radiology, 7th Edition, Page: 1466-1471

Fred A. Mettler Essentials of Radiology, 4th Edition, Page:

https://www.ncbi.nlm.nih.gov/books/NBK470242/

↑ *Back to this question in Part A*

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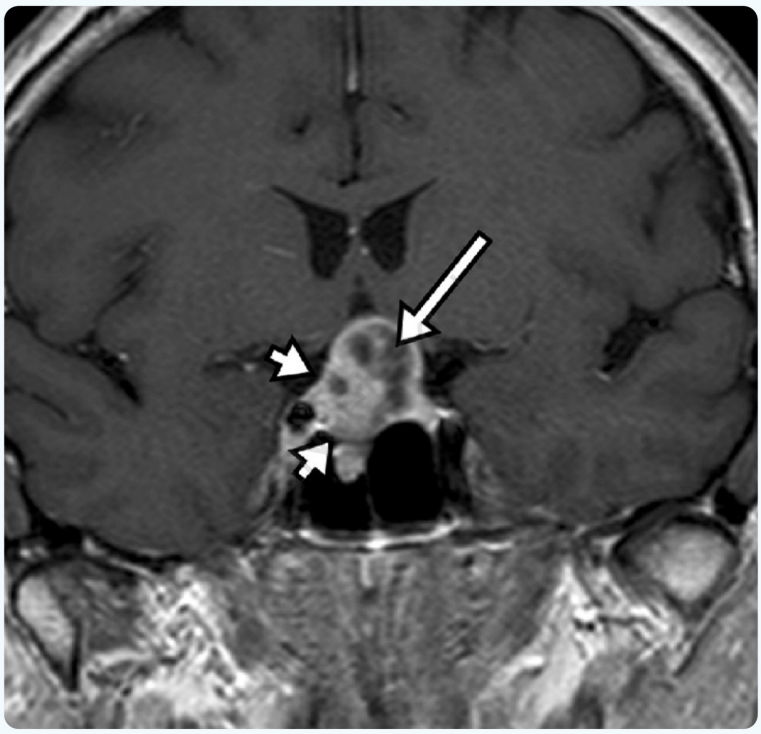
Q6: A cystic lesion in the suprasellar region with calcification is seen on the MRI. What is the most likely diagnosis? (Q855001)

A. Craniopharyngioma

B. Pituitary adenoma

C. Meningioma

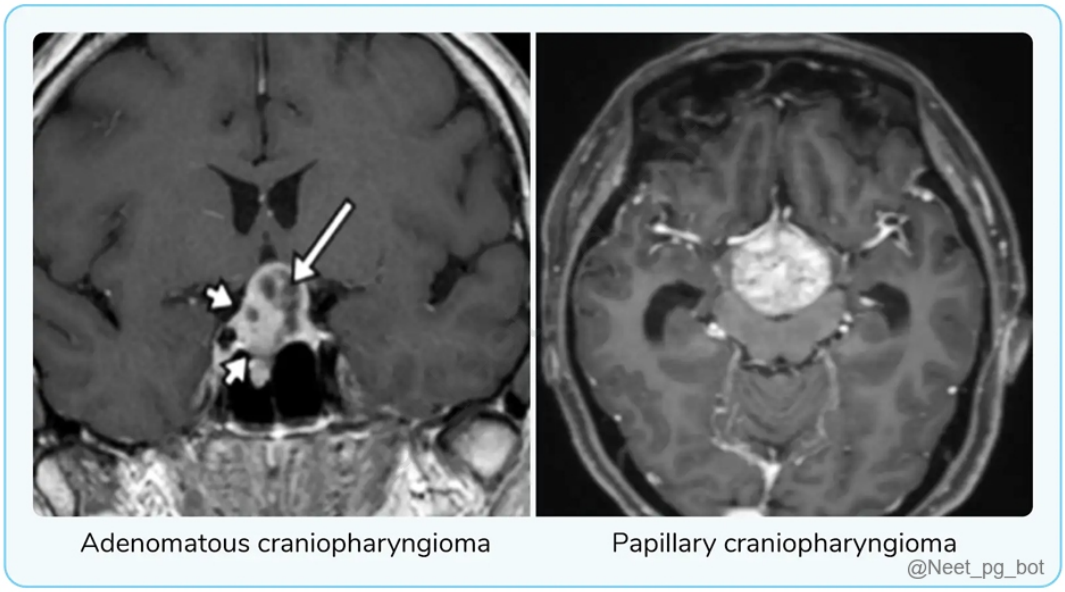
D. Oligodendroglioma



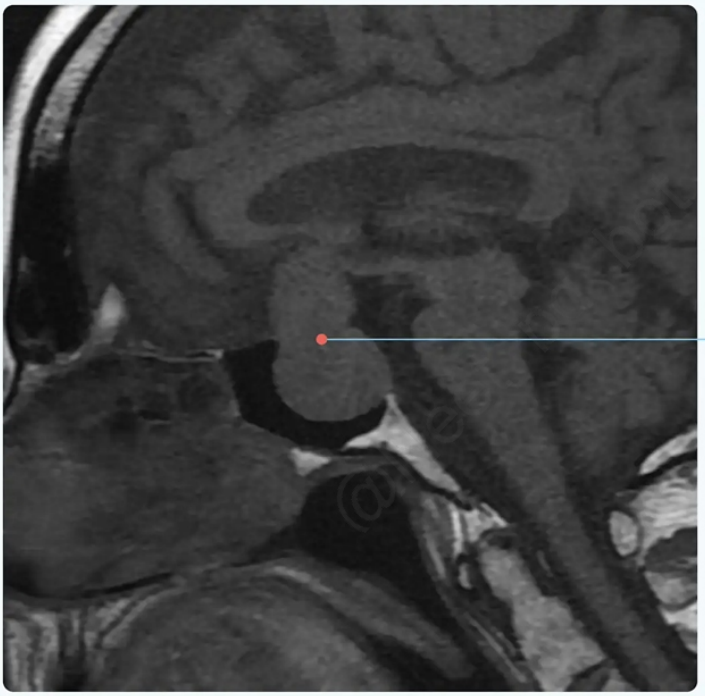
Correct Answer: A. Craniopharyngioma

Explanation: The most likely diagnosis for a cystic lesion in the suprasellar region with calcification seen on MRI is a craniopharyngioma. Craniopharyngiomas are benign tumors that arise from remnants of Rathke's pouch, which is an embryonic structure. They are often located in the suprasellar region, near the pituitary gland. The presence of calcifications is a characteristic feature of craniopharyngiomas and can help differentiate them from other suprasellar lesions. Craniopharyngioma {{caption_text}} Craniopharyngiomas are suprasellar tumors that develop from remnants of the craniopharyngeal duct or Rathke’s pouch . It compress Optic chaism leads to bitemporal hemianopia. Adamantinomatous subtype It is more common Seen in children Typically appear as large, lobulated, multiloculated cystic lesions with a small enhancing solid component and calcifications . Papillary subtype Seen in Adults Primarily solid lesion Rarely exhibit calcifications Pituitary Adenoma (Option B) {{caption_text}} {{caption_text}} Pituitary Microadenomas Less than 10 mm in size. Microadenomas appear isointense to the pituitary on T1-weighted images and slightly hyperintense on T2-weighted images. In dynamic contrast-enhanced MRI , they enhance slowly compared to the surrounding pituitary gland. Pituitary Macroadenomas Larger than 10 mm in size. Most of the macroadenomas are nonfunctioning. They may cause endocrine disturbances or compress the optic chiasm, leading to bitemporal hemianopia. Typically appear as sellar-suprasellar masses with a “snowman” or “figure of eight” appearance due to a waist at the diaphragma sellae . The sella is usually enlarged. These tumors can invade the cavernous sinuses. Meningioma (Option C) {{caption_text}} {{caption_text}} Meningiomas arise from arachnoidal cap cells in the brain and spinal cord coverings. They are the most common benign intracranial tumors . Most common in females Mostly sporadic but can be linked to NF-2 or prior cranial irradiation. Meningiomas are dural based extra-axial masses that appear isointense to gray matter on both T1 and T2-weighted images. They demonstrate intense homogeneous enhancement on post-contrast imaging, accompanied by a dural tail sign . Characteristic imaging features: CSF cleft sign (thin layer of CSF around the mass) Cortical buckling Widening of the subarachnoid space with visible pial arteries/veins, Hyperostosis or erosion of the calvarium. Mother in law sign (early enhancement during the

arterial phase and remain opacified long after the venous phase has passed) Calcification Oligodendroglioma (Option D) {{caption_text}} Oligodendrogliomas are diffuse infiltrating glial tumors originating from oligodendrocytes and are characterized by IDH mutations and 1p/19q codeletion . These tumors can be either WHO grade 2 (well-differentiated oligodendrogliomas) or WHO grade 3 (anaplastic oligodendrogliomas). Typically occurs in the frontal lobe . They are slow-growing, non-encapsulated, and tend to infiltrate the overlying cortex . CT : Oligodendrogliomas are isodense to hypodense with calcification MRI : Tumors are hypointense on T1 and hyperintense on T2. They generally do not enhance with contrast

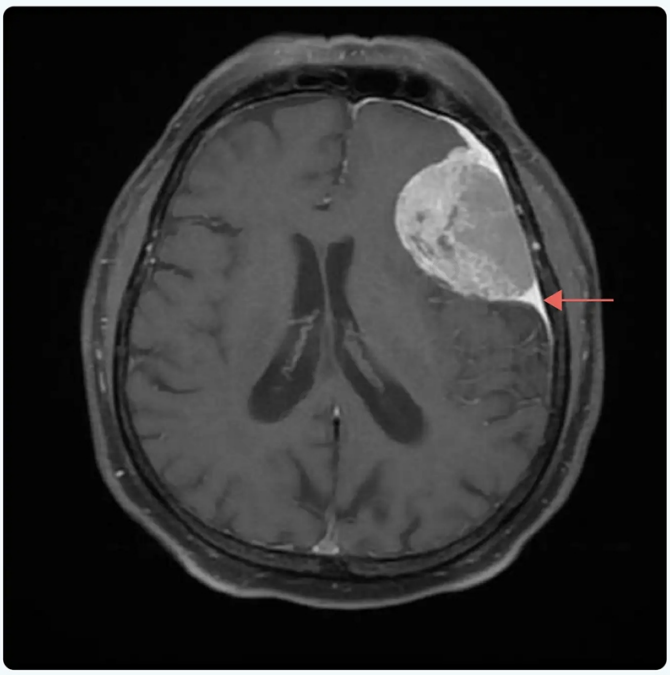






Snowman / Fig 8 Sign
in Macroadenoma

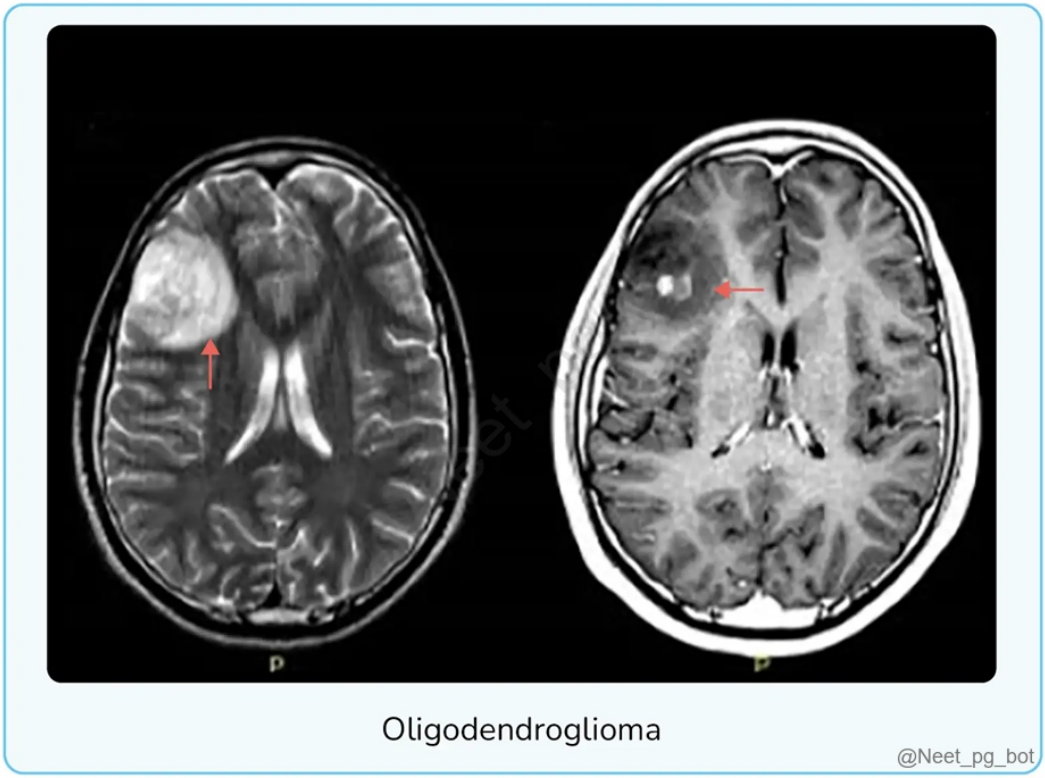
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Dural Tail Sign

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References:

David Sutton Textbook of Radiology & Imaging 8th edition Volume 2 Page 2284-2286, 2287, 2288

https://radiopaedia.org/articles/intracranial-metastatic-melanoma-2

↑ *Back to this question in Part A*

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Q7: A 22-year-old male arrived at the emergency room after being involved in a car accident. During the examination, his Glasgow Coma Scale (GCS) score was E2M2V3, indicating a level of consciousness. No fractures, hydrocephalus, or increased pressure within the skull were detected. A non-contrast CT scan was conducted and showed no abnormalities. The probable diagnosis is- (Q856423)

A. Diffuse axonal injury

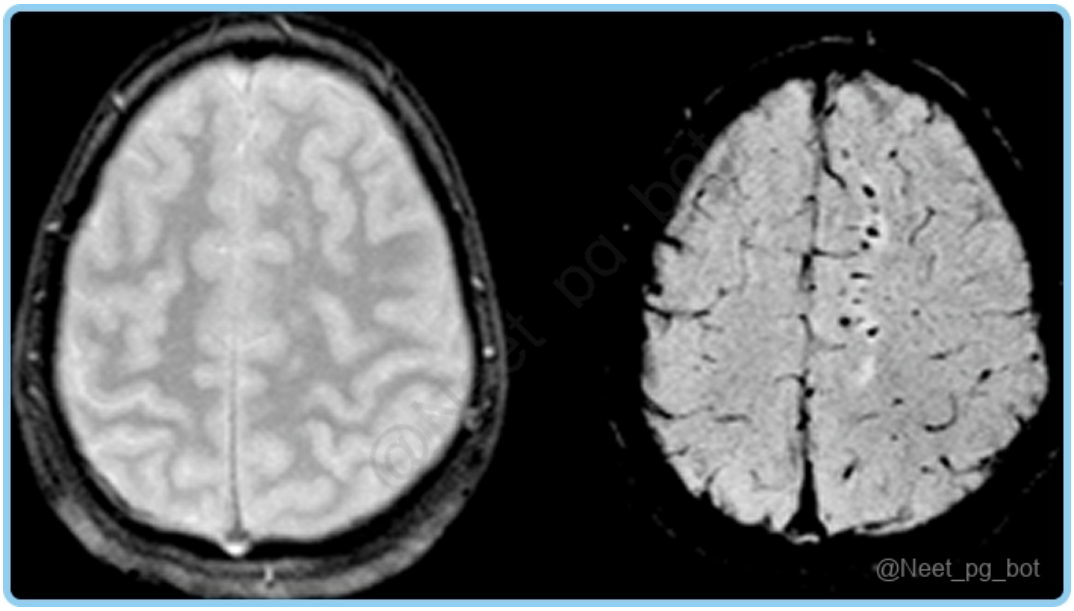
B. Post-concussion syndrome

C. Extradural hemorrhage

D. Herniation of brain

Correct Answer: A. Diffuse axonal injury

Explanation: Glasgow Coma Scale (GCS) of E2M2V3 (Total: 7) suggests a severe traumatic brain injury (TBI) . History of a car accident suggests high-velocity trauma , which is a common cause of DAI . Normal CT scan does not rule out DAI , as it often presents with microscopic damage to axons , which may not be visible on a non-contrast CT but can be detected using MRI (susceptibility-weighted imaging or DWI) . Absence of hydrocephalus, fractures, or increased intracranial pressure further supports DAI , as other traumatic brain injuries (like hemorrhages or herniation) would likely show visible abnormalities on CT . Diffuse Axonal Injury (DAI) Feature Description Etiology High-speed trauma, rotational forces, falls Mechanism Shearing of axons due to rapid acceleration/deceleration Clinical Features Unconsciousness, low GCS, no focal deficits Imaging Findings Normal CT initially; MRI shows microhemorrhages (FLAIR, GRE sequences) Management Supportive care, ICU monitoring, neuroprotection {{caption_text}} Post-concussion syndrome (Option B): Incorrect because post-concussion syndrome usually follows mild TBI , with symptoms like headache, dizziness, and mood changes, but does not cause low GCS . Extradural hemorrhage (Option C): Incorrect because extradural (epidural) hemorrhage appears as a biconvex hyperdense lesion on CT, often with a lucid interval , which is absent here. Herniation of brain (Option D): Incorrect because brain herniation would show CT signs like midline shift, compressed ventricles, and brainstem displacement , none of which are seen in this case.



References:

Harrison's Principles of Internal Medicine, 20th Edition • Pg 3185, 3186

Radiopaedia: Diffuse Axonal Injury

↑ *Back to this question in Part A*

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Q8: A 46-year-old male presented with chronic back pain and neck stiffness. An X-ray cervical spine is given below. What is the diagnosis? (Q856406)

A. Ankylosing spondylitis

B. Diffuse idiopathic skeletal hyperostosis

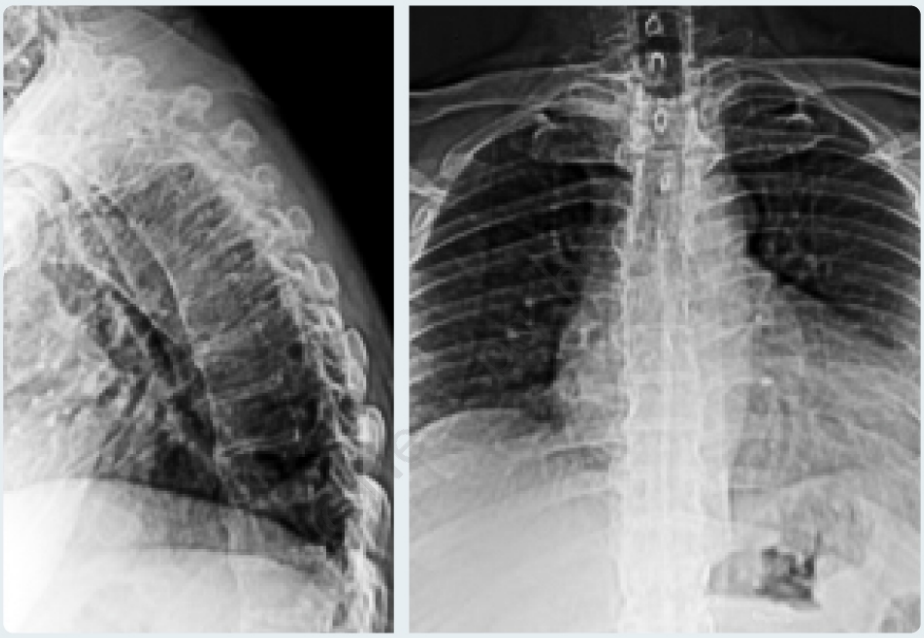
C. Klippel feil syndrome

D. Sprengel deformity



Correct Answer: B. Diffuse idiopathic skeletal hyperostosis

Explanation: Diffuse Idiopathic Skeletal Hyperostosis (DISH) is a condition characterized by calcification and ossification of ligaments, particularly the anterior longitudinal ligament of the spine. On X-ray, it presents as flowing ossifications along the anterolateral aspect of at least four contiguous vertebrae without significant disc space narrowing or sacroiliac joint involvement. Diffuse Idiopathic Skeletal Hyperostosis (DISH) Feature Description Etiology Unknown; associated with metabolic conditions (e.g., diabetes) Radiological Features Continuous flowing ossifications over vertebral bodies, preservation of disc spaces Common Location Cervical and thoracic spine Symptoms Stiffness, chronic pain, dysphagia if cervical involvement Differential Diagnosis Ankylosing spondylitis, degenerative disc disease Management Symptomatic treatment with NSAIDs, physical therapy {{caption_text}} 57-year-old male patient diagnosed with both Diffuse Idiopathic Skeletal Hyperostosis and Spondyloarthritis. Technique: Lateral and Antero-Posterior (AP) X-rays of the thoracic Spine Findings: Flowing ossifications involving the anterior longitudinal ligament along multiple contiguous thoracic levels with preservation of the intervertebral disc height at the involved {{caption_text}} A case of diffuse idiopathic skeletal hyperostosis involving only cervical spine (C3-6). Flowing bridging ossification and partial ossification (arrows) of three contiguous disc levels (C3-6) are noted in consecutive sagittal images (A, B) of whole spine computed tomography. Ankylosing spondylitis (Option A): Incorrect because it typically involves sacroiliac joint fusion and syndesmophytes rather than flowing ossifications. Klippel-Feil syndrome (Option C): Incorrect because it is a congenital disorder with cervical vertebral fusion, not ossification of ligaments. Sprengel deformity (Option D): Incorrect because it presents with congenital elevation of the scapula, not spinal ligament ossification.



57-year-old male patient diagnosed with both Diffuse Idiopathic Skeletal Hyperostosis and Spondyloarthritis.
Technique: Lateral and Antero-Posterior (AP) X-rays of the thoracic Spine Findings:
Flowing ossifications involving the anterior longitudinal ligament along multiple contiguous thoracic levels with preservation of the intervertebral disc height at the involved vertebral segments on the lateral film as well as calcifications of the annulus fibrosus @Neet_pg_bot



A case of diffuse idiopathic skeletal hyperostosis involving only cervical spine (C3-6). Flowing bridging ossification and partial ossification (arrows) of three contiguous disc levels (C3-6) are noted in consecutive sagittal images (A, B) of whole spine computed tomography. @Neet_pg_bot

References:

Learning Radiology: Recognizing the Basics • Page no. 271

Harrison's Principles of Internal Medicine 20th Edition • Page no. 2566

Apley and Solomon’s System of Orthopedics and Trauma, 10th edition, Page 72-76.

https://www.niams.nih.gov/health-topics/ankylosing-spondylitis

↑ *Back to this question in Part A*

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Q9: A 22-year-old male was brought to the emergency room after being involved in a car accident. During the examination, his Glasgow Coma Scale (GCS) score was E2M2V3. There were no fractures, hydrocephalus, or increased pressure within the skull. A non-contrast CT scan was conducted and revealed no abnormalities. The suspected diagnosis is (Q856688)

A. Diffuse axonal injury

B. Post-concussion syndrome

C. Extradural haemorrhage

D. Herniation of brain

Correct Answer: A. Diffuse axonal injury

Explanation: The patient’s Glasgow Coma Scale (GCS) score of E2M2V3 indicates a severe alteration in consciousness, likely due to diffuse brain injury. Non-contrast CT may show no abnormalities, especially in the early stages of diffuse axonal injury, which primarily affects the white matter of the brain. This injury is commonly seen in traumatic brain injury (TBI), especially in high-velocity accidents like car crashes. Clinical signs such as altered consciousness, coma, and normal CT findings are suggestive of diffuse axonal injury. Diffuse Axonal Injury (DAI) A form of primary brain injury caused by widespread damage to axons due to rotational acceleration and deceleration forces, often associated with high-energy trauma. Causes: Rotational forces: High-energy accidents involving rapid acceleration and deceleration (e.g., motor vehicle collisions). Trauma: Blunt force impacts that cause the brain to rotate within the skull. Clinical Features : Impaired arousal : Often presents as coma or reduced consciousness due to damage in critical brain areas (e.g., pontine reticular activating system, bilateral thalami). Neurological deficits: Poor neurological examination, despite the absence of obvious radiographic global brain injury. Irreversible consequences: DAI is often associated with severe and lasting neurological impairment. Investigations : CT scan: May show hemorrhagic foci in the corpus callosum and dorsolateral rostral brainstem in severe cases. MRI: More sensitive than CT . It shows small haemorrhages and diffuse axonal injury, particularly in patients who fail to improve neurologically. Postmortem examination: Confirms the diagnosis with axonal disruption and formation of axon balls. Prognosis: Very poor due to high risk of severe disability or death due to extensive brain damage. Post-concussion syndrome (option B): This is incorrect because post-concussion syndrome typically develops days to weeks after a mild traumatic brain injury and usually presents with headaches, dizziness, and cognitive issues. The acute severe presentation in this case,

especially the GCS of 7 (severe impairment), is more consistent with a diffuse axonal injury. Extradural haemorrhage (option C): This is incorrect because an extradural haemorrhage usually appears on CT as a lens-shaped, hyperdense collection of blood and typically presents with a history of skull fracture. In this case, the CT scan was normal. Herniation of brain (option D): This is incorrect because herniation typically results in changes on CT, such as midline shift or loss of brain structures, which were not observed in the scan. Additionally, herniation would likely present with clinical signs such as pupillary dilation or abnormal posturing, none of which are described here.

References:

Bailey & Love's Short Practice of Surgery, Edition 28, Pg 368

Schwartz Textbook of Surgery, 11th edition, pg no 1837

Grainger and Allison's Diagnostic Radiology, 7th edition, Page 1379

↑ *Back to this question in Part A*

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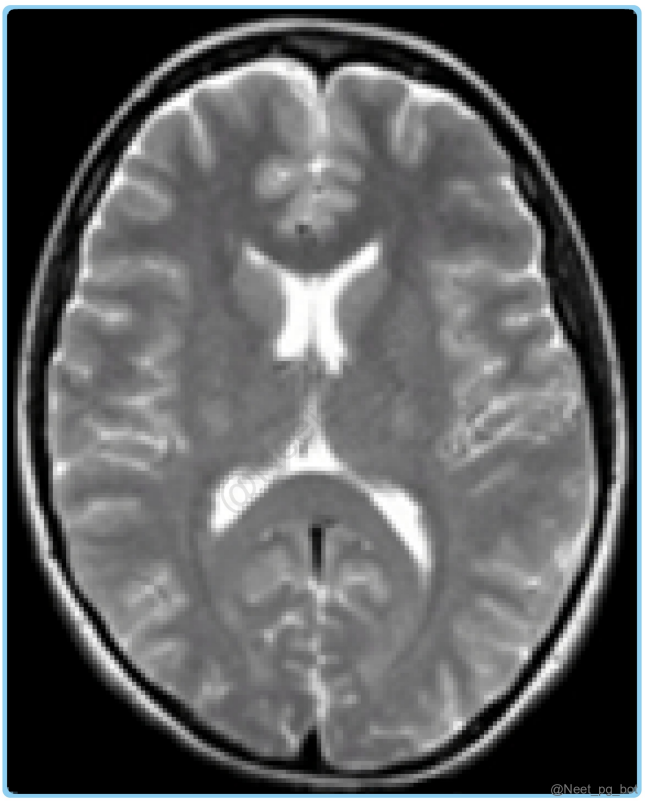
Q10: Which of the following MRI imaging techniques is shown in the image below? (Q857612)

A. T1 MRI

B. T2 MRI

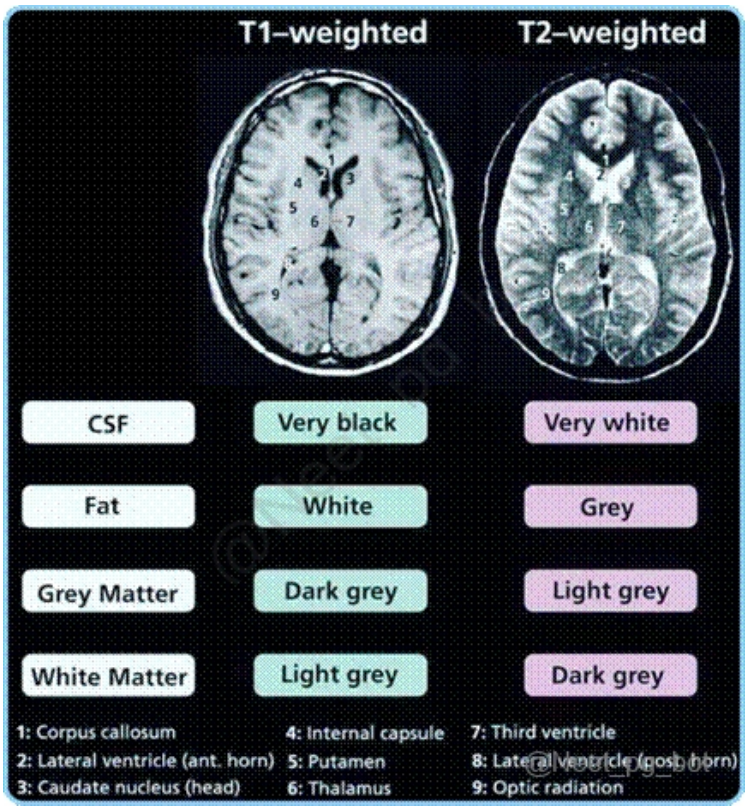
C. STIR

D. FLAIR



Correct Answer: B. T2 MRI

Explanation: A T2-weighted MRI sequence highlights fluid as hyperintense (bright) and soft tissues differently compared to T1-weighted MRI . It is particularly useful in detecting edema, inflammation, and CSF-filled structures . Key Features of T2-Weighted MRI: CSF and fluids appear bright (white) Edema and inflammation are hyperintense Gray matter appears slightly brighter than white matter Fat appears relatively darker compared to T1 MRI Sequences & Their Characteristics MRI Sequence CSF Appearance Fat Appearance Use Cases T1-weighted Dark Bright Anatomy, fat-containing lesions T2-weighted Bright Darker Edema, inflammation, tumors FLAIR Dark Dark White matter lesions, periventricular pathology STIR Dark Dark Suppresses fat signal, good for musculoskeletal imaging {{caption_text}} T1 MRI (Option A): Incorrect because CSF appears dark in T1, while it is bright in the given T2 image . STIR (Option C): Incorrect because STIR suppresses fat signal but does not necessarily highlight fluids as in T2-weighted imaging . FLAIR (Option D): Incorrect because FLAIR suppresses CSF signal, making it dark, while in T2 it remains bright .



References:

Grainger & Allison's Diagnostic Radiology, Volume 2, 7th Edition, Page 1375

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9617470/

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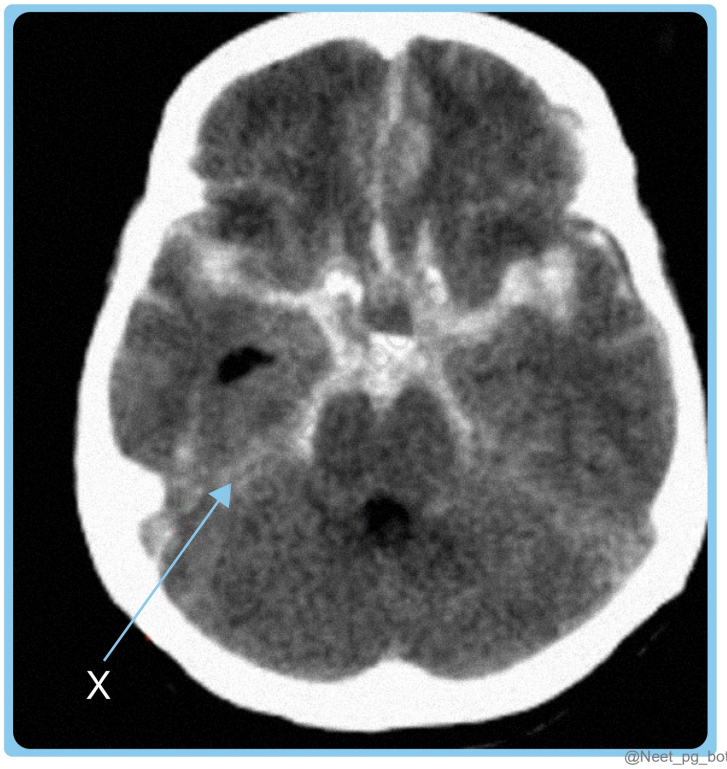
Q11: A patient presents with severe headache. A CT scan of the brain reveals hyperdense areas in the right basal region, marked as 'X'. Which of the following is the most likely diagnosis? (Q866868)

A. Subarachnoid hemorrhage

B. Meningococcal meningitis

C. Brain abscess

D. Pneumocephalus

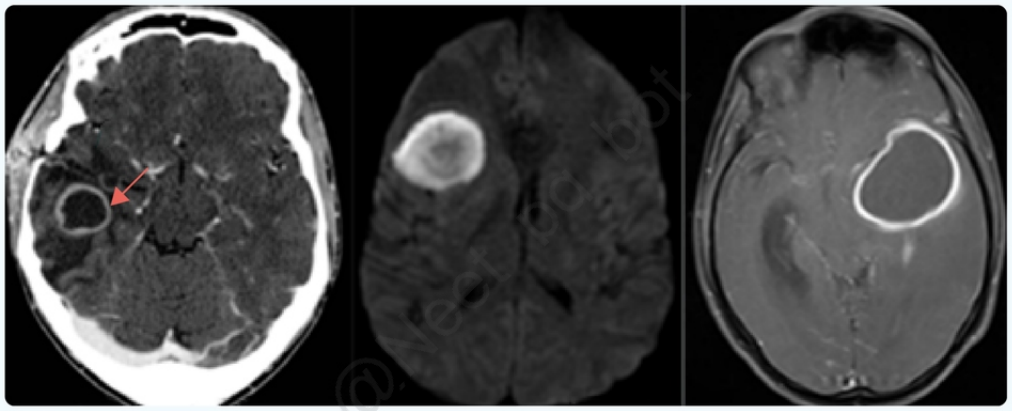


Correct Answer: A. Subarachnoid hemorrhage

Explanation: Subarachnoid hemorrhage (SAH) typically presents with a sudden, severe “thunderclap” headache , often described as the worst headache of life . On non-contrast CT , acute blood in the subarachnoid space appears hyperdense (bright) , especially in the basal cisterns, Sylvian fissures, and interhemispheric fissure . When the blood fills the basal cisterns, the appearance is classically described as the “Star of Death” sign . Hypodense areas may develop later due to ischemia or edema. The most common cause is rupture of a saccular (berry) aneurysm at the circle of Willis. Incorrect Options: Meningococcal meningitis (Option B): CT often normal or with meningeal enhancement after contrast; no acute cisternal blood. Brain abscess (Option C): Ring-enhancing lesion with surrounding edema; different appearance. Pneumocephalus (Option D): Shows air density (dark areas) rather than bright hemorrhage.

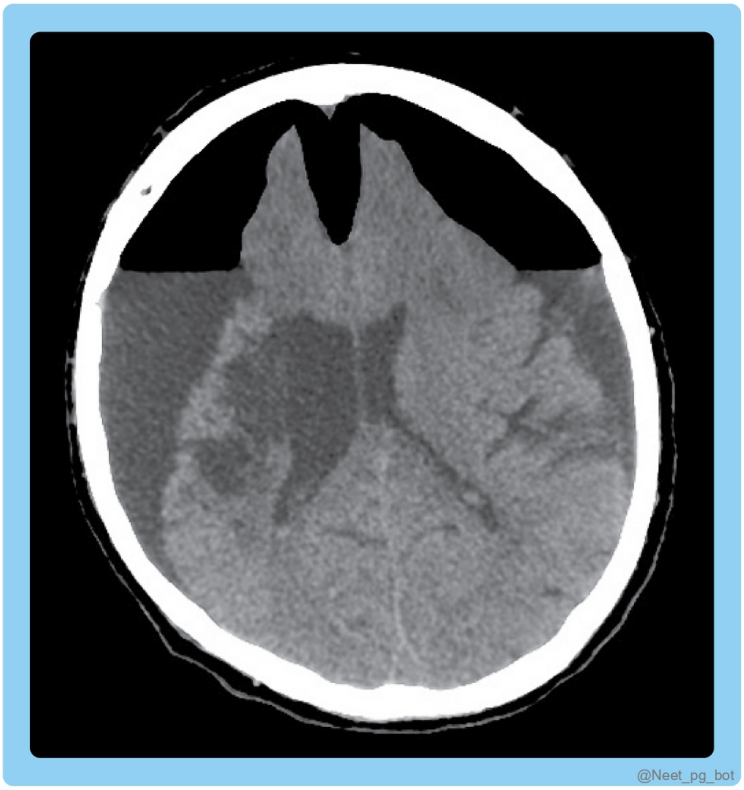


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CECT of Brain abscess DWI T1

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References:

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Q12: A 2-month-old infant is brought to the OPD with a parietal swelling present since birth. The X-ray image is given below. What could be the probable diagnosis? (Q855471)

A. Subgaleal hematoma

B. Cephalohematoma

C. Caput succedaneum

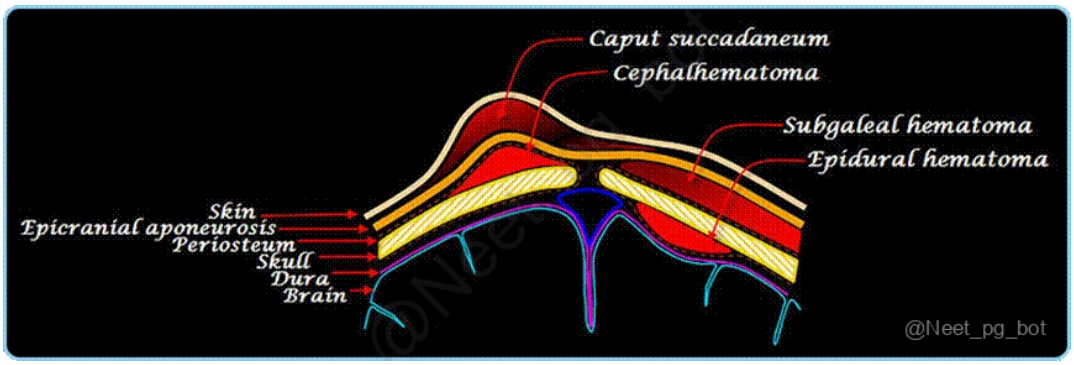
D. Enecephalocele



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Correct Answer: B. Cephalohematoma

Explanation: Cephalohematoma (subperiosteal hematoma) presents as a well-circumscribed, firm mass over the parietal bones that does not cross suture lines. It typically develops in the first few hours after birth, with increasing size for 12-24 hours, and then stabilizes. This fits the description provided in the scenario. Characteristic Caput Succedaneum (Option C ruled out) Cephalohematoma (Option B) Incidence Common Less common Location Subcutaneous plane Over parietal bones, between the skull and periosteum. Time of Presentation Maximum size and firmness at birth. Develops during the 1st few hours of life. Increasing size for 12-24 hours and then stable. Time Course Softens progressively from birth. Takes 3-6 weeks to resolve, but may resolve within 2-3 days. Characteristic Findings Diffuse Circular boggy area of oedema with indistinct borders. Often with overlying ecchymosis Crosses suture line Well-circumscribed fluid-filled mass. Does not cross the suture line Association None Linear skull fracture (5-25%); hyperbilirubinemia {{caption_text}} Subgaleal Hemorrhage (Option A) is a more diffuse, larger haemorrhage that crosses suture lines and is associated with more severe symptoms. It is less likely to present as a firm, well-defined mass and is typically associated with significant blood loss, which is not described in the scenario. {{caption_text}} Encephalocele (Option D): Encephalocele is a neural tube defect characterized by sac-like protrusions of the brain and the membranes that cover it through openings in the skull. It appears as an external bulge in the skull and requires surgical intervention. {{caption_text}}


Caput succadaneum
Cephalhematoma
Subgaleal hematoma
Epidural hematoma
Skin
Epicranial aponeurosis
Periosteum
Skull
Dura
Brain
@Neet_pg_bot



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References:

OP Ghai Paediatrics 10th edition. Pg. 135

Nelson Paediatrics 21st edition. Pg. 869

↑ *Back to this question in Part A*

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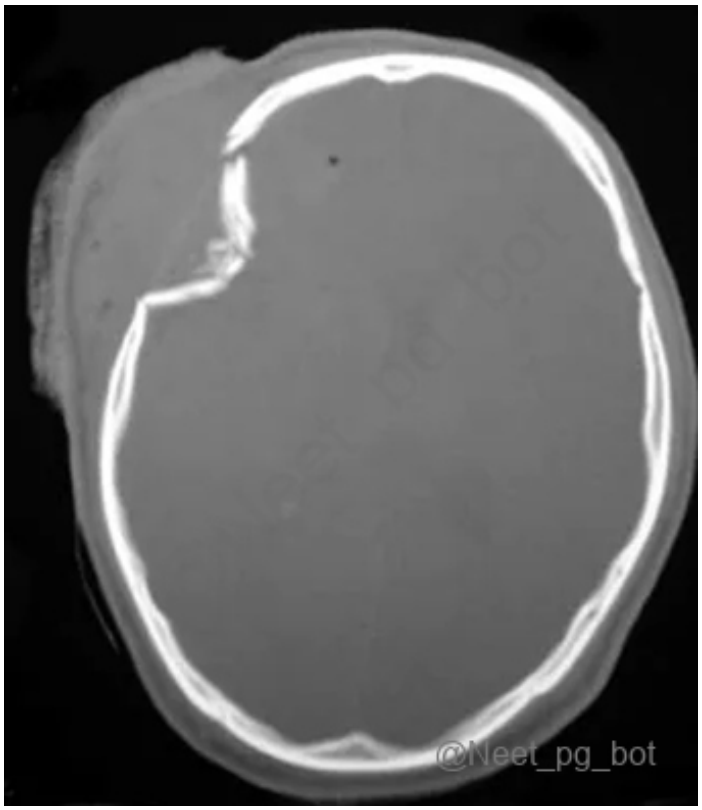
Q13: A patient presented with a head injury after a hammer fell on the skull. CT is shown below. What is the likely diagnosis? (Q820189)

A. Concussion

B. Epidural hematoma

C. Depressed skull fracture

D. Subarachnoid hemorrhage



Correct Answer: C. Depressed skull fracture

Explanation: Correct option C - Depressed skull fracture: A depressed skull fracture occurs when a portion of the skull is pushed inward towards the brain. This type of fracture often occurs from blunt trauma to the head, such as being hit by a heavy object. Incorrect options: Option A, B and D are incorrect.

↑ *Back to this question in Part A*

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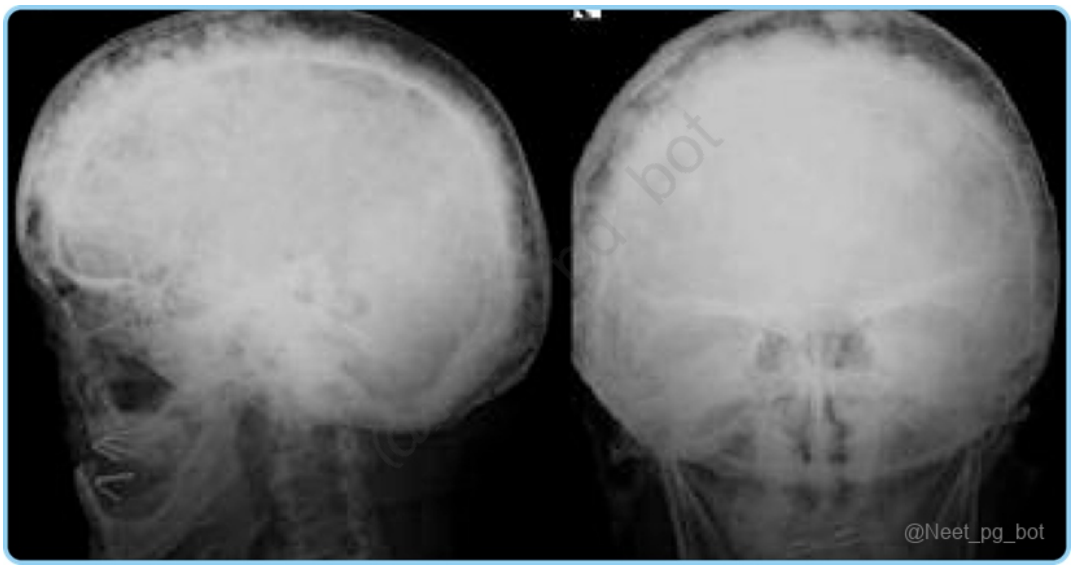
Q14: Identify the radiological image of the condition given below. (Q860273)

A. Paget's disease

B. Multiple myeloma

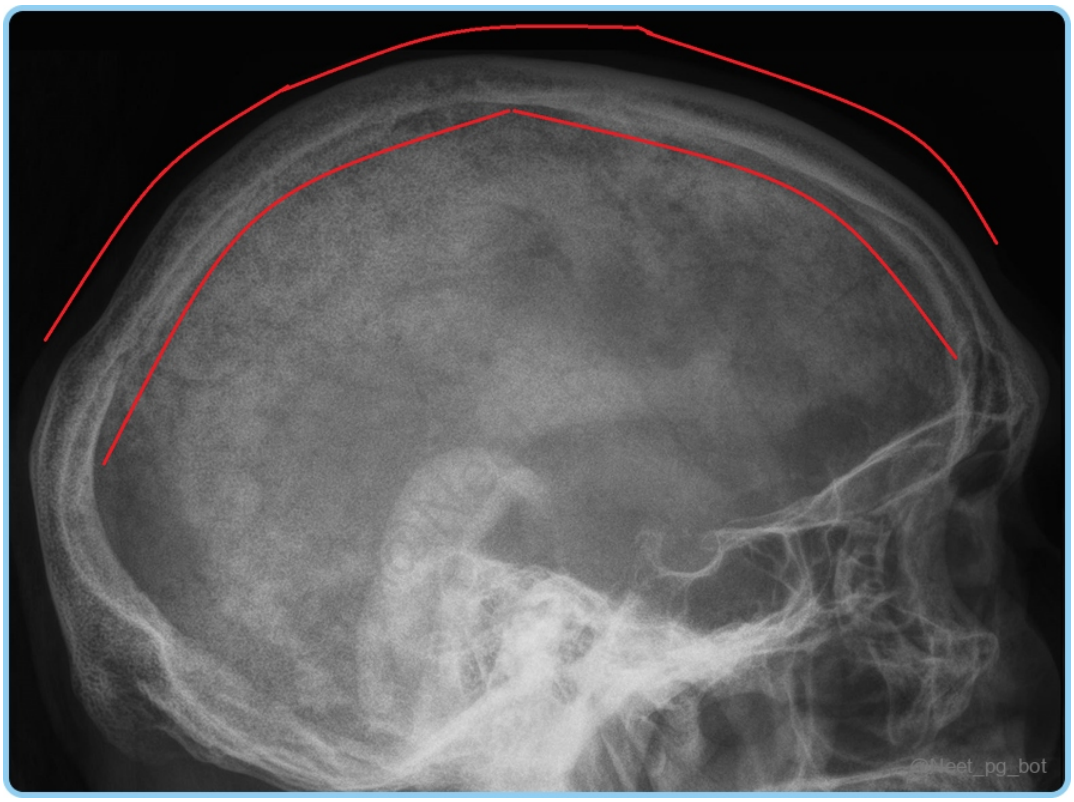
C. Hyperparathyroidism

D. Sickle cell anemia

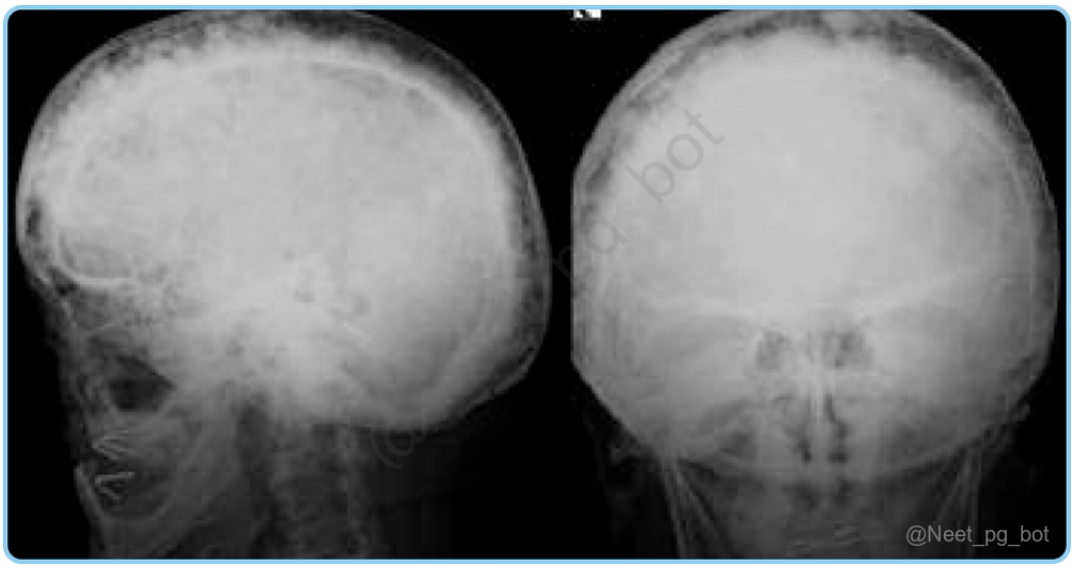


Correct Answer: A. Paget's disease

Explanation: The above-given skull X-ray shows a cotton wool appearance , which is suggestive of Paget's disease. Paget's Disease of Bone: Paget’s disease (osteitis deformans): A non-neoplastic condition that is characterised by abnormal bone remodelling. Clinical features: Seen in elderly patients Presents with bone pain, sensorineural hearing loss (SNHL) (cranial nerve compression) Cardiac failure (hyperdynamic circulation) Raised alkaline phosphatase (ALP), but calcium and phosphorous levels are normal Radiological features: Osteoporosis circumscripta: A circumscribed patch of osteoporosis in the skull. {{caption_text}} {{caption_text}} The cotton wool appearance of the skull (due to sclerosis) {{caption_text}} Tam O'Shanter sign : The skull's expansion and flattened base create the appearance of the skull tilting over the facial structures (due to the thickening of the frontal bone). {{caption_text}} {{caption_text}} Blade of grass appearance or candle flame sign: Flame-shaped lesion extending along the shaft of the bone. {{caption_text}} Picture frame vertebra: The vertebrae appear enlarged and have a thickened cortical bone due to excessive bone remodeling and disorganized osteoblastic activity. {{caption_text}} Ivory vertebra: The homogeneous, radiopaque appearance results from increased bone density caused by abnormal osteoblastic activity, leading to excessive bone formation. {{caption_text}} Lincoln sign or Black Beard sign: Increased radiotracer uptake in the mandible gives it a distinctive black beard appearance that signifies abnormal bone metabolism in Paget’s disease. {{caption_text}} Banana fractures: Occur in a region of abnormal bone. {{caption_text}} Multiple Myeloma (Option B): Punched-out lytic lesions of the skull or Raindrop lesions are seen in Multiple myeloma. {{caption_text}} Hyperparathyroidism (Option C): Salt and pepper appearance is seen in hyperparathyroidism. {{caption_text}} Sickle cell anemia (Option D): Sickle cell anemia is characterized by hair-on-end appearance of skull on X-ray. {{caption_text}}


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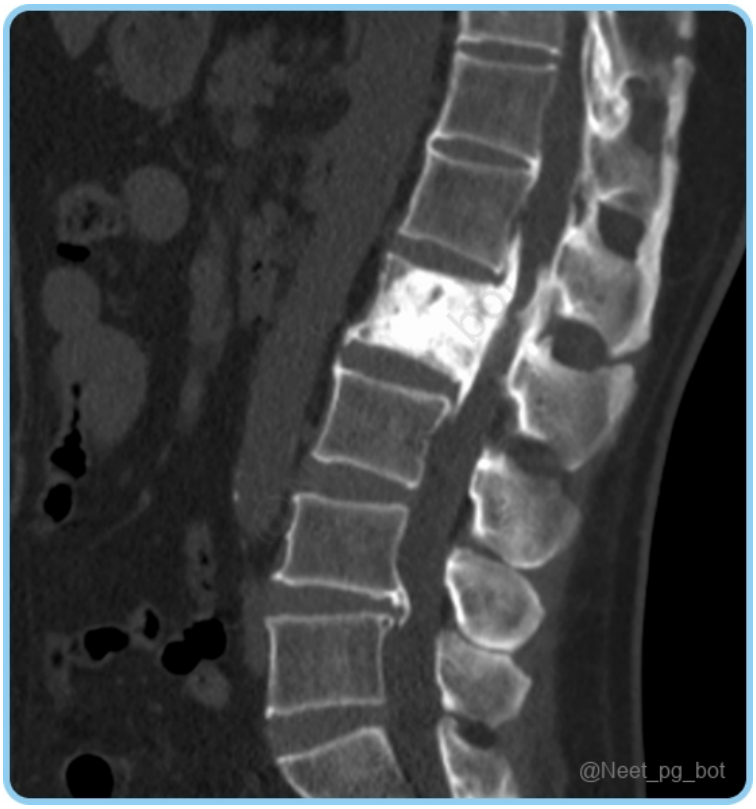

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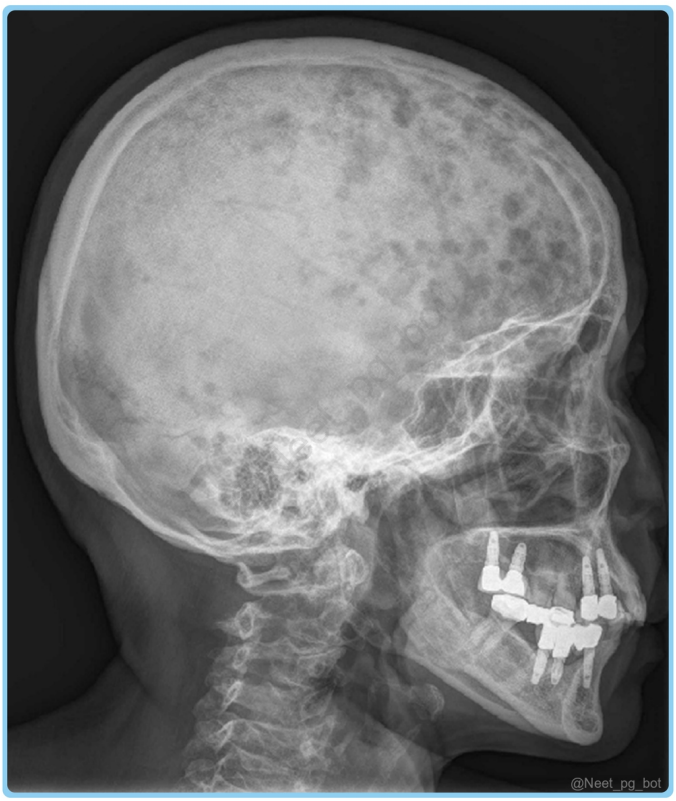

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References:

Grainger and Allison's Diagnostic Radiology, 7th Edition, Page 1057.

David Sutton's Textbook of Radiology and Imaging, Volume II, 7th Edition, Page 694.

Apley and Solomon's System of Orthopaedics and Trauma, 10th Edition, Page 151, 152.

↑ *Back to this question in Part A*

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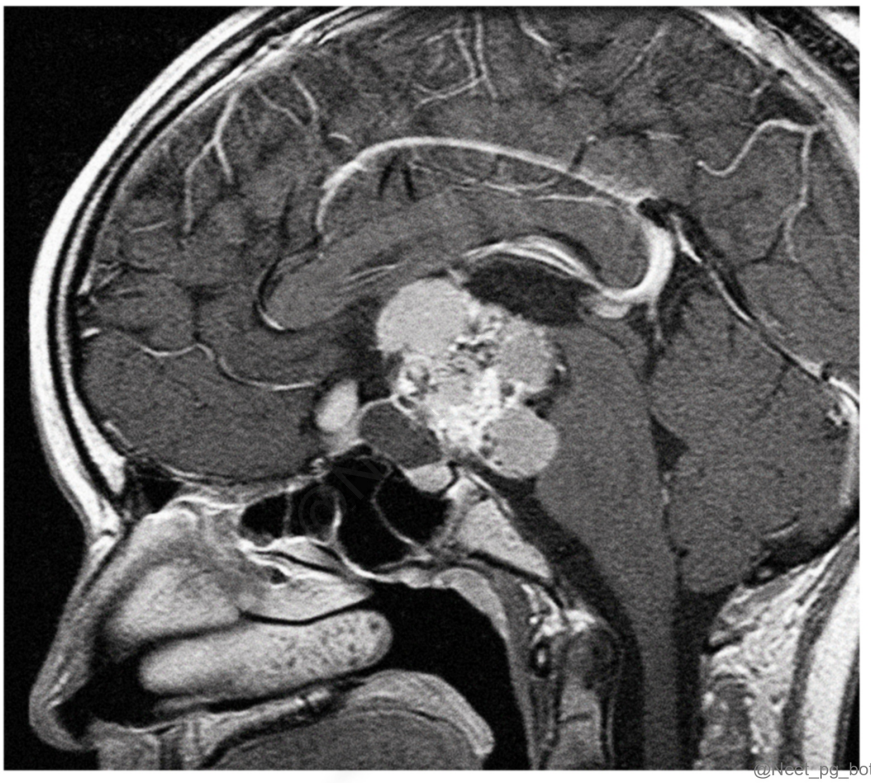
Q15: Which visual field defect is likely to be caused by the lesion shown in the given radiograph? (Q843973)

A. Altitudinal defect

B. Bitemporal hemianopia

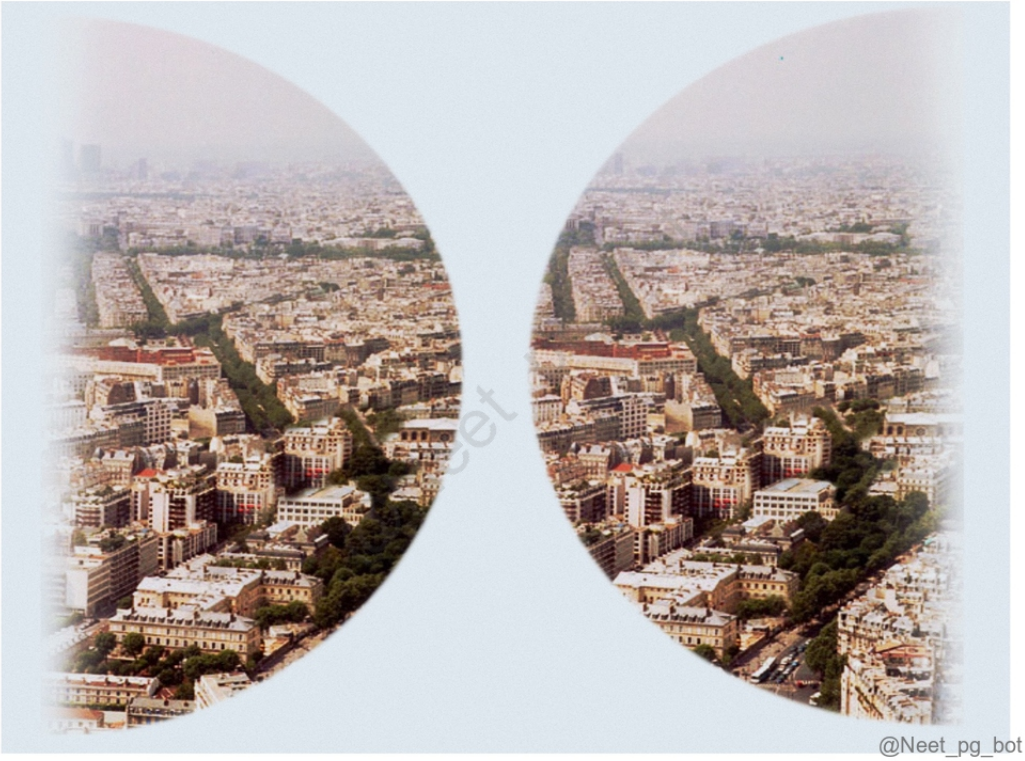
C. Inferior arcuate scotoma

D. Bjerrum scotoma



Correct Answer: B. Bitemporal hemianopia

Explanation: Correct Option B - Bitemporal hemianopia: The radiograph in question shows a craniopharyngioma, which is a suprasellar mass located above the optic chiasma. It compresses the optic chiasma and causes bitemporal hemianopia. Incorrect Options: Options A, C, and D are not typically caused by craniopharyngioma.



References:

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↑ *Back to this question in Part A*

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Q16: Using the radiograph provided, which diagnosis is most likely? (Q843946)

A. Chiari type 1 malformation

B. Dandy-Walker malformation

C. Vein of Galen malformation

D. Corpus callosum agenesis



Correct Answer: A. Chiari type 1 malformation

Explanation: Correct Option A - Chiari type 1 malformation: Chiari type 1 malformation is characterized by a small posterior fossa, which leads to herniation of the cerebellar tonsils through the foramen magnum. Incorrect Options: Option B - Dandy-Walker malformation: Dandy-Walker malformation is characterized by a large posterior fossa and the presence of a posterior fossa cyst. Option C - Vein of Galen malformation: The vein of Galen malformation is identified by an enlarged vein of Galen on imaging. Option D - Corpus callosum agenesis: Agenesis of the corpus callosum refers to the absence or underdevelopment of the corpus callosum, but it is seen in the given image.

↑ *Back to this question in Part A*

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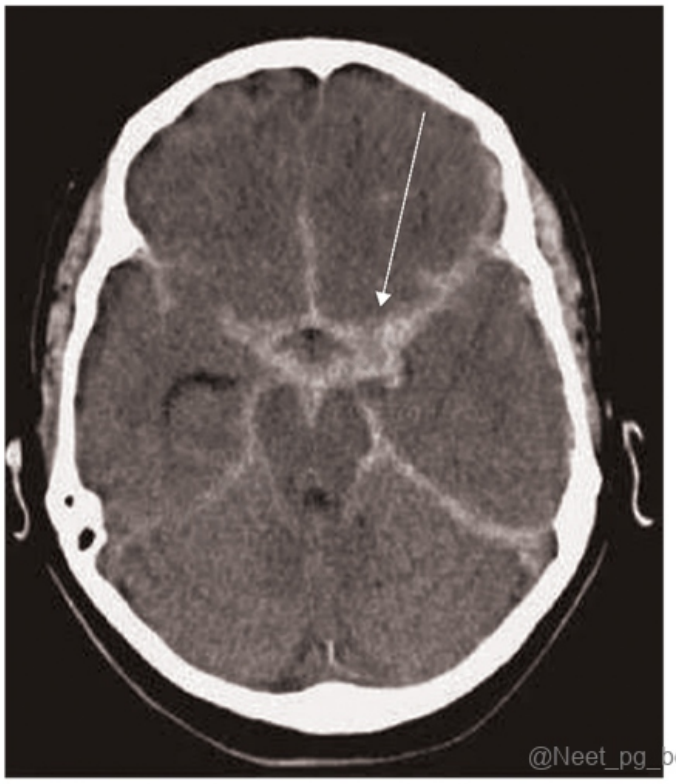
Q17: A 40-year-old female patient complains of a persistent headache. A CT scan of the head was performed, as shown below. What is the most accurate diagnosis? (Q843915)

A. Subarachnoid hemorrhage (SAH)

B. Epidural hemorrhage

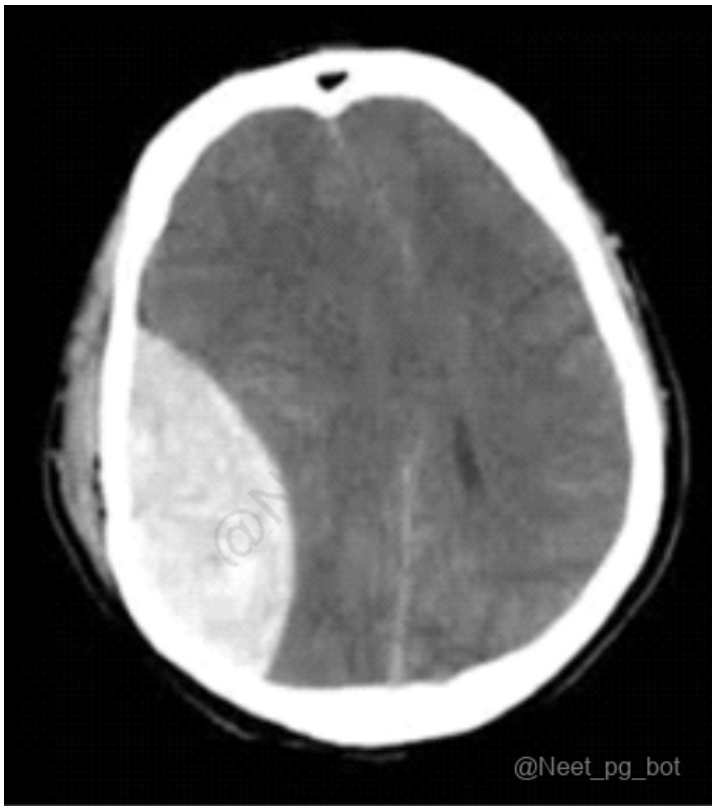
C. Subdural hemorrhage

D. Intraparenchymal hemorrhage



Correct Answer: A. Subarachnoid hemorrhage (SAH)

Explanation: Correct Option A - Subarachnoid hemorrhage (SAH): The given image of the NCCT head shows a star of death appearance, which is a characteristic feature of subarachnoid hemorrhage. The structures which appear white are: Interhemispheric fissure Sylvian fissure Suprasellar cistern Peri mesencephalic cistern Incorrect Options: Option B - Epidural hemorrhage: EDH typically appears as a biconvex or lentiform shape on a CT scan. Option C - Subdural hemorrhage: SDH usually presents as a crescent-shaped or sickle-shaped hemorrhage. Option D - Intraparenchymal hemorrhage: Intraparenchymal Hemorrhage will show a hyperdense pathology.



Subdural haematoma





References:

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↑ *Back to this question in Part A*

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Q18: An elderly man presents with a 7-month history of progressive dysphagia and bad breath. An image is provided. What is the most likely diagnosis? (Q852788)

A. Achalasia

B. Carcinoma esophagus

C. Zenker diverticulum

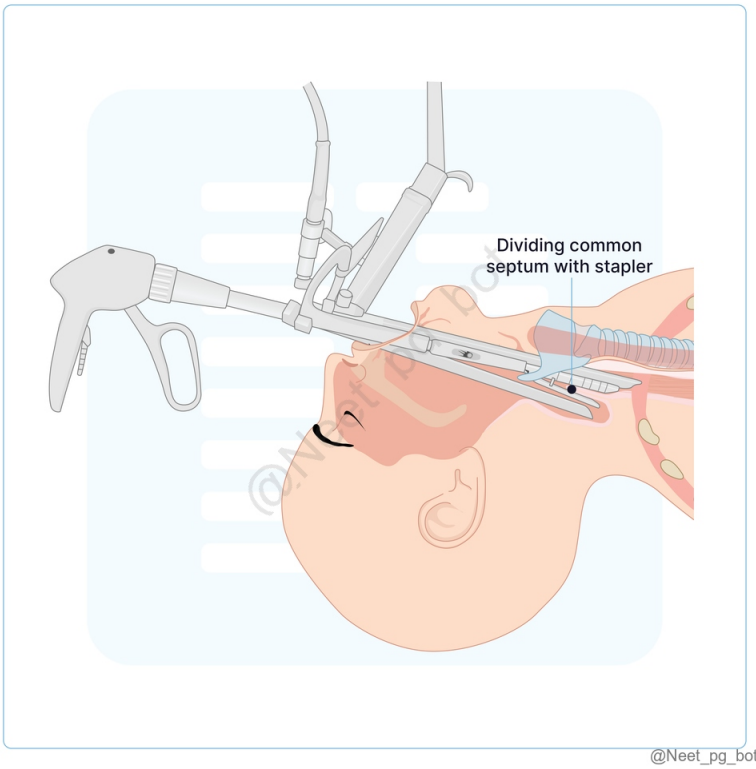
D. Diffuse esophageal spasm



Correct Answer: C. Zenker diverticulum

Explanation: The given image is a barium swallow radiograph showing a posterior outpouching at the pharyngoesophageal junction, characteristic of Zenker's diverticulum. Zenker diverticulum is a pharyngoesophageal diverticulum that develops due to weakness in the Killian's triangle (between the inferior pharyngeal constrictor and cricopharyngeus muscle). Zenker Diverticulum: False pulsion diverticulum as it protrudes posteriorly above the cricopharyngeal sphincter through the dehiscence of Kilian between the oblique and horizontal fibres of the inferior pharnygeal constrictor. It is due to loss of coordination between pharyngeal contraction and opening of the upper esophagal sphincter. Clinical features When the diverticulum is small, symptoms largely reflect desynchronization of swallowing with pharyngeal dysphagia. As the pouch enlarges: The fundus descends into the mediastinum. Regurgitation of trapped food can occur and lead to aspiration. Main symptom is halitosis and regurgitation. Diagnosis: Barium Swallow Study (Esophagram): To visualize the esophagus and identify the presence of a diverticulum. Esophagal Manometry MRI Endoscopy Surgical treatment : Diverticulectomy and cricopharyngeus myotomy Diverticular suspension: The diverticulum is dissected and absence of a suture line lessens the chance of a postoperative leak. Cricopharyngeus myotomy Newer techniques: Transoral introduction of a linear stapler. Achalasia (Option A): Typically presents with dysphagia to both solids and liquids from the onset due to impaired relaxation of the lower esophageal sphincter. Barium Swallow Finding: Classic "bird’s beak" appearance , showing a dilated esophagus with tapering at the lower esophageal sphincter. Carcinoma esophagus (Option B): Presents with progressive dysphagia (first to solids, then liquids) along with weight loss and possible odynophagia. The provided image does not show an irregular mass or luminal narrowing typical of malignancy. Diffuse esophageal spasm (Option D): Characterized by intermittent, non-progressive dysphagia and chest pain , often relieved by nitrates or calcium channel blockers. The imaging here does not show the classic "corkscrew esophagus" seen in esophageal spasm.





References:

Bailey & Love's Short practice of surgery, 28th Edition, Pages 1126,1127

Zenker Diverticulum

↑ *Back to this question in Part A*

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Q19: Which of the following is the most accurate investigation to localize the lesion in a case of primary hyperparathyroidism? (Q865289)

A. Ultrasonography

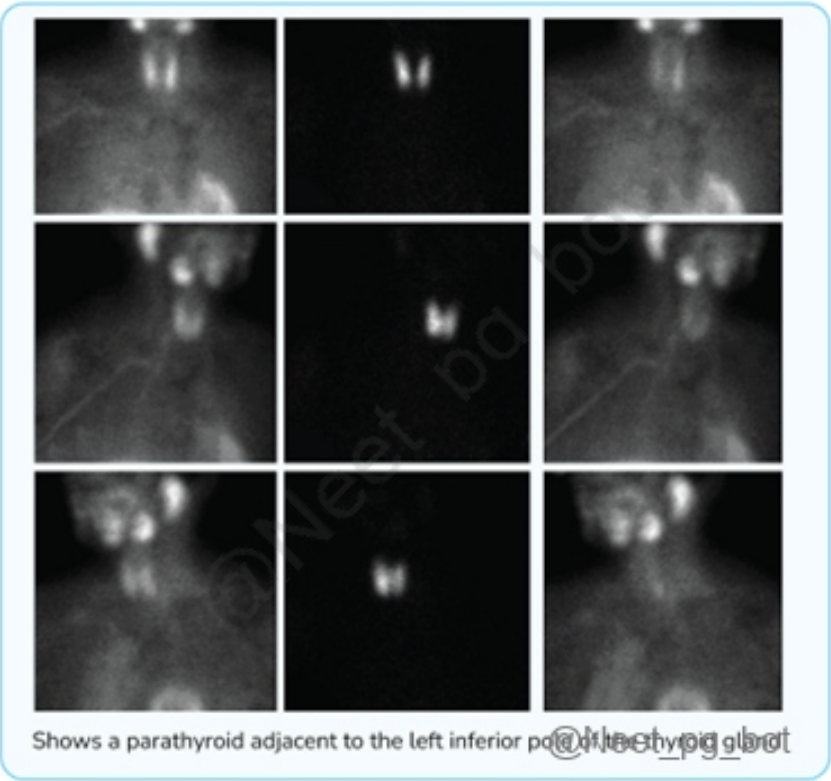
B. Sestamibi scan

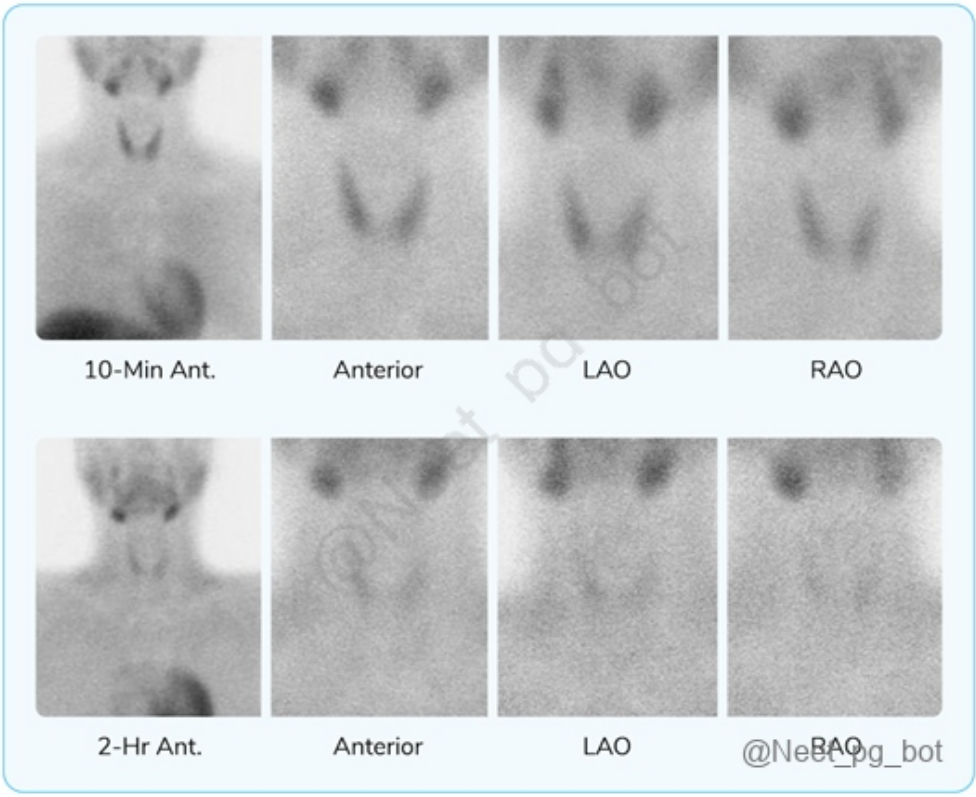
C. 4D computed tomography

D. MRI

Correct Answer: B. Sestamibi scan

Explanation: Sestamibi scan is a type of nuclear medicine-based study that is most accurate for parathyroid lesion localization. It is safe and reproducible . It has a sensitivity and specificity similar to ultrasound but may detect glands in ectopic positions better. Sestamibi accumulates in the mitochondria and hence the rates at which it washes out differs as per the number of mitochondria in different tissues. Parathyroid adenoma is rich in oxyphilic cells with a high concentration of mitochondria and hence has a lower washout than the thyroid gland. False positives are rare and the sensitivity and specificity are 79% and 90% respectively. Addition of a thyroid specific radioactive-tracer eliminates the chance of false positives. Other investigations: Parathyroid angiography and venous sampling for parathyroid hormone. Biochemical analysis is always to be done. Incorrect Options: Ultrasonography (Option A) : Parathyroid adenoma is identified as an oval/ elongated, bi or multiloculated hypoechoic structure. Advantage: Can identify and facilitate biopsy of any concomitant thyroid pathology. Disadvantage : Adenomas in retro-oesophageal, retrosternal, or retro-tracheal areas can be missed. 4D CT (Option C) : Rapid uptake and washout allow hyperfunctioning glands to be differentiated from lymph nodes that demonstrate a progressive enhancement pattern. Disadvantage: Higher radiation dose than traditional imaging. MRI (Option D) : Not commonly used, but helpful for preoperative cases or mediastinal adenomas. Has poor resolution for small glands/adenomas <5 mm, and it is difficult to localize superior glands. Biochemical tests: Serum calcium levels High Intact PTH Low or inappropriately high Serum phosphate Low 24-hour urinary calcium High Chloride to phosphate ratio High 1,25- hydroxy Vitamin D Normal or raised Casanova test: The modified Casanova test evaluates the long-term function of autotransplanted parathyroid glands. During the test, ischemic blockage is induced by a tourniquet, and PTH levels are measured. A significant reduction in PTH indicates well-functioning autografts, while minimal change (≤20% of baseline) suggests functioning residual parathyroid tissue elsewhere. This test can detect graft-dependent recurrent hyperparathyroidism and identify persistent hypoparathyroidism before surgery.





References:

Bailey & Love's Short Practice of Surgery, 28th edition, pg: 877,878.

SRB’s Manual of Surgery, 6th edition, pg: 491.

↑ *Back to this question in Part A*

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Q20: Identify the condition associated with the MRI finding shown below: (Q865262)

A. Pantothenate kinase deficiency

B. Wilson’s disease

C. Krabbe’s disease

D. Huntington chorea



Correct Answer: A. Pantothenate kinase deficiency

Explanation: Pantothenate kinase-associated neurodegeneration (PKAN), formerly Hallervorden-Spatz disease(Option A): The classic MRI finding is the " eye-of-the-tiger " sign in the globus pallidus. This is characterized by bilateral, symmetric hypointensity (darker) on T2-weighted images with a central area of hyperintensity (brighter). This pattern is due to iron accumulation and neuronal loss. Wilson's disease (Option B): MRI findings in Wilson's disease can be varied but often involve the basal ganglia (especially the putamen and globus pallidus), brainstem, and thalami. Common findings include bilateral, symmetrical hyperintensities on

T2-weighted images in these areas. There can also be atrophy and cavitations in chronic stages. Krabbe's disease (Globoid cell leukodystrophy) (Option C) : This is a white matter disease. MRI typically shows diffuse, symmetric white matter hyperintensities on T2-weighted images, often beginning in the posterior cerebral white matter and progressing anteriorly. There can also be involvement of the thalami and brainstem. In later stages, cerebral atrophy may be seen. Huntington's chorea (Option D): The characteristic MRI finding in Huntington's disease is bilateral atrophy of the caudate nuclei and putamen. This can be seen as widening of the frontal horns of the lateral ventricles due to the loss of caudate head volume. Generalized brain atrophy may also be present in later stages.

References:

https://www.ncbi.nlm.nih.gov/books/NBK430689/

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6738489/

↑ *Back to this question in Part A*

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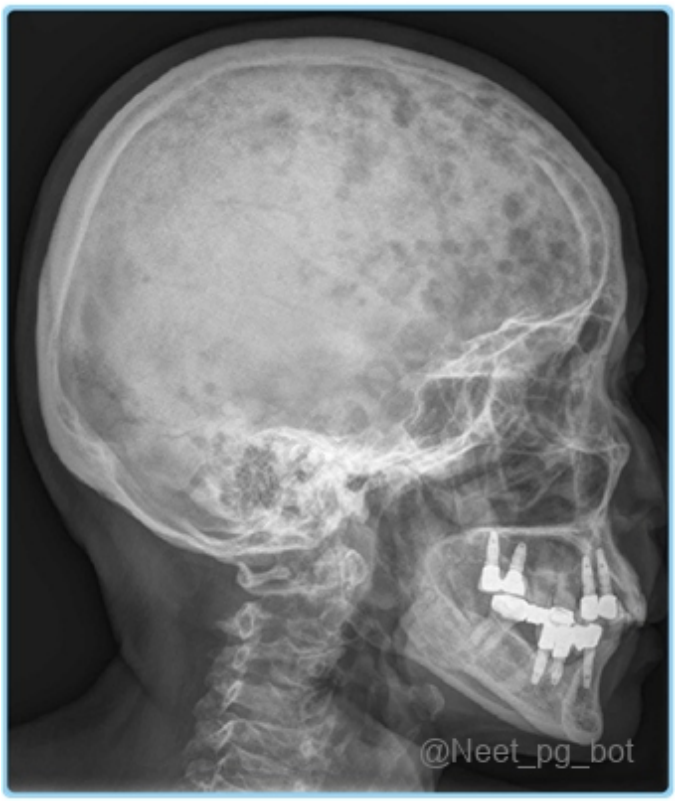
Q21: Based on the X-ray image provided, determine the type of thyroid malignancy: (Q865252)

A. Papillary carcinoma

B. Hürthle cell carcinoma

C. Follicular carcinoma

D. Thyroid lymphoma



Correct Answer: C. Follicular carcinoma

Explanation: The given clinical scenario is a case of follicular carcinoma , in which the most common site of metastasis is bone, and the route is hematogenous. Lymphatic spread is not seen. Papillary carcinoma, Hürthle cell carcinoma, Thyroid lymphoma (Options A,B,D) are less likely to be spread hematogenously to bone Follicular carcinoma (Option C): This is well-established as having a propensity for hematogenous spread, with the lungs and bones being common sites for distant metastases. Bone metastases from follicular carcinoma are relatively frequent compared to other thyroid cancers. Incorrect Options: Hürthle cell carcinoma (Option B ruled out): Often considered a more aggressive variant of follicular carcinoma, Hürthle cell carcinoma also commonly spreads hematogenously to distant sites, including the lungs and bones. But less likely than follicular carcinoma. Papillary carcinoma (Option A ruled out): While papillary carcinoma is the most common type of thyroid cancer and often spreads via the lymphatic system to regional lymph nodes, hematogenous spread to distant sites like bone is less common compared to follicular or Hürthle cell carcinoma. However, it can occur, especially in aggressive subtypes. Thyroid lymphoma (Option D ruled out): Thyroid lymphoma primarily involves the lymph nodes and can spread to other lymphatic tissues. While distant spread can occur, bone metastasis is not a typical or common route of spread for thyroid lymphoma compared to the other thyroid carcinoma types.

References:

Bailey & Love’s Short Practice of Surgery, 28th edition Page 868, 869

↑ *Back to this question in Part A*

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Q22: From the provided MRI, please identify the medical condition observed in the lower back of the newborn, which presents as an abnormal lump. (Q793098)

A. Meningocele

B. Myelomeningocele

C. Spina bifida occulta

D. Bone cyst



Correct Answer: A. Meningocele

Explanation: Correct Option A: The given MRI image is suggestive of a meningocele which represents CSF filled cavity in the Lumbosacral region surrounded by meninges, which is making a protrusion over the lumbosacral region. It is a T2 WI image that shows CSF filled white cystic cavity known as a meningocele. Meningocele is a birth defect where the affected individual has a sac filled with spinal fluid-filled protruding from the spinal cord. Incorrect Options: Option B - Myelomeningocele: The MRI image of myelomeningocele shows a protruding neural placode extending beyond the skin surface as an enlargement of the underlying subarachnoid space. Since the given image does not show this, it is suggestive that the option is incorrect. Option C - Spina Bifida Occulta: A plain radiograph in this condition would show a midline or para-midline bony defect at the posterior arch. Therefore, it is an incorrect option. Option D - Bone cyst: It is a cystic lesion inside the bone seen on X-ray as a lesion filled with fluid. Since the given findings do not match the description, it is considered an incorrect choice.

References:

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↑ *Back to this question in Part A*

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• [09_Genitourinary Radiology] 019 Genitourinary Radiology

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[09_Genitourinary Radiology] 019 Genitourinary Radiology — Quick Jump

Q1 (p. 1333)	*Q2 (p. 1336)*	*Q3 (p. 1339)*	*Q4 (p. 1342)*	*Q5 (p. 1344)*	*Q6 (p. 1348)*
Q7 (p. 1351)	*Q8 (p. 1355)*	*Q9 (p. 1358)*	*Q10 (p. 1362)*	*Q11 (p. 1365)*	*Q12 (p. 1367)*
Q13 (p. 1370)	*Q14 (p. 1373)*	*Q15 (p. 1376)*	*Q16 (p. 1379)*	*Q17 (p. 1383)*	*Q18 (p. 1387)*
Q19 (p. 1390)	*Q20 (p. 1393)*	*Q21 (p. 1396)*	*Q22 (p. 1399)*	*Q23 (p. 1403)*	*Q24 (p. 1405)*
Q25 (p. 1408)	*Q26 (p. 1411)*				

Q1: A 45 y/o male presents with right-sided flank pain and recurrent urinary tract infections. The imaging study is given below. What is the most likely diagnosis? {{caption_text}} (Q852809)

A. Vesicoureteral reflux

B. Transitional cell carcinoma

C. Polycystic kidney disease

D. Retro-caval ureter



Correct Answer: D. Retro-caval ureter

- *Listen (English)*
- *Listen (Hindi)*

Explanation: Imaging shows a medial deviation of the right ureter. A retro-caval ureter is caused by a developmental anomaly in which the ureter is trapped behind the IVC due to improper embryological development of the vena cava. This leads to a characteristic medial deviation of the ureter at the L3-L4 level . Patients with this condition often present with flank pain, recurrent urinary tract infections, and hydronephrosis due to impaired urine flow through the kinked or obstructed ureter. {{caption_text}} {{caption_text}} Vesicoureteral reflux (Option A): This condition occurs when urine flows backwards from the bladder into the ureters, leading to recurrent urinary infections and kidney damage. While it can result in hydronephrosis and recurrent infections, it is not associated with medial deviation of the ureter. Transitional cell carcinoma (Option B): This type of cancer affects the lining of the urinary tract, most commonly the bladder and ureters. It can cause symptoms like hematuria and flank pain, but it is not associated with the specific imaging feature of medial deviation of the ureter. Instead, transitional cell carcinoma typically presents with filling defects and dilatation of the ureter above the tumour giving a, known as the "goblet sign," and does not lead to the ureter passing behind the IVC. {{caption_text}} Polycystic kidney disease (Option C): This genetic disorder is characterised by the growth of numerous fluid-filled cysts in the kidneys, leading to enlarged kidneys and impaired function, and is not linked to ureter deviation or hydronephrosis.



X-ray Intravenous Pyelogram (IVP) showing medial deviation of the right ureter at L3 level

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X-ray Fluoroscopy showing fishhook deformity. There is right kidney hydronephrosis and medial deviation of the right ureter

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Filling defect on retropyelogram, showing typical "goblet sign" due to right ureteral urothelial cell carcinoma

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References:

Grainger and Allison's Diagnostic Radiology, 7th Edition, Page 727, 759, 760

Textbook of Radiology and Imaging, David Sutton, 8th Edition, Volume 1, Page 2906, 2898

radiopaedia.org/articles/fishhook-ureters

↑ *Back to this question in Part A*

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Q2: A 55 y/o woman undergoing routine health screening is found to have an incidental adrenal mass on ultrasound. The lesion is smooth, round, hypoechoic, and measures 2.5 cm with low vascularity. A non-contrast CT scan shows a density of 8 HU. What is the most likely diagnosis? (Q852821)

A. Pheochromocytoma

B. Adrenal calcification

C. Adrenal adenoma

D. Metastasis

Correct Answer: C. Adrenal adenoma

■ *Listen (English)*

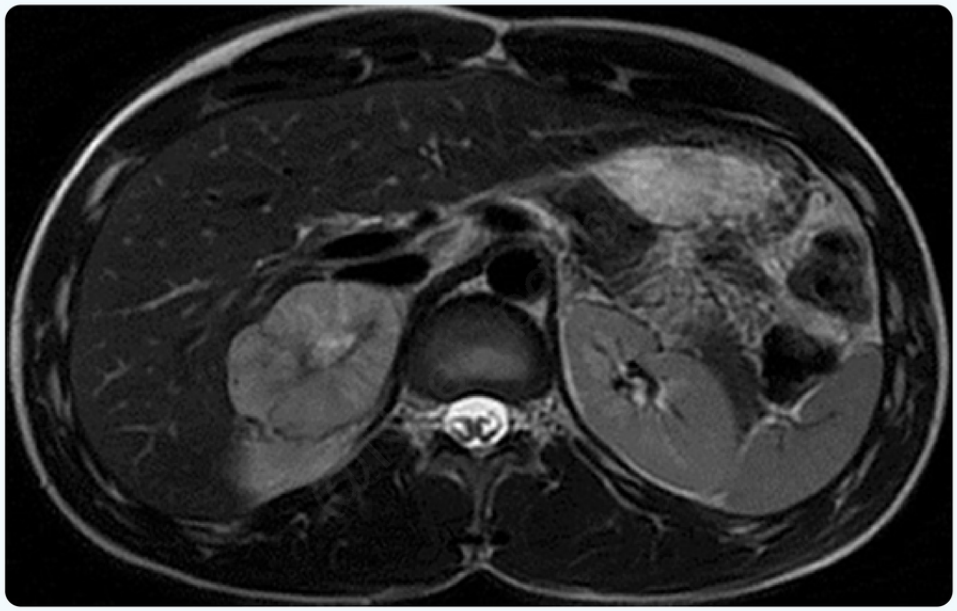
■ *Listen (Hindi)*

Explanation: A smooth, round, hypoechoic lesion with low vascularity and a size of 2.5 cm is typical of a benign adrenal adenoma. The hallmark is a non-contrast CT density of 8 HU, indicating low attenuation (<10 HU), distinguishing it from other adrenal lesions. Adrenal Adenoma (Option C) Pheochromocytoma (Option A ruled out) Adrenal Calcification (Option B ruled out) Common benign tumour, often hormonally inactive and less than 3 cm. Rare adrenal medulla tumour that secretes catecholamines. May result from old haemorrhage, infection, or various diseases (e.g., tuberculosis, neuroblastoma). Ultrasound : Smooth, round, hypoechoic, and low vascularity. CT : Non-contrast shows a low density (<10 HU) if lipid-rich, and 10–30 HU if lipid-poor. Rapid enhancement with >60% washout on contrast-enhanced CT. MRI : Signal drop on T1 out-of-phase imaging due to intralesional lipid. CT : Heterogeneous and strongly enhancing. MRI : T2 is hyperintense with a "light bulb" appearance. No signal loss on out-of-phase imaging. Fluid–fluid levels may indicate haemorrhage. MIBG : Localizes tumour via increased adrenal uptake. Plain X-ray : Calcifications may be diffuse, stippled, or arc-like depending on the cause. CT : Early tuberculosis: Enlarged adrenal with peripheral enhancement. Advanced tuberculosis: Atrophic adrenals with scattered calcifications. {{caption_text}} {{caption_text}} {{caption_text}} {{caption_text}} Metastasis (Option D): Metastatic lesions generally demonstrate higher attenuation values on non-contrast CT due to their lipid-poor nature. They often appear as irregular masses, which contrasts with the smooth and well-defined appearance of the lesion described here.



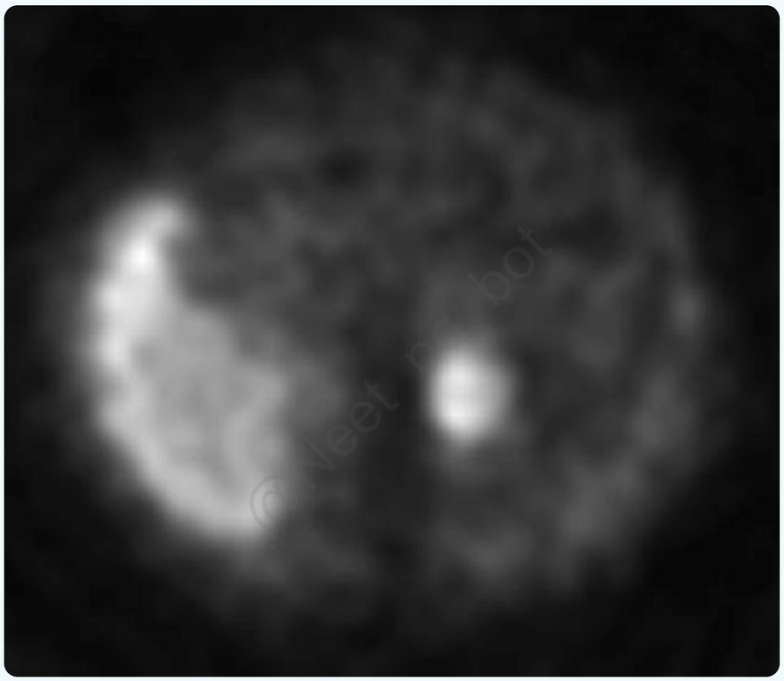
Adrenal CT showing left adrenal adenoma

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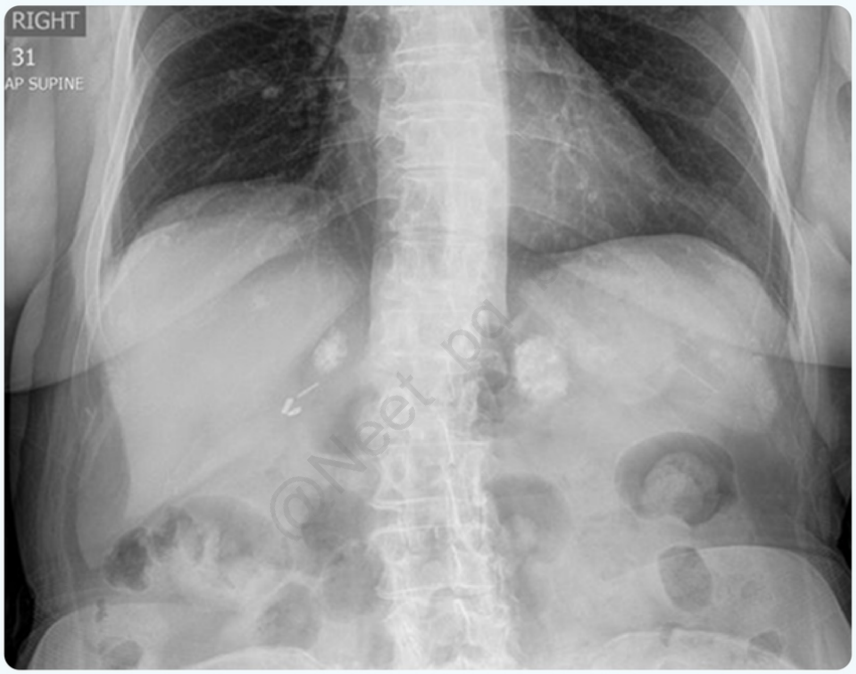
MRI - T2 hyperintense “Light bulb” sign

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MIBG scan showing increased radiotracer uptake on the left adrenal gland

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X-ray showing bilateral adrenal calcification

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References:

Grainger and Allison's Diagnostic Radiology, 7th Edition, Page 950

Textbook of Radiology and Imaging, David Sutton, 8th Edition, Volume 1, Page 3160, 3161, 3168, 3170, 3190

↑ *Back to this question in Part A*

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Q3: A 65 y/o male with a history of coronary artery disease presents with hypertension resistant to medication. A Doppler ultrasound shows a renal artery to proximal aorta ratio (RAR) of 4:1 and a peak systolic velocity (PSV) of 250 cm/s. What is the most likely cause of these findings? (Q852820)

A. Ureteral obstruction

B. Fibromuscular dysplasia

C. Renal vein thrombosis

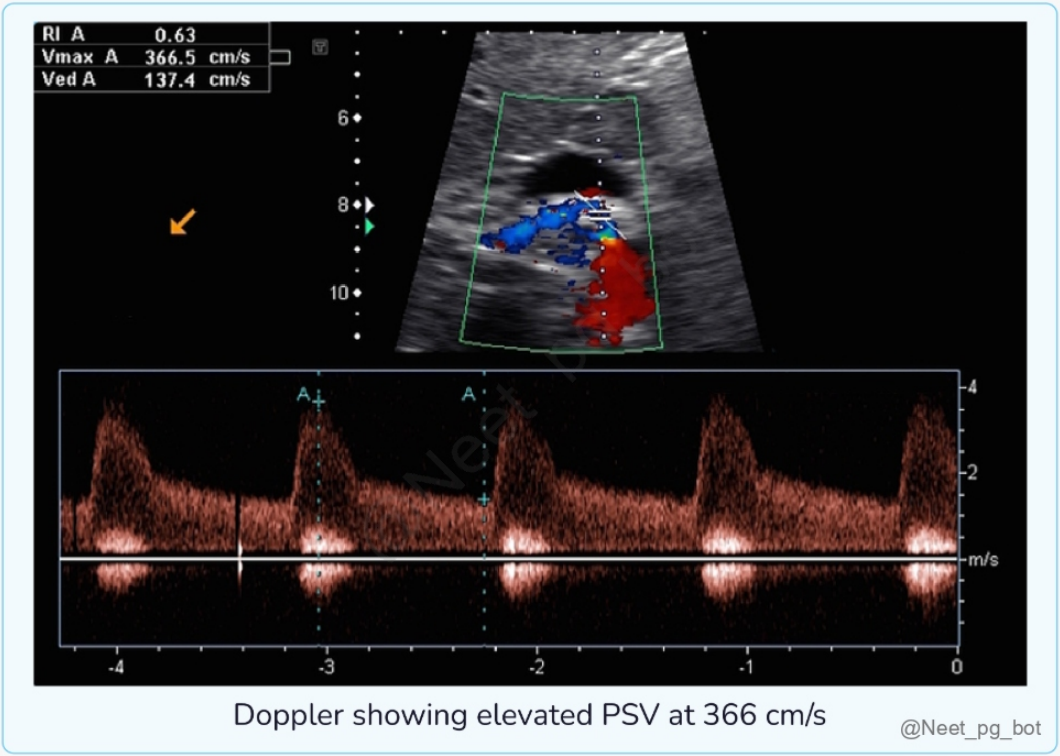
D. Renal artery stenosis

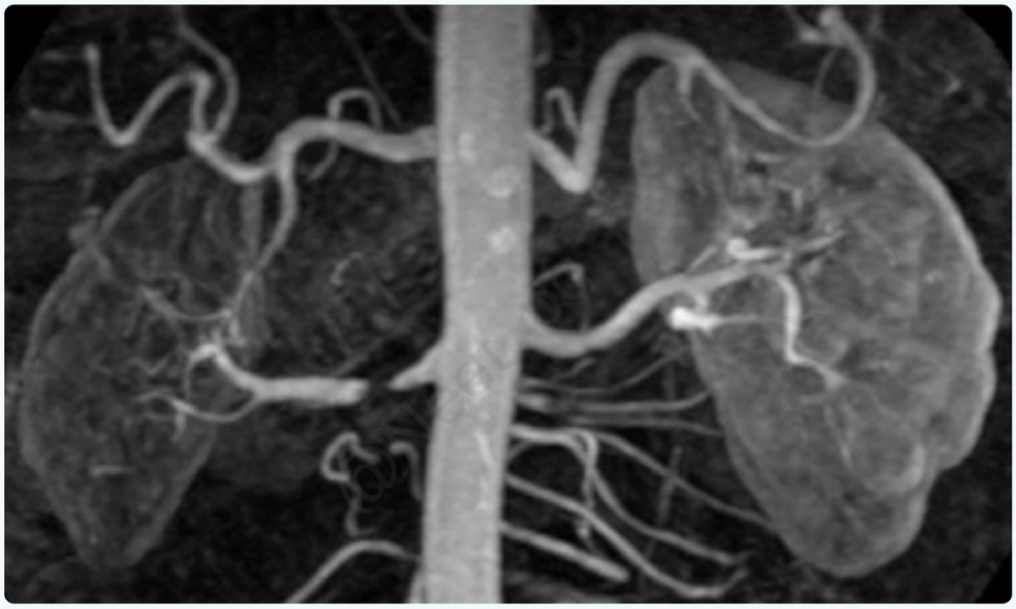
Correct Answer: D. Renal artery stenosis

■ *Listen (English)*

■ *Listen (Hindi)*

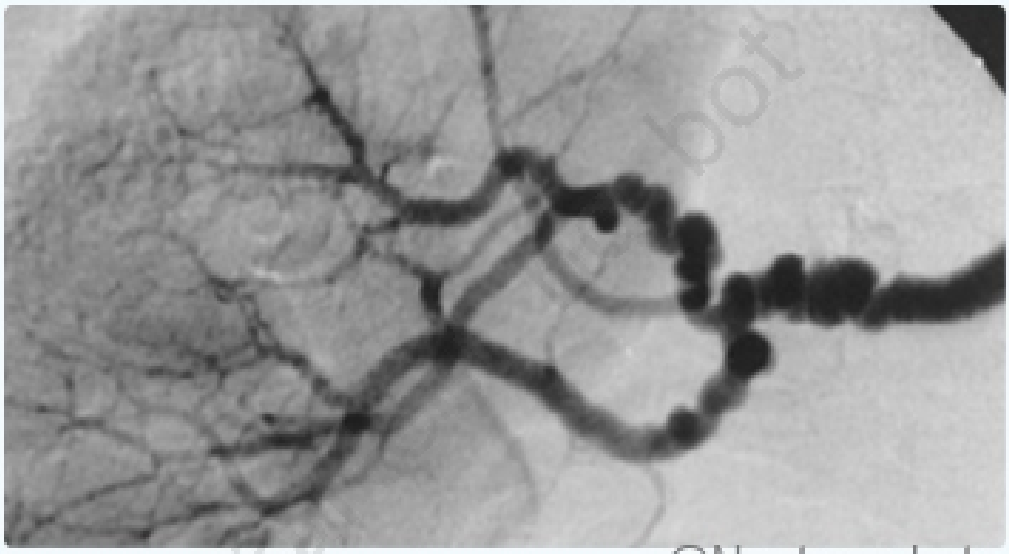
Explanation: Renal artery stenosis is the most common cause of secondary hypertension in elderly patients, usually due to atherosclerosis. The Doppler ultrasound findings strongly support this diagnosis as well. Renal Artery Stenosis (Option D) Fibromuscular Dysplasia (Option B ruled out) • Narrowing of the arteries that supply blood to the kidneys. • Common Causes: Atherosclerosis (most common, especially in elderly patients). Fibromuscular Dysplasia (FMD) (second most common, more frequent in young females). • The second most common cause of RAS after atherosclerosis. • Typically affects middle to distal renal arteries. More common in young females and often affects both kidneys. Doppler Ultrasound Signs of RAS : Direct signs : • PSV > 180 cm/s. • Renal artery to proximal aorta ratio (RAR) > 3.5:1. • Aliasing artefacts and lack of Doppler signals. Indirect signs : Acceleration time > 70 ms. (Time from the start of systole to peak systole) Turbulent flow with spectral broadening and increased resistive index. CT Angiography (CTA) and MR Angiography (MRA) : Provide detailed anatomical views of renal arteries and surrounding structures. {{caption_text}} CTA/MRA Findings: "String of beads" pattern, showing alternating narrowings and dilatations. Ureteral obstruction (Option A): It impacts the urinary system and does not directly affect the blood flow in the renal arteries. It would not result in the arterial Doppler findings of elevated PSV and RAR. Renal vein thrombosis (Option C): Renal vein thrombosis involves the veins rather than the arteries and would not produce the Doppler findings of elevated PSV or an increased RAR. It usually presents with other signs, such as hematuria or flank pain.





Contrast Enhanced MR Angiography showing stenosis of the Right Renal Artery

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CT shows a beaded appearance on the right renal artery

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References:

Grainger and Allison's Diagnostic Radiology, 7th Edition, Page 807, 1461

Textbook of Radiology and Imaging, David Sutton, 8th Edition, Volume 1, Page 1820, 1822, 3016

↑ *Back to this question in Part A*

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Q4: A 45 y/o patient with a history of diabetes and prolonged analgesic use presents with signs of acute renal failure. A CT urography shows deformed calyces and filling defects in the pelvicalyceal system. What is the likely cause of the filling defects seen in this patient? (Q852819)

A. Necrosed papilla

B. Medullary sponge kidney

C. Ureteral stricture

D. Vesicoureteric reflux

Correct Answer: A. Necrosed papilla

■ *Listen (English)*

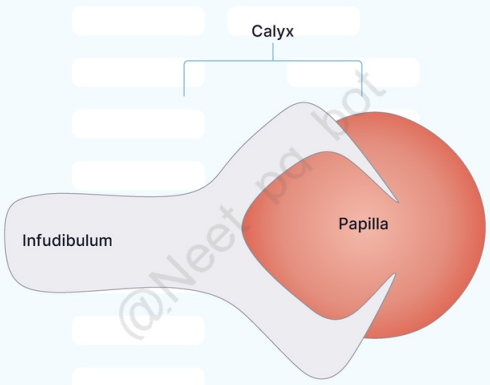
■ *Listen (Hindi)*

Explanation: The given clinical features and radiographic findings point to Renal papillary necrosis. Renal papillary necrosis occurs due to ischemic damage, leading to the necrosis of the papilla. It is commonly seen in patients with diabetes mellitus. These necrosed papillae can detach from the renal medulla and slough into the pelvicalyceal system, resulting in filling defects in CT urography . The sloughed papilla may also obstruct the ureter or vesicoureteric junction, contributing to acute renal failure and other complications. {{caption_text}} Lobster claw appearance Medullary sponge kidney (Option B): It involves cystic dilation of the renal collecting ducts and typically presents with linear striations or sponge-like appearances on imaging, which resolve with the use of contrast. It does not cause sloughing of the papilla or filling defects in the pelvicalyceal system like renal papillary necrosis. Ureteral stricture (Option C): A ureteral stricture causes narrowing of the ureter and may lead to obstruction of urine flow, but it does not cause filling defects within the calyces. Vesicoureteric reflux (Option D): This involves the abnormal backward flow of urine from the bladder into the ureters. However, VUR does not result in the sloughing of papillae or filling defects in the renal pelvicalyceal system, which are key features of renal papillary necrosis.

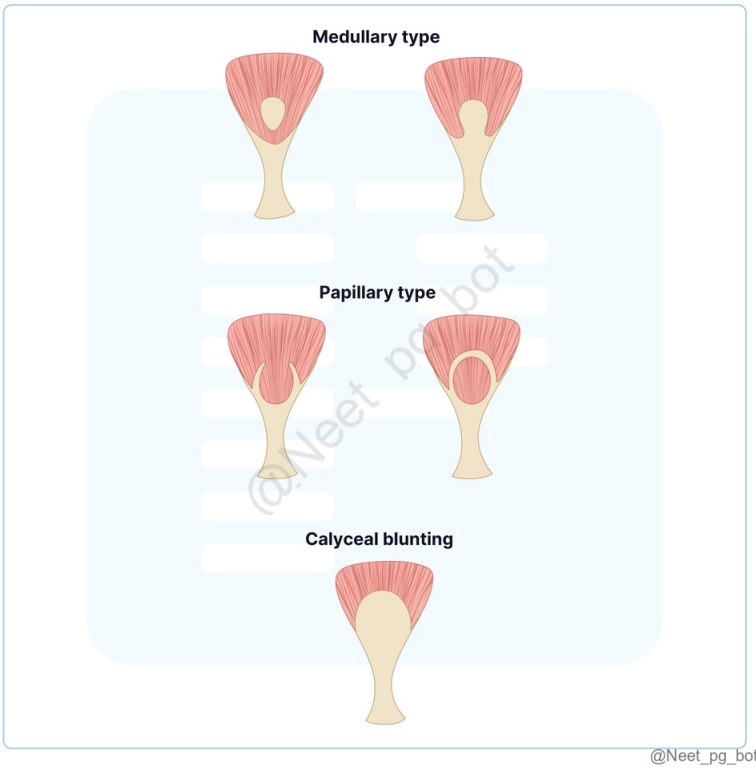


CT showing left-sided calyx clubbing and right-sided filling defects

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References:

Grainger and Allison's Diagnostic Radiology, 7th Edition, Page 740, 760

Textbook of Radiology and Imaging, David Sutton, 8th Edition, Volume 1, Page 2896, 2922, 2923, 2982, 3009

↑ *Back to this question in Part A*

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Q5: A 6-month-old infant is evaluated for an abdominal mass found during a routine examination. An ultrasound reveals large cysts in the kidney and it appears predominantly cystic with little to no identifiable renal parenchyma. What is the most likely diagnosis? {{caption_text}} (Q852818)

A. Autosomal recessive polycystic kidney disease (ARPKD)

B. Multicystic dysplastic kidney (MCDK)

C. Autosomal dominant polycystic kidney disease (ADPKD)

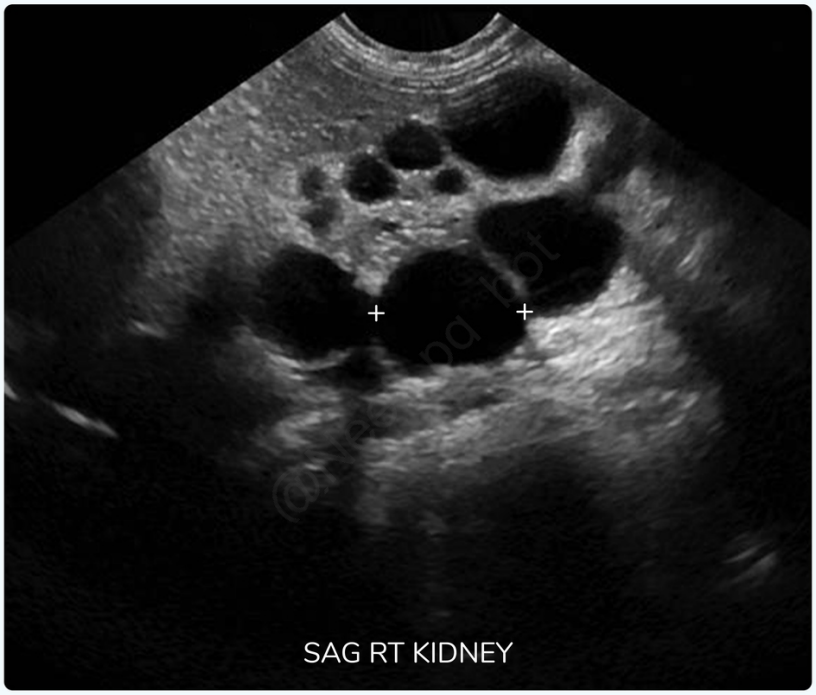
D. Simple renal cysts



Correct Answer: B. Multicystic dysplastic kidney (MCDK)

- *Listen (English)*
- *Listen (Hindi)*

Explanation: The ultrasound findings of a predominantly cystic kidney structure with large cysts, minimal renal parenchyma and the patient’s age align perfectly with MCDK, which typically presents with multiple cystic spaces replacing the kidney. Multicystic dysplastic kidney: {{caption_text}} Multicystic dysplastic kidney (MCDK) is a severe form of congenital kidney abnormality where the kidney is mostly made up of cysts and non-functioning, abnormally developed tissue. Renal parenchyma is hardly seen. Multiple cystic spaces replace the entire kidney. Multicystic dysplastic kidney is usually unilateral. Autosomal recessive polycystic kidney disease (ARPKD): It is a hereditary condition seen in infants. There is dilatation of renal tubules. Several tiny cysts (<2mm) are seen scattered throughout the renal parenchyma giving the kidney a striated appearance. (Option A ruled out) X-ray: Bilateral flank masses due to nephromegaly (enlarged kidneys). USG: Kidneys are predominantly hyperechoic with loss of corticomedullary differentiation. CT imaging: Shows smooth, enlarged kidneys with a striated pattern of contrast excretion. The striated pattern signifies the collection of contrast in dilated renal tubules. Plain abdominal radiograph showing B/L flank mass USG showing ARPKD Striated nephrogram on CT {{caption_text}} {{caption_text}} {{caption_text}} Autosomal dominant polycystic kidney disease (ADPKD) (Option C) generally presents in older children and adults and is characterized by larger cysts along with preserved renal parenchyma, not predominantly cystic kidneys in infancy. Simple renal cysts (Option D) would not explain the significant loss of renal architecture seen in this infant's ultrasound and are generally not seen to replace the entire kidney.



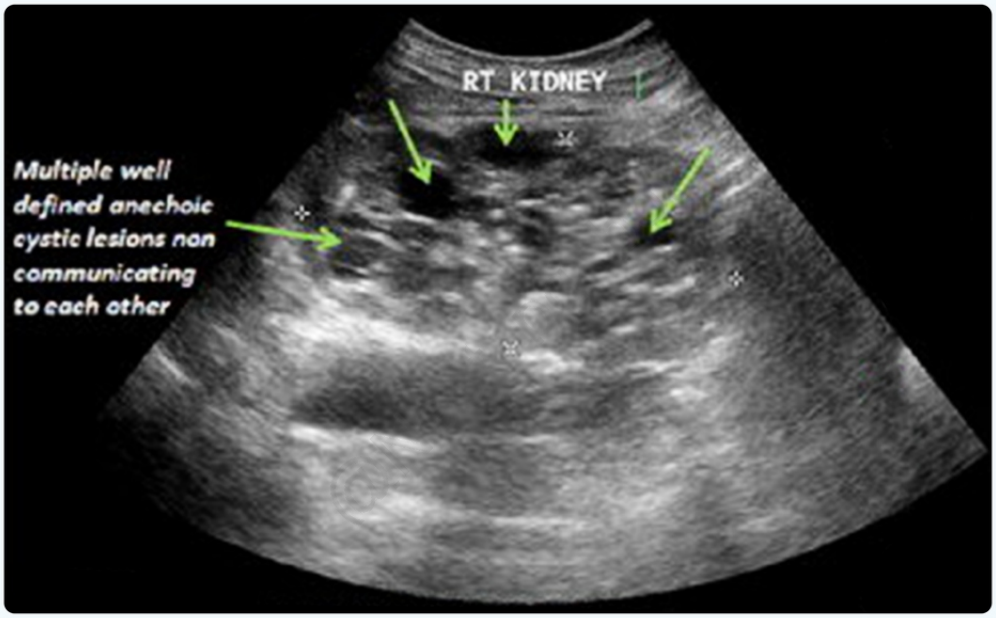
Ultrasound showed a multicystic dysplastic kidney

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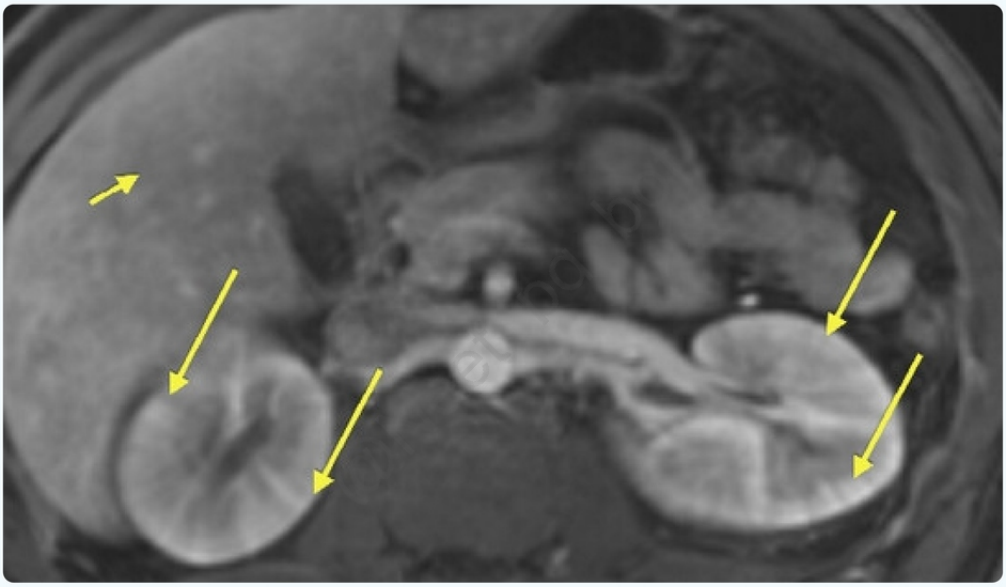
Plain abdominal radiograph
showing B/L flank mass

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USG showing ARPKD

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Striated nephrogram on CT

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References:

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Grainger and Allison's Diagnostic Radiology, 7th Edition, Page 778

Textbook of Radiology and Imaging, David Sutton, 8th Edition, Volume 2, Page 2926

↑ *Back to this question in Part A*

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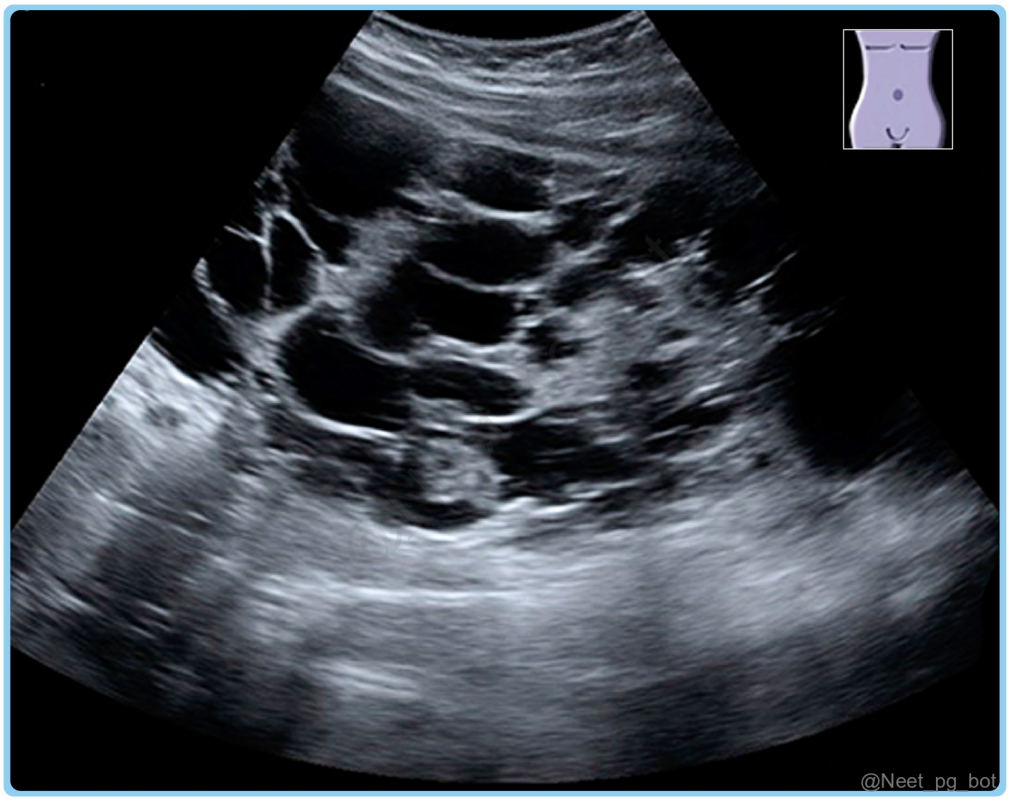
Q6: A 55-year-old woman, with a family history of renal disease, presents with hematuria and hypertension. She has a history of recurrent flank pain and is currently diagnosed with renal failure. Ultrasound imaging is given below. What is the most likely diagnosis? {{caption_text}} (Q852817)

A. Simple renal cysts

B. Autosomal dominant polycystic kidney disease (ADPKD)

C. Multicystic dysplastic kidney

D. Renal cell carcinoma

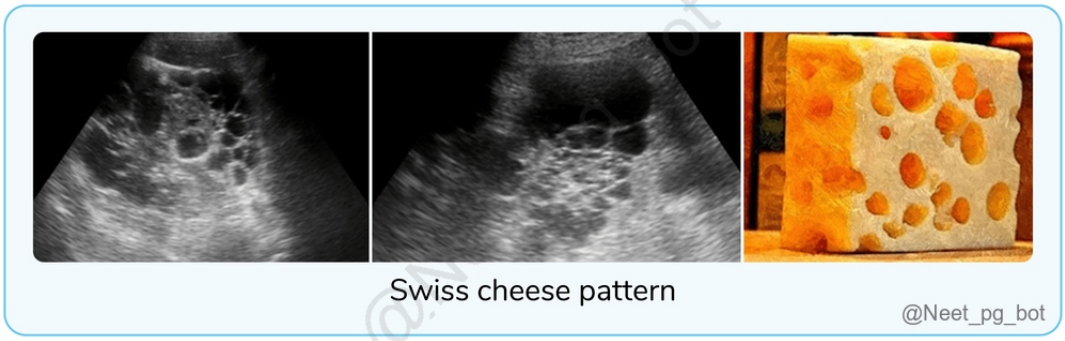


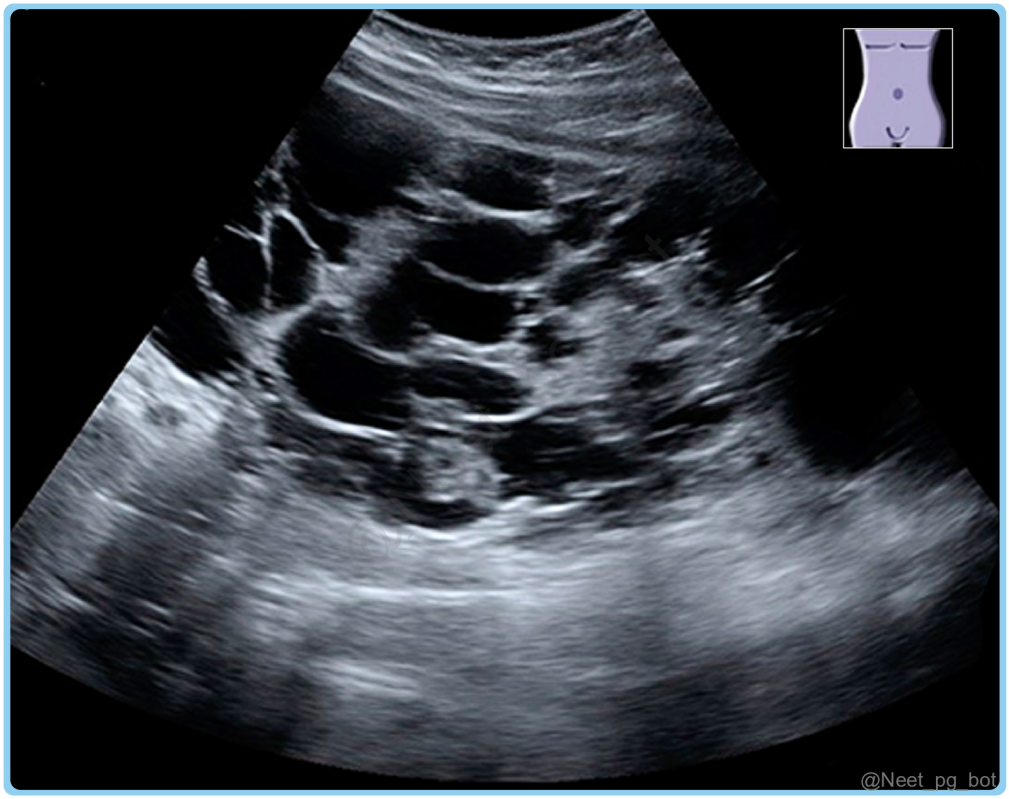
Correct Answer: B. Autosomal dominant polycystic kidney disease (ADPKD)

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: The patient’s age, presenting history, family history, diagnosis of renal failure and ultrasound findings of multiple cysts align with the diagnosis of ADPKD, which is characterized by numerous renal cysts. Autosomal dominant polycystic kidney disease (ADPKD). Familial disorder with autosomal dominant inheritance , classified as a ciliopathy . Kidneys are progressively replaced by multiple cysts in the cortex and medulla, with initial preservation of intervening parenchyma. ADPKD is typically diagnosed between ages 30 and 50 , when symptoms first appear, thus being named "adult PKD”. Typically presents in adults with hematuria , hypertension , and renal failure . It is associated with other conditions namely intracranial aneurysms, heart valve dysfunctions, colonic diverticula, aortic dissection and cystic lesions in other organs like the liver, spleen and pancreas. Imaging Plain Radiograph • Enlarged, multilobulated renal outlines with bowel displacement. • Multiple calcifications, sometimes with multiple ring appearance. • Intravenous urography : "Swiss cheese nephrogram" (due to multiple renal cysts), "Spiderleg pyelogram" (stretched pelvicalyceal system). Ultrasound • Simple cysts: Anechoic with thin walls, posterior acoustic enhancement, and lateral shadowing. • Complicated cysts (haemorrhage/infection): Echogenic material within the cyst, possible wall calcification, absence of internal blood flow. • CEUS : Demonstrates enhancement {{caption_text}} CT • Simple cysts: Rounded with near-water attenuation and thin walls. • Complications (haemorrhage/infection): Higher attenuation and wall calcification. {{caption_text}} MRI • T2 MRI- The most sensitive imaging modality • Both enlarged kidneys have multiple cysts {{caption_text}} Simple renal cysts (Option A): While simple cysts appear anechoic with thin walls, the presence of multiple cysts in a familial context strongly suggests ADPKD. Multicystic dysplastic kidney (Option C): This condition typically presents in children and is characterized by a non-functioning kidney with multiple cysts and intervening dysplastic tissue, which does not match this case. Renal cell carcinoma (Option D) usually presents as a solid mass with possible necrosis or irregular borders, rather than multiple simple cysts.

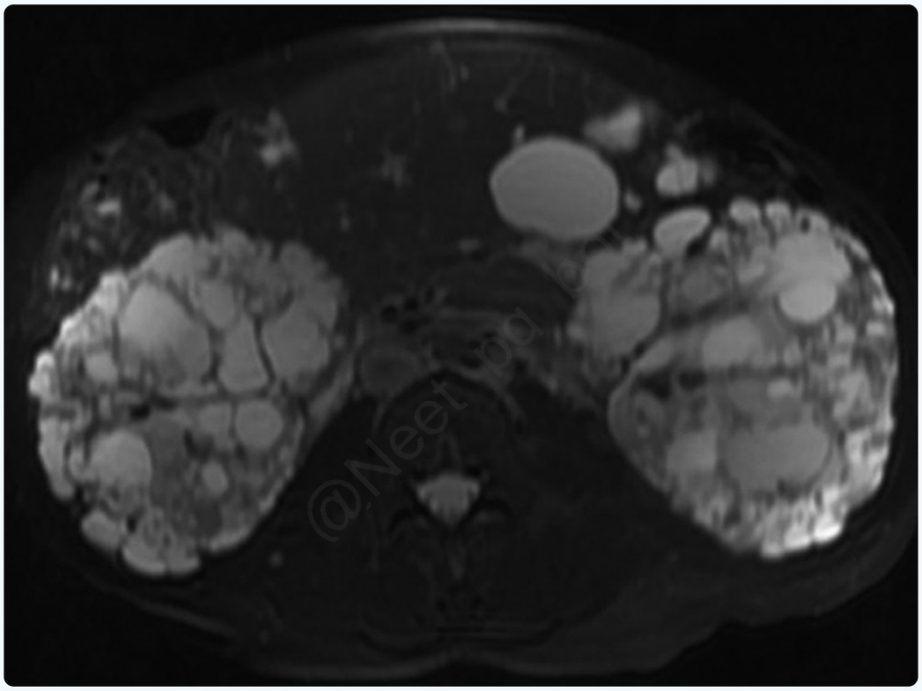






CT showing ADPKD

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MRI showing ADPKD

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References:

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Textbook of Radiology and Imaging, David Sutton, 8th Edition, Volume 2, Page 2928

↑ *Back to this question in Part A*

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Q7: A 45 y/o woman presents with a family history of renal cell carcinoma, along with multiple skin lesions resembling fibrofolliculomas. She also reports episodes of spontaneous pneumothorax. What is the most likely diagnosis? (Q852816)

A. Angiomyolipoma

B. Oncocytoma

C. Birt-Hogg-Dubé syndrome

D. Tuberous sclerosis

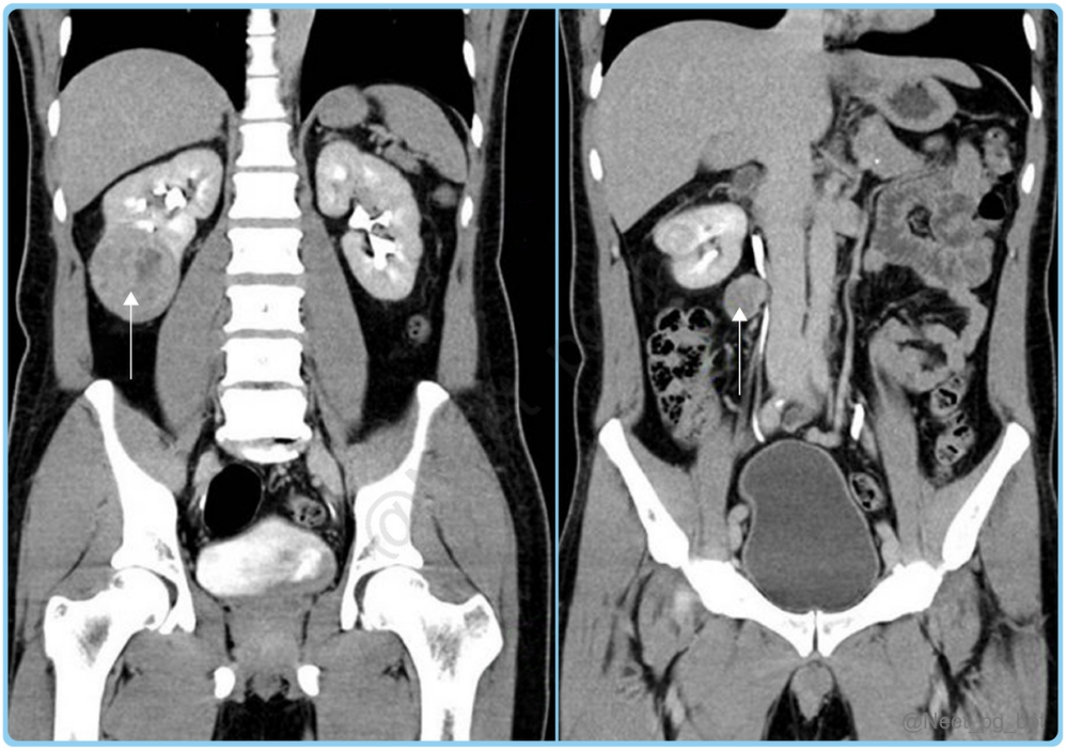
Correct Answer: C. Birt-Hogg-Dubé syndrome

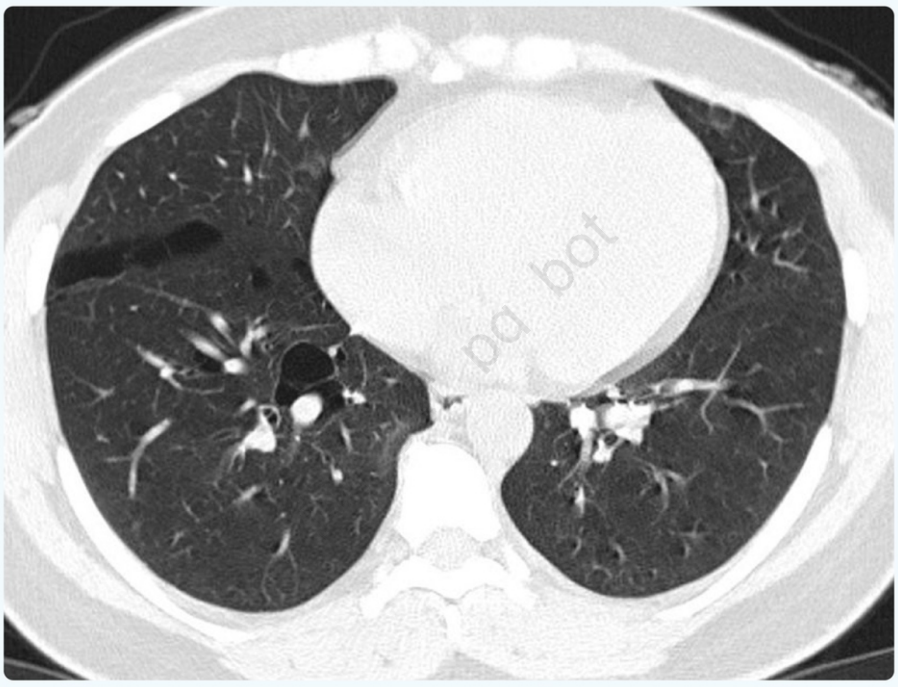
■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: The presence of fibrofolliculomas, renal cell carcinoma, lung cysts, and spontaneous pneumothorax is characteristic of Birt-Hogg-Dubé syndrome, an autosomal dominant disorder. Birt Hogg Dube syndrome Birt-Hogg-Dubé syndrome (BHDS) is an autosomal dominant disorder clinically manifested by fibrofolliculomas, renal cell carcinoma, lung cysts, and spontaneous pneumothorax. Caused by mutations in the FLCN gene, affecting folliculin, which is involved in cellular signaling and regulation. The syndrome is rare and often presents in adults. Patients have a higher likelihood of developing renal tumours , particularly chromophobe and oncocytoma types. {{caption_text}} {{caption_text}} {{caption_text}} Fibrofolliculomas: Papulous skin lesions Renal Cell Carcinoma CT showing hypodense lesions in the kidney. Lung cysts on pulmonary CT Angiomyolipoma {{caption_text}} Angiomyolipoma consists of abnormal blood vessels, smooth muscle, and fat. The risk of spontaneous retroperitoneal haemorrhage increases with larger lesions (>4cm) (Wunderlich syndrome). Multiple angiomyolipomas suggest an association with tuberous sclerosis . USG: Appears as hyperechoic on ultrasound . CT: CT scan shows fatty masses in the kidney. The presence of fat helps to distinguish it from other renal masses. Angiomyolipoma (Option A) is a benign renal tumour associated with tuberous sclerosis but does not typically present with skin lesions like fibrofolliculomas or spontaneous pneumothorax. Oncocytoma (Option B) is a benign renal tumour characterized by large eosinophilic cells but is not associated with fibrofolliculomas or lung cysts as seen in Birt-Hogg-Dubé syndrome. Moreover, oncocytoma presents with a central stellate scar in the kidney - visible on CT and MRI, which is not seen in this case. {{caption_text}} Tuberous sclerosis (Option D) is associated with multiple hamartomas, including angiomyolipomas in the kidneys, but does not typically feature fibrofolliculomas or spontaneous pneumothorax as prominent findings.

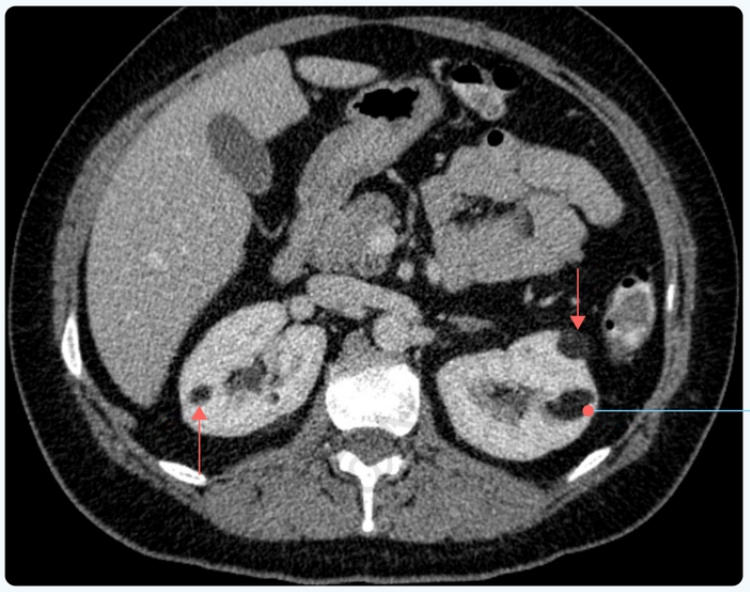






Lung cysts on pulmonary CT

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Angiomyolipoma

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CT showing a central stellate scar

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References:

Grainger and Allison's Diagnostic Radiology, 7th Edition, Page 796

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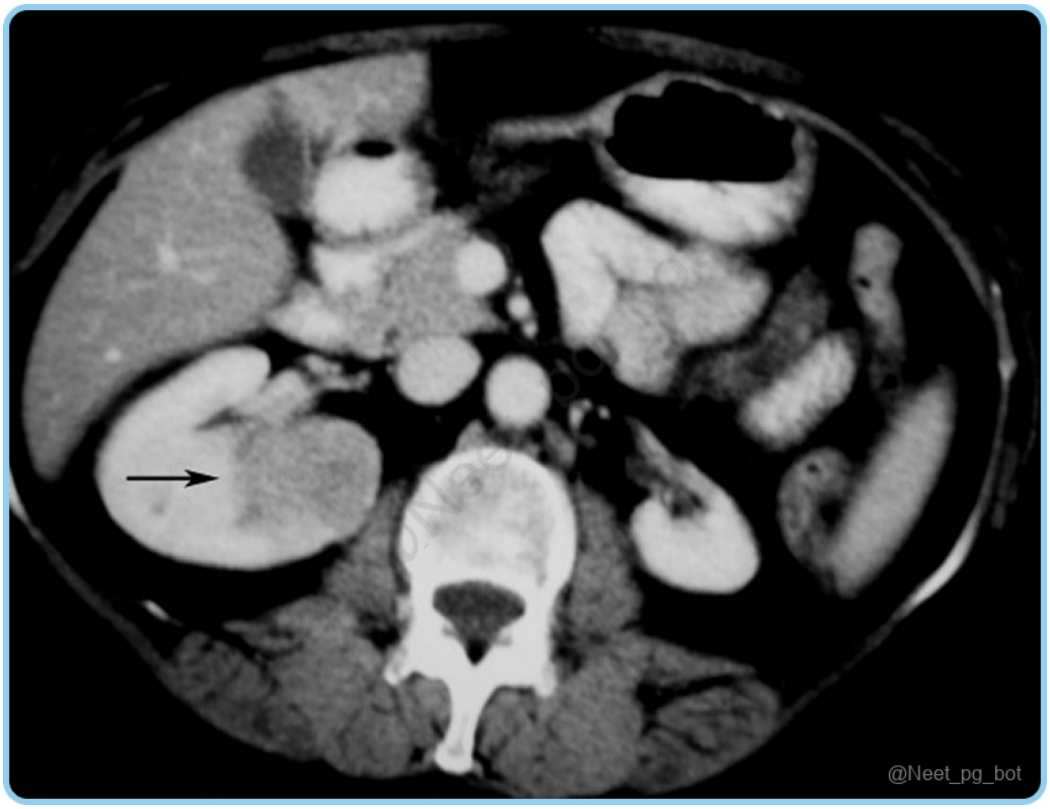
Q8: A 62 y/o female patient presents with hematuria and flank pain. A CECT scan reveals a solid hyper-enhancing renal mass measuring 5 cm. The radiologist notes heterogeneous enhancement and suggests further evaluation for possible extension into the inferior vena cava (IVC). Which of the following imaging modalities is the most appropriate next step to evaluate for potential IVC extension or thrombus? (Q852815)

A. Contrast-enhanced ultrasound

B. Contrast-enhanced CT

C. Contrast MRI

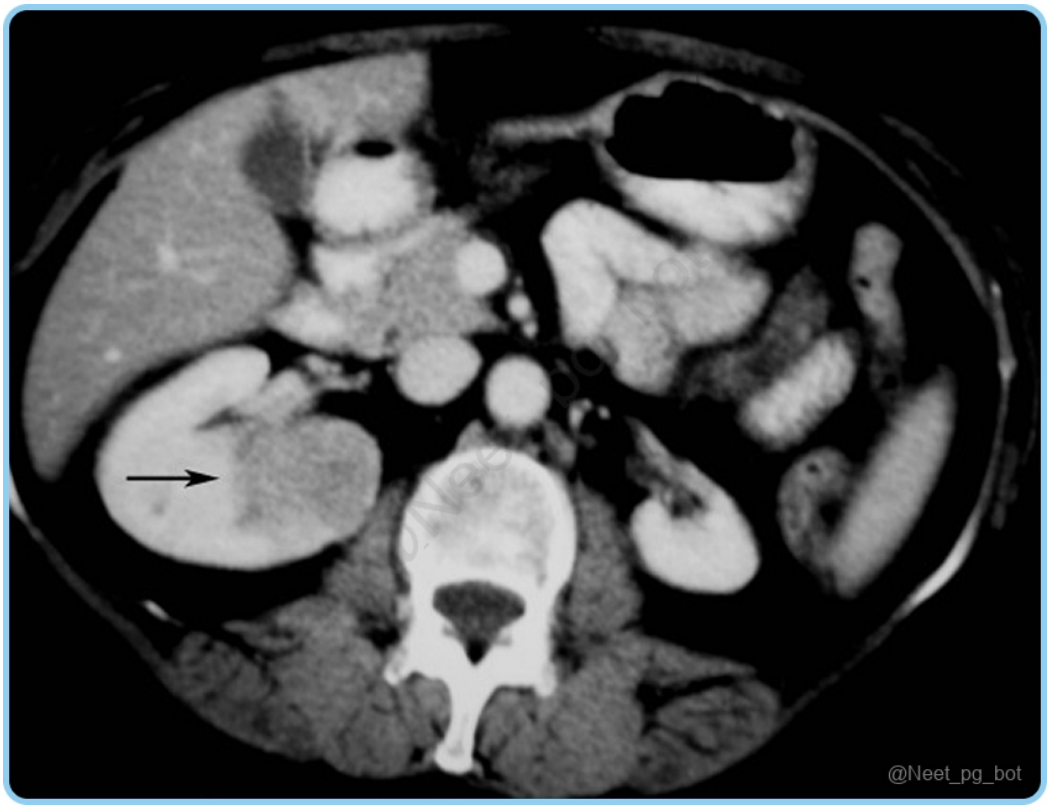
D. Plain abdominal X-ray

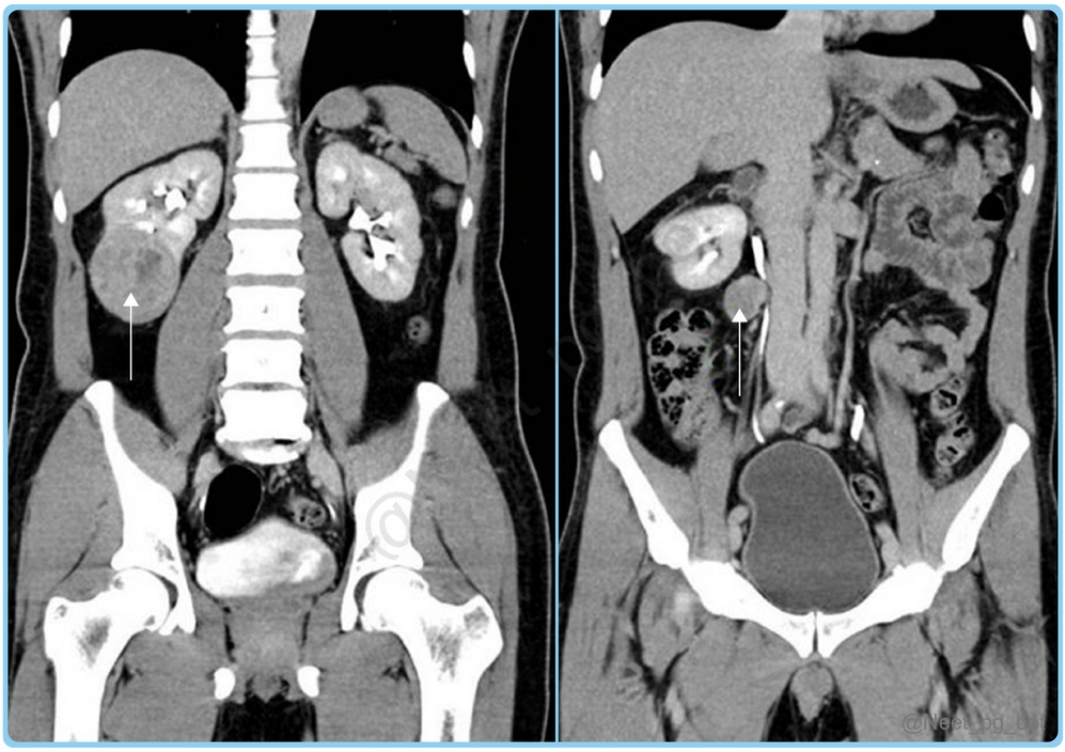


Correct Answer: C. Contrast MRI

- *Listen (English)*
- *Listen (Hindi)*

Explanation: The patient likely has renal cell carcinoma, given the presence of a hyper-enhancing solid renal mass with heterogeneous enhancement on CECT, which is characteristic of this malignancy. Contrast MRI is the most appropriate next step as it is the investigation of choice for detecting inferior vena cava extension or thrombus in renal cell carcinoma. Renal cell carcinoma {{caption_text}} CECT scan shows a right kidney mass suggestive of primary RCC {{caption_text}} CT scan showing Renal cell carcinoma Solid enhancing lesion. Clear cell carcinoma is the most common type, comprising 85% of malignant renal tumours. It is hyper-enhancing after contrast administration. Associated with Von Hippel-Lindau (VHL) syndrome , often with multiple small tumours in cysts. Heterogeneous enhancement on CECT suggests renal cell carcinoma. Renal cell carcinoma can extend into the inferior vena cava (IVC). Contrast MRI is the investigation of choice to detect IVC extension or thrombus . MRI helps differentiate benign vs. malignant thrombus by showing contrast uptake. Contrast-enhanced CT is the investigation of choice for renal cell carcinoma diagnosis and staging . MRI is used in problem-solving or when contrast agents are contraindicated. Contrast-enhanced ultrasound (Option A) : While useful in certain contexts, it is less definitive for assessing vascular involvement compared to MRI. Contrast-enhanced CT (Option B) : Although it is the preferred modality for diagnosing and staging renal cell carcinoma, the scenario specifically calls for evaluation of IVC extension, which is better assessed with MRI. Plain abdominal X-ray (Option D) : This modality is not suitable for assessing the extent of renal cell carcinoma or IVC involvement.





References:

Grainger and Allison's Diagnostic Radiology, 7th Edition, Page 797-800

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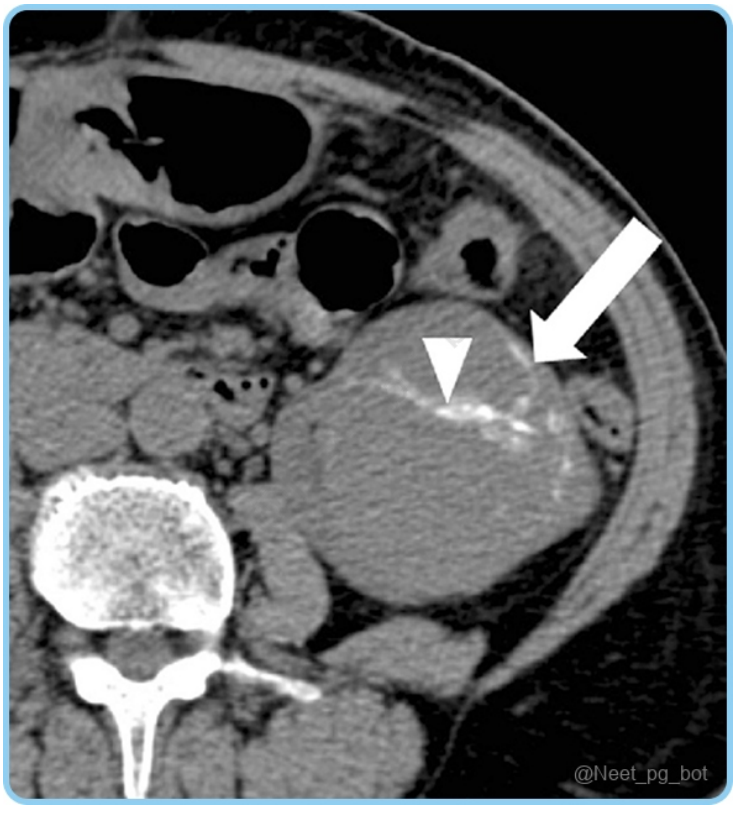
Q9: A 45 y/o male undergoes an imaging study for evaluation of flank pain. A CECT scan reveals a renal cyst with multiple hairline thin septa and minimal wall thickening. The cyst shows thick nodular calcifications but no measurable enhancement after contrast administration. Based on the Bosniak classification, which of the following management options is most appropriate for this patient? {{caption_text}} (Q852814)

A. No follow-up is needed; continue routine monitoring.

B. Follow-up imaging every 6 months for 1 year.

C. Surgical excision or ablation of the cyst.

D. Follow-up imaging every 6 weeks for 1 year.

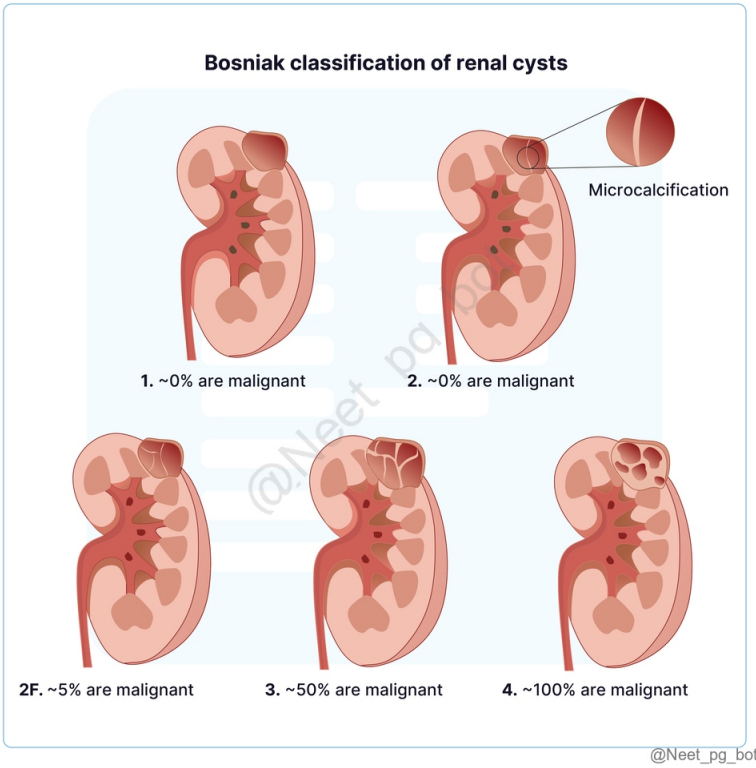


Correct Answer: B. Follow-up imaging every 6 months for 1 year.

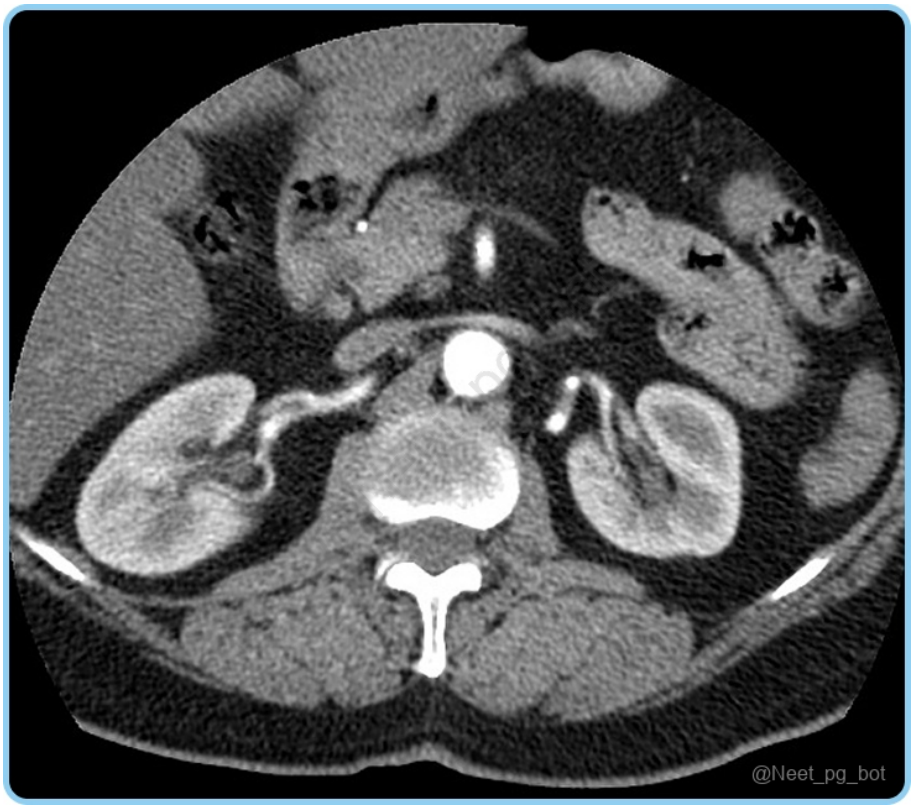
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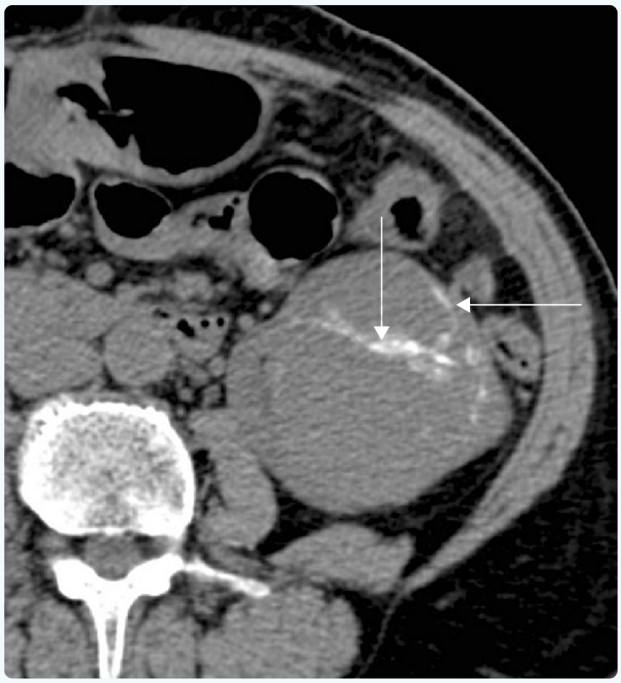
■ *Listen (Hindi)*

Explanation: The CT findings describe a renal cyst with multiple hairline thin septa, minimal wall thickening, and thick nodular calcifications. These features are consistent with Category IIF of the Bosniak classification. The recommended management for this category includes close follow-up with imaging every 6 months for 1 year to monitor any changes. Bosniak Classification of Renal Cysts & Management Category Description Management Category I • Simple cyst, fluid density, hairline thin wall. • No septa, calcifications, or solid components. • No enhancement post-intravenous contrast. {{caption_text}} CT showing a simple cyst. • No follow-up is required. Category II • Cyst with some hairline thin septa, and fine calcifications. • Uniformly high-density (<3 cm). • No measurable enhancement. {{caption_text}} CT showing hairline septa and fine calcifications • No follow-up is required. • US or CT may be sufficient for characterisation. Category IIF • Multiple hairline thin septa, minimal wall/septa thickening. • Thick nodular calcifications or uniformly high-density (>3 cm). • Malignancy Risk : ~20% {{caption_text}} • Follow-up : ■ Every 6 months for 1 year with CT or MRI. ■ Followed by Imaging done annually for at least the next 5 years. ■ May progress to Category III or IV. Category III • Thickened, irregular, or smooth enhancing walls/septa. • Malignancy Risk : ~50% {{caption_text}} CT showing thickened septa • Treatment : Surgical excision/ablation due to high malignancy risk. • Imaging : ■ Contrast-enhanced triphasic CT for follow-up. Category IV • Same as Category III with additional soft-tissue components independent of walls/septa. • Malignancy Risk : ~90% {{caption_text}} CT showing thickened septa with additional soft tissue components • Treatment : Surgical excision/ablation is recommended. • Imaging : Same protocol as Category III for imaging with triphasic CT. No follow-up needed; continue routine monitoring (Option A) : Inappropriate because follow-up is needed due to the presence of septa and calcifications. Surgical excision or ablation of the cyst (Option C) : Surgical excision is not typically indicated for Category IIF cysts given the lower risk of malignancy. Follow-up imaging every 6 weeks for 1 year(Option D) : This is an excessively frequent follow-up schedule, making it an unrealistic and incorrect option.




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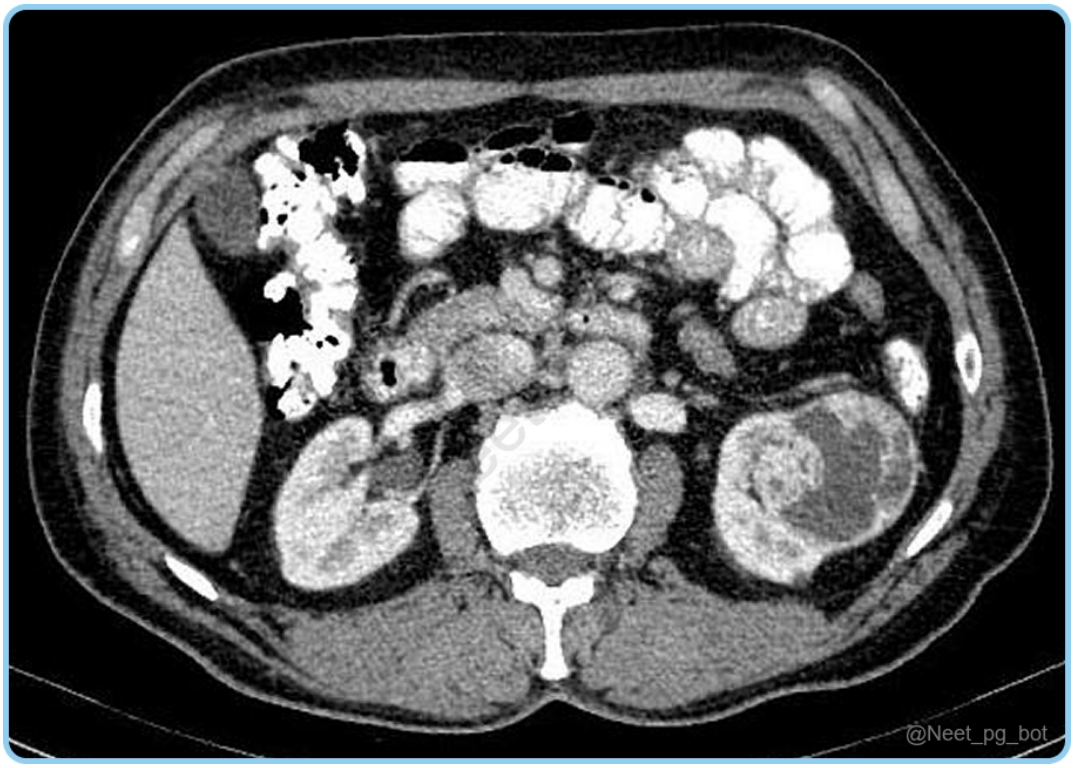

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CT image shows a lesion with irregular calcifications within the wall (arrow) and septa (arrowhead)

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References:

Grainger and Allison's Diagnostic Radiology, 7th Edition, Page 781,783

↑ *Back to this question in Part A*

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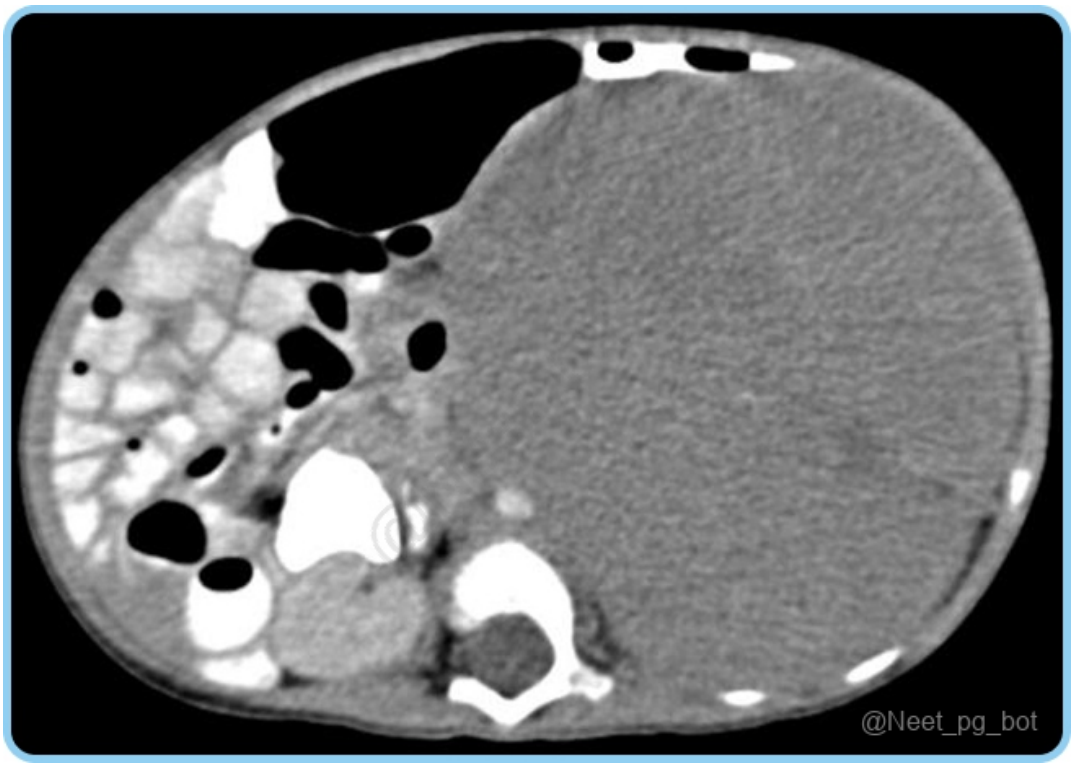
Q10: A 2 y/o child presents with abdominal distension and a palpable abdominal mass. A CT scan is given below. What is the most likely diagnosis? {{caption_text}} (Q852813)

A. Wilms Tumor (Nephroblastoma)

B. Neuroblastoma

C. Renal Cell Carcinoma

D. Hepatoblastoma

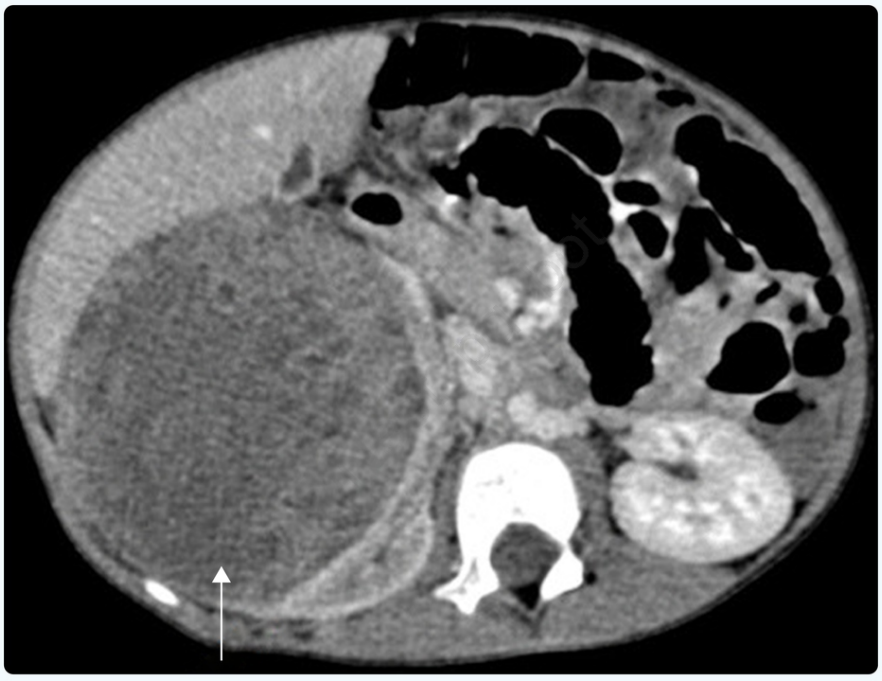


Correct Answer: B. Neuroblastoma

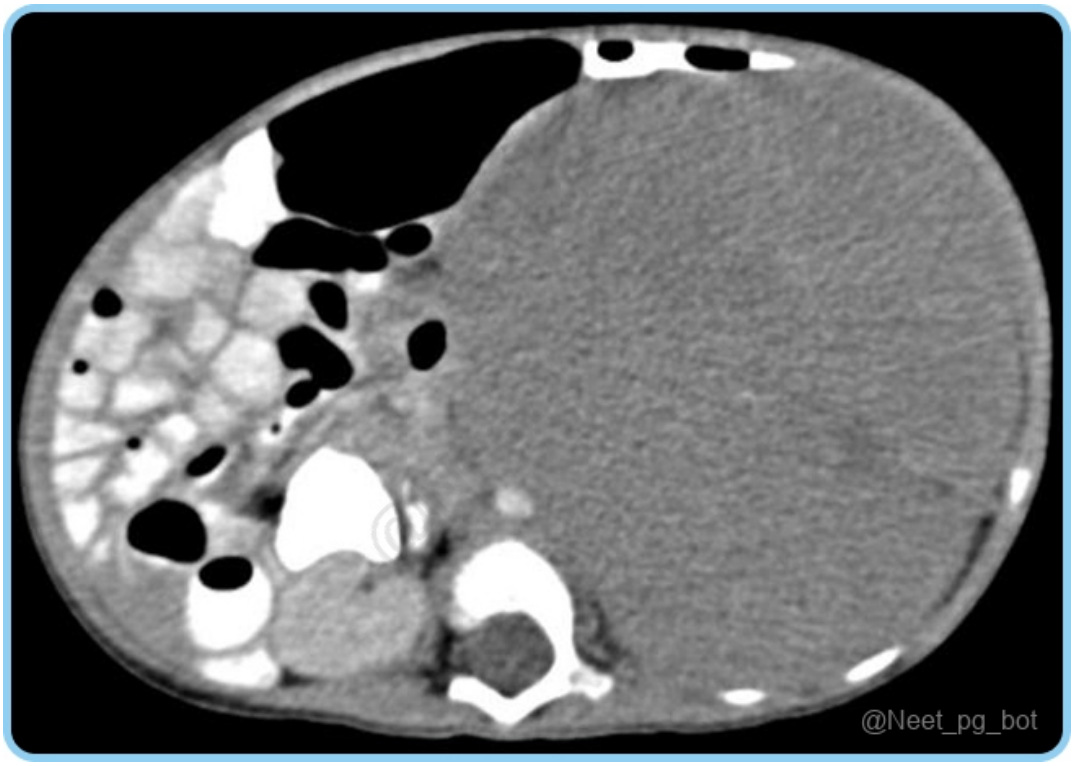
■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: Neuroblastoma commonly occurs in children under 2 years, presents as a poorly marginated mass encasing vascular structures, and is associated with features such as midline crossing, which aligns with the CT findings. CT shows a hypodense mass displacing the kidney posteriorly and displacing structures away from the midline. Wilms Tumor (Nephroblastoma) Neuroblastoma • Calcification : Uncommon (10-15%) • Vascular involvement : Displaces renal vessels but does not encase them • Age group : Slightly older (peak at 3-4 years) • Margins : Well-circumscribed • Claw sign : Kidney claw sign present • Vascular extension : Common into IVC/renal vein • Midline crossing : Does not cross midline • Bone metastases : Rare, lung metastases are common • Spinal canal extension : Never seen • Retroperitoneal lymph nodes : Uncommon • Hemorrhage : Higher incidence {{caption_text}} • Calcification : Very common • Vascular involvement : Encases but does not invade vessels • Age group : Younger (<2 years) • Margins : Poorly marginated • Aorta : Elevates aorta away from the vertebral column • Midline crossing : Frequently crosses the midline, especially behind the aorta • Thoracic extension : Common • Bone metastases : Common (Hutchinson syndrome) • Spinal canal extension : Can occur • Retroperitoneal lymph nodes : Common {{caption_text}} Wilms Tumor (Nephroblastoma) (Option A): Typically presents in slightly older children (peak at 3-4 years) with well-circumscribed margins, making this less likely. Renal Cell Carcinoma (Option C): More common in adults and does not typically present in this age group. Hepatoblastoma (Option D): While it can present in young children, it typically originates from the liver rather than the kidneys and does not match the imaging findings described.



CT showing Wilms tumour



References:

radiopaedia.org/articles/neuroblastoma-vs-wilms-tumour-1

Grainger and Allison’s Diagnostic Radiology, 7th Edition, Page 1876,1877

↑ *Back to this question in Part A*

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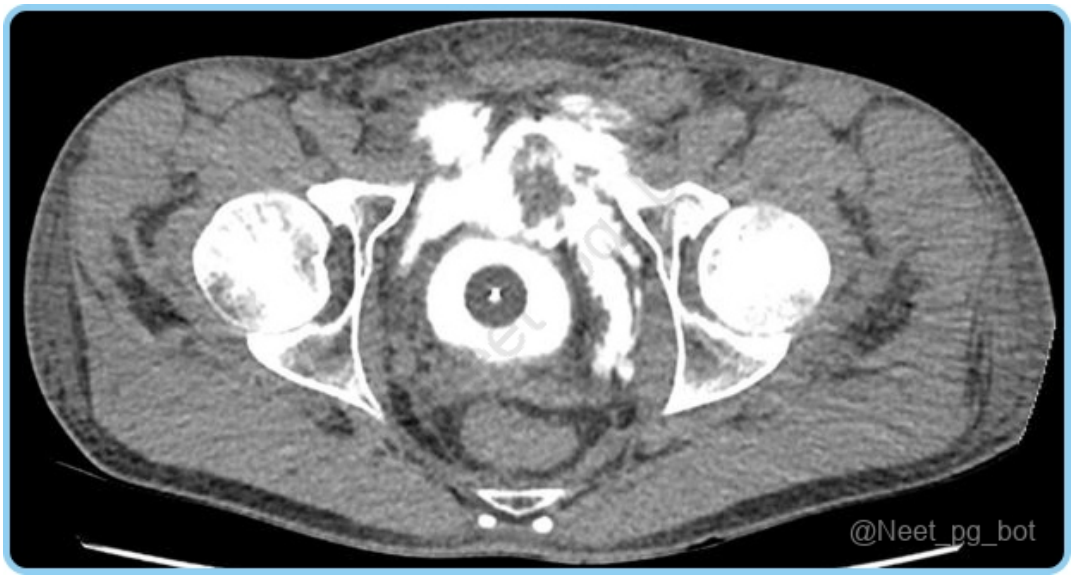
Q11: A 42-year-old male presents to the emergency department with severe pelvic pain after a motor vehicle collision. CT cystogram of the patient is given below. What type of injury is most likely responsible for the patient's symptoms? {{caption_text}} (Q852812)

A. Intraperitoneal bladder rupture

B. Extraperitoneal bladder rupture

C. Bulbous urethra rupture

D. Membranous urethra rupture



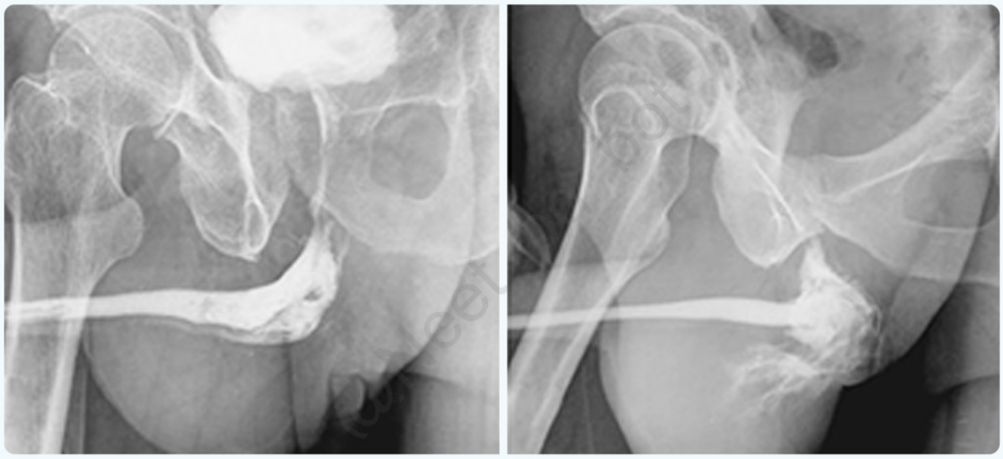
Correct Answer: B. Extraperitoneal bladder rupture

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: The clinical scenario, history, and CT findings of pelvic molar tooth sign due to contrast leakage into the preperitoneal space suggest the diagnosis of Extraperitoneal bladder rupture associated with pelvic fractures. 1. Urethral rupture {{caption_text}} Contrast flows out of the urethra. In pelvic fracture, membranous urethra rupture occurs. In straddle injury, bulbous urethra rupture occurs. 2. Bladder rupture Can be of 2 types Extra-peritoneal bladder rupture Intra-peritoneal bladder rupture • Caused by pelvic fractures and rapid deceleration. • Leakage into thighs, perineum, penis, anterior abdominal wall. • Commonly associated with pelvic

fractures. {{caption_text}} • The pelvic molar tooth sign refers to contrast media leaking from the bladder and accumulating in the preperitoneal space, creating a molar tooth-shaped appearance on CT cystography after extraperitoneal bladder rupture. • Occurs at the bladder dome, above the peritoneal reflection. • Caused by a direct blow to a distended bladder. • Urine leakage into the abdomen; causes metabolic derangements. {{caption_text}} Intraperitoneal bladder rupture (Option A): Less likely, as this type typically does not present with the molar tooth sign or urethral contrast extravasation. Bulbous urethra rupture (Option C): Unlikely, as the scenario primarily indicates bladder involvement rather than a specific urethral injury. Membranous urethra rupture (Option D): Less likely, as the symptoms and imaging findings suggest a bladder injury rather than an isolated urethral rupture.



Urethrogram showing partial and complete urethral rupture

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Axial (A) and sagittal reconstruction (B) from CT cystography demonstrates contrast extravasating from the ruptured bladder in the space of Retzius, and surrounding the bladder and the preperitoneal structures in the shape of a “molar tooth”

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CT showing intra-peritoneal bladder rupture

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References:

emedicine.medscape.com/article/451797-overview#

radiopaedia.org/articles/molar-tooth-sign-pelvis#

www.ncbi.nlm.nih.gov/books/NBK557875/

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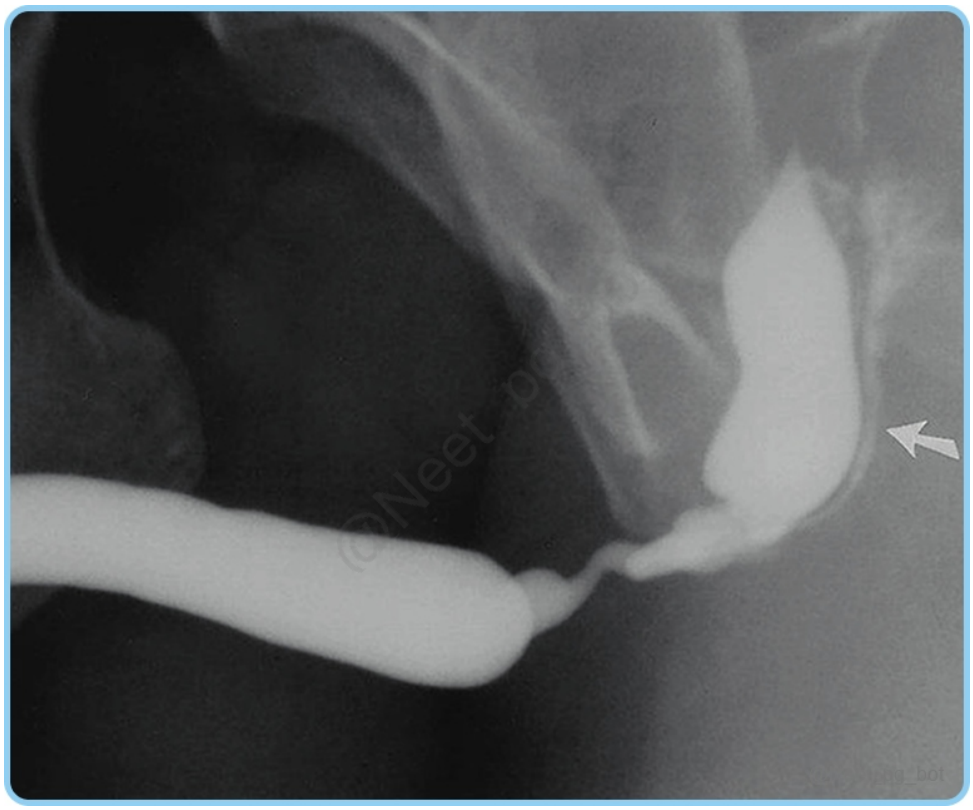
Q12: A 35-year-old male presents with difficulty urinating and a history of profuse, creamy urethral discharge. He reports a prior untreated sexually transmitted infection. The urethrogram of the patient is given below. What is the most likely diagnosis? (Q852811)

A. Urethral carcinoma

B. Bulbar urethral stricture

C. Penile urethral stricture

D. Benign prostatic hyperplasia

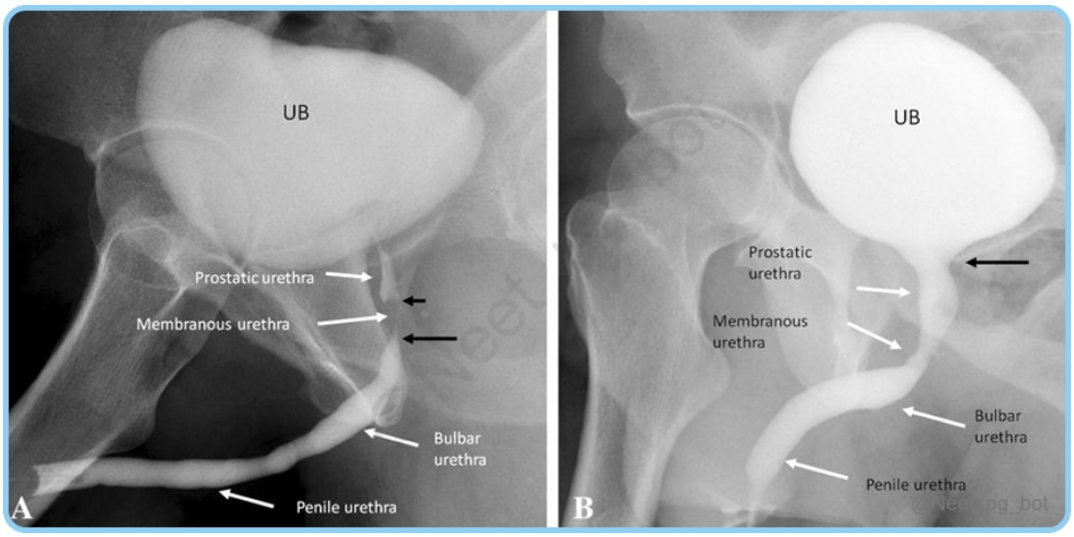


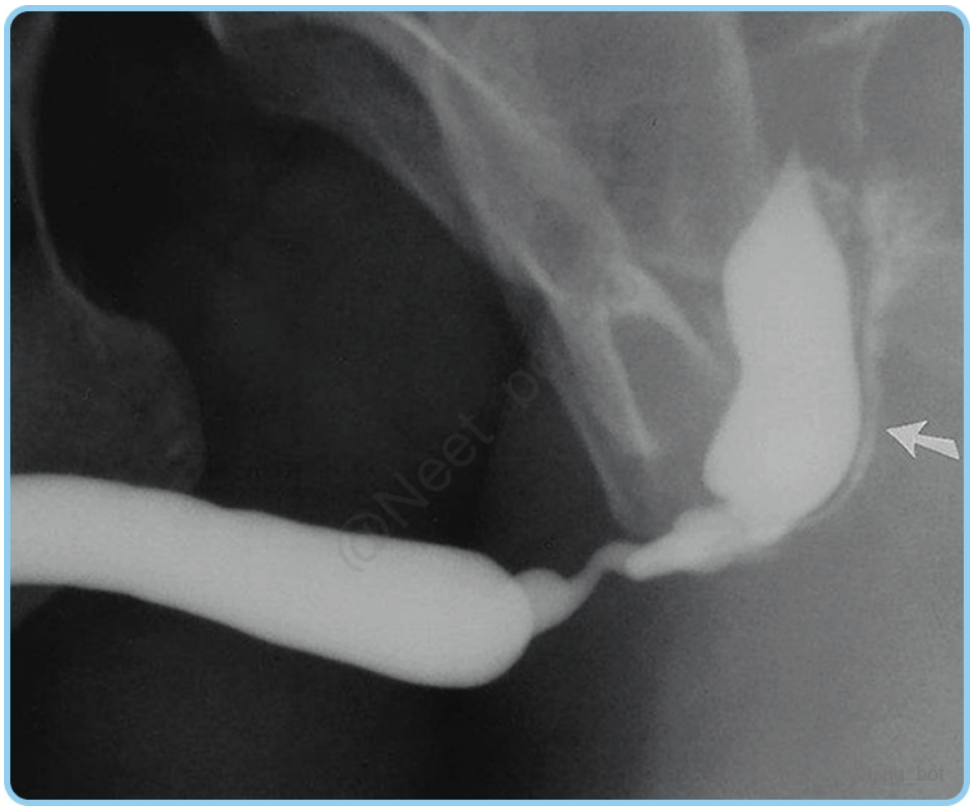
Correct Answer: B. Bulbar urethral stricture

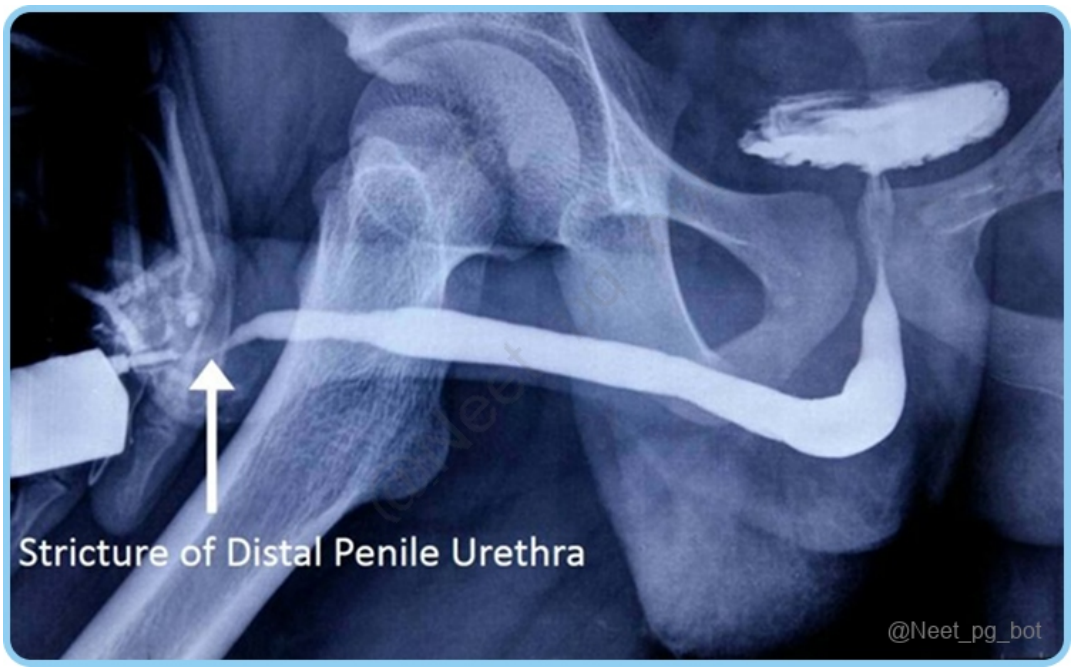
■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: The patient's symptoms of difficulty urinating and a history of profuse, creamy urethral discharge strongly suggest a gonococcal infection, which can lead to inflammation and scarring in the bulbar urethra, resulting in a stricture. The urethrogram findings of narrowing specifically in the bulbar urethra support this diagnosis. Parts of urethra {{caption_text}} Bulbar urethral stricture {{caption_text}} • Stricture seen in the bulbar urethra. • Common in gonorrhoea. • Presents with profuse, purulent or mucopurulent urethral discharge. Stricture of distal penile urethra {{caption_text}} • Urethrogram showing narrowing in the distal urethra. Urethral carcinoma (Option A): Less likely due to the absence of risk factors and the typical presentation of malignancy, which would not match the history of an untreated STI. Penile urethral stricture (Option C): Unlikely, as the urethrogram shows narrowing in the bulbar urethra, and penile strictures are less common in this context. Benign prostatic hyperplasia (BPH) (Option D): Unlikely due to the patient's younger age and specific symptoms that align more with a urethral stricture rather than bladder outlet obstruction.


UB
Prostatic urethra
Membranous urethra
Bulbar urethra
Penile urethra
A
UB
Prostatic urethra
Membranous urethra
Bulbar urethra
Penile urethra
B





References:

www.ncbi.nlm.nih.gov/books/NBK564297/

emedicine.medscape.com/article/778374-clinical

↑ *Back to this question in Part A*

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Q13: A 40 y/o male presents with a history of urinary incontinence and recurrent urinary tract infections. Imaging reveals a bladder with a thickened, trabeculated wall and an elongated shape, resembling a cone. Which of the following bladder appearances is most likely to be seen in this patient? (Q852810)

A. Christmas tree bladder

B. Keyhole appearance

C. Bladder wall calcification

D. Teardrop bladder

Correct Answer: A. Christmas tree bladder

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: Bladder Appearances in Radiology Christmas Tree bladder (Option A) Teardrop bladder (Option D ruled out) Also known as the fir-tree bladder, it is typically seen in the neurogenic bladder due to detrusor-sphincter dyssynergia. The bladder appears elongated and trabeculated, resembling a pine cone or Christmas tree. Often associated with suprasacral lesions or epiconal lesions (above or around S2-S4). {{caption_text}} Refers to a pear-shaped bladder caused by external compression. It can result from pelvic hematoma, pelvic lipomatosis, or excess pelvic fat. The bladder may appear inverted or upright, depending on the source of compression. {{caption_text}} Bladder Wall Calcification (Option C ruled out) Keyhole Appearance (Option B ruled out) Occurs in advanced schistosomiasis. The bladder wall calcifies in a ringlike pattern, resembling a fetal skull on radiologic images. Common in cases of urogenital schistosomiasis, often with calcification of the ureters as well. {{caption_text}} Seen in patients with posterior urethral valves. It is the dilation of the proximal urethra and the presence of a distended, thick-walled bladder. The ultrasound appearance resembles a keyhole. {{caption_text}}

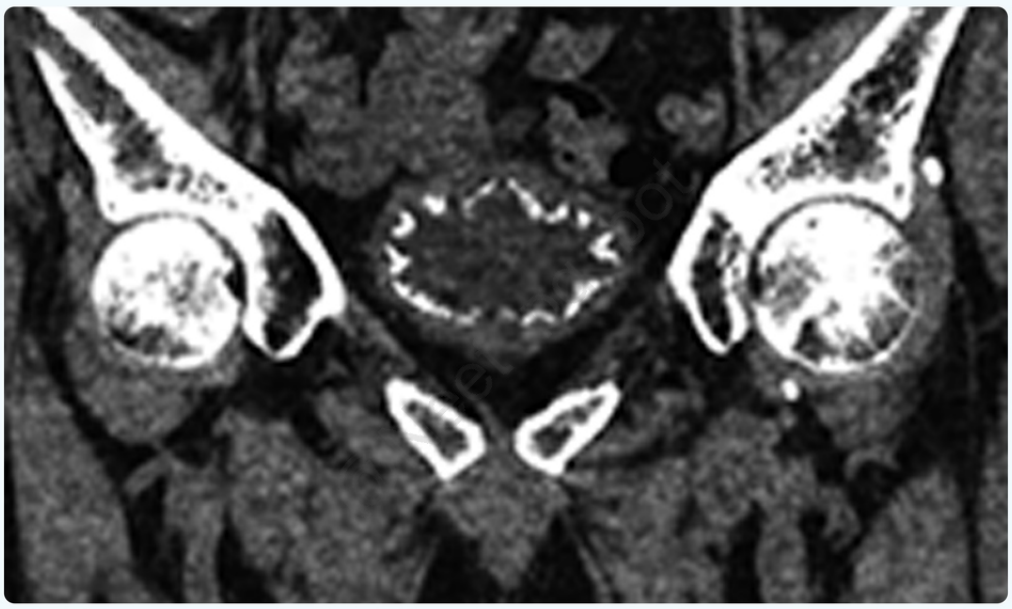


X-ray Fluoroscopy showing Christmas tree appearance



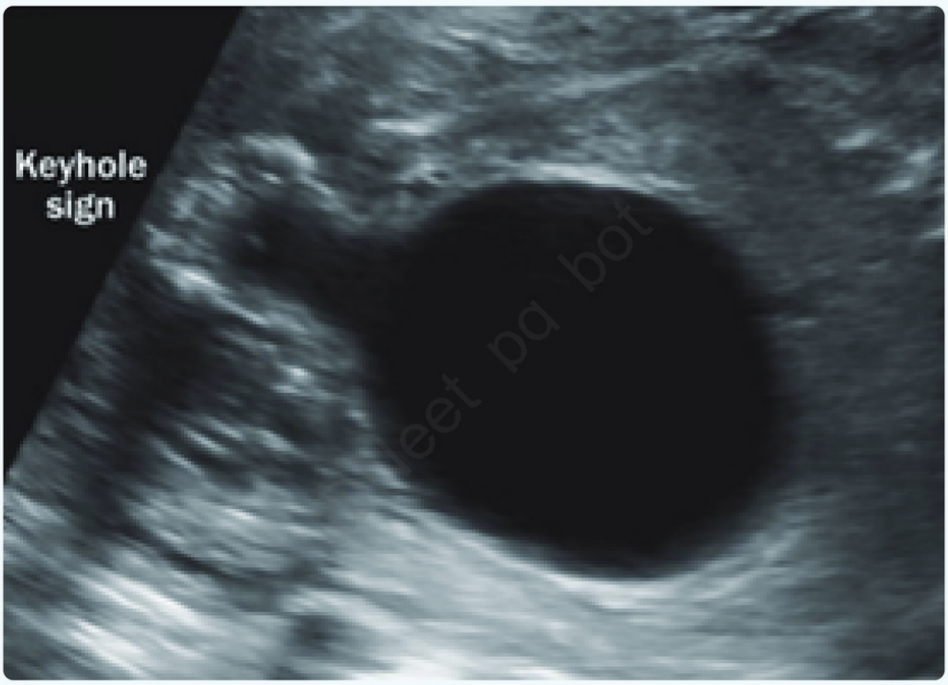
X-ray Fluoroscopy showing Pear shaped bladder

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CT showing Urinary bladder wall calcification

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Ultrasound showing keyhole sign

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References:

Textbook of Radiology and Imaging, David Sutton, 8th Edition, Volume 1, Page 2899

www.eurorad.org/case/10688#

pubmed.ncbi.nlm.nih.gov/318601/#

radiopaedia.org/articles/keyhole-sign-posterior-urethral-valves

↑ *Back to this question in Part A*

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Q14: A 50 y/o male presents to the emergency department with severe flank pain and hematuria. Initial imaging with ultrasound suggests the presence of renal stones. The urologist considers further imaging to assess the urinary tract. The options for further evaluation include Intravenous Pyelography and Retrograde Pyelogram. Which imaging modality is more appropriate for identifying potential ureteral injuries in this patient? (Q852775)

A. Intravenous Pyelography

B. Retrograde Pyelogram

C. Both modalities are equally appropriate.

D. Neither modality is appropriate.

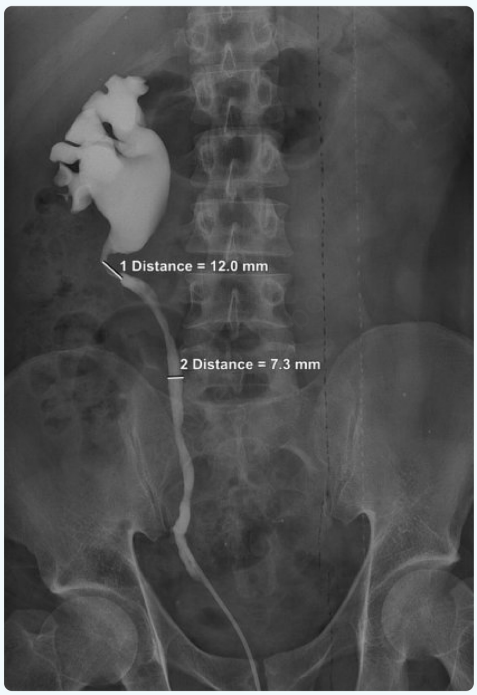
Correct Answer: B. Retrograde Pyelogram

Explanation: Retrograde Pyelogram (RGP) is specifically indicated for assessing ureteral injuries and obstructions. It allows for the introduction of contrast directly into the ureter, providing detailed imaging of ureteral anatomy and any potential injuries, making it the more appropriate choice in this scenario. (Options C & D ruled out) Intravenous Pyelography (IVP) Retrograde Pyelogram (RGP) (Option B) • A diagnostic test involving intravenous contrast and X-ray imaging of the urinary tract. • Purpose: Evaluate hematuria, and renal stone disease, and follow up after interventions. • Mechanism: Iodinated contrast flows through renal vasculature and highlights anatomical structures on X-ray images. • Capture images from the suprarenal region to below the pubic symphysis. • Early bladder filling is important for bladder pathology assessment. • Low osmolar contrast may cause delayed bladder filling. • A procedure that introduces water-soluble contrast retrogradely into the ureter and kidney collecting system under fluoroscopic guidance. • In some cases, an anterograde nephrostogram may be performed to better visualise ureteral injuries or obstructions. • RGP can be performed intraoperatively to evaluate various urinary tract conditions. Indications: • Assessment of flank and lower back pain. • Diagnosis of congenital urinary tract anomalies. • Evaluation of urinary calculi, enlarged prostate, neoplasms, and urinary tract scars/strictures. Indications: • Iatrogenic ureteral injuries . • Ureteral obstruction. • Identification of stones or tumours. • Assistance with stent placement or ureteroscopy. • Trauma evaluation. Pyelography (IVP)" data-author="Glitzy queen00" data-hash="7866" data-license="OPEN ACCESS" data-source="" data-tags="April2025" src="" /> {{caption_text}} {{caption_text}} Intravenous Pyelography (Option A): While IVP is useful for evaluating hematuria and renal stone disease, it is not specifically designed to identify ureteral injuries. IVP focuses on the overall anatomy of the urinary tract but may not provide detailed information about ureteral integrity.



Normal IVP

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Right Pelviureteric junction stricture

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References:

Intravenous Pyelogram - StatPearls - NCBI Bookshelf

pubmed.ncbi.nlm.nih.gov/30959119/

↑ *Back to this question in Part A*

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Q15: A 35 y/o female presents with recurrent urinary tract infections and mild flank pain. An ultrasound reveals a cystic dilation near the lower ureter, and an IVU is shown below. What is the most likely diagnosis? {{caption_text}} (Q852808)

A. Ureterocele

B. Vesicoureteral reflux

C. Hydronephrosis

D. Renal calculi

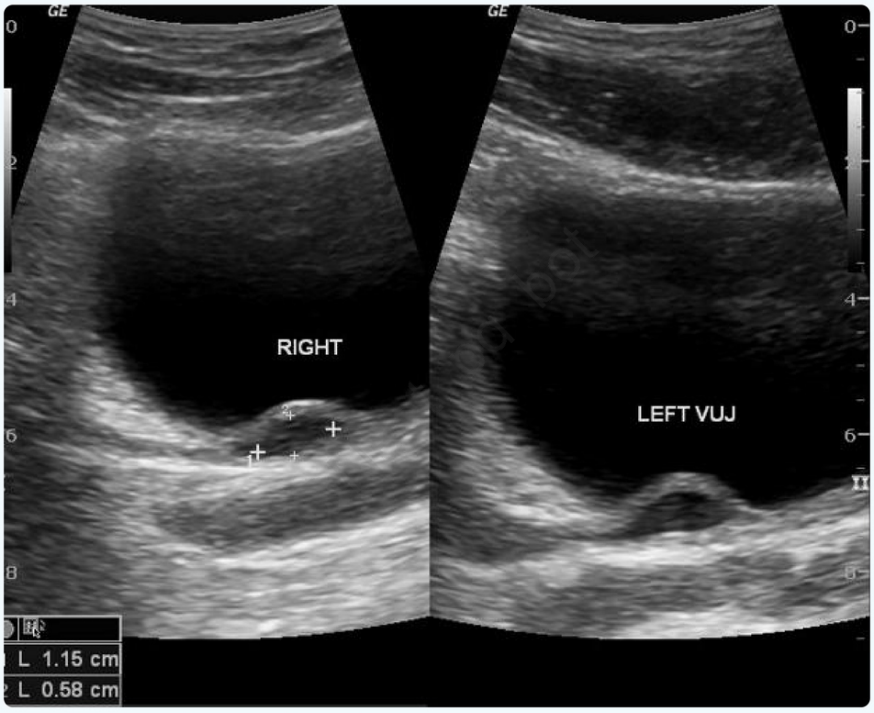


Correct Answer: A. Ureterocele

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: The given IVU shows- a smooth, rounded structure with a radiolucent halo at the ureterovesical junction, also known as the "cobra head" appearance , which is a hallmark of a ureterocele. It results from cystic dilation of the distal ureter, which can cause recurrent infections, as seen in this case. A ureterocele is a congenital dilation of the terminal part of the ureter where it enters the bladder. It consists of layers of ureteric and bladder epithelium. Cobra neck appearance on IVU is a hallmark feature where a dilated contrast-filled ureter is surrounded by a thin rim of the ureteric wall and bladder mucosa, typically measuring less than 2 mm in diameter. Ureterocele {{caption_text}} {{caption_text}} Note: Maiden waist deformity is a term given to describe the medial deviation of both ureters. Commonly seen in retroperitoneal fibrosis or unilateral cases of retrocaval ureter. The ureters take a narrow, waist-like shape, resembling the waist of a maiden, usually at the level of the lumbosacral junction. {{caption_text}} Vesicoureteral reflux (Option B): While reflux can lead to recurrent UTIs, it does not present with the cobra head appearance described on imaging. Hydronephrosis (Option C): This condition results from obstruction, leading to dilation of the renal pelvis and calyces. However, it does not produce the specific cobra head appearance at the ureterovesical junction. Renal calculi (Option D): While stones can cause flank pain and UTIs, they appear as radiopaque densities on imaging and do not have the cobra head sign seen with a ureterocele.



USG showing cystic pouching at left and right ureteral orifices
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X-ray showing cobra head appearance - ureterocele

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X-ray IVU showing maiden waist deformity

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References:

Grainger and Allison’s Diagnostic Radiology, 7th Edition, Page 758

Textbook of Radiology and Imaging, David Sutton, 8th Edition, Volume 1, Page 2903

radiopaedia.org/articles/maiden-waist-deformity

↑ *Back to this question in Part A*

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Q16: Which of the following is a typical finding in the end-stage tuberculosis of the kidney, visible on abdominal radiography? (Q852807)

A. Putty kidney

B. Phantom calyx

C. Sawtooth ureter

D. Hydronephrosis

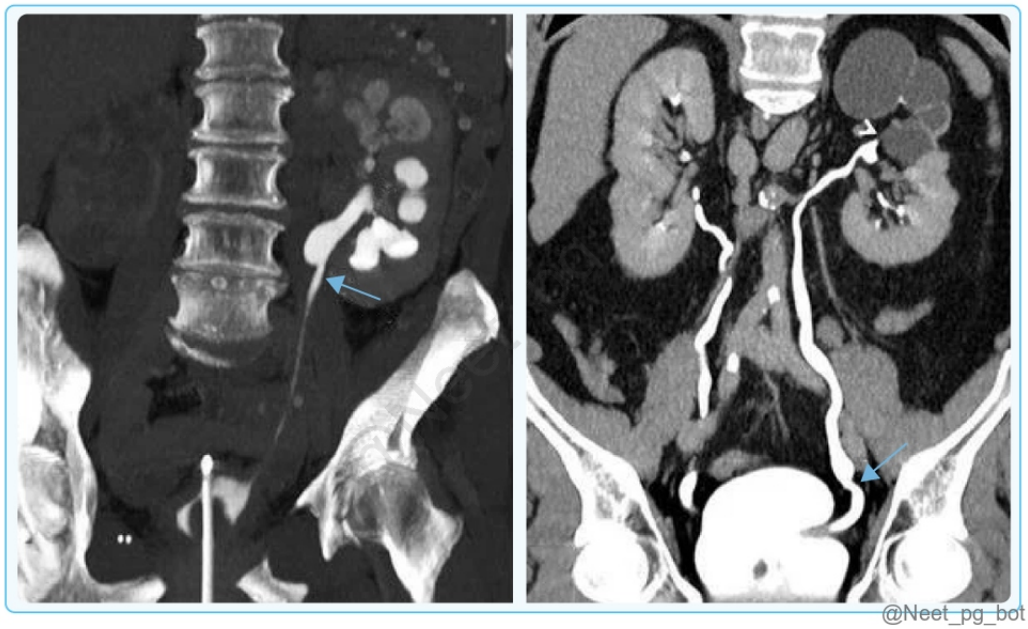
Correct Answer: A. Putty kidney

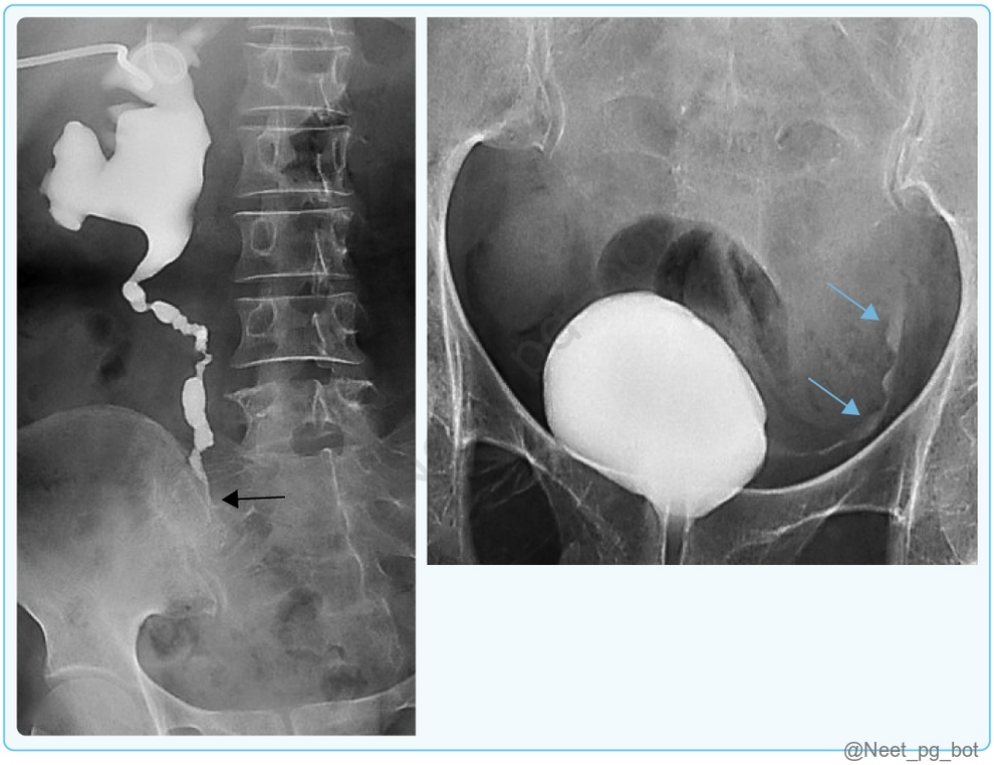
■ *Listen (English)*

■ *Listen (Hindi)*

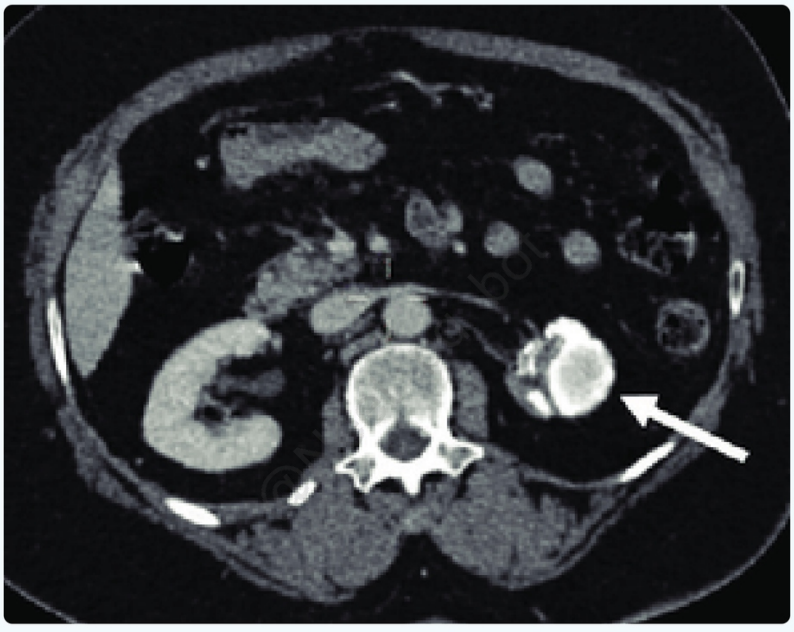
Explanation: Putty kidney refers to a small, shrunken, non-functioning kidney with dense calcification that gives a putty-like appearance on abdominal radiograph. It represents the final (end-stage) sequela of long-standing genitourinary TB due to parenchymal destruction and dystrophic calcification. Tuberculosis of the urinary tract Kidneys Calcifications: Lobar pattern and putty kidney in advanced cases Infundibular Strictures: Phantom calyces due to obstruction in early disease (Option B ruled out) Granulomas and Abscesses: Seen as hypodense areas on CT, hypoechoic on ultrasound, or hypointense on MRI Renal Pelvis and Calyces Calyceal Deformities: Irregular, distorted, or enlarged calyces due to strictures Cavities: Formed by erosion and scarring Hydrocalycosis: Detected on IVU and USG as calyceal dilation Ureters Strictures and Stenosis: Leading to a sawtooth or beaded appearance on IVU (Option C ruled out) Hydroureter: Indicated by uneven ureteral dilation due to obstruction Bladder Thimble Bladder: Bladder contraction from fibrosis, evident on MRI Bladder Wall Thickening: Seen with trabeculation and ureterovesical junction involvement, causing reflux {{caption_text}} {{caption_text}} {{caption_text}} {{caption_text}} Hydronephrosis (Option D): This describes the dilation of the renal pelvis and calyces due to obstruction of urine flow, which can occur in many conditions, including tuberculosis. In end-stage renal tuberculosis, calcification (putty kidney) is a more prominent feature than hydronephrosis.


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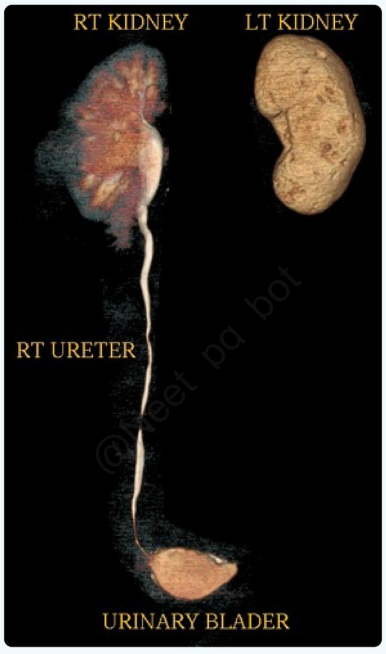
Venous phase post-contrast computed tomography (CT) demonstrates a shrunken left kidney replaced by dystrophic calcifications (white arrow), in keeping with a 'putty' kidney

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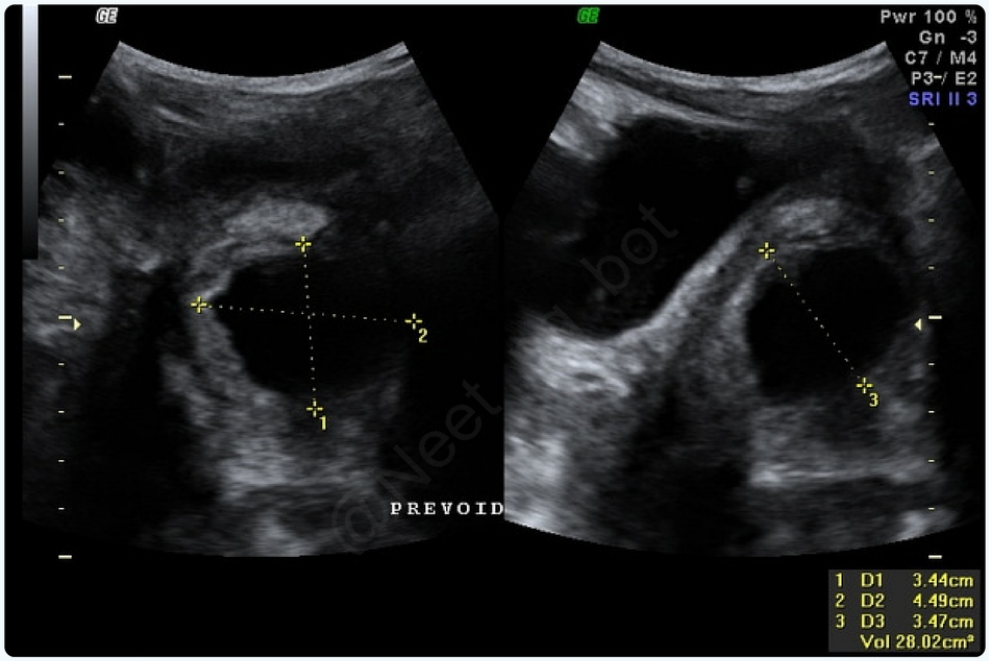
X-ray showing right putty kidney

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CT VR(virtual reality) rendering of contracted bladder and hydronephrosis of the left kidney

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USG showing thickened urinary bladder wall and reduced capacity (thimble bladder)

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References:

Grainger and Allison's Diagnostic Radiology, 7th Edition, Page 744

Textbook of Radiology and Imaging, David Sutton, 8th Edition, Volume 1, Page 2910, 2949

↑ *Back to this question in Part A*

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Q17: A 45 y/o woman with a history of recurrent urinary tract infections presents with fever, flank pain, and weight loss. An ultrasound reveals an enlarged kidney with a large echogenic centre, and CT confirms the presence of a staghorn calculus along with renal enlargement and calyceal dilatation. What is the most likely diagnosis based on these findings? (Q852806)

A. Acute pyelonephritis

B. Xanthogranulomatous pyelonephritis

C. Emphysematous pyelonephritis

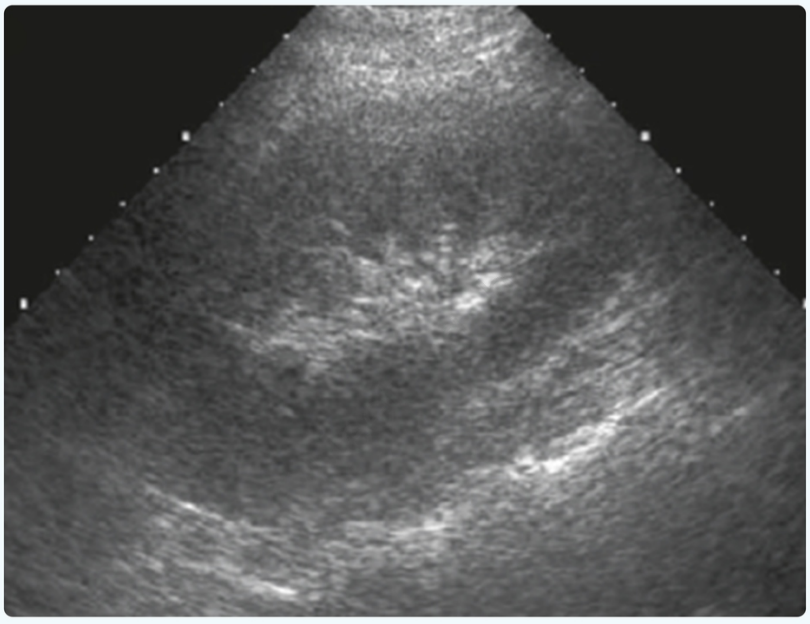
D. Acute lobar nephronia

Correct Answer: B. Xanthogranulomatous pyelonephritis

■ *Listen (English)*

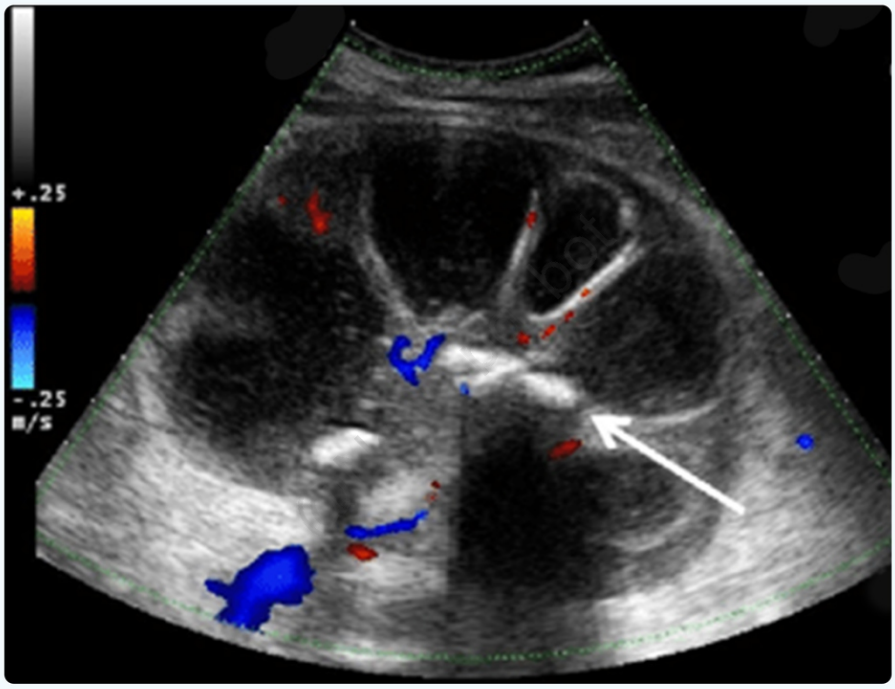
■ *Listen (Hindi)*

Explanation: Acute Pyelonephritis (Option A ruled out) Xanthogranulomatous Pyelonephritis (Option B) Emphysematous Pyelonephritis (Option C ruled out) Ultrasound (USG): This may show kidney enlargement, reduced echogenicity, and dilated collecting systems. {{caption_text}} Ultrasound (USG): Shows an enlarged kidney with echogenic staghorn calculi and hypoechoic masses replacing renal parenchyma. {{caption_text}} Plain Abdominal X-ray: Detects gas in the kidney region in about 70% of cases. {{caption_text}} Contrast-enhanced CT: Most sensitive, showing wedge-shaped hypodense areas, striated nephrograms, and pelvic wall thickening. {{caption_text}} CT Scan reveals a non-functioning kidney, staghorn calculus, expanded calyces, and inflammatory changes . A characteristic bear paw sign is noted. {{caption_text}} CT: Gold standard, reveals gas within the kidney, renal enlargement, perinephric stranding and abscesses. Helps classify into Type 1 (gas without fluid) or Type 2 (gas with fluid). {{caption_text}} Acute infection of the kidney involving the renal parenchyma and collecting system is usually caused by ascending bacteria. • It is a chronic granulomatous response to recurrent renal infection - that leads to the destruction of renal parenchyma and its replacement by lipid-laden foamy macrophages. • Destruction spreads from the renal pelvis→medulla→ cortex. • Usually, staghorn calculus is present in the pelvis. Severe necrotizing infection with gas accumulation in and around the kidney, primarily in diabetic patients. Acute lobar nephronia (Option D): It is a localized form of acute pyelonephritis that affects one or more kidney lobes. It presents with mass-like lesions and poor perfusion in the affected area but is not associated with staghorn calculi or such widespread renal changes as seen in this case.



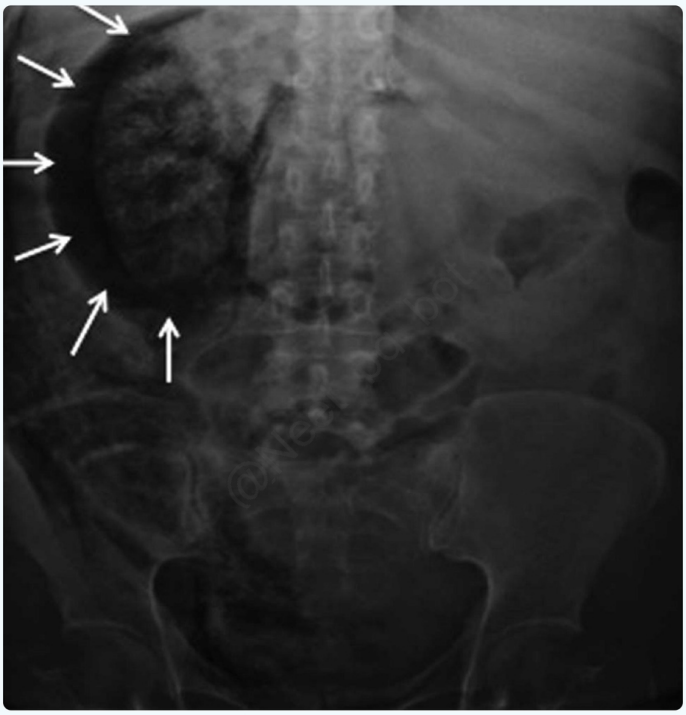
Longitudinal ultrasound of the left kidney shows diffuse enlargement with decreased echogenicity and loss of corticomedullary differentiation

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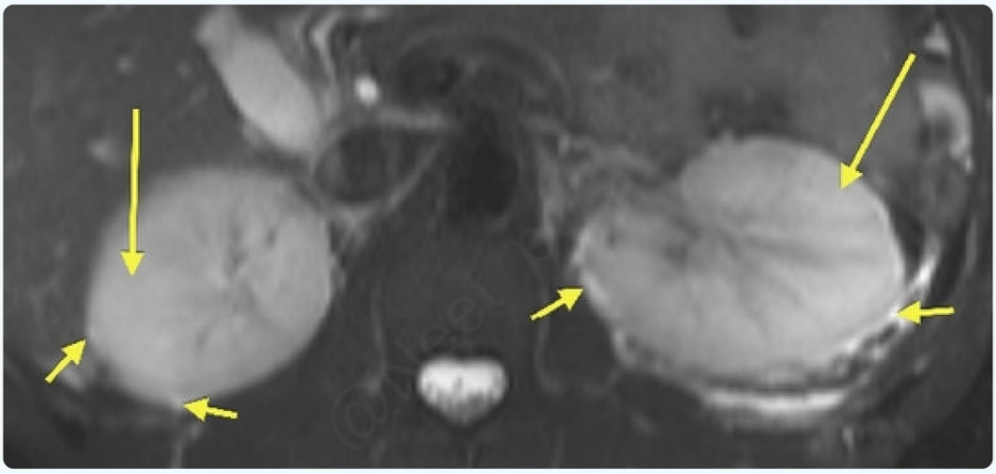
Dilated fluid-filled spaces and calculi (white arrow)

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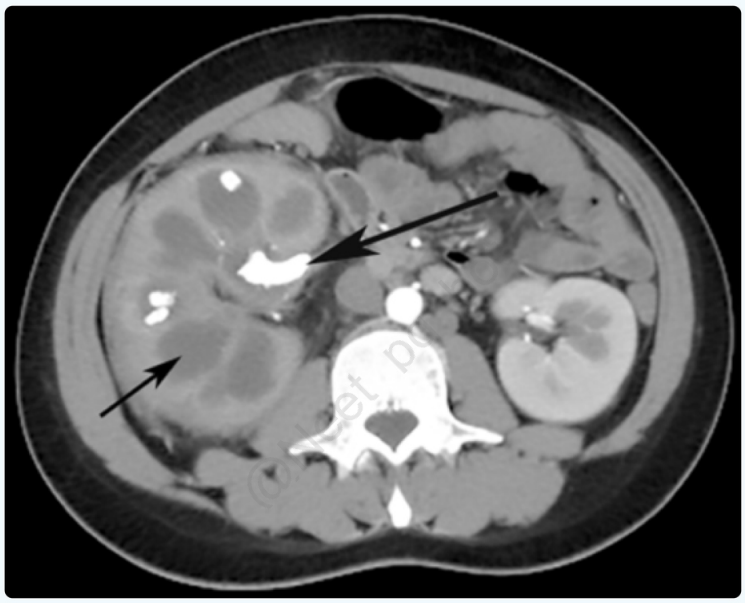
X-ray showing gas overlying renal parenchyma

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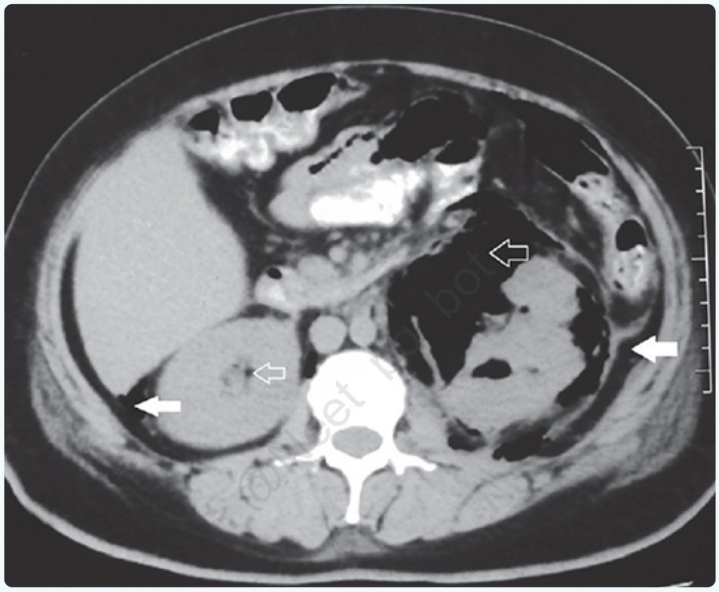
CECT showing striated nephrogram

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“Bear paw sign”: multiple, rounded, low density areas with enhancing rings arranged in a hydronephrotic pattern and hypoenhancement of the renal parenchyma (Small arrow). Multiple renal pelvis stones (Big arrow)

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CT abdomen showing enlargement, distortion of architecture, and loss of corticomedullary differentiation of left kidney along with presence of extensive gas and necrotic tissue (hollow white arrow). Few areas of gas are also seen in the collecting system of right kidney (hollow white arrow). There is evidence of extension of gas into bilateral perinephric and paranephric tissue (solid white arrows)

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References:

Grainger and Allison's Diagnostic Radiology, 7th Edition, Page 736, 739

Textbook of Radiology and Imaging, David Sutton, 8th Edition, Volume 1, Page 2933, 2934, 2935, 2938, 2939, 2940

↑ *Back to this question in Part A*

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Q18: A 12-year-old boy presents with a history of antenatal hydronephrosis detected on prenatal ultrasound. He now reports recurrent urinary tract infections and intermittent flank pain. Diuretic renography reveals delayed drainage of radiotracer. What is the most likely diagnosis? (Q852805)

A. Staghorn calculus

B. Vesicoureteric reflux (VUR)

C. Ureteropelvic junction (PUJ) obstruction

D. Urinary tract infection

Correct Answer: C. Ureteropelvic junction (PUJ) obstruction

- *Listen (English)*
- *Listen (Hindi)*

Explanation: Ureteropelvic junction (PUJ) obstruction is the most likely diagnosis, as it is characterised by delayed radiotracer washout on diuretic renography, indicating obstruction at the junction where the ureter meets the renal pelvis. Antenatal hydronephrosis is also a common presentation of PUJ obstruction. Feature PUJ Obstruction Vesicoureteric (VUR) Staghorn Calculus Location Narrowing at the junction of the renal pelvis and ureter. Retrograde urine flows from the bladder into the ureters. Large, branched stone within the renal pelvis and calyces Cause Commonly: Congenital defect in ureteral muscle development. Less commonly: Compression by an aberrant or accessory renal artery branch. Malformation of the distal ureter, leading to an inadequate valve mechanism at the vesicoureteric junction Urinary tract infection with urease-producing bacteria in the setting of alkaline urine and elevated ammonia levels. Presentation Neonates: Antenatally detected hydronephrosis. Older children/Adults: Palpable mass, intermittent flank/abdominal pain Antenatal hydronephrosis, recurrent urinary tract infections Symptoms of urinary tract infection (e.g., pain, fever, frequent urination), flank pain, haematuria Imaging Ultrasound: Visualisation of hydronephrosis. Diuretic renography: Delayed radiotracer washout indicating obstruction Voiding cystourethrogram (VCUG): Demonstrates retrograde urine flow from the bladder into the ureters. DMSA scan: Can detect renal scarring, a potential complication of VUR. CT scan: Depicts the large, branched stone; can assess for hydronephrosis and other complications. Plain radiograph: May also visualise the stone. {{caption_text}} {{caption_text}} {{caption_text}} Staghorn calculus (Option A) typically causes flank pain and hematuria but would not explain the antenatal hydronephrosis or delayed washout. Vesicoureteric reflux (VUR) (Option B) might cause recurrent UTIs but does not present with flank and abdominal pain. It also has a prompt washout of the radiotracer as it is a reflux disorder and not a blockage. Urinary tract infection (Option D) may explain some symptoms but does not account for the delayed washout seen in the imaging studies, nor does it explain the antenatal hydronephrosis.



CT without contrast demonstrating a UPJO and hydronephrosis of left kidney

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Voiding cystourethrogram revealed bilateral vesicoureteral reflux, grade III

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Plain X-ray KUB displaying a giant right-sided staghorn calculus surrounded by smaller secondary calculi along with a 2 cm calculus located in the distal third of the left ureter, at the inferior border of the sacroiliac joint

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References:

Grainger & Allison’s Diagnostic Radiology, Seventh Edition, Page 760, 777, 788

www.ncbi.nlm.nih.gov/books/NBK562236/

↑ *Back to this question in Part A*

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Q19: A 66 y/o woman presents with pelvic pain and a palpable mass. Imaging studies show a pelvic mass with extensive calcification that has a characteristic "popcorn" appearance. Which of the following diagnoses is most consistent with these findings? (Q852804)

A. Ureteric calculus

B. Vesical calculus

C. Uterine leiomyoma (fibroid)

D. Ovarian teratoma

Correct Answer: C. Uterine leiomyoma (fibroid)

■ *Listen (English)*

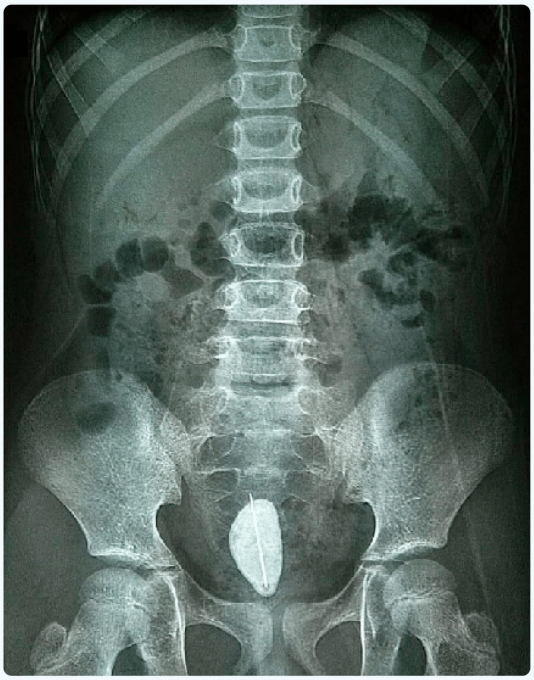
■ *Listen (Hindi)*

Explanation: Severe uterine leiomyoma (fibroid) is associated with popcorn calcification, which appears as irregular, scattered calcifications in imaging studies, particularly in postmenopausal women. Urinary Tract Calculi Type of Calculi Description Characteristics Imaging Findings Ureteric Calculi (Option A ruled out) These are stones located in the ureters, which carry urine from the kidneys to the bladder. Size impacts the likelihood of spontaneous passage: • <5 mm: High chance of passing naturally. • >10 mm: Less likely to pass without intervention. • Identified via CT urography. • Can lead to hydronephrosis if it obstructs urine flow. • White areas in the KUB X-ray indicate calcifications observed in the paravertebral location. {{caption_text}} Vesical Calculi (Option B ruled out) Stones that are found in the bladder. Stones can either get impacted at the vesicoureteric junction or be mobile in the bladder. • CT urography is valuable for differentiation between the two. • Prone positioning during imaging aids in differentiation. • Usually appears as a dense calcification in the centre of the pelvis. {{caption_text}} Popcorn Calcification A radiological finding associated with severely calcified uterine fibroids (leiomyomas). • Irregular, scattered calcifications resembling popped corn. • Common in postmenopausal women with degenerative changes in fibroids. • On X-ray: Pelvic mass with severe calcification, characteristic popcorn pattern. • On CT: clearer visualisation confirming calcified leiomyoma. {{caption_text}} Ovarian teratoma (Option D) may also present with calcifications but typically does not exhibit the distinct popcorn pattern seen in severely calcified leiomyomas.



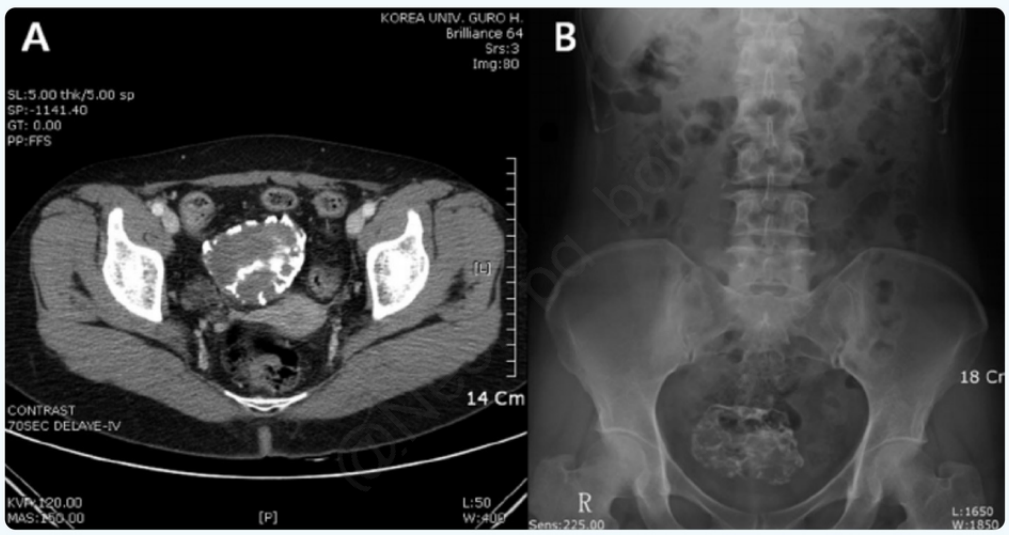
KUB X-ray shows left upper ureteric calculus at the level of L4

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KUB shows Bladder stone with
a sewing needle in its center

@Neet_pg_bot



A. X-ray of the kidney, ureter, and bladder showed a calcified mass in the pelvic cavity
B. The abdomino-pelvic CT showed a solid mass with multiple scattered calcifications

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References:

Grainger & Allison's Diagnostic Radiology, Seventh Edition, Page 771, 788

www.ncbi.nlm.nih.gov/pmc/articles/PMC9818505/

↑ *Back to this question in Part A*

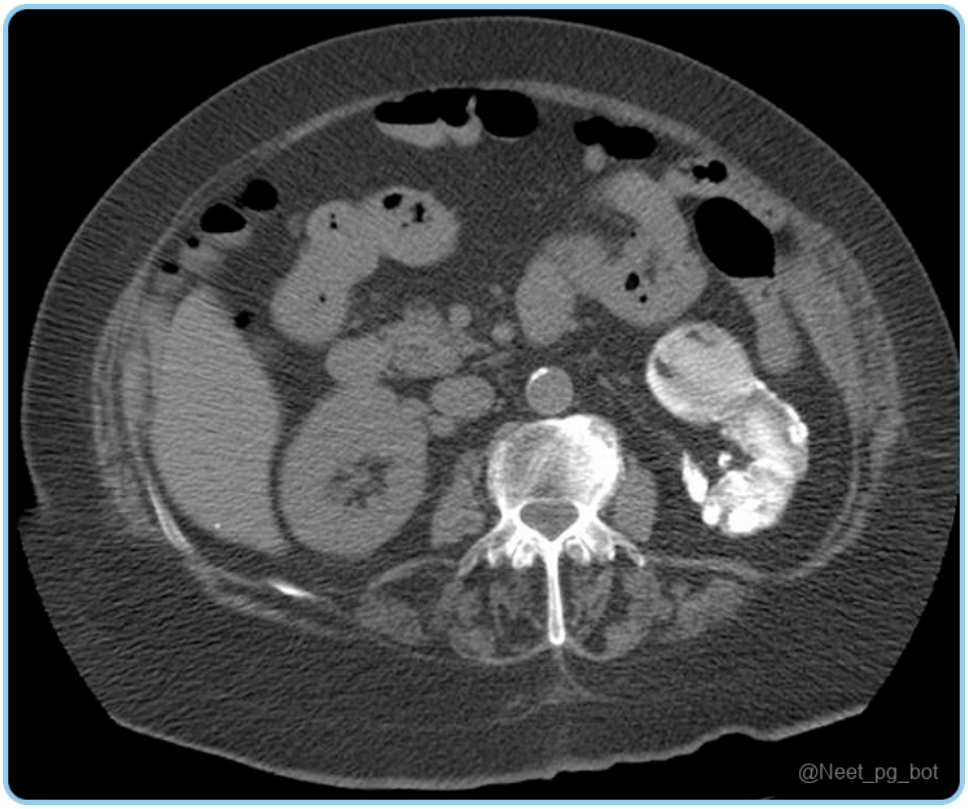
Q20: A 60 y/o male presents with chronic back pain and a history of tuberculosis. A CT scan of the patient is given below. What is the most likely diagnosis based on these findings? {{caption_text}} (Q852782)

A. Staghorn calculus

B. Medullary nephrocalcinosis

C. Putty kidney

D. Renal cell carcinoma



Correct Answer: C. Putty kidney

■ *Listen (English)*

■ *Listen (Hindi)*

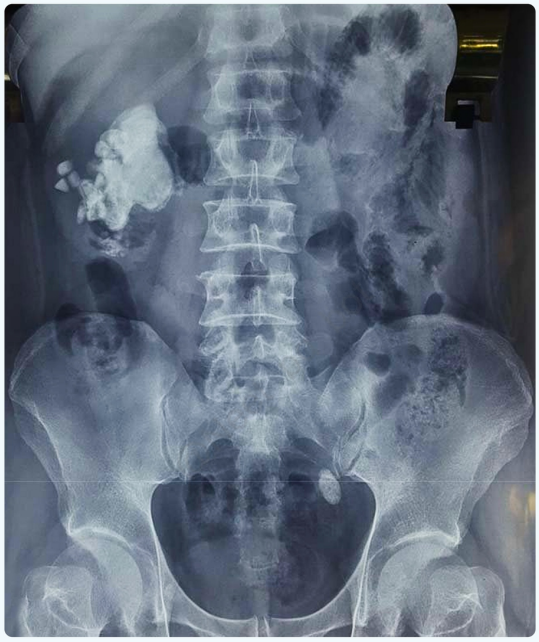
Explanation: The CT shows a calcified mass of the left kidney, often referred to as "putty-like," indicating dystrophic calcification. Putty kidney is seen in advanced renal tuberculosis, where extensive calcification and atrophy lead to a non-functioning kidney. Calcifications in the Kidney: Description Staghorn Calculus Putty Kidney Medullary Nephrocalcinosis Description Large, branching stone filling the renal pelvis and calyces,

resembling the shape of a staghorn. Tissue damage in the kidney by TB leads to dystrophic calcification. Indicates end-stage renal TB. Calcium deposition within the renal medulla (inner kidney). Cause Struvite stones formed from magnesium ammonium phosphate due to infection with urease-producing bacteria (e.g., Klebsiella, Proteus) Renal tuberculosis leads to granuloma formation causing necrosis, cavitation, fibrosis and stricture formation. Metabolic disturbances (e.g., hyperparathyroidism, sarcoidosis, renal tubular acidosis, medullary sponge kidney disease) leading to calcification of the renal medulla Imaging Characteristics Radio-opaque, visible on CT. They often form rapidly; fill the renal pelvis and extend into calyces. (Option A ruled out) Appears as a lobulated mass of calcified tissue on CT scans, resembling "putty"; indicating a non-functioning kidney. Detected on plain radiographs, ultrasound, and CT. USG and CT are very specific and hence useful even in mild cases USG- hyperechoic renal parenchyma with posterior acoustic shadowing. CT- High-density renal parenchyma in the medulla (Option B ruled out) {{caption_text}} {{caption_text}} {{caption_text}} Renal cell carcinoma (Option D) can present with a mass, but calcification is less common, and the presentation would typically involve a solid tumour mass rather than complete calcification and atrophy of the kidney. {{caption_text}}



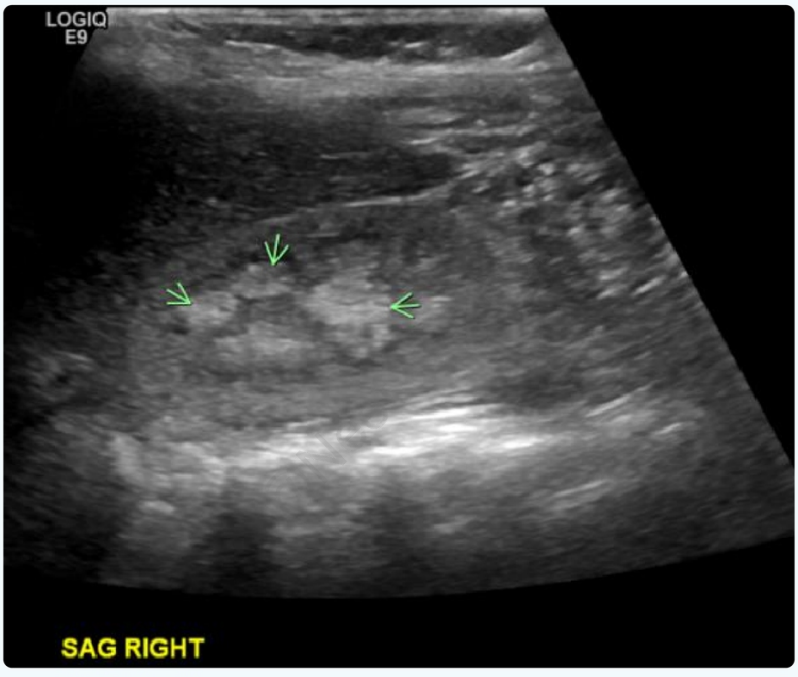
CT revealing parenchymal granulomas (black arrows) in the (L) kidney with uneven caliectasis and ureterectasis accompanied by urothelial thickening (white arrow)

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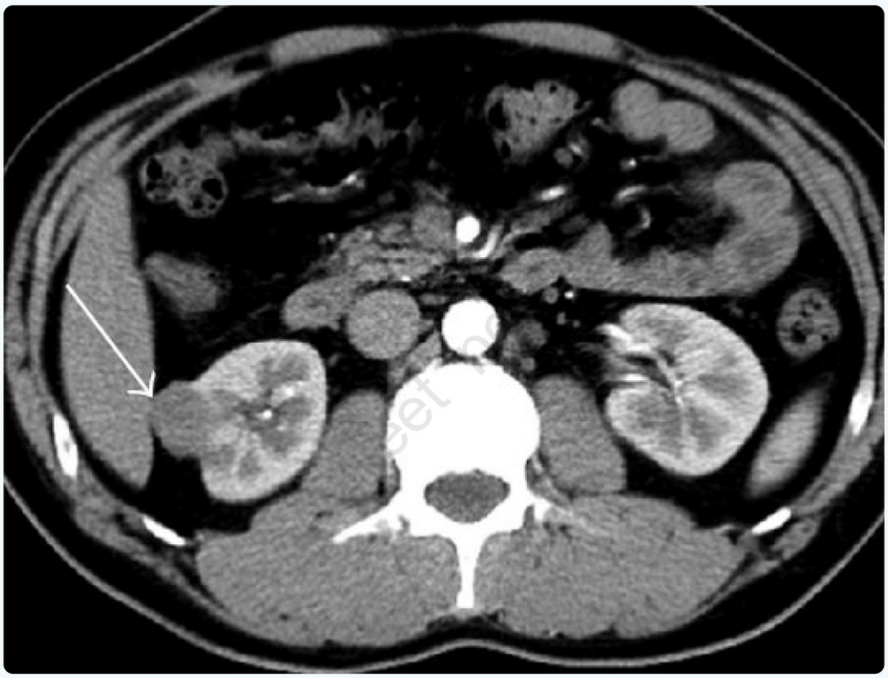
Plain X-ray KUB displaying a giant right-sided staghorn calculus surrounded by smaller secondary calculi along with a 2 cm calculus located in the distal third of the left ureter, at the inferior border of the sacroiliac joint

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Ultrasound demonstrating medullary nephrocalcinosis.
The arrows denote several areas of nephrocalcinosis

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NCCT Abdomen of papillary RCC in right kidney

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References:

Grainger & Allison's Diagnostic Radiology, Seventh Edition, Page 787, 788, 789

www.ncbi.nlm.nih.gov/pmc/articles/PMC9228914/

↑ *Back to this question in Part A*

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Q21: A 32 y/o female presents with left flank pain and nausea. She has a history of recurrent urinary tract infections. Ultrasound reveals moderate hydronephrosis, and a voiding cystourethrogram (VCUG) is performed, which shows vesicoureteric reflux (VUR). What is the most appropriate imaging study to evaluate the severity of the obstruction? (Q852781)

A. Magnetic resonance imaging (MRI)

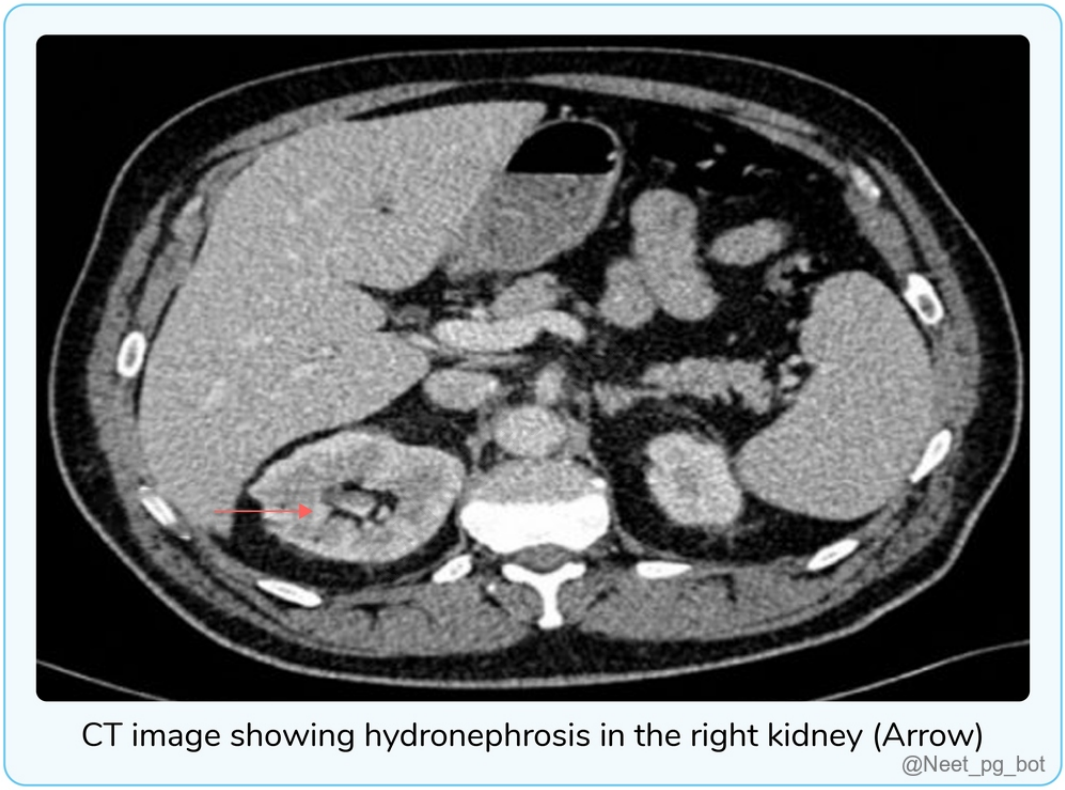
B. Diuretic renography

C. Computed tomography (CT) urography

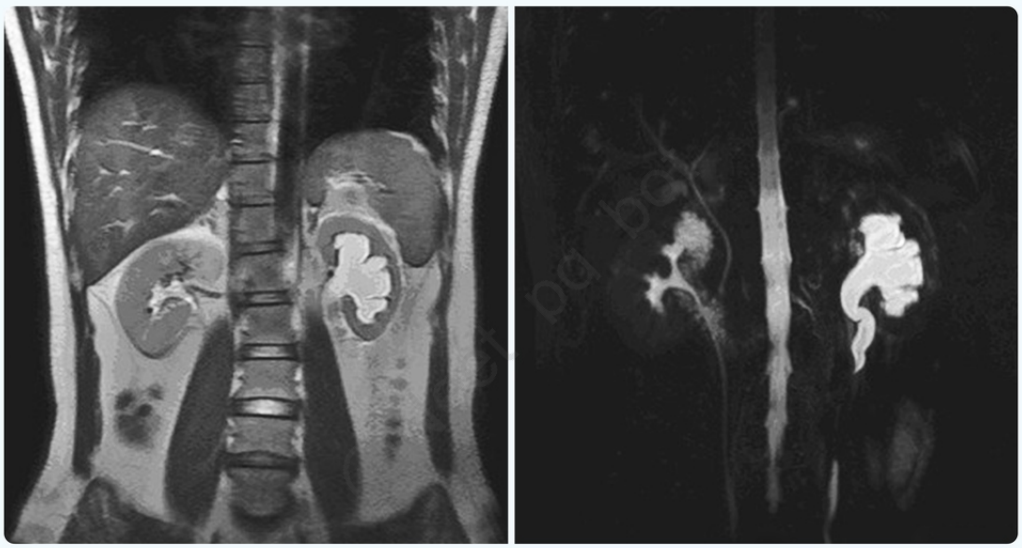
D. Repeat Voiding cystourethrogram (VCUG)

Correct Answer: B. Diuretic renography

Explanation: Diuretic renography is the correct choice for assessing the severity of obstruction in hydronephrosis. It provides information on kidney function and the degree of obstruction using a radioactive tracer. Hydronephrosis: Swelling of the kidney(s) due to urine build-up, usually caused by an obstruction in the urinary tract. Causes: Pelvic ureteric junction obstruction (PUJO)- Congenital narrowing at the junction between the ureter and renal pelvis Ureterocele - Cystic dilatation of the ureter Megaureter - Abnormally enlarged ureter (>7mm) Urinary tract stones (calculi) Tumours eg. Renal cancer, bladder cancer Diagnostic Imaging for Hydronephrosis: Diagnostic Imaging Description Ultrasound (US) First-line, non-invasive test for visualising the dilated renal pelvis and ureters, no radiation. Voiding cystourethrogram (VCUG) (Option D ruled out) Assesses vesicoureteric reflux (VUR), identifies backward flow of urine and grades its severity. Diuretic renography Nuclear medicine test to assess kidney function and determine the severity of obstruction. Computed tomography (CT) urography (Option C ruled out) Provides detailed cross-sectional images of the urinary tract, useful for detecting stones or tumours. Magnetic resonance imaging (MRI) (Option A ruled out) Detailed imaging without radiation, is useful in specific cases (e.g., pregnancy, urethral injuries). {{caption_text}} ureter as shown by magnetic resonance urography." data-author="Ni, Bei-Wen & Zhong, Lu & Wang, Ting & Chen, Fang-Yuan." data-hash="7884" data-license="CC BY 3.0" data-source="" data-tags="April2025" height="392" src="" width="600" /> {{caption_text}} renal parenchyma and 24 weeks foetus on the right side" data-author="Nerli, Rajendra & Mungarwadi, Amit & Mudegowdar, Abhijith & Patil, Amey & Hiremath, Murigendra & Ghagane, Shridhar" data-hash="7885" data-license="CC BY-NC ND 4.0" data-source="" data-tags="April2025" height="569" src="" width="450" /> {{caption_text}} Rim Sign of Hydronephrosis : Appearance : Thin, enhanced layer surrounding a dilated renal pelvis and calyces. The enhancement is due to viable renal parenchyma despite significant dilation and obstruction. Imaging Modalities : Visualised on ultrasound, CT, and MRI. It is particularly noted on CT scans with contrast. Clinical Significance : Indicates preserved renal function, impacting management decisions regarding surgery or further diagnostics.

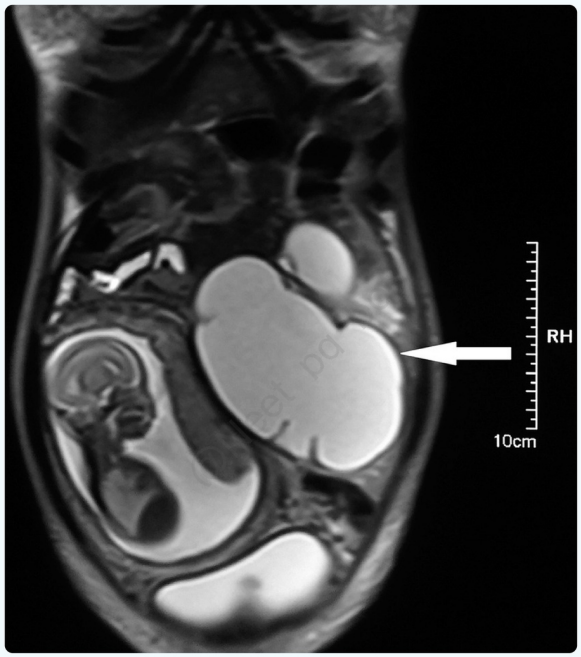


CT image showing hydronephrosis in the right kidney (Arrow)



Left hydronephrosis and stenosis of the left ureter as shown by magnetic resonance urography

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MRI Showing giant hydronephrotic left kindey with thin rim of renal parenchyma and 24 weeks foetus on the right side

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References:

Grainger & Allison’s Diagnostic Radiology, Seventh Edition, Page 769, 771, 777, 788

radiopaedia.org/cases/rim-sign-chronic-hydronephrosis

↑ *Back to this question in Part A*

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Q22: A 45 y/o male presents with sudden onset of severe right-sided flank pain and gross hematuria. He has a history of recurrent urinary tract infections. A non-contrast CT scan reveals a large, radio-opaque stone forming a staghorn shape in the renal pelvis. Which of the following is the most likely composition of the stone? (Q852780)

A. Uric acid

B. Calcium oxalate

C. Struvite

D. Cystine

Correct Answer: C. Struvite

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: Struvite stones are associated with recurrent urinary tract infections and are radio-opaque, often forming staghorn calculi in the renal pelvis. The bacteria that contribute to this include Proteus and Klebsiella. {{caption_text}} {{caption_text}} Urolithiasis: Definition : Formation of urinary tract stones. Presentation : Flank pain, hematuria (blood in urine). Cause : Crystal formation due to the build-up of substances that should typically dissolve in urine. Types of Stones and Imaging Visibility: Type of Stone Composition Cause/Associated Condition Imaging Visibility Calcium-based stones Calcium oxalate or calcium phosphate (Option B ruled out) High levels of calcium or oxalate in urine Radio-opaque (easily detected on imaging) Struvite stones Magnesium ammonium phosphate Urinary tract infections (Klebsiella, Proteus, etc.) Radio-opaque (can form large staghorn calculi) Uric acid stones Uric acid (Option A ruled out) Acidic urine, gout, obesity, diabetes 5-8% are radiolucent and can dissolve with urine alkalinisation Cystine stones Cystine (Option D ruled out) Genetic disorder (cystinuria) Some radiolucent; detectable via unenhanced CT Drug-related stones Drug crystals (e.g., Indinavir) Certain medications (e.g., Indinavir) Radiolucent (harder to detect) Radiolucent stones: Uric acid, cystine, xanthine, ammonium urate, indinavir {{caption_text}} Imaging Techniques for Urolithiasis: Unenhanced CT : Preferred imaging modality. High sensitivity and ability to locate stones, measure size, and detect complications like hydronephrosis. Dual-energy CT : Differentiates stone composition (e.g., uric acid vs. calcium stones), guiding treatment.



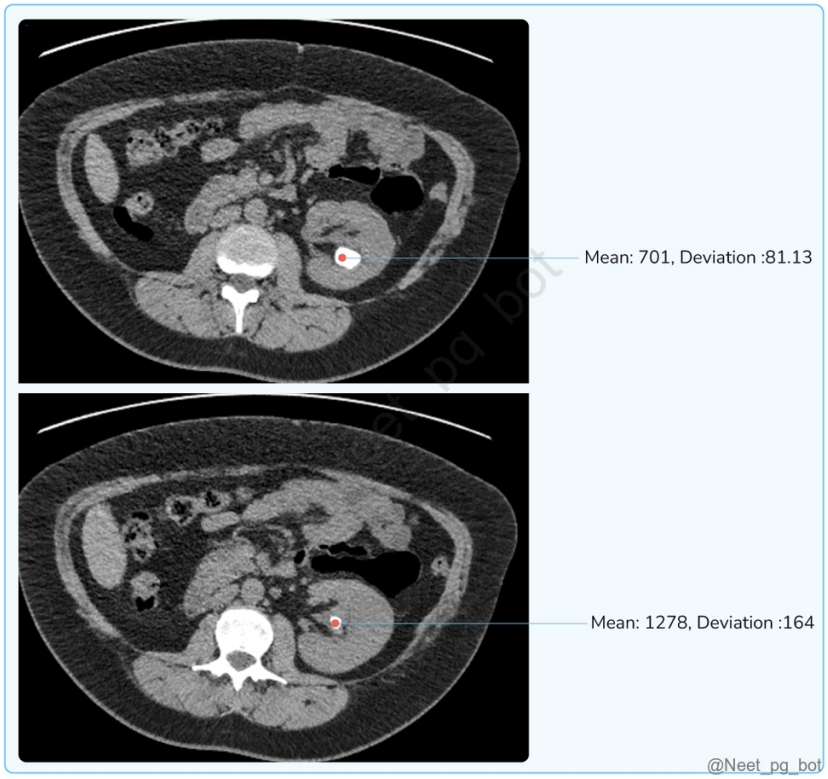
CT showing staghorn calculus

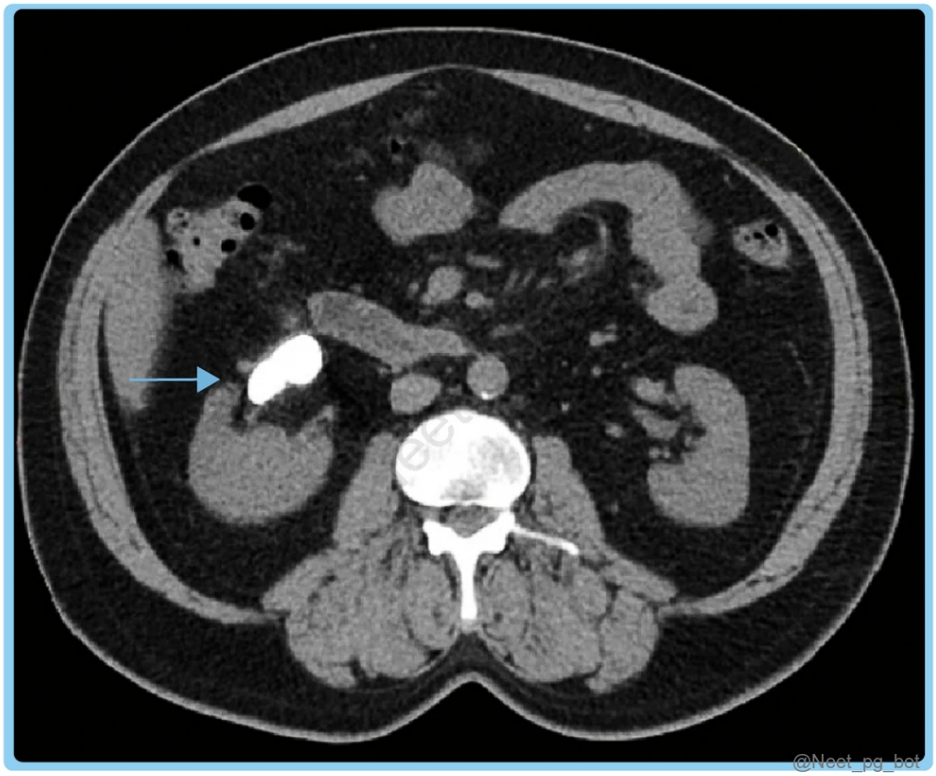
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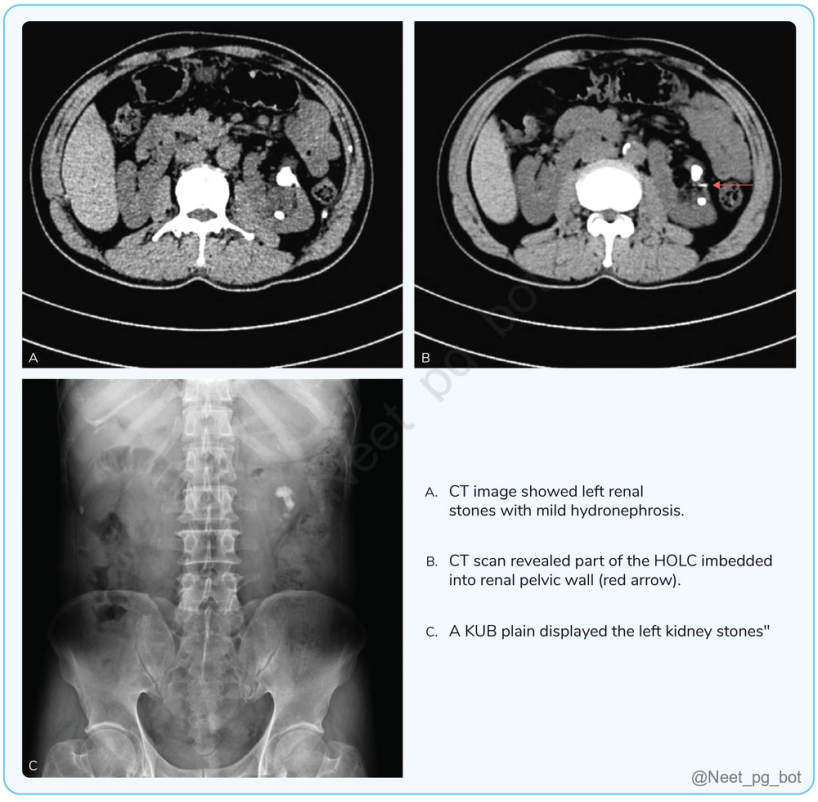
X Ray showing right staghorn calculi

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Mean: 701, Deviation :81.13
Mean: 1278, Deviation :164
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References:

Grainger & Allison’s Diagnostic Radiology, Seventh Edition, Page 722, 788, 789

David Sutton Textbook of Radiology and Imaging, Volume 1, 8th edition, Page 2879, 2920

↑ *Back to this question in Part A*

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Q23: A 12-year-old girl is evaluated for recurrent urinary tract infections. Imaging studies reveal that she has a duplex collecting system, with the upper renal moiety's ureter inserting ectopically into the bladder. The lower renal moiety's ureter is positioned normally. According to Weigert-Meyer law, which of the following statements is true regarding her condition? (Q852779)

A. The upper renal moiety's ureter typically drains into the bladder orthotopically.

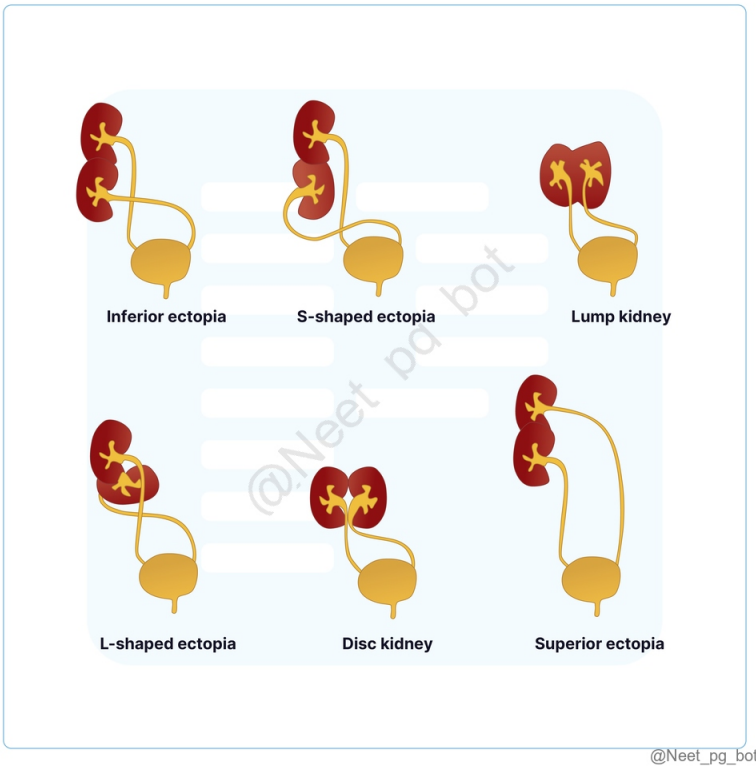
B. The lower renal moiety's ureter is more likely to be associated with ureterocele.

C. Vesicoureteral reflux is more common with the lower renal moiety's ureter.

D. The ectopic ureter insertion of the upper moiety is often located lateral to the lower moiety's

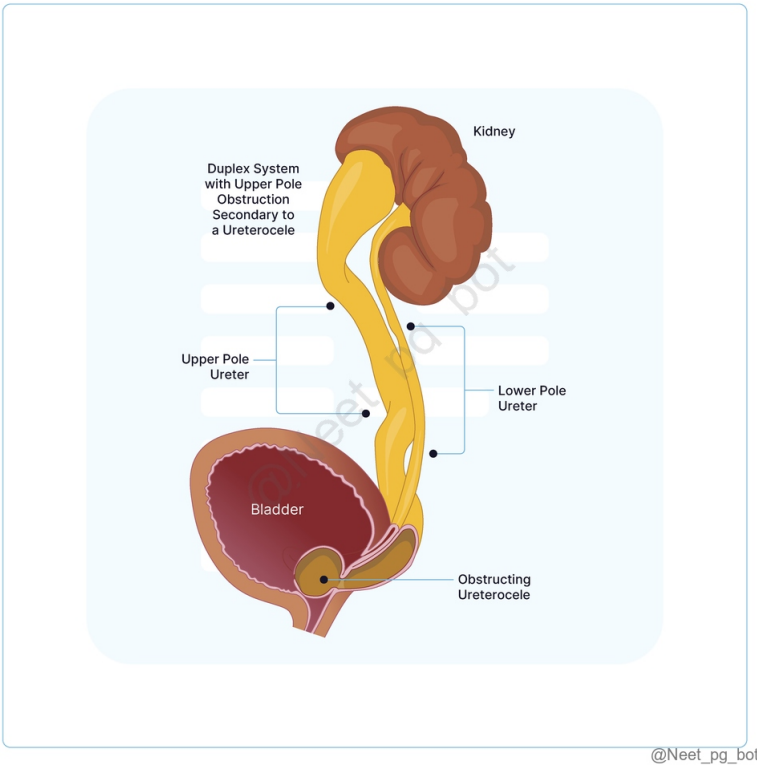
Correct Answer: C. Vesicoureteral reflux is more common with the lower renal moiety's ureter.

Explanation: The diagnosis of a duplex collecting system is supported by the recurrent UTIs and imaging findings showing separate ureters, with the upper moiety's ureter likely inserting ectopically per Weigert-Meyer law, leading to potential complications like vesicoureteral reflux. The normal position of the lower renal moiety's ureter, as per Weigert-Meyer's law, is associated with a higher risk of vesicoureteral reflux. Cross fused Ectopic • A rare congenital malformation where both kidneys are located on one side of the body (unilaterally), with the ureter of the crossed kidney draining into the bladder on the opposite side (contralateral). • Presentations can range from incidental findings during imaging to renal impairment, depending on the function and anatomy of the affected kidneys. • Often identified through ultrasound, CT, or MRI, showing the kidneys positioned on the same side and their unique drainage patterns. Duplex collecting system • A common congenital renal tract abnormality is characterized by incomplete fusion of upper and lower pole moieties, leading to complete or incomplete duplication of the collecting system. • Duplex collecting systems may be associated with vesicoureteric reflux, obstruction, or ureterocele, despite being considered anatomical variants. • Imaging Characteristics : IVP can effectively image both collecting systems, but poorly functioning systems may not excrete contrast, resulting in a "drooping lily appearance" of the functioning lower pole moiety. {{caption_text}} Weigert Meyer Law • Ureteral Drainage : The upper and lower renal moieties each have separate ureters, each with its own orifice in the bladder. • Ectopic Insertion : The upper renal moiety ureter typically inserts ectopically, medial and inferior to the lower renal moiety ureter, often leading to a ureterocele. (Option D ruled out) • Orthotopic Insertion : The lower renal moiety ureter inserts orthotopically , lateral and superior to the upper moiety's ureter, with a risk of vesicoureteral reflux. (Options A & B ruled out)


Inferior ectopia
S-shaped ectopia
Lump kidney
L-shaped ectopia
Disc kidney
Superior ectopia

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Right
10 MIN



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References:

www.jpurol.com/article/S1477-5131(19)30205-0/abstract

radiopaedia.org/articles/duplex-collecting-system

radiopaedia.org/articles/weigert-meyer-law?lang=us

David Sutton Textbook of Radiology and Imaging, Volume 1, 8th edition, Page 2901, 2902

↑ *Back to this question in Part A*

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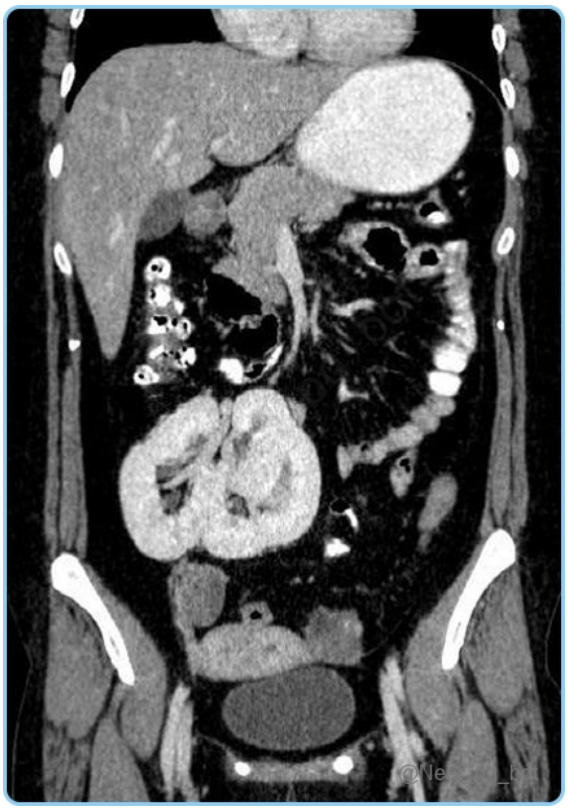
Q24: A 30 y/o presents with recurrent urinary tract infections and abdominal discomfort. An abdominal ultrasound is performed, revealing a fusion anomaly of the kidneys. Further imaging confirms the presence of a unique kidney shape, where both upper and lower poles are merged and located anterior to the aortic bifurcation. The CT Abdomen of the patient is given below. Which of the following is not the most likely diagnosis of the patient? {{caption_text}} (Q852778)

A. Horseshoe Kidney

B. Pancake Kidney

C. Discoid Kidney

D. Fused Pelvic Kidney



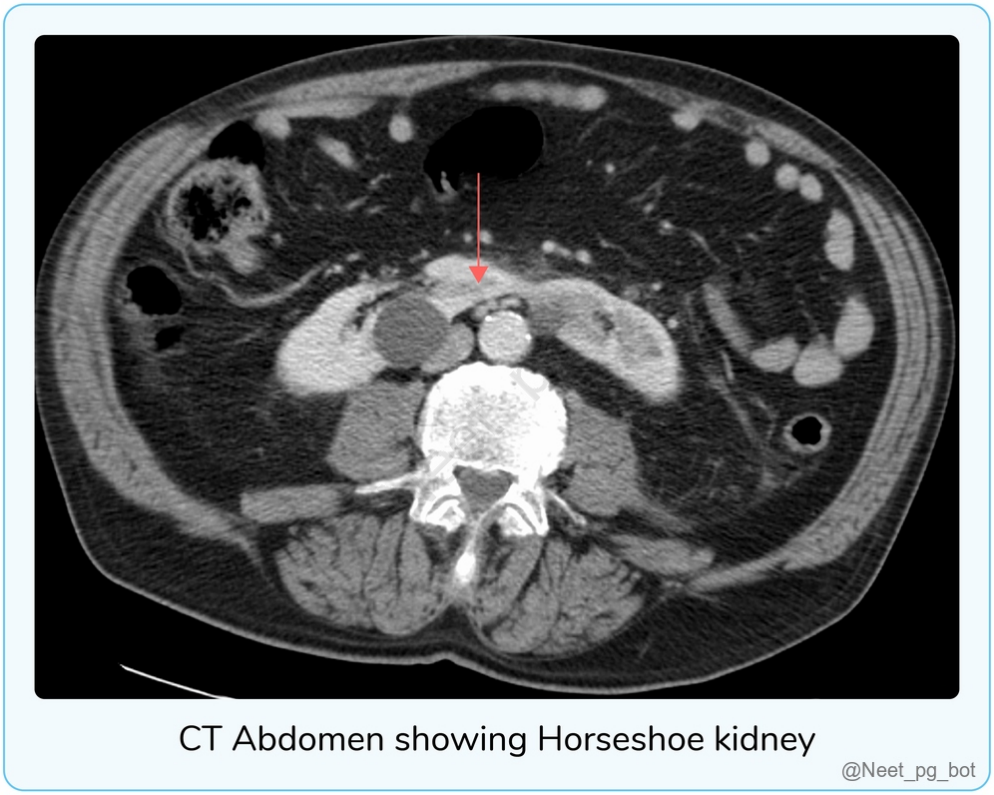
Correct Answer: A. Horseshoe Kidney

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: The patient's presentation of recurrent urinary tract infections and abdominal discomfort, along with the imaging findings, suggest a renal fusion anomaly. The specific characteristics described point towards a pancake kidney, also known as discoid or fused pelvic kidney , where both the upper and lower poles of the kidneys are merged, creating a flat, disk-like appearance. The Horseshoe kidney features fusion at the lower poles and does not present this specific morphology. Horseshoe Kidney Pancake Kidney • The most common renal fusion anomaly occurs in approximately 1 in 1000 births. • Results from abnormal migration and midline fusion of both kidneys, usually at the lower poles (90%). • Kidneys point medially and are connected by a fibrous band or functioning renal parenchyma known as isthmus which is not divided. • Normal renal ascent is halted by the inferior mesenteric artery origin . Usually present between 3rd to 5th Lumbar vertebrae. • Imaging Characteristics: ■ On plain film and IVU, a characteristic horseshoe configuration is observed, though the isthmus may be poorly visualized. ■ Kidneys are typically low-lying and malrotated, with upper poles at the same height pointing superolateral, and lower poles pointing inferomedially. • Complications such as pelvic ureteric junction obstruction (PUJO), calculi, and Wilms' tumour. • Associated with gastrointestinal anomalies, cyclic vomiting syndrome (CVS), and syndromes like Turner’s or Ellis–van Creveld. • A rare renal fusion anomaly where the upper and lower poles of the kidneys merge, resembling a pancake. • Typically located anterior to the aortic

bifurcation. • Usually has two separate ureters, but can occasionally have one. • Other Names: Discoid kidney , fused pelvic kidney, cake kidney . (Option B, C & D ruled out) • Often asymptomatic but can lead to: ■ Ureteropelvic junction obstruction ■ Recurrent infections ■ Kidney stones ■ Increased risk of malignancies • Identified through ultrasound, CT, MRI, IVU, and scintigraphy. {{caption_text}} {{caption_text}}



CT Abdomen showing Horseshoe kidney



CT Abdomen showing Pancake kidney

References:

Grainger and Allison’s Textbook of Diagnostic Radiology, 7th edition, Page 776

David Sutton Textbook of Radiology and Imaging, Volume 1, 8th edition, Page 2901

radiopaedia.org/articles/pancake-kidney

radiopaedia.org/articles/horseshoe-kidney?lang=us

pmc.ncbi.nlm.nih.gov/articles/PMC4277381/

↑ *Back to this question in Part A*

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Q25: A 45 y/o male presents to the emergency department with severe left flank pain and hematuria. A CT scan is performed, revealing a 1 cm ureteric stone obstructing the left ureter. Which of the following procedures would be most appropriate to facilitate urine drainage from the kidney in this patient? (Q852777)

A. CT Urography

B. Magnetic Resonance Urography

C. Double J Stenting

D. Retrograde Urethrography

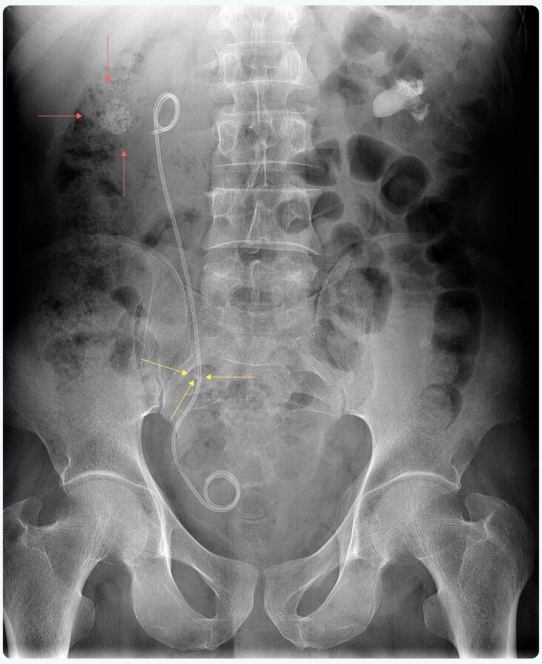
Correct Answer: C. Double J Stenting

Explanation: Double J Stent (Ureteral stenting) is the most appropriate procedure in this case. A ureteral stent would allow for the temporary relief of the obstruction caused by the ureteric stone, facilitating urine drainage from the kidney to the bladder. This can help prevent further complications such as hydronephrosis. CT Urography (CTU or CT IVU/CT IVP) • Uses CT to evaluate the genitourinary tract after intravenous administration of contrast material. • CTU has largely replaced traditional intravenous urogram (IVU) for imaging due to its efficiency and detailed output. (Option A ruled out) • Indications : ■ Hematuria (blood in urine) ■ Urothelial mass ■ Obstructive uropathy ■ Hydronephrosis ■ Hydroureter ■ Urothelial cancer surveillance ■ Stricture ■ Congenital collecting system abnormalities ■ Assessment of upper tract tumours, strictures, and kidney function Urography (CTU or CT IVU or CT IVP)" data-author="Hiroshi Juri, Takahiro Tsuboyama, Mitsuhiro Koyama, Kiyohito Yamamoto, Go Nakai, Atsushi Nakamoto, Kazuhiro Yamamoto, Haruhito Azuma, Yoshifumi Narumi," data-hash="7870" data-license="cc by 4.0" data-source="" data-tags="April2025" src="" /> {{caption_text}} Magnetic Resonance Urography (MRU) • A non-invasive imaging technique using MRI to evaluate the urinary tract after intravenous administration of contrast material. • Offers additional information about surrounding abdominal and pelvic structures and potential diseases affecting them. (Option B ruled out) • Indications: ■ Primary imaging technique for patients with hematuria. ■ Follow-up for patients with a history of cancers in the urinary collecting system. ■ Identification of abnormalities in patients with recurrent urinary tract infections. Resonance Urography (MRU)" data-author="J. LeyendeckerC. BarnesR. Zagoria" data-hash="7871" data-license="NA" data-source="" data-tags="April2025" height="472" src="" width="400" /> {{caption_text}} Ureteral Stenting (Double J Stent) • A procedure involving the placement of a thin, flexible plastic tube (stent) in the ureter to facilitate urine drainage from the kidney to the bladder in cases of blockage. • The stent may remain in place for days to weeks, or even months, depending on the patient's condition. • Indications for Placement: ■ Kidney stones ■ Tumors ■ Blood clots ■ Postoperative swelling ■ Infection ■ To provide a mould for healing

post-surgery. ■ To divert urine from areas of leakage. ■ To manipulate kidney stones or prevent their movement before treatment. ■ To enhance the visibility of ureters during surgical procedures. {{caption_text}} {{caption_text}} Retrograde Urethrography (Option D) is primarily used to evaluate the urethra, especially in cases of suspected urethral injury or strictures. It is not indicated for managing ureteric obstructions or stones, making it an inappropriate choice for this patient's condition.

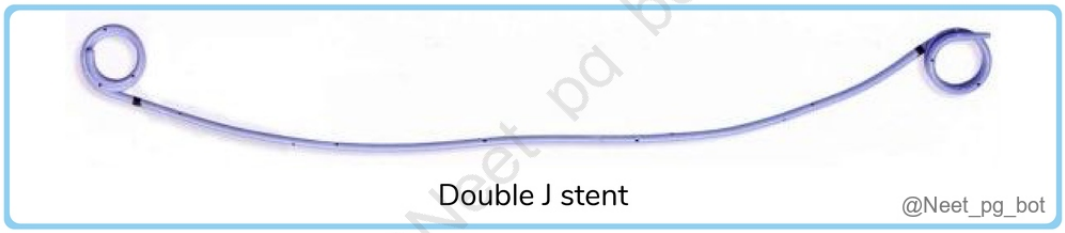






X-ray of the abdomen showing nephrolithiasis (red arrow) a double-J catheter (yellow arrow)

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References:

www.radiologyinfo.org/en/info/urography

radiopaedia.org/articles/ct-urography-protocol

www.bumrungrad.com/en/treatments/ureteral-stenting-double-jj-stent

↑ *Back to this question in Part A*

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Q26: Which of the following statements is true regarding the indications for Voiding Cystourethrography (VCUG) and Retrograde Urethrography (RUG)? (Q852776)

A. VCUG is the gold standard for evaluating urethral strictures.

B. RUG is the gold standard for detecting vesicoureteral reflux (VUR).

C. VCUG is the most important modality for examining urinary tract anomalies in children.

D. Blood at the urethral meatus is a key indicator for performing VCUG.

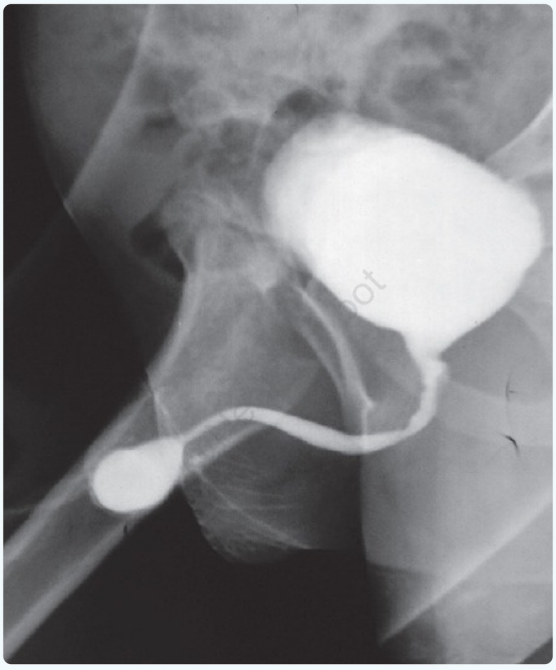
Correct Answer: C. VCUG is the most important modality for examining urinary tract anomalies in children.

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■ *Listen (Hindi)*

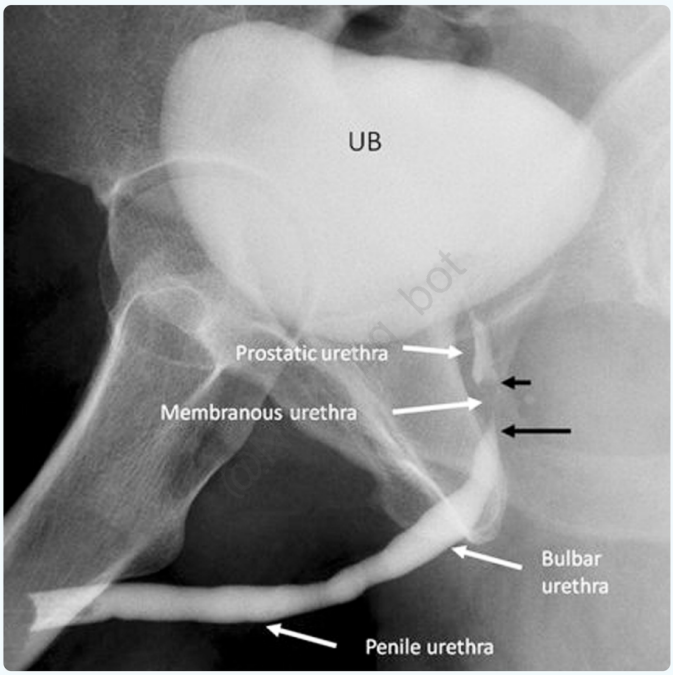
Explanation: VCUG is indeed the most important modality for urological examination in children, particularly for evaluating VUR and related urinary tract anomalies. Voiding Cystourethrography (VCUG)/ Micturating Cystourethrogram (MCUG) Retrograde Urethrography (RUG) • VCUG is a fluoroscopic procedure used to assess the anatomy and function of the bladder and urethra, primarily to detect vesicoureteral reflux (VUR). (Option B ruled out) • The most important modality for urological examination in children. • MCUG is the gold standard for evaluating VUR. • VUR is the retrograde passage of urine from the bladder into the ureter and potentially the calyces. • A diagnostic procedure used to accurately diagnose, stage, and delineate urethral strictures. • The gold standard in the management of urethral stricture disease . (Option A ruled out) • Can be combined with voiding cystourethrogram (VCUG) for better visualization of complex cases. • Contrast media is injected retrogradely into the urethra, followed by a series of radiographs. Indications: • Anomalies of the urinary tract: (Option C) ■ Anorectal malformation. ■ Myelodysplasia. ■ Prune-belly syndrome. • Febrile urinary tract infection (particularly

if recurrent). • Hydronephrosis or hydroureter. • Hematuria. • Voiding abnormalities: ■ Dysuria. ■ Dysfunctional voiding (neurogenic bladder). ■ Incontinence. • Neonatal ascites. • Trauma. • Postoperative evaluation of the urinary tract. Indications: • Pelvic trauma with suspicion of urethral injury. • Urethral obstruction. • Foreign bodies in the urethra. • Urethral diverticula. • Suspected urethral fistula. • Blood at the urethral meatus is a key indicator for testing. (Option D ruled out) • Catheter placement should be withheld until RUG to prevent worsening injury. • Evaluation for rectal trauma and checking for a high-riding prostate is essential. {{caption_text}}
{{caption_text}}



Micturating cystourethrogram showing a large anterior urethral diverticulum

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Normal Retrograde Urethrogram

References:

www.ncbi.nlm.nih.gov/pmc/articles/PMC9432100/

www.tamingthesru.com/blog/intern-diagnostics/the-importance-of-the-rug

www.ncbi.nlm.nih.gov/pmc/articles/PMC4708283/

↑ *Back to this question in Part A*

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• [09_Genitourinary Radiology] 020 Previous Year Questions

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[09_Genitourinary Radiology] 020 Previous Year Questions — Quick Jump

Q1 (p. 1414) *Q2 (p. 1414)* *Q3 (p. 1415)* *Q4 (p. 1417)* *Q5 (p. 1418)* *Q6 (p. 1420)*
Q7 (p. 1421) *Q8 (p. 1425)* *Q9 (p. 1429)* *Q10 (p. 1431)* *Q11 (p. 1432)* *Q12 (p. 1436)*

Q1: Which of the following is the best investigation for detecting ureteric calculi? (Q865284)

A. NCCT

B. Ureteroscopy

C. X-ray

D. CT scan

Correct Answer: A. NCCT

Explanation: NCCT (Option A) is the gold standard for stone detection due to its high accuracy. It finds all stone types, including those not visible on X-ray, and gives crucial details like size, location, and signs of obstruction. It's fast and widely available. Incorrect Options: Ureteroscopy (Option B ruled out) offers direct visualization, it's an invasive procedure, typically used for treatment, not initial diagnosis. X-ray (KUB) (Option C ruled out) is limited; it only shows radiopaque stones, often misses others, and can be obscured by bowel contents. It's mainly for monitoring known stones. CT scan (Option D ruled out) as a general term implies NCCT for stone detection, as contrast is usually avoided.

References:

Grainger & Allison’s Diagnostic Radiology, Seventh Edition, Page 771, 788

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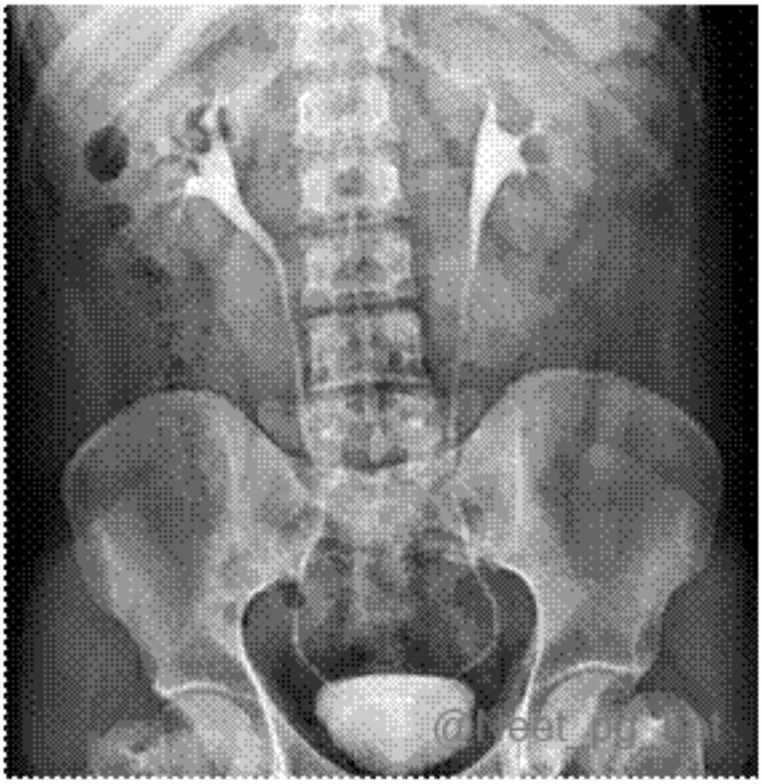
Q2: What is true about the investigation shown below? (Q866517)

A. Invasive procedure

B. Non invasive procedure to diagnose PUJ obstruction

C. Gold standard for bladder cancer

D. Done percutaneously



Correct Answer: B. Non invasive procedure to diagnose PUJ obstruction

Explanation: The image depicts Intravenous Urography (IVU) , also called Intravenous Pyelography (IVP) . It is a non-invasive imaging technique where IV contrast is injected and serial X-rays are taken to outline the kidneys, ureters, and bladder. It is particularly useful to evaluate anatomy and pathology at the ureteropelvic junction (UPJ) , ureter, and collecting system. Invasive procedure (Option A): IVU is not considered invasive; only involves IV contrast administration. Gold standard for bladder cancer (Option C): The gold standard for bladder cancer diagnosis is cystoscopy with biopsy , not IVU. Done percutaneously (Option D): That describes Percutaneous Nephrostography , not IVU.

↑ *Back to this question in Part A*

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Q3: What is the investigation shown in the image? (Q852587)

A. Intravenous Pyelogram (IVP)

B. Retrograde Pyelogram

C. Computed Tomography (CT) Urography

D. Magnetic Resonance Urography



Correct Answer: A. Intravenous Pyelogram (IVP)

Explanation: The image shows a contrast-enhanced study of the urinary tract - with opacification of the renal calyces, pelvis, ureters, and bladder, which is characteristic of IVP. IVP is a traditional imaging modality where intravenous contrast is used to outline the urinary system on serial X-rays. Used for detecting urinary tract obstructions, stones, and structural anomalies. Intravenous Pyelogram (IVP) Feature Intravenous Pyelogram (IVP) Modality X-ray with IV contrast Indications Urinary stones, hydronephrosis, congenital anomalies Procedure Contrast injected → serial X-rays taken at intervals Findings Normal renal function, filling defects, delayed excretion Retrograde Pyelogram (Option B): Incorrect because contrast is introduced via a ureteric catheter, not IV , and it primarily evaluates the lower urinary tract. CT Urography (Option C): Incorrect because CT urography provides cross-sectional images with better resolution and 3D reconstruction, unlike IVP, which is a plain X-ray-based study. Magnetic Resonance Urography (Option D): Incorrect because MR urography is non-ionizing, uses T2-weighted sequences, and does not show contrast excretion in real-time like IVP.

References:

Grainger & Allison's Diagnostic Radiology 7th edition • Page no: 758, 760 Bailey & Love's Short Practice of Surgery - 28th Edition • Page no: 1467

↑ *Back to this question in Part A*

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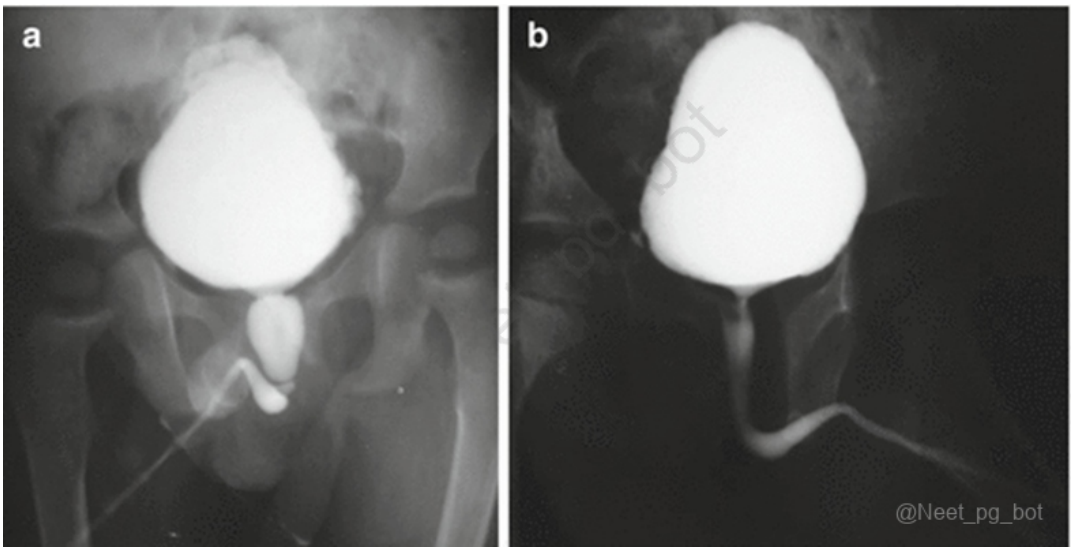
Q4: A 7-year-old male child presents with a history of recurrent urinary tract infections, poor urinary stream, and failure to thrive. On examination, his abdomen is distended, and there is a palpable bladder. His MCU is given below. What is the next best step in management? (Q843932)

A. Cystoscopic resection

B. Urethral reconstruction

C. Intermittent catheterization

D. Bladder augmentation surgery



Correct Answer: A. Cystoscopic resection

Explanation: Correct Option A - Cystoscopic resection: The clinical picture is most consistent with Posterior Urethral Valves (PUV) — the most common cause of lower urinary tract obstruction in male infants/children. Cystoscopic resection is the treatment of choice for Posterior Urethral Valve (PUV), which is a congenital condition characterized by abnormal valve-like folds in the posterior urethra, leading to urinary obstruction. Once the child is stabilized (bladder drained, UTI treated), the definitive management of PUV is endoscopic valve fulguration (cystoscopic resection) This removes the obstructing membranous folds and restores urinary flow. Incorrect Options: Option B: Urethral reconstruction This is not first-line for PUV Reconstruction is reserved only for rare cases with severe urethral injury or atresia, not for typical valve obstruction. Option C: Intermittent catheterization CIC is used in children with neurogenic bladder, not PUV. PUV requires anatomical removal of the obstructing valves rather than bladder-emptying assistance Option D: Bladder augmentation surgery Reserved for end-stage PUV with noncompliant bladder, usually much later. Not the next step in an untreated case.

References:

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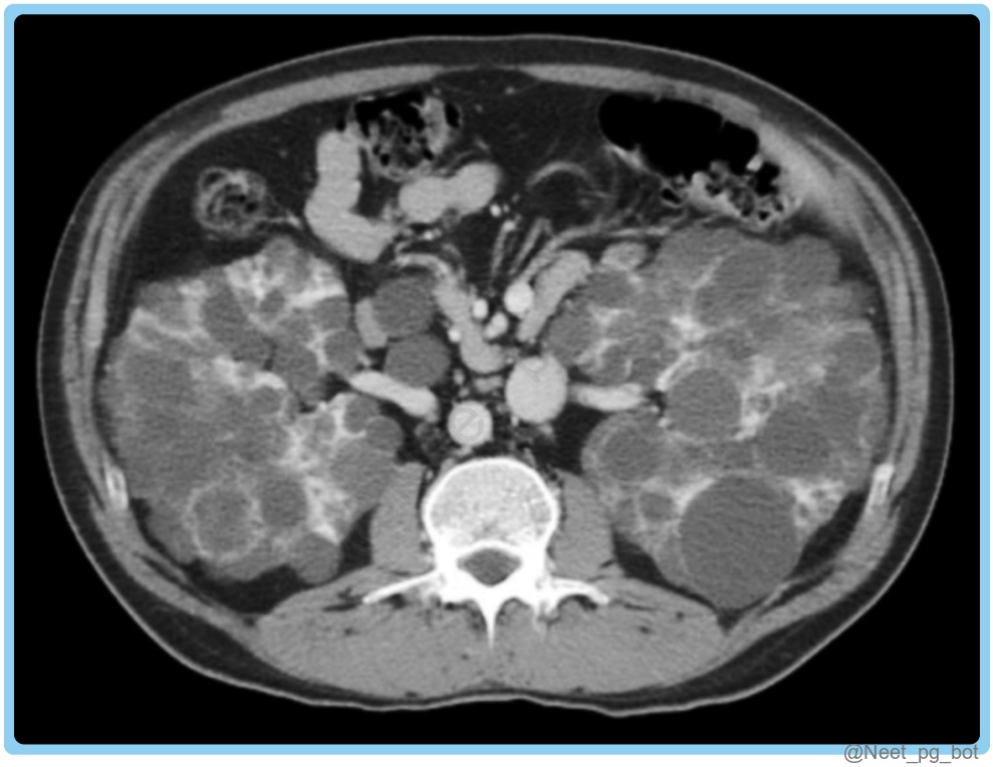
Q5: Based on the CT scan shown below, what is the most likely diagnosis? (Q843935)

A. Renal cyst

B. Renal cell carcinoma

C. Polycystic kidney disease (AD)

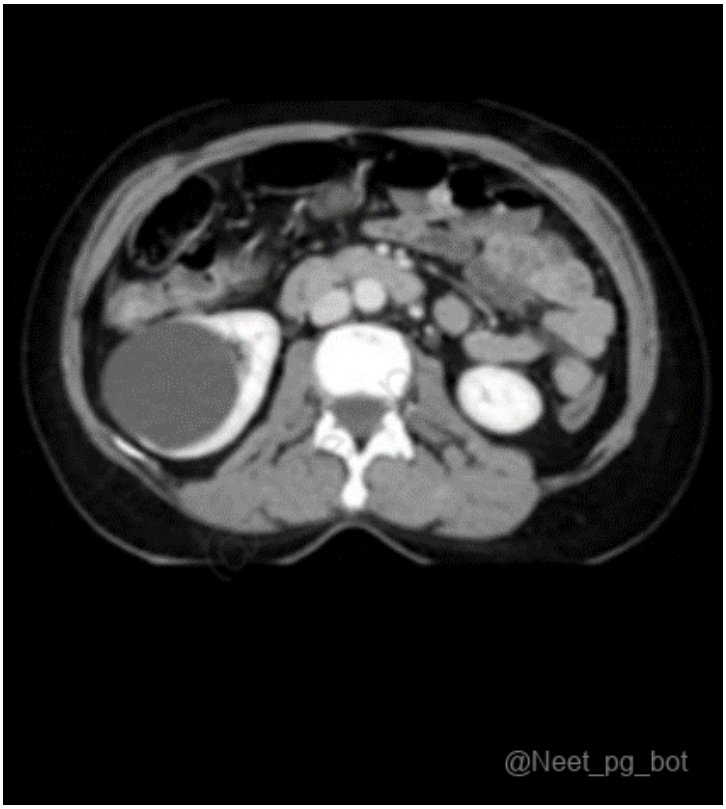
D. Renal angiomyolipoma



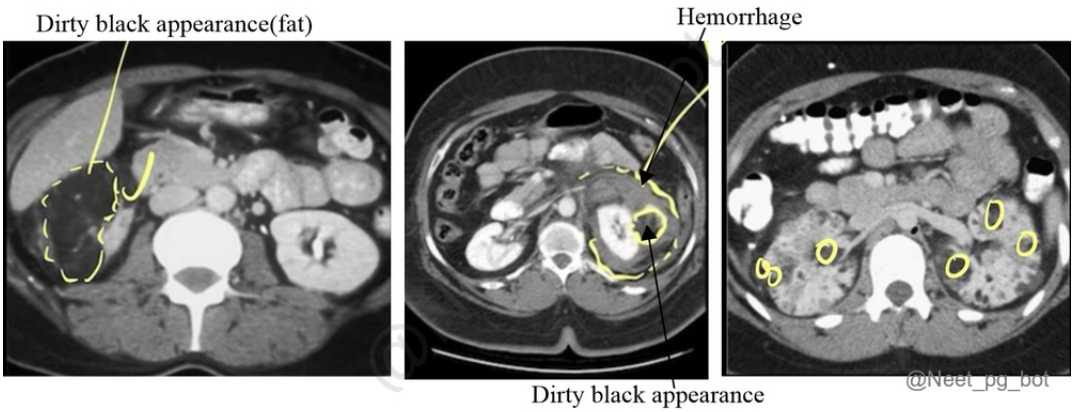
Correct Answer: C. Polycystic kidney disease (AD)

Explanation: The CT image shows massively enlarged kidneys on both sides, which is a hallmark of Autosomal Dominant Polycystic Kidney Disease (ADPKD). Both kidneys are packed with numerous, round, well-defined cysts that vary in size, replacing most of the normal renal parenchyma. These cysts appear as smooth, fluid-filled, non-enhancing structures, typical of PKD and distinctly different from solid tumors. The kidney's normal architecture is distorted, with marked thinning of the renal cortex due to continuous cyst expansion. The presentation is classic for ADPKD, commonly seen in adults and often associated with hypertension, flank pain, hematuria, or family history. Incorrect Options: Option A - Renal cyst: Renal cyst will show a unilocular cystic lesion. Option B - Renal cell carcinoma: Renal cell carcinoma will appear as a renal lesion with heterogeneous

areas of enhancement. Option D - Renal angiomyolipoma: Angiomyolipoma will give a dirty black appearance with areas of hemorrhage.







References:

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Q6: A 28-year-old patient presents with recurrent urinary tract infections and left flank pain . CT scan of the abdomen was performed and the image is shown below. What is the likely diagnosis? (Q820195)

A. Horseshoe kidney

B. Polycystic kidney disease

C. Renal ectopia

D. Hydronephrosis



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Correct Answer: A. Horseshoe kidney

Explanation: of correct answer.

References:

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↑ *Back to this question in Part A*

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Q7: A patient presented with abdominal pain and sterile pyuria, and the x-ray showed the following features. What is the likely diagnosis? (Q855474)

A. Putty kidney

B. Staghorn calculus

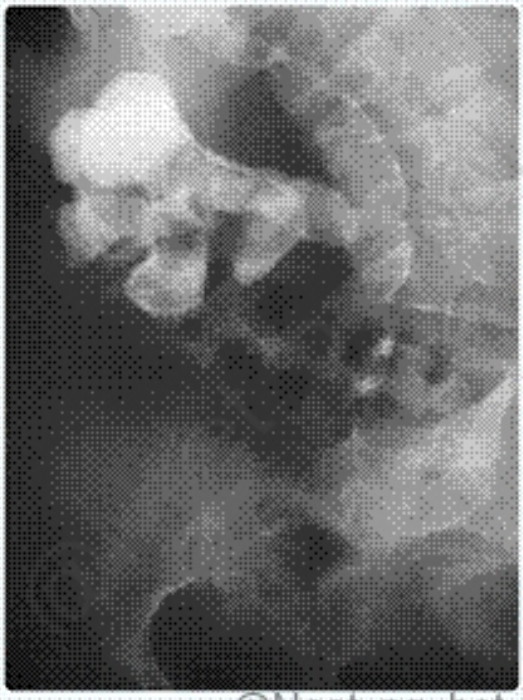
C. Nephrocalcinosis

D. Psoas calcification

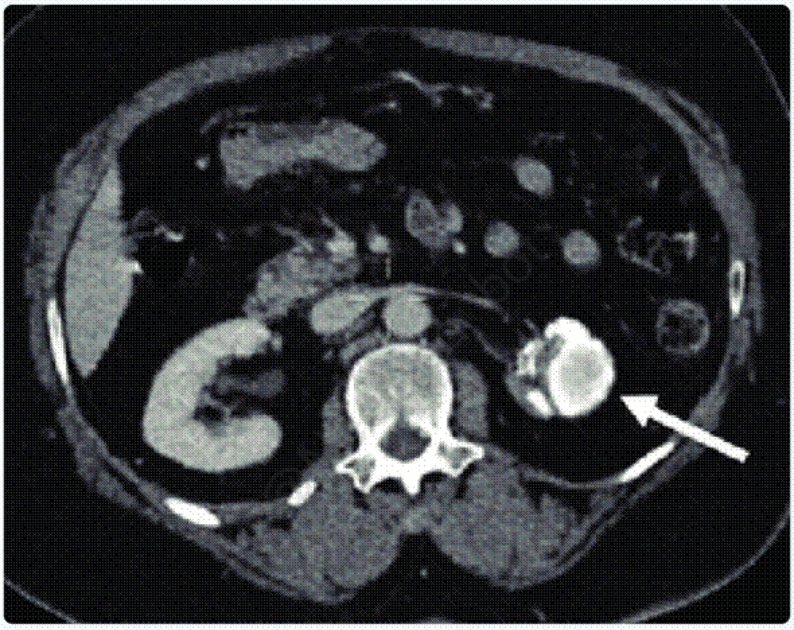


Correct Answer: A. Putty kidney

Explanation: The X-ray shows a calcified mass of the right kidney, often referred to as "putty-like," indicating dystrophic calcification. Putty kidney is seen in advanced renal tuberculosis , where extensive calcification and atrophy lead to a non-functioning kidney. Calcifications in the Kidney: Description Staghorn Calculus Putty Kidney (Option A) Medullary Nephrocalcinosis Description Large, branching stone filling the renal pelvis and calyces, resembling the shape of a staghorn. Tissue damage in the kidney by TB leads to dystrophic calcification. Indicates end-stage renal TB. Calcium deposition within the renal medulla (inner kidney). Cause Struvite stones formed from magnesium ammonium phosphate due to infection with urease-producing bacteria (e.g., Klebsiella, Proteus) Renal tuberculosis leads to granuloma formation causing necrosis, cavitation, fibrosis and stricture formation. Metabolic disturbances (e.g., hyperparathyroidism, sarcoidosis, renal tubular acidosis, medullary sponge kidney disease) leading to calcification of the renal medulla Imaging Characteristics Radio-opaque, visible on CT. They often form rapidly; fill the renal pelvis and extend into calyces. (Option B ruled out) {{caption_text}} Appears as a lobulated mass of calcified tissue on CT scans, resembling "putty"; indicating a non-functioning kidney. Detected on plain radiographs, ultrasound, and CT. USG and CT are very specific and hence useful even in mild cases USG- hyperechoic renal parenchyma with posterior acoustic shadowing. CT- High-density renal parenchyma in the medulla (Option C ruled out) {{caption_text}} {{caption_text}} {{caption_text}} Psoas calcification (Option D): Psoas calcification typically refers to calcification within the psoas muscle or tendon, and it's usually associated with chronic inflammation.


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X Ray showing right staghorn calculi



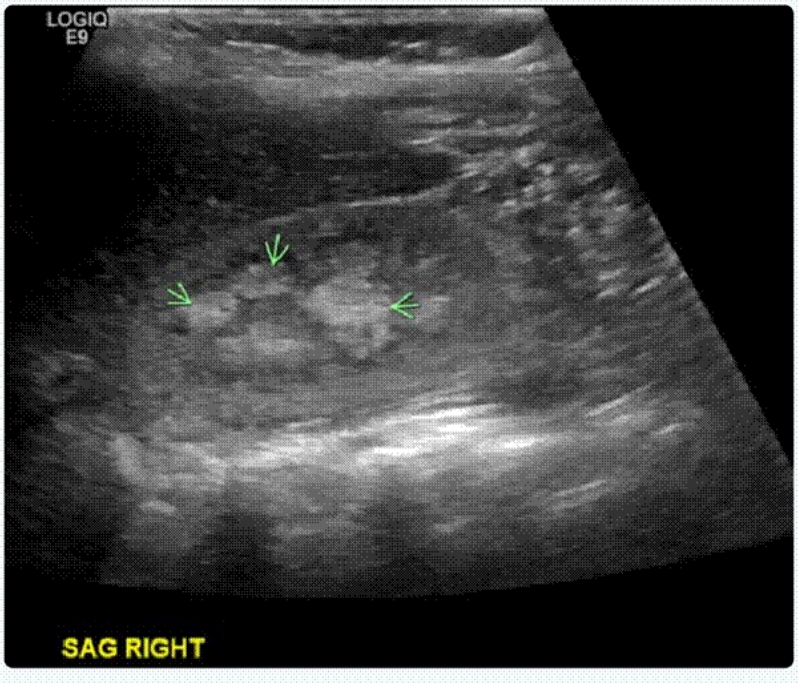
Venous phase post-contrast computed tomography (CT) demonstrates a shrunken left kidney replaced by dystrophic calcifications (white arrow), in keeping with a 'putty' kidney

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Plain X-ray KUB displaying a giant right-sided staghorn calculus surrounded by smaller secondary calculi along with a 2 cm calculus located in the distal third of the left ureter, at the inferior border of the sacroiliac joint

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Ultrasound demonstrating medullary nephrocalcinosis. The arrows denote several areas of nephrocalcinosis

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References:

Grainger & Allison’s Diagnostic Radiology, Seventh Edition, Page 787, 788, 789

Putty Kidney

↑ *Back to this question in Part A*

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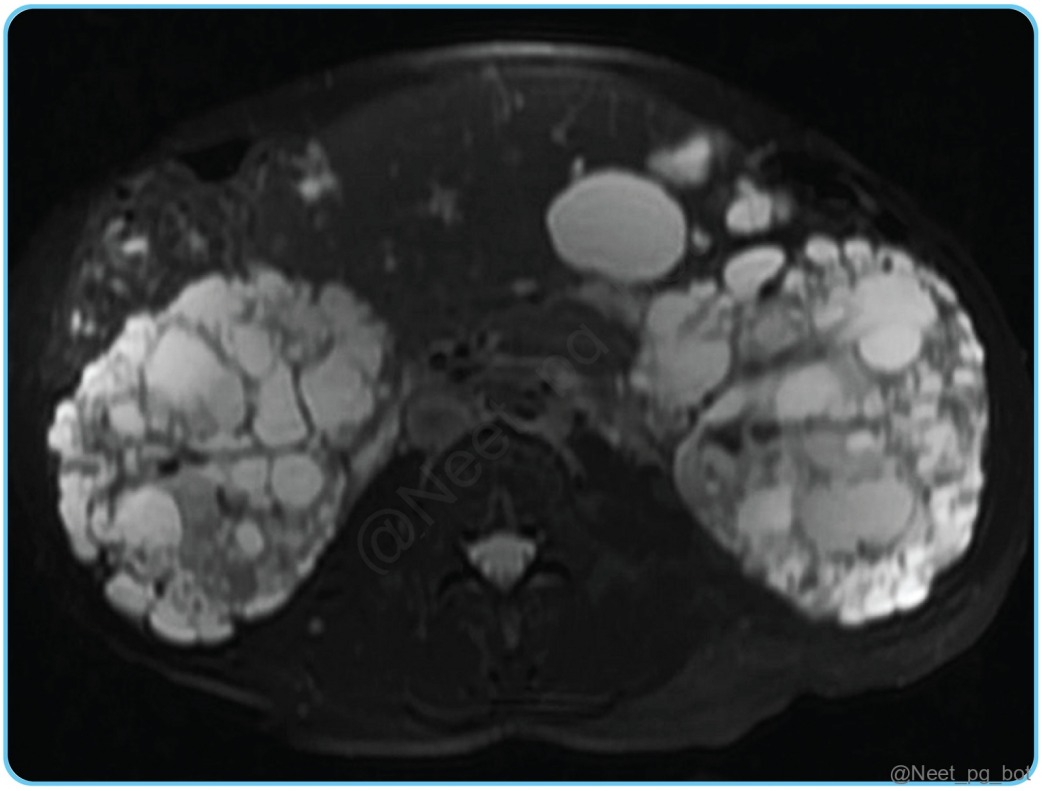
Q8: In the case presented, can you identify the imaging technique employed and the specific diagnosis related to the kidneys? (Q857197)

A. MRI of polycystic kidney disease

B. CT of polycystic kidney disease

C. MRI of Horseshoe kidney

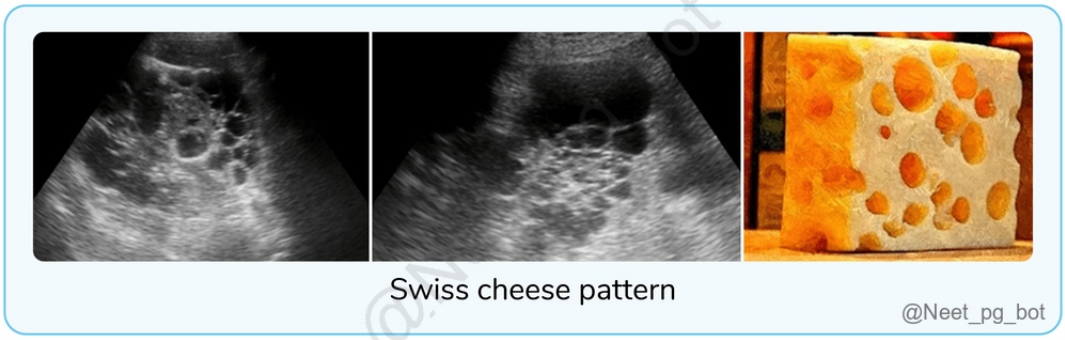
D. CT of Horseshoe Kidney

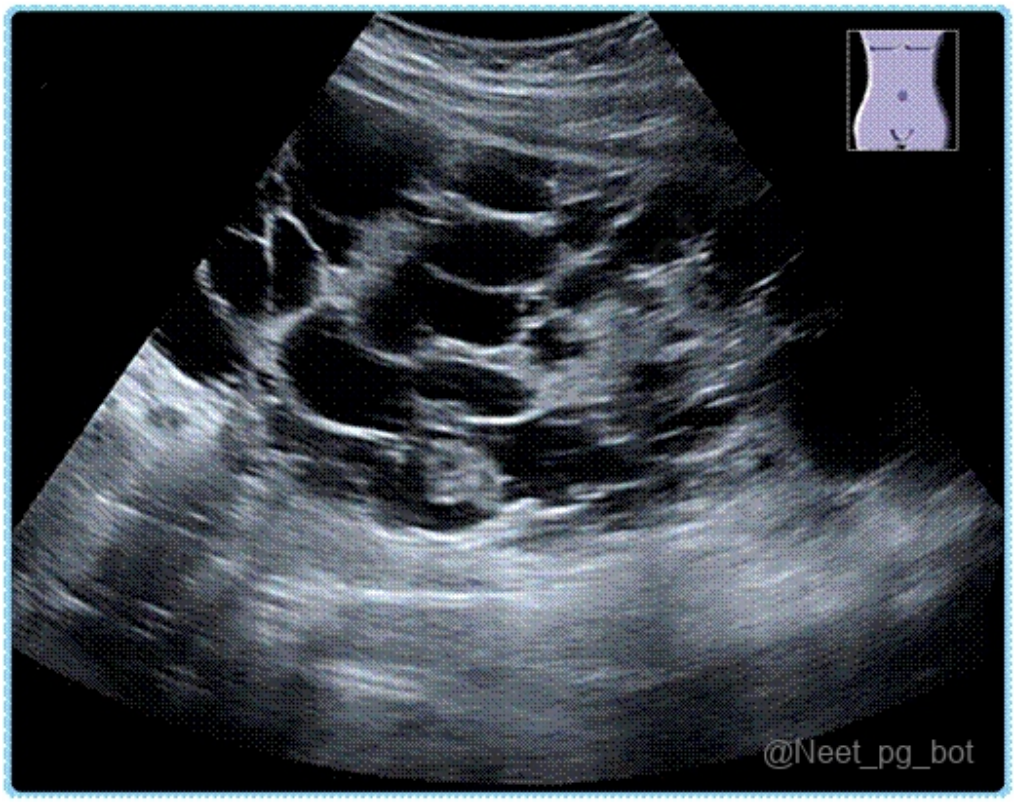


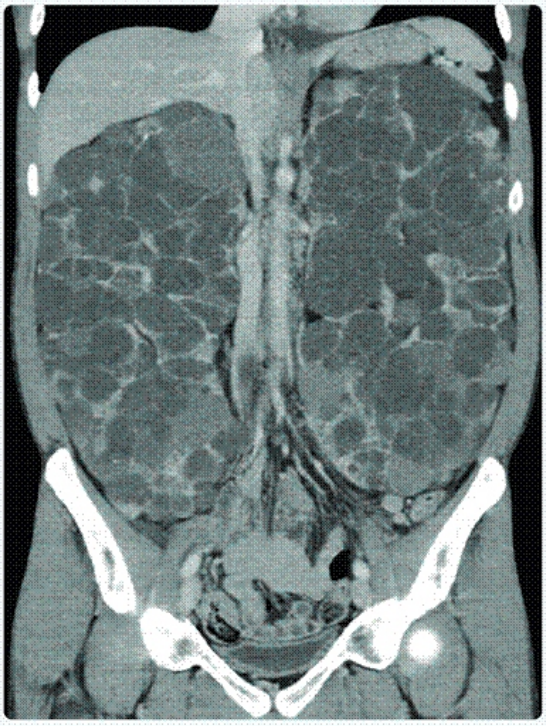
Correct Answer: A. MRI of polycystic kidney disease

Explanation: Magnetic Resonance Imaging (MRI) is a preferred modality for diagnosing Polycystic Kidney Disease (PKD) due to its superior soft tissue contrast and ability to visualize multiple cysts without ionizing radiation . Imaging of Polycystic Kidney Disease (PKD) Imaging Modality Findings Indications Ultrasound (USG) Enlarged kidneys, multiple cysts First-line screening in suspected PKD CT Scan Multiple cysts, hemorrhage, infection Detects complications like rupture or infection MRI High-resolution imaging of cysts, no

radiation Preferred for assessing renal function and disease progression MRI is particularly useful in young patients and those requiring long-term follow-up . Autosomal dominant polycystic kidney disease (ADPKD). Familial disorder with autosomal dominant inheritance , classified as a ciliopathy . Kidneys are progressively replaced by multiple cysts in the cortex and medulla, with initial preservation of intervening parenchyma. ADPKD is typically diagnosed between ages 30 and 50 , when symptoms first appear, thus being named "adult PKD". Typically presents in adults with hematuria , hypertension , and renal failure . It is associated with other conditions namely intracranial aneurysms, heart valve dysfunctions, colonic diverticula, aortic dissection and cystic lesions in other organs like the liver, spleen and pancreas. Imaging Plain Radiograph Enlarged, multilobulated renal outlines with bowel displacement. Multiple calcifications, sometimes with multiple ring appearance. Intravenous urography : "Swiss cheese nephrogram" (due to multiple renal cysts), "Spiderleg pyelogram" (stretched pelvicalyceal system). {{caption_text}} Ultrasound Simple cysts: Anechoic with thin walls, posterior acoustic enhancement, and lateral shadowing. Complicated cysts (haemorrhage/infection): Echogenic material within the cyst, possible wall calcification, absence of internal blood flow. CEUS : Demonstrates enhancement {{caption_text}} CT Simple cysts: Rounded with near-water attenuation and thin walls. Complications (haemorrhage/infection): Higher attenuation and wall calcification. {{caption_text}} CT showing ADPKD MRI T2 MRI- The most sensitive imaging modality Both enlarged kidneys have multiple cysts {{caption_text}} MRI showing ADPKD Autosomal recessive polycystic kidney disease (ARPKD): It is a hereditary condition seen in infants. There is dilatation of renal tubules. Several tiny cysts (<2mm) are seen scattered throughout the renal parenchyma giving the kidney a striated appearance. X-ray : Bilateral flank masses due to nephromegaly (enlarged kidneys). USG : Kidneys are predominantly hyperechoic with loss of corticomedullary differentiation. CT imaging : Shows smooth, enlarged kidneys with a striated pattern of contrast excretion. The striated pattern signifies the collection of contrast in dilated renal tubules. {{caption_text}} CT of Polycystic Kidney Disease (Option B): Incorrect because MRI provides better cyst delineation and avoids radiation exposure. MRI of Horseshoe Kidney (Option C): Incorrect because horseshoe kidney is a congenital fusion anomaly and does not present with numerous cysts as seen in PKD. CT of Horseshoe Kidney (Option D): Incorrect because CT primarily evaluates vascular anomalies and stones , but does not provide the best cyst visualization for PKD.

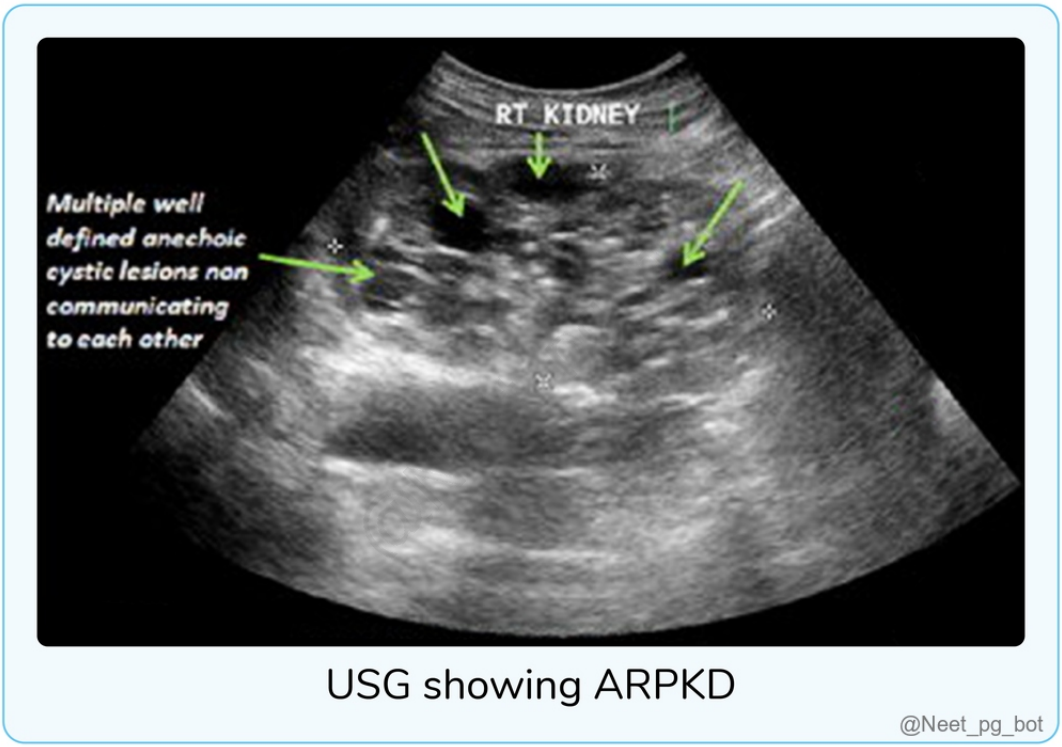






CT showing ADPKD@Neet_pg_bot





References:

Textbook of Radiology and Imaging, David Sutton, 8th Edition, Volume 2, Page 2926, 2928

Grainger and Allison’s Diagnostic Radiology, 7th Edition, Page 778

ADPKD

ARPKD

ARPKD2

↑ *Back to this question in Part A*

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Q9: ■ What is the cause of the following appearance in IVP? ■■ ■■ (Q859326)

A. Horseshoe kidney

B. Ureterocoele

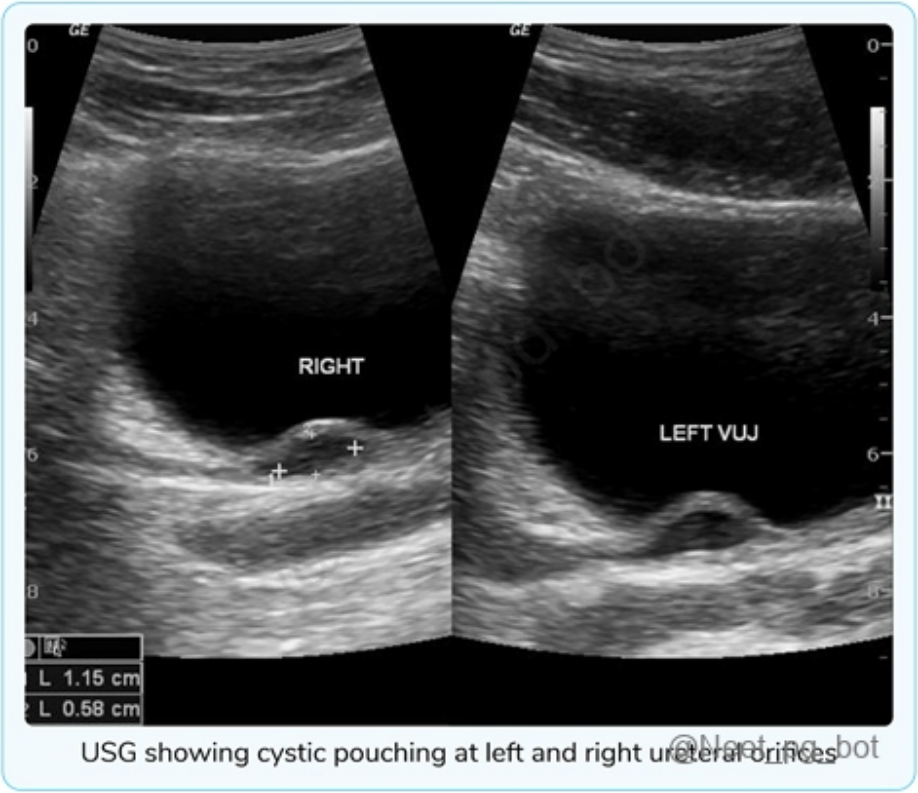
C. Bladder tumor

D. Posterior urethral valve



Correct Answer: B. Ureterocoele

Explanation: Ureterocoele is a congenital abnormality where the lower end of the ureter balloons out and forms a cyst-like structure. In an IVP, ureterocoele can be seen as a filling defect or a dilated portion of the ureter. It may cause obstruction to urine flow and can be associated with hydronephrosis. Ureterocele {{caption_text}} USG showing cystic pouching at left and right ureteral orifices {{caption_text}} Bilateral “Cobra head” appearance of distal ureters on X-ray Intravenous Urography Horseshoe Kidney (Option A) is a congenital condition in which the lower poles of both kidneys are fused together, forming a U-shaped structure. In an Intravenous Pyelogram (IVP), horseshoe kidney may be visualized as a single mass or "horseshoe-shaped" structure in the midline of the abdomen. Bladder Tumor (Option C): Bladder tumors refer to abnormal growths of tissue in the bladder, which may be benign or malignant (cancerous). In an IVP, bladder tumors can appear as filling defects or irregularities within the bladder. These abnormalities may cause partial or complete obstruction of the bladder outlet, and the IVP can help identify the location, size, and extent of the tumor. Posterior Urethral Valve (Option D) is a congenital abnormality that occurs in male infants where there is an abnormal fold of tissue in the urethra, obstructing urine flow. In an IVP, the posterior urethral valve may manifest as dilatation of the urethra and the urinary bladder. The IVP can demonstrate the extent of the obstruction, any associated hydronephrosis, and the impact on the urinary tract.



USG showing cystic pouching at left and right ureteral orifices



X-ray showing cobra head appearance - ureterocele

References:

Grainger and Allison's Diagnostic Radiology, 7th Edition, Page no: 678, 758

Textbook of Radiology and Imaging, David Sutton, 8th Edition, Volume 1, Page 2903

Maiden waist deformity | Radiology Reference Article | Radiopaedia.org

↑ *Back to this question in Part A*

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Q10: A woman with endometrial carcinoma is undergoing radiotherapy. Which of the following is true? (Q855484)

A. Intensity is inversely proportional to the square of the distance from the source

B. Small blood vessels are most radioresistant

C. Rapidly proliferating cells are most radioresistant

D. Small intestinal mucosa is most radio-resistant

Correct Answer: A. Intensity is inversely proportional to the square of the distance from the source

Explanation: The inverse square law defines that the intensity is inversely proportional to the square of the distance from the source. It is a principle of physics that states that the intensity of an effect such as illumination or gravitational force changes in inverse proportion to the square of the distance from the source. Radiotherapy: Radiation is a 'Double-edged sword' - it kills cancerous cells; it may also damage normal cells. It kills cells by damaging DNA which produces free radicals. Types: It depends on the source of radiation. Two types: Teletherapy: EBRT (External Beam Radiotherapy), source is at a distance, Brachytherapy: source is nearer to the patient. Brachytherapy is divided into 3 types: Interstitial (into the tissue): Ca Prostate, Ca Breast Intracavitatory (accessible cavity): Accessible tumors like Ca Cervix Mold (Superficial cancers): Penis, Eye cancers Small blood vessels are most radioresistant (Option B): Small blood vessels are not the most radioresistant. In fact, the vascular endothelium is relatively radiosensitive, and radiation can cause vascular damage leading to ischemia and necrosis. Rapidly proliferating cells are most radioresistant (Option C): Rapidly proliferating cells are not the most radioresistant; in fact, they are more radiosensitive. The reason is that these cells are often in the process of dividing, and radiation damages DNA, disrupting the cell cycle and leading to cell death. Small intestinal mucosa is most radio-resistant (Option D): Small intestinal mucosa is not the most radio-resistant. The cells of the small intestinal mucosa are rapidly dividing, making them more susceptible to radiation.

References:

Inverse-square law - Wikipedia

Are cancer stem cells radioresistant? - PMC

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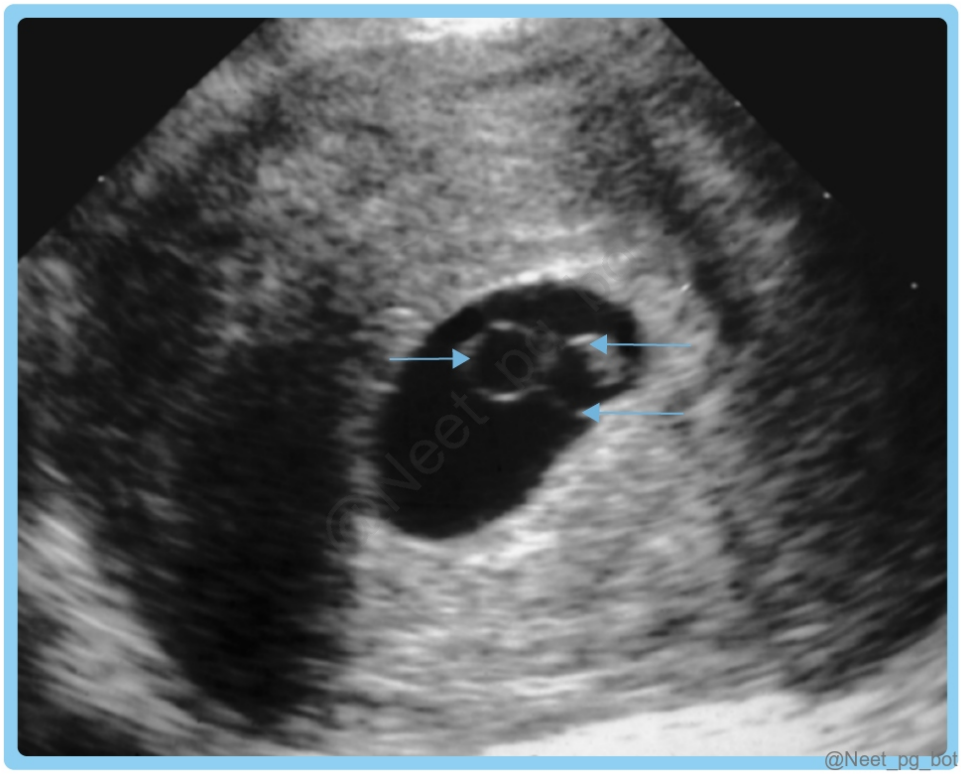
Q11: What is the cause of the double bleb sign observed during early pregnancy? (Q858242)

A. Twin pregnancy

B. Amnion and chorion

C. Yolk sac and amniotic sac

D. Heterotopic pregnancy

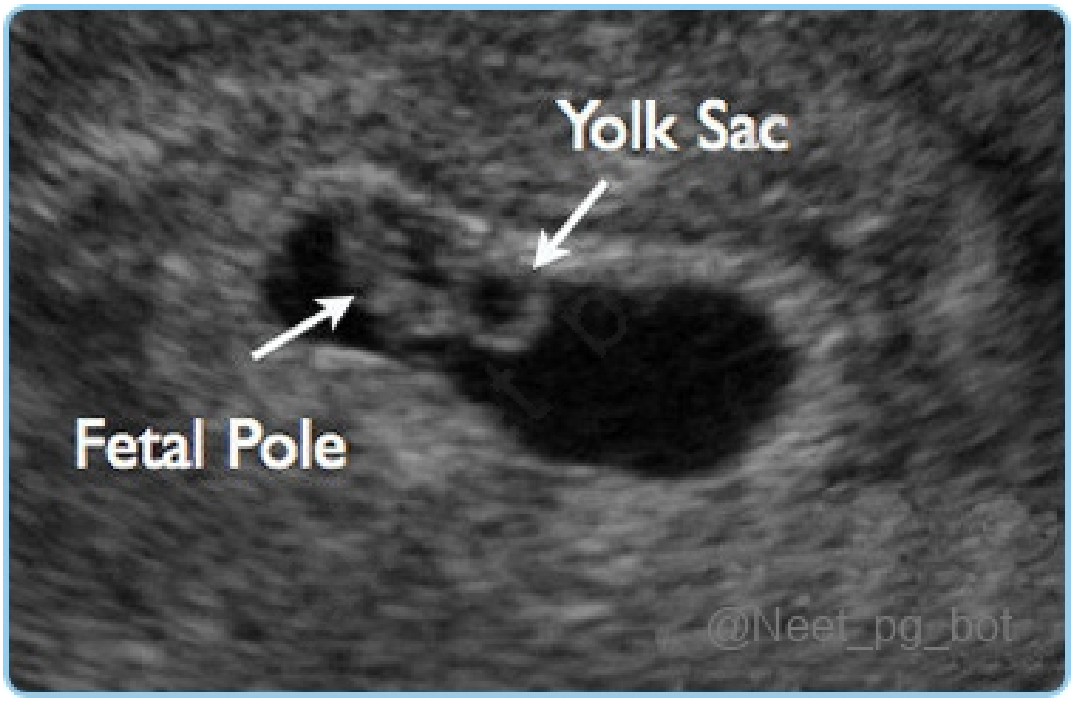


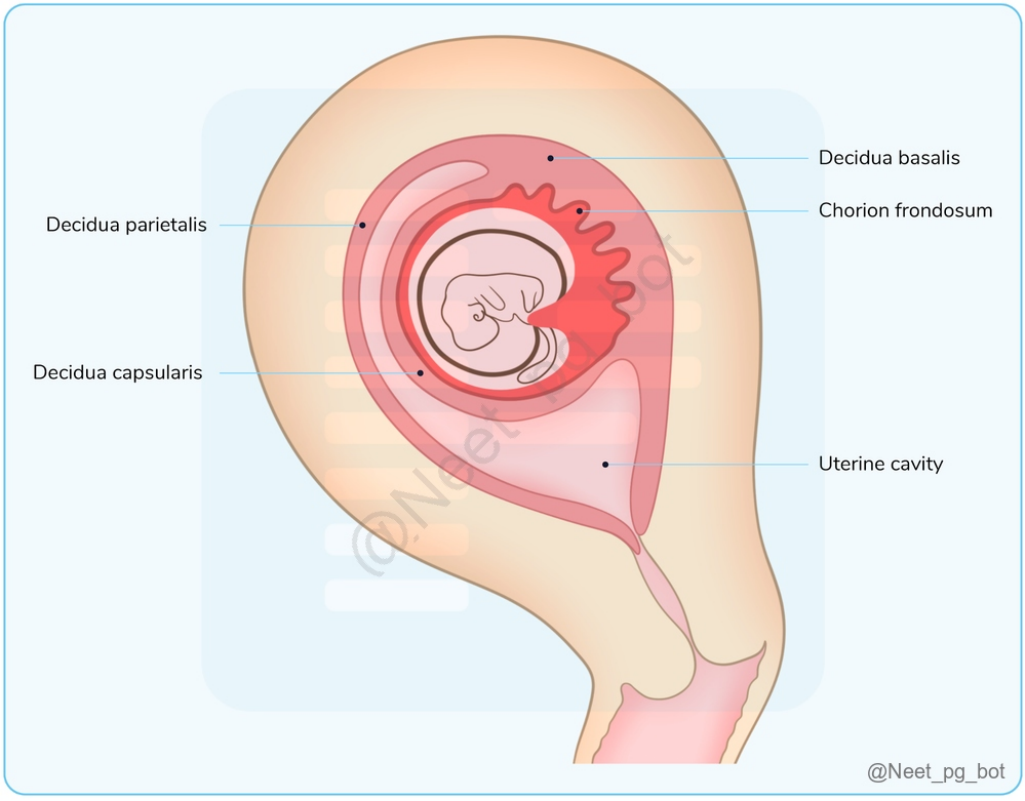
Correct Answer: C. Yolk sac and amniotic sac

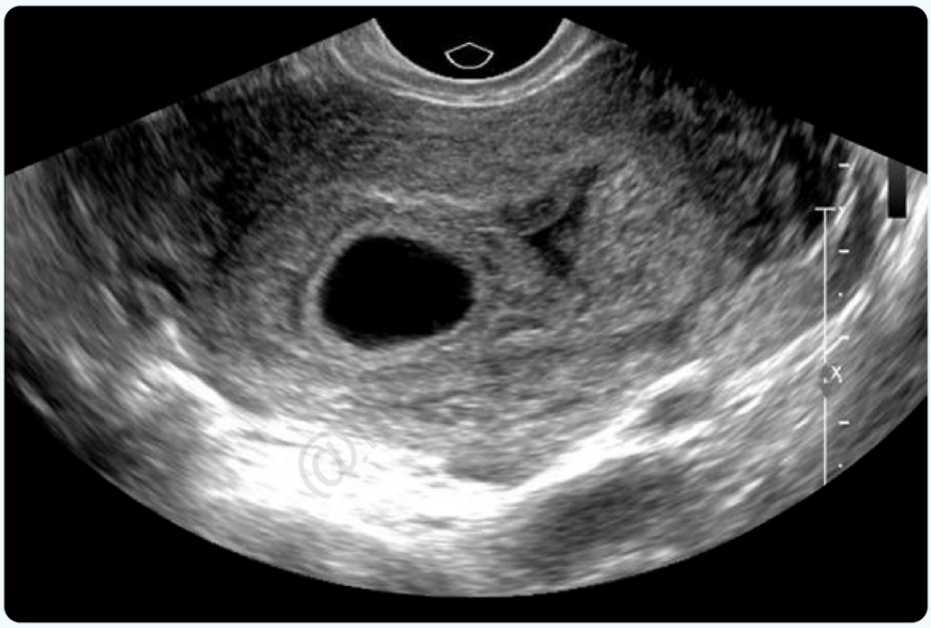
Explanation: Double bleb sign is an early ultrasound finding in a normal intrauterine pregnancy. It represents the yolk sac (first bleb) and the amniotic sac (second bleb) within the gestational sac. This sign is typically observed around 4.5 to 6 weeks of gestation and is considered a marker of a viable intrauterine pregnancy. Early Pregnancy Ultrasound: Ultrasound is the imaging method of choice. In early pregnancy, transvaginal is more sensitive than trans-abdominal. Decidua is first formed as the thick hyperechoic endometrium. Structures visualized Gestational age (TVS) Key features Gestational sac 4.5 to 5 weeks First sign of pregnancy in an ultrasound Yolk sac 5 to 6 weeks First reliable sign of an intrauterine pregnancy. Fetal heartbeat 5.5 to 6 weeks M-mode is preferred for the assessment of cardiac activity. Note: Doppler is contraindicated in 1st trimester, as it can increase the temperature and damage the embryo . {{caption_text}} First reliable sign of an intrauterine pregnancy is the yolk sac inside the gestational sac. {{caption_text}} {{caption_text}} Double decidual sac sign : (Option C) Suggestive of intrauterine pregnancy. (Option A ruled out) Two echogenic rings are seen surrounding the gestational sac, an inner decidua capsularis and an outer decidua parietalis. In between the two decidua is the uterine cavity. {{caption_text}} {{caption_text}} Pseudogestational sac is irregular in outline, usually centrally located in the uterus, has no double decidua sign and the sac remains empty. Twin pregnancy (option A): Incorrect because in a twin pregnancy, two separate gestational sacs or two yolk sacs may be visualised, but it does not produce the classic double bleb sign. Amnion and chorion (option B): Incorrect because the double bleb sign does not represent the amnion and chorion. The chorion is the outermost membrane and is not part of the blebs visualised in early gestation. Heterotopic pregnancy (option D): Incorrect because heterotopic pregnancy refers to the coexistence of an intrauterine and an ectopic pregnancy. It does not produce the double bleb sign.


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Yolk Sac
Fetal Pole
@Neet_pg_bot


Decidua basalis
Chorion frondosum
Decidua parietalis
Decidua capsularis
Uterine cavity
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References:

DC Dutta's Textbook of Obstetrics, Edition 9th- Page 601

Fred A. Mettler, Jr, Essentials of Radiology, Edition 4th- Page 191-93

William's Gynecology Edition 4th- Page 164, 777

Sonography 1st Trimester Assessment, Protocols, and Interpretation - StatPearls - NCBI Bookshelf (nih.gov)

↑ *Back to this question in Part A*

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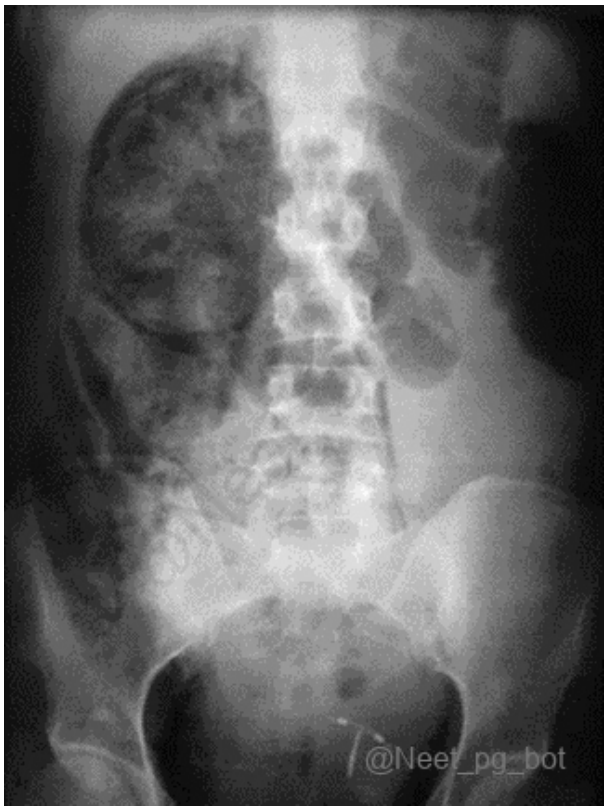
Q12: A 55-year-old female patient presents to the emergency department with chills and rigors . She has acute pain in right flank region . The imaging is shown below. What is the most likely diagnosis? (Q820179)

A. Cholecystitis

B. Emphysematous pyelonephritis

C. Small bowel obstruction

D. Volvulus



Correct Answer: B. Emphysematous pyelonephritis

Explanation: of correct answer.

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• [10_Radiotherapy] 021 Previous Year Questions

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[10_Radiotherapy] 021 Previous Year Questions — Quick Jump

Q1 (p. 1438) *Q2 (p. 1438)* *Q3 (p. 1439)* *Q4 (p. 1440)* *Q5 (p. 1441)* *Q6 (p. 1443)*
Q7 (p. 1445) *Q8 (p. 1446)* *Q9 (p. 1448)*

Q1: Which of the following is the most likely side effect of radioactive iodine (I-131) ablation therapy? (Q852581)

A. Acute Thyroiditis

B. Hypothyroidism

C. Hyperthyroidism

D. Thyroid Storm

Correct Answer: B. Hypothyroidism

Explanation: I-131 ablation therapy is commonly used for Graves' disease, toxic nodules, or thyroid cancer . Soon after I-131 ablation , residual thyroid tissue may release stored thyroid hormones, causing transient hyperthyroidism initially. Later , as the thyroid tissue is destroyed, the patient develops hypothyroidism , the main long-term side effect. Patients often require lifelong thyroid hormone replacement therapy (levothyroxine) . . Side Effects of I-131 Therapy Side Effect Mechanism Common in Hypothyroidism (Correct Answer) Destruction of thyroid tissue → ↓ T4, ↑ TSH Most patients post-I-131 therapy Acute Thyroiditis Radiation-induced inflammation → temporary thyroid pain, swelling Early post-treatment phase Hyperthyroidism Thyrotoxic phase due to sudden hormone release from damaged cells Rare, transient Thyroid Storm Massive release of thyroid hormones (life-threatening) Very rare, usually in untreated Graves'

References:

https://www.ncbi.nlm.nih.gov/books/NBK555978/ https://jnm.snmjournals.org/content/49/12/2012

↑ *Back to this question in Part A*

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Q2: A child with acute lymphoblastic leukemia undergoes prophylactic irradiation prior autologous hematopoietic stem cell transplantation. Which of the following will be the least affected? (Q856172)

A. Spermatogonia

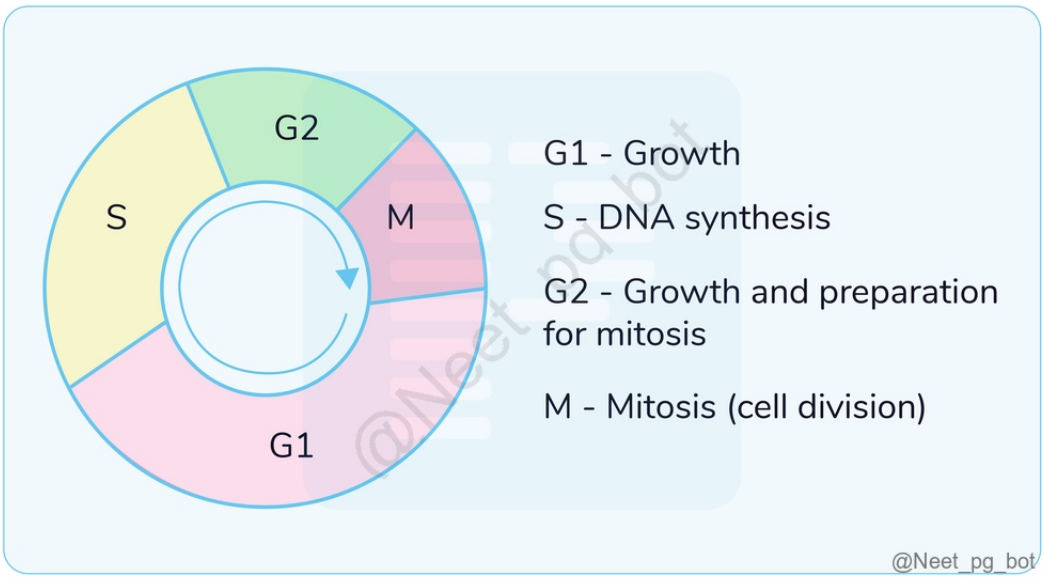
B. Intestinal epithelial cells

C. Neurons

D. Bone marrow/ erythroid precursor cells

Correct Answer: C. Neurons

Explanation: Neurons are terminally differentiated, non-dividing cells. Their low mitotic activity makes them relatively resistant to radiation-induced damage. According to the Law of Bergonie: The more the cells are rapidly dividing, the more they are sensitive to radiation. M-phase (dividing phase) is the most radiosensitive phase S-phase (Synthesizing phase) is the most radioresistant phase Most radiosensitive tissue in the body is Bone marrow (rapidly dividing). Most radioresistant tissue in the body is neurons (non-dividing). Most radiosensitive cells in the blood are lymphocytes. The most radioresistant cell in the blood is the platelet. The most radioresistant organ in the body is the vagina. Spermatogonia (Option A): are highly radiosensitive because they are actively dividing cells. Irradiation can severely affect spermatogenesis. Intestinal epithelial cells (Option B): are composed of rapidly dividing cells. It has one of the highest turnover rates in the body, making it highly sensitive to radiation. Bone marrow/erythroid precursor cells (Option D): Bone marrow cells, including erythroid precursors, are highly proliferative and sensitive to radiation. Irradiation often results in significant suppression of hematopoiesis.



References:

https://pmc.ncbi.nlm.nih.gov/articles/PMC7312565/#:~:text

↑ *Back to this question in Part A*

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Q3: Which phase of the cell cycle displays the highest resistance to radiation among the following options? (Q856694)

A. S phase

B. M phase

C. G1 phase

D. G2 phase

Correct Answer: A. S phase

Explanation: The S phase of the cell cycle is the most radioresistant phase. During this phase, the DNA is actively being replicated, and mechanisms for DNA repair are highly active, providing protection against radiation-induced damage. M phase (option B): This is incorrect because the M phase (mitosis) is the most radiosensitive phase due to the condensed state of chromosomes and limited time for DNA repair mechanisms to function. G1 phase (option C): This is incorrect because cells in the G1 phase are moderately sensitive to radiation. However, their sensitivity depends on whether they are preparing for DNA synthesis. G2 phase (option D): This is incorrect because the G2 phase is also a radiosensitive phase, as the cell prepares for mitosis and DNA repair capacity is lower than in the S phase.

References:

Radiation Resistance of Cancer Stem Cells: The 4 R’s of Radiobiology Revisited - PMC

↑ *Back to this question in Part A*

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Q4: Side effects of Pituitary irradiation? (Q858175)

A. Hypopituitarism

B. Increased risk of cerebrovascular accident

C. Optic nerve damage

D. All of the above

Correct Answer: D. All of the above

Explanation: Pituitary irradiation , commonly used in the treatment of pituitary adenomas or certain hormonal disorders, can lead to various side effects due to the proximity of critical structures in the brain. Hypopituitarism: This is the most common long-term side effect. Radiation can damage the normal pituitary tissue, leading to deficiencies in pituitary hormones (e.g., growth hormone, thyroid-stimulating hormone, or gonadotropins).

Increased risk of cerebrovascular accident (CVA): Radiation exposure to nearby vascular structures, such as the carotid arteries, can lead to vascular damage and increase the risk of strokes or transient ischemic attacks over time. Optic nerve damage: Radiation can damage the optic nerves or the optic chiasm, leading to visual deficits such as visual field loss or, in severe cases, blindness.

References:

David Sutton Textbook of Radiology & Imaging, 8th Edition, Volume 2, Page 2284-2286, 2287, 2288

↑ *Back to this question in Part A*

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Q5: What is the name of the radiotherapy treatment given to a cancer patient that involves administering a dose of 1.8 to 2 Gy once daily for 5 days per week over a period of 6 to 8 weeks? (Q858194)

A. Regular Fractionated radiotherapy

B. Hyper fractionated radiotherapy

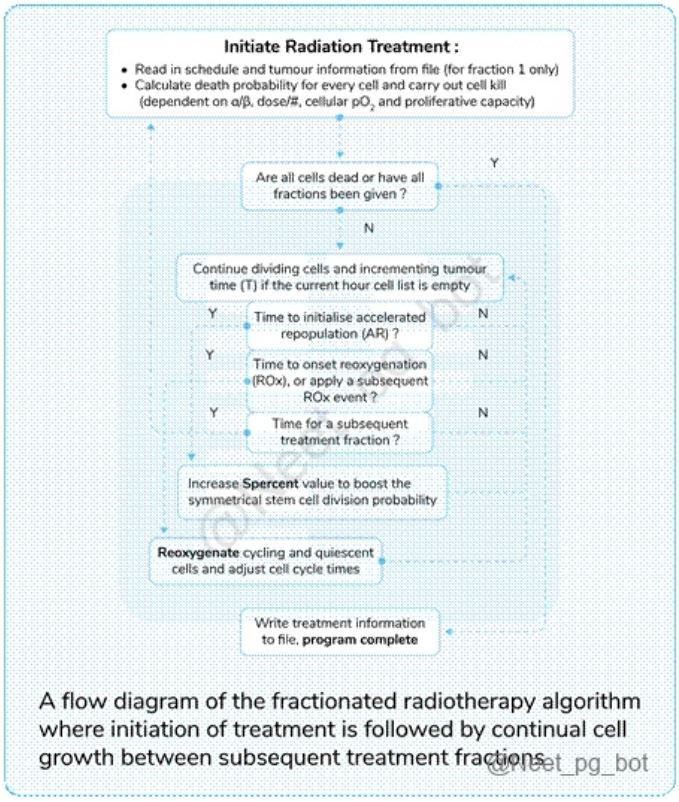
C. Accelerated fractionation radiotherapy

D. Brachytherapy

Correct Answer: A. Regular Fractionated radiotherapy

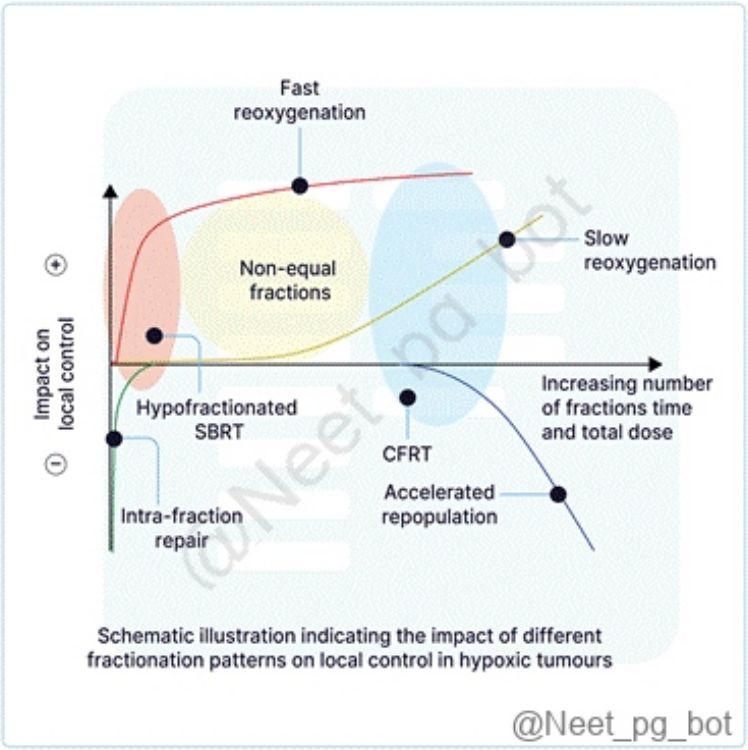
Explanation: Regular Fractionated Radiotherapy : This is the standard treatment regimen in radiotherapy for many cancers. The patient receives a dose of 1.8 to 2 Gy per day , typically administered once daily for 5 days a week (Monday to Friday), with a total treatment course lasting between 6 to 8 weeks . This approach allows for normal tissue recovery while delivering effective doses to the cancerous tissue. Fractionated Radiotherapy Definition : Treatment in multiple smaller doses (fractions) to enhance tumor control and protect normal tissue. Key Principles Therapeutic Window : Balances damage to tumor vs. normal tissue using the "5 Rs of Radiobiology": Radiosensitivity : Tumor cells are more sensitive to radiation. Repair : Normal tissue repairs better between treatments. Reoxygenation : Hypoxic tumor cells reoxygenate, increasing sensitivity. Redistribution : Cells cycle through phases of varying sensitivity. Repopulation : Normal tissue regeneration, affecting treatment outcomes. Fraction Size and Dose : Standard doses are 1.8-2 Gy per session, totaling 50-66 Gy over weeks. Advances in Fractionation Technique Key Features Spatially Fractionated Radiation Therapy (SFRT) Delivers heterogeneous doses to spare normal tissue, effective in bulky tumors. Hyperfractionation More frequent, smaller doses to enhance local control. Accelerated Fractionation Shortens overall treatment time, maintaining or enhancing efficacy. Challenges Radioresistance : Tumors may develop resistance, requiring careful dose planning. Scheduling : Ideal fractionation depends on tumor type, size, and location; research is ongoing Hyper fractionated Radiotherapy (option B) : Incorrect because in hyperfractionated radiotherapy, smaller doses of radiation (usually 1.2 to 1.5 Gy) are given multiple times a day (typically twice), rather than once daily. Accelerated Fractionation Radiotherapy (option C) : Incorrect because accelerated fractionation involves delivering radiation doses more frequently, often with a shorter overall treatment duration (e.g., increasing the daily dose or increasing the

frequency of radiation delivery within a shorter period). Brachytherapy (option D) : Incorrect because brachytherapy is a type of radiotherapy where a radioactive source is placed directly inside or very close to the tumor. It is typically used for specific cancers (e.g., prostate, cervical) rather than the fractionated external beam therapy described in the question.



A flow diagram of the fractionated radiotherapy algorithm where initiation of treatment is followed by continual cell growth between subsequent treatment fractions.

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References:

Combining spatially fractionated radiation therapy (SFRT) and immunotherapy opens new rays of hope for enhancing therapeutic ratio

A Century of Fractionated Radiotherapy: How Mathematical Oncology Can Break the Rules - PMC

The Quest for Optimal Fractionation Schedules in Stereotactic Radiotherapy - PMC

↑ *Back to this question in Part A*

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Q6: Radioisotope used in PET-CT scan? (Q860579)

A. 18F-FDG

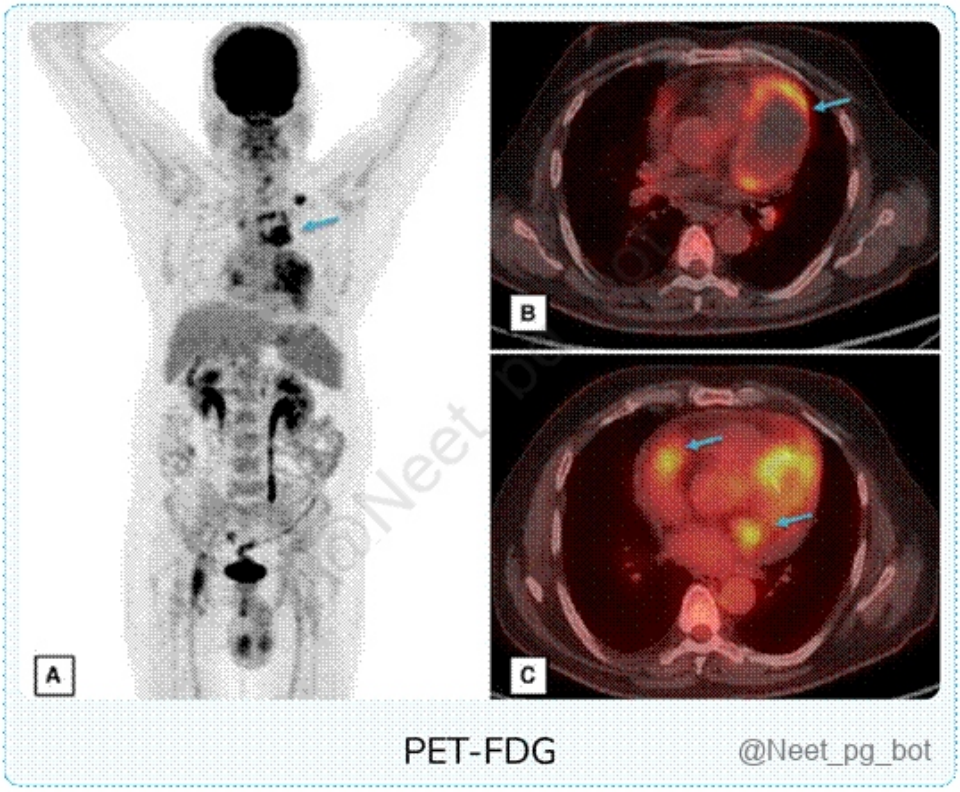
B. Iodine

C. Radium

D. Cesium-131

Correct Answer: A. 18F-FDG

Explanation: 18F-FDG (Fluorodeoxyglucose) is the most commonly used radiotracer in PET-CT scans. It is a glucose analog labeled with the radioactive isotope Fluorine-18. It accumulates in tissues with high glucose metabolism, such as cancer cells, inflammation, or infection, making it highly useful for diagnosing and staging cancers, monitoring treatment response, and detecting recurrent disease. Fluorodeoxyglucose (FDG) positron-emission tomography (PET-FDG) Uptake of 18F-FDG (Analogue of endogenous glucose) in large quantities by cancer cells as compared to normal cells Application: Quantification of tumor metabolic activity Diagnosis (lung cancer) and Staging of cancer Assessing distant metastasis More sensitive in primary lung and oesophageal cancer metastatic disease Assessment of response to treatment A decrease in FDG uptake after chemotherapy indicates that the tumor is responding to treatment Routine surveillance following treatment- not commonly preferred. {{caption_text}} Not useful in the following situations: High Glycolytic Metabolism tissues: Central nervous system tumors. Inflammation vs. Cancer: Both conditions exhibit increased glucose metabolism. Movement disorders Coronary blood flow Warburg Effect Cancer cells prefer glycolysis over oxidative phosphorylation, even in the presence of oxygen. This leads to increased glucose uptake and lactate production , common in many cancers. 18F-fluorodeoxyglucose (18F-FDG) , a glucose analog used in PET imaging, helps study this effect. Mechanisms of 18F-FDG Accumulation Mechanism Description Aerobic Glycolysis Cancer cells rely heavily on glycolysis, increasing glucose and 18F-FDG uptake, even with oxygen. Transport & Trapping GLUT-1 transporters mediate glucose entry. 18F-FDG is phosphorylated and trapped inside cells. Tumor Heterogeneity Differences in tumor subtype, size, and microvasculature affect 18F-FDG uptake. Clinical Implications of 18F-FDG Implication Details Prognostic Indicator Higher 18F-FDG uptake correlates with worse prognosis (e.g., shorter DFS in invasive ductal carcinoma). Reverse Warburg Effect Cancer-associated fibroblasts (CAFs) increase glycolysis in tumor cells via metabolic coupling. Treatment Monitoring PET imaging tracks changes in 18F-FDG uptake, reflecting therapy responses targeting glycolysis or mitochondria. Iodine (Option B): Radioactive iodine (e.g., I-131 or I-123) is mainly used in thyroid imaging and treatment of thyroid disorders Radium (Option C): Radium-223 is used in the treatment of bone metastases (e.g., in prostate cancer) Cesium-131 (Option D): Cesium-131 is used in brachytherapy for localized radiation delivery (e.g., in prostate cancer)



References:

Grainger & Allison's Diagnostic Radiology 7th Edition- Page 1642, 1645, 1646, 1648.

https://www.sciencedirect.com/science/article/abs/pii/S0009926010001790

↑ *Back to this question in Part A*

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Q7: Radioactive isotope used for teletherapy? (Q860597)

A. Iridium-192

B. lodine-125

C. Cobalt-60

D. lodine-131

Correct Answer: C. Cobalt-60

Explanation: Cobalt-60 is the most commonly used radioactive isotope in teletherapy, a type of external beam radiotherapy. It emits high-energy gamma rays, which are effective for treating deep-seated tumors. Teletherapy (External beam radiation) It is a form of radiation therapy in which the radiation source is placed at a distance from the body, delivering high-energy radiation beams to treat tumors. External beam sources are: Betatron Cobalt Linear accelerator Neutron beam Photon beam Proton beam Spray radiation Stereotactic radiosurgery such as gamma knife X-ray Types of Beams Electrons Negatively charged particles Limited penetration Effective for tumors near the body surface (Skin tumors) Photons Can reach deep tumors Scatter radiation along the path Continue through normal tissue after reaching the tumor Made up of high energy: X-rays (LINAC- Linear accelerators) Gamma rays Protons Positively charged particles No radiation scatter Stop precisely at the tumor location cobalt 60 (Co 60) Linear accelerator The Cobalt machine produces an artificial radioisotope (Co) Advantage: Relative constancy of beam output Source replacement approximately every 4 to 5 years LINAC- Linear accelerators do not need a radioisotope The fast-moving electron beam generates radiation which is used in radiotherapy X-ray beams are produced A dvantages of External Beam Painless Do not require a hospital stay in most patients Most patients can continue with their normal daily activities Non-invasive Iridium-192 (Option A): Used in brachytherapy, especially for treating cancers of the cervix, breast, and prostate. Iodine-125 (Option B): Used in brachytherapy, particularly for prostate cancer and eye plaques (e.g., choroidal melanoma). Iodine-131 (Option D): Used in the treatment of thyroid cancer and hyperthyroidism but not in teletherapy.

References:

Perez & Brady's Principles and Practice of Radiation Oncology, 7th edition- Pdf Page 96, 571, 572.

https://training.seer.cancer.gov/treatment/radiation/radiation-types.html#:~:text=*%20Electrons%20%E2%80%93%20negative%20charge%2C%20beams%20do,radiation%20along%20path%2C%20stops%20at%20tumor%20lo

cation.

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Q8: What does a linear accelerator (LINAC) produce in radiation therapy? (Q866873)

A. Alpha and beta rays

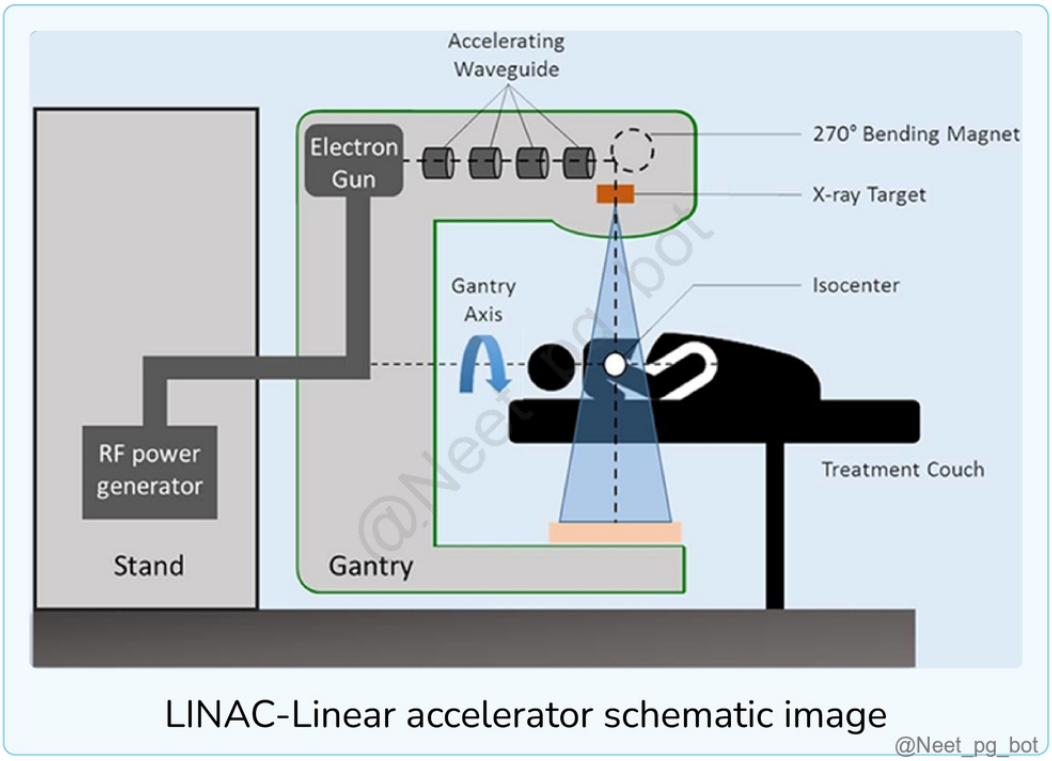
B. X-rays and gamma rays

C. X-rays and electrons

D. Neutrons and positrons

Correct Answer: C. X-rays and electrons

Explanation: A linear accelerator (LINAC) is the most commonly used device in external beam radiation therapy. It accelerates electrons to high energies using microwave technology. These high-energy electrons can be used directly to treat superficial tumors, or they can be directed onto a metal target to produce high-energy X-rays (photons) for treating deep-seated tumors. This allows precise targeting of malignant tissue while sparing surrounding normal structures. LINAC Machine: The overhead X-ray tube emits X-ray beams to the patient. It also has a movable arm that can be mobilized around the patient. The treatment head contains significant shielding material to minimize leakage radiation. Incorrect Options: Alpha and beta rays (Option A): Emitted from radioactive decay of certain isotopes, not generated by LINACs. X-rays and gamma rays (Option B): Gamma rays are emitted from radioactive isotopes like cobalt-60, not produced by a LINAC. Neutrons and positrons (Option D): Neutrons are used in specialized neutron therapy, and positrons are emitted in PET imaging; neither is produced by a LINAC.



LINAC-Linear accelerator schematic image

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References:

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Q9: Which among the following radioactive isotopes is not employed in brachytherapy? (Q793101)

A. Iodine-125

B. Iodine-131

C. Cobalt-60

D. Iridium-192

Correct Answer: B. Iodine-131

Explanation: Correct Option B: Iodine-131 is used in Systemic Radiotherapy like Papillary Thyroid Carcinoma. I-131 is also used for the treatment of benign hyperthyroid conditions. It is, however, not used in any form of brachytherapy. Therefore, option b is the correct answer. In brachytherapy, a radiation source is placed inside the body of tumor tissue or on the body of tumor tissue. This minimizes radiation exposure to the persons handling it and also to the person who is receiving brachytherapy. Incorrect Options: Option A - Iodine- 125: I-125, with a half-life of 60 days, is the most common radioactive isotope used in permanent interstitial brachytherapy. Hence, it is an incorrect choice. Option B - Cobalt- 60: These radioactive isotopes are produced by neutron activation of stable cobalt-59. They have a half-life of 5.27 years. These have been used in intracavitary or HDR brachytherapy for a long. Therefore, it is an incorrect choice. Option D - Iridium-192: Iridium-192 is produced by neutron activation of stable Iridium-191. They have a half-life of 73.83 days. These radioactive isotopes are used in HDR brachytherapy.

References:

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• [11_Cardiovascular Radiology] 022 Cvs Radiology

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[11_Cardiovascular Radiology] 022 Cvs Radiology — Quick Jump

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Q7 (p. 1460)	*Q8 (p. 1462)*	*Q9 (p. 1463)*	*Q10 (p. 1465)*	*Q11 (p. 1467)*	*Q12 (p. 1469)*
Q13 (p. 1471)	*Q14 (p. 1472)*	*Q15 (p. 1474)*	*Q16 (p. 1475)*	*Q17 (p. 1477)*	*Q18 (p. 1479)*
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Q31 (p. 1508)	*Q32 (p. 1510)*	*Q33 (p. 1513)*	*Q34 (p. 1515)*	*Q35 (p. 1518)*	

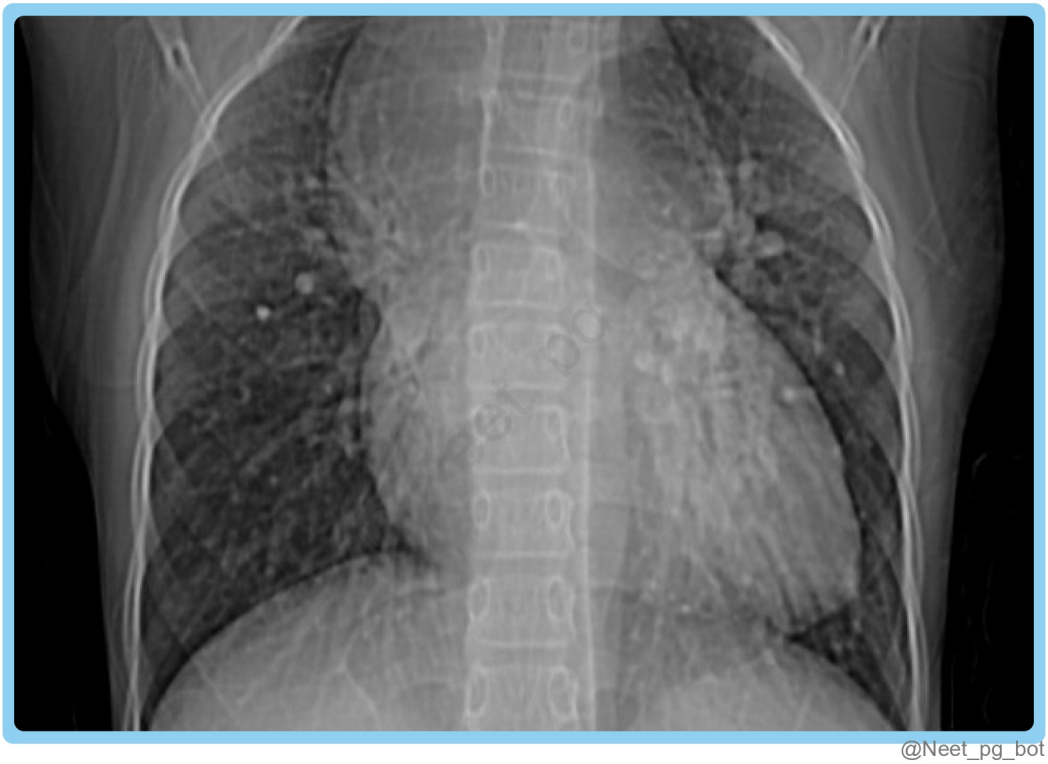
Q1: A neonate presents with early-onset respiratory distress, poor feeding, and central cyanosis not responding adequately to oxygen therapy. Chest X-ray reveals cardiomegaly with increased pulmonary vascular markings and a characteristic mediastinal contour. Based on the clinical presentation and radiographic appearance, what is the most likely diagnosis? (Q885190)

A. Endocardial cushion defect

B. Total anomalous pulmonary venous circulation

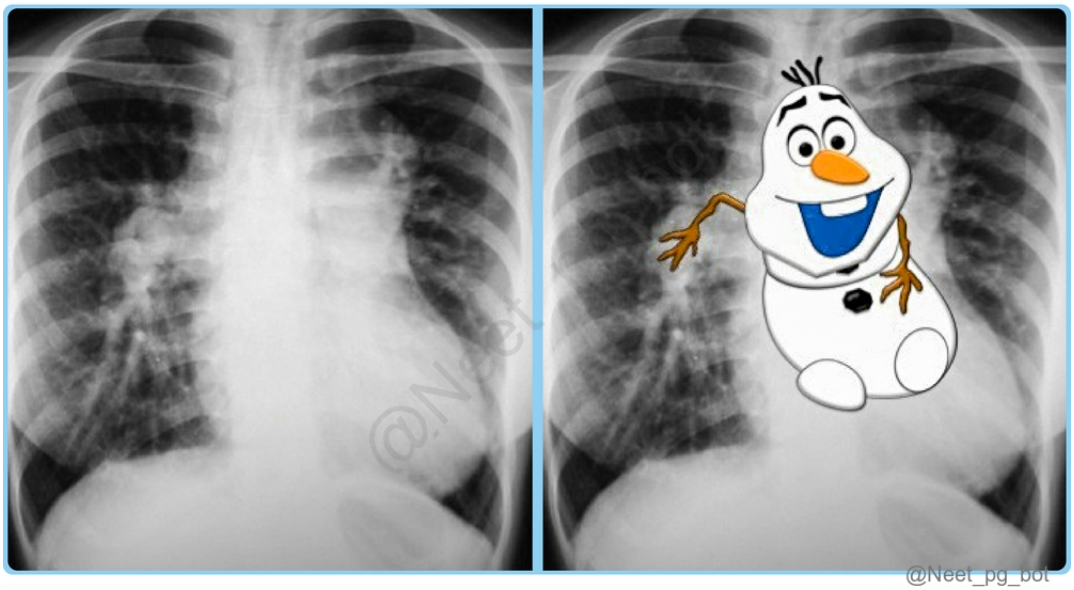
C. Supravalvular aortic stenosis

D. Primary pulmonary artery hypertension



Correct Answer: B. Total anomalous pulmonary venous circulation

Explanation: The above clinical scenario with radiological investigation points towards the diagnosis of Total Anomalous Pulmonary Venous Circulation (TAPVC), where pulmonary veins fail to connect to the left atrium, leading to mixing of oxygenated and deoxygenated blood. Pathophysiology: In TAPVC, all pulmonary veins drain into the systemic venous circulation instead of the left atrium Oxygenated blood returns to the right side of the heart, causing volume overload of the right atrium and right ventricle Systemic circulation depends on an interatrial communication (ASD/PFO) for survival Leads to early cyanosis and respiratory distress in neonates Clinical Correlation Presents in early infancy with: Central cyanosis not relieved by oxygen Poor feeding and failure to thrive Tachypnea and respiratory distress Obstructed TAPVC presents more severely and earlier Radiological Features Chest X-ray may show: Cardiomegaly with right-sided chamber enlargement Increased pulmonary vascular markings due to pulmonary venous congestion Characteristic mediastinal contours such as the “snowman sign” in supracardiac TAPVC Incorrect Options: Endocardial cushion defect (Option A): Typically associated with atrioventricular septal defects, cardiomegaly, and pulmonary plethora but not early severe cyanosis. Supravalvular aortic stenosis (Option C): Causes left ventricular outflow obstruction with normal pulmonary venous drainage and no neonatal cyanosis. Primary pulmonary artery hypertension (Option D): Shows enlarged central pulmonary arteries with peripheral pruning, usually presenting later in life.



References:

https://radiopaedia.org/articles/total-anomalous-pulmonary-venous-return

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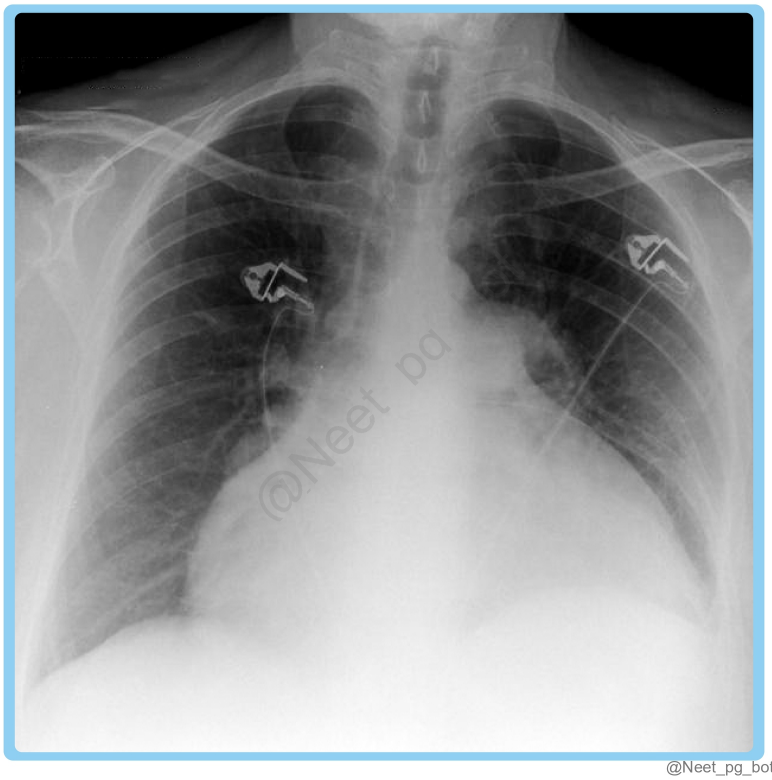
Q2: A 38-year-old male presents with gradually worsening retrosternal chest pain associated with low-grade fever for several days. A chest radiograph obtained shows an enlarged, globular cardiac silhouette with clear lung fields. Based on the clinical presentation and radiographic findings, what is the most likely diagnosis? (Q885128)

A. Pneumonia

B. Aortic dissection

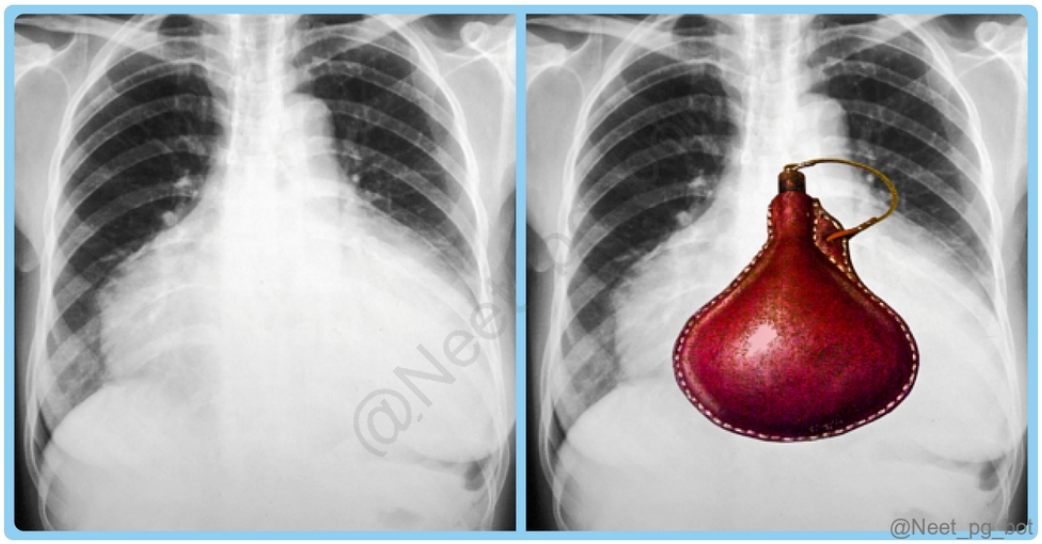
C. Pericardial effusion

D. Coarctation of the aorta



Correct Answer: C. Pericardial effusion

Explanation: The above clinical scenario with radiological findings points towards the diagnosis of pericardial effusion, suggested by fever, chest pain, and a globular cardiac silhouette on chest X-ray with clear lung fields. Radiological Basis Chest X-ray shows: Globular or “water bottle” shaped cardiac silhouette Disproportionate cardiomegaly Clear lung fields , ruling out pulmonary pathology These findings are classic for moderate to large pericardial effusion ■■■■■■■ Clinical Correlation Low-grade fever and progressive chest pain suggest: Inflammatory or infective pericarditis Subacute presentation is typical of: Viral pericarditis Tubercular or inflammatory effusion Pathophysiology Accumulation of fluid in the pericardial sac leads to: Symmetric enlargement of the cardiac shadow Loss of normal cardiac contours Lung parenchyma remains unaffected unless there is associated disease Pericardial effusion presents on chest X-ray as a globular cardiac silhouette with preserved lung fields, especially in a patient with chest pain and fever. Incorrect Options: Pneumonia (Option A): Shows focal or lobar consolidation, air bronchograms, and is associated with lung opacities rather than isolated cardiomegaly. Aortic dissection (Option B): Chest X-ray may show widened mediastinum; diagnosis is best made on CT angiography, not by globular heart enlargement. Coarctation of the aorta (Option D): Chronic condition with rib notching and figure-of-3 sign; does not present with acute fever or globular cardiac silhouette.



References:

Grainger & Allison's Diagnostic Radiology, 7th Edition, Page 96.

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Q3: On a routine posteroanterior chest radiograph, which finding appears first and indicates early enlargement of the left atrium? (Q885172)

A. Straightening of the right cardiac border

B. Prominence of the left atrial appendage

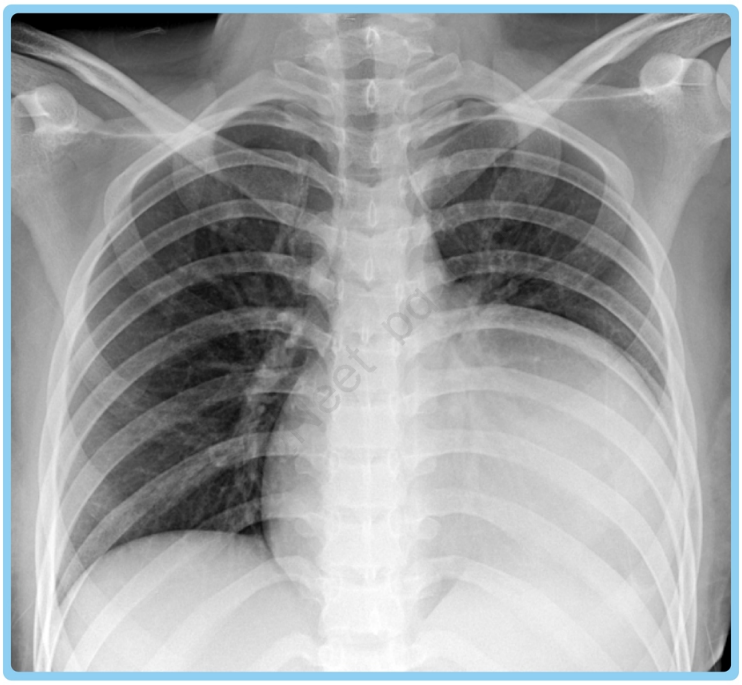
C. Appearance of a double right heart border

D. Elevation of the left main bronchus with carinal widening

Correct Answer: B. Prominence of the left atrial appendage

Explanation: The earliest radiographic indicator of left atrial enlargement on a chest X-ray is prominence of the left atrial appendage, which reflects initial dilatation of the left atrium before it becomes large enough to cause secondary anatomic displacement. Early Radiographic Changes in Left Atrial Enlargement The left atrial appendage lies along the left heart border between the pulmonary artery segment and left ventricle Mild enlargement causes outward bulging in this region, producing an early visible contour change This sign appears before airway displacement or formation of a double cardiac shadow Progressive Changes with Increasing Enlargement Further enlargement leads to: Elevation of the left main bronchus Widening of the carinal angle Development of a double right heart border due to posterior left atrial expansion Incorrect Options: Straightening of the right cardiac border (Option A): Occurs later due to right atrial enlargement or pulmonary hypertension

rather than early left atrial changes. Double atrial shadow (Option C): Seen in moderate to severe left atrial enlargement when the posterior wall projects through the right heart border. Elevation of left main bronchus and carinal widening (Option D): Represents advanced left atrial enlargement and is not an early sign.



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References:

Grainger & Allison's Diagnostic Radiology, 7th Edition, Page 113.

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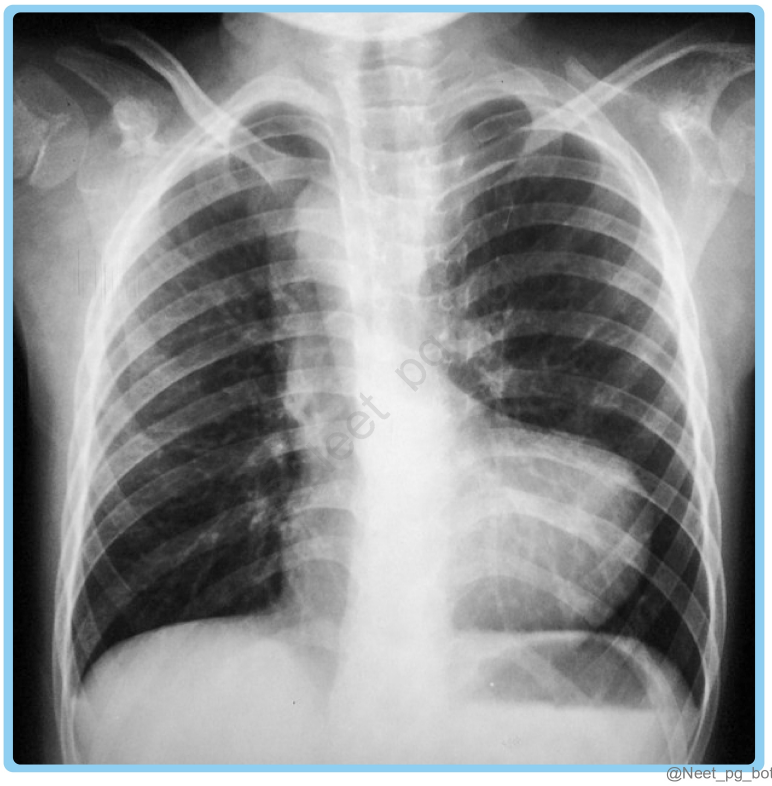
Q4: A 6-year-old child is brought with a history of progressive breathlessness and episodes of bluish discoloration of lips that worsen during exertion. A chest radiograph demonstrates a characteristic cardiac silhouette with reduced pulmonary vascular markings. What is the most likely diagnosis? (Q885173)

A. Transposition of great arteries

B. Tetralogy of Fallot

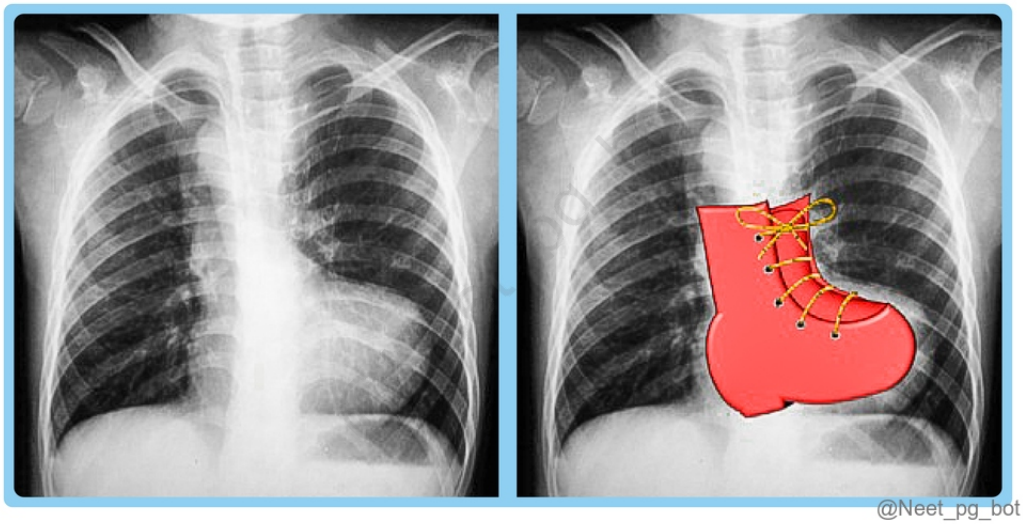
C. Ebstein's anomaly

D. Coarctation of the aorta



Correct Answer: B. Tetralogy of Fallot

Explanation: The above clinical scenario with exertional cyanosis in a young child and characteristic chest X-ray findings most strongly point toward Tetralogy of Fallot , the most common cyanotic congenital heart disease presenting beyond infancy. Radiological and Clinical Basis Children with Tetralogy of Fallot typically develop cyanosis that worsens on exertion due to right-to-left shunting. Chest X-ray classically shows: Boot-shaped heart (coeur en sabot) due to right ventricular hypertrophy Upturned cardiac apex Pulmonary oligemia (decreased pulmonary vascular markings) due to pulmonary stenosis Symptoms usually become evident in early childhood rather than at birth. Key Pathophysiology of Tetralogy of Fallot Consists of four components: Ventricular septal defect Right ventricular outflow tract obstruction Overriding aorta Right ventricular hypertrophy Incorrect Options: Coarctation of the aorta (Option B): Presents with upper limb hypertension and rib notching on X-ray; cyanosis is not a feature except in severe neonatal forms. Transposition of great arteries (Option C): Presents with severe cyanosis at birth and shows an egg-on-string cardiac silhouette rather than exertional cyanosis in a 5-year-old. Ebstein’s anomaly (Option D): Characterised by massive right atrial enlargement with a box-shaped heart and is commonly associated with tricuspid regurgitation rather than pulmonary oligemia.



References:

Grainger & Allison's Diagnostic Radiology, 7th Edition, Page 295.

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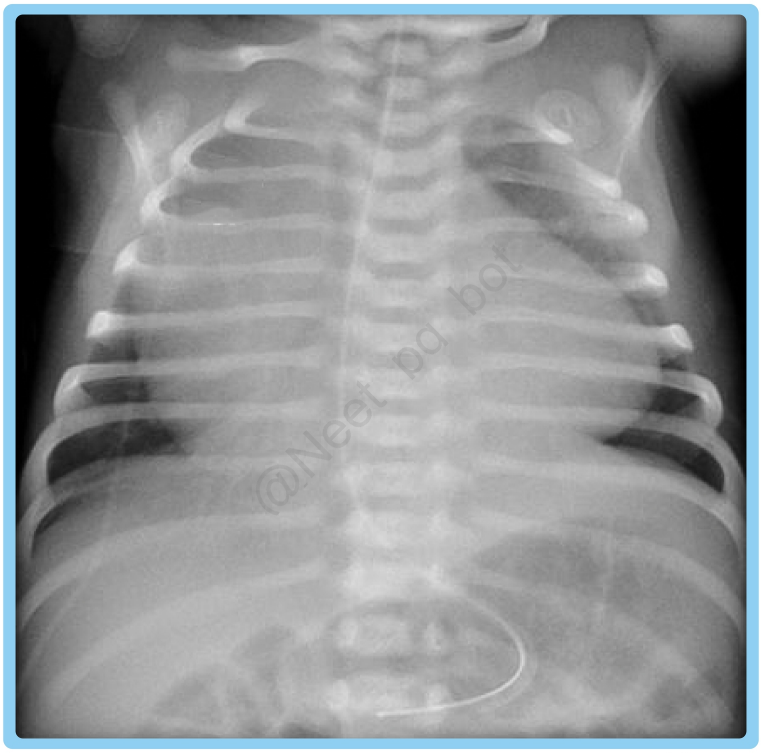
Q5: A 3-month-old infant is evaluated for recurrent episodes of central cyanosis, especially during crying and feeding. Chest radiograph demonstrates cardiomegaly with a characteristic box-shaped heart and reduced pulmonary vascularity. Which of the following best explains the underlying pathology? (Q885176)

A. Single arterial trunk supplying both systemic and pulmonary circulation

B. Downward displacement of the tricuspid valve with atrialization of the right ventricle

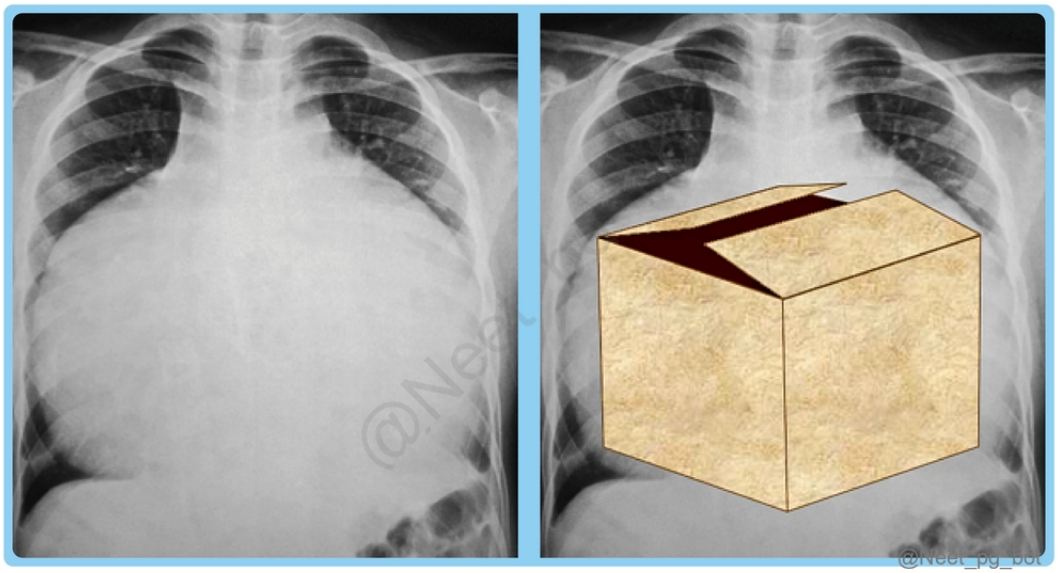
C. Obstruction of the right ventricular outflow tract with overriding of the aorta

D. Abnormal drainage of pulmonary veins into systemic venous circulation



Correct Answer: B. Downward displacement of the tricuspid valve with atrialization of the right ventricle

Explanation: The above clinical scenario with recurrent cyanosis during crying and a box-shaped cardiomegaly on chest X-ray is most consistent with Ebstein anomaly. Key Clinical and Radiological Correlation Infant presents with cyanosis precipitated by crying/feeding , suggesting a congenital cyanotic heart disease Chest X-ray shows: Gross cardiomegaly Characteristic box-shaped (rectangular) heart Decreased pulmonary vascular markings These findings point toward a right-sided valvular abnormality with functional right heart enlargement Ebstein Anomaly - Pathophysiology A congenital malformation of the tricuspid valve Hallmark feature: Downward (apical) displacement of septal and posterior tricuspid valve leaflets Leads to: Atrialization of a portion of the right ventricle Enlarged right atrium Reduced the effective right ventricular cavity Frequently associated with: Right-to-left shunt at atrial level → cyanosis Reduced pulmonary blood flow Chest X-ray Features of Ebstein Anomaly Marked cardiomegaly due to: Dilated right atrium Atrialized right ventricle Box-shaped or rectangular cardiac silhouette Pulmonary oligemia due to decreased forward flow Incorrect Options: Single arterial trunk supplying both systemic and pulmonary circulation (Option A): Seen in truncus arteriosus, which shows increased pulmonary vascularity and does not produce a box-shaped heart. Obstruction of right ventricular outflow tract with overriding of the aorta (Option C): Describes Tetralogy of Fallot, which shows a boot-shaped heart rather than a box-shaped heart. Abnormal drainage of pulmonary veins into systemic venous circulation (Option D): Total anomalous pulmonary venous connection shows different radiographic patterns such as snowman sign and pulmonary congestion.



References:

Grainger & Allison's Diagnostic Radiology, 7th Edition, Page 301

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Q6: A 2-week-old neonate presents with poor feeding, lethargy, and mild central cyanosis since birth. Oxygen saturation shows minimal improvement with supplemental oxygen. A chest radiograph demonstrates a narrow superior mediastinum with an ovoid cardiac silhouette Based on the clinical and radiographic findings, which diagnosis is most likely? (Q885178)

A. Partial anomalous pulmonary venous return

B. Endocardial cushion defect

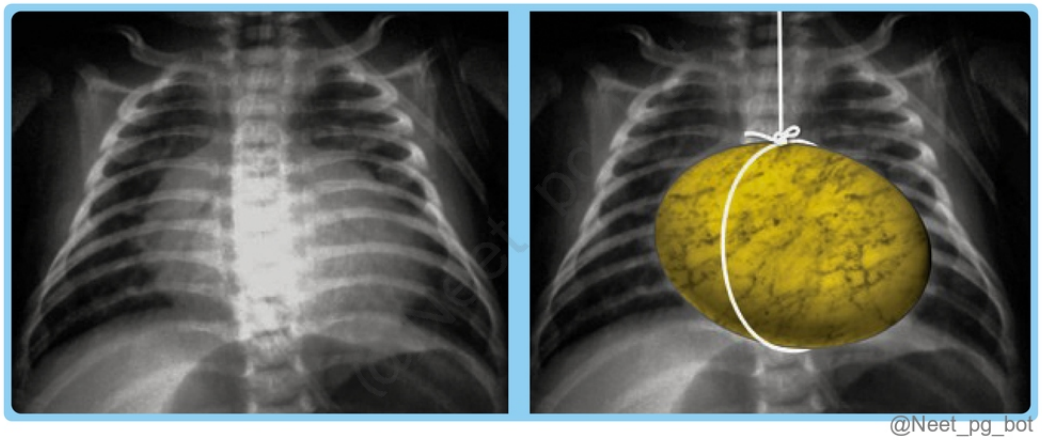
C. Transposition of the great arteries

D. Total anomalous pulmonary venous return



Correct Answer: C. Transposition of the great arteries

Explanation: Correct Option C: Transposition of the great arteries The above clinical scenario with radiological investigation points towards the diagnosis of Transposition of the Great Arteries (TGA) . Early neonatal presentation with cyanosis unresponsive to oxygen, along with a characteristic chest X-ray showing a narrow mediastinum and ovoid cardiac silhouette, is classic for TGA. Radiographic Features Egg-on-string appearance Ovoid/oval cardiac silhouette Narrow superior mediastinum due to parallel great vessels Pulmonary vascularity: Often increased due to pulmonary overcirculation Cardiac size: Usually normal or mildly enlarged in early life Pathophysiology Aorta arises from the right ventricle Pulmonary artery arises from the left ventricle Results in parallel circulations Survival depends on mixing via: ASD VSD PDA Incorrect Options: Partial anomalous pulmonary venous return (Option A): Usually presents later; chest X-ray may show mild cardiomegaly or increased pulmonary markings but not a narrow mediastinum. Endocardial cushion defect (Option B): Associated with atrioventricular septal defects; X-ray typically shows cardiomegaly with increased pulmonary blood flow, not egg-on-string appearance. Total anomalous pulmonary venous return (Option D): Classically shows the “snowman” or figure-of-8 sign (especially supracardiac type), not a narrow mediastinum.



References:

Grainger & Allison's Diagnostic Radiology, 7th Edition, Page 305.

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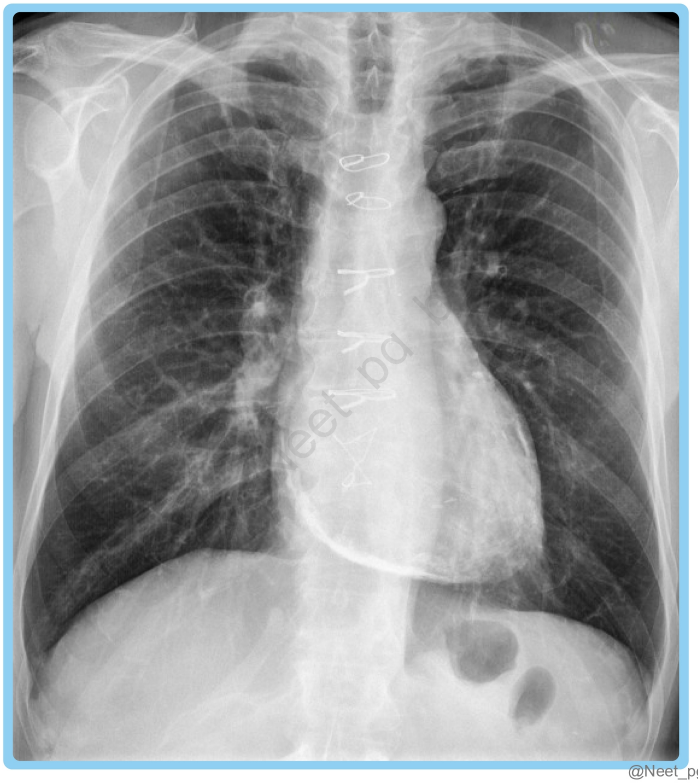
Q7: A 62-year-old woman with a long-standing history of treated tuberculosis presents with progressive exertional dyspnoea, easy fatigability, and lower limb swelling. A chest X-ray shows curvilinear calcification outlining the cardiac silhouette. What is the most likely diagnosis? (Q885185)

A. Pulmonary arterial hypertension

B. Constrictive pericarditis

C. Pericardial effusion

D. Hypertrophic obstructive cardiomyopathy



Correct Answer: B. Constrictive pericarditis

Explanation: The above clinical scenario with radiological investigation points towards the diagnosis of constrictive pericarditis, suggested by a history of chronic infection (tuberculosis), progressive heart failure symptoms, and pericardial calcification on chest X-ray. Radiological Basis Chest X-ray shows pericardial calcification appearing as curvilinear or “egg-shell” like dense outlines around the cardiac silhouette Calcification is most commonly seen along the right atrioventricular groove and diaphragmatic pericardium ■■■■■■■ ■■■■■■■ Pathophysiology Chronic inflammation of the pericardium leads to: Fibrosis Thickening Calcification This results in a rigid pericardial shell that restricts normal diastolic filling Common causes include: Tuberculosis (most common in India) Post-cardiac surgery Radiation therapy Clinical-Radiological Correlation Symptoms of right-sided heart failure : pedal edema, ascites, fatigue Preserved systolic function with impaired diastolic filling Imaging hallmark: pericardial calcification Constrictive pericarditis is characterized by a non-compliant calcified pericardium causing diastolic dysfunction with normal cardiac size and visible pericardial calcification on chest X-ray. Incorrect Options: Pulmonary arterial hypertension (Option A): Shows enlarged central pulmonary arteries with peripheral pruning No pericardial calcification Pericardial effusion (Option C): Causes globular cardiomegaly (water-bottle heart) Pericardial calcification is absent Hypertrophic obstructive cardiomyopathy (Option D): Structural myocardial disease diagnosed on echocardiography Chest X-ray is often normal or shows mild cardiomegaly



References:

Grainger & Allison's Diagnostic Radiology, 7th Edition, Page 99.

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Q8: An infant undergoing fluoroscopic evaluation for suspected congenital heart disease shows prominent, rhythmic pulsations of the pulmonary arteries at both hila (hilar dance). Which of the following cardiac lesions is most likely responsible for this finding? (Q885187)

A. Tetralogy of Fallot

B. Ventricular septal defect

C. Patent ductus arteriosus

D. Atrial septal defect

Correct Answer: D. Atrial septal defect

Explanation: The above fluoroscopic finding of hilar dance represents increased pulmonary blood flow with exaggerated pulsations of the pulmonary arteries, pointing toward a left-to-right shunt lesion. Hilar Dance - Radiological Concept Best appreciated on fluoroscopy Characterized by: Marked pulsation of pulmonary arteries at the lung hila Hyperdynamic pulmonary circulation Indicates: Increased pulmonary blood flow Low-pressure, high-volume shunt Atrial Septal Defect (ASD) Left-to-right shunt occurs at the atrial level Leads to: Increased pulmonary arterial flow Dilated and pulsatile pulmonary arteries Hence, ASD is the classic and most commonly tested cause of hilar dance Incorrect Options: Tetralogy of Fallot (Option A): Right ventricular outflow tract obstruction causes reduced pulmonary blood flow Pulmonary arteries are hypoplastic → hilar dance absent Ventricular Septal Defect (Option B): Left-to-right shunt may increase pulmonary flow However, hilar dance is not a classical or prominent fluoroscopic sign Patent Ductus Arteriosus (Option C): Continuous shunt increases pulmonary flow May cause pulmonary plethora, but hilar dance is less characteristic than in ASD

References:

Grainger & Allison's Diagnostic Radiology, 7th Edition, Page 296.

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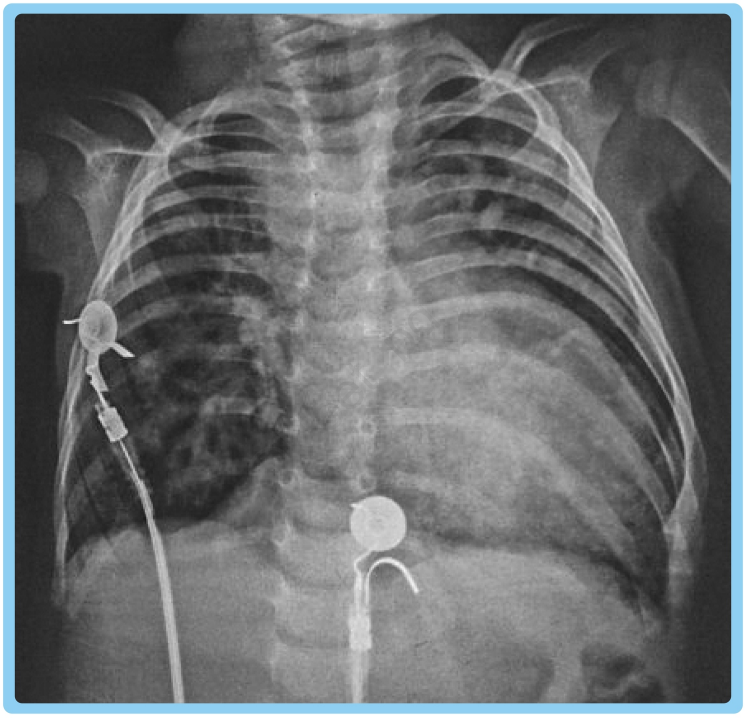
Q9: A newborn presents with cyanosis and features of early congestive cardiac failure. Chest X-ray shows cardiomegaly with a characteristic "sitting-duck" appearance of the heart due to the absence of normal great vessel separation. This radiographic finding is most suggestive of which congenital heart disease? (Q885188)

A. Transposition of great arteries

B. Tetralogy of Fallot

C. Persistent truncus arteriosus

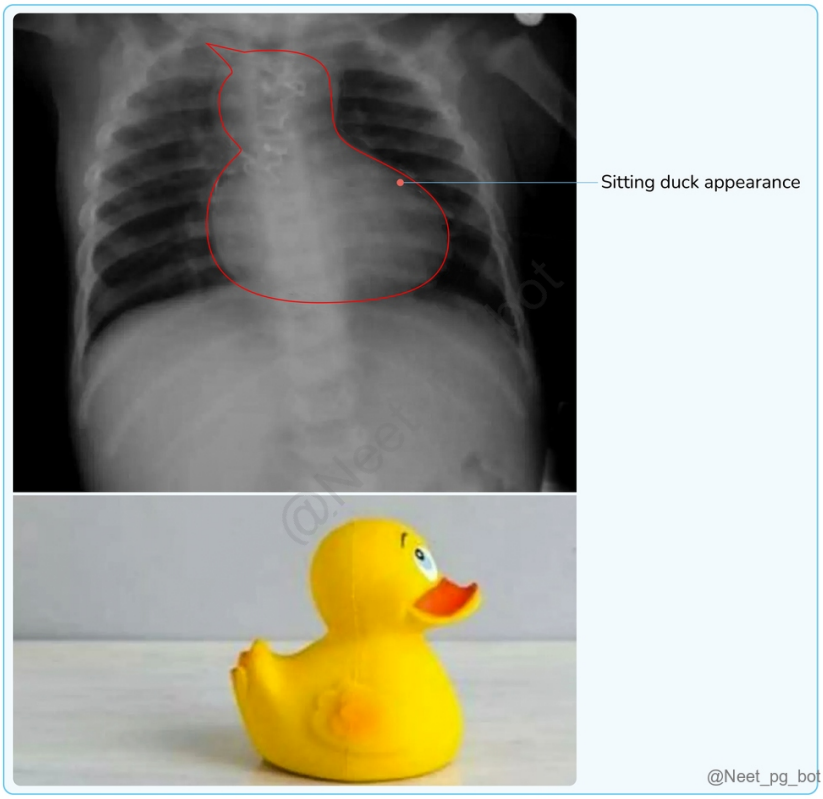
D. Pulmonary arterial hypertension



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Correct Answer: C. Persistent truncus arteriosus

Explanation: The above clinical scenario with radiological investigation points towards the diagnosis of persistent truncus arteriosus , a congenital cyanotic heart disease resulting from abnormal embryologic development of the cardiac outflow tract. Pathophysiology Failure of truncoconal (aortopulmonary) septation during embryogenesis Results in: A single common arterial trunk arising from the ventricles Large ventricular septal defect Mixing of systemic and pulmonary blood Increased pulmonary blood flow leading to early pulmonary hypertension and heart failure Clinical Correlation Presents early in infancy with: Central cyanosis Tachypnea and poor feeding Features of congestive cardiac failure Rapid progression to pulmonary vascular disease if untreated Radiological Features (Sitting-Duck Appearance) Chest X-ray shows: Cardiomegaly with a rounded cardiac silhouette Broad superior mediastinum due to the single arterial trunk Loss of normal pulmonary artery contour The overall appearance resembles a “sitting duck” , which is classically associated with persistent truncus arteriosus Incorrect Options: Transposition of great arteries (Option A): Shows an “egg-on-string” appearance due to narrow mediastinum and vertically oriented great vessels. Tetralogy of Fallot (Option B): Produces a boot-shaped heart (coeur en sabot) with decreased pulmonary vascularity. Pulmonary arterial hypertension (Option D): Demonstrates enlarged central pulmonary arteries with peripheral pruning, not a sitting-duck configuration.



References:

https://radiopaedia.org/articles/truncus-arteriosus-cardiac-anomaly

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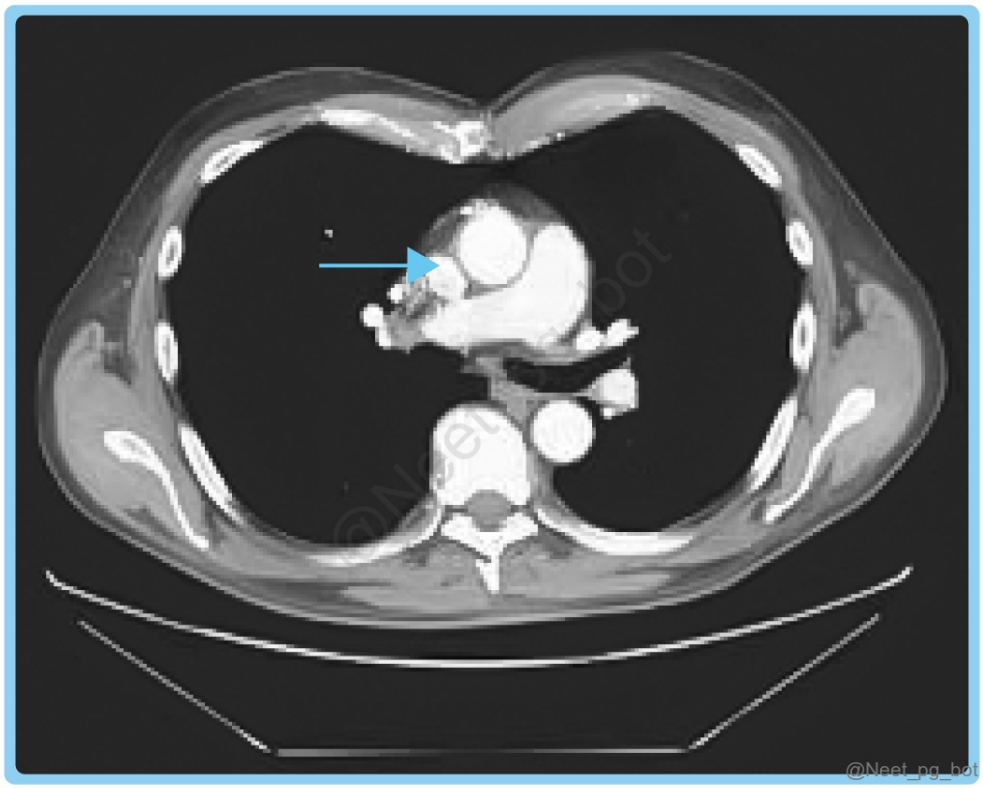
Q10: On the axial CT image of the thorax shown, the labelled vascular structure is best identified as which of the following? (Q885127)

A. Descending aorta

B. Ascending aorta

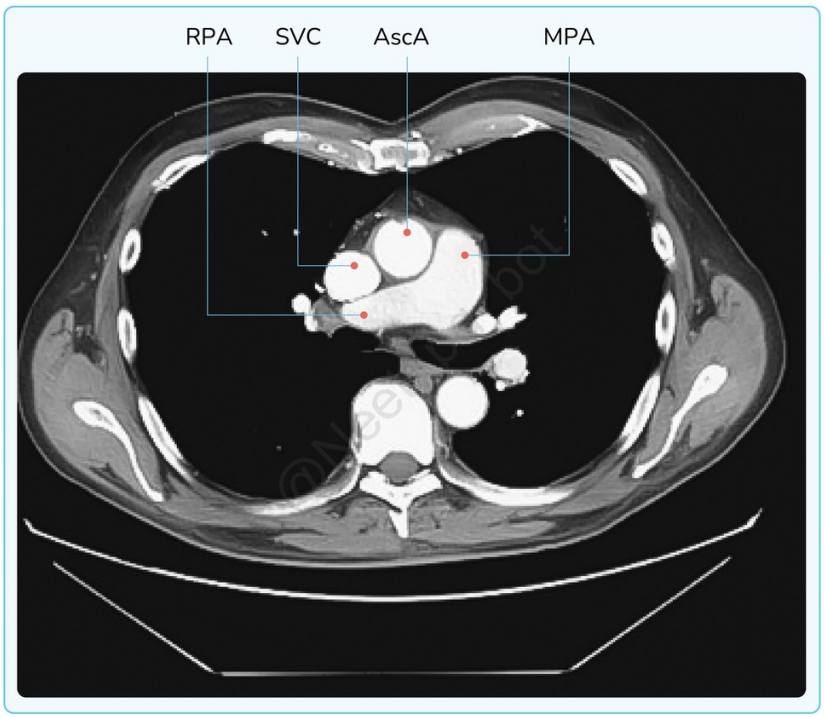
C. Superior vena cava

D. Right pulmonary artery



Correct Answer: C. Superior vena cava

Explanation: The labelled structure on axial CT thorax corresponds to the superior vena cava , which is characteristically seen as a thin-walled venous structure on the right side of the mediastinum. Anatomical Basis on Axial CT The superior vena cava (SVC) lies: Right of the midline Anterolateral to the trachea Anterior to the right pulmonary artery It has a larger calibre , thin wall, and shows homogeneous contrast opacification in venous phase studies. The position and orientation on axial sections help differentiate it from arterial structures. SVC Located on the right side of the mediastinum Drains venous blood from the head, neck, and upper limbs Seen anteriorly compared to the descending aorta Does not show the thick muscular wall typical of arteries Superior vena cava is identified based on its right-sided mediastinal location, thin wall, and venous course on axial CT images. Incorrect Options: Descending aorta (Option A): Located posteriorly and to the left of the vertebral body with a thick arterial wall. Ascending aorta (Option B): Lies anterior and central, closer to the sternum, and is round with thick walls. Right pulmonary artery (Option D): Positioned posterior to the ascending aorta and anterior to the bronchus, not as anterior as the SVC.



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References:

Grainger & Allison's Diagnostic Radiology, 7th Edition, Page 28.

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Q11: A 28-year-old woman reports long-standing upper limb hypertension associated with exertional fatigue and pain in the lower limbs while walking. On examination, femoral pulses are delayed compared to radial pulses. A chest radiograph demonstrates characteristic rib notching. What is the most likely cause of her systemic hypertension? (Q885191)

A. Aortitis

B. Coarctation of the aorta

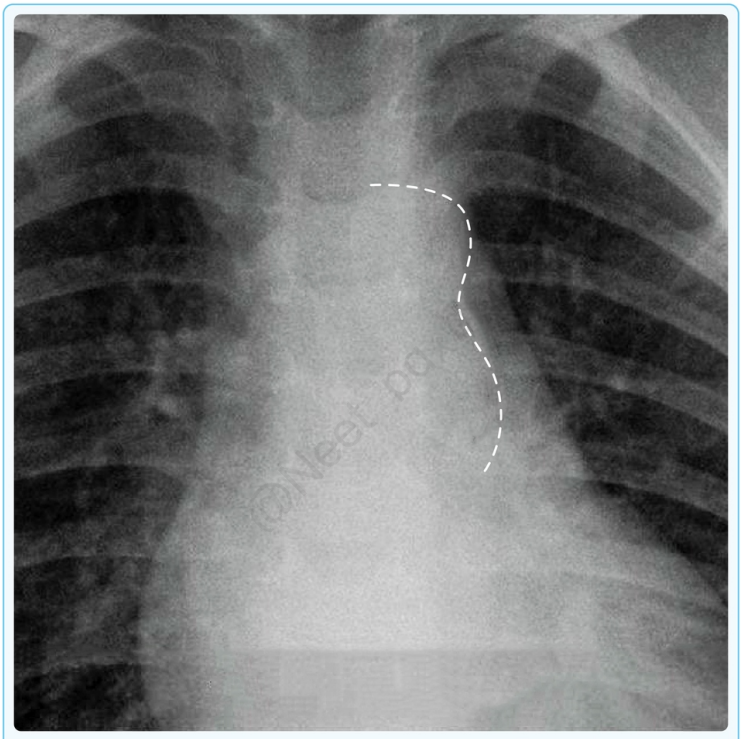
C. Essential hypertension

D. Thoracic aortic aneurysm



Correct Answer: B. Coarctation of the aorta

Explanation: The above clinical scenario with radiological investigation points towards the diagnosis of coarctation of the aorta, a congenital narrowing of the thoracic aorta leading to differential blood pressure between upper and lower limbs. Pathophysiology Congenital narrowing of the aorta, classically just distal to the origin of the left subclavian artery Causes increased pressure proximal to the narrowing and reduced perfusion distal to it Leads to development of extensive collateral circulation via intercostal arteries Clinical Correlation Young patient with: Persistent upper limb hypertension Claudication-like leg pain during exertion Radiofemoral delay and weak femoral pulses May also present with headaches, epistaxis, or heart failure if severe Radiological Features Chest X-ray shows: Inferior rib notching due to dilated intercostal collateral vessels “Figure of 3” sign along the aortic contour (high-yield exam point) MRI/CT angiography confirms site and severity Incorrect Options: Aortitis (Option A): Causes diffuse aortic wall thickening and systemic inflammatory features, not rib notching. Essential hypertension (Option C): No structural vascular abnormality or pulse discrepancy. Thoracic aortic aneurysm (Option D): Produces mediastinal widening, not differential limb blood pressures.



"Figure of 3" sign of coarctation

References:

Grainger & Allison's Diagnostic Radiology, 7th Edition, Page 300.

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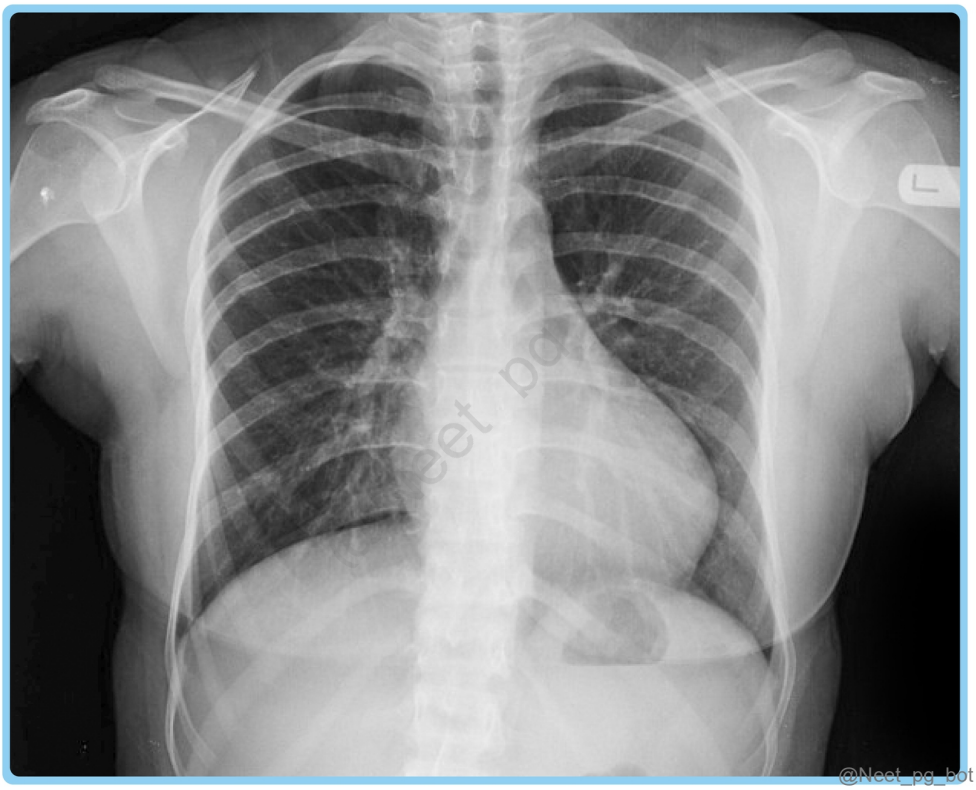
Q12: A 32-year-old patient undergoes a chest X-ray. Which of the following conditions is most likely responsible for the abnormality seen? (Q885193)

A. Marfan's syndrome

B. Coarctation of the aorta

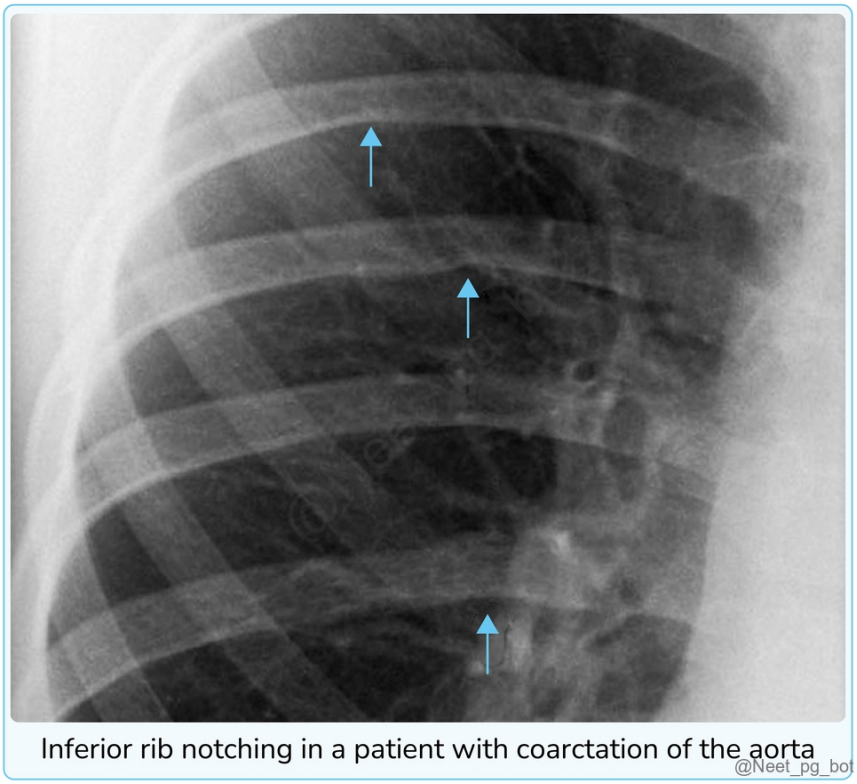
C. Rickets

D. Multiple myeloma



Correct Answer: B. Coarctation of the aorta

Explanation: The above clinical scenario with radiological investigation points towards the diagnosis of coarctation of the aorta, as evidenced by collateral formation secondary to aortic narrowing. Pathophysiology Congenital narrowing of the aortic isthmus Proximal hypertension and distal hypoperfusion develop Collateral circulation forms via intercostal arteries, causing secondary changes in the thoracic cage Radiological Features Inferior rib notching: Most pronounced on ribs 3-8 Figure of 3 sign: Aortic contour shows pre- and post-stenotic dilatation with indentation at coarctation Lateral X-ray may show indentation of the aortic knuckle Clinical Correlation Upper limb hypertension Weak or delayed femoral pulses (radiofemoral delay) Leg claudication or fatigue on exertion Incorrect Options: Marfan’s syndrome (Option A): Associated with aortic root dilatation, mitral valve prolapse, but does not cause secondary changes like rib alterations. Rickets (Option C): Shows cupping and fraying of metaphyses, rachitic rosary, not vascular changes. Multiple myeloma (Option D): Causes punched-out lytic lesions, osteoporosis, not related to aortic narrowing.



Inferior rib notching in a patient with coarctation of the aorta

References:

Grainger & Allison's Diagnostic Radiology, 7th Edition, Page 300

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Q13: A 40-year-old patient undergoes chest radiography, which demonstrates abnormal rib changes. Based on the X-ray, which of the following conditions is most likely responsible for the findings? (Q885196)

A. Coarctation of aorta

B. Neurofibromatosis

C. Rheumatoid arthritis

D. Systemic lupus erythematosus



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Correct Answer: A. Coarctation of aorta

Explanation: The above clinical scenario, with radiological investigation, points towards the diagnosis of coarctation of the aorta, evidenced by inferior rib notching caused by collateral flow through enlarged intercostal arteries Pathophysiology: Narrowing of the aorta (commonly distal to the left subclavian artery) causes collateral circulation via intercostal arteries. High-flow intercostal arteries erode the inferior aspect of the ribs , producing inferior rib notching . Clinical Correlation Upper limb hypertension with lower limb hypotension. Leg claudication or fatigue on exertion. Systolic murmur along the back due to turbulent flow through collateral vessels. Radiological Features Inferior rib notching (ribs 3-8) - hallmark of coarctation. Often bilateral and symmetric . “Figure-of-3” sign along the aortic knuckle on chest X-ray. Incorrect Options: Neurofibromatosis (Option B): Causes superior rib notching due to pressure from paraspinal neurofibromas. Rheumatoid arthritis (Option C): Can rarely cause superior rib erosions or deformities , not inferior notching. Systemic lupus erythematosus (Option D): May produce superior rib changes or costovertebral erosions, not inferior rib notching.

References:

Grainger & Allison’s Diagnostic Radiology, 7th Edition, Page 300.

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Q14: A 55-year-old patient presents with progressive shortness of breath and exertional dyspnea. The chest imaging shows tapering and reduced calibre of the

distal pulmonary arteries. Which of the following conditions is most likely responsible? (Q885198)

A. Pulmonary hypertension

B. Pulmonary embolism

C. Pulmonary oedema

D. Pulmonary infarction

Correct Answer: A. Pulmonary hypertension

Explanation: The above clinical scenario with radiological investigation points towards the diagnosis of pulmonary hypertension , indicated by the pruning of distal pulmonary arteries on imaging, reflecting chronic elevation of pulmonary arterial pressure. Pathophysiology Chronic increase in pulmonary artery pressure leads to: Medial hypertrophy Intimal proliferation Narrowing of the distal pulmonary arteries Results in reduced peripheral vascular markings on radiographs (“pruning”). Clinical Correlation Progressive exertional dyspnea Fatigue and signs of right heart strain (e.g., peripheral oedema, raised JVP) Can be idiopathic or secondary to left heart disease, lung disease, thromboembolism, or connective tissue disorders Radiological Findings Chest X-ray: Enlarged central pulmonary arteries Diminished peripheral pulmonary vascular markings → pruning Right atrial and ventricular enlargement in advanced cases CT Pulmonary Angiography (if performed): Confirms central artery dilation and distal tapering Excludes thromboembolic causes Incorrect Options: Pulmonary embolism (Option B): Acute thromboembolism may show wedge-shaped infarcts or perfusion defects, but not generalised pruning of distal arteries. Pulmonary oedema (Option C): Shows diffuse alveolar or interstitial infiltrates, Kerley B lines, and cephalization of vessels; distal pulmonary arteries usually appear prominent, not pruned. Pulmonary infarction (Option D): Usually focal, wedge-shaped opacity with pleural-based involvement; peripheral arterial pruning is not a feature.



References:

Grainger & Allison's Diagnostic Radiology, 7th Edition, Page 401.

↑ *Back to this question in Part A*

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Q15: Plethoric lung fields on chest X-ray are most commonly seen in which of the following conditions? (Q885200)

A. Tricuspid atresia

B. Ebstein anomaly

C. Tetralogy of Fallot

D. Total anomalous pulmonary venous connection

Correct Answer: D. Total anomalous pulmonary venous connection

Explanation: The above clinical scenario with radiological investigation points towards the diagnosis of Total anomalous pulmonary venous connection (TAPVC). Pathophysiology: Plethoric lung fields indicate increased

pulmonary blood flow . In TAPVC , all pulmonary veins drain into the systemic venous circulation instead of the left atrium. This results in increased pulmonary venous return → increased pulmonary arterial flow , producing pulmonary plethora. Clinical Correlation Commonly presents in infants with: Tachypnea Failure to thrive Cyanosis (mild to moderate, depending on obstruction) Symptoms are due to pulmonary overcirculation and mixing of blood . Radiological Findings Chest X-ray shows: Plethoric lung fields (prominent pulmonary vascular markings) Cardiomegaly (especially in unobstructed TAPVC) Classic “snowman” or “figure-of-8” sign in supracardiac TAPVC (late finding) Incorrect Options: Tricuspid atresia (Option A): Decreased pulmonary blood flow Oligemic lung fields Cyanotic congenital heart disease Ebstein anomaly (Option B): Functional pulmonary outflow obstruction Reduced pulmonary vascularity Tetralogy of Fallot (Option C): Right ventricular outflow tract obstruction Characteristic oligemic lung fields , not plethoric



References:

https://radiopaedia.org/articles/total-anomalous-pulmonary-venous-return

↑ *Back to this question in Part A*

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Q16: A 50-year-old man presents with sudden, severe chest pain. CT chest reveals an intimal flap within the aorta. What is the diagnosis? (Q885212)

A. Pulmonary embolism

B. Aortic aneurysm

C. Aortic dissection

D. Myocardial infarction



Correct Answer: C. Aortic dissection

Explanation: The above clinical scenario with radiological investigation points towards the diagnosis of Aortic dissection . Sudden onset of severe chest pain is a classic presentation. Pain is typically tearing or ripping in nature. Common in middle-aged to elderly patients , often with hypertension. Radiological Findings (CT Chest) Presence of an intimal flap dividing the aorta into: True lumen False lumen This finding is diagnostic of aortic dissection. CT angiography is the investigation of choice . Incorrect Options: Pulmonary embolism (Option A): Shows filling defects in pulmonary arteries , not an aortic flap. Aortic aneurysm (Option B): Shows focal or diffuse dilatation without an intimal flap. Myocardial infarction (Option D): Diagnosed by ECG changes and cardiac biomarkers , not CT aortic findings.



References:

Grainger & Allison's Diagnostic Radiology,7th Edition,Page 422

↑ *Back to this question in Part A*

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Q17: On colour Doppler ultrasonography of the groin, the arrangement of the common femoral vein, common femoral artery, and the great saphenous vein produces a characteristic appearance. What is this sign called? (Q885213)

A. Tillaux sign

B. Mickey Mouse sign

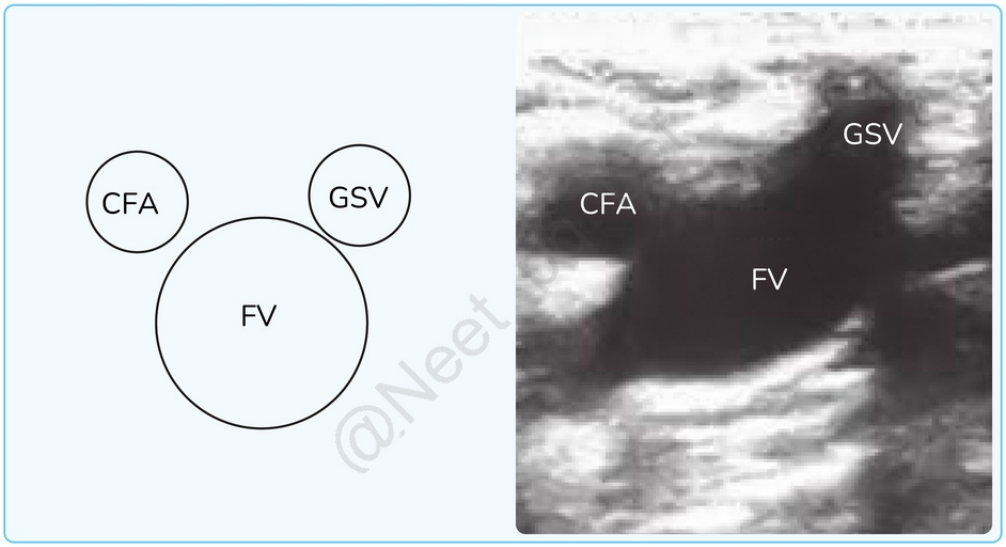
C. Stemmer sign

D. String sign

Correct Answer: B. Mickey Mouse sign

Explanation: The normal anatomical arrangement of the femoral vessels and the great saphenous vein at the saphenofemoral junction on ultrasonography is known as the Mickey Mouse sign . On transverse USG, the common femoral artery (FA) and common femoral vein (FV) form the "head," while the great saphenous vein

(GSV) represents the “ear,” giving the characteristic Mickey Mouse appearance. This sign is a normal Doppler finding and is routinely used as a landmark during venous mapping and assessment of saphenofemoral junction competence. Incorrect Options: Tillaux sign (Option A): Said to be positive when a mass is mobile perpendicular to the mesenteric attachment line and is typically seen in a mesenteric cyst . Stemmer’s sign (Option C): Refers to the inability to pinch or tent the skin at the base of the toes due to skin thickening, commonly observed in lymphedema . String sign (Option D): On barium studies, it appears as a thin, thread-like stream of contrast passing through a narrowed bowel segment and is classically seen in Crohn’s disease .





References:

https://en.wikipedia.org/wiki/Mickey_Mouse_sign

↑ *Back to this question in Part A*

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Q18: A middle-aged woman presenting with acute coronary syndrome is clinically stabilised. To assess myocardial segments that are viable but ischemic and likely to recover function, which investigation is most appropriate? (Q885214)

A. Resting echocardiography

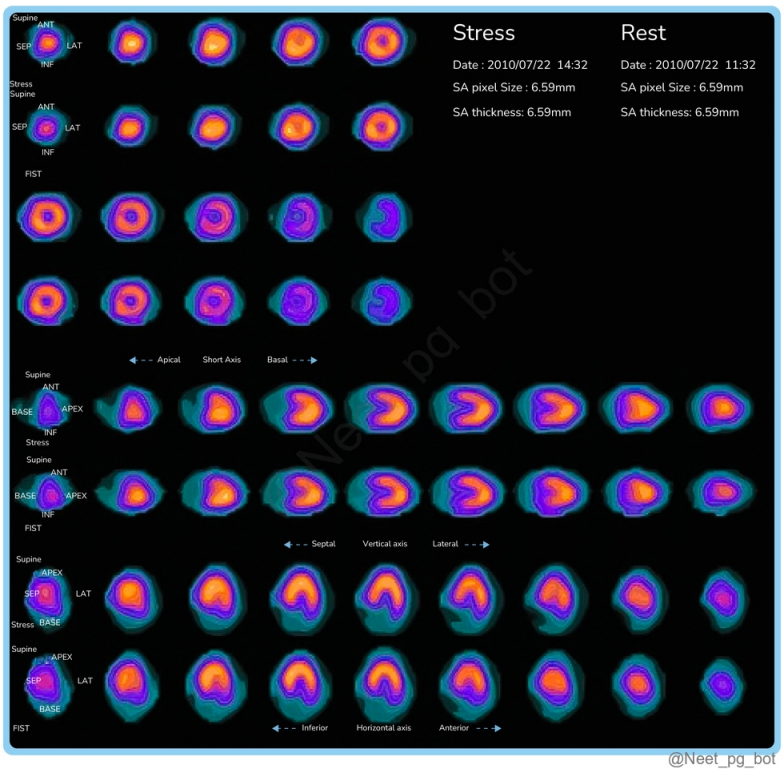
B. Thallium myocardial perfusion scan

C. Coronary angiography

D. MUGA scan

Correct Answer: B. Thallium myocardial perfusion scan

Explanation: A Thallium myocardial perfusion scan is used to detect reversible myocardial ischemia by assessing myocardial perfusion during stress and rest. Thallium behaves like potassium and is taken up by viable myocardial cells in proportion to blood flow. In cases of reversible ischemia, a cold spot appears on stress images due to reduced perfusion, while normal uptake is seen on rest images, indicating viable but ischemic myocardium. In contrast, an irreversible myocardial infarction shows a persistent cold spot on both stress and rest images. Myocardial perfusion scan with thallium-201 for the rest images (bottom rows) and Tc-Sestamibi for the stress images (top rows) Incorrect Options: Coronary angiography (Option A): This is an invasive test that visualises coronary artery anatomy and detects luminal stenosis, but it does not assess myocardial perfusion or differentiate reversible ischemia from infarction. MUGA scan (Option B): This nuclear imaging study evaluates ventricular function and ejection fraction and is commonly used in heart failure assessment, post-myocardial infarction functional evaluation, and monitoring cardiotoxicity from drugs such as anthracyclines, but it does not assess myocardial ischemia. Resting echocardiography (Option D) : This assesses chamber size, wall motion, and overall cardiac function at rest, but it cannot reliably identify reversible myocardial ischemia without stress imaging.



References:

Grainger & Allison's Diagnostic Radiology, 7th Edition, Page 381.

↑ *Back to this question in Part A*

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Q19: A 68-year-old female patient presents to the emergency department with complaints of increasing shortness of breath over the past few weeks and occasional palpitations. She has a history of hypertension and was diagnosed with mitral stenosis five years ago. A chest X-ray is performed, and the radiologist notes specific findings. Based on the chest X-ray findings, which of the following features is most indicative of the condition observed? (Q853488)

A. Elevation of the left main bronchus

B. Widening of the mediastinum

C. Presence of pleural effusion

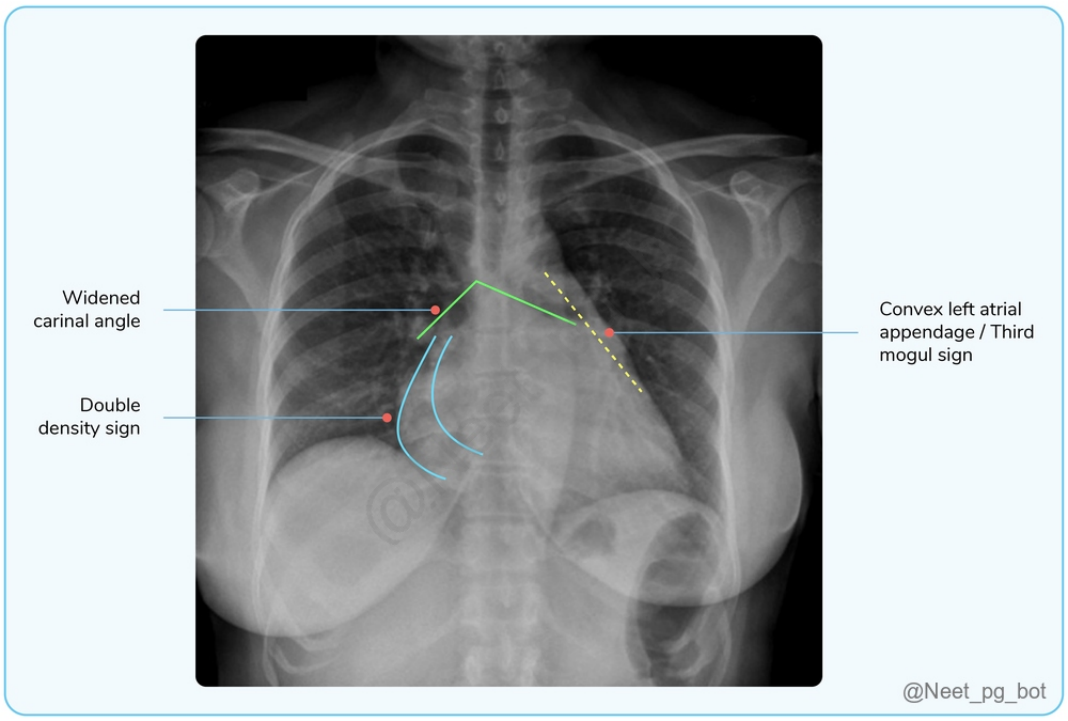
D. Cardiomegaly with a normal heart border



Correct Answer: A. Elevation of the left main bronchus

- *Listen (English)*
- *Listen (Hindi)*

Explanation: In this scenario, the chest X-ray findings indicate left atrial enlargement, and the elevation of the left main bronchus serves as a characteristic feature where the enlarged left atrium can push the left main bronchus upward which correlates with the patient's history of mitral stenosis. Left Atrial Enlargement Radiographic Features Double Density: Extra shadow along the right heart border due to the enlarged left atrium. Right Heart Border: Formation of a “double” right heart border. Bronchial Changes: Elevation of the left main bronchus. Horizontal orientation of the distal left bronchus. Splaying of the carina. Enlargement of the left atrial appendage. Lateral View : Posterior displacement of the left upper lobe bronchus. Convex left atrial appendage (Third mogul sign): Normally, the left heart border just below the pulmonary outflow track should be flat or slightly concave. Measurement Indicator A distance greater than 7 cm between the left atrium's lateral border and the left main bronchus indicates enlargement in over 90% of cases. Common Causes Mitral insufficiency. Mitral stenosis. Decreased left ventricular compliance (e.g., hypertrophic cardiomyopathy). Restrictive cardiomyopathy. Widening of the mediastinum (Option B): While this can indicate various conditions such as aortic dissection or lymphadenopathy, it does not specifically point to an abnormality involving the left atrium. Presence of pleural effusion (Option C): Although pleural effusions can occur in various clinical scenarios, they do not provide specific evidence of left atrial enlargement or its effects. Cardiomegaly with a normal heart border (Option D): While cardiomegaly can occur in many cardiac conditions, a normal heart border would not suggest left atrial enlargement. Instead, changes in the heart border morphology are typically expected with left atrial enlargement.





References:

David Sutton Textbook of Radiology and Imaging. Volume 1. 8th edition. Page. 1421- 1423

Mettler Jr. Essentials of Radiology. 4th Edition. Page. 102-104

↑ *Back to this question in Part A*

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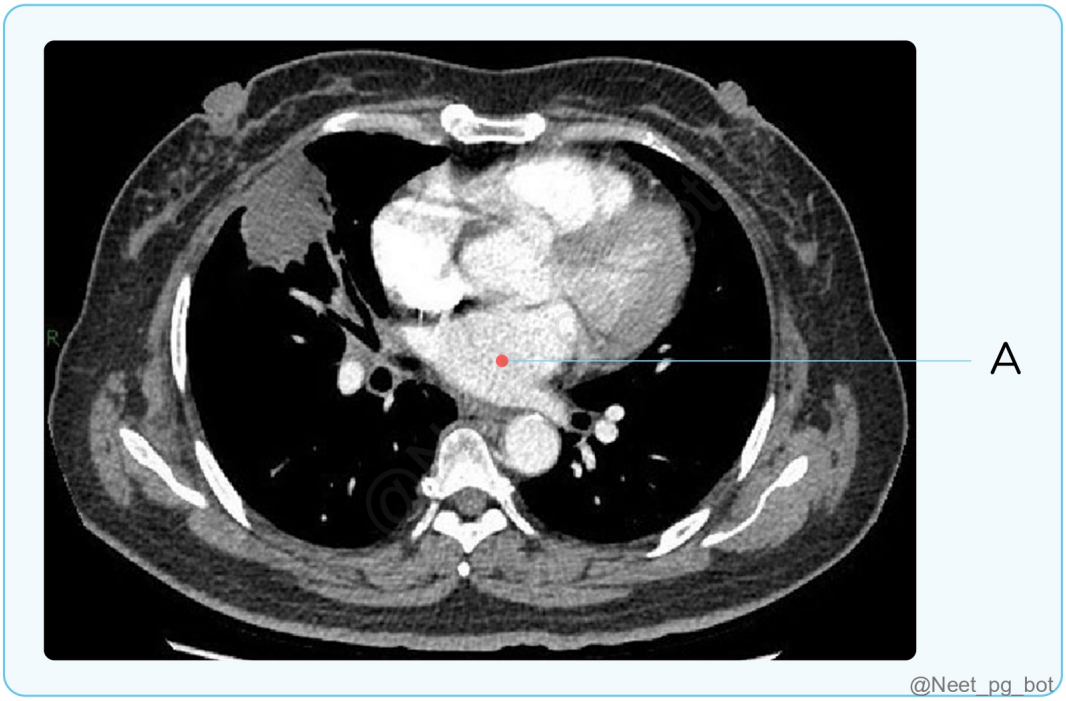
Q20: You are shown a CT scan of the chest. The scan is taken in the arterial phase. Based on the anatomy and contrast enhancement, identify the structure marked as 'A' by the arrow. (Q853480)

A. Left atrium

B. Ascending Aorta

C. Pulmonary trunk

D. Right Atrium



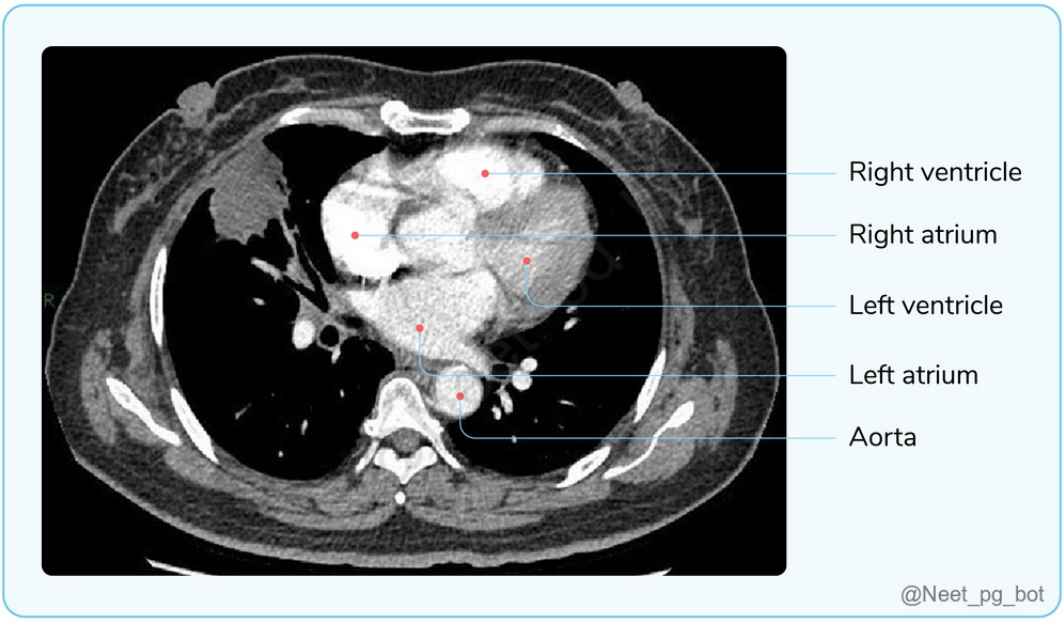
Correct Answer: A. Left atrium

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: . The arrow marks the posteriormost chamber of the heart which is the left atrium. On an axial CT scan of the heart in the arterial phase: Left atrium (LA): Posteriorly and superiorly to the left ventricle. Left ventricle (LV): The thick-walled, highly muscular, most prominent chamber is seen in the left inferior portion of the axial slice. Pulmonary trunk: Lies anterior to the left atrium and superior to the left ventricle. Right ventricle (RV): Anteriormost chamber present retrosternally, appears on the right side of the heart on an axial CT scan and

has thinner walls than the left ventricle. Left atrium: Seen posteriorly.



References:

https://www.ncbi.nlm.nih.gov/books/NBK564317/

↑ *Back to this question in Part A*

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Q21: A 3-year-old child presents with cyanosis and difficulty in breathing during physical exertion. On physical examination, the patient has a harsh systolic murmur heard best at the left upper sternal border. A chest X-ray is performed and it shows the following features. What is the most likely diagnosis? (Q853481)

A. Transposition of the Great Arteries (TGA)

B. Tetralogy of Fallot (TOF)

C. Total Anomalous Pulmonary Venous Connection (TAPVC)

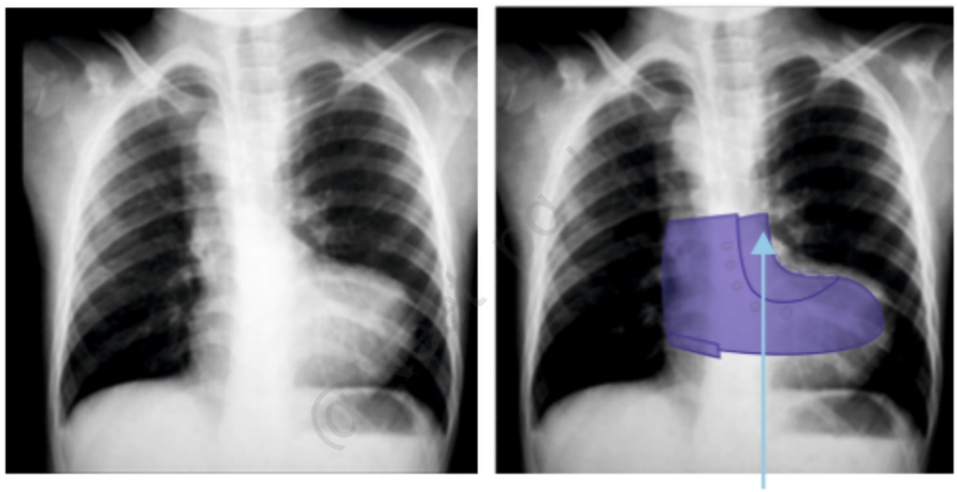
D. Tricuspid Atresia



Correct Answer: B. Tetralogy of Fallot (TOF)

- *Listen (English)*
- *Listen (Hindi)*

Explanation: Tetralogy of Fallot (TOF): Most common cyanotic congenital heart defect Results from abnormal development of the ventricular septum during fetal growth. Four main features characterize it: Right ventricular outflow tract (RVOT) obstruction Ventricular septal defect (VSD) Overriding aorta Right ventricular hypertrophy Chest X-ray Imaging in TOF: The classic finding on a chest X-ray for TOF is the “boot-shaped” heart (also known as coeur en sabot), caused by right ventricular hypertrophy leading to an upward tilt of the cardiac apex. There is often a concave main pulmonary artery and decreased pulmonary vascular markings , reflecting the reduced blood flow through the pulmonary arteries due to the RVOT obstruction. Some patients may also present with a right-sided aortic arch , which can be identified on the X-ray. In Transposition of the Great Arteries (TGA) (Option A), the chest X-ray often shows an “egg-on-a-string” appearance , due to the narrow mediastinum and enlarged heart, which is distinct from the boot-shaped heart of TOF. Total Anomalous Pulmonary Venous Connection (TAPVC) (Option C) , especially the supracardiac type, presents with a “snowman” or “figure-of-eight” appearance on chest X-ray. This is caused by the dilated vertical vein and superior vena cava. Pulmonary congestion is common in TAPVC due to the abnormal drainage of pulmonary veins. In Tricuspid Atresia (Option D) , there is a reduced size of the right ventricle, leading to a small or normal-sized heart on X-ray.



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References:

Grainger & Allison's Diagnostic Radiology, A Textbook of Medical Imaging, 7th Edition, Page. 304, 305

Textbook of Radiology & Imaging by David Sutton, 8th Edition, Chapter 82, Cyanotic Congenital Heart Disease - Tetralogy of Fallot

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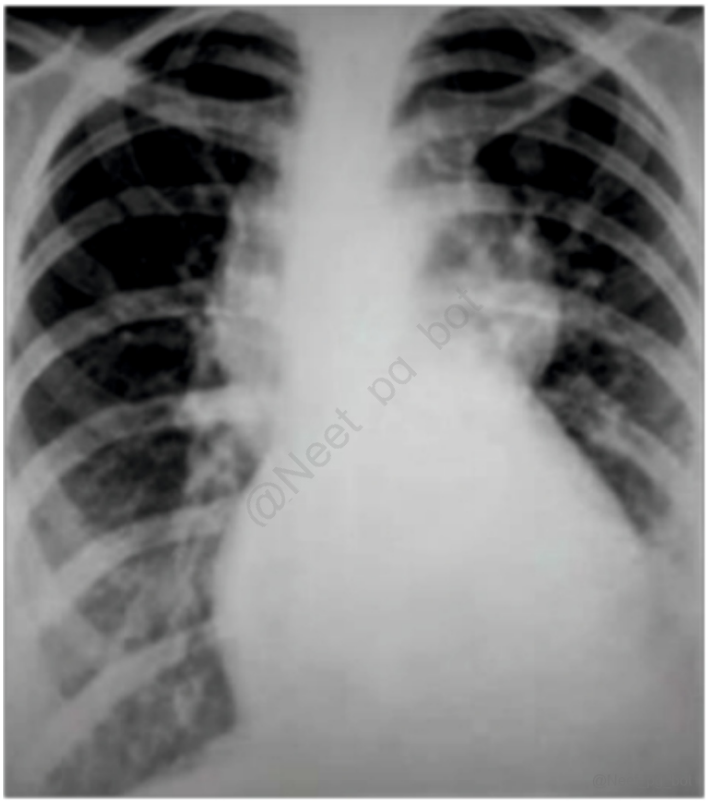
Q22: A 5-month-old male infant presents with cyanosis, difficulty breathing, and failure to thrive. On physical examination, a loud second heart sound (S2) is heard, and there are signs of pulmonary congestion. The patient's chest X-ray is given below. What is the most likely diagnosis? (Q853482)

A. Partial anomalous pulmonary venous return (PAPVR)

B. Tetralogy of Fallot (TOF)

C. Transposition of the great arteries (TGA)

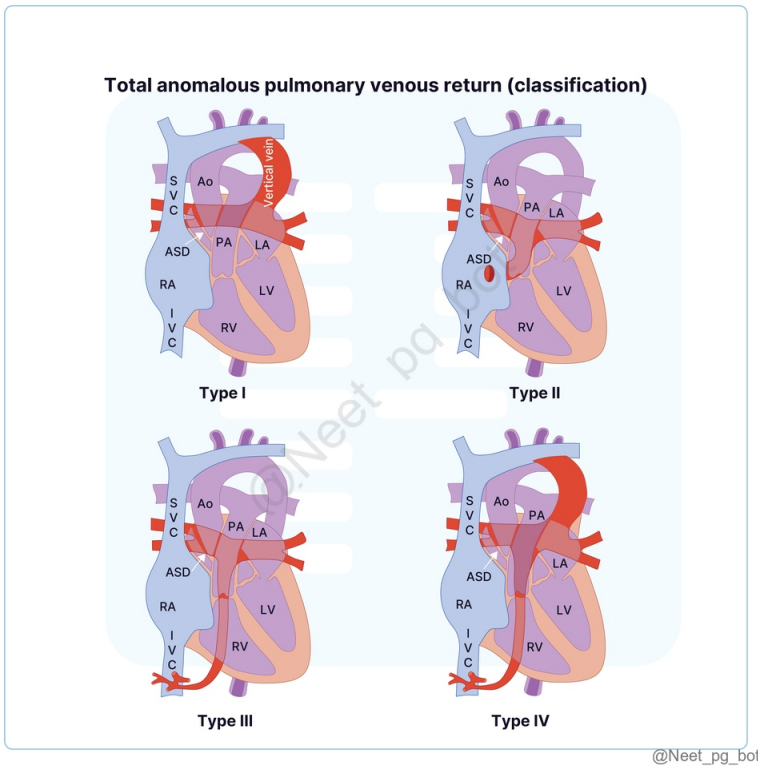
D. Total anomalous pulmonary venous connection (TAPVC)



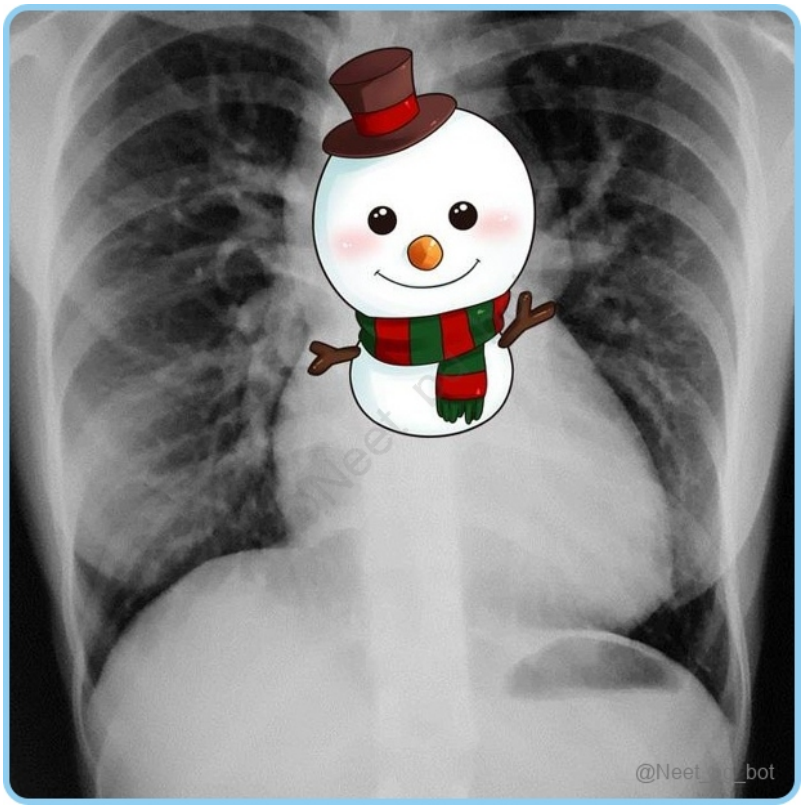
Correct Answer: D. Total anomalous pulmonary venous connection (TAPVC)

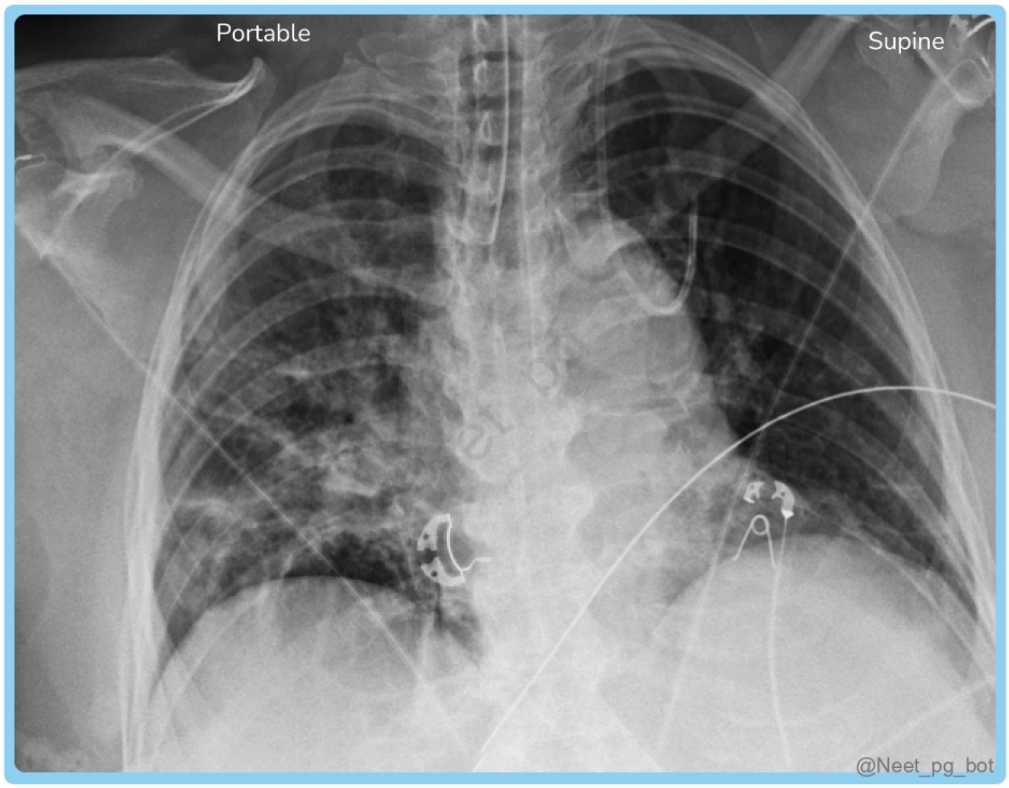
- *Listen (English)*
- *Listen (Hindi)*

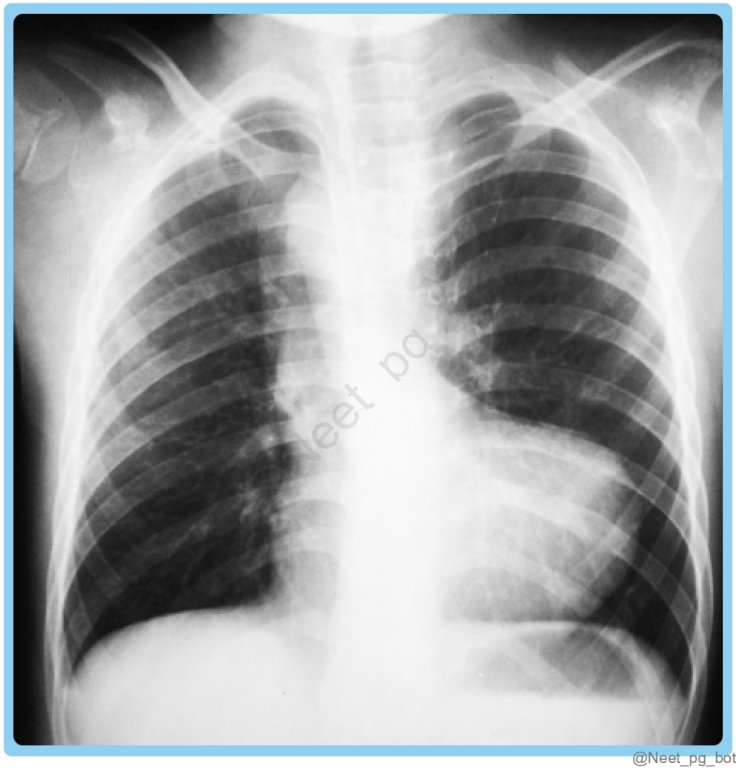
Explanation: . Total Anomalous Pulmonary Venous Connection (TAPVC) - Pulmonary veins join together and form a venous confluence posterior to the left atrium but do not drain into it. Instead, pulmonary veins drain into the right atrium. This may cause pulmonary congestion, respiratory distress, and cyanosis as seen in this patient. TAPVC is classified into the following four types based on the route through which pulmonary veins drain into the right atrium: Supracardiac - to the superior vena cava (SVC) via an ascending vein to the innominate vein. Cardiac - to Coronary sinus Infracardiac - Inferior Vena Cava (IVC) or the portal vein through a descending vein Mixed type. The classic chest X-ray finding in nonobstructive supracardiac TAPVR is a " snowman " or " figure-of-eight " appearance, due to the dilated right-sided SVC and left-sided vertical vein causing widening of the superior mediastinum. These findings, along with increased pulmonary vascularity due to pulmonary venous congestion, are key clues to diagnosing this condition. Partial anomalous pulmonary venous return (PAPVR) (Option A) involves only some pulmonary veins draining abnormally, typically to the right atrium or SVC. The chest X-ray does not show a "snowman" appearance but instead may show mild right-sided enlargement and increased pulmonary blood flow. The scimitar sign may be seen. Tetralogy of Fallot (TOF) (Option B) usually presents with a boot-shaped heart on a chest X-ray due to right ventricular hypertrophy. There is decreased pulmonary vascularity, unlike the increased vascularity seen in TAPVC. Transposition of the great arteries (TGA) (Option C) typically shows an "egg-on-a-string" appearance on chest X-ray, caused by a narrow mediastinum and enlarged cardiac silhouette. This is distinct from the "snowman" sign seen in supracardiac TAPVC.



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References:

Grainger & Allison's Diagnostic Radiology, A Textbook of Medical Imaging, 7th Edition, Page 310, 311

Textbook of Radiology & Imaging by David Sutton, 8th Edition, Vol II, Chapter 82, Cyanotic Congenital Heart Disease - TAPVC, Page 2666 in pdf

↑ *Back to this question in Part A*

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Q23: A 25-year-old male presents with mild exertional dyspnea. Clinical examination reveals a fixed split S2 and a systolic ejection murmur at the left upper sternal border. A chest X-ray shows the following features. What is the most likely diagnosis? (Q853483)

A. Partial Anomalous Pulmonary Venous Connection (PAPVC)

B. Ventricular Septal Defect (VSD)

C. Mitral Stenosis

D. Total Anomalous Pulmonary Venous Connection (TAPVC)

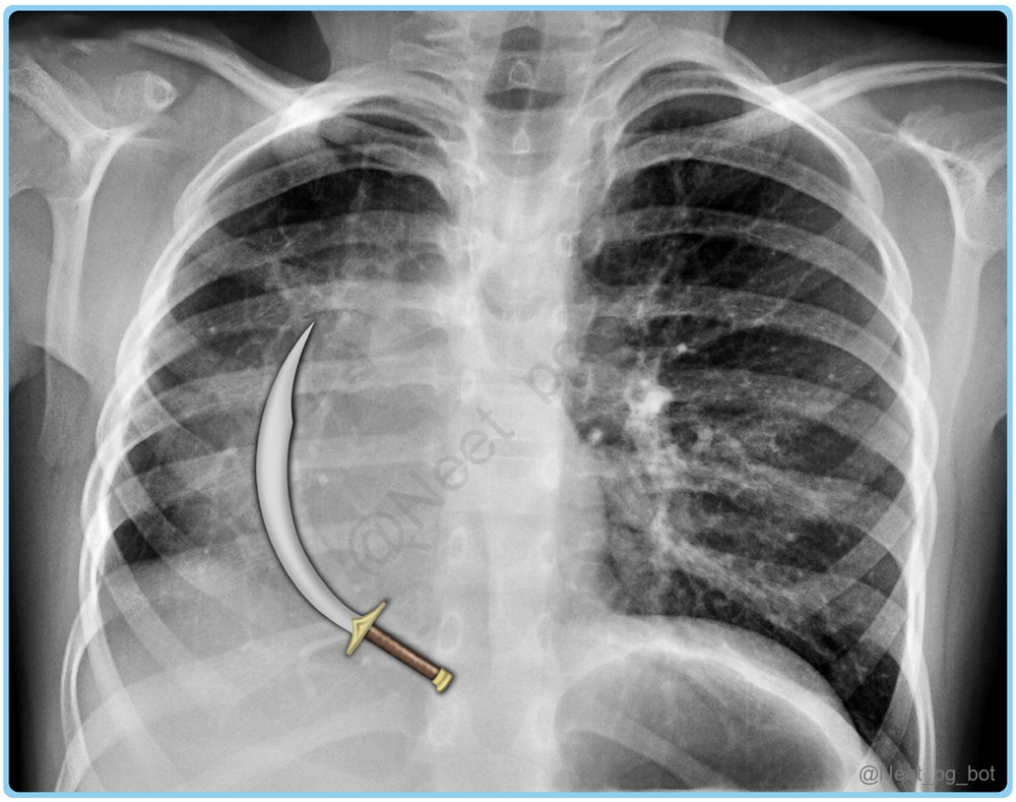


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Correct Answer: A. Partial Anomalous Pulmonary Venous Connection (PAPVC)

Listen to Audio 1

Explanation: Partial Anomalous Pulmonary Venous Connection (PAPVC) A congenital anomaly where one or more but not all pulmonary veins drain into the right atrium or systemic venous circulation instead of the left atrium. This leads to a left-to-right shunt, causing volume overload on the right side of the heart and pulmonary circulation. Most common variant - the left upper pulmonary vein draining into the right atrium. Other variants drain into SVC, coronary sinus, IVC, or azygos veins. The chest X-ray typically shows mild cardiomegaly, right atrial and ventricular enlargement, and increased pulmonary vasculature , especially in the right lung field. Scimitar syndrome - When a part or whole of the right lung is drained by anomalous pulmonary veins that connect to IVC, leading to hypoplastic right lung. Chest X-ray shows anomalous vein parallel to right heart border mimicking Turkish sword (Scimitar). {{caption_text}} Although VSD (Option B) also causes a left-to-right shunt, the characteristic murmur is a holosystolic murmur best heard at the left lower sternal border, and chest X-ray findings typically show biventricular enlargement. Mitral Stenosis (Option C) usually presents with left atrial enlargement on X-ray and features like pulmonary venous congestion. The characteristic murmur is a diastolic rumble at the apex, which is absent in this scenario. In TAPVC (Option D), all pulmonary veins drain into the systemic venous circulation, leading to severe cyanosis and a snowman sign on chest X-ray (in the supracardiac type).



References:

Grainger & Allison's Diagnostic Radiology, A Textbook of Medical Imaging, 7th Edition, Page. 310, 311

www.ncbi.nlm.nih.gov/books/NBK560707/

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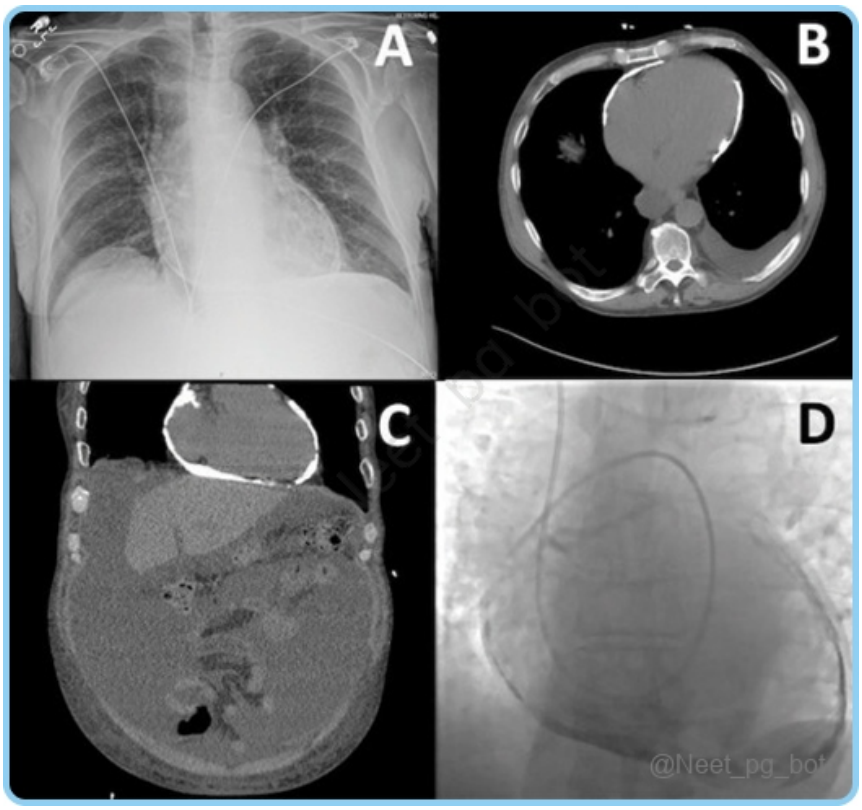
Q24: A 31-year-old man presents with dyspnea, orthopnea and fatigue. The radiological images are attached below. Based on the given information, which of the following is the most likely diagnosis? (Q853484)

A. Acute pericarditis

B. Calcific constrictive pericarditis

C. Cardiac tamponade

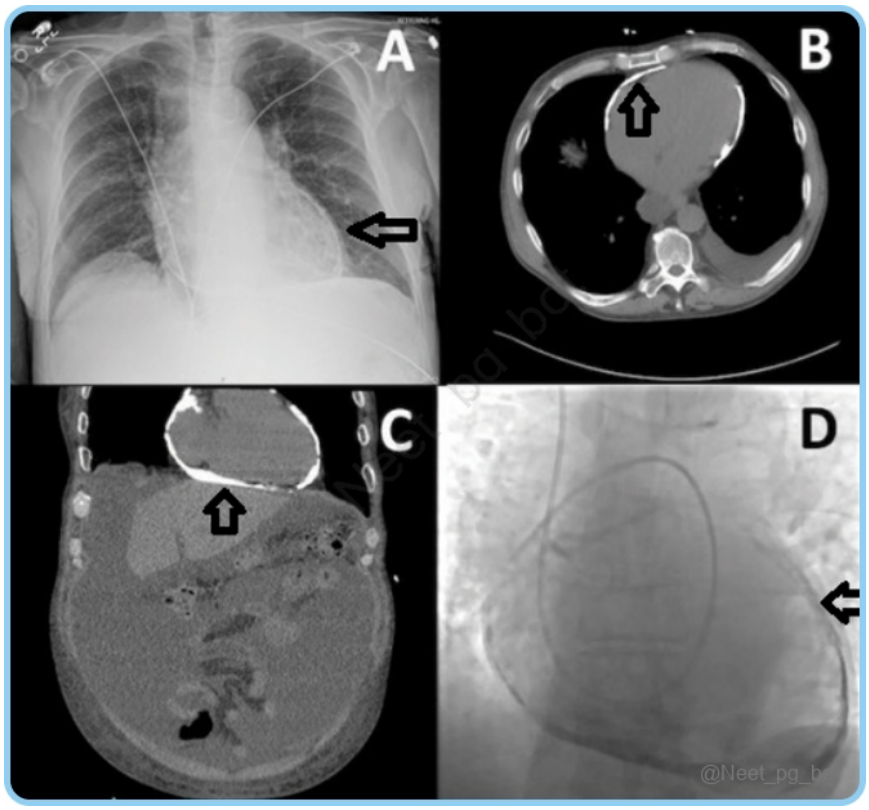
D. Myocardial infarction



Correct Answer: B. Calcific constrictive pericarditis

- *Listen (English)*
- *Listen (Hindi)*

Explanation: The radiological image shows a pericardial calcification, characteristic of C onstrictive Pericarditis. It is a chronic condition where the pericardium becomes thickened, fibrotic, and often calcified, leading to impaired diastolic filling of the heart. The images demonstrate a thickened and calcified pericardium , which is a hallmark of this condition. Etiology: Often idiopathic, can be secondary to infection, radiation, or autoimmune diseases Pathophysiology: Thickened, fibrotic, and calcified pericardium restricting cardiac filling Clinical Presentation: Dyspnea, fatigue, chest pain, signs of right heart failure CT Findings (IOC): Thickened pericardium (>4 mm), often calcified Pericardial effusion may be present Dilation of inferior vena cava and hepatic veins Acute Pericarditis (Option A) typically presents with a thin pericardial effusion without significant pericardial calcification. Cardiac tamponade (Option C) can cause a pericardial effusion, but it doesn't typically present with pericardial calcification as seen in these radiological images. Myocardial infarction (Option D) would not show the characteristic pericardial calcification seen in these radiological images.



References:

Grainger & Allison's Diagnostic Radiology Edition 7th Page 99, 100

www.sciencedirect.com/science/article/pii/S073510972303108X?via%3Dihub

www.ncbi.nlm.nih.gov/pmc/articles/PMC9838225/

↑ *Back to this question in Part A*

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Q25: A 3-day-old newborn is brought to the emergency department with marked central cyanosis. On examination, his heart rate is 160 bpm, respiratory rate is 65 breaths/min, and oxygen saturation is 80% on room air. A chest radiograph is performed, showing cardiomegaly with a characteristic "egg on a string" appearance. If an echocardiogram is conducted, which of the following echocardiographic findings would be most consistent with the suspected condition? (Q853485)

A. Ventricular septal defect with overriding aorta

B. Single great artery arising from the heart

C. Parallel great vessels with the aorta anterior and slightly to the right of the pulmonary artery

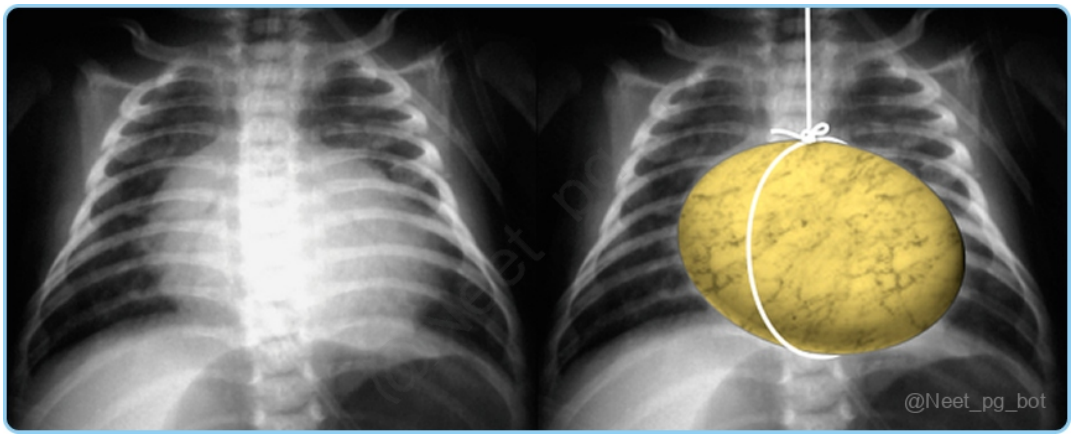
D. Abnormal pulmonary venous connections to the right atrium

Correct Answer: C. Parallel great vessels with the aorta anterior and slightly to the right of the pulmonary artery

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: The clinical presentation and imaging findings are highly suggestive of Transposition of the Great Arteries (TGA), specifically D-loop TGA . In TGA, the great vessels (aorta and pulmonary artery) run parallel to each other, with the aorta positioned anterior and slightly to the right of the pulmonary artery. This arrangement is due to the ventriculoarterial discordance characteristic of TGA. Key points supporting the diagnosis of D-Loop TGA in this case: Early presentation with marked central cyanosis without respiratory distress History of maternal diabetes (associated risk factor) Chest X-ray showing cardiomegaly with an "egg on a string" appearance Echocardiographic finding of parallel great vessels with abnormal positioning D-Loop TGA (dextro-transposition of the great arteries) L-Loop TGA (Congenitally Corrected) Pathology The aorta originates from the right ventricle and the pulmonary trunk from the left ventricle, creating two parallel circulatory circuits. This condition is life-threatening unless a shunt, like a patent ductus arteriosus (PDA) or septal defect, is present to allow blood mixing. Congenitally corrected TGA (ccTGA) is characterized by both atrioventricular and ventriculoarterial discordance, a condition referred to as "double discordance." X-ray Cardiomegaly "Egg on a string" appearance Narrow mediastinum Increased pulmonary vascular markings Mesocardia or levocardia Straight left heart border Abnormally straight vascular pedicle Possible bulge along upper left cardiac border Ventricular septal defect with overriding aorta is characteristic of Tetralogy of Fallot, not TGA (Option A) . A single great artery arising from the heart is the hallmark of Truncus Arteriosus, not TGA (Option B) . Abnormal pulmonary venous connections to the right atrium are seen in Total Anomalous Pulmonary Venous Return, not TGA (Option D) .



References:

Radiopedia

Radiopedia

Grainger & Allison's Diagnostic Radiology Edition 7th Page 305, 307, 308

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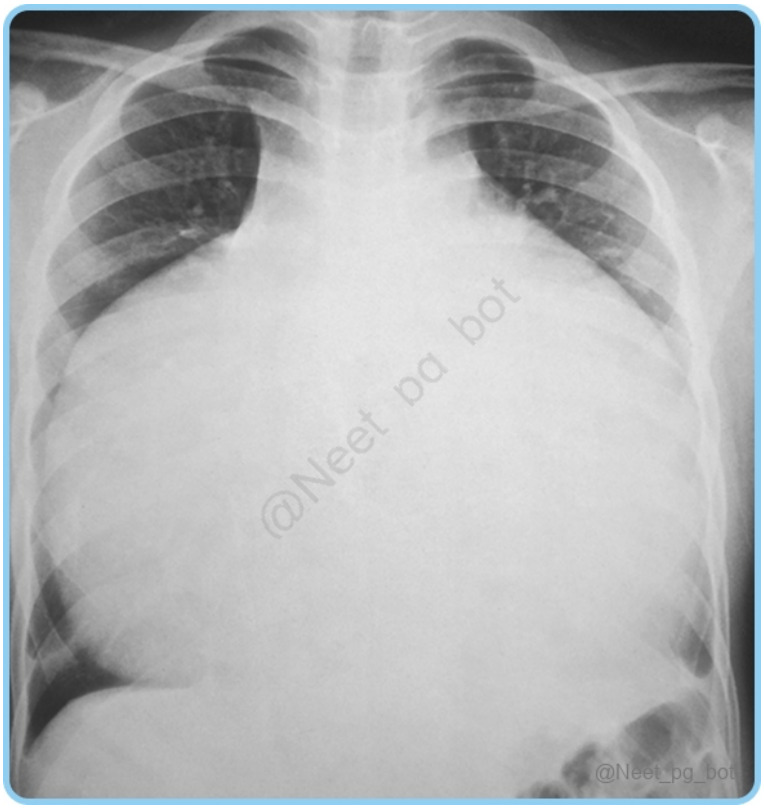
Q26: A 16-year-old female presents to the emergency department with complaints of shortness of breath and palpitations. A chest X-ray is performed, and the radiologist notes a distinctive cardiac silhouette, as shown in the image. Which of the following best describes the cardiac abnormality suggested by this radiographic appearance? (Q853486)

A. Boot-shaped heart; Tetralogy of Fallot

B. Box-shaped heart; Ebstein anomaly

C. Egg-on-string appearance; Transposition of the Great Arteries

D. Snowman sign; Total Anomalous Pulmonary Venous Return

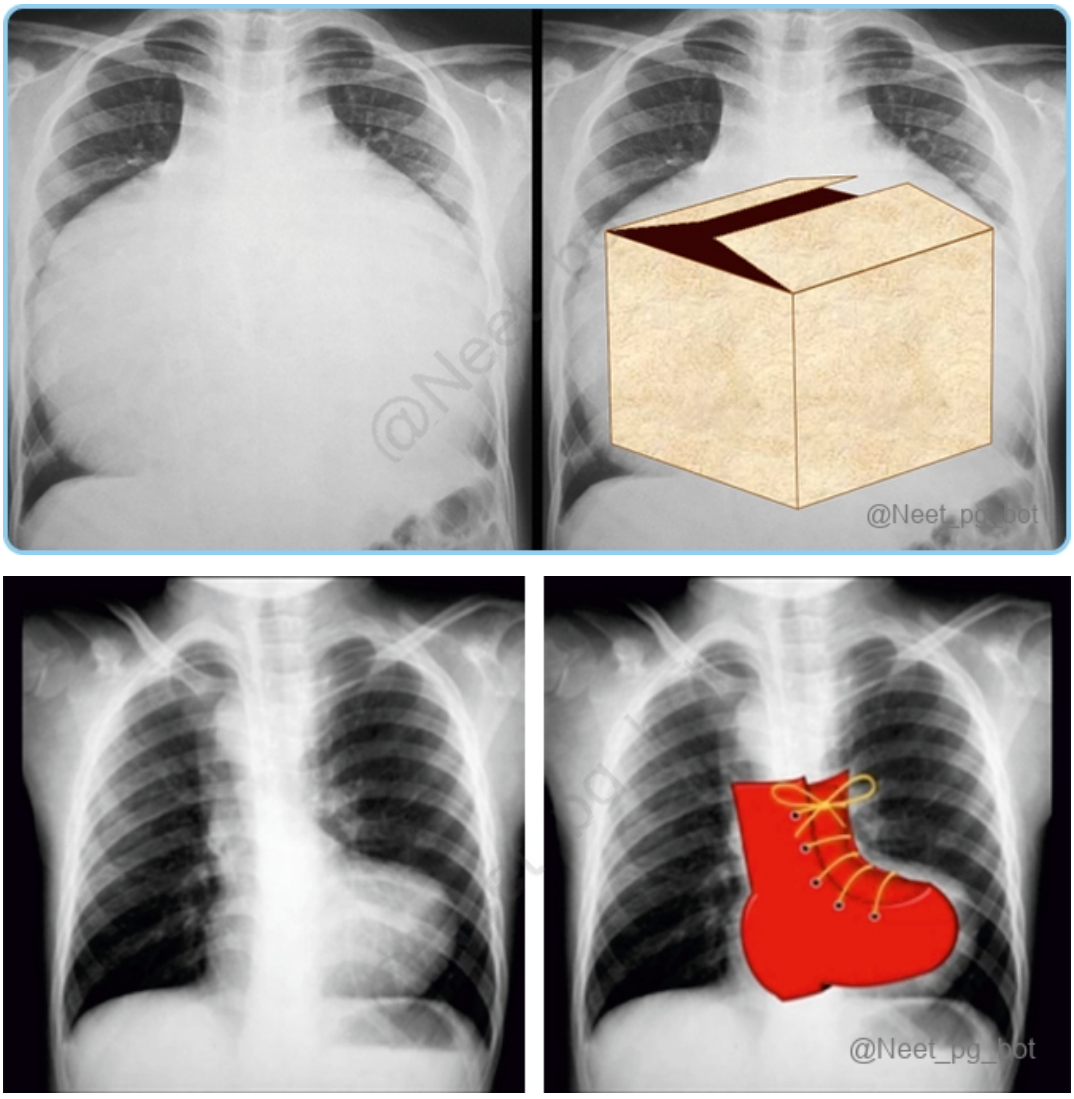


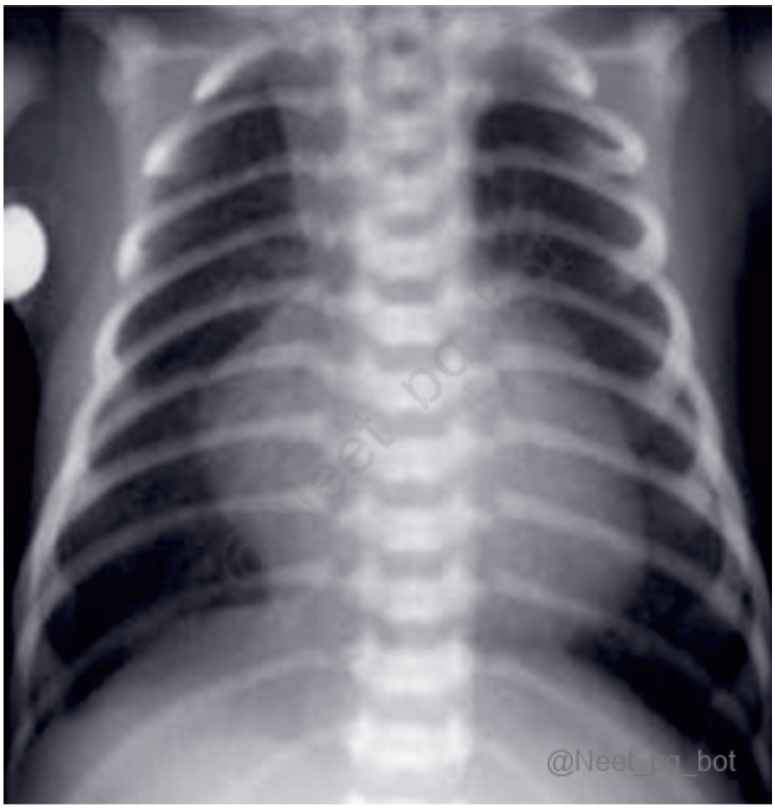
Correct Answer: B. Box-shaped heart; Ebstein anomaly

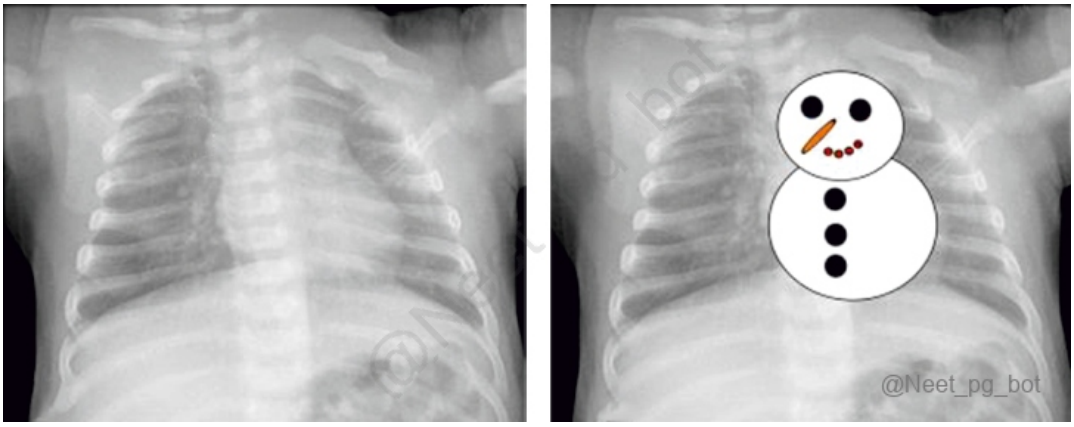
■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: The chest X-ray shows a distinctive cardiac silhouette described as a "box-shaped heart," which is characteristic of Ebstein's anomaly. This appearance is caused by a combination of specific features: A hugely enlarged right atrium that may fill the entire right hemithorax A shelved appearance of the left cardiac contour due to the dilated right ventricular outflow tract or elevated residual right ventricle Small aorta and main pulmonary artery Ebstein anomaly is a congenital heart defect characterized by apical displacement of the septal and posterior leaflets of the tricuspid valve into the right ventricle. This malformation leads to an atrialized portion of the right ventricle and often results in tricuspid regurgitation and right atrial enlargement. Boot-shaped heart is associated with Tetralogy of Fallot, not Ebstein anomaly (Option A) . Egg-on-string appearance is seen in Transposition of the Great Arteries (Option C) . Snowman sign is characteristic of Supracardiac Total Anomalous Pulmonary Venous Return, not Ebstein anomaly (Option D) .







References:

radiopaedia.org/articles/box-shaped-heart-3

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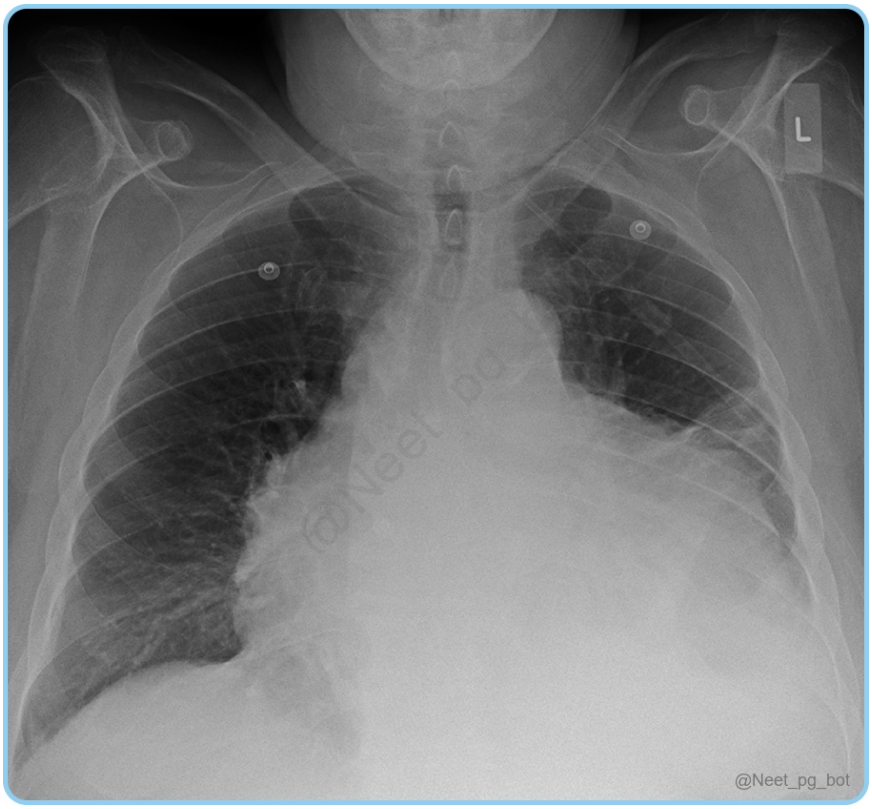
Q27: A 45-year-old woman presents with gradually worsening dyspnea and reduced exercise tolerance over the past month. The chest X-ray is given below. Regarding this patient's condition, which of the following statements is INCORRECT? (Q853487)

A. "Oreo cookie" sign will be seen on lateral view on Chest X Ray

B. The patient typically shows abrupt enlargement of cardiothoracic ratio

C. Seldinger technique is employed for management of this condition

D. An Echocardiogram is a better modality than CT to confirm the diagnosis

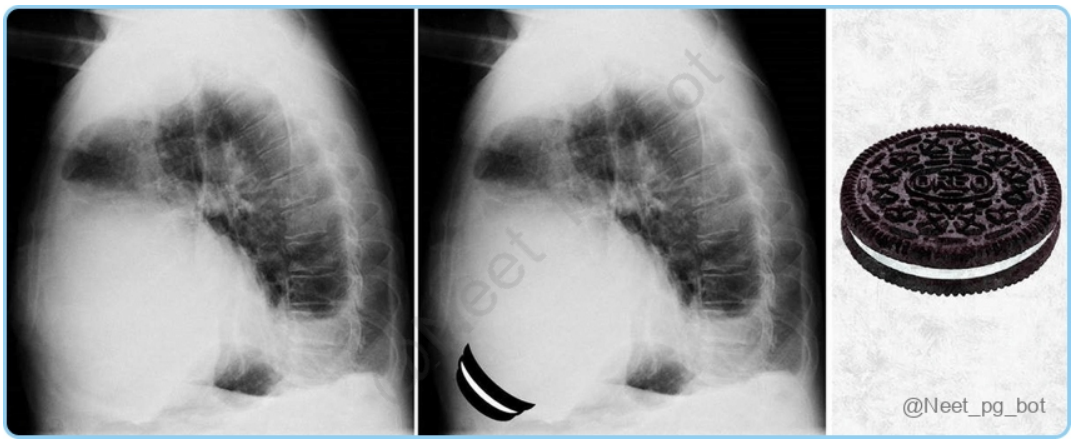


Correct Answer: B. The patient typically shows abrupt enlargement of cardiothoracic ratio

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: The clinical presentation and radiological image indicate towards pericardial effusion. In pericardial effusion, especially when symptoms develop gradually over a month as in this case, the enlargement of the cardiothoracic ratio is typically gradual , not abrupt. The Seldinger technique is used in pericardiocentesis for managing significant pericardial effusions. (Option C) Pericardial effusion- Radiological findings Imaging Modality Radiological Findings Notes Plain Radiograph • Globular enlargement of cardiac shadow • "Water bottle" configuration • Widening of the subcarinal angle • "Oreo cookie" sign on lateral view (Option A) • Serially enlarging cardiothoracic ratio • Usually visible when >200 mL of fluid present • May show signs of cardiogenic pulmonary edema in severe cases Echocardiography • Anechoic separation of pericardial layers • Fluid first appears posteriorly in supine patients • Depth of effusion correlates with volume • Method of choice for diagnosis (Option D) • Can detect as little as 50 mL of fluid • Allows assessment of hemodynamic impact CT • Fluid density material surrounding the heart • Pericardial thickness >3-4 mm is abnormal and suggestive of effusion • Often used to clarify cause rather than confirm diagnosis • Can help differentiate from other conditions (e.g., hemopericardium)





References:

radiopaedia.org/articles/pericardial-effusion

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Q28: A 45-year-old male patient presents with dyspnea on exertion and occasional palpitations. A chest X-ray is performed, revealing the cardiac silhouette. Study the image provided and answer the following question. Which of the following statements

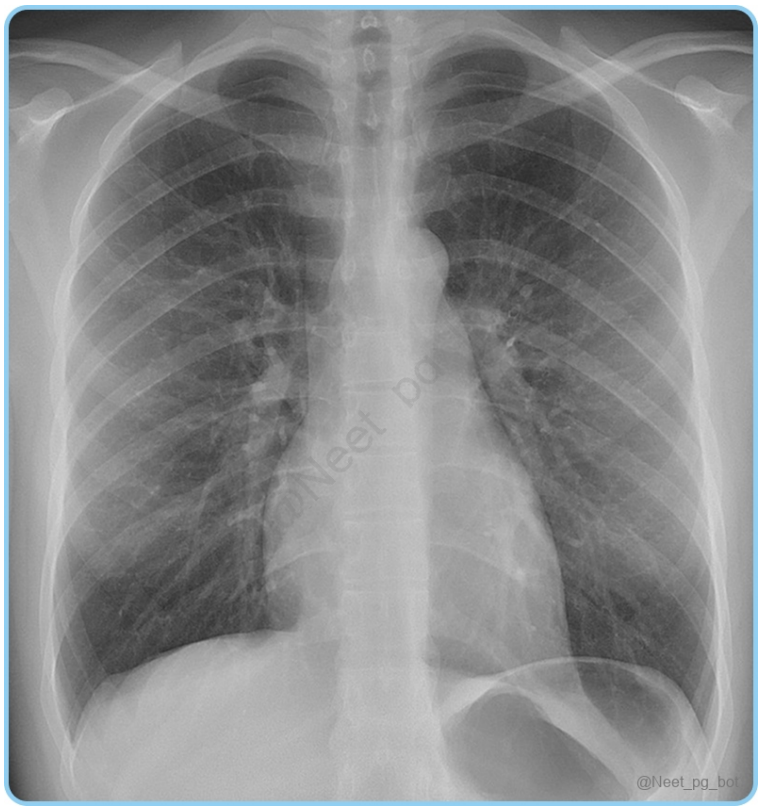
regarding the heart's position, size, and borders on the chest radiograph is correct? (Q853479)

A. The right heart border is formed primarily by the right ventricle

B. The left atrium primarily forms the left heart border

C. The cardiothoracic ratio (CTR) is considered normal if it is less than 0.5 on a PA chest X-ray

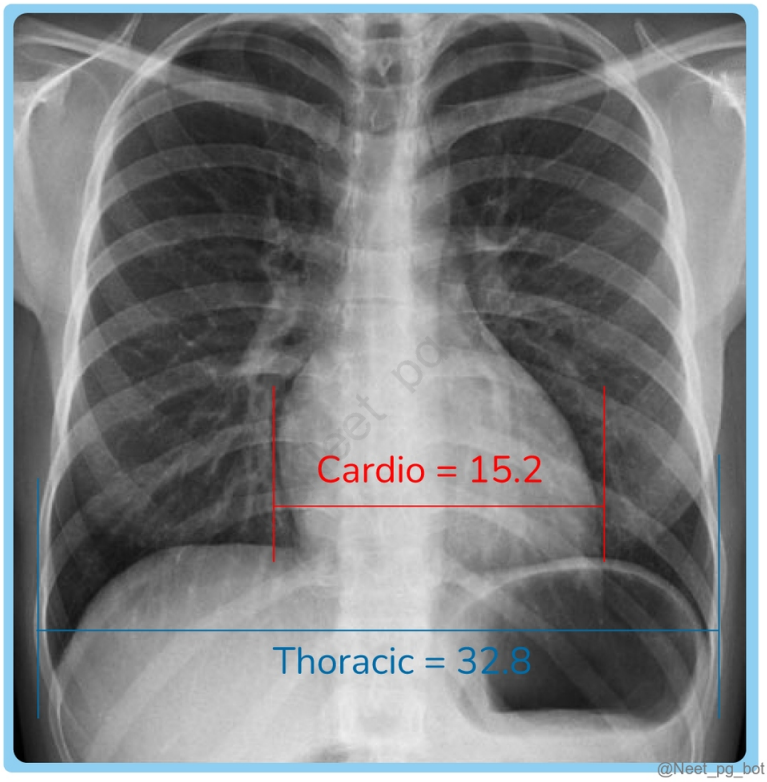
D. The right atrium and the left ventricle mainly form the inferior border of the heart

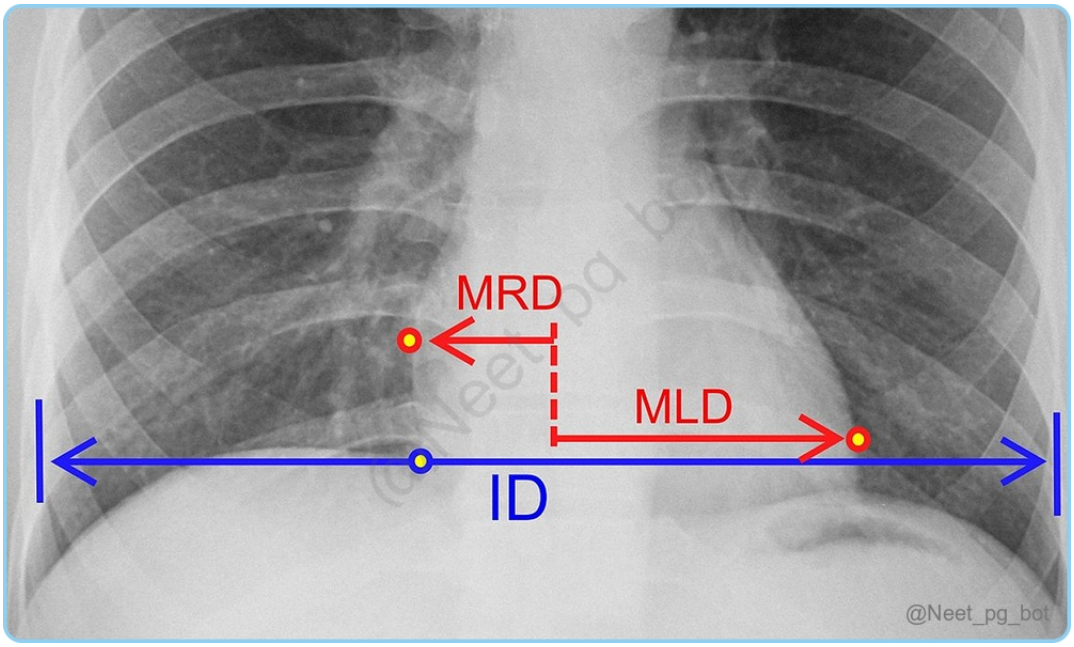


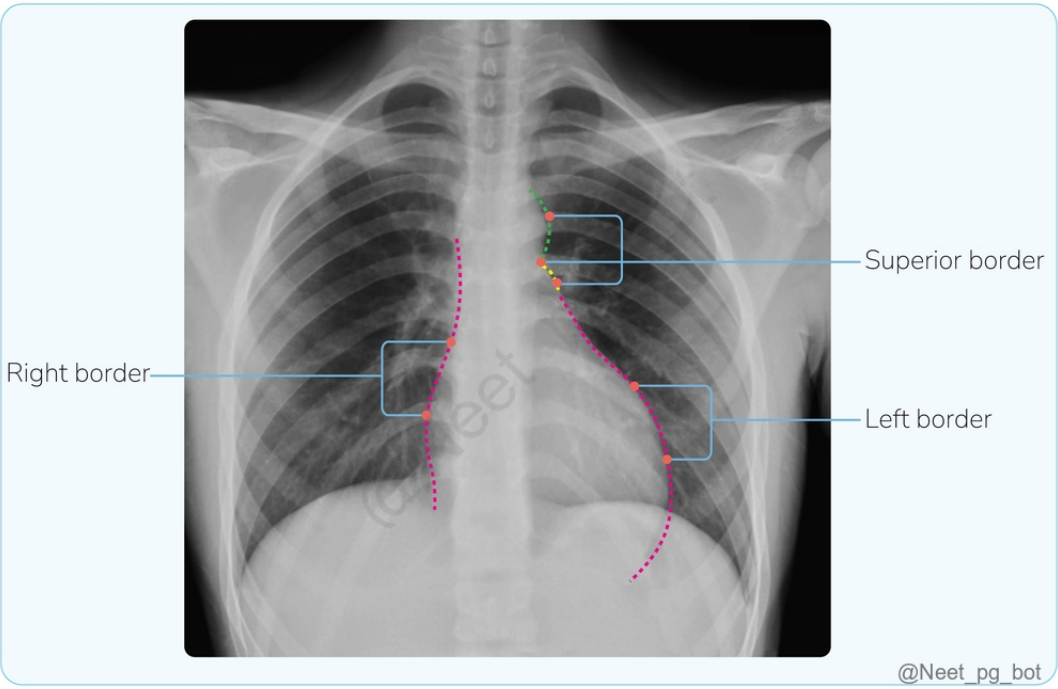
Correct Answer: C. The cardiothoracic ratio (CTR) is considered normal if it is less than 0.5 on a PA chest X-ray

■ *Listen to Audio 1*

Explanation: The cardiothoracic ratio is a measurement used to assess heart size. On a PA chest X-ray, a CTR less than 0.5 is considered normal A larger CTR (>0.5) suggests cardiomegaly or other pathology. However, it's important to consider factors like: Patient positioning, Respiratory phase (increased during expiration), Anatomical variations (e.g., pericardial fat). Width of the heart= MRD + MLD MRD - greatest perpendicular diameter from the midline to the right heart border MLD - greatest perpendicular diameter from the midline to the left heart border Borders of the Heart: Right Border: Formed primarily by the right atrium . (Option A ruled out) Left Border: Composed of the left ventricle and a portion of the left atrium (left auricle). (Option B ruled out) Inferior Border: Formed by the right ventricle , which sits on the diaphragm. (Option D ruled out) Superior Border: The great vessels (aorta, superior vena cava).


Cardio = 15.2
Thoracic = 32.8
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MRD
MLD
ID
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References:

Grainger & Allison's Diagnostic Radiology, A Textbook of Medical Imaging, 7th Edition, Page. 266

Fred A. Metller, Jr, Essentials of Radiology, 4th Edition, Page. 40

Textbook of Radiology & Imaging by David Sutton, 8th Edition, Chapter 21, Chest Radiograph in Acquired Heart Disease- Heart Size and Shape.

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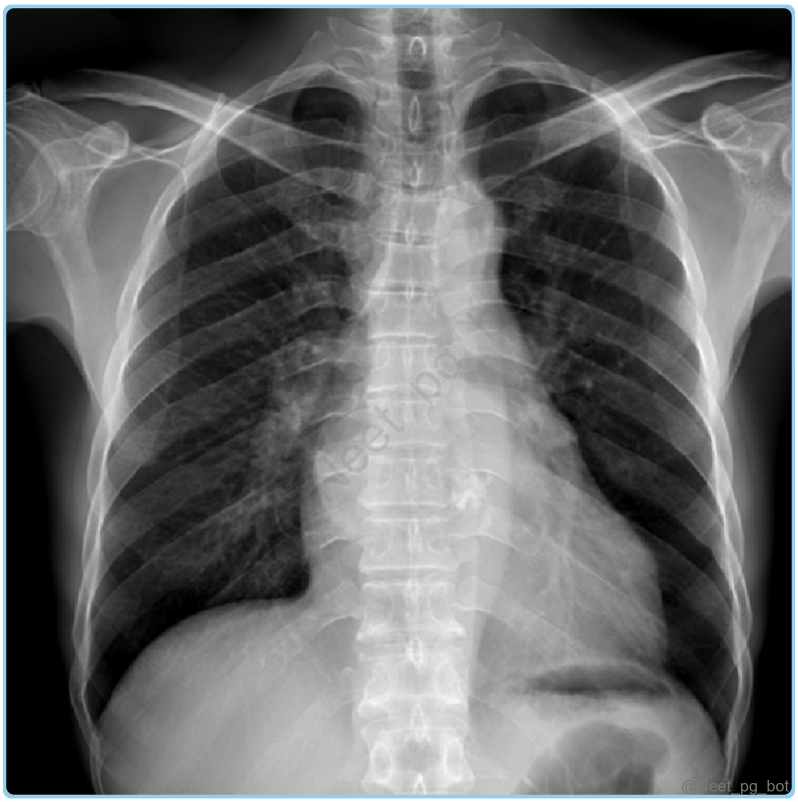
Q29: In mitral stenosis, which Mogul sign is seen? (Q853489)

A. First

B. second

C. Third

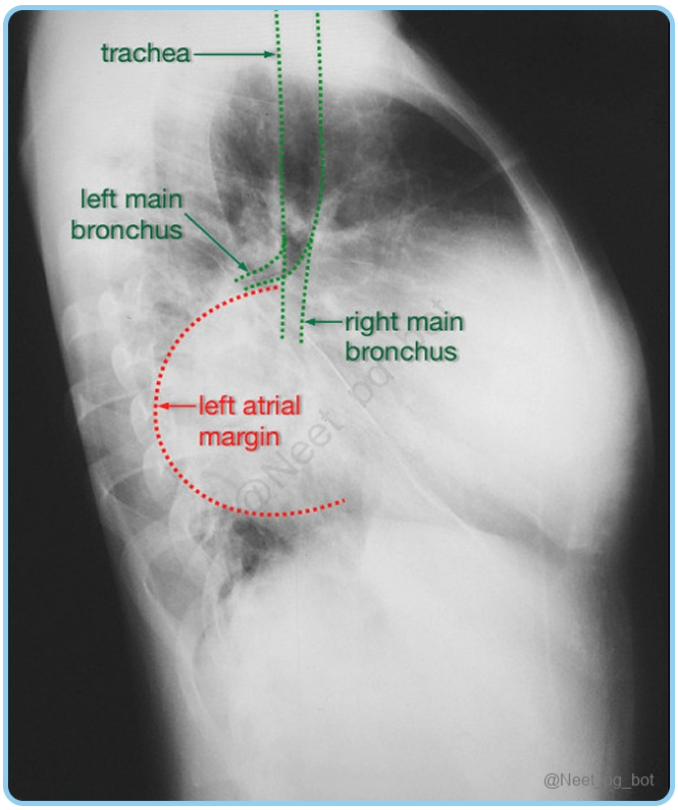
D. Fourth

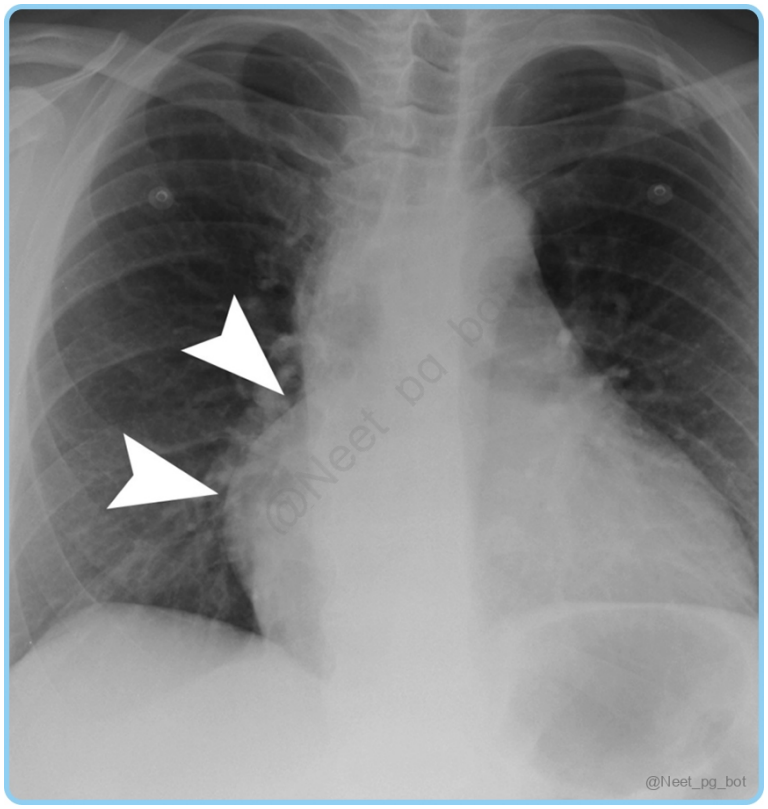


Correct Answer: C. Third

- *Listen (English)*
- *Listen (Hindi)*

Explanation: Third Mogul Sign is typically formed by a prominent left atrial appendage, which is often observed in patients with rheumatic mitral stenosis due to left atrial enlargement. Normal Moguls on the Left Cardiac Border: Aortic Knuckle (first bump) Pulmonary Artery (second bump) Left Atrial Appendage (third bump, below the left main bronchus) Cardiac Apex (fourth bump) Third Mogul sign: Typically formed by a prominent left atrial appendage, often seen in patients with rheumatic mitral stenosis due to left atrial enlargement.





References:

www.ahajournals.org/doi/10.1161/CIRCIMAGING.123.015441

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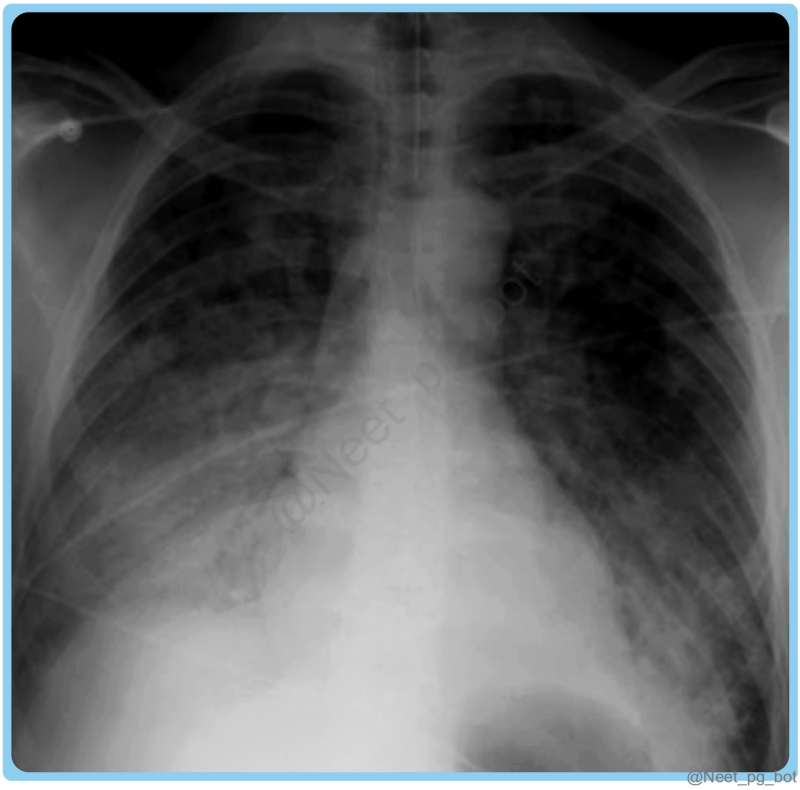
Q30: A 70-year-old male patient presents to the emergency department with acute respiratory distress following a severe allergic reaction. He has a history of asthma and reports recent exposure to a known allergen. Chest X-ray of the patient is given below. Which of the following findings on the chest X-ray is NOT characteristic of the patient's condition? (Q853490)

A. Bat's Wing Distribution

B. Air Bronchogram

C. Widened Mediastinum

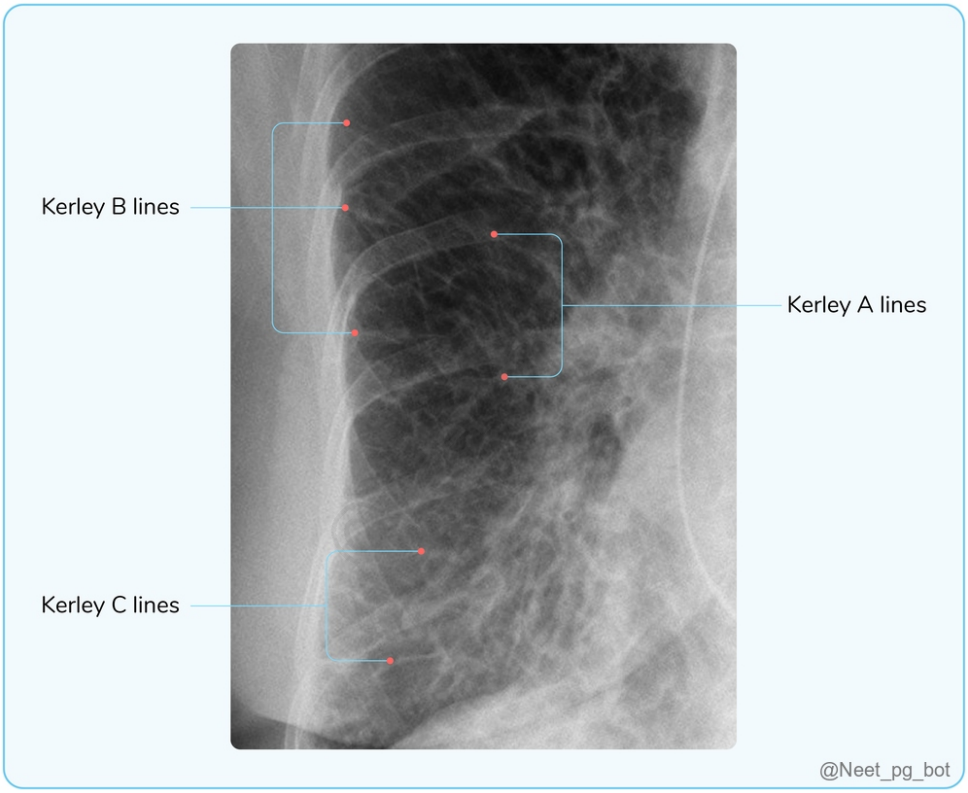
D. Kerley B lines



Correct Answer: C. Widened Mediastinum

Explanation: The patient is experiencing acute respiratory distress likely due to non-cardiogenic pulmonary edema (NCPE) as a result of a severe allergic reaction. Conditions like Acute Respiratory Distress Syndrome (ARDS) can

occur in response to allergens, leading to increased permeability of the alveolar-capillary barrier and resulting in pulmonary edema. A widened mediastinum is NOT characteristic of pulmonary edema. A widened mediastinum is usually indicative of conditions such as aortic dissection, large mediastinal tumors, or significant vascular issues, rather than pulmonary edema. Non-Cardiogenic Pulmonary Edema: Caused by increased permeability of the alveolar-capillary barrier (not due to heart failure) Common Cause: Acute Respiratory Distress Syndrome (ARDS) Features on Chest X-ray: Interstitial Edema Signs: Kerley B Lines: Short horizontal lines at lung periphery due to fluid in the interlobular septa. (Option D ruled out) Kerley A Lines: Longer lines directed towards the hilum (more difficult to detect). Peribronchial Cuffing: Thickening and blurring of airway walls due to fluid accumulation. Perihilar Haze: Blurring of central lung vessels due to fluid in perivascular spaces. Alveolar Edema Signs: Bilateral Opacification: Fluid in alveoli causing diffuse clouding of lung fields. Bat's Wing Distribution: Central lung opacities with sparing of the peripheries. (Option A ruled out) Air Bronchogram: Visible air-filled bronchi surrounded by fluid-filled alveoli. (Option B ruled out) Rapid Changes in Opacity: Quick development of opacities suggests edema rather than infection. Other Findings: Pleural Effusions: Fluid can accumulate between the lung and pleura, seen at costophrenic angles. Upper Lobe Sparing: Edema often spares upper lobes, with a preference for lower lung zones. Peripheral Edema: In NCPE (like ARDS), peripheral lung regions may show more edema than central areas.



References:

Grainger and Allison's Textbook of Diagnostic Radiology, 7th Edition. Page 251- 256

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Q31: A 60-year-old male with hypertension, hyperlipidemia, and a smoking history presents for a routine evaluation. He has no symptoms but is concerned about cardiovascular health due to a family history of heart disease. Which score is used to assess coronary artery disease risk? (Q853491)

A. CHA2DS2-VASc Score

B. Agatston Score

C. Reynolds Risk Score

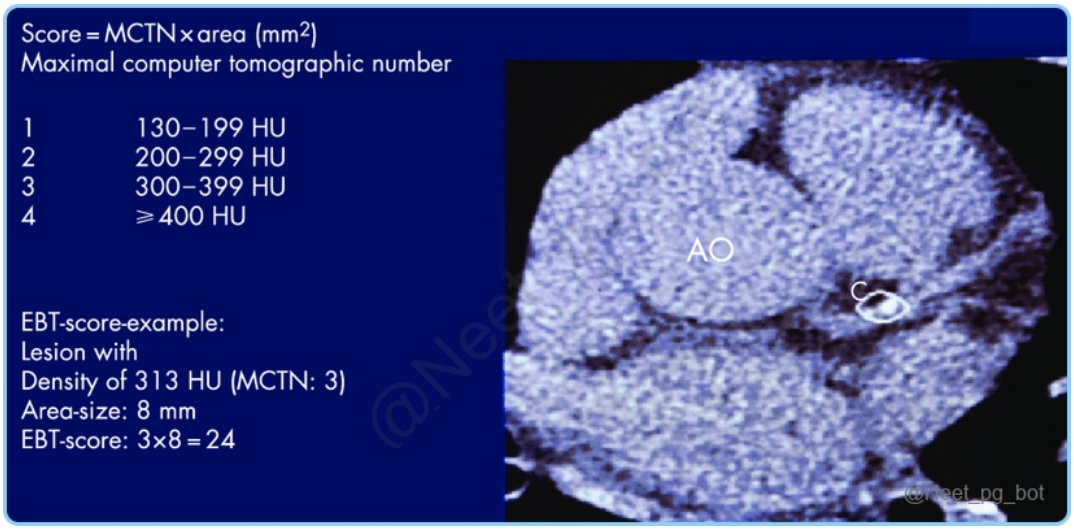
D. Carotid Intima-Media Thickness

Correct Answer: B. Agatston Score

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: The Agatston Score is used to assess coronary artery disease (CAD) risk by quantifying the amount of coronary artery calcification seen on a CT scan. Higher scores indicate a higher burden of coronary atherosclerosis and increased cardiovascular risk. Coronary Atherosclerosis Coronary atherosclerosis is the buildup of plaques in the coronary arteries, leading to reduced blood flow and increasing the risk of cardiovascular events. Agatston Score Purpose: The Agatston score quantifies coronary artery calcium (CAC) detected via computed tomography (CT). It helps assess the risk of coronary artery disease (CAD). Calculation: The score is derived from the density and area of calcified plaques in the coronary arteries. Higher scores indicate a greater burden of coronary calcification and a higher risk of coronary events. Coronary calcium lesion = CT density of 130 Hounsfield units with area >1mm2. Interpretation: 0: No identifiable calcium, low risk of coronary events. 1-99: Mild coronary calcium, moderate risk. 100-399: Moderate to high risk. ≥400: High risk, indicating significant atherosclerotic burden. CHA2DS2-VASc Score (Option A) is used to assess the risk of stroke in patients with atrial fibrillation, not CAD risk. Reynolds Risk Score (Option C) is a tool used to predict cardiovascular risk, but it incorporates more factors such as high-sensitivity C-reactive protein (hs-CRP) and is not specifically for coronary artery calcification. Carotid Intima-Media Thickness (CIMT) (Option D) is not specific to coronary artery disease risk as it measures the thickness of the carotid artery walls, not coronary artery calcification or plaque burden.



References:

www.ncbi.nlm.nih.gov/pmc/articles/PMC8723785/

radiopaedia.org/articles/agatston-score

www.ncbi.nlm.nih.gov/pmc/articles/PMC5487233/

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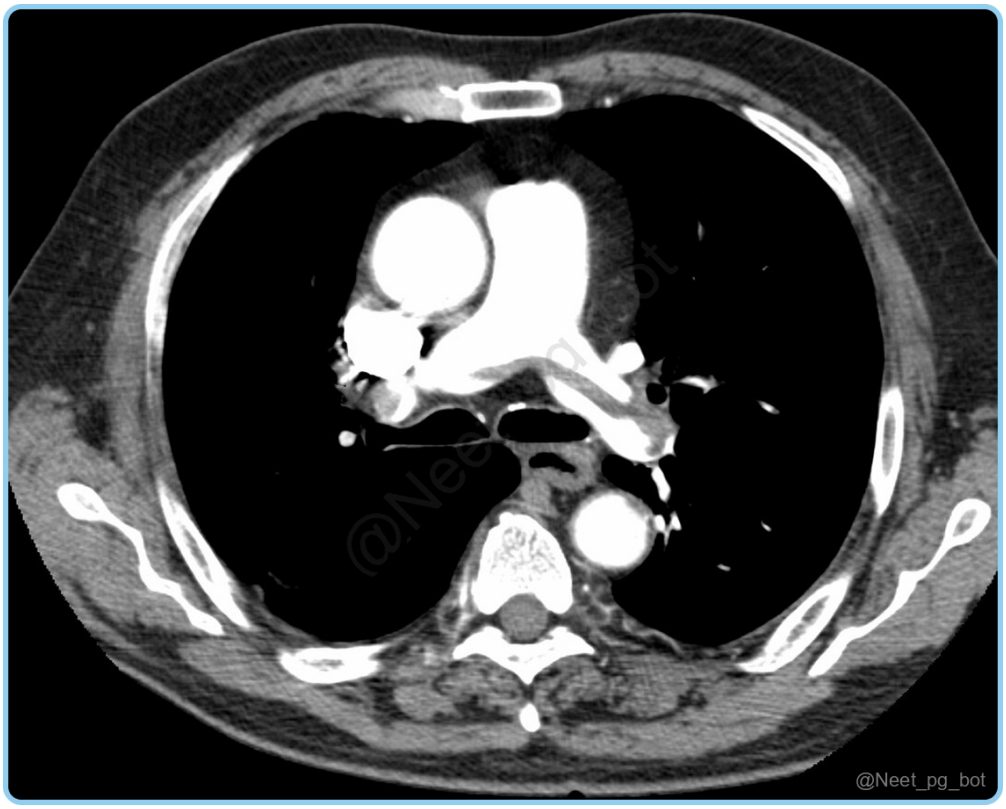
Q32: A 58-year-old male with a history of hypertension and recent long-distance travel presents with sudden chest pain and dyspnea. A Computed Tomography Pulmonary Angiography (CTPA) is performed, and the findings are given below. Which of the following statements regarding the findings associated with the given condition is FALSE? (Q853492)

A. Hampton Hump indicates hemorrhage and necrotic lung tissue in pulmonary infarction.

B. The Westermark Sign shows regional oligemia due to reduced blood flow.

C. Chang Sign shows an enlargement of the right descending pulmonary artery.

D. Palla Sign indicates enlargement of the right descending pulmonary artery.



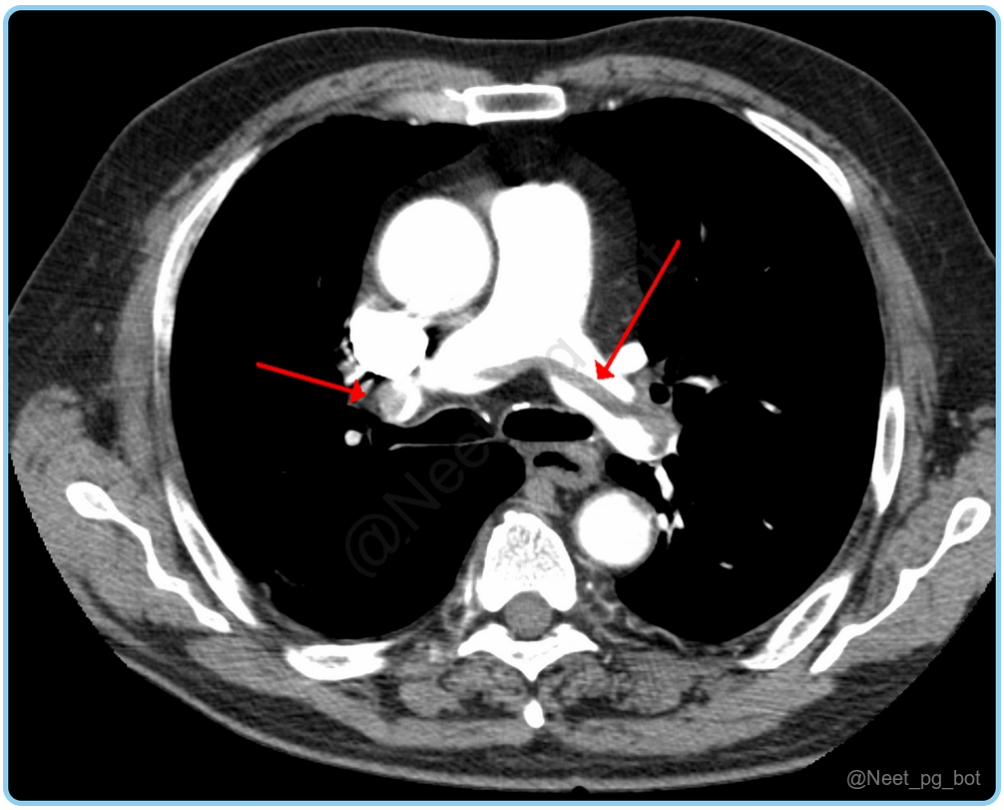
Correct Answer: C. Chang Sign shows an enlargement of the right descending pulmonary artery.

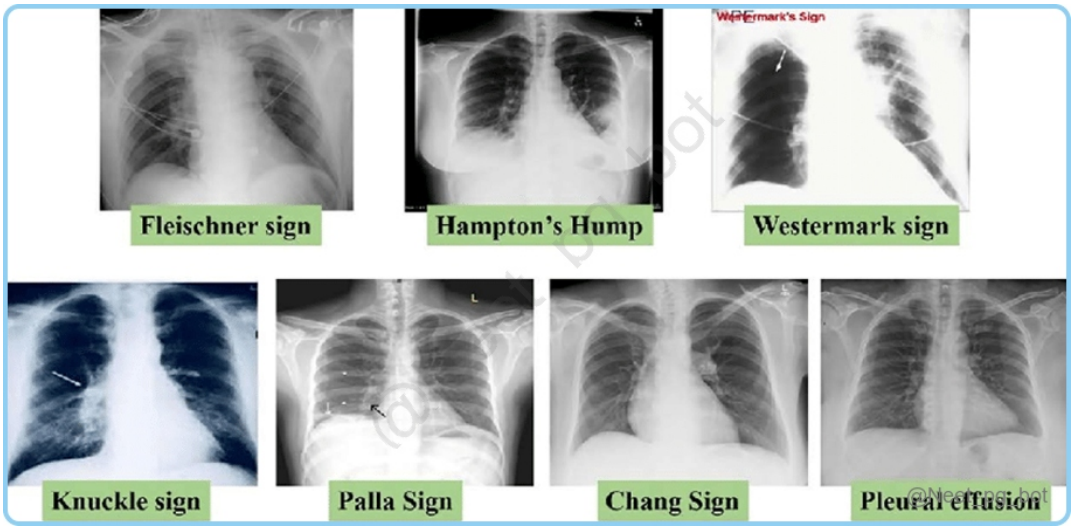
■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: In this scenario, the patient presents with sudden chest pain and dyspnea, and the CTPA findings reveal a saddle embolus, which is a significant pulmonary embolism located at the bifurcation of the main pulmonary artery. This condition can cause right heart strain and severe respiratory distress. The presence of a saddle embolus emphasizes the urgency of the situation, as it can obstruct blood flow to both lungs. The Chang Sign indicates a dilated descending pulmonary artery with an abrupt change in caliber, resembling an "amputated" appearance, but it does not specifically refer to the enlargement of the right descending pulmonary artery. Investigations used in Pulmonary Embolism D-Dimer: Used to investigate suspected pulmonary embolism (PE). If D-dimer is normal, it has 100% specificity for excluding PE. Used in conjunction with Wells Criteria for low to moderate-risk patients to rule out PE, avoiding imaging. Wells Criteria for Pulmonary Embolism: A scoring system to assess the pretest probability of acute PE. Interpretation of Wells Score: 0–1: Low risk 2–6: Moderate risk >6: High risk Computed Tomography Pulmonary Angiography (CTPA): Mainstay imaging for diagnosing PE due to wide availability and quick results. Contrast filling defect indicates pulmonary thromboembolism. Detects emboli down to segmental arteries and sometimes subsegmental arteries. Signs of right heart strain on CTPA: Increased RV ratio, flattening of interventricular septum, dilated RA and IVC. Magnetic Resonance Angiography (MRA): Rarely used in acute settings due to: Long scan time. Difficult monitoring of unstable patients. Widespread availability of CTPA. More useful for patients with contraindications to CT contrast. Lung Scintigraphy (V/Q Scan): First-line test in pregnant patients with a normal CXR. Uses a low-dose technique with shielding to minimize radiation exposure to the fetus. Pulmonary angiography/ arteriography The gold standard for diagnosing pulmonary embolism (PE). Chest X Ray Westermark Sign : Regional oligaemia (reduced blood flow) in the lungs. (Option B ruled out) Hampton Hump : A well-defined pleural-based opacity on chest X-ray indicating

hemorrhage and necrotic lung tissue in a region of pulmonary infarction. (Option A ruled out) Palla Sign : Enlargement of the right descending pulmonary artery. (Option D ruled out) Fleishner Sign : Enlargement of the central pulmonary arteries. Knuckle Sign : Abrupt tapering or cutoff of the pulmonary artery, suggesting an embolus blocking blood flow. Chang Sign : A dilated descending pulmonary artery with an abrupt caliber change, resembling an "amputated" appearance.





References:

David Sutton Textbook of Radiology and Imaging. Volume 1. 8th edition. Page. 1485- 1487

Imaging of acute pulmonary embolism: an update - PMC

Radiographic features of pulmonary embolism: Westermark and Palla signs

CXR eponyms in pulmonary embolism • LITFL

Acute Pulmonary Embolism - StatPearls - NCBI Bookshelf

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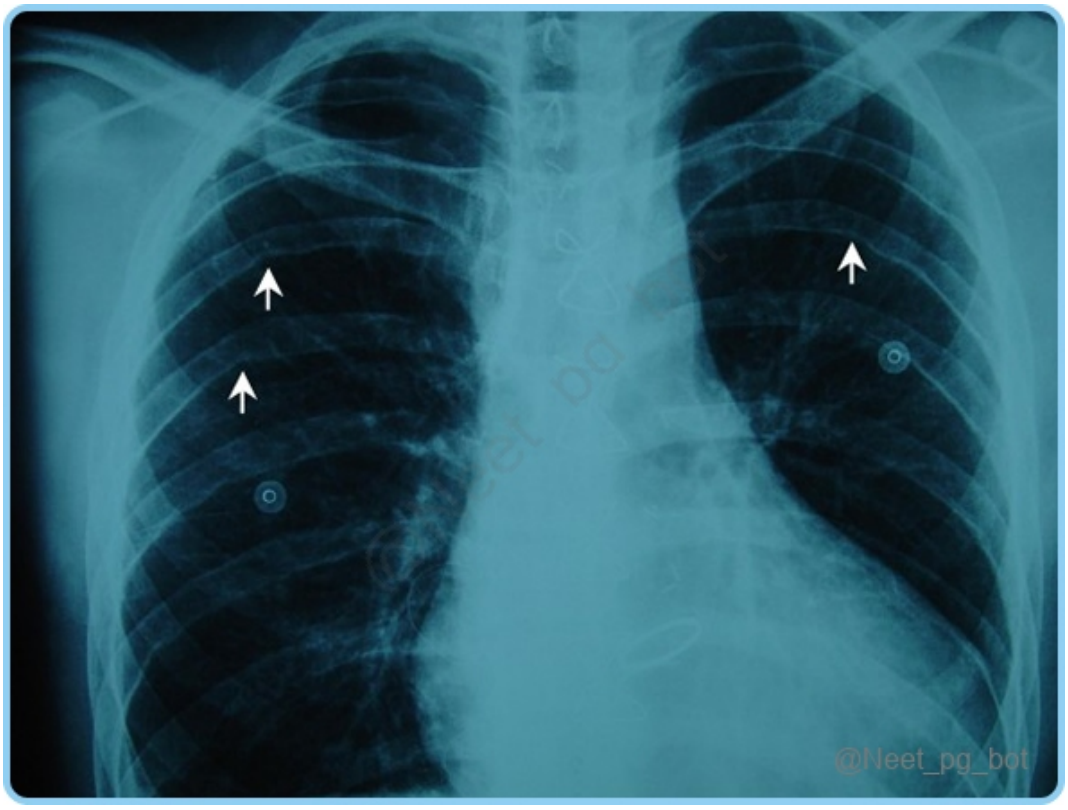
Q33: A 10-year-old boy presents with brachio-femoral pulse delay and a history of recurrent chest pain. A chest X-ray is performed, revealing a contour abnormality of the aorta and rib notching. Which of the following radiographic features is most likely observed in this patient? (Q853493)

A. Figure of 3 sign

B. Widened mediastinum

C. Kerley B lines

D. Enlarged cardiac silhouette

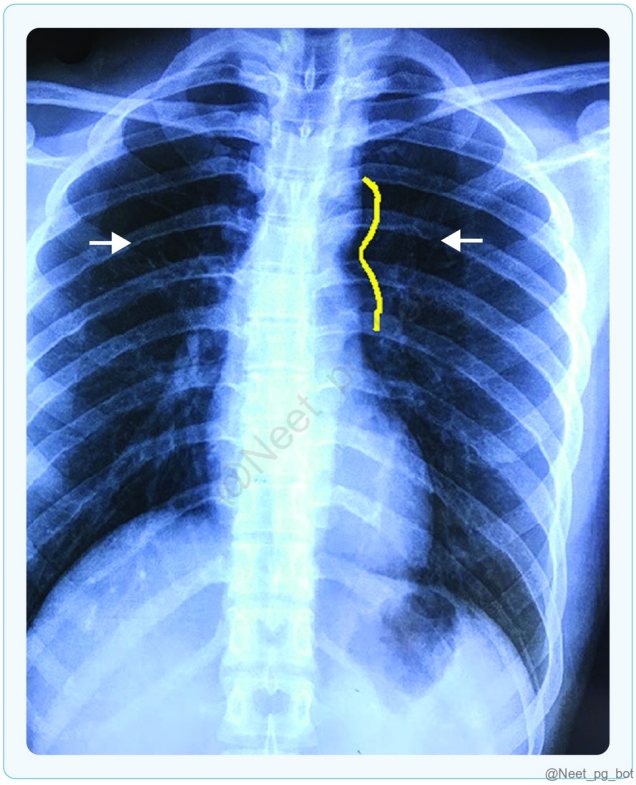


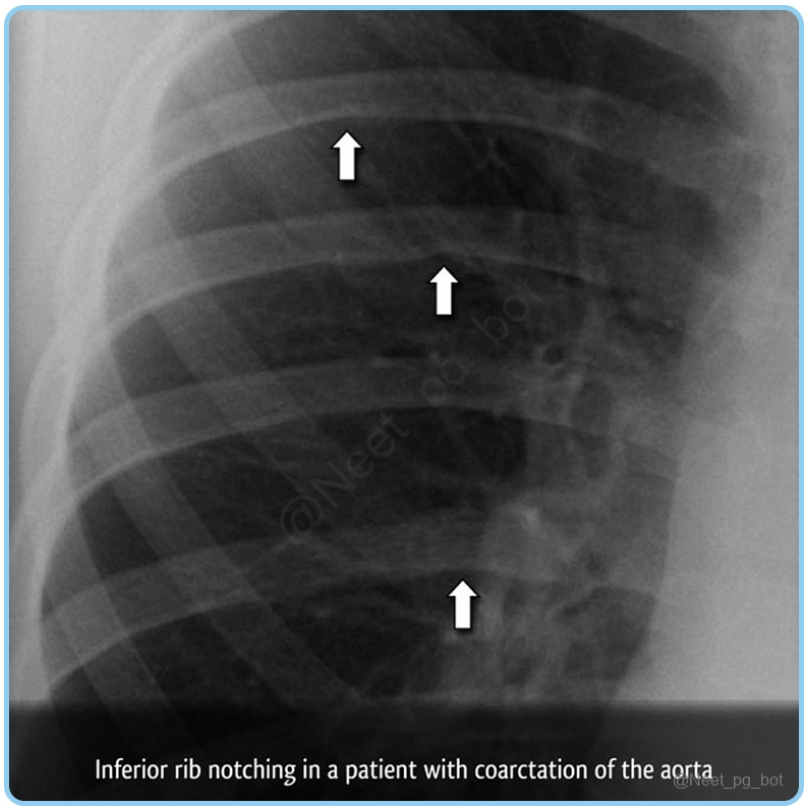
Correct Answer: A. Figure of 3 sign

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: The presence of the Figure of 3 sign and rib notching on X-ray, along with symptoms of hypertension and chest pain, indicates coarctation of the aorta . These findings suggest narrowed aorta leading to collateral circulation and rib erosion, confirming the diagnosis. Figure of 3 sign: This sign indicates a contour abnormality of the aorta commonly associated with coarctation of the aorta. It is characterized by a distinctive "3" shape formed by the aorta and adjacent structures on the X-ray. Radiographic Features of Coarctation of the Aorta (CoA) Plain Radiograph Findings Figure of 3 Sign Contour abnormality of the aorta, indicative of coarctation. Inferior Rib Notching (Roesler Sign) Erosion of the inferior margins of ribs (usually 4th–8th) by dilated intercostal collateral vessels. Seen in long-standing cases (70% of older children/adults). Rare in infancy or children <5 years. Collateral Pathways Increased subclavian artery flow promotes collateral formation via: Internal thoracic arteries Anterior and posterior intercostal arteries Rib Notching Patterns Bilateral Rib Notching : Coarctation distal to both subclavian arteries. Unilateral Right Rib Notching : Coarctation between the brachiocephalic trunk and left subclavian artery, or Right-sided aortic arch with an aberrant left subclavian artery. Unilateral Left Rib Notching : Aberrant right subclavian artery arising post-coarctation, with collaterals on the left. Widened mediastinum (Option B): Suggestive of aortic dissection or large mediastinal masses; not specific to coarctation. Kerley B lines (Option C): Indicate pulmonary congestion due to heart failure; not directly related to aortic coarctation. Enlarged cardiac silhouette (Option D): Suggests cardiomegaly, not a primary feature of coarctation; significant heart failure would be needed for enlargement.





References:

radiopaedia.org/articles/coarctation-of-the-aorta

Grainger and Allison's Textbook of Diagnostic Radiology, 7th edition, Page 300

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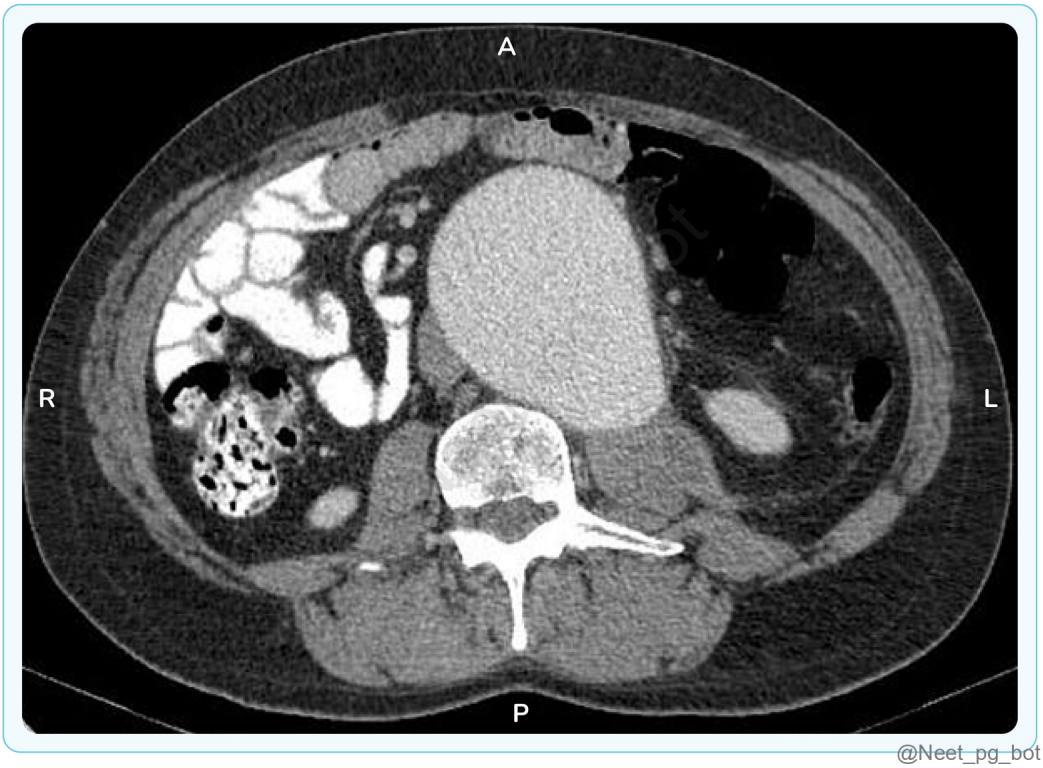
Q34: A 72-year-old male with a history of hypertension and hyperlipidemia presents to the emergency department with sudden, severe abdominal pain radiating to the back. A CT angiogram is given below. Which of the following radiological signs on the CT angiogram indicates an impending rupture of the patient's condition? (Q853494)

A. Retroperitoneal hematoma

B. Contrast extravasation

C. Draped aorta sign

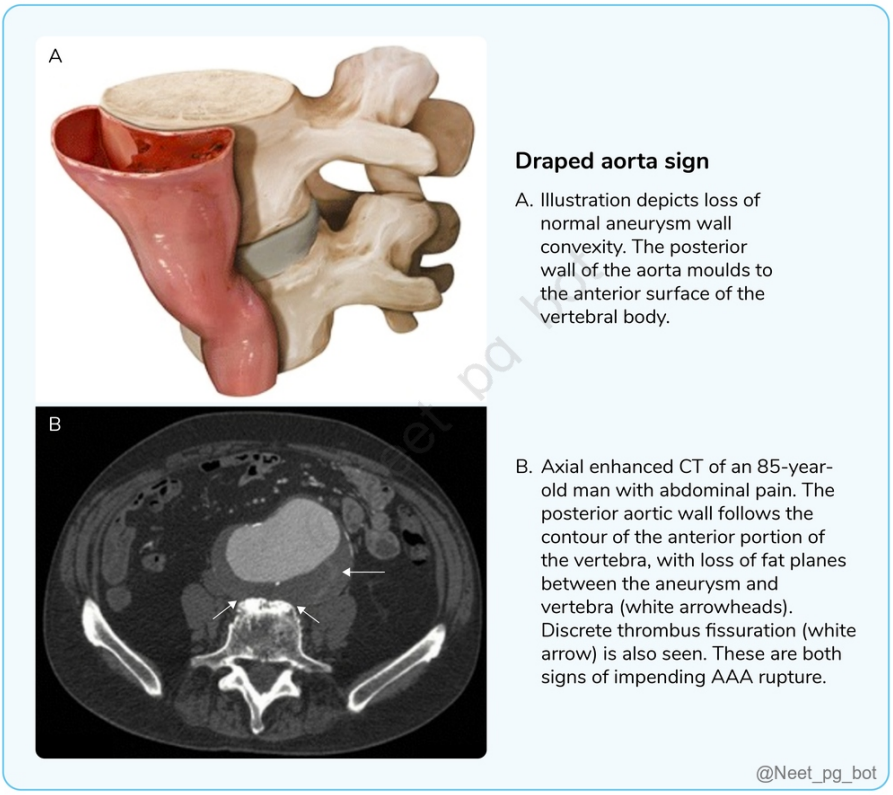
D. Para-aortic fat stranding

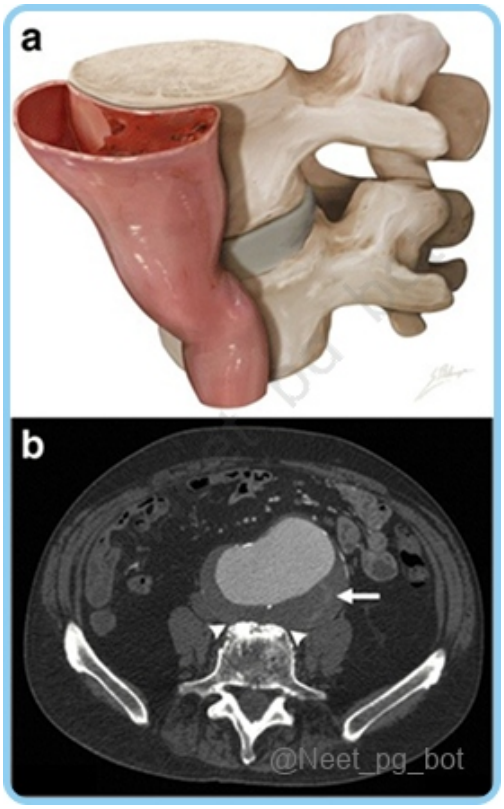


Correct Answer: C. Draped aorta sign

- *Listen (English)*
- *Listen (Hindi)*

Explanation: The patient's symptoms and CT angiogram findings indicate an abdominal aortic aneurysm (AAA), defined as a dilation of the abdominal aorta greater than 3 cm. The sudden severe abdominal pain radiating to the back, combined with the draped aorta sign, suggests an impending rupture, necessitating urgent intervention due to the high mortality rate associated with ruptured AAAs. Draped aorta sign is a crucial indicator of an impending rupture or contained leak of the AAA,. Radiographic Features Plain Radiograph : May show curvilinear calcification in the paravertebral region; not adequate for detailed detection or follow-up.. CT Angiography (CTA) : Gold standard for AAA evaluation; excellent for preoperative planning and accurate measurement of size and shape.. Signs of Rupture : Retroperitoneal Hematoma : Blood collection in the retroperitoneal space. (Option A ruled out) Para-aortic Fat Stranding : Indicates inflammation around the aorta. (Option D ruled out) Contrast Extravasation : Leakage of contrast from the aorta. (Option B ruled out) Signs of Impending Rupture : Draped Aorta Sign : Suggests contained rupture. High-Attenuation Crescent Sign : Indicates blood or thrombus around the aorta. Focal Discontinuity of Intimal Calcification : Suggests potential rupture. Dual-Energy CT: Lower Radiation Dose : Compared to standard CT. Better Endoleak Assessment : Improves visualization of complications. Angiography (DSA): Regional Branch Vessel Visualization : Excellent for detailed anatomy but may obscure aneurysm size. Draped aorta sign





References:

radiopaedia.org/articles/abdominal-aortic-aneurysm?lang=us

↑ *Back to this question in Part A*

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Q35: On a standard posteroanterior chest radiograph, which structure does not contribute to the formation of the right heart border? (Q885126)

A. Right ventricle

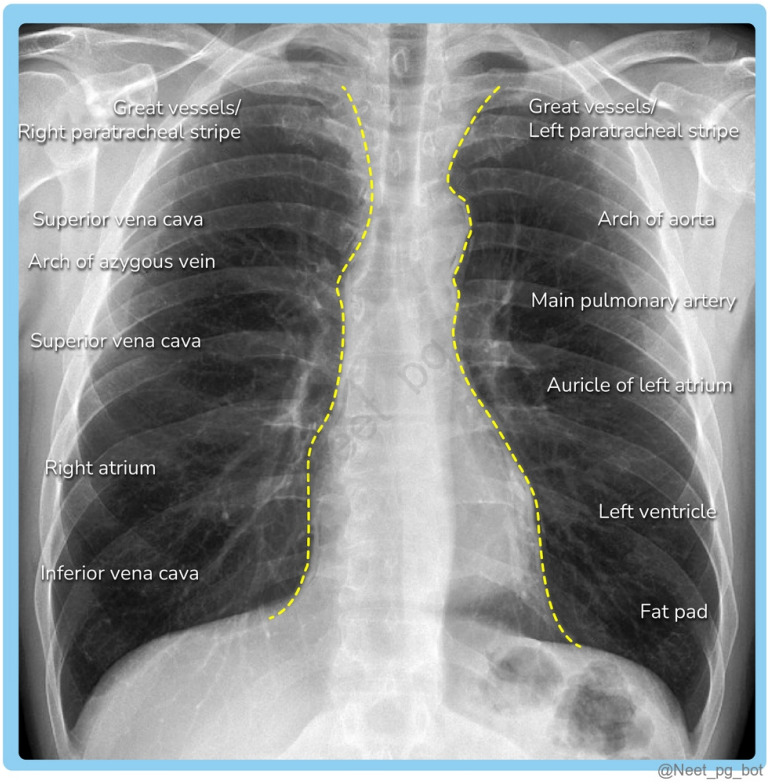
B. Superior vena cava

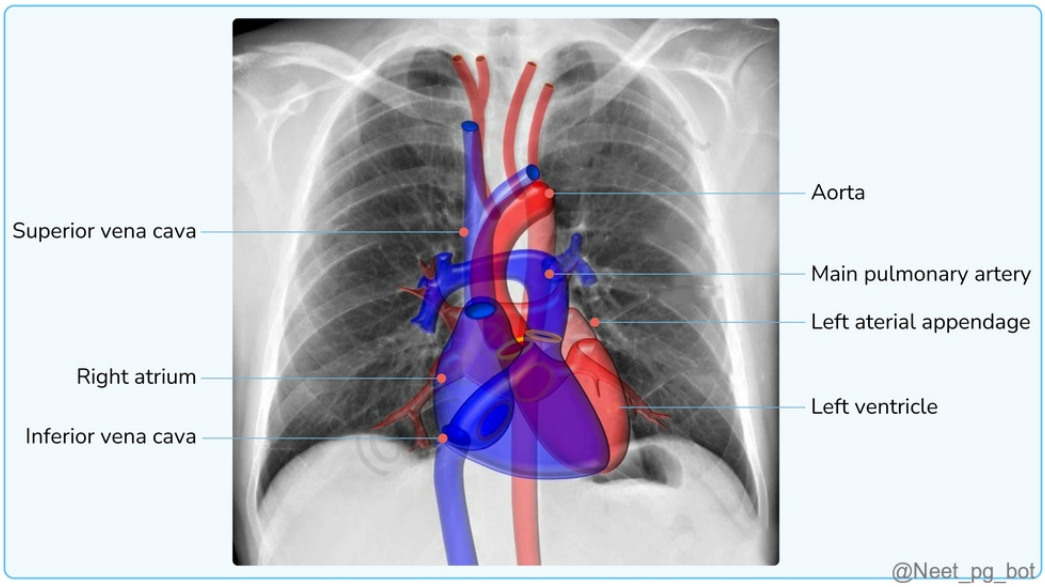
C. Right atrium

D. Inferior vena cava

Correct Answer: A. Right ventricle

Explanation: The right cardiac border on a PA chest X-ray is formed mainly by the right atrium and the superior vena cava; the right ventricle does not contribute to the right heart margin because it lies anteriorly. Cardiac Borders on PA Chest X-ray The cardiac silhouette on a PA view is formed by specific chambers and vessels. Each border corresponds to anatomically adjacent structures. Right Cardiac Border Formed by: Superior vena cava (upper part) Right atrium (major contributor) These structures lie along the right lateral margin of the heart and are in contact with the lung, making them visible on X-ray. Right Ventricle Does NOT Form the Right Border The right ventricle is located anteriorly in the chest. It contributes mainly to: The anterior cardiac surface The inferior border (along with the left ventricle) Being anterior, it does not create a distinct lateral silhouette on a PA radiograph. Right ventricle (Option A): Lies anteriorly and does not contribute to the right heart border on PA chest X-ray. Superior vena cava (Option B): Forms the upper part of the right cardiac border. Right atrium (Option C): Major structure forming the right cardiac border. Inferior vena cava (Option D): Enters the heart inferiorly and does not form the visible right border on PA view.





References:

Grainger & Allison's Diagnostic Radiology, 7th Edition, Page 28

↑ *Back to this question in Part A*

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• [11_Cardiovascular Radiology] 023 Previous Year Questions

« Back to Folder Directory

[11_Cardiovascular Radiology] 023 Previous Year Questions — Quick Jump

Q1 (p. 1520) *Q2 (p. 1523)* *Q3 (p. 1528)*

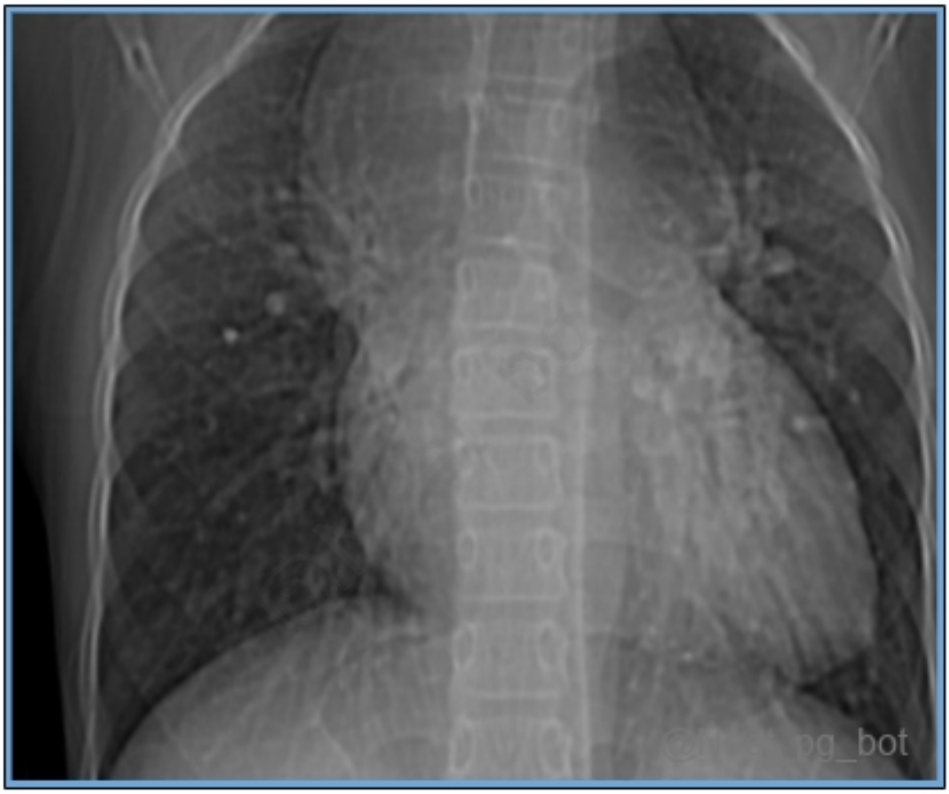
Q1: A 12-week-old infant presented with fever, cyanosis, and fatigue. His chest X-ray is shown below. What is the most likely diagnosis? (Q856159)

A. Total anomalous pulmonary venous circulation

B. Tetralogy of Fallot

C. Transposition of great arteries

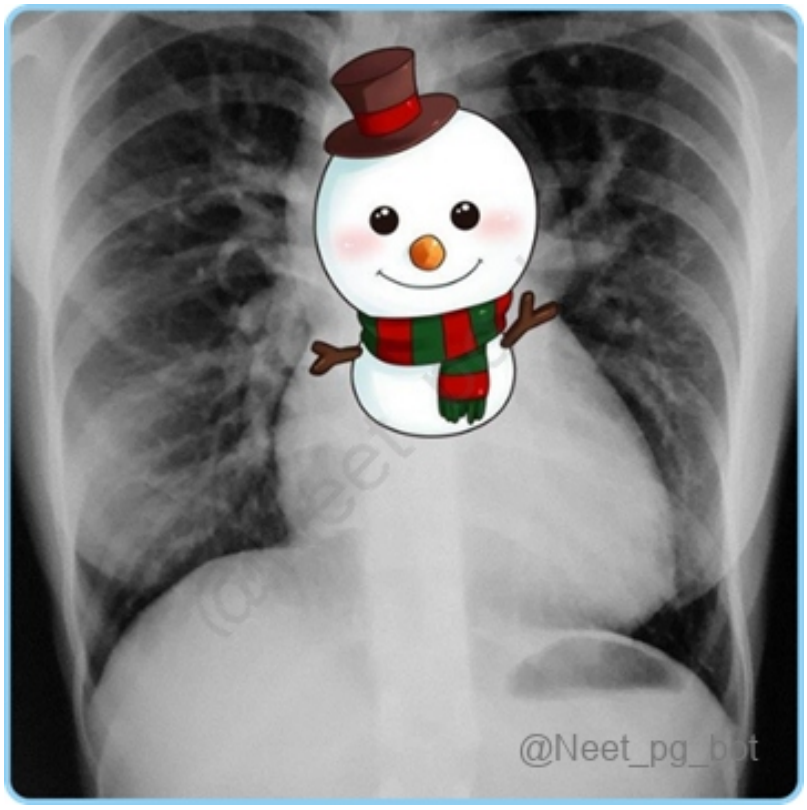
D. Pericardial effusion

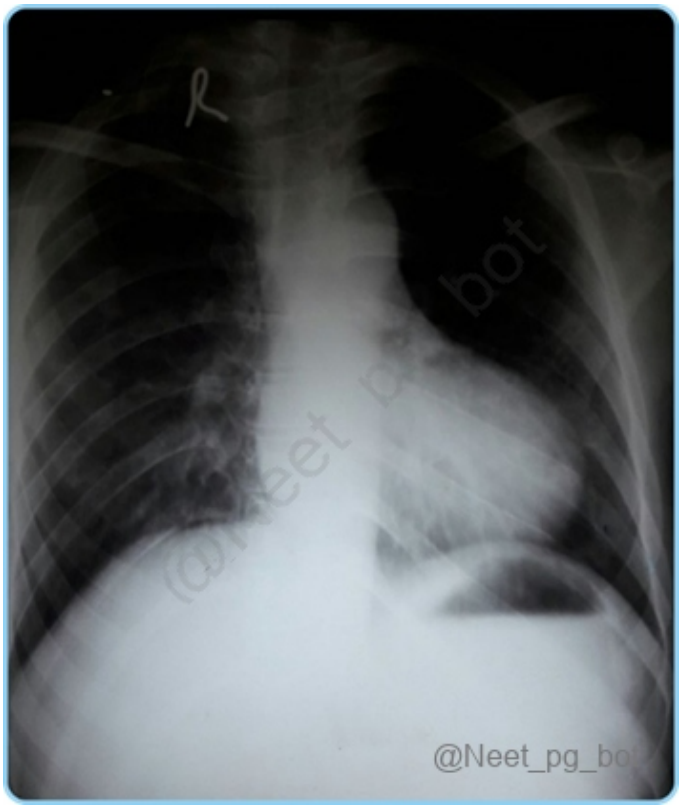


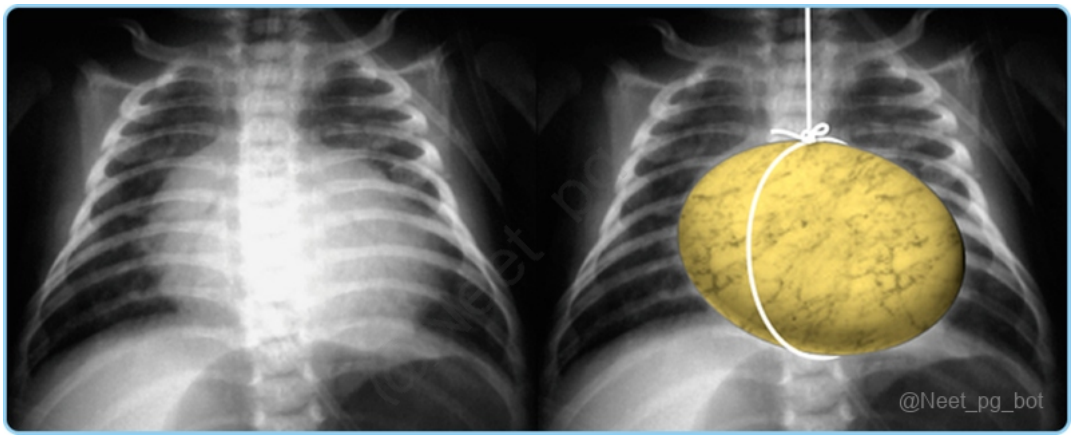
Correct Answer: A. Total anomalous pulmonary venous circulation

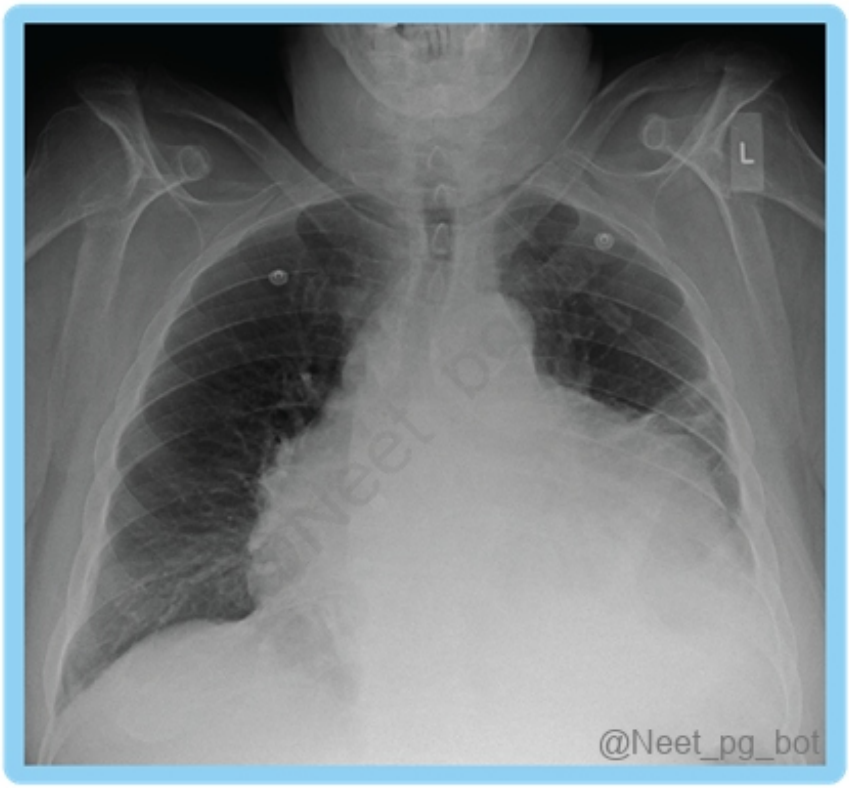
Explanation: The X-ray reveals a "figure-of-eight" or "snowman" appearance, which is characteristic of supracardiac TAPVC. Total Anomalous Pulmonary Venous Connection (TAPVC) Pathology Pulmonary veins

drain into the right atrium directly or indirectly via an abnormal venous connection Not a ductal-dependent cyanotic lesion Sites of venous connection Supracardiac- superior vena cava (Most common) Cardiac-coronary sinus, right atrium Infracardiac Mixed Clinical presentation Cyanosis and congestive cardiac failure With ASD-wide and split S2 Chest X-ray Snowman or figure-8 configuration in supracardiac TAPVC {{caption_text}} Treatment Surgery No indication for prostaglandins (Not a ductal-dependent cyanotic lesion) Tetralogy of Fallot (Option B): Associated with "boot-shaped heart" on X-ray. {{caption_text}} Transposition of Great Arteries (TGA) (Option C): Associated with "egg on a string" appearance on X-ray. {{caption_text}} Pericardial Effusion (Option D): Would present with an enlarged, globular heart ("water bottle" appearance) on X-ray. {{caption_text}}




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References:

Partial and Total Anomalous Pulmonary Venous Connection - StatPearls - NCBI Bookshelf (nih.gov)

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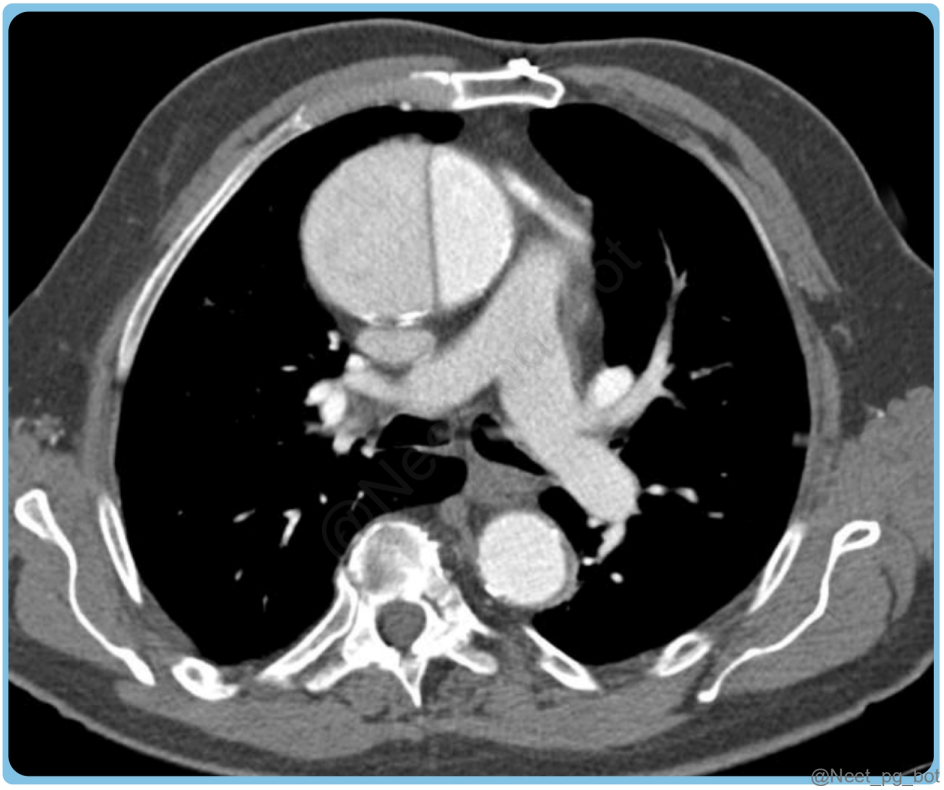
Q2: Comment on the diagnosis of the CT chest shown below. {{caption_text}} (Q859926)

A. Aortic dissection

B. Pulmonary embolism

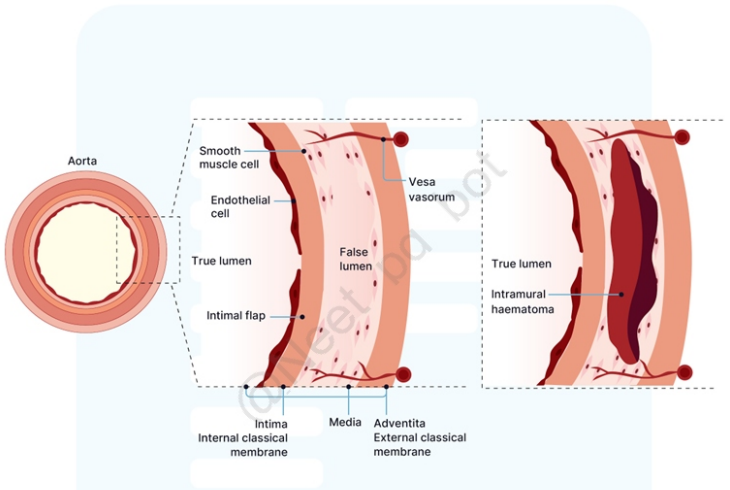
C. Cardiac myxoma

D. Aortic aneurysm

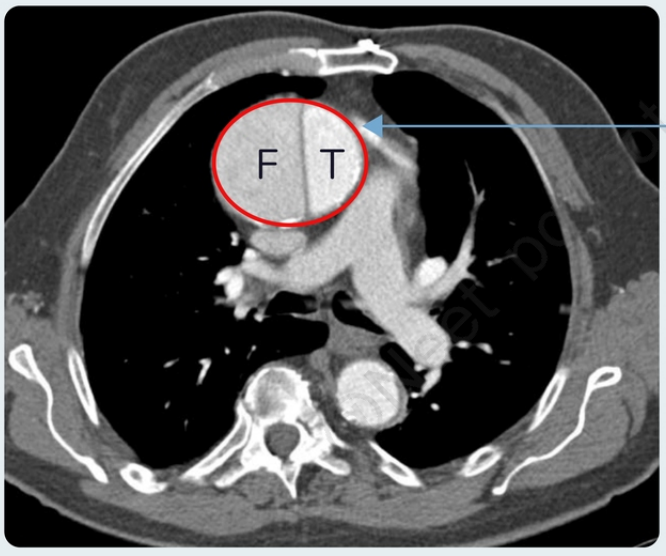


Correct Answer: A. Aortic dissection

Explanation: The given CT shows an intimal tear in the aorta indicating an Aortic dissection. Aortic Dissection It occurs when a defect or a flap occurs in the aorta, resulting in blood tracking into aortic tissues, splitting the medial layer and creating a false lumen. Clinical features: Sudden onset of severe, tearing chest, radiating to the interscapular region Renal pain and renal failure Paraplegia Syncope Weakness Hypotension or shock Investigations: If the patient is stable, CT angiography is the standard investigation of choice. In the case of unstable patients (SBP<100 mm of HG, HR>100 bpm), the preferred investigation of choice will be TEE (TransEsophageal Echocardiography) MRI can also be done if CT is unequivocal. Chest x-ray reveals widening of mediastinum along with left-sided pleural effusion. {{caption_text}} Signs of FALSE LUMEN: Cobweb Sign: Irregularities of False lumen {{caption_text}} Beak Sign: False lumen forms acute angle with True lumen: {{caption_text}} Pulmonary embolism (Option B): Filling Defect seen in Pulmonary artery {{caption_text}} IOC for PE: CT Angiography Incorrect Options: Cardiac Myxoma (Option C): Low annotating hypodense lesion on the posterior most chamber of the heart (Left Atrium) MC primary Benign cardiac tumor in adults. Aortic aneurysm (Option D): Involve either ascending aorta, thoracic aorta & abdominal aorta Represents localized dilation of the aorta; while an aneurysm may predispose to dissection, an intimal tear specifically indicates dissection. M/C cause for abdominal & thoracic aortic aneurysm: Atherosclerosis {{caption_text}}



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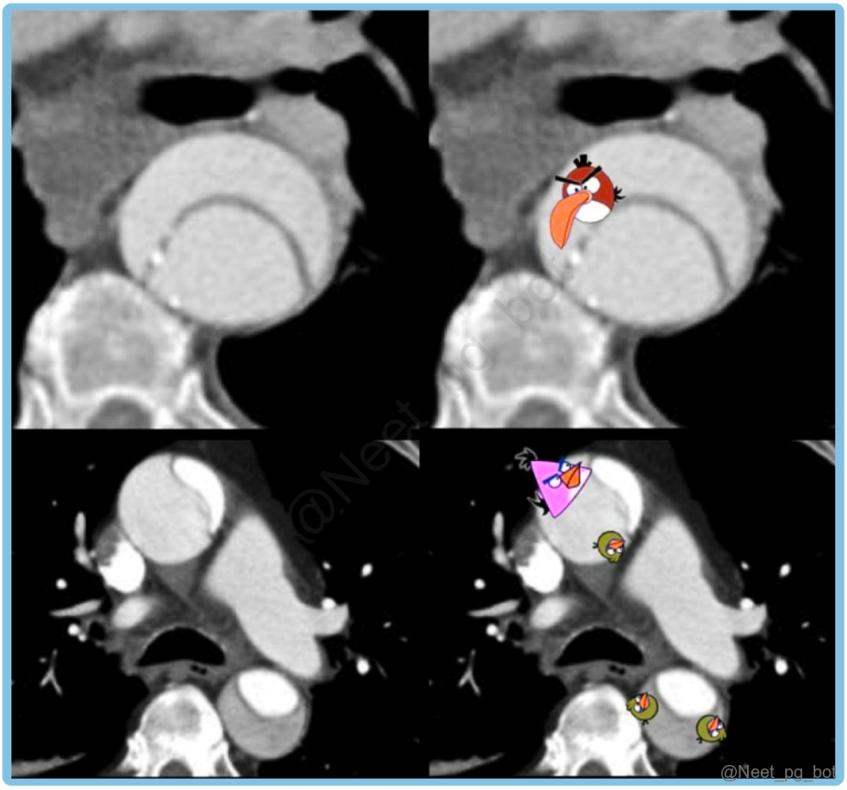


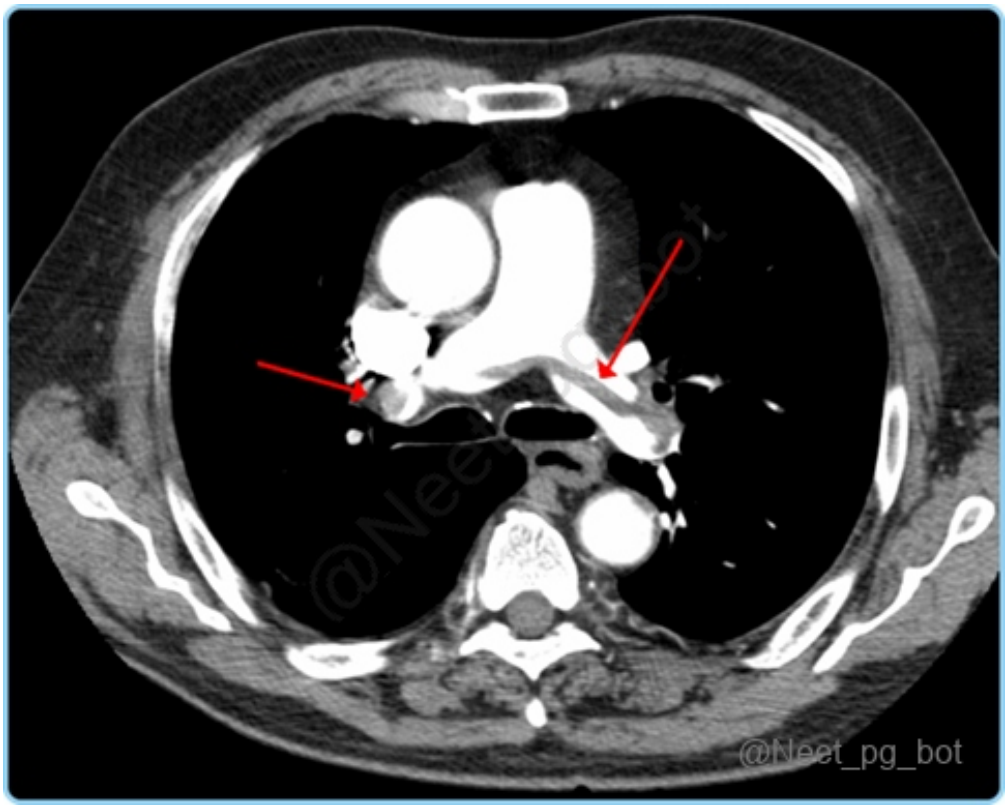
Double lumen

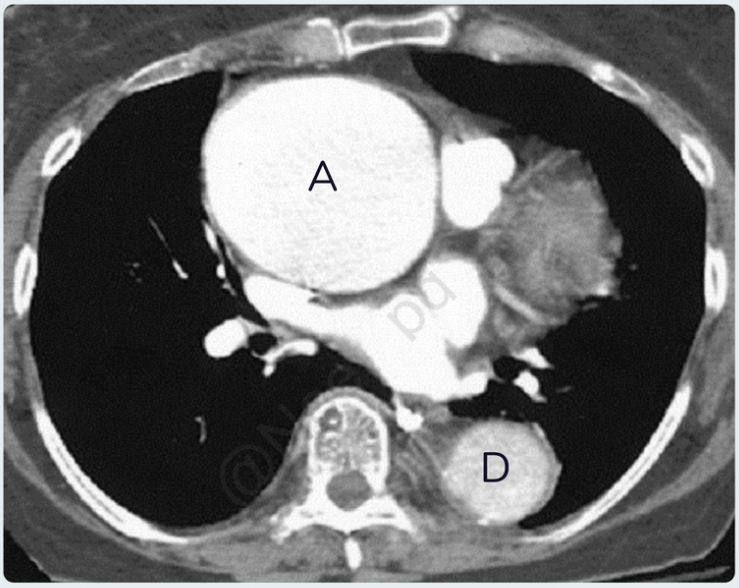
F - False lumen
T- True lumen

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Contrast-enhanced CT scan demonstrating a 7.5 × 8.3 cm ascending thoracic aortic aneurysm. A -indicates ascending; D -descending

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References:

Bailey & Love's Short Practice of Surgery, 28th edition: pg 970, 971

↑ *Back to this question in Part A*

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Q3: A 55 year old male patient presented with complaints of dyspnea with congestive heart failure. The clinician wants to know whether it's HF with preserved EF or reduced EF. Which of the below investigation is used for calculation of ejection fraction? (Q859929)

A. MUGA

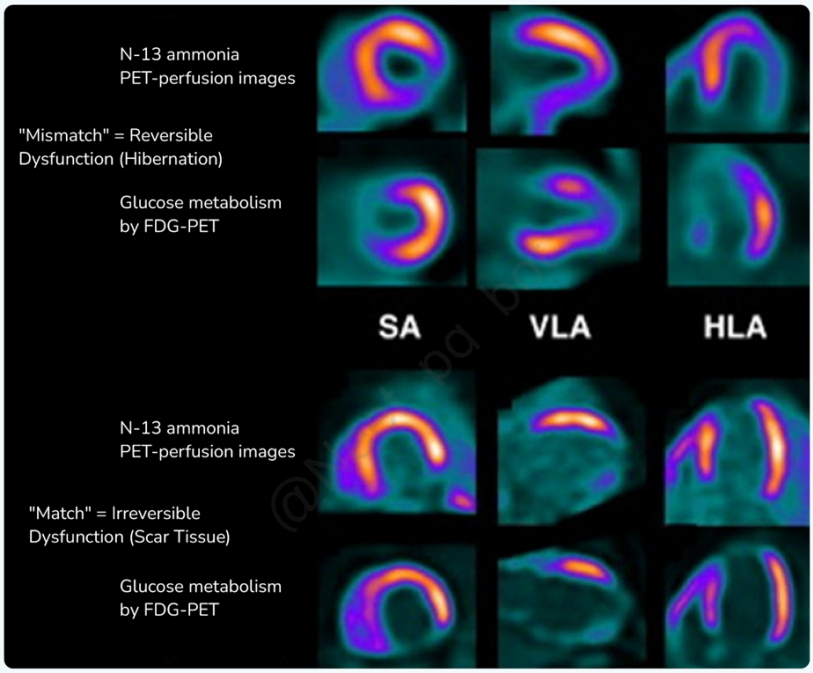
B. SPECT using thallium

C. PET myocardial perfusion imaging

D. Sestamibi scan with pharmacological stress

Correct Answer: A. MUGA

Explanation: Ejection fraction (EF) is a critical parameter for differentiating heart failure with preserved EF (HFpEF) from heart failure with reduced EF (HFrEF). MUGA scan is a non-invasive nuclear imaging test that accurately calculates EF by analyzing the motion of the heart's ventricles using a radioactive tracer and a gamma camera. Purpose Scan types For Myocardial Perfusion Assess ischemia Cold spot: decreased uptake in ischemic areas. Thallium scan (Commonly used) (Option B) Tetrofosmin Sestamibi scan (Option D) For Myocardial Infarction Assess infarct Hot spot in infarct area as pyrophosphate accumulates and is not metabolized. 99m Tc - Pyrophosphate scan. For Ventricular Function Evaluate ejection fraction MUGA (Multiple Gated Acquisition) scan (AKA nuclear ventriculography) Radiolabeled RBCs are used Most accurate for ventricular function - Cardiac MRI For Myocardial Viability Assess the viability of myocardium PETscan - Best investigation for myocardial viability. (Option C) Perfusion and metabolism mismatch are observed in the PET scan. Perfusion Agents :N-13 ammonia and Rubidium chloride. Metabolism Agent : FDG-PET is used for glucose metabolism. No FDG uptake indicates a normal heart or an infarct. FDG uptake is present: In the Ischemic Myocardium FDG-PET is combined with perfusion imaging for comprehensive assessment. Uptake in PET with low perfusion indicates reversible dysfunction (suggestive of hibernation). Irreversible dysfunction indicates the presence of scar tissue . Note: Hibernating myocardium is ischemic but viable. {{caption_text}}



Myocardial viability imaging with PET
Illustration showing a mismatch of resting MBF and glucose metabolism of the inferolateral wall indicating viable myocardium (top). A matched resting perfusion and glucose metabolism defect of the inferior wall, indicating nonviable myocardium is shown in the bottom image

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References:

https://www.ncbi.nlm.nih.gov/books/NBK539772/

https://www.amjmed.com/article/S0002-9343(21)00224-2/pdf

https://www.ncbi.nlm.nih.gov/books/NBK592410/

↑ *Back to this question in Part A*

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• [12_Neuro Radiology] 024 Neuroradiology-I

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[12_Neuro Radiology] 024 Neuroradiology-I — Quick Jump

Q1 (p. 1530)	*Q2 (p. 1533)*	*Q3 (p. 1535)*	*Q4 (p. 1538)*	*Q5 (p. 1541)*	*Q6 (p. 1544)*
Q7 (p. 1546)	*Q8 (p. 1549)*	*Q9 (p. 1553)*	*Q10 (p. 1557)*	*Q11 (p. 1559)*	*Q12 (p. 1564)*
Q13 (p. 1565)	*Q14 (p. 1568)*	*Q15 (p. 1570)*	*Q16 (p. 1573)*	*Q17 (p. 1574)*	*Q18 (p. 1576)*
Q19 (p. 1578)	*Q20 (p. 1579)*	*Q21 (p. 1584)*	*Q22 (p. 1586)*	*Q23 (p. 1589)*	

Q1: A 50-year-old patient is admitted to the ICU after experiencing a cardiac arrest. CT imaging is given below. What is this radiological finding called? (Q853064)

A. Reversal Sign

B. White Cerebellum Sign

C. Pseudo subarachnoid hemorrhage

D. Delta Sign



Correct Answer: B. White Cerebellum Sign

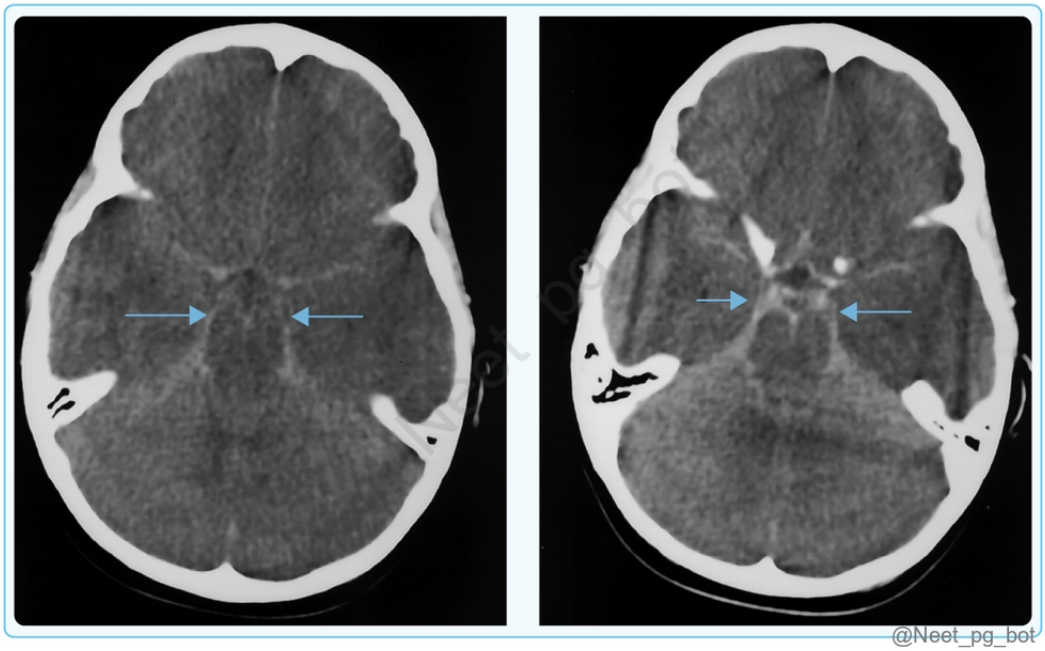
■ *Listen (English)*

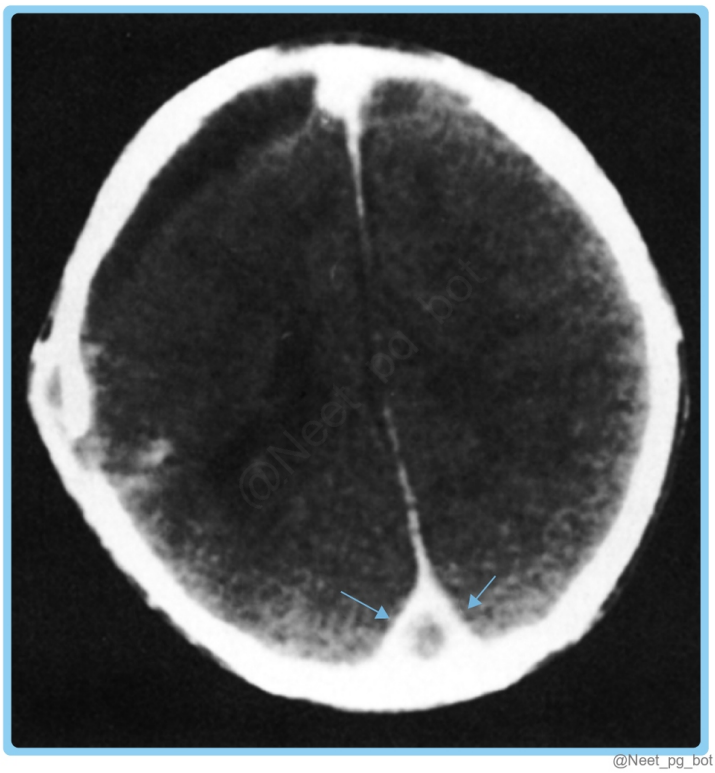
■ *Listen (Hindi)*

Explanation: The CT imaging shows "White Cerebellum Sign" is seen in severe global hypoperfusion where the cerebral hemispheres are diffusely hypoattenuated, but the cerebellum and brainstem remain unaffected, appearing hyperattenuated relative to the cerebral hemispheres. Global cerebral hypoperfusion Epidemiology Older children: drowning and asphyxiation. Adults: cardiac arrest or cerebrovascular disease, leading to secondary hypoxemia or hypoperfusion. Clinical Presentation Patients typically present after an acute event (e.g., near-drowning, asphyxia, cardiac/respiratory arrest). Pathology Severe global hypoxic-ischemic injury Grey matter is particularly vulnerable to injury because of its high metabolic demands for oxygen and glucose, along with its abundance of postsynaptic glutamate receptors, which make it more prone to excitotoxicity from excessive glutamate stimulation. Radiological findings Diffuse edema with effacement of CSF-containing spaces Reversal Sign : (Option A ruled out) Involves the reversal of normal CT attenuation between grey and white matter. Linked to distension of deep medullary veins due to partial venous outflow obstruction from elevated intracranial pressure. White matter appears of higher attenuation than grey matter. White Cerebellum Sign (Option B): Seen with diffuse edema and hypoattenuation of cerebral hemispheres , sparing the cerebellum and brainstem. Makes the cerebellum and brainstem appear hyperattenuated relative to cerebral hemispheres. Pseudo subarachnoid hemorrhage (Option C) : caused by cerebral edema, reduced parenchymal attenuation, swelling, and engorged superficial venous structures, leading to the subarachnoid space appearing hyperdense, mimicking a hemorrhage. Both the reversal sign and the white cerebellum sign are associated with severe brain injury and poor neurological outcomes. Pseudo-SAH (Option C): In Pseudo subarachnoid hemorrhage , you see hyperdensity in basal cisterns mimicking SAH , which is not prominent here . Delta Sign (Option D) is associated with certain types of intracranial hemorrhage and does not apply to the diffuse hypoattenuation of the cerebral hemispheres in this patient.




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References:

https://radiopaedia.org/articles/hypoxic-ischemic-encephalopathy-adults-and-children-1?lang=us

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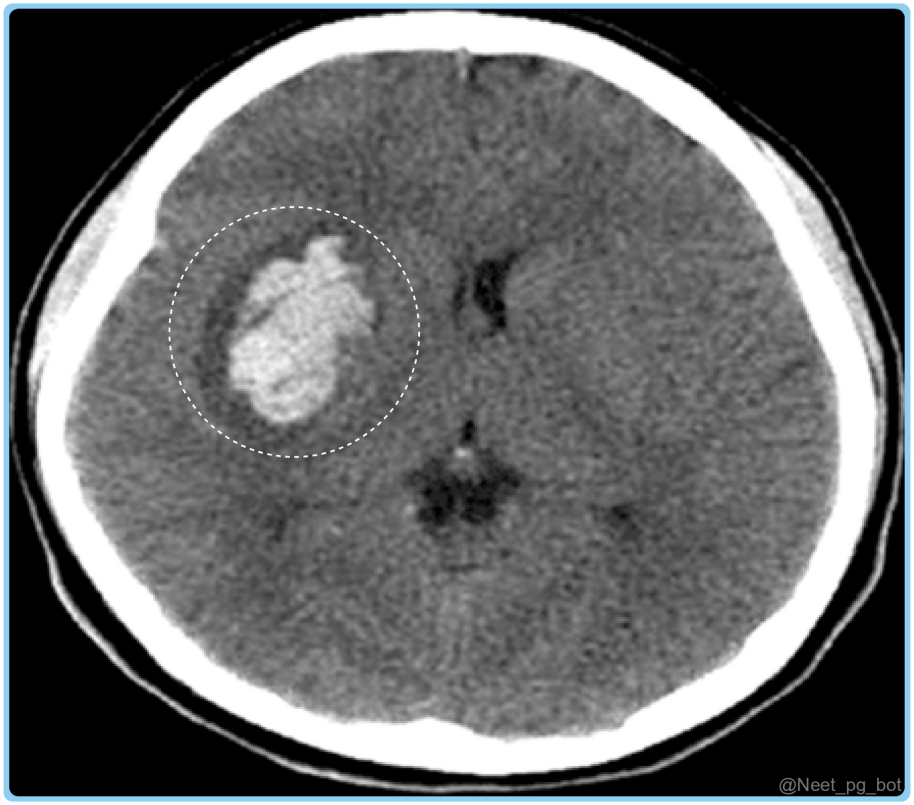
Q2: A 65-year-old male patient with a history of hypertension presents with a sudden onset of severe headache, vomiting, and right-sided weakness. Additionally, he exhibits altered sensorimotor integration and difficulty with voluntary movement control. His blood pressure is recorded at 190/110 mmHg. A CT scan of the head is performed with findings given below Based on the findings, Which artery is most likely involved in this case? (Q852981)

A. Anterior choroidal artery

B. Lenticulostriate artery

C. Posterior cerebral artery

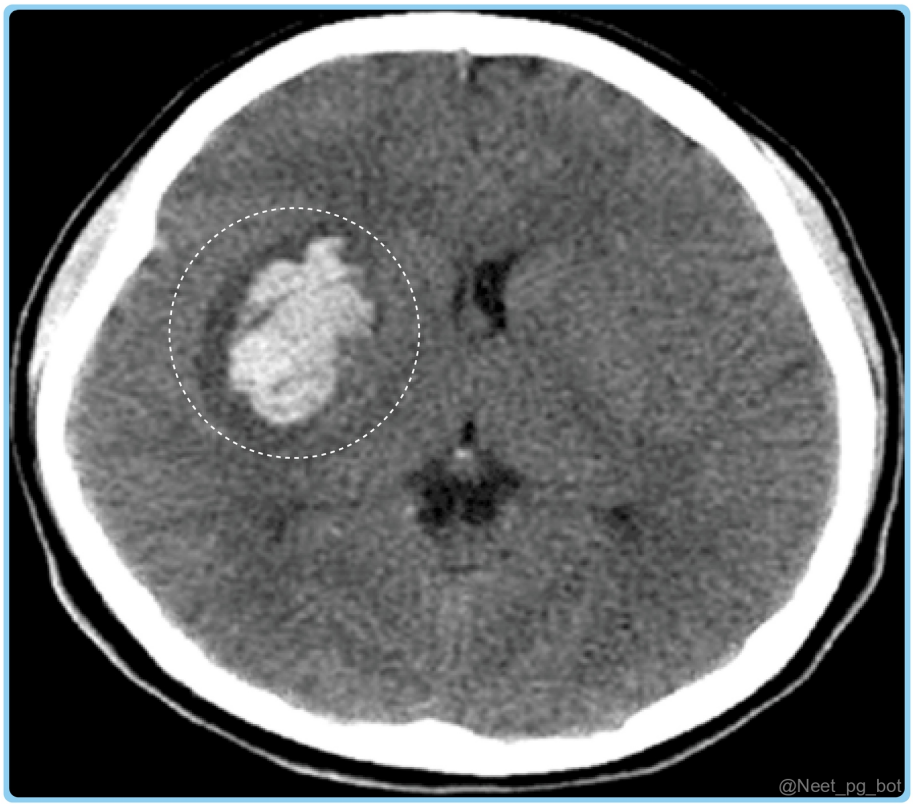
D. Middle meningeal artery



Correct Answer: B. Lenticulostriate artery

- *Listen (English)*
- *Listen (Hindi)*

Explanation: The lenticulostriate arteries, which are small perforating arteries that branch off the middle cerebral artery, are frequently involved in hypertensive hemorrhages. These arteries supply deep brain structures, including the basal ganglia and internal capsule, which are critical for motor control. The patient's presentation of right-sided weakness and difficulties with voluntary movement control aligns with the involvement of these areas, making the lenticulostriate artery the most likely vessel affected. Intraparenchymal Hemorrhage Intraparenchymal hemorrhage (IPH) refers to bleeding that occurs within the brain parenchyma. Imaging Findings: On NCCT, intraparenchymal hemorrhage appears as a hyperdense lesion. The hemorrhage can typically be localized in regions such as the basal ganglia, particularly in the putamen and the internal capsule , which are critical for motor control and other functions. Etiology: Hypertension : Chronic high blood pressure is a primary risk factor, often causing small Bouchard aneurysms in the lenticulostriate arteries that supply the basal ganglia. Trauma Common Sites of Hemorrhage: The most frequent site of intraparenchymal hemorrhage is the putamen , part of the basal ganglia, although other areas like the thalamus and the internal capsule may also be affected. Anterior choroidal artery (Option A): This artery supplies some deep brain structures but is not typically associated with hypertensive hemorrhages. Hemorrhages from this artery would more likely affect areas like the internal capsule, causing motor deficits but less commonly involve the deep structures described. Posterior cerebral artery (OptionC): This artery primarily supplies the occipital lobe, and its involvement typically causes visual deficits rather than motor weakness or hemorrhage in the deep brain regions described. Middle meningeal artery (Option D): While this artery supplies the dura mater and can be involved in epidural hematomas.



References:

Grainger & Allison's Diagnostic Radiology, 7th Edition, Page 26

Fred A. Mettler Essentials of Radiology, 4th Edition, Page 21,22

www.ncbi.nlm.nih.gov/books/NBK470242/

↑ *Back to this question in Part A*

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Q3: A 65-year-old patient presents with bilateral thalamic and basal ganglia symptoms, including motor weakness and sensory disturbances. MRI reveals bilateral infarcts in these regions. Which type of venous thrombosis is most likely responsible for these findings? (Q853057)

A. Superior sagittal sinus thrombosis

B. Internal cerebral vein thrombosis

C. Lateral venous sinus thrombosis

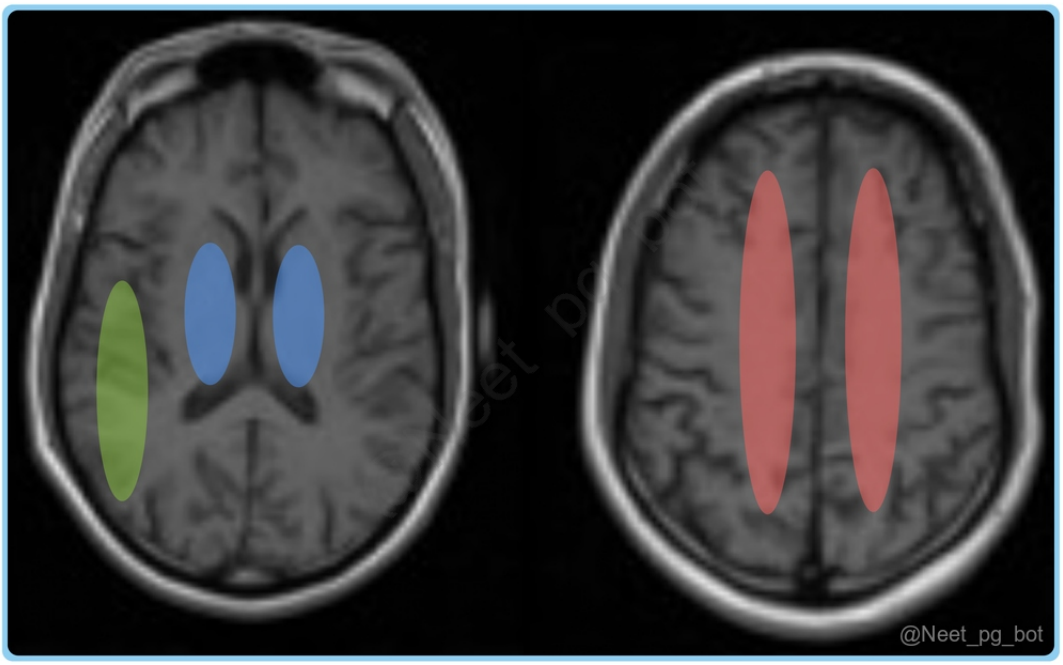
D. Vein of Labbe thrombosis

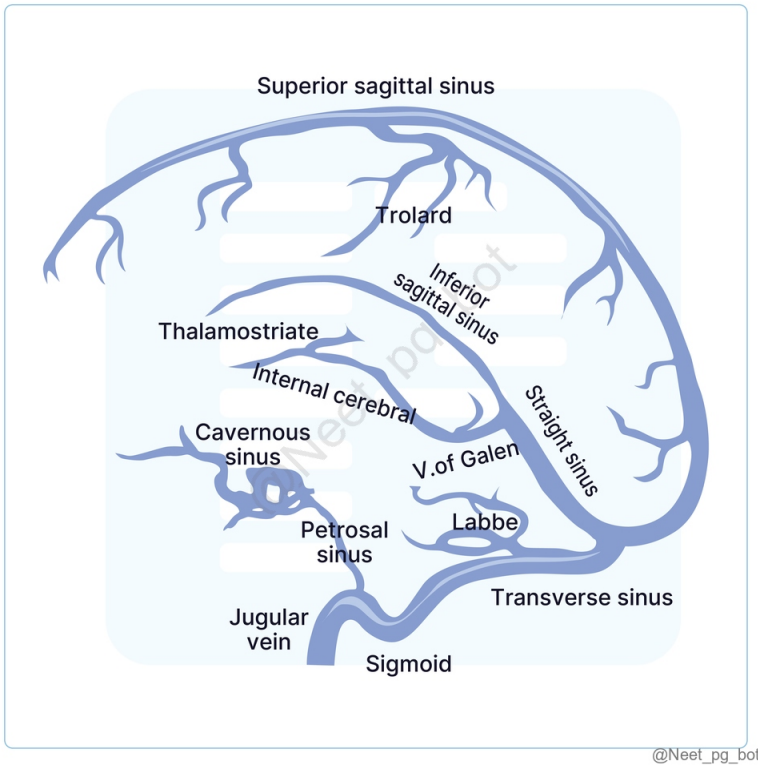
Correct Answer: B. Internal cerebral vein thrombosis

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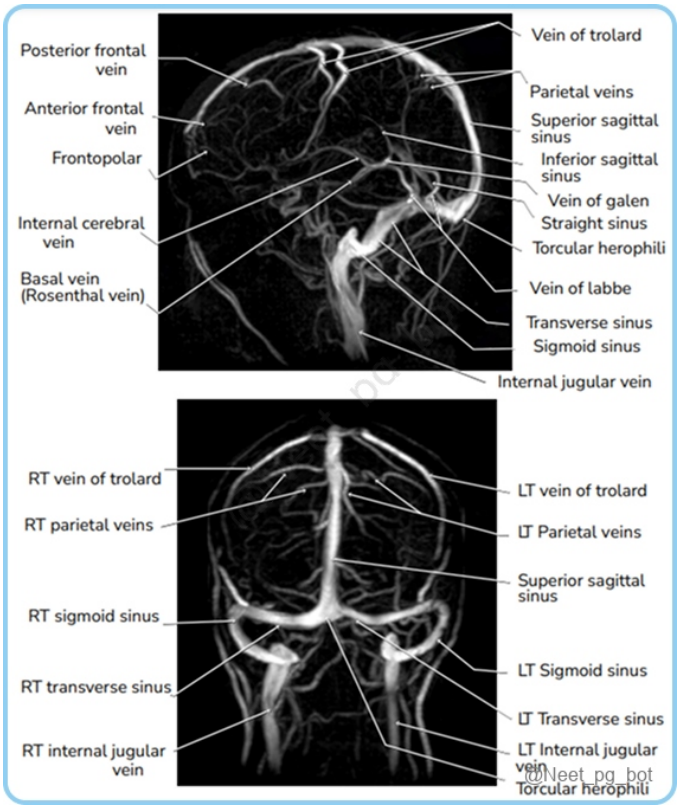
■ *Listen (Hindi)*

Explanation: Internal cerebral veins drain the thalamus and basal ganglia . Thrombosis here can lead to bilateral infarcts in these regions, resulting in the motor and sensory symptoms observed in the patient. Venous Infarction territories Key distribution patterns: B/L Thalamic and basal ganglia involvement in internal cerebral vein/straight sinus thrombosis. (Option B) Affected posterolateral temporal lobe and inferior parietal lobule in the vein of Labbé /lateral venous sinus thrombosis. (Option C & D) B/L asymmetric cortical and subcortical lesions in superior sagittal sinus occlusion. (Option A) Venous Anatomy Cerebral veins are categorized into external (superficial) and internal veins, draining the outer and inner regions of the cerebral hemisphere. External Cerebral Veins Superior Cerebral Veins : Typically 8 to 12 in number, these veins drain the upper parts of the hemisphere, entering the superior sagittal sinus after piercing the arachnoid mater. Middle Cerebral Veins : Comprising four veins (two superficial and two deep), these veins drain the lateral sulcus, connecting to the cavernous sinus, superior sagittal sinus (Trolard) , and transverse sinus (Labbe) . The deep veins merge with the anterior cerebral vein to form the basal vein . Inferior Cerebral Veins : Numerous smaller veins that drain the inferior surfaces of the hemisphere into nearby dural venous sinuses. Additional Veins Anterior Cerebral Vein : Drains parts of the medial surface alongside the anterior cerebral artery. Basal Vein (of Rosenthal) : Formed by the anterior cerebral, deep middle cerebral, and striate veins, this vein runs around the midbrain and drains into the great cerebral vein (of Galen), receiving tributaries from various brain structures. Internal Cerebral Veins Located on either side of the midline in the tela choroidea of the 3rd ventricle. Formed at the interventricular foramen (of Monro) by the thalamostriate, septal, and choroidal veins. Drain specific brain regions: Thalamostriate (thalamus and basal ganglia) Septal (septum pellucidum) Choroidal (choroid plexus). Unite beneath the splenium of the corpus callosum to form the great cerebral vein . Great Cerebral Vein of Galen A single vein (about 2 cm long) formed by the internal cerebral veins. Receives basal veins and joins the inferior sagittal sinu s to form the straight sinus . Tributaries include: Internal cerebral veins Basal veins Veins from the colliculi (tectum of the midbrain) Veins from the cerebellum and adjacent occipital lobes





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References:

Grainger & Allison’s Diagnostic Radiology 7th Edition Page no: 1465.

Vishram Singh Textbook of Anatomy vol.3 2nd edition Page no: 409, 410

↑ *Back to this question in Part A*

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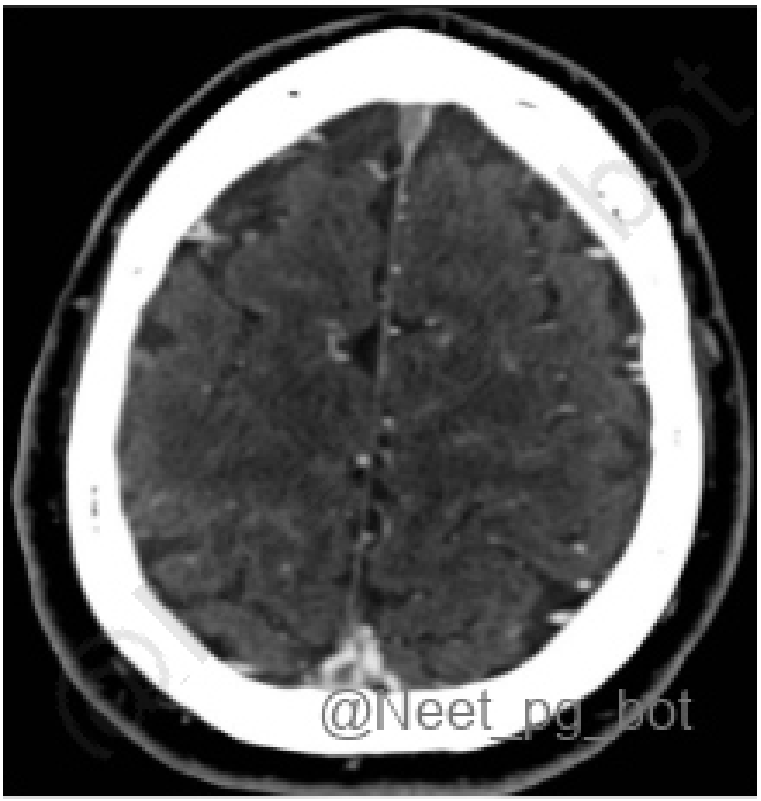
Q4: A 28-year-old woman presents with a severe headache that started 2 days ago. She reports associated symptoms of nausea, vomiting, and a few episodes of seizure. A history of recent oral contraceptive use is present. On examination, she has a mild altered mental status but no focal deficits. A CECT is given below. What specific sign on CT is characteristic of this diagnosis? (Q853055)

A. Empty delta sign

B. Empty theca sign

C. Empty sella sign

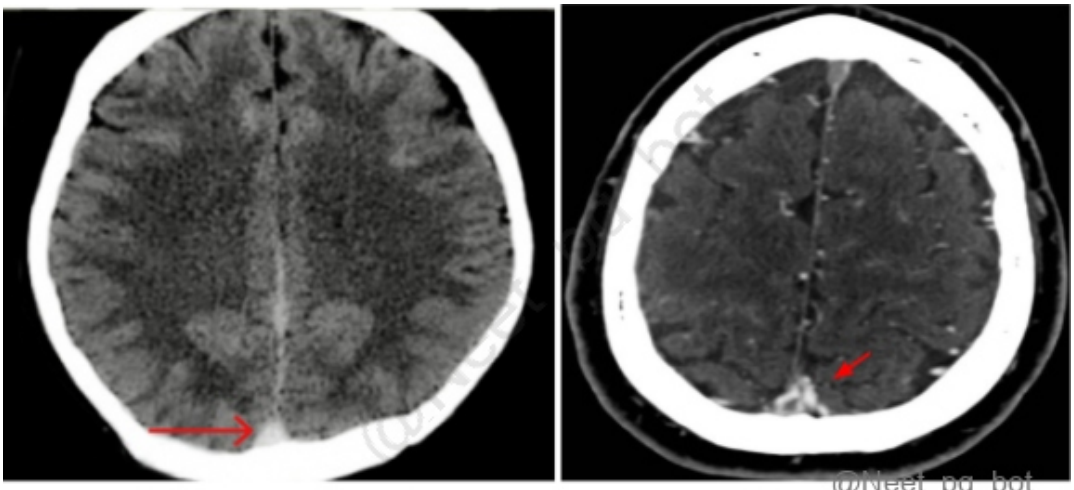
D. Dense vein sign

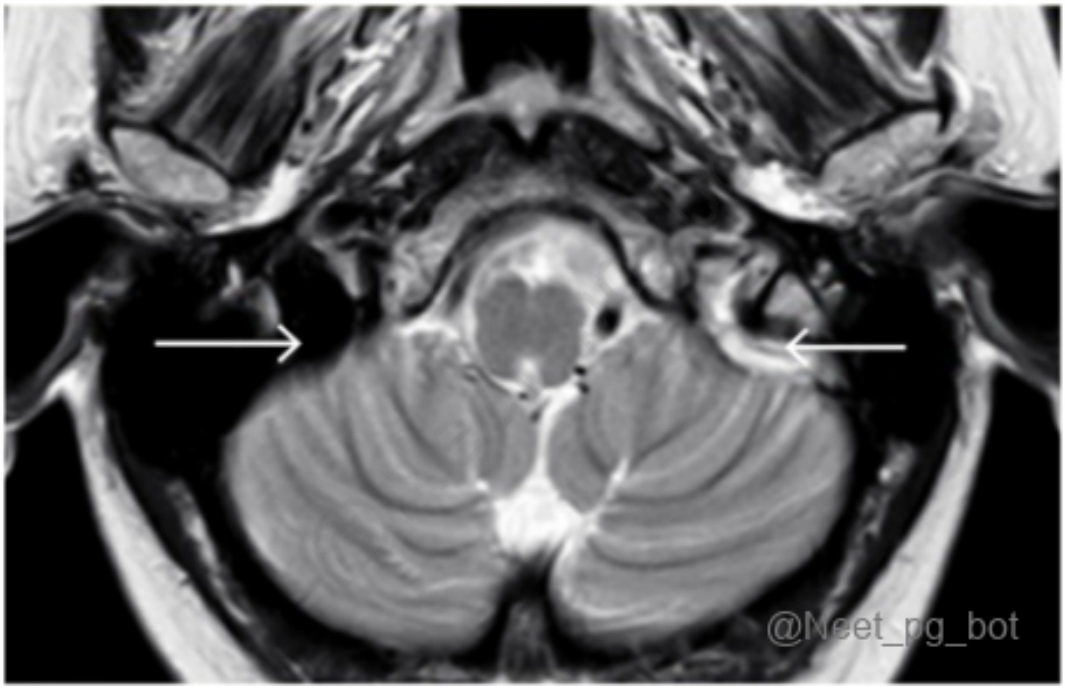


Correct Answer: A. Empty delta sign

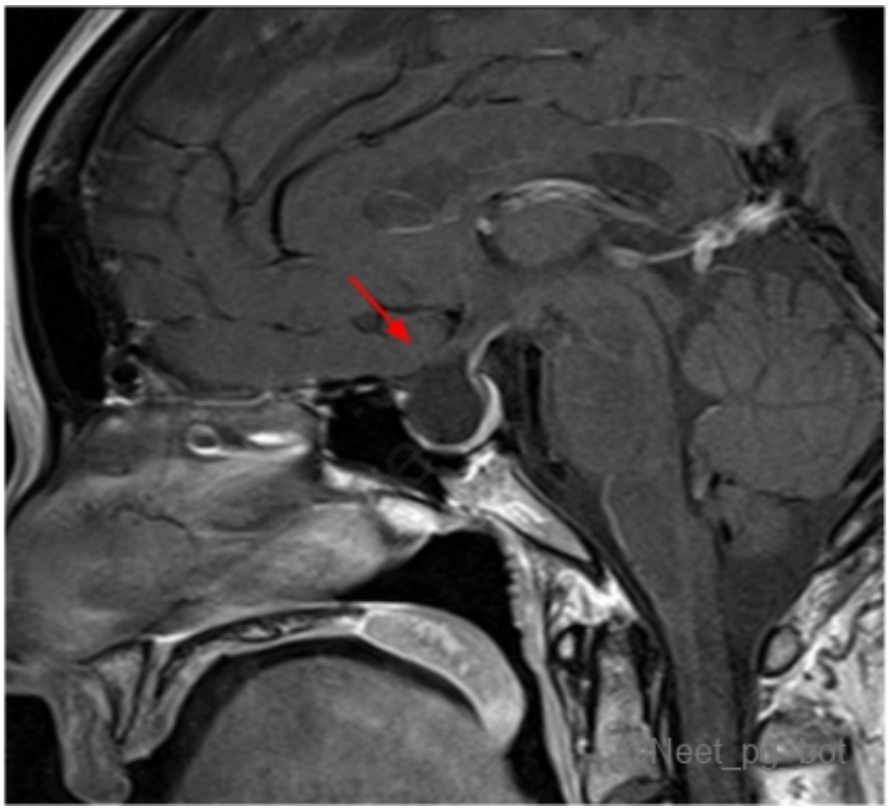
Listen to Audio 1

Explanation: The CECT shows the empty delta sign which is a characteristic finding on CECT that indicates dural venous sinus thrombosis , particularly in the superior sagittal sinus . It appears as a triangular or crescent-shaped filling defect surrounded by contrast , representing the thrombus. This finding aligns well with the clinical suspicion of CVT in this patient, given her symptoms and risk factors (H/o contraception). Central venous sinus thrombosis CVT should be suspected in patients presenting with headaches, seizures, or encephalopathy. Can occur in superficial or deep dural venous sinuses, affecting either isolated veins or as part of broader venous sinus thrombosis. Factors like intracranial infections , trauma, dehydration, pregnancy , oral contraceptives , smoking, and vasculitis (e.g., Behçet disease) can trigger CVT. If absent, a thrombophilia screening is necessary. CT Findings : The empty delta sign , visible in contrast-enhanced CT scans, indicates dural venous sinus thrombosis in the superior sagittal sinus as a triangular filling defect outlined by contrast, representing a thrombus. (Option A) It occurs due to: Recanalization around an organizing clot Enlargement of the peridural small veins: a vascular mesh (dural cavernous spaces), and meningeal venous tributaries Thickening of the dura with increased enhancement D/D: lBifurcated superior sagittal sinus draining directly into each transverse sinus without forming the torcular Herophili The dense vein sign , a hyperdense vessel sign indicating hyperattenuating thrombus due to acute venous thrombosis, is found in cortical veins or dural venous sinuses . (Option D) MRI Findings : Loss of normal flow void; thrombosed vessels may appear hyperintense on T1 and T2 sequences. Very acute thrombus can be hypointense on T2, mimicking flow voids. Additionally, slow flow can also result in loss of the flow void. MR venography (MRV) shows a loss of flow signal or irregularity, indicating a thrombus. SWI (Susceptibility Weighted Imaging) can highlight thrombosed veins and detect acute hemorrhage. Empty theca sign (Option B) Empty sella sign (Option C) The empty thecal sac sign occurs when the thecal sac appears empty on lumbar spine MRI, particularly on T2-weighted images. It is seen in Adhesive arachnoiditis . It occurs when the pituitary gland is shrunken or absent, with CSF filling the sella turcica. Seen in idiopathic intracranial hypertension & Sheehan's syndrome




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References:

Grainger & Allison’s Diagnostic Radiology 7th Edition Page no.1464

https://radiopaedia.org/articles/dense-vein-sign

https://radiopaedia.org/articles/empty-delta-sign-dural-venous-sinus-thrombosi

https://radiopaedia.org/articles/empty-thecal-sac-sign

↑ *Back to this question in Part A*

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Q5: A 65-year-old male presents to the emergency department with sudden onset of right-sided weakness and difficulty speaking. The physician suspects a lacunar infarct. Which of the following radiologic features is typically seen in a lacunar infarct? (Q852989)

A. Bright signal on T1-weighted MRI

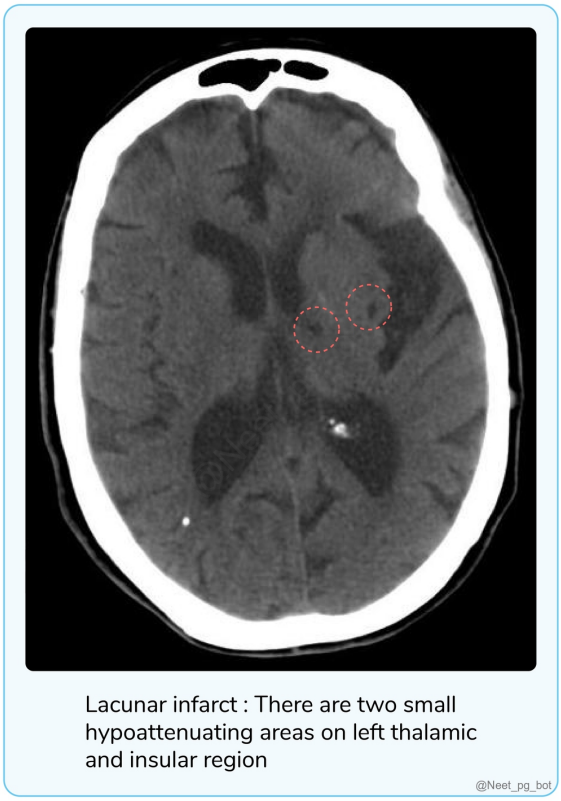
B. CT can detect infarcts as small as 0.2 mm

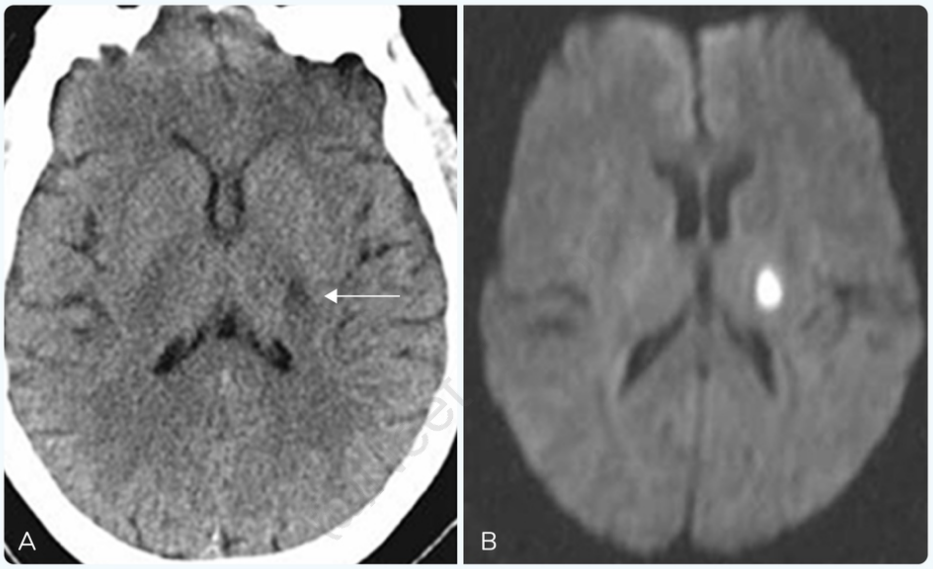
C. Hypointense signal on DWI with restricted diffusion

D. Ill-defined hypodensity on non-contrast CT scan

Correct Answer: D. Ill-defined hypodensity on non-contrast CT scan

Explanation: Lacunar infarcts often appear as ill-defined hypodensities on non-contrast CT scans , especially in the acute phase, although they may not be easily visible in the first 24 hours. Lacunar Infarct: Small strokes (<15 mm) located in non-cortical areas. Caused by occlusion of small, deep penetrating branches from cerebral vessels (Circle of Willis), including: Middle cerebral artery (MCA) Anterior cerebral artery (ACA) Posterior cerebral artery (PCA) Basilar artery Most commonly affected: Basal ganglia, thalami, corona radiata and pons. May demonstrate central encephalomalacia with attenuation/signal equal to that of CSF. Radiological Imaging: Computed Tomography (CT): CT scans often miss lacunar ischemic infarcts within the first 24 hours. If visible, lacunar strokes appear as ill-defined hypodensities unless there is a hemorrhagic component. Early signs of infarction on CT: Loss of gray-white differentiation Focal hypoattenuation in brain parenchyma CT Angiogram: Filling defects consistent with thrombus blocking a specified vessel Arterial narrowing or chronic vessel disease Atheroma features in the middle cerebral artery CT Perfusion Studies: Demonstrate infarcted core (irreversible ischemia) and penumbra (reversible ischemia). Magnetic Resonance Imaging (MRI): Superior for detecting lacunar infarctions in acute and subacute settings. MRI Diffusion-Weighted Imaging (DWI) has high sensitivity: Restricted diffusion (Option C ruled out) Positive within 30 minutes of stroke onset Remain positive for about 7 days T1-weighted images: show lacunes as focal areas of decreased signal intensity. (Option A ruled out) T2-weighted images: show lacunes as hyperintense. MRI can detect lesions as small as 0.2 mm, which CT cannot. (Option B ruled out) Advances in high-resolution MRI can image cerebral perforating arteries and assess their velocity and pulsatility index.



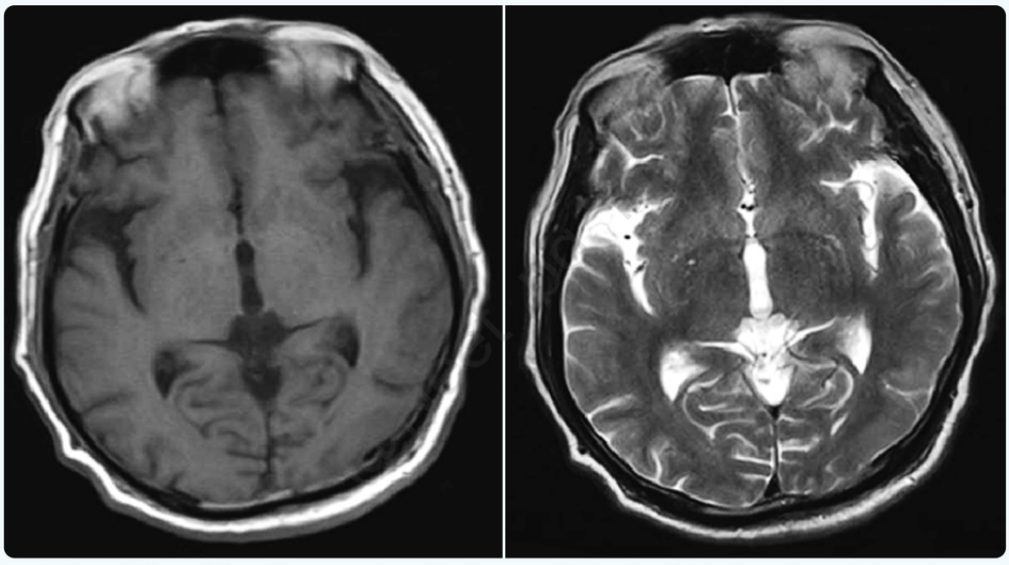


Acute lacunar infarct

A. Axial unenhanced CT image demonstrates an ovoid area of hypo density centered in the posterior limb of the left internal capsule.

B. A corresponding DWI image demonstrates high-signal intensity, reflecting restricted diffusion in an acute lacunar infarct

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T1 and T2 weighted images showing lacunar infarction in the basal ganglia region

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References:

David Sutton Textbook of Radiology and Imaging, Volume 1, 8th Edition, Page: 2025

↑ *Back to this question in Part A*

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Q6: A 75-year-old female with a history of stroke presents for follow-up imaging 6 months after an acute right middle cerebral artery (MCA) infarct. CT head is taken and is shown below. Which of the following imaging findings is most characteristic in this case? (Q852988)

A. T2 hypointensity in the ipsilateral corticospinal tract

B. High signal intensity on DWI and low signal on ADC

C. Enlarged sulci and ventricles with CSF-like signal intensity

D. Ipsilateral cerebellar volume loss due to large MCA infarcts



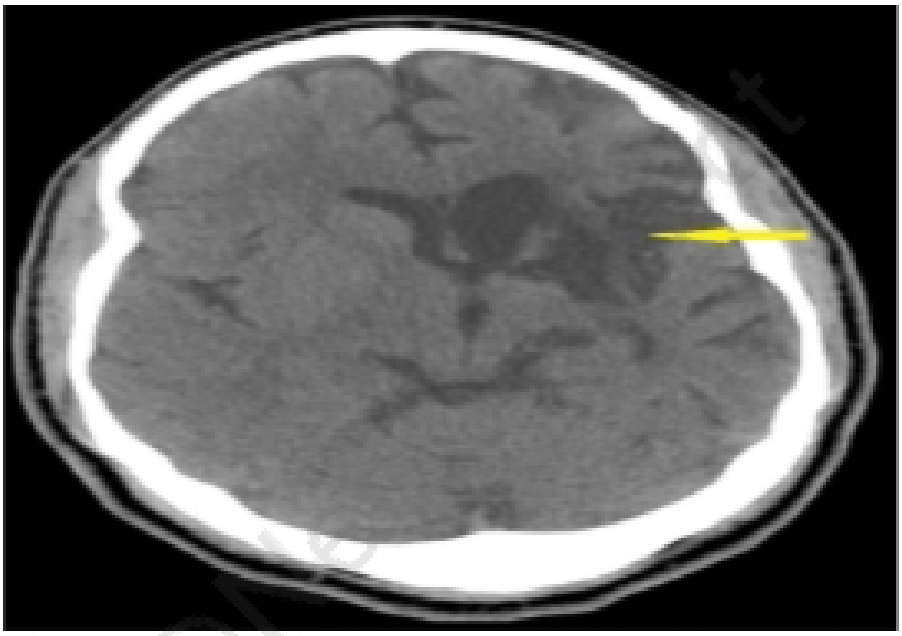
Correct Answer: C. Enlarged sulci and ventricles with CSF-like signal intensity

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: CT scan shows chronic infarcts in the right capsulo-ganglionic region and corona radiata, along with chronic lacunar infarcts in the right thalamus. Enlarged sulci and ventricles with CSF-like signal intensity are characteristic findings of chronic infarct. Chronic Infarct Radiological Imaging: Development of encephalomalacia and volume loss, causing enlargement of adjacent sulci and ventricles. CT and MRI: signal intensity approaches that of cerebrospinal fluid (CSF). Rarely, cystic encephalomalacia can occur, sometimes with

paradoxical mass effect (more common in children). Wallerian degeneration: may be visible as T2 hyperintensity in the ipsilateral corticospinal tract with asymmetrical brainstem atrophy. (Option A ruled out) Contralateral cerebellar volume loss can occur with large middle cerebellar artery infarcts. (Option D ruled out) Dystrophic Calcification: Rarely occurs in the late phase of chronic infarction. DWI and ADC Changes: DWI and ADC signal normalization occurs within 5 to 10 days (“pseudonormalization”), which can mask small infarcts. Larger infarcts remain visible on structural images. Prolonged diffusion restriction in small white matter infarcts may persist for weeks. Mature infarcts later exhibit "free diffusion" (low signal on DWI, bright on ADC map) due to loss of structural integrity. (Option B ruled out) T2 Shine-Through Effect: In mature infarcts, tissue with long T2 relaxation times (hyperintense on T2) can appear bright on DWI due to the "T2 shine-through" effect. This can be differentiated from acute infarcts as the ADC map will also be hyperintense.



CT head showing chronic infarction of the left basal ganglia/corona radiata and the insula and frontal opercular region

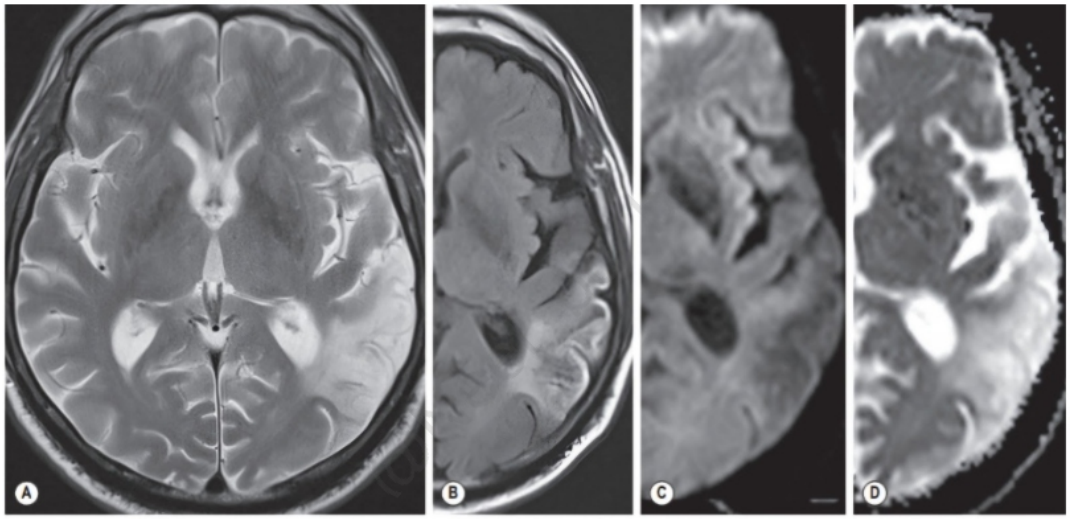


Fig. 56.19 Magnetic resonance imaging of a patient 6 months after a left middle cerebral artery territory infarct reveals marked T_2 hyperintensity on T_2 weighted imaging (A)—which nulls centrally on fluid-attenuated inversion recovery (B)—and free diffusion on diffusion-weighted imaging (DWI) (hypointensity on DWI [C] and hyperintensity on apparent diffusion coefficient [D]). This is associated with local volume loss.

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References:

Grainger & Allison's Diagnostic Radiology, 7th Edition, Pages 1456,1457

↑ *Back to this question in Part A*

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Q7: A 64-year-old male presents with left-sided weakness and speech difficulty for 8 hours. NCCT shows no hemorrhage, and CTAngiography reveals a proximal MCA occlusion. DWI shows a large infarct volume (>70 ml). According to the Massachusetts General Hospital (MGH) Acute Stroke Imaging Algorithm, what is the most appropriate next step for this patient? (Q852987)

A. Proceed with intra-arterial thrombectomy (IAT)

B. Continue with tPA infusion and monitor

C. Consider perfusion imaging with CT or MRI

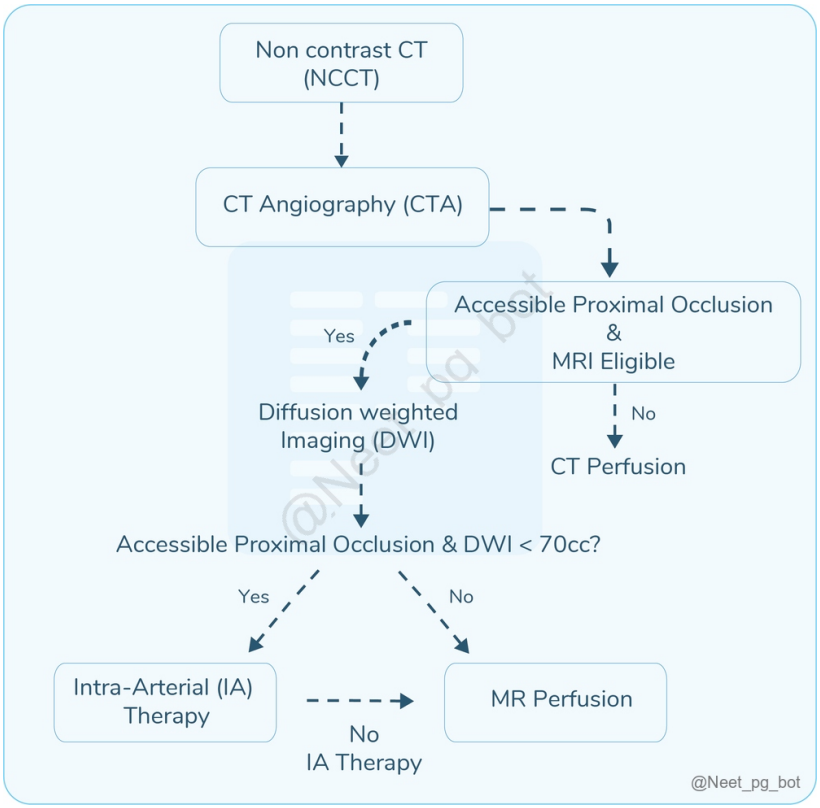
D. Administer aspirin and start rehabilitation

Correct Answer: C. Consider perfusion imaging with CT or MRI

■ *Listen (English)*

■ *Listen (Hindi)*

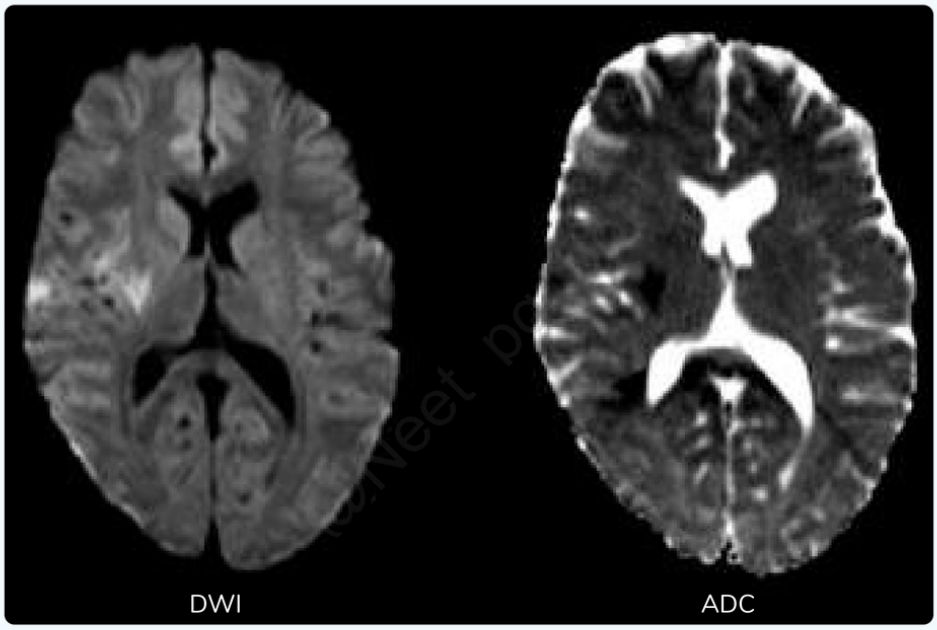
Explanation: According to the MGH Acute Stroke Imaging Algorithm , if the DWI lesion is large (>70 ml), perfusion imaging with CT or MRI may be considered. Massachusetts General Hospital (MGH) Acute Stroke Imaging Algorithm: Acute Ischemic Stroke: Stroke is an acute episode of focal neurological dysfunction that persists for more than 24 hours. Radiological Findings CT Scan Investigation of choice. Characterized by cytotoxic edema, leading to significant but subtle changes in imaging. This condition represents intracellular edema, which causes: Loss of gray matter/white matter differentiation. Effacement of cortical sulci. Early ischemic lesion hypodensity on CT is the hallmark of acute brain infarction, indicating irreversible tissue damage and continual net water uptake. Wedge shaped acute infarct. A thrombus in the proximal middle cerebral artery (MCA) may be visible during the acute phase. The thrombus appears as hyperattenuation on the CT scan. Objectives of Non-Enhanced Cranial CT in Acute Stroke: Exclude hemorrhage to allow aspirin therapy. Exclude alternative causes of neurological deficit. Assess infarct volume and calculate ASPECTS (Alberta Stroke Program Early CT Score). Detecting a hyperdense vessel. Confirm infarct matches the clinical timeline and is not subacute. Diffusion-Weighted Imaging (DWI) Has high sensitivity and specificity, detecting parenchymal hyperintensity as early as 5 minutes after infarction onset. Determines area of penumbra. DWI must be interpreted with an apparent diffusion coefficient (ADC) map. Restricted diffusion in acute infarct appears bright on DWI and dark on the ADC map. In rare cases, DWI-positive areas may not progress to infarction after early recanalization treatments (IV agents or mechanical thrombectomy).





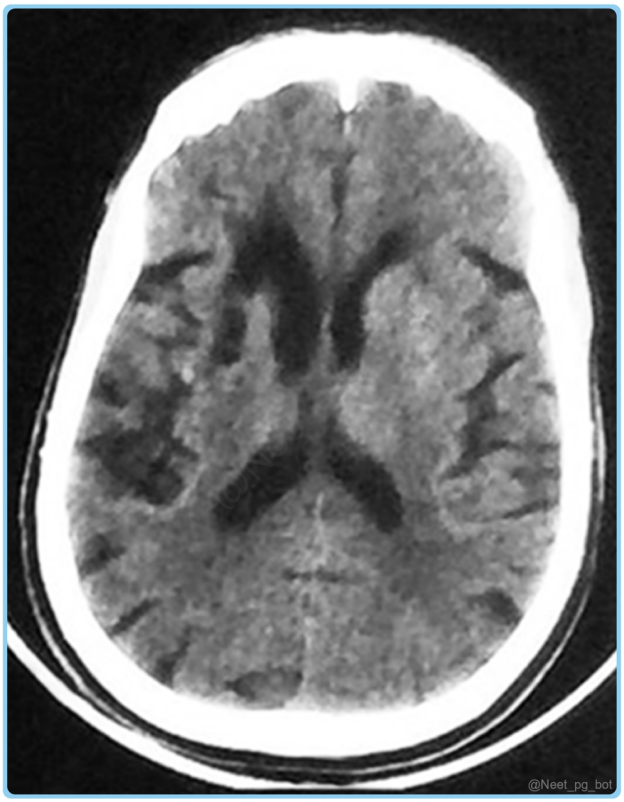
NCCT demonstrating a wedge-shaped hypodense ischemic lesion involving gray -white matter of frontal and insular region of the right cerebral hemisphere (white arrow)

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DWI and ADC Showing an established infarction in the right basal ganglia

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References:

Grainger & Allison's Diagnostic Radiology, 7th Edition, Page: 1444,1449

https://pubmed.ncbi.nlm.nih.gov/23493340/

https://pubmed.ncbi.nlm.nih.gov/34261783/

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3088377/

https://www.researchgate.net/figure/CT-head-revealed-a-wedge-shaped-acute-infarct-in-right-middle-cerebral-artery-territory_fig1_41511203

↑ *Back to this question in Part A*

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Q8: A 65-year-old male with hypertension and atrial fibrillation presents with sudden right-sided weakness and speech difficulty, starting 1 hour ago. A non-contrast CT scan is performed and is shown below. Which of the following signs is marked (arrow) in this case? (Q852986)

A. Sylvian fissure dot sign

B. Disappearing basal ganglia sign

C. Hyperdense basilar artery sign

D. Hyperdense middle cerebral artery (MCA) sign



Correct Answer: C. Hyperdense basilar artery sign

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: Hyperdense basilar artery sign indicates the presence of an acute thrombus in the basilar artery. It is an early finding on a non-contrast CT scan in cases of posterior circulation stroke. Hyperacute Ischemic Stroke: Patients who present within 6 hours of stroke onset fall into this category. Radiologic Findings: Top of basilar syndrome: Basilar artery may also appear dense in posterior circulation infarcts . Dense Artery Sign: (Option D) Earliest detectable sign on CT, caused by a fresh thrombus occluding the vessel. Can be seen at the onset of stroke (ictus). May rapidly disappear if the thrombus disperses. Correlates with large infarcts and poor outcomes when found in the proximal MCA or terminal ICA. Sylvian fissure dot sign (Option A): better prognosis if limited to an MCA branch within the Sylvian fissure. Early Parenchymal Signs: reduced gray matter density and brain swelling manifesting as sulcal effacement. In early MCA infarcts, reduced clarity of the lentiform nucleus and cortex, particularly in the insula, is observed. Disappearing basal ganglia sign (Option B) : Early indicator of middle cerebral artery (MCA) infarction, characterized by the loss of delineation of the basal ganglia due to blurring of the gray-white matter interface. Hypodensity in more than 50% of the MCA territory is associated with high mortality. IV thrombolysis is contraindicated when more than one-third of the MCA territory is involved.



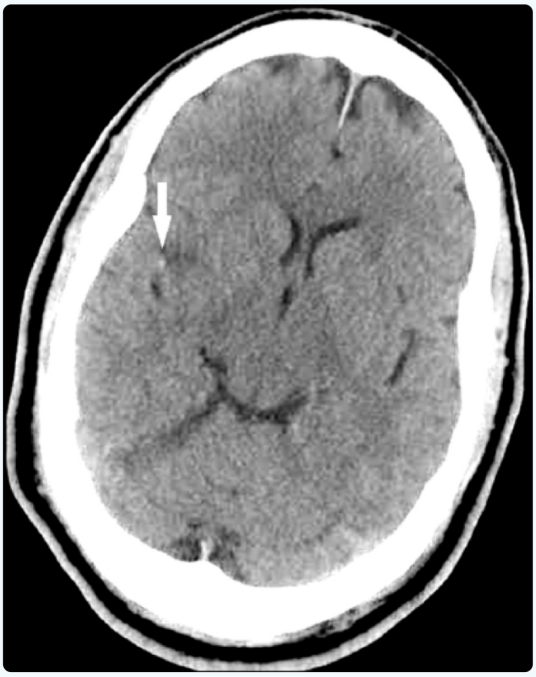
Hyperdense basilar artery (arrow)

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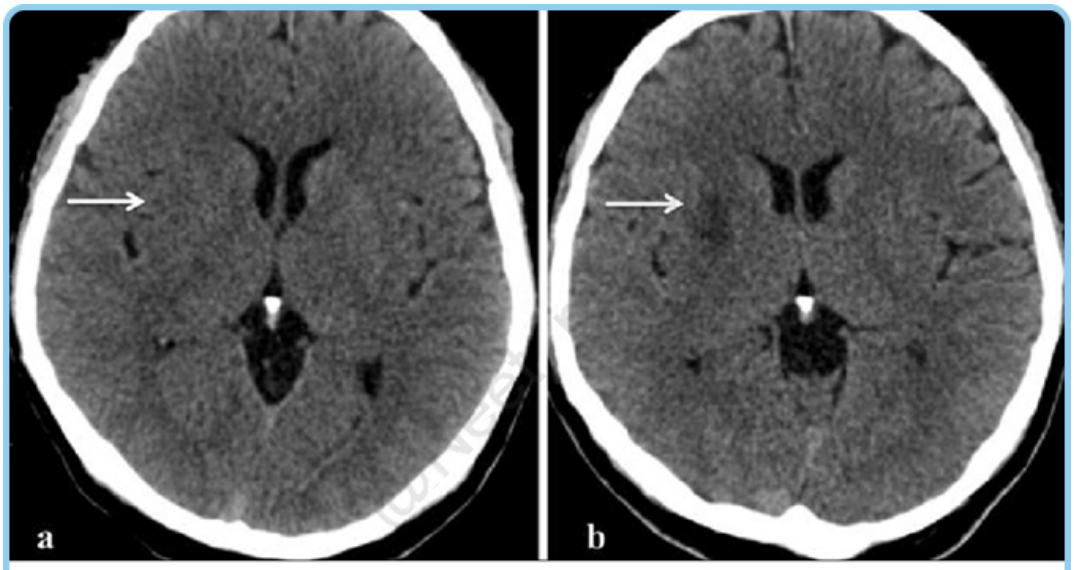
CT of the head revealed a hyper-dense sign in the right middle cerebral artery M1 segment

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Non-contrast head CT, axial plane, 5 mm thickness, showing hyperdense MCA “dot” sign in the right Sylvian fissure (arrow)

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Loss of basal ganglia (lentiform nucleus) sign. (a) Initial NCCT done 2 hours after clinical presentation showed loss of right basal ganglia outline (arrow). Compare with normal-outlined left basal ganglia. (b) Repeat NCCT scan one day later showed more conspicuous hypodensity at the right basal ganglia region.

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References:

Grainger & Allison’s Diagnostic Radiology, 7th Edition, Page: 1444,1445

https://pubmed.ncbi.nlm.nih.gov/16767022/

https://radiopaedia.org/articles/disappearing-basal-ganglia-sign?lang=gb#

↑ *Back to this question in Part A*

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Q9: A 75-year-old male presents with a sudden onset of left-sided weakness and difficulty speaking. The emergency physician needs to determine the best initial imaging modality to assess for an acute ischemic stroke and potential hemorrhage. Which imaging technique should be performed first? (Q852985)

A. MRI

B. CT Angiography

C. Non-Contrast CT

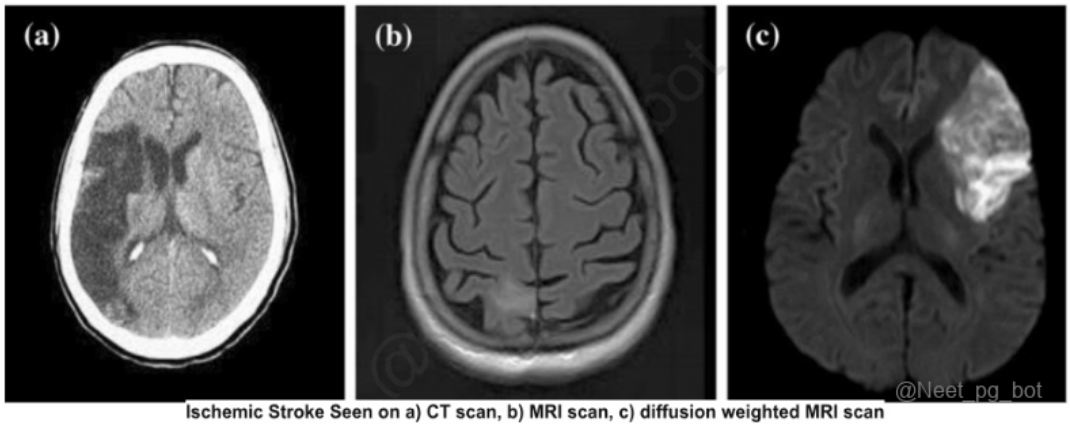
D. MR Angiography

Correct Answer: C. Non-Contrast CT

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: Non-Contrast CT is the preferred initial imaging modality for evaluating acute ischemic stroke to rule out hemorrhage Investigations of Stroke: Non-Contrast CT (Option C) CT Angiography (Option B) MRI (Option A) Earliest Signs of Ischemic Stroke: loss of differentiation between gray and white matter. Loss of Insular Ribbon Sign: seen when the middle cerebral artery is involved, with the insula showing early changes. Hyperdense Vessel Sign: In hyperacute strokes, the thrombus appears dense, causing hyperattenuation of the occluded segment of the MCA. CT scan can also reveal whether there is bleeding in the brain or damage to brain cells resulting from a stroke. Provides high-resolution imaging of the vascular tree from the aortic arch to intracranial vessels. Allows for functional perfusion imaging and assessment of collaterals. Earliest Signs of Ischemic Stroke: restricted diffusion on diffusion weighted imaging. Is observed within a few minutes of arterial occlusion. Can identify changes in brain tissue and damage to brain cells. Uses: Diagnosis of major stroke. To identify a contraindication to treatment, like hemorrhage or large infarct. To identify stroke mimic such as brain tumor. Use: Detection of large vessel occlusion (LVO). Uses: Most sensitive technique for acute ischemic stroke detection. Used in imaging diagnosis of minor stroke Typically during follow-up. CT perfusion (CTP) or perfusion computed tomography (PCT): Time-resolved images of blood flow Display format is perfusion maps, including cerebral blood flow, cerebral blood volume, and mean transit time. Used to identify and quantify the volume of infarcted core and penumbra. MR Angiography (Option D) : Used in patients with a contraindication to contrast or a non-diagnostic CTA.

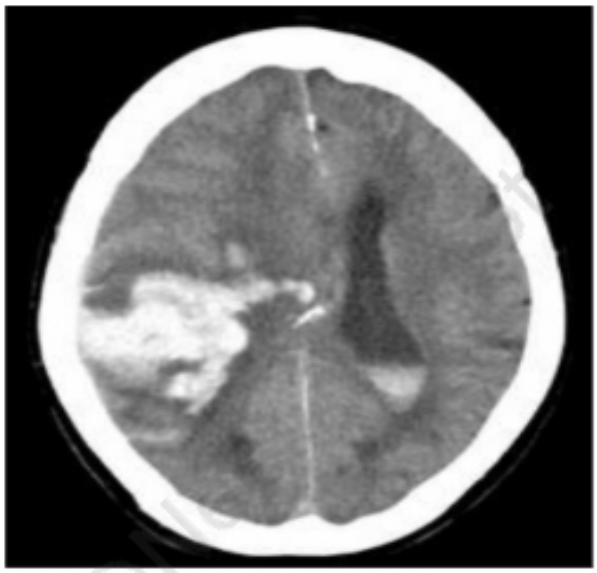


Ischemic Stroke Seen on a) CT scan, b) MRI scan, c) diffusion weighted MRI scan



Loss of insular ribbon sign. NCCT showed loss of grey white matter differentiation at right insular region (arrow).

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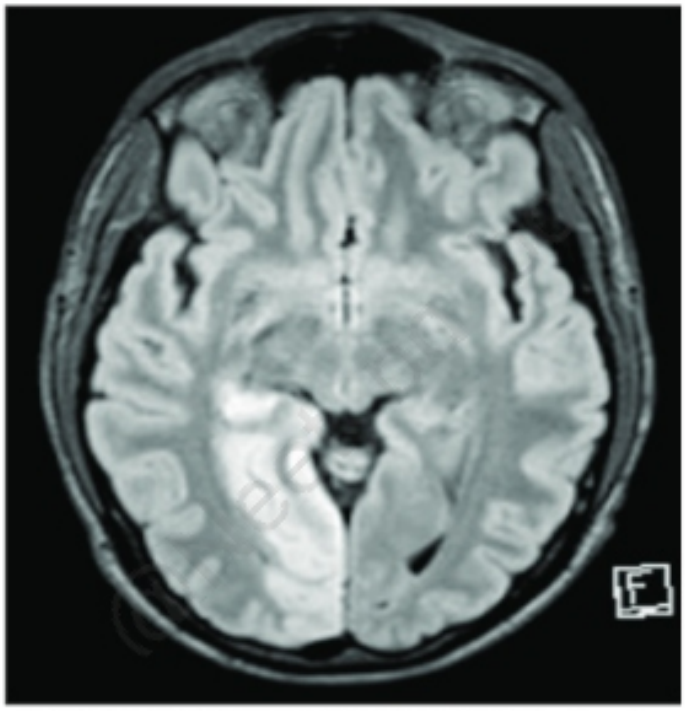
NCCT showing large intracranial hemorrhage can be seen on the right temporo-parietal area with involvement of the ventricular system. Shift of the middle line can be seen to the left and disappearance of the lateral ventricles due to the encephalic edema.

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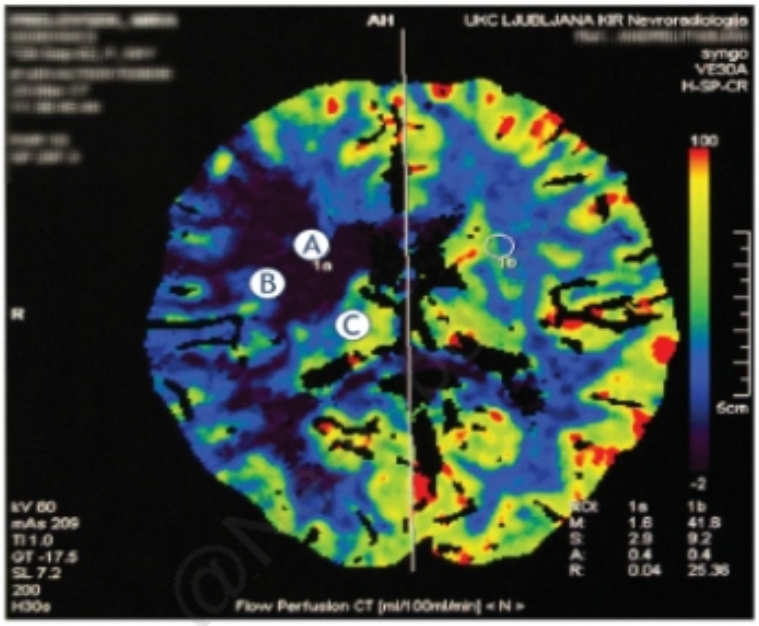
CTA done during the stroke call, demonstrating filling defect in the left proximal MCA (arrowed)

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MRI brain (diffusion weighted images) showing occipital ischaemic stroke.

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CT perfusion (CTP) in acute ischemic stroke (AIS) in the territory supplied by the right middle cerebral artery (MCA). (A) Infarct core. (B) Penumbra. (C) Intact brain parenchyma.

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References:

David Sutton Textbook of Radiology and Imaging, Volume 1, 8th Edition, Pg: 2023-2025

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https://www.frontiersin.org/journals/aging-neuroscience/articles/10.3389/fnagi.2021.685571/full

↑ *Back to this question in Part A*

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Q10: A 45-year-old male presents to the emergency department with a sudden onset of severe headache and loss of consciousness. An MRI is performed shortly after the incident and shows a hyperintense lesion on T1-weighted images and a hypointense lesion on T2-weighted images, consistent with subacute hematoma. What would be the phase of blood in this condition? (Q852984)

A. Deoxyhemoglobin

B. Oxyhemoglobin

C. Methemoglobin

D. Hemosiderin

Correct Answer: A. Deoxyhemoglobin

■ *Listen to Audio 1*

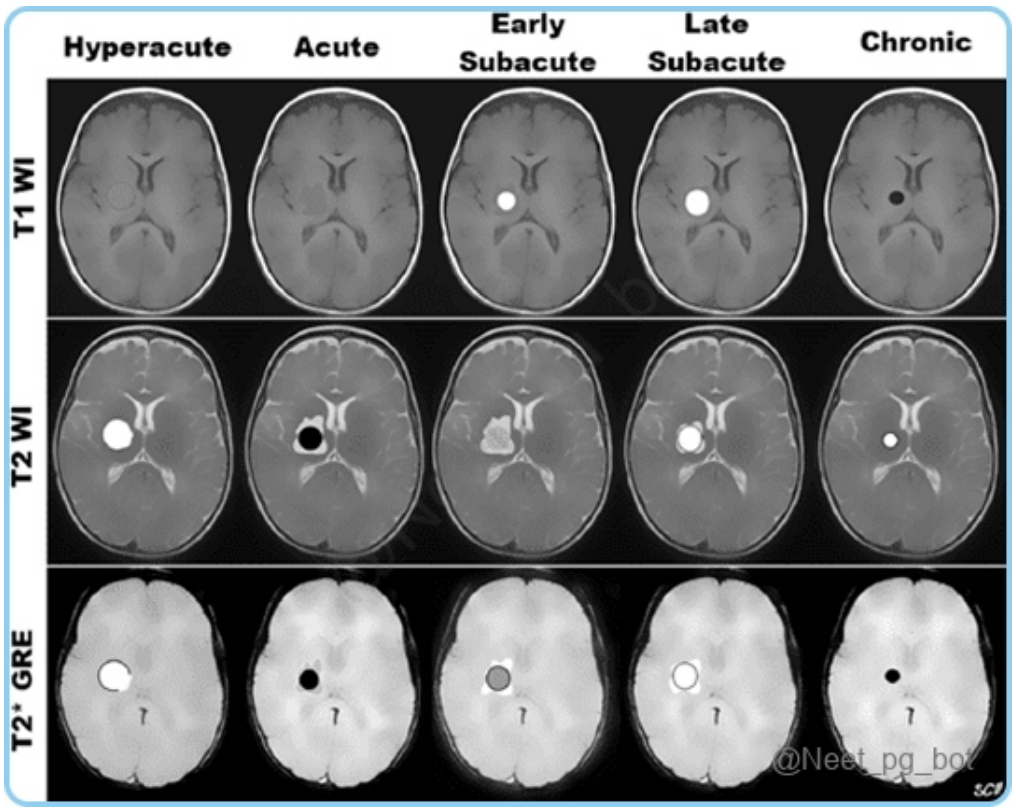
Explanation: The clinical scenario here is of an acute hemorrhage in the brain where the blood is in the deoxyhemoglobin phase . Intracranial Hemorrhage Appearance on MRI: The appearance of intracranial hemorrhage on magnetic resonance imaging (MRI) is influenced by: The age of the hematoma. The type of MRI sequence used (T1 or T2 weighted). As a hematoma ages, hemoglobin transforms through several forms: Oxyhemoglobin Deoxyhemoglobin Methemoglobin Eventually breaking down into ferritin and hemosiderin. Stages of Hemorrhage: Hyperacute: Characterized by intracellular oxyhemoglobin . (Option B) Acute: Features intracellular deoxyhemoglobin . Early Subacute: Contains intracellular methemoglobin . (Option C) Late Subacute: Comprises extracellular methemoglobin . Chronic: Consists of ferritin and hemosiderin . (Option D) Magnetic Properties: Magnetic susceptibility effects cause short T2 values observed in intracellular deoxyhemoglobin, methemoglobin, or hemosiderin. T2 shortening can also occur due to hemoconcentration and

clot retraction. The most sensitive sequence of MRI detecting hemorrhage is susceptibility-weighted imaging (SWI) as it has a high sensitivity to blood products and hemosiderin.

	Phase of blood	T1	T2	Flair	T2*GRE
Hyperacute	Oxyhemoglobin				
Acute (12-48h)	Deoxyhemoglobin				
Early subacute(2-7d)	Methemoglobin intracellular				
Late subacute(8d-1m)	Methemoglobin extracellular				
Chronic (>1m)	Hemsiderin and ferritin				

Hypointense Isointense Hyperintense

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References:

https://pubs.rsna.org/doi/10.1148/radiology.189.1.8372185

David Sutton Textbook of Radiology and Imaging, Volume 1, 8th edition, page: 387

↑ *Back to this question in Part A*

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Q11: A 30-year-old male presents to the emergency department with confusion and headache. A CT scan of the brain is performed which shows as follows: The radiologist notes a characteristic appearance of increased spacing between the frontal lobes. What is the most probable diagnosis? (Q852983)

A. Porencephalic cyst

B. ACOM aneurysm

C. Pneumocephalus

D. Carotid cavernous fistula

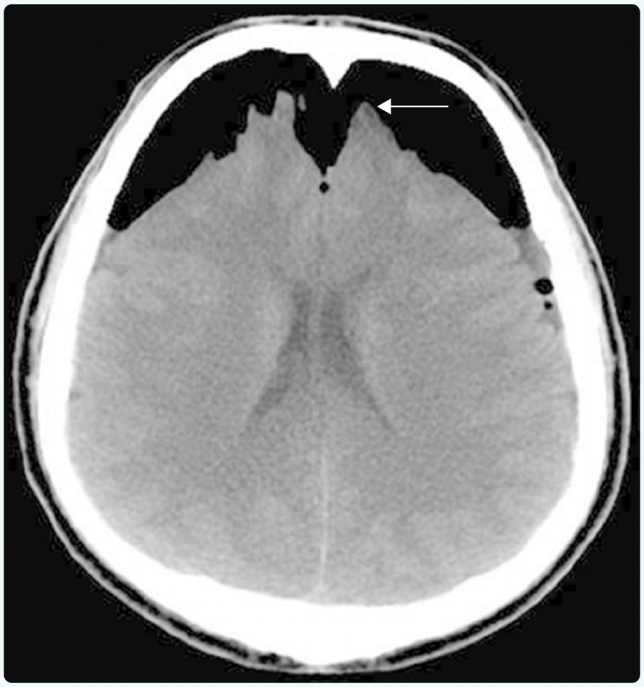


Correct Answer: C. Pneumocephalus

■ *Listen (English)*

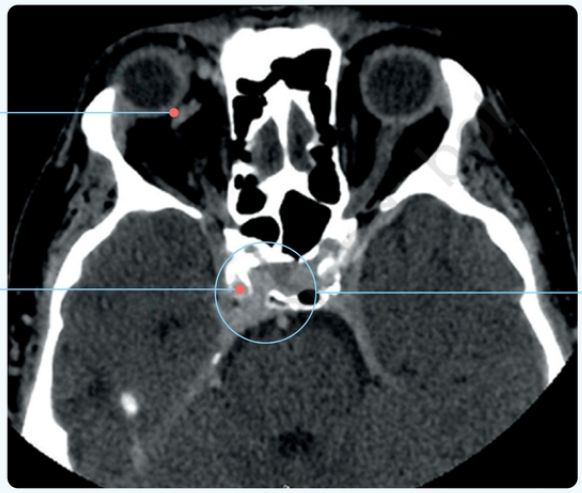
■ *Listen (Hindi)*

Explanation: The CT image in this scenario shows the classical “Mount Fuji” sign where the two frontal lobes take the appearance of mountain peaks which points to the diagnosis of pneumocephalus i.e., air within the cranial cavity . Pneumocephalus/Tension pneumocephalus: Pneumocephalus refers to the presence of air within the cranial cavity . It most frequently occurs as a result of traumatic head injuries . Tension pneumocephalus can be identified on imaging by: Compression of the frontal lobes. Increased spacing between the frontal lobes in the interhemispheric area. This condition is commonly referred to as the "Mount Fuji sign" because its appearance resembles the famous mountain peak in Japan. Carotid-cavernous fistula (Option D): Classification : Carotid-cavernous fistulas (CCFs) are categorized as either direct or indirect . Direct CCF: Involves a direct connection between the internal carotid artery (ICA) and the cavernous sinus. Indirect CCF: Occurs when branches of the ICA or external carotid artery (ECA) connect to the cavernous sinus. Causes : Trauma : Skull base fractures or penetrating injuries Spontaneous Dural arteriovenous malformations Rupture of an aneurysm Fibromuscular hyperplasia Symptoms : Patients usually present with: Unilateral pulsatile exophthalmos (protrusion of one eye) Scleral injection (redness of the eye) Chemosis (inflammation of the conjunctiva) Imaging findings: Venous distention is visible on ultrasound (USG), CT, CTA, MRI, and MRA. Muscle enlargement is most noticeable on CT and MRI. Diagnostic procedure : CT angiography (CTA) is currently the preferred method for early detection of cavernous sinus and jugular vein enhancement. Porencephalic cyst (Option A): A porencephalic cyst is an unusual condition of the central nervous system characterized by a fluid-filled cavity within the cerebral hemisphere. A CT scan of the brain reveals a hypodense intracranial cyst: The cyst has a well-defined border. Central attenuation is consistent with cerebrospinal fluid (CSF). Typically, there is no mass effect on the surrounding brain tissue; however, very large cysts may exert local pressure. An MRI of the brain demonstrates: A clearly defined cyst coated with white matter. Presence of gliosis may be noted, either with or without the cyst. The cyst shows a signal consistent with cerebrospinal fluid. Anterior communicating artery (ACOM) aneurysm (Option B): Anterior communicating artery (ACOM) aneurysms are the most prevalent type of intracranial aneurysms. The anatomical structure of the artery involves the size and shape of the aneurysm like the direction and calcification, and the presence or absence of of thrombosis. They are particularly common in patients under 30 years of age. ACOM aneurysms have a higher likelihood of rupture compared to other intracranial aneurysms due to specific anatomical and hemodynamic features. ACOM aneurysms can compress the optic chiasm leading to symptoms like scotoma or blindness or bilateral hemianopsia and optic tract causing homonymous hemianopsia.



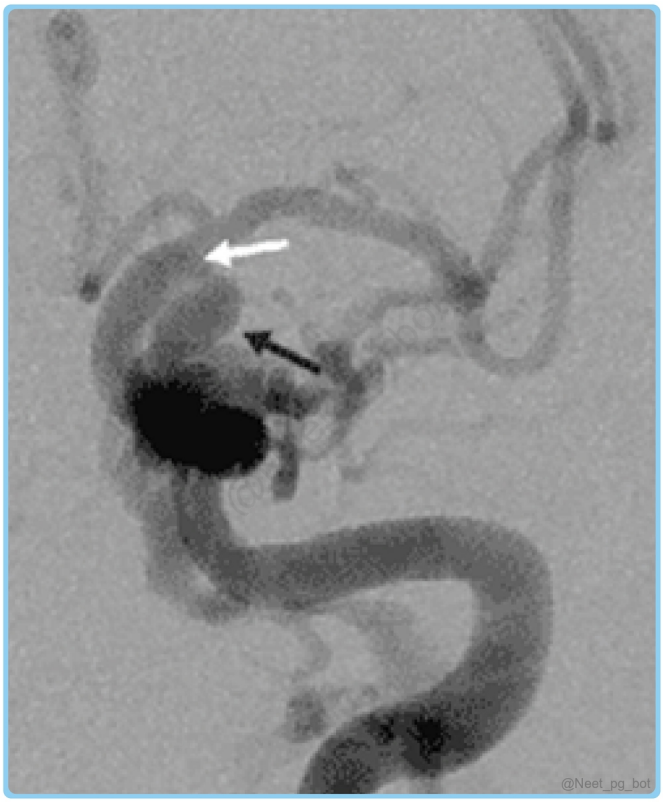
NCCT showing tension pneumocephalus and mount Fuji sign (arrows)

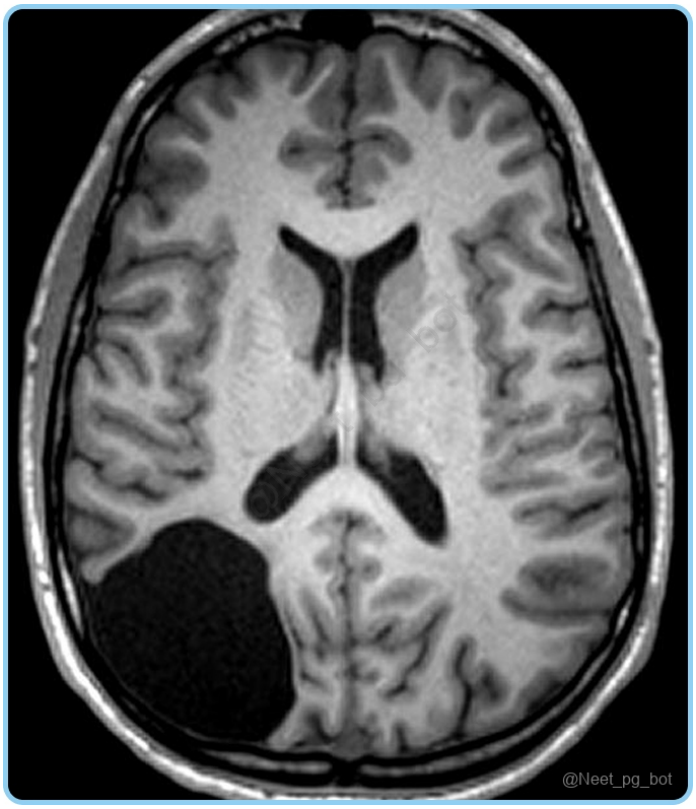
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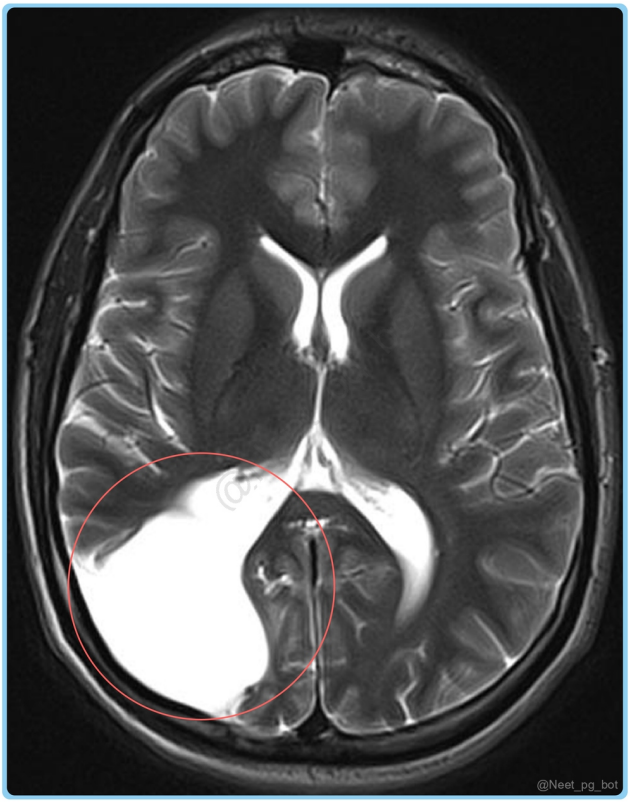


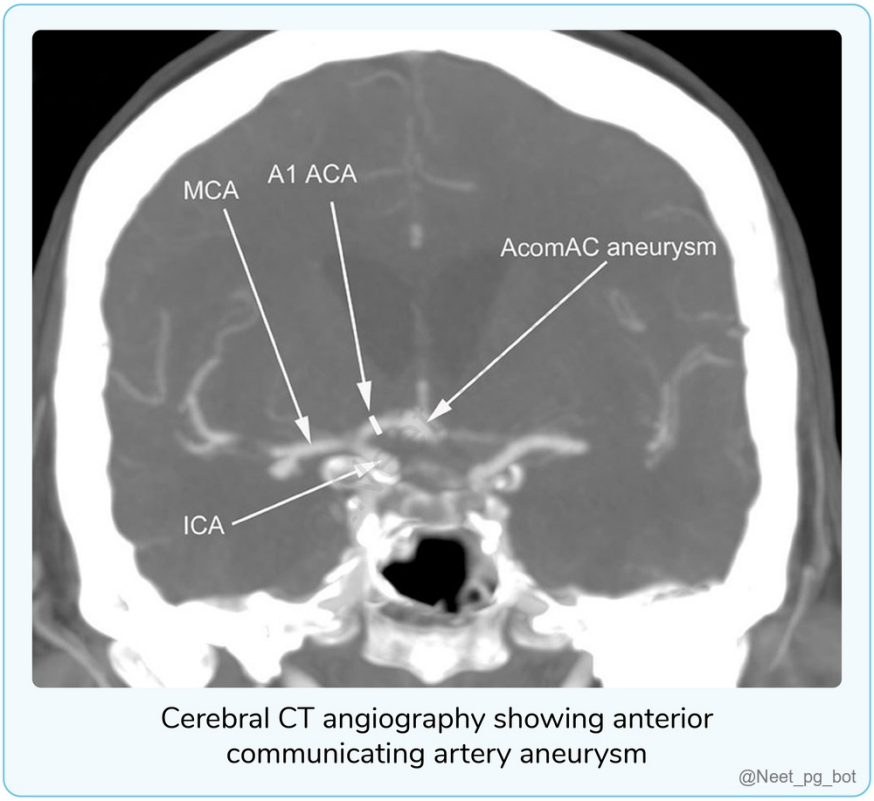
Contrast CT showing carotid cavernous fistula

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Cerebral CT angiography showing anterior communicating artery aneurysm

References:

David Sutton Textbook of Radiology and Imaging, Volume 2, 8th edition, page: 1568.

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8745398/

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https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7509403/

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2764022/

↑ *Back to this question in Part A*

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Q12: A 32-year-old male is brought to the emergency department after a road traffic accident. He presents with loss of consciousness, altered mental status, decerebrate posturing, and widespread cerebral edema. A CT scan returns normal. After intubation, which MRI sequence is preferred for evaluating the extent of his neurological injuries? (Q852982)

A. T1-weighted MRI (T1W)

B. Susceptibility-Weighted Imaging (SWI)

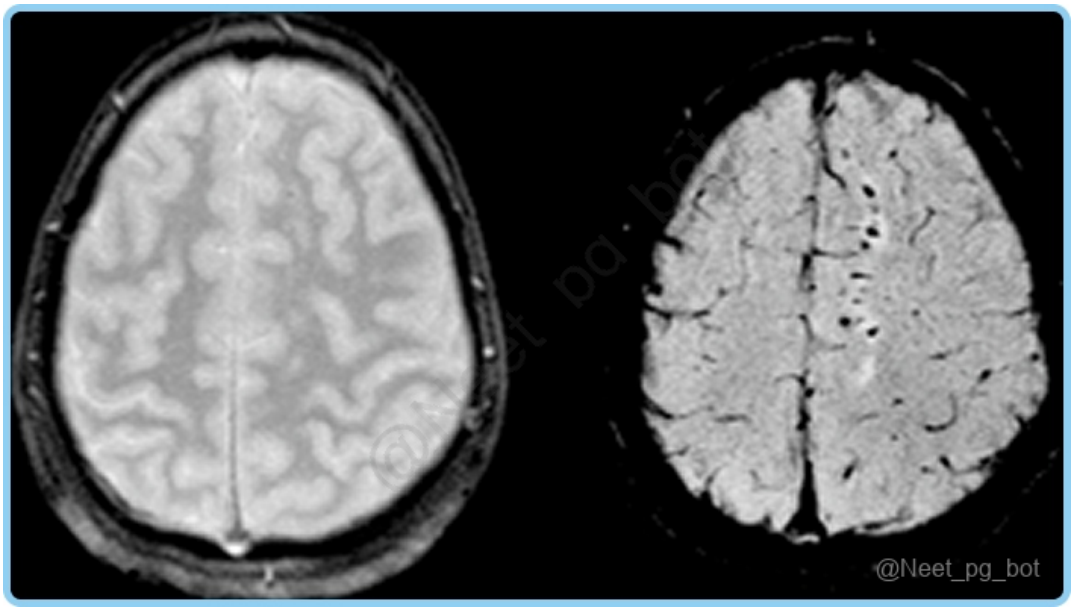
C. FLAIR (Fluid-Attenuated Inversion Recovery) MRI

D. Diffusion-weighted MRI (DWI)

Correct Answer: B. Susceptibility-Weighted Imaging (SWI)

Explanation: In a patient with traumatic brain injury (TBI) presenting with loss of consciousness, altered mental status, decerebrate posturing, and diffuse cerebral edema, but with a normal CT scan, the most appropriate MRI sequence for evaluating the extent of neurological injuries is: Susceptibility-Weighted Imaging (SWI). This sequence is highly sensitive for detecting microhemorrhages and diffuse axonal injury (DAI) , which are common in high-velocity trauma. CT scans often miss DAI , as the injuries can be microscopic or non-hemorrhagic. Diffuse axonal injury (DAI) Diffuse axonal injury (DAI) is a type of traumatic brain injury that results from rapid acceleration and deceleration forces, commonly seen in cases of severe trauma, such as road traffic accidents (RTAs). It primarily affects the white matter of the brain, leading to widespread damage to axonal fibers. Radiological Features: MRI Findings: It is the investigation of choice for diagnosing diffuse axonal injury (DAI), particularly using Susceptibility Weighted Imaging (SWI) . This sequence is sensitive to magnetic susceptibility changes, effectively detecting small hemorrhagic foci. On SWI, black areas represent hemorrhage, appearing as blooming due to blood product accumulation, indicating diffuse axonal injury. T2-weighted MRI is useful for assessing DAI, as it reveals hyperintense areas of axonal injury and edema, highlighting brain damage and secondary changes from the injury. However, T2-weighted MRI can sometimes be less sensitive to small hemorrhagic lesions The combination of SWI and T2-weighted MRI enhances diagnostic accuracy, enabling a comprehensive evaluation of DAI and its structural effects on the brain. CT Findings: In most cases of DAI, CT scans may appear normal . However, in certain instances, they can show punctate hemorrhages, which are small spots of bleeding that indicate areas of axonal damage. Clinical Presentation : Patients with DAI typically present

with a poor or worsening Glasgow Coma Scale (GCS) score following trauma. This deterioration in consciousness is indicative of significant brain injury. Adams grading classification for the severity of diffuse axonal injury (DAI) The severity of DAI can be classified using Adams grading, which assesses the extent of axonal damage. Grade Location of Injury Description Prognosis I Gray matter and white matter interface Involves the initial site of axonal injury. Relatively better prognosis II Corpus callosum Involves the critical structure connecting the two hemispheres. Suggests more severe disruption of axonal pathways. Worse prognosis than Grade I III Brain stem Involves the brain stem, which can significantly affect vital functions. Associated with the worst prognosis T1-weighted MRI (T1W) (Option A): T1-weighted images provide detailed anatomical information but are not optimal for visualizing edema and diffuse changes associated with widespread brain injury. FLAIR MRI (Option B): While FLAIR imaging suppresses the signal from cerebrospinal fluid and can highlight certain lesions, it is not the primary sequence for detecting widespread edema and damage resulting from trauma. Diffusion-weighted MRI (DWI) (Option D): DWI is useful for detecting early ischemic changes but may not provide the best assessment for the diffuse and complex injury patterns present in this scenario compared to T2-weighted imaging.



References:

Grainger & Allison's Diagnostic Radiology, 7th Edition, Page: 1404-1407

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8571536/

↑ *Back to this question in Part A*

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Q13: Assertion (A): On CT scan, the bone cortex appears black, while on MRI, it appears white. Reason (R): The appearance of structures on CT and MRI depends on the density of tissues and the presence of hydrogen atoms. (Q852969)

A. Both Assertion (A) and Reason (R) are true, and Reason (R) is the correct explanation of Assertion (A).

B. Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).

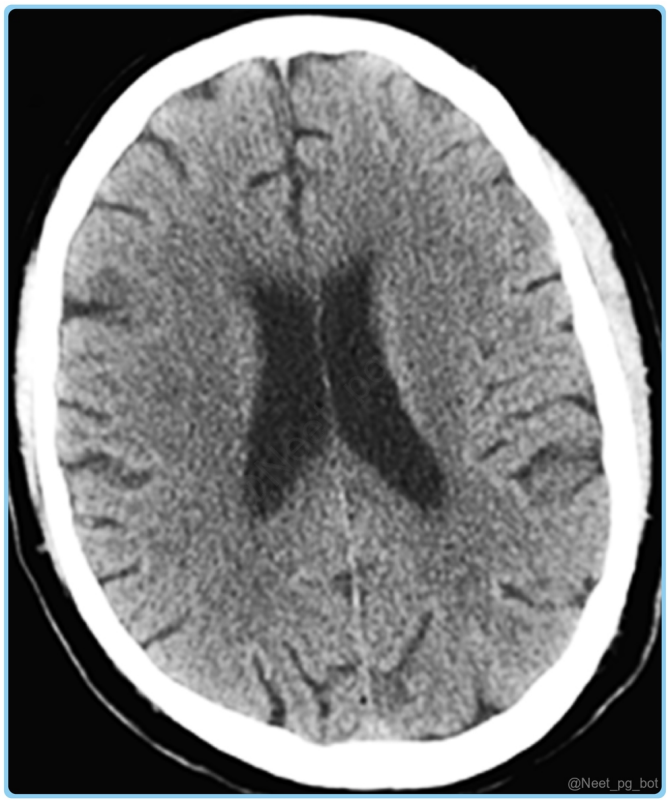
C. Assertion (A) is false, but Reason (R) is true.

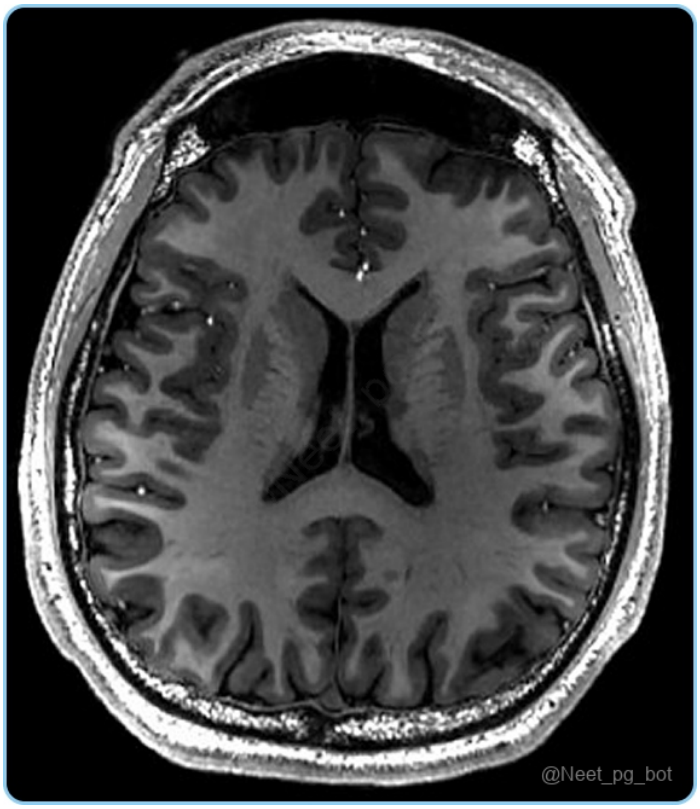
D. Both Assertion (A) and Reason (R) are false.

Correct Answer: C. Assertion (A) is false, but Reason (R) is true.

- *Listen (English)*
- *Listen (Hindi)*

Explanation: On CT scan, the bone cortex appears white, not black. This is because CT scans measure tissue density, and bones are dense structures that absorb X-rays heavily, thus appearing white. On MRI, the bone cortex typically appears black due to the lack of free hydrogen atoms needed for generating MRI signals. Reason: The reason is true, as the appearance of tissues on CT depends on tissue density (denser structures appear whiter), and on MRI, it depends on the presence of hydrogen atoms (more hydrogen results in a stronger signal). Feature CT (Computed Tomography) MRI (Magnetic Resonance Imaging) Principle Based on differential absorption of X-rays by tissues (denser tissues absorb more X-rays) Based on the alignment of hydrogen protons in tissues in response to a magnetic field and radiofrequency pulses Imaging Time Faster Slower, can take 30 minutes to over an hour Bone cortex appearance: White (due to dense bone absorbing X-rays) Dark (lacks hydrogen protons) Applications Best for: Acute bleeding, skull fractures, calcifications, hyperacute stroke Emergency use: Ideal for emergencies due to speed Best for: Soft tissue details, brain tumors, demyelinating diseases, subacute/chronic ischemia Emergency use: Not typically used in emergencies (except for soft tissue analysis) Detection of Acute Hemorrhage Highly sensitive for detecting acute hemorrhage Less sensitive for acute hemorrhage, but can be used after a few days Evaluation of Edema Limited sensitivity to subtle edema Excellent for detecting edema and differentiating tissue types Stroke Detection Good for detecting stroke in hyperacute phase (hours) Better for detecting ischemia in subacute and chronic stages (days to weeks) Contrast Agent Used Iodine-based contrast agents (risk of allergy or kidney issues) Gadolinium-based contrast agents (caution in renal failure)





References:

Grainger & Allison's Diagnostic Radiology, 7th Edition, Page 1351-1354.

Fred A. Mettler Essentials of Radiology, 4th Edition, Page 11-16.

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10827017/

↑ *Back to this question in Part A*

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Q14: A 45-year-old male with a significant history of smoking presents with a sudden onset of a severe headache. He reports accompanying symptoms of palpitations, photophobia, and neck stiffness. On examination, signs of meningeal irritation are noted. The patient also has hyperflexible joints and mentions that his symptoms began after experiencing a minor jerk while in the car. A CT scan reveals specific findings given below. What is the most likely cause of this patient's symptoms? (Q852980)

A. Meningitis secondary to a bacterial infection

B. Cervical spine injury leading to meningeal irritation

C. Migraine with aura exacerbated by the minor jerk

D. Rupture of a cerebral aneurysm



Correct Answer: D. Rupture of a cerebral aneurysm

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: Rupture of a cerebral aneurysm is the most common cause of sudden, severe headaches and is particularly associated with features suggestive of meningeal irritation, as seen in cases of subarachnoid hemorrhage. Individuals with Ehlers-Danlos syndrome are at increased risk for vascular abnormalities, including cerebral aneurysms. Subarachnoid Hemorrhage (SAH) Definition Presence of blood in the subarachnoid space, typically from a ruptured cerebral aneurysm or trauma. Clinical Features Sudden, severe headache (often described as a "thunderclap headache") Worst headache ever experienced by the patient. Etiology Traumatic: Head injuries causing bleeding in the subarachnoid space. Non-Traumatic: Most commonly due to rupture of a cerebral aneurysm. Initial Imaging Non-Contrast CT (NCCT): First-line imaging for suspected SAH, effective in the acute setting. Radiological Findings (NCCT) Appearance of Blood: Hyperdense (white) compared to surrounding cerebrospinal fluid (CSF). Common Sites for Blood Accumulation: Interhemispheric Fissure Sylvian Fissure Suprasellar Cistern Perimesencephalic Cistern Distinctive Shape: Blood may take on a pentagon or star shape, referred to as the " Star of Death." Additional Investigations CT Angiography: Visualizes potential aneurysms or vascular malformations; useful for rupture suspicion. Digital Subtraction Angiography (DSA): Gold standard for diagnosing cerebral aneurysms; provides detailed vascular images and therapeutic options (e.g., endovascular coiling).



References:

Grainger & Allison's Diagnostic Radiology, 7th Edition, Page: 1466-1471 Fred A. Mettler Essentials of Radiology, 4th Edition, Page: https://www.ncbi.nlm.nih.gov/books/NBK470242/

↑ *Back to this question in Part A*

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Q15: A 35-year-old male presents after a road traffic accident. He experienced a brief loss of consciousness, followed by a lucid interval. On examination, he has a Glasgow Coma Scale score of 13 and exhibits signs of a head injury. A CT scan of the head was performed, and the image revealed the following findings. What is the most likely diagnosis? (Q852979)

A. Subdural hematoma (SDH)

B. Epidural hematoma (EDH)

C. Subarachnoid hemorrhage (SAH)

D. Cerebral contusion

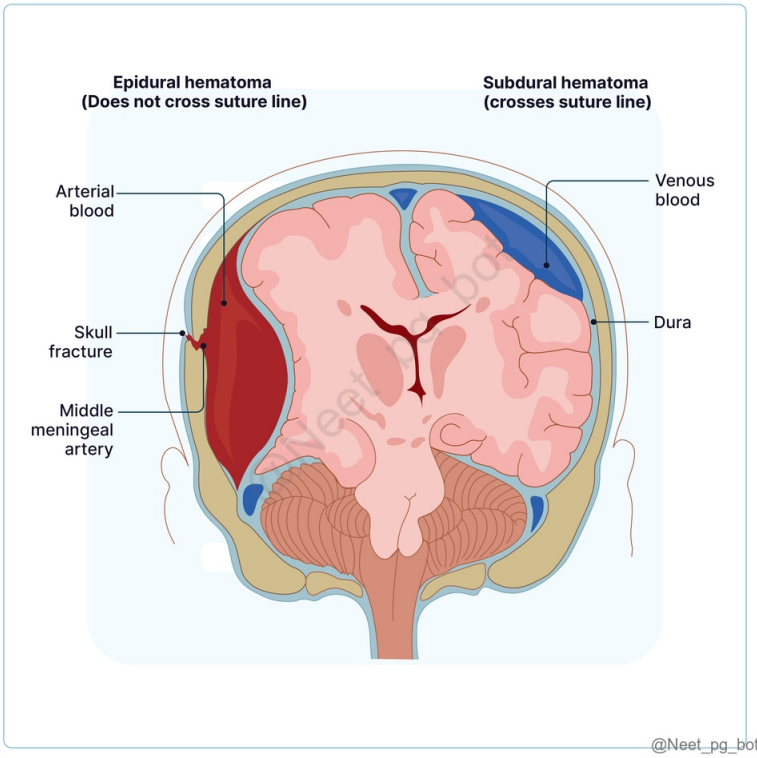


Correct Answer: B. Epidural hematoma (EDH)

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: EDH is often caused by trauma, such as in this road traffic accident, leading to disruption of the middle meningeal artery . The classic presentation includes a brief loss of consciousness followed by a lucid interva l, typical for EDH. Here the CT, shows a biconvex (lentiform) shaped hematoma that does not cross suture lines. A GCS score of 13 indicates mild impairment, consistent with this diagnosis. Feature Extradural Hemorrhage (EDH) Subdural Hemorrhage (SDH) (Option A) Type of Hemorrhage Arterial Hemorrhage Venous Hemorrhage Shape Biconvex or lentiform Crescent or sickle-shaped Location Limited by sutures; can cross the midline Follows the brain surface; crosses sutures, does not cross midline Cause Rupture of the middle meningeal artery (MMA) Rupture of cortical bridging veins Onset of Symptoms Often presents with a lucid interval Symptoms may develop gradually, often without a lucid interval Force Required Requires more force; associated with adjacent bony rupture Can occur with trivial trauma Midline Crossing Can cross the midline Does not cross the midline Lucid Interval Yes; patient appears normal before deterioration No; deterioration may be more gradual Clinical Signs Symptoms may include headache, loss of consciousness, and focal neurological deficits Symptoms may include headache, confusion, and potential focal deficits Subarachnoid hemorrhage (SAH) (Option C): SAH presents with bleeding in the subarachnoid space and shows diffuse blood in the sulci and cisterns rather than a localized collection. Cerebral contusion (Option D): Cerebral contusions typically appear as areas of brain parenchymal damage and do not exhibit the characteristic biconvex shape seen in this case.







References:

Grainger & Allison's Diagnostic Radiology, 7th Edition, Pages 1476-1479

Fred A. Mettler Essentials of Radiology, 4th Edition, Pages 21,22

https://www.ncbi.nlm.nih.gov/books/NBK470242/

↑ *Back to this question in Part A*

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Q16: A 28-year-old male presents to the emergency department following a head injury sustained during a fall. He is alert, opens his eyes to speech, follows commands, and is oriented but complains of a mild headache. On assessment, he opens his eyes spontaneously, is verbally coherent but slightly disoriented, and follows motor commands. There are no focal neurological deficits, bleeding disorders, seizures, or intoxication. Based on the clinical findings and his GCS score, what is the next appropriate step in management? (Q852978)

A. Immediate intubation and mechanical ventilation

B. CT scan of the head

C. Observation with repeat neurological assessment every 4 hours

D. Initiate anticonvulsant therapy

Correct Answer: C. Observation with repeat neurological assessment every 4 hours

Explanation: Observation with repeat neurological assessment every 4 hours, The patient has a GCS score of 13 (Eye = 4, Verbal = 4, Motor = 5), indicating a mild head injury. As there are no additional risk factors per the ACR guidelines, the next best step is close observation with repeated neurological assessments rather than immediate imaging. CT Imaging Guidelines for Head Trauma GCS Score TBI Severity 13-15 Mild TBI 9-12 Moderate TBI 3-8 Severe TBI In cases of penetrating cranial injury, a head CT is recommended immediately, regardless of GCS. Indications for Head CT For patients with mild to moderate TBI (GCS 13-12) , the decision to perform a CT scan depends on the presence of additional risk factors . The ACR guidelines state that a head CT should be performed if any one of the following "ABCDEF" criteria are met. A ge >60 years B lood coagulopathy C lavicle or supra-clavicular injury D rugs or neurological deficits E pilepsy or post-traumatic seizure F ocal neurological deficits G eneric brain-related complaints (e.g., headache, vomiting) These additional findings serve as red flags, warranting imaging to prevent delayed diagnosis of significant brain injuries. Severe TBI or Penetrating Injury In the context of severe TBI (GCS 3-8) or penetrating cranial injury, a head CT is indicated immediately due to the high risk of life-threatening intracranial injuries. Immediate intubation and mechanical ventilation (Option A): This option is incorrect as intubation is typically reserved for patients with severe traumatic brain injury (GCS ≤ 8) or those at risk of airway compromise. The patient's GCS of 13, indicating a mild head injury, does not meet the criteria for intubation. CT scan of the head (Option B): According to the American College of Radiology (ACR) guidelines, a head CT scan is typically reserved for patients with a GCS score between 13-15 if additional risk factors are present, a CT scan is not immediately necessary. Initiate anticonvulsant therapy (Option D):

Anticonvulsants are not routinely indicated unless there is a history of seizures or a high risk of post-traumatic seizures, which the patient does not exhibit here.

References:

https://www.acr.org/-/media/ACR/NOINDEX/RSCAN/Minor-Ped-head-trauma.pdf

↑ *Back to this question in Part A*

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Q17: A patient comes with his MR angiography brain report to the clinic. Identify the marked artery in this image. (Q852977)

A. Anterior cerebral artery

B. Vertebral artery

C. Basilar artery

D. Middle cerebral artery

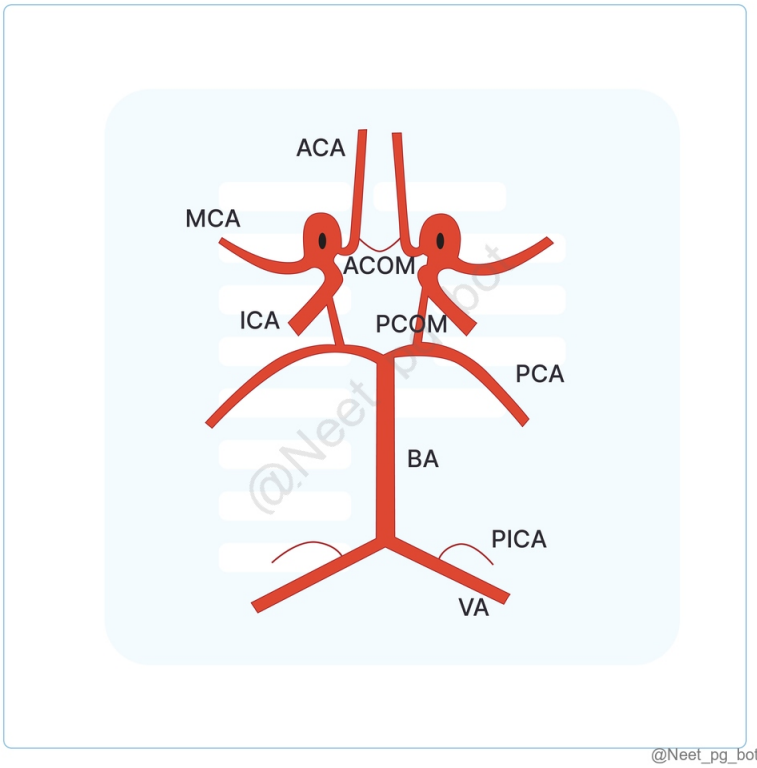


Correct Answer: C. Basilar artery

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: The image here shows the circle of Willis, and the artery marked is the basilar artery which arises from the joining of both left and right vertebral arteries. Magnetic Resonance Angiography (MRA) There are various types of MR angiograms based on different principles and can be classified into non-contrast and contrast enhanced methods. Non-contrast MRA Contrast enhanced (CE) MRA Time-of-flight (TOF) imaging: It is the most prevalent method for Magnetic Resonance Angiography (MRA) in clinical practice. Phase-contrast MRA: It is more sensitive for identifying slow blood flow and useful for imaging cerebral veins (MR venography or MRV). Effective for detecting dural venous sinus thrombosis and venous stenoses. MRA combined with gadolinium-based contrast agents is called contrast-enhanced (CE) MRA. Excellent for quickly visualizing the carotid and vertebral arteries where a large field of view (FOV) is necessary. Reduces artifacts caused by turbulent or slow flow. Useful for assessing arteriovenous malformations (AVMs), aneurysms , and intracranial stenosis . Two types are: Elliptical-centric Multiphase techniques Anterior cerebral artery (Option A) is found at the anterior-most of the circle of Willis arising from the internal carotid artery (marked as 1 in the image). Vertebral artery (Option B) is a branch of the subclavian artery that joins together from both sides to form the basilar artery (marked as 8 in the image). Middle cerebral artery (Option C) is not a part of the circle of Willis and originates from the internal carotid artery (marked as 2 in the image).



References:

Grainger and Allison’s Diagnostic Radiology Textbook of Medical Imaging, 7th Edition, Pages 1384, 1385.

https://www.ncbi.nlm.nih.gov/books/NBK558984/

↑ *Back to this question in Part A*

Q18: Which of the following statements about the given image is not true? (Q852976)

A. It is a standard investigation alongside non-contrast CT for diagnosing stroke

B. It is used to resolve discrepancies in findings from noninvasive imaging

C. It diagnoses spontaneous subarachnoid hemorrhage when CTA results are negative

D. It can be used for embolization of AVMs and fistulas



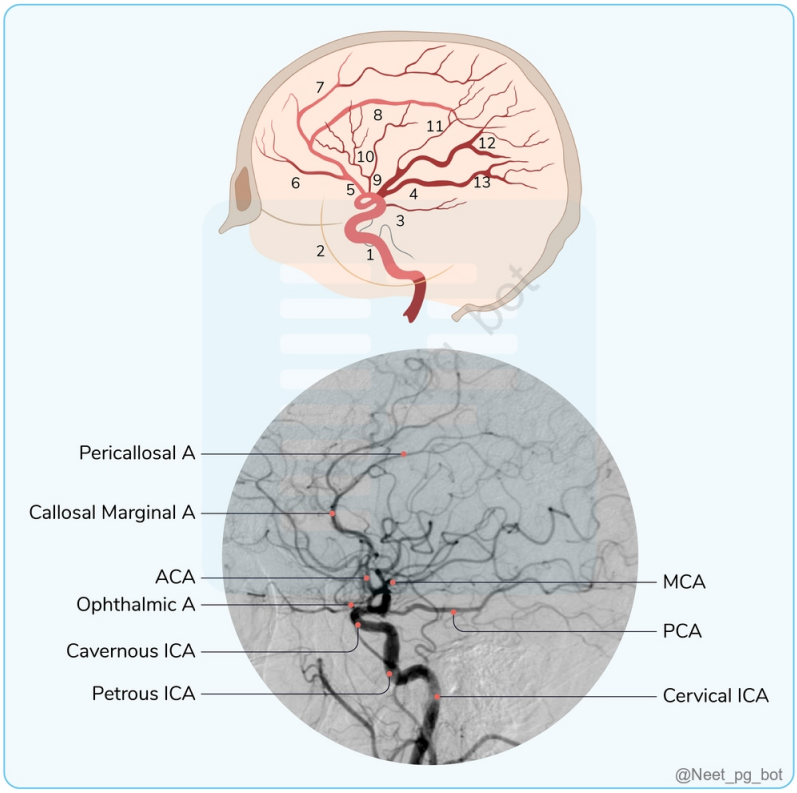
Correct Answer: A. It is a standard investigation alongside non-contrast CT for diagnosing stroke

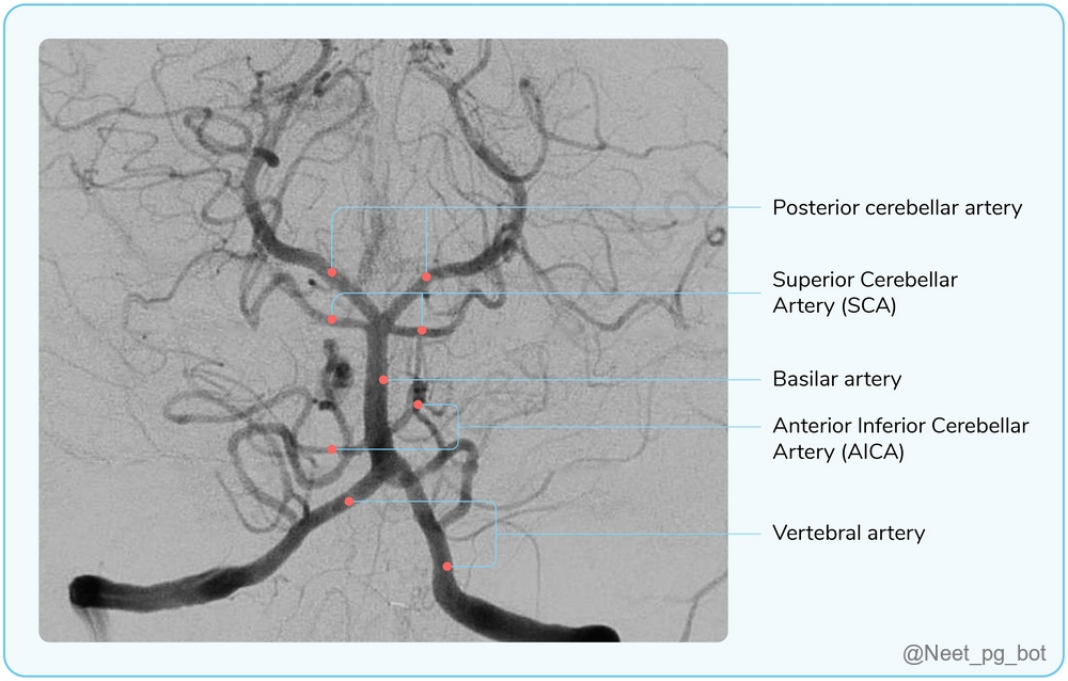
■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: The given image shows Digital subtraction angiography(DSA). CT angiography is used as a standard investigation along with non-contrast CT for the diagnosis in acute stroke protocols and not DSA. Computed Tomography Angiography (CTA) Clinical applications Acute stroke protocols : CTA is a standard investigation alongside non-contrast CT and CT perfusion (CTP) for evaluating stroke. It is used to detect dynamic contrast extravasation indicative of active hemorrhage . It is highly sensitive (>90%) for intracranial aneurysms , particularly in subarachnoid hemorrhage cases. It is also effective for assessing carotid artery stenosis , cervical

artery dissection , and intracranial vascular stenosis Digital Subtraction Angiography (DSA) Applications Resolve discrepancies in findings from noninvasive imaging (CTA or MRA). (Option B) Diagnosing spontaneous subarachnoid hemorrhage when CTA results are negative. (Option C) Evaluate younger patients with intraparenchymal hemorrhage for underlying arteriovenous malformations (AVMs). DSA supports a variety of endovascular treatments, including: Clot retrieval for acute ischemic stroke Treatment of brain aneurysms (coiling, stenting, flow diversion) Embolization of AVMs and fistulas (Option D) Tumor embolization and stenting of intracranial arterial stenoses Intra-arterial therapies for vasospasm





References:

Grainger and Allison's Diagnostic Radiology a Textbook of Medical Imaging, 7th edition, page: 1382, 1383

↑ *Back to this question in Part A*

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Q19: Match the following structures with their corresponding CT score. Structure CT score in HU a) Air 1) 0 b) Water 2) -1000 c) Grey Matter 3) 700 to 3000 d) Bone 4) 37 to 45 (Q852975)

A. a-2, b-1, c-4, d-3

B. a-1, b-2, c-3, d-4

C. a-2, b-3, c-1, d-4

D. a-1, b-4, c-2, d-3

Correct Answer: A. a-2, b-1, c-4, d-3

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: Structure CT score in HU a) Air 1) -1000 b) Water 2) 0 c) Grey Matter 3) 37 to 45 d) Bone 4) 700 to 3000 Housenfield unit (HU): In each slice of a CT scan, every tiny cube of tissue (called a voxel) is given a CT

number. This number is based on how much the x-rays are blocked by that tissue, compared to distilled water at 0°C and 1 bar of pressure, and is measured in Hounsfield Units (HU). The ones with a lower CT number appear the darkest, and the ones with a higher CT number appear brighter. The values of some structures are as follows: Structure CT score (HU) Air -1000 Water 0 CSF 8 to 15 White matter 20 to 30 Blood 30 to 45 Grey matter 37 to 45 Contrast 100 to 300 Bone 700 (cancellous) to 3000 (inner and outer tables) Soft tissue +20 to +70 Fat -200 to -50

References:

Grainger and Allison's Diagnostic Radiology: A Textbook of Medical Imaging, 7th edition, page: 1369, 1371-1372, 1374-1375

↑ *Back to this question in Part A*

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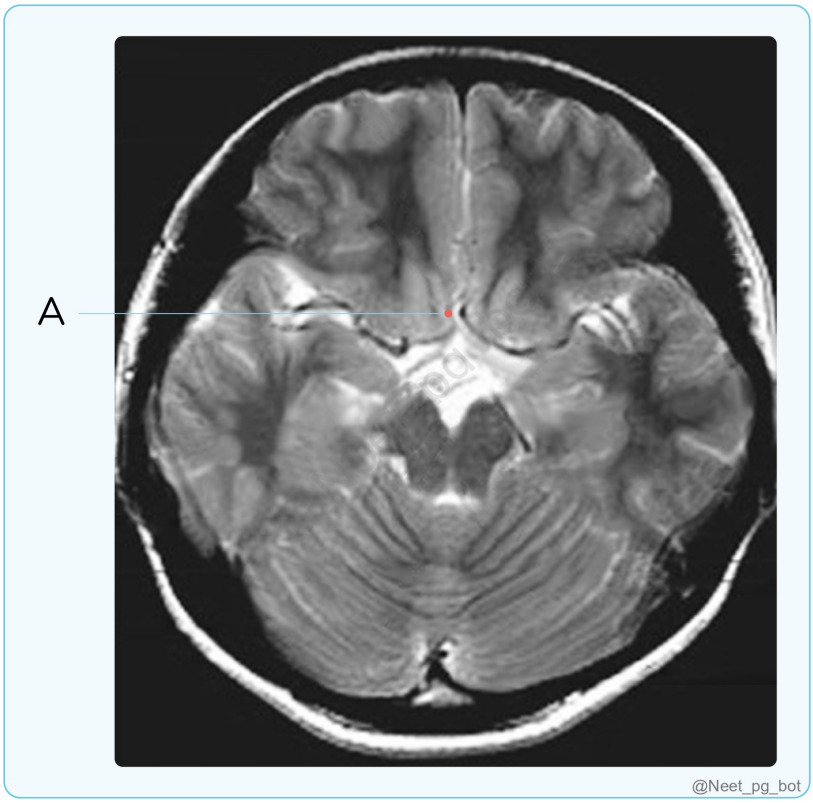
Q20: A student is analyzing an MRI of the brain at the midbrain level. The examiner asks the student to identify the structure marked as "a". What is this structure? (Q852974)

A. Optic tract

B. Amygdala

C. Mamillary body

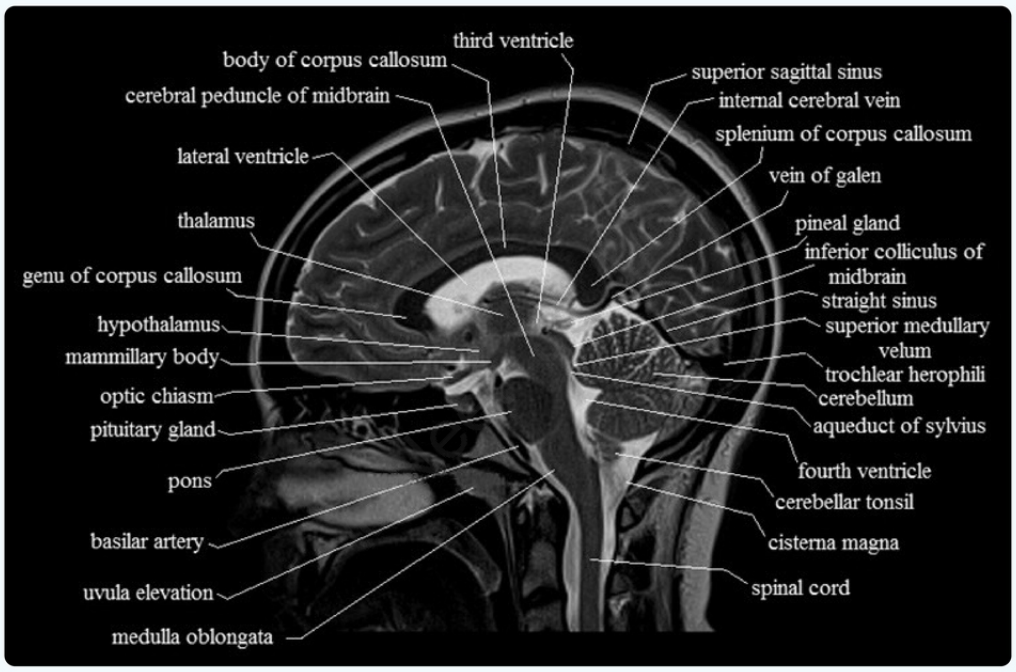
D. Anterior cerebral artery



Correct Answer: D. Anterior cerebral artery

- *Listen (English)*
- *Listen (Hindi)*

Explanation: The hypodense structure marked in the image is the anterior cerebral artery. MRI BRAIN CT BRAIN This uses the alignment of hydrogen protons in tissues in response to a magnetic field and radiofrequency pulses. The skull bone cortex appears black/dark in the MRI. X-rays that penetrate the head or other parts of the body produce images based on tissue density and atomic number. The bone cortex can be seen as a hyperintense (white) area.



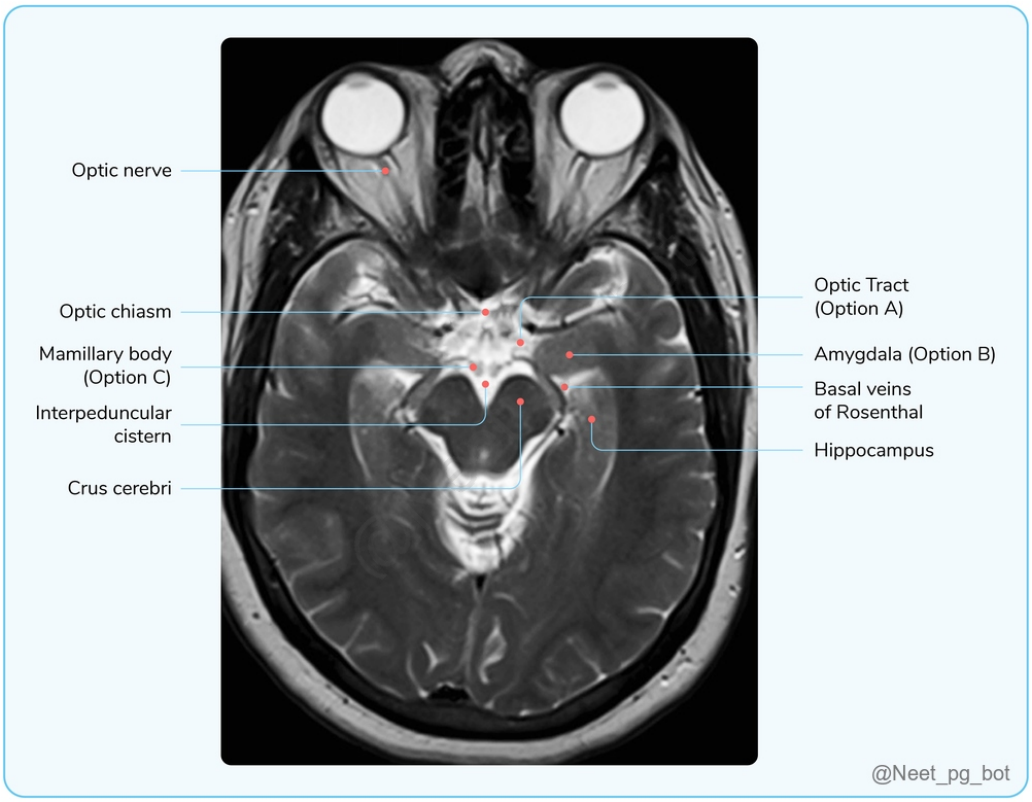
Mid sagittal MRI of Brain

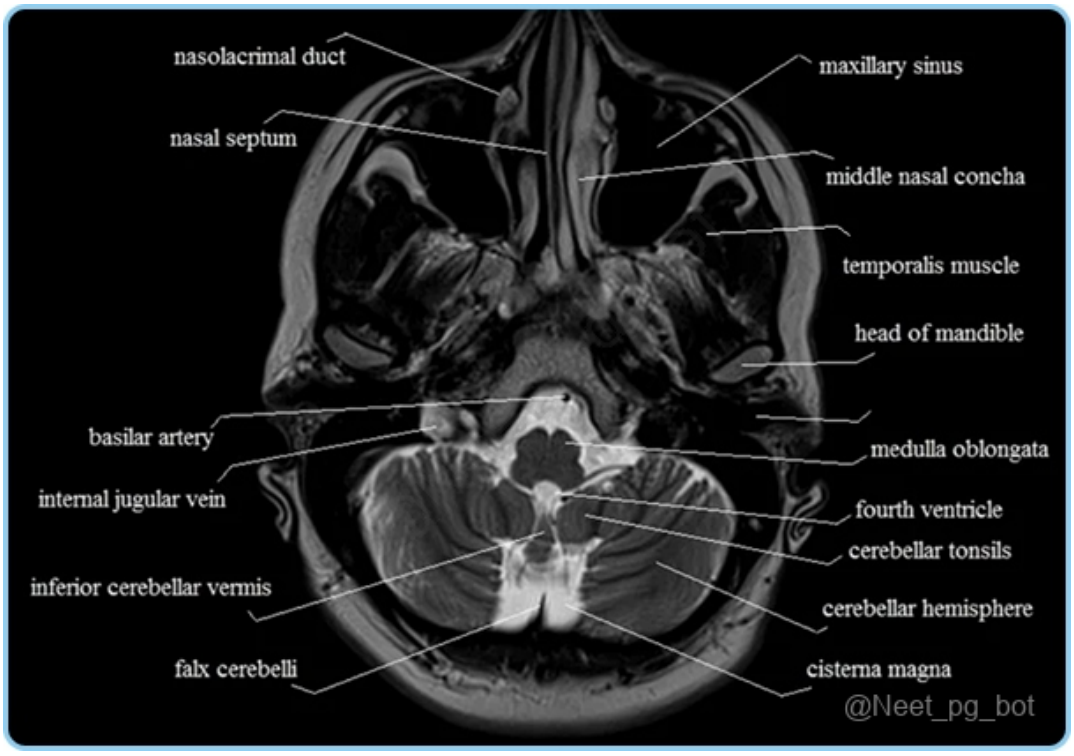
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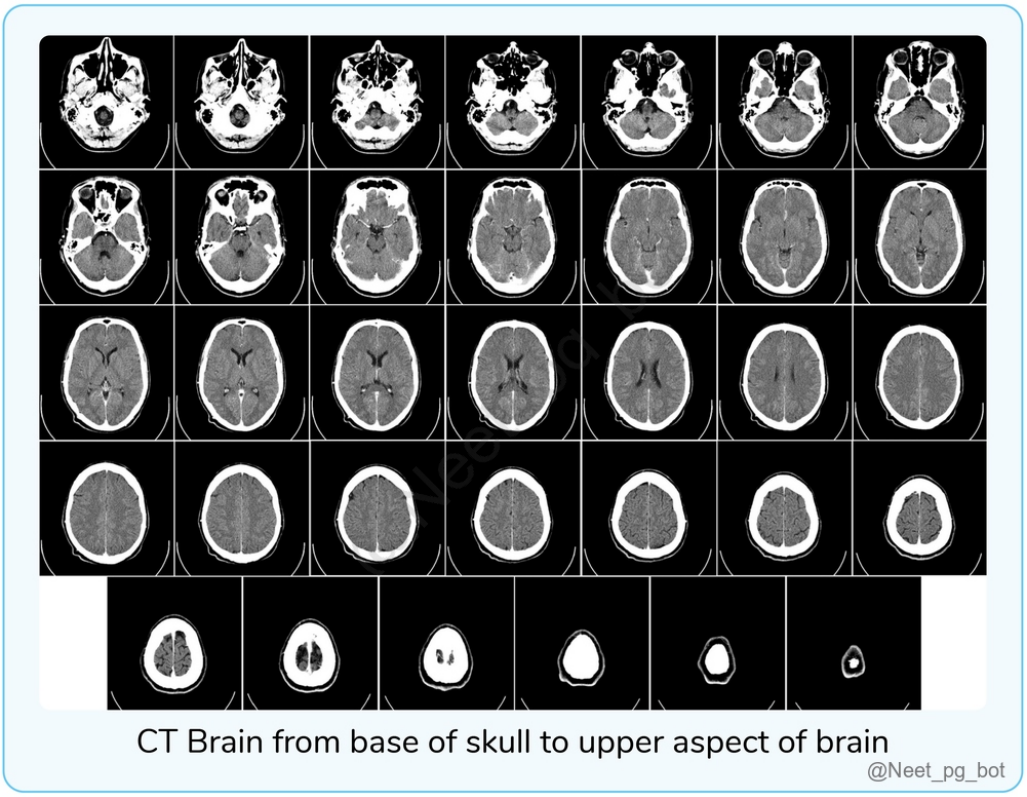
Mid sagittal MRI Brain

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Optic nerve
Optic chiasm
Mamillary body (Option C)
Interpeduncular cistern
Crus cerebri
Optic Tract (Option A)
Amygdala (Option B)
Basal veins of Rosenthal
Hippocampus
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nasolacrimal duct
nasal septum
maxillary sinus
middle nasal concha
temporalis muscle
head of mandible
basilar artery
internal jugular vein
medulla oblongata
fourth ventricle
cerebellar tonsils
inferior cerebellar vermis
cerebellar hemisphere
falx cerebelli
cisterna magna
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CT Brain from base of skull to upper aspect of brain
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References:

Grainger and Allison's Diagnostic Radiology: A Textbook of Medical Imaging, 7th edition, page: 1369, 1371-1372, 1374-1375

↑ *Back to this question in Part A*

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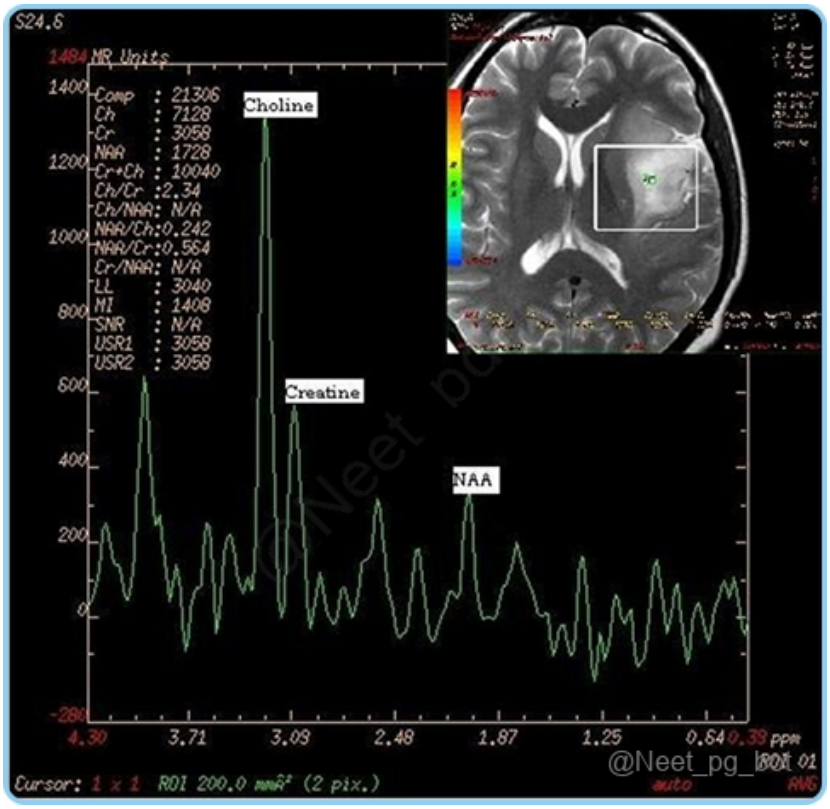
Q21: A 58-year-old male presents with persistent headaches and cognitive decline. An MRI reveals a suspicious mass in the parietal lobe. To further characterize the mass, an MR spectroscopy (MRS) is performed which shows: Which of the following interpretations is most accurate regarding the metabolic changes observed in MR spectroscopy? (Q852972)

A. The elevated choline levels suggest high cellular turnover

B. The decreased NAA indicates significant neuronal viability

C. The absence of any metabolites in the spectrum indicates healthy brain tissue

D. Raised creatinine levels show low metabolic activity

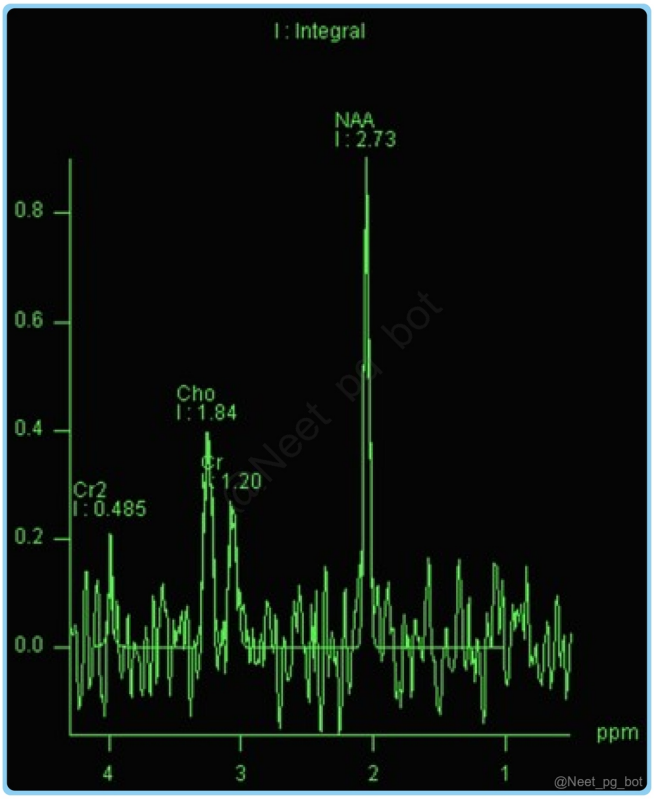


Correct Answer: A. The elevated choline levels suggest high cellular turnover

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: The MR spectroscopy analyzes the metabolites in various tissues and choline is a metabolite suggesting increased cellular turnover. MR Spectroscopy It is a technique used to analyze metabolites in various tissues, including the brain, breast, and prostate done at 1.5 or 3T. Measures levels of lactate, lipids, and choline within a specific volume of tissues. Metabolite Markers N-acetyl aspartate (NAA) : indicates neuronal viability. (Option B) Choline : represents cell membrane composition and cellular turnover . Creatine : found in metabolically active tissues, serving as a reference. (Option D) Lipids : released during cell membrane damage. Lactate : signifies anaerobic metabolism. In a normal brain, these metabolites are present in the order: NAA > creatinine > choline. (Option C) Clinical Applications Choline is raised in malignancies. Lipids are raised in TB due to mycolipids of mycobacterium. MRS is used for assessing brain tumors, including: Grading of tumors. Monitoring tumor progression versus treatment effects. Diagnosing infectious and metabolic diseases.



References:

David Sutton Textbook of Radiology and Imaging, Volume 1, 8th edition, page: 395, 398.

Grainger and Allison’s Diagnostic Radiology: A Textbook of Medical Imaging, 7th edition, page: 1375, 1376.

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4868063/

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4757282/

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Q22: A 65-year-old male with progressive memory loss and word-finding difficulty shows language deficits on a neurological exam. The physician orders an MRI to map language centers before treatment. Which MRI technique is most appropriate for this? (Q852971)

A. Diffuse Tensor Imaging

B. Susceptibility Weighted Imaging

C. Functional MRI

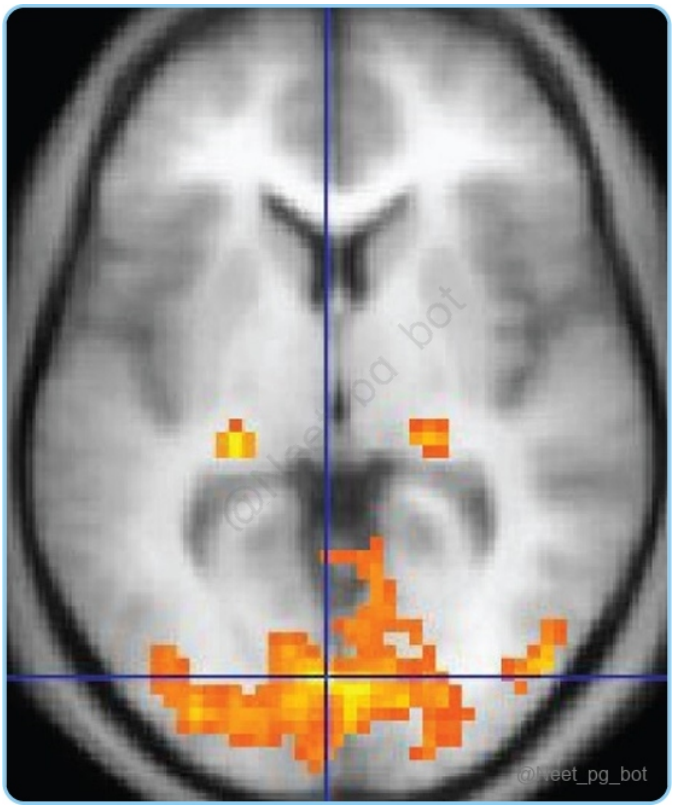
D. Perfusion Weighted Imaging

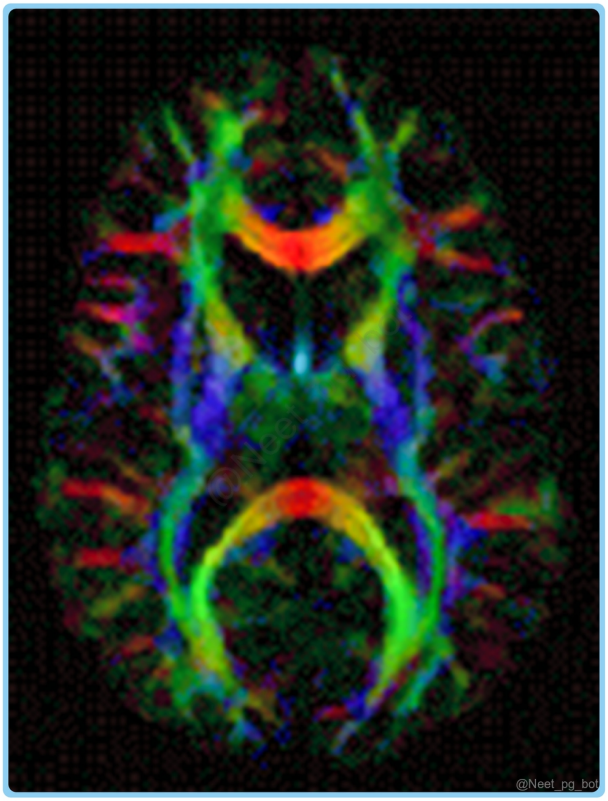
Correct Answer: C. Functional MRI

■ *Listen (English)*

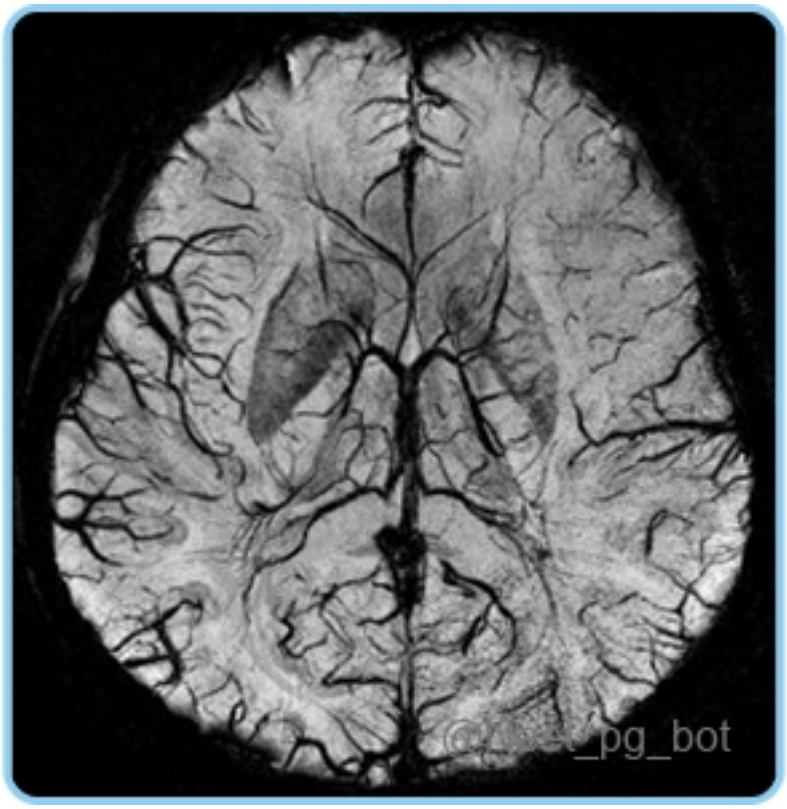
■ *Listen (Hindi)*

Explanation: A functional MRI is used to assess the brain function related to specific tasks, and hence it is used to detect the language center in the brain in this scenario and also in preoperative assessments. Functional MRI (fMRI) It is used for noninvasive mapping of brain function related to specific tasks (e.g., motor, language, visual, memory). It provides insights into functional localization, anatomical variations, and the effects of diseases and adaptations and is important for preoperative assessments in tumors, arteriovenous malformations (AVMs), and epilepsy surgery. Principle Increased neural activity during a task ■ Localized rise in blood flow for oxygen and glucose supply ■ ■ Oxygenated hemoglobin (oxyHb) ■ deoxygenated hemoglobin (deoxyHb) ■ Changes in magnetization ■ Measured by blood oxygen level-dependent (BOLD) effect . The comparison between the BOLD effect measured at rest and while doing a particular function gives the precise functional localization of nerve cells to be color-mapped . Applications Detects functionality in diseases like Alzheimer's. Presurgical assessment for brain tumor and AVM surgeries. Preepilepsy surgery assessment of language centre localization and hemispheric dominance. Diffusion Tensor Imaging (DTR)/Tractography (Option A) : It is a variation of the diffusion-weighted imaging technique. This is useful in analyzing the principal white matter pathways in the brain, connections of various regions of the brain, and their disorders. Susceptibility- Weighted Imaging (SWI) (Option B) It incorporates T2*-signal intensity losses in images. This is highly sensitive for detecting variations in tissue structure caused by differences in susceptibility. Effectively identifies substances such as Deoxygenated blood Hemosiderin Ferritin Calcium T2* T2* (T2 star) relaxation is the time taken for the decay of transverse magnetization in magnetic resonance imaging (MRI), including both the irreversible T2 relaxation and additional reversible dephasing processes. T2* is always less than T2. Perfusion-Weighted Imaging (PWI) (Option D) : Perfusion-weighted imaging encompasses three methods for assessing brain tissue perfusion. It provides information about: Cerebral blood volume (CBV) Cerebral blood flow (CBF) Mean transit time (MTT) Capillary permeability, which is elevated in conditions like gliomas, metastases, and inflammatory lesions Areas of reduced perfusion (oligemic or ischemic brain tissue) Measures tissue blood flow without the need for contrast injection.


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References:

David Sutton Textbook of Radiology and Imaging, Volume 1, 8th edition, Page 349.

Grainger and Allison’s Diagnostic Radiology: A Textbook of Medical Imaging, 7th edition, Page 1375-1377

↑ *Back to this question in Part A*

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Q23: A 60-year-old man is brought to the emergency department with a sudden onset of weakness for an hour on one side of his body. He has a history of deep vein thrombosis but is not compliant with his medications. A CT scan is performed, which shows no acute hemorrhage. An MRI of the brain was performed below. Which MRI sequence is most appropriate for detecting early ischemic changes in this patient? (Q852970)

A. T1 weighted

B. Fluid-attenuated inversion recovery

C. T2 weighted

D. Diffusion-weighted imaging

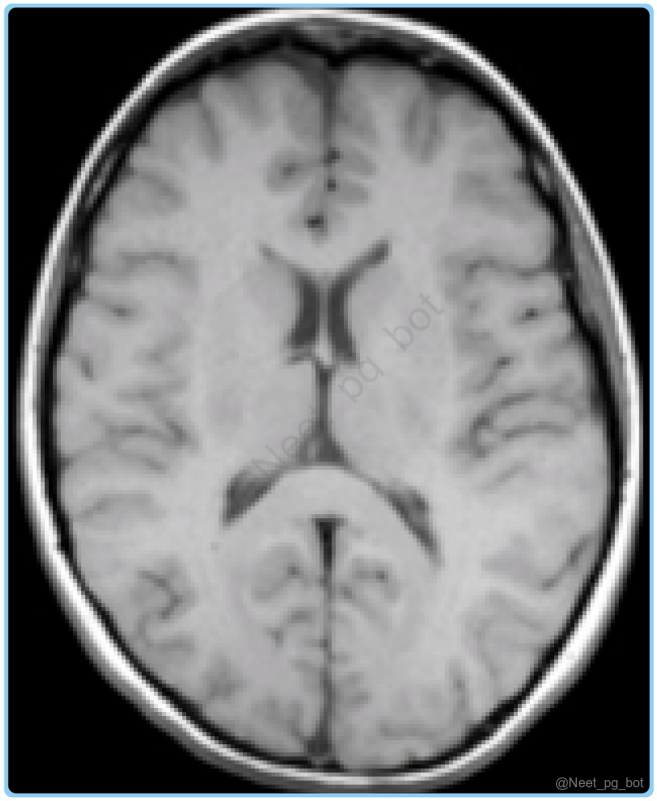


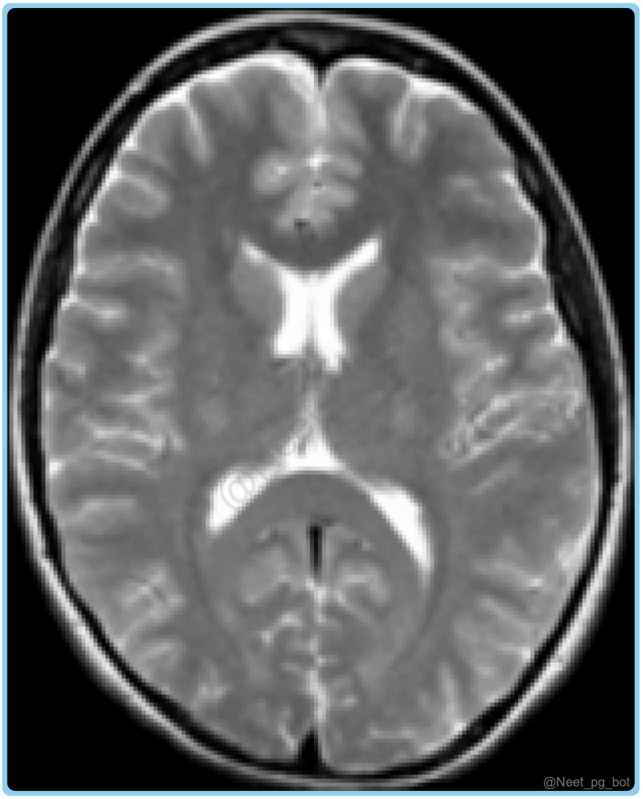
Correct Answer: D. Diffusion-weighted imaging

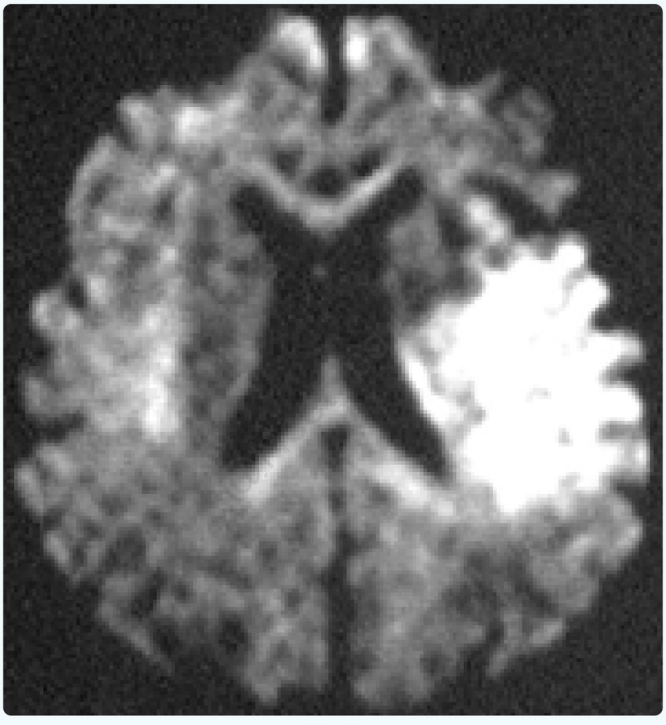
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Explanation: The above scenario points to an acute stroke due to an acute infarct causing ischemia, which is best diagnosed with diffusion-weighted imaging (DWI) MRI as it can detect infarcts within minutes of onset . The image also points out that it is DWI since in this method, the skull is not visualized . T1 weighted vs T2 weighted MRI: The tissue appearance in MRI is either hyperintense or hypointense relative to the gray matter. T1 weighted MRI (Option A) T2 weighted MRI (Option C) T1 is the time taken for the longitudinal magnetization to return to 63% of its original value. Observations: Hyperintense: White matter is more intense than gray matter Fat appears bright Cerebrospinal fluid is of low-intensity Hypointense: Melanin Proteinaceous material Gadolinium-based contrast agents Late subacute hemorrhage T2 is the time taken for the transverse magnetization to decay to 37% of its original value. Observations: Hyperintense: Cerebrospinal fluid Pathologies involving increased tissue water content Hypointense: White matter is hypointense compared to gray matter Fat It has a short TR and TE It has a long TR and TE Newer technologies in MRI Diffusion-Weighted Imaging (DWI) Any pathology that affects the dispersion of water is detected by this method. The shift of extracellular fluid into the intracellular space causes restricted Brownian motion and gets detected as restricted diffusion in the DWI. The skull is not visualized in this method. Applications: Acute brain infarction: The failure of the sodium-potassium ATP pump leads to cytotoxic edema. Detected within minutes of onset . Ischemia is seen as a bright lesion. Regions of active demyelination. Infections like cerebral abscess. Cellular tumors like glioblastoma and lymphoma. Fluid-Attenuated Inversion Recovery (FLAIR) (Option B) This is useful in identifying: Demyelinating plaques Edema Infarcts after 6 hours Differentiation of arachnoid cyst from other complex cysts Hyperintensity may be seen in cerebral or cerebellar sulci due to: Blood product in subarachnoid hemorrhage Pus in meningitis Leptomeningeal spread of tumor Artefact due to oxygen administration during the scanning.

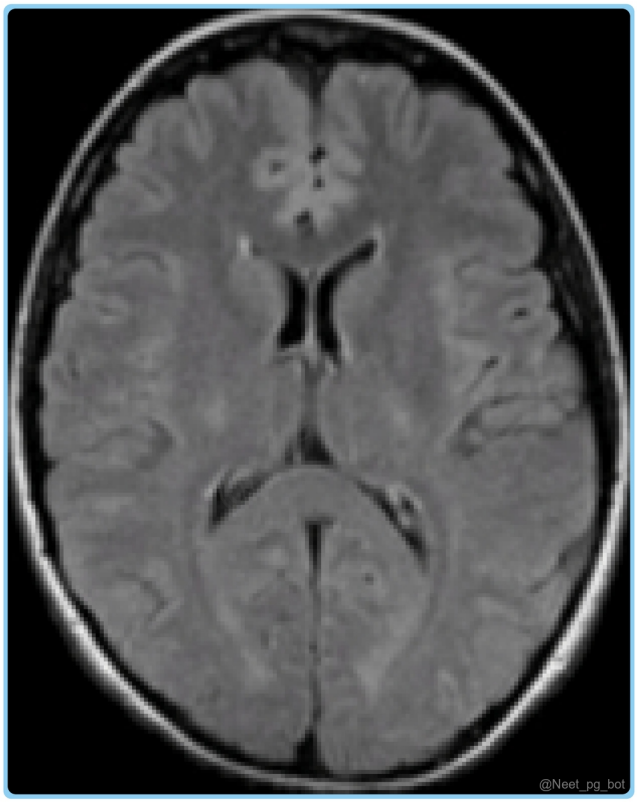






DWI

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References:

David Sutton Textbook of Radiology and Imaging, Volume 1, 8th edition, Page 345, 346, 347, 348, 349, 383.

Grainger and Allison's Diagnostic Radiology: A Textbook of Medical Imaging, 7th edition, Page 1375

↑ *Back to this question in Part A*

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• [12_Neuro Radiology] 025 Neuroradiology-Ii

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[12_Neuro Radiology] 025 Neuroradiology-Ii — Quick Jump

Q1 (p. 1593)	*Q2 (p. 1597)*	*Q3 (p. 1602)*	*Q4 (p. 1604)*	*Q5 (p. 1608)*	*Q6 (p. 1611)*
Q7 (p. 1615)	*Q8 (p. 1619)*	*Q9 (p. 1622)*	*Q10 (p. 1626)*	*Q11 (p. 1631)*	*Q12 (p. 1635)*
Q13 (p. 1641)	*Q14 (p. 1643)*	*Q15 (p. 1645)*	*Q16 (p. 1649)*	*Q17 (p. 1653)*	*Q18 (p. 1656)*
Q19 (p. 1660)	*Q20 (p. 1664)*	*Q21 (p. 1667)*	*Q22 (p. 1671)*	*Q23 (p. 1675)*	

Q1: An intern reviewing an MRI scan observes a "boxcar ventricle" This radiological finding is indicative of which of the following conditions? (Q853137)

A. Creutzfeldt-Jakob disease

B. Huntington's disease

C. Pick's disease

D. Alzheimer's disease

Correct Answer: B. Huntington's disease

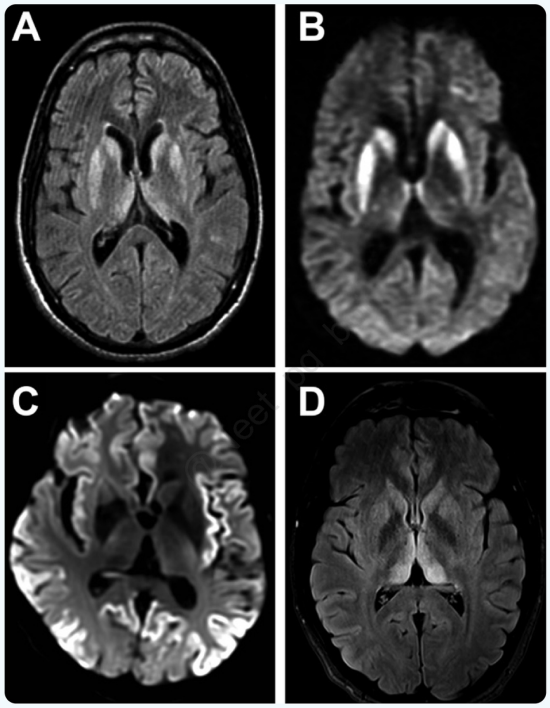
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Explanation: Huntington's disease is characterized by the atrophy of the caudate nucleus and is associated with boxcar-shaped ventricles due to the enlargement of the lateral ventricles. Huntington's Disease Definition Hereditary neurodegenerative disorder characterized by chorea, psychiatric symptoms, and cognitive decline. Inheritance Pattern Autosomal dominant due to a mutation in the HTT gene on chromosome 4 involving a CAG trinucleotide repeat. Clinical Features Chorea: Involuntary, irregular movements. Mood Changes: Irritability and aggressive behavior. Cognitive Decline: Progressive memory loss (dementia). Radiological Findings Atrophy of Caudate Nucleus: Leads to dilation of the frontal horn of the lateral ventricle. "Boxcar Ventricles" Appearance: Resulting from caudate atrophy. Creutzfeldt-Jakob Disease (CJD) (Option A) Definition A rapidly progressive neurodegenerative disorder caused by prions—misfolded proteins that induce other proteins to misfold, leading to brain damage. Clinical Features Cognitive Decline: Rapid deterioration of mental function. Behavioral Changes: Altered behavior and personality. Myoclonus: Sudden muscle jerks. Radiological Findings Diffusion-weighted MRI Findings: Increased signal intensity in the basal ganglia (particularly in the putamen and caudate nuclei) and cortical ribboning. Ventricular Enlargement: Atrophy leading to enlarged ventricles Variant Creutzfeldt-Jakob Disease (vCJD) A subtype of CJD associated with consumption of beef products contaminated with BSE (bovine spongiform encephalopathy). Radiological Findings Cortical Atrophy: Particularly in the occipital and parietal lobes. Increased Signal Intensity on MRI: Observed in affected areas, especially in the basal ganglia and cerebral cortex. Pulvinar Sign (Image A): Increased signal intensity in the pulvinar nucleus of the thalamus. Hockey Stick

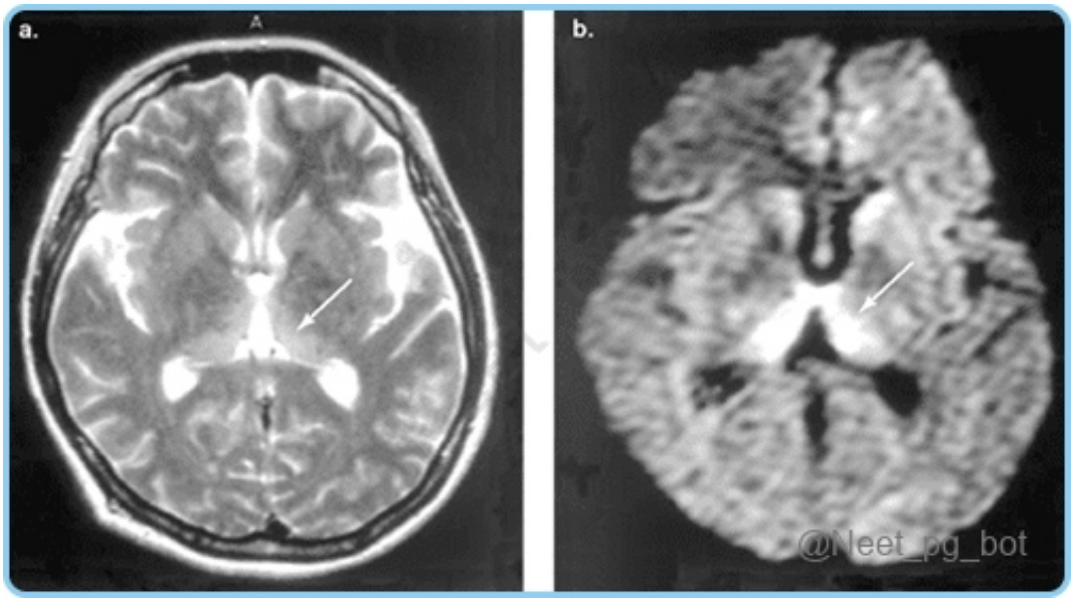
Sign (Image B): A characteristic appearance on MRI, indicating involvement of the posterior thalamus. Pick’s Disease (Frontotemporal Dementia) (Option C) Definition A type of frontotemporal dementia characterized by early changes in personality, behavior, and social conduct. Affected Areas Primarily affects the frontal and temporal lobes. Clinical Features Behavioral Abnormalities: Significant personality changes and social withdrawal. Radiological Findings Prominent Sulci in the Frontal Lobe: Indicates atrophy of the frontal lobe. Symmetric Disproportionate Atrophy of the Frontal Lobe: A hallmark distinguishing it from other forms of dementia. Alzheimer’s Disease (Option D) Definition The most common form of dementia, marked by progressive memory loss, cognitive decline, and changes in behavior and personality. Pathophysiology Accumulation of amyloid plaques and neurofibrillary tangles in the brain. Clinical Features Memory Impairment: Often the earliest symptom reported is difficulty remembering recent events. Radiological Findings Bilateral Symmetric Disproportionate Atrophy of the Hippocampus: Affects memory function. Prominent Temporal Horns of the Lateral Ventricles: An indirect sign of hippocampal atrophy, indicating significant neurodegeneration in the temporal lobes.

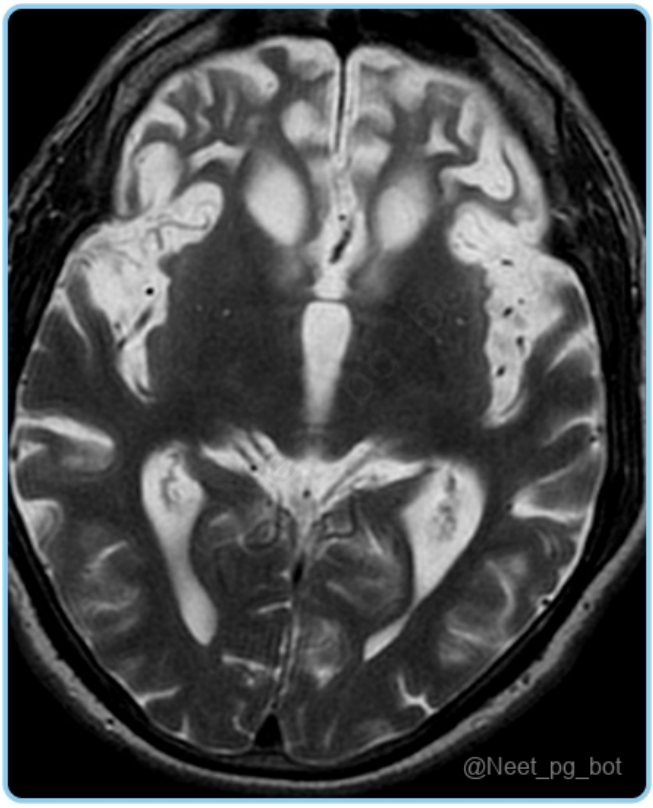




Typical FLAIR-MRI features of Creutzfeldt–Jakob disease. (A and B) Visible basal ganglia lesions, more obvious on diffusion-weighted sequences (B). (C) Striking cortical ribboning with normal basal ganglia. (D) Variant Creutzfeldt–Jakob disease showing pulvinar sign.

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References:

Grainger & Allison's Diagnostic Radiology, 7th Edition, Page: 1551,1552, 1554

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4223233/

https://www.ncbi.nlm.nih.gov/books/NBK562226/

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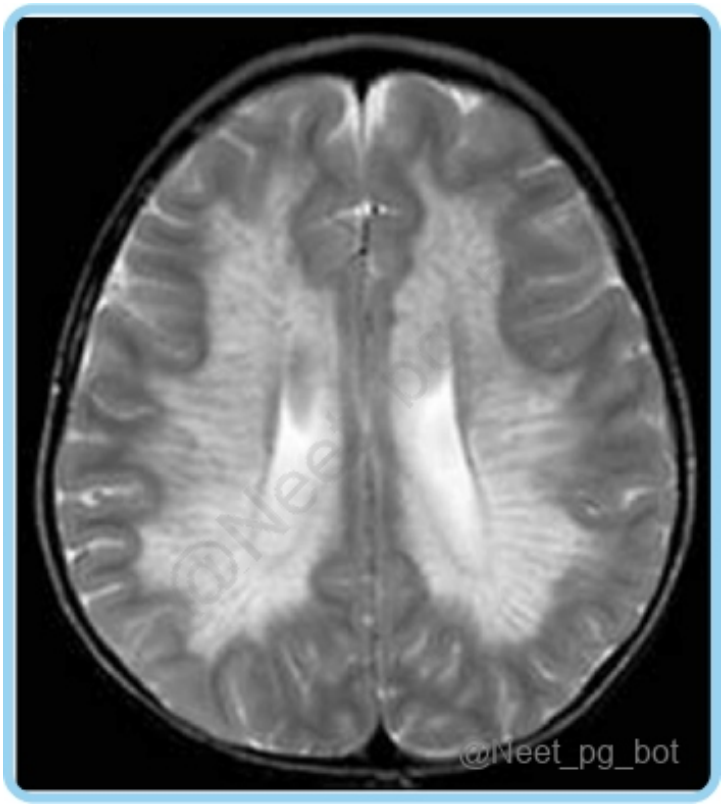
Q2: A 3-year-old child presents with progressive motor decline, cognitive regression, and spasticity. MRI shows confluent and symmetric hyperintense T2 signals in the periventricular and deep white matter, with sparing of subcortical U fibers & tigroid pattern is noted. What is the underlying enzymatic deficiency? (Q853142)

A. Aspartoacylase deficiency

B. Arylsulfatase A deficiency

C. β-Galactocerebrosidase deficiency

D. Glutaryl-CoA deficiency

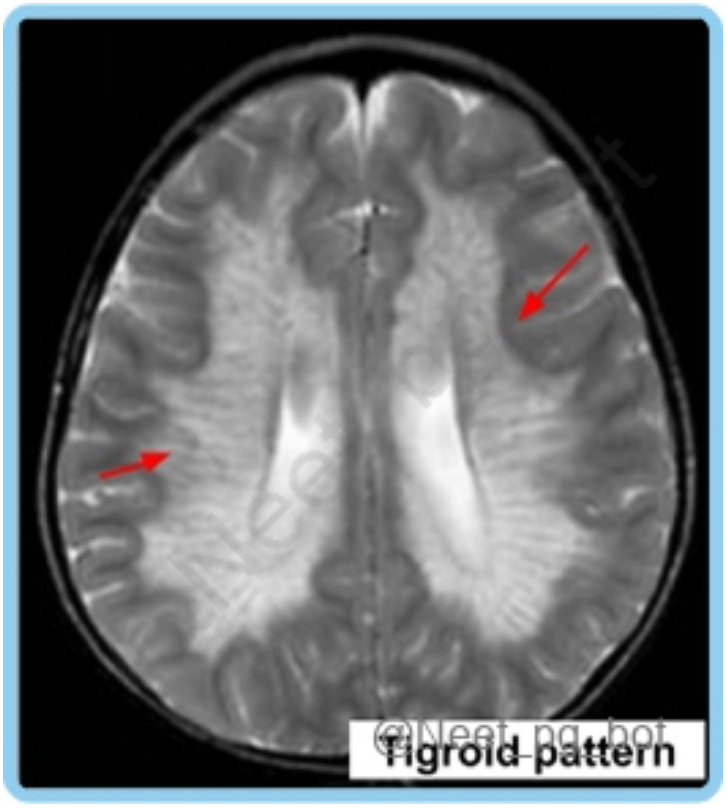


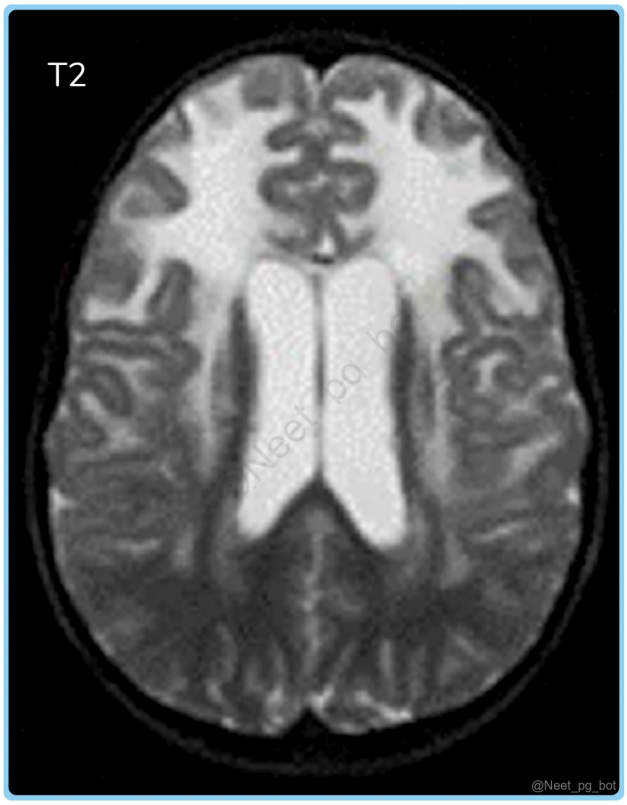
Correct Answer: B. Arylsulfatase A deficiency

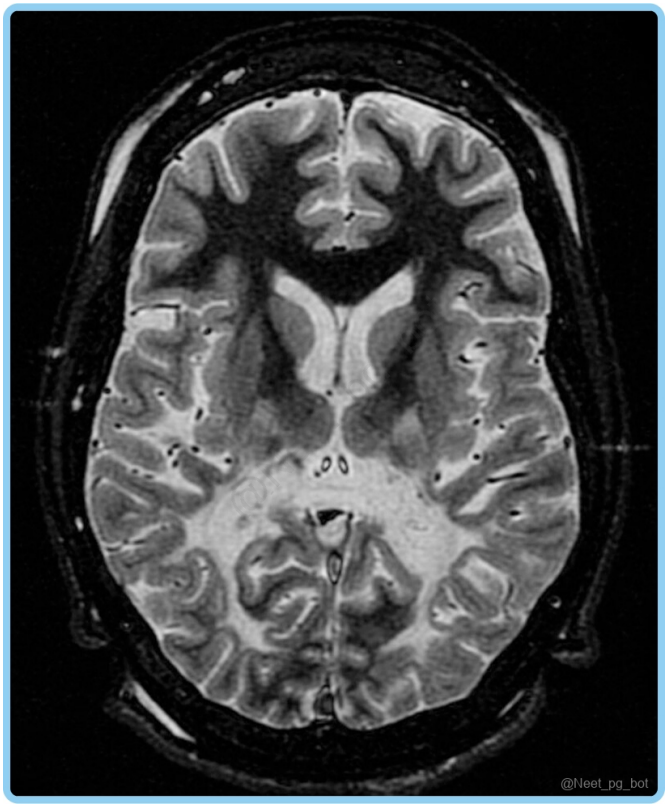
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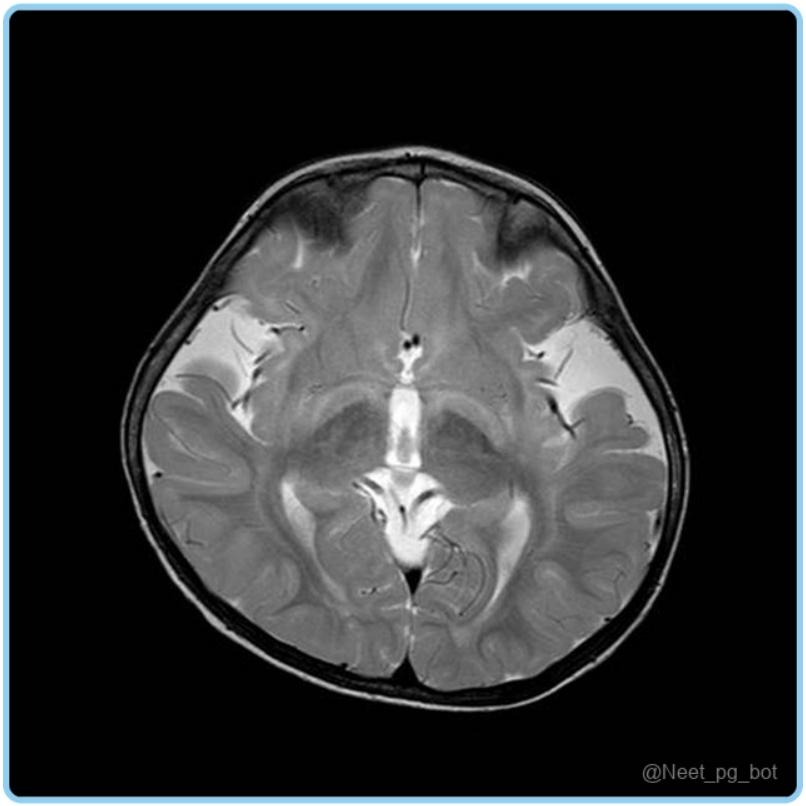
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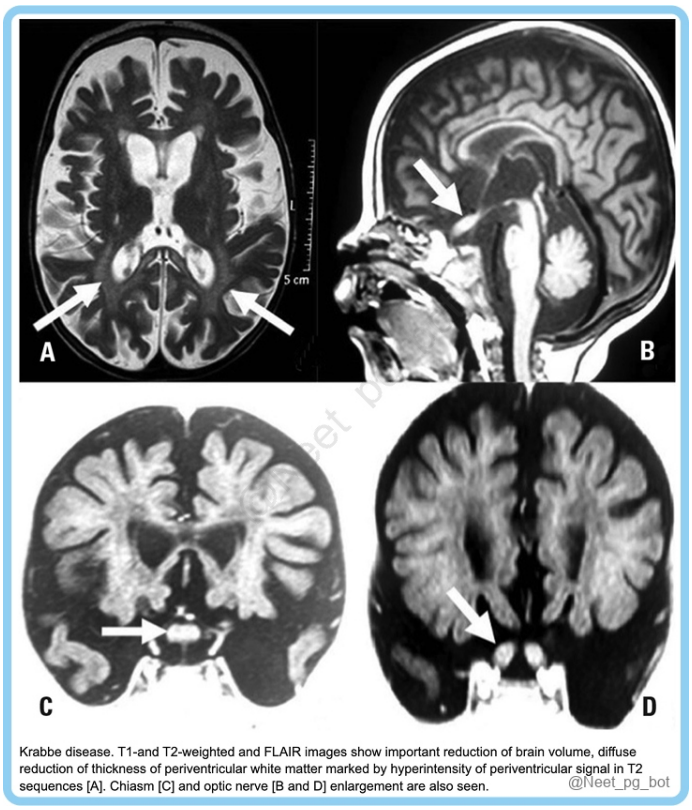
Explanation: Arylsulfatase A deficiency leads to Metachromatic Leukodystrophy , which presents with symmetric periventricular white matter changes and the characteristic tigroid pattern on MRI. Metachromatic leukodystrophy Caused by a deficiency of the enzyme Arylsulfatase A (Option B) Characterized by confluent and symmetric hyperintense T2 signals in the periventricular and deep white matter , while subcortical U fibers are relatively spared. The perivenular myelin shows relative sparing , creating a tigroid pattern. Alexander disease Three clinical forms exist: infantile, juvenile, and adult, with the infantile form being the most common, presenting with macrocephaly . Characteristic T2 hyperintense signal in bifrontal white matter . Early disease may show intense post-contrast enhancement. Histopathologically characterized by Rosenthal fibers in the brain. Adrenoleukodystrophy An inherited X-linked peroxisomal disorder caused by a mutation in the ABCD1 gene . Accumulation of very long-chain fatty acids in the white matter. Confluent T2 hyperintense signal in periventricular and deep white matter, especially in peritrigonal regions . Marked rim enhancement on post-contrast T1 images at the leading edge indicates perivascular inflammation linked to demyelination. Glutaric aciduria type I It is caused by an inherited deficiency of the enzyme glutaryl-CoA. (Option D) Atrophy or hypoplasia of the frontotemporal regions . Enlarged anterior temporal subarachnoid spaces. Cyst-like dilation of the Sylvian fissures with a "batwing" appearance. Globoid Leukodystrophy (Krabbe’s Disease) A lysosomal disorder caused by a deficiency of the enzyme β-galactocerebrosidase . (Option C) CT shows symmetrical hyperdensity in the basal ganglia , thalami , cerebellum , and corona radiata. Enlargement of the optic chiasm and optic nerves MRI reveals confluent, symmetric T2 hyperintense signals in the periventricular and deep white matter. Alternating hyperintense and hypointense signals in the cerebellar white matter surrounding the dentate nuclei. Canavan Disease An autosomal recessive disorder caused by a deficiency of the aspartoacylase enzyme . (Option A) Leads to increased levels of N-acetyl aspartate (NAA) in the brain, resulting in spongiform degeneration of white matter , globus pallidus, and thalami. Presents with macrocephaly and hypotonia On MRI there is Involvement of subcortical U fibers, thalamus, and globus pallidus, with relative sparing of the internal capsules and putamen. The distinctive finding on MR spectroscopy is an increase in N-acetylaspartate (NAA) .


Tigroid pattern
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T2
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Krabbe disease. T1-and T2-weighted and FLAIR images show important reduction of brain volume, diffuse reduction of thickness of periventricular white matter marked by hyperintensity of periventricular signal in T2 sequences [A]. Chiasm [C] and optic nerve [B and D] enlargement are also seen.



References:

David Sutton Textbook of Radiology & Imaging 8th edition Volume 2 Page 2447, 2448, 2449

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5228723/#

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4845155/

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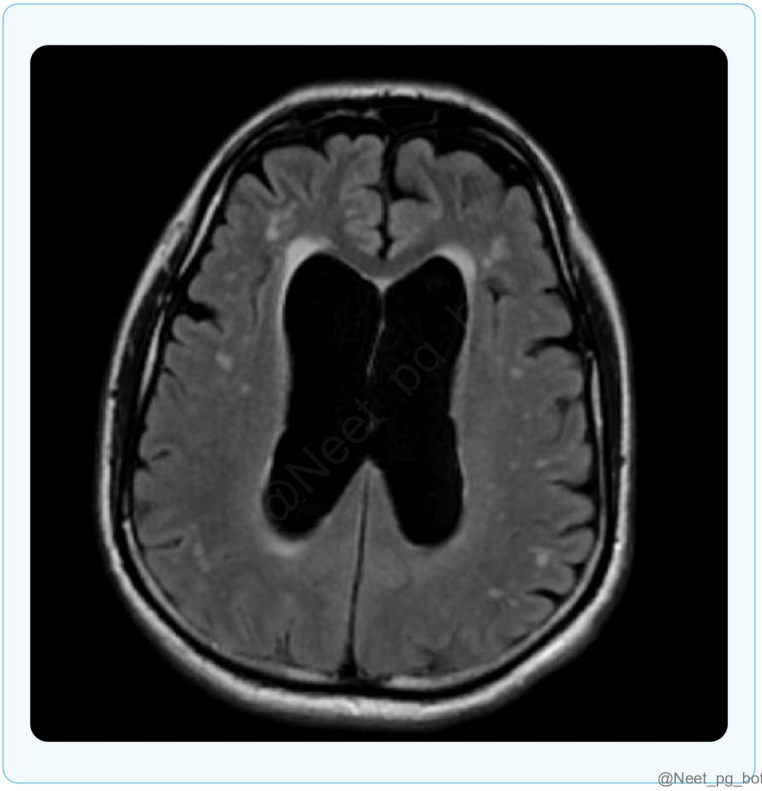
Q3: A 75-year-old female presents to the clinic with a 6-month history of progressive difficulty in walking, frequent urinary urgency, and occasional episodes of confusion. Imaging is performed, revealing ventriculomegaly and effacement of the sulci at the vertex as shown. Which of the following statements about the condition is false? (Q853166)

A. It is idiopathic but can be caused due to past injuries

B. The Evans ratio is less than 0.31

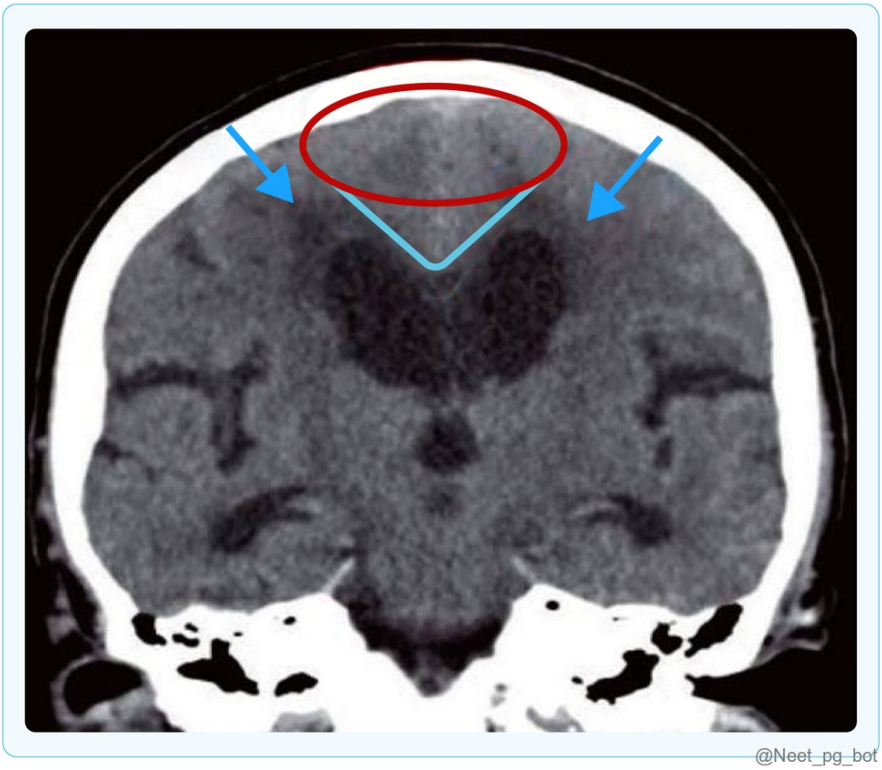
C. The callosal angle is less than 90 degrees

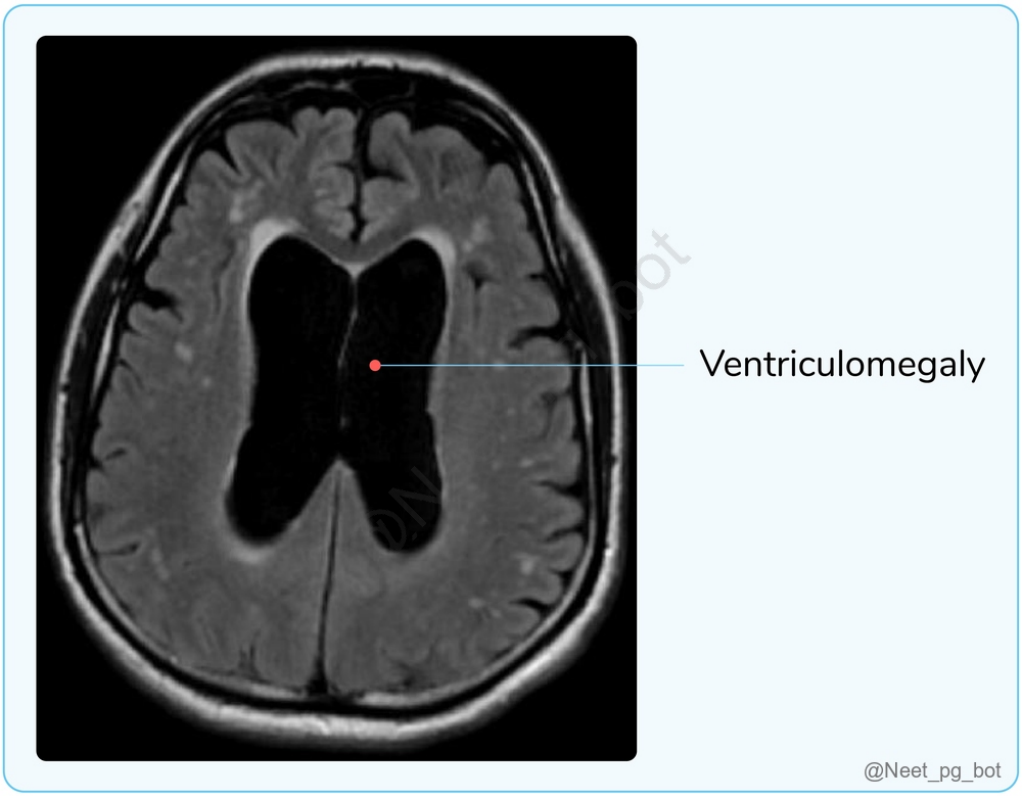
D. A disproportionately enlarged subarachnoid space is seen



Correct Answer: B. The Evans ratio is less than 0.31

Explanation: The scenario here points to the diagnosis of normal pressure hydrocephalus in which the Evans ratio is more than 0.31 . Normal Pressure Hydrocephalus (NPH) NPH is often idiopathic but can result from prior injuries affecting cerebrospinal fluid (CSF) dynamics, such as subarachnoid hemorrhage. (Option A) Clinical presentation Gait disturbance: progressive difficulties in walking Urinary issues: urgency or incontinence Cognitive impairment: decline in cognitive functions Imaging Characteristics Ventriculomegaly is typically seen Evans ratio : the ratio of the maximum width of frontal horns to inner table width of more than 0.31 is often used for evaluation but has low diagnostic accuracy. An acute callosal angle (less than 90°) on coronal MR images is another measurement used, also with limited accuracy. (Option C) A disproportionately enlarged subarachnoid space hydrocephalus (Option D) is seen having ventriculomegaly combined with sulcal effacement at the vertex and scattered enlarged sulci. CSF flow study shows hyper-dynamism with a streak of flow void through cerebral aqueduct.





References:

David Sutton Textbook of Radiology and Imaging, volume 2, 8th edition, page: 2083

↑ *Back to this question in Part A*

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Q4: A 6-year-old boy presents to the pediatric neurologist with a history of recurrent seizures since he was 1 year old. Upon examination, a port wine stain is noted on the right side of his face. What imaging findings would you expect to see in this patient, considering Sturge–Weber Syndrome? (Q853165)

A. Normal MRI with no abnormality

B. Cystic lesions with enhancing mural nodules in the cerebellum

C. Tramline calcifications and atrophy of the affected hemisphere

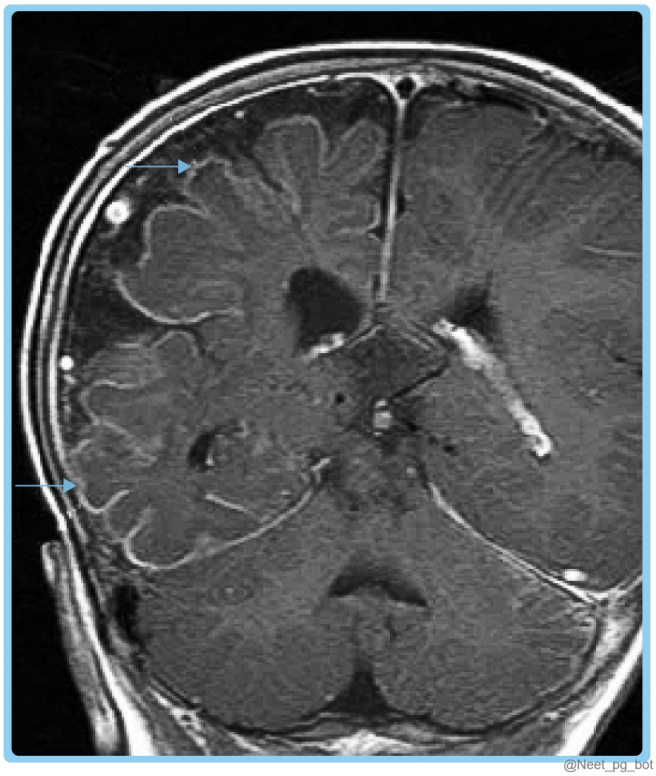
D. Cerebellar atrophy

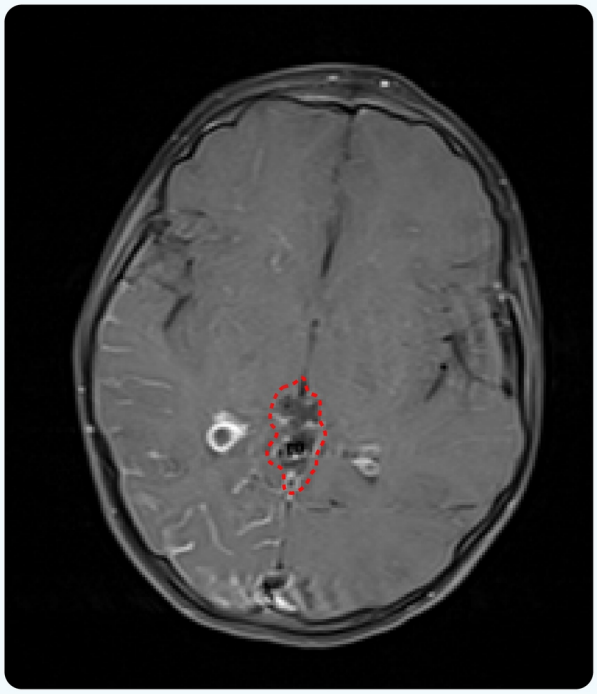
Correct Answer: C. Tramline calcifications and atrophy of the affected hemisphere

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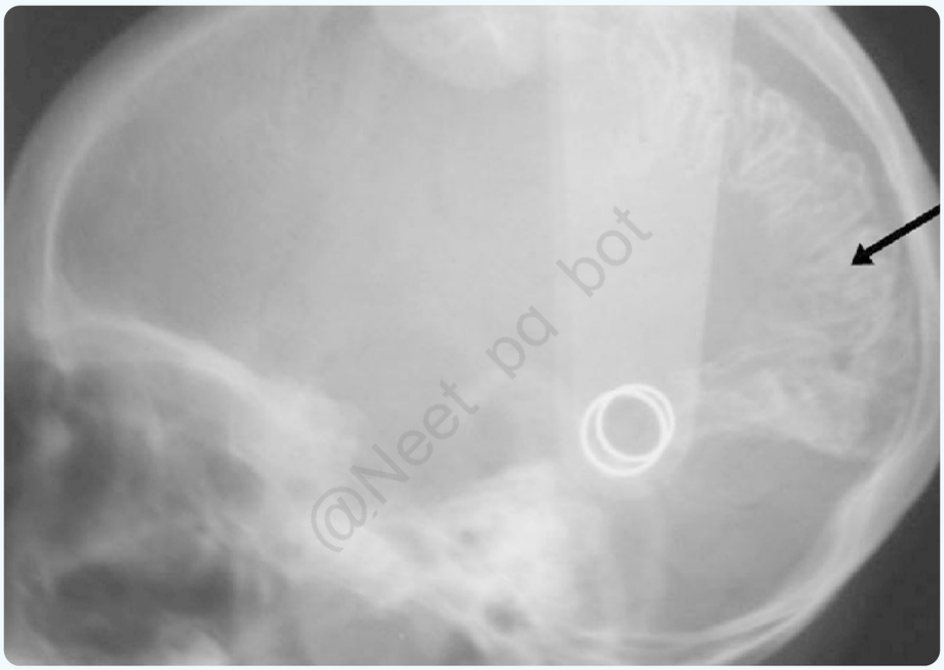
Explanation: In Sturge-Weber syndrome, the tramline calcifications, caused due to chronic ischemia and atrophy of the affected hemisphere, are seen as later findings, that is, after 2 years of the child, which is the case depicted here with a 6-year-old child. Sturge-Weber Syndrome (SWS) It is a congenital syndrome characterized by a facial port-wine stain (nevus) and ipsilateral leptomeningeal angiomas, typically located in the parieto-occipital region. Clinically present with: Focal seizures often begin in the first year of life and may become refractory later Developmental delay Progressive hemiparesis Hemianopsia Intellectual impairment Glaucoma (Unilateral) Imaging findings: Early Imaging: CT and MRI may appear normal initially as pial angiomas may not be noticeable before age 2 . (Option A ruled out) By age 2 , " tramline calcifications " may be visible on skull radiographs due to chronic ischemia. The affected hemisphere shows atrophy and progressive cortical calcification. A pial angioma is seen as diffuse pial enhancement, with possible variable thickness on imaging. Other Findings: enlargement of the ipsilateral choroid plexus and dilation of veins connecting superficial and deep venous systems. Late imaging: Burnt Out Cases: in chronic cases, the pial angioma may no longer be detectable, leaving a shrunken, calcified hemisphere. Polymicrogyria may be observed in some children with SWS. Cystic lesions with enhancing mural nodules in the cerebellum (Option B) is incorrect because this description is classic for hemangioblastoma (seen in Von Hippel–Lindau disease), not Sturge–Weber syndrome, which primarily affects the cerebral cortex (parieto-occipital region) . Cerebellar atrophy (Option D) is incorrect because Sturge–Weber syndrome causes ipsilateral cerebral hemispheric atrophy due to leptomeningeal angiomas, not isolated cerebellar degeneration.





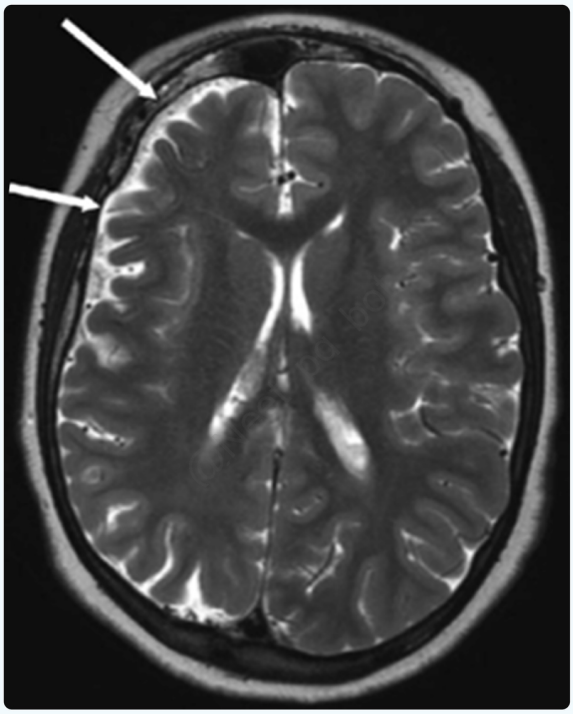
Enlarged choroid plexus

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Tramline gyriform calcifications in the occipital region

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Cortical atrophy with abnormal vessels

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Choroidal hemangioma

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Portwine stain in sturge weber syndrome

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References:

David Sutton Textbook of Radiology and Imaging, Volume 2, 8th Edition, Pages 2003, 2004, 2537

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4106125/

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Q5: An infant undergoes a brain MRI that reveals a crescent-shaped mass filling the entire ventricular system, with the interhemispheric fissure not visible. The cerebrum exhibits a pancake-like appearance of the cerebral tissue, and there are no identifiable structures of the corpus callosum or falx cerebri. Which of the following conditions is the most likely diagnosis for this infant? (Q853164)

A. Alobar holoprosencephaly

B. Schizencephaly

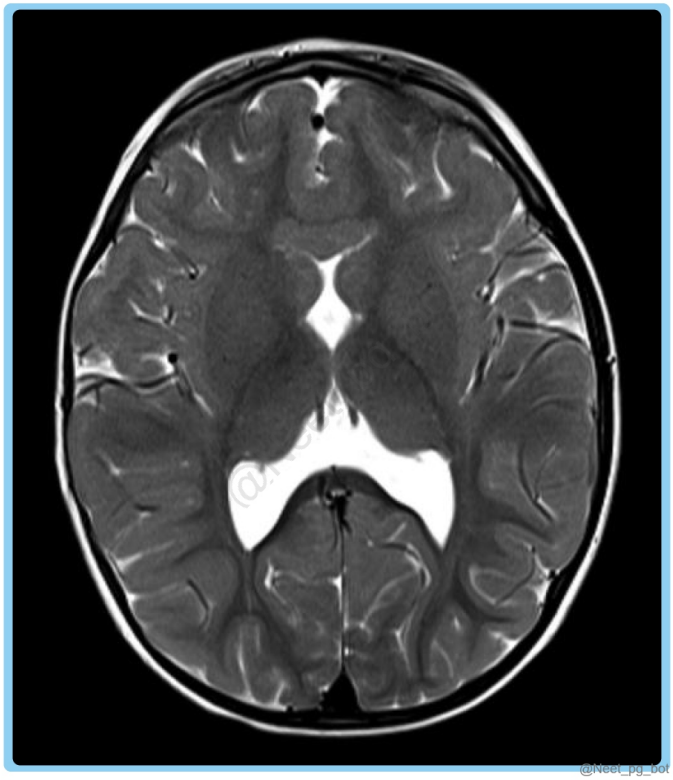
C. Lissencephaly

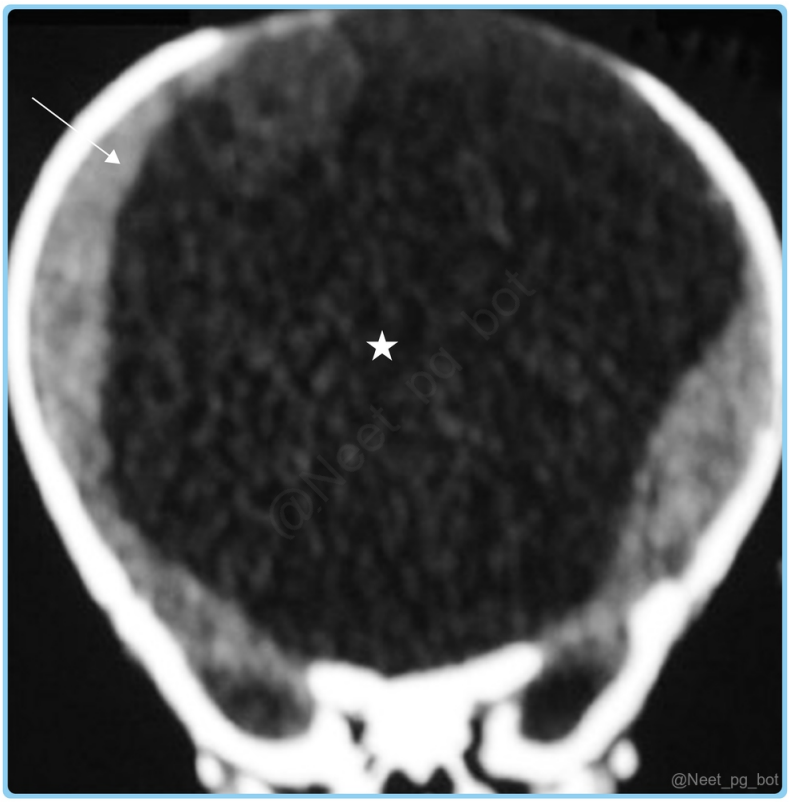
D. Lobar holoprosencephaly

Correct Answer: A. Alobar holoprosencephaly

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Explanation: The clinical scenario and MRI findings correspond to the diagnosis of alobar holoprosencephaly with a pancake-like tissue on the cerebrum and a crescent-shaped holo ventricle . Holoprosencephaly Holoprosencephaly is a forebrain malformation caused by incomplete separation of the cerebral hemispheres, associated with facial deformities. It has varying severity, classified into Alobar Semilobar Lobar Interhemispheric types Imaging Findings: Alobar : Crescent-shaped holo ventricle with no interhemispheric fissure Cerebrum has a pancake - like mass of tissue on imaging No interhemispheric fissure, corpus callosum, or falx cerebri Semilobar: Partial separation of the hemispheres, presenting with a single ventricle Mild facial abnormalities Lobar (Option D) : Near-normal separation of hemispheres with some continuous cortex between the frontal lobes Typically shows normal brain volume Interhemispheric (Syntelencephaly): Anterior and posterior fissures are present, but the middle lacks an interhemispheric fissure with fused frontal and parietal lobes Schizencephaly (Option B): Schizencephaly is a defect in the cerebral mantle characterized by a cleft that connects the calvarium with the lateral ventricles, lined with grey matter and leptomeninges. The cleft can be classified as: Open lip (wide-open defect) Closed lip (closed but lined with grey matter) Imaging Findings: CT: lateral ventricles may show clefts and abnormalities in the cortical mantle. MRI: Closed lip forms are best visualized showing abnormal cortical thickness due to polymicrogyria Potential contralateral developmental abnormalities are visualized as well Lissencephaly (Option C): Lissencephaly, or "smooth brain," involves abnormal neuronal migration resulting in a thickened cortex with few or no gyri, often associated with agenesis of the corpus callosum. It can be categorized into complete lissencephaly (no gyri) and incomplete lissencephaly (fewer, broader gyri). Imaging Findings: MRI: Shows a smooth cortical surface Shallow and wide Sylvian fissures A thin outer cortical layer with a thicker band of grey matter underneath

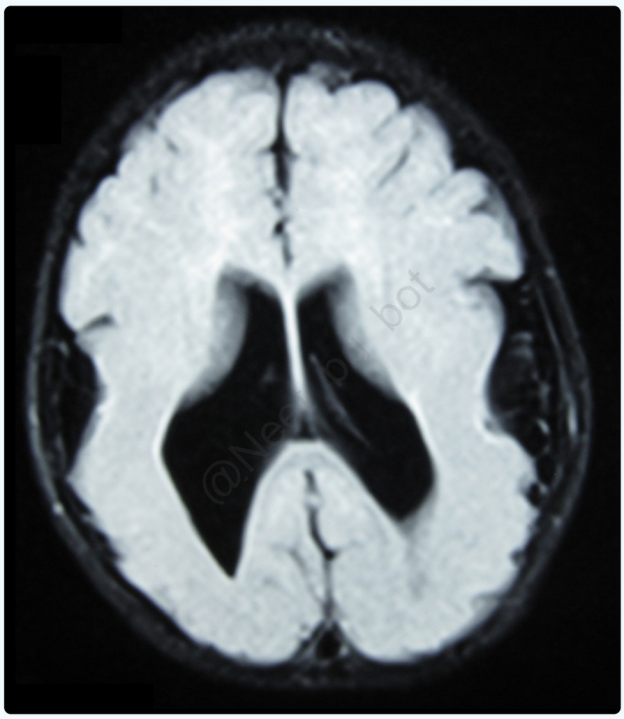






Schizencephaly

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MRI- lissencephaly

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References:

Grainger & Allison's Diagnostic Radiology 7th Edition, page: 1992, 1993, 1887, 1998

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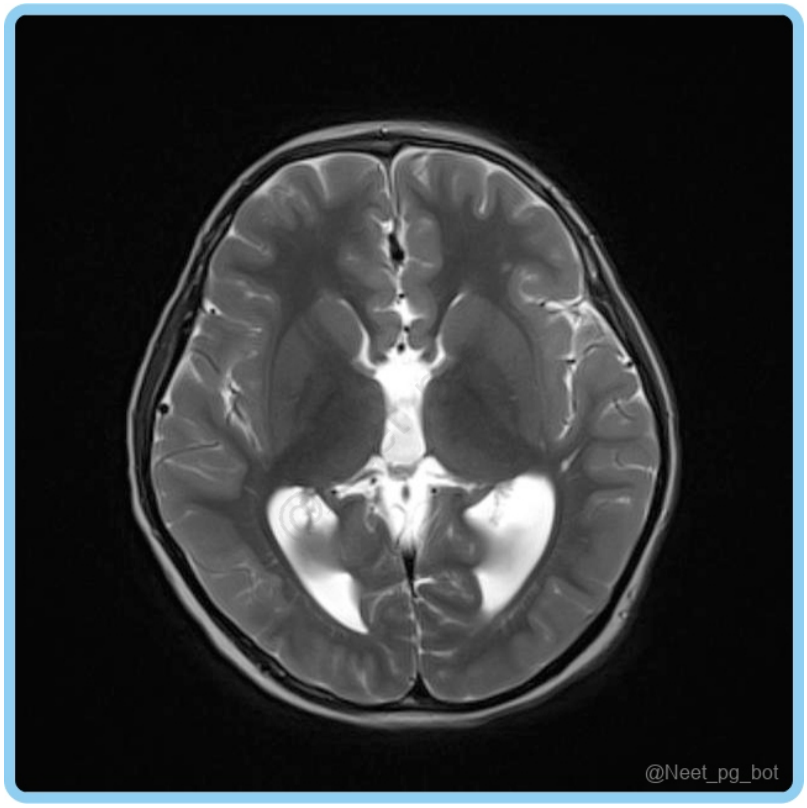
Q6: The brain imaging of a child reveals the following: What is the classical appearance of the lateral ventricles in this image called? (Q853162)

A. Batwing appearance

B. Sunray appearance

C. Race car appearance

D. Moose-head appearance



Correct Answer: C. Race car appearance

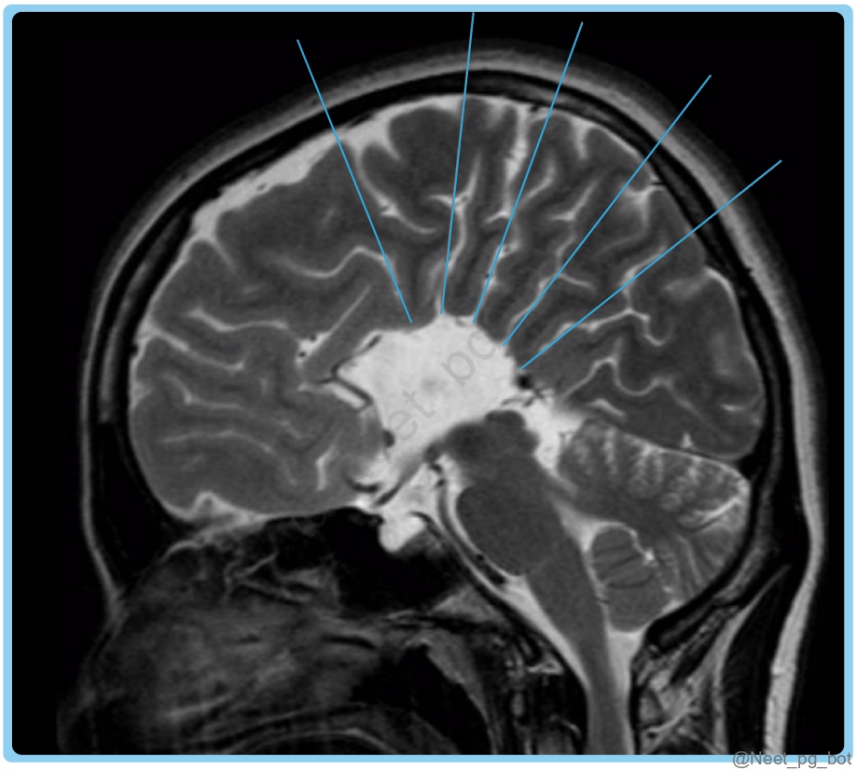
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Explanation: The lateral ventricles in the given image are parallel to each other with a posterior enlargement (colpocephaly) resembling a race car and hence called the race car appearance which is found in corpus callosum agenesis. Corpus callosum agenesis: The corpus callosum is part of major interhemispheric commissural connections and consists of the rostrum, genu, body, and splenium. Isthmus is the narrowing point between the body and splenium of the corpus callosum. The partial formation of the corpus callosum is called dysgenesis and the complete absence is agenesis. Axial Imaging: Lateral ventricles appear parallel with typical posterior enlargement known as colpocephaly resembling a “ race car ”. The third ventricle is positioned higher than normal. Normal convergence of the lateral ventricle bodies towards the midline is absent. Sagittal Imaging: Absence of the corpus callosum. Vertically oriented sulci extend down to the ventricle without the development of cingulate gyri. The cingulate sulcus is absent. Sunray appearance of gyri radiating outward in a radial pattern from the ventricle is seen. (Option B) Coronal Imaging: The absence of the corpus callosum is noted in the midline. The third ventricle appears elevated. Characteristic indentation on the medial aspect of the lateral ventricles due to the bundles of Probst represent white matter tracts unable to cross the midline. The " moose head appearance ," also known as the " Viking helmet sign " or " longhorn appearance ," of the frontal horns due to the eversion of the bilateral cingulate gyri is seen. (Option D) Joubert Syndrome: It is a group of recessive congenital ataxia disorders. Usually presents with neonatal hypotonia, tachypnea, abnormal eye movements, and mental retardation. Molar tooth sign is characterized by midbrain hypoplasia and an abnormally deep interpeduncular fossa with failure of the superior cerebellar peduncles to cross the midline. Axial Imaging Findings: The abnormal shape of the fourth ventricle is often described as having a "batwing appearance." (Option A) Hypoplastic cerebellum with a midline vermian cleft and a dysplastic small vermis. Small midbrain size Batwing Appearance

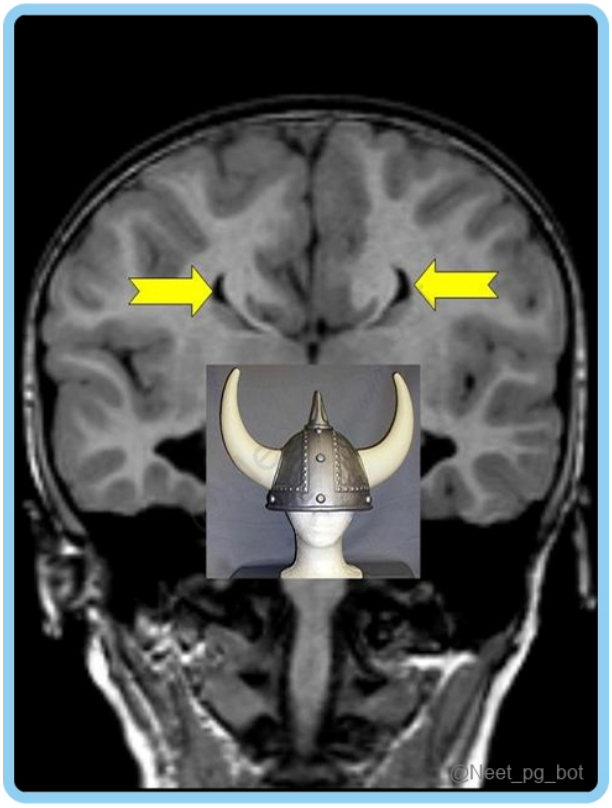


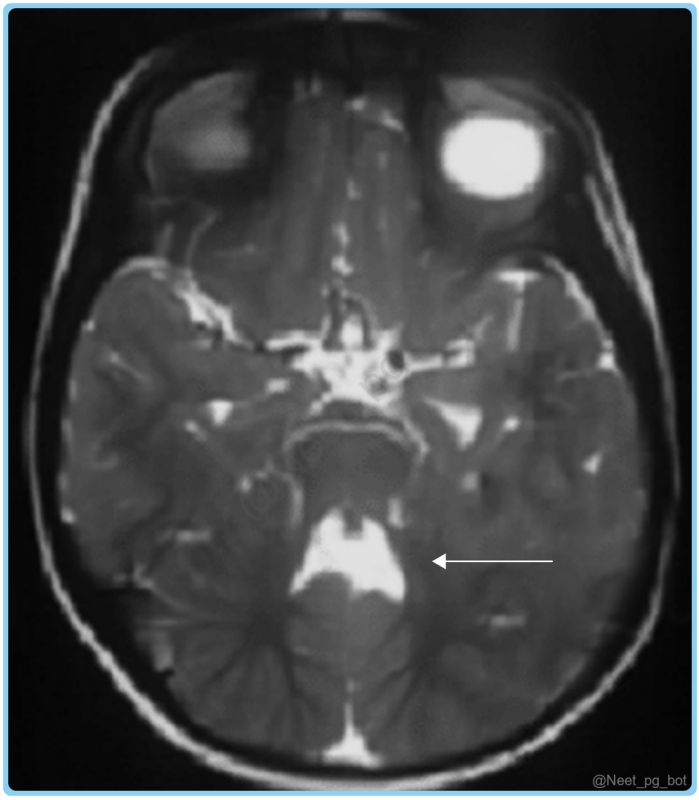
Racing car sign of corpus callosum agenesis

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References:

Grainger & Allison's Diagnostic Radiology 7th Edition, Pages 1993, 1994, 1988, 1989

https://www.ncbi.nlm.nih.gov/books/NBK540986/

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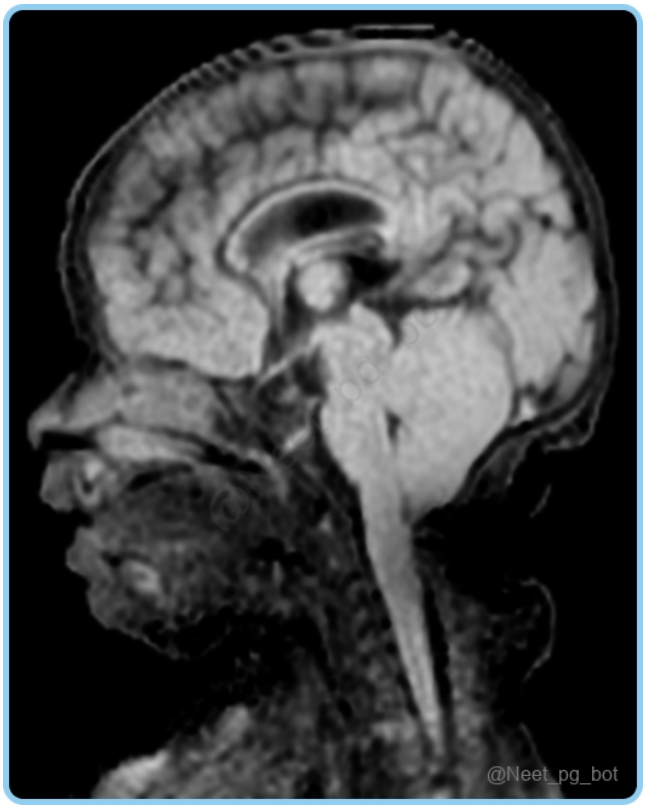
Q7: A 3-month-old infant is evaluated for developmental delays and abnormal head shape. An MRI reveals a dysplastic cerebellum with an everted inferior vermis. Which type of Chiari malformation is most likely indicated by these findings? (Q853160)

A. Chiari Type I

B. Chiari Type II

C. Chiari Type III

D. Chiari Type IV



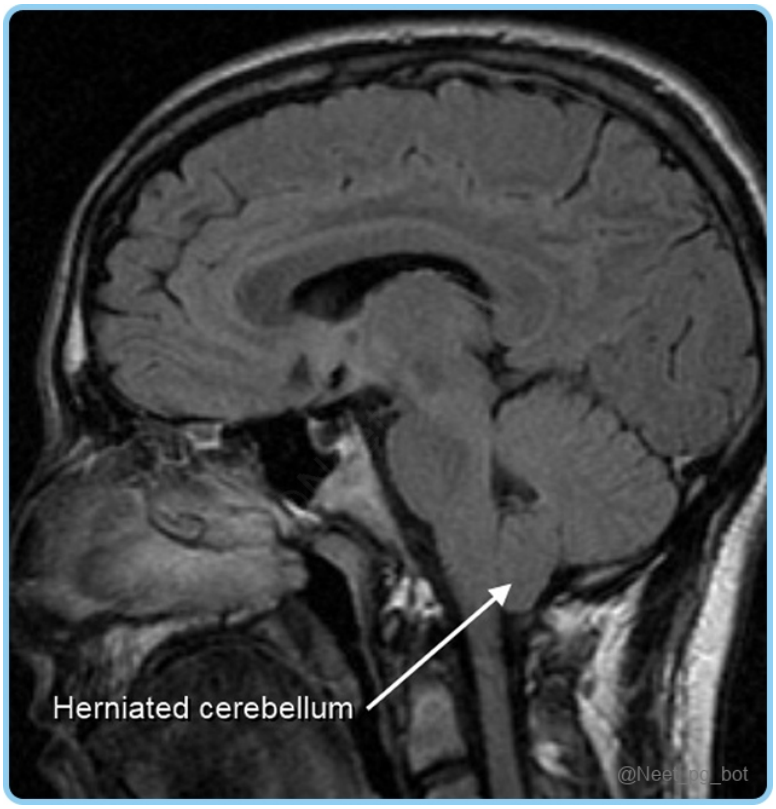
Correct Answer: B. Chiari Type II

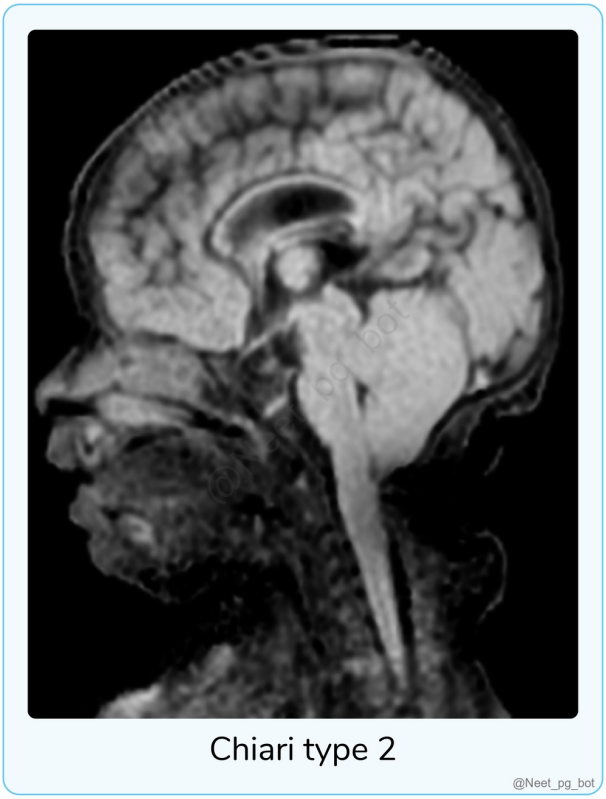
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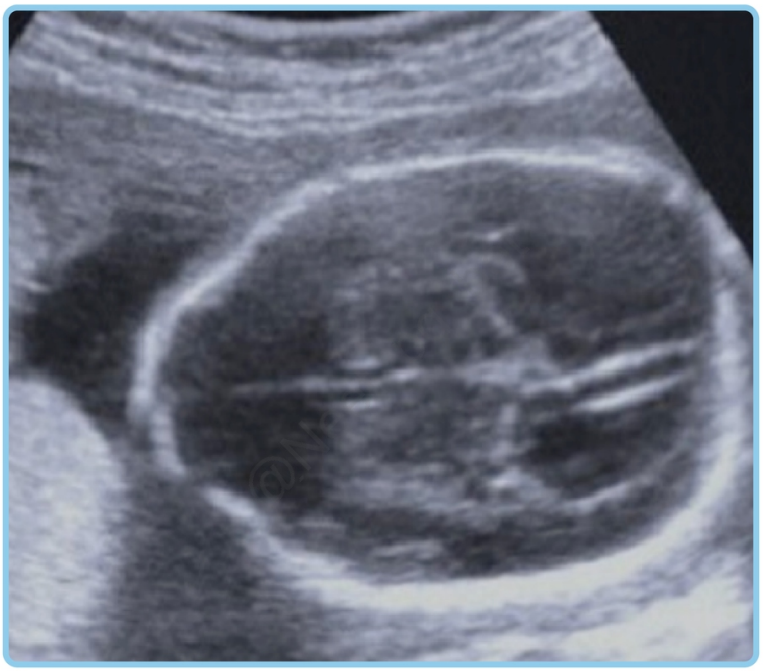
Explanation: The dysplastic cerebellum with an everted inferior vermis points to the diagnosis of Type II Chiari malformation. Chirari or Arnold-Chiari malformations: Chiari malformations involve the dislocation of the hindbrain into the spinal canal. Chiari described 4 types: Chiari I : often acquired and associated with conditions affecting intracranial or intraspinal pressure. Chiari II : primarily seen in pediatric cases and characterized by dysplastic cerebellum. Types III and IV : rarely seen. Chiari Type I lesion or cerebellar ectopia (Option A) Chiari Type II malformations Chiari Type III (Option C) Description Involves the descent of normal cerebellar hemispheres below the foramen magnum, often with pointed tonsils. Defined by a dysplastic cerebellum with an everted inferior vermis. This is a rare type. Involves herniation of the hindbrain (cerebellum with or without brainstem). Anatomical changes The cisterna magna is often obliterated. Medulla oblongata elongation occurs leading to kinking as the fourth ventricle tail rolls over the spinal cord as it descends into the cervical canal. Occipitalisation of the atlas and basilar invagination is seen. The cerebellum herniates mainly involving the inferior vermis. Medulla oblongata is elongated and may become kinked. Compression and progressive degeneration of the brainstem, cerebellum, and upper spinal cord. Brain anomalies of Type II Occipital or cervical encephalocele Occipital bone defect Associated presentations Patients become symptomatic only in adulthood and it is often associated with syringomyelia. Ectopia of ≤2 mm is usually considered normal, while ≥5 mm is considered abnormal. MRI findings tend to overestimate the prevalence. Hydrocephalus Dysplasia of the cerebral hemisphere, cranial vaults, and meninges. Meningomyelocele is present in 98% of cases. A low occipital or high cervical meningoencephalocele. MRI images in the coronal plane Fetal sonography findings Lemon sign: flattening or inward scalloping or bowing of the frontal bone. Banana sign: due to abnormal anterior curvature of the cerebellum or obliteration of cisterna magna. Type IV Chiari malformation (Option D) is a rare condition and

is considered an obsolete diagnosis currently. It was previously diagnosed when there is a cerebellar hypoplasia and/or meningomyelocele.



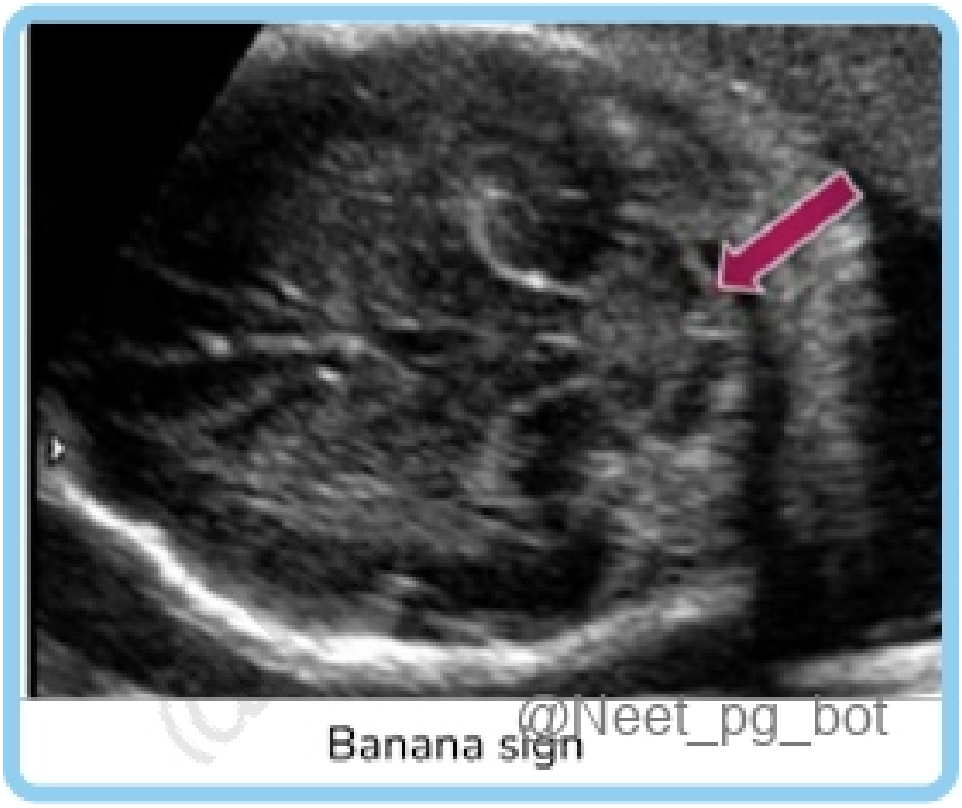






Lemon sign

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References:

Grainger & Allison's Diagnostic Radiology 7th Edition, page: 1311, 1992.

https://www.ncbi.nlm.nih.gov/books/NBK431076/

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Q8: A 10-year-old boy presents with progressive headaches, vision changes, and growth delay. Neurological examination reveals bitemporal hemianopia. MRI of the brain shows a large, lobulated, multiloculated cystic lesion with a small enhancing solid component and calcifications in the suprasellar region. What is the most likely diagnosis? (Q853159)

A. Pituitary adenoma

B. Craniopharyngioma

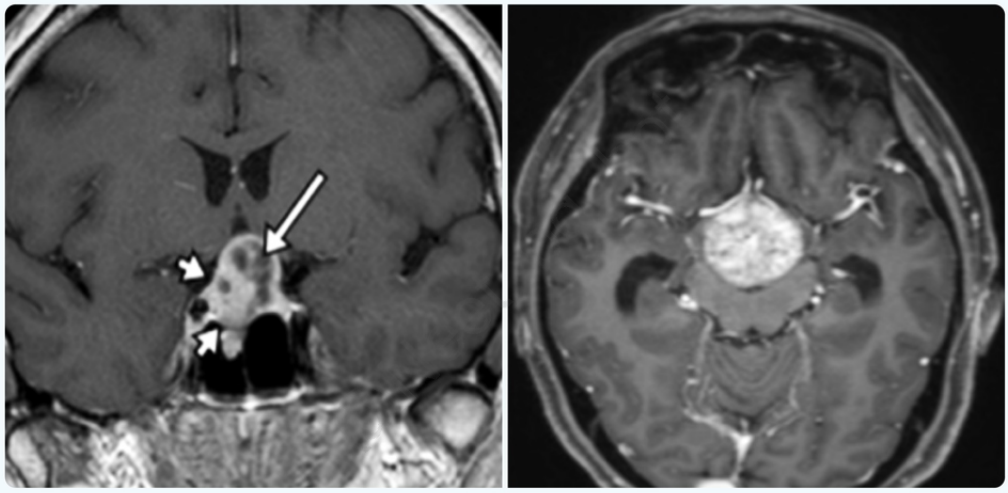
C. Melanoma

D. Astrocytoma



Correct Answer: B. Craniopharyngioma

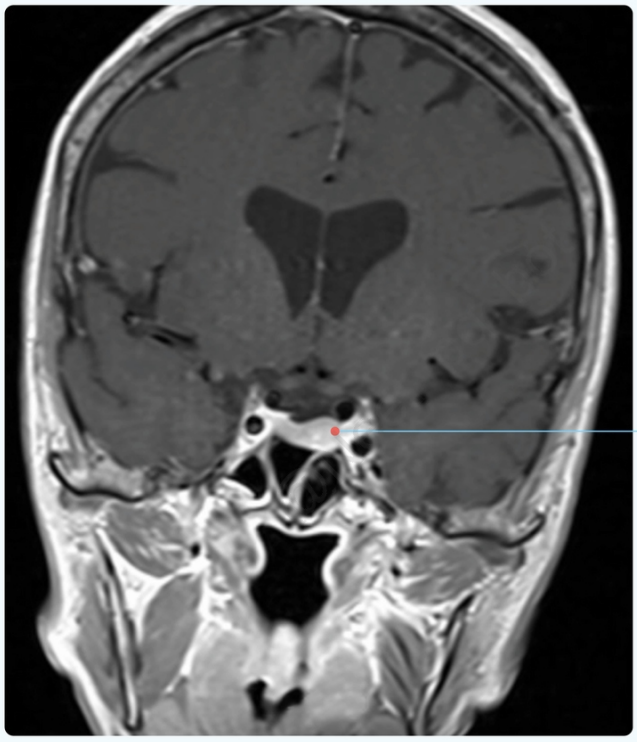
Explanation: The presence of bitemporal hemianopia , combined with the MRI findings of a large, lobulated, multiloculated cystic lesion in the suprasellar region , is characteristic of a craniopharyngioma , particularly the adamantinomatous subtype, which is more common in children. Craniopharyngioma (Option B) Craniopharyngiomas are suprasellar tumors that develop from remnants of the craniopharyngeal duct or Rathke's pouch . It compress Optic chaism leads to bitemporal hemianopia. Adamantinomatous subtype It is more common Seen in children Typically appear as large, lobulated, multiloculated cystic lesions with a small enhancing solid component and calcifications . Papillary subtype Seen in Adults Primarily solid lesion Rarely exhibit calcifications Pituitary Adenoma (Option A) Pituitary Microadenomas Less than 10 mm in size. Microadenomas appear isointense to the pituitary on T1-weighted images and slightly hyperintense on T2-weighted images. In dynamic contrast-enhanced MRI , they enhance slowly compared to the surrounding pituitary gland. Pituitary Macroadenomas Larger than 10 mm in size. Most of the macroadenomas are nonfunctioning. They may cause endocrine disturbances or compress the optic chiasm, leading to bitemporal hemianopia. Typically appear as sellar-suprasellar masses with a "snowman" or "figure of eight" appearance due to a waist at the diaphragma sellae . The sella is usually enlarged. These tumors can invade the cavernous sinuses. Melanoma (Option C) T1 Imaging : Typically hyperintense due to hemorrhage or melanin . T2 Imaging : Typically hypointense . T1 C+ Imaging: Shows enhancement usually in a peripheral rim pattern or a diffusely heterogeneous pattern. Astrocytomas (Option D) usually manifest as infiltrative and heterogeneous masses, not distinct multiloculated cystic lesions.



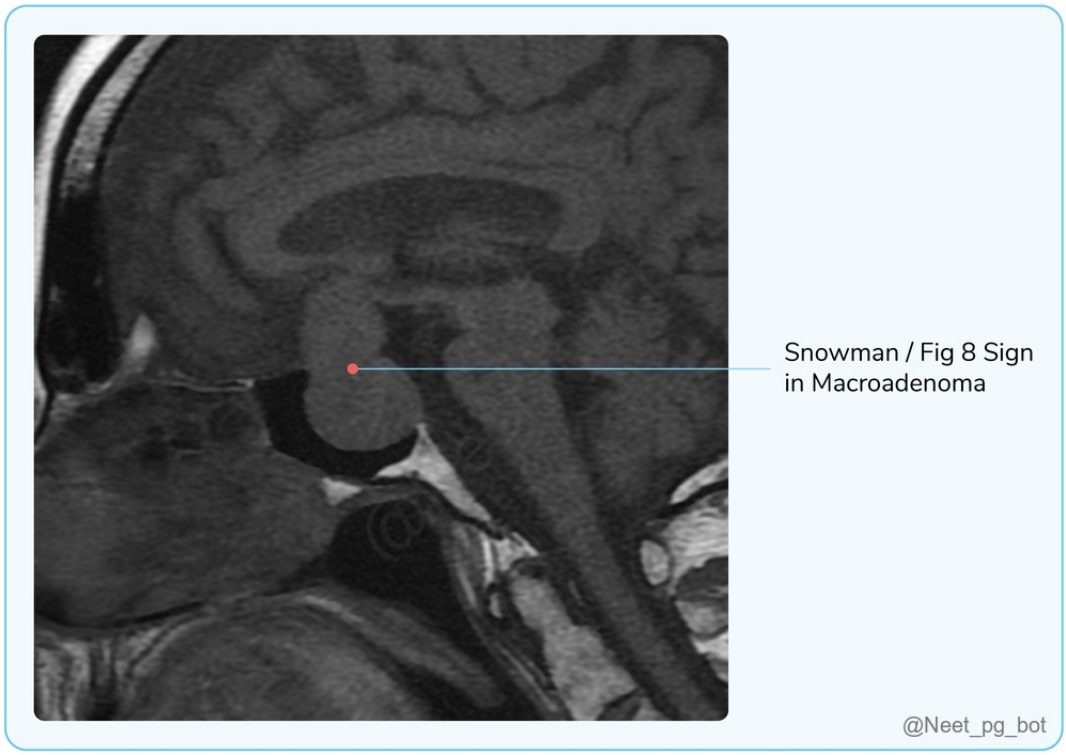
Adenomatous craniopharyngioma

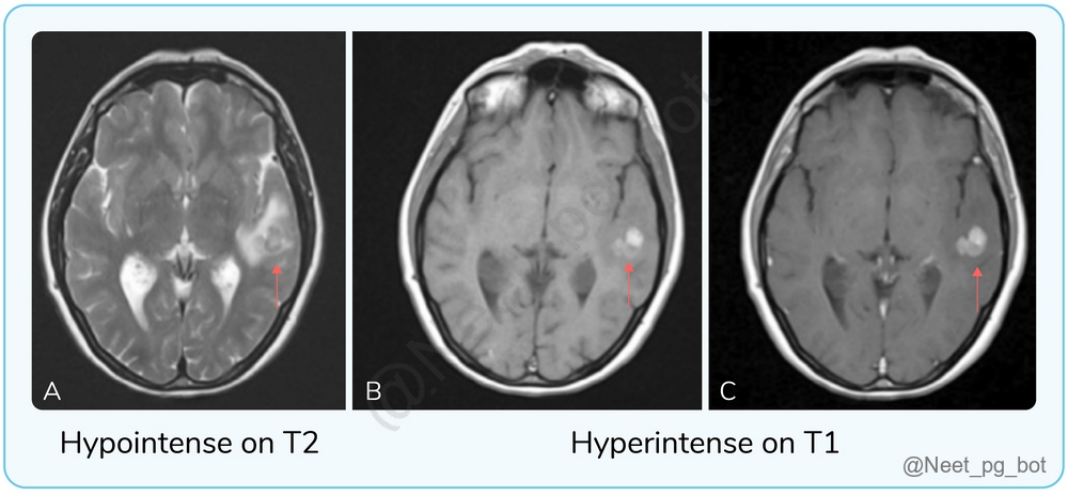
Papillary craniopharyngioma

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References:

David Sutton Textbook of Radiology & Imaging 8th edition Volume 2 Page 2284-2286, 2287, 2288

https://radiopaedia.org/articles/intracranial-metastatic-melanoma-2

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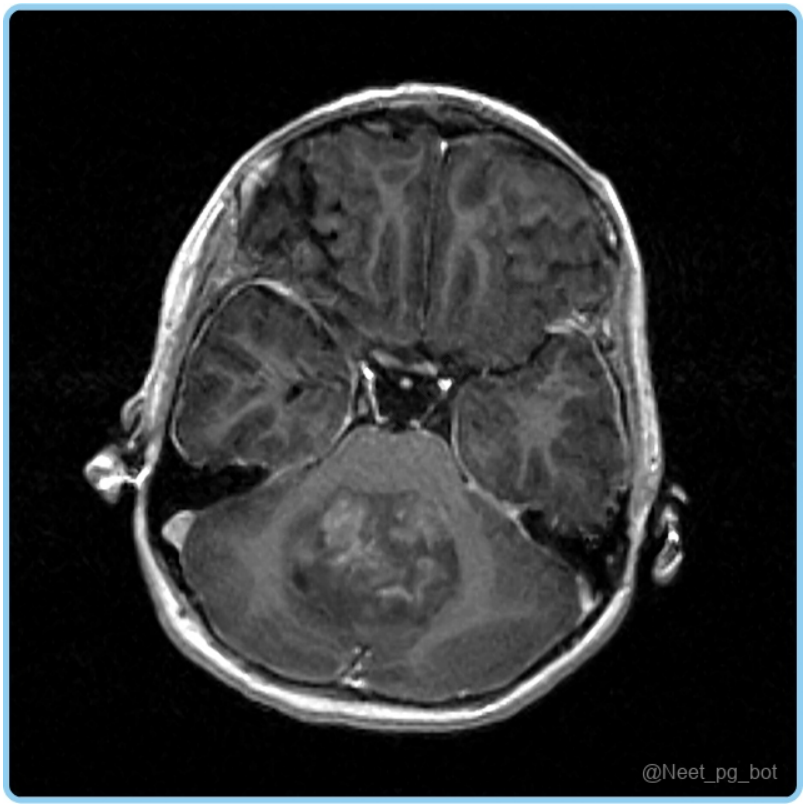
Q9: A 6-year-old boy presents with headache, nausea, and balance difficulties. MRI reveals a hyperdense mass in the midline cerebellar vermis, with surrounding vasogenic edema and hydrocephalus. The mass shows restricted diffusion on MRI and homogeneous contrast enhancement. What is the most likely diagnosis? (Q853154)

A. Ependymoma

B. Medulloblastoma

C. Cerebellar Pilocytic Astrocytoma

D. CNS Lymphoma



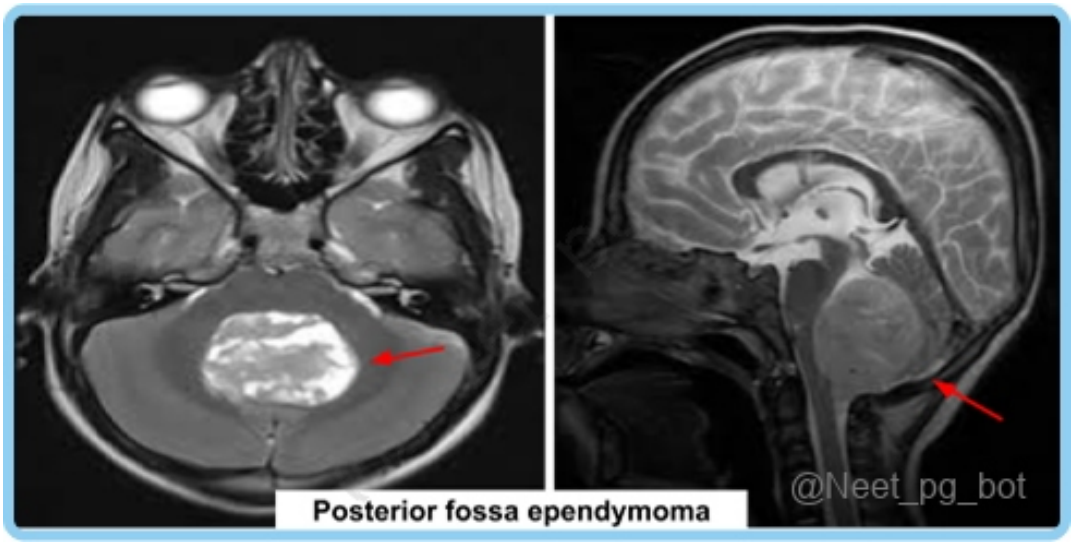
Correct Answer: B. Medulloblastoma

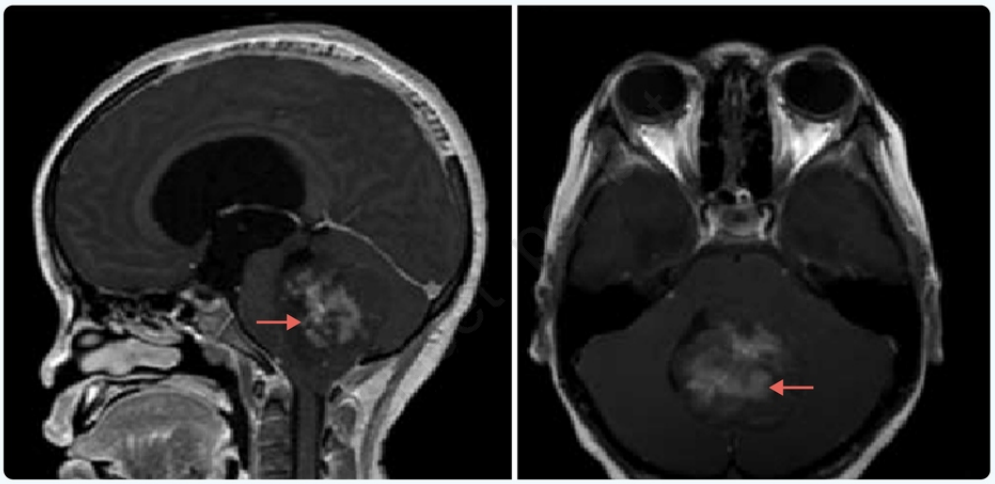
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Explanation: The MRI imaging shows a hyperdense mass in the midline cerebellar vermis , with surrounding vasogenic edema and associated symptoms, like presents with headache, nausea, and balance difficulties, which are common in children with cerebellar tumors due to increased intracranial pressure and disruption of cerebellar function, suggestive of Medulloblastoma . Ependymoma (Option A) Ependymomas are glial tumors originating from the ependymal cells lining the brain's ventricles Infratentorial (posterior fossa) tumors cause increased intracranial pressure and hydrocephalus. Supratentorial tumors cause focal neurological deficits, headaches, and seizures. Associated with neurofibromatosis 2 Posterior fossa ependymomas : Appear as intraventricular masses

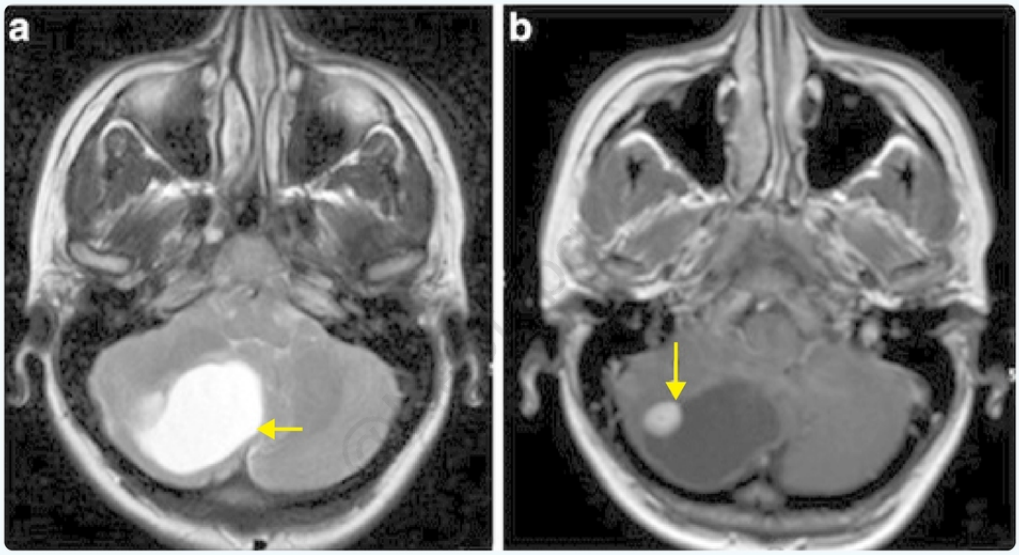
filling the 4th ventricle , often extending through the foramina of Luschka and Magendie, resembling a "plaster cast." Supratentorial ependymomas : Half are intraparenchymal. Ependymomas show heterogeneity with areas of necrosis, calcification, cystic changes, and hemorrhage. On MRI, they are hypointense on T1, hyperintense on T2, with heterogeneous enhancement and possible restricted diffusion. Medulloblastoma (Option B) Medulloblastomas are the most common malignant brain tumors in children . It is typically present as well-defined, hyperdense masses in the midline cerebellar vermis, often with surrounding vasogenic edema, hydrocephalus, and homogeneous contrast enhancement . These tumors are T1 hypointense, T2 hyperintense, and heterogeneously enhancing, with surrounding edema, mass effect, and restricted diffusion . Typically arise in the midline cerebellar vermis . These tumors often bulge from the roof of the fourth ventricle , leading to obstructive hydrocephalus in children. CSF seeding is common at presentation. Cerebellar Pilocytic Astrocytoma (Option C) Pilocytic astrocytoma (PA) is a low-grade (WHO grade 1) astrocytoma, and it is well-circumscribed It is the most common primary brain tumor in children strongly associated with neurofibromatosis type I (NF1) Cystic lesions with an enhancing mural nodule . Cystic component typically shows fluid signal, with enhancement of the cyst wall The solid mural nodule is hypointense on T1, hyperintense on T2, and shows intense enhancement. Primary CNS Lymphoma (Option D) Primary CNS Lymphoma is a rare type of non-Hodgkin lymphoma associated with EBV. Primarily found in the periventricular area (along the ependymal surface of the ventricle) and within deep gray matter nuclei . CT Scan : Displays solitary or multiple hyperdense, enhancing lesions MRI: Lesions are typically hypointense on T1 and iso/hypointense to gray matter on T2-weighted images; most lesions exhibit intense homogeneous enhancement. MR Spectroscopy : Characterized by low N-acetylaspartate (NAA) , elevated choline peaks.





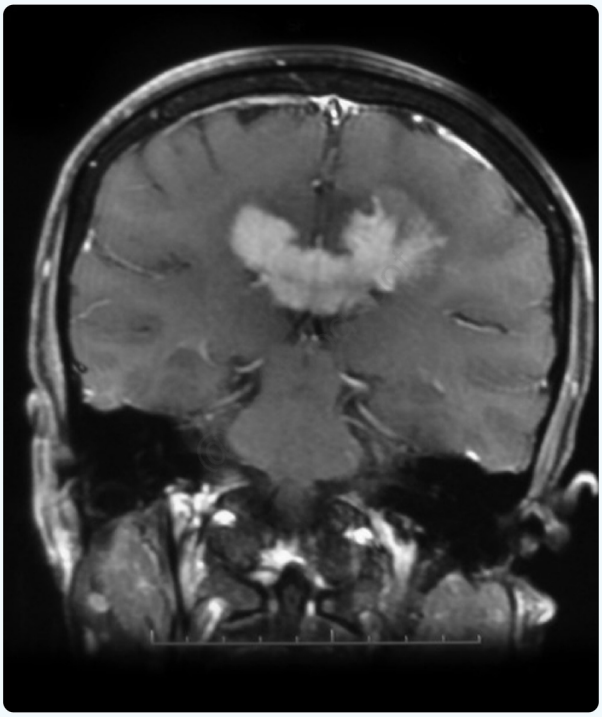
Medulloblastoma

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Cerebellar pilocytic astrocytoma

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References:

David Sutton Textbook of Radiology & Imaging 8th edition Volume 2 Page 2238, 2257, 2258, 2243, 2244

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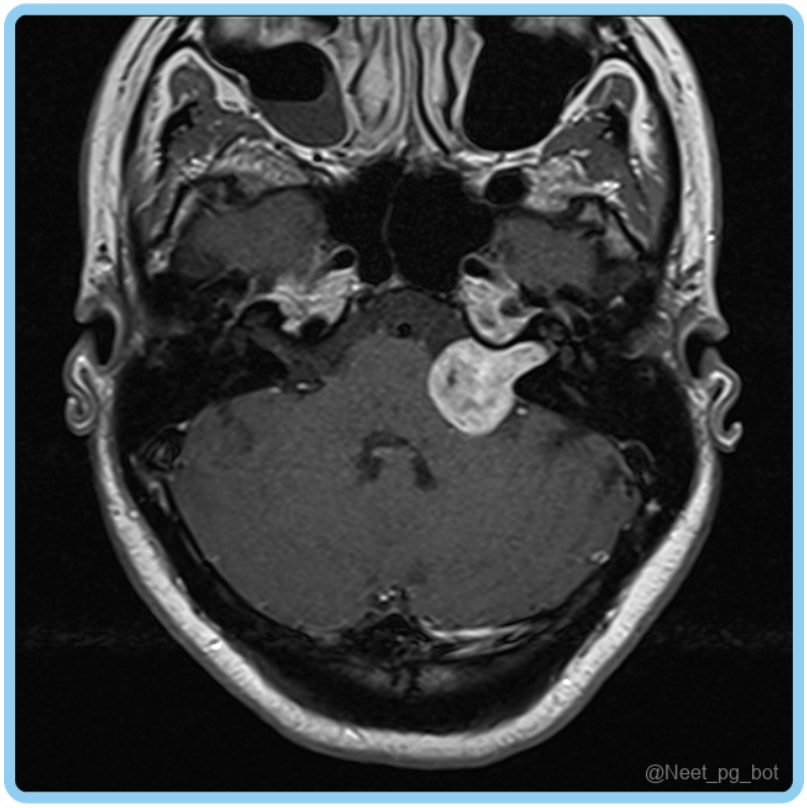
Q10: A 45-year-old woman presents with progressive SNHL and non-pulsatile tinnitus in the right ear. MRI reveals a solid, enhancing mass in the internal auditory canal extending into the cerebellopontine angle, creating an "ice cream cone" appearance. What is the most likely diagnosis? (Q853152)

A. Glioblastoma Multiforme

B. Oligodendroglioma

C. Vestibular Schwannoma

D. Meningioma

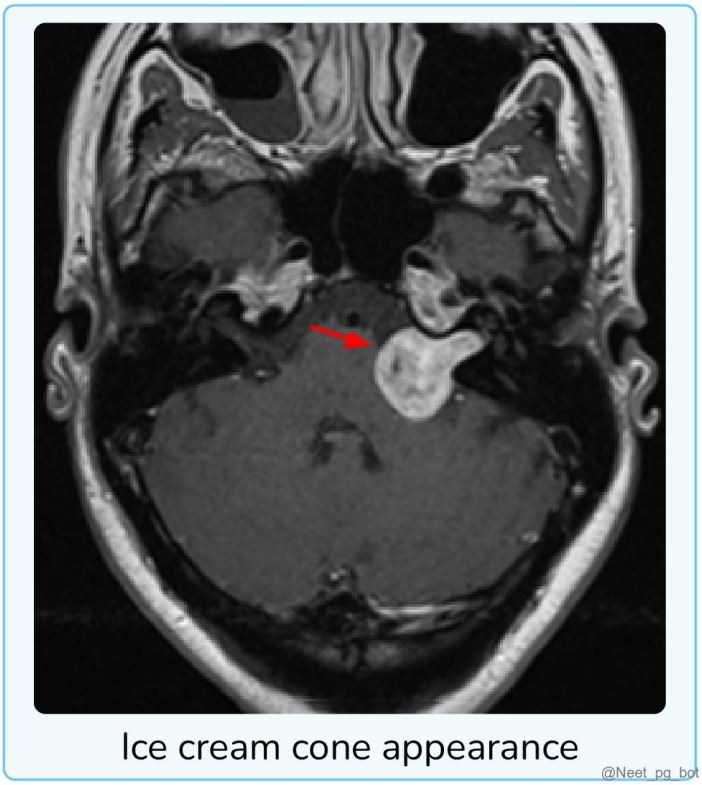


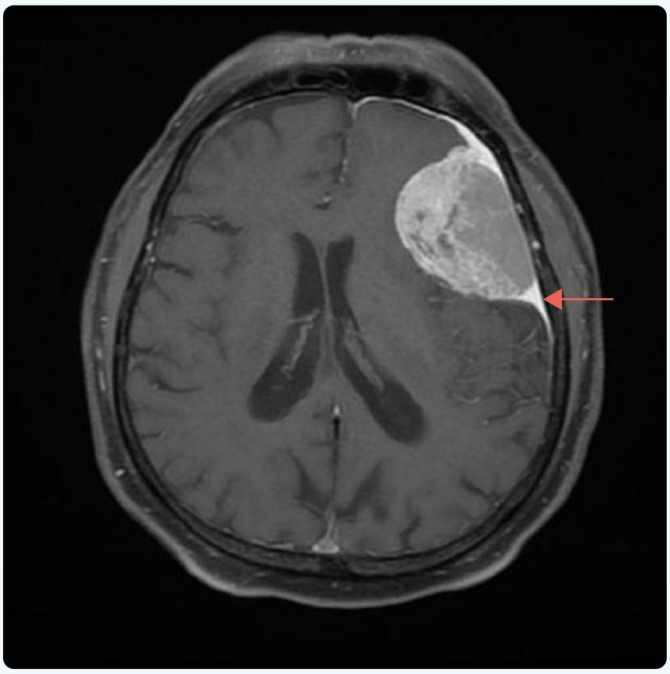
Correct Answer: C. Vestibular Schwannoma

- *Listen (English)*
- *Listen (Hindi)*

Explanation: The MRI findings show a solid, enhancing mass in the internal auditory canal extending into the cerebellopontine angle , creating the characteristic "ice cream cone" appearance with clinical feature SNHL & tinnitus suggestive of Vestibular Schwannoma . Vestibular Schwannoma (Option C) Schwannomas are benign tumors that originate from Schwann cells forming the nerve sheath. Commonly arise from superior & inferior vestibular divisions of the 8th cranial nerve Usually solitary, B/L acoustic tumors are seen in neurofibromatosis type 2 (NF2) . presents with sensorineural hearing loss & nonpulsatile tinnitus . On contrast-enhanced scans, it appears as solid, nodular enhancing masses in the internal auditory canal extending into the cerebellopontine angle cistern . Extracanalicular extension can produce an "ice cream cone" appearance. Meningioma (Option D) Meningiomas arise from arachnoidal cap cells in the brain and spinal cord coverings. They are the most common benign intracranial tumors . Most common in females Mostly sporadic but can be linked to NF-2 or prior cranial irradiation. Meningiomas are dural based extra-axial masses that appear isointense to gray matter on both T1 and T2-weighted images. They demonstrate intense homogeneous enhancement on post-contrast imaging, accompanied by a dural tail sign . Characteristic imaging features: CSF cleft sign (thin layer of CSF around the mass) Cortical buckling Widening of the subarachnoid space with visible pial arteries/veins, Hyperostosis or erosion of the calvarium. Mother in law sign (early enhancement during the arterial phase and remain opacified long after the venous phase has passed) Calcification Glioblastoma Multiforme (Option A) Glioblastomas are aggressive, poorly differentiated WHO grade 4 astrocytic tumors It appears as heterogeneous tumors with thick, irregular enhancing margins and central necrosis . They may also contain intratumoral vessels and hemorrhage. T2 signal abnormalities surrounding the tumor represent a mix of vasogenic edema and infiltrating neoplastic cells. They can invade the corpus callosum, crossing the midline in a butterfly configuration . Oligodendroglioma

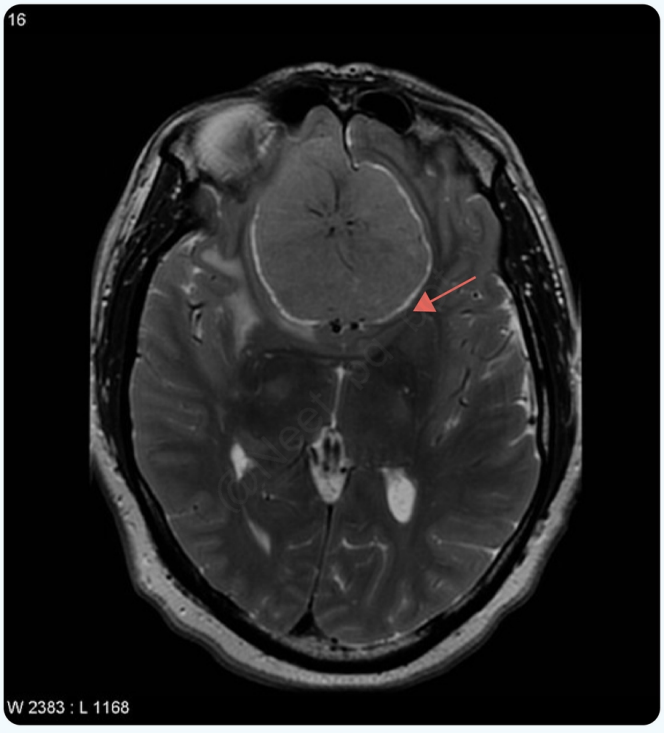
(Option B) Oligodendroglioma (Option B) Oligodendrogliomas are diffuse infiltrating glial tumors originating from oligodendrocytes and are characterized by IDH mutations and 1p/19q codeletion . These tumors can be either WHO grade 2 (well-differentiated oligodendrogliomas) or WHO grade 3 (anaplastic oligodendrogliomas). Typically occurs in the frontal lobe . They are slow-growing, non-encapsulated, and tend to infiltrate the overlying cortex . CT : Oligodendrogliomas are isodense to hypodense with calcification MRI : Tumors are hypointense on T1 and hyperintense on T2. They generally do not enhance with contrast





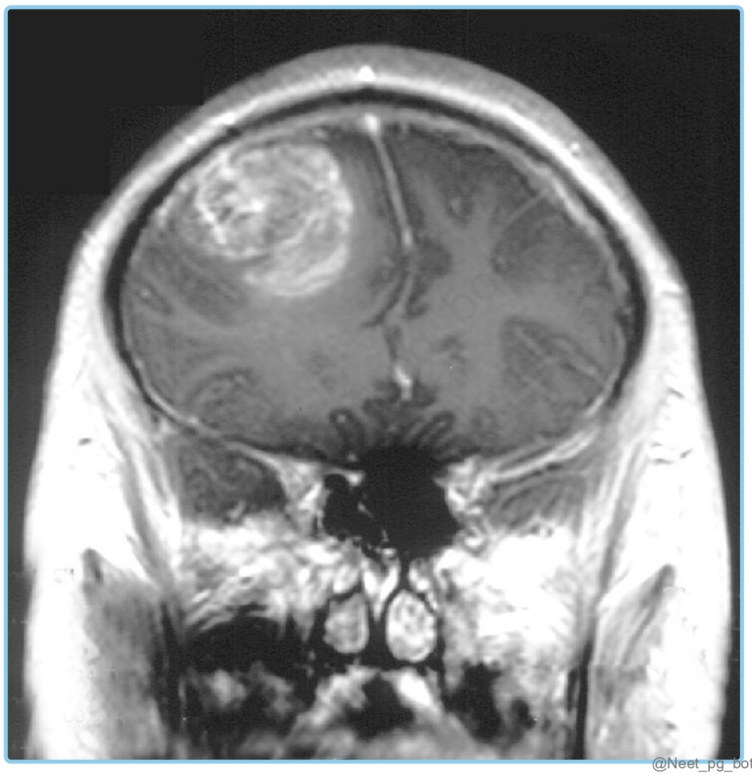
Dural Tail Sign

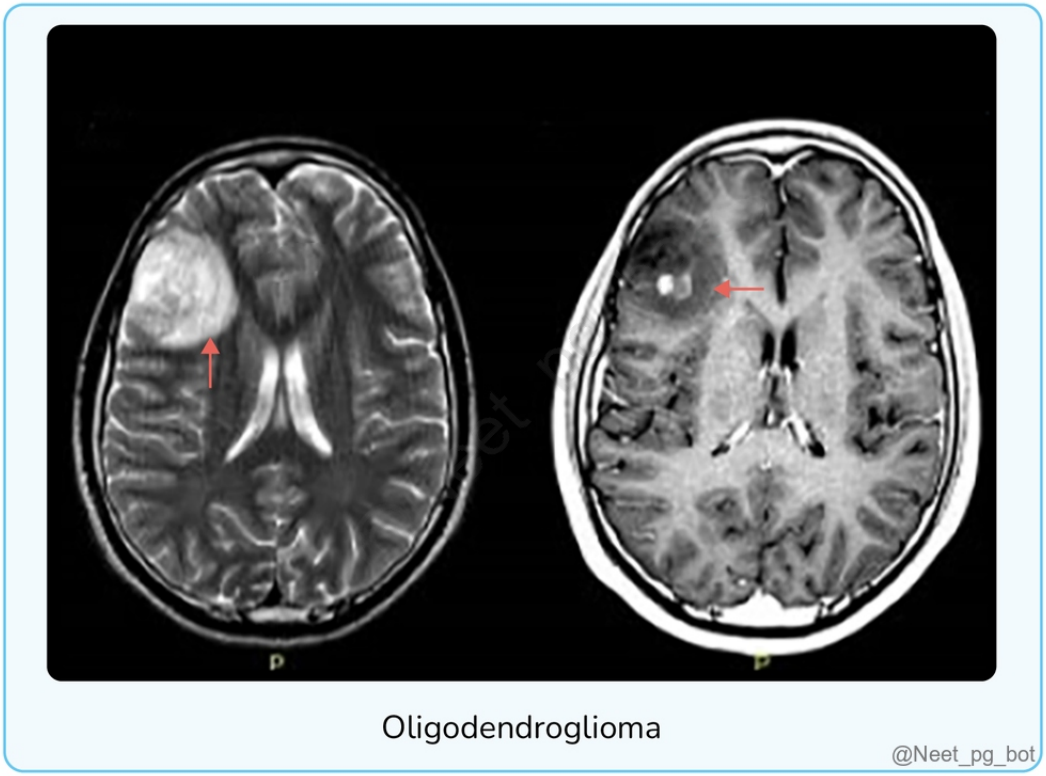
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CSF Cleft Sign

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References:

David Sutton Textbook of Radiology & Imaging 8th edition Volume 2 Page 2236, 2237, 2231, 2232, 2266, 2268, 2262, 2263

↑ *Back to this question in Part A*

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Q11: A 27-year-old woman with a family history of an autosomal dominant genetic disorder presents with recurrent seizures and developmental delay. On physical examination, she has red papules on her face consistent with adenoma sebaceum. Which of the following is not a radiologic finding typically associated with this condition? (Q853149)

A. Cortical tubers

B. Subependymal nodules

C. Sphenoid wing dysplasia

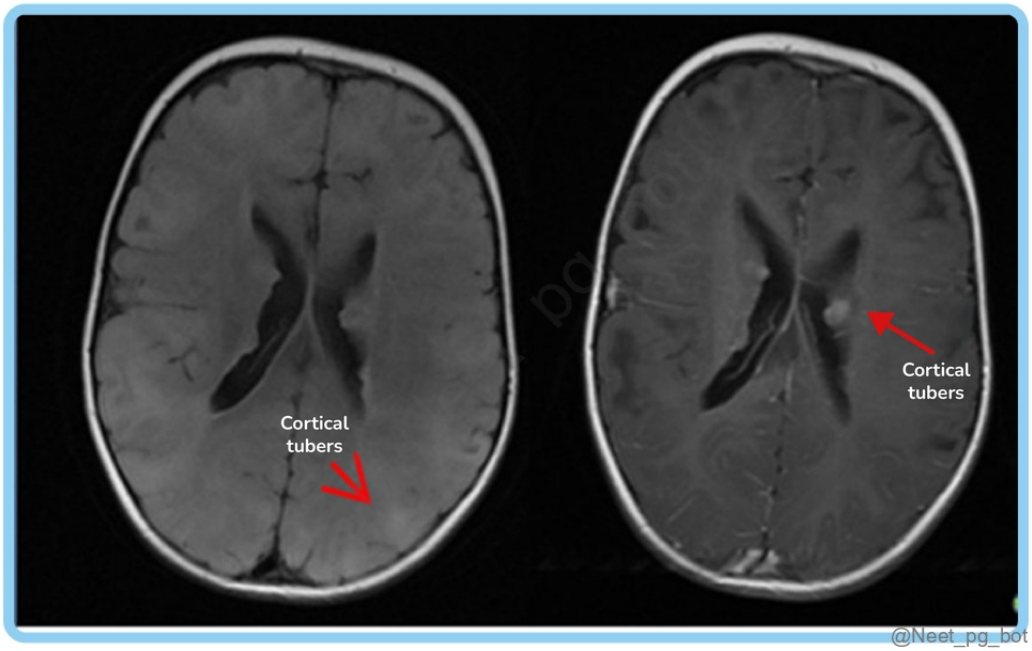
D. Lymphangioleiomyomatosis

Correct Answer: C. Sphenoid wing dysplasia

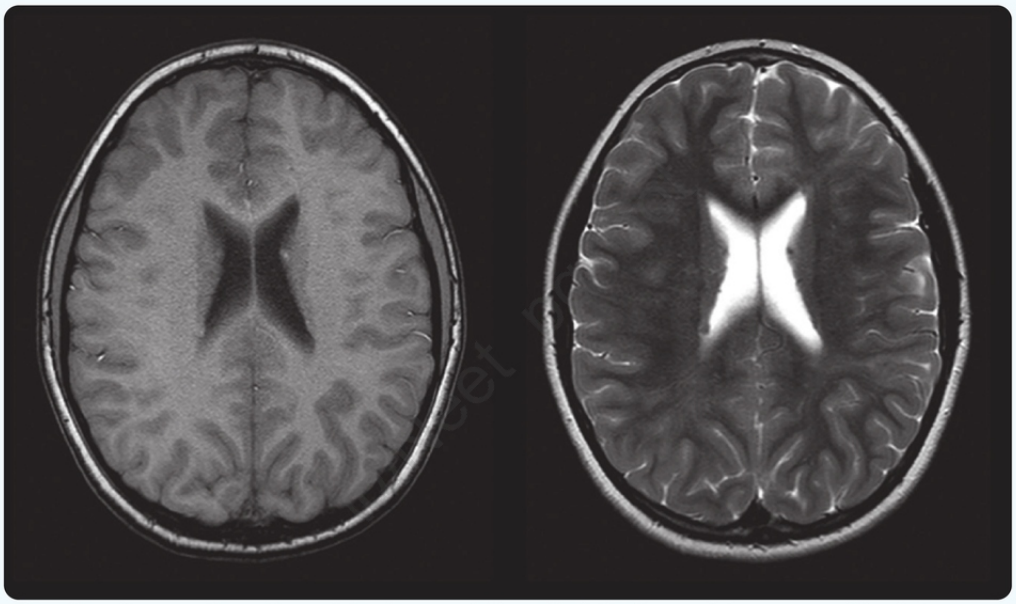
■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: The woman likely has Tuberous sclerosis (TS), an autosomal dominant genetic disorder characterized by seizures, developmental delay, and adenoma sebaceum (facial angiofibromas). Sphenoid wing dysplasia is a radiological finding commonly associated with neurofibromatosis type 1 (NF1), not tuberous sclerosis (TS). Tuberous Sclerosis (TS): Multisystem hamartomatous genetic neurocutaneous syndrome. Autosomal dominant inheritance with TSC1 and TSC2 genes mutations. Classical triad: Intellectual impairment Epilepsy Adenoma sebaceum Radiological Features: Intracranial Manifestations: a. Cortical tubers: (Option A) Benign hamartomas found in the cerebral cortex. Detected in approximately 95% of patients with TS. MRI Appearance: T1-weighted sequences: Well-circumscribed areas of low signal intensity T2-weighted sequences: High signal intensity b. Subependymal nodules: (Option B) Common brain lesions found in patients with TS and represent as hamartomatous growths. CT: Useful for detecting subependymal nodules, which are commonly associated with calcification (88% of cases). MRI Appearance: T1-weighted images: Show intermediate signal intensity. T2-weighted images: Exhibit isointense to hyperintense signals. c. Subependymal giant cell astrocytomas (SEGAs): SEGAs are derived from subependymal nodules. MRI Appearance: T1-weighted images: Hypo- to isointense compared with the cortex. T2-weighted images: Heterogeneously iso- to hyperintense. d. White Matter (WM) Abnormalities: Hyperintense areas on T2-weighted images Hypointense areas on T1-weighted images 2. Pulmonary Manifestations: Lymphangioleiomyomatosis (Option D) Multifocal micronodular pneumocyte hyperplasia (MMPH) 3. Cardiac Manifestation: Cardiac rhabdomyoma 4 . Renal Manifestation: Renal Angiomyolipoma

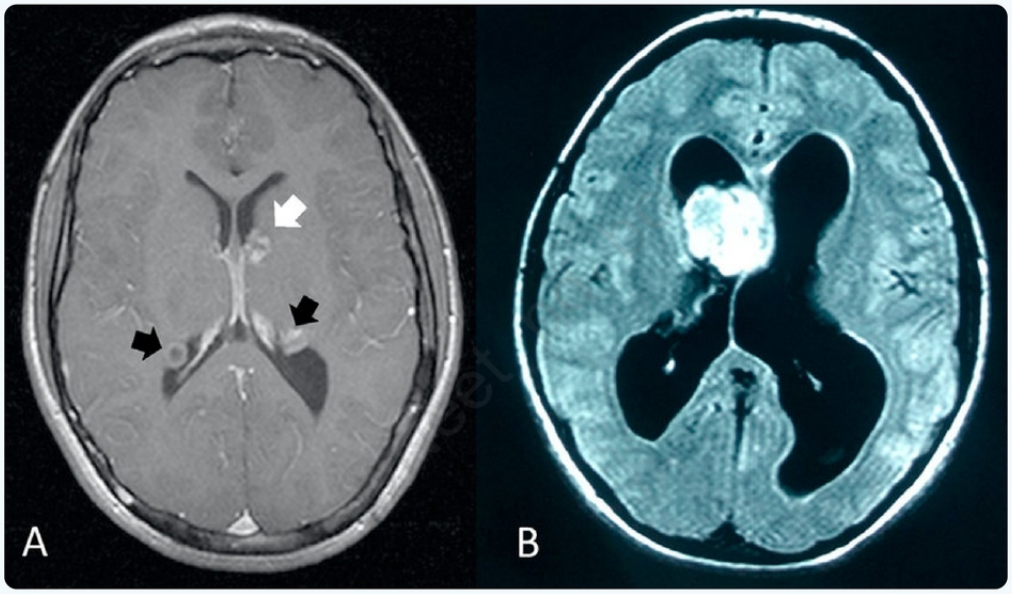


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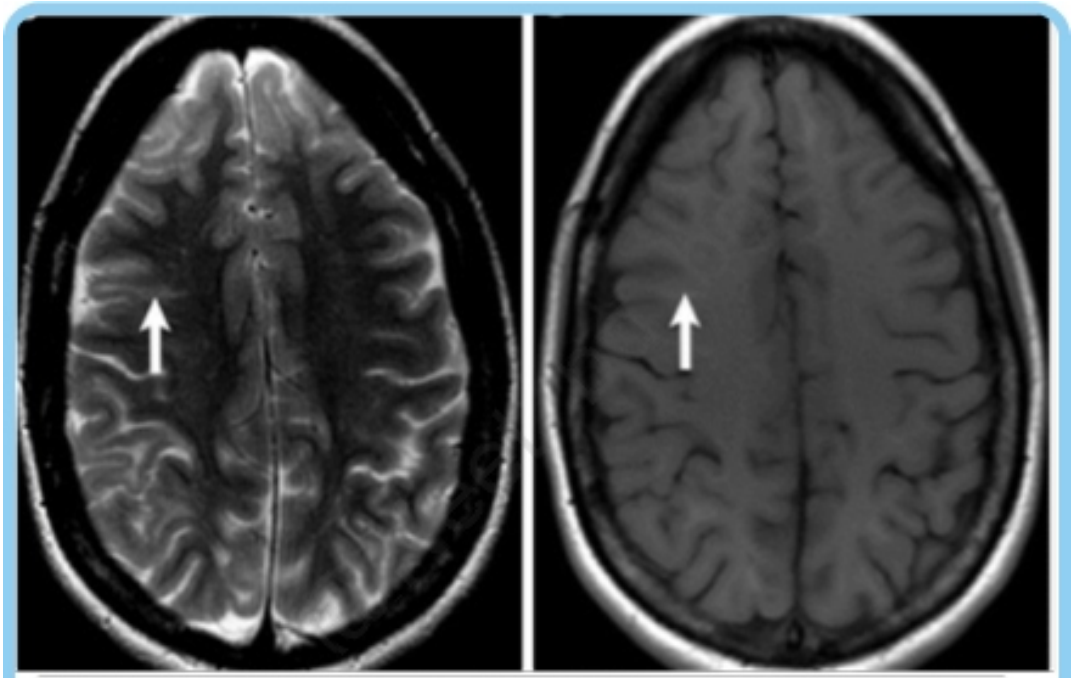
Small subependymal ventricular nodules slightly hyperintense and isointense on axial T1WI and hypointense on T2WI

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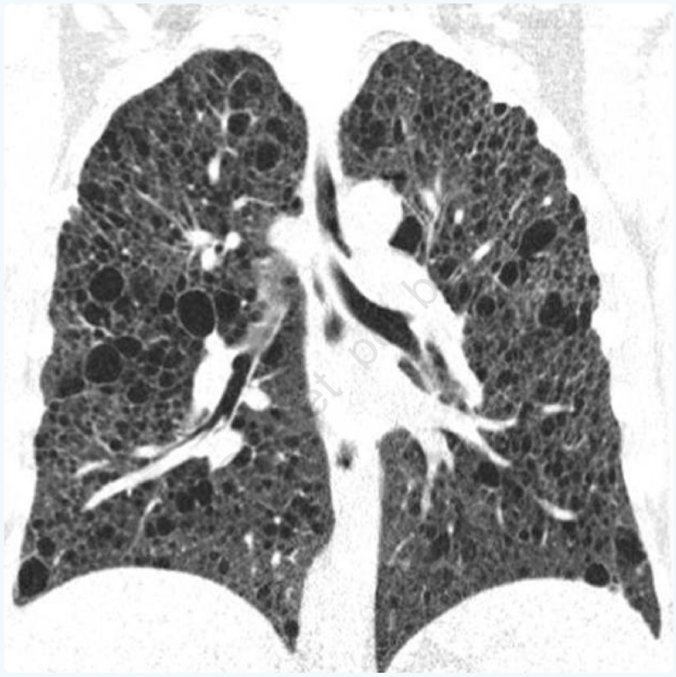
Magnetic resonance imaging (MRI). A. Axial T1-weighted image of the brain demonstrating a subependymal giant cell astrocytoma (SEGA) near the left foramen of Monro (white arrow) and subependymal nodules (SENs) at the posterior horn of the right and left lateral ventricle (black arrows) B: Axial T2 fluid-attenuated inversion recovery (FLAIR) image of the brain showing a giant SEGA located in the vicinity of the right foramen of Monro.

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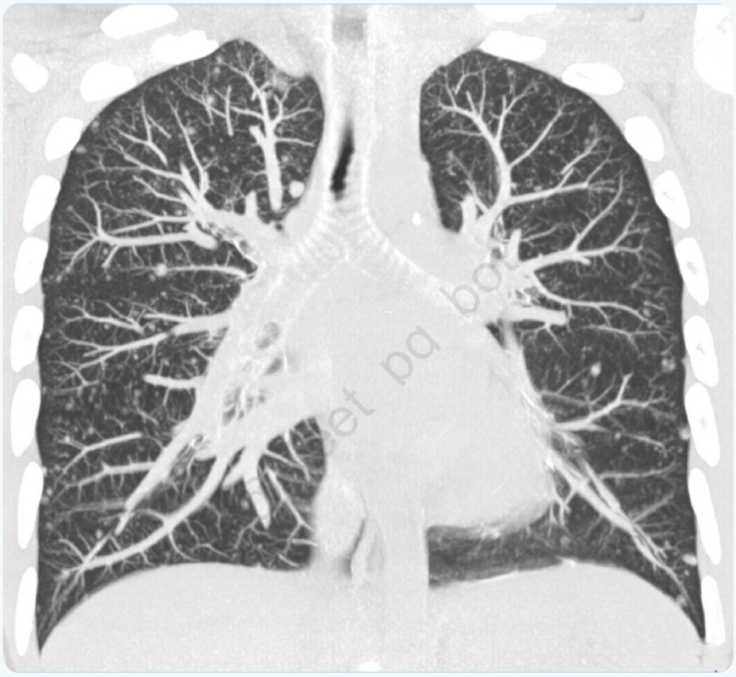
Axial T2-weighted MR (left) image shows linear hyperintense white matter lesions (arrow) extending from the cortex. These lesions may represent areas of demyelination, dysmyelination, or hypomyelination. Axial noncontrast T1-weighted MR (right) image shows isointense linear white matter lesions (arrow) extending from the cortex.

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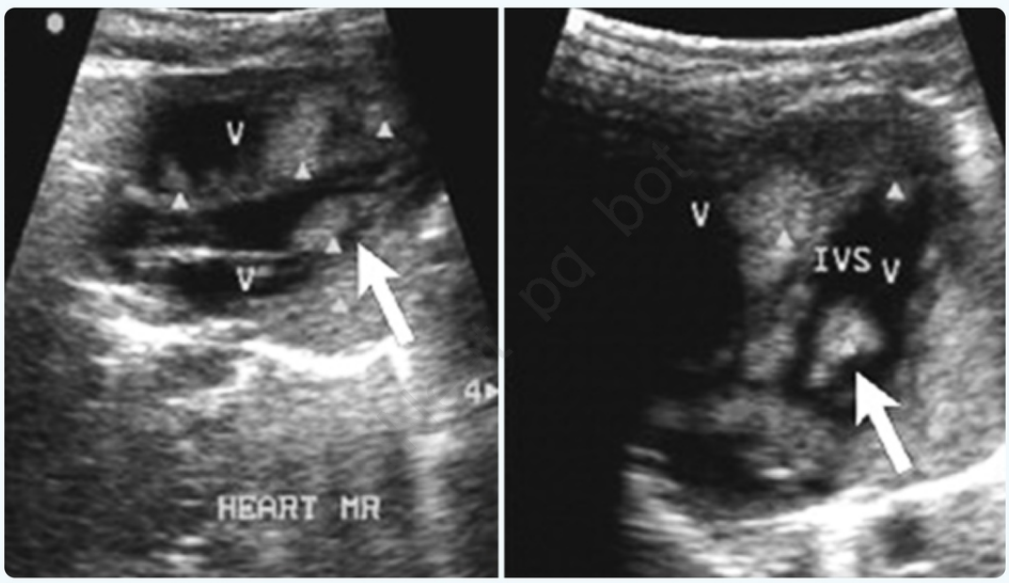
Lymphangioleiomyomatosis

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Pulmonary Multifocal Micronodular Pneumocyte Hyperplasia (MMPH)

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Cardiac rhabdomyomas

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Renal angiomyolipomas

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References:

Grainger & Allison's Diagnostic Radiology 7th Edition, Pg: 2002

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5347503/

↑ *Back to this question in Part A*

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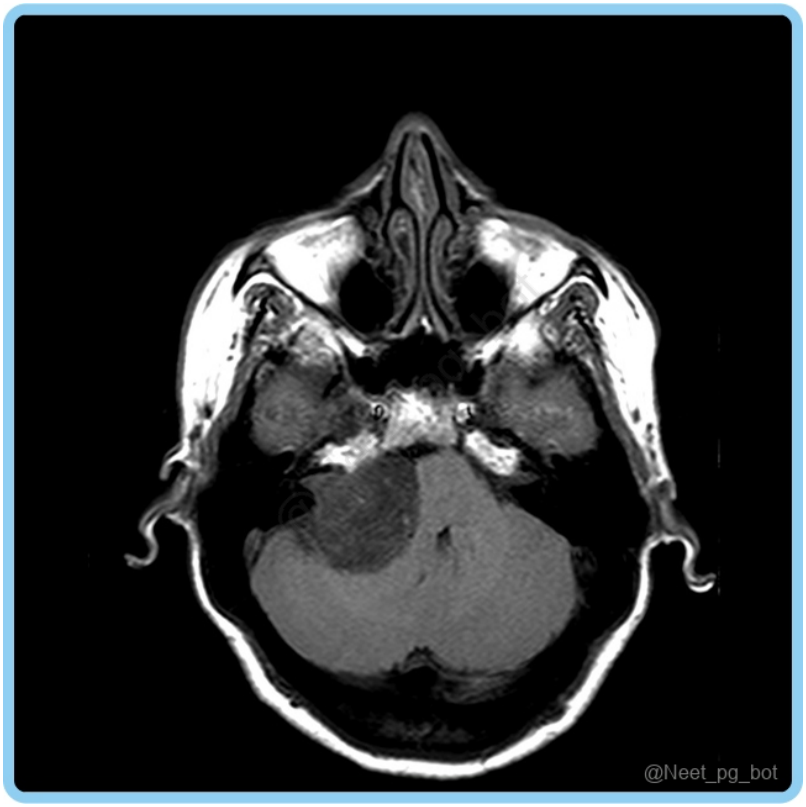
Q12: A 25-year-old patient with a family history of an autosomal dominant condition was diagnosed with a mutation in chromosome 22 and advised to have an MRI every 2 years to monitor for tumors. An MRI scan was performed and shown below. Identify the radiological finding shown below that is most consistent with this chromosomal abnormality? (Q853147)

A. Dural ectasia

B. Pilocytic astrocytomas

C. Vestibular schwannomas

D. Plexiform neurofibromas



Correct Answer: C. Vestibular schwannomas

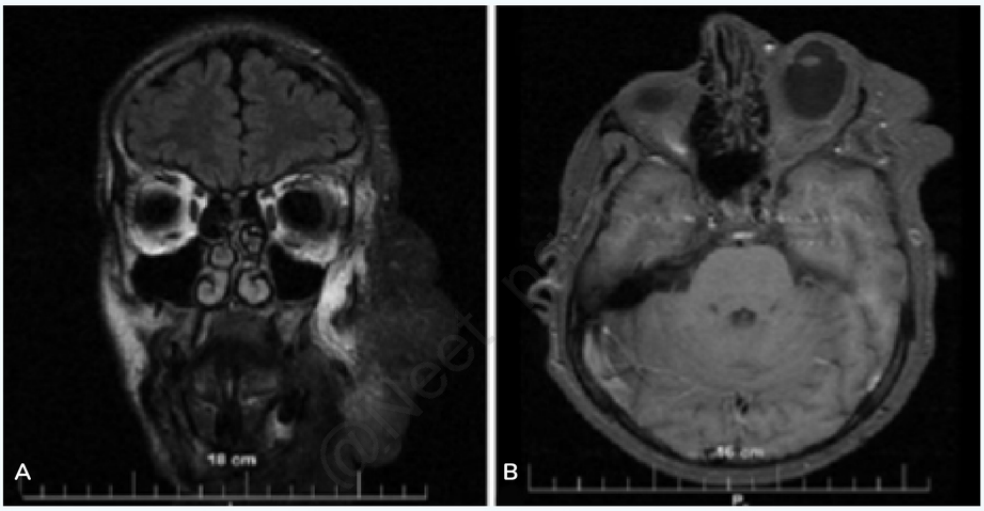
■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: A chromosome 22 mutation is commonly associated with neurofibromatosis type 2 (NF2) , characterized by vestibular schwannomas. On MRI, these tumors can exhibit an "ice cream cone" appearance in the cerebellopontine angle. Neurofibromatosis Type 2 (NF-2): (Option C) Autosomal dominant condition due to mutation on chromosome 22. Also referred to as MISME syndrome for M ultiple I nherited S chwannomas, M eningiomas and E pendymomas. NF2 often manifests clinically in early adulthood with symptoms related to

vestibular schwannomas. Arise from the vestibulocochlear nerve (CN VIII) and represent as cerebellopontine angle (CPA) mass. Extracanalicular extension may result in an "ice cream cone" appearance. Neurofibromatosis Type 1 (NF-1): Most common inherited central nervous system (CNS) disorder and autosomal dominant condition due to mutation on chromosome 17. Radiological Findings: 1. Plexiform neurofibromas: (Option D) Complex masses from peripheral nerve sheaths. Appear as thickened, firm masses or nodules that may deeply infiltrate structures, causing disfigurement and dysfunction. MRI: Show as multinodular confluent masses with mass effect on surrounding structures. Display multiple target signs on T2-weighted images 2. Sphenoid wing dysplasia: Key skull abnormality in NF1 patients. Manifests as hypoplasia of the greater and lesser sphenoid wings. Indicated by the "bare orbit sign" (absence of innominate line) on radiography and CT. Associated features include: Widening of the middle cranial fossa and orbital fissures. Flattening of the posterior orbit. 3. Dural ectasia: (Option A) Focal dilatation of the dural sac. May be associated with underlying bony weakness. Appears as well-circumscribed, low-attenuation paravertebral masses on CT. Shows cerebrospinal fluid signal intensity on MRI. 4. Focal Areas of Signal Intensity (FASIs): Appear by age 3, decrease in size after age 20. MRI features of FASIs: Hyperintense in the basal ganglia, cerebellum, or brainstem on T2-weighted and FLAIR imaging. Isointense or mildly hyperintense on T1-weighted imaging. No enhancement or mass effect. 5. Non-optic pathway intracranial gliomas: Mostly low-grade astrocytomas, commonly pilocytic astrocytomas. (Option B) Typically located in the brainstem or posterior fossa. MRI features: Hypo- or isointense on T1-weighted images. Hyperintense on T2-weighted images. 6. Arterial changes: Aneurysms Arteriovenous malformations Moyamoya disease: Terminal internal carotid artery or proximal anterior/middle cerebral arteries are often obstructed. Characterized by tiny abnormal intracranial collateral vessel networks. Angiographically, these abnormal collaterals resemble a "puff of smoke" appearance.



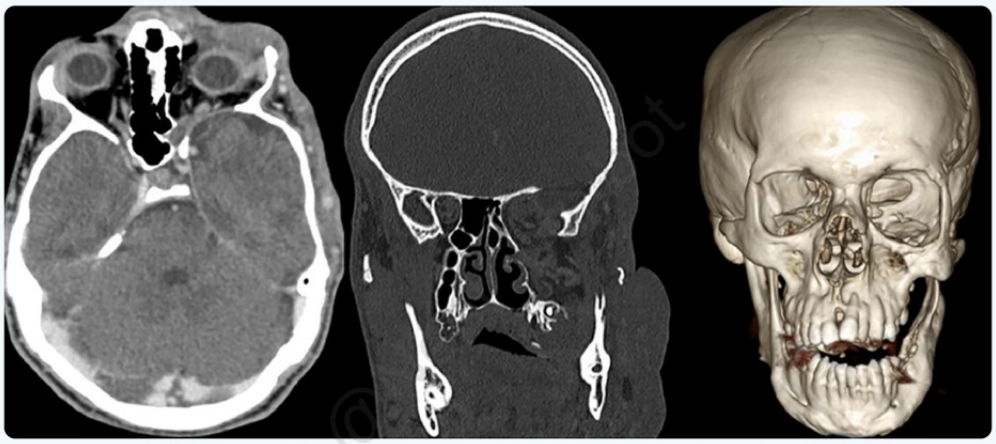


Craniofacial MRI. (A) Axial view: deforming plexiform neurofibroma arising from the left side of the face (B) coronal view: homolateral eye dislocation.

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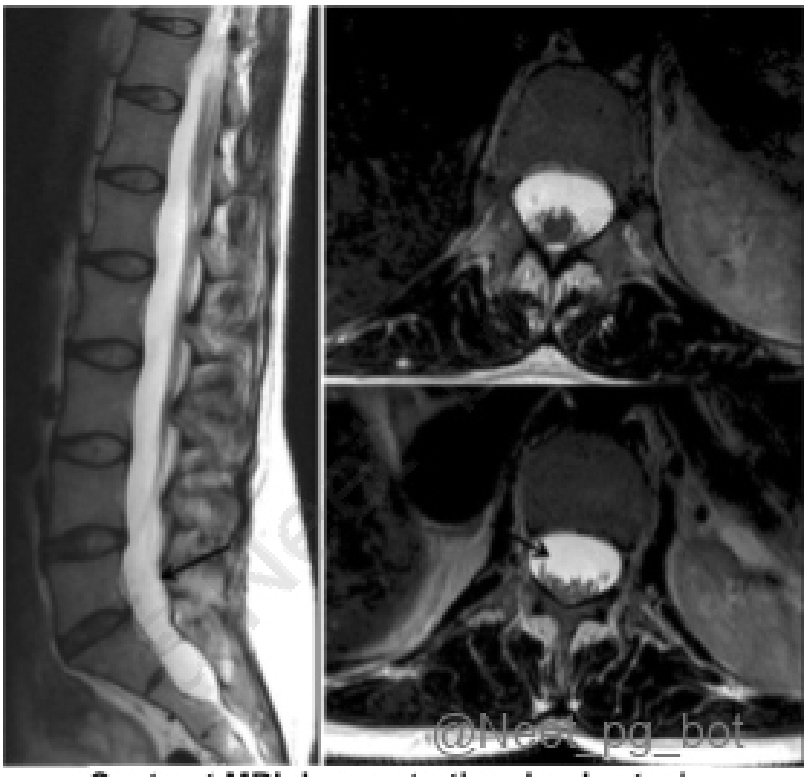


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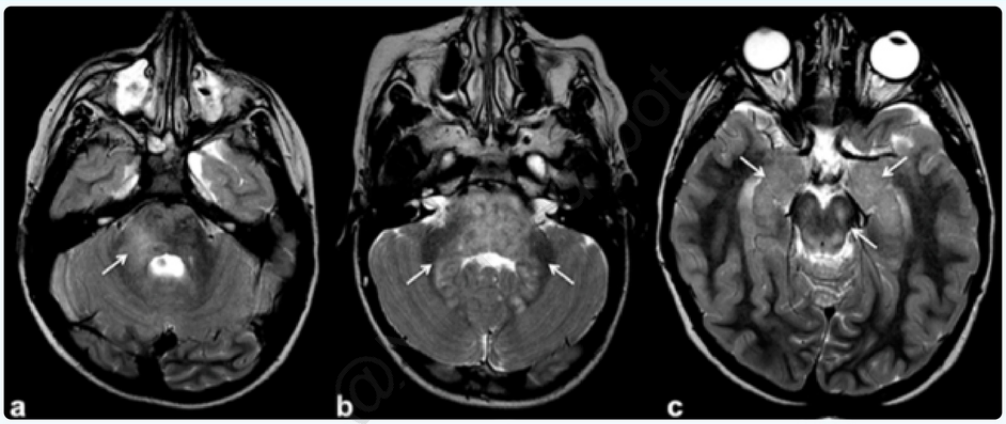


Sphenoidal dysplasia, marked by the absence of the large left wing of the sphenoid

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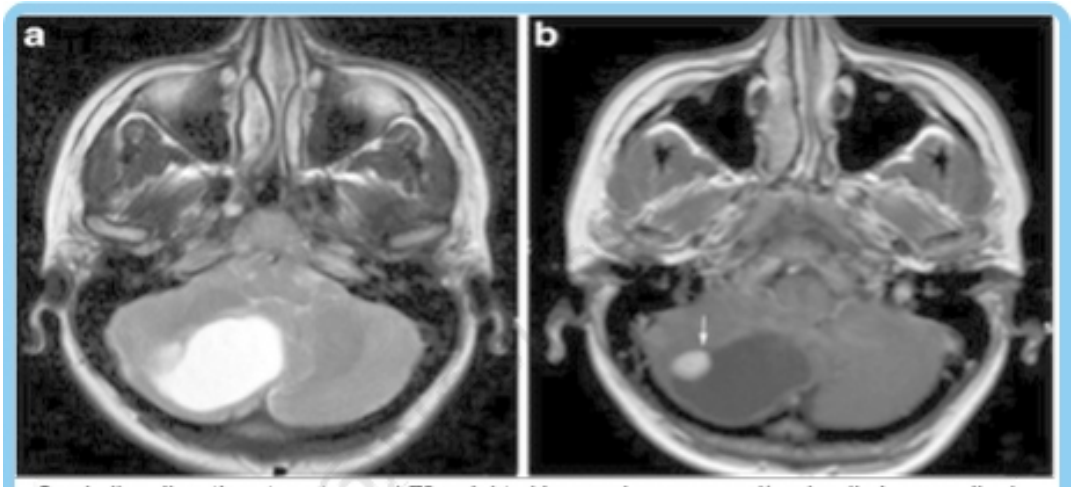


Contrast MRI demonstrating dural ectasia.



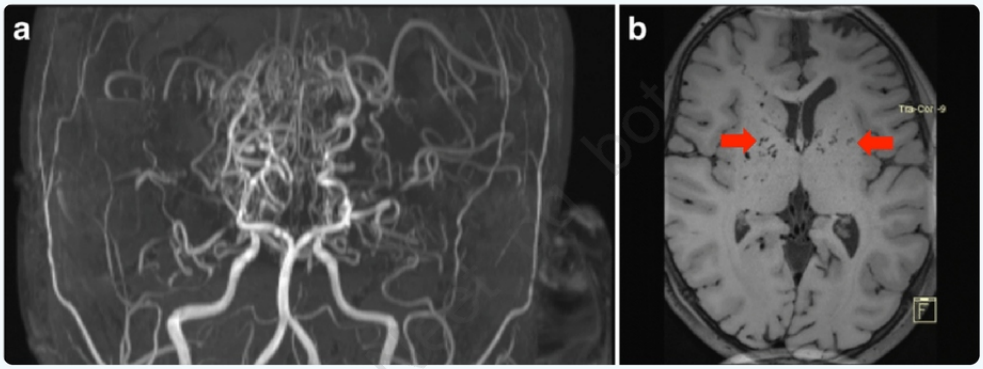
Focal areas of signal intensity (FASI) localization to cerebellar pedicles and cerebellum (a,b), brainstem, cerebral peduncles and hippocampi (b,c)

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Cerebellar pilocytic astrocytoma. a) T2-weighted image shows a round/oval well-circumscribed expansive mass. b) Contrast enhanced T1-weighted image demonstrates an intense enhancement of the solid portion (arrow) and no enhancement of the cyst wall.

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MRI findings in Moyamoya Disease patients. a MRA shows significant narrowing of bilateral internal carotid arteries, middle cerebral arteries, and anterior cerebral arteries, as well as characteristic “puff-of-smoke” collaterals. b High-resolution MRI (T1-weighted image) reveals flow-void signals (red arrows) resulting from moyamoya collaterals.

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References:

Grainger & Allison's Diagnostic Radiology, 7th Edition, Pg: 2000

https://pubs.rsna.org/doi/full/10.1148/rg.210235

https://radiopaedia.org/articles/puff-of-smoke-sign

https://www.sciencedirect.com/science/article/pii/S2214751917301123

https://www.ncbi.nlm.nih.gov/books/NBK470350/

↑ *Back to this question in Part A*

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Q13: A 2-week-old neonate is evaluated for failure to thrive and persistent tachycardia. A cranial MRI shows a large vascular malformation with multiple feeding arteries and a dilated vein of Galen. What is the most likely diagnosis? (Q853145)

A. Mural type Vein of Galen Malformation

B. Choroidal type Vein of Galen Malformation

C. Arteriovenous malformation

D. Developmental venous anomaly

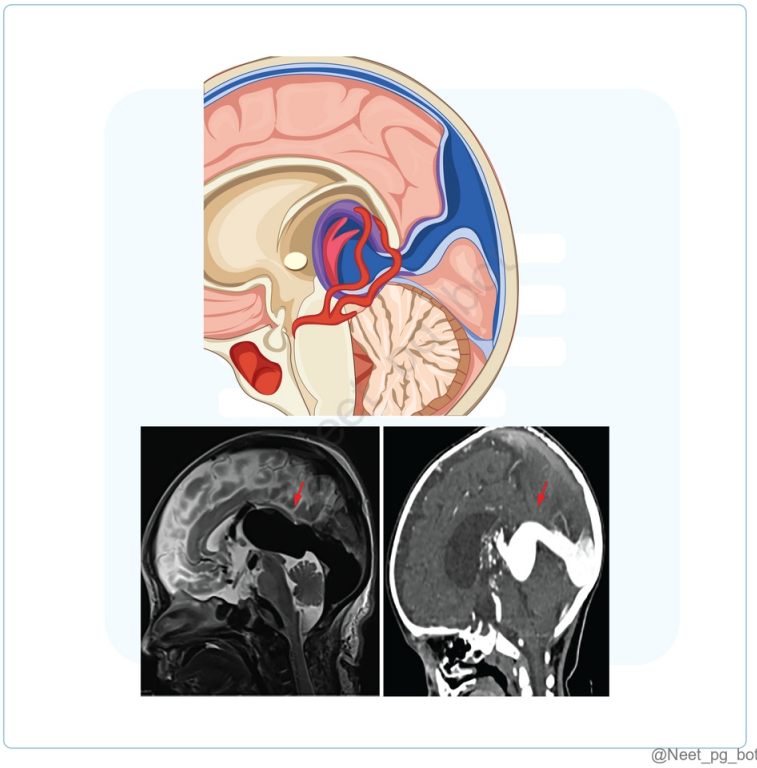
Correct Answer: B. Choroidal type Vein of Galen Malformation

■ *Listen (English)*

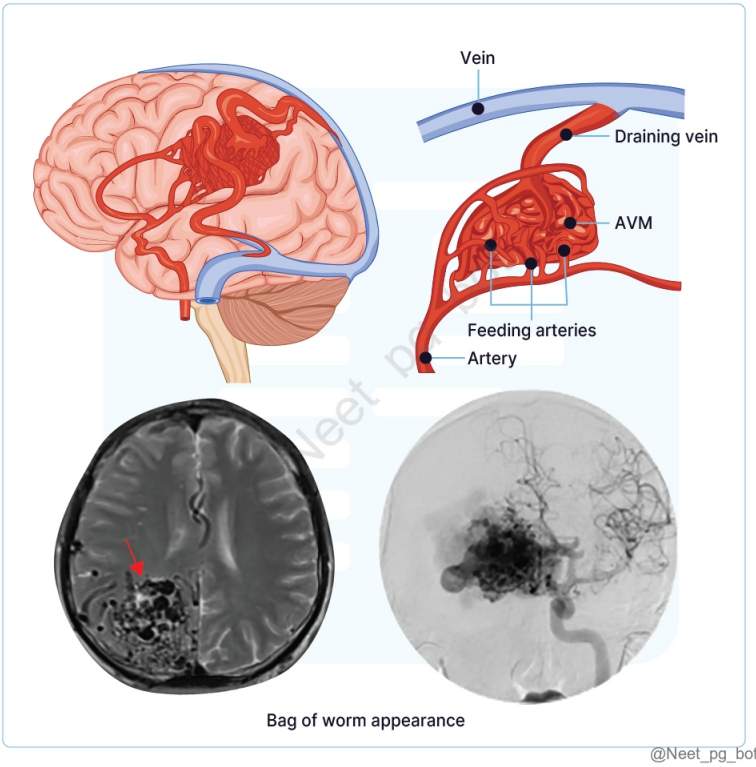
■ *Listen (Hindi)*

Explanation: Choroidal type Vein of Galen Malformation typically presents early in life with symptoms like heart failure due to high-output conditions. The MRI findings align with the choroidal type, which involves multiple feeding arteries . Vein of Galen Malformation It is an arteriovenous malformation (AVM) developing prenatally due to abnormal connections (arteriovenous fistulas) involving the median prosencephalic vein which is a precursor to the vein of Galen. Types of VGM: Choroidal type (Option B) Fed by multiple choroidal arteries forming a nidus anterior to the venous varix. Presents in the neonatal period with high-output heart failure . Mural type (Option A) Characterized by fewer, more defined fistulous connections within the wall of the venous varix. Presents later in infancy with symptoms such as hydrocephalus . The dilated median prosencephalic vein (MPV) appears as a fluid-filled, echo-free structure in the posterior midline, showing significant blood flow on Doppler examination. On T2-weighted images, dilated feeding and draining vessels appear as flow-voids . The primary treatment involves endovascular procedures. Arteriovenous (AV) malformation (Option C) AVM is an abnormal tangle of vessels connecting an artery to a vein without a normal capillary bed. Clinically present as Acute hemorrhage . AVMs consist of several components: Feeding arteries – supply blood to the malformation Nidus

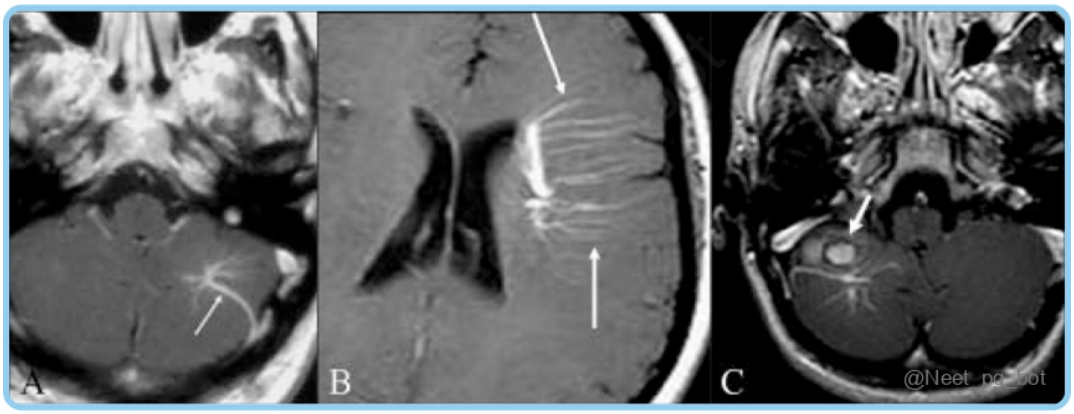
(meaning "nest") – the central part where abnormal connections occur Shunting arterioles – the main issue, causing direct blood flow from arteries to veins Interconnected venous loops Draining veins – carry blood away from the malformation Early appearance of draining veins during the arterial phase of cerebral angiography indicates the presence of an arteriovenous shunt. CECT shows a "bag of worms" appearance. Fast blood flow creates flow voids visible on T2-weighted images. Developmental venous anomaly (Option D) Congenital malformation of veins that drain the normal brain. It is the most common cerebrovascular malformation. "Caput medusae" sign (collection of dilated medullary veins converging into an enlarged transcortical or subependymal collector vein) is pathognomonic and is observed in the venous phase of angiography.



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References:

David Sutton Textbook of Radiology & Imaging 8th edition Volume 2 Page 1937, 3993

https://radiopaedia.org/articles/developmental-venous-anomaly

https://radiopaedia.org/articles/brain-arteriovenous-malformation

↑ *Back to this question in Part A*

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Q14: A 35-year-old male presents with a 2-week history of worsening headache, fever, and progressive neurological deficits, including weakness in his right arm. He has no significant past medical history. On examination, he exhibits right-sided hemiparesis and mild confusion. Blood tests show mild leukocytosis. A CT image is given below. Which of the following is the most likely diagnosis? (Q853069)

A. Metastatic disease

B. Brain abscess

C. Neurocysticercosis

D. Lymphoma



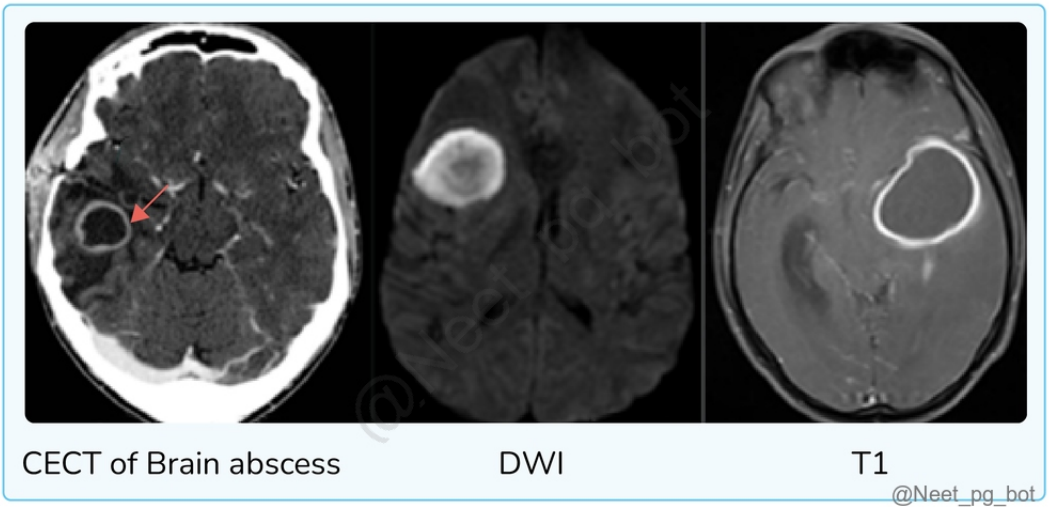
Correct Answer: B. Brain abscess

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: The CT scan reveals a ring-enhancing lesion in the frontoparietal region. This is characteristic of a brain abscess , especially when surrounded by edema . The presence of fever, acute neurological symptoms and mild Leukocytosis further supports this diagnosis. Brain abscess Most brain abscesses in immunocompetent patients are bacterial, predominantly from streptococci. Causes : Hematogenous dissemination Penetrating trauma Direct spread from nearby infections (e.g., frontal sinusitis or mastoiditis) Bloodborne infections often target the

territory of the middle cerebral arteries, especially the frontoparietal region. Abscesses are frequently subcortical or periventricular. Metastases (Option A) may also appear as ring-enhancing lesions but usually occur in patients with a known primary cancer and have a chronic presentation. The acute symptoms and fever here are more indicative of an infectious process. Neurocysticercosis (Option C) presents as a ring-enhancing lesion in endemic areas, but usually with chronic symptoms, often including seizures. The acute fever and significant neurological deficits in this case suggest a brain abscess. Lymphoma (Option D) can present with ring-enhancing lesions, often in immunocompromised patients. It generally exhibits more diffuse symptoms rather than acute fever and localized deficits.



References:

Grainger & Allison's Diagnostic Radiology 7th Edition Pg no. 1481, 1482

David Sutton Textbook of Radiology & Imaging 8th edition Volume 2 Pg no. 1950

↑ *Back to this question in Part A*

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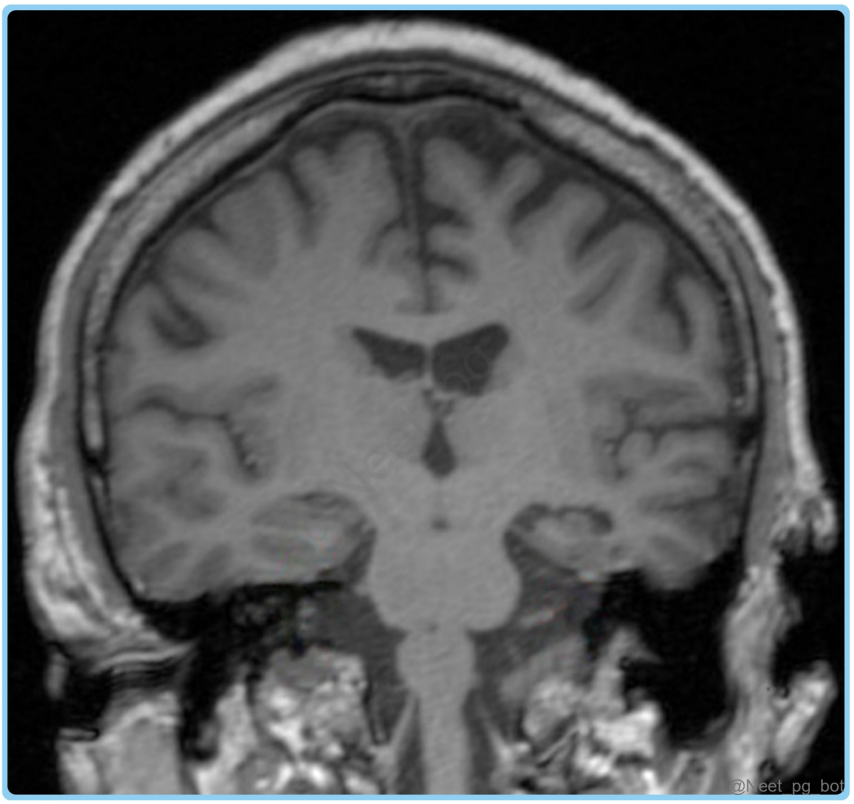
Q15: A 65-year-old patient presents with epilepsy and progressive memory loss over the past year. Neuroimaging reveals hippocampal volume loss and abnormal signal intensity on high-resolution coronal MRI. The internal laminated architecture of the hippocampus is disrupted. Which of the following is the most likely diagnosis? (Q853140)

A. Alzheimer's Disease

B. Mild Cognitive Impairment

C. Mesial Temporal Sclerosis (MTS)

D. Frontotemporal Dementia



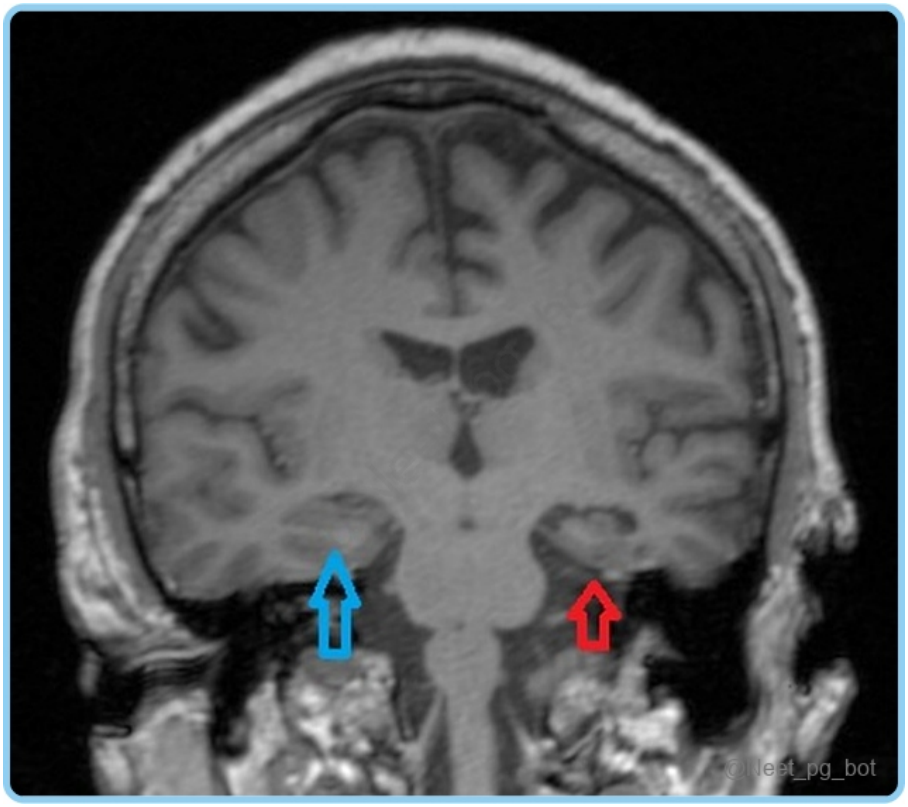
Correct Answer: C. Mesial Temporal Sclerosis (MTS)

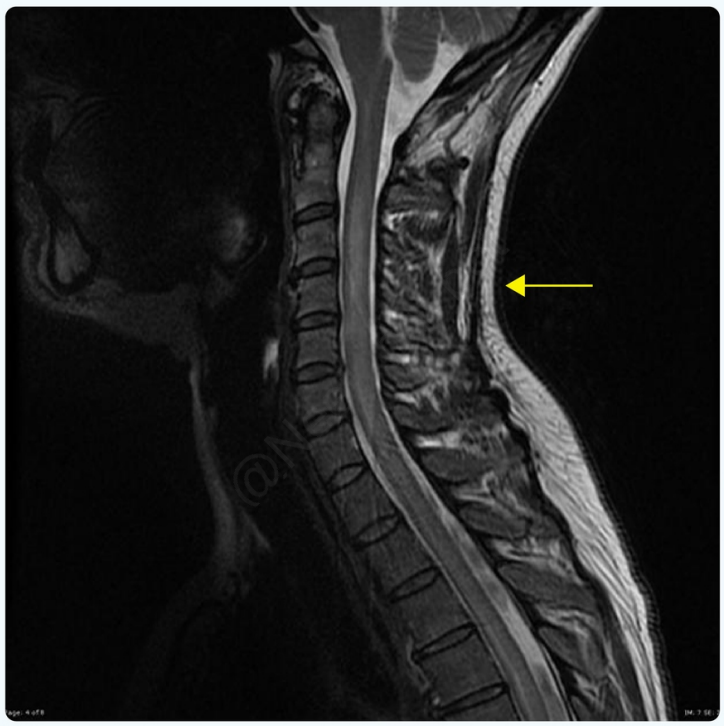
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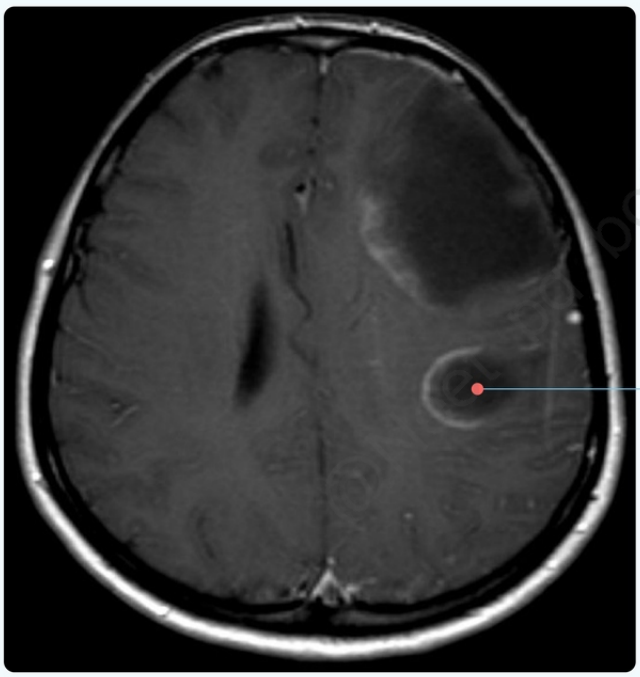
Explanation: Neuroimaging shows hippocampal volume loss , abnormal signal intensity, and disruption of the internal laminated architecture of the hippocampus , all of which are hallmark findings of Mesial Temporal Sclerosis .It is often associated with epilepsy, particularly temporal lobe epilepsy, and can lead to progressive memory loss, which aligns with the patient's symptoms. Mesial temporal sclerosis (MTS) MTS primarily affects the hippocampus , a key region in the medial temporal lobe responsible for memory . Best visualized on high-resolution coronal MRI which demonstrates Hippocampa Volume loss. Abnormal signal. Loss of normal internal laminated architecture. MTS may cause atrophy in the ipsilateral mammillary body or fornix due to their connection within the medial limbic (Papez) circuit. Devic’s disease Neuromyelitis optica (NMO) typically presents with optic neuritis and transverse myelitis, along with additional demyelination. It has overlapping clinical and radiographic features of multiple sclerosis. Antibodies involved in NMO target astrocyte aquaporin-4 channels, myelin oligodendrocyte glycoprotein, and neurofascin at the node of Ranvier. Spinal cord involvement typically presents as a high T2 signal that spans at least 3 vertebral segments, referred to as a longitudinally extensive spinal cord lesion . Multiple sclerosis MS is considered an autoimmune disease with elevated antibodies to glial antigens (e.g., CSF oligoclonal bands). Optic neuritis is common in MS. Dawson's fingers (lesions radiating perpendicularly from the corpus callosum), hyperintense lesions on T2-weighted and FLAIR images. Hypointense "black holes" on T1-weighted images. T1 C+ (Gadolinium): Active lesions enhance, often showing incomplete enhancement ("open ring sign") . Alzheimer's (Option A) typically involves global cognitive decline and memory impairment. While it shows hippocampal atrophy, the imaging findings (architectural disruption) and

specifics here point to MTS. Mild Cognitive Impairment (Option B) represents a transitional stage between normal aging and dementia. Does not usually cause significant structural changes in the hippocampus. Frontotemporal Dementia (Option D) primarily affects the frontal and temporal lobes , leading to personality and behavioral changes, not isolated memory loss.

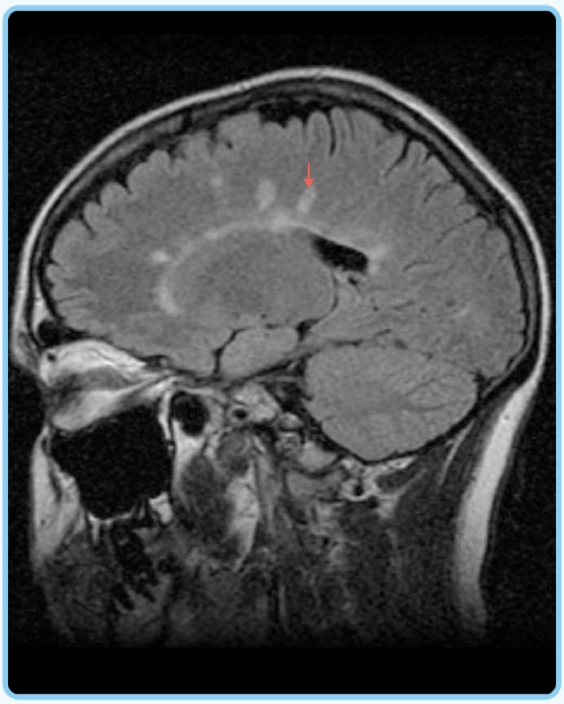




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https://radiopaedia.org/articles/mcdonald-diagnostic-criteria-for-multiple-sclerosis-4?lang=us

https://radiopaedia.org/articles/multiple-sclerosis

↑ *Back to this question in Part A*

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Q16: A 55-year-old chronic alcoholic presents with symptoms of confusion, ataxia, and memory impairment. He has a history of Alcoholic Liver Disease. An MRI is ordered to assess any potential brain damage due to chronic alcohol abuse. The MRI reveals signaling abnormalities. Which of the following locations are likely to show abnormal signals? Locations: Mammillary bodies Periventricular grey matter Thalamus Corpus callosum Hippocampus (Q853138)

A. 1, 2, and 5

B. 2, 3, and 4

C. 1, 2, and 3

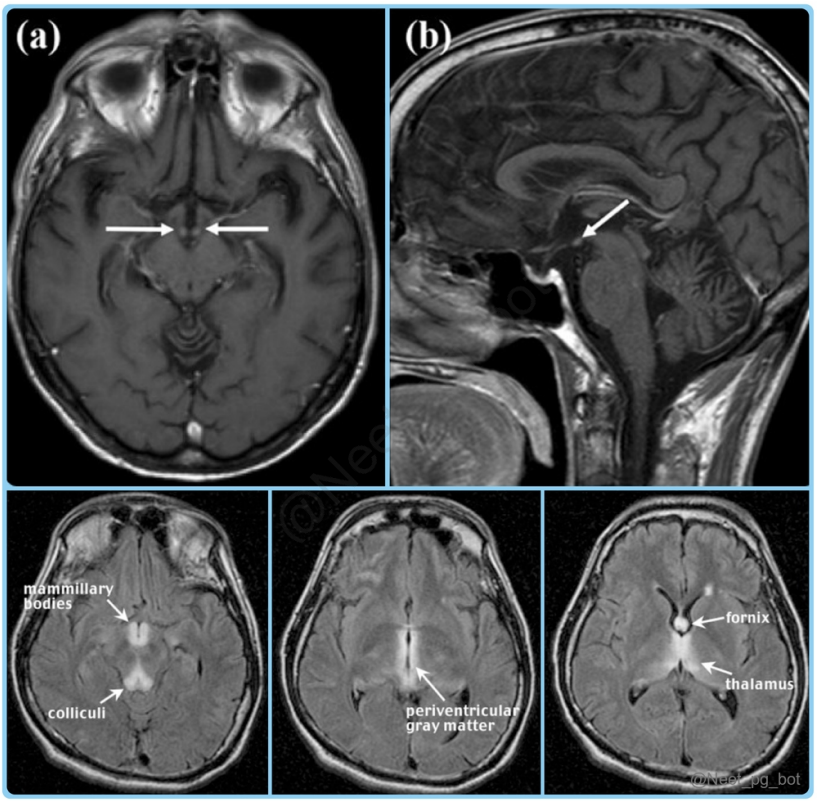
D. 3, 4, and 5

Correct Answer: C. 1, 2, and 3

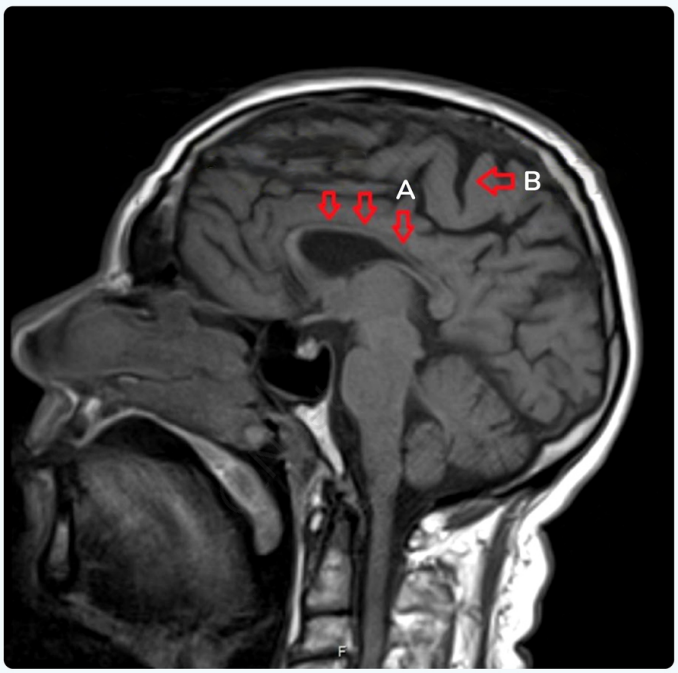
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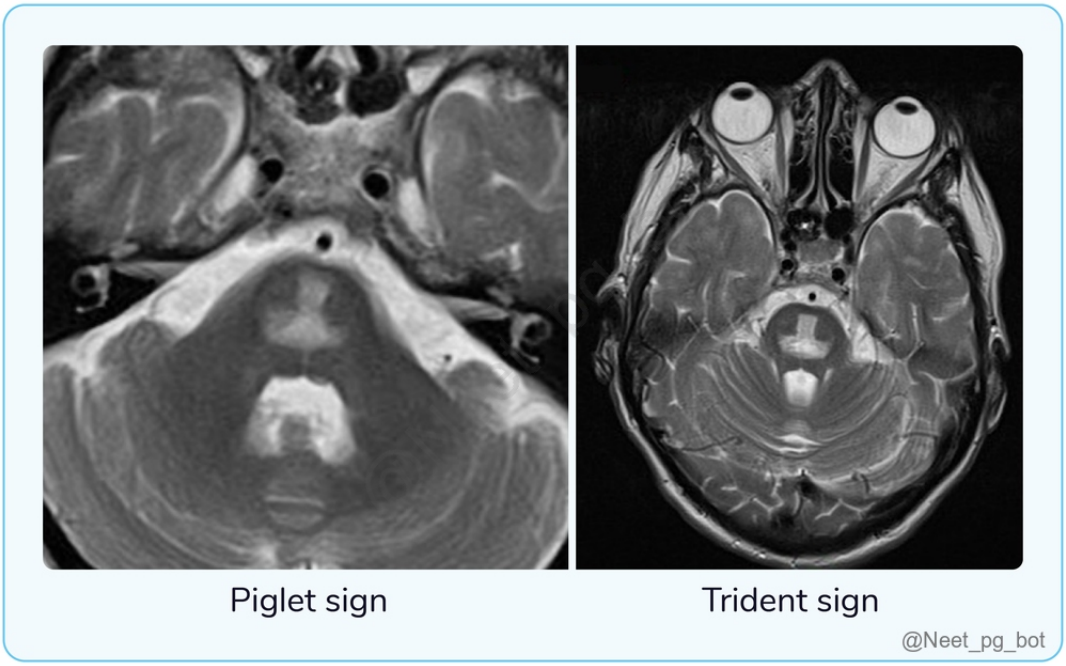
■ *Listen (Hindi)*

Explanation: Chronic alcohol abuse, especially in cases involving Wernicke’s encephalopathy, typically affects the mammillary bodies, periventricular grey matter, and the thalamus. These areas are particularly vulnerable to thiamine deficiency, often seen in alcoholics. Other areas, like the corpus callosum and hippocampus, can be affected in other conditions but are not primary locations for damage. Chronic Alcoholism Chronic alcoholism can lead to several severe neurological conditions, many of which are due to vitamin deficiencies or electrolyte imbalances that result from prolonged alcohol abuse. Three major conditions associated with chronic alcoholism are Wernicke’s encephalopathy, Marchiafava-Bignami Disease (MBD), and Central Pontine Myelinolysis (CPM) / Osmotic Demyelination Syndrome (ODS). Wernicke's Encephalopathy Pathophysiology Thiamine (Vitamin B1) deficiency caused by chronic alcoholism leads to impaired glucose metabolism and brain dysfunction, particularly in memory and coordination areas. Clinical Features Mnemonic: GOA G lobal Confusion: Mental disorientation, concentration issues, memory loss. O phthalmoplegia: Paralysis or weakness of eye muscles, nystagmus, or double vision. A taxia: Gait and stance disturbances due to cerebellar dysfunction. Progression Can lead to Wernicke-Korsakoff Syndrome, characterized by irreversible memory deficits and confabulation. Korsakoff Psychosis (Chronic Stage) Results from untreated or partially treated Wernicke’s encephalopathy Persistent thiamine deficiency Irreversible damage to: Mammillary bodies Medial thalamus Limbic system structures Clinical Features: Severe anterograde amnesia Retrograde amnesia Confabulation (fabricated memories) Apathy Lack of insight Diagnostic Test Red Blood Cell Transketolase Test: Assesses thiamine deficiency. MRI Findings Signaling abnormalities seen in Mammillary Bodies: Atrophy or hyperintensity. Periventricular Gray Matter Thalamus. Midbrain Colliculi. Fornix involvement. Treatment Immediate Thiamine Supplementation: Administer thiamine (typically 100 mg IV or IM). Glucose Infusion: After thiamine is given, a glucose-containing solution can be infused, Marchiafava-Bignami Disease (MBD) Pathophysiology Rare condition affecting chronic alcoholics, causing demyelination and necrosis of the corpus callosum. The mechanism is not fully understood, but it's linked to malnutrition and chronic alcohol toxicity. Clinical Features Cognitive Disturbances: Progressive dementia, confusion, memory loss. Motor Symptoms: Seizures, gait abnormalities, spasticity. Altered Sensorium: Lethargy, stupor, or coma. Progression Can lead to severe cognitive impairment, spasticity, coma, or death. The condition may worsen rapidly or fluctuate over time. MRI Findings Hyperintense lesions on T2-weighted and FLAIR sequences in the corpus callosum, especially the body and splenium. Signs: 1. "Butterfly-shaped" lesions in the corpus callosum 2. Sandwich sign Treatment Thiamine and vitamin B-complex supplementation is usually administered. Osmotic Demyelination Syndrome (ODS) / Central Pontine Myelinolysis (CPM): Pathophysiology Occurs due to rapid correction of chronic hyponatremia, leading to osmotic shifts and destruction of the myelin sheath in the central pons and other areas (e.g., basal ganglia). Chronic alcoholics are at higher risk due to electrolyte imbalances. Signs Piglet sign: Characteristic imaging pattern in the central pons. Trident sign: Imaging hallmark resembling a trident, indicating myelinolysis. Clinical Features Altered Sensorium: Ranges from confusion and disorientation to stupor or coma. Quadriparesis: Severe weakness in all four limbs. Rapid Deterioration: Symptoms can progress quickly, leading to coma or death if untreated. Treatment Slow correction of sodium levels in chronic hyponatremia is essential to avoid ODS.


(a)
(b)
mammillary bodies
colliculi
periventricular gray matter
fornix
thalamus
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References:

Grainger & Allison's Diagnostic Radiology, 7th Edition, Page 1532

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5513685/

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Q17: Assertion: The absence of the swallow tail on MRI is indicative of Parkinson's disease. Reason: It represents the characteristic loss of dopamine-producing neurons in the substantia nigra, leading to specific changes in the brain's morphology. (Q853093)

A. Both the assertion and reason are true, and the reason correctly explains the assertion

B. Both the assertion and reason are true, but the reason does not correctly explain the assertion

C. The assertion is true, but the reason is false

D. The assertion is false, but the reason is true

Correct Answer: A. Both the assertion and reason are true, and the reason correctly explains the assertion

■ *Listen (English)*

■ *Listen (Hindi)*

Explanation: The absence of the "swallow tail" on MRI is associated with neurodegenerative changes in the brain, particularly the loss of dopamine-producing neurons in the substantia nigra. This loss leads to specific morphological changes in the putamen and other structures, supporting the assertion that its absence is indicative of Parkinson's disease. Parkinson's Disease (PD) Parkinson's Disease (PD) is a neurodegenerative disorder marked by motor symptoms like bradykinesia, rigidity, and tremors, primarily due to dopaminergic neuron loss in the substantia nigra pars compacta of the midbrain. Diagnosis typically involves clinical evaluation, though neuroimaging can offer insights into disease pathophysiology and assist in distinguishing PD from "Parkinson plus" syndromes. Normal and Abnormal Radiological Findings Normal Midbrain: Split/Swallow Tail Sign (Figure 1A): In healthy individuals, MRI imaging of the midbrain reveals a characteristic "swallow tail" sign due to the presence of nigrosomes (distinctive structures within the substantia nigra). This sign is indicative of normal dopaminergic function. Parkinson's Disease (Figure 1B): Absence of Swallow Tail Sign: In patients with PD, the swallow tail sign is absent. This finding suggests a loss of nigrosomes due to the degeneration of dopaminergic neurons. Loss of Nigrosomes: MRI findings will demonstrate the absence of nigrosomes in the substantia nigra, correlating with the loss of dopamine production. Parkinson's Plus Syndromes "Parkinson plus" syndromes are atypical Parkinsonian disorders that share core features with Parkinson’s Disease, such as bradykinesia and rigidity, but with distinct additional symptoms: Dementia: Early cognitive decline. Autonomic Dysfunction: Symptoms like orthostatic hypotension, urinary incontinence, and sexual dysfunction. Common examples of Parkinson's plus syndromes include: Progressive Supranuclear Palsy (PSP) (also known as Steele-Richardson-Olszewski Syndrome) Multiple System Atrophy (MSA) Corticobasal Degeneration (CBD) Radiological Considerations for Other Parkinson Plus Syndromes Progressive Supranuclear Palsy (PSP)/Steele-Richardson-Olszewski Syndrome ■■■■■: It typically presents with early postural instability and difficulty with eye movements, especially vertical gaze palsy. PSP is associated with midbrain atrophy, which is easily identified on MRI. Mickey Mouse Sign: One key radiological sign seen in PSP is the "Mickey Mouse sign" on axial MRI imaging of the midbrain. This occurs due to atrophy of the midbrain, giving it the shape of Mickey

Mouse's head. Hummingbird Sign: Seen on sagittal MRI views of the midbrain. This appearance is due to atrophy of the midbrain, which gives it the shape of a bird in flight, with the preserved pons forming the body and the atrophic midbrain forming the head. Multiple System Atrophy (MSA): MRI may show atrophy of the putamen and cerebellar structures. The presence of the "hot cross bun" sign in the pons is characteristic of MSA, especially when there is cerebellar involvement (MSA-C). Corticobasal Degeneration (CBD): MRI findings in CBD may show asymmetrical cortical atrophy and basal ganglia changes.

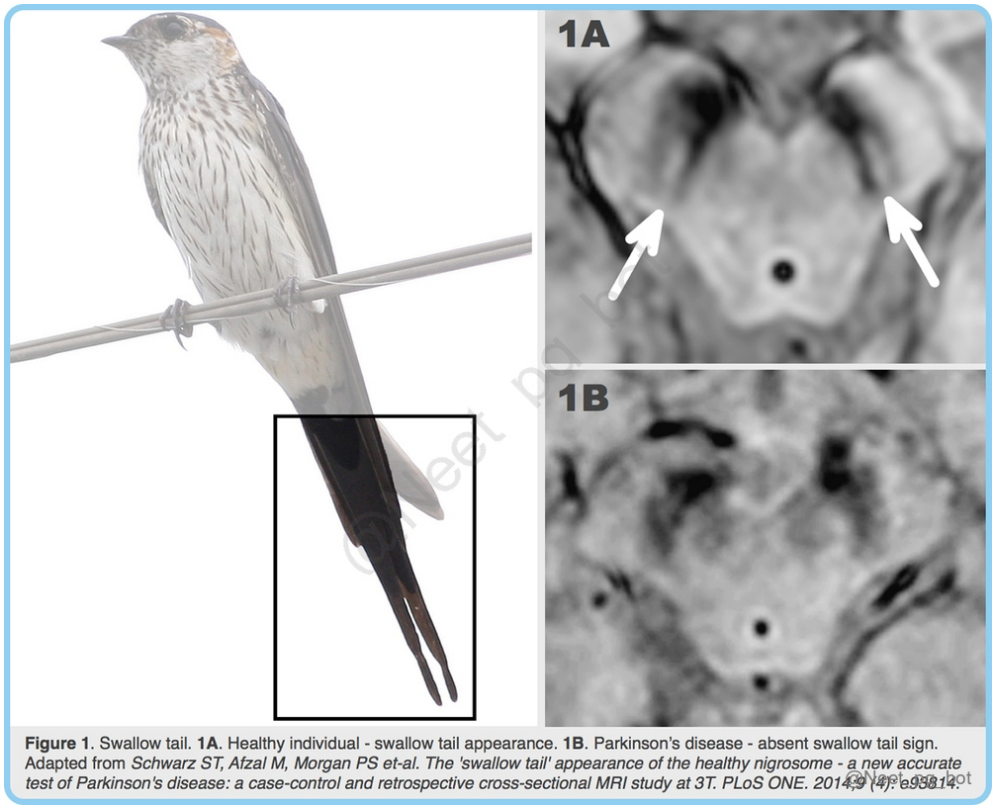
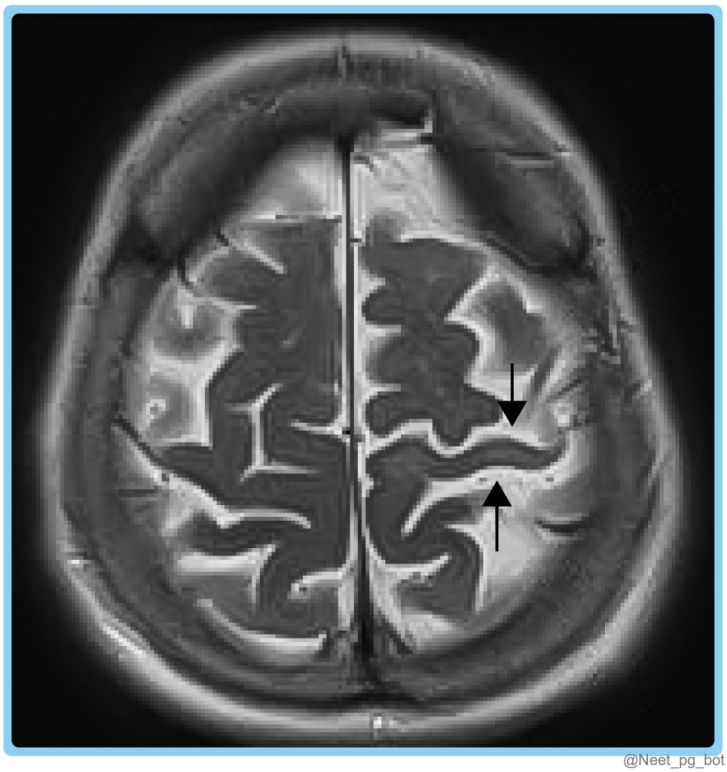
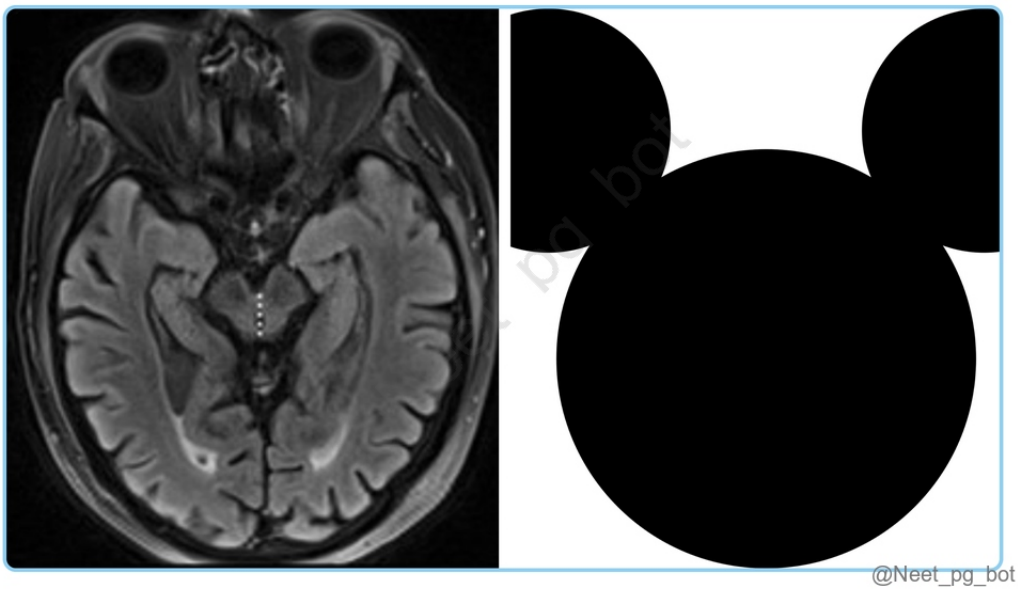


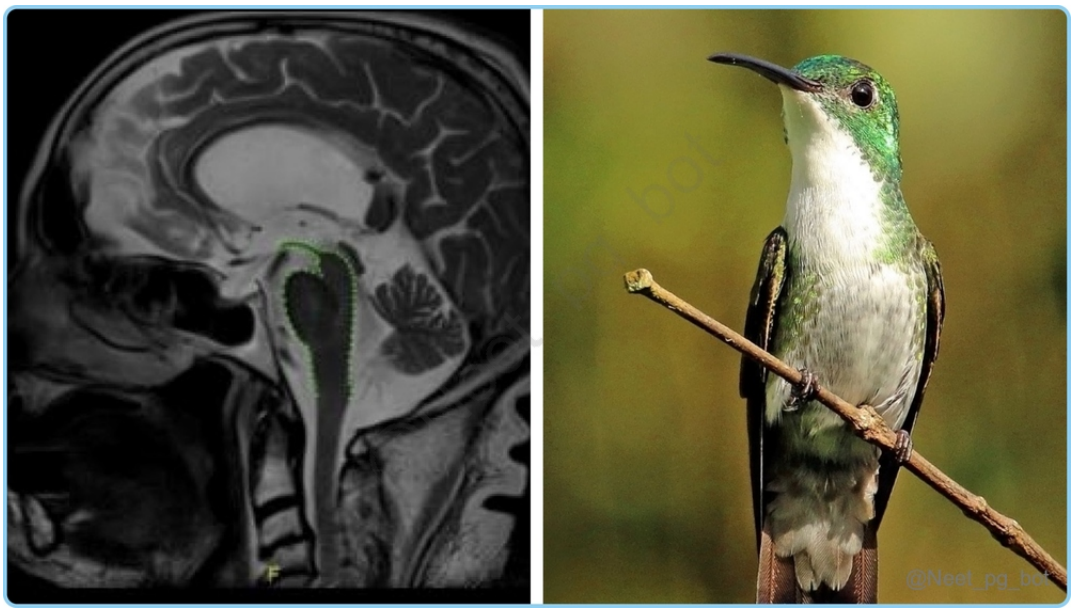
Figure 1. Swallow tail. **1A**. Healthy individual - swallow tail appearance. **1B**. Parkinson's disease - absent swallow tail sign. Adapted from *Schwarz ST, Afzal M, Morgan PS et-al. The 'swallow tail' appearance of the healthy nigrosome - a new accurate test of Parkinson's disease: a case-control and retrospective cross-sectional MRI study at 3T. PLoS ONE. 2014; 9(7): e93814.*



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Grainger & Allison's Diagnostic Radiology, 7th Edition, Page 1555

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5514207/

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Q18: Match the following diseases and their associated radiological signs Radiological Sign Disease 1) Giant Panda sign a) Ceruloplasmin Defeciency 2) tram track calcification b) Fahr’s Disease 3) Eye of the tiger sign c) Sturge Weber syndrome 4)

Basal ganglia Calcification d) Hallervorden-Spatz disease (Q853083)

A. 1-a, 2-c, 3-d, 4-b

B. 1-c, 2-b, 3-a, 4-d

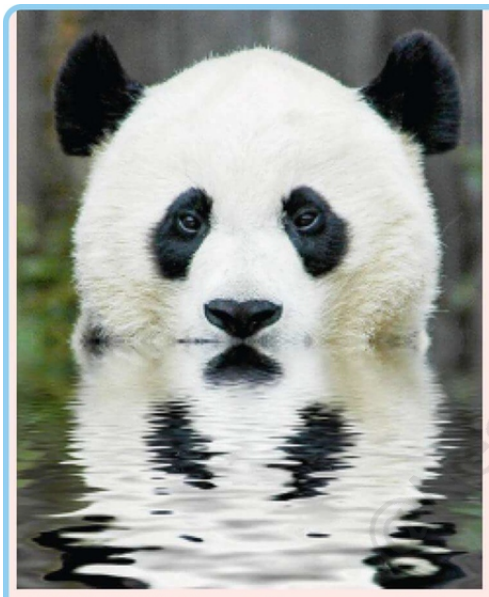
C. 1-b, 2-d, 3-c, 4-a

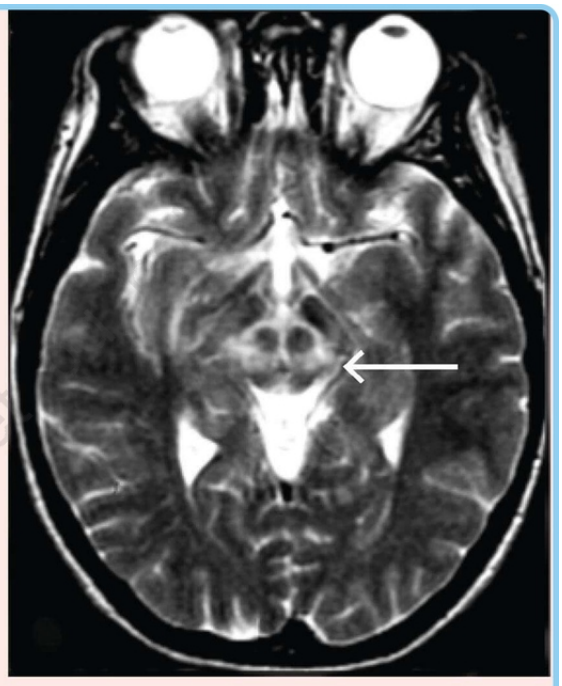
D. 1-d, 2-a, 3-c, 4-b

Correct Answer: A. 1-a, 2-c, 3-d, 4-b

- *Listen (English)*
- *Listen (Hindi)*

Explanation: Pathological Conditions Associated with Brain Calcification Condition Cause Radiological Features Wilson’s Disease Genetic disorder leading to low levels of ceruloplasmin, impairing copper transport and resulting in copper accumulation. MRI: "Face of the giant panda" sign in the midbrain; signal abnormalities in basal ganglia due to copper deposits. KF ring: Golden-brown ring in the cornea due to copper accumulation. Note: Sarcoidosis: Gallium scan: Distinctive "panda sign" showing tracer uptake in the lacrimal, parotid, and salivary glands. This should not be confused with the panda sign of Wilson's disease seen on MRI. Hallervorden-Spatz Disease (PKAN) Iron accumulation in the brain, especially the globus pallidus. MRI: "Eye of the tiger" sign on T2-weighted imaging. Central hyperintense gliotic area surrounded by hypointense iron deposits, resembling a tiger's eye. Fahr’s Disease (Basal Ganglia Calcification) Idiopathic or secondary to metabolic disorders (e.g., hypoparathyroidism). CT scan: Symmetrical calcifications in the basal ganglia, thalamus, dentate nucleus, and other brain structures. Bracket calcifications: Curvilinear hyperdensities forming a bracket-like appearance around the basal ganglia. Sturge-Weber Syndrome Congenital neurocutaneous disorder with vascular malformations. CT scan: "Tram-track" calcifications along the gyri of the cerebral cortex, especially in the occipital and parietal lobes. MRI: Cortical atrophy and leptomeningeal enhancement.

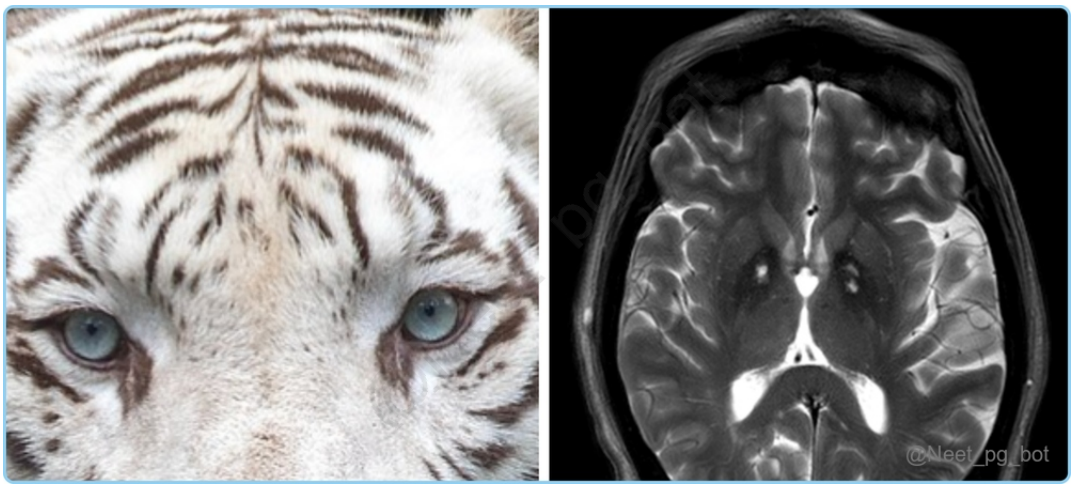


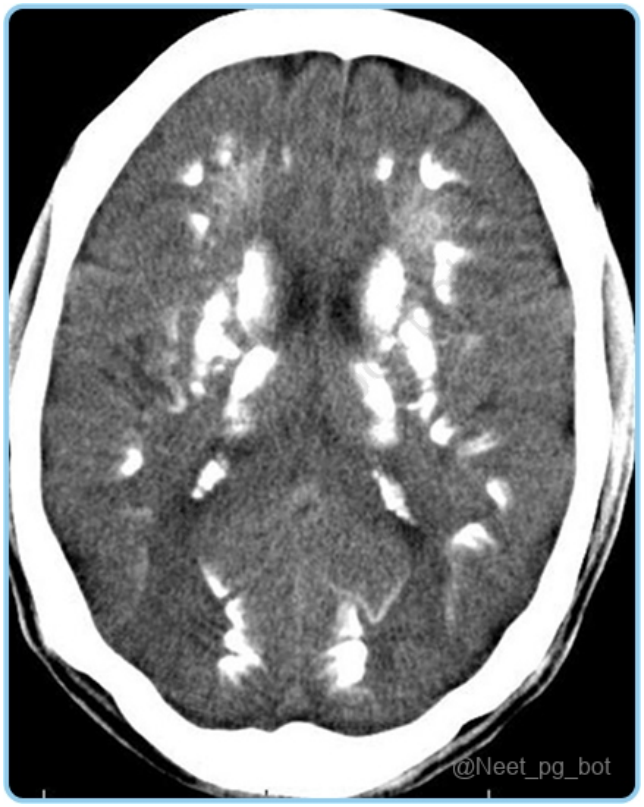


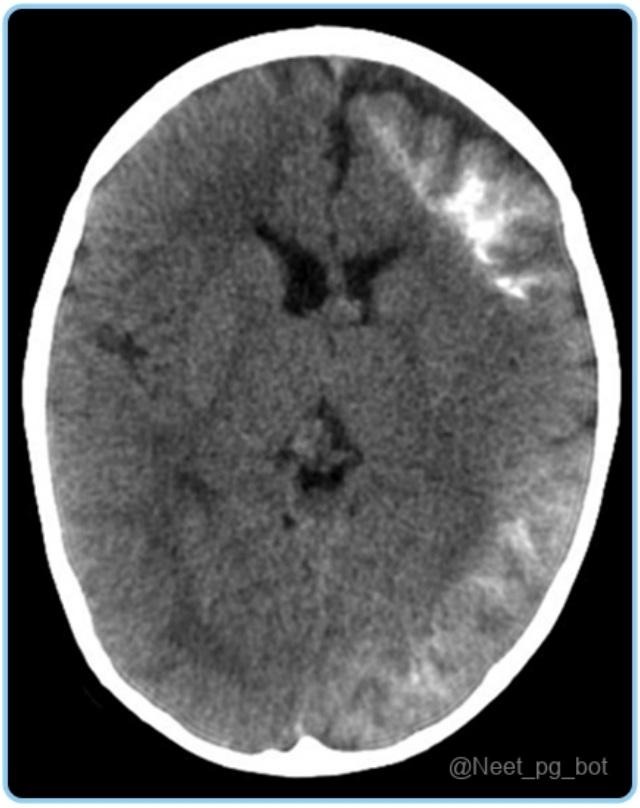
T2 MRI the ‘face of the giant panda’ in the midbrain (arrow).

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References:

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6738489/

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Q19: An 80-year-old male presents to his physician with complaints of difficulty sleeping and frequently waking up during the night. He denies any accompanying symptoms, such as pain, anxiety, or other disturbances. Concerned about his sleep issues, the physician orders a CT scan of the brain. The CT findings reveal an appearance commonly referred to as "brain sand." Based on the findings, what is the most likely diagnosis? (Q853081)

A. Choroid plexus calcification

B. Pineal gland calcification

C. Falx cerebri calcification

D. Basal ganglia calcification

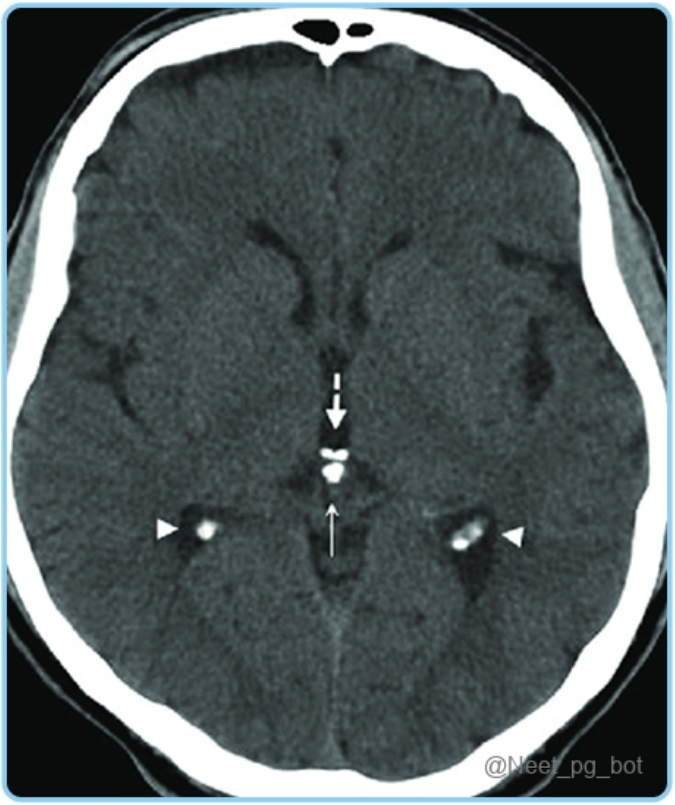


Correct Answer: B. Pineal gland calcification

- *Listen (English)*
- *Listen (Hindi)*

Explanation: The term "brain sand" refers to calcifications often seen in the pineal gland, especially in older adults. These calcifications are primarily due to the deposition of calcium salts, which is a common physiological process associated with aging. Pineal gland calcification can occur without any symptoms, but it is sometimes associated with sleep disturbances due to the gland's role in melatonin production, which regulates sleep-wake cycles. Site Location Description Physiological Function Pineal Calcification Posterior to the third ventricle Known as "brain sand" (corpora arenacea); increases with age. Involved in melatonin production and regulation of circadian rhythms. Choroid Plexus Calcification Lateral ventricles Benign calcification that produces cerebrospinal fluid (CSF); often a normal finding with age. Responsible for CSF production. Falx Cerebri Calcification Midline of the brain Calcification along the sickle-shaped fold of dura mater; common aging change. No specific physiological role; considered a normal anatomical change. Basal Ganglia Calcification Globus pallidus and surrounding areas Common in elderly individuals; not usually associated with neurological impairment. Associated with aging processes


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References:

Grainger & Allison's Diagnostic Radiology, 7th Edition, Page: 1435

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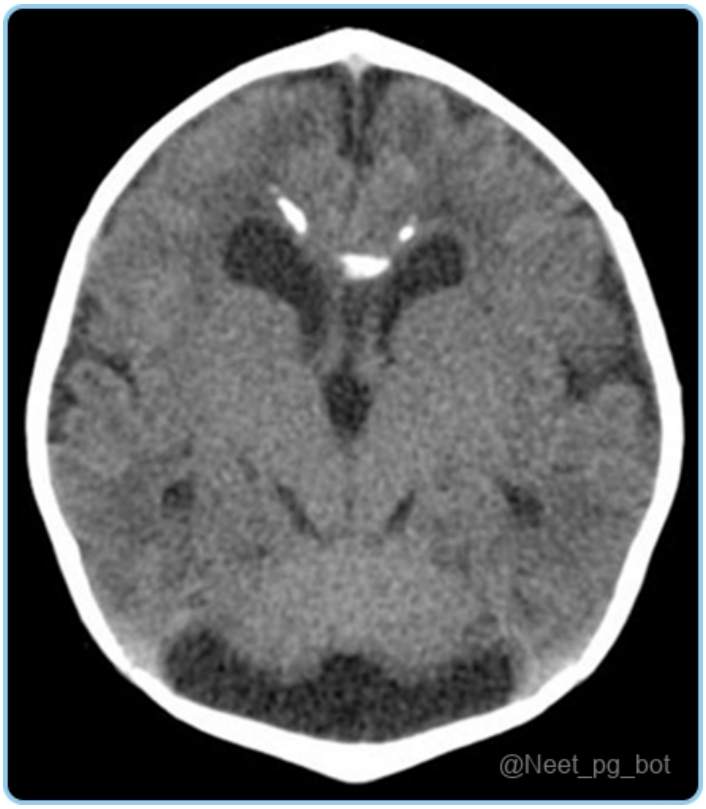
Q20: A 2-month-old infant is brought to the clinic with persistent jaundice, hepatosplenomegaly, petechiae, and microcephaly. On further evaluation, the infant is found to have sensorineural hearing loss and signs of developmental delay. The mother reports a history of a flu-like illness during pregnancy. A CT scan of the infant's brain reveals the following findings. Based on these findings, which of the following is the most likely causative agent? (Q853080)

A. Rubella

B. Toxoplasma gondii

C. Zika virus

D. Cytomegalovirus (CMV)



Correct Answer: D. Cytomegalovirus (CMV)

■ *Listen (English)*

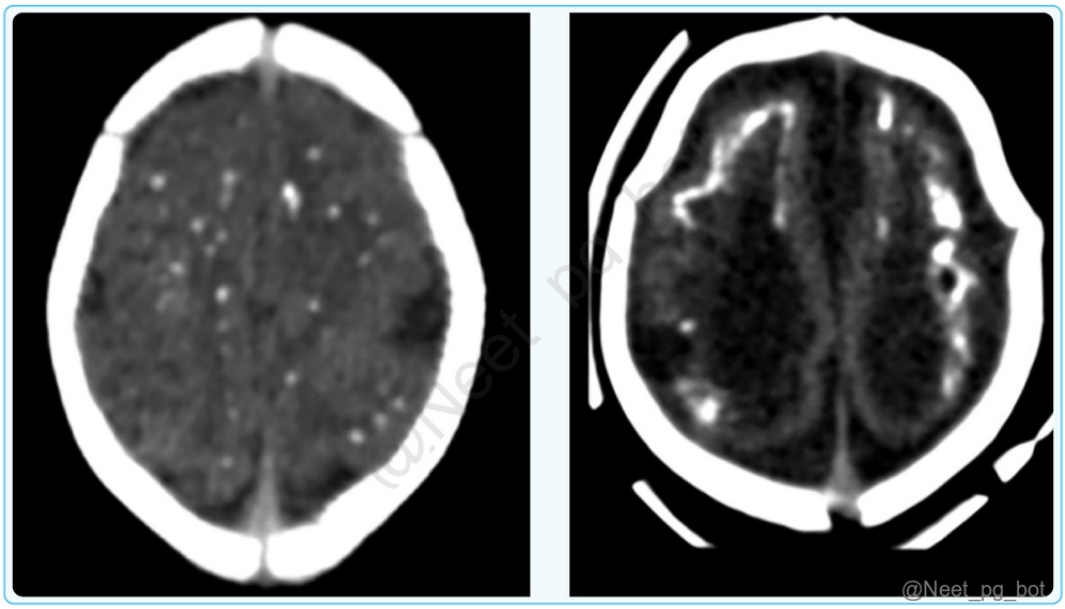
■ *Listen (Hindi)*

Explanation: CMV is the most common cause of congenital viral infections. Typical features include periventricular calcifications on neuroimaging, microcephaly, hepatosplenomegaly, jaundice, petechiae, developmental delays, and sensorineural hearing loss. CMV infection occurs when the virus is transmitted from the mother to the fetus, often during a primary maternal infection. Periventricular calcifications are a hallmark of congenital CMV. Congenital Infections Infection Type of Calcification Affected Brain Region Key Features Congenital Toxoplasmosis (Option B) Diffuse or nodular intracranial Basal ganglia, cerebral cortex Hydrocephalus, chorioretinitis, developmental delays Congenital Cytomegalovirus (CMV) Periventricular calcifications Periventricular region Microcephaly, sensorineural hearing loss, developmental abnormalities Congenital Zika Virus (Option C) Punctate calcifications Cortical/subcortical regions Microcephaly, brain malformations, joint contractures Congenital Rubella (Option A) Punctate calcifications Cortical/subcortical regions Microcephaly, cataracts, deafness, heart defects

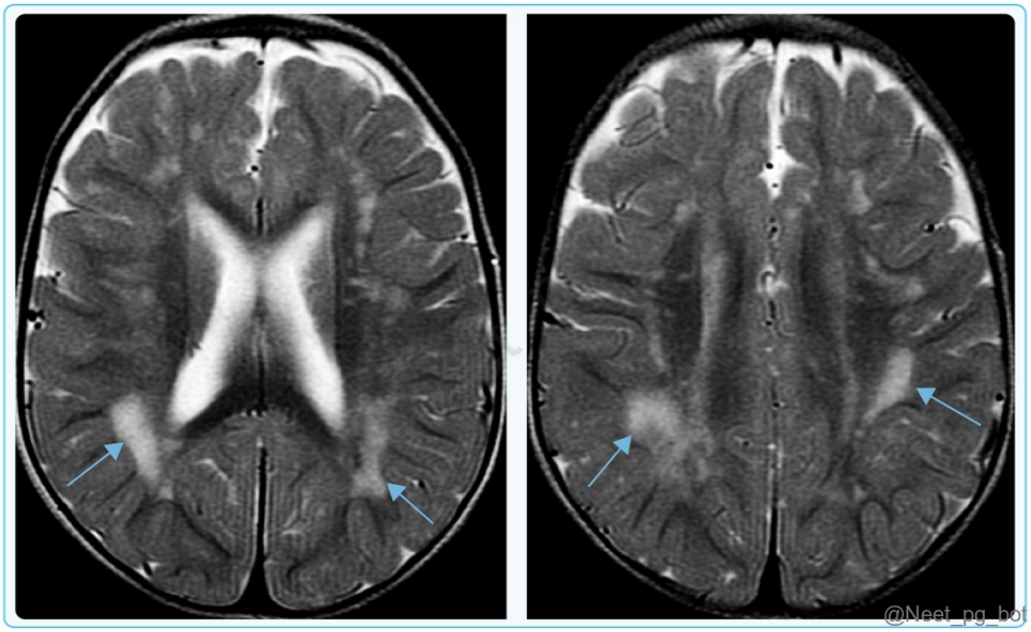




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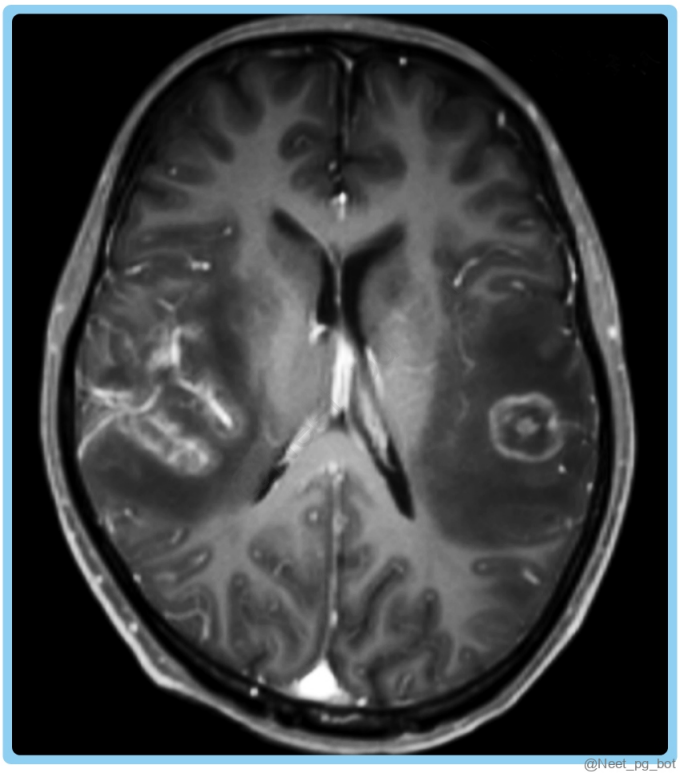
Q21: A 35-year-old man with a history of HIV presents to the emergency department with new-onset seizures and altered mental status. His CD4 count is 80 cells/mm³. A brain MRI is performed to evaluate for potential infections and is as shown below. What is the diagnosis? (Q853079)

A. Herpes simplex

B. Japanese encephalitis

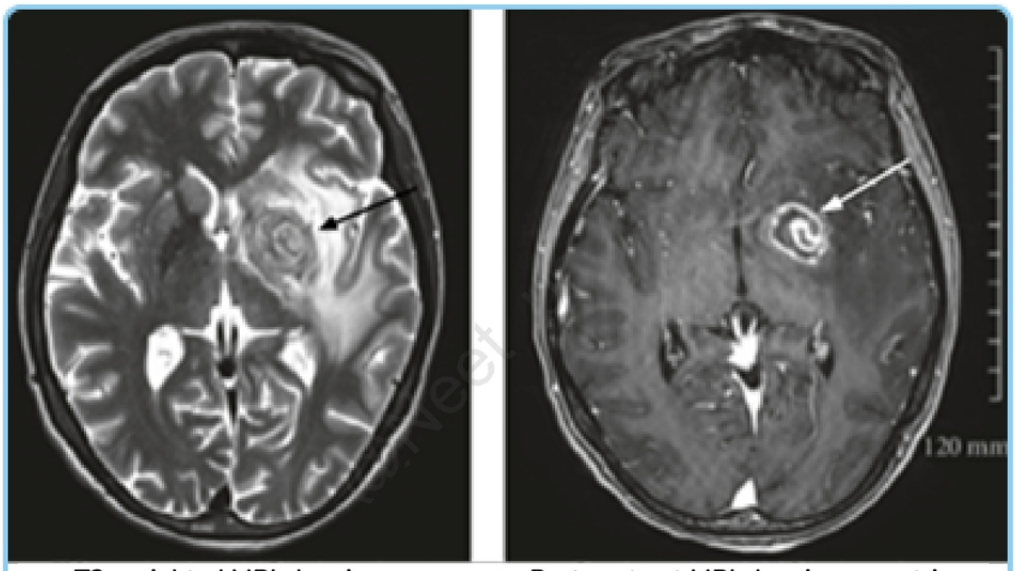
C. Cryptococcosis

D. Toxoplasmosis



Correct Answer: D. Toxoplasmosis

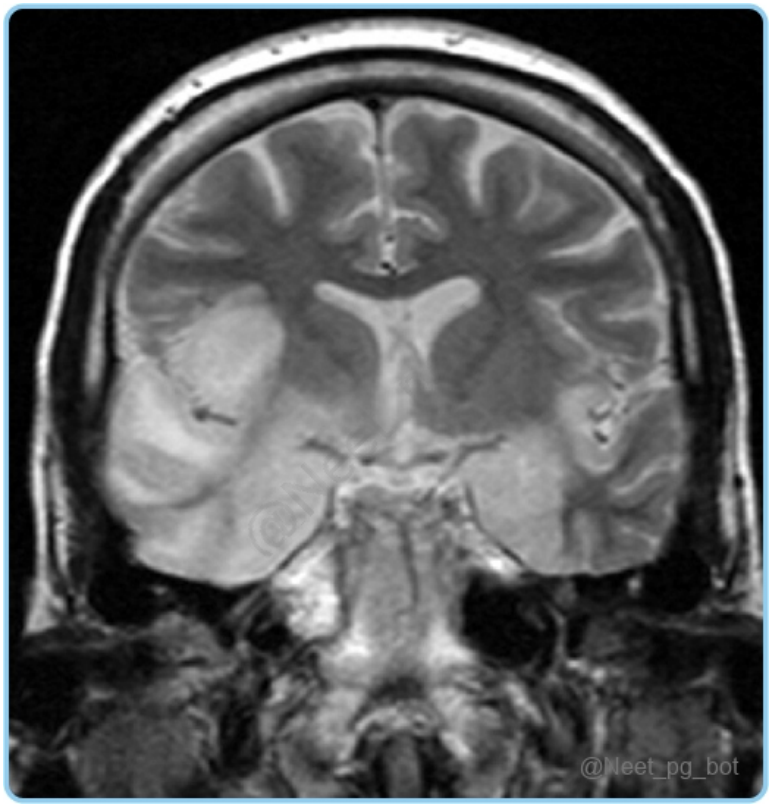
Explanation: The clinical scenario points to toxoplasmosis, which occurs in immunocompromised patients with a low CD4 (<100 cells/mm³), and the MRI shows the “target sign” confirming the diagnosis. Toxoplasmosis Toxoplasma gondii, a protozoan, causes toxoplasmosis. Humans contract it by contact with cat feces or by eating undercooked meat and shellfish. In healthy people, the infection is usually asymptomatic and can remain latent in brain tissue. Radiological findings: CT/MRI appearance: ring-enhancing abscesses are commonly found in the basal ganglia , thalamus , and corticomedullary junction . Variable degrees of perilesional edema and mass effect may be present. MRI characteristics: abscesses appear hyperintense on T2/FLAIR sequences and hypointense on T1 images unless hemorrhage occurs, which causes peripheral T1 shortening. Target sign : on T2 images, this is characterized by a central hyperintensity (fluid), peripheral hypointensity (mural blood), and an outer ring of hyperintense edema . Differential diagnosis: primary CNS lymphoma shows restricted diffusion, while toxoplasmosis displays a wider range of diffusion characteristics. Herpes Simplex Encephalitis (Option A): CT/MRI appearance: initial CT may appear normal for the first 3 to 5 days, but abnormalities are often detectable within 3 days using modern imaging techniques. Low attenuation and swelling are primarily seen in the anteromedial temporal lobe and inferior frontal lobe, often involving the insula and cingulate gyrus. Lesions typically begin unilaterally and may progress bilaterally. Hemorrhage is a late feature, with patchy contrast enhancement. Japanese Encephalitis (Option B): MRI Appearance: characteristic findings include hyperintense areas on T2 and FLAIR sequences, particularly affecting the basal ganglia and thalamus . Differential diagnoses: internal cerebral vein thrombosis and metabolic or toxic causes. Cryptococcosis (Option C): CT/MRI appearance: imaging may reveal meningeal enhancement , especially in cases of cryptococcal meningitis. Basal meningeal thickening and hydrocephalus may also be present. MRI shows gelatinous material-filled pseudocysts in the basal ganglia, periventricular white matter, mamillary bodies, midbrain, and dentate nucleus, which give the appearance of a “soap bubble”. Cysts : in some rare cases, cryptococcal abscesses can appear as lesions with variable enhancement patterns, potentially mimicking other types of CNS infections.

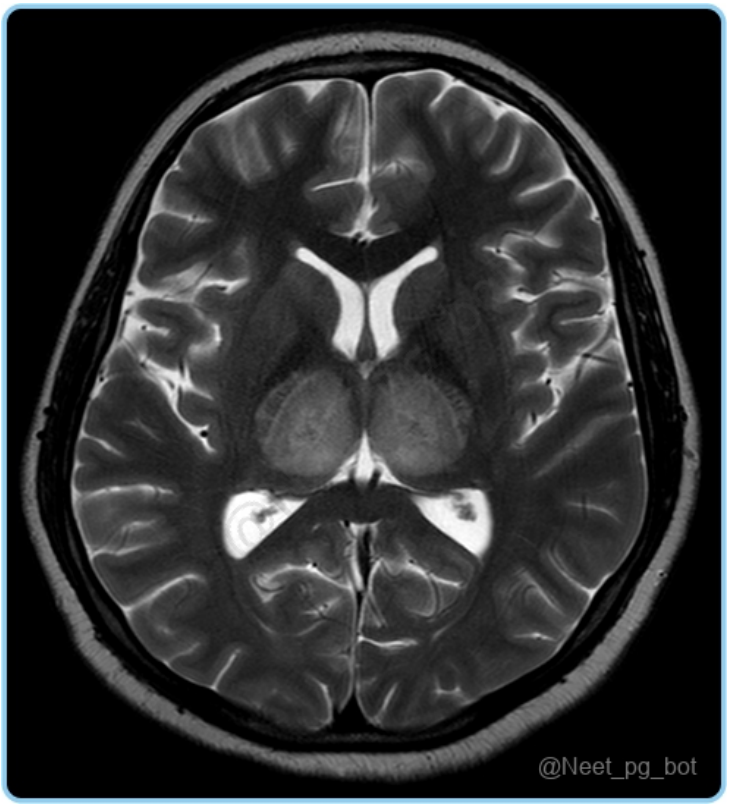


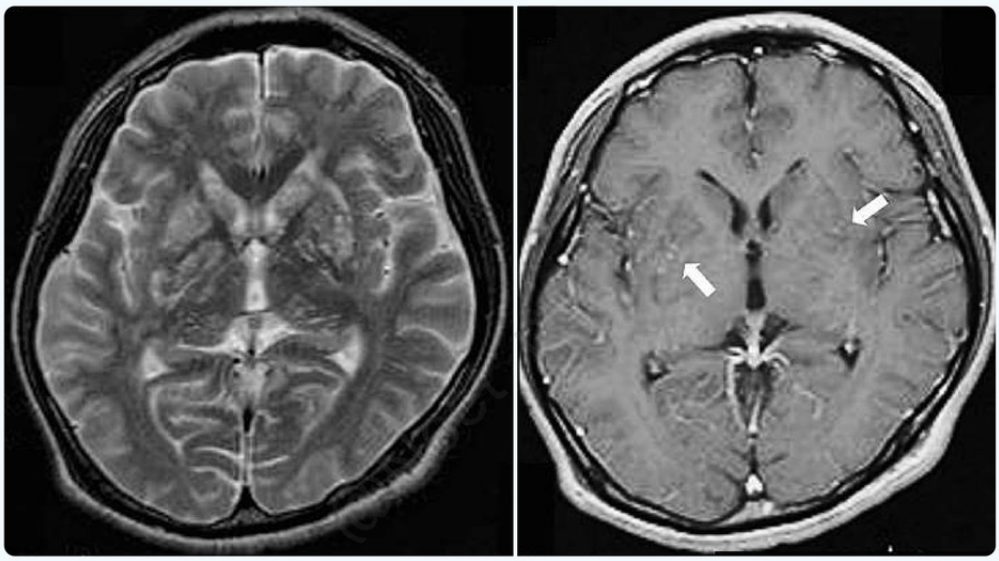
T2-weighted MRI showing concentric "Target sign"

Post contrast MRI showing eccentric "Target sign"

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Cryptococcal cysts at the basal ganglia level are evident on T2-weighted MRI : after contrast administration, some appear hyperintense on T1

References:

Grainger & Allison's Diagnostic Radiology 7th Edition, page: 1486-1488, 1492.

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5746879/

https://pubmed.ncbi.nlm.nih.gov/24270259/

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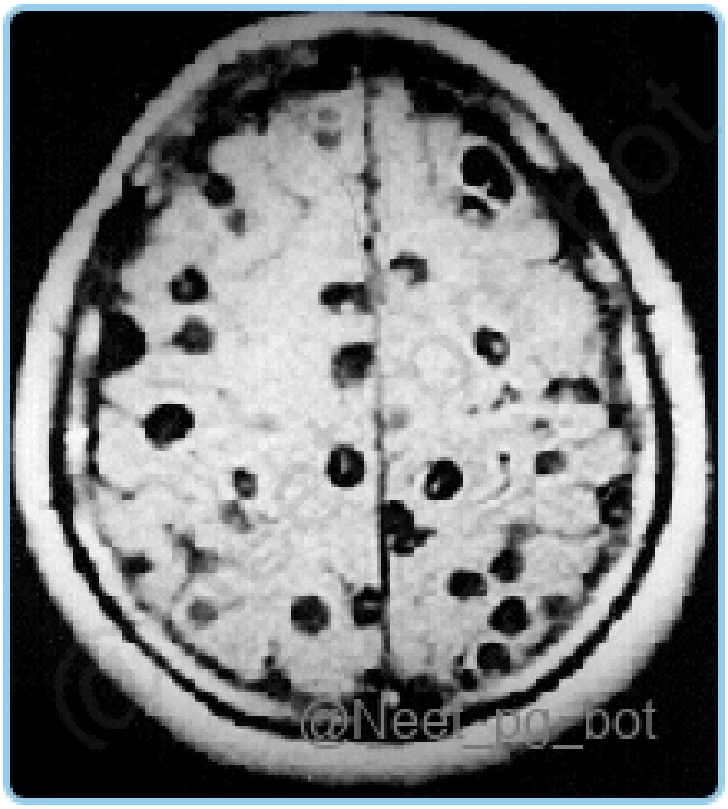
Q22: A 32-year-old male presents with recurrent seizures. MRI imaging reveals as follows: Based on the MRI findings, which stage of neurocysticercosis is most consistent with this presentation? (Q853075)

A. Granular nodular stage

B. Vesicular stage

C. Colloidal vesicular stage

D. Calcified nodular stage

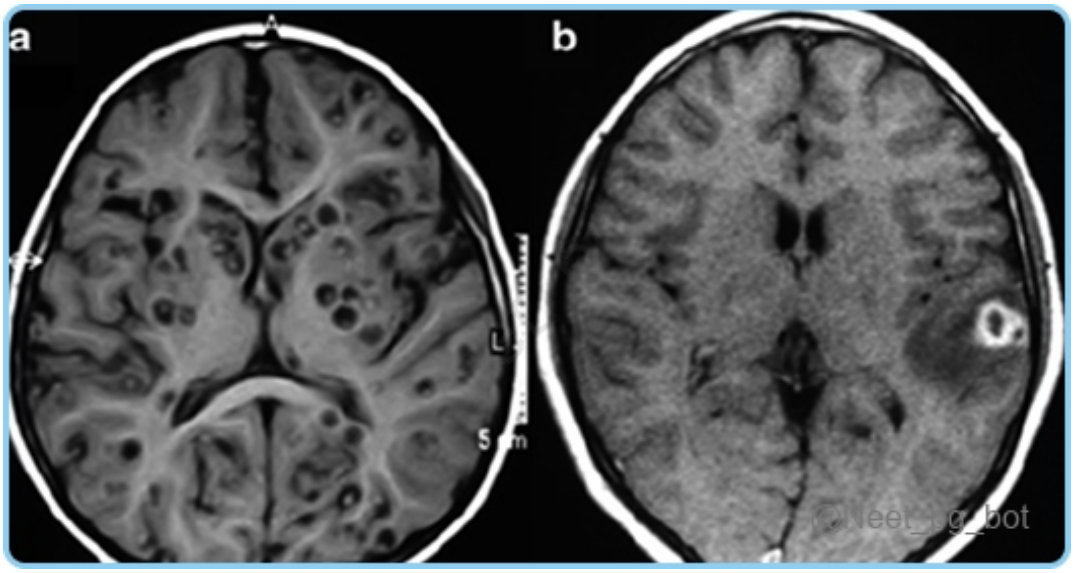


Correct Answer: B. Vesicular stage

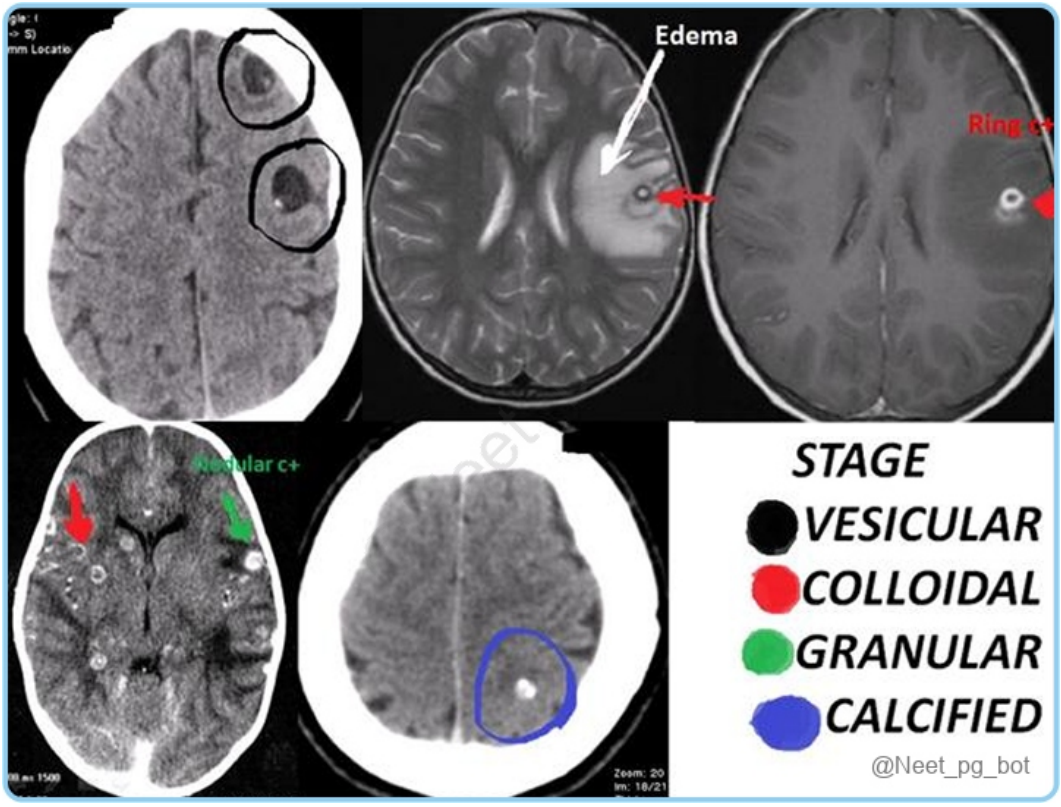
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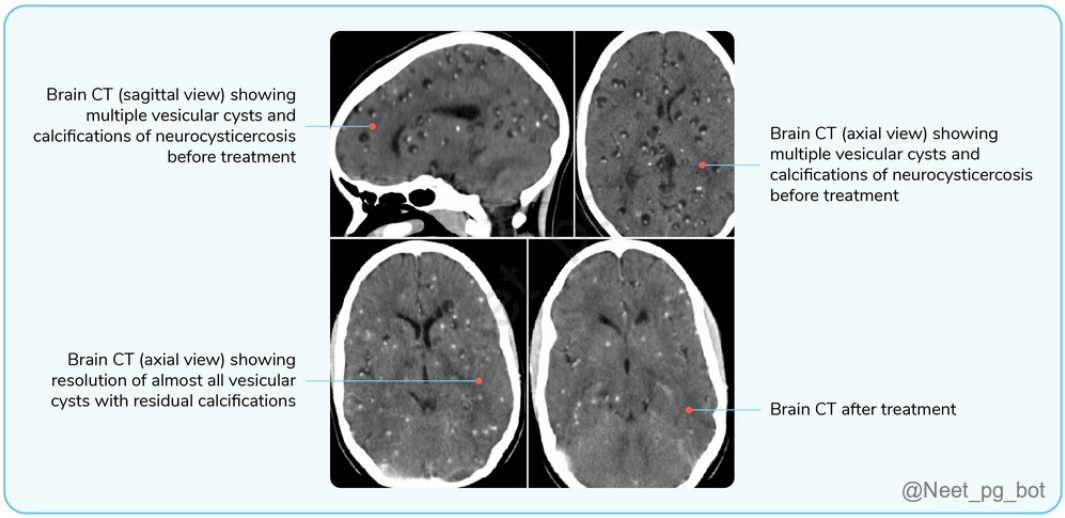
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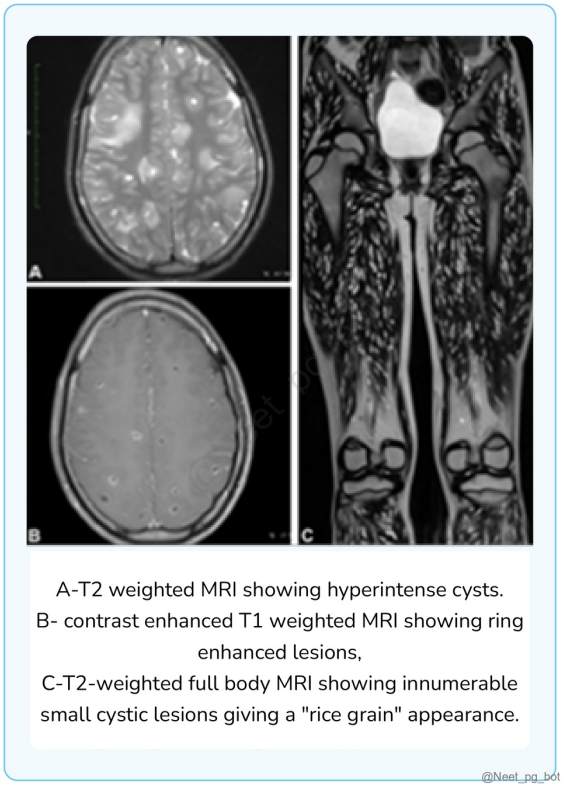
Explanation: The MRI shows a cyst with viable scolex that appears hyperintense and fluid as content which signifies the vesicular stage of neurocysticercosis . Neurocysticercosis Neurocysticercosis is the most critical parasitic disease of the central nervous system (CNS) globally. It is caused by the encysted larvae of the tapeworm Taenia solium , transmitted through: Ingesting eggs from undercooked pork Fecal-oral transmission between humans Larvae are spread to neural, muscular, and ocular tissues via the bloodstream. The symptoms typically appear around 5 years after initial infection and are non-specific; 50%–70% of patients present with epilepsy. Larvae can infect the brain parenchyma, subarachnoid space, and ventricles. The most common form is parenchymal, followed by intraventricular. Mixed types may also occur. Imaging Stages of Parenchymal Neurocysticercosis Vesicular stage Viable larva with a scolex (worm head). Cysts have thin walls, minimal enhancement, and no surrounding edema. Cyst fluid resembles cerebrospinal fluid (CSF) and allows unrestricted water diffusion. The scolex may appear hyperintense on T1 , FLAIR , and DWI images. Colloidal vesicular stage (Option C) Larva begins to break down, triggering an immune response. Characterized by ring-enhancing lesions , perilesional edema , and mass effect . Cyst content becomes more proteinaceous, appearing hyperintense on T1 and FLAIR images. Granular nodular stage (Option A) As the larva dies, the cyst collapses, leading to thick enhancing cyst walls and increased surrounding edema . Calcified nodular stage (Option D) Represents the inactive form of neurocysticercosis. Edema resolves, revealing small calcified lesions (2–10 mm in diameter). Contrast enhancement and edema are rare but can occur during seizure activity . Intraventricular cysticercosis The second most common form, with larvae more frequently located in the third and fourth ventricles. Can obstruct CSF flow, potentially causing hydrocephalus , which may present acutely. Subarachnoid cysticercosis Involves areas such as basal cisterns, Sylvian fissures, and cerebellopontine angles. Racemose cysticercosis is a rare form characterized by multiple clustered cysts separated by septae, resembling a ‘bunch of grapes,’ and can cause significant local meningeal enhancement.






Edema
Ring c+
Granular c+
STAGE
VESICULAR
COLLOIDAL
GRANULAR
CALCIFIED
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References:

Grainger & Allison’s Diagnostic Radiology, 7th Edition, page: 1492-1494.

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5197059/

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4338448/

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4296877/

https://www.researchgate.net/publication/305784377

https://www.ncbi.nlm.nih.gov/books/NBK333429/

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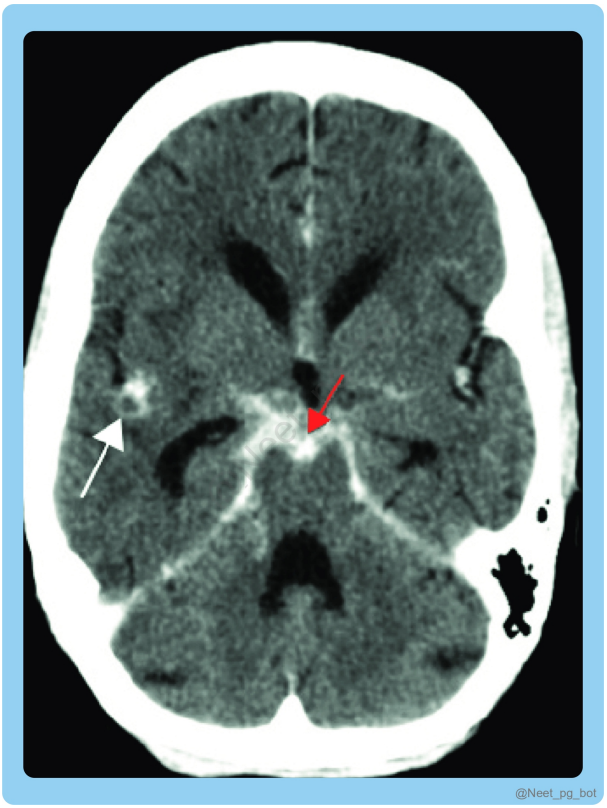
Q23: A 35-year-old male, an HIV-positive patient, presents with fever, headache, and confusion for the past week. Neurological examination reveals neck stiffness and altered mental status. CT shows basal meningeal enhancement and hydrocephalus. What is the most likely diagnosis? (Q853072)

A. Tuberculomas

B. Tuberculous meningitis

C. Cerebritis

D. Miliary tuberculosis

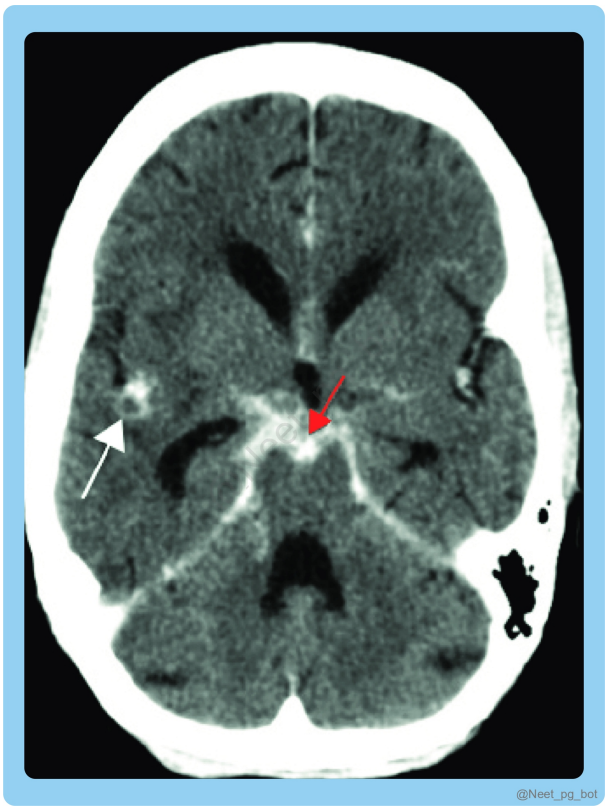


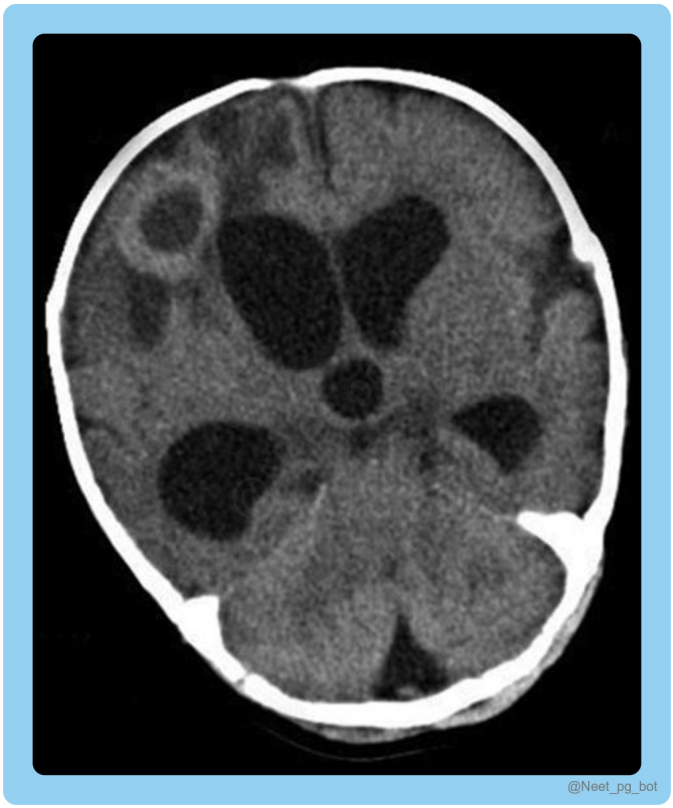
Correct Answer: B. Tuberculous meningitis

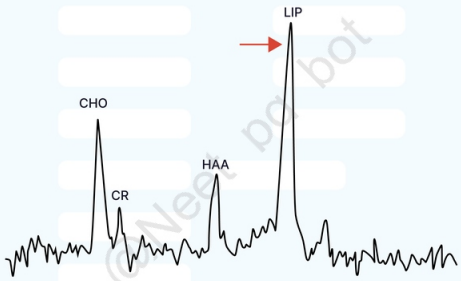
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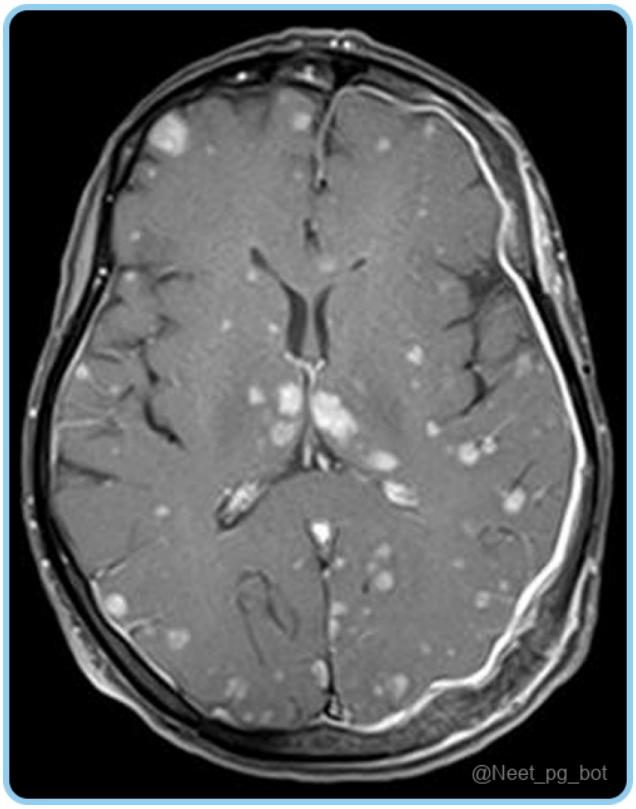
Explanation: The symptoms of fever, headache, and confusion, along with neck stiffness, suggest meningeal irritation and infection . The CT findings of basal meningeal enhancemen t and hydrocephalus are characteristic of tuberculous meningitis , where exudative material can obstruct cerebrospinal fluid (CSF) pathways, leading to hydrocephalus. CNS Infection with Mycobacterium tuberculosis : More common in immunocompromised individuals (e.g., HIV, alcohol or IV drug users). Spread and Manifestations : Hematogenous spread. Intracranial manifestations include: Meningitis (most common) Cerebritis Tuberculomas Tuberculous meningitis Tuberculous meningitis is the most frequent CNS manifestation. Early disease shows diffuse leptomeningeal enhancement ; later stages typically involve the basal leptomeninges , especially in the interpeduncular cistern. Imaging Findings : CT Findings : Obliteration of basal cisterns due to isoattenuating or hyperattenuating exudate. Sensitive indicators: linear enhancement of middle cerebral artery cisterns, obliteration of CSF spaces, Y-shaped enhancement at the suprasellar/middle cerebral artery junction, and asymmetric enhancement. Hydrocephalus is common at diagnosis. MRI Advantages : Greater sensitivity for detecting basal meningeal enhancement , hydrocephalus, and infarcts in perforator territories. Intracranial Tuberculomas (Option A) Most commonly found at the junction of white and grey matter. CT Appearance : Present as small, rounded lesions iso or hypo attenuating to normal brain tissue with variable surrounding vasogenic edema. Homogeneous contrast enhancement in solid lesions; rim enhancement indicates central caseation or liquefaction. The "target sign" (central high attenuation with rim enhancement) is not definitive for tuberculomas. MRI Characteristics : Small, non-caseated tuberculomas exhibit low signal intensity on T1 and high signal on T2 sequences. Caseation leads to low signal intensity on T2. On DWI, tuberculomas may show either elevated or restricted diffusion. MR Spectroscopy shows a prominent lipid peak at 1.3ppm Miliary Tuberculosis (Option D) Characterized by multiple small (<5 mm) enhancing granulomas scattered throughout the brain, which may calcify over time. TB Abscess Single supratentorial abscess at the gray–white matter interface . CT appearance: hyperdense rim with low-density center . MRI appearance: abscess wall slightly T1-hyperintense and T2-hypointense; central contents are T1 hypointense and T2 hyperintense, with irregular dense wall enhancement and significant perilesional edema. More common in elderly and immunocompromised individuals; larger than tuberculomas, often multiloculated, with thicker peripheral enhancement Cerebritis (Option C) : involves brain tissue inflammation and would show focal neurological signs rather than classic meningeal signs.

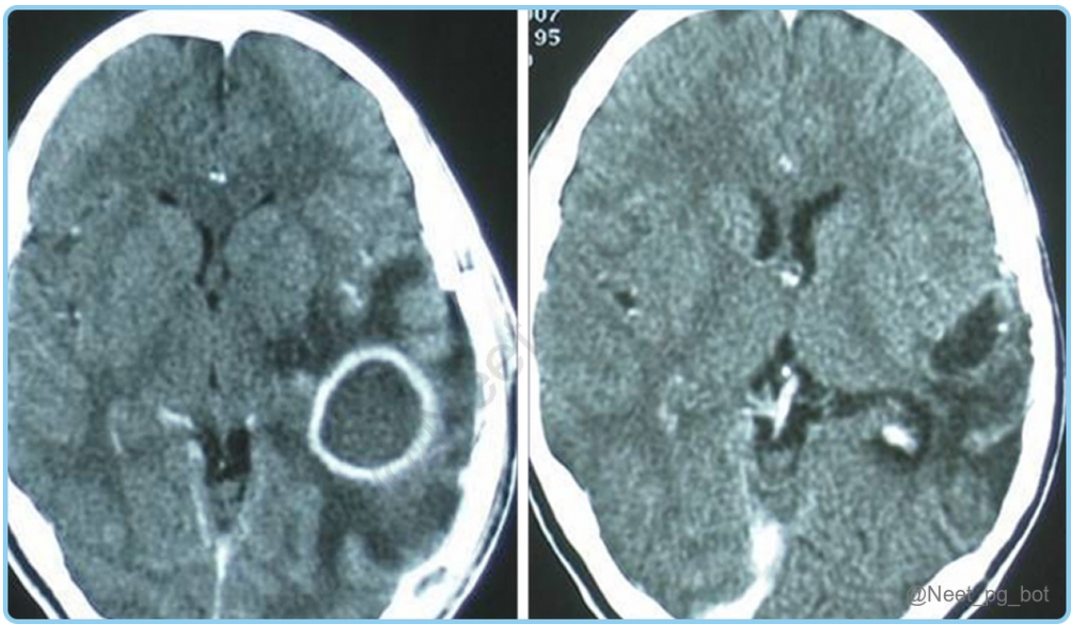

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References:

Grainger & Allison’s Diagnostic Radiology 7th Edition Pg no.1483, 1484

David Sutton Textbook of Radiology & Imaging 8th edition Volume 2 Pg no. 1950, 1951

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6384409/

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4845155/

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• [12_Neuro Radiology] 026 Previous Year Questions

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[12_Neuro Radiology] 026 Previous Year Questions — Quick Jump

Q1 (p. 1680) *Q2 (p. 1681)* *Q3 (p. 1685)* *Q4 (p. 1687)* *Q5 (p. 1690)* *Q6 (p. 1693)*

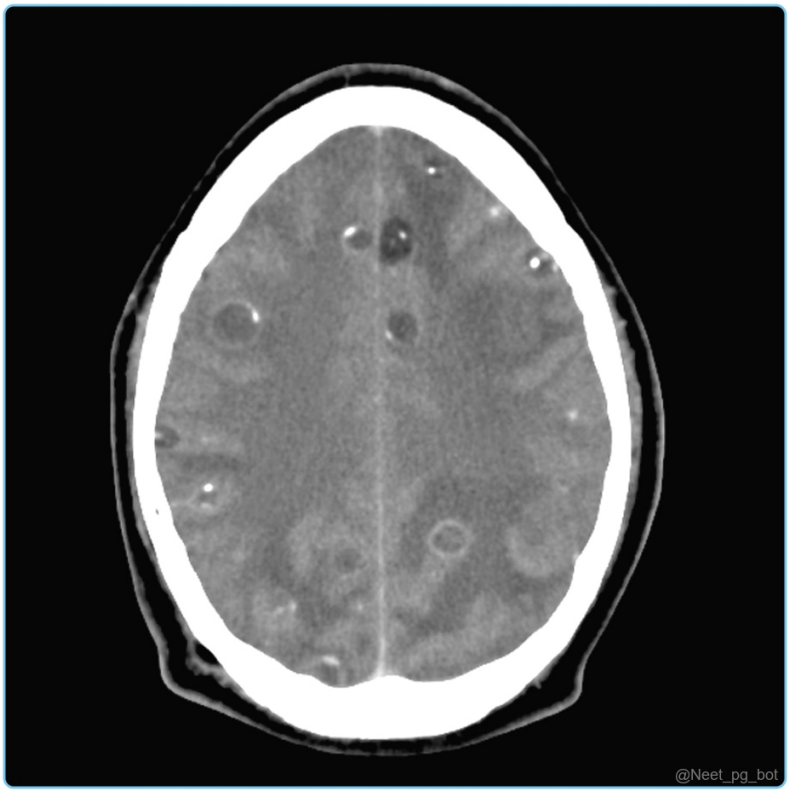
Q1: Based on the given CT finding, what is the most likely diagnosis? (Q865277)

A. Tuberculoma

B. Brain abscess

C. Neurocysticercosis

D. Brain metastasis



Correct Answer: C. Neurocysticercosis

Explanation: - Vesicular: CSF- density cyst with a hyperdense "dot" (scolex). No/minimal edema or enhancement. Colloidal Vesicular: Hyperattenuating cyst fluid, thick/irregular ring enhancement, significant perilesional edema. Most symptomatic stage. Granular Nodular: Shrinking cyst forming an enhancing nodule. Decreasing edema.

Nodular Calcified: Small, punctate hyperdense (bright) calcification. No edema or enhancement. Tuberculoma (Option A): Typical CT findings include: Iso- or hyperdense lesion Thick irregular ring enhancement Marked perilesional edema Often, multiple conglomerate lesions May show central caseation but no scolex Tuberculoma does not show the eccentric hyperdense dot (scolex) seen in neurocysticercosis. Brain Abscess (Option B): Typical CT findings include: Hypodense lesion with smooth thin ring enhancement Marked surrounding edema Central liquefied necrotic cavity Shows restricted diffusion on MRI Abscess cavity contains pus , not a parasite Scolex is never present Brain Metastasis (Option D): Typical CT findings include: Multiple lesions at the gray-white junction Ring or nodular enhancement Significant vasogenic edema Often associated with a known primary malignancy No cyst with eccentric scolex Usually solid or necrotic enhancing masses

References:

Grainger & Allison's Diagnostic Radiology, 7th Edition, page: 1492-1494.

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Q2: Identify the hemorrhage shown in the following image? (Q860591)

A. Extradural hemorrhage

B. Intraparenchymal hemorrhage

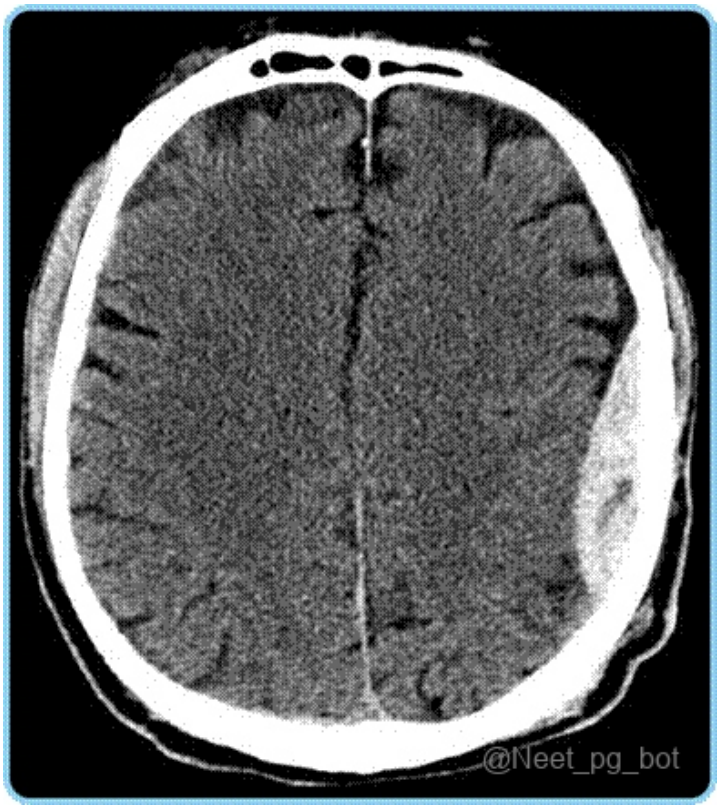
C. Subarachnoid hemorrhage

D. Subdural hemorrhage

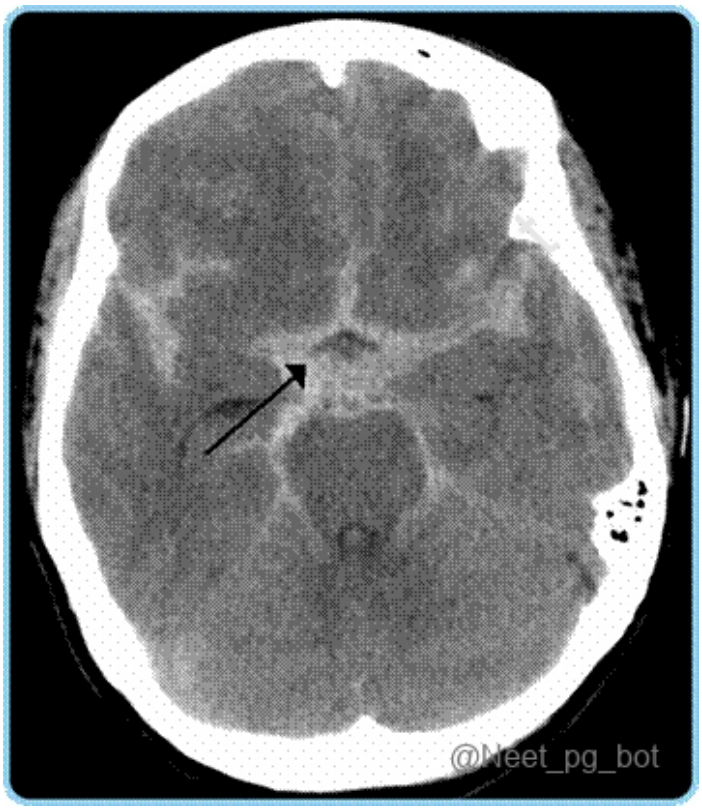


Correct Answer: D. Subdural hemorrhage

Explanation: A crescent-shaped hemorrhage on imaging, particularly on CT or MRI, is characteristic of a subdural hemorrhage (SDH). Feature Extradural Hemorrhage (EDH) (Option A) Subdural Hemorrhage (SDH) Type of Hemorrhage Arterial Hemorrhage Venous Hemorrhage Shape Biconvex or lentiform {{caption_text}} Crescent or sickle-shaped {{caption_text}} Location Limited by sutures; can cross the midline Follows the brain surface; crosses sutures, does not cross midline Cause Rupture of the middle meningeal artery (MMA) Rupture of cortical bridging veins Onset of Symptoms Often presents with a lucid interval Symptoms may develop gradually, often without a lucid interval Force Required Requires more force; associated with adjacent bony rupture Can occur with trivial trauma Midline Crossing Can cross the midline Does not cross the midline Lucid Interval Yes; patient appears normal before deterioration No; deterioration may be more gradual Clinical Signs Symptoms may include headache, loss of consciousness, and focal neurological deficits Symptoms may include headache, confusion, and potential focal deficits Subarachnoid hemorrhage (SAH) (Option C): SAH presents with bleeding in the subarachnoid space and shows diffuse blood in the sulci and cisterns rather than a localized collection. {{caption_text}} Intraparenchymal hemorrhage (Option B): On NCCT,appears as a hyperdense lesion. The hemorrhage can typically be localized in regions such as the basal ganglia, particularly in the putamen and the internal capsule , which are critical for motor control and other functions. {{caption_text}}


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References:

Grainger & Allison's Diagnostic Radiology, 7th Edition, Page: 1476-1479.

Fred A. Mettler Essentials of Radiology, 4th Edition, Page: 21,22.

https://www.ncbi.nlm.nih.gov/books/NBK470242/

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Q3: Identify the condition that presents with an empty delta sign. (Q860602)

A. Subarachnoid hemorrhage

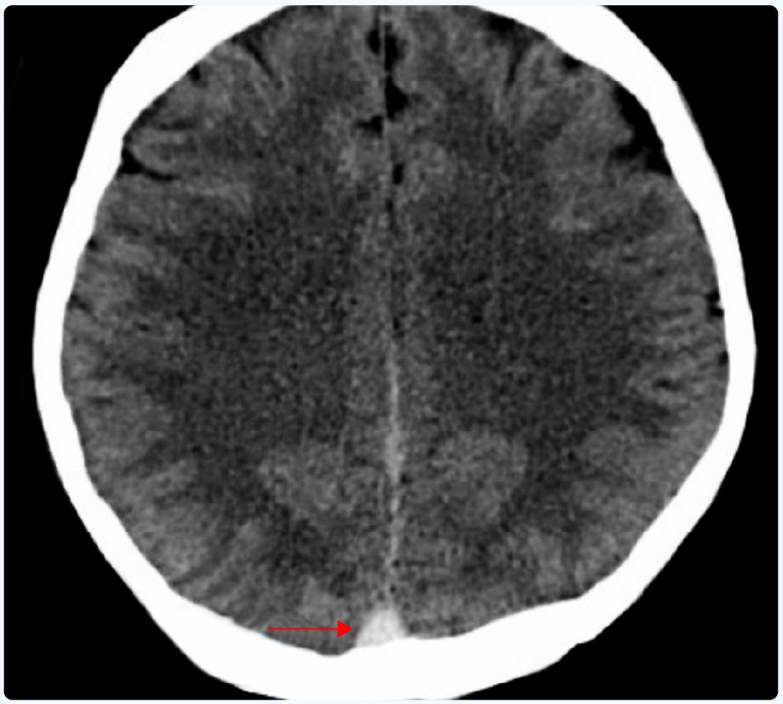
B. Subdural hemorrhage

C. Cerebral venous thrombosis

D. Intraparenchymal hemorrhage

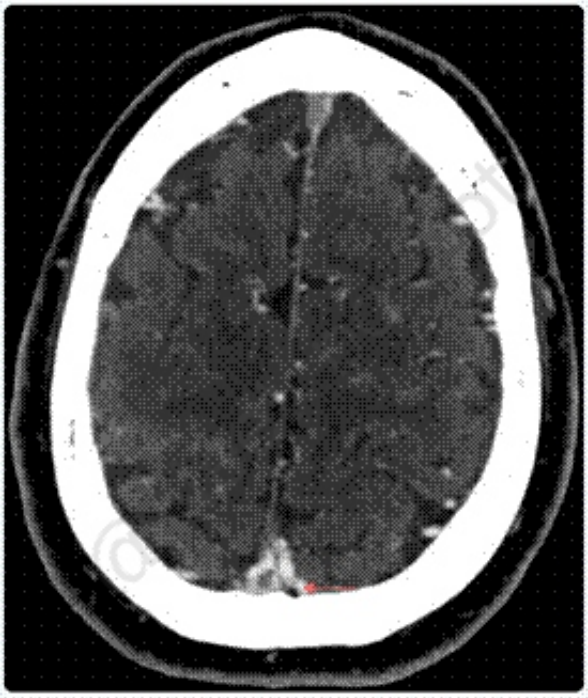
Correct Answer: C. Cerebral venous thrombosis

Explanation: The empty delta sign is a radiological finding seen on contrast-enhanced CT scans or MR venography. It indicates the presence of a thrombus in the dural venous sinus, most commonly the superior sagittal sinus. The thrombus appears as a filling defect surrounded by contrast enhancement, forming a triangular or delta-shaped void. Central venous sinus thrombosis CVT should be suspected in patients presenting with headaches, seizures, or encephalopathy. Can occur in superficial or deep dural venous sinuses, affecting either isolated veins or as part of broader venous sinus thrombosis. Factors like intracranial infections , trauma, dehydration, pregnancy , oral contraceptives , smoking, and vasculitis (e.g., Behçet disease) can trigger CVT. If absent, a thrombophilia screening is necessary. CT Findings : {{caption_text}} {{caption_text}} The empty delta sign , visible in contrast-enhanced CT scans, indicates dural venous sinus thrombosis in the superior sagittal sinus as a triangular filling defect outlined by contrast, representing a thrombus. The dense vein sign , a hyperdense vessel sign indicating hyperattenuating thrombus due to acute venous thrombosis, is found in cortical veins or dural venous sinuses . MRI Findings : {{caption_text}} Loss of normal flow void; thrombosed vessels may appear hyperintense on T1 and T2 sequences. Very acute thrombus can be hypointense on T2, mimicking flow voids. Additionally, slow flow can also result in loss of the flow void. MR venography (MRV) shows a loss of flow signal or irregularity, indicating a thrombus. SWI (Susceptibility Weighted Imaging) can highlight thrombosed veins and detect acute hemorrhage. Subarachnoid hemorrhage (Option A): Typically presents with hyperdense blood in the basal cisterns or sulci on non-contrast CT, not an empty delta sign. Subdural hemorrhage (Option B): Appears as a crescent-shaped hyperdensity along the brain's surface, unrelated to the venous sinuses. Intraparenchymal hemorrhage (Option D): Appears as a hyperdense lesion within the brain parenchyma on non-contrast CT and is not associated with the empty delta sign



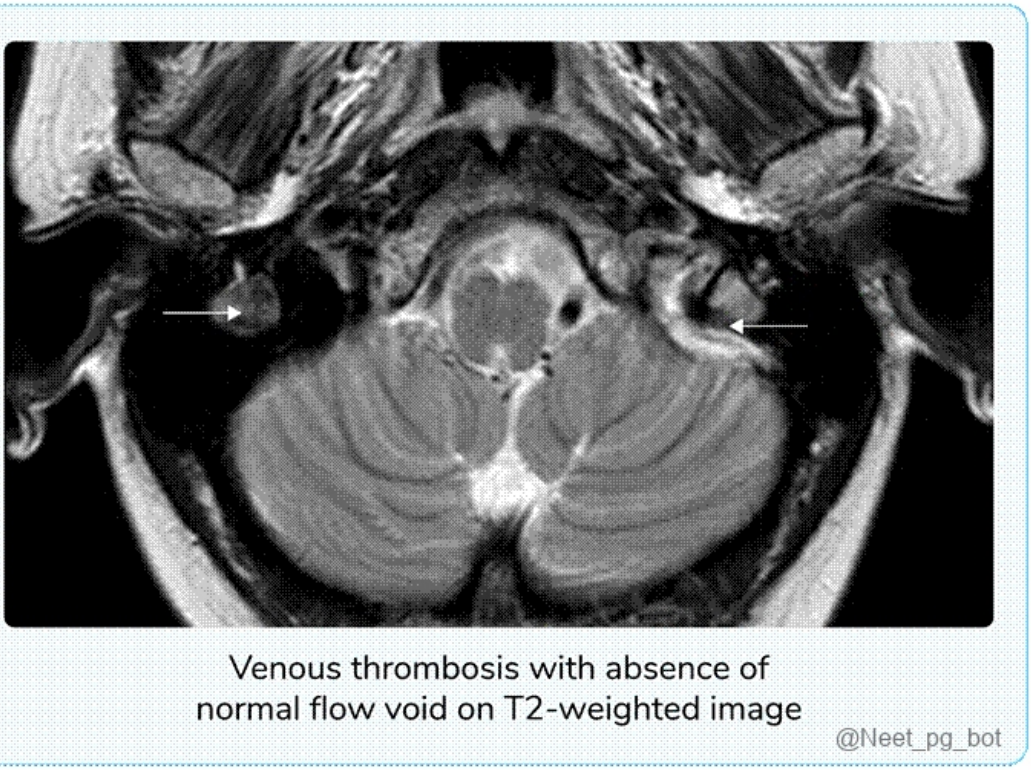
Dense clot sign

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Empty delta sign

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References:

Grainger & Allison's Diagnostic Radiology 7th Edition Page no.1464

https://radiopaedia.org/articles/dense-vein-sign

https://radiopaedia.org/articles/empty-delta-sign-dural-venous-sinus-thrombosi

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Q4: Which imaging technique is preferred for diagnosing primary hyperparathyroidism in a woman who presented with confusion, constipation, and headache, and has elevated serum calcium (13.1 mg/dL) and ALP levels? (Q856691)

A. MRI

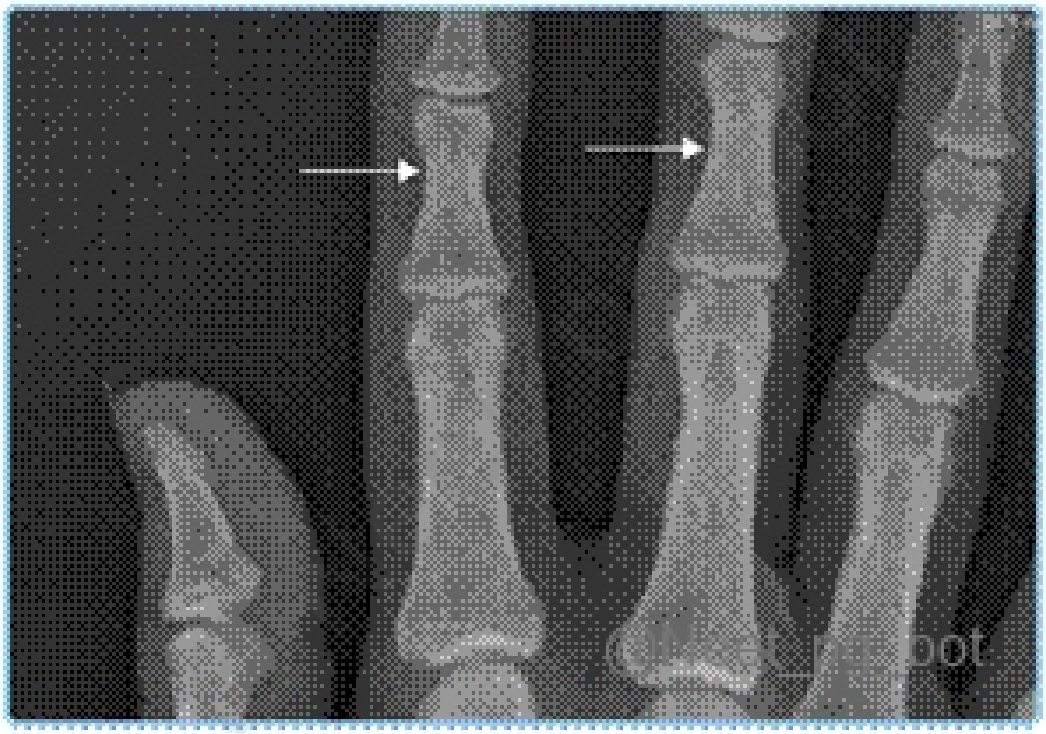
B. FDG PET

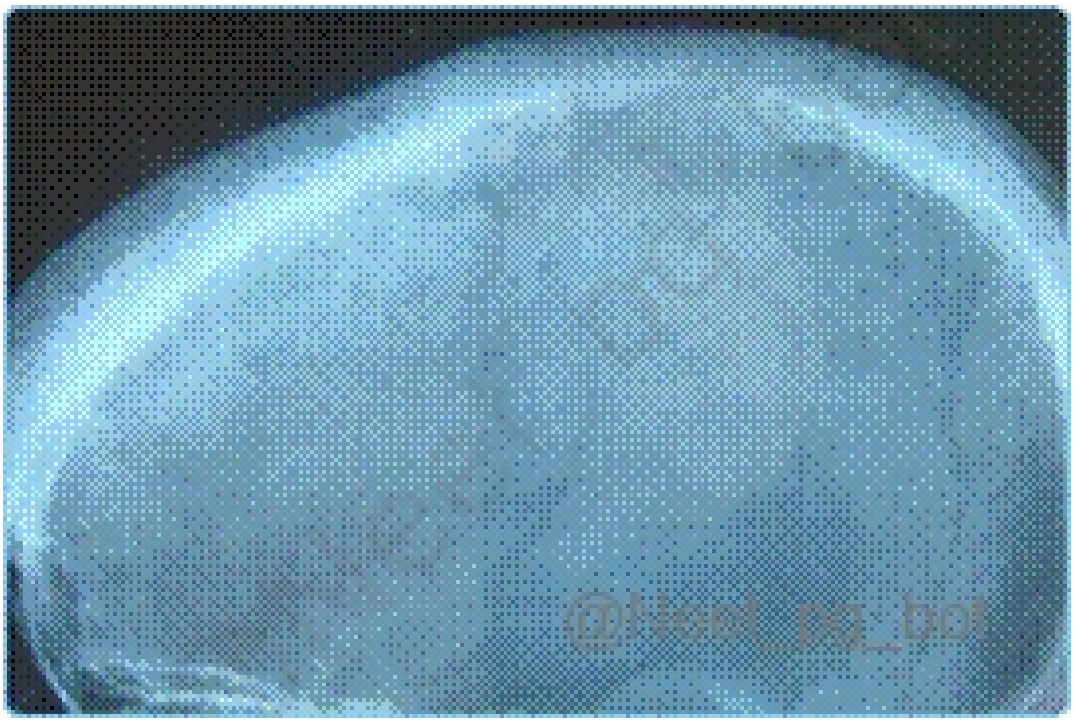
C. CT

D. Sestamibi scan

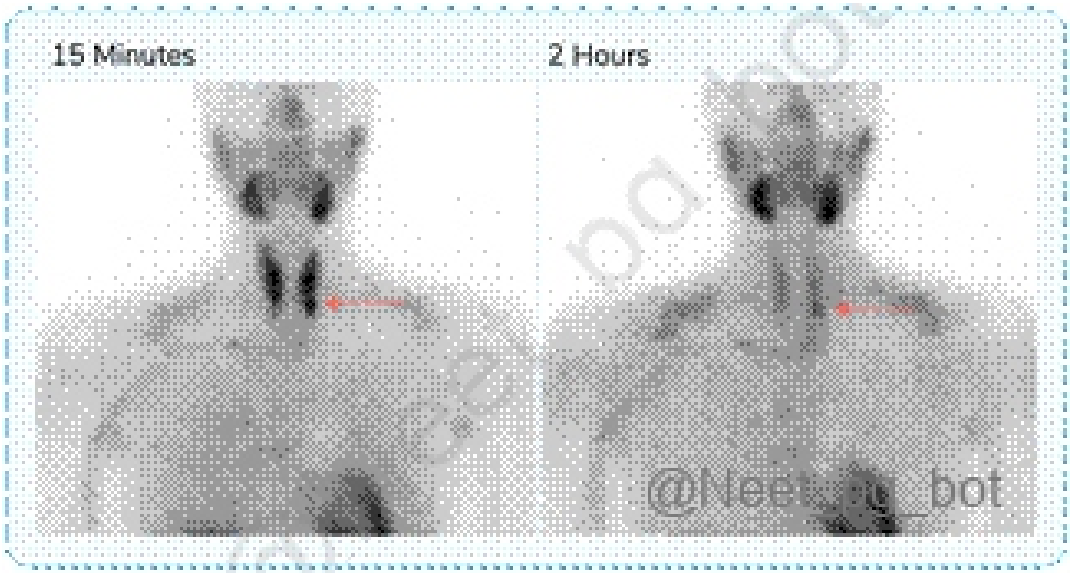
Correct Answer: D. Sestamibi scan

Explanation: This is the preferred imaging technique for diagnosing primary hyperparathyroidism , especially when the patient is suspected to have a parathyroid adenoma or hyperplasia. The sestamibi scan uses a radiotracer that is taken up by the parathyroid glands, particularly in the presence of adenomas or hyperplasia. It is highly sensitive and specific for detecting parathyroid pathology. Elevated calcium levels and ALP, along with the clinical symptoms, suggest primary hyperparathyroidism, making a sestamibi scan the most appropriate next step. Radiological features of Primary Hyperparathyroidism: Features Image Subperiosteal erosions and terminal resorption in the phalanges (usually starts in the middle phalanx of the index finger's radial side) along with bone demineralisation. {{caption_text}} The "salt and pepper" appearance, or pepper pot skull (lytic lesions in the skull). {{caption_text}} Brown tumour or osteitis fibrosa cystica: Cystic lesions in bone from excessive osteoclastic resorption appear as low-density, multiloculated cysts that can lead to bone expansion, accompanied by bleeding and granulation tissue. {{caption_text}} Sestamibi scan (Tc-99): Localize the tumour . {{caption_text}} MRI (option A): This is not typically used for the initial diagnosis of primary hyperparathyroidism. MRI may be used for further evaluation if other imaging modalities are inconclusive. FDG PET (option B): This is primarily used for oncology, such as detecting malignancies or metastases, and is not routinely used for diagnosing primary hyperparathyroidism. CT (option C): CT can be used in some cases to localize parathyroid adenomas, but it is less sensitive than a sestamibi scan and is not the first-line imaging modality for primary hyperparathyroidism.




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References:

Harrison’s Principles of Internal Medicine, 21st Edition, Volume I, Page 3176-3178.

Davidson’s Principles and Practice of Medicine, 24th Edition, Page 663, 664

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Q5: A young woman, aged 18, has come forward with seizures. Her radiological image is provided below. MR spectroscopy shows prominent lipid–lactate peaks with decreased N-acetyl aspartate (NAA), what is the probable medical condition she is facing? (Q856935)

A. Cerebral toxoplasmosis

B. Neurocysticercosis

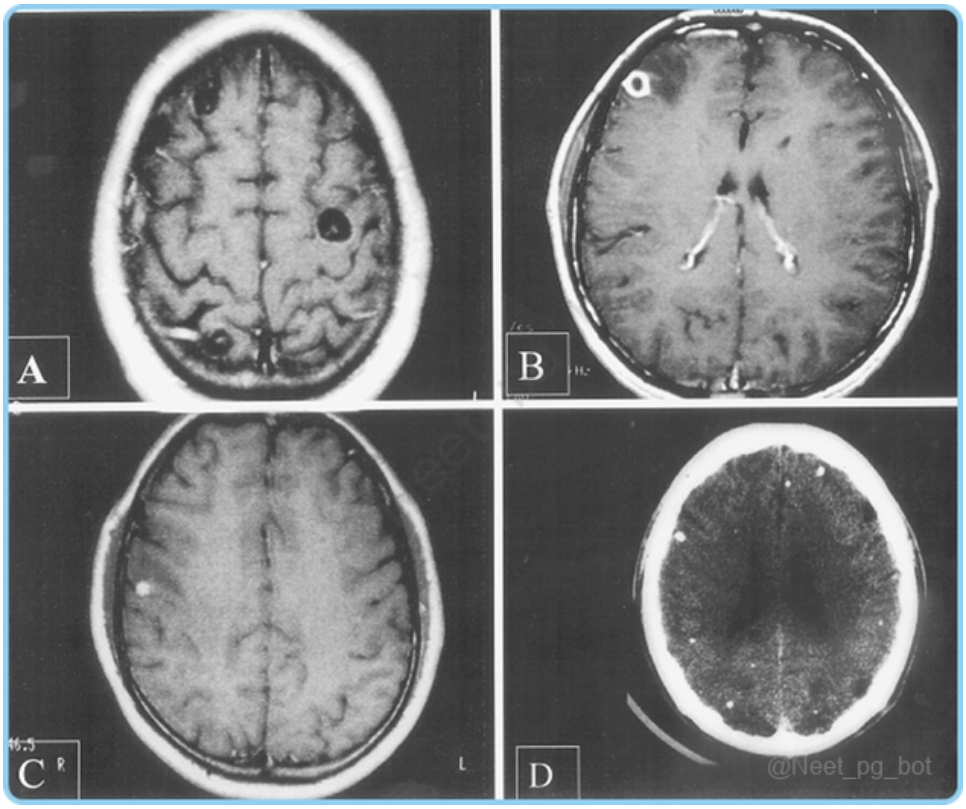
C. Cryptococcosis

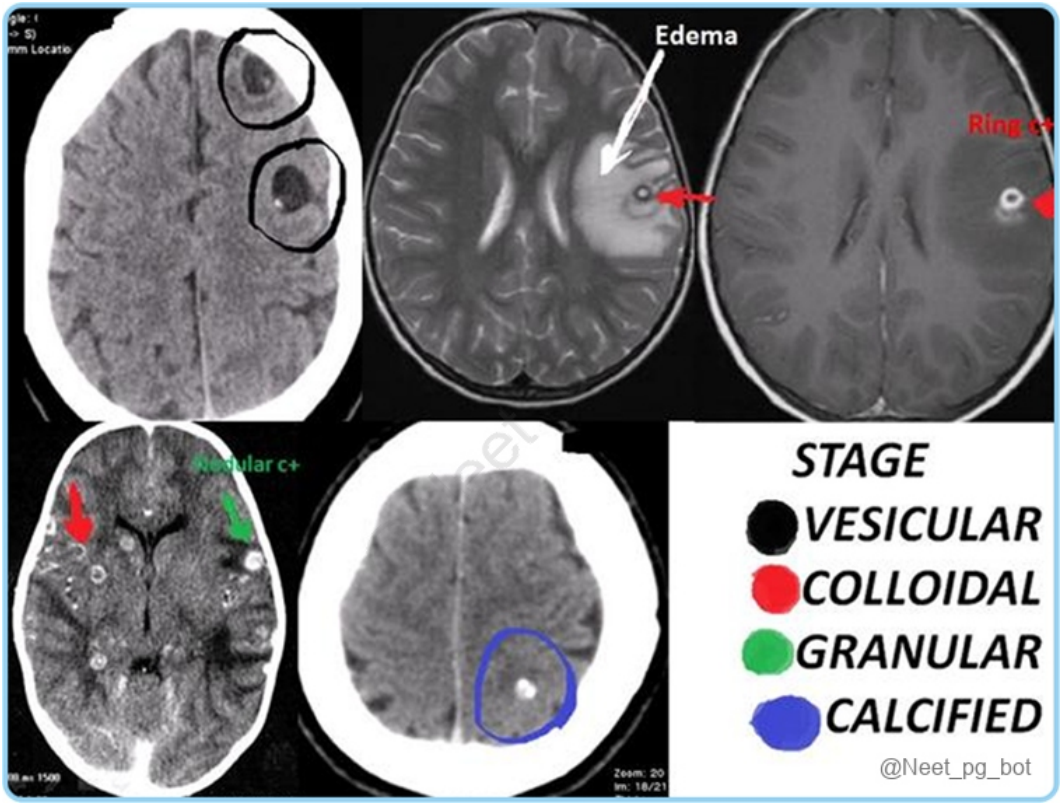
D. Multiple tuberculomas

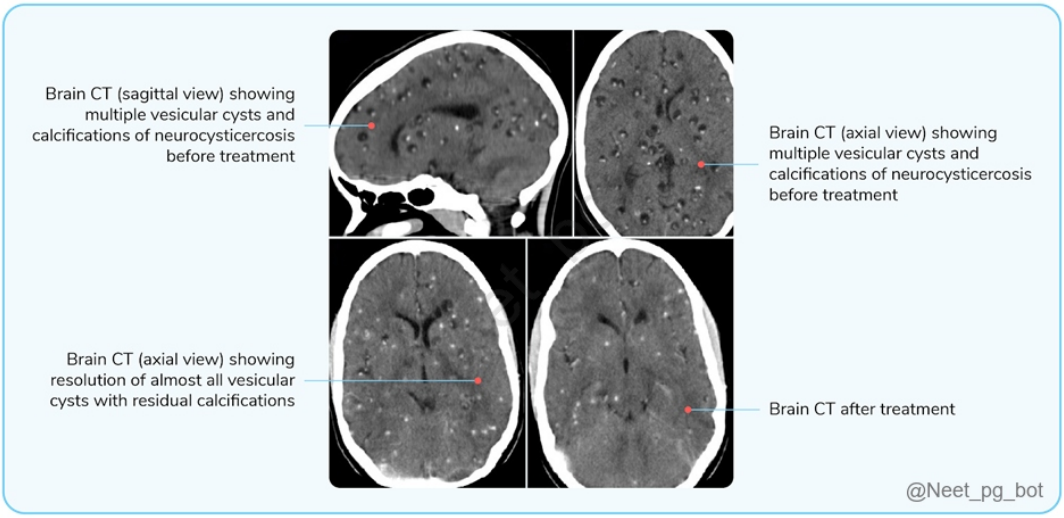


Correct Answer: B. Neurocysticercosis

Explanation: The radiological findings and MR spectroscopy results are consistent with neurocysticercosis (NCC) , which is caused by Taenia solium. Radiological Features: Cystic lesions with or without ring enhancement Scolex (dot sign) seen within the cyst in vesicular stage Perilesional edema due to inflammatory response Calcifications in the nodular-calcified stage MR Spectroscopy Findings: Lipid lactate peak - degeneration of the parasite Decreased NAA - Neuronal injury Absence of alanine peak - differentiates NCC from tuberculoma These findings strongly indicate neurocysticercosis as the probable diagnosis. Neurocysticercosis NCC is the most common parasitic CNS infection worldwide, caused by the ingestion of Taenia solium eggs. Feature Details Clinical Presentation Seizures, headaches, focal neurological deficits Stages Vesicular, Colloidal, Granular, Nodular-calcified Radiology Cystic lesions with "dot sign," ring enhancement, or calcifications MR Spectroscopy Lipid lactate peak, decreased NAA, no alanine peak Management Albendazole + Steroids ± Antiepileptics {{caption_text}} Stages of Neurocystericosis {{caption_text}} {{caption_text}} Incorrect Options: Cerebral toxoplasmosis (Option A): Incorrect because toxoplasmosis does not show the "dot sign" and has different spectroscopy findings (elevated lipids but not alanine). Cryptococcosis (Option C): Incorrect because cryptococcosis presents as gelatinous pseudocysts in the basal ganglia with low choline and high lipid peaks on MR spectroscopy. Multiple tuberculomas (Option D): Incorrect because tuberculomas usually present with solid ring-enhancing granulomas and restricted diffusion rather than well-defined cystic lesions with scolex.


A
B
C
D
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Edema
Ring c+
Regular c+
STAGE
VESICULAR
COLLOIDAL
GRANULAR
CALCIFIED
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References:

Harrison's Principles of Internal Medicine 20th Edition • Page nos. 1642 and 1643

CNS Cryptococcosis

Intracranial Tuberculous Granuloma

Neurotoxoplasmosis

↑ *Back to this question in Part A*

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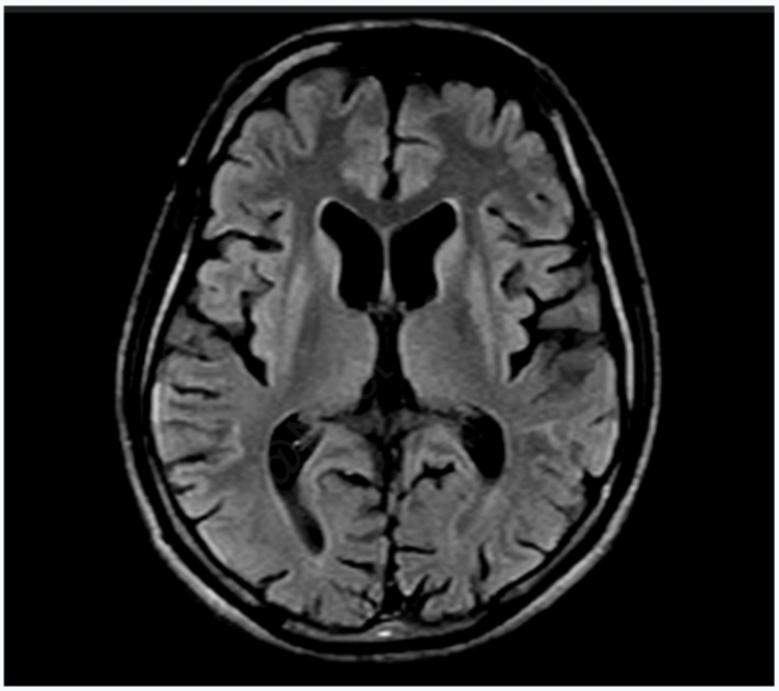
Q6: A 28-year-old man presents with involuntary, jerky movements of the face and limbs that have gradually worsened over the past year. His family reports personality changes, irritability and progressive forgetfulness. On examination, he has choreiform movements involving both upper and lower limbs and an unsteady gait. Which of the following is the most likely diagnosis? (Q878941)

A. Tardive Dyskinesia

B. Huntington’s disease

C. Sydenham’s chorea

D. Tourette syndrome



Correct Answer: B. Huntington’s disease

Explanation: Huntington’s disease presents with chorea, personality changes, and dementia due to autosomal dominant CAG repeat expansion causing caudate nucleus atrophy. Incorrect Options: Tardive Dyskinesia (Option A): Follows long-term antipsychotic use, movements are stereotyped. Sydenham’s chorea (Option C): Occurs after streptococcal infection in children, transient and self-limited. Tourette syndrome (Option D): Characterized by motor and vocal tics, not progressive dementia.

References:

Harrison’s principles of internal medicine, 21st Edition, Pages 3404, 3405.

↑ *Back to this question in Part A*

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