

## 1. Earliest sign of increased ICT is?

a) Erosion of dorsum sellae

b) Pineal displacement

c) Widening of sella

d) Copper beaten appearance

Correct Answer - A

Erosion of dorsum sellae

REF: Sutton 7<sup>th</sup> edition volume 2 page 1626

SIGNS OF RAISED INTRA CRANIAL TENSION:

1. Suture diastasis: first and most important sign in children, Not seen in adults
2. Sellar erosion: First sign in adults
3. Pineal displacement: more in adults
4. Copper/silver beaten appearance: Gyri make prominent markings on the skull (Increased convolutional marking), Also seen in craniostosis, so not much diagnostic

## 2. Which chamber enlargement show double right heart border with wide subcarinal angle?

a) Left atrium

b) Left ventricle

c) Right atrium

d) Right ventricle

Correct Answer - A

Left atrium REF: Sutton's radiology 7th edition page 294

Radiological signs of left atrial enlargement:

- A 'double' right heart border
- Elevation of the left main bronchus
- Splaying of the carina
- Enlargement of the left atrial appendage
- Prominence of the portion of the left heart border at the level of the left main bronchus

### 3. Egg Shell Calcification" in chest X ray is seen in?

a) Silicosis

b) Sarcoidosis

c) Treated Lymphoma

d) All above

Correct Answer - D

All above REF: Chapman 4th ed p. 148

EGG SHELL CALCIFICATION:

- Silicosis
- Pneumoconiosis
- Sarcoidosis
- Lymphoma following radiotherapy
- TB, Histoplasmosis, Blastomycosis
- Amyloidosis

4. USG of a patient shows solitary hypoechoic lesion of liver with septa and debris which are characteristic of?

a) Caroli's disease

b) Simple cyst

c) Hydatid cyst

d) Liver abscess

#### Correct Answer - C

The sonographic appearance of **hydatid disease** includes a unilocular cyst; a complex cyst with multiple internal daughter cysts; a complex cyst with septations, echogenic debris, or floating membranes.

Daughter cysts appear as numerous small fluid-filled areas surrounded by thick walls inside a parent cyst.

**The demonstration of daughter cysts is considered pathognomonic of hydatid disease.**

Calcifications may be seen in the walls of the cysts or in the septations.

**Ref:** Pediatric Sonography By Marilyn J. Siegel, 2010, Page 242; Sleisenger 6th edition, Page 1381; Schiff 8th edition, Page 1085; Rumack's Diagnostic ultrasound 3rd edition, Page 86-94; Kuntz/Kuntz Hepatology Textbook and Atlas 3rd edition, Page 143-144.

**5.** Which of the following has most penetrating power?

a)  $\alpha$  particle

b)  $\beta$  particle

c)  $\gamma$  - radiation

d) Electron beam

**Correct Answer - C**

Penetration power maximum for gamma rays (1000 times of alpha rays). Minimum for alpha rays.

**Ref:** Park's Preventive and Community Medicine, 16th Edition, Page 514 and 17th Edition, Page 521

**6.** Which of the following is the most radio sensitive phase of the cell cycle?

a) G2M

b) G2

c) S

d) G1

**Correct Answer - A**

Studies on synchronously dividing cells in culture have revealed greatest radio sensitivity for cells in G2 and M phase, and relative radio resistance for cells in late S phase, and intermediate radio sensitivity between these two extremes.

**Ref:** Progress In Cell Cycle Research By Laurent Meijer, Armelle Jezequel, Leonard Ducommun, Volume 4, Page 202; Basic Radiation Oncology By Beyzadeoglu, Murat Beyzadeoglu, Gokhan Ozyigit, Cuneyt Ebruli, Pages 75-77

7. A 43 year old male during the preoperative evaluation of hernia repair is found to have a solitary pulmonary nodule. What is the important radiological feature to suggest its benign nature?

a) Large lesion with calcification

b) Irregular shape

c) No calcification

d) 1 cm lesion with uniform calcification

**Correct Answer - D**

**The important radiological characteristics to suggest benign lesion in solitary pulmonary nodule:**

- No growth in follow up imaging in two years and calcification
- Younger age group
- Regular shape
- Normal edge

**Ref:** Lange radiology, Edition - 7, Page - 256.

## 8. X-rays are produced when:

a) Electron beam strike the nucleus of the atom

b) Electron beam strikes the anode

c) Electron beam reacts with the electromagnetic field.

d) Electron beam strikes the cathode

Correct Answer - B

B i.e. Electron beam strikes the anode

**9. Radiocontrast is contraindicated in all except -**

a) Renal failure

b) Patient on metformin

c) Dehydration

d) Obesity

Correct Answer - D  
D i.e. Obesity

## 10. An absolute contraindication of MRI is:

a) Pacemaker wires

b) Intravascular stents

c) Prosthetic cardiac valves

d) Severe hypertension

Correct Answer - A  
A i.e. Pacemaker Wires

## 11. All of the following form radiolucent stones except:

a) Xanthine.

b) Cysteine.

c) Allopurinol.

d) Orotic acid.

Correct Answer - B

B i.e. Cysteine

Stone	Radiological appearance
- Calcium phosphateQ (apatite),	Densely radiopaque
- Ca - hydrogen - phosphate (Brushite)	
- Ca - mono - oxalateQ	
- Ca - di - oxalate (StruviteQ)	Moderately radiopaque
(Magnesium - ammonium - phosphate)	
- CystineQ	<i>Faint</i> (slight) radiopaque d/t

suiter  
content

- *Orotic acid*Q
- *Uric acid*Q
- *Xanthine*Q Radiolucent
- 
- Dihydroxyadenine
- Indinavir
- *Triamterene*
- Matrix

### Orotic Acid Urea

- Hereditary orotic aciduria is AR disorder caused by deficiency of *LIMP Synthase*Q [Uridine Mono Phosphate synthase; a bifunctional enzyme having activity of Orotate - phosphoribosyl - transferase & Orotidine - 5' - monophosphate decarboxylase, which converts orotic acid to UMP] resulting in excessive accumulation of orotic acid.
- Clinically presents as Macrocytic Hypochromic Megaloblastic anemia() *not responsive to folic acid and B<sub>12</sub>, with normal serum levels of B<sub>12</sub> & folic acid*, growth retardation, neurological abnormalities and orotic acid urea.
- *Allopurinol*Q, *5 - azauridine*, *5 - flurouracil* produce secondary (2°) orotic aciduria.
- 2° Orotic acid urea also occurs in parenteral nutrition, essential amino acid deficiency & Rye's syndrome.  
\* Allopurinol treatment may lead to Xanthine & orotic acid stones, which are radiolucent.

## 12. All are X-ray findings of retinoblastoma except :

a) Widening of optic canal

b) Intra cerebral calcification

c) Intraocular calcification

d) Secondaries in cranial bones

Correct Answer - B

B i.e. Intracerebral calcification

Retinoblastoma is the malignant congenital intraocular tumor arising from primitive *photoreceptor cells of retina* (included in primitive neuroectodermal tumor).

Histologically, it shows *Flexner-Wintersteiner rosettes* (50%) *Home-Wright rosettes* & *fleurettes*. Clinically presents with *cat's eye reflex/leukokoria*.

*Retinoblastoma is the most common cause orbital calcification* (nodular or punctate calcification & is favourable prognostic sign.) *Enlargement of orbit & orbital canal* occurs d/t involvement of optic nerve & intracranial extension. *Metastasize to meninges, cranial bones*, bone marrow, lung, liver, lymph node.

### 13. Normal hilar shadow in X-ray chest is produced by all except

a) Pulmonary artery

b) Bronchus

c) Lower lobe veins

d) Upper lobe veins

Correct Answer - C

C i.e. Lower lobe veins

The *lower lobe pulmonary veins* do not cross the hila in their course to the left atrium and therefore do not contribute to the hilar shadow.

- The hila is formed by?
  1. *Pulmonary arteries & their main branches (most imp.)*
  2. *Upper lobe pulmonary veins*
  3. Major bronchi (contribute little)
  4. Lymph nodes (usually not seen)

**14. A patient presents with a solitary pulmonary nodule (SPN) on x-ray. The best investigation to come to a diagnosis would be :**

a) MRI

b) CT Scan

c) USG

d) Image guided biopsy

Correct Answer - D

**D** i.e. Image guided biopsy

Friends don't get surprised! I have checked it from various textbooks. These are the lines from David Sutton ?

- Some 40% of solitary pulmonary nodules are malignant with other common lesions being granulomas & benign tumors.

- CT scan is most sensitive imaging modality available for identification of pulmonary nodules of . 3mm diameter but relatively insensitive to smaller nodules. The specificity for small nodules is also poor.

- Spiral scanning has improved detection rate for pulmonary nodule but has not improved specificity.

- The presence of calcification indicates benign lesion but 14% of carcinomas (malignant) show calcification.

- The cavitation not necessarily indicates malignant lesion.

So summary is, **CT** scan is most sensitive for detecting large pulmonary nodules ( 3mm) but neither sensitive nor specific for smaller nodules the maximum CT scan can show is calcification & cavitation, which are not always diagnostic of benign & malignant

lesions respectively.

So the best investigation to come to a diagnosis (i.e. most specific) will be Image guided biopsy.

## 15. Characterstic X Ray finding in ASD is:

a) Enlarged left ventricle

b) Enlarged left atria

c) Pulmonary pletheora

d) PAH

Correct Answer - C  
C i.e. Pulmonary plethora

## 16. Pruning of Pulmonary arteries is seen in:

a) Pulmonary hypertension

b) Chronic Bronchitis

c) Pulmonary infections

d) Pulmonary transplant

Correct Answer - A

A i.e. Pulmonary hypertension

Pulmonary arterial hypertension is characterized by *pruning of peripheral pulmonary arteries* (i.e. disproportionate increase in caliber of fibrous central arteries from sustained increase in PBF with a decrease in caliber of small muscular/peripheral arteries).

**Pulmonary (Arterial) Hypertension (PAH)**

It is defined as an elevation in *mean pulmonary arterial pressure* above 30mmHg during exercise and *above 25mmHg at rest in systole*. An increase in PAH most commonly occurs as a result of *intrinsic lung disease, which results in an increase in pulmonary vascular resistance* and subsequent *increase in PA pressure*. PAP can also increase as a result of an *increase in pulmonary venous pressure* (which may be d/t impaired left ventricle function or obstruction to left sided cardiac flow eg MS etc). So radiological features may be slightly different depending on cause i.e. pulmonary arterial or pulmonary venous hypertension. Radiological features of PAH include.

**Vascular Signs**

- **Enlargement of central pulmonary arteries** (*main pulmonary artery & its branches down to the segmental level*) and *tapering of peripheral arterial branches (vessels beyond segmental level)*- termed *peripheral pruning* are seen

- Enlargement of central main pulmonary artery may be extremely large with *complete infilling of pulmonary artery/ventricular concavity of left heart border* on X-ray.
- Widest diameter of main pulmonary artery (MPA) **29mm** measured on transverse section (CT) at level of PA bifurcation has 90% sensitivity & specificity
- Diameter **ratio of MPA to ascending aorta** (measured at same level) **>1** i.e. diameter **of MPA>AA** has strong correlation in
- Transverse diameter of right descending pulmonary artery at midpoint **>17mm** (Grainger); diameter of left and right pulmonary artery **>16mm** (Wolfgang); maximum diameter of descending branch of pulmonary artery (measured 1cm medial & 1 cm lateral to hilar points) **>16mm for males & >15mm for females** (Sutton)
- Pulmonary arteries within lungs are enlarged but there is rapid tapering of vessels (beyond segmental level) as they run towards the periphery. The **important feature is discrepancy between central and peripheral vessel size**, central pulmonary arteries being large or near normal sometimes and **peripheral arteries disproportionately small (pruning or tapering)**. - Vascular complications include *sub pleural pulmonary infarct*, dissection & **calcified plaques of central pulmonary arteries (pathognomonic**, a feature not seen in nonhypertensive pulmonary arteries; is often *curvilinear & egg shape calcification* mimicking enlarged lymph nodes, from which it is differentiated by *absence of lobulation and presence of smooth border*). - **Pulmonary veins** are *small in pre capillary pulmonary hypertension whereas enlarged in post capillary causes*.

### **Mediastinal & Cardiac Signs**

- *Cardiac enlargement (right heart i.e. RA and RV enlargement & hypertrophy)* demonstrating a large, triangular heart.
- *Mild pericardial thickening & effusion.*
- Dilatation of IVC, coronary sinus & SVC (On MRI/CT)

**Lung Parenchymal Signs** - *Mosaic perfusion without dilatation of bronchi*

(increase in vessel diameter in areas of hyper attenuation & tapering of peripheral vessels in areas of hypo attenuation)

**17. A patient is having Mitral stenosis. His x-ray will show all of the following finding *except***

a) Lifting up of left bronchus

b) Double atrial shadow

c) Obliteration of retrosternal shadow on lateral x-rays

d) Posterior displacement of esophagus on barium swallow

Correct Answer - C

C i.e. Obliteration of retrosternal shadow on lateral X Ray

**18. All of the following are diagnostic barium follow through features of ileocecal tuberculosis EXCEPT**

a) Apple - core appearance

b) Pulled up contracted cecum

c) Widening of ileocecal angle

d) Strictures involving terminal ileum

Correct Answer - A

**A i.e. Apple - core appearance**

- Apple core sign is seen in carcinoma of colon whereas ileocecal tuberculosis presents with stricture of terminal ileum, widening of ileocecal angle and pulled up contracted cecum on barium study.

**19. For the evaluation of blunt abdominal trauma, which of the following imaging modalities is ideal?**

a) Ultrasonography

b) Computed tomography

c) Nuclear scintigraphy

d) Magnetic resonance imaging

Correct Answer - B

B i.e. Computed tomography

- CT Scan is the imaging modality of choice in all blunt abdominal trauma (both in children as well as adults).
- Spleen is the most commonly injured organ in blunt injury abdomen.
- Contrast - enhanced CT is the investigation of choice for detecting splenic injuries
- Kehr sign (after elevating foot end referred pain over left shoulder d/t irritation of under surface of diaphragm by blood) is seen in splenic ruptures.
- On X-ray fracture of left lower ribs, obliteration of splenic & psoas shadows, elevation of left diaphragm, indentation of stomach & presence of free fluid between coils of intestine are suggestive of splenic rupture.

## 20. Anencephaly can be diagnosed by USG at

a) 10-12 weeks of gestation

b) 14-18 weeks of gestation

c) 20-24 weeks of gestation

d) 24-28 weeks of gestation

Correct Answer - A

A i.e. 10-12 weeks of gestation

- Earliest detectable congenital anomaly on USG is *Anencephaly*.Q
- Anencephaly can be diagnosed
  - *Earliest at 10 weeksQ Best at 12 weeksQ (100% accuracy)*

**21. Best for unruptured ectopic pregnancy is:**

a) Per abdominal US

b) HCG

c) Trans vaginal US

d) Amniocentesis

Correct Answer - C  
C i.e. Tranvaginal US

## 22. Floating water-lily sign is feature of:

a) Lung Hydatid

b) Bronchial adenoma

c) Lung abscess

d) Aspergilloma

Correct Answer - C  
C i.e. Lung abscess

### Calcification type

### Condition associated

Pop corn calcification

*Pulmonary hamartoma*Q, mediastinal lymph nodes of acute histoplasmosis.

Egg shell (peripheral) calcification

*Silicosis*Q, *Sarcoidosis*Q

Rice grain calcification

*Cysticercosis*Q

Tram track (Rail road) calcification

*Struge Weber syndrome*Q

Basal ganglion calcification

Hyper parathyroidism

Cardiac calcification

Carcinoid syndrome

Pericardial calcification

Constructive pericarditis

Not calcify

*Hydatid cyst in lung*Q

## 23. String sign is suggestive of:

a) Toxic Megacolon

b) Hypertrophic Pyloric stenosis (HPS)

c) Ulcerative Colitis

d) IBS

Correct Answer - B

B i.e. Hypertrophic Pyloric Stenosis

Meconium ileus is small bowel obstruction secondary to sticky tenacious meconium d/ t deficiency of pancreatic secretions. It is the *earliest clinical manifestation of cystic fibrosis*. It usually presents with *abdominal distension, bilious vomiting and failure to pass meconium within 48 hours*. It has *Bubbly/Froathy/Soap BubbleQ/Apple sauce appearanceQ* d/t admixture of gas with meconium.

Barium meal (swallow) appearance of Oesophageal Disorders

Bird's beak Oesophageal

appearance (very achlasia

**Radio**logical Disorders

features oesophagus with

Beak sign narrowing

Dot's lower

end (hair on neck) hypertrophic

Sigok screw pyloric

(should be) stenosis

sign String d/t

signary oesophageal

Signations

(Barium meal) Radiospasm

call

Beryllium shaped  
 Enteroliths  
 Multiple gas pseudodiverticulosis  
 fluid-filled Intestinal  
 (creptitudinal) obstruction  
 (antenna)um  
 Study) bundle Round worm  
 Spore (contour) Candida  
 appearance  
 With irregular Oesophagitis  
 plaque like filling  
 railway track  
 normal (double contrast  
 Medusa head), barium)  
 colonies on  
 CT scan  
 Appearance or Intussusception  
 Glaucescent  
 appearance  
 plaque (plate  
 disc) which  
 Coiled spring  
 appearance  
 Target sign,  
 Meniscus sign, foamy  
 (or barium  
 (1-3) mm  
 Shank like Ileocecal  
 appearance valve  
 lead pipe foamy ulcerative  
 appearance) colitis  
 Strait like Chron's  
 Kater's disease Cricopharyngeal/  
 Bulsion wall or (Regional  
 Target (ileitis) oesophageal web  
 lesion Benign  
 narrow stomach (when a/w Fe  
 (narrow) with

antrum, wide	deficiency anemia,
pylorus with	glossitis &
flared (on	
tubular	pharyngeal atrophy
barium swallow)	it is k/a Plummer
antrum	Vinson Syndrome)
opening into	
corpus of	
Lucent, tortuous,	Esophageal varices
stomach)	
worm like	
Thumb	Ischemic
filling defects	(dilated
printing sign	colitis
which distort the	subepithelial
	(hallmark)
mucosal pattern	
(on barium	also veins d/t increased
swallow);	Amoebic &
thickened	Ulcerative
longitudinal	colitis collaterals). Uphill
Saw tooth	
esophageal folds	Diverticula of
appearance	varices (d/t portal
with fusiform	colon
(on barium	(Diverticulosis)
separation (on	
enema)	hypertension) are
mucosal spot	
films):	
Apple core lesion,	Carcinoma
beaded or	confined to distal
Napkin's sign (on	colon
serpiginous	half
barium enema)	
longitudinal filling	
defects (best	& down hill varices
seen on mucosal	Midgut
relief views of	(d/t SVC
current jelly stools/	volvulus
collapsed	obstruction)
matena with	(torsion of
oesophagus in	gut
double	involve upper &
prone RAO	
bubble sign (x-	around
position with high	SMA)
ray), clockwise	middle part of
density barium	
whirlpool	
paste/suspension-	
sign (USG), apple-	oesophagus
peel twisted	
mucosal	
corckscrew	Endoscopy is
adherence).	
appearance	investigation of

(compression); investigation of  
 makes a shallow choice  
 pattern (CT) all  
 bad esophageal sign  
 (angio) intramural Leiomyoma of  
 mid dist (CT); Sigmoid  
 with characteristic esophagus  
 tapered or beak like  
 distal aspect of  
 submucosal lesion  
 twist smooth,  
 rounded,  
 even) white  
 striation & that  
 three lines sign  
 (respectively of wall  
 obliquely oriented  
 center line/  
 outer wall  
 & center line of rd  
 shaped loop),  
 barium column, &  
 exposing the vent tyre  
 tube pharyngeal  
 (directly distended  
 paralyzed loop  
 with longitudinal  
 striations  
 arising from pelvis  
 & annular apple core  
 extending towards Carcinoma  
 diaphragm) Oesophagus  
 margins (or  
 bean sign (midline  
 regular structure  
 crease  
 corresponding to  
 mesentery of  
 largely

gas distended  
loop)- on plain X-  
ray.

Distension of  
small bowel &      Necrotizing  
colon  
(loops wider than  
L1 vertebral body    enterocolitis  
±

air fluid level in  
right lower      (ischemic  
quadrant is      bowel

(1<sup>st</sup> & most  
common sign),      disease of  
*loss of mosaic*  
*multifaceted bowel* premature  
*gaa pattern, large* infants)  
*bowels*

*may be impossible*  
*to differentiate*  
*from small*

*bowel, fixed bowel*  
*or persistent loop*  
*sign, bowel wall*  
*thickening, thumb*  
*printingQ,*

*pneumatosis*  
*intestinalisQ*

(black lines of  
intramural gas a/b  
white

lines of intestinal  
wall), bubbly  
appearance of  
bowel wall, gas in  
portal

venous system

(plain horizontal beam cross table x-ray); zebra pattern; Y pattern & ring pattern (on USG)

shouldering) on barium oesophagogram; other features may be *irregular narrowed segment of lumen, diffuse nodular filling defects, irregular /smooth tapering stricture, bulky endophytic mass and fixed varicoid appearance (i.e. b/o submucosal spread of tumor, the appearance may mimic that of varices, however, unlike varices it is fixed & does not change in size & shape at fluoroscopy)*

Adynamic ileus pattern, nodular haustral pattern (thumb printing -

transverse banding = markedly

thickened & distorted haustral folds most prominent in transverse colon) -on plain x-ray; accordion sign (oral contrast traps between distorted

thickened closely spaced transverse

edematous folds of low attenuation; is

typical but seen only in severe cases), target sign and rarely pneumatosis coli ± portal vein gas - on CT; barium enema

is contraindicated

Rowler's hat sign

Pseudomembra?

nous colitis

(Clostridium

difficile diseases)

Colonic polyp

Dawson's flat sign,  
lace like/reticular  
surface pattern  
(characteristic of  
villous  
adenoma >> tubular  
adenoma)

Colonic polyp

**24. A newborn presenting with intestinal obstruction showed on abdominal X-ray, multiple air fluid levels. The diagnosis is not likely to be-**

a) Pyloric obstruction

b) Duodenal atresia

c) Ileal atresia

d) Ladd \ s bands

Correct Answer - A  
A i.e. Pyloric obstruction

**25. Excretory urography is contraindicated in:**  
***March 2011***

a) Renal artery hypertension

b) Single kidney

c) Multiple myeloma

d) Trauma

Correct Answer - C

Ans. C: Multiple myeloma

Contraindication to excretory/intravenous urography are 1) iodine sensitivity or previous reaction to contrast media, 2) pregnancy, 3) intractable cardiac or renal failure and 4) multiple myeloma

**26. Radioactive isotope of which of the following is used in bone scans:**  
***September 2009, 2010***

a) Phosphorous

b) Iodine

c) Technetium

d) Gallium

Correct Answer - C

Ans. C: Technetium

**Bone scan/ nuclear medicine technique:**

The patient is injected with a small amount of radioactive material such as 600 MBq of technetium-99m-MDP and then scanned with a gamma camera, a device sensitive to the radiation emitted by the injected material.

Two-dimensional projections of scintigraphy may be enough, but in order to view small lesions (less than 1 cm) especially in the spine, single photon emission computed tomography (SPECT) imaging technique may be required. About half of the radioactive material is localized by the bones. The more active the bone turnover, the more radioactive material will be seen.

Not all tumors are easily seen on the bone scan.

Some lesions, especially lytic (destructive) ones, require positron emission tomography (PET) for visualization.

## 27. Spider leg appearance is found on: *September 2012*

a) Polycystic kidney

b) Pyelonephritis

c) Hydronephrosis

d) Renal artery stenosis

Correct Answer - A

Ans. A i.e. Polycystic kidney

### **Urinary system: Radiological signs and conditions**

- Flower vase appearance: Horse shoe kidney
- Fish hook bladder: BPH
- Drooping flower sign: Ectopic ureter
- Cobra head appearance: Ureterocoele
- Adder head appearance: Ureterocoele
- Rim sign: Hydronephrosis
- Crescent sign: Hydronephrosis
- Golf hole bladder: TB urinary bladder
- Thimble bladder: Chronic TB
- Bilateral spider leg pattern: Polycystic kidneys
- Bilateral spider leg pattern: Polycystic kidney
- Thimble bladder: Chronic TB
- Rim sign: Hydronephrosis
- Cobra head appearance: Ureterocoele
- Adder head appearance: Ureterocoele

**28. Signet ring sign is seen in:**  
***March 2013***

a) Blastomycosis

b) Bronchogenic carcinoma

c) Invasive aspergillosis

d) Bronchiectasis

Correct Answer - D

Ans. D i.e. Bronchiectasis

**Signet ring sign**

- The signet ring sign is a CT finding seen in patients with Bronchiectasis
- The ring of soft-tissue attenuation represents the wall of the dilated bronchus seen on a cross-sectional CT scan, whereas the low-attenuating circle of air represents air within the dilated bronchus.
- The circle of soft-tissue attenuation abutting the ring represents a cross-sectional image of the pulmonary artery that lies adjacent to the dilated bronchus.

**29. Vessels catheterized on carotid angiography are:**

a) 2 external carotids and 2 vertebral

b) 2 internal carotids and 2 vertebral

c) 2 internal carotids and 1 vertebral

d) 2 external carotids and 1 vertebral

Correct Answer - C

Ans. 2 internal carotids and 1 vertebral

### 30. Radium gives:

a)  $\alpha$ -rays

b)  $\beta$  rays and  $\gamma$  rays

c) X-rays

d) All of the above

Correct Answer - A  
Ans.  $\alpha$ -rays

**31. Coiled spring appearance on barium enema is seen in:**

a) Carcinoma colon

b) Sigmoid volvulus

c) Intussusception

d) Deal atresia

Correct Answer - C  
Ans. Intussusception

**32. Bird beak appearance of distal oesophagus is seen in:**

a) Achalasia cardia

b) Reflux oesophagitis

c) Carcinoma oesophagus

d) Hiatus hernia

Correct Answer - A  
Ans. Achalasia cardia

### 33. Best imaging modality in patients with breast implants is:

a) MRI scan

b) CT scan

c) Mammography

d) Radionuclide scan

Correct Answer - A

Ans. MRI scan

It is the best imaging modality for the breasts of women with implants.

MRI can be useful to distinguish scar from recurrence in women who have had previous breast conservation therapy for cancer

### 34. Extradural hematoma CT scan finding is

a) Hypodense biconvex lesion

b) Hyperdense biconvex lesion

c) Concavo convex hyperdense lesion

d) Low attenuated biconvex lesion

Correct Answer - B

Ans. Hyperdense biconvex lesion

**35. In colour doppler the color depends upon:**

a) Strength of returning echo

b) Relation of transducer to blood flow

c) Frequency of doppler used

d) Type of doppler machine used

Correct Answer - B

Ans. Relation of transducer to blood flow

**36. One gray of radiation is equal to:**

a) 1 rad

b) 10 rad

c) 100 rad

d) 1000 rad

Correct Answer - C  
Ans. 100 rad

### **37. Investigation of choice for multiple sclerosis:**

a) MRI

b) CT scan

c) X-ray

d) EEG

Correct Answer - A  
Ans. MRI

**38. Percentage of cold thyroid nodules likely to be malignant:**

a) 20%

b) 30%

c) 40%

d) 72%

Correct Answer - A  
Ans. 20%

**39. Thickness of lead apron to prevent radiation:**

a) 1 mm

b) 3 mm

c) 0.5 mm

d) 7 mm

Correct Answer - C  
Ans. 0.5 mm

**40. Hilar dance on fluoroscopy is seen in:**

a) ASD

b) TOF

c) VSD

d) TGV

Correct Answer - A  
Ans. ASD

**41. Perihilar fluffy opacities on chest X-ray is seen in:**

a) Pulmonary embolism

b) Pericardial effusion

c) Pulmonary arterial hypertension

d) Pulmonary venous hypertension

Correct Answer - D  
Ans. Pulmonary venous hypertension

## 42. Half life of Technetium 99 is:

a) 2 hours

b) 6 hours

c) 12 hours

d) 24 hours

Correct Answer - B  
Ans. 6 hours

### 43. Investigation of choice in obstructive jaundice is:

a) ERCP

b) Ultrasound

c) Cholecystography

d) X-ray

Correct Answer - B  
Ans. Ultrasound

#### 44. The principle used in radiotherapy is:

a) Cytoplasmic coagulation

b) Ionising the molecules

c) DNA damage

d) Low dose causes tissue necrosis

Correct Answer - C  
Ans. DNA damage

**45. Prominent left border of heart is formed by all the following *except*:**

a) Azygous vein

b) Pericardial cyst

c) Coronary artery aneurysm

d) Enlarged left auricular aneurysm

Correct Answer - A  
Ans. Azygous vein

**46. Investigation of choice in parathyroid pathology is:**

a) CT scan

b) Gallium scan

c) Thallium scan

d) Technetium-thallium subtraction scan

Correct Answer - D

Ans. Technetium-thallium subtraction scan

**47. All the following show miliary shadows on chest X-ray *except*:**

a) Pneumoconiosis

b) Mitral stenosis

c) Sarcoidosis

d) Staphylococcal pneumonia

Correct Answer - D  
Ans. Staphylococcal pneumonia

**48. The causes of homogenous opacity on X-ray is all *except*:**

a) Pleural effusion

b) Diaphragmatic hernia

c) Massive consolidation

d) Emphysema

Correct Answer - D  
Ans. Emphysema

## 49. Phosphorous — 32 emits:

a) Beta particles

b) Alfa particles

c) Neutrons

d) X-rays

Correct Answer - A  
Ans. Beta particles

**50. Which of the following malignant tumours is radioresistant?**

a) Ewing's sarcoma

b) Retinoblastoma

c) Osteosarcoma

d) Osteosarcoma

Correct Answer - C  
Ans. Osteosarcoma

**51. Which radionuclide is best suited for measurement of GFR?**

a) DTPA

b) DMSA

c) Orthoiodohippurate

d) EDTA

Correct Answer - A  
Ans. DTPA

**52. Current gold standard to detect ductal carcinoma in situ breast is:**

a) Mammography

b) MRI

c) USG

d) CT/PET

Correct Answer - B  
Ans. MRI

**53. "String of beads" appearance on horizontal abdominal view X-ray is suggestive of:**

a) Intussusception

b) Sigmoid volvulus

c) Small bowel obstruction

d) Large bowel obstruction

Correct Answer - C  
Ans. Small bowel obstruction

**54. "Double bubble" sign with air shadows absent in distal bowel coils on X-ray abdomen is characteristic of**

a) Duodenal webs

b) Duodenal atresia

c) CHPS

d) All of the above

Correct Answer - B  
Ans. Duodenal atresia

**55. On barium swallow Leiomyoma shows following characteristic appearance?**

a) Rat tail appearance

b) Cork screw appearance

c) Oval mass lined by barium

d) String sign

Correct Answer - C

**Ans. is 'c' i.e., Oval mass lined by barium**

[Rel Atlas of Esophageal Surgery p. 1761]

- On barium swallow, leiomyoma may be seen as a discrete round or ovoid submucosal mass that is well outlined by barium.
- Its borders form slightly obtuse angles with the esophageal wall.
- Esophageal leiomyoma is a benign smooth-muscle neoplasm of the oesophagus.
- It is the most common benign tumor of the oesophagus.
- They typically involve the mid-to-distal oesophagus.

## 56. Electron beam therapy is used for which tumor ?

a) Renal carcinoma

b) Kaposi sarcoma

c) Hepatic carcinoma

d) AML

Correct Answer - B

**Ans. is'b'i.e., Kaposi sarcoma**

[Ref: Textbook of radiotherapy - 1031]

- Electron-beam radiation therapy is the most common modality employed for the treatment of localized KS.

## 57. Most important mechanism of action of microwave irradiation is?

a) Thermal effect

b) Ionizing effect

c) Stereotactic effect

d) All of the above

Correct Answer - A

**Ans. is'a'i.e., Thermal effect .**

- Ref: [cdn.intechopen.com/.../InTech-Prospective-application-of-microwaves-in-medicine](https://cdn.intechopen.com/.../InTech-Prospective-application-of-microwaves-in-medicine)
- The most important mechanism in medical applications of microwaves is the thermal effects of EM field.

## 58. Ring of fire on USG signifies?

a) H. mole

b) Ectopic pregnancy

c) PCOD

d) Aneuploidy

Correct Answer - B

**Ans. is'b'i.e., Ectopic pregnancy**

[Ref: Diagnostic Ultrasound: Abdomen and Pelvis E-Book p. 8011]

- The ring of fire sign also known as ring of vascularity signifies a hypervascular lesion with peripheral vascularity on colour or pulsed doppler examination of the adnexa due to low impedance high diastolic flow.

**This sign can be seen in**

- .. Corpus luteum cyst (more commonly)
- ?. Ectopic pregnancy

## 59. Soft markers on ultrasonography are helpful in diagnosing?

a) Fetal age

b) Chromosomal anomalies

c) Fetal size

d) Site of pregnancy

Correct Answer - B

**Ans. is'b'i.e., Chromosomal anomalies**

- Antenatal soft ultrasound markers are fetal sonographic findings that are generally not abnormalities as such but are indicative of an increased age adjusted risk of an underlying fetal aneuploidic or some non chromosomal abnormalities.

## 60. Double decidual sac sign is indicative of?

a) Ectopic pregnancy

b) Intrauterine pregnancy

c) H. mole

d) Twin pregnancy

Correct Answer - B

**Ans. is'b'i.e., Intrauterine pregnancy**

[Ref: sutton 7/e p. 1041 & callen 4th/e p . 114)

- If a double decidual sac sign is present, then it is highly suggestive that the intrauterine fluid collection is an intrauterine pregnancy.

**61. Hummingbird sign in brain MRI is seen in ?**

a) Multiple sclerosis

b) Progressive supranuclear palsy

c) Parkinson's disease

d) Alzheimer disease

Correct Answer - B

**Ans. is 'b' i.e., Progressive supranuclear palsy**

[Ref Clinical neurology - 113]

- Hummingbird sign on brain MRI is a radiological sign of progressive supranuclear palsy.

## 62. Threshold radiation dose for hematological syndrome is?

a) 2 Gy

b) 6 Gy

c) 15 Gy

d) 50 Gy

Correct Answer - A

**Ans. is'a'i.e., 2 Gy**

[Ref: Harrison 15h/e p. 25901]

- Bone marrow or hematological syndrome:- Full syndrome occurs with a dose between 0.7 and 3 Gy (70-300 rads).
- The destruction of bone marrow cells results in pancytopenia.

### 63. Not a radiosensitizing drug ?

a) 5-Fu

b) BUDR

c) Cyclophosphamide

d) Hydroxyrea

Correct Answer - C

**Ans. is'c'i.e., Cyclophosphamide**

- IRef. Cancer nursing: Principles & practice p. 256
- Cisplatin and 5-FU - Most common radiosensitive drugs.

## 64. "Head at risk" sign is seen in ?

a) Perthes disease

b) Ewing's sarcoma

c) Osteomyelitis

d) Paget's disease

Correct Answer - A

**Ans. is'a'i.e., Perthes disease**

(Ref: Pediatric Orthopedic Deformities p.326)

- "Head at risk sign is a radiological prognostic sign for Perthes disease (also k/a Legg-Calves- Perthes disease or Coxa Plana
- or Idiopathic avascular necrosis of femoral head).

## 65. Investigation of choice for evaluating a renal mass is ?

a) Plain X-ray

b) CT scan

c) IVP

d) Renal scintigraphy

Correct Answer - B

**Ans. is'b'i.e., CT scan**

(Ref: Grainger &/e p.881)

- "Computed Tomography is still the investigation of for evaluating and characterizing solid renal masse

**66. Best investigation to diagnose a hydatid cyst in liver is ?**

a) Ultrasound

b) CT-scan

c) MRI

d) MRCP

Correct Answer - B

**Ans. is 'b' i.e., CT-scan**

- For hydatid cyst
- 1st line investigation - Ultrasound
- Investigation of choice - CT-scan

**67. Early arterial phase enhancement CECT scan of liver indicates towards -**

a) Hydatid cyst

b) HCC

c) Hepatic abscess

d) Simple hepatic cyst

Correct Answer - B

**Ans. is 'b' i.e., HCC**

[Rd Kumar and Chrk's Clinical Medicine p. 347)

- In HCC, the dassic finding on CT imaging is hyper vasclarity/enhancement in the arterial phase with washout in the portal (venous) and delayed phases.

**68. All are Neurocysticercosis findings on CT scan except ?**

a) Parenchymal calcification

b) Low density non enhancing lesion

c) Diffuse cerebral edema

d) High density lesions

Correct Answer - D

**Ans. is 'd' i.e., High density lesion**

[Ry' Walsh and Hoyt's Clinical Neuro-ophthalmology p.2872]

**important findings of Neurocysticercosis on CT**

- Parenchymal calcification at junction of grey and white matter
- Low density round non enhancing lesions
- Hypodense or isodense round masses with surrounding edema

**69. Active pulmonary TB can be diagnosed on CT-scan by following finding ?**

a) Tree in bud appearance

b) Honey comb appearance

c) Ground glass appearance

d) Signet ring sign

Correct Answer - A

**Ans. is 'a' i.e., Tree in bud appearance**

(Ref Chapman 4n/e p.142,143; Fundamentals of radiology)

- Tree-in-bud sign or pattern describes the CT appearance of multiple areas of centrilobular nodules with a linear branching pattern.
- This is a characteristic sign of active pulmonary TB.
- Other important sign of pulmonary TB on CT is lymph nodes showing peripheral rim enhancement because of necrosis.

**70. X-rays showing widening of sella but neurological and endocrinological investigations are normal, diagnosis is**

a) Pseudotumor cerebri

b) Empty sella sign

c) Chromophobe adenoma

d) Prolactinoma

Correct Answer - A

**Ans. is'a'i.e., Pseudotumor cerebri**

Ref: Principles and Practice of Endocrinology and Metabolism p. 107

- "Elevated intracranial pressure is a potentially important contributory factor because it has been documented in patients with primary empty sella syndrome.
- Ten percent of the patients with benign intracranial hypertension have a co-existing empty sella."

## 71. MRI utilizes -

a) Hydrogen atoms

b) X-rays

c) Helium ion

d) Radioactivity

Correct Answer - A

**Ans. is 'a' i.e., Hydrogen atoms**

[Ref' Essential Clinical Neuroanatomy p. 263]

- MRI is a technique that produces tomographic images by means of magnetic fields and radio;frequency waves.
- It causes some alignment of the hydrogen atoms within the body along the magnetic field.

## 72. Amount of radiation used in mammography -

a) 0.5 mSv

b) 0.7 mSv

c) 0.9 mSv

d) 1 mSv

Correct Answer - B

**Ans. is'b'i.e.,0.7 mSv**

- Screening mammography and radiation A screening mammogram is an X-ray of the breast tissue for women without any breast symptoms.
- It uses low doses of radiation (about 0.7mSv for 4 X-rays).

### 73. Dysphagia lusoria is best diagnosed by

a) Plain radiography

b) Fluoroscopy

c) CT Angiography

d) Ultrasound

Correct Answer - C

**Ans. is'c'i.e., CT Angiography**

Ref: Human Malformations and Related Anomalies p. 130

- Dysphagia lusoria is an impairment of swallowing due to compression from an aberrant right subclavian artery (arteria lusoria)
- CT angiography and MRI thorax are the best diagnostic modalities that could identify the arteria lusoria.

## 74. Air on X-rays appears -

a) White

b) Black

c) Grey

d) None of the above

Correct Answer - B

**Ans.is'b'i.e.,Black**

- Structures that are dense (such as bone) will block most of the x-ray particles, and will appear white.
- Metal and contrast media (special dye used to highlight areas of the body) will also appear white.
- Structures containing air will be black, and muscle, fat, and fluid will appear as shades of gray.

## 75. Which of the following is a late complication of radiotherapy -

a) Nausea

b) Erythema

c) Thrombocytopenia

d) Radiation pneumonitis

Correct Answer - D

**Ans. is'd'i.e., Radiation pneumonitis**

[Ref Cancer in Children: Clinical Management p. 132

- Radiation pneumonitis is a late complication.
- **Late effects : - Appearance within a few to many years : -**
- Pericardial involvement is the most common and includes asymptomatic pericardial effusion & constrictive pericarditis.
- Radiation pneumonitis
- Post radiation transverse myelitis develop after 12-24 months.
- Leukemia is the most common radiation induced cancer.
- Other cancers are thyroid and breast carcinoma.
- Papillary carcinoma of the thyroid may develop due to radiation exposure in infancy.
- Gliomas, Meningiomas, Sarcomas, Lung cancer

**76. In which of the following form of imaging, Harmonic Imaging is related -**

a) Sonography

b) Digital radiography

c) MRCP

d) Nuclear imaging

Correct Answer - A

**Ans. is 'a' i.e., Sonography**

[Ref: Ultrasound teaching manual p. 16]

- Harmonic imaging is a technique in ultrasonography that provides images of better quality as compared with conventional ultrasound technique.

## 77. Sievert is a unit of

a) Radioactivity

b) Radiation exposure

c) Absorbed dose

d) Dose equivalent

Correct Answer - D

**Ans. is'd'i.e., Dose equivalent**

Ref: A Textbook of Science for the Health Professions p. 132

- Sievert is new (SI) unit of dose equivalent replacing Rem

**78. All of the following appear hypo-intense on MRI except**

a) Air in lung

b) Ligaments

c) Adipose tissue

d) CSF

Correct Answer - C

**Ans. is'c'i.e., Adipose tissue**

## 79. Which one is non-ionising radiation -

a) MRI

b) CT Scan

c) X-ray

d) Position emission scintigraphy

Correct Answer - A

**Ans. is'a'i.e., MRI [Ref Grainger Sth/ep.703]**

- Ionizing Radiation: X-ray, Barium studies, IVU, CT scan, Mammography, fluoroscopy DEXA
- Non Ionizing radiation: USG, MRI, microwaves, UV rays, Radiofrequency waves, Thermography (infrared rays)

## 80. Which of the following is true regarding cardiac MRI

a) Infarcted myocardium is hypointense on T2-MRI

b) Viable myocardium can be differentiated from infarcted myocardium

c) Prosthetic heart valves are an absolute contraindication for MRI

d) It is better than CT for non-invasive assessment of coronary arteries

Correct Answer - B

**Ans. is 'b' i.e., Viable myocardium can be differentiated from infarcted myocardium.**

- Infarcted myocardium appears hypointense on T1-MRI and hyperintense on T2-MRI
- Viable myocardium can be easily differentiated from infarcted tissue.
- Prosthetic heart valves are a relative contraindications for MRI.
- Multislice CT is a better modality than cardiac MRI for the non invasive assessment of coronary arteries.

## 81. Best imaging study for the earliest diagnosis of cerebral infarct-

a) FLAIR MRI

b) Non-contrast CT

c) CECT

d) Diffusion-weighted MRI

Correct Answer - D

Diffusion-weighted MRI

Diffusion-weighted MRI detects cytotoxic edema in just a few hours of infarction.

**82. Bone and soft tissue radiology, most important interaction?**

a) Compton scattering

b) Thompson scattering

c) Photoelectric absorption

d) Coherent scatter

Correct Answer - A

**Ans. is'a'i.e., Compton scattering**

[Ref: Fundamental Radiology 33]

- Compton scattering is the most common type of interaction in diagnostic radiology and is responsible for most scattered radiations.

### 83. CT in EDH shows ?

a) Hyperdense lesions

b) Crescent shaped

c) Concavo-convex

d) None

Correct Answer - A

**Ans. is'a'i.e., Hyperdense lesions**

[Ref Clinical radiology p. 212]

- Acute extradural (epidural) hematoma is biconvex hyperdense or mixed density lesion.

## 84. All are true about transvaginal USG except ?

a) Bladder should be full

b) Bladder should be empty

c) Consent is mandatory

d) None of the above

Correct Answer - A

**Ans. is'a'i.e., Bladder should be full**

[Ref: USG in obstetrics and Gynaecology p. 76]

- Transvaginal sonography is best performed with an empty bladder, which enables the pelvic organs to reach a closer proximity to the tip of the high-frequency transvaginal probe.
- On the other hand, transabdominal sonography is done with full bladder to get an overview of anatomy.

## 85. Isotope used for RAIU is ?

a) I-123

b) I-137

c) I-125

d) None

Correct Answer - A

**Ans. is'a'i.e., I-123**

[Ref: Essential of thyroid cancer management p. 50]

- Radio-active iodine uptake (RAIU) test is used to measure thyroid function.
- Usual isotope of radioiodine used is I-123.

## 86. Which is the investigation of choice for fat embolism?

a) CT scan

b) MRI

c) Arterial blood gas analysis

d) Chest x-ray

Correct Answer - A

**Ans. is 'a' i.e., CT scan**

[Ref; With text Textbook of Orthopaedics By John Ebnezar 4'h/e p. 32]

- In case of ARDS due to fat embolism the investigation of choice is spiral CT pulmonary angiogram,

**87. Size of liver metastasis that can be detected by CECT is?**

a) 1 mm

b) 5 mm

c) 1 cm

d) 2 cm

Correct Answer - B

**Ans. is 'b' i.e., 5 mm**

[ref: Adam and Dixon Sth/e Ch. 35]

- CECT can detect lesions of size upto 5mm but it is difficult to differentiate benign from malignant.

## 88. Best investigation for VUR is ?

a) IVU

b) MCU

c) Retrograde pyelogram

d) Retrograde urethrogram

Correct Answer - B

**Ans. is 'b' i.e., MCU**

[Re/ Clinical radiology 3'd/e p. 252]

- Investigation of choice for VUR > Voiding/micturating cystourethrogram.

**89. Which of the following is used to differentiate tumour recurrence and radiation necrosis?**

a) PET scan

b) MRI

c) 3D CT

d) USG

Correct Answer - A

**Ans. is'a'i.e., PET scan**

[Ref.: Devita oncology 6h/ e Ch. 24]

- PET may be used in therapeutic monitoring after chemotherapy or radiotherapy, with a classic indication being assessment for recurrent tumor versus radiation necrosis.
- Conventional imaging can not differentiate recurrent tumor from radiation necrosis.

## 90. Best investigation of planning radiotherapy for carcinoma of esophagus?

a) PET

b) CT Scan

c) USG

d) MRI

Correct Answer - A

**Ans. is'a'i.e., PET**

[Ref: Recent advances in GT oncologist p. 21]

- Prior to radiotherapy, the extent of tumor and its spread is assessed to target the area for radiotherapy.
- CT scan, endoscopic USG and FDG-PET are used for esophageal carcinoma, but for accurate radiotherapy planning PET scan is far superior to CT or endoscopic USG.

**91. Which is the best investigation for assessing the plaque of atherosclerosis?**

a) CT scan

b) MRI

c) Angiography

d) Intravascular USG

Correct Answer - B

**Ans. is 'b' i.e., MRI**

[Rel Textbook of cardiac imaging p. 292)

- "MRI is emerging as the most promising radiological technique for assessing plaque morphology (particularly aortic and carotid plaques) since its superior capability to determine plaque size and composition with accuracy and reproducibility provides the opportunity to evaluate the relationship between plaque morphology/composition and subsequent cardiovascular event.

## 92. Which of the following is not seen in coronal CT paranasal sinuses?

a) Ostiomeatal complex

b) Orbit

c) Sinus cavities

d) Frontoethmoid recess

Correct Answer - D

**Ans. is'd'i.e., Frontoethmoid recess**

[Ref : Sutton Vh/e vol. 2 p. 1519-1522; Grainger Sth/e Ch. 62]

- Structures seen on coronal view of CT paranasal sinus are Nasal cavity, osteomeatal complex, Sinus cavities and surrounding structures like orbit, cribriform plate and optic canal.
- Frontoethmoidal recess is evaluated by parasagittal view.

**93. Which is the investigation of choice for recurrent sinusitis?**

a) MRI

b) CT scan

c) X-ray PNS Waters view

d) X-ray PNS Cadwells view

Correct Answer - B

**Ans. is'b'i.e., CT scan**

[Ref : Sutton //e vol. 2 p. 1521; Grainger Sth/e Ch. 62]

- CT scan is the investigation of choice for recurrent sinusitis.

## 94. Radiological hallmark of primary tuberculosis in childhood is?

a) Ghon's focus

b) Normal chest Xray

c) Lymphadenopathy

d) Pleural effusion

Correct Answer - C

**Ans. is 'c' i.e., Lymphadenopathy**

[Rel Diagnostic radiology paediatric imaging by A.K. Gupta p. 78]

- Lymphadenopathy with or without parenchymal abnormality is the radiological hallmark of primary tuberculosis in childhood.