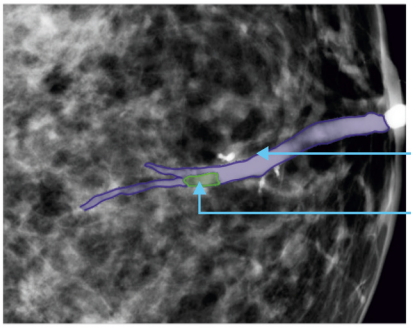
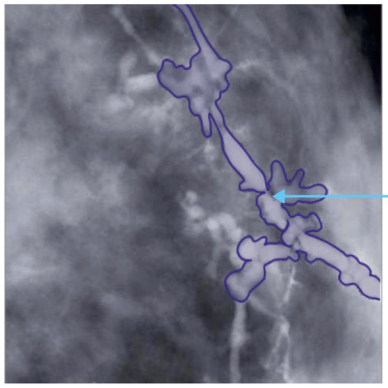
2. BREAST

NIPPLE DISCHARGE

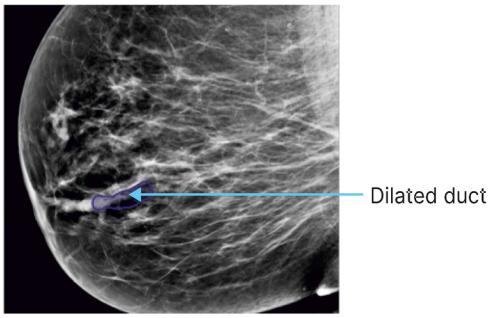
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FMGE 2022

Type of Discharge	Most Common Cause	Other Causes
Bloody	Duct papilloma	Carcinoma, Duct ectasia
Serous	Fibrocystic disease	Carcinoma, Duct ectasia
Greenish/Blackish/grumous/pultaceous	Duct ectasia	-
Any type of discharge possible - Duct ectasia		

- Investigation
  - First investigation in suspected breast cancer → Mammography
  - Bloody discharge → Ductography
    → Ductography findings

Finding	Diagnosis	Mammography
Smooth filling defect	Papilloma	 Papilloma
Irregular filling defect	Carcinoma	 Carcinoma

Yourwish

Dilated duct	Duct ectasia	 Duct ectasia

- Treatment

Condition	Treatment
Duct papilloma	Microdochectomy
Duct ectasia	Hadfield's operation (Conical excision of involved duct)

BREAST CANCER

Risk Factors For Breast Cancer

INICET 2023, NEET PG 2023

Category	Risk Factors
Age	Advancing age
Geography	Western origin
Lifestyle	Alcohol, Obesity, High-fat diet
Hyperestrogenic	Early menarche, Late menopause, Nulliparity, Late first pregnancy
Personal history of malignancy	Carcinoma endometrium and ovary
Family history	Maternal side important
Genetic mutation	BRCA 1 in females(females first) BRCA 2 in males
Radiation	40-60 Gy exposure
Hormone replacement therapy	
Smoking ↑ risk of	Breast CA, Duct ectasia, Mondor's disease, Zuska disease

Dcis (ductal Carcinoma In Situ)

00:06:55

INICET 2023, FMGE 2021

- Ducts are seen in both males & females,hence DCIS seen in both male and female
- High risk of progression to invasive ductal carcinoma (M+F)
- Lobular carcinoma seen only in females.

Pathology

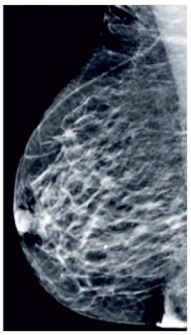
- Classification of DCIS based on nuclear grade & necrosis

Yourwish

Category	Types
Low Grade(CPM)	Cribriform, Papillary, Micropapillary
High Grade(SC)	Solid, Comedo

Investigation

- Most sensitive → MRI
- Best for microcalcification → Mammography



Treatment

- Low grade → Lumpectomy
- High grade → Lumpectomy + Radiotherapy
- Non-palpable → Excision by needle localization + specimen mammogram

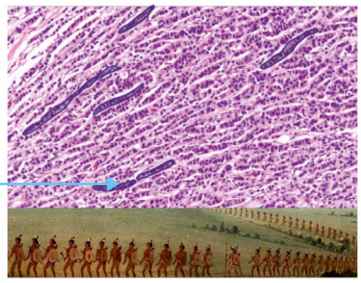
Lcis (lobular Carcinoma In Situ)

00:10:00
FMGE 2022

- Arises from Terminal Duct Lobular Unit(TDLU)
- Only in females
- Multicentric & Bilateral
- Marker of increased risk of bilateral breast cancer

Pathology

- Indian file pattern: tendency of tumor cells to invade in linear pattern
- Cytoplasmic mucoid globules



Clinical Features

- MC presentation : Lump

Diagnosis

- Characteristic feature : Neighbourhood calcifications

Treatment

- Observation
- Chemoprevention (Tamoxifen / Raloxifene)
- Prophylactic bilateral mastectomy

One-liners

Question	Answer
Most common gene mutated	p53
Most common gene mutated in familial breast cancer	BRCA1
Most common histological type	Adenocarcinoma
MC subtype	Invasive ductal carcinoma
LC subtype	Papillary

Most malignant having worst prognosis	Inflammatory breast cancer
Least malignant having best prognosis	Tubular carcinoma
Most common site	Upper outer quadrant
Least common site	Lower inner quadrant
More common breast	Left

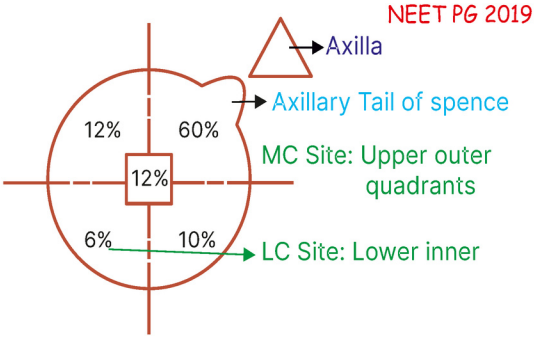
Route Of Spread

Category	Answer
MC route of spread	Lymphatic
MC site of metastasis	Bone
	• Bone mnemonic ○ LFT (Lumbar, Femur, Thoracic)
	• Organs mnemonicL ○ LLBB (Liver, Lung, Brain, Bone)
Most common cause of death	Malignant pleural effusion

Pathway Of Spread

- Upper outer quadrant → Posterior intercostal vein → Batson's plexus → Lumbar vertebra → Deural venous sinuses → Leptomeninges → Brain
- MC primary for leptomeninges → CA breast
- MC Primary for brain Metastasis → CA Lung > CA Breast

NEET PG 2019



FMGE2025 NEET 2025

Clinical Features

- MC Presentation: → Lump
- Architectural distortion
- Asymmetry
- Skin fixation
- Nipple retraction/deviation/ulceration
- Chest wall fixation
- Metastasis
  - Backache
  - Headache
  - Dyspnea
  - Jaundice
  - Anorexia/ Weightloss
- Peau d'orange
  - Lymphatic permeation by tumor cells obstructing the flow of lymph leading to cutaneous edema
  - Most conspicuous sign of CA Breast
  - Stage T4B



FMGE 2020



Yourwish

- Dimpling & Puckering
  - Cooper's ligament involvement
- Cancer en cuirasse
  - Multiple nodules & ulceration
  - Skin & chest wall involvement




Finding	Cause
Peau d'orange	Lymphatic permeation
Dimpling	Cooper ligament involvement
Puckering	Cooper ligament
Cancer en cuirasse	Skin + chest wall involvement

Triple Assessment

INICET 2023, FMGE 2021

- Clinical signs and symptoms
- Imaging (Mammography/USG)
- Biopsy (Core needle/FNAC)
- PPV → 99.9%

Investigations

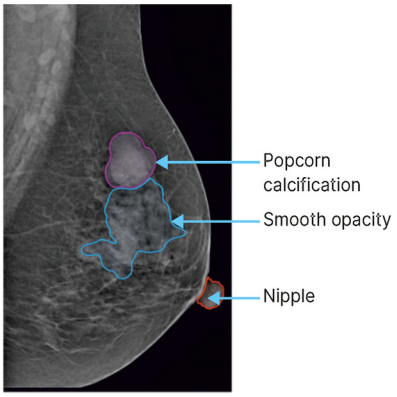
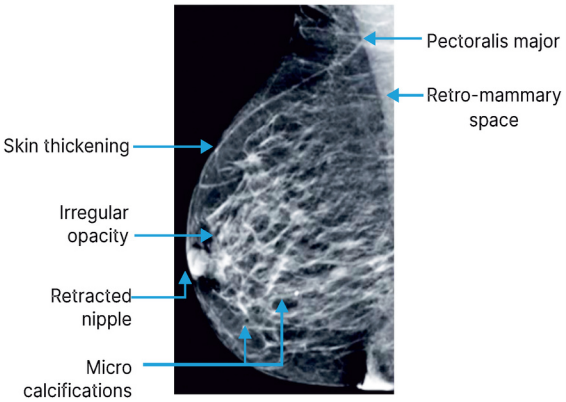
Mammography

- IOC for screening of breast cancer
- Screening mammography should be started at 45 years
- Type of Xray : Bremstraumlung
- Radiation exposure → 0.1 cGy
- 1 Mammography = 4 chest X-rays
- First Investigation in suspected CA Breast is Mammography
- IOC is Biopsy (corecut/ true cut/ needle)
- Malignant vs Benign Mammography

Feature	Benign	Malignant
Opacity	Thin Halo,	Wide Halo
Margin	RegularSmooth,	Irregular Spiculated/stellate/comet tail
Calcification	Macro (>0.5 mm) Popcorn calcification (Fibroadenoma)	Micro (<0.5 mm)
Density	Homogeneous,Low density	Heterogeneous, High density
Retromammary space	Present	Obliterated
Skin thickening	Absent	Present

Yourwish

Yourwish

Nipple retraction	Absent	Present
		

Bi-rads

Category	Meaning	Risk of malignancy
0	Incomplete(Additional Imaging required)	–
1	Negative(Annual mammogram)	0%
2	Benign(Annual mammogram)	0%
3	Probably benign(Short term follow Up)	<2%
4A	Low suspicion(Biopsy)	2-10%
4B	Moderate(Biopsy)	10-50%
4C	High(Biopsy)	50-95%
5	Highly suggestive of malignancy (Intervation)	>95%
6	Biopsy proven malignancy	100%

MRI

- IOC for screening of breast cancer in high risk females
  - Positive family history
  - Genetic mutation
- IOC for diagnosis of Implant related complications
- IOC to differentiate scar from benign lesions

USG

- First investigation done <35 year with LUMP

Pet Scan

- FDG PET (F18)
- Differentiates recurrence from scar/fibrosis/necrosis (IOC)

Bone Scan

- IOC for diagnosis of Bone Mets

Yourwish

Tnm Classification

00:34:00

Type	Meaning
cTNM	Clinical staging
pTNM	Pathological staging
rTNM	Recurrent tumours
mTNM	Multiple tumors
yTNM	Staging After neoadjuvant chemo(NACT)
ypTNM	Pathological after NACT

8th Ajcc Tnm Classification

00:36:00

FMGE 2021

Category	Stage	Criteria / Description
T (Tumor)	T1	Tumor ≤ 2 cm
	T2	Tumor 2-5 cm
	T3	Tumor > 5 cm
	T4A	Involvement of chest wall RIBS+ Intercostal muscle + Serratus anterior (not Pectoralis major, minor , involvement of skin or nipple)
	T4B	Involvement of skin in ipsilateral breast • Ulcration • Edema(Peude orange) • Satellite nodule
	T4C	T4A + T4B
	T4D	Inflammatory carcinoma(worst prognosis)
N (Nodes)	N1	Mobile level I/II axillary nodes.
	N2A	Fixed/Matted level I/II axillary nodes.
	N2B	Internal mammary lymph nodes
	N3A	Ipsilateral Infraclavicular
	N3B	Axillary + Internal mammary
	N3C	Metastasis to supraclavicular lymph nodes
M (Metastasis)	M0	No distant metastasis
	M1	Distant metastasis

Staging

- Stage I: T1
- Stage II A: T0-1 N1, T2
- Stage II B: T2 N1, T3
- Stage III A: T0-2 N2, T3 N1-2
- Stage III B : T4 N0-2
- Stage III C: Any T N3
- Stage IV: Any T, Any N, M1

No Of Lymph Nodes Removed For Adequate Staging

- G: GB - 6
- B: Breast - 10
- C: Colon - 12
- R: Rectum - 12
- E: Esophagus - 15
- St: Stomach - 16

Management Of Breast Cancer

00.42.16

Early Invasive Breast Cancer

- Stage I, IIA, IIB
- Breast conservation surgery (BCS)+ SLN biopsy + RT
- If CI to BCS : Simple mastectomy + Axillary LN sampling
- Indications of Adjuvant Chemotherapy:
  - Tumor size > 1 cm
  - LN positive
  - Tumor size > 0.5 cm, LN negative with adverse prognostic factors:
  - High histological grade
  - Lymphovascular invasion
  - Hormone receptor negative
  - HER-2/neu positive

Locally Advanced Breast Cancer

- Stage III (IIIA, IIIB, IIIC)
- NACT + MRM + RT

(Neoadjuvant chemotherapy + Modified radical mastectomy + Radiotherapy)

Metastatic Breast Cancer

- Stage IV
- Goal is to Prolong survival and improve the quality of life

Hormone Therapy (Indications):	Chemotherapy (Indications):
• ER/PR positive • Asymptomatic visceral metastasis • Bone or soft tissue metastasis	• ER/PR negative • Symptomatic visceral metastasis • Hormone refractory disease

Yourwish

Indication of Radiotherapy

- BCS
- LABC
- 4 or more +ve LN
- Positive margins

Chemotherapy Regimens

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CMF	CAF (Preferred):6 cycles
• Cyclophosphamide • Methotrexate • 5-FU	• Cyclophosphamide • Adriamycin / Doxorubicin • 5-FU

- If Resistant:
  - To Adriamycin → Taxanes (Docetaxel, Paclitaxel)
  - To Adriamycin and Taxens → Ixabepilone
- Her-2-neu positive:
  - 1st line : Trastuzumab (Herceptin)
  - 2nd line : Lapatinib
- Refractory or Metastatic : Sunitinib

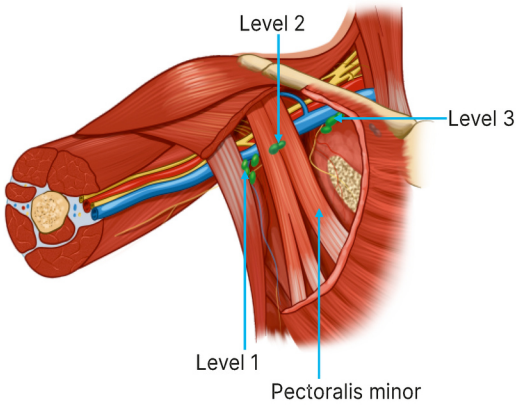
Hormone Therapy

FMGE 2021

- DOC for hormone therapy in premenopausal females : Tamoxifen 10 mg BD for 5 years
- DOC for hormone therapy in postmenopausal : Aromatase inhibitors
  - Letrozole or Anastrozole
  - Tamoxifen not preferred in postmenopausal age due to increased risk of endometrial cancer risk

Ln Levels: Pectoralis Minor

- Level 1 : Below & lateral to Pectoralis minor
  - A: Anterior
  - P: Posterior
  - L: Lateral
- Level II : Behind Pectoralis minor
  - Central
  - Interpectoral (Rotter's nodes)
- Level III : Medial & above Pectoralis minor
  - Apical



Types Of Mastectomy

Type	Removal
Simple/Total	Breast only (En block removal of nipple, areola, skin, breast tissue)
Extended	Simple+ Level 1 nodes
MRM	Extended+ Level 1 & 2
Radical(Halstead)	MRM + 1,2,3 + Pectoralis Major and MInor Structures spared → Axillary vein, Long thoracic nerve, Cephalic vein

Yourwish

Yourwish

- Variants of MRM (Modified Radical Mastectomy)
  - Auchincloss modification:
    → Standard MRM
    → Breast removal with Level I & II axillary lymph node dissection
    → Pectoralis major and minor preserved
  - Patey's modification:
    → En-bloc removal of nipple-areola complex, skin, breast tissue, breast mass
    → Level I, II, III lymph nodes removed
    → Excision of pectoralis minor
  - Scanlon's modification:
    → Similar to Patey's
    → Division (not excision) of pectoralis minor

Complications Of Mastectomy

FMGE 2021

- Seroma - 30 % (MC)
- Wound infections / Flap necrosis
- Nerve injuries(winging of scapula)
  - Long thoracic nerve
  - Thoracodorasal nerve
  - Intercostobrachial nerve (MC)
- Persistent axillary fat pad
- Lymphedema due to lymphatic disruption occurring post MRM + RT → after 10.5 yrs develops Angiosarcoma (Stewart treves syndrome)

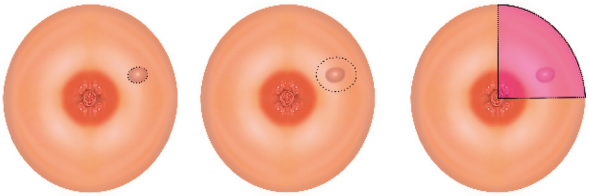


INICET2023

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Breast Conservation Surgery

- Indicated in : Stage 1, 2A, 2B(Early invasive breast CA)
- Types:
  - Lumpectomy
  - Wide local excision (1 mm margin)
  - Quadrantectomy



Lumpectomy Wide local excision Quadrantectomy

INICET 2019

Absolute contraindications:	**Relative:**
• Pregnancy • Multicentric disease(2 or more tumours in different quadrants • Diffuse microcalcification • Persistently positive margin • H/o therapeutic radiation exposure • Inflammatory breast cancer	• Scleroderma, Lupus, H/o Collagen Vascular disease • Large tumor in small breast • Large pendulous breast

INICET 2022

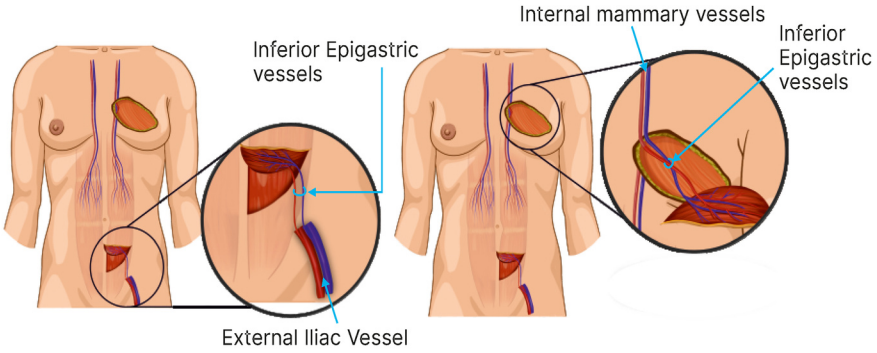
Breast Reconstruction

- Most common method for breast augmentation and reconstruction : Silicone implants
- Most common flap: → TRAM flap
- Best flap: → DIEP flap
- TRAM: Transverse abdominis muscle flap

Yourwish

- Reconstruction between inferior epigastric and internal mammary vessels
- Muscle cut → Hernia risk

- DIEP: Deep inferior Epigastric artery perforator flap
  - Reconstruction between inferior epigastric and internal mammary vessels.
  - Muscle spared
  - No hernia



Prognostic Factors In Ca Breast

01:03:39

- Most important Prognostic factor: Stage (TNM)
  - Exception
    - → Wilms tumour(histology> stage)
    - → Soft tissue sarcoma (Tumour Grade)
- Single most important Prognostic factor: Axillary lymph node status
- Prognostic factor in metastatic breast cancer: Hormone receptor status
- Nottingham Prognostic Index: used to select patient for Adjuvent therapy
  - NPI = 0.2 × Tumor size + Node stage + Grade
- Bloom Richardson Grading
  - T- Tubule formation
  - N- Nuclear pleomorphism
  - M - Mitosis
- VNPI- Van Nuys prognostic index
  - For patients is DCIS who does not require RT
  - Based on: MICRO SWAG
    - → Microcalcification
    - → Size
    - → Width
    - → Age
    - → Grade

SENTINEL LYMPH NODE BIOPSY

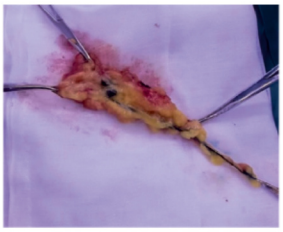
01:07:00

- Gate keepers lymph node:First lymph node that receives the lymph from particular organ
- First described by Cabanas for CA penis
- Established role in malignancy of:
  - Breast
  - Penis
  - Melanoma
  - Head & neck
  - Vulva
- Indication for SLNB in breast carcinoma: → Clinically node negative axilla(no palpable lymph nodes)
- Techniques:

- Blue dye: 1% lymphazurin ,Isosulfan
- Radioactive colloid technique : Tc99 sulfur colloid
- Usually combined together

- Contraindications:
  - Palpable LN
  - Lymphatic disruption, prior axillary surgery / chemotherapy/ radiotherapy
  - Multifocal breast CA
- Most common complication : Skin tattooing
- Most common nerve injured : Intercostobrachial nerve
- Other complications : Necrosis, urine discoloration , anaphylaxis





INFLAMMATORY BREAST CANCER

01:11:15

- Aka Mastitis carcinomatosa
- T4D→ 3B → LABC(locally advanced breast CA)

NEET PG 2020

- Clinical Features
  - Inflammatory changes in >33% or 1/3rd of the breast tissue :
    - → Erythema
    - → Brawny induration
    - → Early Peau d'orange because of early lymphatic permeation by tumor cells
  - Presence of lump: Not mandatory
  - Investigations



- IOC (Investigation of choice) for diagnosis: Skin biopsy
- Treatment
  - Multimodality treatment : NACT + MRM + RT (Neoadjuvant chemotherapy + Modified radical mastectomy + Radiotherapy
- Prognosis
  - Most malignant
  - Worst prognosis

PHYLLODES TUMOR

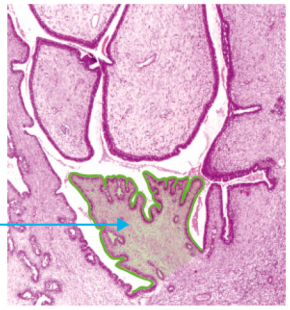
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FMGE 2021

- Also called cystosarcoma phyllodes or Serocystic disease of Brodie
- Biphasic proliferation(both Mammary epithelium, connective tissue)

Pathology

- Rapid growth
- Leaf-like appearance
- Monoclonal stroma
- Hematogenous spread only no lymphatic spread



Clinical Features

- Massively enlarged breast
- Bosselated appearance
- Pressure atrophy of the skin
- No nipple/skin/chest wall involvement

Yourwish

Diagnosis

- IOC is Biopsy

Treatment

- Wide excision if benign
- Simple mastectomy if malignant
- No MRM since no lymph nodes involved or spread

Feature	BRCA 1	BRCA 2(OCPGSM)
Chromosome	17	13
Age of onset	Early Bilateral Invasive ductal carcinoma	
Laterality		
Common type		
Hormone receptor	ER negative	ER positive
Differentiation	Poorly differentiated	Well differentiated
Increased risk of	• Ovary • Colon • Prostate	• Ovary • Colon • Prostate,Pancreas • Gall bladder • Stomach • Melanoma

- Life time risk of carcinoma in BRCA mutation
  - Breast CA: 60-80%
  - Ovary CA: 30-40%

CANCER RISK ASSOCIATED WITH BENIGN BREAST DISEASE AND CARCINOMA IN SITU

01.21.01

Abnormality	Relative Risk
• Non-proliferative lesions • Sclerosing adenosis • Duct papilloma	No increased risk
• Florid hyperplasia	1.5-2 fold
• Atypical ductal hyperplasia (ADH) • Atypical lobular hyperplasia (ALH)	4 fold
• Ductal involvement by cells of atypical ductal hyperplasia	7 fold
• LCIS • DCIS	10 fold

Yourwish

Yourwish

ANDI- ABERRATIONS IN NORMAL DEVELOPMENT AND INVOLUTION

01.22.30

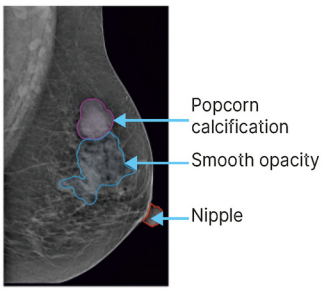
- All the changes occurring from Thelarce to Involution

Age in years	Condition
15-25	Fibroadenoma
25-40	Fibrocystic disease
>40	Fibrocystic disease >Duct ectasia

Fibradenoma

01.22.45

- Benign
- Seen in 15-25 years
- Clinical features : firm mobile lump called as breast mouse
- IOC : FNAC
- Management
  - Observation
  - Surgical excision for cosmetic reasons



MONDOR'S DISEASE

01.23.50

- Aka string phlebitis
- Superficial thrombophlebitis of lateral thoracic and thoraco epigastric veins
- Treatment:
  - NSAIDs
  - Excision if persistent



BREAST ABSCESS

01.24.47

- SEEN in:
  - Lactating primigravida due to faulty feeding technique
- MC organism: → Staph aureus
- Clinical features
  - Pain and tenderness
  - Fever with chills
  - Engorged breast
  - Erythema
  - Cracked nipple
- Treatment:
  - Needle aspiration initially
  - If not reduced then Incision & drainage + antibiotics
  - Cloxacillin/Dicloxacillin 10-14 days



ZUSKA DISEASE

01.27.03

- Recurrent periductal mastitis
- MC in females who are smokers Smokers
- Treatment: I&D + antibiotics

Yourwish

PYQs

Q. Most important prognostic factor in carcinoma breast?

A. Tumor size

B. Axillary lymph node status

C. Histological type

D. Hormone receptor status

Ans. **B.** Axillary lymph node status

Q. A 43-year-old female presents to OPD due to changes in the breast and lump in the breast. Biopsy confirms breast cancer. Identify the stage. (Image showing redness involving more than 1/3rd of breast skin)

A. T4A

B. T4B

C. T4C

D. T4D



Ans. **D.** T4D

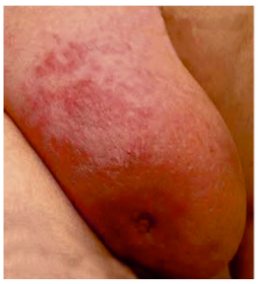
Q. A 45-year-old lady presents with inflammatory changes in the left breast for 3 months and pain for 2 months. What is the management plan?

A. Simple mastectomy

B. Neoadjuvant chemotherapy followed by radical mastectomy

C. Modified radical mastectomy followed by radiotherapy

D. Neoadjuvant chemotherapy followed by modified radical mastectomy



Ans. **D.** Neoadjuvant chemotherapy followed by modified radical mastectomy

- Ideal complete answer: Neoadjuvant chemotherapy → MRM → Radiotherapy

Q. A 50-year-old female diagnosed with BI-RADS 5 breast lesion. Which of the following is a good prognostic factor?

A. BRCA1 positive

B. p53 positive

C. ER positive

D. High Ki-67

Ans. **C.** ER positive

Q. A 50-year-old female presents with a 6 × 7 cm breast lump invading pectoralis major. Left axillary lymph nodes are matted. There is dimpling of skin. Identify the stage.

A. T2N1

B. T3N1

C. T3N2A

D. T4N2

Ans. **C.** T3N2A

Explanation:

- Size 7 cm → T3 (>5 cm)
- Matted lymph nodes → N2A
- Involvement of pectoralis major → does NOT affect stage
- Dimpling → does NOT affect stage
- So→ T3N2A

Q. Which of the following is NOT a contraindication to breast conservation surgery?

A. Scleroderma

B. History of therapeutic radiation exposure

C. Multiple lesions in one quadrant

D. Persistently positive margin

Ans. C. Multiple lesions in one quadrant

Explanation:

- Scleroderma → Relative contraindication
- Prior radiation → Absolute contraindication
- Persistently positive margin → Absolute contraindication
- Multiple lesions in one quadrant → Not a contraindication

-

Q. A 55-year-old female presents with breast cancer and positive family history involving two relatives. She has a 29-year-old daughter. Which gene should be tested to assess hereditary breast cancer?

A. BRCA1

B. BRCA2

C. p53

D. HER2

Ans. A. BRCA1

Explanation:

- Most common mutation in familial breast cancer → BRCA1

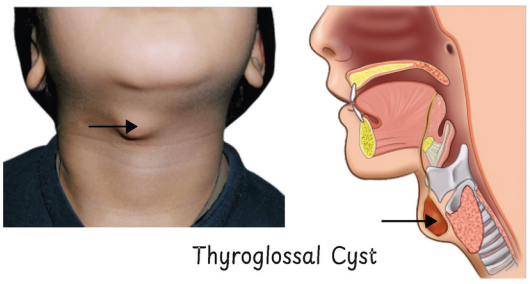
Yourwish

1. THYROID

THYROGLOSSAL CYST

FMGE 2023
INICET 2024
00:00:24

- Congenital condition, but the age of presentation is 15-30 yrs
- M/c location: Subhyoid / Infrahyloid



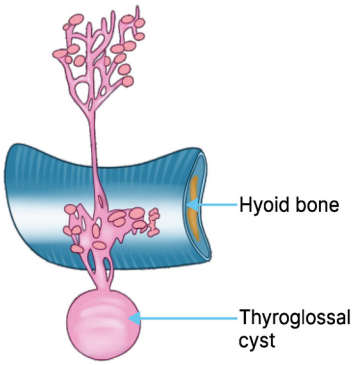
Thyroglossal Cyst

Clinical Features

- Midline swelling in the anterior part of the neck
- Moving well deglutition
- Moves up on protrusion of the tongue

Complication

- Infection → leads to abscess formation
  - If managed with Incision and drainage → Thyroglossal Fistula (acquired condition)
- Thyroglossal cyst- ↑ risk for papillary carcinoma of the thyroid



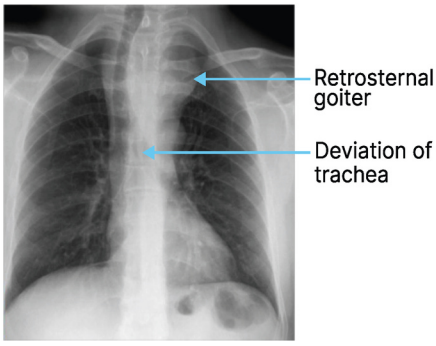
Treatment

- TOC: Sistrunk Operation
  - En-bloc removal of the central part or body of the hyoid bone with cyst

RETROSTERNAL GOITRE

NEET PG 2019, 2020
00:03:25

- Aka Substernal / Mediastinal goitre
  - Located behind the sternum, hence substernal
  - Located in the mediastinum, hence mediastinal
- Definition: ≥50% of thyroid tissue below the opening of the thoracic inlet
- Usually asymptomatic
- Diagnosed incidentally on radiological investigation



Clinical Features

- Tracheal compression → Dyspnea
- Esophageal compression → Dysphagia
- Recurrent laryngeal nerve compression → Hoarseness of voice
- Dilated veins over the anterior chest wall
- Pemberton's Sign positive



Treatment

- Thyroidectomy via Cervical incision

RADIOACTIVE IODINE

00:06:31

Iodine-123

- Half-life: 13 hours
- Used for RAI scan

Yourwish

Yourwish

Iodine-131

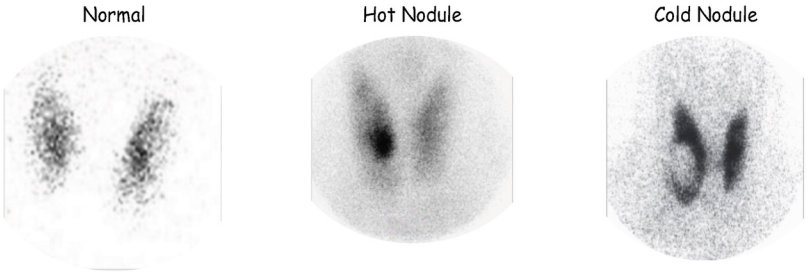
- Half-life: 8 days
- Used for RAI ablation
- Emits:
  - β-rays (90%) → Therapeutic effect
  - γ-rays (10%) → Used for Tracer studies and are responsible for side effects
- β-ray penetration depth: 0.5 mm, so parathyroids are spared

Absolute Contraindications of RAI

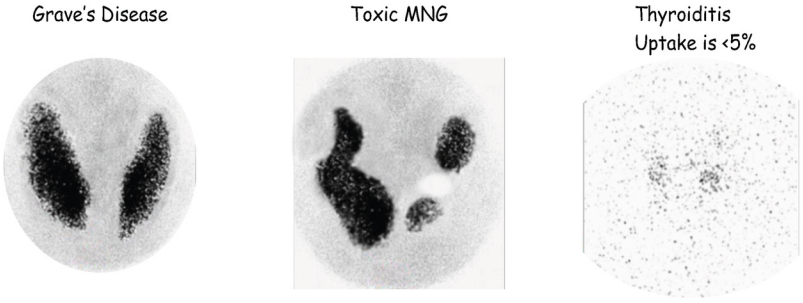
- Pregnancy (fetal exposure)
- Lactation (infant exposure)

Radioactive Iodine Scan (Thyroid Scan)

- Areas of uptake appear black; no uptake appears white



- Hot nodule: Increased uptake; malignancy risk 1–3%.
- Cold nodule: Decreased uptake; malignancy risk 17–20%.

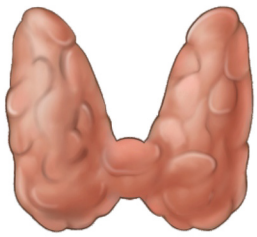


- Graves' disease:
  - Diffuse increased uptake in the entire thyroid → diffused toxic goitre
- Toxic multinodular goitre:
  - Multiple hot nodules with some cold nodules → multinodular goitre
- Thyroiditis:
  - Minimal uptake (<5%) due to follicular destruction

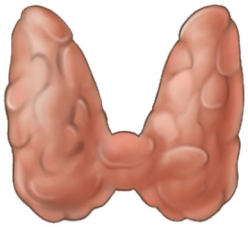
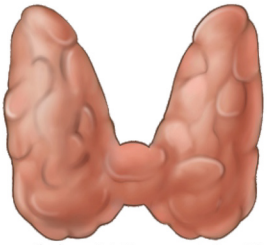
TYPES OF THYROIDECTOMY

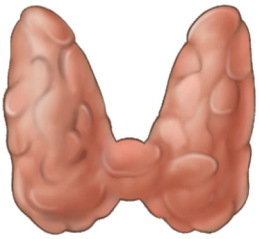
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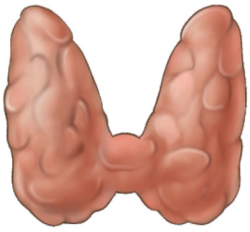
- Total thyroidectomy:
  - Removal of all visible thyroid tissue



Yourwish

• Hemi-thyroidectomy: ○ Removal of one lobe with the isthmus	
• Subtotal thyroidectomy: ○ Leaves 3-4 g tissue in each lobe	 3 to 4 grams of thyroid tissue retained in each lobe

• Hartley-Dunhill procedure:
  ○ Leaves 4-6 g tissue in one lobe
  ○ Modification of subtotal thyroidectomy
	
	4 to 6 grams of thyroid tissue retained in one lobe

• Near-total thyroidectomy: ○ Leaves <1 g tissue near the RLN near the ligament of Berry	 1 gram of thyroid tissue retained adjacent to recurrent laryngeal nerve

Indications of thyroidectomy

- Total thyroidectomy:
  - All thyroid malignancies
  - Benign disease involving both lobes
- Hemi-thyroidectomy:
  - Benign disease involving a single lobe
- Subtotal thyroidectomy:
  - Multinodular goitre in elderly patients

SOLITARY THYROID NODULE (STN)

00:13:32

FMGE 2021
NEET PG 2022

- M/c STN: Colloid goitre > Follicular adenoma
- First investigation: Thyroid Function Test (TFT)
  - Most informative parameter: TSH (ultra-sensitive)
- IOC: FNAC

Limitations Of FNAC

- Follicular neoplasms
  - FNAC cannot differentiate a follicular adenoma from a follicular carcinoma

- Diagnosis of follicular carcinoma depends on capsular and vascular invasion
- Capsular and vascular invasion cannot be assessed on FNAC
- Biopsy (histopathology) is required to demonstrate invasion and confirm malignancy

- Riedel's thyroiditis requires biopsy
  - Aka invasive fibrous thyroiditis
  - Thyroid is replaced by fibrous tissue, hence FNAC does not give any yield
- Thyroid lymphoma → requires biopsy

Management Of STN

- IOC: Perform FNAC
- If Inconclusive → Repeat FNAC (preferably USG-guided)
- If Benign
  - Cystic:
    - ➢ Aspiration → repeat up to 3 times
    - ➢ Persistent recurrence → Hemi-thyroidectomy
  - Solid:
    - ➢ Thyroxine suppression therapy
    - ➢ No response/compression symptoms → Hemi-thyroidectomy
- If Suspicious (usually follicular neoplasm)
  - Perform RAI scan:
    - ➢ Cold nodule → Hemi-thyroidectomy
    - ➢ Hot nodule → RAI ablation or hemi-thyroidectomy
- Malignant: Total thyroidectomy

Important Information

- M/c cause of:
  - Hypothyroidism (worldwide): Hashimoto's thyroiditis
  - Hyperthyroidism (worldwide): Graves' disease

GRAVES' DISEASE

00:18:36

NEET PG 2024
FMGE 2025
INICET 2025

- Also called Diffuse Toxic Goitre
- Autoimmune disorder
- Autoantibody: LATS (Long-Acting Thyroid Stimulator) against TSH receptor
- Associated with HLA-B8 and DR-3





Characteristic Features

- Thyrotoxicosis
- Ophthalmopathy (exophthalmos)
- Dermopathy (pretibial myxedema)
- Acropathy (subperiosteal new bone formation in metacarpals)
- Gynecomastia

Pathophysiology

- LATS stimulates TSH receptors → ↑ T3, T4 → Negative feedback → ↓ TSH

Yourwish

Clinical Features

- Signs and symptoms of hyperthyroidism
  - ↑BMR → ↑appetite with weight loss
  - Excessive sweating
  - Heat intolerance
- Signs and symptoms of Sympathetic stimulation
  - Tachycardia
  - Palpitations
  - Excessive sweating
  - Fine tremors of fingers and tongue
- M/c Gastrointestinal symptom: Diarrhea
- Females:
  - Amenorrhea
  - ↑Risk of abortions and infertility
- Young patients: CNS symptoms predominate
- Elderly: CVS symptoms (AF, CHF) predominate
- Local thyroid findings
  - Hyperactive
  - Hypervascular → most prominent at the upper pole

Diagnosis

- Presence of eye signs is diagnostic
- Confirmatory investigation: LATS autoantibody

Management

- First drug: Propranolol (non-selective β-blocker)
- Antithyroid Drugs:
  - Methimazole: → ↑ risk of Aplasia cutis, choanal atresia
  - Carbimazole
  - Propylthiouracil (PTU)
    → Risk of hepatic failure (in females and children- Black box warning)
    → Used in thyrotoxic crisis → blocks peripheral T4 to T3 conversion
- Antithyroid DOC
  - Graves' disease: Methimazole
  - Pregnancy:
    → If no trimester mentioned →Carbimazole
    → 1st trimester→ PTU
    → 2nd & 3rd trimester → Carbimazole
  - Thyrotoxic crisis → PTU
- Lugol's iodine solution (saturated potassium iodide):
  - Pre-Operative: 3 drops twice daily for 7–10 days
  - To reduces risk of intraoperative bleeding (↓thyroid vascularity)
  - To decrease the risk of precipitation of thyroid storm
- TOC in graves disease: Total thyroidectomy
- Alternative treatment: Radioactive ablation

Yourwish

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HASHIMOTO'S THYROIDITIS

00:27:46

- Struma Lymphomatosa
- Autoantibody: Anti-TPO (Anti-thyroid peroxidase)
- Associations: HLA-B8, DR-3, DR-5
- Increases the risk of:
  - Thyroid lymphoma
  - Papillary carcinoma

Etiopathogenesis

- CD4 mediated CD8 cytotoxicity → permanent destruction of thyroid follicle → permanent Hypothyroidism

Clinical features



- Patients present with signs and symptoms of hypothyroidism
- Thyroid shows mild to moderate enlargement, causing increased neck circumference

Diagnosis

- Presence of Anti-TPO antibodies
- FNAC Findings (**Mnemonic: HASHIMOTO**)
  - H - Hurthle cells
  - AS - Askanazy cells
  - I - Lymphocytic infiltration
  - TO - Anti-TPO antibody

Management

- Levothyroxine is given lifelong
- Suspicion of malignancy → Total thyroidectomy

SUBACUTE THYROIDITIS

00:31:24

- Also called
  - De Quervain's thyroiditis
  - Viral thyroiditis
  - Granulomatous thyroiditis
  - Giant cell thyroiditis

Pathophysiology

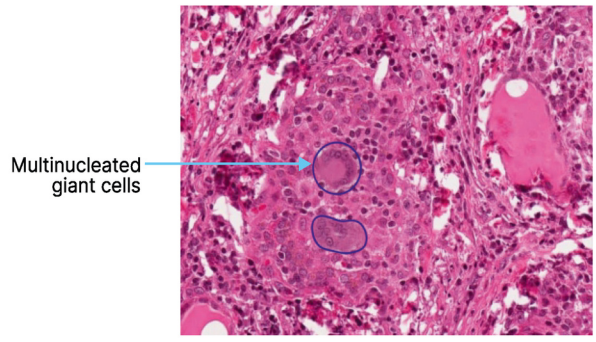
- Upper respiratory viral infection → granulomatous inflammation with giant cells → follicular destruction →release of preformed T3/T4 → transient hyperthyroidism → f/b euthyroid phase → hypothyroid phase →Inflammation subsides → return to euthyroid state
- Spontaneous resolution in ~90% cases
- A/w HLA B35

Clinical Features

- Painful and tender thyroid gland.
- Signs and symptoms of hypo/hyperthyroidism

Investigations

- ESR is increased
- Radioactive iodine uptake is decreased
- IOC: FNAC
  - Shows multinucleated giant cells



Yourwish

Management

- NSAIDs for pain and inflammation
- Steroids if no response to NSAIDs
- Spontaneous resolution in 90%

RIEDEL'S THYROIDITIS

00:34:16

- Aka invasive fibrous thyroiditis
- Thyroid and parathyroid glands are replaced by fibrous tissue
  - Results in permanent hypothyroidism and permanent hypoparathyroidism
- Associated with:
  - Retro-orbital fibrosis
  - Peri-orbital fibrosis
  - Retroperitoneal fibrosis
  - Sclerosing cholangitis

Clinical Feature

- Signs & symptoms of:
  - Permanent hypothyroidism
  - Permanent hypoparathyroidism
- Hard & woody thyroid → causes compression symptoms:
  - Dyspnea
  - Dysphagia
  - Hoarseness of voice



Diagnosis

- FNAC is not useful due to dense fibrosis
- IOC: Wedge-shaped excision biopsy
  - Isthmus removal relieves compression symptoms

Management

- Lifelong levothyroxine
- Lifelong calcium and vitamin D supplementation

Important Information

- Thyroid malignancies - Order of Frequency
  1. Papillary carcinoma (most common)
  2. Follicular carcinoma
  3. Medullary carcinoma
  4. Anaplastic carcinoma

PAPILLARY CARCINOMA THYROID

00:37:16

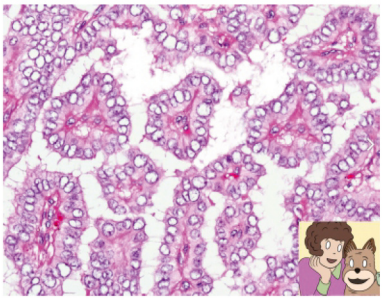
FMGE 2020, 2021

- M/c Thyroid malignancy
- Seen in iodine-sufficient areas
- Common in 3rd-4th decade
- Mutations: BRAF, RAS, RET oncogenes (RET/PTC translocation)

- Risk factors:
  - Low-dose childhood radiation exposure
  - Thyroglossal cyst
  - Hashimoto's thyroiditis

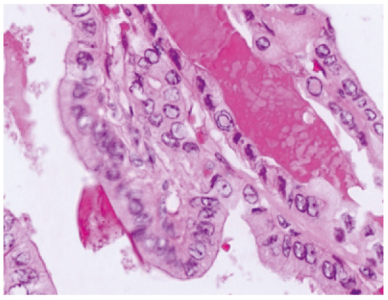
Pathology

- Orphan Annie eye nuclei (optically clear nuclei)

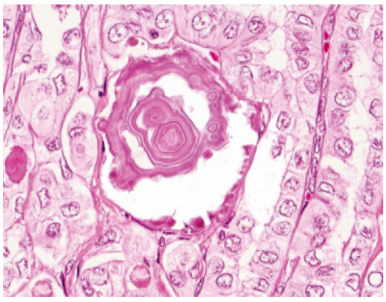


Orphan Annie eye nucleus
Optically clear nuclei

- Intranuclear pseudoinclusions



- Psammoma bodies (dystrophic calcification)



Clinical features

- Midline swelling
- M/c route of spread: Lymphatic spread
- Lateral cervical node metastasis → Lateral aberrant thyroid
- M/c site of distant metastasis: Lungs

Investigation

- IOC for diagnosis: FNAC

Management

- Total thyroidectomy + Central (Level VI) lymph node dissection + Ipsilateral MRND if any nodes are positive

FOLLICULAR CARCINOMA THYROID

00:41:30
NEET PG 2019, 2020

- Seen in iodine-deficient areas
- Common in the 6th decade
- M/c thyroid malignancy seen in long-standing goitre
- Genetic Mutations: PAX8/PPAR-1, PTEN, P53, RAS

Clinical Features

- Sudden increase in size of long-standing goitre
- Minimal or no pain
- No lymphatic spread

Route of Spread

- Hematogenous spread
- M/c site of metastasis: flat bones (Vertebra > Ribs > Pelvis > Skull)
  - Vertebra (thoracic, most common)
- Metastases are pulsatile (osteolytic and hypervascular)

Yourwish

Investigation
- FNAC cannot differentiate adenoma from carcinoma
- IOC: Biopsy

Treatment
- TOC: Total thyroidectomy

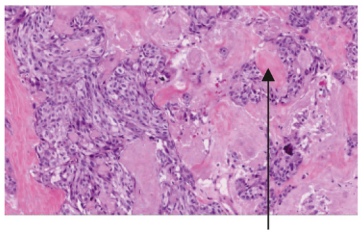
MEDULLARY CARCINOMA THYROID

00:44:30

- Arises from parafollicular C cells
  - PFC cells are derived from the ultimobranchial body
  - PFC cells secrete calcitonin → ↑ calcitonin
- Serum calcium is usually normal despite ↑ calcitonin

Types
- Sporadic (80%)
  - Age: 6th decade
  - Unilateral
  - Mutation: RET proto-oncogene
- Familial (20%)
  - Younger age
  - Bilateral/multiple
  - Associated with MEN 2A, MEN 2B
  - Mutation: RET proto-oncogene

Clinical Features
- Midline swelling
- Characteristic features:
  - ↑ calcitonin
  - Diarrhea
  - Amyloid stroma on FNAC
  - Positive family history of pheochromocytoma, Hyperparathyroidism



Spread
- Lymphatic + hematogenous
- Most common metastasis: Liver

Important Points
- TSH-independent tumor → No radioactive iodine uptake → RAI ablation cannot be used
- Chemotherapy has a limited role in Thyroid and salivary gland tumors
- IOC for diagnosis: FNAC

Treatment
- Total thyroidectomy + Routine central lymph node dissection + Ipsilateral MRND if tumor >1 cm ± Bilateral MRND if any node positive
- Prognosis is poor

Yourwish

Yourwish

ANAPLASTIC CARCINOMA THYROID



00:49:12

- Rare
- Seen in 7th-8th decade

Important Information

Age of onset in Thyroid malignancies

- Papillary: 3rd to 4th decade
- Follicular and medullary: 6th decade
- Anaplastic: 7-8th decade

Clinical features

- H/o sudden enlargement of pre-existing thyroid swelling
- Severe pain
- M/c route of spread: Direct invasion
  - Direct invasion of the Trachea, Esophagus, and Recurrent laryngeal nerve
  - This leads to signs and symptoms of compression
    → Dyspnea
    → Dysphagia
    → Hoarseness of voice
- M/c site of Metastasis: Lungs

Investigation

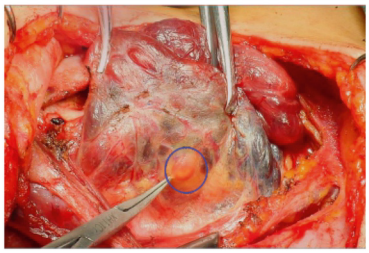
- IOC for diagnosis: FNAC

Management

- If resectable → Total thyroidectomy
- Usually unresectable → Emergency tracheostomy

PARATHYROID GLAND- HIGH-YIELD POINTS

00:51:18



- Color: Canary yellow/golden brown
- Accidental removal of parathyroid during thyroidectomy:
  - Divide it into 1 mm pieces
  - Auto-transplant into the sternocleidomastoid
- Hyperparathyroidism d/t parathyroid hyperplasia:
  - Remove 3½ gland
  - The remaining half gland is transplanted into the brachioradialis of the non-dominant arm

COMPLICATIONS OF THYROIDECTOMY

00:52:42

- Hemorrhage due to:
  - Bleeding from muscular arteries
  - Slippage of ligature from superior thyroid vessels → massive bleeding → Tension hematoma→ Respiratory distress
    → Management of tension hematoma:
    - Shift to OT
    - Open the sutures
    - Control the bleeding

    - Drain the hematoma
    - Close the wound
- Respiratory Obstruction
    - M/c cause: Laryngeal edema (extubation injury)
    - Other causes:
        → RLN injury
        → Tension hematoma
- Nerve Injury
    - M/c injured nerve:
        → External branch of the superior laryngeal nerve
        → Causes loss of pitch (cannot sing)
    - Recurrent laryngeal nerve injury:
        → Hoarseness of voice
    - Cervical sympathetic injury → Horner syndrome

Parathyroid Insufficiency

- D/t vascular infarction
- M/c occur in 2nd-5th postoperative day
    - Causes hypocalcemia → carpopedal spasm

Management

- Calcium >8 → Oral calcium
- Calcium <8→ IV calcium gluconate
- Thyroid Insufficiency: Levothyroxin
- Thyrotoxic Crisis
    - Cause: Inadequate pre-operative preparation

PYQs

00:57:57

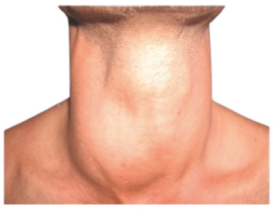
Q. A 40-year-old female noticed a neck swelling 2 months back. Clinical examination reveals a solitary nodule on the right side, as shown. What is the most appropriate initial investigation for this patient?

a. Serum TSH, T3, T4 levels

b. Radioisotope I-123 assay

c. PET scan

d. Radioisotope I-131 assay



Ans. a

Q. A 23-year-old male patient presents with midline swelling in the neck. The swelling moves with deglutition and protrusion of the tongue. What is the likely diagnosis?

a. Branchial cyst

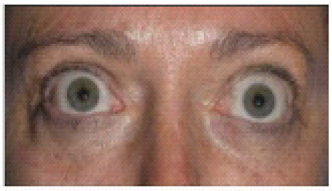
b. Thyroglossal cyst

c. Plunging ranula

d. Dermoid cyst

Ans. b

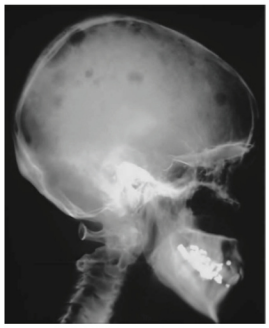
Q. A 25-year-old male patient complained of palpitations, sweating, and restlessness. He complains of sweaty palms. Clinical findings are depicted in the image. What is the diagnostic test done in this patient?



a. Anti-thyroglobulin antibody
b. Anti-thyroid peroxidase antibody
c. Thyroid receptor antibody
d. Elevated ultrasensitive thyrotropin levels

Ans. c

Q. Based on the provided image, identify the type of thyroid malignancy responsible:



a. Papillary carcinoma
b. Hurthle cell carcinoma
c. Follicular carcinoma
d. Thyroid lymphoma

Ans. c

Q. A 40-year-old female patient with a history of prior neck radiation is diagnosed with papillary thyroid cancer without LN involvement. What is the treatment of choice?

a. Hemithyroidectomy
b. Total thyroidectomy
c. Hemithyroidectomy + MRND
d. Total thyroidectomy + MRND

Ans. b

Q. A 45-year-old male patient with neck swelling presented with odynophagia and dyspnea. The swelling showed cells with variations in size and morphology. Amyloid deposits were also seen. The swelling was positive for IHC markers TTF-1, synaptophysin, and chromogranin. What is the most likely diagnosis?

a. Papillary carcinoma
b. Undifferentiated carcinoma
c. Follicular carcinoma
d. Medullary carcinoma

Ans. d

Q. A malignant neck swelling was surgically removed from a patient, shown in the image below. What is the symptom likely to develop within 2–3 days after the procedure?



a. Carpopedal spasm

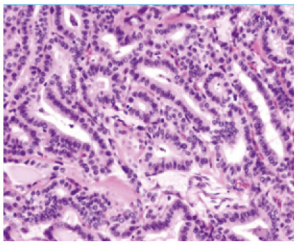
Yourwish

b. Deviation of the angle of the mouth
c. Hoarseness of voice
d. Migratory superficial thrombophlebitis

Ans. a

Q. A 45-year-old lady presented with a swelling in her neck. She had an exposure to radiation in the past. Identify the type of disease. An image of FNAC is given below: FMGE June 2021

a. Papillary carcinoma
b. Follicular carcinoma
c. Medullary carcinoma
d. Anaplastic carcinoma



Ans. a

Q. A 50-year-old woman presents with a slowly enlarging, painless thyroid nodule. She has no history of radiation exposure. On examination, the nodule is firm and mobile. Thyroid function tests are within normal limits. Ultrasound shows a solitary, solid lesion in the right lobe of the thyroid. Fine-needle aspiration cytology (FNAC) is performed, but is inconclusive. A hemithyroidectomy is done, and histopathology reveals capsular and vascular invasion. What is the most likely diagnosis? INICET May 2025

a. Papillary thyroid carcinoma
b. Follicular adenoma
c. Follicular thyroid carcinoma
d. Medullary thyroid carcinoma

Ans. c

Yourwish

Yourwish

3. PARATHYROID AND ADRENAL GLAND

MEN SYNDROME

00:00:16

- Multiple endocrine neoplasia syndrome
- All MEN syndromes are autosomal dominant

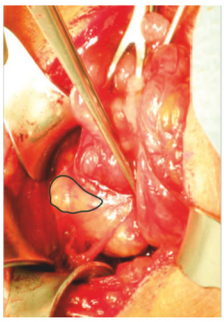
Men1

- Also known as: Wermer syndrome
- Gene mutated: MEN1 gene
- Chromosome: 11
- Tumor suppressor protein expressed: Menin

Common manifestations	Less common manifestations
• Parathyroid hyperplasia (more common) or adenoma • Pancreatic neuroendocrine tumors • Pituitary adenoma	**Mnemonic: FACIAL CABS** • **Facial** cutaneous angiofibroma • Collagenoma • Adrenocortical tumors • Bronchial or thymic carcinoid • Subcutaneous or visceral lipoma

Parathyroid Tumors

- Parathyroid hyperplasia more common than adenoma
- MC endocrine abnormality in MEN1: Multiglandular parathyroid tumor
- Cardinal sign: Multicentric parathyroid adenoma
- MC manifestation of MEN1: Hyperparathyroidism
- MC cause of Hyperparathyroidism: Parathyroid hyperplasia
- 1st biochemical abnormality detected: Hypercalcemia



Pancreatic Neuroendocrine Tumors

- MC enteropancreatic NET in MEN1: Pancreatic polypeptidoma > Gastrinoma > Insulinoma
- MC functional enteropancreatic NET in MEN1: Gastrinoma > Insulinoma

Pituitary Tumors In Men1

- MC pituitary tumour in MEN1: Prolactinoma > Somatotrophinoma > Corticotrophinoma

Men2a

00:05:54

- Also known as: Sipple syndrome
- Gene: RET oncogene
- Chromosome: 10
- Mutated codon: Cysteine codon

Yourwish

- Characteristic Features **(Mnemonic: MP in PHC)**:
  - Medullary carcinoma thyroid
  - Pheochromocytoma
  - Parathyroid hyperplasia or adenoma
  - Hirschsprung disease
  - Cutaneous lichen amyloidosis

Men2b

00:07:46

- Also known as: MEN3
- Gene: RET oncogene
- Chromosome: 10
- Mutated codon: Tyrosine kinase codon
- Characteristic Features :
  - Medullary carcinoma thyroid
  - Pheochromocytoma
  - Mucosal neuroma
  - Megacolon
  - Marfanoid features
  - Intestinal ganglioneuroma



00:10:09

Prophylactic Thyroidectomy

- RET mutation carrier with MEN2A: before 5 years of age
- RET mutation carrier with MEN2B: before 1 year of age

Men4

- Also known as: MENX
- Mutation: CDKN1B
- Chromosome: 12
- Characteristic Features **(Mnemonic: HP TARGet)**:
  - Hyperparathyroidism
  - Pancreatic neuroendocrine tumor
  - Thyroid tumor
  - Adrenal tumor
  - Renal tumor
  - Gonadal tumor

Summary Of Men Syndromes

Syndrome	Other Name	Gene	Chromosome
MEN1	Wermer syndrome	MEN1	11
MEN2A	Sipple syndrome	RET oncogene	10
MEN2B	MEN3	RET oncogene	10
MEN4	MENX	CDKN1B	12

ADRENAL INCIDENTALOMA

00:12:17

- Definition: Incidentally diagnosed adrenal mass
- Usually asymptomatic
- Diagnosed on ultrasound or CT
- Most are non-functioning
- MC adrenal incidentaloma: Non-functioning adenoma
- Other incidentalomas :
  - Preclinical Cushing syndrome
  - Pheochromocytoma
  - Adrenocortical carcinoma
  - Metastatic carcinoma
  - Aldosterone-producing adenoma

Evaluation

- Hormonal evaluation to determine functioning or non-functioning tumor
- Tumor size important because :
  - Risk of malignancy directly proportional to size
- H/o previous malignancy is important because it can suggest adrenal metastasis
- Hypertension important because :
  - MC manifestation of Pheochromocytoma
- Evaluate symptoms of glucocorticoid or sex steroid excess

Management

- Surgery indicated if :
  - Tumor is hormonally active
  - Increased risk of malignancy
- Most incidentalomas are benign
- Laparoscopic surgery is preferred because most are benign
- Avoid laparoscopic surgery if malignancy is suspected

Size-Based Management Of Incidentaloma

- >5 cm: Surgical removal
- 3 to 5 cm: Strongly consider surgery
- <3 cm: CT follow-up every 6 months

Indications For Surgery In A 3 To 5 Cm Incidentaloma

- Suspicious lesion on imaging
- Young patient & few surgical risks- Tolerates surgery well
- Interval increase in tumor size
- Patient preference for surgery

PHEOCHROMOCYTOMA

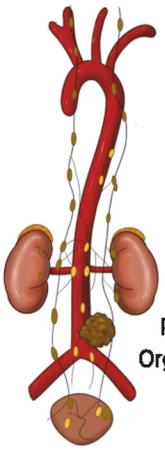
00:17:32

- Arises from: Chromaffin cells of the adrenal medulla
- Common age group: 4^{th}- 5^{th} decade
- Most common extra-adrenal site: Organ of Zuckerkandl
- Extra-adrenal pheochromocytoma: Paraganglioma

Yourwish

10% Tumor Of Pheochromocytoma

- 10% malignant
- 10% bilateral
- 10% pediatric
- 10% familial
- 10% extra-adrenal



Paraganglioma at Organ of Zuckerkandl

Syndromic Associations

Mnemonic: MVVS

- Associations :
  - MEN2a/2b
  - Von Hippel-Lindau syndrome
  - Von Recklinghausen syndrome
  - Sturge-Weber syndrome

Non-Syndromic Familial Association

- MC associated with succinate dehydrogenase B and D mutation
- SDH-B mutation associated with :
  - Extra-adrenal pheochromocytoma
  - Malignant pheochromocytoma

Pathology

- Most pheochromocytomas are: Unilateral, Solitary, & Benign
- MEN-associated pheochromocytoma: Rarely malignant
- Most pheochromocytomas secrete: Noradrenaline more than adrenaline
- Extra-adrenal pheochromocytoma: Only noradrenaline
  - As it lacks PNMT (phenylethanolamine N-methyltransferase) enzyme
- Pheochromocytoma in MEN secretes: Only adrenaline
- Malignant pheochromocytoma secretes:
  - Dopamine
  - Homovanillic acid

Criteria Of Malignancy

- Based on metastasis

Pathophysiology

Sympathetic stimulation	State of volume depletion
Increase noradrenaline & adrenaline ↓ Sympathetic stimulation ↓ Increase in HR and total peripheral resistance ↓ Vasoconstriction	• Body tries to normalise the BP by decreasing the stroke volume, in turn decreasing blood volume and plasma volume • If phenoxybenzamine (DOC, non-selective alpha blocker) is given without volume depletion, there is an increased risk of orthostatic hypotension • Therefore, before giving an alpha blocker, restore volume status by using fluids

Yourwish

↓
Increase total peripheral resistance
↓
Episodic hypertension (MC manifestation)
↓
Headache

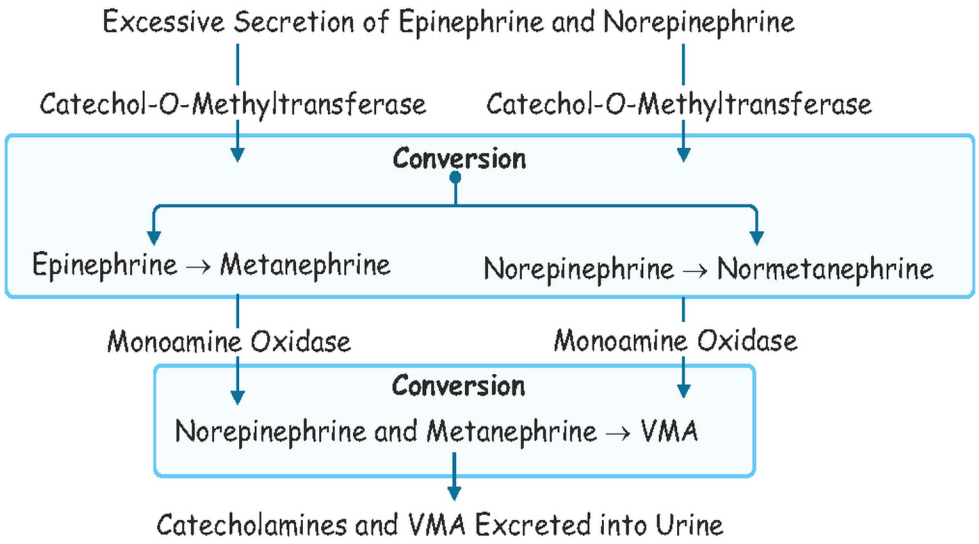
- Crystalloids
- Colloids

Clinical Features Of Pheochromocytoma

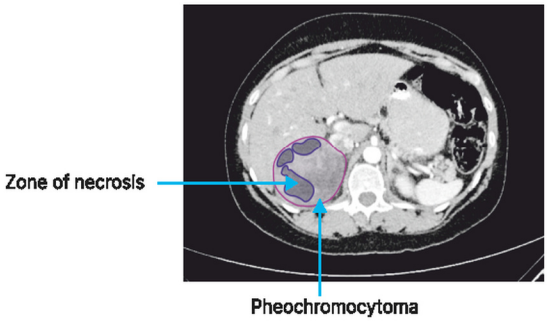
- Most common symptom: Headache
- Type of headache: Bounding headache
- Classical tirad :
  - Palpitations
  - Headache
  - Diaphoresis

Investigations

- Most sensitive screening test: 24-hour urinary catecholamines and VMA
- Best diagnostic test: Plasma-free metanephrine
  - Sensitivity of plasma-free metanephrine: 100%



- Radiological IOC for adrenal pheochromocytoma: MRI
- Radiological IOC investigation for extra-adrenal pheochromocytoma: MRI
- Radiological IOC investigation for pheochromocytoma in pregnancy: MRI
- MRI better than MIBG (Metaiodobenzylguanidine) scan for extra-adrenal pheochromocytoma
- Gold standard investigation for definitive staging: FDG PET
- FNAC and biopsy are contraindicated: Can precipitate hypertensive crisis



Yourwish

Management Of Pheochromocytoma

- First step: Restore volume status
- Fluids used:
  - Crystalloids
  - Colloids
- DOC: Phenoxybenzamine (non-selective alpha blocker)
- Signs of adequate alpha blockade:
  - Tachycardia
  - Nasal stuffiness
- Beta blockers are started only after adequate alpha blockade
- Treatment of choice: Adrenalectomy
- Preferred surgery: Laparoscopic adrenalectomy
- Most tumors are benign and <5 cm

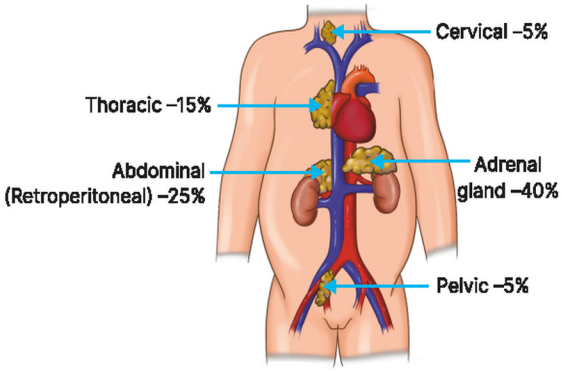
NEUROBLASTOMA

00:32:50

- MC tumor in infants <1 year of age
- MC intra-abdominal malignancy in children
- Arises from: Neural crest cells

Common Sites Of Neuroblastoma

Site	Frequency Order
Adrenal	Most common
Retroperitoneum	Second
Thoracic	Third
Cervical	Fourth
Pelvic	Fifth



Special Feature Of Stage 4s

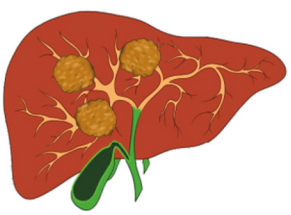
- Spontaneous regression can occur

Clinical Features Of Neuroblastoma

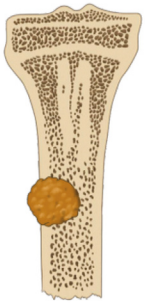
- Peak incidence: 2 years
- Most patients present before: 4 years
- MC presentation: Fixed lobular mass
  - Mass starts from the flank and approaches the midline
- Paraspinal tumor can cause:
  - Spinal cord compression
  - Bladder and bowel dysfunction
  - Paraplegia
- Liver infiltration causes: Hepatomegaly
- Bone marrow metastasis causes: Bony pain
- Cervical sympathetic trunk involvement causes: Horner syndrome


Adrenal tumor

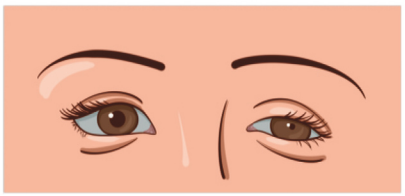

Paraspinal tumor


Liver infiltration leading to hepatomegaly

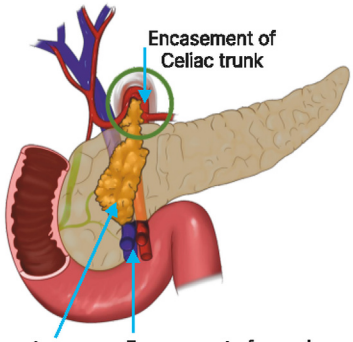
- Celiac axis tumor can encase:
  - Celiac trunk
  - Superior mesenteric artery



Bone marrow metastases



Horner's syndrome

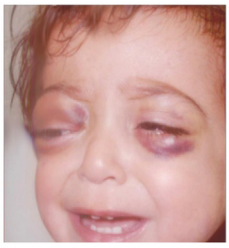


Metastasis In Neuroblastoma

- Present in 60 to 70% patients at diagnosis
- MC metastatic site in older children: Long bones
- MC skull bone involved: Sphenoid bone
- In infants, metastasis is commonly confined to:
  - Liver
  - Subcutaneous tissue
- Lung metastasis: Rare

Important Signs In Neuroblastoma

- Periorbital metastasis causes:
  - Proptosis
  - Ecchymosis
  - Raccoon eyes
- Bluish cutaneous metastasis in infants: Blueberry muffin lesions
- Paraneoplastic syndrome:
  - Increased VIP causing watery diarrhea
  - Opsoclonus-myoclonus: Dancing eye, dancing feet syndrome





Lab Findings In Neuroblastoma

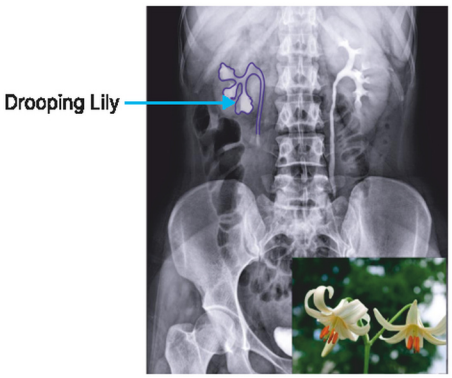
- Anemia
- Thrombocytosis
- Increased LDH
- Increased ferritin
- Increased urinary catecholamines
- Increased neuron-specific enolase

Important Radiological Signs

- Stippled calcification seen on imaging
- IVP finding: Drooping lily sign
- Also seen in ectopic ureteric orifice
- Investigation of choice for diagnosis: CECT

Yourwish

- MRI is done for :
  - Vascular invasion/encasement
  - Vascular patency
  - Spinal cord compression
  - Bone involvement
- Single best study to document metastasis: MIBG scan



Treatment Of Neuroblastoma

- Localized disease: surgical excision
- Unresectable disease:
  - Biopsy
  - Chemotherapy and radiotherapy
  - Surgical excision after downstaging
- Disseminated disease: palliative chemotherapy

ESTHESIONEUROBLASTOMA

00:42:45

- Also known as: Olfactory neuroblastoma
- Arises from: Basal neural cells of the olfactory mucosa
- Mnemonic: CUSP
  - Cribriform plate
  - Upper nasal wall
  - Superior turbinate
- Common site: Upper one-third of nose

PYQs

00:43:53

NEET PG 2022

Q. Which of the following is not seen in MEN 2B syndrome?

a. Megacolon

b. Parathyroid adenoma

c. Mucosal neuroma

d. Marfanoid habitus

Ans: **b. Parathyroid adenoma**

Yourwish

Yourwish

5. LIVER

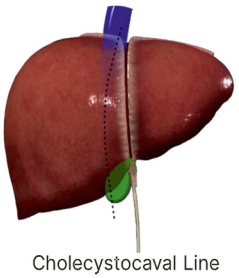
ANATOMY OF LIVER

00:00:30

- Normal weight of the liver
  - 1800 gm in males
  - 1400 gm in females
- Glycogen storage capacity
  - 65 g/kg of liver tissue
- Blood supply
  - Portal vein 75%
  - Hepatic artery 25%

CHOLECYSTOCAVAL LINE

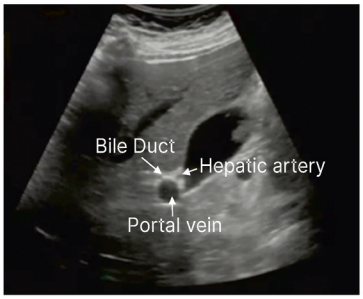
- Physiological line of demarcation of the liver into the left and right
- Passing through the IVC to the gallbladder fossa



Cholecystocaval Line

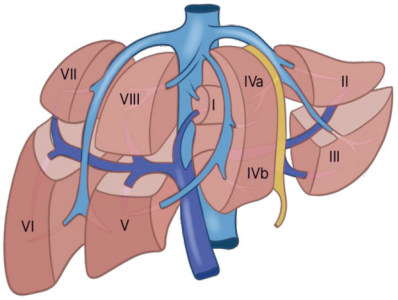
PORTAL TRIAD

- Mickey Mouse view
  - Posteriorly→ Portal vein
  - Laterally→ Bile duct
  - Medially→ Hepatic artery



COUINAUD SEGMENTS

- Divides the liver into 8 segments based on
  - Portal vein
  - Hepatic vein

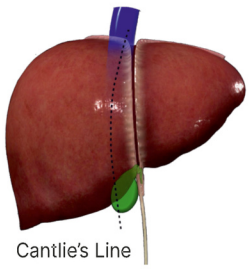


Important Information

- Segment 1, located posterioinferiorly cannot be seen in the front view
- Gallbladder cancer involves 4b and 5 of the liver (close relation)

CANTLIE'S LINE/MAIN PORTAL FISSURE

- Plane passing from the IVC to the gallbladder fossa
  - Right portal fissure
  - Left portal fissure

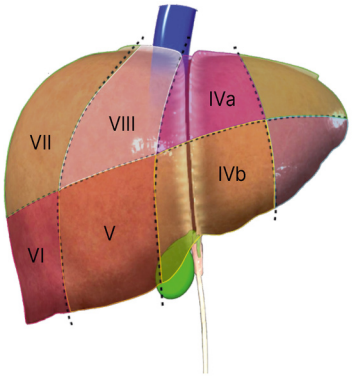


Cantlie's Line

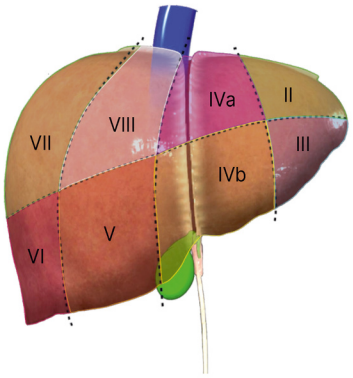
Yourwish

TRISEGMENTECTOMY/EXTENDED HEPATECTOMY

- Right trisegmentectomy
  - Removal of the 5, 6, 7, 8, 4a, and 4b segments of the liver



- Left trisegmentectomy /extended left hepatectomy
  - Removal of 2, 3, 4a, 4b, 5, 8



Important Information

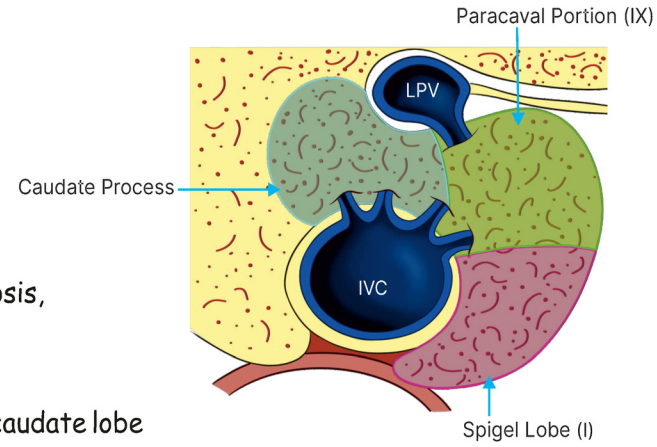
- Segment 1- Caudate lobe
- Segment 4- Quadrate lobe

CAUDATE LOBE

00:07:40

FMGE 2025

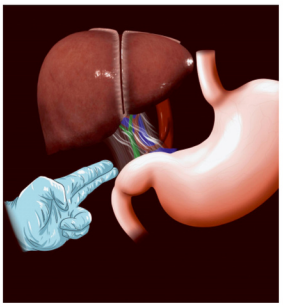
- Located in the centre of the right and left lobes
- Receives blood supply from both sides
  - Left and right branches of the portal vein
- Biliary drainage
  - Right and left hepatic duct
- Venous drainage
  - Directly to the IVC
  - Advantages
    → Budd-Chiari syndrome caused by hepatic vein thrombosis, whole liver atrophy, and caudate lobe hypertrophy
  - Disadvantage
    → Hilar cholangiocarcinoma → Early involvement of the caudate lobe
    → Routine caudate lobectomy is done
- Part of the Caudate lobe- Spigel lobe; Paracaval portion; Caudate process



PRINGLE'S MANEUVER

- Soft clamp is placed in the foramen on winslow/epiploic foramen

- Total outflow occlusion
- Bleeding is controlled from
  - Portal vein (effectively controlled due to less pressure)
  - Hepatic artery
- Bleeding not controlled from
  - IVC
  - Hepatic vein



PYOGENIC LIVER ABSCESS

00:12:18

NEET PG 2024

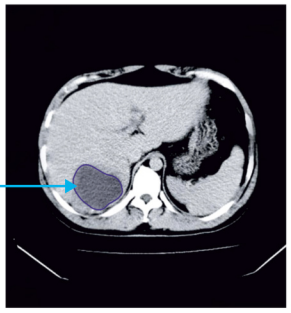
- MC type of liver abscess is
- MC organism responsible
  - MC organism involved worldwide→ E.coli
  - MC organism in asia→ Klebsiella
  - Children suffering from granulomatous skin disorder→ Staphylococcus aureus
- More common in males
- Seen in the 5th-6th decade of life
- MC route of infection: Biliary tract > Portal vein
  - Obstruction of the biliary tract → Infection → Liver damage

CLINICAL FEATURES

- MC symptom: Fever with chills and rigor
- Abdominal pain, tenderness
- Anorexia and fatigue
- Obstructive Jaundice (25% cases)
- MC LFT abnormally in PLA (↑↑ALP)

INVESTIGATION

- 1st investigation -USG
  - Liver abscess is seen
- Diagnosis is highly suggested by: USG & CT
- IOC for diagnosis: Aspiration and culture



TREATMENT

- Percutaneous catheter drainage + systemic antibiotics
- IOC for follow-up of Liver abscess patient-USG

AMOEBIC LIVER ABSCESS

00:17:14

- Caused by Entamoeba histolytica
- MC in developing countries d/t poor sanitation
- Route of transmission: Fecal route
- Infective cyst- Quadrinucleate cyst

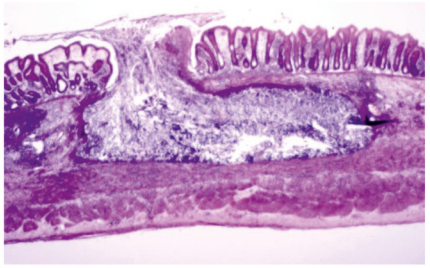
PATHOLOGY

A person ingests a quadrinucleated cyst

↓

Yourwish

Reaches GIT
↓
Converts into an octanucleate cyst
↓
8 trophozoites are released
↓
Cause flask-shaped ulcers in the ascending colon and caecum


Flask-shaped ulcers

- Amoebic colitis
- Ameboma
- MC site: Caecum > Ascending colon more involved
- Anchovy sauce appearance of liver due to the histolysis of hepatocytes
- Necrosis of WBCs



Anchovy sauce

CLINICAL FEATURES

- MC symptom: Abdominal pain
- Fever is present (not high grade)
- Anorexia and fatigue
- Jaundice is rare. CBT is not involved
- MC LFT abnormality raised PT
- H/O diarrhea, dysentery present
- H/O travel to endemic areas

INVESTIGATIONS

- 1st investigation done- USG
- Diagnosis is highly suggested by: USG & CT
- IOC for diagnosis: Amebic serology using ELISA

TREATMENT

- High dose oral metronidazole 750 mg TDS x 10-14 days
- Symptoms improve in 3 days
- I/C/O no improvement → aspiration

INDICATION OF ASPIRATION IN AMEBIC LIVER ABSCESS

- No improvement after medical management, within 3-5 days
- High-risk abscess (risk of rupture)
  - Size >5 cm
  - Left lobe abscess
- Diagnostic uncertainty
- Bacterial superinfection
- Pregnancy (high-dose metronidazole is not safe)

ASYMPTOMATIC CARRIERS: INTRALUMINAL AGENTS

- Paromomycin

Yourwish

Yourwish

- Iodoquinol
- Diloxanide furoate

COMPLICATIONS

- Rupture into
  - Peritoneal cavity (MC)
  - Pleural cavity
  - Pericardial cavity

HYADATID CYST

00:24:14

- Zoonosis (infection of animals)
- Caused by
  - Echinococcus granulosus (MC)
  - E.multilocularis-malignant hydatidosis

HOST

- Definitive host- Dog
- Intermediate host- Sheep
- Accidental, dead-end, intermediate host w/o human-to-human transmission- Man

ROUTE OF TRANSMISSION

- The faecooral route (dogs pass eggs of Echinococcus in fecal matter)
- Infective stage- Eggs of Echinococcus

PATHOLOGY

Eggs of Echinococcus in dog fecal matter

↓

Ingested by humans due to contamination

↓

Eggs transform to hexacinth larva/oncosphere

↓

Penetrates capillaries

↓

Portal vein

↓

liver

- Sometimes larvae enter to IVC→ Right atrium→ Lungs
- MC site liver > lungs

CLINICAL FEATURES

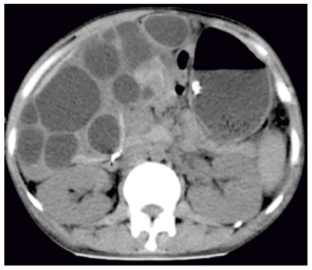
- Most patients asymptomatic
- Hepatomegaly
- Abdominal pain



Hydatid cyst of liver

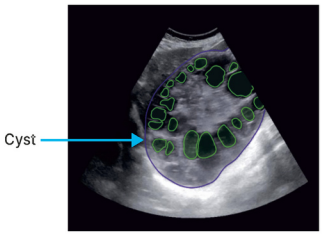
Yourwish

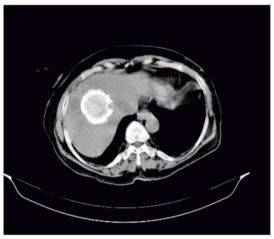
- MC complication- Intrabiliary rupture



DIAGNOSIS

- 1st investigation-USG
  - Multiple cysts seen
  - Cyst within cyst appearance- Rosette appearance
- CT can be done
  - Ring-like calcification seen
- IOC for diagnosis- Hydatid serology using ELISA





TREATMENT

- Perioperative chemoprophylaxis with Albendazole reduces the size
- Alternative: Mebendazole

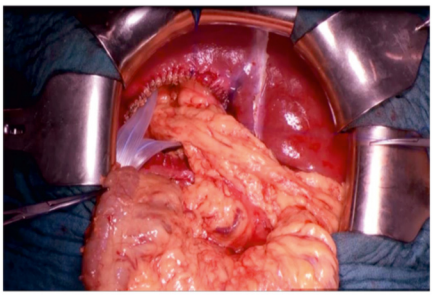
SURGICAL INTERFERENCE

- **PAIR** is preferred
  - Puncture
  - Aspiration of content
  - Instillation of scolicidal agent
    → Hypertonic saline is used 20%
  - Reaspiration

CYST EVACUATION AND OMENTOPEXY



Cyst evacuation



Omentopexy

- Evacuate the content and fill the dead place with omentum



PERICYSTECTOMY

- Excision of the cyst outside of the pericyst
- Most effective treatment

HEPATIC RESECTION

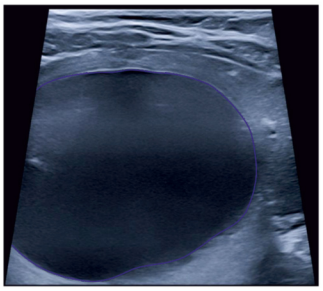
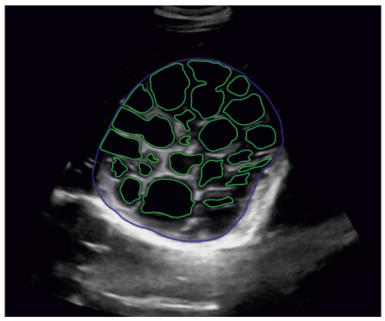
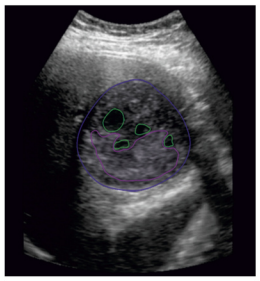
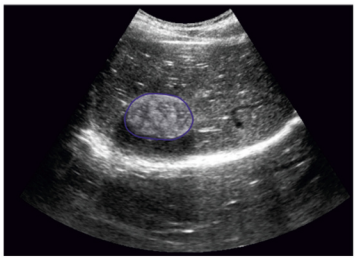
- Most radical treatment

CONTRAINDICATIONS OF PAIR Sx

- Inaccessible cyst
- Peripherally located
- Multiloculated cyst

- Cyst in lungs and brain, no pericyst present, healthy tissue is also damaged
- Calcified cyst
- Cystobiliary communication

GHARBI'S CLASSIFICATION OF HYDATID CYST
(BASED ON USG FINDINGS)

TYPE 1		· Simple fluid collection
TYPE 2		· Floating undulating membrane is present · Water lily sign/water snake sign
TYPE 3		• Multiloculated/multiseptated/honeycombed
TYPE 4		• Complex heterogeneous mass • Both cystic and solid areas are present
TYPE 5		• Calcified cysts

Yourwish

Important Information

- Honeycomb liver is seen in actinomycosis

LIVER TUMOURS

00:34:32



Liver metastasis

- MC malignancies are metastases/secondaries
- MC primary malignancy of the liver: HCC
- MC primary malignancy of the liver of children: Hepatoblastoma
- MC benign tumor of the liver: Hemangioma
- MC site metastasis in GI malignancies with hematogenous spread: Liver
- MC site of metastasis in non GI Malignancies with hematogenous spread: Lungs
- Examples
  - CA oral cavity
  - CA anal canal
  - HCC
  - Hepatoblastoma
  - RCC
  - Nephroblastoma
  - CA penis
  - Testicular cancer
  - Soft tissue cancer

LIVER METASTASIS

- MC primary site for liver metastasis colorectal cancer > carcinoma lung
- Carcinoma of the lung is MC primary metastasis to (KEPABS)
  - Kidney
  - Esophagus
  - Pancreas
  - Adrenal
  - Brain (MC)
  - Skin
- Ca breast metastasis (TLL)
  - Thyroid
  - Lungs, lumbar vertebra
  - Leptomeninges
- MC primary metastasis to the heart
  - Males- Ca lung
  - Females- Ca breast
- MC primary metastasis to testis- Ca prostate
- MC primary metastasis to the penis- Ca bladder
- MC primary metastasis to spleen- Malignant melanoma(multiple organs)
- MC primary isolated secondaries to spleen- Ca ovaries
- MC primary metastasis to bone

Yourwish

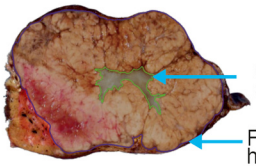
- Ca breast > Ca prostate
- MC osteolytic and osteoblastic secondaries in females
- MC primary for osteoblastic secondaries in males- Ca prostate
- MC primary for osteolytic secondaries in males- RCC, leads to Pulsatile secondaries
- MC site of bone metastasis- Thoracic vertebra/dorsal spine
- IOC for Dx: Bone scan

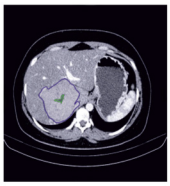
BENIGN TUMORS OF THE LIVER

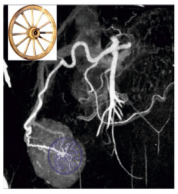
00:43:20

FOCAL NODULAR HYPERPLASIA

- Central stellate scar is visible ON CECT
- Cartwheel/spokewheel on angiography
- IOC- CECT







Cartwheel/Spoke wheel appearance

Important Information

- CENTRAL STELLATE SCAR IS SEEN IN
  - FNH
  - Fibrolamellar variant of HCC
  - Serous cystadenoma pancreas
  - Renal oncocytoma

HEPATIC ADENOMA

00:44:44

- Benign proliferative disorder of hepatocytes
- Low risk of malignant transformation into HCC
- High risk of tumor rupture- 30-50%

HEPATOCELLULAR CARCINOMA

00:48:00

NEET PG 2023
INI CET Nov 2021

- MC primary malignancy of the liver
- More common in
  - Males (alcohol intake)
  - 6th decade
- MC cause- Hepatitis B virus (worldwide)
  - Asia & Sub-Saharan Africa maximum incidence

CIRRHOSIS	METABOLIC DISORDERS	ENVIRONMENTAL FACTORS
• HBV • HCV • ALCOHOL • NAFLD • PBC • Chronic active Hepatitis	• Hemochromatosis • Wilson disease • Glycogen storage disorders (1 and 3) • Alpha-1-antitrypsin deficiency • Porphyria cutanea tarda • Citrullinemia • Orotic aciduria • Alagile syndrome/congenital cholestasis syndrome	• Smoking cigarettes • Anabolic steroids • Aflatoxin (fungal toxin) • Thorotrast (radiocontrast)

Yourwish

CLINICAL FEATURES

- MC symptom is abdominal pain followed by weightloss
- Anorexia & fatigue
- Jaundice- not common
- Hypervascular tumor- audible bruit present

TUMOR MARKERS

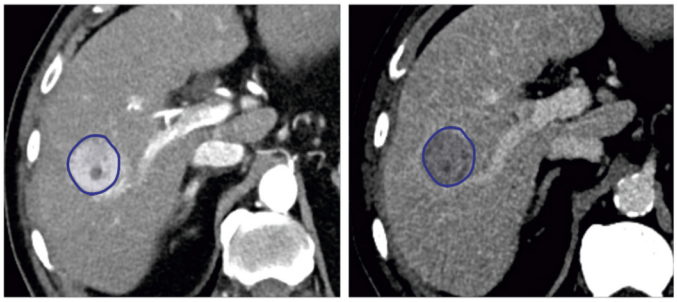
- AFP->20 ng/ml (70% patients have raised levels)
- PIVKA-2

INVESTIGATIONS

- 1st investigation done USG
- IOC screening in high-risk population- USG
- IOC for diagnosis of HCC: Triple-phase CT
  - Arterial hypervascularization with venous washout

STAGING

- **OCUDA STAGING is followed**
  - Bilirubin
  - Albumin
  - Tumor size
  - Ascitis



MANAGEMENT

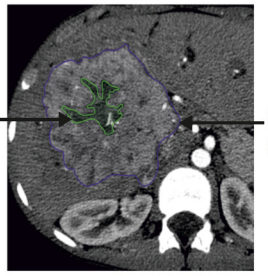
- BCLC criteria (Barcelona Clinic Liver Cancer)
  - Unresectable tumor (multilocular bilobal disease)
    → Palliation done
    → Sorafenib- Drug for advanced and metastatic
  - Resectable tumor
    → Check hepatic reserve
    - Adequate→ Resection
    - Liver transplantation

FIBROMELLAR VARIANT OF HCC

- MC in females (Southeast Asia)
- The young age group is affected
- Fibrous stroma with lamellar structures
- Not associated with cirrhosis, HBV, HBC
- AFP levels are normal
- Tumor markers
  - Neurotensin
  - Vit B12 binding globulin

DIAGNOSIS

- IOC for diagnosis: CECT scan
- The central stellate scar is visible



TREATMENT

- Resection
- Good prognosis

HEPATOBLASTOMA

00:56:05

- MC primary malignancy of the liver in children
- Associated with
  - FAP
  - Beckwith-Wiedemann syndrome
- Not associated with
  - HBV, HCV infection
  - Cirrhosis
  - Metabolic disorders
- AFP is raised 90%

CLINICAL FEATURES

- Most patients are less than 18 months old
- All patients <3 years
- MC presentation hepatomegaly
- Lab investigation- Thrombocytosis

DIAGNOSIS

- Radiological IOC for diagnosis- CECT
- IOC to confirm- Biopsy

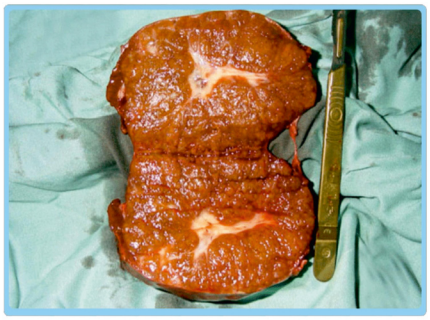
TREATMENT

- Resection(if possible)
- Pulmonary metastasis- Neoadjuvant chemotherapy
  - Most of the time, it disappears

MCQs

00:58:33

Q. A cut section of liver is shown below. What is the likely diagnosis?



A. Hepatic adenoma
B. Hepatocellular carcinoma
C. Focal nodular hyperplasia
D. Hemangioma

Answer: C

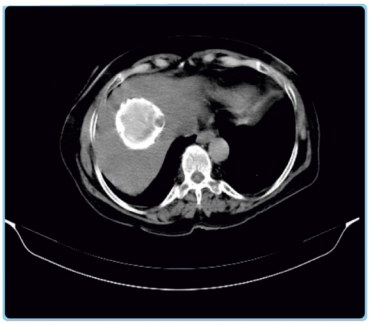
Q. Identify the condition based on the non-contrast CT scan of a patient given below:

INI CET May 2022

A. Hepatocellular carcinoma

Yourwish

B.Fibronodular hyperplasia
C. Liver abscess
D. Hydatid cyst



Answer: D

Q. A 35-year-old patient with a history of dysentery for 6 weeks complains of pain in the right upper abdomen. On ultrasound, a hypoechoic hyperdense lesion is seen in the liver. Based on the given findings, identify the condition.

FMGE June 2024

A. Amoebic liver abscess
B. Pyogenic liver abscess
C. Hydatid cyst
D. Hemangioma

Answer: A

Q. A 55-year-old alcoholic patient presents with sudden and unintentional weight loss. Lab investigations revealed serum alkaline phosphatase (ALP) of 2%-+d/L, alpha-fetoprotein (AFP) of 600 ng/ml, and normal serum AST and ALT levels.
What is the most likely diagnosis?
A. Hepatic adenoma
B. Cholangiocarcinoma
C. Hepatocellular carcinoma
D. Alcoholic hepatitis

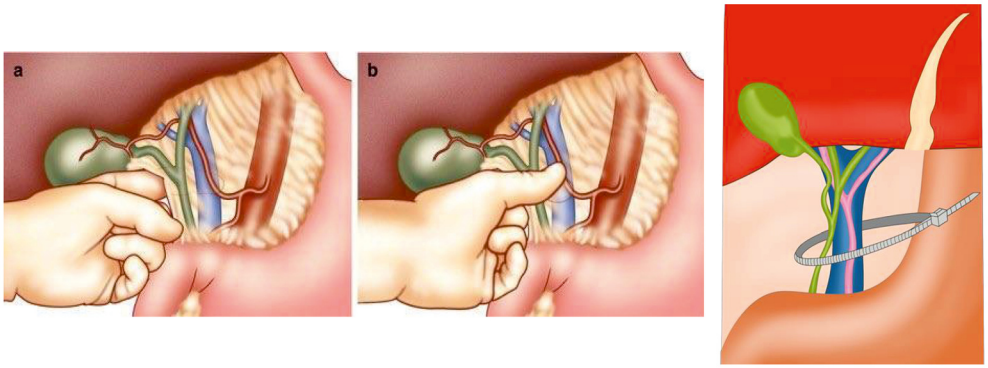
Answer: C

Q. A 39-year-old patient presented with RTA and was brought to the ER with a pulse rate of 120/min, and SBP of <80mmHg. Despite intravenous fluid resuscitation and BT, the patient's condition deteriorated with ongoing profuse bleeding from the liver. Identify the procedure shown in the image done to control a massive liver bleed.

FMGE July 2023

A. Kocher maneuver
B. Pringle's maneuver
C. Cattell-Braasch maneuver
D. Mattox maneuver

Answer. B



Yourwish

3. GALLBLADDER

ANATOMY OF THE GALLBLADDER

FMGE 2019, 2025,
INICET 2022, 2025

Feature	Details
Shape	Spiral / Pear-shaped
Color	Sea green
Capacity	30–50 mL
Epithelium	Tall columnar epithelium
Layers Absent	No muscularis mucosa, no submucosa
Important Exam Point	Direct transition: Lamina propria → Muscularis propria

Functions of the Gallbladder

- Storage of bile
- Concentration of bile (5–10 times)
- Acidification of bile

Important Information

- Jejunum has the maximum absorptive capacity overall
- Gallbladder has a maximum absorptive capacity per unit surface area

Cystic Duct

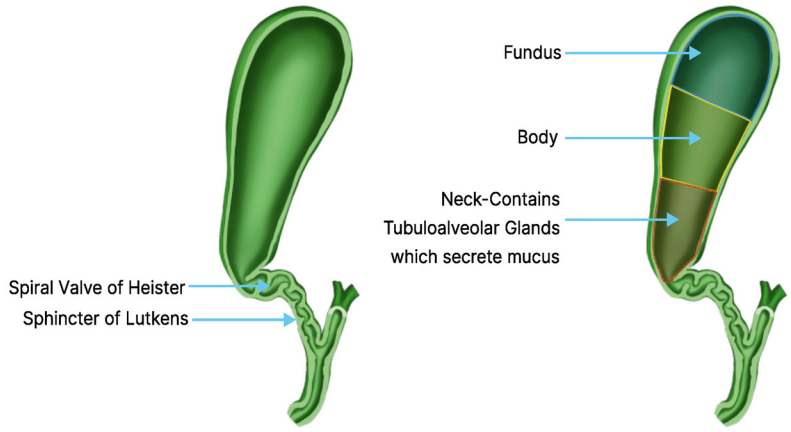
- Spiral valve of Heister
- Sphincter of Lütkens

Parts Of Gallbladder

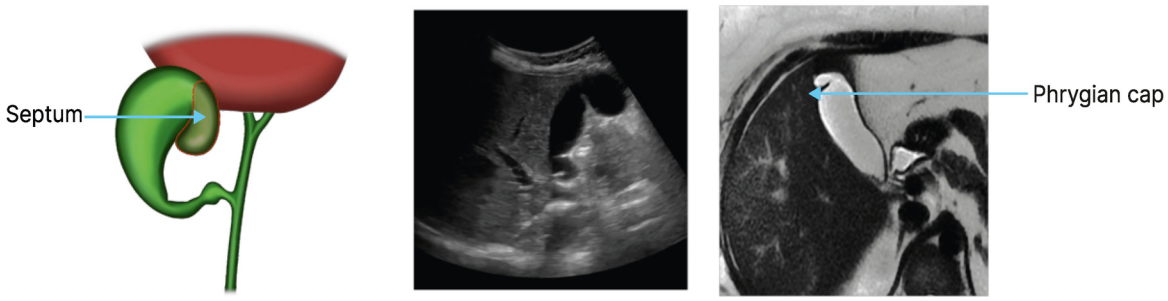
00:02:21

- Fundus- Most common site of carcinoma
- Body
- Neck - Contains tubuloalveolar glands (mucus secretion), secretes mucin
- Large stone obstructs the cystic duct-CBD junction → Mucus accumulation → Massive distension → Mucocele Leads to distension

Yourwish



PHRYGIAN CAP



- Most Common Congenital Anomaly
- Septal infolding between the fundus and the body
- Gallbladder function is normal
- No treatment (cholecystectomy) required

GALLSTONES

00:04:20

Cholesterol Stones

- Yellow in color
- Most common worldwide
- If a mixed option is present → mark mixed
- Otherwise → mark cholesterol
- Composition: Crystalline cholesterol monohydrate

Bile Composition

- 85-95% water
- Cholesterol
- Bile acids
- Lecithin- Normally fat soluble, but made water soluble by micelle formation (bile acid + lecithin)

Lithogenic Bile	Nucleation	Stasis
Increased Biliary Cholesterol: Obesity High cholesterol intake Clofibrate therapy	**Pronucleating factors:** • Infection • Mucin glycoproteins	• Prolonged fasting • Prolonged TPN • Pregnancy • Octreotide intake • OCPs • Massive burns

Decreased Bile Acid: • Ileal disease or resection • Bile acid sequestrants (Cholestyramine, Colestipol) • CYP7A1 gene mutation **Decreased Biliary Lecithin:** • MDR3 gene mutation		

Pigment Stones

00:09:10

Black Stones



- Hard & radio-opaque
- Insoluble bilirubin pigment polymer of Calcium phosphate/carbonate
- Seen in hemolysis:
  - Hereditary spherocytosis
  - Thalassemia
  - Sickle cell anemia
  - Prosthetic valves

Brown Stones



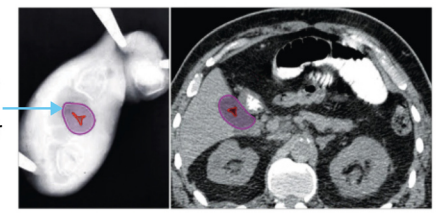
- Compositon
  - Calcium bilirubinate
  - Calcium palmitate
  - Calcium stearate
- More common in CBD
- Rare in GB
- Associated with:
  - Worm infestation (Ascaris)
  - Clonorchis sinensis
- Common in developing countries

Important Information

- MC type of gallstone Worldwide → Cholesterol (If mixed option present → mark mixed)
- MC type of gallstone India/Asia → Pigmented (combined black + brown)

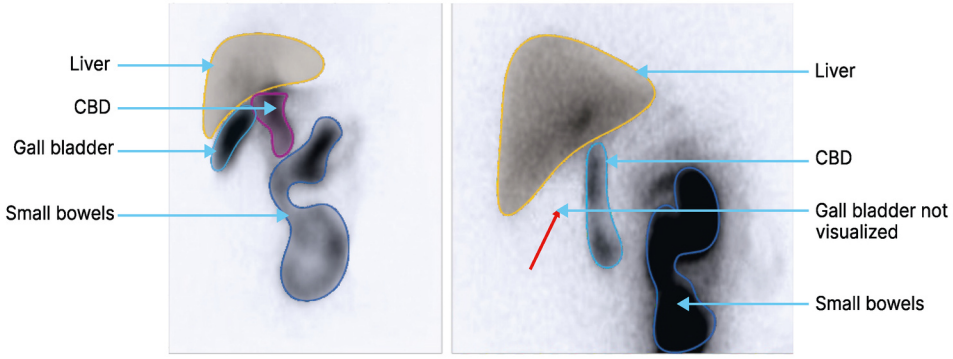
Investigation

- Gallstones on X-ray
  - Triradiant fissure- Mercedes-Benz sign
  - Biradiate fissure- Seagull sign
- Investigation of choice for gallstones, acute cholecystitis, acute acalculous cholecystitis, chronic cholecystitis:→ Ultrasound
- Gold standard for acute cholecystitis:→ HIDA scan
  - Diagnostic in acute cholecystitis on HIDA scan:→ Non-visualization of gallbladder



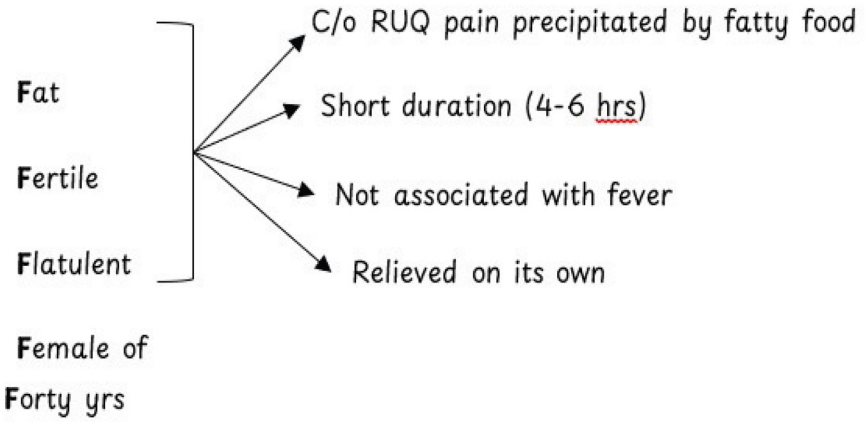
Mercedes sign- Gall bladder with triradiate air

Yourwish



Biliary Colic

00:14:50



Acute Cholecystitis

00:15:37

Clinical Features- Triad

- RUQ pain >24 hours
- Fever
- Leukocytosis

Examination

Murphy's sign (Nauny's sign): Inspiratory arrest on palpation of the RUQ	**Boas sign:** Hyperesthesia below the right scapula
	

Yourwish

Tokyo Consensus Guidelines

- Diagnostic Criteria for Acute Cholecystitis

A. Local signs of inflammation	• Murphy's sign • RUQ pain/tenderness/mass
B. Systemic signs of inflammation	• Fever • Elevated CRP • Elevated WBC count
C. Imaging findings	• Imaging findings characteristic of acute cholecystitis
• Suspected diagnosis: 1 item in A + 1 item in B • Definite diagnosis: 1 item in A + 1 item in B + C	

Treatment

00:18:40

If <72 hours	After >72 hours
• Conservative • Same sitting laparoscopic cholecystectomy	Due to the vascularization of adhesion and inflammation • Conservative • Interval lap cholecystectomy (after 4-6 weeks)

Prophylactic Cholecystectomy

Indications	Absolute Contraindications
• Heart/lung transplant due to Cyclosporin • Chronic TPN • Biliopancreatic diversion • Hemoglobinopathy children • Asymptomatic stone ≥3 cm • Stones with polyp • Asymptomatic gallstone with a family history of carcinoma • Incidental detection during elective surgery • Non-functioning gallbladder • Typhoid carrier with positive bile culture • Porcelain gallbladder • Trauma to the gall bladder	• Cannot tolerate GA • Refractory coagulopathy • Suspicion carcinoma

Yourwish

Emphysematous Cholecystitis

- MC organism: Clostridium welchii (perfringens) Anerobe
- E. coli Aerobe

Emphysematous Pyelonephritis

- MC organism: E. coli Aerobe

Xanthogranulomatous Pyelonephritis

- MC organism: Proteus

Xanthogranulomatous Cholecystitis

- Non-infectious
- Rupture of Rokitansky-Aschoff sinuses leading to Bile leak

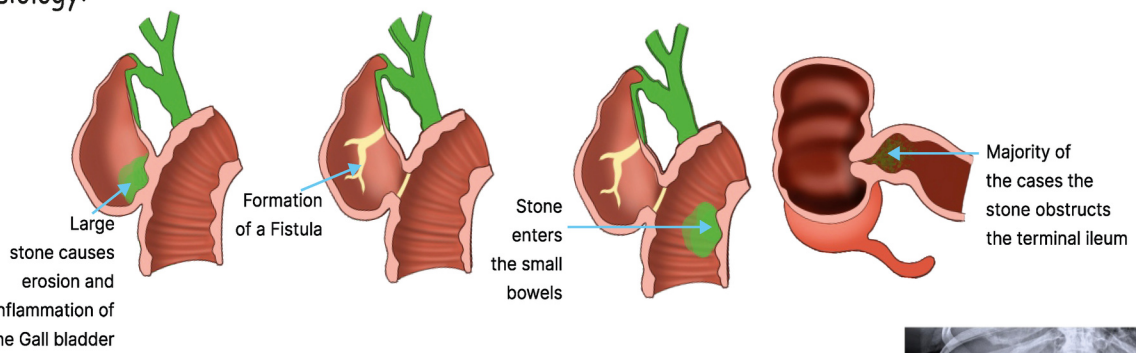
Effects & Complications Of Gallstones

00:24:24

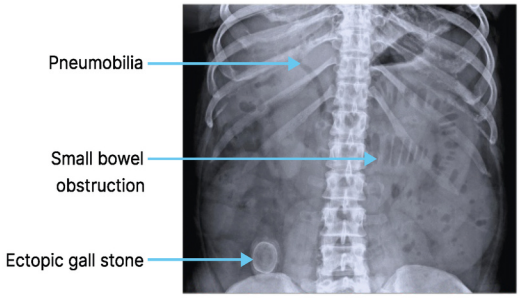
Site	Complications / Effects
Gallbladder	Asymptomatic, Acute cholecystitis, Chronic cholecystitis, Mucocele, Empyema, Gangrene, Perforation, Carcinoma gallbladder
CBD & Pancreas	Jaundice, Acute pancreatitis
Small Intestine	Gallstone ileus

Gallstone Ileus

- Mechanical obstruction of the small intestines by a gallstone
- Most patients are asymptomatic and have a single large stone
- MC in the 6th decade
- 1st MC fistula: Cholecystoduodenal fistula; 2nd MC fistula: Cholecystocolic
- Size-based obstruction of bowel- MC is the terminal ileum
- Pathophysiology:



- Rigler's Triad (plain X-ray)
  - Small bowel obstruction
  - Pneumobilia
  - Ectopic stone
- Diagnosis : C/F + X-ray + USG
- Treatment



- Enterotomy + removal of obstruction
- Cholecystectomy only in young & stable pts

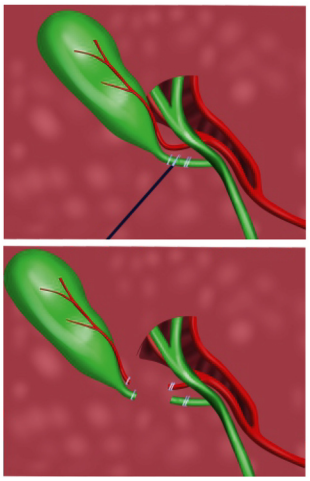
Acalculous Cholecystitis

00:30:15

- Inflammation of the GB in the absence of a stone
- Cause:
  - Stasis
  - Ischemia
- Seen in:
  - Elderly and critically ill patients after trauma
  - Massive burns
  - Post major surgery: CABG, and aortic aneurysm repair
  - Bacterial infections: **S**- **S**almonella, **S**treptococci; **L**- **L**eptospira; **V**- **V**ibrio cholerae
- Clinical features- Same as Acute cholecystitis
- MC site of perforation: Fundus
- IOC for diagnosis: USG
- Gold standard investigation: HIDA scan
- Treatment of choice: Lap cholecystostomy

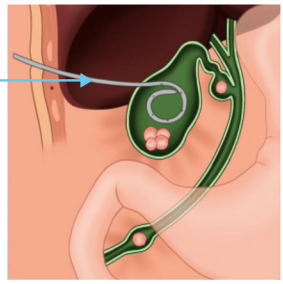
LAPAROSCOPIC CHOLECYSTECTOMY STEPS

1. Create pneumoperitoneum (Veress needle)
2. Insert ports (4 ports)
   - Umbilical 10mm
   - Right lateral subcostal port (5mm port)
   - Right subcostal midclavicular port (5mm port)
   - Epigastric port (5mm port)
3. Dissect the hepatocystic triangle
4. Establish a critical view of safety
5. Clip the cystic duct & artery
6. Separate from the liver bed
7. Remove specimen



TREATMENT OF CHOICE IN UNSTABLE PATIENTS

- Percutaneous Cholecystostomy



Gallbladder Polyps

00:36:20

Feature	Cholesterol Polyp	Adenomatous Polyp
Frequency	Most common	Less common
Size	<10 mm	≥10 mm
Number	Multiple	Solitary
Shape	Pedunculated	Sessile
Nature	Benign	Premalignant

Yourwish

Risk Of Malignancy In Adenomatous Polyps

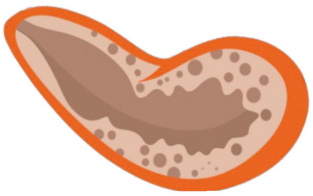
- Age >60
- Size >10 mm
- Gallstones present
- Increasing size (documented)

Strawberry Gallbladder

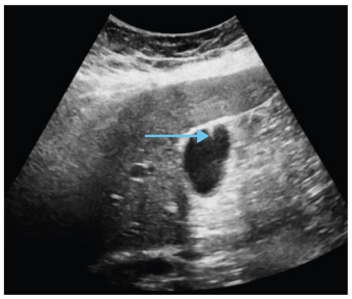


- Cholesterolosis
- Deposition of Cholesterol ester + triglyceride deposition in macrophages
- Benign
- Associated with hypercholesterolemia, cholesterol stones, and cholesterol polyps
- T/t - Laparoscopic Cholecystostomy in Symptomatic Gallstones

Adenomyomatosis



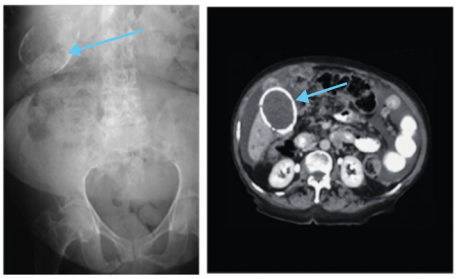
- Hyperplastic wall changes
- Rokitansky-Aschoff sinuses- Mucosal hyperproliferation
- Diagnosis- USG
  - Comet-tail artifact on ultrasound
  - Diamond ring sign
  - V-shaped artifacts
- Treatment: Laparoscopic Cholecystostomy in symptomatic gallstones



Comet tail artifact

Porcelain Gallbladder

- Calcified GB wall
- Extensive calcium encrustation in the GB wall- Bluish colour and brittle in consistency
- Seen in the 6th decade
- 90% Patients are Asymptomatic
- 90% have stones
- Detected incidentally on radiology
- 90% have stones
- 6% risk of malignancy
- T/t: Early laparoscopic cholecystectomy



Porcelain gall bladder

Carcinoma Gallbladder

00:42:20

- Risk factors
  - Choledochal cyst
  - Obesity
  - Gallstone >3 cm
  - PSC
  - Adenomatous polyp >10 mm
  - Chronic typhoid carrier
  - Porcelain gallbladder
- Smoking: NOT a risk factor
- Epidemiology
  - India has the highest incidence

Yourwish

Yourwish

  - More common in females
  - 6^{th}–7^{th} decade
- Most Common Site: Fundus > Body > Antrum
- MC route of spread **(Mnemonic: HELP)**
  - **He**patic (most common)- Direct invasion
  - **L**ymphatic
  - **P**erineural
- MC segments involved of liver: 4B and 5

Similarities Between CA Gallbladder & Cholangiocarcinoma

Feature	Details
Histological type	• Adenocarcinoma
Non-specific marker	• CEA
Specific marker	• CA 19-9
Chemotherapy regimen	• Gemcitabine + Cisplatin
Histological patterns	• Diffuse infiltrative / Sclerosing (Most common, worst prognosis) • Nodular • Papillary (Best prognosis)

Clinical Features

Category	Features
Most common presentation	• Recurrent attacks of biliary colic
Associated with	• Increased frequency of attacks • Increased severity of pain during an attack • Persistent dull aching pain Suggests involvement of the liver • Anorexia and weight loss
On Examination	• Palpable mass • Jaundice • Ascites

Yourwish

Diagnosis

- 1ST investigation: USG
- IOC: CECT

Stage	Description
T1A	Involvement of the lamina propria
T1B	Involvement of the muscularis propria
T2A	Invasion of peri muscular connective tissue towards the peritoneal side without direct extension to the serosa
T2B	Invasion of peri muscular connective tissue towards the hepatic side without direct extension to the liver
T3	Serosal perforation or direct hepatic invasion or involvement of a single extrahepatic organ
T4	Involvement of the portal vein, or hepatic artery, or two or more extrahepatic organs

Lymph Node Staging

N1	Metastasis to 1-3 regional lymph nodes
N2	Metastasis to 4 or more regional lymph nodes
M0	No Metastasis
M1	Distant Metastasis

Treatment By Stage 00:51:00

Stage	Treatment
IA: T1A	Simple lap cholecystectomy
IB: T1B IIA: T2a IIB: T2b IIIA: T3 IIIB: T1-3, N1	Extended cholecystectomy. Structures removed: • Gall bladder • 4B, 5 segments of liver • LN along the cystic duct • Pericholedocal LN • Periportal LN • Retropancreatic LN

IVA: T4A, N0-1	Extended cholecystectomy + extended right hepatectomy (segments removed: 5, 6, 7, 8 + 4A, 4B)
IVB: T-any to N2, T-any, N-any, M1	Palliation (Gemcitabine + Cisplatin)

Important Surgical Facts

- First laparoscopic cholecystectomy: Erich Mühe
- First video-assisted: Philippe Moure
- First laparoscopic appendectomy: Kurt Semm (Father of pelviscopy)

PYQs 00:54:12

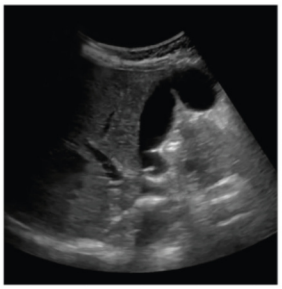
Q. Which of the following is NOT a risk factor for carcinoma gallbladder?
A. Porcelain gallbladder
B. Primary sclerosing cholangitis
C. Polyp size less than 10 mm
D. Gallstone more than 3 cm

Q. Arrange the following steps of laparoscopic cholecystectomy in the correct order:
A. Creation of pneumoperitoneum
B. Dissection of hepatocystic triangle
C. Ligation of cystic duct and artery
D. Separation of gallbladder from liver bed
Ans: A-B-C-D

Q. A 50-year-old woman presents with colicky abdominal pain and bilious vomiting. On evaluation, air is present in CBD. What is the diagnosis?
A. Adhesions
B. Gastroenteritis
C. Gastric outlet obstruction
D. Gallstone ileus

Q. Which of the following is an early feature of carcinoma gallbladder?
A. Mass
B. Jaundice
C. Ascites
D. Cholecystitis

Q. What is the gallbladder anomaly shown on ultrasound?
A. Floating GB
B. GB polyp
C. Mercedes Benze Sign
D. Phrygian cap



Yourwish

4. BILE DUCT

CHOLEDOCHAL CYST

00:00:14
FMGE 2021

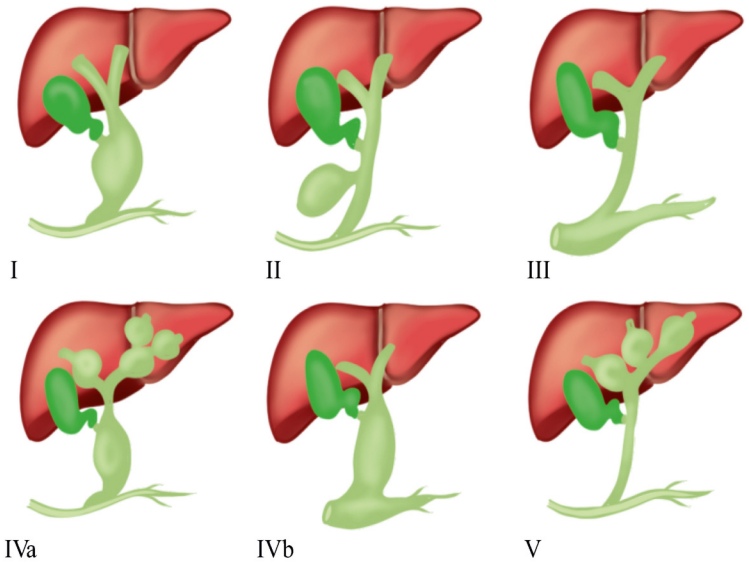
- Characterised by dilatation of bile duct
- Congenital
- More common in children
- More common in females
  - Exception: **Primary sclerosing cholangitis** (more common in males)
- Most accepted hypothesis: APBDJ

Todani Modification Of Alonso-lej Classification

NEET PG 2019

Type		Description
Type I	Ia	Cystic dilation of EHBD
	Ib	Focal segment dilation
	Ic	Fusiform dilatation
Type II		Diverticular dilation
Type III		Dilatation of intraduodenal part of bile duct → Choledochocele
Type IV	IVa	Dilatation of IHBD + EHBD
	IVb	Dilatation of multiple sections of EHBD
Type V		Dilatation of IHBD (Carolis disease)

- Most Common Type : Type IA > IV> III



Todani Modification of Alonso-Lej Classification

Yourwish

- Type-1 is most common in:
  - Choledochal cyst
  - Hiatus hernia
  - Gastric ulcer
  - Fistula-in-ano
  - Posterior urethral valve
- Type A is most common in:
  - Strasberg classification
  - Luminal criteria

Treatment Of Choledochal Cyst

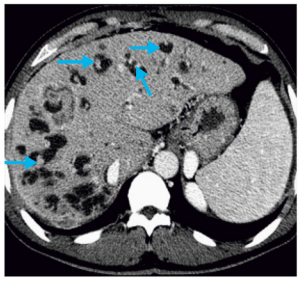
Type Involvement	Todani Types	Management
Extrahepatic involvement	Type I, Type II, Type IVB	Excision + Roux-en-Y Hepaticojejunostomy
Intrahepatic involvement	Type IVA, Type V	Liver transplantation
Type III (Choledochocele)	Type III	Endoscopic sphincterotomy + Cyst unroofing

Clinical Features

- Triad of:
  - Mass
  - Pain
  - Intermittent jaundice
- Complication
  - Cholangitis
  - Acute pancreatitis
  - Cholangiocarcinoma (long-standing)

Investigation

- Investigation of Choice: MRCP
- CECT of Type V choledochal cyst: Central dot sign



Central Dot sign

CHOLEDOCHOLITHIASIS

00:09:04

NEET PG 2025

FMGE 2024

- Types:
  - Retained CBD stones: Detected within 2 years after cholecystectomy
  - Recurrent CBD Stones: Detected after 2 years after cholecystectomy

Primary CBD Stone	Secondary CBD Stone
• Formed in CBD	• Formed in gallbladder → slips into CBD
• M/c Stone:Brown pigment stone	• M/c stone: Cholesterol stone

Yourwish

- More common in Developing countries
- A/w Worm infestation



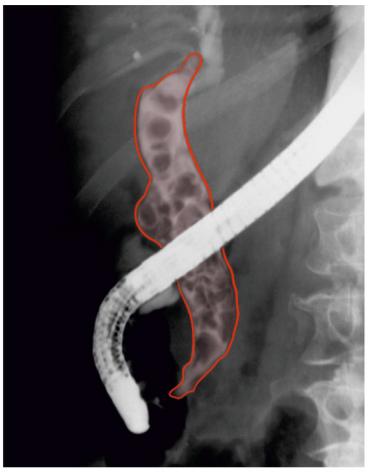
- M/c in Developed countries



Clinical Feature

- Often asymptomatic
- Jaundice with or without complications
  - Cholangitis
  - Acute pancreatitis
  - Risk of cholangiocarcinoma
- Lab Findings
  - ↑ ALP
  - ↑ GGT
  - ↑ 5' nucleotidase

Investigation

MRCP	ERCP
• MRCP → Investigation of choice 	• ERCP → Gold standard (diagnostic + therapeutic) 

Management

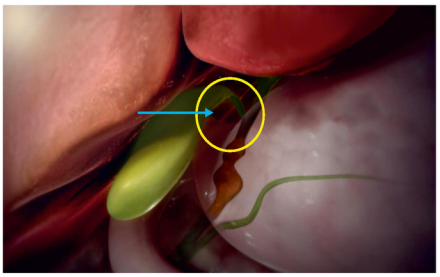
Clinical Scenario	Management
Stone ≤ 1.5 cm	ERCP + Stone extraction
Stone > 1.5 cm	Choledochotomy
Distal obstruction present	Choledochoduodenostomy

CHOLANGITIS

00:15:40

NEET PG 2020, FMGE 2025

- Mandatory Factors: Obstruction, Infection
- Most common cause → CBD stone
- Most common organism → E. coli > Klebsiella



Inflammation of the bile duct

Predisposing Factors

- Choledocholithiasisi
- Biliary stricture
- Choledochal cyst
- Cholangiocarcinoma
- Worms

Clinical Feature

- Charcot's triad
  - Right upper quadrant Pain
  - Jaundice
  - Fever
- Delay in treatment, leads to Reynold's Pentad
  - Charcot triad + Shock and mental status changes
- Most characteristic manifestation: Chills

Management

- Two large bore IV cannulas
- IV fluids + IV antibiotics → most patients improve
- If no Improvement:
  - ERCP with stone extraction/ stenting
  - If ERCP fails → PTC with Stone extraction / stenting
  - If both fail → Open biliary decompression

Open Biliary Decompression

Longitudinal incision on bile duct

↓

Stone removal

↓

T-Tube insertion

↓

T-Tube cholangiogram (7th - 10 th day)

↓

Retain T-Tube for 4- 6weeks

↓

Percutaneous stone extraction via Burhenne technique

Yourwish

AUTOIMMUNE DISORDERS

00:21:41

- M/c in females
- A/w autoantibodies
  - Primary Biliary Cirrhosis → Anti-mitochondrial antibody
  - Graves' Disease → LATS Ab against TSH-receptor
  - Hashimoto's Thyroiditis → Anti-TPO
  - Pernicious Anemia → Auto-antibody against parietal cells

Primary Biliary Cirrhosis

- Autoimmune disease
- M/c in females
- Anti-mitochondrial antibody (AMA)
- Progressive destruction of intrahepatic bile ducts → Management is Liver transplantation

Pathology

- On Biopsy
  - Florid duct lesion
  - Lymphocytic infiltration
  - Granulomatous inflammation

Clinical Features

- Pruritus precedes jaundice
- Characteristic symptoms
  - Pruritis: worse in evening
  - Fatigue
- Associated with
  - Hyperlipidemia : Xanthomas / Xanthelasma
  - Melanosis

Diagnosis

- Diagnosis can be made by: Anti-mitochondrial antibody
- IOC for diagnosis: Biopsy

Treatment Of Choice

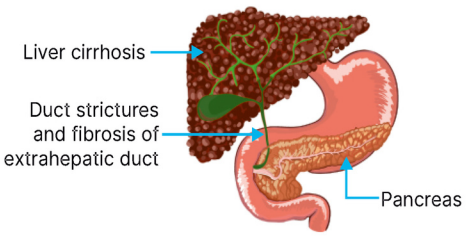
- Liver transplantation

PRIMARY SCLEROSING CHOLANGITIS (PSC)

00:26:34

FMGE 2021

- Etiology: unknown
- Multiple strictures involving both intrahepatic and extrahepatic bile ducts
- More common in males
- Associated with:
  - Ulcerative colitis
- Smoking protective in



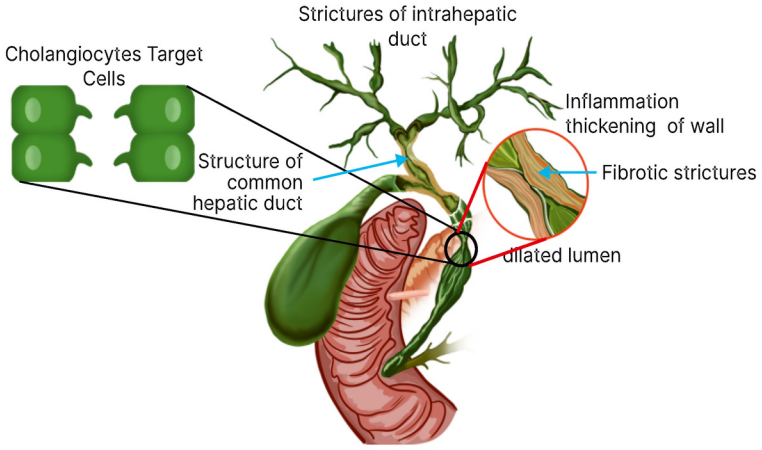
Yourwish

Yourwish

- UC
- PSC
- Parkinson's Disease
- Alzheimer's Disease

Pathology

- Multiple strictures involving both intra & extrahepatic ducts involved
- Target cell of injury → Cholangiocytes (cells lining the bile duct)
- Cut section appearance of fibrotic strictures → Onion skin appearance
- Selective destruction of terminal branches of intrahepatic bile duct → Prune tree appearance

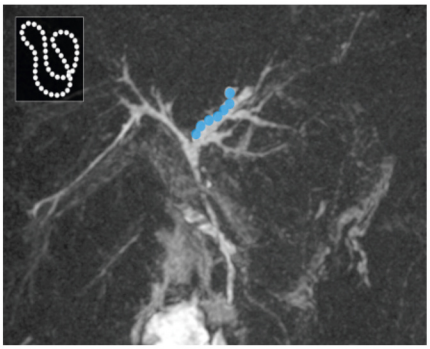


Clinical Features

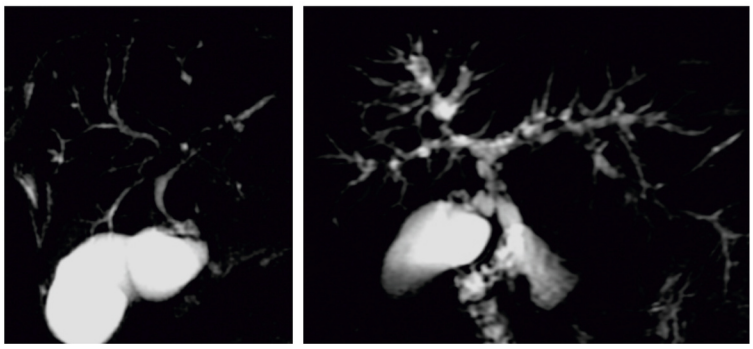
- Initial presentation → Asymptomatic ↑ GGT (Gamma-glutamyl transpeptidase)
- Complications → Cholangitis, acute pancreatitis, ↑ risk of cholangiocarcinoma

Diagnosis

- Investigation of Choice (IOC) for diagnosis → MRCP (to visualize the bile duct)
- Gold standard (Diagnostic and Therapeutic) → ERCP



Beaded appearance



Pruned tree appearance

Treatment

- TOC: Liver transplantation

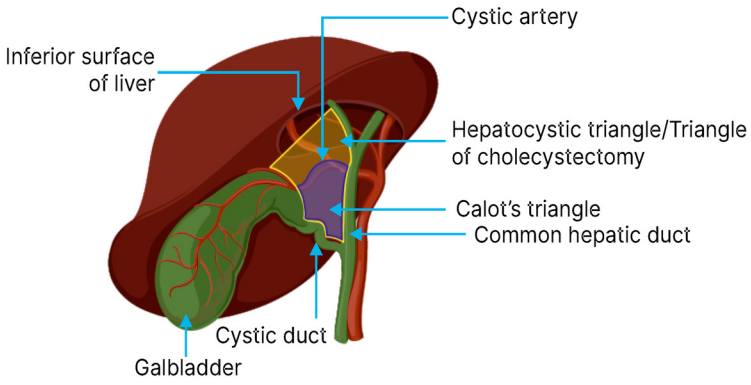
BILE DUCT INJURY

00:30:43

- Incidence of bile duct injury
  - Open cholecystectomy → 0.1-0.2%
  - Laparoscopic → 0.3-0.8%

Yourwish

Important Triangles



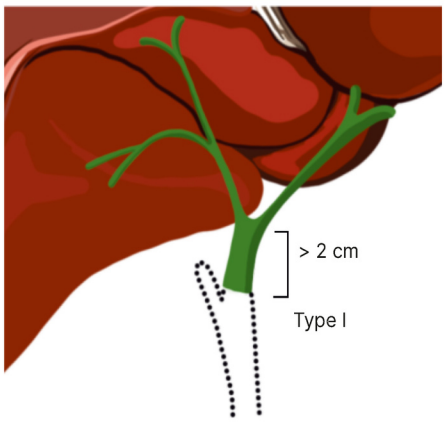
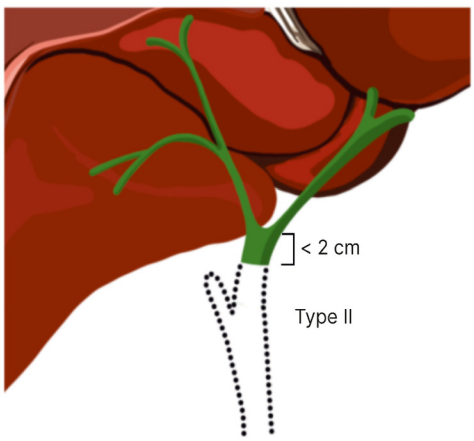
	Calot's Triangle	Hepatocystic Triangle
Medial Boundary	Common hepatic duct	Common hepatic duct
Lateral Boundary	Cystic duct	Cystic duct
Superior Boundary	Cystic artery	Hepatic edge (Inferior surface of liver)
Content	Lymph node of Lund (Cystic node)	Cystic artery

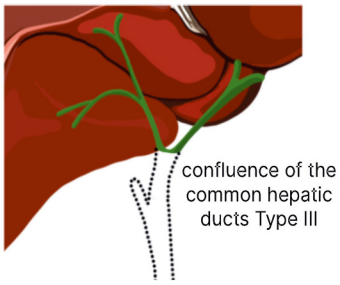
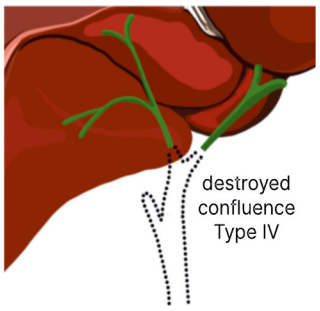
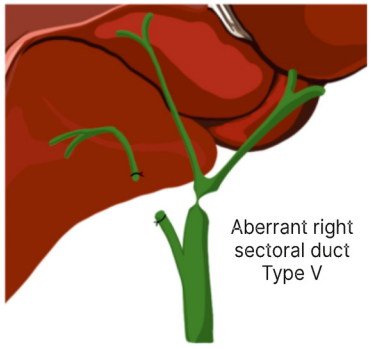
- Most commonly injured part of bile duct in Lap Chole → Common hepatic duct

Classification Of Bile Duct Injuries

Bismuth Classification For Biliary Stricture

FMGE 2022

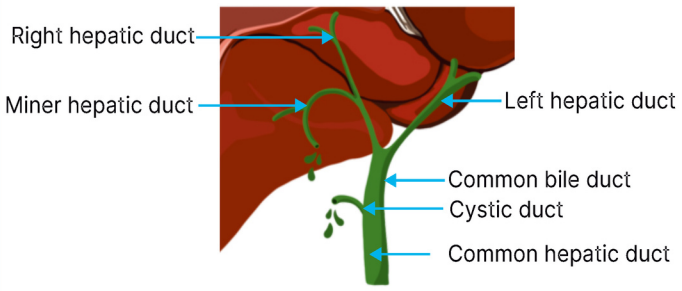
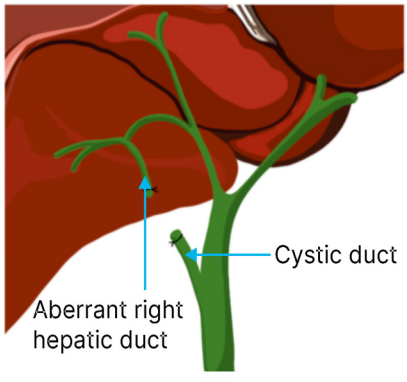
Type I	Common hepatic duct (CHD) stump > 2 cm	
Type II	CHD stump < 2 cm	

Type III	Hilar stricture with intact confluence	
Type IV	Hilar stricture with destroyed confluence	
Type V	Stricture involving aberrant right sectoral duct with or without stricture of CHD	

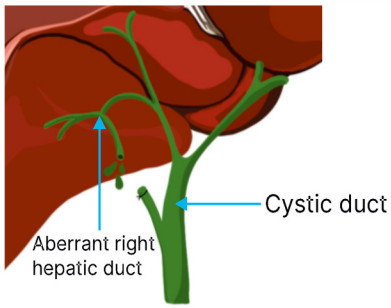
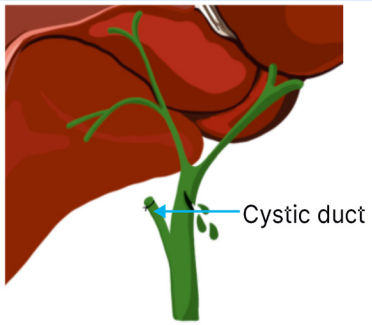
- Drawbacks of Bismuth Classification
  - Lacks information regarding intraoperative bile leak and type of injury

Strasberg Classification For Laparoscopic Bile Duct Injuries

AIIMS 2020

Type A (M/c)	• Cystic duct stump leak • Leak from subvisceral duct of Luschka	
Type B	• Ligation or Occlusion of aberrant right sectoral duct(no bile leak, later detected)	

Yourwish

Type C	• Transection of aberrant duct without occlusion (bile leak)	
Type D	• Lateral injury to common hepatic duct (CHD)	
Type E	• Corresponds to Bismuth classification E1 to E5	

Stewart-way Classification

- Based on mechanism and anatomy of bile duct
- Includes vascular injury

Management Of Post-operative Diagnosed Bile Duct Injury

00:38:18

- Step 1: Control infection → IV antibiotics
- Step 2: Drain the biloma → USG/CT-guided percutaneous aspiration or Pigtail catheter insertion
- Step 3: Complete the cholangiography → MRCP
- Step 4: Definitive management:
  - ERCP with stenting
  - Roux-en-Y HJ (Hepaticojejunostomy)
- In Post-operative cases of Bile Duct injury:
  - If drain output decreases: only observation
  - If drain output increasing or constant → Indicates distal obstruction (missed CBD stone) → ERCP required

CHOLANGIOCARCINOMA

00:41:55

AIIMS 2020

Risk Factors

- Memonic: 6C BHC DOSTI
  - Choledochal cyst
  - Choledocholithiasis
  - Primary sclerosing cholangitis
  - Ulcerative colitis
  - Cirrhosis
  - Clonorchis sinensis & Opisthorchis viverrini
  - HBV, HCV, HIV
  - Asbestos, Nitrosamines, Dioxin
  - DM, Obesity, Smoking, OCP, Thorotrast, Isoniazid

Yourwish

Yourwish

Site

- Most Common Site: Hilum
- Hilar Cholangiocarcinoma → Klatskin tumor

Clinical Features

- MC symptom: Painless progressive jaundice > Weight loss
- Anorexia and fatigue
- Pruritus
- Clay colored stool
- Gallbladder usually non-palpable

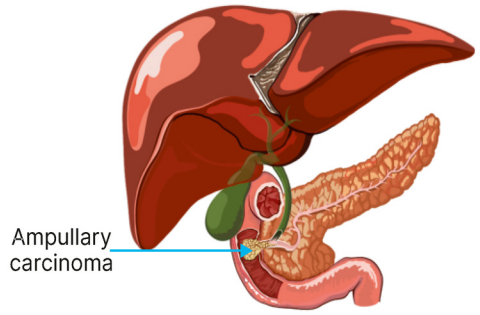
Courvoisier's Law

- In a case of obstructive jaundice, GB is seldom palpable due to stone disease because GB is shriveled or fibrosed.
- In a case of obstructive jaundice, GB is palpable in periampullary carcinoma.
- Exceptions:
  - Double impaction
  - Mucocele
  - Stone impacted in ampulla of vater
  - Oriented cholangiohepatitis

Periampullary Carcinoma Includes:

00:46:13

- Includes:
  - Ampullary carcinoma
  - Head of pancreas carcinoma
  - Distal cholangiocarcinoma
  - Duodenal carcinoma
- Worst prognosis → Pancreatic head carcinoma
- Best prognosis → Duodenal carcinoma



Diagnosis Of Cholangiocarcinoma

- IOC: MRI + MRCP > CECT

Treatment Of Cholangiocarcinoma

Clinical Situation	Treatment
Hilar tumor (Klatskin tumor)	CBD resection + Routine Caudate lobectomy + Lymphadenectomy
Distal cholangiocarcinoma	Pylorus-preserving Whipple procedure
Advanced metastatic disease	Gemcitabine + Cisplatin

HEMOBILIA

00:48:24

- Hemobilia → Blood entering bile duct
- M/c cause: iatrogenic (PTC)
- Source of bleed: Arterial bleed

Clinical Feature

- Quincke's Triad or Sandblom's Triad
  - GI hemorrhage → can lead to Hematemesis or malena (M/c, 40-60ml bleed)
  - Clot colic
  - Jaundice

Investigation

- First → Endoscopy (UGI bleed)
- Investigation of choice → Angiography (diagnostic + therapeutic embolization)

Management

- Conservative management
- If conservative fails → Angiography + embolisation → if not available or failed → Open surgical ligation

PYQs

00:50:55

NEET PG 2021

Q. The patient underwent a cholecystectomy for gallstone 2.5 years ago. She now presents with symptoms of obstructive jaundice. Investigation reveals stone in the CBD. What is the stone most likely to be?

A. Retained

B. Secondary

C. Tertiary

D. Recurrent

Answer D

NEET PG 2025

Q. Patient presents with 2 years history of anorexia, epigastric pain, jaundice and pruritus. On examination, the gallbladder is palpable. What is the most likely diagnosis?

A. Gallbladder carcinoma

B. Hepatocellular carcinoma

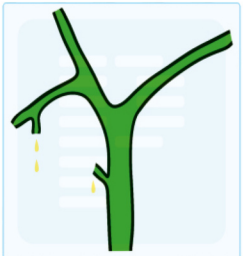
C. Cholelithiasis

D. Carcinoma head of pancreas

Answer D

NEET PG 2025

Q. Based on the given image, which type of injury is shown according to Bismuth -Strasberg classification?



A. Type A

B. Type B

C. Type C

D. Type D

Answer A

Q. A patient underwent laparoscopic cholecystectomy and was discharged after removing the drain tube on the first postoperative day. On day two, the patient came back to hospital with complaints of increasing abdominal pain with tachycardia and was febrile on examination. On ultrasound examination, there was a 5 × 5 cm collection in the subhepatic space. What is the most likely cause of this condition? FMGE DEC 2021

A. Infection
B. Surgical site pain
C. Bile leak
D. Retained gallstones

Answer C

Q. What is the optimal management approach for a patient presenting with fever and abdominal pain 5 days after experiencing CBD injury resulting in leak? FMGE June 2022

A. Ultrasound guided aspiration
B. ERCP with stenting
C. Re-exploration and hepaticojejunostomy
D. Re exploration and primary repair

Answer A

Q. Which of the following is the classical triad of acute cholangitis? FMGE Jan 2025 Part 2

A. Pain, Jaundice, Fever
B. Pain, Jaundice, shock
C. fever, jaundice, ↑WBC
D. Pain, ↑WBC, ↑ Bilirubin

Answer A

INI CET Nov 2021

Q. What is the most appropriate next step in the management of female patient who is having abdominal pain, multiple gallstones, no thickening of gallbladder wall, CBD diameter 12 mm, bilirubin 0.8 but ALP 380, and a fivefold increase in GGT?

A. MRCP
B. ERCP
C. Endoscopic Ultrasound
D. Lap chole

Answer A

INI CET July 2021

Q. What should be the subsequent course of action in the management of a female patient who experienced abdominal pain and increased heart rate three days after cholecystectomy. Her WBC count is 11000/mm^3, and an ultrasound examination revealed a 5 × 5 cm accumulation of fluid in the sub-hepatic space on the right side.

A. Antibiotics and send home
B. USG-guided pigtail catheter drainage
C. Laparoscopy and re-exploration
D. ERCP and T-tube placement

Answer B

Yourwish

Q. A 50-year-old alcoholic patient presents with a history of waxing and waning jaundice for the past 2 months. His CT examination reveals dilatation of the common bile duct and pancreatic duct. What is the most probable diagnosis in the patient? INI CET Nov 2022

a. Cholangiocarcinoma
b. Periampullary carcinoma
c. Common bile duct stone
d. Head of the pancreas carcinoma

Answer B

Q. Which classification system is used for bile duct injury taking location, injury to duct and vessel involvement into account? INI CET Nov 2023

A. Bismuth classification
B. Strasberg classification
C. Stewart-Way classification
D. Todani classification

Answer C

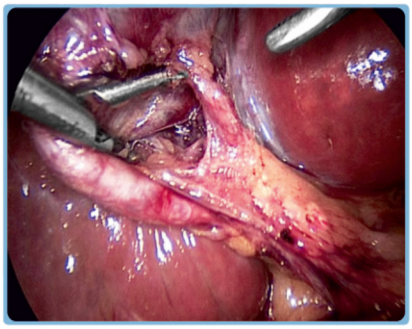
Q. Which of the following statements about choledochal cyst is incorrect? INI CET Nov 2023

A. There is risk of cholangiocarcinoma
B. Cyst can be opened and drained
C. Todani classification is used
D. Associated with abnormal pancreatico-biliary duct junction

Answer B

Q. During laparoscopic cholecystectomy, the surgeon identifies boundaries of the hepatocystic triangle to avoid the injury to important structures. Which of the following is NOT a boundary?

A. Cystic duct
B. Common hepatic duct
C. Inferior border of liver
D. Cystic artery



Answer D

Yourwish

6. PANCREAS

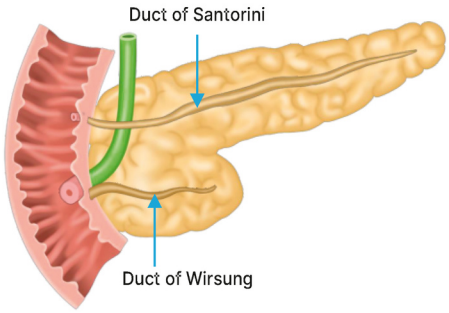
CONGENITAL ANOMALIES

Pancreas Divisum

00:00:18

NEET PG 2019

- Divisum means 'Divided drainage'
- The most common congenital anomaly of the pancreas
- **Embryology:**
  - **Dorsal bud develops into:** Part of the head, Body, & Tail → Drained by the Duct of Santorini
  - **Ventral bud develops into:** Part of the head & Uncinate process → Drained by the Duct of Wirsung (main duct)
- **Pathophysiology:**
  - Major part of pancreas (from dorsal bud) → Drained by Duct of Santorini → Small opening (minor papilla)
  - Duct of Wirsung → Relatively larger opening (ampulla)
  - Due to this size difference, there is a relative outflow obstruction of pancreatic secretions
  - As a result Recurrent attacks of acute pancreatitis
- **Clinical Features**
  - Recurrent attacks of acute pancreatitis
- **Investigations**
  - **Investigation of choice:** MRCP (to visualize 2 separate ducts)
  - **Gold standard:** ERCP (diagnostic + therapeutic)
- **Treatment:**
  - Dorsal duct sphincterotomy
  - Dorsal duct sphincteroplasty

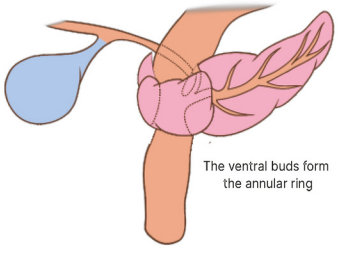


Annular Pancreas

00:3:42

FMGE 2023

- **Definition:**
  - Annular = Ring
  - A ring formed by the ventral pancreas around the 2nd part of the duodenum
  - Location: Proximal to the ampulla
- **Embryology:**
  - Bilobed ventral bud → Forms a ring around the 2nd part of the duodenum
  - During development → One part moves posteriorly, one part anteriorly
- **Clinical Features:**
  - Obstruction proximal to the ampulla → Multiple episodes of **Non-bilious vomiting**
- **Associations:**
  - Duodenal atresia
  - Down syndrome



Yourwish

- Investigation of choice: **ERCP**
- **Treatment of choice:** DD (Duodeno-duodenostomy) > DJ (Duodeno-jejunostomy)

Duodenal Atresia

00:06:15

NEET PG 2019, FMGE 2023

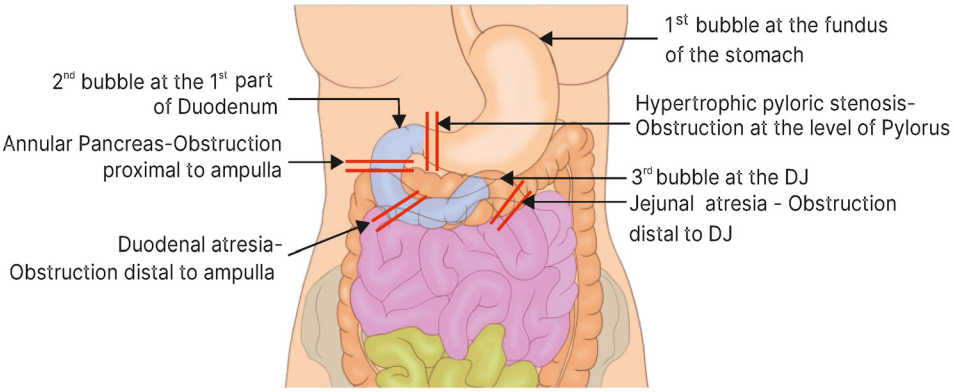
- Most common cause of neonatal intestinal obstruction
- Obstruction is **distal to the ampulla**
- **Clinical Features:**
  - **Bilious vomiting** (because obstruction is distal to the ampulla)
  - Just after birth → Multiple episodes of bilious vomiting
  - Bilious vomiting → Suspect small bowel obstruction
  - MCC of neonatal duodenal atresia.
- Radiological Features: Double bubble sign on Abdominal X ray
- **Treatment:** DD (Duodeno-duodenostomy) followed by DJ (Duodeno-jejunostomy)

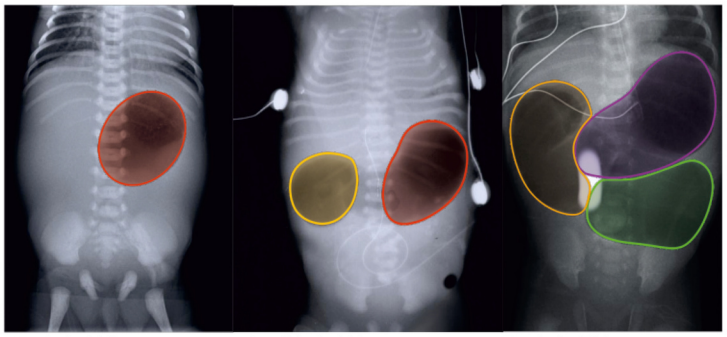
Superior Mesenteric Artery Syndrome

- **Treatment:** DJ (Duodeno-jejunostomy)

ABDOMINAL X-RAY FINDINGS - BUBBLE CLASSIFICATION

07:45:00





Single bubble appearance: Hypertrophic pyloric stenosis | Double bubble appearance: Annular pancreas and Duodenal atresia | Triple bubble appearance: Jejunal atresia

Single Bubble	Double Bubble	Triple Bubble

• Gas in the fundus only
• Obstruction between 1st and 2nd bubble
• **Seen in:** Hypertrophic pyloric stenosis
	• Gas in fundus + 1st part of duodenum
	• Obstruction between 2nd and 3rd bubble
	• **Seen in:**
	  ○ Annular pancreas
	  ○ Duodenal atresia
		• Gas in fundus + 1st part of duodenum + DJ junction
		• Obstruction distal to the 3rd bubble
		• **Seen in:** Jejunal atresia

ACUTE PANCREATITIS

00:09:05
NEET PG 2019,
FMGE 2023, 2024

Etiology

- **Most Common Causes:**
  - **Gallstones** (most common)
  - **Alcohol** (2nd most common)
- **Principle:**
  - Anything that injures the pancreas
  - Anything that inflames the pancreas
  - Anything that causes obstruction/compression of the pancreatic duct → Can lead to acute pancreatitis

Other Causes

- **Trauma:**
  - Blunt trauma to the abdomen (especially in children)
  - Cycle handle injury in children
- **ERCP:**
  - Most common complication of ERCP
  - Occurs in ~5% cases
- **Hypertriglyceridemia:** Causes inflammation
- **Hyperparathyroidism:**
  - PTH controls calcium balance
  - Hyperparathyroidism → Hypercalcemia
  - Hypercalcemia → Stone formation in organs
  - Pancreatic duct stones formation → Obstruction → Acute pancreatitis
- **Carcinoma pancreas**
  - Compression of the ducts
- **Cystic fibrosis**
  - Sero-Mucous secretions, solidified, lead to obstruction
- **Viral Infections - Mnemonic: CME**
  - C = Cytomegalovirus
  - C = Coxsackie
  - M = Mumps
  - E = Echovirus
- Multiple drugs can cause acute pancreatitis

Pathophysiology

- **Normal Physiology**
  - The pancreas secretes enzymes in zymogen form (inactive)
  - Fatty food → Release of enterokinase
  - Enterokinase → Converts trypsinogen to trypsin
  - Trypsin → Activates the rest of the pancreatic enzymes
- **In Acute Pancreatitis**
  - Abnormal intrapancreatic activation of pancreatic enzymes
  - Leads to injury of the duct and acini
  - Pancreatic enzymes come outside the pancreas
  - Fluid collection in the lesser sac

Yourwish

- Goes into the greater sac anteriorly → Omentum, which is made up of fat
  → **Fat necrosis:**
  - Lipase digests fat
  - Converts fat → Fatty acid + Glycerol
  - Fatty acid combines with calcium
  - Results in **chalky white deposits**
  - Also known as **saponification**
  - **Leads to Hypocalcemia**
- **Calcium changes:**
  - **Hypercalcemia** = Risk factor for acute pancreatitis
  - **Hypocalcemia** = Develops after acute pancreatitis (a poor prognostic factor)

Prognosis

- **Mild Acute Pancreatitis:**
  - The majority of cases are usually gallstone-induced and are Self-limited
  - So the mortality: <1%
- **Severe Acute Pancreatitis:**
  - Mortality: 10-30%
- **Best Prognosis:**
  - **Gallstone-induced pancreatitis**
  - Does not cause permanent changes in the pancreas (unlike alcohol)
  - **Alcohol-induced Pancreatitis:** Causes permanent changes in the pancreas

Complications & Mortality

- **ARDS (Adult Respiratory Distress Syndrome) <2week after hospitalization**
  - The patient should be put on a ventilator
- **The most common cause of death within 2 weeks of hospitalization:** MODS (Multi-organ Dysfunction Syndrome), as they can develop:
  - Respiratory failure
  - Hepatic failure
  - Renal failure
- Patient expires within 2 weeks
- Initial sign: Impaired lung function (ARDS)
- **The most common cause of death after 2 weeks of hospitalization:** Sepsis

Clinical Features

- **Pain:**
  - Epigastric pain radiating to the left side of the back
  - Partially relieved by sitting or bending forward
  - (The pancreas starts from the epigastrium, goes to the left side, located in the retroperitoneum.)
- **Gastrointestinal:**
  - **Paralytic ileus** (due to pancreatic enzymes)
    → Abdominal distension
    → Nausea
    → Vomiting

Yourwish

- **Pleural Effusion:** Reactive pleural effusion
  - **Left-sided** pleural effusion (pancreas located towards the left side of the diaphragm)

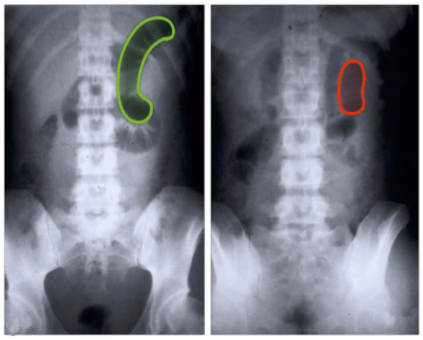
Important Information

- Liver disorders (amoebic/pyogenic liver abscess) → Right-sided pleural effusion
- Splenectomy complications, Acute pancreatitis → Left-sided pleural effusion

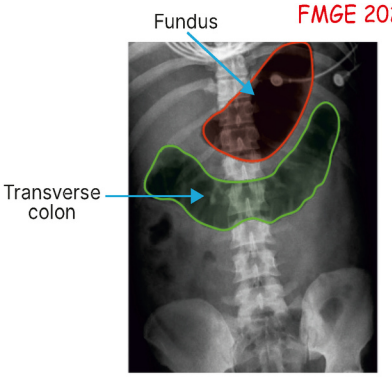
X-Ray Findings

FMGE 2020

- **Gasless abdomen**
- **Ground glass appearance**
- **Sentinel loop sign:**
  - Localized ileus involving the jejunum
- **Colon cutoff sign:**
  - The colon is cut off
  - The transverse colon is not visible
  - Cannot visualize the transverse colon and beyond (splenic flexure)
  - Due to localized ileus involving the transverse colon



Sentinel loop sign



Colon cut off sign

Hemorrhagic Pancreatitis Signs

00:17:25

NEET PG 2020, INICET 2019

- Seen in Severe acute pancreatitis
- There will be retroperitoneal bleeding
- Bleeding along fascial planes
- Ecchymosis at specific locations
- **Cullen Sign:**
  - Ecchymosis around the umbilicus
- **Grey Turner Sign:**
  - Ecchymosis around the flank
- **Fox Sign:**
  - Ecchymosis around the inguinal region



Investigations

- **Investigation of Choice:** CECT (Contrast-Enhanced CT)
  - Any organ in the retroperitoneum → Investigation of choice = CECT
- **Pancreatic pathologies requiring CECT:**
  - Acute pancreatitis
  - Pancreatic pseudocyst
  - Pancreatic abscess
  - Pancreatic necrosis
  - Carcinoma pancreas
- **Kidney pathologies requiring CECT:**
  - ADPKD
  - Renal tuberculosis
  - RCC
  - Angiomyolipoma
  - Phaeochromocytoma

Yourwish

- **Other retroperitoneal pathologies:**
  - Retroperitoneal lymphadenopathy
  - Retroperitoneal fibrosis
  - Retroperitoneal sarcoma
- **Laboratory Investigations in Emergency:** Diagnosis can be made on clinical features + laboratory investigations
  - **Amylase**
  - **Lipase** (more specific than amylase)
  - Problem: Cannot diagnose complications with amylase/lipase alone
  - Cannot detect: Pancreatic fluid collection, Abscess, Necrosis
- **Laboratory investigations for complications:**
  - Complications usually take 3 days to appear.
  - **Best time to perform CECT:** After 3 days or 72 hours of acute pancreatitis

Treatment

00:21:00

Conservative management: majority of cases

- **Oxygen inhalation** (for respiratory difficulties/ARDS)
- **IV Fluids** (for 3rd space loss due to lesser sac fluid collection)
  - Fluid of choice: Ringer's lactate
- **Analgesics** (for pain):
  - **NSAIDs:** Metamizol
  - **Opiates:** Buprenorphine
- **Nutrition:**
  - **Preferred:** Enteral nutrition (more physiological)
  - **Alternative:** Total Parenteral Nutrition (TPN)
    → TPN preferred in: Severe acute pancreatitis & pt in shock
  - Why the enteral route is avoided initially: Paralytic ileus → Patient might vomit
- **Antibiotics:**
  - **Not given prophylactically to all patients**
  - Because antibiotics themselves can cause acute pancreatitis
  - Given ONLY if there is: Evidence of sepsis or Fever present

Assessment of Severity - Scoring Systems

Assessment Method	Criteria / Notes
Ranson's score	≥3 → Severe Acute Pancreatitis (SAP)
Modified Glasgow score	
BISAP score	
Q-SOFA	Used for severity assessment
APACHE II	≥8 → Severe Acute Pancreatitis (SAP)
CT Severity Index	Balthazar CT grading + Necrosis score
CRP	>150 mg/L

Ranson Score

- For non-gallstone-induced pancreatitis

Time of Assessment	Parameter	Criteria
At Presentation	Age	>55 years
	WBC count	>16,000/μL
	Blood glucose	>200 mg/dL
	LDH	>350 IU/L
	AST	>250 U/L
After 48 Hours	Fall in hematocrit	>10%
	Blood urea nitrogen	>5 mg/dL
	Serum calcium	<8 mg/dL
	Base deficit	>4 mEq/L
	Arterial PO_2	<60 mmHg
	Fluid sequestration	>6 L

- **Mnemonic to Remember Values:**
  - 10-5-8-4-60-6
  - Total at presentation: 5 parameters
  - After 48 hours: 6 parameters
  - Total: 11 parameters: ≥3 positive → Severe acute pancreatitis
  - **Limitation:**
    → Minimum time required for complete assessment: **48 hours**

Bisap Score

- Bedside Index for Severity of Acute Pancreatitis
- **Mnemonic: BISHOP**
  - **B** = Blood Urea Nitrogen >25 mg/dL
  - **I** = Impaired mental status
  - **S** = SIRS (Systemic Inflammatory Response Syndrome) ≥2 of 4 parameters

Mnemonic: THR COUNTS

- **T** = Temperature >38°C OR <36°C
- **H** = Heart rate >90/min
- **R** = Respiratory rate >20/min or $PaCO_2$ <32 mmHg
- **WBC COUNTS** = WBC count >12,000/μL or <4,000/μL or >10% immature cells
  - **A** = Age ≥60 years
  - **P** = Pleural effusion present
- **Total BISAP Parameters:** 5
- **Score ≥3 = Severe acute pancreatitis**

Yourwish

Qsofa Score

- Quick Sequential Organ Failure Assessment

Mnemonic: Q-R-S-MS

- **Q** = QSOFA
- **R** = Respiratory rate ≥22/min
- **S** = Systolic BP ≤100 mmHg
- **MS** = Mental Status alteration (assessed by GCS)

Apache Ii Score

- Acute Physiology and Chronic Health Evaluation II

Mnemonic: "Blood Transfusion Increases Heart Rate at Commonwealth Games Shop Number 2"

Category	Mnemonic Letter / Word	Parameter
Vitals	B	Blood pressure
	T	Temperature
	H	Heart rate
	R	Respiratory rate
Laboratory Investigations	C	Creatinine
	W	WBC count
	G	**GCS (Glasgow Coma Scale)**
	S	Sodium
	H	**Hematocrit**
	O	**Oxygenation**
	pH	pH
	P	Potassium

- **Total Parameters:** 12
- **Score ≥8 = Severe acute pancreatitis**

Revised Atlanta Classification

- **For:** Local complications of acute pancreatitis. **Important Duration:** 4 weeks
- **Acute Complications (<4 Weeks):**
  - No defined wall
  - **APFC (Acute Pancreatic Fluid Collection):** Fluid collection in acute pancreatitis
  - **ANC (Acute Necrotic Collection):** Necrosis present
- **After 4 Weeks (Chronic):**
  - Formation of granulation tissue
  - Very defined wall

Yourwish

Yourwish

- **Pseudocyst:** Converted from APFC
- **WON (Walled-Off Necrosis):** Necrotic collection becomes walled off

Pancreatic Pseudocyst

00:33:15

- **Pseudocyst:** lined by Granulation tissue
  - **True cyst:** Lined by epithelium
- This is the most common cystic lesion of the pancreas
- Most common site: **Lesser sac** (just behind the stomach, above the pancreas)
- Most common cause of acute pancreatitis: Gallstones > Alcohol
- Therefore, the most common cause of pseudocyst **is alcohol** (Alcohol causes permanent changes**)**

Clinical Features

- **Symptoms:**
  - Asymptomatic: If small (Majority)
  - Symptomatic: If sufficiently large
    → It pushes on the posterior wall of the stomach in the lesser sac, causing obstruction
    → Abdominal pain (Most common symptom)
    → Vomiting:
- Non-bilious
- Contains undigested food particles due to obstruction

Complications

- **Most Common Complication: Infection** (most common) > **Hemorrhage** (followed by)

Investigations

- **Investigation of Choice for Diagnosis: CECT** (for most retroperitoneal pathologies)

Treatment

- **Conservative Management**
  - **Observation period:** 6 weeks. Since the cyst is small, it will resolve spontaneously.
- **Surgical Management**
  - **Indications for Surgery:**
    → **Duration:** >6 weeks (cyst persists)
    → **Size:** ≥6 cm
  - **Surgical Options:**
    → Cysto-gastrostomy (open cyst into the stomach)
    → Cysto-duodenostomy (open cyst into the duodenum)
    → Cysto-jejunostomy (open cyst into jejunum)
  - **Preferences:**
    → **Most popular:** Cysto-gastrostomy
    → **Treatment of choice:** Cysto-jejunostomy

CHRONIC PANCREATITIS

00:37:26

- Irreversible fibrosis
- Ongoing inflammation

Yourwish

Manifestations

- Exocrine insufficiency- 90% of acini destroyed
  - Leads to Malabsorption
  - Steatorrhea
    → Excretion of fecal fat
    → Definition: **Fecal fat >7 grams per day** (very important)
- Endocrine insufficiency: 90% of islet cells destroyed
  - Decreased insulin secretion
  - **Leading to Diabetes mellitus**
- **Chronic Pain**
  - Due to ongoing inflammation

Etiology

- **Most Common Cause:** Chronic heavy alcohol consumption (≥10 years)
- **Environmental Factors - Synergistic Effect:**
  - **Smoking:** Increases risk multiple times; it has a synergistic action with alcohol
  - People who drink + smoke → Much higher risk

Tigar-O Classification

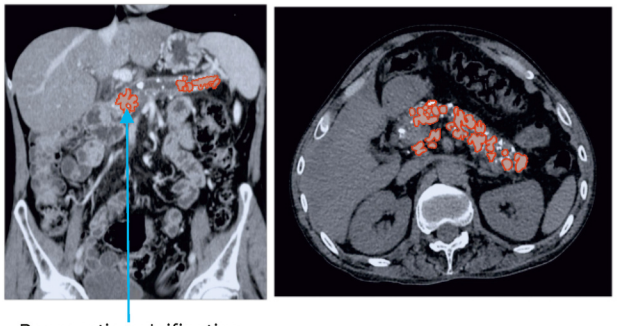
- For the etiology of chronic pancreatitis
  - **T** = Toxic-metabolic
  - **I** = Idiopathic
  - **G** = Genetic
  - **A** = Autoimmune
  - **R** = Recurrent severe
  - **O** = Obstructive

Clinical Presentation

- **Most Common Symptom:** Chronic epigastric abdominal pain
- **Characteristic Triad - Mnemonic: DPS**
  - **D** = Diabetes mellitus (endocrine insufficiency)
  - **P** = Pancreatic calcification seen in 30-40% cases (permanent change)
  - **S** = Steatorrhea (exocrine insufficiency)

Investigations

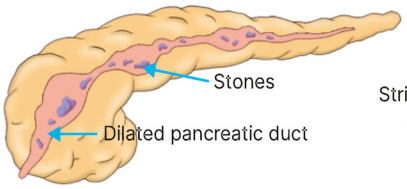
- **For Duct Pathologies:**
  - **Investigation of choice:** MRCP to visualize/evaluate the bile duct or pancreatic duct
  - **Gold Standard: ERCP**: Diagnostic + Therapeutic

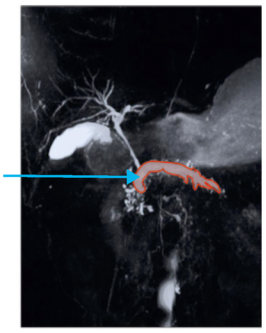


Imaging Findings (Very Important)

INICET 2020

- **MRCP/ERCP Findings:** Beaded appearance: Dilated duct with multiple stones.
- **Characteristic appearances**
  - String of pearls
  - Chain of Lakes appearance
- **Composition of stone:** Calcium carbonate
- **X-Ray/CT Findings:** Calcification in the pancreas

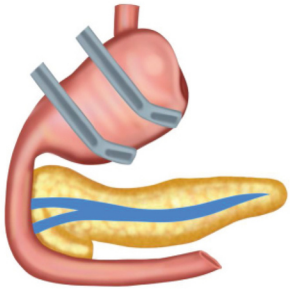
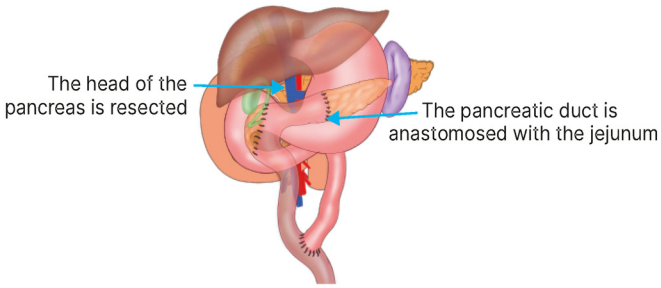




Treatment

- **Exocrine Insufficiency:** Enteric-coated pancreatic enzyme supplements
- **Endocrine Insufficiency (Diabetes):** Insulin
- **Chronic Pain:**
  - **First-line:** Analgesics
  - Same as acute pancreatitis:
    → **NSAIDs:** Metamizol
    → **Opiates:** Buprenorphine
  - **If pain is still not relieved:**
    → Theory: Obstruction of the pancreatic duct is responsible for pain
    → **ERCP with stenting will relieve the obstruction**
    → **Stone extraction**
  - **If still symptomatic:** Celiac ganglion block
  - **If still symptomatic:** Surgery

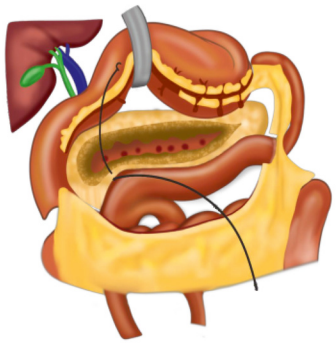
Surgical Management

Drainage Procedures	Resection Procedures
Purpose: Since there is an obstruction to secretions, → Drain it	Theory: Pancreatic head = Pacemaker of inflammation
	Must resect the head Maximum pain relief after this procedure
	Resection Procedures:
Procedure: Puestow = LPJ (Longitudinal Pancreatico-Jejunostomy) 	a) Beger's Procedure: DPPHR (Duodenal Preserving Pancreatic Head Resection) 
• Longitudinal opening of the pancreatic duct with removal of stones and anastomosis of the duct to the jejunum to drain pancreatic secretions.	• Duodenum-preserving resection of the pancreatic head with pancreatico- jejunostomy to drain the remaining pancreas.

Yourwish

- Along the whole length of the pancreas, the jejunum is attached

b) Frey's Procedure: LR-LPJ (Local Resection of Pancreatic Head + Longitudinal Pancreatico-Jejunostomy)



- Local resection/coring of the pancreatic head combined with longitudinal pancreaticojejunostomy along the pancreatic duct.
- Pancreatic head combined with longitudinal pancreaticojejunostomy along the pancreas

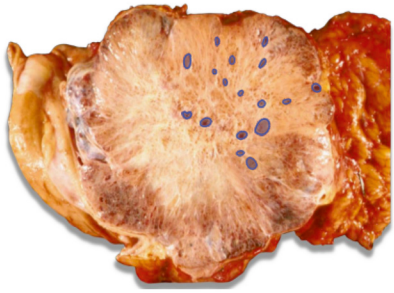
CYSTIC NEOPLASMS OF PANCREAS

00:50:00

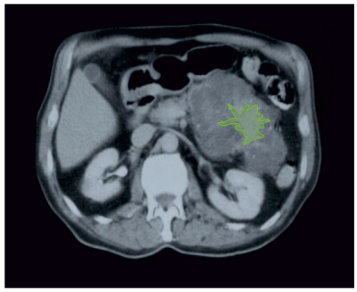
- **Most Common Cystic Lesion:** Pseudocyst (75% of cases)
- **Most Common Cystic Neoplasm:** Serous Cystic Neoplasm (25%)

Serous Cystic Neoplasm (Serous Cystadenoma)

- Most common cystic neoplasm
- Benign
- More common in **females**
- Age group: **6th decade** (~60 years)
- Most common site: **Head of pancreas**
- **Appearance:**
  - Multiple small cysts, **like a sponge, are** called **microcystic**
  - **Honeycomb appearance**
- **Clinical Features:**
  - **Majority asymptomatic**
  - If symptomatic: Vague abdominal pain, dull aching abdominal pain
- **Investigations:**
  - **Investigation of choice for diagnosis:** CECT
  - **CT Findings**
    → **Central stellate scar**
    → **Central sunburst calcification**
- **Aspiration analysis**
  - **Cyst Content:** Serous
  - **Nature:** Benign
  - **Tumor Markers:** CEA- Normal or relatively low
  - **Amylase:** Normal or low (no acute pancreatitis)



Microcysts



Central stellate scar

Yourwish

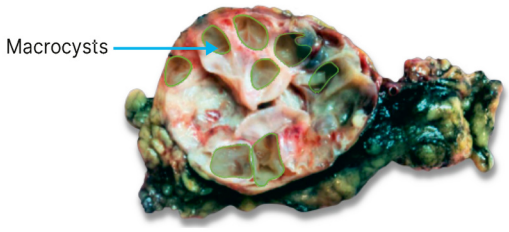
Yourwish

- **Treatment:**
  - The tumor is benign
  - Patient asymptomatic
  - **Majority:** Only observation
  - **Indications for excision:**
    → Not sure what kind of tumor
    → Patient has symptoms
    → Size is big (>4 cm)

Mucinous Cystic Neoplasm

00:52:31

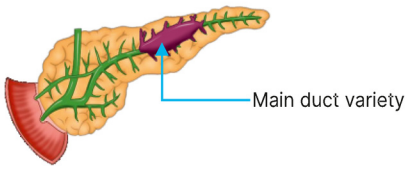
- 2nd most common cystic neoplasm
- **Appearance:** Cysts are relatively larger and are **Macrocystic**
- **Pathological Features:**
  - Macrocystic
  - Ovarian-like stroma
  - Staining for estrogen and progesterone: positive
- **Clinical Features:**
  - **Most patients are symptomatic**
    → Symptom: Vague, dull, aching pain
  - **Premalignant** (can become malignant)
  - More common in **females**
  - Age group: **6th decade**
  - Most common site: **Body and tail**
- **Investigations:**
  - **Investigation of choice:** CECT
  - **CT Findings:** Peripheral eggshell calcification
- **Cyst Content:**
  - Content: Mucinous
  - Nature: Premalignant
  - Tumor Markers: CEA- Raised (because premalignant)
  - **Amylase:** Normal or low (no acute pancreatitis)
- **Treatment:**
  - **Treatment of choice:** Distal pancreatectomy

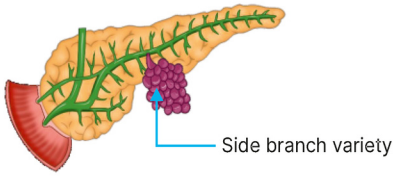


Intraductal Papillary Mucinous Neoplasm (Ipmn)

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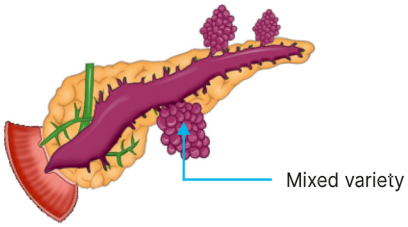
- Intraductal papillary projections
- Mucinous content
- Premalignant
- Equally common in males and females
- Age group: 6th-7th decade
- Most common site: Head and uncinate process
- **Types:**
  - **Main duct variety** (arises from the main duct)
  - **Side branch variety** (arises from a side branch)
  - **Mixed variety** (arises from the main duct + side branch)

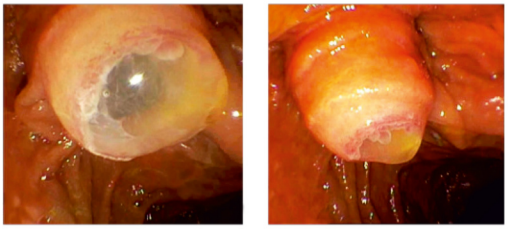




Yourwish

- **Pathophysiology:**
  - Excessive mucin secretion distends the whole duct, causing relative outflow obstruction.
  - Results in Recurrent attacks of acute pancreatitis
- **Clinical Features:**
  - Recurrent attacks of acute pancreatitis
  - Abdominal pain
- **Cyst Fluid Analysis:**
  - Content Mucinous
  - **Premalignant:** ↑CEA
  - Increased amylase (because of pancreatitis)
- **Investigations:**
  - **Initial investigation of choice:** MRCP (duct is dilated, visualize duct)
    → Endoscopic Findings (Classical Feature): Mucin extruding via the fish mouth opening
  - If the MRCP facility is not available: CECT
    → **Finding on both:** Dilated duct
- **Treatment:**
  - Since it's a Premalignant condition requiring Partial pancreatectomy





Mucin extruding through large Fish - Mouth Opening

Comparison Table - Cystic Neoplasms

Feature	Serous Cystic Neoplasm	Mucinous Cystic Neoplasm	IPMN
Cyst Content	Serous	Mucinous	Mucinous
CEA	Normal/Low	Raised	Raised
Amylase	Normal/Low	Normal/Low	Raised (only IPMN)

Most Common Genetic Mutation:

AIIMS 2020, FMGE 2020

Cancer Type	Most Common Genetic Mutations
Carcinoma Pancreas	KRAS > P16
Cholangiocarcinoma	KRAS > P16
Carcinoma Gallbladder	P53 > KRAS
Carcinoma Stomach	P53 > COX-2

Carcinoma Pancreas Risk Factors

00:59:55

INICET 2020

Established	Association
• **Most Important Established Risk Factor:** Smoking **Hereditary Risk Factors - Mnemonic: H3-AFP** 1. **H** = Hereditary pancreatitis 2. **H** = HNPCC (Hereditary Non-Polyposis Colorectal Cancer) 3. **H** = Hereditary breast and ovarian cancer	**Associations - Mnemonic: DOC** • **D** = Diabetes mellitus • **O** = Obesity • **C** = Chronic pancreatitis

4. **A** = Ataxia-telangiectasia 5. **F** = FAP (Familial Atypical Multiple Mole Melanoma syndrome) 6. **P** = Peutz-Jeghers syndrome	

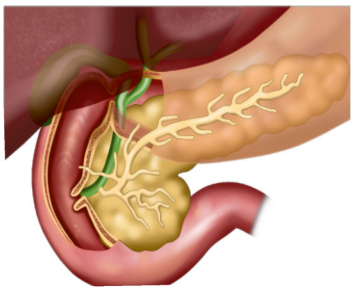
- **Maximum risk:** Peutz-Jeghers syndrome
- **Inheritance:**
  - 5 are autosomal dominant
  - 1 is autosomal recessive: **Ataxia-telangiectasia** (only one)

Pathology

- **Most Common Type:** Adenocarcinoma
- **Most Common Site:** Head > Body > Tail
- **Tumor Markers:**
  - **Non-specific:** CEA (Carcino-Embryonic Antigen)
  - **Specific:** CA 19-9 (for carcinoma pancreas, gallbladder, cholangiocarcinoma)
- **Most Common Site of Metastasis:** Liver
  - Pancreas venous drainage → Splenic vein
  - Splenic vein + Superior mesenteric vein → Portal vein
  - Portal vein → Liver
- **Chemotherapy:** Gemcitabine
- **Important Pathology:**
  - Intense desmoplastic reaction
  - Excessive fibrosis around the tumor
  - Therefore, biopsies are not very informative in carcinoma of the pancreas

Clinical Features

INICET 2022



- **By Location:**
  - **Head of Pancreas (Most Common Site):**
    → Mass in the head → Compression of the bile duct
    → Obstruction/compression → Jaundice
    → Most common symptom overall: Jaundice
  - **Body and Tail Tumors:**
    → No compression of the bile duct
    → Weight loss
- **Overall, the most common symptom:**
  - Jaundice followed by weight loss
  - **Obstructive Jaundice Features:** Pruritus (itching), Anorexia, Fatigue, Clay colored stools
- **Symptom by Tumor Location:**
  - **Periampullary carcinoma:** Jaundice (obstruction of the bile duct around the ampulla)
  - **Head of pancreas:** Jaundice
  - **Body or tail:** Weight loss (far from the bile duct)

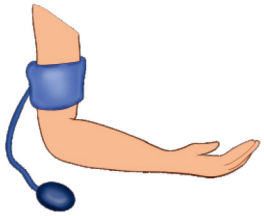
Yourwish

Special Signs & Syndromes

- **Trousseau Syndrome:**
  - Migratory superficial thrombophlebitis
  - Generally seen in malignancies
  - Most commonly in: Carcinoma pancreas



- **Trousseau Sign:**
  - Inflate cuff → Carpopedal spasm (if hypocalcemia)
  - Due to hypocalcemia
  - Carpopedal spasm

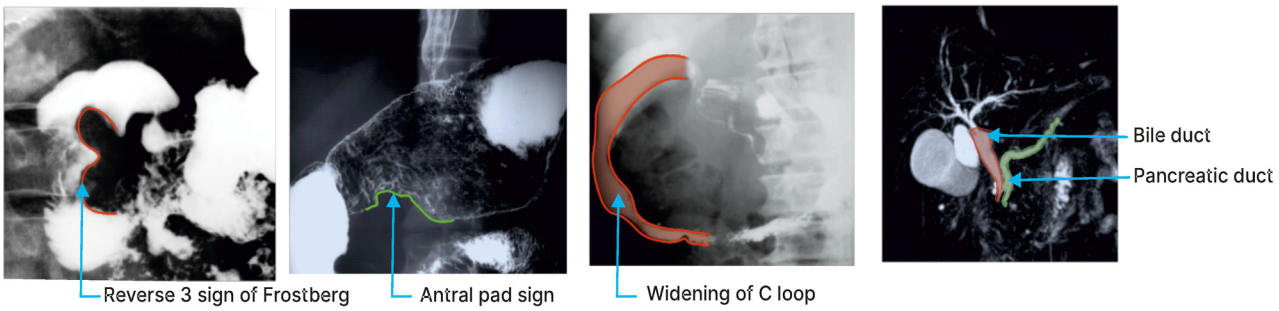


- **Troisier Sign:**
  - Left supraclavicular lymphadenopathy



Investigations

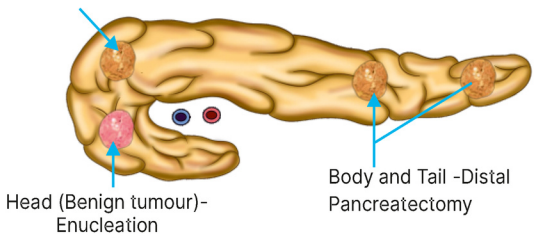
- **IOC:** CECT
  - Special Type: MDCT (Multi-Detector CT)
- Radiological Signs in CA Head of pancreas
  - **Antral Pad Sign**
    → Mass in the head → Compresses the antrum
  - **Reverse 3 Sign of Frostberg**
    → Tumor near head; inflamed, prominent medial duodenal wall, suggestive of a "reverse 3" sign
  - **Double Duct Sign**
    → Tumor in the head that compresses both the bile duct + pancreatic duct
  - **Widening of the C-loop**



Surgical Management

01:07:50

- **Tumor in Body and Tail:**
  - **Distal pancreatectomy:** Cut the body and tail
- **Malignant Tumor in the Head:**
  - **Whipple's procedure** (Pylorus-preserving Whipple's procedure)
  - Also known as **Pancreatico- duodenectomy (PD)**
- **Benign Tumor in Head:**
  - Enucleation
  - Classical example: Insulinoma (benign tumor in the head)

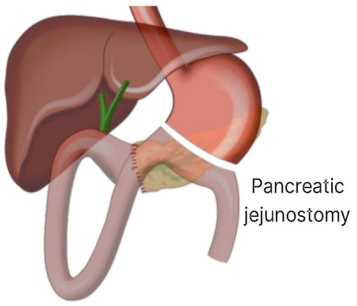


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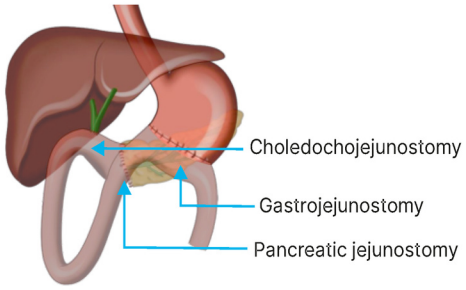
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Whipple's Procedure

- It's also called Pancreatico-Duodenectomy



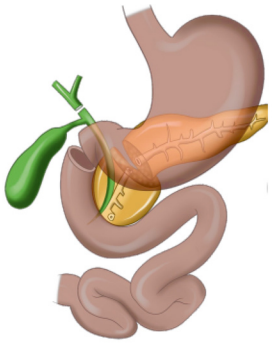
- **Structures Removed:**
  - Pancreas (head and uncinate process)
  - The distal part of the stomach
  - Gallbladder
  - Bile duct
  - C-loop of the duodenum
  - A little part of the jejunum
- **Structures Left:**
  - Proximal part of the stomach
  - Pancreas (body and tail)
  - Common hepatic duct (or bile duct)
  - Jejunum



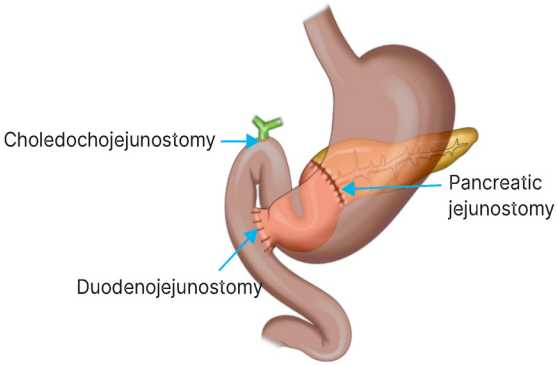
- **Sequence of Anastomoses:**
  - **PJ (Pancreatico-Jejunostomy):** Between the pancreatic duct and the jejunum
  - **HJ (Hepatico-Jejunostomy/Choledocho-Jejunostomy):** Between the bile duct and the jejunum
  - **GJ (Gastro-Jejunostomy):** Between the stomach and the jejunum

Longmire Traverso Procedure 01:09:40

- **Also Known As:** Pylorus Preserving Pancreatico-Duodenectomy
- **Difference from Standard Whipple's:**
  - Pylorus preserved. Stomach cut at the first part of the duodenum (not the distal stomach)



- **Structures removed:**
  - Whole C-loop of the duodenum
  - Gallbladder
  - Bile duct
  - Pancreas (head and uncinate process)



- **Sequence of Anastomoses:**
  - PJ (Pancreatico-Jejunostomy)
  - HJ (Hepatico-Jejunostomy/Choledocho-Jejunostomy)
  - DJ (Duodeno-Jejunostomy): Between the 1st part of the duodenum and the jejunum
    → Different from standard Whipple's (which is GJ)
- **Most Dangerous Substance:** Pancreatic enzymes
- **Most Common Site of Anastomotic Leak:** PJ >HJ>GJ
- **Most Common Complication:** DGE (Delayed Gastric Emptying)
- **Most Common Cause of Death:** Cardiopulmonary complications (nowadays)
- **Most Important Predictor of Survival:** R0 resection
  - Remove the whole tumor with negative margins
- **Most Important Margin:**
  - Uncinate margin
  - Also known as:
    → Superior mesenteric vessel margin
    → Retroperitoneal margin

Yourwish

Neuroendocrine Tumors

01:13:11
FMGE 2020, NEET PG 2023

- **Origin:** Arises from neuroendocrine cells
- Examples:
  - Insulinoma (from beta cells)
  - Glucagonoma (from alpha cells)
  - Gastrinoma (from G cells)
- **Most Common Neuroendocrine Tumor:**
  - Non-functional: PPoma (Pancreatic Polypeptidoma)
  - Functional Neuroendocrine Tumor: Insulinoma
- **Most Common Functional and Malignant NET of the pancreas:** Gastrinoma

Clinical Features

- **Carcinoma Pancreas (Adenocarcinoma):**
  - Symptomatic (mass effect); mass compresses the bile duct → Jaundice
- **Neuroendocrine Tumors:**
  - Symptomatic due to active substance production (e.g., Insulinoma → Hypoglycemia; Gastrinoma → Ulcer)
  - Symptomatic, diagnosed, and treated early
  - Relatively better prognosis than adenocarcinoma

Diagnosis & Localization

- Diagnosed in the lab after we measure the active substance or its byproduct
  - Examples:
    → Insulinoma: Measure the insulin and glucose ratio
    → Gastrinoma: Measure gastrin
- **Investigation of Choice for Localization:**
  - Almost all neuroendocrine tumors express somatostatin receptors (except insulinoma)
  - SRS (Somatostatin Receptor Scintigraphy)
- **Most Common Site of Metastasis:** Liver

Insulinoma

01:15:45
FMGE 2020, NEET PG 2023

- Most common functional neuroendocrine tumor
- 90% are benign
- Most common site: Equally distributed in the head, body, and tail
- **Whipple's Triad:**
  - Increased insulin secretion → Hypoglycemia
  - Blood glucose level: ~45-50 mg/dL
  - Improvement in symptoms after taking oral glucose

Clinical Features

- **Neuroglycopenic Symptoms:**
  - Dizziness
  - Confusion
  - Headache
  - Coma (when glucose <40)
- **Sympathetic Stimulation:**

- Tachycardia
- Palpitations
- Excessive sweating
- Sympathetic stimulation causes gluconeogenesis to counteract hypoglycemia

- Habitual eating when symptoms appear leads to weight gain (atypical for tumors). Painless

Diagnosis

- **Gold Standard Laboratory Investigation:**
  - 72 hours of fasting
  - Calculate the insulin and glucose ratio
  - Diagnostic value: Insulin/Glucose ratio >0.4
- **Investigation for Localization:**
  - Overall best: Intra-operative endoscopic ultrasound with manual palpation
  - Exception to SRS rule (all other neuroendocrine tumors use SRS)

Treatment

- **Pre-operative Preparation:** Diazoxide
  - Directly toxic to beta islet cells
  - Controls insulin secretion
  - Controls hypoglycemia
- **Surgical Treatment:**
  - **If in body/tail:** Distal pancreatectomy
  - **If in head:** Enucleation (because benign)

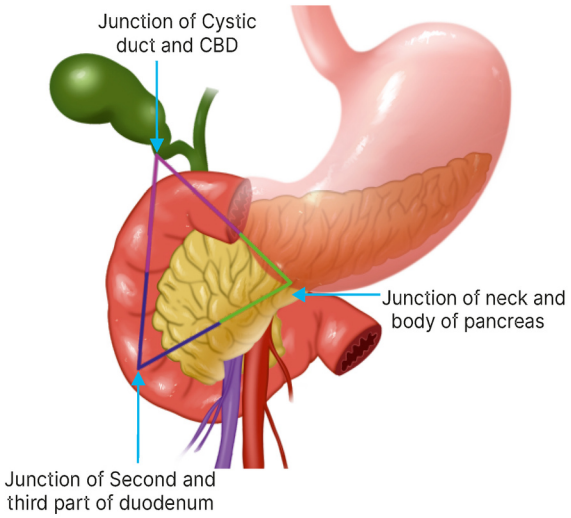
Gastrinoma

01:20:00

- Also known as Zollinger-Ellison syndrome
- Most common functional and malignant neuroendocrine tumor
- **Most Common Site:** Duodenum (most common) > Pancreas
  - In duodenum: D1 > D2 > D3 (NOT seen in D4)
- **Association:**
  - Sporadic: 75%
  - **Familial (MEN 1):** 25%
  - **In MEN 1, the most common site:** Still 1st part of the duodenum

Triangle of Passaro

- **Boundaries :**
  - Junction of the cystic duct and the CBD
  - Junction of the 2nd and 3rd parts of the duodenum
  - Neck of the pancreas
- 90% of gastrinomas are located in the Triangle of Passaro



Yourwish

Clinical Features

- **Pathophysiology:** Increased gastrin → Increased acid secretion
- **Clinical Features:**
  - PUD (Peptic Ulcer Disease)
  - MC symptom: Abdominal pain
  - Acid reflux/retrosternal heartburn
  - Dyspepsia
  - **Acid-induced diarrhea:**
    → Acid inactivates pancreatic enzymes in the duodenum
    → Nasogastric aspiration characteristically halts diarrhea

Diagnosis

- **Gastrin level:** >1000 pg/mL
- **Diagnostic Criteria:**
  - Raised gastrin
  - Gastric aspirate pH<2
- **Best Provocative Test:** Secretin stimulation test
- **IOC for Localization:** SRS (Somatostatin Receptor Scintigraphy)

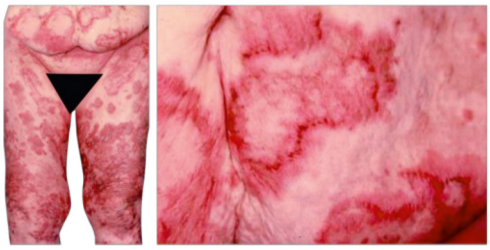
Treatment

- **Drug of choice:** PPI
- **Treatment of choice:** Pylorus-preserving Whipple's procedure

Glucagonoma

01:23:50

- Increased secretion of glucagon: Diabetes
- **Cutaneous Syndrome:**
  - **Hyperglycemic cutaneous syndrome**
  - Also known as **4D Syndrome**
  - **4D Syndrome:**
    → **D** = Diabetes mellitus
    → **D** = Dermatitis
    → **D** = DVT
    → **D** = Depression
- Most Common symptom: NEM (Necrolytic Erythema Migrans)
- Most Common site: Body and tail
- **Diagnosis:**
  - **Glucagon level:** >1000 pg/mL (same value as gastrinoma)
  - **Investigation for Localization:** SRS
- **Treatment of choice:** Distal pancreatectomy



Vipoma

01:25:46

- VIP = Vasoactive Intestinal Polypeptide
- **Other Names:**
  - Werner-Morrison syndrome
  - **Pancreatic cholera** (watery diarrhea, like cholera, tumor in the pancreas)

Yourwish

Yourwish

- **Most Informative Name:** WDHA Syndrome
- **WDHA Syndrome:**
  → **W** = Watery
  → **D** = Diarrhea
  → **H** = Hypokalemia
  → **A** = Achlorhydria

- **Clinical Features:**
  - **Watery diarrhea:** 4-6 liters per day
  - Loss of electrolytes
    → Sodium loss → Hyponatremia
    → Chloride loss → Hypochloremia
    → Potassium loss → Hypokalemia
    → Bicarbonate loss → Metabolic acidosis (not alkalosis)
  - **Special Features:**
    → Hypercalcemia
    → Hyperglycemia (RBS raised)
- **Most Common site:** Tail
- **Diagnosis:**
  - VIP level raised
  - **Investigation for Localization:** SRS
- **Treatment**
  - Emergency Management:
    → Fluid resuscitation
    → Correction of dyselectrolytemia
  - Definitive Treatment: Distal pancreatectomy

Location Summary - Pancreatic Tumors

- **Most Tumors Located in the HEAD:**
  - Carcinoma pancreas
  - PPoma (Pancreatic polypeptidoma)
  - Somatostatinoma
  - Serous cystadenoma
  - IPMN
- **Located in BODY AND TAIL:**
  - Mucinous cystic neoplasm
  - Glucagonoma
- **Located in TAIL:**
  - VIPoma
- **Equally Distributed (Head, Body, Tail):**
  - Insulinoma
- **Located in DUODENUM > Pancreas:**
  - Gastrinoma (D1 > D2 > D3, NOT in D4)

Yourwish

MCQ

01:30:00

Q. A 46-year-old man presented to OPD with chronic abdominal pain. The X-ray image shows calcification in the pancreas. What is the diagnosis?



A. Carcinoma pancreas
B. Enterolith in the jejunum
C. Chronic pancreatitis
D. Horseshoe kidney with calculi

Ans: C

Q. A 65-year-old female patient presents with vague abdominal pain. On evaluation, the patient has raised mucin and raised CEA levels with normal amylase. What is the most probable diagnosis?
A. Serous cystadenoma of pancreas
B. Pseudocyst of pancreas
C. Mucinous cystic neoplasm of pancreas
D. Intraductal papillary mucinous neoplasm of the pancreas

Ans: C

Explanation:

- Mucinous component and raised CEA rule out serous cystadenoma (serous content, normal/low CEA). Normal amylase rules out IPMN (raised amylase, pancreatitis). Therefore, the diagnosis is Mucinous Cystic Neoplasm.

Q. What is the Tigar-O classification used for?
A. Acute pancreatitis
B. Chronic pancreatitis
C. Acute cholecystitis
D. Pancreatic cancer

Ans: C

Q. A patient with a recurrent history of gastric ulcer presented with severe abdominal pain. On evaluation, there is a small mass in the anterior wall of the duodenum. Which investigation will help in diagnosis?
A. Insulin levels
B. Gastrin levels
C. Urea breath test
D. 24 hours ambulatory PG monitoring

Ans: B

Explanation:

- Mass in the duodenum → Gastrinoma
- In insulinoma → Check insulin level
- Urea breath test → For H. pylori
- 24-hour ambulatory pH monitoring → For GERD

Q. An elderly male presented with epigastric pain, anorexia, weight loss, and jaundice for the last 2 years. He had Scratch marks all over his body. On examination, the gallbladder was palpable, smooth, and non-tender. What is the most probable diagnosis?

A. Choledocholithiasis
B. Carcinoma head of the pancreas
C. Carcinoma of the gallbladder
D. HCC

Ans: B

Explanation:

- Palpable gallbladder in obstructive jaundice → **Courvoisier's law**
- Courvoisier's law → Cause of obstructive jaundice periampullary carcinoma
- Periampullary carcinoma includes:
  - Ampullary carcinoma
  - Carcinoma head of the pancreas
  - Cholangiocarcinoma
  - Duodenal carcinoma

Q. A patient presented with features of chronic pancreatitis. Recurrent attacks present. Dilatation of the pancreatic duct with a stone in the duct (intraductal calculi). What is the procedure?

A. Pancreaticoduodenectomy
B. Longitudinal pancreaticojejunostomy
C. ERCP with sphincterotomy
D. Coring of the pancreas head

Ans: B

Yourwish

22. ESOPHAGUS

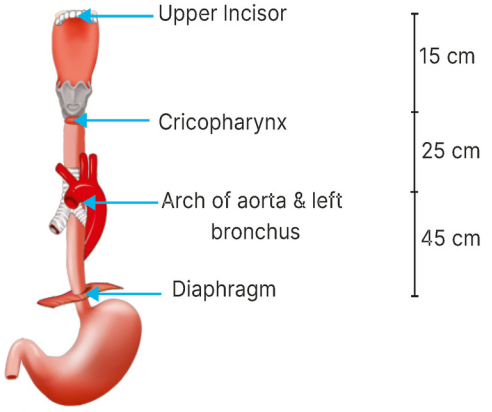
ANATOMY OF ESOPHAGUS

00:00:30

- Length: 25 cm
- Extent: C6 to T11

FMGE Jan, July 2023

Normal Endoscopic Narrowings Of Esophagus



- Landmark = Upper incisor
- At 15 cm - Narrowing due to cricopharynx
- At 25 cm - Narrowing due to
  - Arch of Aorta
  - Left bronchus
- At 40 cm - Narrowing due to diaphragm
- Mnemonic - BALD
  - B - Beginning of esophagus / cricopharynx
  - A - Arch of aorta
  - L - Left bronchus
  - D - Diaphragm

Characteristic Features Of Esophagus

- No serosa
- No villi
- No secretions
- Only Auerbach plexus present
- Meissner plexus absent

Foreign Body In Esophagus

00:03:00

NEET PG 2021

- Narrowest tube of GIT - Esophagus
- Narrowest part of esophagus - Cricopharynx
- Diameter of cricopharynx - 1.5 cm or 15 mm
- If foreign body crosses cricopharynx
  - Usually it will be excreted in stool
  - Only observation required
- Exceptions
  - Sharp foreign body (Nail, Pin, Blade)
  - Button battery (Contains Lithium hydroxide, Sodium hydroxide, Potassium hydroxide)
  - These are dangerous because alkali causes liquefactive necrosis
  - T/t: Endoscopic removal

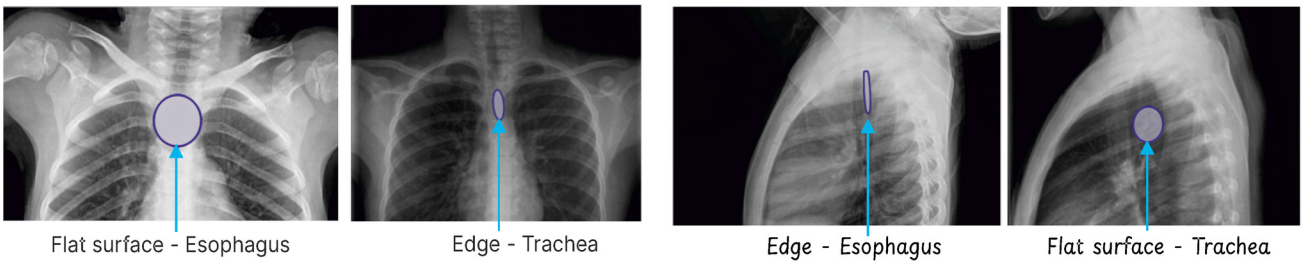
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Coin In Esophagus Vs Trachea

Clinical Difference

- Esophagus
  - Dysphagia
  - Patient not severely symptomatic
- Trachea
  - Dyspnea
  - Severe symptoms

FMGE Dec 2021



X-ray Difference

Location	PA View	Lateral View
Esophagus	Flat surface seen	Edge seen
Trachea	Edge seen	Flat surface seen

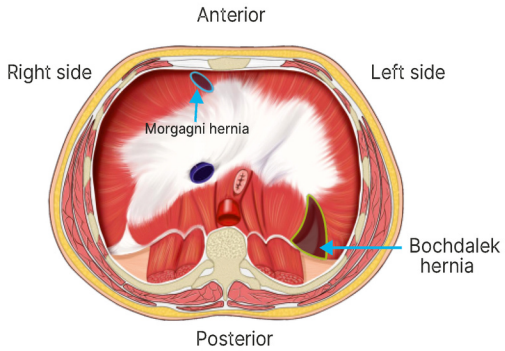
Management Of Esophageal Foreign Body

- Impacted foreign body at cricopharynx & symptomatic: Endoscopic removal
- Foreign body beyond cricoipharynx & asymptomatic: Observation
- Button battery: Endoscopic removal

FMGE Jan 2023
00: 09:20

Congenital Diaphragmatic Hernia

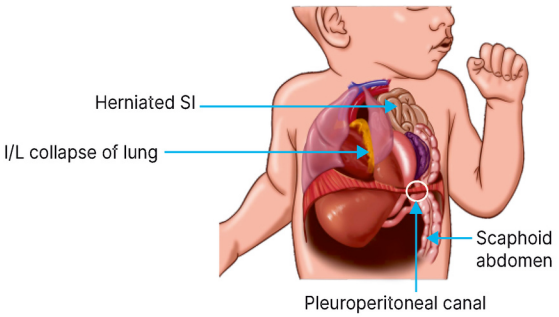
- Most common type: Bochdalek hernia (Left posterolateral)
- Second most common: Morgagni hernia (Rgiht anteromedial)



Bochdalek Hernia

INICET May 2025

- Most common congenital diaphragmatic hernia
- Site of defect: Left posterolateral
- Cause- Failure of fusion of left pleuroperitoneal canal
- Most commonly herniated organ- Small intestine
- Other herniated organs
  - Stomach
  - Spleen
  - Transverse colon



Yourwish

Clinical Features

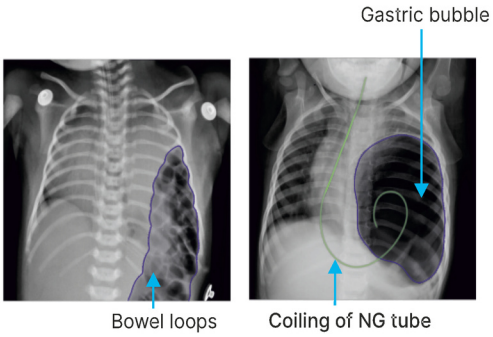
- TRIAD OF BOCHDALEK HERNIA (RDS)
  - R - Respiratory distress
  - D - Dextrocardia
  - S - Scaphoid abdomen
- Most common cause of death / MC important prognostic factor: Pulmonary hypoplasia > Pulmonary hypertension
- Bag and mask ventilation is contraindicated
  - Because air enters stomach and intestines
  - Causes more distension
  - Further worsens lung compression

Diagnosis

- Antenatal
  - Polyhydramnios
- Postnatal diagnosis : Chest X-ray

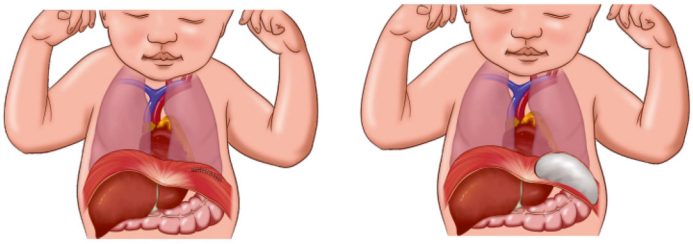
Findings

- Multiple bowel loops in left hemithorax
  - Suggests herniation of small intestine
- Gastric bubble in thorax
  - Suggests herniation of stomach
- If infant feeding tube / Ryle's tube inserted
  - Coiling in thoracic stomach



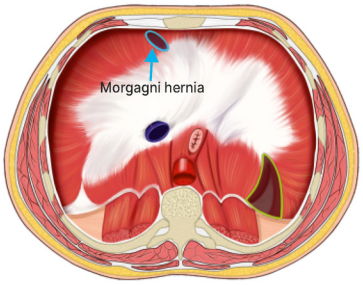
Treatment

- Reduce the herniated organ back
- Close the defect
- If defect is large - Use mesh
- In children
  - Mesh is not used
  - Use prosthetic patch



Morgagni Hernia

- Defect - Right anteromedial
- Location - Just behind sternum
- Also known as - Retrosternal hernia
- Since it is right-sided congenital diaphragmatic hernia
  - Occurs via space of Larrey
  - Also called Larrey hernia
- Through space of Larrey
  - Superior epigastric vessels pass
- Most commonly herniated organ - Transverse colon
- Treatment
  - Reduce herniated organ
  - Repair defect
  - If large defect
    → Prosthetic patch

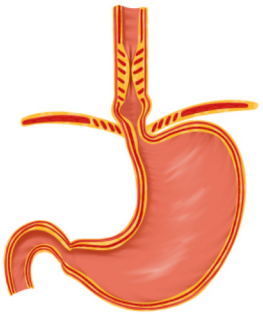


Hiatal Hernia

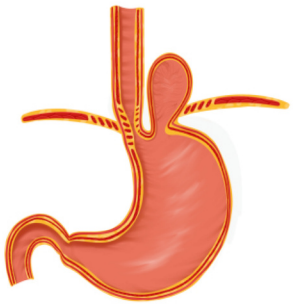
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- Two things should remain below diaphragm
  - GE junction
  - Fundus

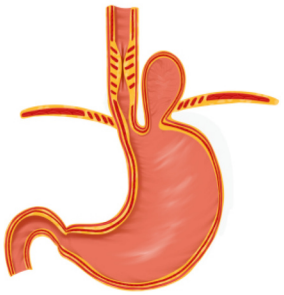
Types of Hiatal Hernia



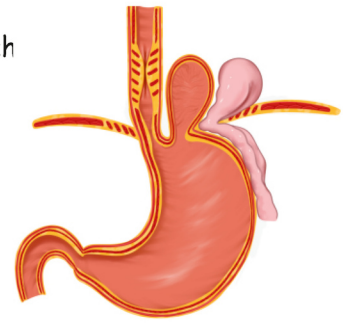
Type 1
- Sliding hernia
- Herniation of GE junction
- GE junction moves up and down



Type 2
- True paraesophageal hernia
- Also called rolling hernia
- Herniation of only fundus
- Fundus herniates by side of esophagus



Type 3
- Mixed paraesophageal hernia
- Herniation of
  - GE junction
  - Fundus



Type 4
- Paraesophageal hernia with herniation of intra-abdominal organs other than stomach

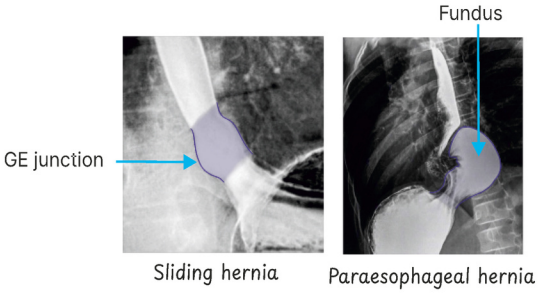
Symptoms Of Hiatal Hernia

Type	Key Features	Symptoms/Complications
Type 1 (Sliding)	Gastroesophageal junction herniates	• Reflux
Type 2 (True Paraesophageal)	Fundus herniates alongside esophagus	• Abdominal pain • Obstruction, ischemia
Type 3 (Mixed)	Both sliding + paraesophageal	• Reflux + abdominal pain
Type 4	Other organs (bowel) herniate with stomach	• Abdominal pain • Obstruction, strangulation, intestinal complications

Yourwish

Diagnosis Of Hiatal Hernia

- Investigation of choice
  - CT with oral contrast
- Sliding hernia
  - Herniation of only GE junction
- Paraesophageal hernia
  - Herniation of fundus



Treatment Of Hiatal Hernia

- Reduce herniated organ back
- Repair the defect

Routes

- Thoracic route
  - More painful
- Preferred route
  - Abdominal route
- Open approach
- Laparoscopic approach

Preferred

- Laparoscopic approach
- Laparoscopic hiatal hernia repair via abdominal route

Ulcer

00:22:30

Riding / Cameron Ulcer

- Seen in sliding hiatal hernia
- Due to up and down movement of GE junction → Causes friction

Location

- Lesser curvature
- Near GE junction
- Also called Sliding ulcer
- Good thing
  - If hiatal hernia is repaired
  - Cameron ulcer heals

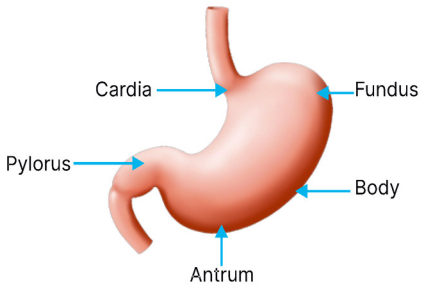
Stress Ulcer

- Also known as - Stress gastritis/ Hemorrhagic gastritis
- If seen in head injury - Cushing ulcer
- If seen in burns - Curling ulcer

FMGE June 2021, Jan 2024

Site of Stress Ulcer

- Directly or indirectly related to acid secretion
- Acid secreted by parietal cells
- Maximum concentration of parietal cells in fundus
- M/c site: Fundus > Body > Antrum >Pylorus
- M/c site in duodenum: D1 > D2 > D3 > D4



Yourwish

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Upper Esophageal Sphincter (ues) Vs Lower Esophageal Sphincter (les)

FMGE Jan 2025

Feature	UES	LES
Length	4-5 cm	Total: 5 cm Intra-abdominal: 2 cm
Pressure	60 mmHg	6-26 mmHg

Incompetent Les

- Total LES length < 2 cm
- Intra-abdominal length < 1 cm
- LES pressure < 6 mmHg
- Incompetent LES → Free reflux of gastric contents into esophagus → Esophagitis, Ulceration, Fibrosis, Stricture, Barrett esophagus, Adenocarcinoma

FMGE Dec 2021, Jan 2024

Gerd

00:27:00

- Due to incompetent LES
- Free reflux of acidic gastric content into esophagus

Can Lead To

- Esophagitis
- Ulceration
- Fibrosis
- Stricture
- Barrett esophagus (Coulmnar metaplasia)
  - Type of metaplasia - Intestinal metaplasia
  - Difference from gastric metaplasia
    → Intestinal metaplasia has goblet cells
  - Diagnosis
    → Endoscopy + biopsy
    → Biopsy should show goblet cells
- Adenocarcinoma

Clinical Features

- TRIAD OF GERD
  - Retrosternal heartburn
  - Epigastric pain
  - Regurgitation

Gerd In Children

- Can occur due to overfeeding
- Stretching of junction leads to reflux

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Atypical Complications of Gerd

- Laryngitis
- Pneumonia
- Nocturnal cough
- Asthma
- Pulmonary fibrosis

Diagnosis of Gerd

- Investigation of choice - Endoscopy
- Gold standard - 24-hour ambulatory pH monitoring
  - Used for:Diagnosis & Quantifying reflux
  - Score calculated - DeMeester score
    → Normal < 14.7
    → If more than 14.7 - Suggests GERD

Initial Management of Gerd

Lifestyle Modification

- Avoid smoking
- Decrease caffeine intake
- Do not lie down just after meals
- Avoid heavy meals, especially at night

For Symptomatic Improvement

- PPI
- Good response to PPI suggests
  - Patient may respond to surgery also

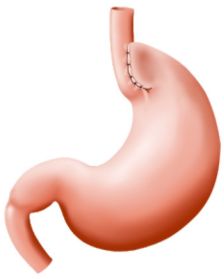
Mandatory Investigations Before Surgery For Gerd

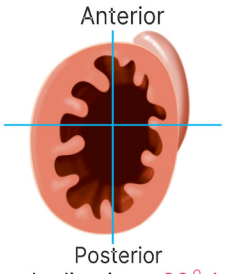
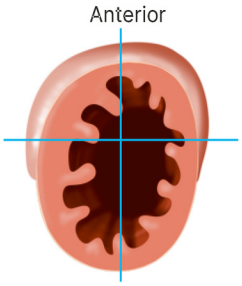
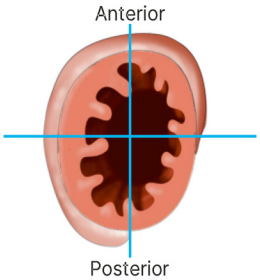
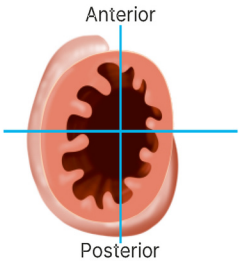
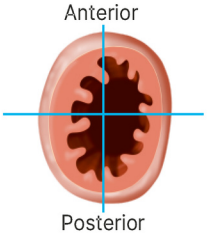
- 24-hour ambulatory pH monitoring
  - To confirm and quantify reflux
  - To rule out sliding hiatal hernia
- Endoscopy + biopsy
  - To rule out Barrett esophagus
  - To rule out malignancy

Gold Standard Treatment Of Gerd

- Laparoscopic Nissen's fundoplication
- Fundus is wrapped around LES
- This strengthens LES

Types of Fundoplication



Procedure	Fundoplication Angle	Direction
Watson	90°	Anterior  Watson fundoplication - 90° Anterior
Dor	180°	Anterior  Dor fundoplication - 180° Anterior
Belsey Mark IV	270°	Anterior Not commonly done nowadays  Belsey Mark IV fundoplication 270° Anterior
Toupet	270°	Posterior  Toplet fundoplication - 270° Posterior
Nissen	360°	Circumferential Most commonly performed worldwide  Nissen's fundoplication - 360°

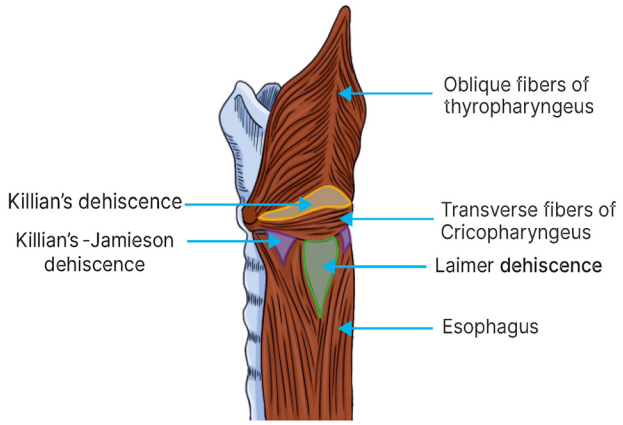
Yourwish

Partial Vs Complete Fundoplication

- Complete
  - Nissen
- Partial
  - Dor
  - Toupet

Upper Esophageal Region

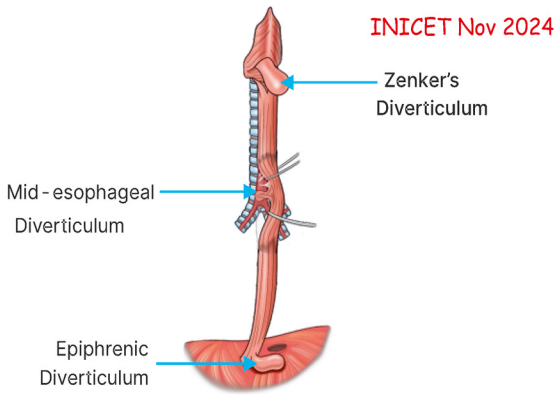
- Oblique fibers of thyropharyngeus
- Transverse fibers of cricopharyngeus
- Between them
  - Killian dehiscence
- Below this
  - Killian-Jamieson dehiscence
- In center
  - Laimer dehiscence



Esophageal Diverticulum

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INICET Nov 2024



Types

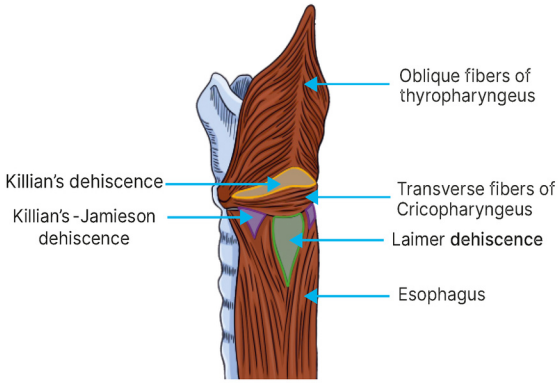
Feature	Zenker (Upper)	Mid-esophageal	Epiphrenic (Lower)
Location	Upper esophageal	Mid-esophageal (parabronchial)	Lower esophageal
Type	Pulsion False (mucosa + submucosa only)	Traction True (all layers)	Pulsion False (mucosa + submucosa)
Cause	-	TB, histoplasmosis (T3: Traction, True, Tuberculosis)	-
Demographics	Most common Elderly (6th-7th decade)	-	Site: Adjacent to diaphragm (Supradiaphragmatic)
Treatment	Small: Esophagomyotomy Large: Diverticulectomy + Diverticulopexy	Diverticulectomy + Diverticulopexy	Small: Esophagomyotomy OR Diverticulectomy + Diverticulopexy

Yourwish

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Zenker Diverticulum

- Most common type of esophageal diverticulum
- False diverticulum (Mucosa + Submucosa)
- Seen in: Elderly (Usually 6th–7th decade)
- Type - Pulsion diverticulum



Pathophysiology Of Zenker Diverticulum

FMGE Dec 2021

- Herniation of mucosa and submucosa
- Initially small
- Gradually increases in size
- Then compresses esophagus



Clinical Features Of Zenker Diverticulum

- Most common symptom - Dysphagia
- Other features
  - Sticking in throat
  - Nagging cough
  - Repeated throat clearing
  - Halitosis (D/t fermentation of food in diverticulum)
  - Persistent lump in throat sensation

Complications Of Zenker Diverticulum

- Food and liquid may enter diverticulum → during sleep, contents may enter trachea → Causes → Aspiration/ Pneumonitis
- Most common complication: Lung abscess
- Because inflammation continues in diverticulum
  - Increased risk of squamous cell carcinoma

Diagnosis Of Zenker Diverticulum

- Investigation of choice - Barium swallow



TREATMENT OF ZENKER DIVERTICULUM ACCORDING TO SIZE

- If size < 2 cm - Esophagomyotomy
- If size 2–5 cm - Cricopharyngeal myotomy + diverticulopexy
- If size > 5 cm - Diverticulectomy
- Treatment of choice- Cricopharyngeal myotomy + diverticulopexy

Yourwish

Endoscopic Procedure For Zenker Diverticulum

- Communication is created between
  - Diverticulum
  - Esophagus
- Septum between diverticulum and esophagus is divided using stapler
- Procedure name
  - Diverticuloesophagostomy
- Also known as
  - Dohlman procedure
- Used when size is
  - 2-5 cm
- It is
  - Endoscopic stapling of septum between diverticulum and esophagus

MOTILITY DISORDERS OF ESOPHAGUS

00:44:12

- M/c motility disorder/ m/c hypomotility disorder - Achalasia cardia
- M/c hypermotility disorder/ most painful motility disorder - Nutcracker esophagus
- IOC for diagnosis of motility disorders - Manometry

Achalasia Cardia

FMGE Dec 2021

- Achalasia means absence or failure of relaxation

Pathophysiology

- Characterized by absence of LES relaxation
- There is selective loss of inhibitory neurons - in Auerbach plexus

Types

- Primary achalasia
  - Etiology unknown
  - Most cases are primary
- Secondary achalasia
  - Due to malignancy
  - Due to Chagas disease

Similarity With Zenker Diverticulum

- Most common symptom
  - Dysphagia
- Aspiration can occur
- Can cause lung abscess
- Chronic inflammation increases risk of
  - Squamous cell carcinoma

Clinical Features Of Achalasia

- M/c symptom - dysphagia
- Food does not enter stomach properly → Weight loss & Regurgitation
- Dysphagia is more to Liquids > Solids
- This is the only esophageal condition where dysphagia is more for liquids first

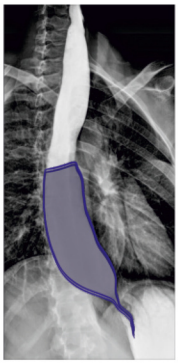
Triad

- DRAW
  - D – Dysphagia
  - R – Regurgitation
  - W – Weight loss

Complications Of Achalasia

- Aspiration
- Pneumonitis
- Most common complication - Lung abscess
- Increased risk of
  - Squamous cell carcinoma

FMGE Jan 2025







Diagnosis Of Achalasia

- Investigation of choice - Manometry
- Important barium swallow finding
  - Bird beak appearance
  - Pencil tip appearance
  - Rat tail appearance

Treatment of Achalasia

- Medical management
  - Drugs that relax smooth muscle and decrease LES pressure
  - Calcium channel blockers
  - Nitrates
  - 5-phosphodiesterase inhibitors
  - Botox injection - Helps LES relaxation
  - Dilatation
  - Bougie dilatation
  - Balloon dilatation
- Treatment of choice
  - Laparoscopic Heller cardiomyotomy
- POEM: Per oral endoscopic myotomy
  - POEM can be used in Achalasia & Diffuse esophageal spasm

Diffuse Esophageal Spasm

- Tertiary contractions
- Spasmodic contractions of esophagus
- Temporary reduction in blood supply
- Causes ischemia

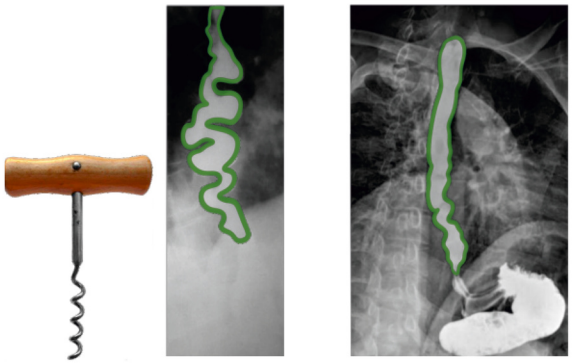
Clinical Features

- Left-sided chest pain
- Dysphagia
- May also have pain in cervical esophagus/neck

Yourwish

- Mimics
  - Angina
  - MI/ heart attack
- Cardiovascular profile is normal

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Diagnosis

- Investigation of choice- Manometry
- Barium swallow appearance
  - Corkscrew appearance
  - Pseudo-diverticula appearance
  - Rosary bead appearance

Treatment

- Since problem is spasm, give antispasmodics
  - Calcium channel blockers - most effective drug
  - Nitrates
- If no improvement – Esophagomyotomy
- Also helpful – POEM

Nutcracker Esophagus

FMGE June 2021

- M/c hypermotility disorder
- Most painful motility disorder

Pressure

- Esophageal pressure - > 180 mmHg

Clinical Features

- Chest pain
- Dysphagia

Diagnosis

- Manometry

Treatment

- Mainly medical management
- Calcium channel blockers
- Nitrates
- Surgery is not very helpful

NEET PG August 2024

00:55:10

BARRETT ESOPHAGUS

- Proximal migration of columnar epithelium into lower esophagus
- Extends: More than 1 cm above GE junction

Risk Factors

- Chronic GERD symptoms

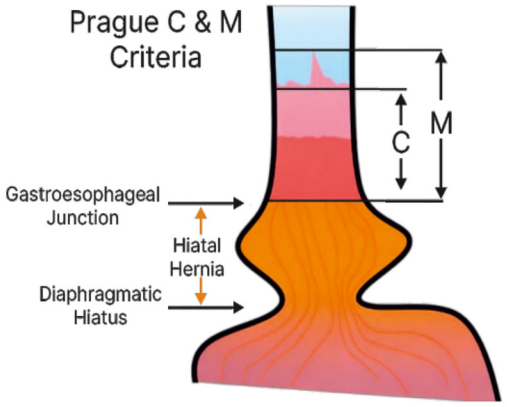
Yourwish

- Advancing age
- Smoking
- Central obesity
- Male gender

Clinical Features

- Majority have long history of GERD / reflux symptoms
- Many patients are asymptomatic

FMGE July 2023

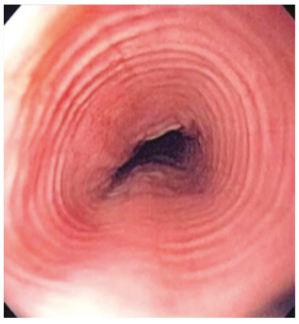


Pathology

- Columnar metaplasia(Intestinal type)
- Goblet cells

Endoscopy Finding

- Red velvety tongue-like projections
- The pale area - Squamous epithelium
- The red velvety area - Columnar epithelium



Diagnosis Of Barrett Esophagus

- IOC: Endoscopy + biopsy
  - Endoscopy shows red velvet like appearance
  - Biopsy shows Goblet cells
    → Biopsy protocol: Seattle biopsy protocol
- Four-quadrant random biopsy every 2 cm

Management

- Managed like GERD
- Medical treatment
  - PPI
  - Aspirin + high-dose PPI (Improves outcome)
- Surgery
  - Anti-reflux surgery
  - Laparoscopic Nissen fundoplication
- When endoscopic ablation is done
  - If patient has
  - Signs / symptoms
  - Evidence of malignancy
- Ablation is done for

Yourwish

- Flat lesions
- Without
- Nodularity
- Ulceration
- Irregular contour

- Methods of ablation
  - Radiofrequency ablation
  - Photodynamic therapy
  - Cryotherapy
- Most commonly used method
  - Radiofrequency ablation

CARCINOMA ESOPHAGUS

00:59:16

INICET Nov 2024

- Epithelium of esophagus – Squamous
- Most common type of carcinoma esophagus worldwide - Squamous cell carcinoma
- Most common type in Western countries - Adenocarcinoma (d/t obesity, High-fat diet, ↑ GERD → Barrett's esophagus → Adenocarcinoma)
- M/c site of squamous cell carcinoma - Middle one-third
- M/c site of adenocarcinoma- Lower one-third
- M/c site of carcinoma esophagus
  - Middle one-third (Because most common type is Squamous cell carcinoma)

Squamous Cell Carcinoma

- More common in -Low socioeconomic status
- Associated with - poor hygiene & HPV infection

Adenocarcinoma

- More common in - high socioeconomic status
- Associated with
  - High-fat diet
  - Obesity
  - GERD
  - Barrett esophagus

Risk Factors

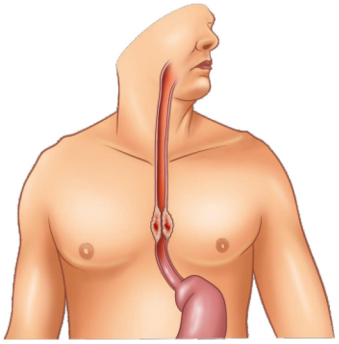
Adenocarcinoma	Squamous Cell Carcinoma
Obesity	Alcohol (most important)
High-fat diet	Smoking (most important)
GERD	Ingested carcinogens (nitrites, nitrates, nitrosamines)
Scleroderma (smooth muscle atrophy → LES relaxation → GERD)	Fungal toxins

Barrett esophagus	Achalasia cardia
	Zenker diverticulum
	Hot liquid ingestion
	Plummer-Vinson syndrome
	Tylosis
	Lye/corrosive injury
	Esophageal papilloma virus
	Bulimia nervosa
	Nutritional deficiency (MOZA: Molybdenum, Zinc, Vitamin A)

- Usual age - 6th decade
- M/c site of hematogenous metastasis – Liver
- Chemotherapy regimen
  - ECF(Epirubicin, Cisplatin, 5-fluorouracil)

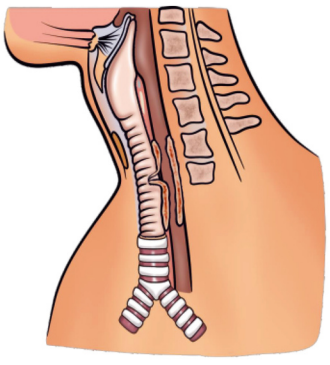
Clinical Features

- Dysphagia due to obstruction by a tumor(MC symptom)
  - Progressive dysphagia →Initially to solids, then semisolids, then liquids
- Weight loss



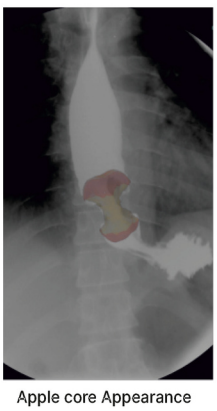
Malignant Tracheoesophageal Fistula

- Tumor infiltrates the trachea
- Food/fluid enters the trachea
- Clinical features
  - Choking
  - Coughing
  - Cyanosis
  - Dyspnea
  - If recurrent laryngeal nerve involved: Hoarseness of voice



Diagnosis

- First investigation in suspected case - Barium swallow
- Barium swallow finding - Apple core appearance
- Investigation of choice for diagnosis - Endoscopy + biopsy
- Investigation of choice for staging - Endoscopic ultrasound
- Important because staging in GI malignancy depends mainly on depth of invasion
- In advanced malignancy / luminal obstruction – CECT
- If distant metastasis suspected - PET scan



Apple core Appearance

Yourwish

Treatment

- T1a: Endoscopic mucosal resection
- T1b, T2: Esophagectomy is sufficient (Margin in esophagectomy:10 cm)
- Advanced disease
  - T2N1, T3, T4
  - Neoadjuvant chemotherapy followed by surgery
- ≥ T3 and N+
  - Multimodality treatment
  - Neoadjuvant chemotherapy
  - Surgery
  - Radiation

Definitive Chemoradiation

- Squamous cell carcinoma involving cervical esophagus
- GE junction tumor not amenable to resection

IMPORTANT MARGINS

Important Information

- GI malignancies during resection and anastomosis
  - 5 cm
  - Distal rectum
  - 2 cm
- Esophagus
  - 10 cm
- **Wide local excision**
  - Squamous cell carcinoma
  - Basal cell carcinoma
  - Malignant melanoma
  - Soft tissue sarcoma
  - Margin
  - 2 cm
- **Breast conservation surgery**
  - Previously 1 cm
  - Now 1 mm

Types of Esophagectomy

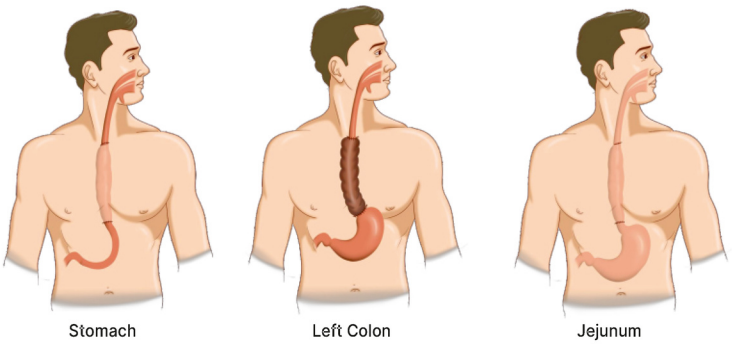
- Ivor Lewis operation
- Orringer transhiatal esophagectomy
- McKeon en bloc esophagectomy
- Most popular
  - Orringer transhiatal esophagectomy
- Least recurrence rate
  - McKeown en bloc esophagectomy

Yourwish

Yourwish

Conduits After Esophagectomy

- After removing esophagus, conduit is needed
  - Best conduit
  - Stomach
- If stomach not available
  - Left colon
- If left colon also unhealthy
  - Jejunum
- Best / shortest route of replacement
  - Posterior mediastinal route

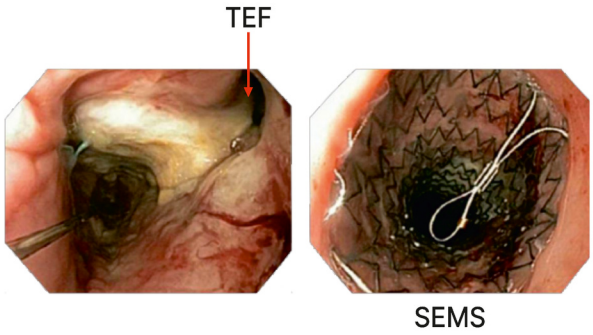


Arterial Supply Of Conduits

Conduit	Blood supply / Source
Stomach	Right gastric artery, Right gastroepiploic artery
Left colon	Left colic artery (branch of Inferior mesenteric artery)
Jejunal	Jejunal branches (from Superior mesenteric artery)

Malignant Tracheoesophageal Fistula Management

- Patients have limited survival
  - Palliation is done with stent
- Stent used
  - SEMS - Self-expanding metallic stent
  - It bypasses the fistula
- Most common complication of stent - Stent migration



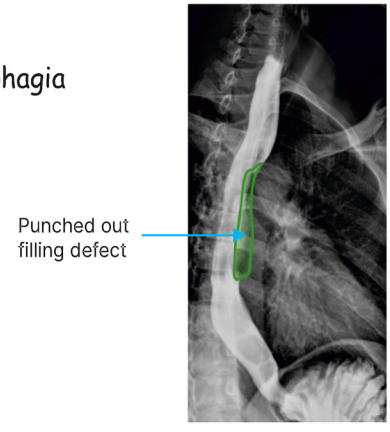
LEIOMYOMA ESOPHAGUS

01:13:12

- M/c benign tumor of esophagus - Leiomyoma
- Location
  - In >90% cases
  - Lower 2/3rd of esophagus

Clinical Features

- Most patients are asymptomatic
- When tumor becomes large → Lumen gets compromised → Patient develops dysphagia
- M/c symptom - Dysphagia
- Diagnosis
  - Investigation of choice
  - Barium swallow
  - Barium swallow finding
  - Smooth punched out filled defect
- Do not do



Yourwish

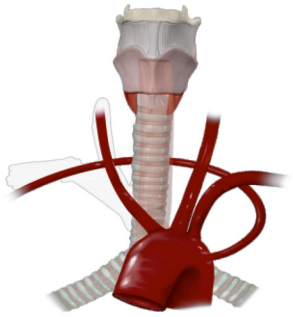
- Endoscopy + biopsy
- Causes adhesion between tumor and mucosa
- During enucleation, may lead to perforation

- Treatment of choice
  - Enucleation

Plummer-vinson Syndrome

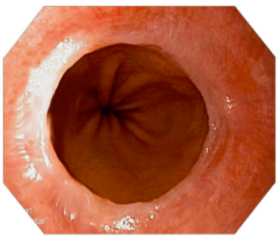
- Patterson-Brown-Kelly syndrome
  - Sideropenic dysphagia
  - Dysphagia - Due to cervical web
  - Sideropenia - Due to iron deficiency anemia
- Premalignant condition
  - Increased risk of squamous cell carcinoma
  - Esophagus
  - Oral cavity
- Hypopharynx
- Mnemonic - SAD CA COIL
  - S : Splemomegaly
  - A : Achlorhydria
  - D : Dysphagia
  - C : Chronic iron deficiency anemia
  - A : Atrophic oral mucosa
  - COIL : Koilonychia

Dysphagia Lusoria

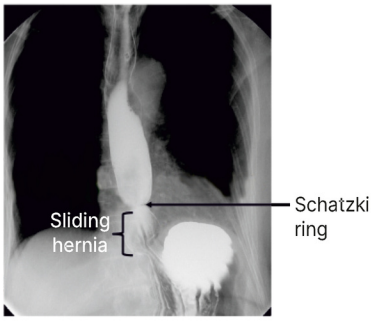


- Anomalous course of artery
  - Cause - Aberrant right subclavian artery
  - Effect - Causes posterior compression of esophagus
  - Symptom – Dysphagia
- Most common anomaly
  - Aberrant right subclavian artery

Schatzki Ring

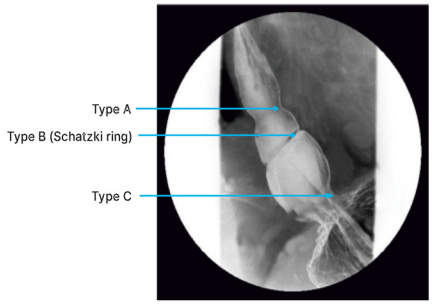


- Characterized by concentric symmetric narrowing ring located at
  - Squamocolumnar mucosal junction
- GE junction



- Composition
  - Mucosa
  - Submucosa
- Symptoms
  - Dysphagia to solids only
  - Can have episodic dysphagia (Especially with large piece of meat)
- Investigation of choice - Barium swallow

- Types of rings on barium swallow
  - Type A
    → Located above GE junction
  - Type B
    → Located at GE junction
    → Schatzki ring
  - Type C
    → Located below GE junction



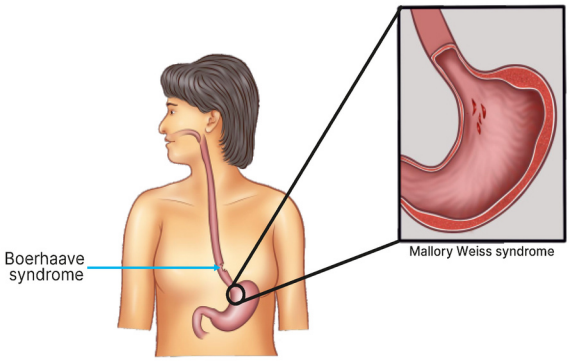
- Management
  - If asymptomatic: Only observation
  - If symptomatic
    → Dilatation -No surgical excision
    → Healing by fibrosis - May cause stricture

Esophageal Perforation

01:20:05

- M/c cause - Iatrogenic (usually during endoscopy)
- M/c site - Posterior wall of cricopharyngeus

Types



- Boerhaave syndrome
  - Longitudinal perforation of esophagus
- Mallory-Weiss tear
  - Longitudinal tear - Involves cardia / stomach

Boerhaave Syndrome

- Also known as - Spontaneous esophageal perforation
- Typical history
  - Forceful vomiting
  - Multiple vomiting
  - Binge drinking
  - More common in males
- M/c site - Lower 1/3rd of esophagus
- Exact site - Left posterolateral
- Pathogenesis: Vomiting against closed glottis → Esophagus perforates → Gastric contents enter mediastinum → Severe mediastinitis → Pneumomediastinum

Clinical features

- Mackler triad
  - Thoracic pain
  - Vomiting
  - Cervical subcutaneous emphysema
- If massive contamination
  - Sepsis
  - Fever

Yourwish

- On examination
- Hamman crunch (d/t Pneumomediastinum)
- Chest X-ray findings
  - Left-sided pleural effusion
  - Can also have left-sided hydropneumothorax

Diagnosis

- Investigation of choice - Water-soluble contrast esophagogram
  - Contrast used : Gastrografin

Treatment

- Golden period of repair - Within 24 hours

Within 24 hours	After 24 hours
• Repair the perforation • Insert ICD • Feeding jejunostomy • Mortality rate- 20%	• Esophagostomy • ICD insertion • Feeding jejunostomy • Mortality rate- > 50%

PYQ

INICET May 2024

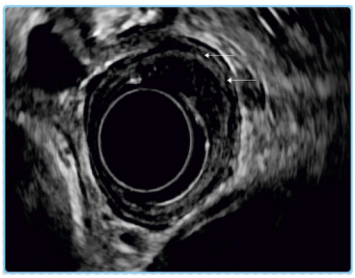
Q A 45-year-old patient presents to the clinic with complaints of food regurgitation and weight loss over the past several months. A barium swallow test is performed. What is the diagnosis?



a. Achalasia cardia
b. Esophageal carcinoma
c. Zenker's diverticulum
d. Diffuse esophageal spasm

Answer: a. Achalasia cardia

FMGE Jan 2025



Q . Which of the following is a primary use of this imaging modality?
a. Staging of esophageal cancer
b. Evaluation of gastroesophageal reflux disease (GERD)
c. Identifying the cause of dysphagia
d. Assessing cardiac and aortic pathology

Answer: a. Staging of esophageal cancer

FMGE June 2021

Q. A patient presented with retrosternal chest pain radiating to the jaw and dysphagia. A barium swallow was performed, and the following image was shown. Which of the following is the most likely diagnosis?



a. Infectious esophagitis
b. Diffuse esophageal spasm
c. Barrett's esophagus
d. Esophageal stricture

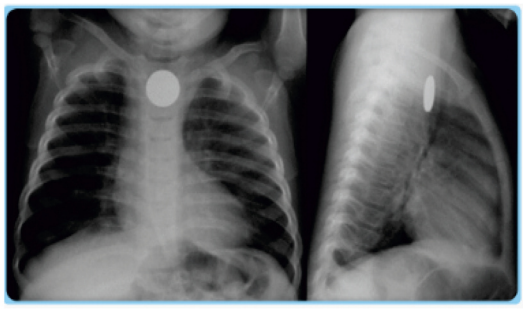
Answer: b. Diffuse esophageal spasm

Yourwish

Q. During ward rounds, you encounter a patient who has been admitted with esophageal carcinoma. What is the most likely presentation for this patient?
a. Dysphagia of liquids followed by solids
b. Dysphagia of solids followed by liquids
c. Chest pain
d. Neck mass

Answer: b. Dysphagia of solids followed by liquids

Q. A baby playing unsupervised was brought with complaints of difficulty in swallowing for the last few hours. The x-ray image is given below. What is the diagnosis?



a. Foreign body in the trachea
b. Foreign body in the esophagus
c. Artifact
d. Soft tissue calcification in the neck

Answer: b. Foreign body in the esophagus

Q. A 6-week-old infant presents with a history of non-bilious, non-projectile vomiting starting at 3 weeks of age. The infant's abdominal examination is normal. Which of the following is the most likely diagnosis?
a. Pyloric stenosis
b. Gastroesophageal reflux disease (GERD)
c. Cow milk protein allergy
d. Intestinal obstruction

Answer: b. Gastroesophageal reflux disease (GERD)

Q. A 35-year-old man arrives at the emergency department with a massive episode of vomiting blood. He mentions a recent pattern of excessive alcohol consumption. Upon examination, his vital signs are stable, and he has a pale appearance. There are no indications of ongoing bleeding. The results of his liver function tests are within the normal range. To further assess the situation, an upper gastrointestinal endoscopy is scheduled. What is the most probable diagnosis?
a. Esophageal varices
b. Gastric ulcer
c. Mallory-Weiss tear
d. Atrophic gastritis

Answer: c. Mallory-Weiss tear

Q. During an endoscopy, a man is found to have the squamocolumnar junction located more proximally than normal. Which of the following conditions is most likely responsible for this finding?
a. Achalasia cardia
b. Sliding hernia
c. Rolling hernia
d. Gastroesophageal reflux disease

Answer: b. Sliding hernia

Yourwish

Q. Identify the procedure commonly performed in patients with recurrent gastroesophageal reflux disease (GERD):
a. 360-degree Nissen fundoplication
b. Partial gastrectomy
c. Esophageal banding
d. 270-degree Nissen fundoplication

Answer: a. 360-degree Nissen fundoplication

Q. 24-year-old female presents with dysphagia, weight loss and bronchiectasis. Barium swallow image is given below. Which investigation should be done to confirm the diagnosis?
a. Esophageal manometry
b. Upper GI endoscopy
c. CT chest
d. CECT chest

Answer: a. Esophageal manometry

Q 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?
a. Achalasia
b. Carcinoma esophagus
c. Zenker diverticulum
d. Diffuse esophageal spasm

Answer: c. Zenker diverticulum

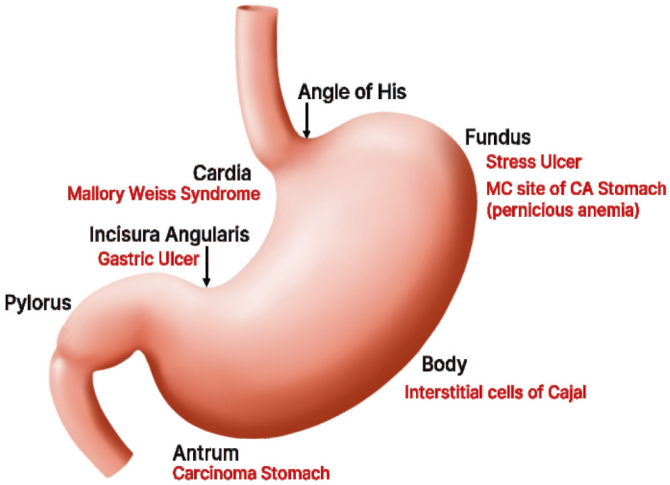
Q. Match the following diagnostic tests with their most appropriate clinical condition:
a. A-4, B-3, C-2, D-1
b. A-1, B-3, C-4, D-2
c. A-3, B-1, C-2, D-4
d. A-2, B-4, C-1, D-3

Answer: a. A-4, B-3, C-2, D-1

10. STOMACH

ANATOMY OF STOMACH

00:00:25



- Cardia: Most common site of Mallory-Weiss Syndrome
- Fundus
  - Most common site of:
    - ➢ Stress ulcer/stress gastritis
    - ➢ Carcinoma Stomach in pernicious anemia
- Body
  - Location of Interstitial cells of Cajal (Gastric pacemaker cells)
- Antrum
  - Most common site of Carcinoma stomach
- Incisura angularis (Notch)
  - Most common site of Gastric ulcer (especially peptic ulcer)
  - Note: Most common site of peptic ulcer overall = 1st part of duodenum
- Pylorus

Vagus Nerve Anatomy in Relation to Stomach

00:01:32

- 2 Vagus nerves: Left vagus and Right vagus
  - Left vagus = Anterior
  - Right vagus = Posterior
- Branches of Right Vagus (Posterior)
  - First branch = Criminal nerve of Grassi (CNG)
  - Second branch = Celiac branch
    - → Sero muscular branches to the stomach
  - Terminal branch = Nerve of Latarjet
    - → Terminal nerve endings look like a crow's foot → called "crow's foot."
- Branches of Left Vagus (Anterior)
  - First branch = Hepatic branch
    - → Sero muscular branches to the stomach
  - Terminal branch = Nerve of Latarjet

Vagotomy

- Increased acid is a frequent cause of peptic ulcers
- Vagus nerve stimulates acid secretion.
- A Vagotomy reduces acid secretion, thereby promoting and accelerating the healing of peptic ulcers

Types of Vagotomy

- Highly selective vagotomy
  - Division of seromuscular branches only

Yourwish

- Minimum morbidity but maximum risk of recurrence
- Indication: Intractable duodenal ulcer

- Selective vagotomy
  - Division of vagus after celiac and hepatic branches
- Truncal vagotomy
  - Cut the main trunk
  - Maximum morbidity but minimum recurrence (maximum reduction in acid secretion)
  - Indication: Recurrent duodenal ulcer

PEPTIC ULCER

00:04:09
NEET PG 2023

- Types
  - Most common type: Duodenal ulcer > Gastric ulcer
- Organism Responsible: H. pylori
  - Responsible for 90% of duodenal ulcers
  - Responsible for 75% of gastric ulcers
- Most Common Site: 1st part of duodenum (D1)
- Management Principle
  - Duodenal ulcer: Location is fixed (1st part of duodenum) → Treatment depends on complication
  - Gastric ulcer: Location is variable → Treatment depends on location

Modified Johnson's Classification (Gastric Ulcer)

Type	Location	Associated Blood Group	Acid Secretion
Type 1 (Most common)	Incisura angularis	A	Normal or Low
Type 2(2 ulcers)	One ulcer in body + one in 1st part of duodenum	O	High (Increased)
Type 3	Pre-pyloric (just before pylorus)	O	High (Increased)
Type 4	High on lesser curvature	O	Normal or Low
Type 5	Anywhere in stomach	O	Normal or Low

Management of Gastric Ulcer (By Type)

00:07:26

- TYPE 1
  - Treatment: Distal gastrectomy
- TYPE 2 and TYPE 3
  - High acid secretion present
  - Treatment: Truncal vagotomy + Antrectomy
- TYPE 4
  - High on the lesser curvature
  - Needs special procedures for local excision:
    → Sendis
    → Pauchet

→ Kelling - Madeleine
→ Shoemaker

- TYPE 5
  - NSAIDs induced
  - Treatment: Stop NSAIDs

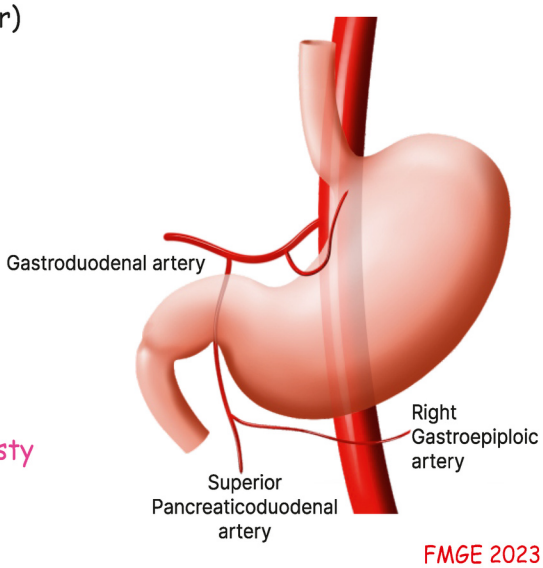
Complications of Peptic Ulcer

00:08:40

- Intractable duodenal ulcer → high selective vagotomy
- Bleeding: Most common complication of a peptic ulcer (duodenal ulcer)
- Perforation: Most common complication of gastric ulcer
- Gastric outlet obstruction: rare

Bleeding Duodenal Ulcer

- Anteriorly located ulcers → Perforate
- Posteriorly located ulcers → Bleed
- Most common artery involved in bleeding duodenal ulcer→ Gastroduodenal artery
- Management of Bleeding Duodenal Ulcer
  - Procedure: Duodenotomy + Ligation of bleeding vessel + Pyloroplasty

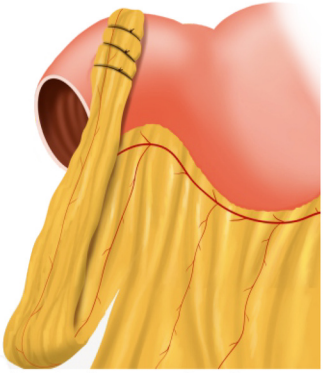


Duodenal Perforation

FMGE 2023

- Procedure: Omental patch repair (Modified Graham's repair)

- Steps:
  - Take vascular omentum from greater omentum
  - Mobilize it
  - Take 3 sutures
  - Pass over perforation
- First performed by: Graham


Patched over perforation

Gastric Outlet Obstruction

- Most Common Cause Worldwide: Carcinoma stomach
- Most common site of obstruction in GOO caused by peptic ulcer = 1st part of duodenum
- Pathophysiology
  - Obstruction at the 1st part of the duodenum
  - Cause: Inflammatory edema due to ulcer
- Clinical Features
  - Multiple episodes of non-bilious vomiting
  - Abdominal pain
- Diagnosis
  - Test: Saline load test
- Initial Management:
  - Nil per oral for 48 hours
  - Give IV fluids
    → Fluid of choice for adults and children→ Normal saline

Yourwish

- Definitive Treatment:
  - Treatment of choice: Truncal vagotomy + Antrectomy
  - If excessive fibrosis (antrectomy not possible): Truncal vagotomy + Gastrojejunostomy

Gastrectomy

00:15:45

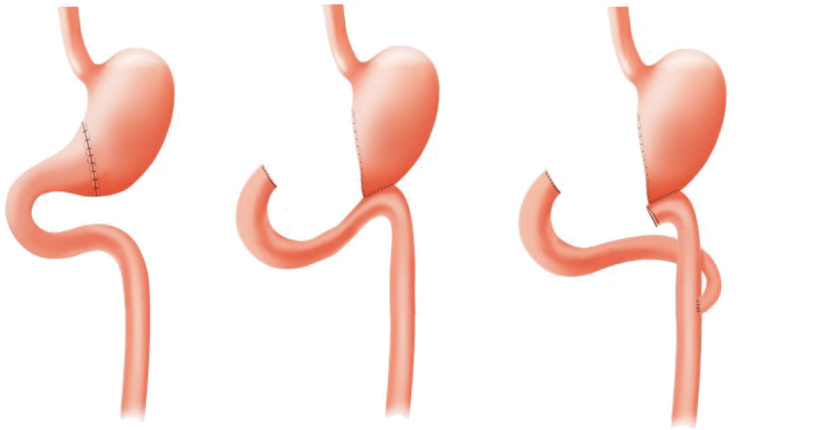
- First gastrectomy performed by: Billroth in the Year 1881

Types of Billroth Gastrectomy

INICET 2023, 2024

- Based on Method of Reconstruction

BILLROTH 1	• Reconstruction: Gastroduodenostomy • Attach the duodenum to the stomach • More physiological (food goes stomach → duodenum → jejunum)
BILLROTH 2	• Reconstruction: Loop gastrojejunostomy (loop GJ) • Anastomosis between the jejunum loop and the stomach • Maximum risk of complications
ROUX-EN-Y reconstruction	• After gastrectomy, create a Roux limb (free limb)



Billroth I - Gastroduodenostomy | Billroth II - Gastrojejunostomy | Roux-en-Y reconstruction

Dumping Syndrome

- Accelerated emptying/dumping of hyperosmolar content directly into proximal small intestine (jejunum)
- More common in Billroth 2

Types of Dumping

Early Dumping	Late Dumping
• 15-30 minutes after meals • Mechanism	• 2-3 hours after meals • Mechanism

High-carbohydrate meal ↓ Hyperosmolar gastric contents rapidly enter jejunum ↓ ↑ Jejunal secretion → fluid shifts into bowel (third-space loss) ↓ Hypovolemia due to fluid collection in jejunum • Treatment: IV fluids	Hyperosmolar content in jejunum ↓ ↑ Blood glucose → excess insulin release ↓ Reactive hypoglycemia • Treatment: Oral glucose

Metabolic Complications of Gastrectomy

00:19:56

- Most common metabolic complication → Iron deficiency anemia
- When >50% stomach removed: → Intrinsic factor deficiency → Vitamin B12 deficiency → Megaloblastic anemia
- Clinical Features of B12 Deficiency:
  - Paresthesia (tingling/burning sensation in peripheries)
  - Neuropathy

UPPER GI BLEEDING

00:21:20

- Bleeding proximal to the Ligament of Treitz
  - The ligament of Treitz is located at the DJ junction (duodenojejunal junction)
- Most Common Cause of Upper GI bleed is Peptic ulcer
- First Investigation: Upper GI endoscopy

Forrest Classification

00:22:00

- Based on endoscopic findings to predict the risk of re-bleeding

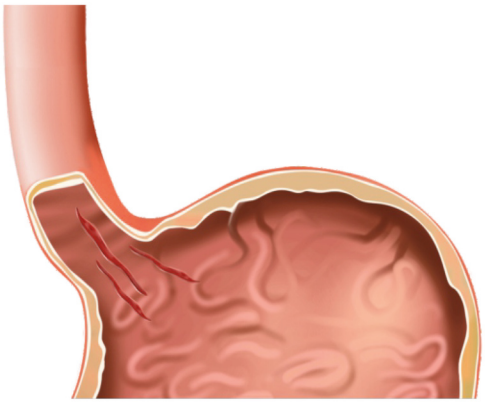
Type	Description	Risk of Re-bleeding
1A	Active pulsatile bleeding	HIGH
1B	Oozing (blood coming, but vessel is not identified)	HIGH
2A	Non-bleeding visible vessel	HIGH
2B	Adherent clot	INTERMEDIATE
2C	Black dot	LOW
3	Clean base	LOW

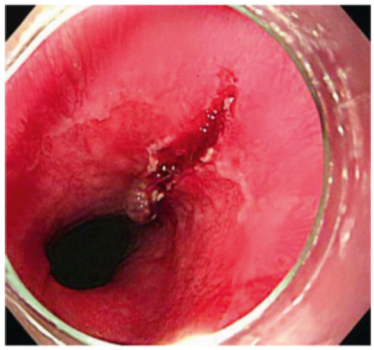
Yourwish

MALLORY-WEISS TEAR/SYNDROME

00:23:30

NEET PG 2020, FMGE 2020





- Longitudinal partial tear
- Involving only mucosa + submucosa
- MC Location: Cardia (just below GE junction)
- More common in alcoholic males
  - Mechanism: Binge drinking
- Risk factors: binge drinking → Multiple episodes of vomiting, Retching→ Tear formation
- Clinical Features
  - Minor bleeding
  - Massive bleeding = Only 20% cases
  - Painless
  - M/c vessel Responsible for bleeding: Left gastric artery
- Investigation of Choice: Endoscopy
- Management

Conservative management
↓(failed)
Endoscopic electrocoagulation
↓(failed)
Angiography + Embolization
↓(failed)
Open surgical ligation

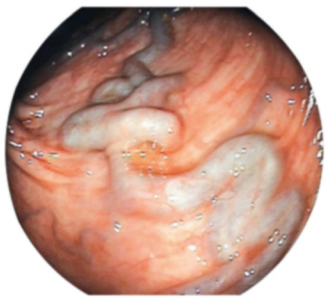
- Sengstaken-Blakemore tube
  - Contraindicated in Mallory-Weiss
    → An inflated balloon can convert a partial tear into a complete tear
  - And is used in variceal bleeding

DIEULAFOY'S LESION

00:27:46

FMGE 2023, INICET 2020

- Large arteriole Placed just below the mucosa
- Diameter: 1-3 mm (large)
- Location; Within 6-10 cm of the GE junction
- Clinical Features
  - Massive bleeding → Recurrent hypotension
- IOC for diagnosis → Endoscopy



Yourwish

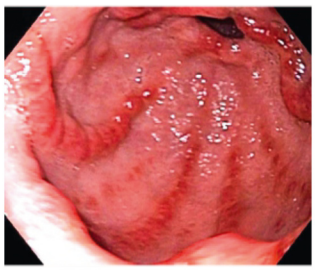
Yourwish

- Management:

Endoscopy + Electrocoagulation
↓ (Failed)
Angiography + Embolization
↓ (Failed)
Open surgical ligation / wedge resection of the stomach

WATERMELON STOMACH

00:29:30



- Also called: Gastric Antral Vascular Ectasia (GAVE)
- Most common site is antrum
- Pathophysiology: Vascular Ectasia
- More common in elderly females
- 25% patients have chronic liver disease
- Clinical Features
  - Occult blood loss → Anemia → Fatigue
- Diagnosis
  - IOC: Endoscopy + Biopsy
    → On endoscopy: Parallel stripes of blood vessels
    → On biopsy: Confirms vascular ectasia (dilated blood vessels)
- Management
  - Preferred: Argon plasma coagulation
  - If not available: Endoscopy + Electrocoagulation

CARCINOMA STOMACH

00:32:24

- Most common histological type: Adenocarcinoma
- More common in low socioeconomic status

Risk Factors For Carcinoma Stomach

Nutritional Risk Factors

- Low-fat or low-protein diet
- Common in Japan (smoked fish / Salted meat consumption)
- High complex carbohydrate intake
- Increased nitrate intake

Social Risk Factors

- Low socioeconomic status

Environmental Risk Factors

- Smoking (most important)
- Lack of refrigeration
- Use of well water (contaminated, not hygienic)
- Poor food preservation technique

Yourwish

Medical Risk Factors

- Bacteria: H. pylori infection
- Virus: Epstein-Barr virus (EBV)
- Adenomatous polyp (premalignant)
- Partial gastrectomy, Chronic atrophic gastritis, Ménétrier's disease
  - All have decreased acid secretion

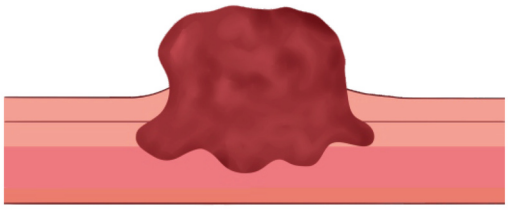
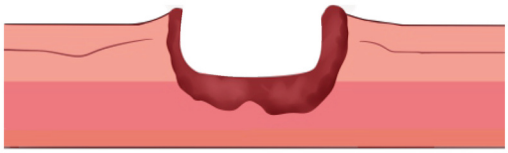
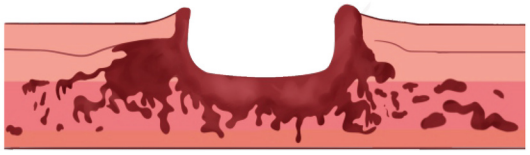
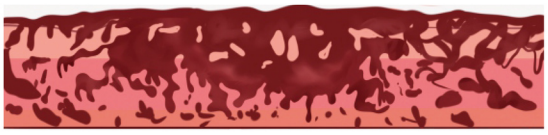
Genetic Risk Factors

- More common in males
- Blood group A
- HNPCC (Hereditary Non-Polyposis Colorectal Cancer)/ Lynch syndrome
- Li- Fraumeni syndrome
- Pernicious anemia
  - Most common site of carcinoma stomach in pernicious anemia: Fundus

Borrmann's Classification

00:35:58

- Based on macroscopic appearance

TYPE 1	Diffuse polypoid growth	
TYPE 2	Ulcerated lesion with raised border	
TYPE 3	Ulcerated lesion infiltrating the gastric wall	
TYPE 4	Linitis plastica: Extensive fibrosis in the submucosa (Aka leather bottle stomach)	
TYPE 5	Non-classifiable	

Lauren Classification

00:36:52

Feature	Intestinal Type (Classical)	Diffuse Type (Atypical)
More common in	Elderly males	Young females

MC site	Distal part of stomach	Proximal part of stomach
Risk factors	Environmental factors	Familial predisposition
Gland formation	Well-defined glands	Poor gland formation (Signet ring variety)
Spread	Hematogenous	Lymphatic or Transmural
Associated with	APC gene mutation	Decreased E-cadherin
Distribution	Epidemic (more scattered cases)	Endemic (clustered in certain areas)
Associated With	P53, p16 inactivation	

Carcinoma Stomach

- Japan / Males / 6th decade
- Most common site: Antrum
- Most common site in pernicious anemia: Fundus
- Most common site of metastasis: Liver
- Chemotherapy regimen: ECF
  - Epirubicin
  - Cisplatin
  - 5-FU

Clinical Features

- M/c symptom: Abdominal pain > Weight loss
- Malignancy at GE Junction: Dysphagia
  - D/t obstruction in the esophagus
  - Special Classification for GE Junction Tumors: Siewert classification

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Linitis Plastica

- Excessive fibrosis in submucosa→ Stomach loses distensibility
- Early satiety (due to loss of distensibility)
- Aka Leather bottle stomach





00:41:27

00:42:00

Lymph Node Involvement

- Left axillary LN: Irish Node
- Left supraclavicular lymph node: Virchow's Node (Signal Node)
- Cutaneous metastatic deposit around umbilicus: Sister Mary Joseph Node
- Palpable intraperitoneal metastasis on digital rectal examination: Blumer's Shelf
- Krukenberg Tumor
  - Involvement of bilateral ovaries in Ca stomach
  - Route of spread:
    → Retrograde lymphatic (Most common)
    → Hematogenous spread
    → Transcoelomic or transperitoneal route

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Virchow's Node



Sister Mary Joseph node

Yourwish

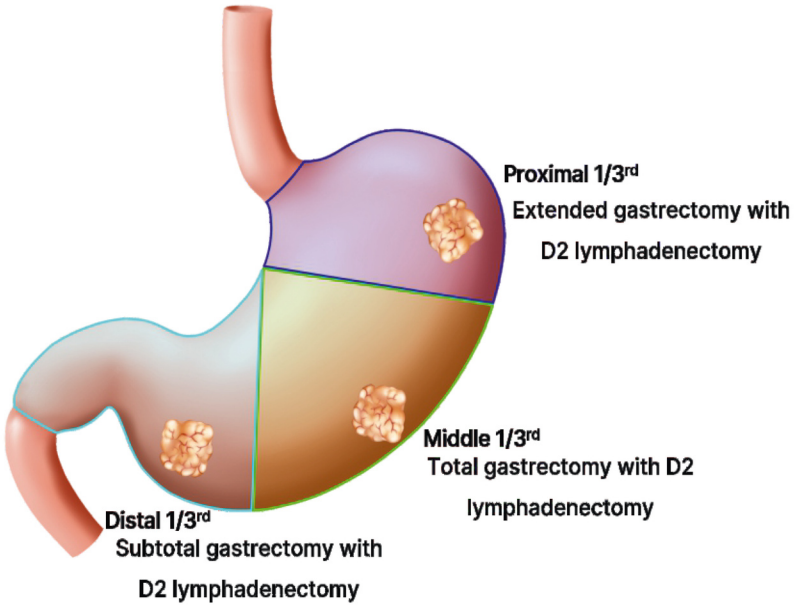
Investigations

- IOC For Diagnosis: Endoscopy + Biopsy
- IOC For Staging: Endoscopic ultrasound (EUS)
  - Staging mainly based on depth of invasion

Management

00:45:20

- In GI malignancies: Take a 5 cm margin during resection and anastomosis



- Based on Location
  - Proximal 1/3rd
    → Procedure: Extended gastrectomy + D2 lymphadenectomy
  - Middle 1/3rd
    → Procedure: Total gastrectomy + D2 lymphadenectomy
  - Distal 1/3rd
    → Procedure: Subtotal gastrectomy + D2 lymphadenectomy

GIST (GASTROINTESTINAL STROMAL TUMOR)

00:46:00

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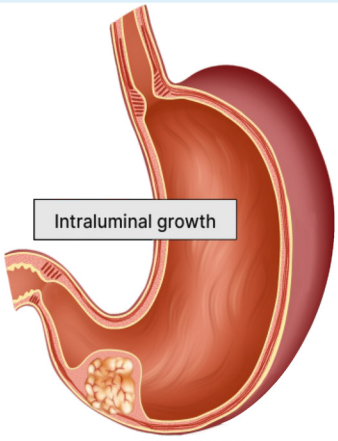
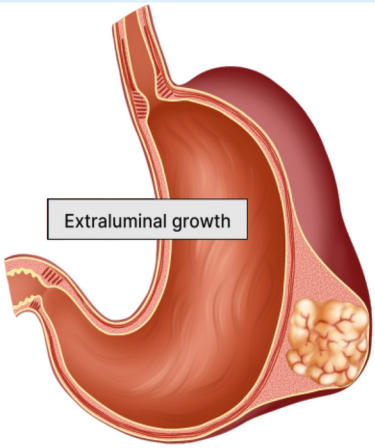
- Most common sarcoma of GIT: GIST
- Spread: Exclusively hematogenous
- M/c site: stomach > Small intestine > Colon -rectum > Esophagus
- Arises from: Interstitial cells of Cajal (Gastric pacemaker cells)
- Tyrosine kinase receptor: C-KIT (CD117)
- Other markers:
  - BCL2
  - CD34
  - PDGF-alpha
- New Markers
  - DOG-1: Detected On GIST-1
  - Protein kinase C theta

Yourwish

- Types
  - 70%: Spindle cell type
  - 30%: Epithelioid type

Clinical Features

Comparison: Gist Vs Carcinoma Stomach

CA STOMACH	GIST
 CA Stomach Abdominal pain & weight loss	 GIST Bleeding & abdominal pain

• Growth: Intraluminal
• Symptoms: Early (early obstruction)
  ○ Abdominal pain
  ○ Weight loss
	• Growth: Extraluminal
	• Patient: Not symptomatic (no early obstruction)
	• Tumor is hypervascular Bleeds
	• Most common presentation: Bleeding + Abdominal pain

Spread & Metastasis (Gist)

- Route of Spread
  - Sarcoma → Hematogenous
  - Most common site of metastasis: Liver
- Lymphatic Spread
  - Not seen
  - Therefore: No lymph node resection/dissection needed

Investigations

- Investigation of choice for diagnosis: CECT

Important Information

- Other Extraluminal GIT Conditions (use CECT)
  - Meckel's diverticulum
  - Diverticulitis
  - Intra-abdominal abscess
  - Intra-abdominal collection
  - All these → CECT

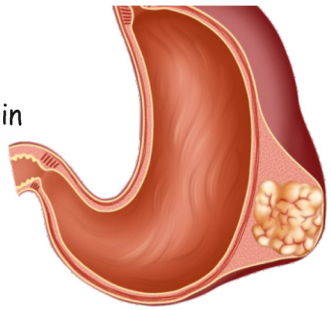
Yourwish

- Endoscopic Biopsy Contraindicated in GIST
  - Tumor is highly vascular → Will rupture,

Management

00:49:54

- Resectable Tumor
  - Sarcoma → 2 cm margin
  - Type of resection: Segmental resection or Wedge-shaped excision with 2 cm margin
- Unresectable Tumor → Down stage the tumour, Drug Therapy
  - 1st line agent: Imatinib
  - 2nd line agent: Sunitinib
  - 3rd line agent: Regorafenib
- IOC to assess response to Imatinib Therapy: PET SCAN
- Gold standard investigation for diagnosis For Recurrent GIST: PET-CT



Carny's Triad

1. Multifocal GIST
2. Pulmonary chondroma
3. Extra-adrenal paraganglioma

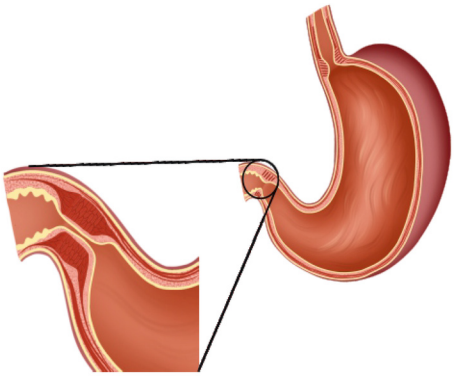
INFANTILE HYPERTROPHIC PYLORIC STENOSIS (IHPS)

00:51:33

- Previously: CHPS (Congenital Hypertrophic Pyloric Stenosis)
- Acquired disease
- Pathology:
  - Hypertrophy of circular muscle fibers at pylorus → Leading to stenosis
- Epidemiology
  - Incidence: 1 in 3000-4000 live births
  - More common in: Firstborn males
- Age of Presentation
  - It's acquired → At birth, child is completely normal
  - Age of presentation: 4-6 weeks after birth

Clinical Features

- Non-bilious vomiting
  - Obstruction at pylorus due to hypertrophy of circular muscle fibers
  - Vomiting can be projectile or non-projectile
- Palpable mass or olive in epigastrium
  - If stomach distended → Right hypochondrium
- Direction of peristalsis: Left to right

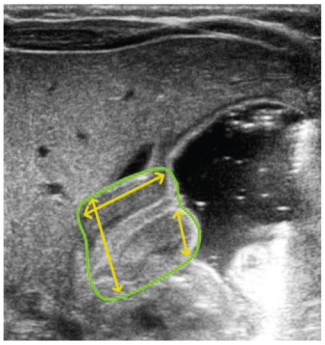


Diagnosis

- IOC for Hypertrophic pyloric stenosis → Ultrasound
- Diagnostic Criteria on Ultrasound

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Parameter	Value
Pyloric muscle thickness	>4 mm
Channel length	>16 mm
Transverse diameter	>13 mm

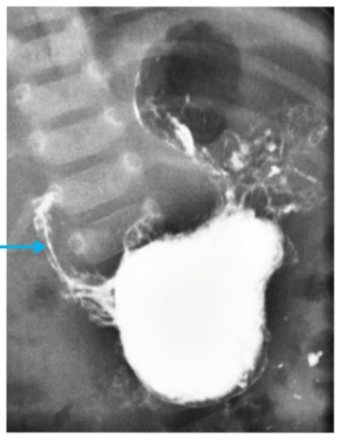


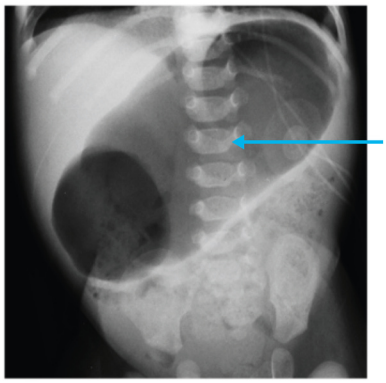
IHPS

Radiological Signs

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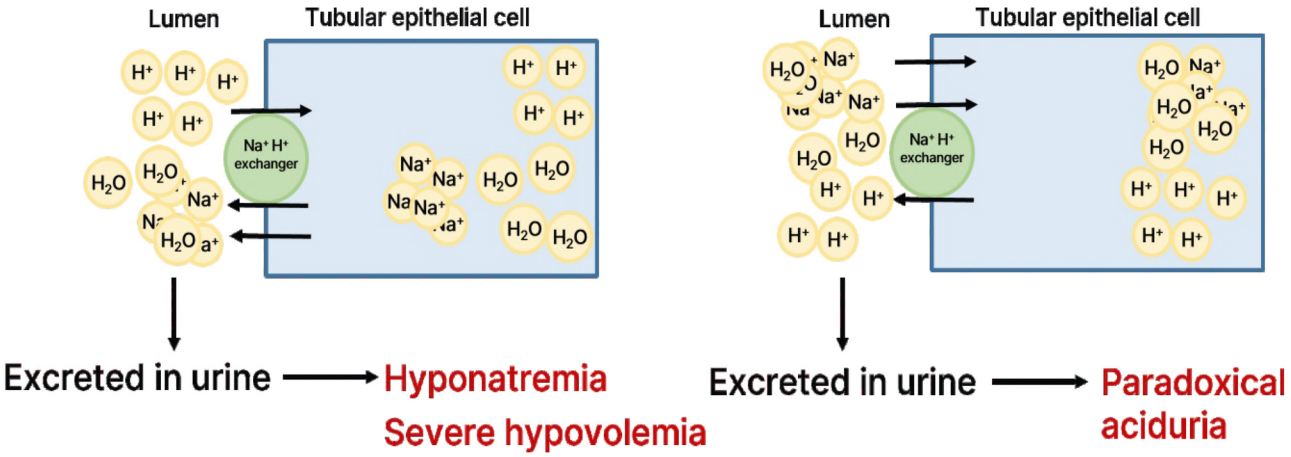
- On Barium Meal
  - String sign
  - Other signs:
    - ➢ Shoulder sign
    - ➢ Double track sign
- On X-ray:
  - IHPS: Single bubble
  - Annular pancreas: Double bubble
  - Duodenal atresia: Double bubble
  - Jejunal atresia: Triple bubble





Electrolyte Abnormalities

- Early phase → Vomiting → Loss of gastric content (H^+, Cl^-, K^+) → Electrolyte & acid-base changes
  - Hypokalemia (↓ K^+)
  - Hypochloremia (↓ Cl^-)
  - Metabolic alkalosis (↓ H^+)
- Multiple episodes of vomiting → Compensatory mechanism → Kidney tries to preserve H^+ via Na^+/H^+ exchanger → H^+ retained & Na^+ excreted in urine along with water → Hyponatremia + Hypovolemia
- Kidney senses ↓ volume & ↓ Na^+ → Reversal of compensation → Kidney now preserves Na^+ and water and excretes H^+ → Acidic urine despite metabolic alkalosis → Paradoxical Aciduria



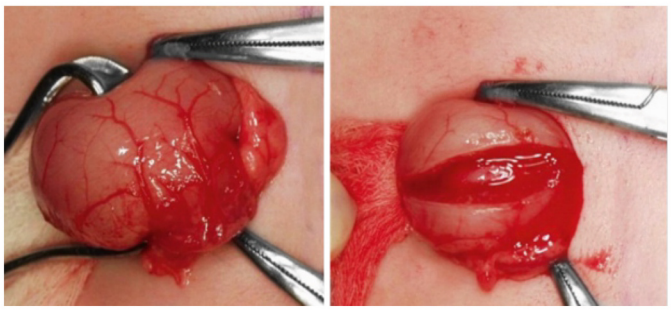
Management

00:58:00

- Medical emergency
- Initial Management: IV Fluid + Correction of dyselectrolemia
  - Fluid of choice: Normal saline

Yourwish

- Definitive Treatment
- Treatment of Choice: Ramstedt's Fredet Pyloromyotomy
  - Procedure: performed using either a laparoscopic or an open approach



TRICHOBEZOAR

FMGE 2022, 2024, 2025
NEET PG 2024
INICET 2024

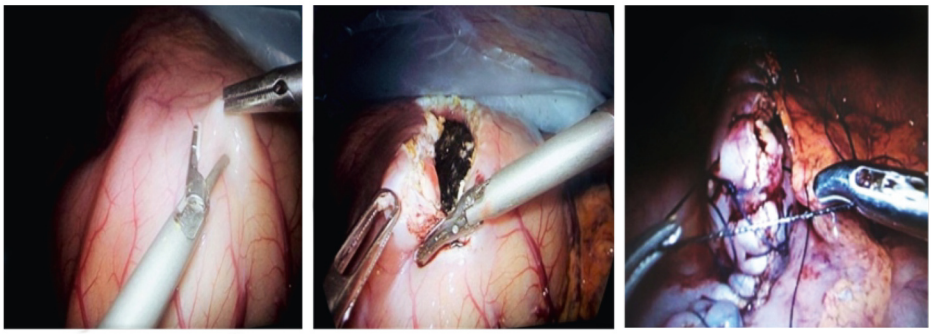
00:59:18

- Concretions of swallowed hair in GIT (especially stomach)
- Epidemiology
  - More common in: Teens
  - More common in: Females
- Associated with Trichophagia
- Gastric trichobezoar extending into small intestine: Rapunzel Syndrome



- Clinical Features
  - Abdominal pain
  - Gastric outlet obstruction
- Treatment

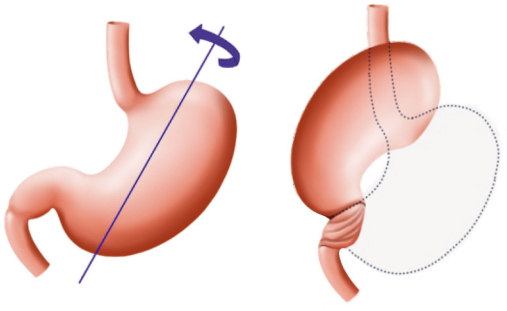
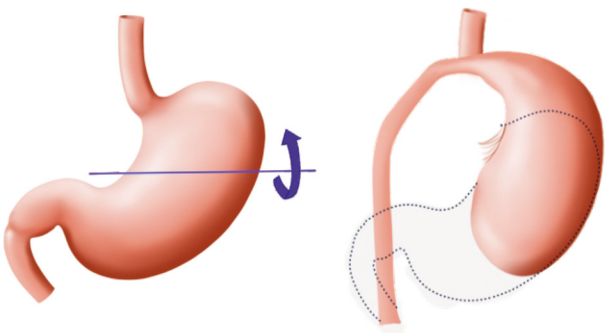
  Perform gastrotomy
  ↓
  Remove the hairball
  ↓
  Psychiatric referral



GASTRIC VOLVULUS

- Volvulus = Torsion or rotation

Types

ORGANOAXIAL	MESENTEROAXIAL
	

Yourwish

• Most common • Torsion along longitudinal axis of stomach • Responsible for2/3rd of cases • Usually associated with diaphragmatic defect • Acute presentation	• Less common • Rotation along vertical axis • Usually partial volvulus • Recurrent volvulus • 1/3rd of the cases

Clinical Features

- Borchardt's Triad
  - Epigastric pain
  - Inability to vomit
  - Inability to insert Ryle's tube

MCQ

01:02:16

Q. 6 weeks old child brought to emergency department with recurrent projectile non-bilious vomiting. Based on the image provided, what is the likely diagnosis?



A. Annular pancreas
B. Congenital hypertrophic pyloric stenosis
C. Duodenal atresia
D. Meckels diverticulum

Answer: B. Congenital hypertrophic pyloric stenosis (IHPS)

Q. What is the most probable outcome for patient after undergoing gastrectomy?
A. Folic acid deficiency
B. Vitamin b12 deficiency
C. Gastric ulcer
D. Constipation

Answer: B. Vitamin b12 deficiency

Q. A 45-year-old alcoholic with a history of binge drinking presents with an episode of vomiting bright red blood. His vitals are stable. An endoscopy was performed, an image of which is given below; what is the probable diagnosis here?
A. Tension pneumothorax
B. Boerhaave syndrome
C. Mallor weiss tear
D. Gastric ulcer perforation

Answer: C. Mallory-Weiss tear

Q. A 45-year-old patient presents after undergoing a Billroth II gastrectomy operation and complains of symptoms suggestive of dumping syndrome, including vomiting and diarrhea occurring approximately 20 minutes after meals. What should be the initial management for this patient's condition?

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A. Low fat diet
B. Small frequent meals

C. Insulin and protein
D. Reverse bilroth 2 and bilroth 1

Answer: B. Small frequent meals



Q. A young adult with gastric outlet obstruction presents with vomiting. Which of the following fluids is preferred in this patient for initial resuscitation?
A. Normal saline
B. Ringer lactate
C. 5% dextrose in water
D. 20% dextrose in water

Answer: A. Normal saline

9. PERITONEUM

SPONTANEOUS BACTERIAL PERITONITIS (SBP)

00:00:20

- Spontaneous infection of ascitic fluid
- Prerequisite for SBP: Ascites

	Most common cause of Ascites	Most common organism
Adult	Chronic liver disease (Cirrhosis)	E. coli > Klebsiella
Children	Nephrotic syndrome	Group A Streptococci

Clinical Features

- Ascites
- Abdominal pain
- Tenderness
- Fever
- Tachycardia

Investigations

- IOC for diagnosis: Paracentesis
- Procedure: Aspirate **ascitic fluid**

Diagnostic Criteria

Finding	Value
Neutrophils	**> 250 cells/mm^3**
Culture	**Monomicrobial growth**

Condition	Neutrophil Count
Spontaneous bacterial peritonitis	**> 250/mm^3**
GI Tuberculosis (Ascitic fluid)	**> 500/mm^3**

Treatment

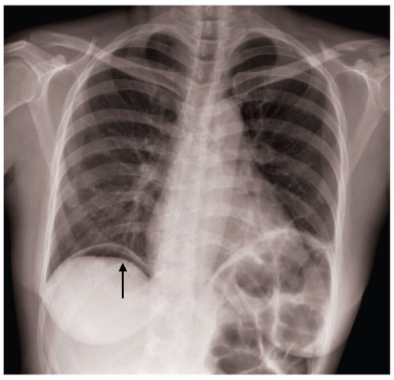
- IV Cefotaxime
- Albumin infusion for Hypoalbuminemia

SECONDARY BACTERIAL PERITONITIS

Aspect	Details
Cause	• Visceral perforation
Nature of Infection	• Polymicrobial infection

Yourwish

Common Organisms	• E. coli • Bacteroides fragilis
Clinical Features	• Severe abdominal pain • Tenderness • Tachycardia • Guarding • Rigidity

Aspect	Details
Diagnosis	Chest X-ray showing free gas under the diaphragm (pneumoperitoneum) 

Management	• Fluid resuscitation: Ringer's lactate (Fluid of choice)
	  ○ Ryle's tube - Gastric decompression
	  ○ Foley catheter - Monitor urine output
	• IV antibiotics
	• Exploratory laparotomy followed by peritoneal lavage
	  ○ If repair is possible: Repair of perforation
	  ○ If repair is not possible: Stoma formation

PERITONITIS IN CAPD

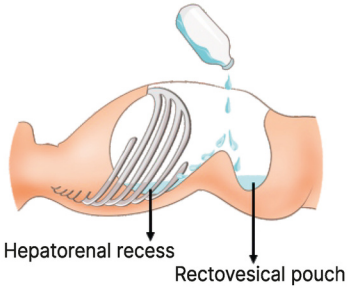
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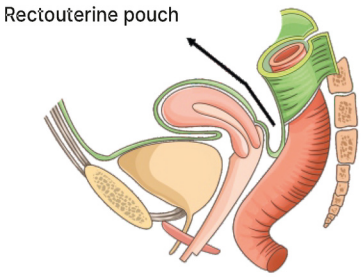
- Peritonitis in Chronic Ambulatory Peritoneal Dialysis
- Cause: Infection of the peritoneal dialysis catheter
- MC organism: Staphylococcus epidermidis
  - Produces slime
  - Colonizes catheter

Treatment

- Intraperitoneal instillation of 1st generation of Cephalosporins
- Recurrent attacks: Change the catheter

Dependent Parts of the Peritoneal Cavity





Yourwish

Yourwish

Aspect	Recumbent (Supine) Position	Upright Position

Most Dependent Part	• Hepato-Morrison pouch
	  ○ Also called: Hepatorenal recess, Right subhepatic space
		• Pelvis (Pouch of Douglas)
		  ○ Male: Rectovesical pouch
		  ○ Female: Rectouterine pouch

MC Abscess Site	• Hepato-Morrison pouch	• Pouch of Douglas
MC site overall	• Pelvis	

MESENTERIC CYST

00:09:00

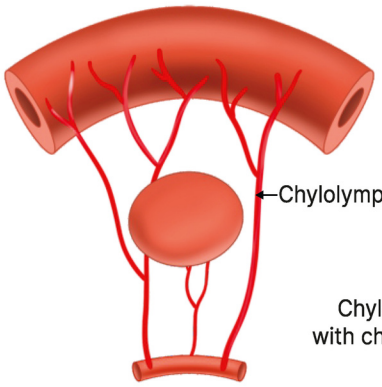
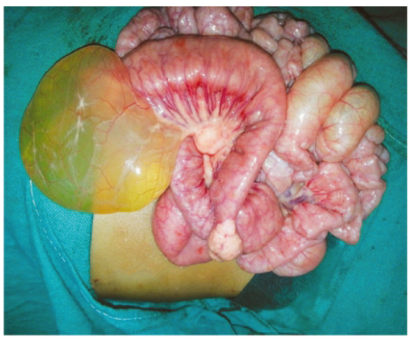
Incidence

- More common in females
- Seen in the 2nd decade

Types of Mesenteric Cyst

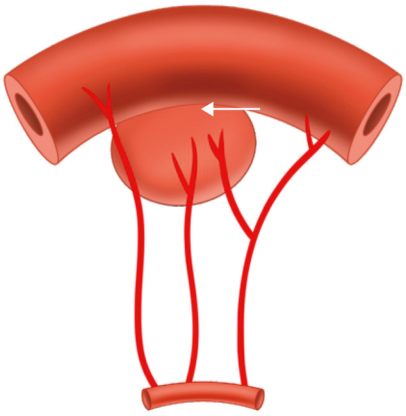
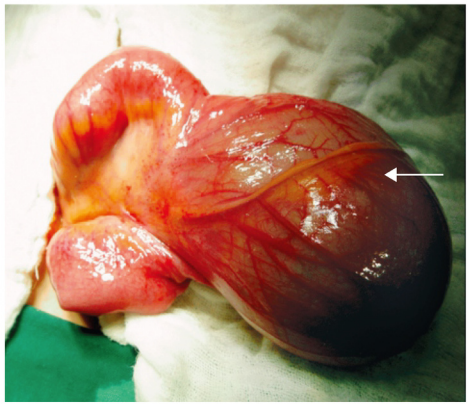
- MC: Chylolymphatic cyst
- 2nd MC: Enterogenous cyst

Chylolymphatic Cyst

Aspect	Details
Pathology	• Afferent lymphatics present • Efferent lymphatics absent • Result: Chylous collection inside the cyst   Chylolymphatic cyst with chylous collection
Important Features	• Wall: Not shared • Blood supply: Not shared
Treatment of choice	• Enucleation

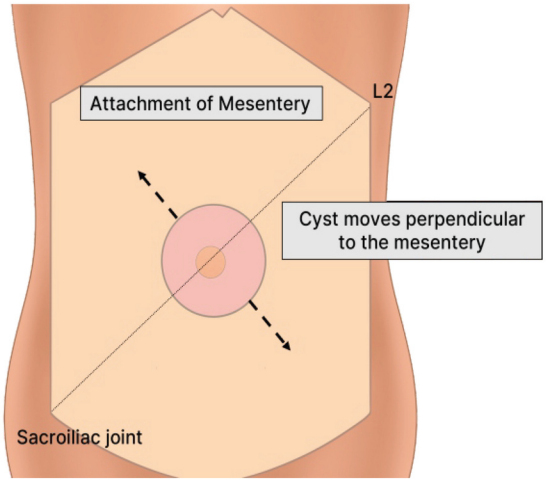
Yourwish

Enterogenous Cyst

Aspect	Details
Origin	• Arises from: Small bowel diverticulum • Duplication cyst  
Contents	• Mucin secretion from the Goblet cells present in the columnar epithelium • Result: Mucinous content
Important Features	• Wall: Shared with bowel • Blood supply: Shared with the bowel
Treatment	• Resection with anastomosis • Reason: Shared wall and blood supply

Mesentery – Extent

- Extends from the L2 vertebra (left side) to the right sacroiliac joint
- **TILLOX SIGN-** Mesenteric cyst moves perpendicular to the attachment of the mesentery



Clinical Features

- Asymptomatic (as it is an extraluminal swelling)
- Large palpable mass
- **TILLOX TRIAD**
  - Soft fluctuant swelling
  - Zone of hyperresonance around swelling
  - Movement perpendicular to the mesenteric attachment

Investigations

- 1st investigation: USG
- IOC: CECT scan

Important Information

- CECT is the IOC for diagnosis in:
  - Mesenteric cyst
  - GIST
  - Diverticulitis
  - Intra-abdominal abscess
  - Intra-abdominal collections

PSEUDOMYXOMA PERITONEI

00:14:02

- Collection of jelly-like mucinous material in the peritoneum
- Cause: Mucinous adenocarcinoma
- MC Primary: Appendix > Ovary

RETROPERITONEAL FIBROSIS

00:14:53

Aspect	Details
Primary (Idiopathic) Form	• Also called: Ormond's disease

Structures Involved	• Fibrosis encases midline structures
	• Order of involvement:
	  ○ Ureter (most common)
	  ○ IVC
	  ○ Aorta

Symptoms	• MC: Dull aching back pain (non-specific) • MC specific earliest symptom: Obstructive uropathy ○ Reason: Compression of the ureter

PYQs

00:16:18

Q. Which appendicular carcinoma is most commonly associated with pseudomyxoma peritonei?

FMGE Jan 2024

a. Mucinous cystadenocarcinoma
b. Adenocarcinoma
c. Carcinoid tumour
d. Serous cystadenoma

Ans: a. Mucinous cystadenocarcinoma

Q. A patient with a history of chronic liver disease presents with abdominal distension, jaundice, and pruritus. Ascitic fluid analysis revealed a neutrophil count of 650 per cubic mm. What is the most likely diagnosis?

NEET PG 2022

a. Spontaneous bacterial peritonitis
b. Malignant ascites
c. Tubercular ascites
d. Intestinal obstruction

Ans: a. Spontaneous bacterial peritonitis



Yourwish

13. INTESTINAL OBSTRUCTION

TYPES OF INTESTINAL OBSTRUCTION

INICET 2019

Dynamic Obstruction	Adynamic Obstruction
• Mechanical obstruction is present • There is peristalsis working against a mechanical obstruction • Patients present with colic pain	• Seen in patients with the absence of peristalsis, such as paralytic ileus • No mechanical obstruction • Peristalsis is absent or inadequate

- **Most common cause of Large Bowel Obstruction:** Malignancy
- **Most common cause of Small Bowel Obstruction:** Adhesions

SMALL BOWEL OBSTRUCTION

00:01:10

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Causes

Mnemonic: Adhesions followed by MHC

- Adhesions (Most common)
- Malignancy
- Hernia
- Crohn's disease
- Cause of adhesions: Previous surgery
- Surgeries with maximum risk of adhesive small bowel obstruction (in descending order):
  - Pelvic surgeries (Maximum risk)- Hysterectomy
  - Lower abdominal surgery (followed by)- Appendicectomy
  - Upper abdominal surgery- Cholecystectomy

Clinical Features Of Small Bowel Obstruction

- Colicky abdominal pain (First symptom)
- Bilious vomiting
  - Multiple episodes of bilious vomiting
- Obstipation
  - Non-passage of faeces and flatus
  - Also known as absolute constipation

Proximal Vs Distal Small Bowel Obstruction

- **Proximal Obstruction (e.g., Duodenal obstruction)**
  - Obstruction is proximal
  - Vomiting is more common
  - Dyselectrolytemia is more common
- **Distal Obstruction (e.g., Ileal obstruction)**
  - Obstruction is distal

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- Distension is more prominent

Complications

Third Space Loss

- Whenever there is obstruction: Proximal part → Distended; Distal part → Collapsed
- Food and fluid taken by the patient are collected in the proximal part.
- Jejunum secretions: Around 2-3 litres of secretions are present
  - This leads to third space loss.
  - Because of third space loss → hypovolemia

Strangulation

- Definition: In some patients in whom there is late presentation, the vascular supply is also compromised - this is known as strangulation
- Features of strangulation:
  - If a patient is having obstruction, apart from obstruction, there is: Fever & Leucocytosis

Air Fluid Levels

- There are air fluid levels on X-ray
- Swallowed air is responsible for the air fluid levels
- Nitrogen is the major component of the swallowed air

Bowel Sounds

- Initially, hyperactive
- 4 to 6 hours later- Sluggish bowel sound

Management Of Small Bowel Obstruction

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Initial Emergency Management

- Nothing should be allowed orally - Patients should be NPO
- 2 large-bore IV cannula
- Start IV fluids
- IV antibiotics
- Ryle's tube is the tube of choice- Done for proximal decompression
- Foley's catheterization for monitoring of urine output
- Best clinical indicator of tissue perfusion: Urine output
- Normal Urine Output
  - In Adults:
    → 1 mL per minute (minimum)
    → 60 mL per hour
  - In Children:
    → It is just half, that is, 0.5 to 1 mL per minute
    → In children, it is 30 to 60 mL per hour

Investigations

00:07:55

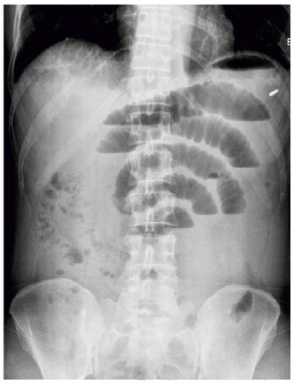
X-Ray Abdomen

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- Initial investigation is done in the emergency

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- 2 views are recommended: erect and supine
- Supine is better as it tells about the site of obstruction
- Erect view: Tells about the air fluid levels
- Investigation of Choice: Investigation of choice for diagnosis: CECT

Supine View Findings	Upright View Findings
• There is a circumferential ring-like pattern • This is seen in the jejunum • The patient is having a distal small bowel obstruction 	• Air fluid levels in a step ladder pattern 

Cect

1. Done in a high-grade obstruction
2. Cause is outside the lumen (extra luminal cause)
3. Suspected complications like strangulation

Enteroclysis

- Also known as a **small bowel enema**
- Investigation of choice for diagnosis of **LISBO**
  - **L**ow grade
  - **I**ntermittent
  - **S**mall
  - **B**owel
  - **O**bstruction
- **Classic example:** Tuberculosis, in which there are possible strictures

Appearance Of Bowel Loops On X-Ray

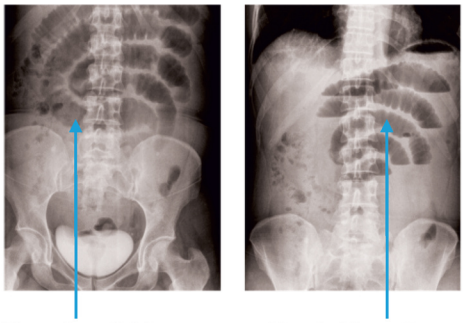
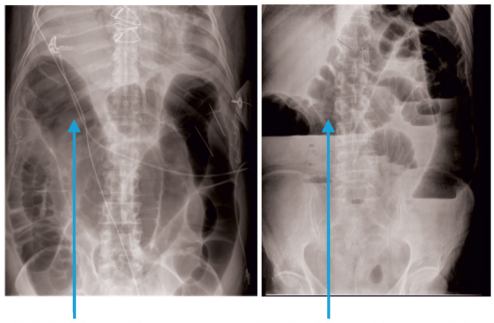
- **Jejunum**
  - Circumferential ring-like pattern
  - Also known as Plicae Circulares
- **Ileum**
  - Featureless
  - Also known as characteristically characterless



Valvulae conniventes

Small Bowel Vs Large Bowel Obstruction

NEET PG 2021, 2024

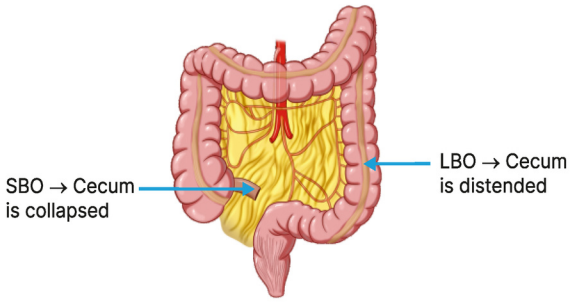
Feature	Small Bowel Obstruction	Large Bowel Obstruction
Number of dilated loops	Multiple	Few
Location	Centrally	Peripherally
Calibre	Narrow calibre	Wider calibre / Large calibre
Special feature	-	Presence of **haustrations** (characteristic feature)
Imaging	 Circumferential ring like pattern; Step-ladder pattern	 Dilated bowel loops; Dilated bowel loops with multiple air-fluid levels

3-6-9 Rule For Normal Calibre

- Small bowel: Less than 3 centimetres
- Large bowel: Less than 6 centimetres
- Appendix: Less than 6 millimetres (Remember: it is millimetres)
- Caecum: Less than 9 centimetres

Laparotomy Finding

- First Organ Visualized to Predict Type of Obstruction: Caecum
- **Why caecum?**
  - In Large Bowel Obstruction: In a patient who is having a large bowel obstruction, the caecum will be distended because the proximal loop will be distended, and the distal loop will be collapsed



- **In Small Bowel Obstruction:**
  - The patient is having an obstruction in the small bowel, the caecum is distal to the small bowel obstruction, and so the caecum will be collapsed

Treatment Of Small Bowel Obstruction

00:14:56

- Adhesions → Adhesiolysis
- Malignancy → Resection and anastomosis (if it's possible)
- Hernia → Reduction
- Crohn's disease → Resection and anastomosis

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POST-OPERATIVE ILEUS

00:15:30

- After surgery, there is a failure of neuromuscular transmission
- It is a type of paralytic ileus
- Return of Peristaltic Activity (Timeline)
  - Small bowel: Within 24 hours (Earliest activity)
    → In the jejunum, activity is seen within 8 hours
  - Stomach: 48 hours
  - Colon: 3 to 5 days
- Organ Responsible for Post-operative Ileus: Colon

INTUSSUSCEPTION

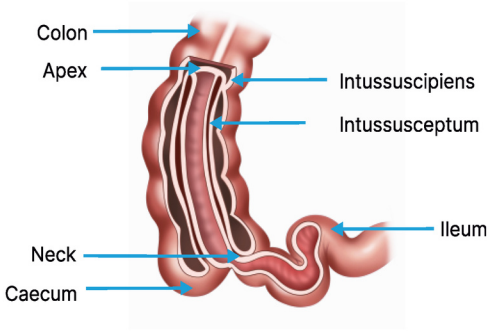
00:17:00

- This is the telescoping of one segment of bowel into another
- More common in children
- Seen in: 4 to 10 months
- Association: Idiopathic
- Associated with:
  - Rotavirus diarrhoea: This leads to Peyer's patch hypertrophy
  - Rotavirus vaccine
  - The ileum enters the colon: Ileocolic (Most common type)
- Most Common Type in Adults: Colocolic

Anatomy Of Intussusception

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- Intussuscipiens (Receiving segment): The recipient is the suscipient
- Intussusceptum (Incoming segment): Incoming segment is the intussusceptum
- Neck: Where it enters inside, that is known as the neck
- Apex: The terminal part is known as the apex
- Most Prone to Gangrene: Apex



Types & Lead Points In Intussusception

- Most Common Type: ileocolic
- Lead Point
  - An anatomical abnormality leading to intussusception. This anatomical abnormality is known as a lead point
  - In the majority of cases: Idiopathic
- Most common lead point: Meckel's diverticulum > Polyp
- Most Common Small Bowel Tumour Causing Intussusception
  - In Children: Lymphoma
  - In Adults: Villous adenoma

Clinical Features Of Intussusception

During the attack:

- Obstruction leads to colicky pain
- Bilious vomiting (multiple episodes)
- During an attack, the child cries a lot, pulls their legs towards their abdomen (because of colicky pain)
- Child is having green-coloured or bilious vomiting

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Between attacks:

- Child feels hungry
- After breastfeeding, the child is going to sleep
- Asymptomatic between attacks

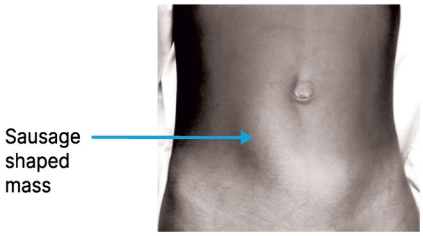
After multiple attacks:

- Child is going to pass a little amount of stool mixed with blood: Red Currant Jelly Appearance

Physical Examination Findings

Abdominal Mass

- **Findings:**
  - There will be **a sausage-shaped mass**
  - The area of the **right iliac fossa will be empty**
- **Sign of Dance**
  - Empty right iliac fossa
  - Known as the **Sign of Dance**

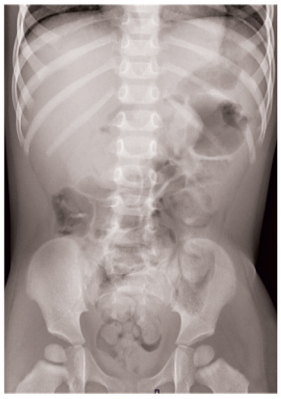


Management Of Intussusception

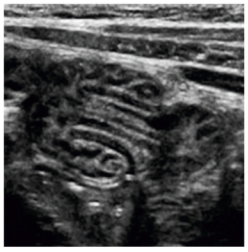
INICET 2025, FMGE 2024

- Enema: It is going to create pressure, and the bowel loop will come out
- Types of enema:
  - Barium enema
  - Air enema
    - → Air enema is preferred over barium enema
    - → This is diagnostic and therapeutic
- Management of Recurrence: Repeat air enema
- After the 3rd recurrence: indication for surgery
- Ileocolectomy + Ileotransverse anastomosis
  - Start resecting from the ileum
  - Remove caecum
  - Remove ascending colon

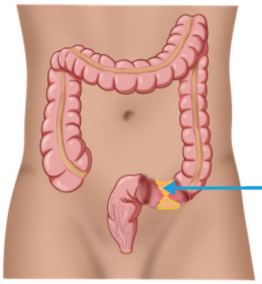
Radiological Signs

Investigation	Signs Seen	
Plain X-ray	Meniscus sign	Target sign
		

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Barium Enema	Claw sign	Coil spring sign
		
Ultrasound	**Target sign (donut sign)**	**Pseudokidney sign**
		

LARGE BOWEL OBSTRUCTION



00:24:55

NEET PG 2021

- Most common cause: Malignancy
- Most common site of Large bowel malignancy
  - Rectum (Most common site)
  - Sigmoid

Pathophysiology – Closed-Loop Obstruction

- In sigmoid malignancy with a competent ileocaecal valve, movement is unidirectional, resulting in a closed-loop obstruction
- This condition causes material collection and progressive colonic distension
- Early surgery is mandatory due to the high risk of perforation without prompt intervention

Clinical Features

- Colicky Pain in the lower abdomen
  - Since the rectum and sigmoid develop from the hindgut
    → Pain of foregut: Epigastrium
    → Pain of the midgut: Around the umbilicus
    → Pain of the hindgut: Lower abdomen (hypogastrium)
- Abdominal distension
- Vomiting is not prominent
- Obstipation (absolute constipation)
- Emergency due to closed-loop obstruction

Management Protocol

Initial Treatment

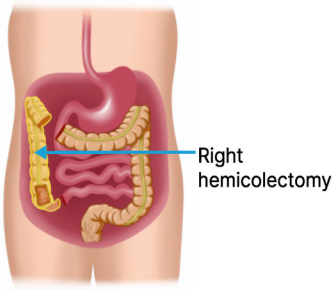
- Similar to small bowel obstruction:

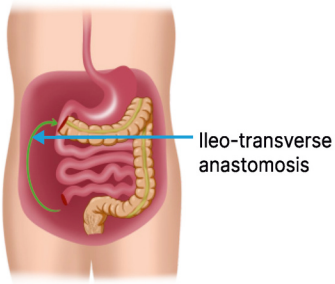
- first resuscitate
- Insert Ryle's tube
- Insert Foley's
- Investigate

Definitive Treatment

Right Colon Malignancy

- Right hemicolectomy
- Anastomosis: Ileotransverse anastomosis

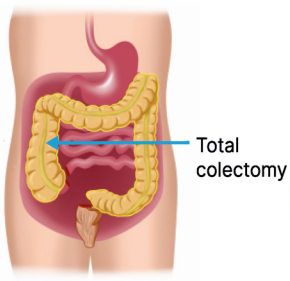


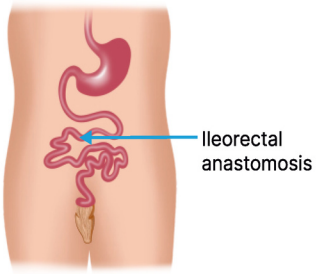


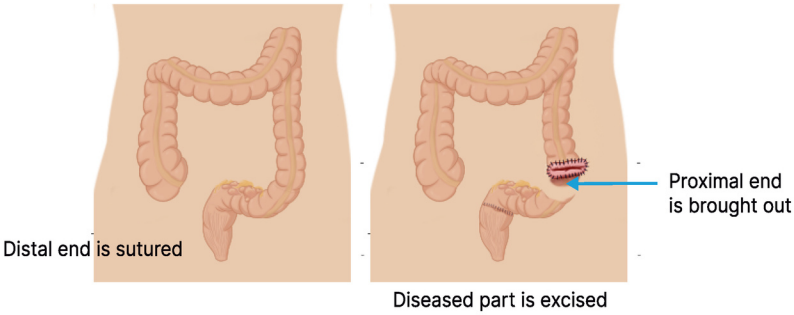
Sigmoid Malignancy

- Length of sigmoid: 30 centimetres
- Option 1 (First option)
  - Sigmoidectomy followed by Colorectal anastomosis
- Option 2 (Second option)
  - If the whole colon is papery thin: Total colectomy + Ileorectal anastomosis

- Option 3 (Third scenario) - HARTMAN'S PROCEDURE
  - Sigmoid malignancy leading to obstruction in the elderly
  - Components of Hartman's procedure:
    → Perform a sigmoidectomy, but avoid doing an anastomosis
    → Perform a descending colostomy
    → Close the rectal stump
  - Sigmoidectomy + Colostomy PLUS Closure of rectal stump







Mid- or Lower-Rectal Malignancy

- Relieve the obstruction through a defunctioning colostomy
- Afterward, downstage the tumour using chemoradiation
- Once the tumour is downstaged, proceed with tumour resection and close the colostomy
- Summary: Tumour resection and colostomy closure

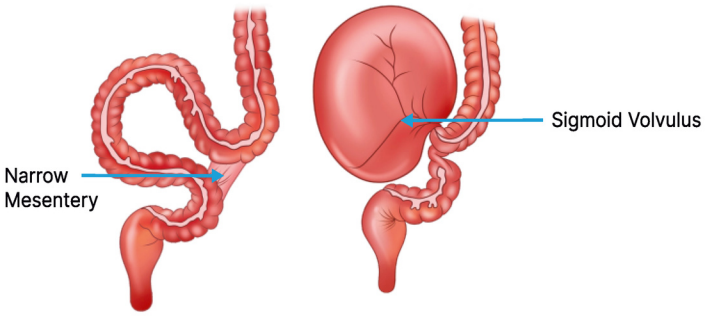
SIGMOID VOLVULUS

00:31:13

- Most common site of volvulus: Sigmoid
- Sigmoid volvulus can be clockwise, or anticlockwise
- Most commonly: Anticlockwise
- Two Mandatory Factors
  - First factor: Constipation

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- Second factor: Long, narrow mesentery

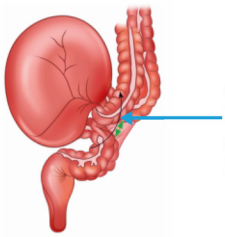


Predisposing Factors

- Old age: Impaired peristaltic activity → constipation
- Hospitalised patient: Drug-induced
- Mentally impaired: Taking antipsychotics
- Two drugs, especially:
  - Opiates
  - Antipsychotics
- Why opiates and antipsychotics?
  - The side effects of both of these are anticholinergic.
  - Constipation results from this.

Clinical Features

- Signs and symptoms of **large bowel obstruction**
  - Colicky pain
  - Abdominal distension
  - Non-passage of faeces and flatus



Radiological Findings

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X-Ray Abdomen Findings

- Coffee bean sign
- **Other signs on X-ray:**
  - Bent inner tube sign
  - Omega sign



Barium Enema Findings

- Bird beak sign
- Ace of Spades sign
- Bird of prey sign



Treatment

- Colonoscopic detorsion followed by Elective sigmoidectomy (after 3 days/72 hours)

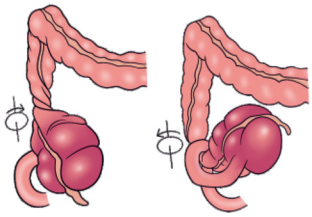
CAECAL VOLVULUS

00:35:14

- **Direction-** Clockwise
- **Terminology and Pathophysiology**
  - The term "Caecal Volvulus" is actually a misnomer because the condition

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frequently involves the ascending colon and portions of the terminal ileum.
  - A more accurate name would be **Caecoascending volvulus**.
  - The pathology involves a **clockwise rotation** of the ileum, caecum, and ascending colon.
  - The torsion typically originates at the **ileum**.



- **Clinical Presentation**
  - Due to the twisting starting from the ileum, patients primarily present with clinical features of **small bowel obstruction**.

Surgical Management Strategies

- **Resection Profile**: Includes the terminal ileum, the caecum, and the ascending colon.
  - Procedure: An Ileocolectomy is the primary surgery performed.
  - Reconstruction: Post-resection, the remaining ileum and transverse colon are joined via an Ileotransverse anastomosis.
- **Complete surgery:**
  - Ileocolectomy + Ileotransverse anastomosis

Predisposing Factors For Caecal Volvulus

- **Multiparous:** Release of hormone relaxin → ligaments are relaxed → caecum is mobile
- **History of previous surgery:** You are going to cut the ligaments → caecum is mobile
- **Malrotation:** The caecum is mobile
- **Distal obstructing lesion:** Caecum will be loaded
- **Clinical Feature:** Signs and symptoms of small bowel obstruction

X-Ray Findings

- kidney bean sign
- Also known as a comma-shaped caecum



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Treatment

- Ileocolectomy + Ileotransverse anastomosis

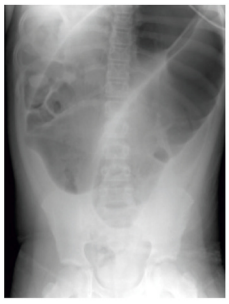
MCQs

00:38:24

Q. A 70-year-old patient presents with absolute constipation and abdominal distension. And the X-ray of the abdomen is given below. What is the most likely diagnosis?

FMGE Jan 2025

a. Caecal volvulus
b. Sigmoid volvulus
c. Intestinal obstructio
d. Small bowel volvulus



Ans: b

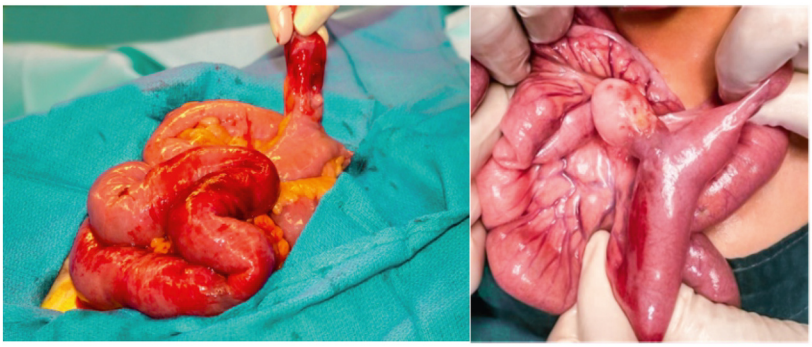
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8. SMALL INTESTINE

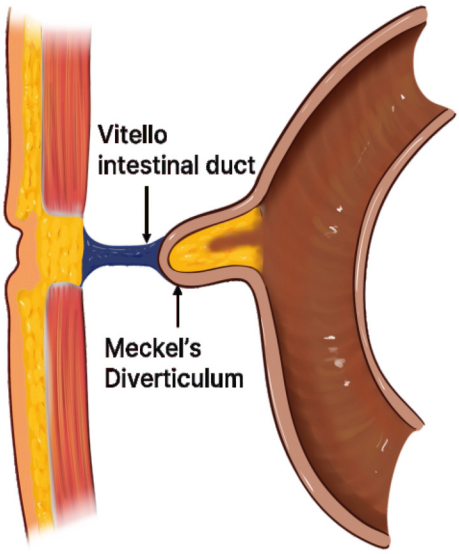
MECKEL'S DIVERTICULUM

00:00:22

FMGE 2021



- M/c congenital abnormality of the midgut



- Abnormal persistence of vitello intestinal duct (aka omphalomesenteric duct)
- Mechanism of Bleeding (M/c Presentation in Children)
  - Ectopic gastric mucosa → secretes acid → acid acts on surrounding tissue → ulcer → bleeding
- Characterised by Rule of 2
  - Seen in 2% of the population
  - 2 inches in length
  - Located 2 feet proximal to IC junction
  - Symptomatic patients are less than 2 years of age
- M/c ectopic mucosa → mnemonic GPC:
  - G → Gastric (M/c)
  - P → Pancreatic
  - C → Colonic

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INICET 2025

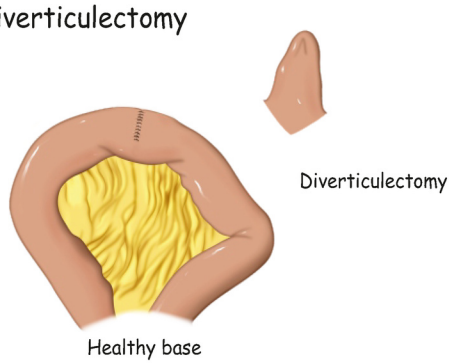
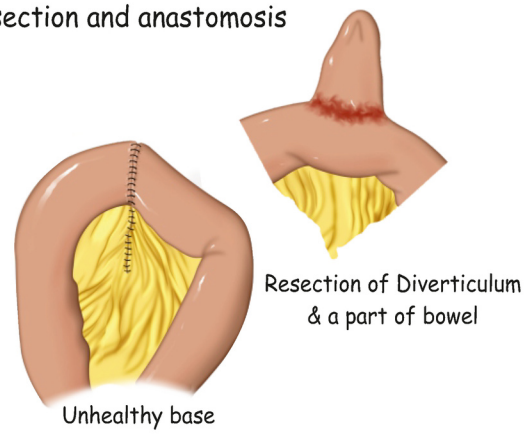
- Clinical features
  - M/c presentation → Bleeding (in children < 2 years)

- M/c symptom in adults → Abdominal pain
- Causes of Abdominal Pain in Meckel's
  - Fibrous band attached to the umbilicus → twisting → midgut volvulus
  - Meckel's diverticulum acts as a lead point → intussusception → obstruction → pain
  - Inflammation in the diverticulum → diverticulitis
- It is a True diverticulum → contains all 3 layers: mucosa, submucosa, muscularis propria
- Located on the antimesenteric border

Investigations

- IOC for diagnosis of Meckel's Diverticulum: Technetium 99m pertechnetate scan (detects ectopic mucosa)
- In absence of ectopic mucosa: Small bowel enema (Enteroclysis)

MANAGEMENT

Meckel's Diverticulum with	Treatment
Healthy base	Diverticulectomy 
Unhealthy base (e.g., ulcer near base)	Resection and anastomosis 

- Factors Increasing Risk of Complications
  - Narrow mouth
  - Presence of ectopic gastric mucosa
  - Unhealthy base

SUPERIOR MESENTERIC ARTERY (SMA) SYNDROME

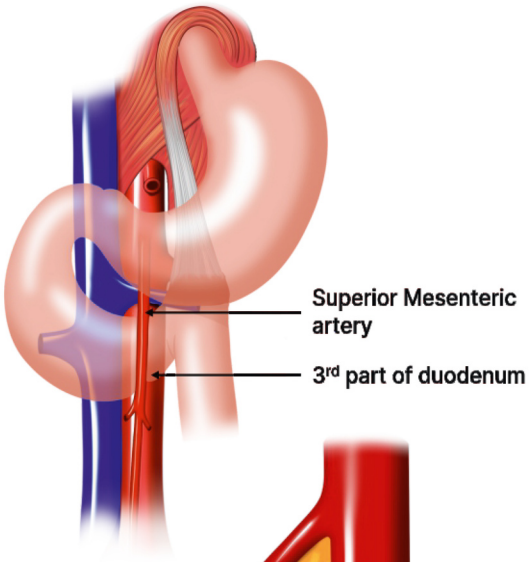
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INICET 2022
FMGE 2019

- Aka Wilkie's syndrome / Cast syndrome
- There is compression of the 3rd part of the duodenum by the Superior Mesenteric Artery

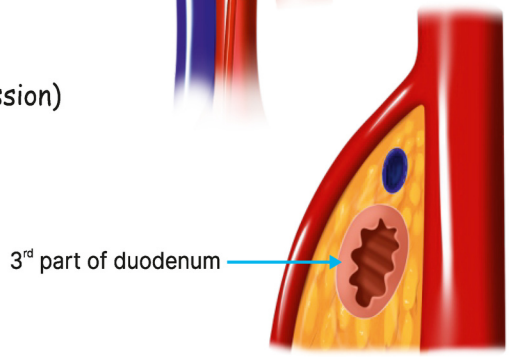
Yourwish

- Normal Anatomy
  - SMA arises from the aorta
  - The aorto-mesenteric angle is normally 38 to 65 degrees
  - This angle is maintained by fatty cushions

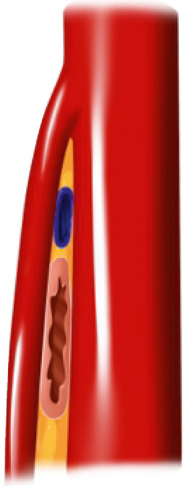


- In SMA Syndrome
  - Fat loss causes fatty cushions to disappear.
  - The angle becomes less than 20 degrees.
  - This leads to compression of the 3rd part of the duodenum
  - The compression results in partial obstruction

- Predisposing Factors (Any condition with fat loss or compression)
  - Rapid weight loss
  - Rapid gain of height
  - Prolonged immobilisation
  - Body cast application



- Symptoms
  - partial obstruction → patient passes faeces and flatus normally
  - Patient complains of colicky pain after meals



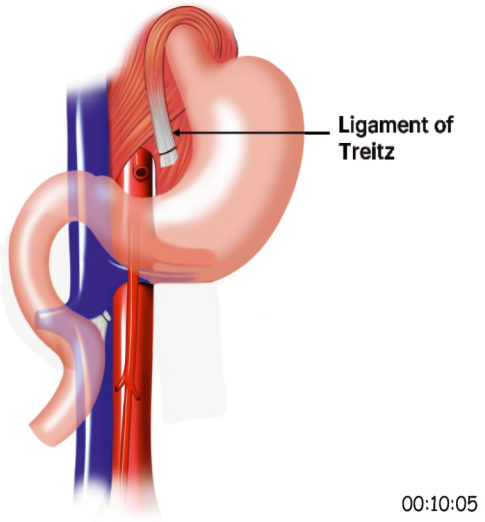
- Diagnosis
  - Hypotonic duodenography
  - CECT scan

Management

- Conservative (Majority of patients improve)
  - Encourage weight gain
  - If the cast is applied → remove the cast
  - If prolonged immobilisation → ask patient to lie prone after meals

Surgical Management

- Strong's procedure
  - Cut/divide the ligament of Treitz
  - Mobilise the 4th part of the duodenum
- If not improving: Bypass the obstruction
  - TOC: duodenojejunostomy (DJ)
- TOC for annular pancreas and duodenal atresia → duodenoduodenostomy > duodenojejunostomy



GI TUBERCULOSIS

00:10:05

NEET PG 2021

- M/c organism responsible → Mycobacterium tuberculosis
- 1st organ affected → Lungs

Yourwish

Yourwish

- Mechanism → swallowing of infected sputum → reaches the GIT
- Earliest disease activity seen in → Submucosa layer (recruitment of lymphocytes)
- M/c site of GI TB → Ileocecal region

Pathological Types of Tb

Variety	Percentage
Ulcerative (M/c)	60%
Hypertrophic/Hyperplastic	10%
Cicatrotic/Fibrotic	30%

- Ulcer Characteristics
  - GI TB → Transverse ulcers
  - Typhoid → Longitudinal ulcers (perforate during 3rd week)



Tuberculosis
(Transverse ulcer)



Typhoid
(Longitudinal ulcer)

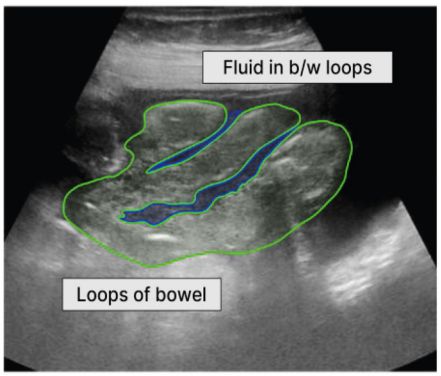
Clinical Features

- Non-specific signs and symptoms
  - Evening rise of temperature
  - Night sweats
  - Low grade fever
  - Anorexia & weight loss
- Specific signs & symptoms
  - M/c symptom of GI TB → Abdominal pain
  - Diarrhoea → seen in initial stages when ulcer is present
  - Subacute intestinal obstruction

Investigations

FMGE 2020
INICET 2019

- M/c laboratory abnormality → raised ESR (in 90% of patients)
- Ultrasound Finding
  - Club sandwich appearance → bowel loops + fluid in between loops of bowel
- Paracentesis (if ascites present)
  - Cells → Lymphocytes > 500 per mm^3
  - Type of fluid → Exudate (it is an inflammatory condition)
    → In exudate → excess of protein (> 2.5 grams per decilitre)
  - SAAG < 1.1
  - Raised ADA (Adenosine Deaminase)
- IOC for Diagnosis: CECT



Club-sandwich appearance

Barium Meal Follow Through Findings

00:15:20

- Pulled up caecum
- Obtuse IC angle

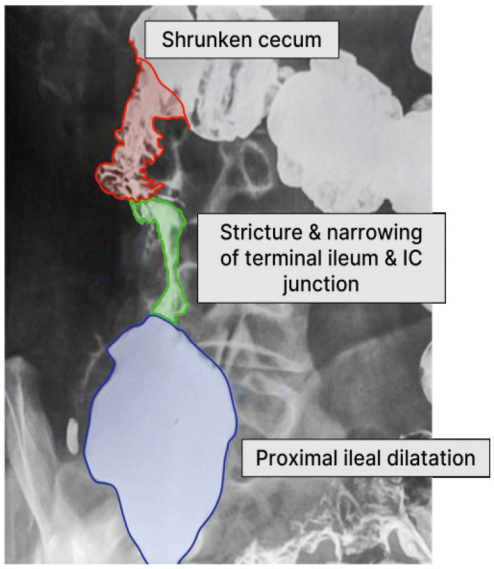
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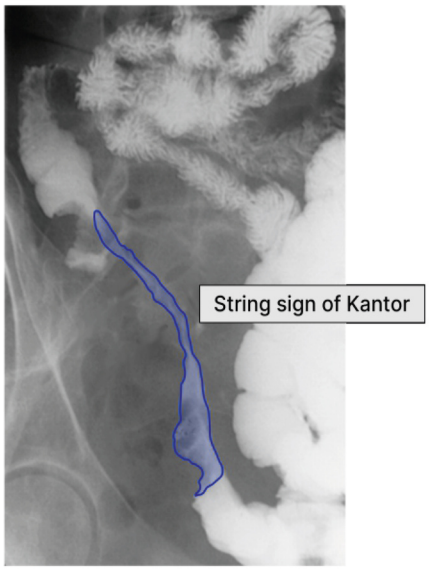
- Goose neck deformity
- Narrowed appearance of ileum (due to ulcer) → Stierlin sign
- Persistent narrowing of ileum (due to stricture) → String sign of Cantor
- Fleischner sign / Inverted umbrella sig
  - Rigid caecum + narrow ileum + thickened ileocecal valve

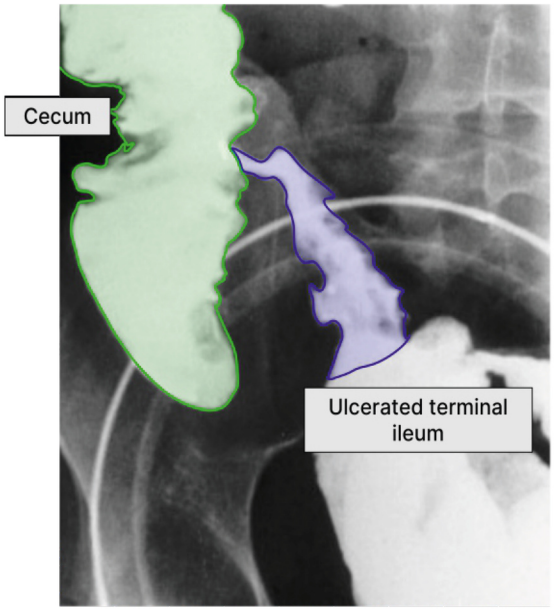
Important Information

- Stierlin sign & String sign of Cantor are seen in both GI tuberculosis AND Crohn's disease

NEET PG 2024







Fleischner sign / Inverted umbrella appearance

Management

- Medical → ATT + Management of complications
- Surgical indications:
  - Obstruction
  - Perforation
  - Bleeding
  - Abscess
  - Fistula formation

SMALL BOWEL TUMOURS

00:18:50

- M/c Small Bowel Tumour (Overall): Stromal tumour > Adenoma
- M/c Small Bowel Tumour in Children: Lymphoma
- M/c malignant small bowel tumour → Adenocarcinoma > Carcinoid

Carcinoid Tumour

00:19:38

- It is a neuroendocrine tumour
- Special feature → arises from neuroendocrine cells, expresses somatostatin receptors
- Investigation of choice for localisation → SRS (Somatostatin Receptor Scintigraphy)
- Originates from → ECL cells (Enterochromaffin-like cells)
  - ECL cells are located in → Crypt of Lieberkühn
- Overall M/c Site — Mnemonic: BIRACS
  - **B** - Bronchus
  - **I** - Ileum
  - **R** - Rectum
  - **A** - Appendix
  - **C** - Colon
  - **S** - Stomach

Important Information

- Most Common Site
  - If Small intestine is an option → Mark Small intestine
    → Reason: Combined incidence of duodenum, jejunum, and ileum
  - If Small intestine is not given → Mark Bronchus

Types Of Carcinoid Tumor

Type	Mnemonic	Sites
Localized	LOAR	Larynx> Ovary> Appendix > Rectum
Non-localized (high chance of invasion/metastasis)	PCS	Pancreatic> Colonic> Small intestinal

- Prognosis
  - Best prognosis overall → Laryngeal carcinoid
  - Best prognosis in GIT → Appendix carcinoid
  - Worst prognosis → Pancreatic carcinoid (most are non-localized)

Sites

- M/c Sites of carcinoid tumor in GIT: Ileum
- M/c Sites of carcinoid tumor in Hindgut: Rectum
- M/c Sites of carcinoid tumor in Foregut of GIT: Stomach

Yourwish

Pathophysiology Of Carcinoid Syndrome

- Midgut carcinoid secretes → 5-Hydroxytryptamine (5-HT = Serotonin)
- 5-HT is metabolised in → Liver, Lungs, Brain
  - Enzyme responsible → MAO (Monoamine Oxidase)
- MAO catabolises 5-HT → 5-HIAA (5-Hydroxyindoleacetic acid)
  - 5-HIAA is excreted in urine
- Investigation of Choice for Diagnosis of Carcinoid Tumour: 24-hour urinary estimation of 5-HIAA
- Carcinoid Syndrome
  - Accumulation of 5-HT in the body
  - 5-HT /serotonin are inflammatory mediators → excessive inflammation → manifestations:
    → Flushing (M/c)
    → Wheezing
    → Bronchospasm
    → Diarrhoea



Carcinoid Heart Disease

- Midgut carcinoid → 5-HT secreted → via superior vena cava → right atrium → right ventricle → lungs → metabolised by MAO in lungs → does Not reach left side
- The right side of the heart is mainly affected
- Tricuspid valve is more commonly affected
- Regurgitation more common than stenosis
- Order of valvular abnormalities (most to least common):
  - TR — Tricuspid Regurgitation (M/c)
  - PR — Pulmonary Regurgitation
  - TS — Tricuspid Stenosis
  - PS — Pulmonary Stenosis

Risk of Malignancy

- Location of tumour
- Size of tumour
- Depth of invasion
- Growth pattern

Small Bowel Carcinoid

00:27:40

- Arises from ECL cells in the crypt of Lieberkühn
- Associated with intense desmoplastic reaction → excessive fibrosis → contraction → obstruction → abdominal pain

Clinical Features

- M/c symptom → Abdominal pain
- M/c site of metastasis → Liver (haematogenous spread via portal vein)
- Gastric Carcinoid
  - Most peculiar symptom → Bright red, patchy flushing

Yourwish

Yourwish

Investigations

- IOC for Diagnosis → 24-hour urinary 5-HIAA
- Initial investigation for localisation and staging → SRS (Somatostatin Receptor Scintigraphy)
- Best investigation for localisation → DOPA-PET (trending question

Treatment

- Since malignant → Segmental resection + en bloc lymphadenectomy
- Most Important Prognostic Marker
  - Chromogranin A
  - High levels of Chromogranin A → poor prognosis

SHORT BOWEL SYNDROME

00:30:49

- Caused by massive resection of the small bowel
- Normal length of Small intestine → 600 cm
- Normal length of Large intestine → 150 cm (one fourth of the small intestine)
- Short bowel syndrome → when the length of the small intestine is less than 200 cm
- Conditions Requiring Massive Resection of Small Bowel.
  - Mesenteric ischaemia
  - Mesenteric trauma
  - Meckel's volvulus
  - Crohn's disease

Manifestations of SBS

- Megaloblastic anemia
  - If Terminal Ileum is Resected → Impaired B12 absorption → megaloblastic anaemia
- Cholesterol Gall stones
  - Impaired enterohepatic circulation of bile salts → cholesterol gallstones
- Choleretic diarrhea
  - Unabsorbed bile salts enter the colon → irritate the colon → bile salt-induced watery diarrhoea
- Malabsorption
  - If Jejunum is Resected → malabsorption
- Oxalate renal stone formation
  - If Jejunum is Resected → Malabsorption → Free fatty acids in lumen bind with calcium → calcium no longer available for oxalate → free oxalate absorbed in colon → oxalate renal stones
- Bacterial overgrowth and diarrhea
  - If IC Valve is Removed → Anastomosis between the ileum and the colon → free reflux of faecal matter → bacterial overgrowth and diarrhoea
- Hypergastrinaemia:
  - Catabolism of gastrin occurs in the small bowel mucosa
  - If small bowel removed → gastrin rises → hypergastrinaemia

Management

- Post-operative period: Give TPN (Total Parenteral Nutrition)
  - Preferred access site for TPN: Subclavian vein > Internal jugular vein > Femoral vein
- Treatment of Choice: Small bowel transplantation

Yourwish

- Intestinal Lengthening Operations:
  - Bianchi Procedure: LILT (Longitudinal Intestinal Lengthening and Tailoring)
    → Bowel is divided longitudinally → sutured
    → Ends are sutured together
    → Result: length is doubled, circumference is reduced to half
    → Food travels with close contact with the mucosa → promotes absorption
  - STEP Procedure: Serial Transverse Enteroplasty Procedure
    → Multiple staplers are fired across the bowel
    → Zigzag travel → increases transit time → increases absorption

MCQ

FMGE Jan 2025 00:37:15

Q1. A 4-year-old boy is brought to emergency with complaints of melena that contains gastric mucosa and acute intermittent pain in the right iliac region. On surgical exploration a structure is found which contains ectopic gastric mucosa. What is the diagnosis?



A. Merckel's diverticulum
B. Appendicular lump
C. Carcinoid
D. Obstructed bowel loops

Ans.: A

Q2. Which of the following is the most commonly encountered ectopic tissue in Meckel's diverticulum?

INI CET May 2022

A. Gastric and pancreatic
B. Colonic and pancreatic
C. Gastric and colonic
D. Thyroid and lung

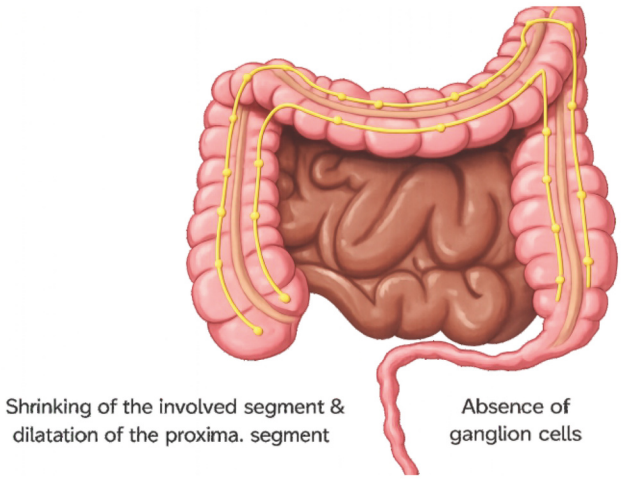
Ans.: A

2. LARGE INTESTINE

HIRSCHSPRUNG'S DISEASE

00:00:25

- Absence of ganglion cells
- Incidence: 1: 5000 live births
- M/c site: Rectum > sigmoid
- Neurocristopathy



Absence of ganglion cells

↓

Shrinking of the involved segment & dilatation of the proximal segment

↓

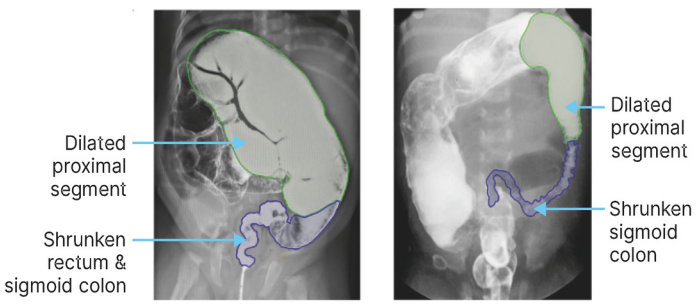
Hence, the patient will suffer from large bowel obstruction symptoms

Clinical Presentations

Just After Birth	After First Few Weeks of Life	Older Children & Adults
• M/c symptom: Abdominal distension • Delayed passage of Meconium	• Chronic constipation • Abdominal distention • Failure to thrive	• Chronic constipation

Diagnosis:

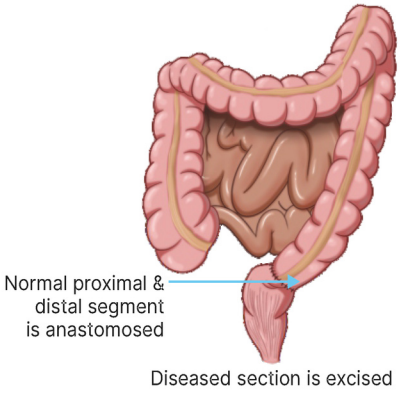
- IOC for Diagnosis: Rectal Biopsy
- On Barium enema
  - Affected segment is contracted & dilatation of the proximal segment



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Management

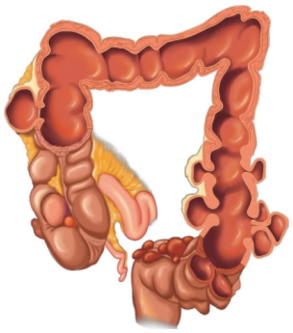
- Short segment disease: extended myectomy
- Long segment disease: temporary colostomy f/b definitive procedure
- Definitive procedures:
  - Swenson
  - Duhamel
  - Soave



COLONIC DIVERTICULOSIS

00:05:43

- M/c site: Sigmoid colon
- M/c cause of significant lower GI Bleed
- Bleeding is more common from the right side

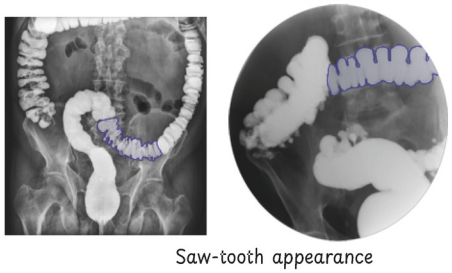


Classification

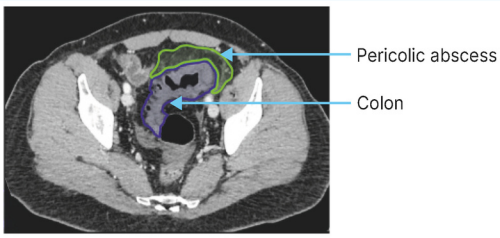
MODIFIED HINCHEY CLASSIFICATION SYSTEM (Sabiston 21st edition Update)	
Stage 0	Mild clinical diverticulitis
Stage Ia	Confined pericolic inflammation
Stage Ib	Confined pericolic abscess
Stage II	Pelvic, distant intraabdominal or intraperitoneal abscess
Stage III	Generalized purulent peritonitis
Stage IV	Fecal peritonitis

Diagnosis

- IOC for Diagnosis of colonic diverticulosis: Barium enema → saw-tooth appearance


Saw-tooth appearance

- IOC for diagnosis of colonic diverticulitis: CECT



Yourwish

Yourwish

COLORECTAL POLYPS

00:08:56

Neoplastic Polyps	Non-Neoplastic Polyps

• Tubular (M/c)
• Villous (most malignant)
• Tubulovillous
	• Hyperplastic (M/c colorectal polyp overall)
	• Hamartomatous:
	  ○ Juvenile polyp
	  ○ PJ polyp
	• Inflammatory / pseudopolyp (M/c in UC > CD)

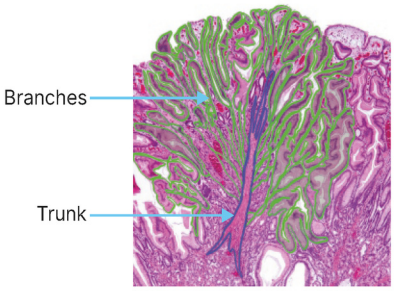
- M/c Colorectal & Gastric Polyp: Hyperplastic
- M/c Neoplastic Colorectal & Gastric Polyp: Tubular
- Most Malignant Colorectal & Gastric Polyp: Villous

Juvenile Polyp

- Hamartomatous Polyp
- Seen in children / <5 years
- Solitary polyp
- M/c site: rectum
- Clinical feature: bleeding PR
- Treatment: Polypectomy

Peutz-jegher's Syndrome

- Multiple Hamartomatous Polyps
- M/c site: Jejunum
- Mutated Gene: LKB-1/STK-11
  - Located on chromosome 19p
- Features
  - Hypermelanotic macules (Benign)
  - Arborizing pattern, Pseudo-invasion, Christmas tree pattern



Arborizing pattern


Hypermelanotic macules

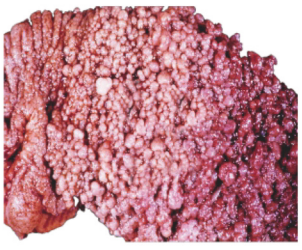
Clinical Features:

- Recurrent Intussusception → recurrent abdominal pain
- Increased risk of intestinal as well as extraintestinal malignancies
  - Extra-Intestinal malignancies:
    - → Gastric carcinoma
    - → Ca Pancreatic (max risk)
    - → Ca Lung
    - → Ca Breast, Uterine Ca, Cervical Ca, Testicular Ca, Ovarian Ca

Adenomatous Polyp

00:14:44

- Premalignant
- Risk factors for adenomatous polyps:
  - U: Ureterosigmoidostomy
  - S: Streptococcus Bovis Bacteremia
  - A: Acromegaly
- Factors increasing the risk of malignancy:



Yourwish

- Villous polyp
- Sessile polyp
- Size > 2cm

- Syndrome associated with Adenomatous Polyp
  - FAP:
    → Responsible for 1% colorectal cancer in population
    → 100% risk of malignancy
    → Prophylactic treatment is recommended
  - Lynch Syndrome:
    → Responsible for 5% colorectal cancer in population
    → Up to 80% risk of malignancy
    → Prophylactic treatment is not recommended

Familial Adenomatous Polyposis

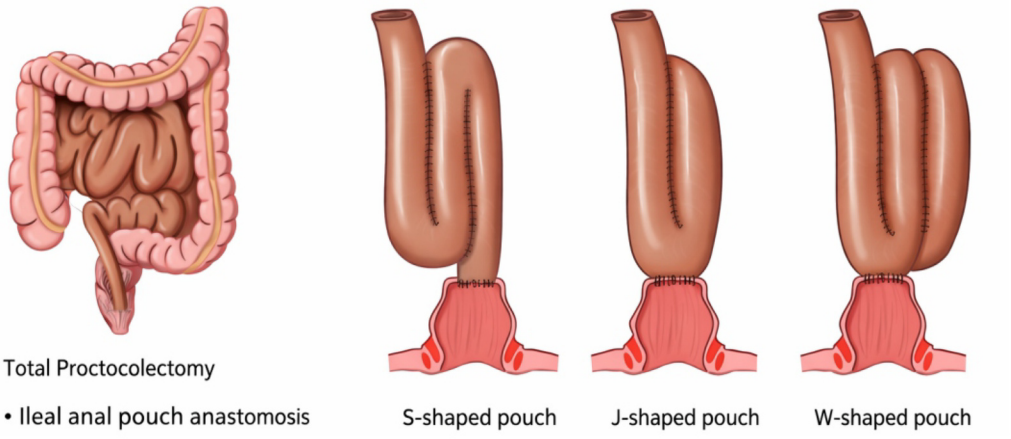
00:17:20

- Mutated gene: APC gene on Ch 5q21
- Characterized by > 100 adenomatus polyps
- Risk of malignancy: 100%
- Polyp formation begins at 15 years
- 100% patients develop malignancy by 40 years
- M/c symptom: Bleeding PR

Diagnosis:

- IOC for diagnosis: Colonoscopy + Biopsy

Management



- Total Proctocolectomy + Ileal pouch anal anastomosis
- Types of pouch used
  - S-shaped pouch
  - J-shaped pouch: Most preferred
  - W-shaped pouch

Important Information

- Total Proctocolectomy + Ileal pouch anal anastomosis is also the TOC in Ulcerative Colitis

- M/c cause of death after TPC: Periampullary carcinoma
- Complications of Surgery:
  - FAP: Small bowel obstruction (in 25%)
  - Ulcerative colitis: Pouchitis (in 33%) > Small bowel obstruction (in 25%)
- Screening:
  - IOC for screening of family members of FAP patients: APC gene testing
    → Positive mutation: Colonoscopy
    → Polyp is detected: Total Proctocolectomy

Lynch Syndrome

- Previously k/a Hereditary Non-Polyposis Colorectal Cancer (HNPCC)
- Caused by Mismatch repair gene abnormality
- Chromosomes involved: 2, 3, and 7
- Genes responsible for >90% cases:
  - h MLH 1
  - h MSH 2
- Revised Amsterdam criteria: used to select at-risk patients for HNPCC
- Modified Bethesda guidelines: to detect microsatellite instability
- Lynch syndrome is further divided into
  - Lynch 1 → only Colorectal Cancer
  - Lynch 2→ Colorectal cancer + Extraintestinal malignancies (**Mnemonic** → EGO)
    → Endometrial > Gastric > Ovarian cancer
- Muir-Torre Syndrome:
  - Sebaceous Adenoma & Carcinoma of Skin + Keratoacanthoma

Diagnosis:

- Gold standard for confirming causative gene mutation for Lynch syndrome: Germline sequencing of MMR

Management:

- Risk of Malignancy: Up to 80%
- Surveillance colonoscopy at 25 years
  - Frequency: every 2 years
- Patients develops CA colon: Total colectomy + ileorectal anastomosis
  - Annual proctoscopy is done
- Female with completed family: Transabdominal hysterectomy + Bilateral salpingo-oophorectomy

Screening For Colorectal Cancer

- Started at 50 years
  - FOBT done annually
  - Flexible sigmoidoscopy: every 5 years
  - Double-contrast Barium Enema: every 10years
  - Colonoscopy: every 10years
- Most preferred method: Colonoscopy > Double-contrast Barium Enema

Yourwish

Risk Factors For Colorectal Cancer

00:28:43

- Dietary factors: High fat diets, alcohol
- Hereditary syndromes: FAP, HNPCC
- IBD: risk is equal in CD and UC
- Adenomatous polyp
  - U: Ureterosigmoidostomy
  - S: Streptococcus Bovis Bacteremia
  - A: Acromegaly
- Smoking
- Pelvic irradiation

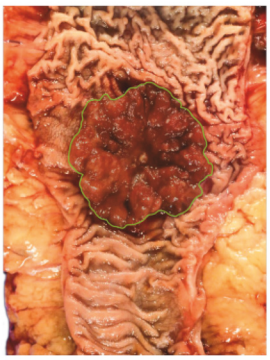
CARCINOMA COLON

00:29:51

- M/c form of colon cancer: Sporadic
- M/c site: Sigmoid
- LC site: Hepatic flexure of the colon
- M/c site of metastasis: Liver
- Chemotherapy:
  - FOL: Folinic acid or Leucovorin
  - F: 5 fluorouracil
  - OX: Oxaliplatin

Clinical Features:

- M/c symptom: abdominal pain
- Alteration of bowel habit
- Symptom is dependent on location

Right Colonic Malignancy  Fungating growth	• Ulceroproliferative or fungating growth • M/c symptom: Bleeding ○ Occult bleeding → anemia → fatigue ○ Haematochezia ○ Melena • RIF mass
Left Colonic malignancy  Annular/stenosing growth	• Annular or stenosing growth • Left colon → Narrow caliber • Solid fecal matter • Obstruction is more common ○ Symptom: Abdominal pain

Yourwish

Diagnosis

- IOC for diagnosis: Colonoscopy
- Barium enema: Apple core lesion
- IOC for staging of CA colon: CECT
- Assessment for metastatic disease: PET-CT



Apple core lesion

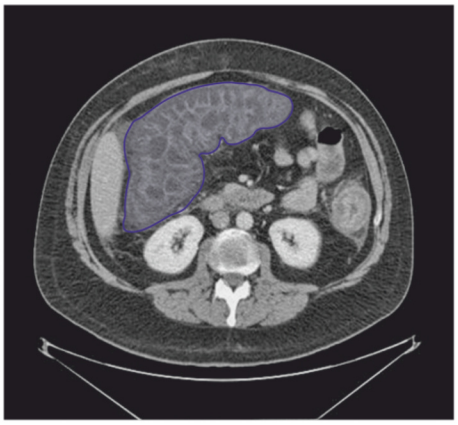
Treatment

- Stage 0 (Tis, N0, M0):- Polypectomy
- Stage I-II (T1-3, N0, M0): Segmental resection
- Stage III (Tany, N1, M0): Segmental resection + adjuvant chemotherapy
- Stage IV (Tany, Nany, M1):
  - Number of metastasis up to 3 → Metastasectomy + adjuvant chemotherapy
  - Unresectable: Palliation

PSEUDOMEMBRANOUS COLITIS

00:35:43

- Caused by clostridium difficile





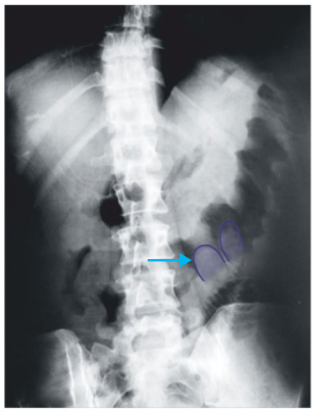
Accordion sign

- On CECT: Accordion sign

ISCHEMIC COLITIS

00:36:12

- M/c site: Splenic flexure of colon



Thumbprint Sign

- Thumb printing is seen both on x-ray and barium enema

Yourwish

LOWER GI BLEED

00:36:41

- Bleeding distal to ligament of Treitz
- M/c site of LGIB: R-side of colon
- M/c cause of LGIB: Hemorrhoids
- M/c cause of significant LGIB: Colonic diverticulosis
- M/c cause of small bowel bleeding: Angiodysplasia
- M/c cause of recurrent & obscure LGIB: Vascular ectasia

PYQs

00:37:54

Q. Which of the following is correct about Hirschsprung's disease?

1. Failure of migration of ganglion cells
2. Cause of intestinal obstruction postnatally
3. Proximal segmental constricted
4. Non coordinated peristalsis

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

Ans: c. 1, 2 & 4

Q. Which of the following matching is correct related to the confirmation of diagnosis?

a. Hirschsprung's disease: Rectal Biopsy
b. Carcinoma colon: CECT
c. Carcinoma breast: Mammography
d. Carcinoma bladder: MRI

Ans: a. Hirschsprung's disease: Rectal Biopsy

Q. A 5-years old boy with rectal bleeding is diagnosed with rectal polyp. Lesion on biopsy shows mucin & presence of giant cells. What is the diagnosis?

a. Hamartomatous polyp
b. Choristoma
c. Inflammatory polyp
d. Adenomatous polyp

Ans: a. Hamartomatous polyp

Q. Which of the following statements are true about Peutz-Jegher's syndrome?

1. Inherited as autosomal recessive disorder
2. Polyps show arborization on histology
3. Associated with congenital hypertrophied retinal pigment epithelium
4. Hamartomatous polyps
5. STK-11 mutation

a. 1, 2, 4, 5
b. 1, 3, 4, 5
c. 2, 4, 5
d. 1, 2, 3, 4, 5

Ans: c. 2, 4, 5

18. ILEOSTOMY AND COLOSTOMY

DEFINITION

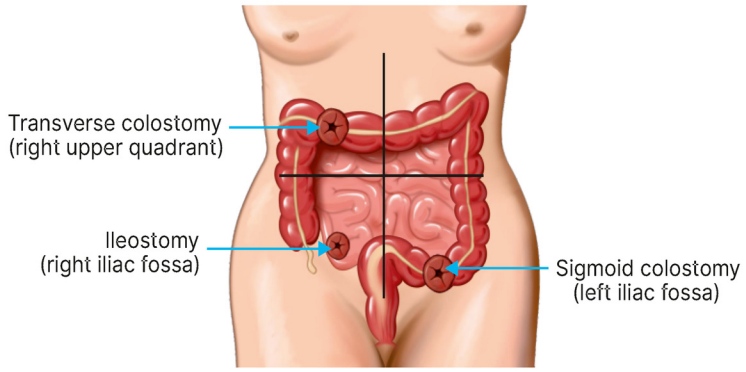
00:00:16

- Exteriorisation of the ileum to the abdominal skin is an ileostomy
- Exteriorisation of the colon to the abdominal skin is a colostomy

SITES OF STOMA FORMATION

NEET PG 2022

- Transverse colostomy done at the right upper quadrant
- Ileostomy done at the right iliac fossa
- Sigmoid colostomy at the left Iliac Fossa



DIFFERENCE BETWEEN ILEOSTOMY AND COLOSTOMY

ILEOSTOMY	COLOSTOMY
• Spouted: above the level of skin • Effluent is a liquid rich in nutrients and electrolytes • Maximum risk of dyselectrolytemia and malnutrition	• Flush: at the level of the skin • Effluent is solid

COMPLICATIONS OF STOMA FORMATION

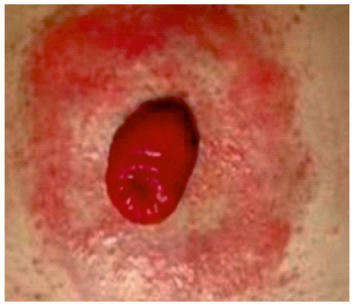
00:03:41

FMGE 2019

EARLY COMPLICATIONS	LATE COMPLICATIONS
• Seen within 1 month ○ Retraction ○ Abscess ○ Poor location ○ Ischemia / Necrosis ○ Detachment / Dermatitis ○ Opening the wrong end ○ Output is high	• Seen after 1 month ○ Stenosis ○ Prolapse ○ Parastomal hernia ○ Fistula ○ Gas ○ Odor ○ Obstruction

Yourwish

- Overall, the MC complication is dermatitis

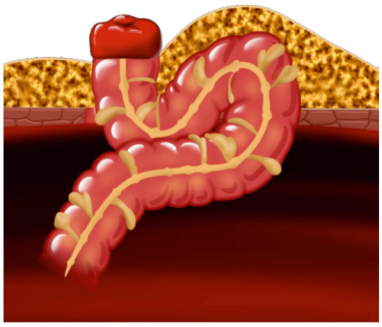


- MC early complication is ischemia and necrosis



- MC complication in end and loop colostomy is parastomal hernia





Parastomal Hernia

- Parastomal hernia is MC in end colostomy because of extensive tissue dissection
- Prolapse is MC in a loop colostomy because more tissue is outside the body



Prolapse

Yourwish

PYQ

00:09:03

Q. Identify the wrong statement about stoma from the following:
a. Ileostomy loops are kept spouted
b. Maximum absorption of electrolytes and nutrients is seen with colostomy
c. Stoma of colostomy is everted above skin level
d. Only muscular layer is taken in sutures while creating ileostomy

Ans. c

Q. Most common complication of ileostomy:
a. Ischemic necrosis
b. Skin irritation
c. Prolapse
d. Parastomal hernia

Ans. b

Yourwish

16. INFLAMMATORY BOWEL DISEASE

CROHNS DISEASE V/S ULCERATIVE COLITIS

00:00:05

FMGE 2021

MACROSCOPIC FEATURES

FEATURES	CROHNS DISEASE	ULCERATIVE COLITIS
Distribution	Segmental with skip areas	Continuous
Location	Ileum, caecum, ascending colon	Rectum, sigmoid, rest of colon
Extend	Transmural	Mucosa and submucosa
Ulcers	Serpiginous progressing to deep ulcers	Superficial mucosal ulcers
Pseudopolyps	Rare	Common
Fibrosis and stricture	Common	Rare
Shortening of the bowel	Due to fibrosis	Due to muscularis construction

MICROSCOPIC FEATURES

CROHNS DISEASE	ULCERATIVE COLITIS
Depth of inflammation: Transmural	Depth of inflammation: Mucosa and submucosa
Type of inflammation: • Non-caseating granuloma • Langerhans giant cell • Infiltration of mononuclear cells	Non-specific acute and chronic inflammatory cells
Mucosal changes: Patchy ulceration	Mucosal changes: Hemorrhagic mucosa with ulcerations
Submucosa: Widened due to edema and lymphoid aggregates	Submucosa: Normal or reduced in width
Muscularis propria: Infiltrated by inflammatory cells	Muscularis propria: Sparred
Fibrosis: Common in Crohn's disease	Fibrosis: Rare

COMPLICATIONS

INICET 2022, FMGE 2022

	CROHNS DISEASE	ULCERATIVE COLITIS
Fistula formation	More common	Rare

	• Involves ileum
	  ○ Enteroenteric
	  ○ Enterocutaneous
	  ○ Enterovesicle	

Perianal fistula	Common	The perianal area is spared
Malignant changes	Risk of small intestine malignancy more	Risk of cholangiocarcinoma is more
Fibrotic strictures	Common	Rare
Toxic megacolon	Rare	Common

- Risk of colon cancer: CD=UC

SIGNS

CROHNS DISEASE	ULCERATIVE COLITIS Signs → Due to loss of hausterisation

• Due to stricture formation of terminal ileum:
  ○ String sign of Kantor
  ○ Hose pipe appearance
• Creeping fat sign
  ○ Circumferential wrapping of small bowel by mesenteric fat
• Cobblestone appearance
  ○ Deep fissuring ulcers between the mucosa
• Comb sign
  ○ Vascular jejunisation of ileum
• Raspberry thorn/rose thorn
  ○ Linear transmural ulcers
• Fat halo sign
  ○ Submucosal fat around the bowel
	• Lead pipe sign
	• Pipe stem colon
	• Garden hose appearance
	• Stove pipe appearance
	• Collar button ulcer

PYQ

00:08:42

Q. Mark the correct statement regarding inflammatory bowel disease:
A. Skip lesions are present in Crohn's disease
B. Mucosal layers are involved in Crohn's, while transmural involvement is seen in ulcerative colitis
C. Inflammatory bowel disease doesn't have a genetic predisposition
D. Crohn's is curable through surgical resection of the affected segment

Answer: A

Q. In contrast with Ulcerative colitis, which of the following in Crohn's disease is likely to show?
A. Seldom presents with daily hematochezia
B. Increased frequency of perianal fistula
C. Continuous lesion

Yourwish

D. Increased risk of colon cancer

Answer: B

Q. What is the Truelove and Witts classification used for:
A. Severity grading of ulcerative colitis
B. ARDS
C. Acute encephalitis
D. Acute pancreatitis

Answer: A

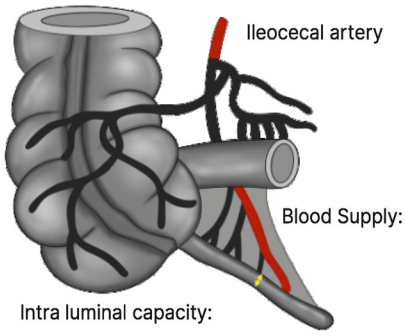
Yourwish

28. VERMIFORM APPENDIX

ANATOMY OF APPENDIX

00:00:14

- Normal length: 2 - 20cm
- Intraluminal capacity: 0.1ml



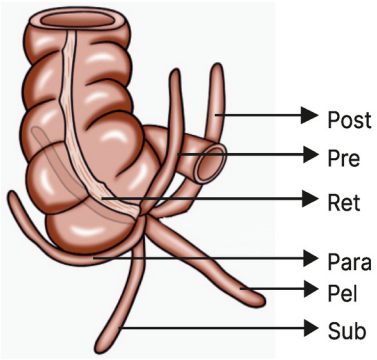
Blood Supply

- Appendicular artery
  - Branch of the Ileocolic artery
  - It is an end artery

Location

FMGE 2022, 2025
INI CET May 2023

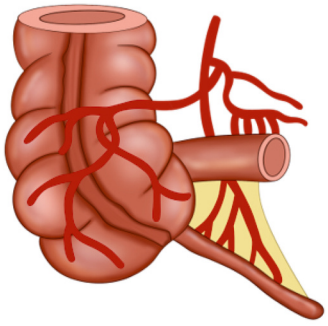
- Retrocecal → Behind the caecum (MC)
- Paracecal → On the side of the caecum
- Subcecal → Below the caecum
- Pelvic → Tip of the appendix points towards the pelvis
  - Most dangerous because the abdominal signs and symptoms are not marked → leading to delayed presentation and perforation
- Pre-ileal → In front of the ileum
- Post ileal → Behind the ileum (Least common)



ACUTE APPENDICITIS

00:02:54

- MC general surgical emergency worldwide.
- Seen commonly in the 2nd decade



Cause

- Luminal obstruction
  - Fecalith (MC)
  - Tumors
  - Worm eggs
  - Fruit seeds
- MC site of perforation → Just distal to obstruction on the antimesenteric border
- MC organism isolated → Bacteroides fragilis > E.coli
- MC sequelae after perforation → Abscess
- MC location of abscess → Peri-appendiceal > Pelvic

Clinical Features

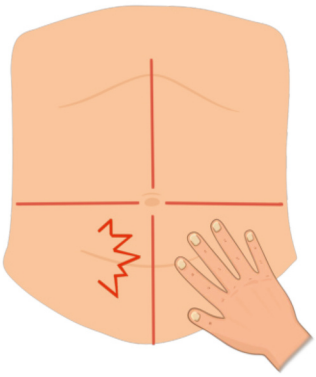
FMGE June 2021, 2024

Mantrel's / Alvarado Score	
Clinical features	**Score**
Symptoms	

Yourwish

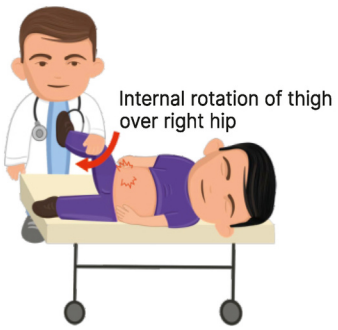
Migratory pain • Initially pain over periumbilical region later to right iliac fossa • Most characteristic symptoms	1
Anorexia	1
Nausea & vomiting	1
Signs	
Tenderness	2
Rebound tenderness	1
Elevated temperature	1
Laboratory investigations	
Leucocytosis	2
Shift to left	1

- Interpretation of Mantrel's score
  - Score 9 - 10 → Diagnosis is ceratin
  - Score 7 - 8 → High likelihood of diagnosis
  - Score 5 -6 → Equivocal → Confirmed by CECT
  - Score 1 -4 → Negative

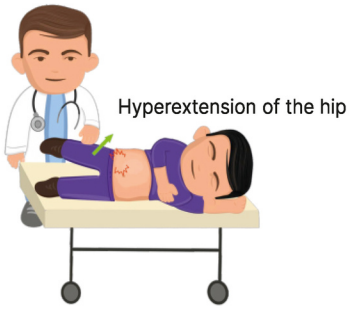


Other Signs

- Rovsing sign → Pain in right iliac fossa on pressing left iliac fossa
  - Most characteristic sign
- Obturator sign → Pain on internal rotation of thigh over right hip



  - Seen in pelvic appendicitis
- Psoas sign → Pain on hyperextension of the right hip



  - Seen in retrocecal appendicitis

Diagnosis

- Clinical diagnosis is supplemented by other investigations
  - USG
  - Lab investigations → Leucocytosis
- IOC in children → USG
- Gold standard for diagnosis of acute appendicitis →CECT
- Initial investigations in pregnant women → USG
- IOC for diagnosis in pregnant women → MRI

Treatment

- Prompt Appendectomy
- Appendicular lump cannot be palpated when guarding / rigidity is present.
- As a result, following spinal anesthesia, the abdomen is palpated to rule out any appendicular lump

Ochsner - Sherren Regimen

- Conservative management of appendicular lump
- Components of the appendicular lump
  - Appendix
  - Terminal ileum
  - Caecum
  - Omentum
- Confirmation of diagnosis by CECT
- Treatment
  - IV antibiotics
  - Analgesics
  - Vitals monitoring → Pulse and Temperature every 4 hourly
  - Conservative management till 4 - 6 weeks
  - Interval appendectomy is done in case of recurrent appendicitis (>1 episode of pain)

Exploratory Laparotomy

- Done in case of perforated appendix, which leads to peritonitis
- Features of perforated appendix
  - Pulse rate increasing
  - Spreading abdominal pain
  - Mass size increasing

PERFORATION OF APPENDIX

00:17:18

Factors Responsible

- Fecalith obstruction
- Diabetes Mellitus
- Immunocompromised state
- Extreme of ages: < 5 years and > 65 years
- Pelvic Appendicitis
- History of previous surgeries

Yourwish

NEUROENDOCRINE TUMOR OF APPENDIX

00:18:27

- a/k/a carcinoid tumor of the appendix
- MC tumor of the appendix
- Origin → Argentaffin or Kulchitsky cells
- Small, localized tumor not associated with carcinoid syndrome
- MC site of Carcinoid tumor in Appendix → Tip of appendix
- Risk of malignancy is directly related to the size of the tumor

Important Information

- MC site of carcinoid tumor overall → Bronchus

Diagnosis

- IHC staining for synaptophysin & chromogranin A

Treatment

FMGE June 2022, 2025

- Size up to 1 cm → Appendectomy
- Size > 2 cm → Right Hemicolectomy
- Size > 1 cm to 2 cm → In majority of cases Appendectomy is done exception
  - Indications for right hemicolectomy
    - → Involvement of mesoappendix
    - → Involvement of cecal base
    - → Involvement of lymph node

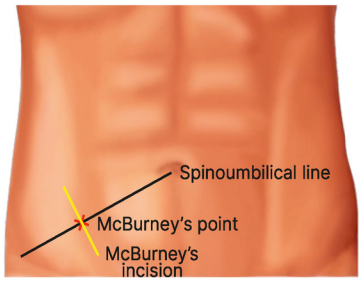
Appendectomy

00:20:27

- Spinoumbilical line → line drawn from ASIS to umbilicus
- MacBurney's point
  - Junction of medial 2/3rd and lateral 1/3rd of spinoumbilical line
  - Corresponds to base of appendix
  - Junction of 3 taenia coli

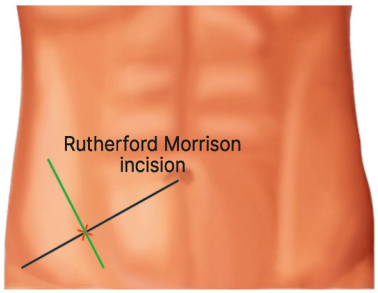
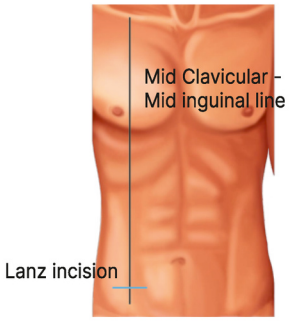
Incisions

INICET Nov 2025

Incisions	Features
McBurney's incision 	• a/k/a Gridiron incision , McArthur incision • Muscle splitting incision • Junction of medial 2/3rd and lateral 1/3rd

Yourwish

Yourwish

Rutherford Morrison incision  	• Muscle cutting incision • Extend the incision upwards and laterally after cutting Conjoint tendon • Preferred for Retrocecal appendicitis
Lanz incision  	• a/k/a modified McBurney's incision, Rocky Davis incision, Bikini incision • Muscle-splitting incision • It is a transverse skin crease incision • Placed 2 cm below the umbilicus on the midclavicular - mid inguinal line

Complications

- Wound infection → MC complications
- Bleeding from the appendicular artery
- Intra-abdominal abscess
- Ileus
- Venous thrombosis
- Portal Pyemia
- Adhesive Intestinal Obstruction → MC late complications
- Fecal Fistula
- Stump appendicitis
  - Risk is increased if the size of the stump is > 3mm
- Injury of nerves
  - Iliohypogastric nerve → MC nerve injured
  - Ilioinguinal nerve → leads to inguinal hernia

PYQ

00:27:07

Q. A 20-year-old male presents with pain in the right iliac fossa for 4 days, associated with fever and vomiting. On examination, a tender, palpable mass is felt in the right iliac fossa. He is diagnosed with an appendicular lump. Which of the following statements is incorrect regarding this condition? INICET Nov 2025

a. Ochsner- Sherren regimen is the initial treatment
b. Ultrasonography is useful in evaluation
c. Interval appendectomy is mandatory in all cases
d. Appendicular lump is a complication of acute appendicitis

Answer: c.Interval appendectomy is mandatory in all cases

Yourwish

Q. A 20-year-old male presents with a 5-day history of abdominal pain, fever, and vomiting. On examination, there is a palpable mass in the right iliac fossa with leukocytosis. What is the management plan for this condition?

FMGE July 2023

a. Ochsner-Sherren regime
b. Alvarado scoring
c. Laparoscopic appendectomy
d. Cholecystectomy

Answer: a. Ochsner-Sherren regime

Q. Which of the following statements accurately describes McBurney's point in cases of acute appendicitis?

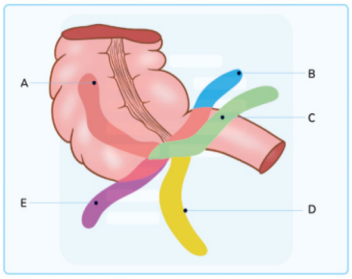
FMGE June 2021

a. McBurney point is located in the left lower quadrant of the abdomen.
b. McBurney point corresponds to the site of maximal tenderness in acute appendicitis.
c. McBurney point is used to assess rebound tenderness in acute appendicitis.
d. McBurney point is located at the umbilicus in acute appendicitis.

Answer: b. McBurney point corresponds to the site of maximal tenderness in acute appendicitis.

INI CET May 2023

Q. Please identify the position of the appendix in the image provided.



a. A-Retrocecal; B-Preileal, C- Postileal, D-Pelvic; E- Subcecal
b. A- Retrocecal; B- Postileal; C Preileal; D-Pelvic: E-Paracecal
c. A- Retrocecal; B- Postileal; C- Preileal; D - Subcecal; E – Pelvic
d. A- Retrocecal; B- Postileal; C- Preileal; D-Pelvic; E- Subcecal

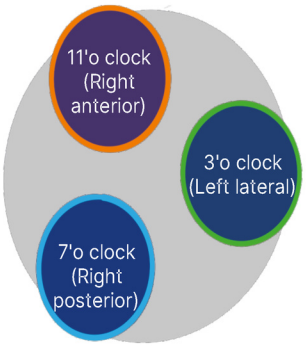
Answer: d. A- Retrocecal; B- Postileal; C- Preileal; D-Pelvic; E- Subcecal

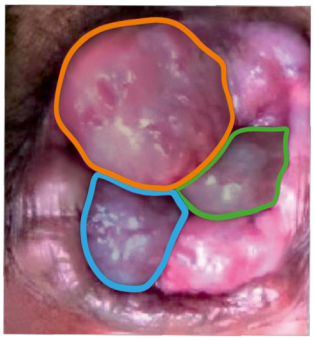
24. RECTUM AND ANAL CANAL

HEMORRHOIDS

00:00:20

- Normal anatomical cushions → help in defecation
- Become pathological due to constipation → straining → injury → painless bleeding
- Components (VAS)
  - Venules
  - Arterioles
  - Smooth muscle fibers
  - Elastic tissue
- Location
  - 3 o'clock → left lateral
  - 7 o'clock → right posterior
  - 11 o'clock → right anterior
  - Position considered in lithotomy





- Most common cause of lower GI bleeding → Hemorrhoids
  - Amount → 1-10 ml
- Most common cause significant bleeding → Colonic diverticulosis
- Most common cause Occult bleeding → Vascular ectasia (Angiodysplasia)

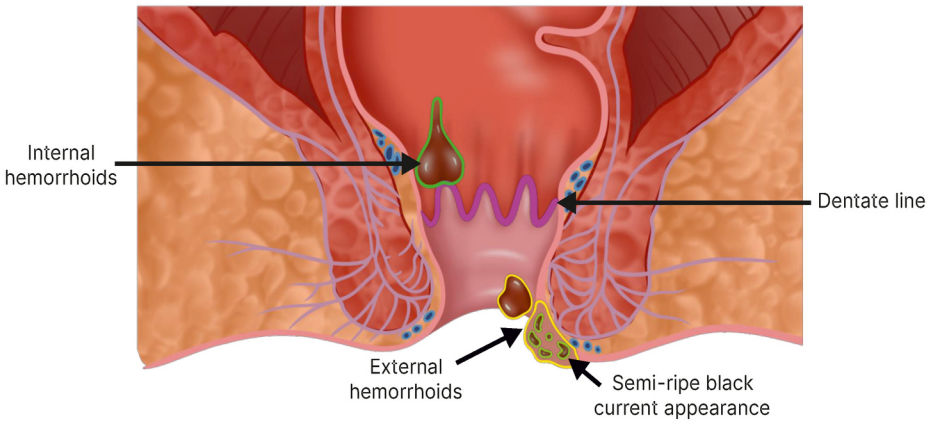
CLINICAL FEATURES

- Painless bleeding per rectum
- Mucus discharge

DIAGNOSIS

- Digital rectal examination → Non-palpable
- Investigation of choice → Proctoscopy

TYPES OF HEMORROIDS

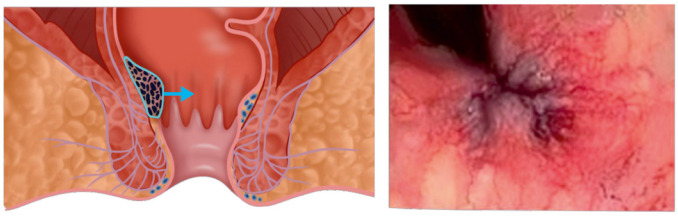
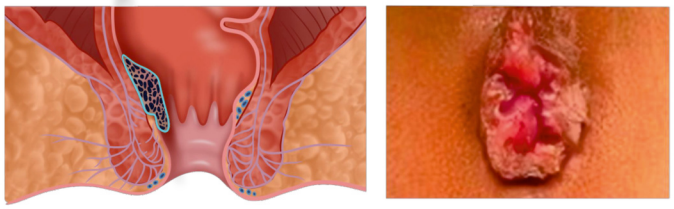
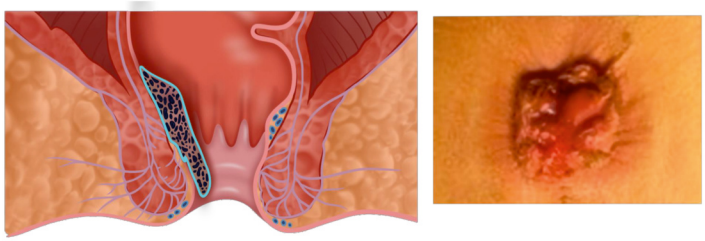
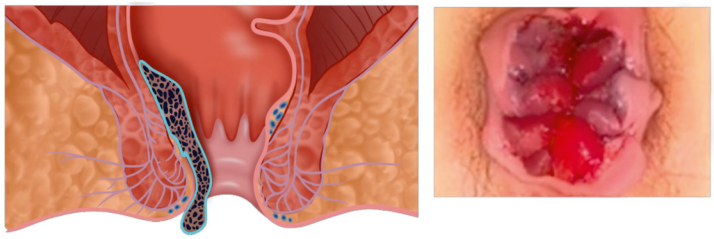


Feature	Internal hemorrhoids	External hemorrhoids
Location	• Internal to dentate line	• External to dentate line

Yourwish

Area	• Pain insensitive	• Pain sensitive
Bleeding	• Painless	• Painful • 5 days painful self-curing lesion • Recurrent thrombosis → semi-ripe black currant appearance
Treatment	• Stage wise	• Excision under local anesthesia

CLASSIFICATION OF INTERNAL HEMORRHOIDS

Degree	Features
First degree	Only bleeding 
Second degree	Bleeding + prolapse during defecation; Reduces spontaneously 
Third degree	Bleeding + prolapse; Requires manual reposition 
Fourth degree	Bleeding + permanent prolapse; Emergency 

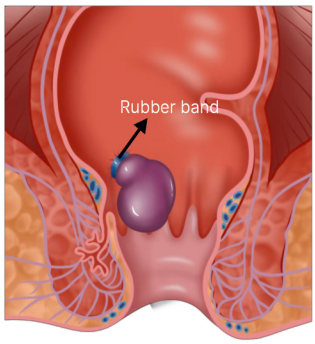
MANAGEMENT

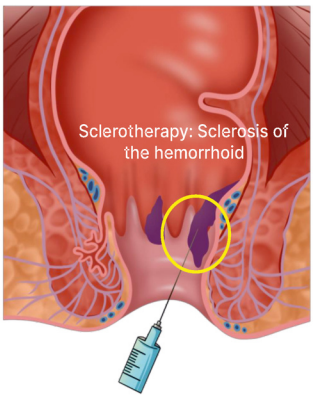
- First degree
  - Sitz bath
  - Dietary modification (high fibre diet, stool softeners)
- First, second, selected patients of third degree

Yourwish

Yourwish

- Rubber band ligation





- Sclerotherapy (5% phenol in almond oil)

- Third (selected) & fourth degree / failure → Hemorrhoidectomy

HEMORRHOIDECTOMY

INDICATIONS OF HEMORRHOIDECTOMY

- Third & fourth-degree hemorrhoids
- Second-degree not cured by non-operative treatment
- Mixed hemorrhoids when the external hemorrhoid is well-defined
- Bleeding causing anemia

TYPES OF HEMORRHOIDECTOMY

- Milligan-Morgan open hemorrhoidectomy (painfull)
- Ferguson closed hemorrhoidectomy → most preferred
- Whitefield submucosal hemorrhoidectomy
- Longo's Stapler hemorrhoidectomy (external hemorrhoids cannot be treated)

COMPLICATION

- MC complication: pain > Urinary retention

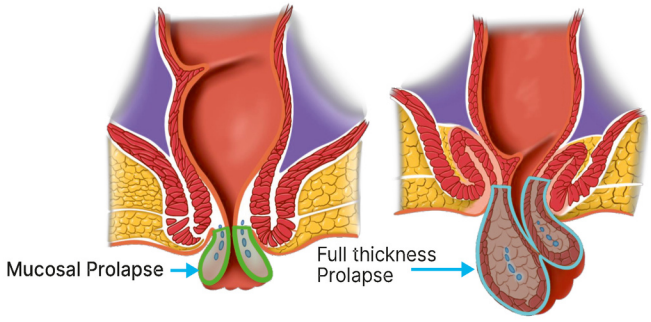
RECTAL PROLAPSE

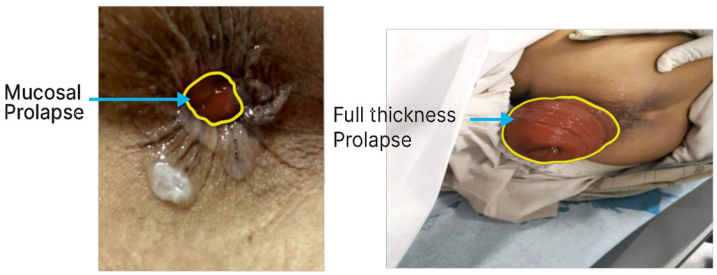
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INI CET May 2023
FMGE 2020, NEET PG 2022

TYPES

- Mucosal prolapse → only mucosa
  - More common in children
- Full thickness prolapse → mucosa + submucosa + muscularis propria
  - More common in adults





Yourwish

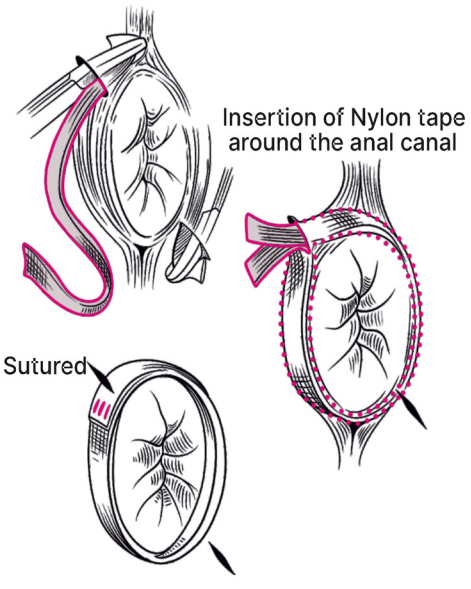
RECTAL PROLAPSE IN CHILDREN

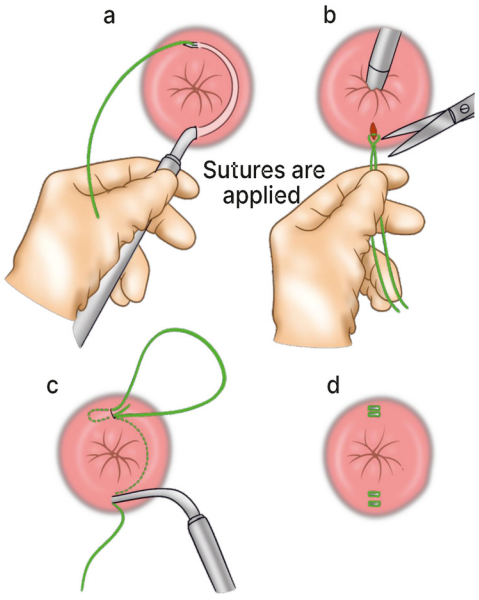
- Risk factors
  - PEM
  - Worm infestation
  - Diarrhea
  - Sacral agenesis
  - Meningomyelocele
- For prolapse d/t PEM, Worm infestation, Diarrhea
  - Treat the underlying cause
  - If patient is not improving → Lockhart-Mummery rectopexy
- For Sacral agenesis, Meningomyelocele
  - Thiersch anal wiring

RECTAL PROLAPSE IN ADULTS

Abdominal Rectopexy	Perineal Rectopexy

• Recurrence rate: Low
• Associated with: High morbidity
• Preferred in: Young patients
• **Types:**
  ○ W: Well's
  ○ A: Abdominal
  ○ R: Ripstein
• Frykman Goldberg procedure:
	• Recurrence rate: high
	• Associated with: Low morbidity
	• Preferred in : Elderly and frail
	• **Types:**
	  ○ P: Perineal
	  ○ A: Altemeiers
	  ○ D: Delorome
	• Thiersch anal wiring



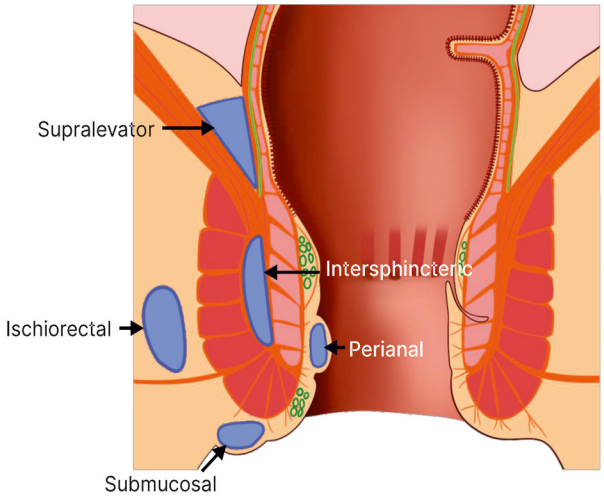


ANORECTAL ABSCESS

00:20:53

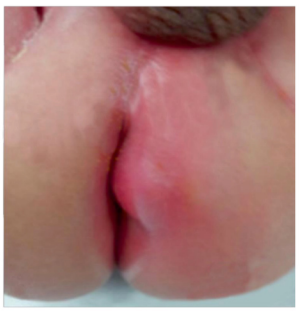
- MC organism responsible for anorectal abscess: E. Coli
- Cryptoglandular theory
  - Infection starts in anal crypt → Spreads to anal gland → Leads to pus formation

- Types of anorectal abscess in the order of decreasing frequency: Perianal> Ischiorectal > Intersphincteric > Supralevator > Submucosal



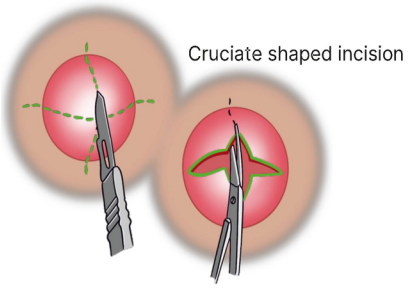
CLINICAL FEATURES

- Severe pain
- Throbbing swelling
- Swinging pyrexia (high grade fever)
- Fluctuation (late sign)
  - Fluctuation is a late sign in:
    - → Breast abscess
    - → Anorectal abscess
    - → Parotid abscess
    - → Palmar & plantar abscess



TREATMENT

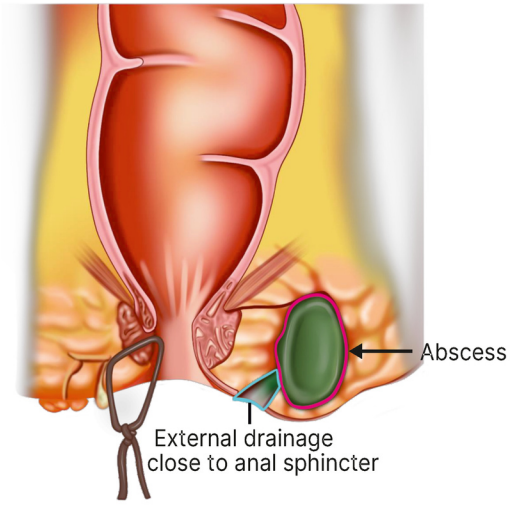
- Incision and Drainage + Antibiotics
  - Cruciate (cross-shaped) incision



FISTULA IN ANO

FMGE 2021, Jan 2023, 2024
NEET PG 2019,2022

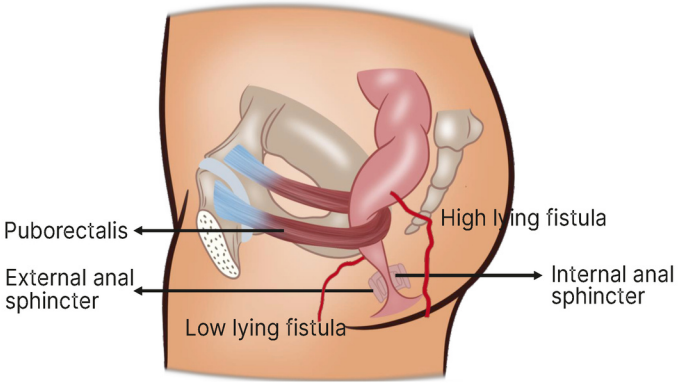
- Chronic abnormal communication between anorectum & perineal skin
- Cryptoglandular Theory
- History of: Ano-rectal abscess



Yourwish

ANORECTAL RING

- Components
  - Puborectalis muscle
  - Internal anal sphincter
  - External anal sphincter



TYPES

NEET PG 2025

- Low lying: Internal opening located below Anorectal ring
- High lying: Internal opening located above Anorectal ring
- Simple fistula: Single straight tract
- Complex fistula: Multiple branching tracts

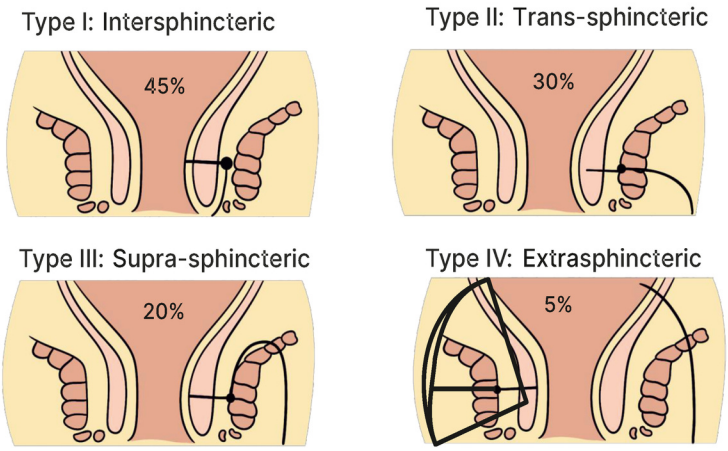
CAUSES

INICET May 2024

- Anorectal abscess
- Crohn's disease
- Lymphogranuloma venereum
- Actinomycosis
- Foreign body in the rectum
- Malignancy
- HIV

PARK'S CLASSIFICATION

Type	Track Description
Type 1: Intersphincteric (most common)	Track between sphincters
Type 2:Transsphincteric	Track crosses sphincter
Type 3: Suprasphincteric	Track above sphincter
Type 4: Extrasphincteric	Track outside sphincter

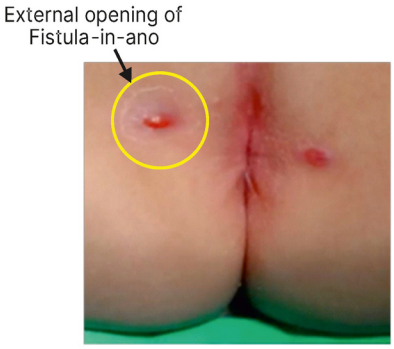


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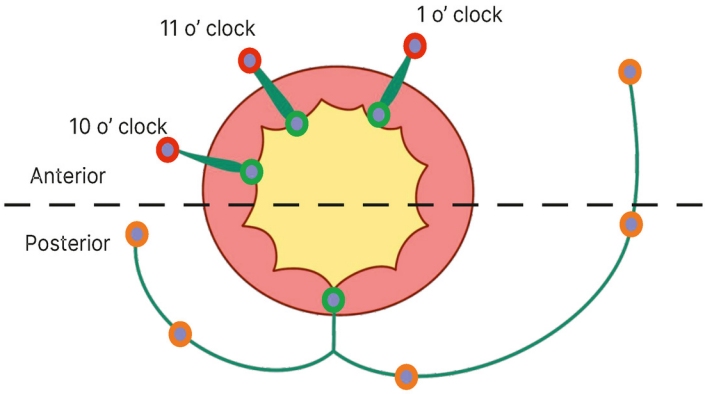
Yourwish

CLINICAL FEATURES

- Intermittent seropurulent discharge + Pain
- Obstruction of tract → Infection → Abscess (I and D + Antibiotics)
- Passes feces & flatus from external opening (internal opening in rectum)



GOODSALL'S RULE



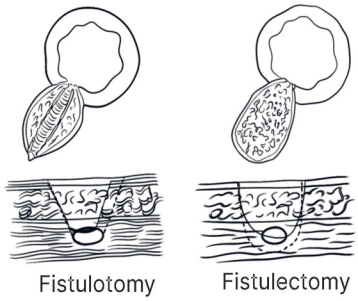
- Anteriorly located external openings are joined by Straight tract
- Posteriorly located external openings are joined by Curved tract (opens posteriorly in the midline at 6 o'clock)
  - Exceptions: External opening >3 cm from anal verge or Multiple openings → Internal opening at 6 o'clock

INVESTIGATION

- Initial: Fistulogram
- Investigation of choice: MRI

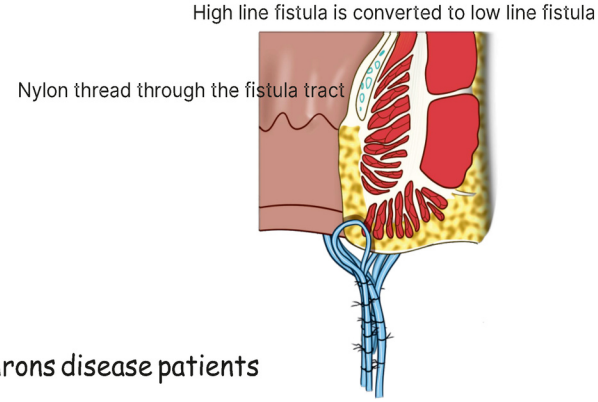
TREATMENT

- Fistulotomy: Incision over tract
- Fistulectomy: Complete excision of tract
- Seton (Thread/tape inserted)
- VAAFT (Video assisted anal fistula treatment)
- Glue



SETON TYPES





- Cutting seton → converts high lying fistula into low lying
- Non-cutting seton → used to control infection in HIV +ve and chrons disease patients

Yourwish

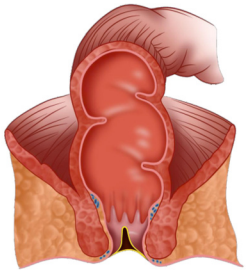
- Marking seton
- Staging seton

INDICATIONS OF SETON

- Complex anorectal fistula
- Fistula in Crohn's disease & HIV patients (Non-cutting seton)
- Anterior fistulas
- Fistulas a/w chronic diarrheal state

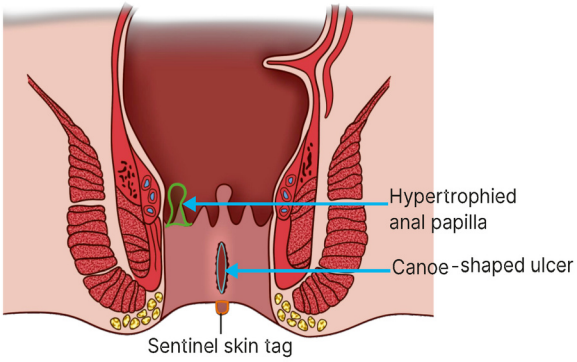
FISSURE IN ANO

00:38:10





- Longitudinal tear from anal verge to dentate line
- Extent: from analverge to dentate line
- Location: Posteriorly in midline → 6 o'clock
- Types
  - Acute fissure: Simple longitudinal split
  - Chronic fissure (Triad)
    - → Canoe-shaped ulcer
    - → Hypertrophied anal papilla
    - → Sentinel pile (skin tag)
- Pathophysiology
  - Constipation → hard fecal matter → mucosal tear
  - Spasm of internal anal sphincter (IAS)
- Clinical features
  - Severe pain during defecation
  - Streaking of blood on stool
- Examination
  - Digital rectal examination → Contraindicated
- Management
  - Conservative
    - → Sitz bath (lukewarm water + potassium permanganate)
    - → High fiber diet
    - → Stool softeners
  - Medical therapy
    - → 2% Diltiazem gel (topical CCB)
    - → 0.2% Nitroglycerin gel
  - Botox injection → reduces sphincter spasm
  - Lord's procedure: Manual dilatation of sphincter → obsolete (risk of incontinence)
  - TOC: Notara's Lateral sphincterotomy
  - Anal advancement flap



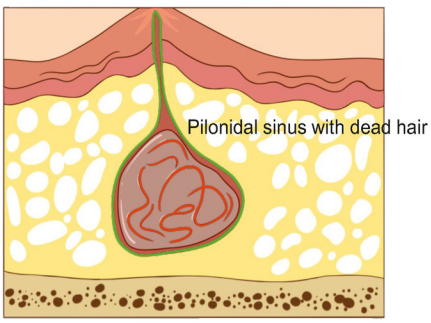
PILONIDAL SINUS

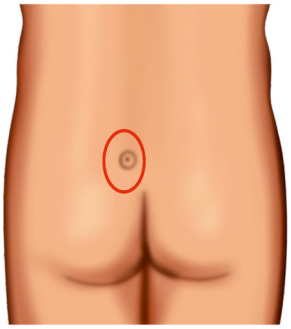
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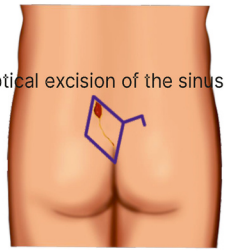
NEET PG 2022, August 2024

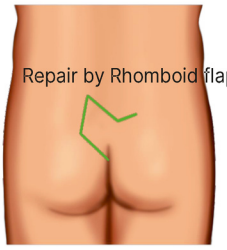
- Collection of dead hair in the natal cleft overlying the coccyx
- Acquired condition
- Seen in hairy males
- Site: Post natal cleft over coccyx

- Called as Jeep's disease
- Clinical features
  - Discomfort
  - Intermittent serous disease
  - Infection → Abscesss (I & D + Antibiotics)
- Locations:
  - Interdigital pilonidal sinus
  - Axilla
  - Umbilicus
- Management
  - If abscess present: Incision & drainage + antibiotics
  - No abscess
    → Excision + Flap closure
    → Flap Used: Limberg flap (rhomboid flap), Karydakis flap
  - Combined procedure: Bascom procedure















CARCINOMA RECTUM

00:48:12

NEET PG 2023, 2024, 2025
FMGE 2021, 2024, 2025
INICET May 2023

- MC site of large bowel malignancy→ rectum
- Seen in: 6th decade
- MC site of metastasis: Liver
- Chemotherapy regimen:
  - FOL: Folinic acid (Leucovorin)
  - F: 5-Fluorouracil
  - Ox: Oxaliplatin

CLINICAL FEATURES

- Most common symptom: Bleeding per rectum
- Early morning bloody diarrhea
- Passage of bloody slime
- Spurious diarrhea
- Tenesmus: Painful Defectation with sensation of incomplete evacuation
- Backache/sciatica
- Anorexia & weight loss

Yourwish

INVESTIGATIONS

- Instruments
  - Proctoscope :10 cm
  - Rigid sigmoidscope:25cm
  - Flexible sigmoidoscope: 60cm
  - Colonoscope : 160 cm
- IOC for diagnosis: Rigid sigmoidoscopy + biopsy
- Colonoscopy: To r/o synchronous polyps or malignancy in colon
- IOC for T staging: Transrectal ultrasound (TRUS)
- IOC for LN-staging: MRI
- Best investigation for staging: MRI

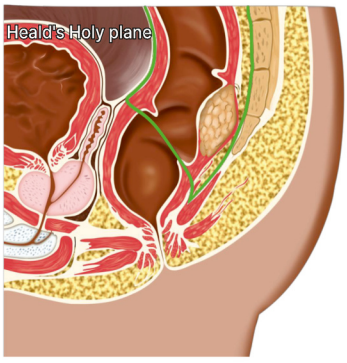
MANAGEMENT

- Treatment principle
  - Rectum lies in narrow pelvis
  - Advanced tumors → need downstaging
  - Done by neoadjuvant chemoradiation

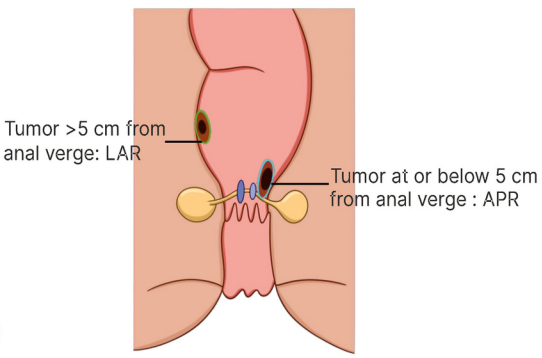
NEET PG 2023

Stage	Management
Stage 1	• Surgical excision
Stage 2 & 3	• Neoadjuvant chemoradiation f/b surgery
Stage 4	• Neoadjuvant chemoradiation f/b Surgery if feasible • Otherwise → palliation

- TOC: Total Mesorectal Excision
  - Given by: Bill Heald
  - Excision of surrounding tissues up to the plane between mesorectum & presacral fascia



- Surgical margins
  - General GI malignancy: Margin → 5 cm
  - Exceptions
    → Esophagus → 10 cm
    → Distal rectum → 2 cm
- If tumor > 5 cm from anal verge: Low Anterior Resection (LAR)
- If tumor ≤ 5 cm from anal verge: Abdominoperineal Resection (APR)



Yourwish

Yourwish

CARCINOMA ANAL CANAL

00:58:46

- MC histological type: Squamous cell carcinoma > BCC > malignant melanoma
- Seen in:low socioeconomic status
- MC site of metastasis: Lungs
- MC involved LN: Superficial inguinal → then deep

RISK FACTORS

- HPV infection
- Immunocompromised state like HIV +ve and transplant recipient
- Smoking
- Anal receptive intercourse (homosexual)
- Sexual promiscuity
- Chronic inflammation
- AIN
- History of Ca vulva, Ca cervix

CLINICAL FEATURES

- Most common symptom: Bleeding per rectum
- Foul-smelling discharge
- Altered bowel habits

DIAGNOSIS

- IOC: Proctoscopy + biopsy

TREATMENT

- TOC: Nigro regimen (Chemoradiation)
  - 5-Fluorouracil + Mitomycin C f/b Radiotherapy
- Follow-up: Check biopsy at 12 weeks (3 months)
- If no response: Surgery → APR

PYQ

01:03:19

FMGE Jan 2023

Q A homosexual man presents with painful defecation and a protruding mass from the anal canal. Biopsy confirms squamous cell carcinoma of the anus. What is the appropriate course of action for managing this patient?

a. Chemotherapy
b. Abdominoperineal repair
c. Combined chemoradiation
d. Wide local excision

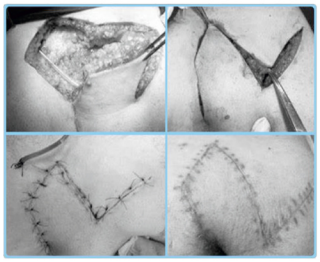
Answer: **c**

Q A 55-year-old woman presents to the clinic complaining of blood in her stools. Physical exam reveals firm, enlarged inguinal lymph nodes. A contrast CT scan is performed and a possibly cancerous mass is visualised in the lower part of GI tract. In which location is the mass most likely located?

a. Anal canal inferior to the pectinate line
b. Distal rectum
c. Sigmoid colon
d. Proximal rectum

Answer: **a**

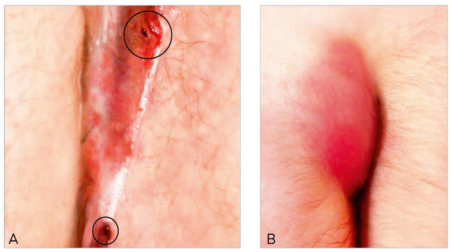
Q A patient underwent surgery for pilonidal sinus. Which type of flap is used in this surgery? FMGE June 2024



a. Rhomboid flap
b. Advancement flap
c. Rotational flap
d. Free flap

Answer: **a**

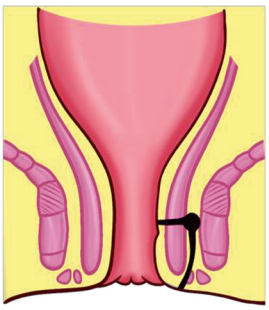
Q A jeep driver presented with pain in the gluteal region along with swelling. What is the most likely diagnosis?



a. Pilonidal sinus
b. Fistula in ano
c. Fissure in ano
d. Gluteal abscess

Answer: **a**

Q Identify the fistula according to Park's classification?



a. Intersphincteric
b. Suprasphincteric
c. Extrasphincteric
d. Transsphincteric high

Answer: **d**

Q A patient with rectal prolapse underwent surgery. The postoperative image is given. Identify the procedure. NEET PG 2021



a. Stapled hemorrhoidopexy
b. Well's procedure
c. Thiersch anal wiring
d. Altemeier repair

Answer: **c**

Q Which of the following is not a perineal approach for rectal prolapse? INI CET May 2023

a. Altemeier
b. Well's
c. Thiersch
d. Delorme

Answer: **b**

18. HERNIA AND ABDOMINAL WALL

HERNIA

00:00:24

- Abnormal protrusion of a viscus or part of a viscus through the wall of its containing cavity

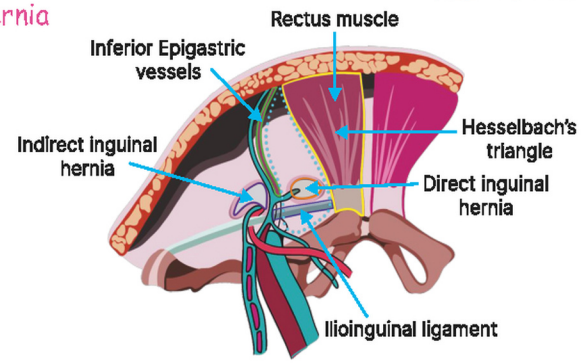
Risk Factors

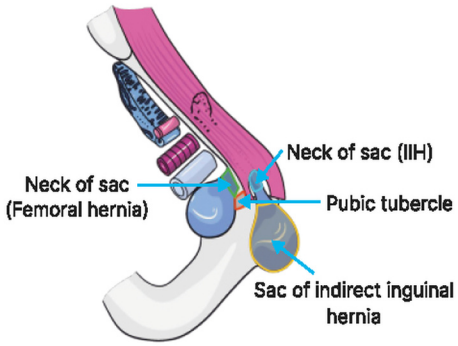
Weakness of abdominal muscles	Increased intra-abdominal pressure

• Patent processus vaginalis
• Patent canal of Nuck
• Connective tissue disorders → EDS
• Prune-Belly Syndrome
• Ectopia vesicae
• Lower abdominal incision
• Defective collagen synthesis (especially in Smokers)
• Steroid intake
	• Chronic cough
	• COPD/ bronchitis
	• Chronic constipation
	• Obstructive uropathy
	  ○ BPH in the elderly
	  ○ Stricture urethra
	• Heavyweight lifting
	• Intra-abdominal tumors/mass
	• Ascites
	• Pseudomyxoma peritonei
	• Pregnancy
	• Chronic ambulatory peritoneal dialysis

NEET PG 2021

- MC type of Hernia in both males and females: Indirect inguinal hernia
- Femoral hernia is more common in females
- Triangle of Hasselbach
  - Medially: Rectus abdominis
  - Laterally: Inferior epigastric vessel
  - Inferiorly: Inguinal ligament
- Direct inguinal hernia: Medial
- Indirect inguinal hernia: Lateral to the inferior epigastric vessel
- Relation of the sac to the spermatic cord
  - Sac is anterolateral to the spermatic cord in an indirect inguinal hernia
  - Posterior to the spermatic cord in a direct inguinal hernia
- Relation of pubic tubercle in Indirect Inguinal and Femoral Hernia
  - Indirect Inguinal hernia: Neck of the sac is located above and medial to the pubic tubercle
  - Femoral Hernia: Neck of sac is located below and lateral to the pubic tubercle

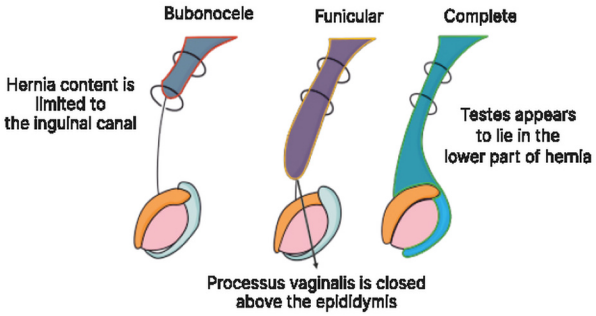


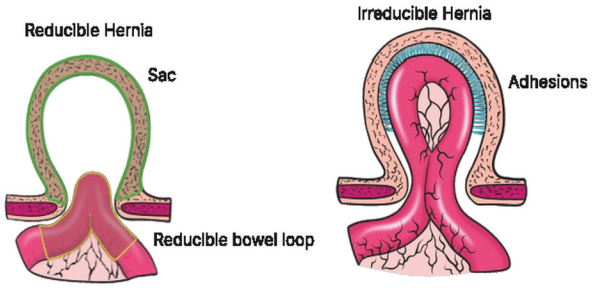


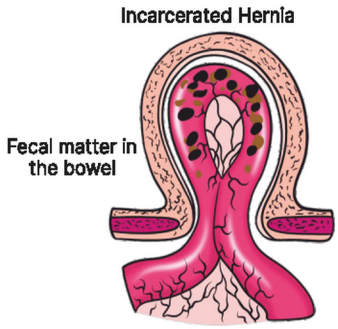
Yourwish

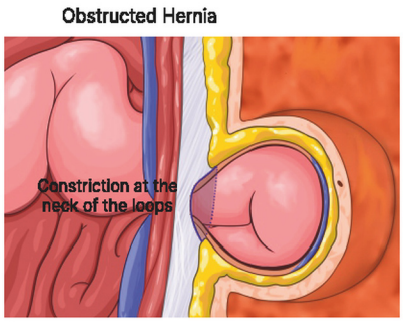
Indirect Inguinal Hernia

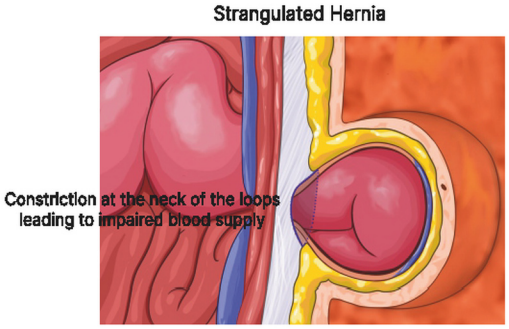
00:08:58
FMGE Jan 2023







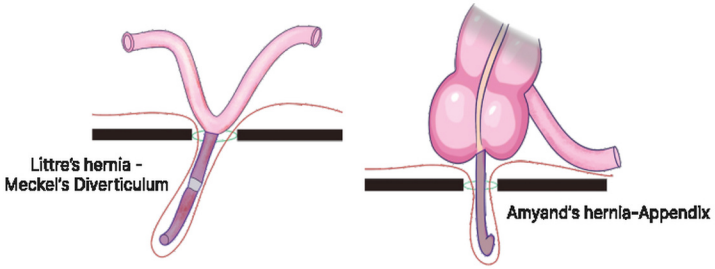




Types

- Bubonocele: Hernia content is limited to the inguinal canal
- Funicular:
  - Processus vaginalis is closed just above the epididymis
  - The content of the hernia sac is felt separately from the testis
- Complete/ Scrotal: Testis appears to lie in the lower part of the hernia
- Reducible Hernia: Content can be reduced easily
- Irreducible Hernia: Cannot be reduced d/t the formation of adhesions between the bowel and sac
- Incarcerated Hernia: Cannot be reduced d/t the presence of fecal matter
- Obstructed Hernia: Intestinal obstruction with preserved vascular supply
- Strangulated Hernia: Intestinal obstruction with impaired vascular supply
- Based on content, it is classified into:

Enterocele	Omentocele
• Content is the small intestine • The first part is difficult to reduce • The last part is easy to reduce (reduces with a gurgling sound)	• Content is Omentum (doughy) • Aka Epilocele • The first part is easy to reduce • The last part is difficult to reduce



- Littre's Hernia → If the content is Meckel's diverticulum
- Amyand's Hernia → If the content is Appendix

Yourwish

Yourwish

Clinical Features



- Swelling in the inguinoscrotal region
- Reduced spontaneously
- Progressive increase in the size of the swelling

Diagnosis

- Diagnosis is purely clinical- A hernia should be visible or palpable
  - Exception: Spigelian & Internal hernia
    - → They are not palpable
    - → Diagnosed with the help of CT/ ultrasound

Treatment

Treatment of sac

- Herniotomy: Done in case of
  - Congenital hydrocele with patent processus vaginalis
  - Congenital inguinal hernia
  - Inguinal hernia in children
- Herniorrhaphy:
  - Herniotomy + Inguinal floor repair with sutures
  - Done in case of
    - → Infected hernias
    - → Strangulated hernias
- Hernioplasty:
  - Herniotomy + Inguinal floor repair with MESH
  - Gold standard treatment for an inguinal hernia

Inguinal Floor Reconstruction

Primary Tissue Repair (with sutures)	Anterior Tension Free Repair (with MESH)	Laparoscopic/ Pre-Peritoneal Repair
• Bassini's • Shouldice	• Lichtenstein (Gold standard for Inguinal hernia)	• TEP (Totally extraperitoneal) • TAPP (Transabdominal preperitoneal)

Primary Tissue Repair

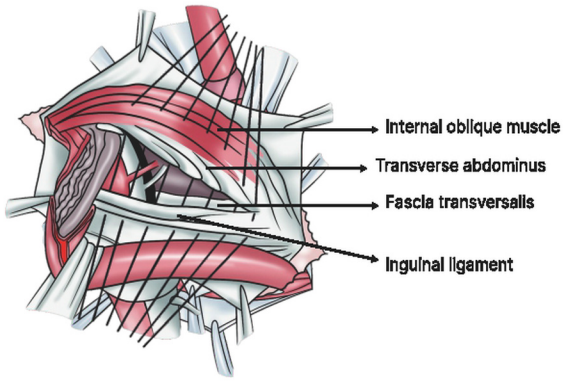
1. Bassini's Repair

- Aka Triple Layer Repair

Internal oblique + transversus abdominis + fascia transversalis are sutured together to the inguinal ligament

↓

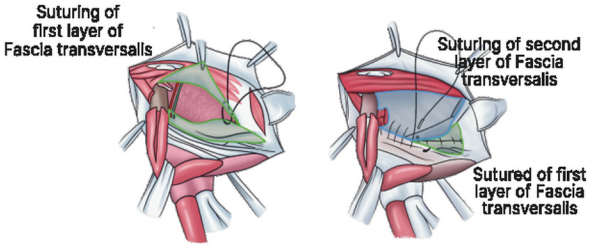
↑ Tension over the tissues → ↑ recurrence rate



Yourwish

2. Shouldice repair

- Double-breasting of Fascia transversalis
- Aka Four Layered Repair
- Relatively ↓ tension in tissues (compared to Bassini's) → ↓ recurrence rate compared to Bassini's

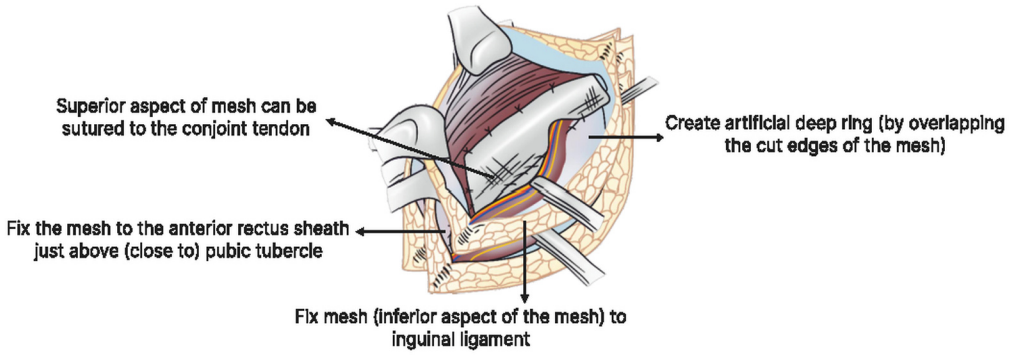


3. Modified Shouldice

- Double breasting of the Internal oblique, Transversus Abdominis, Fascia transversalis
- Aka Six Layered Repair

Anterior tension-free repair

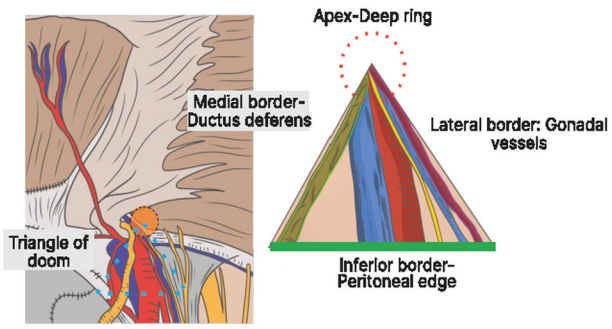
- Lichtenstein repair: Gold standard
  - The mesh is fixed to the anterior rectus sheath just above (close to) the pubic tubercle
  - Inferior aspect of the mesh is sutured to the inguinal ligament
  - Superior aspect of the mesh is sutured to the conjoint tendon



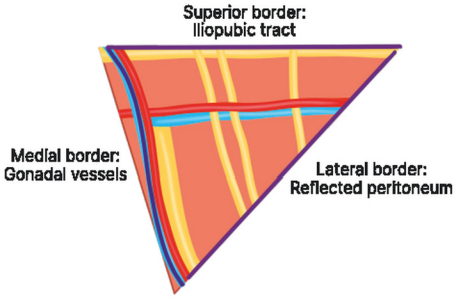
Landmarks In Laparoscopic Repair

00:29:07

- Triangle of Doom
  - Boundaries:
    - → Medially: Vas Deferens
    - → Laterally: Gonadal vessels
    - → Inferiorly: Peritoneal edge
    - → Apex: Deep ring
  - Content: Iliac vessels
    - → Sharp dissection → Can lead to injury of the iliac vessels
      - → Bleeding and death

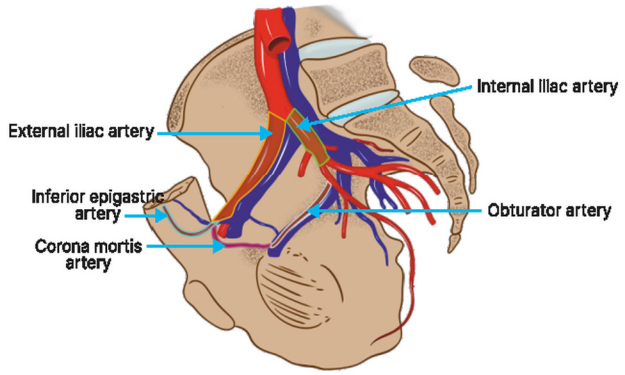


- Triangle of Pain
  - Boundaries:
    - → Medially: Gonadal vessels
    - → Laterally: Peritoneum
    - → Superiorly: Iliopubic tract
  - Content (From medial to lateral):
    - → Femoral nerve
    - → Femoral branch of the genitofemoral nerve
    - → Anterior cutaneous nerve of the thigh
    - → Lateral cutaneous nerve of the thigh



- Electric Hazard Zone→ Cautery should not be used (Use of cautery → Nerve injury → Pain during Post OP period)
- MC injured nerves during open Hernia Repair: Ilioinguinal nerve
- MC injured nerves during laparoscopic Hernia Repair: Lateral cutaneous nerve of the thigh
  - Meralgia paresthetica: Tingling, numbness & burning pain along the lateral aspect of the thigh d/t injury to the Lateral cutaneous nerve of the thigh
- During Appendectomy
  - MC injured nerve: Iliohypogastric nerve
  - Injury to the ilioinguinal nerve leads to an inguinal hernia
- Trapezoid of disaster: Triangle of Doom + Triangle of Pain
- Crown of Death/ Corona Mortis
  - Inferior epigastric artery → Branch of the external iliac artery
  - Obturator artery → Branch of the internal iliac artery
  - Corona mortis artery/Aberrant obturator artery → Branch of Inferior epigastric artery

Corona mortis artery /Aberrant obturator artery
↓
Attaches to the obturator artery
↓
Injured during mesh fixation
↓
Bleeding & death

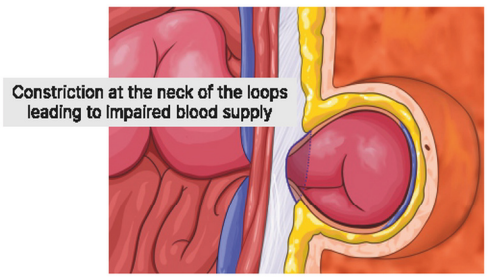


Strangulated Hernia

00:38:57

- Characterized by Intestinal obstruction + impaired vascular supply
- Constricting agent: Neck of sac

NEET PG 2023



- Clinical features
  - Irreducible hernia
  - Symptoms of intestinal obstruction: colicky pain, bilious vomiting, obstipation
  - H/o sudden pain at the hernia site, later becoming generalized abdominal pain
- On examination:
  - Hernia: Tense & extremely tender
  - Skin discoloration
  - Cough impulse absent
- Diagnosis: Clinical diagnosis

Management

NEET PG 2023,
INICET May 2022

- Start IV fluids & antibiotics
- Nasogastric aspiration
- Foley's Catheterization

Yourwish

Surgery

Incision over most prominent part of Hernia
↓
After dissection, Open the sac at Fundus
↓
Aspirate the collected fluid
↓
Examine the bowel
↓
Viable → Reduce Bowel to peritoneal cavity
Gangrenous → Excision → Omentum: not viable → Excision

- Synthetic mesh is contraindicated
- Absorbable mesh/prosthetic mesh can be used

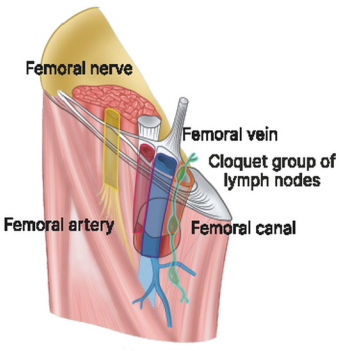
Femoral Hernia

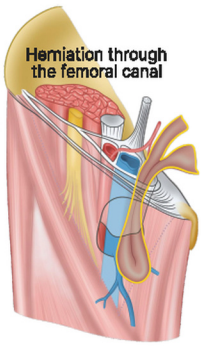
00:43:09

- MC in females (Multipara)
- MC on the right side
- B/L in 20% cases

Femoral Canal And Femoral Ring

- Diameter of femoral ring: 1.25 cm
- Length of femoral canal: 1.25 cm
- Content of the femoral canal: Cloquet group of LN
- From medial to lateral: Femoral vein, femoral artery, and femoral nerve (VAN)
- Femoral canal is rigid & narrow → ↑ risk of strangulation
  - Surgery should be performed as early as possible to prevent strangulation



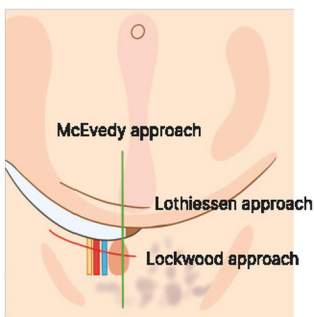


Clinical Features

- Swelling located below and lateral to the pubic tubercle

Treatment

- Approaches of Repair depend on the incision
  - Sub inguinal incision: Lockwood approach
  - Inguinal incision: Lothissen's approach
  - Supra inguinal incision: McEvedy approach
- TOC: Henry's Procedure

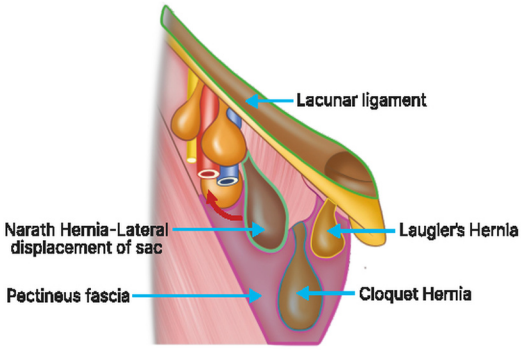


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Variants Of Femoral Hernia

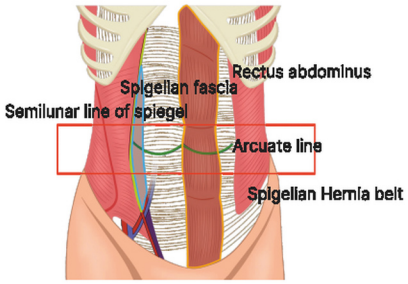
- Hernia through the gap in the lacunar ligament: Laugier's hernia
- Hernia located behind the pectineus fascia: Cloquet Hernia
- Narath Hernia:
  - Seen in congenital dislocation of the hip
  - Lateral displacement of the sac
  - Sac is located behind the femoral vessels

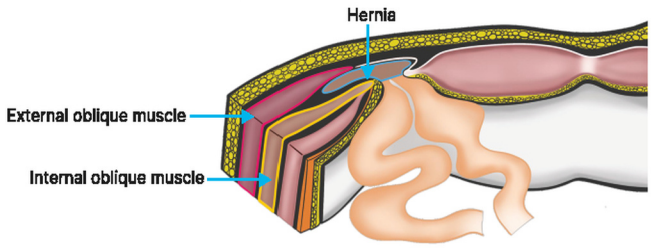


Spigelian Hernia

00:48:44

- Hernia through the Spigelian fascia
- Location: Infraumblical region at or below the arcuate line
- Aka Interparietal hernia
  - As it is located between the internal oblique and the external oblique
- Neither visible/nor palpable → Late presentation
- Clinical feature: Abdominal pain or strangulation
- Diagnosis: USG/CT
- Management
  - Reduce the herniated content + Close the defect



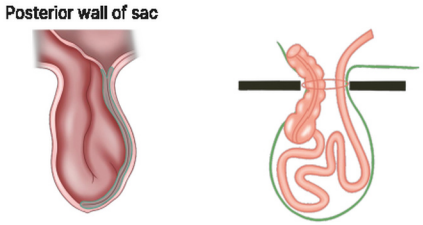


INICET Nov 2025, FMGE Jan 2024

Sliding Hernia (Hernia-En-Glissade)

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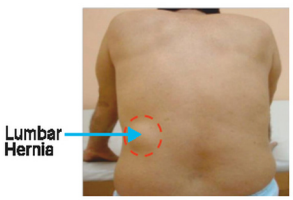
- Posterior wall of the sac is formed by the viscera
- More common in males (left side)
- MC content is sigmoid colon
- MC content on the right side is the cecum
- Management: Reduce content along with sac

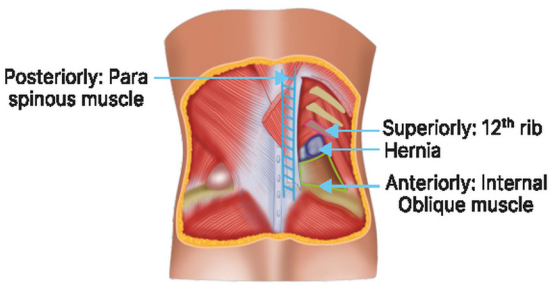
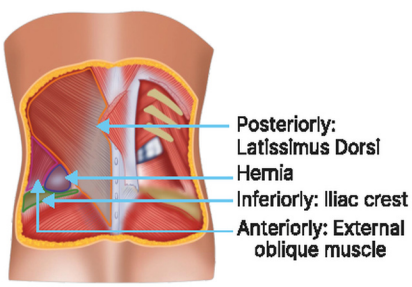


LUMBAR HERNIA

00:53:41

- Herniation is in the lumbar region of the posterior abdominal wall
- More common on the left side
- Congenital: 20%
- Acquired: 80%



Superior triangle of Grynfeltt	Inferior triangle of Petit
	

Yourwish

- Most lumbar hernias occur via the superior triangle of Grynfeltt
- Boundaries
  - Posteriorly: Paraspinal muscle
  - Superiorly: 12th rib
  - Anteriorly: Internal Oblique muscle

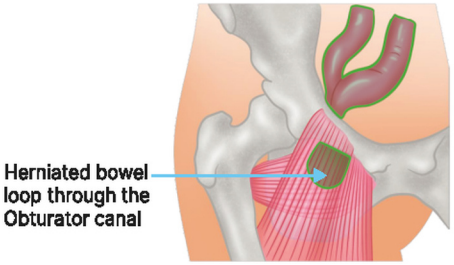
- Boundaries
  - Posteriorly: Latissimus Dorsi
  - Anteriorly: External oblique muscle
  - Inferiorly: Iliac crest

- Clinical features
  - U/L bulge in the lumbar region
  - Strangulation is rare
- Treatment: Dowd's operation

Obturator Hernia

00:56:30

- Aka Skinny old lady hernia, French hernia
- Risk factors
  - Chronic malnutrition
  - Elderly females
  - Multipara patients
  - Chronic constipation



- Clinical features
  - Howship-Romberg Sign: Compression of the obturator nerve → Pain along the medial aspect of the thigh radiating to the ipsilateral knee joint
  - Hannington Kiff sign: Absent adductor reflex, Positive patellar reflex
- Treatment: Repair via posterior approach

Umbilical Hernia

NEET PG August 2024

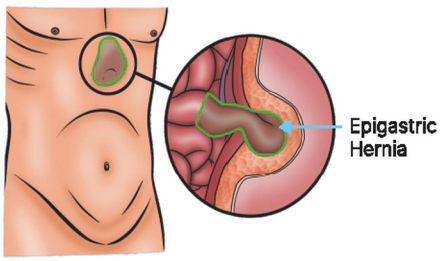




- Umbilical hernia: It is a hernia occurring directly through the umbilicus
- Paraumbilical hernia: Herniation within 2 cm of the umbilicus

Epigastric Hernia

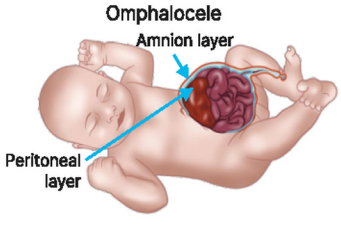
- Aka Epigastric Lipoma, Fatty hernia of the Linea Alba
- Herniation of preperitoneal fat via the linea alba
- Multiple: 20%
- Midline: 80%
- Referred pain to the epigastric → mimics peptic ulcer
- Treatment
  - Excision of preperitoneal fat + Repair of defect
  - Mesh is used if the size of the defect is >4 cm



ABDOMINAL WALL DEFECTS

01:02:06

Omphalocele





- Intestine fails to return to the abdominal cavity
- Covered by:
  - Amnion outside
  - Peritoneum inside
- Associated with: Trisomy 13, 18, 21
- MC Congenital malformations: CVS
- MC cause of death: Congenital malformation
- Prognosis Poor
- Management of Omphalocele
  - Small to medium-sized defect: Primary closure
  - Giant Omphalocele: Topical application of escharotic agent (scar becomes thick and epithelialized)

Gastroschisis



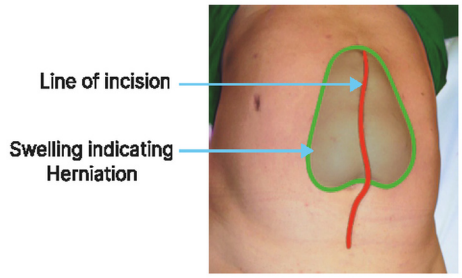


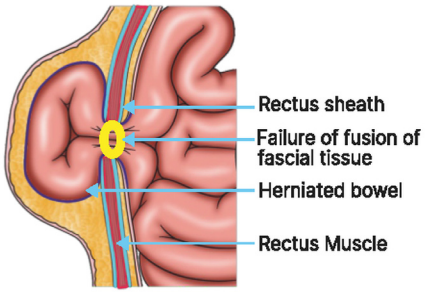
- Splitting of the abdominal wall with herniation of bowel on the right side of the umbilical cord
- Exposed Bowel → is a/w intestinal atresia
- Congenital malformations: rare
- Prognosis: Good
- Management of Gastroschisis
  - Primary closure
  - Defects requiring prosthetic patch closure: Goretex Patch
  - If viscera can not be reduced into the abdomen: Silo placement → serial reduction → Operative fascial closure

Incisional Hernia

01:07:19

FMGE Jan 2024





- Postoperative ventral wall hernia
- Caused by the failure of the fusion of fascial tissue
- Increased risk in Long/ midline/ vertical/ lower abdominal incision

Risk Factors

Surgery Related	Surgeon Related	Patient Related
• Emergency surgeries • Post-operative complications like wound infection, burst abdomen	• Poor technique • Closure under tension • Use of absorbable sutures	• DM • Steroid intake • Immunocompromised state • Jaundice • Cirrhosis

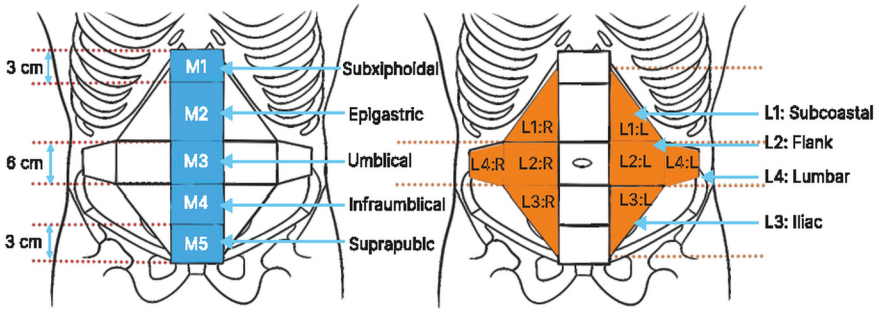
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Ehs Incisional Hernia Classification

Midline (Mnemonic: SEe U IN Suprapubic region)	Subxiphoid	M1: 3 cm from the xiphoid process
	Epigastric	M2: 3 cm below the xiphoid process to 3 cm above the umbilicus
	Umbilical	M3: 3 cm above & below umbilicus
	Infraumbilical	M4: 3 cm below the umbilicus till 3 cm above the pubis
	Suprapubic	M5: 3 cm cranial to pubis
Lateral (Mnemonics: Sub FIL)	Subcostal	L1
	Flank	L2
	Iliac	L3
	Lumbar	L4

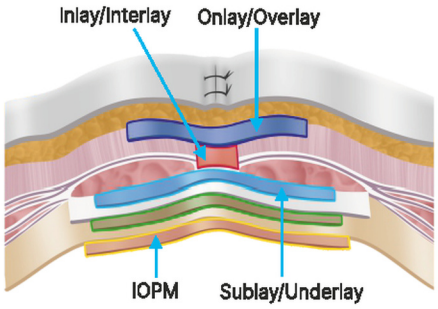
Other features

- Recurrent incisional hernia or not
- Length in cm
- Width in cm
  - W1 : <4 cm
  - W2: ≥4-10 cm
  - W3: >10 cm



Treatment

- Gold standard treatment: Intra-peritoneal onlay mesh repair (IPOM)
  - Onlay / Overlay: Mesh is placed above the sheath
  - Inlay / Interlay: Mesh is placed between the sheath
  - Sublay / Underlay: Mesh is placed below the sheath
  - IPOM: Mesh is placed inside the abdominal cavity, against the peritoneum



Desmoid Tumor

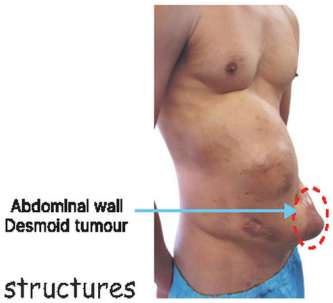
01:16:12

- MC primary malignant neoplasm of the mesentery
- Distribution:
  - Extra abdominal: 60%
  - Abdominal wall: 25%
  - Intra-abdominal: 15%

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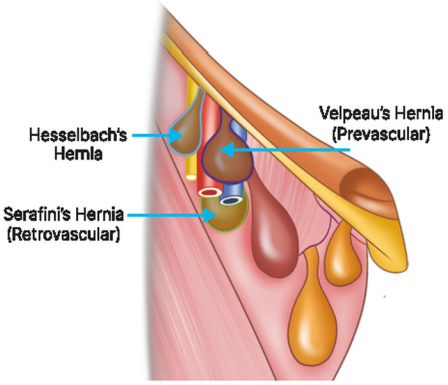
- Abdominal wall desmoid
  - Arises from musculoaponeurotic structure
  - Location: infra-umbilical
- Characteristic Features
  - No Sarcomatous changes
  - No distant metastasis
  - High risk of local recurrence after surgical excision d/t infiltration of surrounding structures
- Risk factors
  - H/o surgical incision or trauma
  - Estrogen stimulates growth, hence it is more common in females
  - Variant of FAP a/w desmoid tumor: Gardner's syndrome
- Clinical features
  - MC presentation: Lump
- Diagnosis
  - IOC for diagnosis: Biopsy
  - IOC to assess the extent: MRI
- Treatment
  - Wide local excision with 2 cm margin
  - Recurrent desmoid: Surgery + radiotherapy



ONE LINERS

01:19:48

- Gibbons Hernia: Hernia + Hydrocele
- Berger's Hernia: Hernia into the pouch of Douglas
- Beclard's Hernia: Hernia via the saphenous opening
- Ogilvie's Hernia: Hernia through a defect in the conjoined tendon
- Stammer's Hernia: Hernia through the transverse mesocolon after retrocolic gastro-jejunostomy
- Peterson Hernia: Hernia behind Roux limb after Roux-en-Y Gastric bypass
- Velpeau's Hernia
  - Pre-vascular hernia
  - Located in front of the femoral vessels
- Serafini's Hernia
  - Aka Retrovascular hernia
  - Located behind the femoral vessels
- Holthouse Hernia
  - Type of inguinal hernia
  - Extension of the bowel along the inguinal ligament

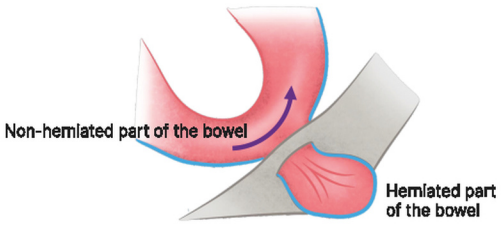


Richter's Hernia

01:22:33

FMGE June 2024

- Characterized by the herniation of part of the circumference of the bowel
- MC associated with femoral hernia
- Clinical features: Colicky pain & Diarrhea
  - Mimics acute Gastroenteritis

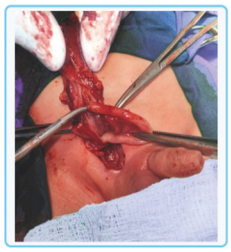


MCQs

01:23:50

Q. During surgery for an inguinal hernia, the appendix is found inside the hernia sac. What type of hernia is this?

INCET NOV 2025



a. Litter's hernia
b. Amyand's hernia
c. Gibbons hernia
d. Richter's hernia

Ans: b. Amayand's hernia

Q. A 34-year-old male undergoes an open appendectomy for acute appendicitis. The choice of incision was McBurney's incision. Postoperatively, after a few days, he presents with pain and a bulge in the right lower quadrant, which is diagnosed as an indirect inguinal hernia. Which nerve injury during the appendectomy is most likely responsible for this complication?

FMGE Jan 2025

a. Ilioinguinal nerve
b. Femoral nerve
c. Genitofemoral nerve
d. Pudendal nerve

Ans: a. Ilioinguinal nerve

Q. What is the type of hernia in which the internal organ forms a portion of the wall of the hernia sac?

FMGE June 2024

a. Lumbar hernia
b. Sliding hernia
c. Spigelian hernia
d. Richter hernia

Ans: b. Sliding hernia

Q. A 25-year-old patient presents to the surgical OPD with a painless left inguinal reducible mass. On examination, the cough impulse is positive. After further investigations, the patient was diagnosed with an inguinal hernia. What is the surgical management of this patient?

a. Herniotomy
b. Hernioplasty
c. Wait and watch
d. Emergency laparotomy

Ans: b. Hernioplasty

Q. A patient presents with a hernia medial to the inferior epigastric artery. What is the most likely diagnosis and appropriate management for the same?

a. Direct hernia and Bassini repair
b. Direct hernia and Lichtenstein mesh repair
c. Indirect hernia and Bassini repair
d. Indirect hernia and Lichtenstein mesh repair

Ans: b. Direct hernia and Lichtenstein mesh repair

Q. A 45-year-old male presents with right thigh pain after undergoing bilateral laparoscopic hernia repair for an inguinal hernia. Which nerve entrapment is most likely responsible for this symptom?

a. Ilioinguinal nerve
b. Iliohypogastric nerve
c. Femoral nerve
d. Lateral cutaneous nerve of the thigh

Ans: d. Lateral cutaneous nerve of the thigh

Yourwish

7. SPLEEN

INDICATIONS OF SPLENECTOMY

00:00:05

FMGE 2022 FMGE 2024

- M/c indication of splenectomy: Trauma
- M/c indication of elective splenectomy: Immune thrombocytopenic purpura (ITP)
  - New name of ITP: Immune thrombocytopenia
  - Best time to give platelets → After ligation of the splenic artery

Always Indicated	Usually Indicated
• Primary splenic tumor • Hereditary spherocytosis	• Chronic ITP • Splenic Abscess • Splenic vein thrombosis • Primary Hypersplenism

COMPLICATIONS OF SPLENECTOMY

00:02:18

NEET PG 2024

- Lung-related:
  - Atelectasis: M/c complication
    → Fever within the first 48 hours
  - Consolidation
  - Reactive pleural effusion
- Diaphragm-related:
  - Subdiaphragmatic hematoma
  - Subdiaphragmatic abscess
- Pancreas-related:
  - Acute pancreatitis- M/c pancreas-related complication
  - Injury to tail of the pancreas
  - Pancreatic fistula
- Thromboembolic Complications
  - Immobilization after splenectomy→ Thrombocytosis
    → Leads to DVT → Pulmonary embolism

Opsi (Overwhelming Post-Splenectomy Infection)

00:04:29

NEET PG 2021

- M/c late and fatal complication of splenectomy
- Time of Occurrence: 2-5 years after splenectomy
- Mortality:40-50%

Risk Of Opsi

- Beta thalassemia (maximum) > Sickle cell anemia > Trauma (least)

Yourwish

Yourwish

Cause Of Opsi

- The spleen performs phagocytosis of capsulated organisms
- After splenectomy, the risk of infection increases

Organism	Alternate Name
Streptococcus pneumoniae (M/c)	Pneumococcus
Neisseria meningitidis	Meningococcus
Haemophilus influenzae type B	Hib

Prevention Of Opsi

- Method: Vaccination

Timing Of Vaccination

- Elective Splenectomy:
  - Ideally, 10–12 weeks before surgery
  - At least 2 weeks before surgery
- Emergency Splenectomy:
  - 14 days after splenectomy or at discharge (whichever comes first)

SPLENIC CYSTS

00:08:00

- M/c true cyst of spleen: Hydatid cyst
- M/c non-parasitic cyst of spleen: Pseudocyst
  - Overall, the most common splenic cyst is Pseudocyst
  - Incidience: 70–80%
  - Cause: Trauma → Splenic hematoma (Lined by granulation tissue)
- M/c congenital splenic cyst: Epidermoid

SPLENIC TUMORS

00:08:50

- M/c tumor of the spleen: Lymphoma
  - Type: Non-Hodgkin lymphoma
- M/c primary benign tumor of the spleen: Hemangioma
- M/c primary malignant tumor of the spleen: Hemangiosarcoma
- M/c primary for splenic metastasis: Malignant melanoma
- M/c primary leading to isolated secondaries to the spleen: Carcinoma ovary

SPLENIC ABSCESS

00:10:35

- M/c organism responsible for splenic abscess: Staph Aureus
- M/c organism responsible for splenic abscess in Sickle Cell Anemia: Salmonella

ACCESSORY SPLEEN

- Small additional splenic tissue
- AKA: Splenunculi
- M/c site: Splenic hilum

Yourwish

Q. Splenectomy is always indicated in:

a. ITP

b. Splenic abscess

c. Splenic vein thrombosis

d. Hereditary spherocytosis

Ans: d. Hereditary spherocytosis

23. KIDNEY AND URETER

RENAL STONES

00:00:35

- Mandatory factors for stone formation:
  - Supersaturation
  - Crystallization

Stones & Risk factors

Calcium oxalate → Hypercalciuria, Hyperoxaluria
Xanthine → Xanthinuria
Uric acid stone → Uricosuria
Cystine → Cystinuria

Types of renal stones

NEET PG AUGUST 2024, INICET 2023, 2024, 2025, FMGE 2024

Calcium oxalate stones

- M/c type of renal stone
- **Risk factors:**
  - Hypercalcemia → Hypercalciuria
  - Hyperoxaluria

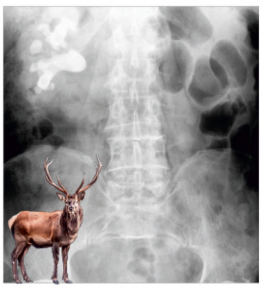
Uric Acid Stones

FMGE DEC 2021

- M/c type of radiolucent renal stone
- Risk factors:
  - Gout
  - Lesch-Nyhan syndrome
  - Myeloproliferative disorders →↑Turnover of nucleic acids → Hypoxanthine → Xanthine → Uric acid → T/t → Allopurinol

Struvite Stone (Staghorn Calculi/Triple Phosphate Stone)

- Calcium magnesium ammonium phosphate stone
- Commonly seen in → Females
  - Short urethra →↑ risk of UTI
- M/c Organism → Proteus
  - Converts Urea → NH3, with help of Urease
- Management:
  - Sandwich technique → Percutaneous Nephrolithotomy (PCNL) + Extracorporeal Shock Wave Lithotripsy (ESWL)



Staghorn stone

cystine stone

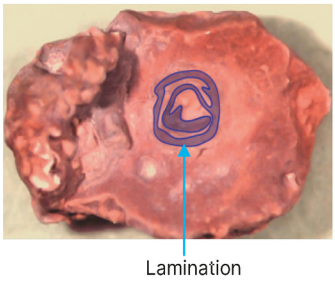
- Seen in Cystinuria

Yourwish

- Radio-opaque → d/t Disulphide bond
- Hardest stone → Not easily broken by ESWL
- Management:
  - D-Penicillamine
  - α-MPG → α-Mercapto Propionyl Glycine

Xanthine Stone

- Seen in Xanthinuria
- Radiolucent
- Colour → Brick red
- Shows lamination on cross-section



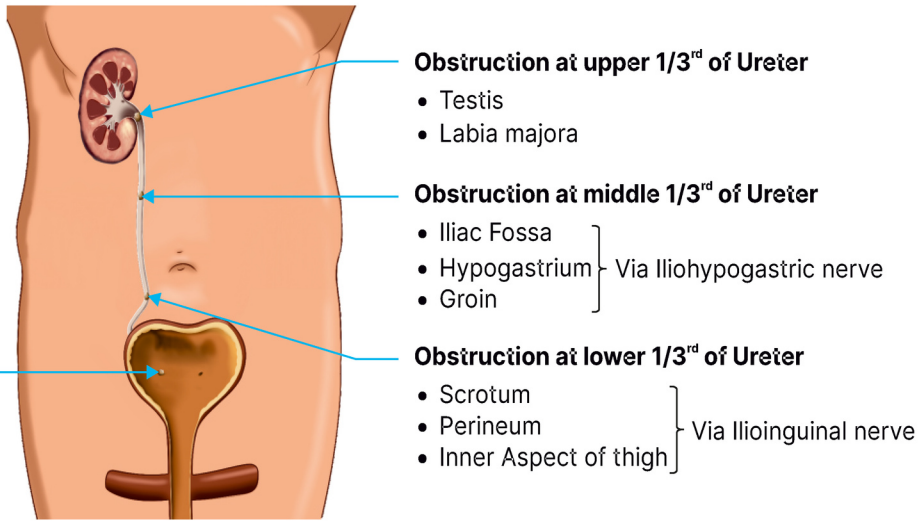
Drug-Induced Stones

- Radiolucent stones:
  - Triamterene
  - Indinavir
- Silicate stones → d/t excessive consumption of silica-containing antacids

Radiolucent stones	Acidic stones
Triamterene Indinavir Xanthine Uric acid	Calcium oxalate Cystine Uric acid

Clinical Features

- M/c → Abdominal pain, flank pain, radiating pain
- Radiation of pain depends upon the location of the renal stones



- Obstruction in the middle 1/3rd:
  - Right side → Mimics Acute Appendicitis
  - Left side → Mimics Diverculitis
- Strangury → Painful urination with expulsion of urine drop by drop
  - If the stone is stuck in the intramural ureter

Yourwish

Yourwish

Investigations

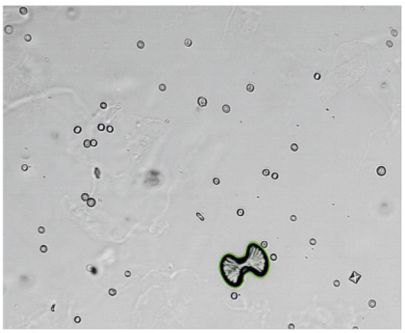
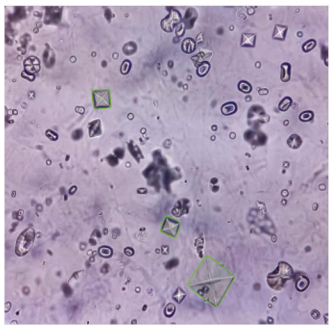
INICET NOV 2024

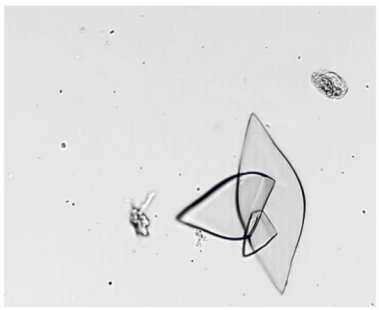
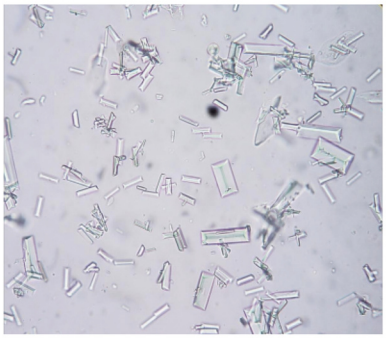
- Emergency:
  - IOC → Non-contrast spiral CT
  - Management → Voveram (Diclofenac)
- Further investigations:
  - Urine Routine & Microscopy:
    - → Colour
    - → pH
    - → Specific gravity
    - → Sugar/Albumin
    - → RBC's /WBC's/Pus cells
    - → Cast/Crystals

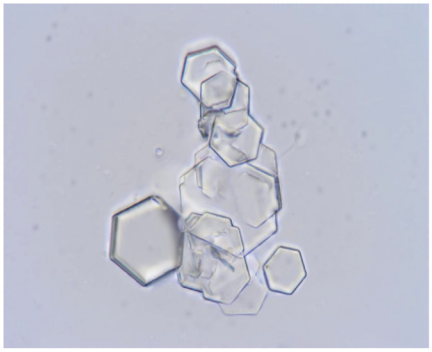
Crystals In Renal Stones

00:16:19

Calcium Oxalate stone

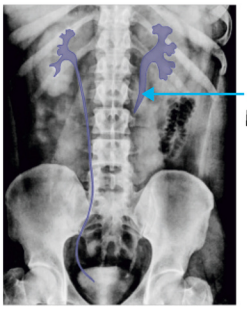
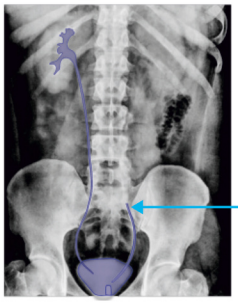
Monohydrate → Dumbbell/Hourglass shaped	**Dihydrate** → Envelope/Bipyramidal
 Dumbbell shaped crystal	 Envelope shaped crystal

Uric acid stone: Rosette/Multifaceted shaped	
Struvite stone: Coffin-lid crystals	

Cystine stone: Hexagonal/Benzene-shaped	

Urine Culture & Sensitivity

- To diagnose UTI/Organism involved/Antibiotic sensitivity
  - 90% of Renal stones → Radio-opaque
  - 90% of Gallstones → Radiolucent
  - 80% of Salivary Gland stones → Radio-opaque
  - IOC for Renal & Salivary Gland stones → NCCT
- Screening investigation for Hydronephrosis → USG

Intravenous Pyelogram (IVP) / Intravenous Urogram (IVU)	RGP - Retrograde Pyelogram
• Used to assess: ○ Proximal part of obstruction ○ Hydronephrosis ○ Renal function	• Used to assess: ○ Distal part of obstruction
	

Radionuclide Scans

00:22:42

- DMSA (Dimercaptosuccinic acid scan): Used to assess
  - M: Morphology
  - S: Scar
  - SA: Surface Anatomy
  - DMSA SCAN: IOC for Dx OF Chronic Pyelonephritis
- DTPA Scan (Diethylene triamine pentaacetic acid scan): Used to assess:
  - Renal perfusion & function
- MAG-3 (Mercaptoacetyltriglycine)
  - Gold standard for Renal perfusion
  - **Tc-99m MAG3 (Mercaptoacetyltriglycine):** Radiopharmaceutical of choice for suspected upper urinary tract obstruction, such as PUJ obstruction (Bailey 28th edition update).

Management Of Renal Stones

00:25:58

Conservative Management

FMGE JULY 2023, JAN 2023

- Plenty of fluids → 4-6 L/Day
- Alkalinization/Acidification of urine
- Indications:
  - Stone size up to 5mm
  - Non-dilated ureter
  - Stone located in the distal third of the ureter
  - Progressive downward movement of the stone on repeated scans

Medical Expulsion Therapy (Bailey 28th edition Update)

- Tamsulosin:
  - Causes smooth muscle relaxation of the distal ureteric muscle
  - Can be used for distal ureteric stone >5 mm
  - Assist the passage of fragments following ESWL

Surgical Interventions

- ESWL: Extracorporeal Shock Wave Lithotripsy → 85%
- 15%
  - PCNL: Percutaneous Nephrolithotomy
  - RIRS: Retrograde Intrarenal Surgery
  - URS: Ureteroscopy
- LSS: Laparoscopic Stone Surgery
- Open Stone Surgery: Indications -
  - Stone with a non-functioning kidney → Nephrectomy
  - Stone with anatomical disorders of the kidney (PUJ Obstruction)

ESWL (Extracorporeal Shock Wave Lithotripsy)

- Gold Standard Lithotripter → Dornier Unmodified HM-3

Shock wave-induced tensile cracking
↓
Erosion and shattering
↓
Stone Fragments excreted
↓
Urine

- Tamsulosin → Assist passage of fragments following ESWL (Bailey 28th edition Update)
- Complications: Steinstrasse/Street of Stone/Columnation of Gravel
  - Clogging of stone fragments d/t obstruction in the ureter
- Absolute Contraindications: Pregnancy & Bleeding Disorders
- Renal stones of size up to 2 cm → ESWL
- CBD stones of size up to 1.5 cm → ERCP
- Hard stones that are not broken by ESWL:
  - B: Brushite
  - H: Hydroxyapatite

Yourwish

- C: Cystine
- C: Calcium oxalate monohydrate

RIRS (Retrograde Intrarenal Surgery)

- Retrograde access of the kidney via the ureteric orifice
- Avoids the morbidity of PCNL
- Ureteroscope used:
  - Slimmer & more flexible
  - Active deflection of the tip
- Energy source used for stone fragmentation: Laser
- Indications of RIRS
  - Renal stones <2 cm
  - Lower pole calculi
  - Obesity
  - Musculoskeletal deformities (Kyphoscoliosis)
  - Renal abnormalities (HSK or pelvic kidney)
  - Bleeding diathesis

Pcnl (Percutaneous Nephrolithotomy)

- Approach → Posterior Calyceal Approach
- M/c Complication → Bleeding
- M/c injured organ → Pleura>Colon>Spleen
- Indications:
  - Size of Stone (>2 cm)
  - Distal Obstruction
  - Hard Stone
  - Lower Calyceal Stone
  - Staghorn Calculi → PCNL + ESWL
  - Failed ESWL or RIRS

Ureteroscopy (Urs)

- Done under Spinal/General anaesthesia
- M/c Complication → Ureteric perforation
- Indications:
  - Insertion of a DJ stent
  - Removal of a ureteric stone
  - Removal of a foreign body
  - Taking a biopsy (from the urothelial tumour)



Ureteroscope

Management of Renal Stone

- Stone size up to 2 cm: ESWL
- Stone size >2 cm: PCNL
- Hard stone: PCNL
- Staghorn Calculus: PCNL + ESWL (Sandwich technique)

Yourwish

Yourwish

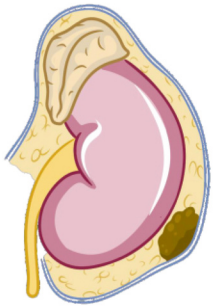
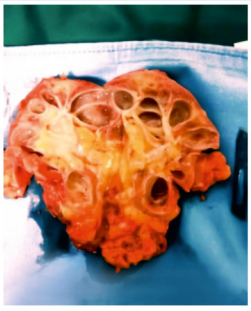
Management of Ureteric Stone → Depends on the location of the stone

- Stone in the upper & middle 1/3rd of the Ureter
  - Size of stone up to 1 cm: ESWL > URS
  - Size of stone >1 cm: URS
- Stone in the lower 1/3rd of the Ureter → URS

INFECTIOUS DISORDERS OF KIDNEY

00:45:46

- Emphysematous cholecystitis - *Clostridium welchii* (anaerobe) > *E. coli* (aerobe)
- Emphysematous pyelonephritis - *E. coli*
- Xanthogranulomatous pyelonephritis - *Proteus*
- Xanthogranulomatous cholecystitis - Rupture of Rokitansky-Aschoff sinuses

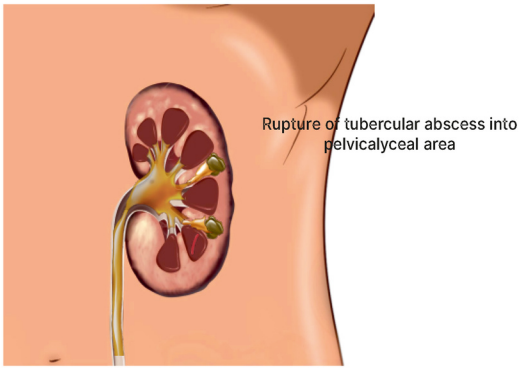
Perinephric Abscess	Pyonephrosis
The collection of pus around the kidney	The collection of pus inside the kidney
	

Genitourinary Tuberculosis

- MC organism: Mycobacterium TB
- Primary Organ involved: Lungs
  - Lungs → Hematogenous spread → Kidney & Prostate
- Descent of infection: Kidney → Ureter → Bladder
- Ascent of infection: Prostate → Epididymis
- Testis: Spared

Pathophysiology

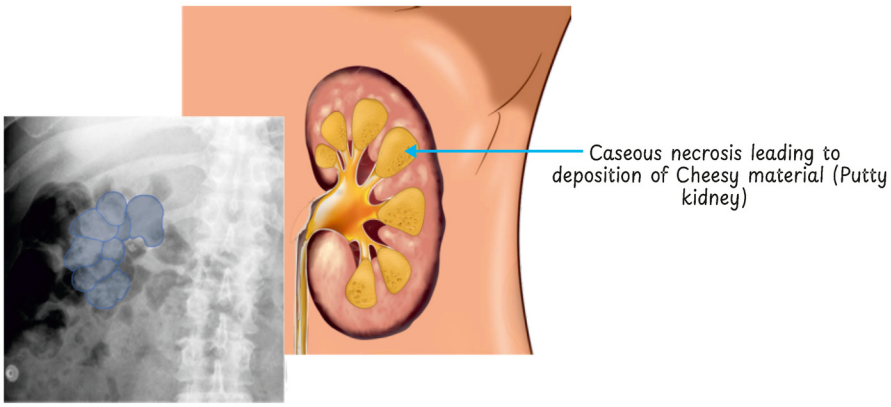
- Chronic Granulomatous Disorder
  - Granuloma at renal pyramid→ Tubercular Abscess → Burst into Pelvicalyceal System → Sterile Pyuria
  - Earliest M/c Symptom of Genitourinary TB: Increased frequency of urination



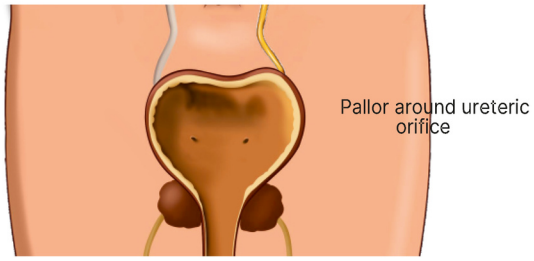
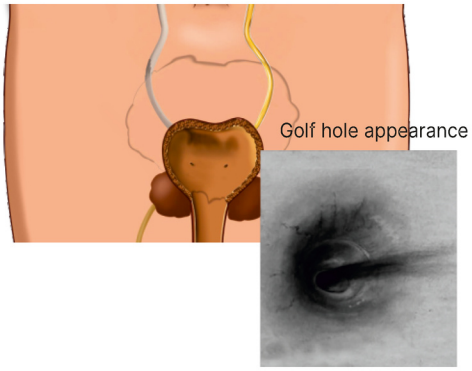
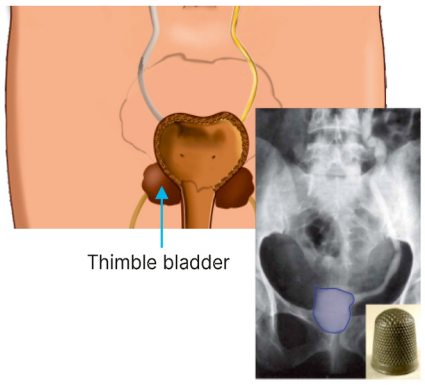
Changes in kidney and ureter:

- Calyceal Stenosis/Stenosis at PUJ → Hydronephrosis / Pyonephrosis → Perinephric Abscess → Caseous Necrosis → Putty Kidney → Cement Kidney (calcified kidney) → Non-Functioning Calcified Kidney (Autonephrectomy).

Yourwish

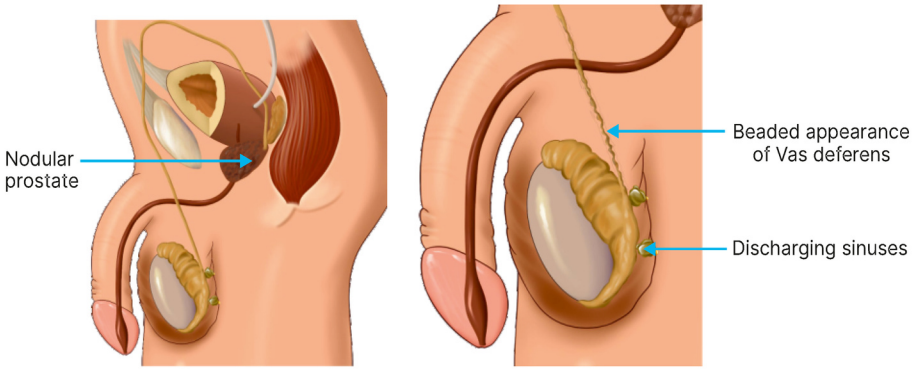


Changes In Bladder

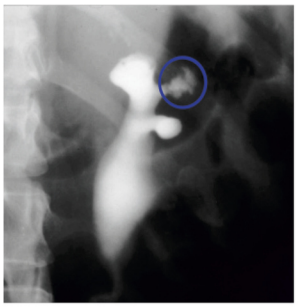
Earliest sign visualised during Cystoscopy → Pallor around the ureteric orifice	
Golf Hole Ureteric Orifice	
Chronic inflammation → Tubercles → Fibrosis → Small, contracted Bladder • Small, contracted bladder → Thimble bladder	

Changes in prostate:

- Calcified → Hard & Nodular
- Characteristic Feature of TB:
  - Beaded appearance of the vas deferens with multiple discharging sinuses via the scrotum



Investigations And Treatment



Moth eaten calyx

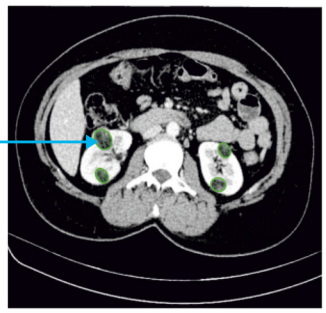
- Investigations:
  - Urine R/M → Pus cells
  - Urine C/S → Sterile
  - Pus cells + Sterile → Sterile pyuria
  - Earliest Sign of Renal TB on IVP: Moth-eaten calyx
  - IOC for diagnosis → CECT
- Treatment → ATT + Manage complications
- Complications:
  - Ureteric Stricture → Dilatation
  - Small Contracted Bladder → Augmentation Enterocystoplasty → Donor site → Small bowel
  - Non-Functioning Kidney: Nephrectomy
  - Non-Dilatable Stricture of Lower 3rd of Ureter: Boari's operation

RENAL TUMOURS

01:00:37

FMGE Jan 2023

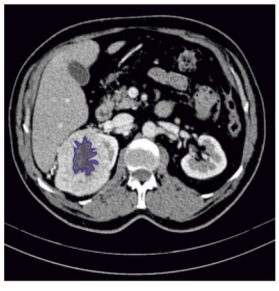
Angiomyolipoma



- Composed of → Vessel + Muscle + Fat
- Benign
- More common in → Females (6th decade)
- Associated with → Tuberous sclerosis
- Immunohistochemistry: HMB-45
- Macro-aneurysm → Retroperitoneal haemorrhage
  - Wunderlich Syndrome
- Clinical → Benign & Asymptomatic
- IOC → CECT (Intralesional fat density of -15 to -20 Hounsfield units within the mass)
- Treatment:
  - Asymptomatic, tumour size up to 4 cm: Observation
  - Symptomatic, tumour size >4 cm: Partial nephrectomy (Nephron sparing surgery)
  - Acute haemorrhage: Angioembolization

Renal Oncocytoma





- Arises from: Oncocytes
- Mimics: Chromophobe RCC (Eosinophilic variant)
- Diagnosis:
  - IOC for Diagnosis: CECT → Central stellate scar
  - Angiography → Cartwheel/Spokewheel appearance
- Treatment → Partial Nephrectomy



Yourwish

Renal Cell Carcinoma (Rcc)

01:06:04
FMGE June & Dec 2021

- AKA:
  - Hypernephroma → Arises from the upper pole
  - Grawitz Tumour
  - Radiologist Tumor
  - Internist Tumor → d/t Paraneoplastic manifestations
- M/c Malignancy of the Kidney
- More Common in: Males (Smokers), 6th decade
- Sporadic
- Risk Factors:
  - Smoking/Tobacco
  - Analgesic Nephropathy
  - Cadmium & Asbestos Exposure

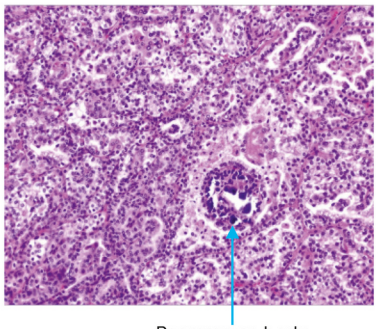
Types

1. Clear cell variant:

- M/c variant of RCC
- Arises from → PCT
- Gene mutation → VHL gene located on chromosome 3
  - Deletion
  - Translocation → (3:6), (3:8), (3:11)

2. Papillary cell variant of RCC:

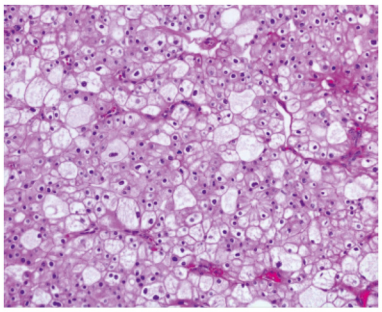
- M/c type seen in patients of Cystic Disease requiring Hemodialysis
- Arises from → PCT
- Mutation: MET gene on chromosome 7 (Trisomy)
- Associated with dystrophic calcification → Psammoma bodies


Psammoma body

Psammoma bodies are seen in:

- Papillary variant of RCC
- Papillary Carcinoma of Thyroid
- Serous Cystadenoma of Ovary
- Meningioma

3. Chromophobe Variant of RCC:



- Best Prognosis
- Arises from → Intercalated cells of CD
- Plant Cell Appearance
- Multiple chromosome losses with Extreme Hypodiploidy

4. Bellini Duct Carcinoma:

- Arises from → CD
- Hobnail pattern
- Desmoplastic Reaction
- Prognosis → Poor

Yourwish

Yourwish

5. Medullary Variant of RCC:

- Exclusively seen in → Children suffering from sickle cell trait

Characteristic Features Of Rcc

- Pseudocapsule
- Refractory to → Cytotoxic agents
- Response to Biological Response Modifiers → IL-2 + IFN-a
- Spontaneous Regression:
  - N: Neuroblastoma
  - C: Choriocarcinoma
  - R: RCC
  - M: Malignant Melanoma
  - R: Retinoblastoma

Clinical Features

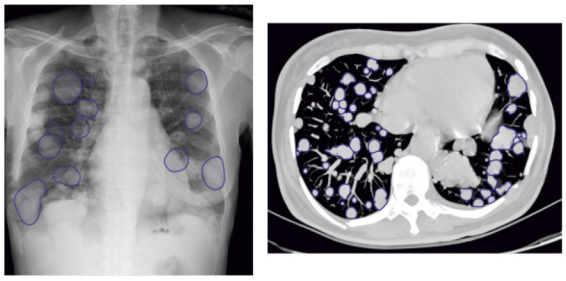
- Triad: (only in 10% of patients) → "Too-Late" Triad
  - Mass
  - Pain
  - Hematuria
- M/c Presentation: Hematuria

Route of Spread

- M/c route of Spread → Hematogenous
- M/c site of Metastasis → Lungs
  - Cannonball Secondaries

Pulsatile secondaries →Osteolytic & Hypervascular

- RCC
- Follicular Thyroid Ca



Cannon ball appearance

M/c Malignancy Responsible for:

- Osteoblastic Secondaries in Males → Ca Prostate
- Osteolytic secondaries in Males → RCC

Paraneoplastic Manifestations

- ↑ ESR (>55%) → M/c manifestation
- Anaemia: Non-functional mass →↓ Erythropoietin
- Polycythemia: Functional mass →↑ Erythropoietin
- Hypertension: ↑ Renin
- Hypercalcemia: ↑ PTHrp → DOC: Zolendronate
- Stauffer's syndrome: Non-metastatic hepatic dysfunction because of IL-6

Investigations

- IOC for diagnosis → CECT
- IOC for detecting tumour thrombus → MRI
- Gold Standard Investigation for IVC Invasion: IVC Gram

Yourwish

Treatment

Localized RCC	Locally Advanced/Metastatic RCC

• Radical Nephrectomy
• Indications of Nephron Sparing Surgery: (Bailey 28th edition update)
  ○ RCC <4 cm
  ○ Well-selected tumors within 4-7 cm
  ○ RCC in a solitary kidney
  ○ Bilateral RCC
  ○ RCC with Diseased C/L Kidney
	• Radical Nephrectomy
	• 1st line: Sunitinib
	• 2nd line: IL-2 + IFN-a

Named staging & grading

Robson Staging Fuhrman Grading	RCC
Jackson Staging	Ca Penis
Gleason Grading	Ca Prostate

Paediatric tumours

01:19:08

- M/c malignancy of infancy: Neuroblastoma
- M/c Intra-abdominal malignancy in Children: Neuroblastoma
- M/c primary renal malignancy in children: Nephroblastoma/Wilm's tumour
- M/c Renal tumour of infancy: Congenital mesoblastic nephroma
- M/c soft tissue tumour in children: Rhabdomyosarcoma
- M/c malignancy of childhood: ALL
- M/c solid malignancy of childhood: Brain tumours

Wilms Tumour

01:20:47

- Nephroblastoma
- Age: 2-5 years
- Genes: WT1, WT2 → Chromosome 11
- Components of Wilms Tumor:
  - B: Blastema
  - E: Epithelium
  - St: Stroma

Variants of Wilms Tumor

WAGR Syndrome	Denys-Drash Syndrome	Beckwith-Wiedemann Syndrome
W: Wilms Tumour **A**: Aniridia **G**: Genital anomalies **R**: Mental Retardation	Gonadal dysgenesis • Male pseudohermaphroditism Renal failure	Hemihypertrophy Visceromegaly • Hepatomegaly • Splenomegaly Macroglossia Omphalocele Hepatoblastoma

- **Clinical presentation** (Bailey 28th edition update)
  - Triad:
    → Mass → M/c presentation
    → Fever
    → Hematuria
  - Bilateral in 13% cases
- M/c Route of Spread → Hematogenous
- M/c site of Metastasis → Lungs
- **Investigation:**
  - IOC for diagnosis: MRI>CECT
  - Claw sign: Tumour infiltrates the kidneys & normal renal parenchyma is compressed at the periphery around the tumour (Bailey 28th edition update)
- **Treatment:**
  - TOC: Radical Nephrectomy
  - Most important prognostic factor: Histology > Stage
  - Adverse Histological Factors:
  → Chemotherapy within 5 Days
  → Radiotherapy within 10 Days

Autosomal Dominant Polycystic Kidney Disease

01:26:27
NEET PG 2022



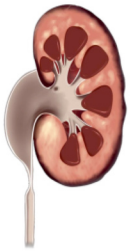


Spider Leg appearance

- Autosomal Dominant
- Chromosomes: 16,4
- Abnormal Protein: Polycystin
- **Clinical features:**
  - M/c manifestation: Hypertension
    → Due to the activation of RAS
    → In 75% of adults and 25% of children
  - Polyuria, Nocturia, Hematuria
  - Nephrolithiasis
  - M/c Extra-renal manifestation of ADPKD:
    → Polycystic Liver Disease
  - Cysts are never seen in: Lungs
  - M/c cause of Death: Cardiovascular disorders
  - 5th/6th Decade → Chronic Renal Failure
    → T/t → Renal Transplantation
  - **Investigation:**
  - IOC for diagnosis: CECT
  - On IVP: Spider Leg Appearance
- **Management** → **TOC** → Renal Transplantation

PELVI-URETERIC JUNCTION (PUJ) OBSTRUCTION

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- Unilateral
- More common on the left side & in boys
- **Causes:**
  - Congenital:

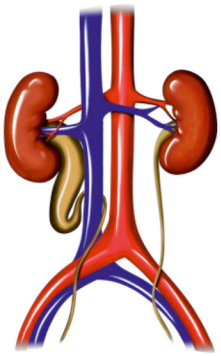
Yourwish

→ Atresia/Stenosis of Ureter
→ Aberrant Left Renal Artery
- Acquires:
→ Stone
→ Infection
→ Instrumentation

- **Clinical features:**
  - Asymptomatic
  - Palpable Intra-abdominal mass → d/t Hydronephrosis
- **Investigations:**
  - Tc-99m MAG3: Radiopharmaceutical agent of choice for PUJ obstruction; replaced DTPA scan (Bailey 28th edition update)
- **Treatment:**
  - Gold Standard → Anderson-Hynes Dismembered Pyeloplasty
    → Removal of site of obstruction → Placement of DJ stent → Anastomosis of the two ends

Retrocaval Ureter

- Abnormal Persistence of Right Posterior Subcardinal Vein
- Ureter → Embryologically normal
- **Clinical features** → Signs & Symptoms of Ureteric Obstruction
- **Investigation:**
  - IOC for Diagnosis: MRI
  - On IVP: Reverse-J/ Fish-hook/Shepherd Crook appearance
- Management → Treatment of choice → Relocation Uretero-ureterostomy

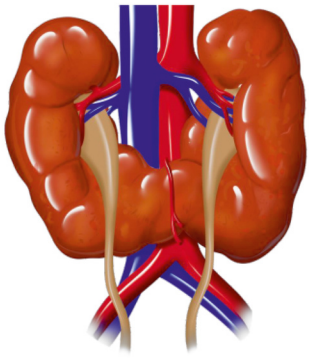


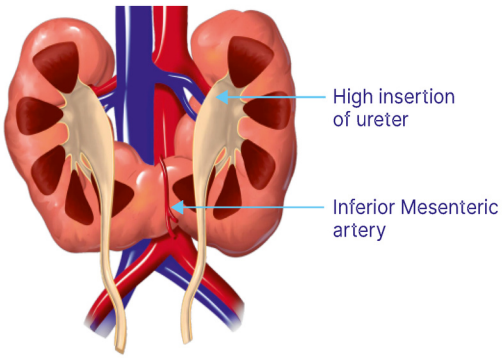


HORSESHOE KIDNEY

01:36:29
FMGE Jan 2023

- Fusion of Kidneys at the lower pole
- Incidence: 1:400 Live births
- Level of IMA: Lower border of L2
- Level of Isthmus: L3-L4
- Axis: Vertical
- Medial calyx → Hand joining sign
- High insertion of the ureter with anterior transposition
  - Flower vase-like curve of the ureter
- **Clinical features:**
  - Asymptomatic
  - M/c Symptom: Vague, dull aching pain
  - Rovsing Syndrome: (d/t compression of isthmus)
    → On Hyperextension of Spine → Abdominal Pain, Nausea & Vomiting
- **Investigations:**
  - IOC for Diagnosis: CT Angiography > CECT
  - On IVP

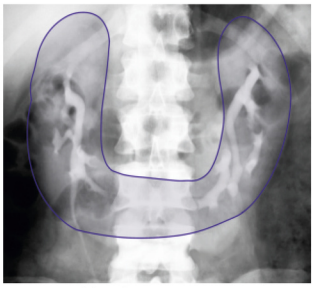




Yourwish

Yourwish

→ Medial Orientation of Calyx: Hand joining sign
→ High Insertion of Ureter with Anterior Transposition: Flower vase-like curve of the ureter



Hand joining sign

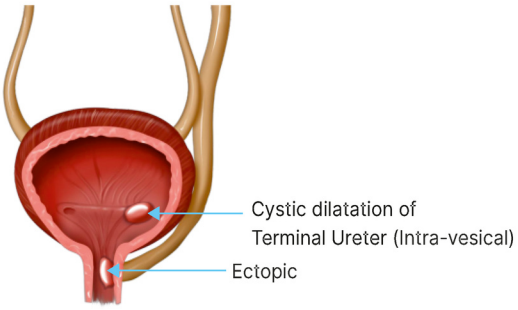
- **Management:**
  - Management of Complications
  - Staghorn Calculi: PCNL
  - Isthmus should not be divided (d/t presence of functional tissue)

URETER

01:41:25

Ureterocele

- Cystic dilatation of the terminal ureter
- More common in: Females
- **Types:**
  - Intra-vesical (20%)
  - Ectopic (80%)



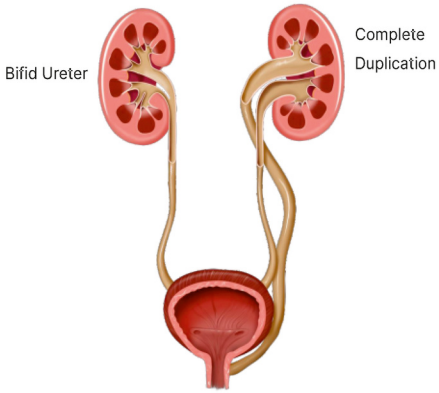
- **Clinical Presentation:**
  - Recurrent attacks of UTI/Urosepsis
  - Palpable Mass → Hydronephrosis
- **Investigations:**
  - IOC for Diagnosis: IVP
    → Adder/Cobra Head Appearance
- **Treatment:**
  - Intravesical Ureterocele: Incision over the cyst
  - Ectopic Ureterocele: Excision with Reimplantation
- M/c Congenital abnormality of Upper Urinary Tract: Duplication of Ureter
  - Autosomal Dominant
- M/c Congenital abnormality of Urogenital Tract: VUR
  - Autosomal Dominant



Adder Head/Cobra Head Appearance

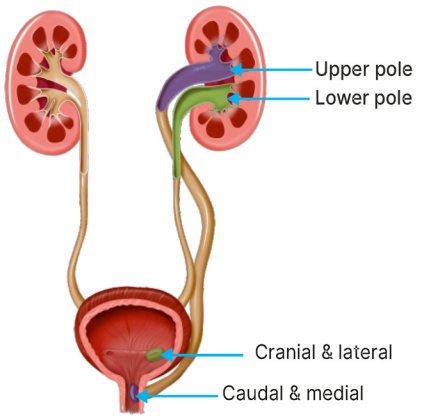
Duplication of The Ureter

- More common in Females
- Bilateral
- Types:
  - Incomplete Duplication/Bifid Ureter
    → On RGP, reflux of contrast in both limbs of the ureter → Yo-Yo Reflux
  - Complete Duplication
    → Upper Pole is caudal & medial as compared to the lower pole Ureter: Weighert-Meyer's Rule
- **Complete Duplication of the Ureter Pathology:**
  - Upper Pole Ureter: Ureterocele
  - Lower Pole Ureter: VUR
- **MC location of Ectopic Ureteric Orifice:**



- Males: Posterior Urethra (Prostatic Urethra)
- Females: Anterior Urethra
  → Continuous incontinence

- **Clinical features of Ectopic Ureteric Orifice:**
  - Males: Recurrent Infection
  - Females:
    → Continuous incontinence with dribbling of urine
    → Normal voiding pattern
- **Investigations:**
  - IOC for diagnosis of Ureterocele: IVP
  - IOC for diagnosis of VUR: MCU
- **Treatment:**
  - Upper Pole Ureter:
    → Excision with Reimplantation into the Bladder
  - Lower Pole Ureter: Ureterovesicoplasty
  - Upper Pole Hydronephrosis with no function:
    → IVP: Drooping lily sign
    → Treatment: Upper pole Nephrectomy
- Drooping lily sign is seen in:
  - Ectopic Ureteric Orifice
  - Neuroblastoma





Drooping Lily Sign

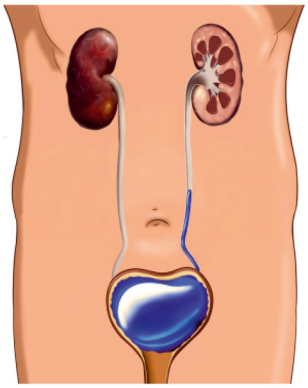
Vesicoureteric Reflux

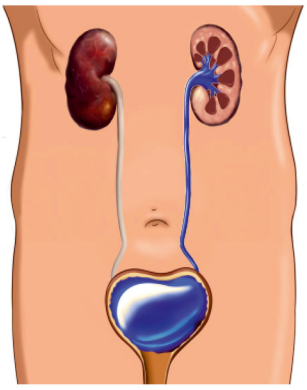
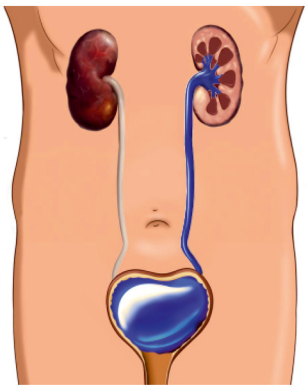
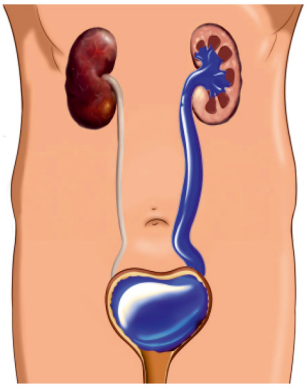
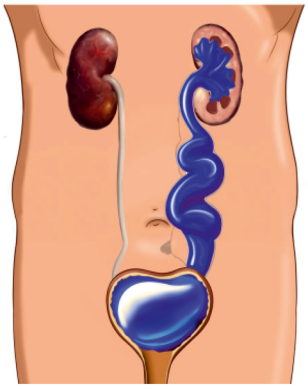
01:52:53
NEET PG 2022

- M/c Congenital abnormality of the Urogenital Tract
- More common in: Children (d/t non-maturation of the system)
- Asymptomatic
- Mostly resolves spontaneously by 5-6 years of age
- **Investigations:**
  - IOC for diagnosis of VUR: MCU

MCU is IOC for:

- VUR
- Posterior Urethral Valve
- Posterior Urethral Stricture
- **International Classification of VUR:**

Grade I • Reflux into Non-dilated Ureter	

Grade II • Reflux into the Pelvi-Calyceal System	
Grade III • Reflux into Non-dilated Ureter + • Mild-Moderate Dilatation	
Grade IV • Blunting of Fornix	
Grade V • Reflux into the Pelvi-Calyceal System + • Dilated tortuous Ureter	

Yourwish

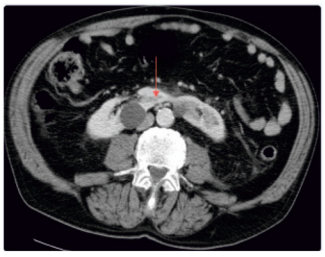
- **Management:**
  - Prophylactic Antibiotics for all patients
  - Medical management is sufficient for:
    → Grade I-III VUR
    → Unilateral Grade IV VUR
  - Surgical Intervention Indications:
    → Bilateral Grade IV VUR
    → Grade V VUR
    → Recurrent UTI despite Antibiotics
    → Older Children
    → Permanent Scar
    → Bladder Diverticula
  - Surgical intervention:
    → Strengthening of Ureterovesical Junction → Ureterovesicoplasty
    → STING Operation: **S**ubureteric **T**ransurethral **I**njection of Teflon Paste
    → Ureteric Reimplantation:
      - Lich-Gregoir Technique → Preferred
      - Leadbetter Politano Technique

PYQs

01:57:15

Q. A male patient presents with complaints of hematuria and recurrent urinary tract infection. You notice the following finding on his CT scan. What is the likely condition indicated by the arrow?

A. Polycystic kidney disease
B. Horseshoe kidney
C. Hydronephrosis
D. Pancake kidney

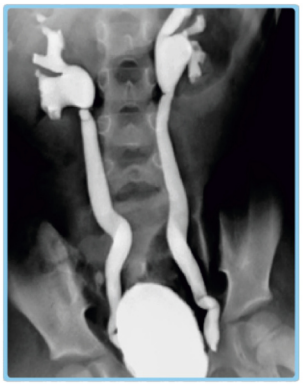


Answer: B

Q. A 6-year-old boy presents with a history of recurrent urinary tract infections. Imaging is shown below. What is the diagnosis?

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A. Vesicoureteric reflux
B. Urinary bladder diverticulum
C. Urinary bladder hernia
D. Vesicocolic fistula



Answer: A

- B/L Grade V VUR

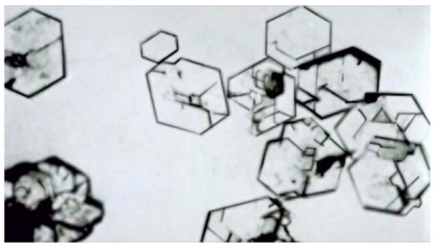
Q. What is the best treatment option for a patient diagnosed with renal cell carcinoma having a tumour measuring 10 cm in size, located at the lower pole of the kidney, with negative regional lymph nodes?

Yourwish

A. Radical nephrectomy
B. Partial nephrectomy
C. Radiotherapy
D. Chemotherapy

Answer: A

Q. A young patient presents with recurrent colicky abdominal pain. Urine examination shows RBCs and the crystals shown in the image. What is the most likely diagnosis? NEET PG Aug 2024



A. Glomerulonephritis
B. Oxalate stone
C. Polycystic kidney disease
D. Cystine stone

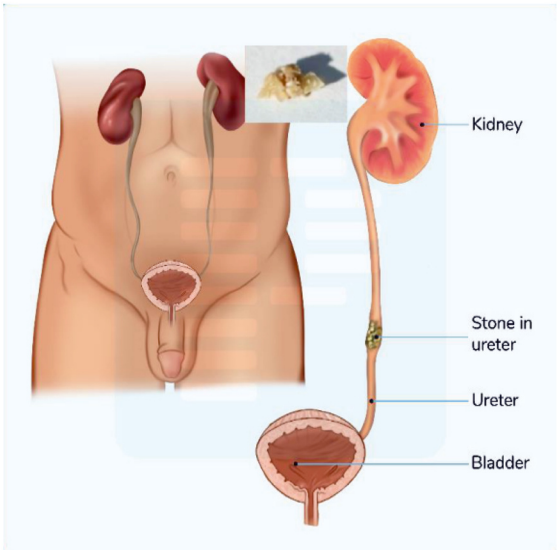
Answer: D

- Benzene/ Hexagonal-shaped crystals → Cystine stone

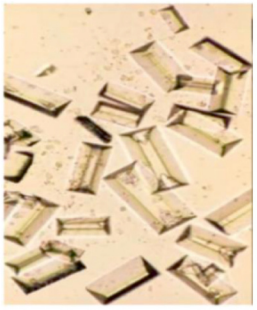
Q. Which of the following is the recommended treatment for the condition shown in the image, where the size of the stone is 1.5 cm? FMGE Jan 2023

A. Percutaneous nephrolithotomy
B. Ureteroscopy
C. ESWL
D. Wait and watch

Answer: B



Q. 45-year-old female presents with recurrent episodes of right flank pain, hematuria, and a history of urinary tract infections. Urine analysis shows alkaline urine with a pH of 8.0. Microscopy revealed the following finding. Which of the following is the most likely underlying cause of this patient's condition?



A. Triple phosphate stone
B. Calcium oxalate stone
C. Uric acid stone
D. Cystine stone

Answer: A

Yourwish

Q. A middle-aged woman presents with flank pain and dysuria. The pain was temporarily relieved by intravenous analgesics administered at a nearby primary healthcare centre. She is diagnosed with ureteric colic secondary to ureteric calculi. What is the most appropriate diagnostic modality in this case?

A. NCCT KUB
B. CECT
C. USG KUB
D. Ureteroscopy

Answer: A

12. URINARY BLADDER

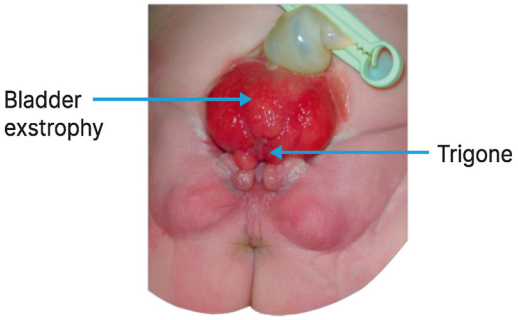
ECTOPIA VESICAE

00:00:17

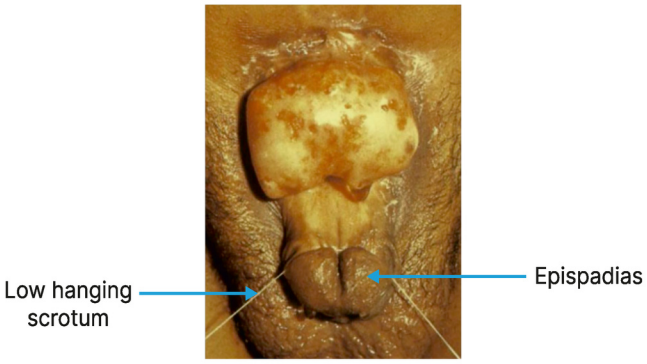
FMGE 2021

- AKA Extrophy bladder
- Complete ventral defect of the urogenital sinus + Abnormality of the overlying musculoskeletal system
- Abnormal maturation of the urogenital sinus → Rupture
- Epispadias- urethral opening on the dorsal aspect
- Shallow scrotum
- Undescended testis

CHILD



ADULT



Associated with

- Absent infraumbilical abdominal wall
- Absent anterior wall of the bladder
- Exposed posterior wall of the bladder
- Urine dribbling from the trigone
- Widely separated pubic rami
- Umbilical hernia
- Rectal prolapse

Management

- Augmentation enterocystoplasty
  - Small bowel is used to close the defect
- Abdominal wall closure
  - Due to the absence of the infraumbilical wall, the posterior iliac bone is cut, and mobilize the muscles
- Repair/correction of associated abnormalities
- Since the small bowel is used to reconstruct the bladder, the columnar epithelium is not used for the urinary environment, so there is an increased risk for adenocarcinoma

Yourwish

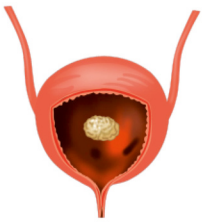
BLADDER STONE

NEET PG 2021 00:04:16

PRIMARY BLADDER STONE	SECONDARY BLADDER STONE

• Stone formed in the absence of
  ○ Anatomical factors
  ○ Functional factors
  ○ Infectious factors
  ○ Obstructive factors
• MC in children 2-4 years with chronic dehydration
• MC stone ammonium urate- D/t Chronic laxative use
	• Formed in the bladder due to
	  ○ Anatomical factors
	  ○ Obstructive factors -mainly
	  ○ Infectious factors
	  ○ Functional factors
	• MC in elderly males because of BPH
	• MC stone uric acid > struvite stone

Clinical features



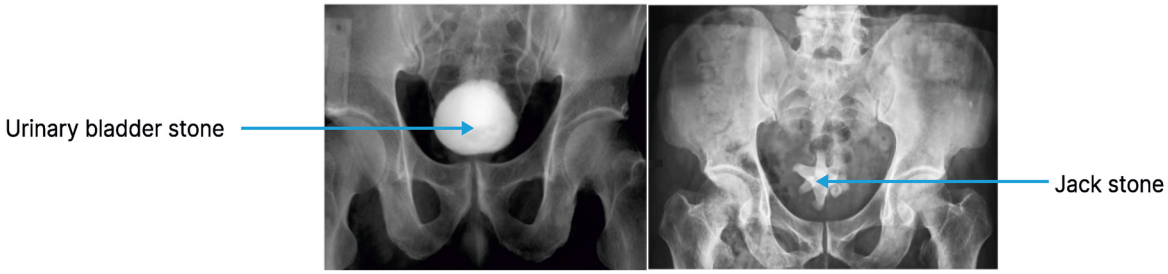
- They show when the stone passes down into the bladder
- Intermittent painful voiding
- Severe pain at the end of micturition
- Terminal hematuria

Jack stones



- It has projections
- Seen in the bladder
- Composition- Calcium oxalate dihydrate

X-RAY



Diagnosis

- IOC for the diagnosis of urinary bladder and gallbladder stones is USG

Treatment

- Small stone- Cystolitholapexy
- Large stone
  - Suprapubic cystolithotomy
  - Electrohydraulic lithotripsy

SCHISTOSOMIASIS

00:09:22

FMGE 2020, 2021

- AKA Bilharziasis
- Causative agent- Schistosoma haematobium
- Endemic to the Middle East
- Definitive host- Man
- Intermediate host- Snail

Yourwish

Yourwish

Clinical features

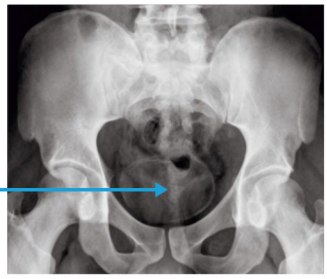
- Swimmer's itch- Itching sensation within 24 hours
  - At the site of penetration of the cercaria <24 hours
- Katayama fever- 3 weeks to 4 months, the body reacts to the eggs
- Earlier MC symptom- Increased frequency
- MC cause of bladder calcification worldwide due to chronic inflammation
- Risk of malignancy also increases- squamous cell carcinoma > transitional cell carcinoma

Investigations

- Cystoscopy
  - Bladder has deposited eggs
  - Sandy patches on the bladder wall
- Urine microscopy examination
  - Presence of eggs of Schistosoma hematobium

X-RAY

- Fetal head in the pelvis appearance

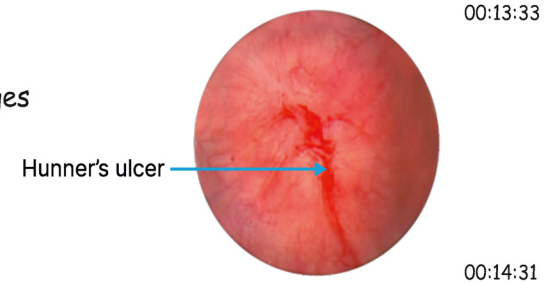


Treatment

- DOC is praziquantel

INTERSTITIAL CYSTITIS/HUNNER'S ULCER

- Linear bleeding ulcer at the fundus of the bladder
- Chronic pancystitis with infiltration of lymphocytes and macrophages
- MC in females
- Etiology → Unknown



FMGE 2020, INICET 2021

BLADDER RUPTURE

- Types
  - Extraperitoneal bladder rupture (80%)
  - Intraperitoneal bladder rupture (20%)
- Rupture depends on
  - State of the bladder
  - Kind of injury

Extraperitoneal bladder rupture

- MC cause RTA → Pelvic fracture

Clinical features

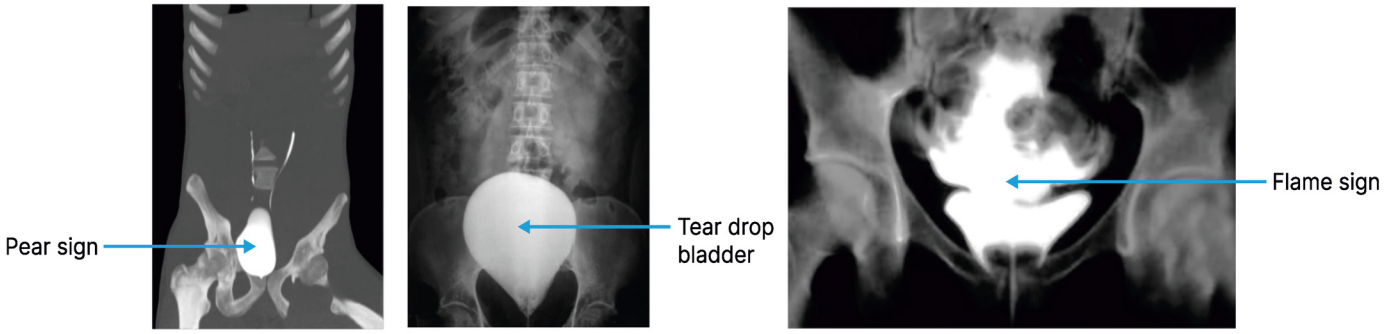
- Suprapubic pain
- Hematuria
- Difficulty in passing urine

Investigations

- IOC for diagnosis- CT cystography

Yourwish

- Flame sign
- Pear sign
- Tera drop bladder



Management

- Foley's catheterization
- Healing occurs in 7-10 days

Indications of surgical intervention

- Repeated occlusion of the catheter- Hematuria
- Projecting bone fragment
- Tear near the neck of the bladder

Intraperitoneal bladder rupture

NEET PG 2020

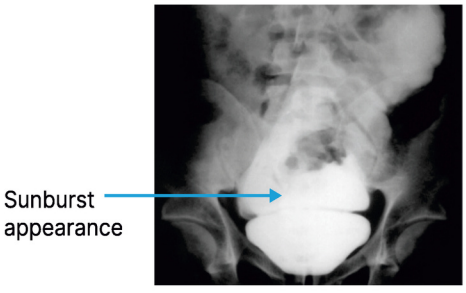
- External blow/kick to the bladder
- Mostly in alcoholics due to a distended bladder
- MC in males

Clinical features

- Suprapubic pain
- Difficulty in passing urine
- Hemturia
- Peritonitis

Investigations

- IOC for diagnosis is CT cystography
- On the USG bladder, the within-bladder appearance



Treatment

- Exploratory laparotomy + peritoneal
- Lavage + repair of defect + suprapubic catheter/Foley's catheterization

CARCINOMA BLADDER

00:20:56

- MC type of carcinoma of the bladder: Transitional cell carcinoma > squamous cell carcinoma > adenocarcinoma

Risk factors of bladder cancer

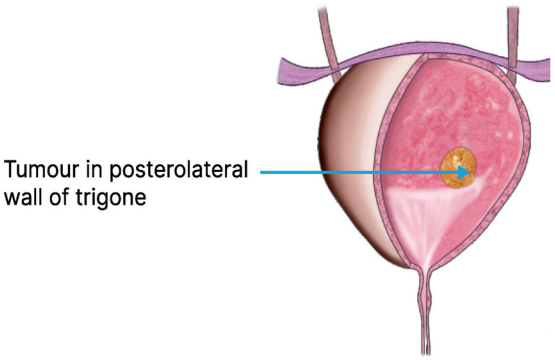
TCC	SCC	ADENOCARCINOMA

• Smoking
• Drugs
  ○ Phenacetin
  ○ Chlornaphazine
• Cyclophosphamide
• Exposure to certain substances
  ○ Benzidine
  ○ Hydroscarbon
  ○ Aniline
  ○ Acrolene
  ○ B-naphthalamine
• Printing, dyeing, rubber, leather, automobile, and petroleum industries
• Schiostosomiasis
• Pelvic irradiation
	• Schistosomiasis
	• Chronic inflammation
	• Blader stone
	• Bladder diverticula
	• Chronic catheterization
		• Ectopic versace
		• Patent urachus
		• Intestinal pouch/conduit
		• Augmentation enterocystoplasty

SQUAMOUS CELL CARCINOMA	ADENOCARCINOMA
Nodular and invasive	Lymphatic spread: Pelvic lymph node (obturator)
Treatment Radical cystectomy	**Treatment** Radical cystectomy Pelvic lymphadenectomy

Transitional cell carcinoma

- MC in males and smokers
- Age- 6th to 7th decade
- MC histological type- TCC
- MC site- Posterolateral wall of triogone



Clinical features of ca bladder

- MC Symptom- Hematuria
  - Painoes
  - Gross
  - Intermittent
- Irritative symptoms
- Frquency
- Urgency
- Dysuria

Yourwish

Route of spread

- MC group of LN involved- Obturator
- MC site of metastasis- Liver

Investigations

- IOC- Cystoscopy and biopsy
- Urine cytology
  - Multiple layers of cells of the bladder are shed in urine
  - Detection of the location is not possible
- IOC for staging- MRI

Treatment

Tis

- Malignant cystitis
- Intravesical chemotherapy

Ta

- Paipillary tumour/kiss ulcer
- Single low to moderate grade non-recurrent
- Tranurethral resection (TUR)

Ta

- Multiple, high-grade, recurrent
- Tranurethral resection + Intravescal chemotherapy

T1

- Tranurethral resection + Intravescal chemotherapy

T2-T4

- Radical cystectomy
- Chemotherapy + radiotherapy

ANY T, N, M

- Neoadjuvant chemotherapy followed by surgery/palliation

Systemic chemotherapy agents

MVAC

- Methotrexate
- Vinblastine
- Adriamycin
- Cisplatin

Intravesical chetherapy agents

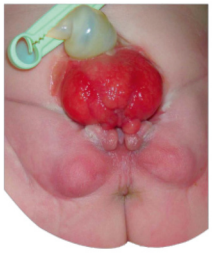
- Mitomycin C
- Epirubicin

Yourwish

Yourwish

- Thiotepa
- BCG → most effective

PYQs



00:35:52

Q. Identify the condition shown below:

a. Bladder extrophy
b. Omphalocele
c. Gastroschisis
d. Patent urachus

Ans: a

Q. A 25-year-Old male after a pelvic fracture could not pass urine. On examination, the bladder was not palpable. What is the most probable diagnosis?

a. Posterior urethral injury with retention of urine
b. Anterior urethral injury with retention of urine
c. Intraperitoneal rupture of the bladder
d. Extraperitoneal rupture of the bladder

Ans: d

Yourwish

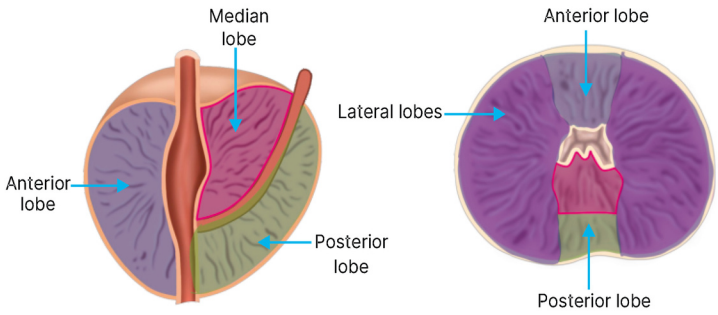
14. PROSTATE AND SEMINAL VESICLE

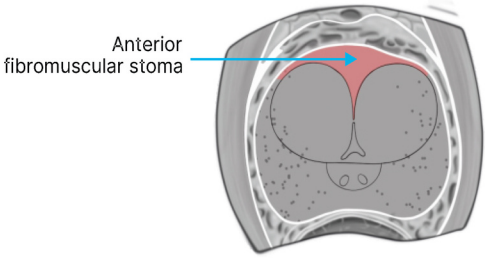
ANATOMY OF PROSTATE

00.00.14

FMGE 2019

- Average weight of prostate: 20 - 25 grams
- Average volume of prostate: 20 - 25 ml
- Lobes of prostate → 5
  - Anterior lobe
  - Posterior lobe
  - Median lobe
  - 2 lateral lobes
- M/c lobe of BPH → Median lobe
- M/c lobe of CA prostate → Posterior lobe
- McNeal's Zonal Anatomy:
  - Transition zone
  - Central zone
  - Peripheral zone
  - Anterior fibromuscular stroma
- M/c site of BPH → Transition zone
- M/c site of CA prostate → Peripheral zone
- No correlation between the size of prostate and severity of symptoms
- Most patient of CA prostate is asymptomatic
- TURP
  - Gold standard treatment for BPH patients
  - Not protective for CA prostate
- IOC for screening of CA prostate → PSA (Prostate-Specific Antigen) blood tests + DRE (Digital Rectal Exam)
- Screening for CA prostate should be continued even after TURP





BENIGN PROSTATIC HYPERPLASIA

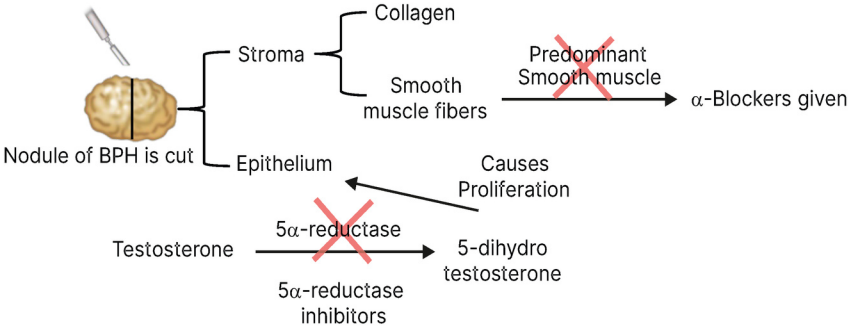
00.04.35

FMGE 2022, 2023

- Age-related → M/c age above 60 years
- Endocrine controlled
  - Under the influence of testosterone
- Multifactorial process
- M/c site → Transition zone / Median lobe

Pathophysiology

- Component of BPH tissue
  - Epithelium
  - Stroma



Epithelium

- Testosterone is converted to 5-Dihydrotestosterone by the enzyme 5α reductase
- 5 -DHT causes proliferation of epithelium
- Significance of 5α reductase inhibitors
  - Decrease conversion of Testosterone to 5-Dihydrotestosterone
  - Decreased proliferation of epithelium
  - Starts acting around 1 month
  - The maximum effect was exhibited around 6 months
  - E.g : Finasteride , Dutasteride

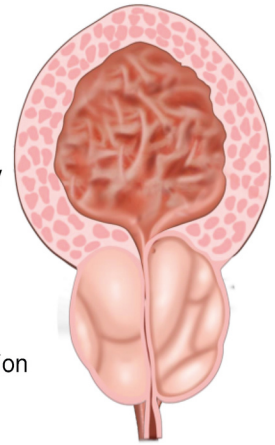
Stroma

- Collagen and smooth muscle fibres
- Significance of α Blockers
  - Relaxation of smooth muscle
  - It acts instantly
  - E.g : Prazosin , Terazosin , Doxazosin , Tamsulosin

Secondary Changes In Bladder

Nodule formation
↓
Obstructive symptoms
↓
Contraction of the bladder against resistance
↓
Changes in the bladder
↓
Collagen deposition
Detrusor muscle hyperplasia & hypertrophy
↓
Irritative symptoms

Increased force of contraction
- Collagen deposition
- Detrusor muscle hyperplasia
- Detrusor muscle hypertrophy



Nodular formation

Clinical Features

- Obstructive symptoms
  - Hesitancy
  - Intermittency
  - Poor flow/stream
  - Incomplete evacuation of the bladder
  - Dribbling of urine
  - Post residual volume
- Irritative symptoms
  - Frequency
  - Urgency
  - Nocturia

Yourwish

Differential Diagnosis

- CA prostate
  - Prostate enlarged and hard
  - Median sulcus obliteration
- BPH
  - Smooth elastic enlargement of the prostate

Investigations

FMGE 2021

- Uroflowmetry
  - Qmax > 15ml/sec → Normal
  - Qmax 10-15 ml/sec → Equivocal
  - Qmax < 10ml/sec → Suggestive of obstruction → BPH / Neurogenic bladder
    → Bladder is not contracting properly
- Cystometry
  - Voiding pressure >80cm H2O → BPH
- Diagnostic criteria for BPH
  - Qmax < 10ml/sec
  - Voiding pressure >80cm H_2O

Management

Medical Management

- Alpha blockers
  - Prazosin
  - Terazosin
  - Doxazosin
  - Alfuzosin
  - Silodosin
  - Tamsulosin (Urimax) → Most preferred drugs because it is α_{1A} blockers
- 5α reductase inhibitors
  - Finasteride
  - Dutasteride
  - Triptorelin pamoate
- Combination treatment → Alpha blockers + 5α reductase inhibitors
  - Large prostate
  - Increased PSA level

Surgical Management

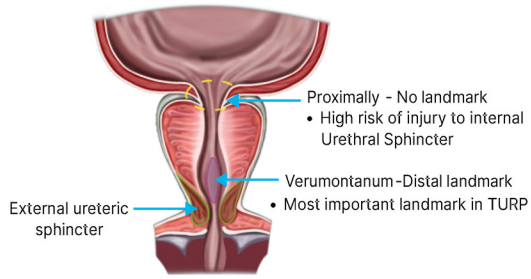
- Indications for surgical intervention
  - No improvement after medical treatment
  - Recurrent UTI
  - Hydronephrosis / Renal failure
  - Bladder stone
  - Gross hematuria
  - Refractory urinary retention
- Surgical Treatment → TURP - Gold standard

Yourwish

Yourwish

TURP

- Transurethral resection of prostate
- Techniques used for TURP
  - Nesbit Technique - preferred
  - Mauer-Meyer Technique
- Fluid used for irrigation:
  - 1.5% Glycine with monopolar cautery
  - NS with Bipolar cautery - Transurethral Resection in Saline (TURis)
- No proximal landmark → increased risk of injury to the internal urethral sphincter leads to Retrograde ejaculation
- Distal landmark present → Verumontanum → prevents injury to the external urethral sphincter
- Complications of TURP
  - Retrograde ejaculation seen in 75%
  - Impotence seen in 10%
  - Incontinence seen in <1%
  - M/c late complication → Bladder neck stenosis > urethral stricture



TUR Syndrome

- Water intoxication / Dilutational hyponatremia
- Occurs due to excessive absorption of water
- Predisposing factors
  - Duration of surgery >90min
  - Size of prostate >75grams
- Clinical features
  - Symptoms of hyponatremia
    → Dizziness and confusion
    →Visual abnormalities
  - Symptoms of fluid overload
    → Bradycardia
    → Hypertension
- Treatment
  - Furosemide - DOC
  - Fluid of choice - 3% hypertonic saline

TUIP

- Transurethral incision of prostate
- Done when the size of the prostate upto 20grams
- Collin's knife
- 2 incision at 5'O clock and 7'O clock

Open Prostatectomy

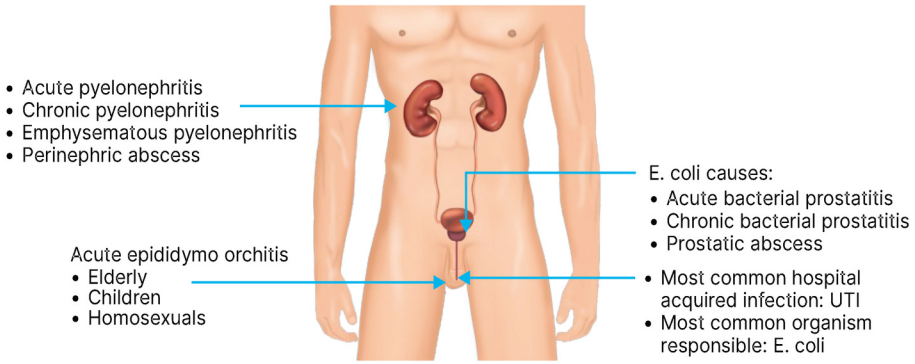
- Indications:
  - Size of prostate >75 grams
  - Bladder stone
  - Bladder diverticula

Yourwish

- Surgeries like
  - Frayer's suprapubic prostatectomy - Preferred in Bladder pathology
  - Millin's retropubic prostatectomy
  - Young's perineal prostatectomy - Obsolete

GENITOURINARY INFECTION

00.21.52

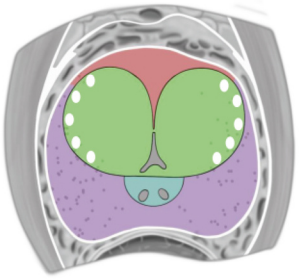


- M/c hospital-acquired infection → UTI
- M/c organism responsible → E.coli
- E.coli causes
  - Acute bacterial prostatitis
  - Chronic bacterial prostatitis
  - Prostatic abscess
  - Acute epididymo orchitis seen in the elderly, children, and homosexuals.
  - Acute pyelonephritis
  - Chronic pyelonephritis
  - Emphysematous pyelonephritis
  - Perinephric abscess

PROSTATIC CALCULI

00.23.36

- Calcified corpora amylacea
- Composed of calcium phosphate
- Occurs in clusters located in the periphery of Transition zone
- Mostly, it is asymptomatic



CARCINOMA PROSTATE

00.24.31

NEET PG 2020

- M/c Histological type - Adenocarcinoma
- Seen among High socioeconomic status
- Common in the 7th and 8th decades of life
- M/c site - Peripheral zone / Posterior lobe

Risk Factors

- Advancing age
- High-fat diet in high socioeconomic status

Important Information

- M/c Carcinoma in the 7th and 8th decades of life
  - CA prostate
  - Anaplastic carcinoma thyroid
  - Angiosarcoma

Clinical Features

- In the initial stages, it is asymptomatic
- If the appearance of symptoms is noted, it may be advanced disease/metastasis
- M/c site of metastasis → Bone (Lumbar) →Osteoblastic/Sclerotic
- M/c involved lymph node - Pelvic (Obturator)

Route Of Spread

Prostatic venous plexus
↓
Internal iliac vein
↓
Vertebral venous plexus (Batson plexus)
↓
Lumbar venous plexus

One Liners

- M/c malignancy responsible for osteoblastic secondaries in males → CA prostate
- M/c malignancy responsible for osteolytic secondaries in males → RCC (pulsatile metastasis)
  - Pulsatile metastasis is also seen in Follicular carcinoma of thyroid
- M/c malignancy responsible for osteoblastic and osteolytic secondaries in Female → CA Breast (osteolytic >osteoblastic)
- M/c site of visceral metastasis in CA prostate → Lung

Important Information

- CA having metastasis to lungs
  - CA prostate
  - RCC
  - CA penis
  - Testicular tumor like choriocarcinoma
- Ca having metastasis to liver
  - Urinary bladder

Investigations

- Digital rectal examination
  - The prostate is enlarged and hard
  - Median sulcus obliteration
- IOC for diagnosis - Trans rectal ultrasound (TRUS) guided biopsy
- IOC for staging - Endorectal coil MRI
- Tumor markers
  - Prostate specific antigen(PSA)
    → Prostate specific
    → Normal <4ng/ml
    → Diagnostic of Ca prostate >20ng/ml
  - Prostatic acid phosphatase
  - Alkaline phosphatase

Yourwish

- Alpha methyl CoA racemase
- Hepsin
- DD-3

- PSA velocity
  - Rate of change of PSA
  - Diagnostic for Ca prostate >0.75ng/ml/year

Management

Stage	Management
T1a	• Observation and follow-up (DRE +PSA)
T1b , T1c , T2	• <70 years - Observation and follow-up
	• >70 years -Radical prostatectomy > Radiotherapy • Preferred radiotherapy is Brachytherapy

T3,T4	• Androgen ablation > Radiotherapy
	  ○ Surgical - B/L orchidectomy + Flutamide
	  ○ Medical - LHRH agonist (Goserelin, Leuperolide) + Flutamide
	  ○ Recently FDA approved for advanced and metastatic CA prostate - Goserelin
	  ○ New drugs for castration resistant CA prostate - Cabazitaxel, Sipuleucel -T (vaccine)

Important Information

- Gradings and staging in urology
- Robson staging → RCC
- Jackson staging → CA penis
- Gleason grading → CA prostate

PYQ

00.35.44

Q.What is the likely diagnosis for a 60-year-old male who is experiencing low back pain and has sclerotic lesions in the vertebra?
a.Carcinoma prostate
b.Tuberculosis
c.Renal cell carcinoma
d.Carcinoma colon

Ans. **a**.Carcinoma prostate

Q.What is the initial management approach for urinary symptoms in a patient with BPH?
a.TURP(Transurethral resection of prostate)
b.Tamsulosin
c.Finasteride
d.Observation
Ans. **b**.Tamsulosin

Yourwish

Yourwish

17. URETHRA AND PENIS

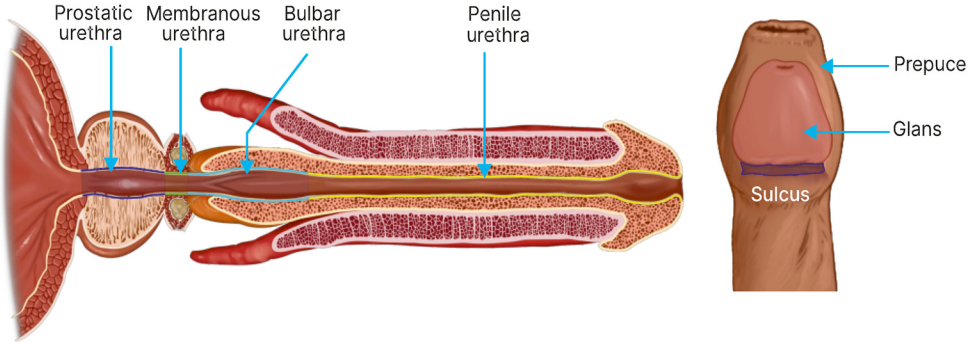
ANATOMY

00:00:20

- Male urethras- 20 cm
- Female urethra- 4 cm

NEETPG 2022
FMGE June 2021

Parts Of Urethra



Posterior Urethra

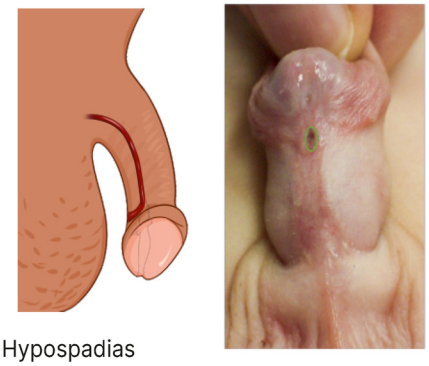
- Prostatic urethra: Widest, most dilatable
- Membranous urethra: Shortest, narrowest, least dilatable

Anterior Urethra

- Bulbar urethra
- Penile urethra: Longest part of the urethra
- Urethral meatus: Narrowest apart

HYPOSPADIAS

00:03:10



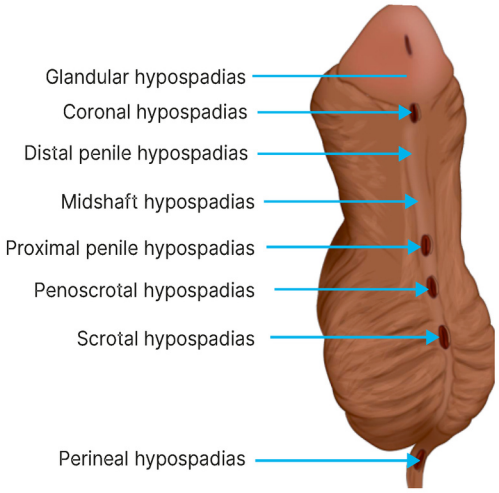
Hypospadias

- MC congenital abnormality of the urethra
- Incidence: 1 in 250 live births
- D/t failure of the fusion of the urethral fold
- Anterior part of the urethra closes at the end in the ned
- MC type is the anterior type of hypospadias, as the anterior part of the urethra closes at the end

Yourwish

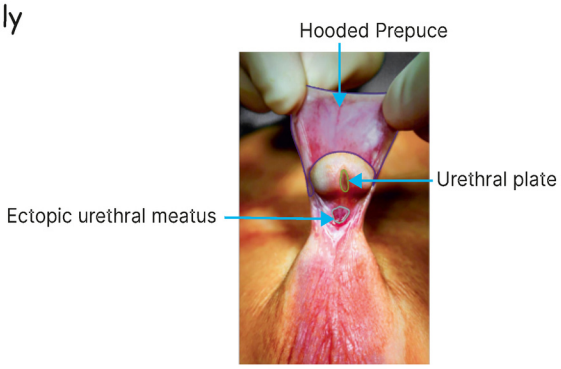
Types Of Hypospadias

- Glandular hypospadias→ Most common (70%)



Assosciations

- The meatus opens on the dorsal aspect, and the other part of the urethra undergoes deep fibrosis, because of which the prepuce does not close ventrally
- Glans penis flatten
- Ectopic meatus is present
- Meatal stenosis
- Hooded prepuce- Dorsally
- Ventral chordae
- Microphallus: Short length of the penis



Clinical Features

- Anterior hypospadias
  - Abnormal stream of urine
- Posterior type hypospadias
  - Painful erection, unable to penetrate Vagina
  - Semen deposited outside the vagina
  - Impotency
  - Infertility

Treatment

- Best age of repair is before 18 months
- MAPGI- Meatal advancement glanulopalasty integration

Steps Of Hyspospaiasis Repair

INICET Nov 2022

Mnemonic: Do UR Meatoplasty with GPS

- Degloving
- Orthroplasty→ Straightening Of Penis
- Urethroplasty
- Meatoplasty
- Glanuloplasty/Balanoplasty
- Penoplasty
- Scrotoplasty

Other Procedures

- Dennis-brown
- Thiersch-duplay
- Bracka's
- Mathieu's
- Asopa and duckett (indian)

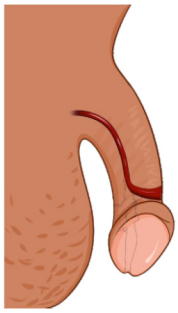
Complications

- MC complications after hypospadias repair: Urethral fistula in 10% of patients
- Prepuce is used for urethral reconstruction
- Circumcision in contraindicated

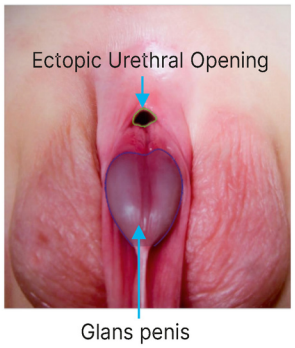
EPISPADIAS

00:12:25

- The urethral opening is over the dorsal aspect
- Females: Fissure in the anterior wall of the urethra
- Associated with
  - **D**- Dorsal chordee
  - **E**- Ectopia vesicae
  - **V**- Vesicoureteral reflux



Epispadias



Glans penis

Clinical features

Females

- Maldevelopment of the urinary sphincter- Incontinence
- Bifid clitoris
- Widely separated labia

Males

- Undescended testis
- Shallow scrotum

Treatment

- **I**ncontinence correction
- **C**hordae removal
- **E**xtension of the urethral opening till the glans penis

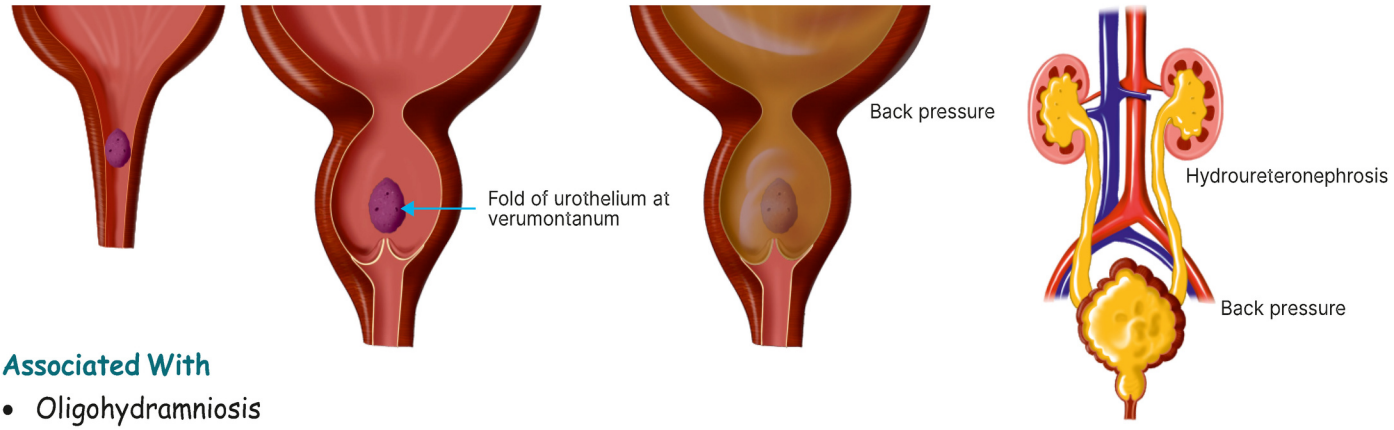
POSTERIOR URETHRAL VALVE

00:15:45

FMGE Jan 2025
INICET Nov 2021

- Valve is unidirectional at the end of the bladder
- Symmetric folds of urothelium
- Extent- Prostatic urethra to the external urinary sphincter
- Male urethra
  - MC type: Type 1 just distal or at verumontanum
  - Exclusive anomaly of the male urethra
  - Vesiocoureteric reflux present
  - Back pressure causes B/L hydroureteronephrosis

Yourwish



Associated With

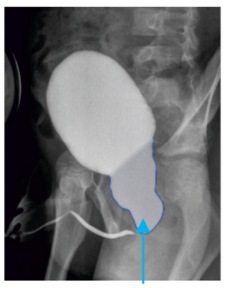
- Oligohydramniosis
- Pulmonary hypoplasia→ MC cause of death
- Renal parenchymal dysplasia
- Bladder dysfunction

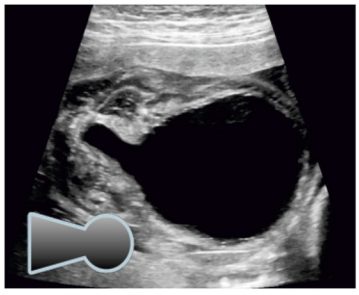
Clinical Features

- Most patients are symptomatic
- MC parenstation is B/L palpable abdominal mass
- Distended bladder
- Urinary Ascites

Investigations

- IOC diagnosis- Micturating cystourethrogram
- MCU is the IOC for
  - Posterior urethral valve
  - Posterior urethral stricture
  - VUR
- In prenatal USG at 28 weeks
  - Keyhole sign


Dilated prostatic urethra


Keyhole sign

Management

- Relieve the obstruction
- Infant feeding tube insertion
- After tube insertion
  - If creatinine is normal- Endoscopic fulguration of valves
  - If creatinine is raised- Suprapubic cystostomy

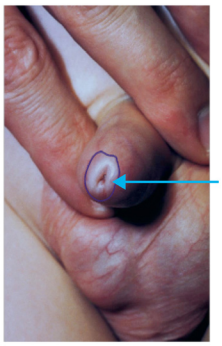
PHIMOSIS

00:22:29

NEET PG 2025

- The prepuce cannot be retracted over the glans penis
- MC cause- Chronic infection due to poor hygiene


Phimosis



Balanitis Xerotica Obliterans

Yourwish

Yourwish

Other Causes

- Congenital
- Acquired
  - Traumas
  - Carcinoma penis
  - Balantis xerotica obliterans



Ballooning of prepuce

Clinical Features

- Difficulty in passing urine
- Ballooning of the prepuce
- Difficulty in intercourse

Complications

- Balanoposthitis
- Preputial stone
- Increased risk of carcinoma of the penis

Treatment

- Children
  - Conservative management
  - Steroidal cream application x 4-6 weeks
- Circumcision
  - Indications
    - → No improvement
    - → Recurrent infections
    - → Age 16-18 years

PARAPHIMOSIS

00:26:22

- Formation of the ring of the prepuce
- The prepuce, once retracted, cannot be brought back
- Acquired condition
- Urine flow is normal, not obstructed



Treatment

- Ice bag application
- Manual compression
- Hyaluronidase injection
- For a non-responding pt's
  - Go for a dorsal slit→ Circumcision

URETHRAL INJURIES

00:28:03

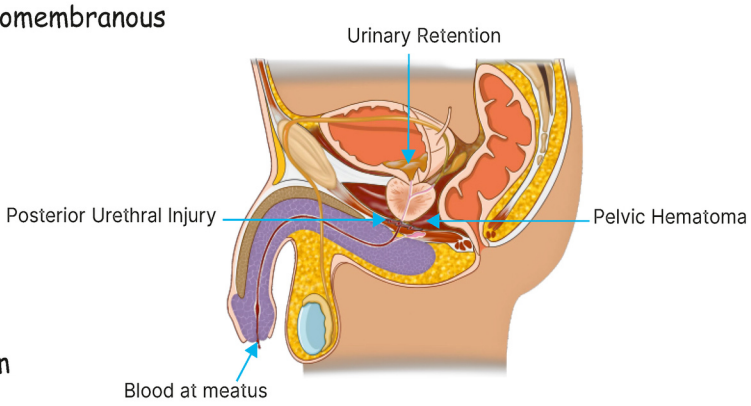
NEET PG 2022

- Posterior urethral injuries are more common- Membranous
- Anterior urethral injuries- Bulbar

Yourwish

Posterior Urethral Injuries

- Caused by road traffic accident → Pelvic fracture
- MC site- Membranous: Bulbomembranous > Prostatomembranous



Clinical Features

- Urinary retention
- Blood at the meatus
- Pelvic hematoma

Investigations

- Single investigation done- Retrograde urethrogram
- **IVP**
  - High-lying prostate
  - Pie in the sky appearance
- Usually, investigations are not required always



Pie in sky appearance

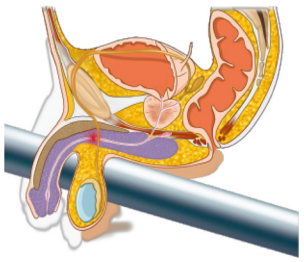
NEETPG Aug 2024

Treatment

- Gold standard- Suprapubic cystostomy
- Delayed repair

Anterior Urethral Injury

- MC site- Bulbar urethra



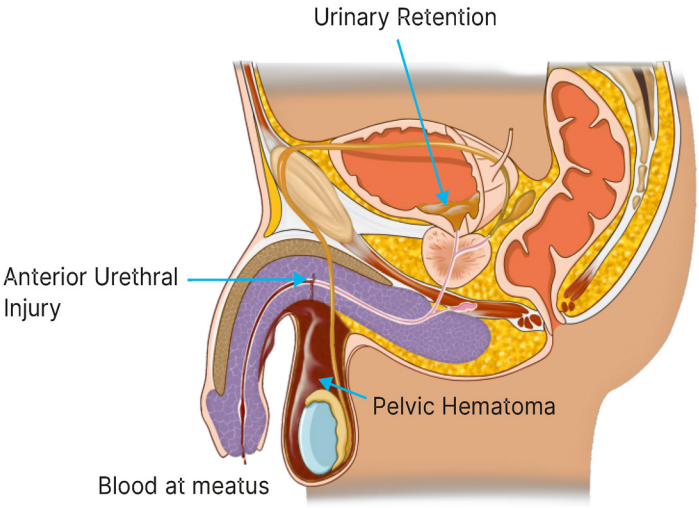
Straddle injury

Causes

- External blow/kick
- Straddle injury/manhole injury

Clinical Features

- Urinary retention
- Blood at the meatus
- Perineal hematoma





Butterfly- shaped Hematoma

Treatment

- Gold standard treatment- Suprapubic followed by delayed repair
- Antibiotics→ Extensive urinary extravasation

Important Information

- Road traffic accident
  - Extraperitoneal bladder rupture- Heamturia
  - Posterior urethral injury- Blood at meatus
- Blood at meatus
  - RTA- Posterior urethral injury
  - Perineal injury- Anterior urethral injury

URETHRAL STRICTURE

00:38:05

FMGE June 2022

- MC cause: Trauma

Investigations

- IOC for diagnosis of posterior urethral stricture→ Micturating cystourethrogram
- IOC for diagnosis of anterior urethral stricture → RGU

Management

- Dilation of stricture
- Optical internal urethrotomy for short bulbar stricture at 12 o' clock position
- Length of stricture up to 2 cm- Excision and end-to-end repair
- Length of stricture >2 cm- Excision with reconstruction and tissue transfer
- MC donor site: Buccal mucosa >> Bladder mucosa > Penile skin

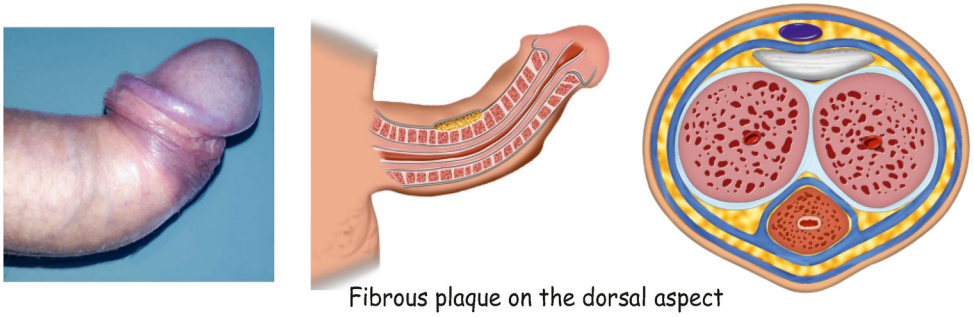
PEYRONIE'S DISEASE

00:41:50

FMGE 2020

NEET PG 2023, 2024

- Penile fibromatosis
- Chronic vasculitis
- Fibrous plaques- Dorsolateral aspect



Fibrous plaque on the dorsal aspect

Clinical Features

- Painful erection
- Poor erection
- Upward curvature
- Impotence and infertility
- Dorsolateral plaque

Yourwish

Treatment

- Observation + emotional support
- Nesbit operation
  - Non-absorbable sutures on the opposite side of the plaque

CARCINOMA PENIS

00:44:10

FMGE 2024, 2025
NEETPG 2025

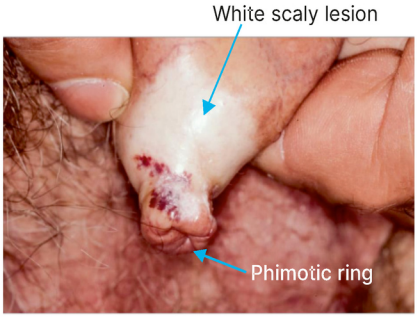
- MC histological type: Squamous cell carcinoma
- More common in low socioeconomic status
- Seen in the 6th decade
- Associated with
  - Phimosis- Neonatal circumcision is protective
  - HPV

Premalignant Lesions In Ca Patient

- Buschke-lowenstein tumor/Verucous carcinoma
  - Locally malignant
- Surrounding tissues are destroyed by compression, not by invasion
- Balanitis xerotic obliterans
- Cutaneous horns
- Genital warts
- Leukoplakia



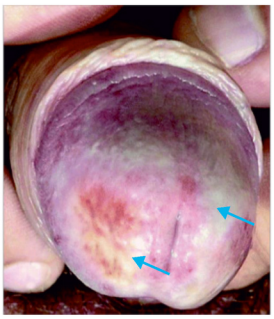
Buschke-Lowenstein Tumor



Balanitis Xerotica Obliterans



Cutaneous Horn



Leukoplakia

Carcinoma In Situ



Bowen's Disease



Bowen's Disease



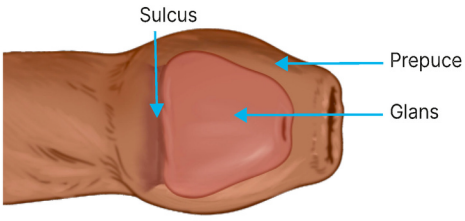
Erythroplasia of Queryat

- Penis involved
- Called as Bowen's disease
- Glans penis: Erythroplasia of Queyrat

Yourwish

Yourwish

- MC site of carcinoma penis: Glans > Prepuce > Sulcus
- Since malignancy is accessible to→ Biopsy



Clinical Features

- MC presentation: Lesion itself
- Foul-smelling discharge
- Minimal and low pain
- Inguinal lymphadenopathy in 50% cases
  - Sepsis in half cases
  - Metastasis in half cases
  - Give prophylactic antibiotic for 4-6 weeks
- MC cause of death- Bleeding > Sepsis
  - Bleeding due to erosion of the femoral vessels caused by the enlarged inguinal LN
- Earliest MC symptoms of metastasis in CA penis: Priapism
- MC site of metastasis is the lungs

Diagnosis

- IOC for diagnosis- Biopsy
- IOC staging- MRI
- Sentinel lymph node biopsy
  - 1st time done by Gabana, AKA Gabana procedutre

Sentinel Lymph Node Biopsy

- CA breast
- Malignant melanoma
- CA penis
- CA vulva
- Head and neck malignancy

Treatment

FMGE 2020, 2022, 2024, 2025
NEET PG 2020
INICET 2024

- CA penis involving the prepuce- Circumcision
- CA penis involving the distal part- Partial penectomy with a 2 cm margin
- CA penis involving the proximal part- Total penectomy + perineal urethrostomy
- Chemotherapy agents in the CA penis
  - Bleomycin
  - Cisplatin

PYQs

00:54:34

Q. A newborn male presents with urinary retention, lethargy, and a distended bladder. Antenatal ultrasound showed a "keyhole sign" with a thickened bladder wall. Which of the following is the most likely diagnosis?

FMGE Jan 2025

a. Hypospadias
b. Vesicoureteral reflux
c. Posterior urethral valve
d. Neurogenic bladder

Ans: c. Posterior urethral valve

Yourwish

INICET Nov 2022

Q. Which is the correct sequence for the correction of hypospadias?

1. Urethroplasty
2. Penile degloving
3. Orthoplasty
4. Glanuloplasty

a. 1,3,2,4
b. 2,3,1,4
c. 3,1,4,2
d. 13.42

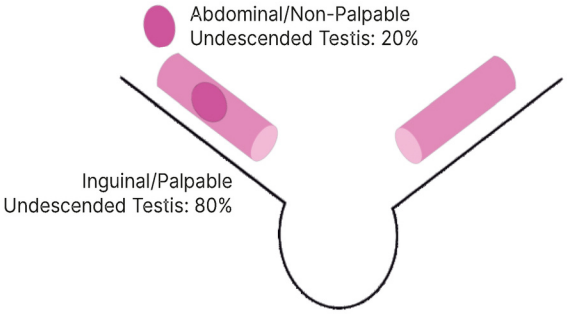
Ans: b. 2,3,1,4

15. TESTIS AND SCROTUM

UNDESCENDED TESTIS

00:00:19

- Incidence
  - 3% at birth
  - 1% at 1 year of age
- Spontaneous descent occurs in 70-77% of cases by 3 months of age
- MC location: Inguinal > abdominal
  - In the abdomen, it's non-palpable- 20%
  - Inguinal → palpable → 80%
- Increased risk with prematurity and low birth weight
- Complete absence of spermatogenesis by 5-6 years of age
- Earliest postnatal histological abnormality - Hypoplasia of Leydig cells

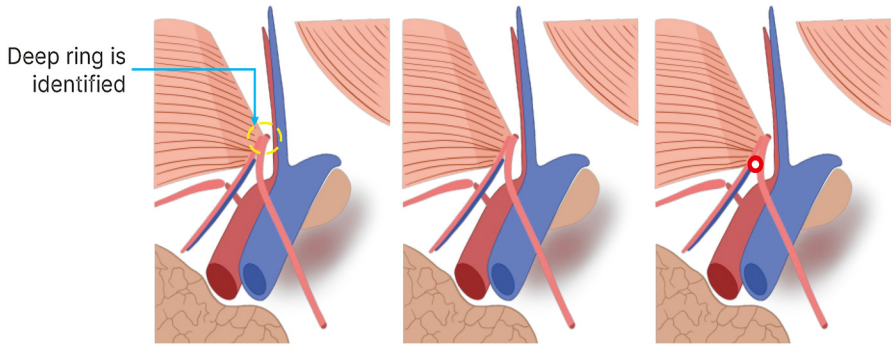


Complications

- Sterility
- Atrophy
- Trauma, tumor, torsion
  - MC tumor - Seminoma
- Maximum risk of tumor- Abdominal testis
- Hernia
- Inflammation

Diagnosis

- IOC for UDT: Inguinal exploration
- IOC for non-palpable UDT: Explore the abdominal cavity with diagnostic laparoscopy
- Identify the deep ring and trace backwards the vas deferens and testicular artery
  - In case both blind - Testicular agenesis
  - Vas is blind- Testis may or may not be present



- Best age for orchidopexy- 6 months
- Should not be delayed by 12months

Yourwish

Named Orchidoplexy

- Ombridanne's
- Keetley-Torek
- Stephen-Fowlers
- Ladd & Gross
- Placing the testis in the Dartos pouch
- Microvascular testicular auto-transplantation → Best results

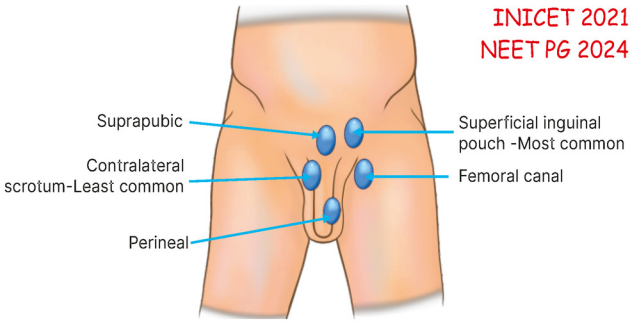
ECTOPIC TESTIS

00:07:16

INICET 2021

NEET PG 2024

- Normally developed testis with abnormal location
- Due to the abnormality of the gubernaculum
  - MC location - Superficial inguinal pouch
  - Least common- C/L scrotum



Treatment

- Orchiopexy
  - Best age - 6months
  - Should not be delayed by 2months

RETRACTILE TESTIS

00:08:55

INICET 2023

- Normally developed testis
- Completed process of normal descent moves back and forth between the scrotum and groin
- Causes
  - Overactive cremasteric reflex
  - Increased tone of the cremasteric muscle
- Treatment
  - Not required

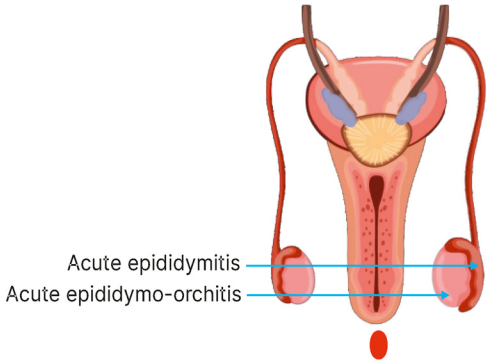
ACUTE EPIDIDYMO ORCHITIS

00:10:02

FMGE 2019

NEET PG 2020

- Caused by an ascending bacterial infection
- MC organism responsible for acute EDO
  - Chlamydia in sexually active males under 35 years
  - E.coli in children, the elderly, & homosexuals



Clinical Features

- Fever
- Pain
- Burning micturition

On Examination

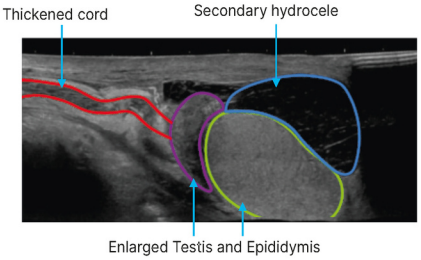
- Prehn's sign: +ve
- Cremastric reflex: Present
- Thickened cord

Yourwish

Yourwish

Dianosis

- IOC for diagnosis of acute EDO - USG
- Testis and epididymis are enlarged
- Cord is thickened
- Secondary hydrocele
  - MC cause - acute epididymo-orchitis



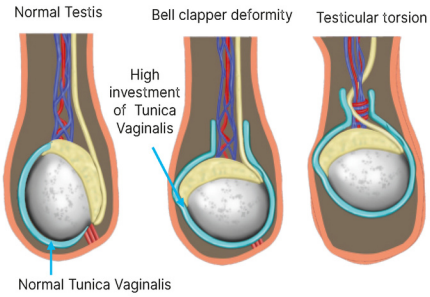
Treatment

- Antibiotics
- NSAIDs
- Scrotal support

TESTICULAR TORSION

00:13:20

- A high investment of the tunica vaginalis- Bell clapper deformity
- Inside the tunica vaginalis, there is torsion or rotation - Intravaginal
- Outside tunica vaginalis, rotate as a single unit - Extravesicular testicular torsion



Intravaginal Testicular Torsion

- 10-25 years prepubertal males

Spiral attachment of cremastric fibers over the cord
↓
Brisk cremastric reflex
↓
Testicular torsion

Predisposing Factors

- Bell clappers deformity
- Inversion of the testis
- Separation of the testis from the body of the epididymis

Clinical Features

- Severe agonizing pain
- Nausea and vomiting

Examination Findings

FMGE 2019, 2022, 2023
NEET PG 2023

- Prehn's sign: Negative
- Cremastric reflex- Absent
- High-riding testis in the upper part of the scrotum- Seming sign
- C/L testis is ling transversally- Angel sign

Factors Determining The Damage To The Testis

- Extent of twist and duration of episode
- Twists of 720° more rapid ischemia than twists of 360° or less
- **Testicukar Salvage Rate**
  - If the testis can be untwisted within 6 hours from the onset of pain, salvage rae is 100%
  - Surgery delayed for 24 hours- Salvage rate is 20%

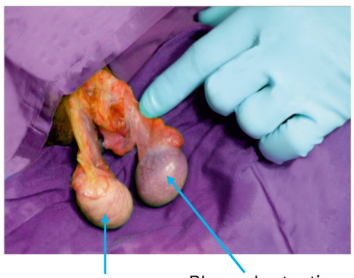
Yourwish

Diagnosis

- IOC for the diagnosis - Doppler

Treatment

- Typical window period for surgical intervention and testicular salvage: 6 hrs
  - Orchidopexy
- C/L hemiscrotum shows 'Bell clapper deformity' - B/L orchidopexy
- Ischemic testis – Orchidectomy

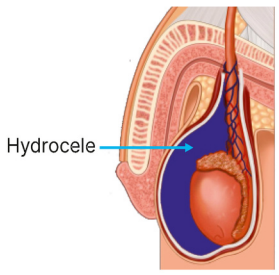


HYDROCELE

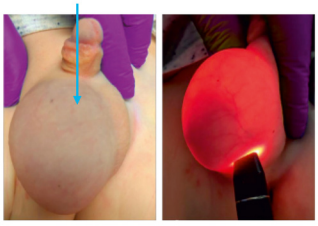
00:19:51

NEET PG 2020
INICET 2023

- Collection of fluid between the layers of the tunica vaginalis- Vaginal hydrocele



Positive transillumination test



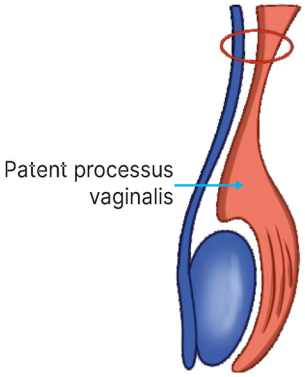
Vaginal Hydrocele

PRIMARY HYDROCELE	SECONDARY HYDROCELE

• More common
• Large
• Tense
• Testis: not felt
• Transillumination test positive
	• Less common
	• Causes
	  ○ Acute EDO →mc
	  ○ Trauma
	  ○ Testicular tumor
	• Small and lax
	• Testis can be felt separately
	• Diagnosis: USG

Congenital Hydrocele

- Patent processus vaginalis
  - Supine- No swelling
  - Upright- Swelling appears
- Occurs due to the patent processus aginalis
- Spontaneous obliteration- 2 years
- T/t: Herniotomy



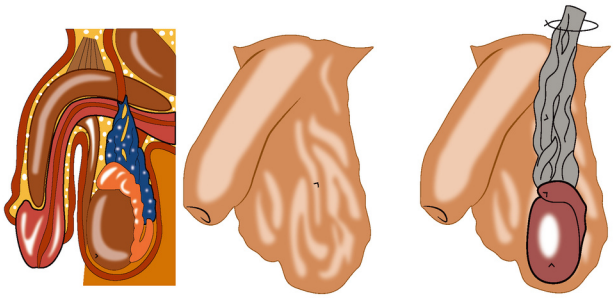
Treatment Of Hydrocele

- Small- Lord's plication of sac
- Medium-sized- Jaboulay's eversion of the sac
- Large hydrocele- Excision of sac

VARICOCELE

00:24:23

- Dilated tortuous pampiniform plexus of veins
- Location: Posterior and above the testis
- MC cause of reversible atrophy of the testis
- More common on the left side



Clinical Features

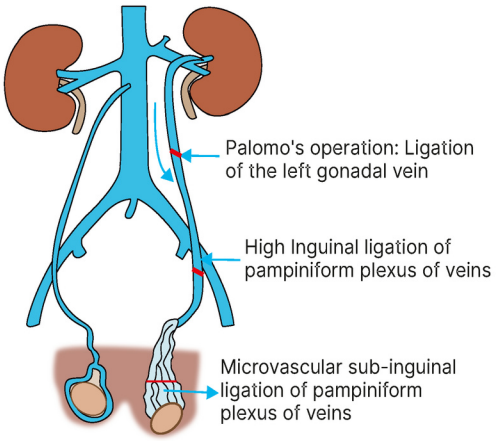
- Discomfort
- Painless compressible swelling
- Palpation: Bag of worm-like feel
- Temperature around the testis increases- Spermatogenesis is affected
- Most severely affected parameter in semen analysis
  - Sperm count
  - Motility

Diagnosis

- IOC - Doppler
- Gold standard- Venography

Treatment

- Alternative venous drainage
  - Ligate the pampiniform plexus of veins
  - Ligate it close to the deep ring
  - Palomo's operation: Ligation of the left gonadal vein
  - Microvascular sub-inguinal ligation of pampiniform plexus of veins → Best results
- First-line intervention
  - In case of significant discomfort- Percutaneous embolization of the gonadal veins
- Second line intervention - Surgical ligation of testicular veins
- Most effective method- Microsurgical varicocelectomy
  - Lesser complication
  - Lower recurrence rate



FOURNIER'S GANGRENE

00:29:00

- AKA Idiopathic scrotal gangrene
- Type of necrotizing fasciitis
- Abrupt onset
- Polymicrobial infection
  - Aerobes
  - Anaerobes



Yourwish

STRUCTURES INVOLVED ARE	STRUCTURES SPARED ARE
• Skin • Superficial fascia • Deep fascia	• Corpora cavernosa • Corpora spongiosa • Urethra • Testis • Cord structures

Predisposing Factors

- DM
- Immunosuppression
- Paraphimosis
- Local trauma
- Anal infections

Clinical Features

- Purplish discoloration
- Dish water like discharge
- Fetid odour
- Pain, high-grade fever, marked systemic toxicity → Septic shock

Management

- IV fluid + IV antibiotics
- Extensive surgical debridement
- Mortality rate: 7-75%
- Surgical debridement + skin grafting



Surgical debridement of the gangrene



Skin grafting



Post-OP results

TESTICULAR TUMOURS

00:33:25

Risk Factors

- Cryptorchidism/undescended testis
- Testicular feminising syndrome
- Klinefelter syndrome
- H/o testicular tumor in sibling
- Personal h/o testicular tumor
- In utero exposure of DES

One Liners

- MC testicular tumor: Seminoma/mixed
- MC primary bilateral testicular tumor: Seminoma
- Most radiosensitive testicular tumor: Seminoma
- MC testicular tumor in children (1-3 years): Yolk sac tumor
- Testicular tumor with the best prognosis: Yolk sac tumor
- MC testicular tumor in pre-pubertal children (11-13 years): Teratoma

Yourwish

Yourwish

- Testicular tumor with early hematogenous spread/ early pulmonary metastasis/ worst prognosis: Choriocarcinoma
- MC testicular tumor in the elderly: Lymphoma
- MC secondary testicular tumor: Lymphoma
- MC bilateral testicular tumor: Lymphoma
- DLBCL is the most common type of lymphoma in
  - Primary CNS lymphoma
  - Small intestine lymphoma
  - Orbital lymphoma
  - Appendicular lymphoma
  - Thyroid lymphoma
  - Colonic lymphoma
  - Breast lymphoma
  - Rectal lymphoma
  - Gastric lymphoma
  - Testicular lymphoma
- MC testicular tumor- Seminoma
  - 3^{rd}-4^{th} decade

Clinical Features

- Painless mass
- Testis enlarged and hard
- Secondary hydrocele → 10%
- Gynecomastia → 5%, stromal origin mostly

Route Of Spread

- MC route of spread- Lymphatics
- Choriocarcinoma- Hematogenous spread

On Examination

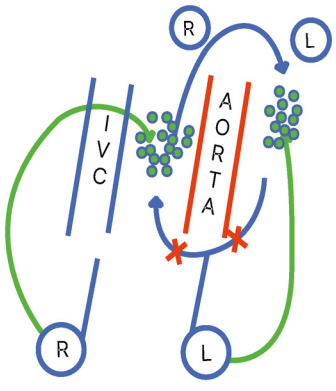
- Affected testis -
  - Enlarged
  - Hard
  - Mass is also felt

Diagnosis

- FNAC/trans-scrotal biopsy- Contraindicated
- First investigation done: USG
  - Findings are
    → Affected testis enlarged
    → Hypoechoic mass
    → Secondary hydrocele

Treatment

- High inguinal orchidectomy
- IOC for retroperitoneal lymphadenopathy- CECT
- MC group of LN involved in testicular tumor- Paraaortic



Yourwish

Tumor Markers

- Alpha fetoprotein
  - Yolk sac tumor
  - Embryonal carcinoma
  - Teratoma
- Beta-hCG
  - Choriocarcinoma
  - Embryonal carcinoma
  - Seminoma

Markers Based On The Bulk Of Disease

- LDH
- Placental alkaline phosphatase
- Gamma-glutamyl transpeptidase

Tnm-s Staging Classification

- S- Serum markers
  - LDH -LDH
  - A- AFP
  - B- Beta hCG

Management

	SEMINOMA	NON SEMINOMA GERM CELL TUMOR
IA, IB	Radiotherapy	Retroperitoneal lymph node destruction
IIA, IIB	Radiotherapy	Retroperitoneal lymph node destruction
IIC, III, Is	Chemotherapy- 6 cycles Bleomysin Etoposide Cisplatin	Chemotherapy + Retroperitoneal lymph node destruction

CARCINOMA SCROTUM

00:45:27

- Chimney sweeps cancer
- MC histological type: Squamous cell carcinoma

Risk Factors

- Tar
- Soot
- Hydrocarbon

Clinical Features

- Ulcer with everted edges and an indurated base
- MC involved LN: Inguinal

Investigations

- IOC for diagnosis- Biopsy

Treatment

- Wide local excision with a 2 cm margin

Most Common Group Of Lymph Node Involved

- CA Penis: Inguinal LN
- CA Scrotum: Inguinal LN
- CA Bladder: Pelvic obturator LN
- CA Prostate: Pelvic obturator LN
- Primary landing site from right testicular tumor: Interaortocaval
- Primary landing site from left testicular tumor: Paraaortic

Composition Of Stone In Various Organs

- MC gallstone: Cholesterol/mixed
- MC pancreatic stone: Calcium carbonate
- MC salivary gland stone: Calcium carbonate
- MC renal stone: Calcium oxalate
- MC radiolucent renal stone: Uric acid
- MC primary bladder stone: Ammonium urate
- MC secondary bladder stone: Uric acid > Struvite
- MC prostatic stone: Calcium phosphate

PYQs

00:48:48

Q. A diabetic patient presents with a sudden onset of perineal pain. On examination, foul-smelling discharge and necrotic tissue as seen in the image are noted. Which of the following is true about the given condition?

a. Anti-gas gangrene serum is indicated for all cases
b. Urinary diversion is the next step
c. Bilateral orchidectomy is the next step
d. Mixed aerobic and anaerobic infection



Ans: d. Mixed aerobic and anaerobic infection

FMGE June 2021

Q. A 33-year-old man was referred to the surgery OPD from the infertility clinic. On inspection, the scrotum appeared as in the image. On palpation, a bag-of-worm sensation was felt. What is the most likely diagnosis?

a. Hydrocele
b. Varicocele
c. Testicular torsion
d. Epididymoorchitis



Ans: b. Varicocele

Yourwish

Q. What is the most likely diagnosis for a patient who has a scrotal mass on the left side that is hard in texture, has uneven edges, does not decrease in size when lying down or manipulated, doesn ot has a cough impulse, but shows enlargement in the para-aortic lymph nodes?

a. Hydrocele
b. Direct inguinal hernia
c. Indirect inguinal hernia
d. Metastatic testicular tumour

Ans: d. Metastatic testicular tumour

Q. A 10-month-old male baby presented with an empty scrotum. Ultrasonography revealed that the right testis was found in the right inguinal canal, while the left testis was found in the perineum. Comment on the diagnosis of this baby.

a. Bilateral undescended testis
b. Bilateral ectopic testis
c. Right-sided undescended testis and left-sided ectopic testis
d. Right-sided ectopic testis and left-sided undescended testis

Ans: c. Right-sided undescended testis and left-sided ectopic testis

Q. A 12-year-old child presented with a sudden onset of severe scrotal pain after a history of trauma 6 hours before. UGS Doppler was done, followed by immediate surgical exploration, and the following findings were seen. What is the probable diagnosis?

a. Testicular hematoma
b. Testicular torsion with gangrene
c. Strangulated inguinal hernia
d. Torsion of testicular appendages with gangrene



Ans: b. Testicular torsion with gangrene

Q. An adult male presents to the outpatient department with a painful scrotal swelling accompanied by fever. The swelling is associated with the tunica vaginalis and is characterized by fluid accumulation. What is the likely diagnosis?

FMGE June 2024

a. Varicocele
b. Hydrocele
c. Cystocele
d. Torsion testis

Ans: b. Hydrocele

Yourwish

2. ARTERIAL DISORDERS

PERIPHERAL ARTERIAL OCCLUSION

00:00:26

- Characterized by the 5P's
  - Pain- MC
  - Pallor
  - Paresthesoa
  - Paralysis- Worst prognosis
  - Pulslessness- Late sign
- MC cause of Peripheral arterial occlusion, subclavian artery stenosis, degenerative disorder of vessels, & abdominal aortic aneurysm: Atherosclerosis

FMGE 2021, 2023

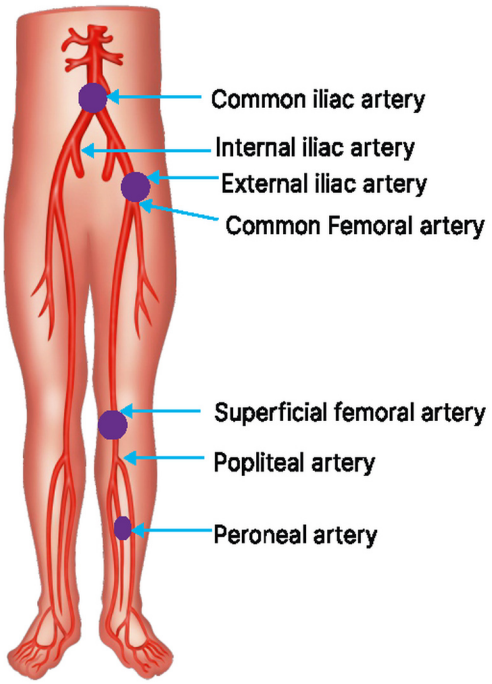
ATHEROSCLEROSIS	BUERGER'S DISEASE

• More common
• 6^{th} -7^{th} decade
• Involves large vessels (ALL INDIA POLICE FORCE)
  ○ Aorta
  ○ Iliac artery
  ○ Femoral artery
  ○ Popliteal artery
• Mainly seen in the lower limb
	• Exclusively seen in
	  ○ Young (age <40 years)
	  ○ Males
	  ○ Smokers
	• Involves small & medium sized vessels
	  ○ Tibial artery
	  ○ Plantar artery
	  ○ Radial artery
	• Mainly seen in the lower limb > upper limb

SITE OF DISEASE	MANIFESTATIONS

AORTOILIAC OBSTRUCTION	• Claudication: buttocks, thigh & calves
	• Femoral & distal pulses not palpable
	• LERICHE SYNDROME
	  ○ Erectile dysfunction
	  ○ Internal claudication
	  ○ Absent femoral pulses

ILIAC OBSTRUCTION	• Claudication: Thigh & Calf • Femoral and distal pulses: Non palpable
FEMOROPOPLITEAL OBSTRUCTION	• Claudication: Calf • Femoral pulses: Palpable • Distal pulses: Absent
DISTAL OBSTRUCTION	• Claudication: Calf & Foot • Femoral and popliteal pulses: Palpable • Ankle pulses: Absent



Yourwish

BUERGER'S DISEASE

00:08:47

- AKA, TAO (Thrombangitis obliterans): Thrombosis causing inflammation and obstruction
- Segmental inflammatory disease
  - Shows skip lesions
  - Small and medium-sized vessels are involved
  - Progresses from distal to proximal direction
- Seen in tibial, plantar, and radial
- Seen in a young male smoker, age <40 years
- It involves the artery, vein, and nerve ultimately

Clinical Features

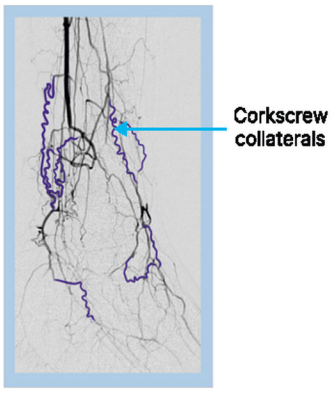
- Triad
  - **R**aynaud's phenomenon
  - **I**ntermittent claudication
  - **M**igratory superficial thrombophlebitis

Boyd's Classification

- Grading of intermittent claudication
  - Grade 1: Pain appears at the start of the walk, disappears if the patient continues to walk
  - Grade 2: Patient can walk with pain
  - Grade 3: Pain makes the patient to take rest
  - Grade 4: Rest pain
- Rest pain
  - D/t cutaneous ischemia
  - Disease progresses from the distal to the proximal direction, including the gangrene progression

Diagnosis

- IOC- Duplex scan
- Gold standard- DSA (Digital Subtraction Angiography)
- Collateral in
  - Buerger disease → Cork screw collaterals
  - Budd-Chiari syndrome → Spider web collaterals on venography



Ankle Brachial Pressure Index

- Systolic BP at ankle/arm

ABPI	INTERPETATION
>1.4	Calcified vessel due to DM and end-stage renal disease
1.0 - 1.4	Normal
0.91 - 0.99	Borderline
0.5 - 0.8	Intermittent claudication
0.1 - 0.4	Critical limb ischemia/chronic threatened limb ischemia

Treatment



- Abstinence from smoking
- Vasodilators
  - Xanthinol nicotinate
  - Pentoxifylene
- Lumbar sympathectomy- effective for patients with rest pain
- Mental transposition- Around the arteries is not effective
- Amputation for gangrene
- Smoker with gangrene
  - 6^{th} to 7^{th} decade- Atherosclerosis
  - Sound 40 years of age- Burger's disease

Lumbar Sympathectomy

- Indication: Rest pain
- Ganglia removed: L1-L4
- B/L lumbar sympathectomy
  - At least the L1 ganglia is preserved on one side to prevent retrograde ejaculation
- Structures mistaken for lumbar sympathetic ganglia, which are accidentally removed **(Mnemonic: Gujarat Premier League)**
  - **G**- Genitofemoral nerve
  - **P**- Psoas sheath /psoad minor
  - **L**- Lymphatics

Indications

Mnemonic: (BARA CHEF)

- **B**uerger's disease
- **A**therosclerosis
- **R**aynaud disease
- **A**crocyanosis
- **C**ausalgia
- **H**yperhidrosis
- **E**rthrocyanosis
- **F**rostbite

GANGRENE

00:24:34

INICET May 2025

- Death of the macroscopic portion of tissue
- Turns black d/t breakdown of hemoglobin, leading to the formation of iron sulfide
- Affects- Distal parts of the limb
- Arterial occlusion- Dry gangrene
- Venous occlusion- Wet gangrene



Dry gangrene



Wet gangrene

Yourwish

	DRY GANGRENE	WET GANGRENE
SITE	Lower limb	MC in the bowel
MECHANISM	Arterial occlusion	Venus occlusion → Infection
MACROSCOPY	The organ is dry, shrunken, and black	Moist, swollen, and dark
LINE OF DEMARCATION	Present between the gangrenous and healthy parts	Poor/no line of demarcation
PRESENCE OF BACTERIA	Bacteria fail to survive	Numerous bacteria in wet gangrene
PROGNOSIS	Better	Poor

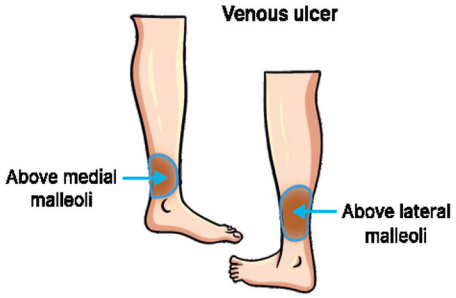
NEET PG Aug 2024

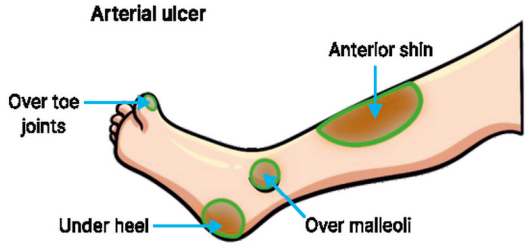
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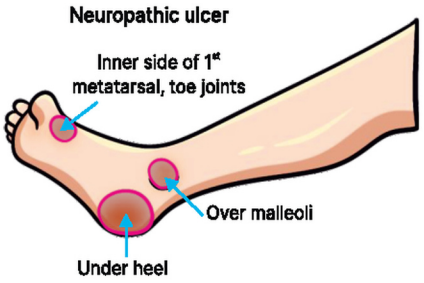
LEG ULCERS

Venous Ulcers

- Seen in Gaiters (area between calf and medial malleolus) area







Arterial Ulcers

- D/t arterial occlusion
- Distal end mostly

Neuropathic Ulcers

- Loss of sensation
- Seen over the pressure points or bony prominences

Arterial Ulcers

- Arterial occlusion → Ischemia → Tissue death → Punched out ulcer edges
- Caused by diabetes mellitus
  - Microanghipathy
  - macroangiopathy



Yourwish

Yourwish

Clinical Features

- Punched out edges
- Intensely painful due to ischemia
- Distal pulses: Not palpable
- Associated with:
  - Shiny think skin
  - Loss of hair
  - Brittle nails



Arterial ulcer

Diagnosis

- Clinical diagnosis
- Doppler to assess flow

Treatment

- Revascularization procedures
- Infected ulcers: Debridement + Antibiotics

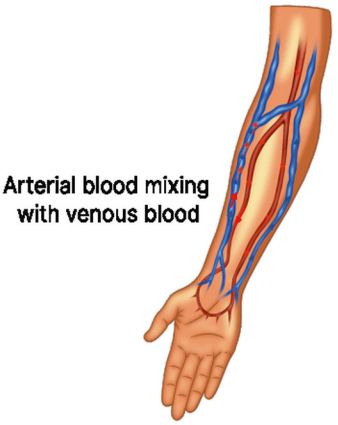
ARTERIOVENOUS FISTULA

00:33:30

- Most commonly, it is congenital
- Acquired
  - MC cause is penetrating trauma
- Created
  - Brescia-Cimino fistula between the radial artery and the brachiocephalic vein

Pathophysiology

- Increased venous return to heart → Increased cardiac output → Increased HR → Increased systolic BP
- Wide pulse pressure
- Pulsatile mass
- Palpable thrill
- Chronic cases: Arterialisation of the vein



Nicoladoni Or Branham Sign

- Occlusion of the artery proximal to the fistula leads to
  - P- Pulsatile mass → Size decreases
  - T- Thrill disappears
  - H- Heart rate decreases

Diagnosis

- Angiography: Diagnostic and therapeutic

Treatment

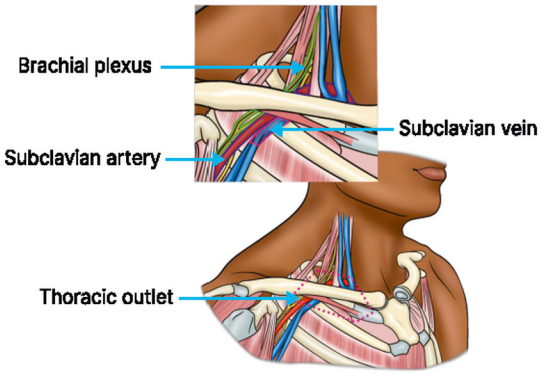
- Small fistula → Embolization
- Large fistula → Surgical ligation

Yourwish

THORACIC OUTLET COMPRESSION SYNDROME

00:37:50

- Compression of the subclavian vessels and the nerves of the brachial plexus at the thoracic inlet
- More common in middle-aged females



Types

- Neurogenic- MC
- Vascular
  - SCA
  - SCV

Compression At Tos

- Dynamic compression → Marked in particular posture
- Best diagnosed by a provocative test

Predisposing Factor

- Cervical rib
- Long transverse process of C7
- Osteoarthritis
- Pancoast tumor
- Cervical hematoma

Clinical Features

- Neurogenic form
  - MC involved nerve root value C8 to T1- Ulnar nerve
  - Pain and paresthesia in the inner aspect of the forearm and hand
  - O/E→Atrophy of hand muscles (hypothenar and interossei)
- Arterial compression- Pain, paresthesia, and pallor
- Venous form- Cyanosis, edema, and pain

Diagnosis

Provocative Tests

- Adson's test/Scalene test
- Costoclavicular test/military position or Halsted test
- Hyperabduction test/Wright test
- Roos test/Arm claudication test

Management

Neurogenic Form

- Conservative management
  - Improvement with sitting, sleeping, and standing positions
  - Physiotherapy- Muscle stretching & strengthening exercises

Indications For Surgical Intervention

- Failure of conservative management
- Progression of sensory or motor symptoms
- Excessively prolonged ulnar or median nerve conduction velocity
- Narrowing/occlusion of the subclavian artery
- Thrombosis of the axillary/subclavian vein
- Presence of anatomical abnormality

ACUTE MESENTRIC ISCHEMIA

00:44:37

Etiology

- Embolic occlusion- 50% due to the superior mesenteric artery (SMA) being involved
- Arterial thrombosis due to atherosclerosis
- Non-occlusive mesenteric ischemia causing hypotension/shock
- Venous thrombosis → Virchow triad → Hypercoagulable state, stasis & endothelial injury

Clinical Features

- Severe abdominal pain- MC symptom
- Persistent vomiting and diarrhea
- Malena and hematochezia (15%)
- Late stages
  - Ischemia → Gangrene → Sepsis → Shock

Diagnosis

- Mesenteric arteriography
  - Vasoconstriction seen
  - String of sausages sign seen

Management

- Early diagnosis
- Aggressive resuscitation in OT with IV fluids + IV antibiotics
- Non-occlusive mesenteric ischemia
  - Early revascularisation with catheter-directed papaverine infusion in SMA
- Mesenteric venous thrombosis: Anticoagulants

MESENTRIC VENOUS THROMBOSIS

00:51:19

- Responsible for 5%-15% of acute mesenteric ischemia
- MC involved vein is the superior mesenteric vein

Yourwish

Clinical Features

- Severe abdominal pain: MC
- Malena and hematochezia (15%)

Dignosis

- IOC for the diagnosis of MVT is CECT

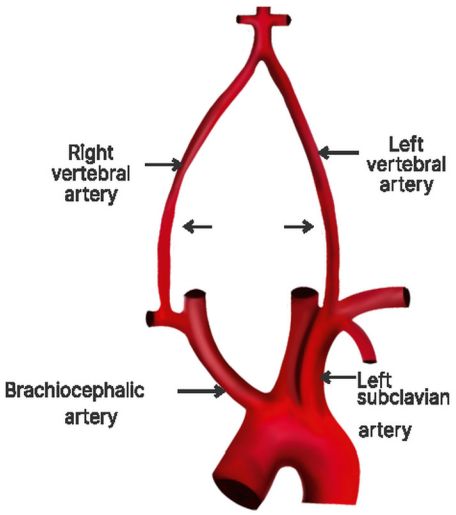
Management

- Rapid initiation of systemic anticoagulants, such as heparin
- Peritonitis: Exploratory laparotomy performed

SUBCLAVIAN ARTERIAL STENOSIS

00:52:53

- MC cause: Atherosclerosis
- MC involved vessel: Left subclavian artery
- MC site of stenosis: First part, just proximal to the origin of the left vertebral artery
- Reversible blood flow in the I/L vertebral artery leading to transient vertibrobasilar ischemia



- In case of severe stenosis, it can lead to
  - Weakess
  - Syncope/vertigo
  - Dizziness/ataxia
  - Visual abnormalities

ANEURYSMS

00:55:50

- Irreversible localized dilatation of blood vessels with at least 50% increase in the diameter
- Ectasia: Dilatation of blood vessels with <50% increase in the diameter
- MC vessel involved in aneurysm: Circle of Willis
- MC location of extracranial aneurysm: Abdominal aorta > Iliac artery > Popliteal artery > Femoral artery (ALL INDIA POLICE FORCE)
- MC site of the peripheral artery aneurysm: Popliteal artery
- MC site of Splanchnic arterial aneurysm: Splenic artery
- MC site of mycotic aneurysm: Femoral artery > Aorta
- MC cause of abdominal aortic aneurysm: Atherosclerosis
- Risk of rupture: Directly proportional to width and diameter

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Cut-off Diameter

- Descending thoracic aorta: ≥6.5 cm
- Abdominal aorta: ≥5.5 cm
- Ascending aorta: ≥5.5 cm
- Iliac artery: ≥3.5 cm
- Femoral artery: ≥2 cm
- Popliteal artery: ≥2 cm

Abdominal Aortic Aneurysm

- MC site of AAA: Infrarenal aorta
- MC site of Atherosclerosis: Infrarenal aorta
- MC & most lethal complication of AAA: Rupture with mortality of >50% cases
- Most important predictor for rupture: Width or diameter
- MC site of rupture: Left retroperitoneal

VASCULAR GRAFTS

01:02:38

Types

Bioprosthetic

- Autograft- Patient' own tissue is used
- Allograft/homograft- Graft from the same species
- Xenograft/heterograft- Graft from a different species
- Tissue engineered

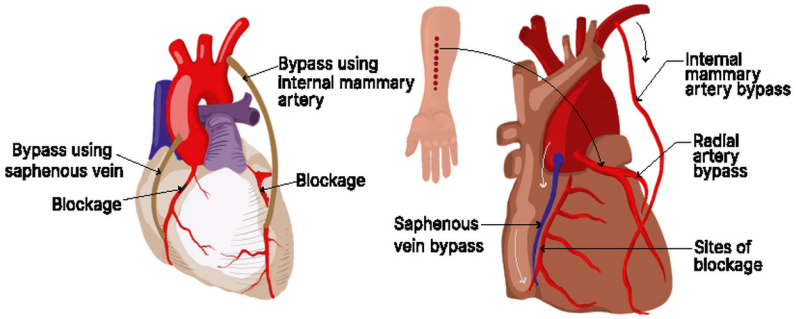
Synthetic

- Textile graft- Dacron
- Non-textile graft- EPTFE (Expanded Polytetrafluoroethylene), Polyurethane

- Best natural vascular graft- Reversed long saphenous vein
- Best synthetic vascular graft- Dacron
- Preferred vascular graft for infrainguinal bypass- Long saphenous vein
- Preferred vascular graft for suprainguinal bypass- Dacron

Coronary Artery Bypass Graft/cabg

- Most preferred vascular graft- Left internal mammary artery
- MC used vascular graft- Long saphenous vein
- Radial artery is most commonly used for CABG



Yourwish

PYQS

01:06:26

Q. Which of the following provides long-lasting results in a coronary artery bypass graft?

a. Long saphenous vein
b. Internal mammary artery
c. Polytetrafluoroethylene (PTFE)
d. Gastroepiploic artery

Ans: b. Internal mammary artery

Q. A 32-year-old male chronic smoker presents with pain in the fingers for a few months. On examination, gangrenous ulcers were present in the fingers, as shown below. Investigation showed blood glucose and lipid profile within normal limits. Which of the following is the most likely diagnosis?



a. Buerger's disease
b. Diabetic ulcers
c. Acute paronychia
d. Raynaud's phenomenon

Ans: a. Buerger's disease

Q. A chronic smoker presents with leg pain after walking 100 meters. On examination, there is an absent pulse in the B/L dorsalis pedis, anterior tibial, and posterior tibial arteries, but no gangrene is noted. Intermittent claudication is suspected. Which of the following statements about this condition is correct?

a. Pain is more at night and with sleep
b. Pain aggravated by standing and relieved by bending forward
c. Development of pain on the 1st step of walking
d. Pain develops after walking the same distance and is relieved by rest

Ans: d. Pain develops after walking the same distance and is relieved by rest

Q. In a chronic limb ischemia patient, what is the ABI below which gangrene is imminent:

a. 0.5
b. 0.3
c. 0.9
d. 1

Ans: b. 0.3

1. VENOUS DISORDERS

DEEP VEIN THROMBOSIS (DVT)

00:00:16

FMGE Dec 2021

Virchow's Triad (pathogenesis Of Dvt)

- Endothelial injury
- Stasis
- Hypercoagulable state

Post-surgical Dvt Risk

- Surgery involves prolonged immobilization, leading to stasis

Stratification Of Surgical Procedures And Dvt Risk

Low risk	Medium risk	High risk
• Neurosurgery • Maxillofacial surgery • Cardiothoracic surgery	• Abdominal surgery • Inguinal hernia repair • Urological surgeries • Gynecological surgeries	• Pelvic surgeries (elective or trauma) • Hip replacement • Total knee replacement

Dvt Prophylaxis

FMGE June 2024

Mechanical methods	Pharmacological methods

• Used in low-risk DVT
• Early ambulation: The simplest method for DVT prophylaxis
• Pneumatic compression devices: The most commonly used method
  ○ Applied over the calf or thigh
  ○ Mimics walking via contraction and relaxation

	• Used in high-risk DVT
	• Unfractionated Heparin (UFH)
	• Low Molecular Weight Heparin (LMWH)
	  ○ Preferred over UFH
	  ○ Does not require monitoring

Dvt Clinical Characteristics

Common Sites

- Most common site of DVT: Calf or soleal vein
- Most common site leading to Pulmonary Embolism (PE): Thigh or femoropopliteal vein
- Risk of PE is directly proportional to the diameter of the vessel

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Presentation

- Pain and swelling in the calf region
- Bilateral DVT: Common; seen in 30% of patients

Complications

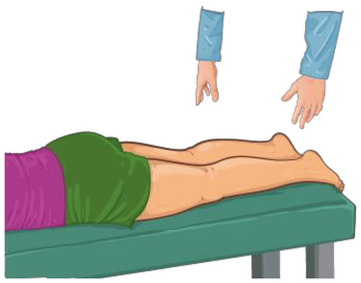
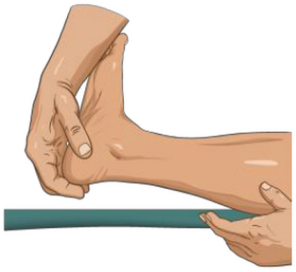
- Pulmonary Embolism (PE) → Can result in sudden death
- Recurrent PE presentation → Low-grade fever

Physical Signs

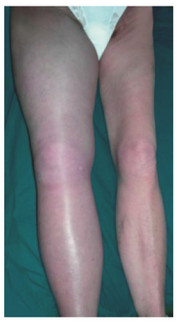
- Calf tenderness: The most common sign
- Edema: Initially pitting; later becomes non-pitting
- Tenderness along the course of the vein

Elicited Clinical Signs

INI CET May 2023

Homan's sign	Moses sign (bancroft sign)	Pratt sign
• ↑ resistance on passive dorsiflexion of the foot • Non-specific sign 	• Pressure over the calf region leads to pain 	• Squeezing of the calf leads to pain 

Severe Presentations

Phlegmasia alba dolens (painful white leg)	Phlegmasia cerulea dolens (painful blue leg)
• DVT with patent collaterals • No collection of deoxygenated blood 	• DVT with obstructed collaterals • Collection of deoxygenated blood → Blue color 

Modified Wells Criteria For Dvt Prediction

00:09:55

Variables And Scoring

- Lower limb trauma/surgery/immobilization in plaster cast: +1
- Bedridden >3 days or surgery in last 4 weeks: +1

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- Tenderness along the course of the femoral/popliteal vein: +1
- Entire limb swollen: +1
- Calf circumference >3 cm larger than the other side (measured 10 cm below the ischial tuberosity): +1
- Pitting edema: +1
- Dilated collateral superficial veins (not varicose): +1
- History of previous DVT: +1
- Malignancy (including treatment within the last 6 months): +1
- Intravenous drug abuse: +3
- Alternative diagnosis more likely than DVT: -2

Interpretation (probability)

- Score -2 to 0: Low probability (5% risk)
- Score 1 to 2: Moderate probability (17% risk)
- Score >2: High probability (17% - 53% risk)

Dvt Diagnosis And Management

- IOC: Duplex Scan
  - Evaluates both anatomy and blood flow

Treatment

- DOC: IV Heparin, Administered for 5 days
- WARFARIN
  - Requires 72 hours to act
  - Dose adjustment begins on the 3rd day

Duration Of Treatment

- First episode: 3 months
- Recurrent DVT: Life-long

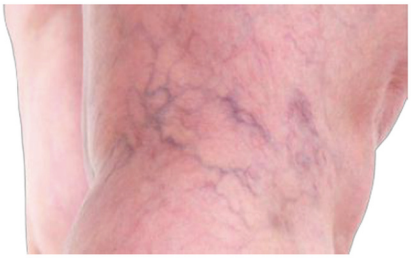
Monitoring

- Heparin monitoring: APTT (Target: 1.5 - 2.5)
- Warfarin monitoring: INR (Target: 2.0 - 3.0)

VARICOSE VEINS

00:14:35

Definitions Based On Diameter

• Spider Vein: <1 mm	• Reticular Vein: 1 mm to <3 mm	• Varicose Vein: Dilated, elongated, and tortuous vein ≥3 mm
		

Yourwish

Epidemiology

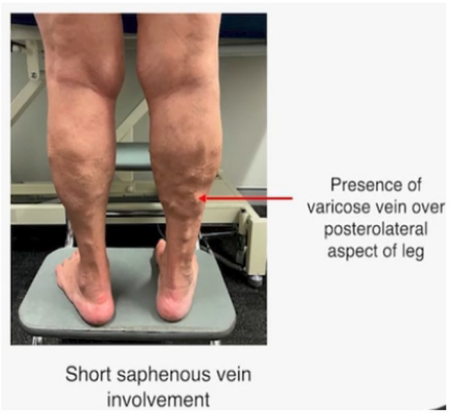
- More common in females
- Risk factor: Prolonged standing (housewives, teachers, traffic police, surgeons)

Vein Involvement

- Long Saphenous Vein (LSV): Involved in 60% of cases
- Varicosity seen on the inner/medial aspect of the thigh and the anteromedial aspect of the leg
- Short Saphenous Vein (SSV): Involved in 20% of cases
- Varicosity seen along the posterolateral aspect of the leg only

Varicose Veins Classification

Based On The Vein Involved

Long saphenous vein involvement	Short saphenous vein involvement
 Long saphenous vein involvement	 Short saphenous vein involvement

Based On The Cause

Primary Varicose Veins	Secondary Varicose Veins
• Most common • Congenital predisposition (↓ number of valves or defective valves) + occupational standing	• Caused by venous obstruction or valvular destruction **Causes:** • DVT (MCC of deep vein obstruction) • Trauma • AV Fistula (↑ pressure from artery to vein) • Deep vein compression (pelvic mass, tumor, or pregnancy) • In pregnancy, the gravid uterus compresses the veins; varicosity usually disappears after delivery

Clinical Features And Complications

Symptoms

- Dull aching pain, heaviness, throbbing, or burning/bursting sensation
- Symptoms ↑ with prolonged standing
- Symptoms relieved by limb elevation or use of compression stockings

Complications

- Cause: Chronic ambulatory venous hypertension
- Hemosiderosis: RBC seepage → brownish/blackish hyperpigmentation
- Eczema
- Lipodermatosclerosis
- Venous Ulcer: Typically occurs in "Gaiter's area" (above the medial malleolus)



Hyperpigmentation | Venous ulcer

Clinical Tests For Varicose Veins

Brodie-trendelenburg Test

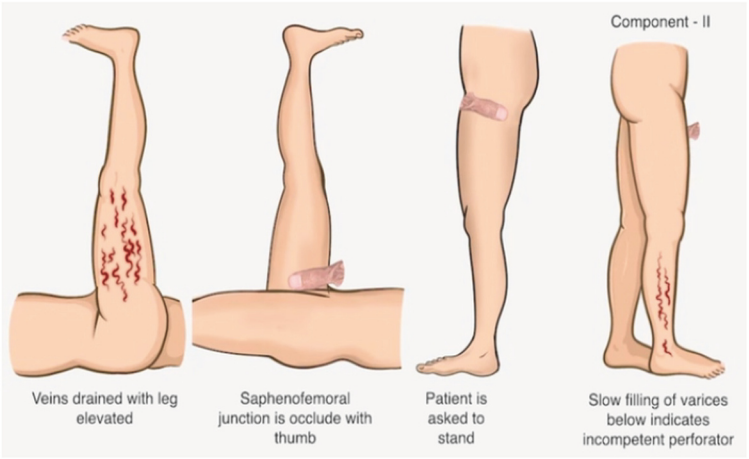
- Method: Patient lies down → elevate limb to empty veins (milking) → apply thumb pressure at Saphenofemoral Junction (SFJ)

Component 1 (sfj Incompetence)

- Patient stands up → release thumb pressure
- Result: Rapid filling of veins from above → Indicates SFJ incompetence

Component 2 (perforator Incompetence)

- Patient stands up → maintain thumb pressure.
- Result: Slow filling of veins from below → Indicates perforator incompetence

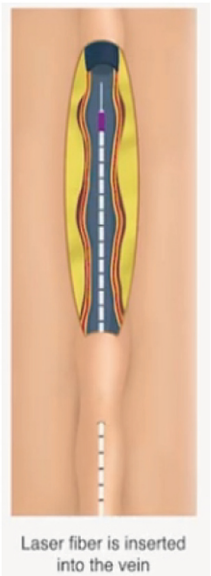


Diagnosis And Treatment Of Varicose Veins

- IOC: Duplex Scan
  - Provides info on SFJ/SPJ incompetence, DVT, and perforator location

Treatment

- Gold standard treatment: Endothermal Ablation
  - Performed on a day-care basis


Laser fiber is inserted into the vein

Endothermal Ablation Types

Evla (endovenous Laser Ablation)

- Laser fiber inserted into the vein → Laser beam activated → Vein collapses and converts into a cord-like structure.

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Rfa (radiofrequency Ablation)

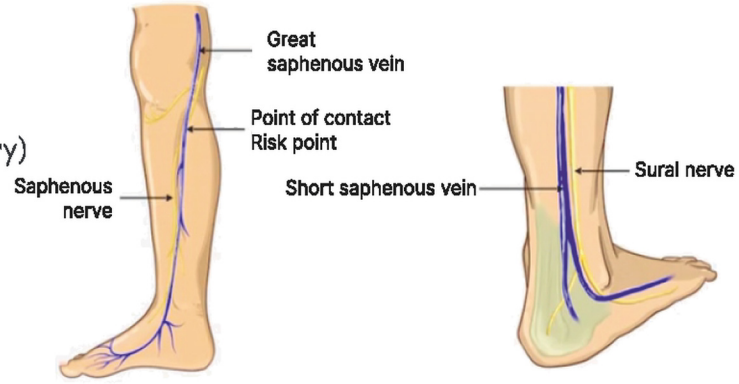
- Radiofrequency probe/catheter inserted → heat energy causes lumen collapse



Varicose vein

Trendelenburg Operation/stripping

- Stripping of LSV: Performed just below the knee to avoid the saphenous nerve injury
- MC nerve injured during stripping of:
  - LSV Stripping → Saphenous nerve
  - SSV Stripping → Sural nerve (more common injury) or Common Peroneal nerve (4% risk).



Post-operative Complications

- Wound infection: Most common complication
- Nerve injury: Most serious complication
- Recurrence, hematoma, and ecchymosis
- Sensory Nerve Injury Rates
  - Saphenous nerve (LSV stripping): 7%
  - Sural nerve (SSV stripping) 20% > Common peroneal nerve

CEAP CLASSIFICATION FOR CHRONIC VENOUS DISORDERS

00:27:22

- C (CLINICAL MANIFESTATIONS: 0-6)
  - A: Asymptomatic
  - S: Symptomatic
- E: Etiological classification
- A: Anatomical distribution
- P: Pathophysiological dysfunction

Clinical Manifestation

- C0: No visible or palpable signs
- C1: Telangiectasia or reticular veins
- C2: Varicose veins
- C3: Edema
- C4a: Pigmentation, eczema, or hyperpigmentation
- C4b: Lipodermatosclerosis or atrophic blanche
- C4c: Corona phlebectatica
- C5: Healed venous ulcer
- C6: Open/active venous ulcer



Yourwish

Yourwish

- MNEMONIC FOR C1-C4
  - "TV of Piglet Corona"
  - T: Telangiectasia (1).
  - V: Varicose (2).
  - O: Oedema (3).
  - Pig: Pigmentation (4a).
  - Let: Lipodermatosclerosis (4b).
  - Corona: Corona phlebectatica (4c)

VENOUS ULCERS

00:30:20

Epidemiology

- 60%-70% of lower limb ulcers are venous/varicose ulcers



Characteristics

- Site: Gaiter's area (between the medial malleolus and calf muscle)
- Appearance: Sloping edges; surrounded by hyperpigmentation
- Limb shape: Inverted champagne bottle appearance

Pathogenesis Theories

- Fibrin cuff theory (outdated)
- WBC migration theory (outdated)
- Accepted Theory: Chronic ambulatory venous hypertension

Venous Vs. Arterial Ulcers

Venous	Arterial (ischemic)
• Sloping edges • Hyperpigmentation present 	• Punched-out appearance • Signs of ischemia: Thin, shiny skin, loss of hair, brittle nails. 

Management

Bisgaard's Regime (4 E's Of Management)

- Education
- Elevation of limb (at night)
- Elastic compression bandages/stockings (during day)
- Evaluation

SYNDROMES ASSOCIATED WITH AV MALFORMATIONS

00:33:12

Klippel-trenaunay Syndrome

- Triad:

Yourwish



- Congenital AV fistula/malformations
- Cutaneous hemangioma (Port-wine stain/hyperpigmentation)
- Varicosity

- Key Feature: Absence of deep venous system
- Management:
  - Stripping is contraindicated as the superficial system is the only drainage
  - Use elastic compression stockings

Kasabach-merritt Syndrome



- Seen in children
- Congenital AV malformations
- Complicaitons
  - Microangiopathic hemolytic anemia
  - Consumption coagulopathy
  - Platelet trapping → Thrombocytopenia
- Management: Embolization of malformations and elastic compression bandages

PYQs

00:36:04

Q. What is the probable medical condition for an 80-year-old male who experienced pain and swelling in the calf muscle on the right side after being immobilized due to a fracture in the right intertrochanteric region?

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a. Chronic osteomyelitis
b. Deep vein thrombosis
c. Compartment syndrome
d. Arterial claudication

Ans: b. Deep vein thrombosis

Q. A patient presents with dull, aching pain and tortuous veins in both lower limbs. Which test would be appropriate for evaluating SFJ competence?

INI CET May 2023

a. Fegan's test
b. Homan's test
c. Modified Perthes test
d. Brodie Trendelenburg test

Ans: d. Brodie Trendelenburg test

Q. Which nerve is the most likely to be affected in a patient who underwent a coronary bypass graft with the great saphenous vein and is now experiencing paresthesia and sensory loss over the inner side of the leg and foot?

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a. Superficial peroneal nerve
b. Saphenous nerve
c. Femoral nerve
d. Sural nerve

Ans: Saphenous nerve

Q. A patient with dilated tortuous veins of the leg presented to the OPD and was diagnosed with varicose veins of grade C4a. What is the best preferred treatment? FMGE Jan 2025

a. Compression
b. Endothermal ablation
c. Non-endothermal non-tumescent ablation
d. Open surgery

Ans: b. Endothermal ablation

Yourwish

29. LYMPHATIC SYSTEM

LYMPHEDEMA

00:00:20
NEET PG 2021

- Types of lymphedema :
  - Primary
    → Due to Congenital malformations
  - Secondary

Secondary Lymphedema

- Most common type
  - Causes :
  - Lymphatic obstruction - MC
  - Lymphatic disruption

Lymphatic Obstruction

- MC cause worldwide: Filariasis
- MC Organism: Wuchereria bancrofti

Lymphatic Disruption

- Causes: lymph node dissection

Examples :

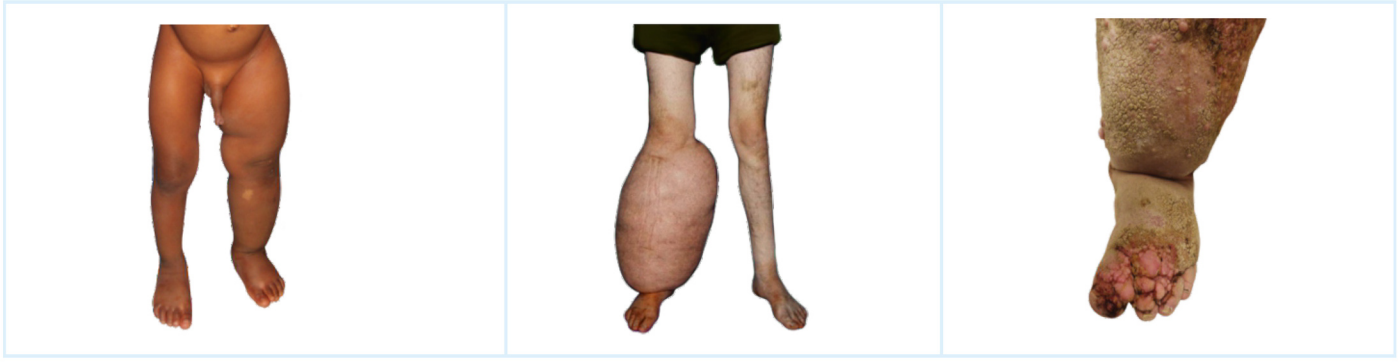
- Axillary lymph node dissection in breast carcinoma
- Inguinal lymph node dissection in carcinoma penis
- MC cause of secondary lymphedema in the US: axillary lymph node dissection in breast carcinoma

Types Of Primary Lymphedema (sabiston 21st Edition Update)

Congenital Lymphedema	Lymphedema Praecox	Lymphedema Tarda
Age: <1 year Present at birth	Age: 1-35 years	Age: >35 years
Involves: face, lower limb, genitalia	Most common type	Rare
Usually bilateral	More common in females	
Multiple limbs involved	Usually unilateral	
Familial version of congenital lymphedema: Milroy disease	Involves calf and foot Familial version of lymphedema precox: Meig's disease	

Yourwish

Yourwish



Important Information

- Meigs syndrome: Ovarian tumor, ascites, and pleural effusion (right-sided)

Clinical Features

- Swelling over the dorsum of the foot: Buffalo hump
- Square-shaped toes due to prolonged confinement in footwear: Squaring of toes
- Inability to pinch skin over the dorsum of toes due to subcutaneous fibrosis: Stemmer sign



Buffalo hump



Square toes



Complications



- Discomfort and pain
- Skin discoloration
- Skin thickening
- Skin folds
- Increased risk of infection
  - Cellulitis
  - Lymphangitis
- Long-standing lymphedema can lead to lymphangiosarcoma (Angiosarcoma)
- Angiosarcoma after MRM and radiotherapy in breast carcinoma: Stewart-Treves syndrome

Investigations

00:08:25

- IOC for edema of unknown origin with suspicion of lymphedema: Lymphoscintigraphy
  - Contrast lymphangiography: Provides the finest detail of lymphatic anatomy
  - Contrast used in lymphangiography: Ethiodized oil
  - Dye injected through: Lymphatics in the web space
- Gold standard for measuring limb volume: Water plethysmography (water displacement method)

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Management

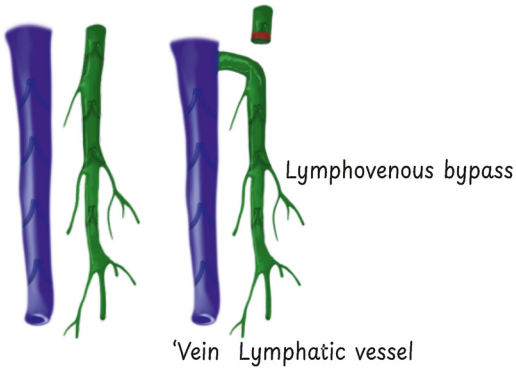
- Most cases are managed conservatively
- Surgical outcome - Poor with increased complications and morbidity

Conservative Management

- Compression stockings during daytime
- Limb elevation during the night
- Antibiotics for infection
- Complex decongestive physical therapy → Special massage technique
- Drug used: Benzopyrons

Surgical Management

- Indications:
  - Stage II or stage III lymphedema with severe functional impairment
  - Recurrent lymphangitis
  - Severe pain despite optimal medical therapy
- Types:
  - Reconstructive operation
  - Excisional operation

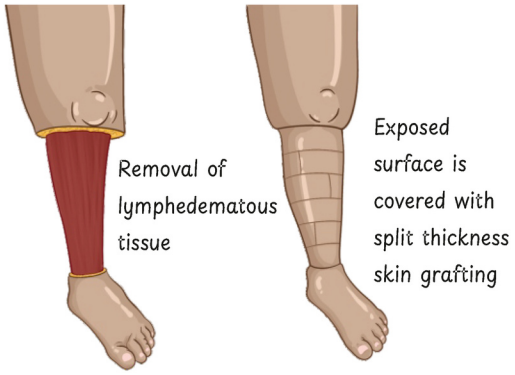


Reconstructive Operations

- Aim: Reconstruct lymphatic drainage
- Lymphovenous anastomosis: Nilubolovik operation
- Skin bridge used for reconstruction: Gillies
- Ileal mucosa used for reconstruction: Kinmonth

Excisional Operations

- Aim: Excision of unhealthy lymphedematous tissue
- Charles procedure: Excision of lymphedematous tissue
  - Exposed surface covered with split-thickness skin graft
- Other excisional operations :
  - Sistrunk procedure
  - Kondoleon or Homans procedure
  - Thompson procedure



Q. A 35-year-old woman, 10 years after mastectomy, notices gradual swelling and heaviness in her right upper limb without pain. On examination, bluish nodules on the skin with no infections are noted. What is the most likely cause of her symptoms?

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a. Lymphangiosarcoma
b. Thoracic outlet syndrome
c. Chronic venous insufficiency
d. Recurrent breast cancer

Answer: **a. Lymphangiosarcoma**

2. THORAX AND MEDIASTINUM

MEDIASTINUM

00.00.15

- MC anterior mediastinal mass → Thymoma
- MC middle mediastinal mass → Pericardial cyst
- MC posterior mediastinal mass → Neurogenic tumor
- Overall MC mediastinal mass → Neurogenic tumor
- IOC for diagnosis of Mediastinal mass → CECT
- IOC for Neurogenic tumors → MRI

PULMONARY EMBOLISM

00.01.56

- Most important risk factor for PE→ Deep venous thrombosis (DVT)
- MC site of DVT → Calf / soleal vein
- MC site of DVT leading to PE → Thigh vein / Femoro-popliteal vein

Risk Factors

- Virchow's triad of DVT
  - Endothelial injury
  - Stasis
  - Hypercoagulable state
- Obesity
- Prolonged immobilization
- Pregnancy and puerperium
- High-dose estrogen therapy
- Long-duration surgery
  - Orthopaedic surgery involving the hip, pelvis, and lower limb
- Hypercoagulable states

Clinical Features

- Pulmonary embolism is clinically silent in 60-80% of cases

SYMPTOMS	SIGNS
• MC symptom: Dyspnea • Chest pain • Hemoptysis • Cough	• MC sign: Tachypnea • Fever: Low-grade fever is suggestive of Recurrent pulmonary embolism • U/L leg swelling • Wheeze & pleural friction rub

- >60% of obstruction in pulmonary circulation leads to
  - Sudden death
  - Cor-pulmonale
  - Cardiovascular collapse

Yourwish

Criteria For Pulmonary Embolism

00:05:29

- Modified Wells criteria is used to predict PE
- Interpretation of score
  - Score <4 → Unlikely to be PE
  - Score >4 → Suggestive of PE

Modified Wells Criteria	
Variable	**Score**
Clinical signs & symptoms of DVT (minimum of leg swelling & pain on palpation of deep veins)	3
Alternative diagnosis less likely than PE	3
HR >100/min	1.5
Immobilization >3 days or surgery within the past 4 weeks	1.5
Previous DVT or PE	1.5
Hemoptysis	1
Malignancy (Treatment or palliation within the last 6 months)	1

Investigations

- D-Dimer
  - Excellent screening test for DVT
  - Has high negative predictive value
- IOC / Best investigation for PE → Multi-detector CT FMGE Dec 2021
- Gold standard investigation for PE → Pulmonary angiography
- ECG findings in PE
  - MC finding → Sinus tachycardia
  - Most specific finding → S1Q3T3 pattern seen in only <12%

Management

- Majority of patients: Anticoagulants and observation
- Patient with severe right heart strain and shortness of breath
  - Fibrinolytic treatment
  - Radiologically guided catheter embolectomy

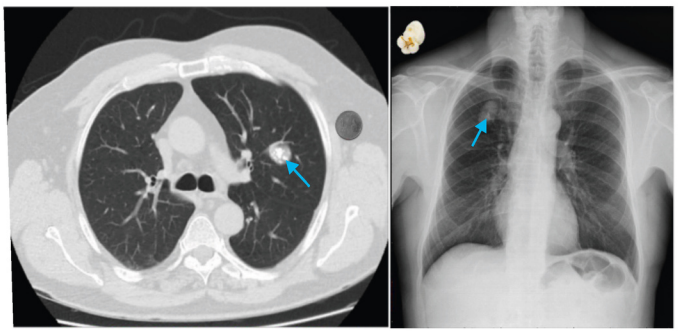
Prophylaxis

- IVC filter → High-risk patients with C/I to anticoagulants

PULMONARY HAMARTOMA

00.10.40

- MC benign tumor of the lungs
- MC manifestations → Overgrowth of cartilage
- Male > Female
- Age group affected is around 40-60 years
- Pattern of growth → Peripheral slow-growing tumor
- Investigations
  - Chest X-ray → Popcorn calcification
  - CT → Coin-like lesion
- Treatment: Surgical excision



Yourwish

Yourwish

BRONCHIAL ADENOMA

00.12.46

- Includes neoplasms of the tracheobronchial tree
- Tumors included
  - Carcinoid tumors → MC, seen in 80% of cases
  - Adenoid cystic tumors → 2nd MC, seen in 10 - 15% of cases
  - Mucoepidermoid tumors
- MC site of bronchial adenoma → Main Bronchi

Clinical Features

- Tumor is highly vascular
  - Recurrent hemoptysis - MC symptom
  - Intermittent hemoptysis
- Endobronchial growth of the tumor leads to obstruction
  - Chronic cough
  - Atelectasis
  - Pneumonia
  - Lung abscess

Diagnosis

- IOC- Bronchoscopy with biopsy

Treatment

- Surgical resection

MALIGNANT MESOTHELIOMA

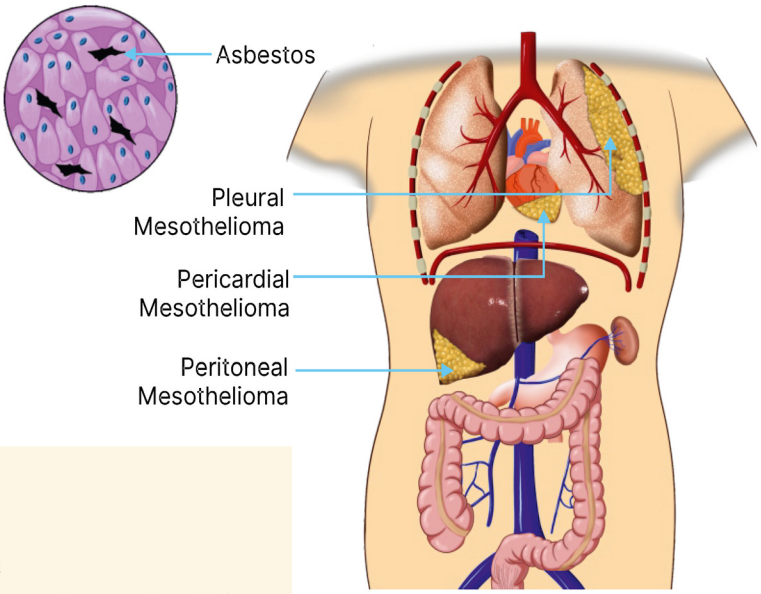
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- MC tumor of the pleura
- Male > Female
- Common around the age of 40 years

Risk Factor

- Chronic Asbestos exposure
  - Amphibole fibres → Crocidolite variety
- Asbestos exposure causes
  - Pleural mesothelioma
  - Pericardial mesothelioma
  - Peritoneal mesothelioma
- Radiation exposure



Important Information

- Smoking
  - Not a risk factor for Malignant mesothelioma
  - Has a synergistic effect with asbestosis exposure in causing CA Lung

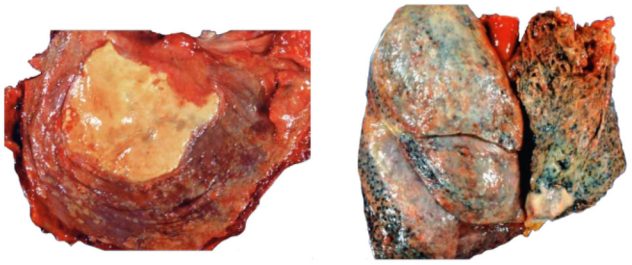
Yourwish

Types

- Epithelioid: MC type and has a favourable prognosis
- Sarcomatoid
- Biphasic

Gross Findings

- Discrete fibrocalcific plaques on the pleural surface
- Pleural effusion is seen in > 90% of patients



Clinical Features

- Dyspnea
- Chest pain
- Chronic cough
- Weight loss

Diagnosis

- Chest X-ray
  - Pleural effusion
  - Generalized pleural thickening
  - Shrunken hemithorax
- IOC- Thoracoscopic / Open pleural biopsy
- Staging for malignant mesothelioma → Butchart staging

Treatment

- No effective treatment
- Available treatment options
  - Supportive care
  - Surgical resection
  - Multi-modality treatment → Surgery + Chemotherapy + Radiotherapy

CARCINOMA LUNG

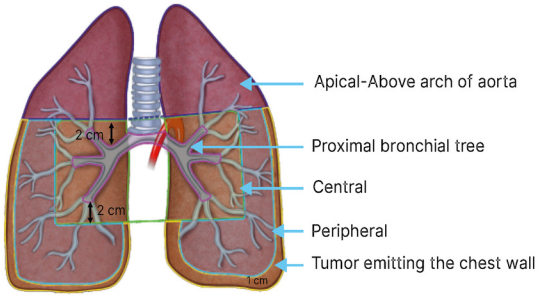
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- Aka Bronchogenic carcinoma
- Origin → Respiratory epithelium
  - Bronchi
  - Bronchioles
  - Alveoli
- Majority of CA Lung arises from the hilum except
  - Bronchoalveolar lung
  - Large cell carcinoma → Arises from the periphery of the lung
- MC type of lung neoplasm
- MC visceral malignancy worldwide
- MC malignancy responsible for deaths

Risk Factors

- Smoking → Both active and passive smokers
- Air pollution due to a component called Radon
- Exposure to Uranium, Nickel, and Asbestos
- Smoking has a synergistic effect with asbestosis exposure in causing CA Lung
- Old infarct & lung scar →Increased risk for Adenocarcinoma of the lung
- Ionizing radiation exposure

Types

Tumor	Description
	Basis → Location of tumor 
Central tumors	• Located within 2 cm from the proximal endobronchial tree, the heart, the great blood vessels, and the trachea ○ Squamous cell CA ○ Small cell CA • Smoking is a risk factor
Peripheral tumors	• Located >2 cm from the proximal endobronchial tree, Heart, Great blood vessels, and Trachea ○ Adenocarcinoma ○ Large cell CA • Smoking is not a risk factor
Apical tumors	• Located above the arch of the aorta
Tumor abutting the chest wall	• Tumor within 1 cm of the chest wall

Clinical Features

- MC symptom → Cough > Dyspnea > Chest pain > Hemoptysis
- Hemoptysis occurs due to bleeding from the bronchial artery
- Massive hemoptysis → >600 ml of blood in 24 hrs

Symptoms

Endobronchial growth of a tumor	• Cough • Stridor • Wheeze • Dyspnea • Hemoptysis

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Peripheral location	• Pain d/t the involvement of the chest wall/pleura

Regional spread of the tumor	• Trachea → Dyspnea
	• Esophagus → Dysphagia
	• RLN paralysis → Hoarseness of voice
	• Peripheral/Apical tumors
	  ○ Pancoast tumor → D/t involvement of C8/T1 causes pain over the shoulder or arm
	  ○ Horner's syndrome → D/t involvement of the cervical sympathetic chain
	  ○ SVC syndrome → Small cell lung CA > Squamous cell CA
	• Malignant pleural effusion

Metastasis

- MC site of metastasis from CA lung
  - Brain > Bone > Liver > Adrenal > Lungs of opposite side
- CA Lung is the MC primary for metastasis to
  - Kidney
  - Esophagus
  - Pancreas
  - Adrenal
  - Brain
  - Skin

Paraneoplastic Syndromes

00:31:00

CVS	• Superficial Migratory Thrombophlebitis • NBTE (Non-Bacterial Thrombotic Endocarditis)

Metabolic syndrome	• Small cell lung CA
	  ○ Cushing syndrome → D/t increased ACTH
	  ○ SIADH → D/t increased ADH secretion
	  ○ Hypocalcemia → D/t increased calcitonin
	• Squamous cell CA of the lung
	  ○ Hypercalcemia → D/t increased PTHrP
	• Adenocarcinoma
	  ○ Acanthosis nigricans
	• Carcinoid syndrome
	• Erythrocytosis

Neuromuscular syndrome	• Small-cell lung CA
	  ○ Autonomic neuropathy
	  ○ Lambert-Eaton syndrome
	• Cerebellar degeneration

Diagnosis

- IOC- Bronchial and Endobronchial biopsy
  - Done via Fiberoptic bronchoscopy
- Best imaging modality for diagnosis & staging- PET - CT

Yourwish

Yourwish

Treatment

00:33:40

Operable Non-small Cell Lung Carcinoma

- Stage IA & IB and Stage IIA & IIB
  - Surgical resection
- Stage IIIA with minimal N2 involvement
  - Neoadjuvant chemotherapy f/b surgery with complete mediastinal lymph node dissection
- Stage IIIA with N2 involvement
  - Radiotherapy

Who Classification

- Adenocarcinoma → MC worldwide
- Squamous cell carcinoma → MC in India
- Small cell carcinoma
- Large cell carcinoma

Adenocarcinoma Lung

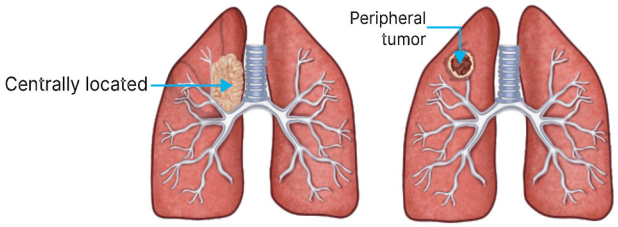
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- MC tumor type in worldwide
- Slow-growing tumor located peripherally
- Common in non-smokers, females, and young patients
- Tumor has aerogenous spread and can involve the C/L Lung
- Classification followed → Noguchi
- Associated with
  - Clubbing
  - Acanthosis nigricans
  - Thrombophlebitis
  - Scar/infarct

Squamous Cell Carcinoma

00:36:26

- MC type in India
- Centrally located tumor
- More common in smokers
- Tumor with the best prognosis
- Hypercalcemia occurs d/t increased secretion of PTH-rp



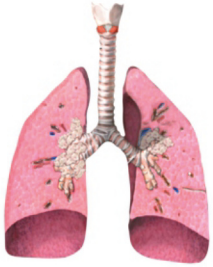
Important Information

- Histology of Pancoast Tumor
  - Squamous cell carcinoma > Adenocarcinoma > Large cell carcinoma

Small-cell Carcinoma Lung

00:38:26

- Most malignant tumor
- Centrally located tumor
- Strongly related to smoking
- Histology
  - Cells are small with little cytoplasm → Aka Oat cell carcinoma
- SVC syndrome occurs due to mediastinal invasion and mediastinal lymphadenopathy



Yourwish

- Clinical presentation
  - Perihilar mass
  - Mediastinal invasion
  - Massive lymphadenopathy
    → Hilar lymph nodes
    → Mediastinal lymph nodes
- Tumor most responsive to chemotherapy
- Rumor shows response to radiotherapy
- Hormones secreted include
  - ACTH → Leads to Cushing syndrome
  - Gastrin-releasing peptide
  - Calcitonin → Leads to Hypocalcemia
  - AVP (vasopressin) → Leads to SIADH
  - Atrial Natriuretic Factor

Large Cell Carcinoma

00:40:29

- Peripherally located tumor
- Seen in Non-smokers
- Highly undifferentiated tumor as a result → Early metastasis is seen and is of poor prognosis
- Hormones secreted
  - Estrogen → Gynecomastia

PANCOAST TUMOR

00.41.38

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- Aka Superior sulcus tumor
- MC histological tumor responsible
  - SCC (peripheral type) > Adenocarcinoma > Large cell carcinoma
- Peripheral type of SCC →Leads to compression of C8/T1 (Ulnar nerve)
  - Pain and paresthesia along the forearm of the hand
  - Atrophy of the hypothenar muscles

Clinical Features

- Involvement of the C8/TI nerve (Ulnar nerve)
  - Insidious onset of pain → starting from the upper arm
  - Sensory disturbances along the inner aspect of the forearm and hand
  - Weakness & atrophy of the hypothenar aspect
- Involvement of the cervical sympathetic chain → I/L Horner syndrome

Diagnosis

- IOC: MRI

Treatment

Pre-op radiotherapy
↓
En bloc resection of the lung and chest wall
↓
with/without Post-op radiotherapy / Brachytherapy

CARDIAC TUMORS

00.44.15

- MC primary cardiac tumor → Myxoma
- MC malignant tumor of heart / vascular channels in adults → Angiosarcoma
- Tumor in children
  - MC benign tumor of the heart in children → Rhabdomyoma
  - MC malignant tumor of the heart in children → Rhabdomyosarcoma
- MC tumor of cardiac valves → Papillary Fibroelastoma
- MC site of involvement in cardiac metastasis → Pericardium
- MC primary for metastasis to the heart
  - Male → CA Lung
  - Female → CA Breast

CHEST WALL TUMORS

00.46.12

- MC chest wall tumor → Metastasis
- MC primary chest wall malignancy → Chondrosarcoma
- MC benign primary chest wall tumor → Osteochondroma

PYQs

00.46.42

NEET PG 2023

Q. A 65-year-old chronic smoker came to the medicine outpatient department with complaints of upper chest discomfort and drooping of an eyelid. He also complained of pain radiating to the upper arm and a tingling sensation in the 4th and 5th digits of his right hand. The chest X-ray is given below. Which of the following is the most likely diagnosis?



a. Pancoast tumor
b. Superior vena cava obstruction
c. Upper lobe pneumonia
d. Aspergilloma

Ans: a. Pancoast tumor

Q. Which of the following imaging tests should be performed to confirm a diagnosis of pulmonary embolism in a patient?

FMGE Dec 2021

a. Doppler echocardiography
b. CT pulmonary angiography
c. Ventilation-perfusion scan of the lungs
d. MR pulmonary angiography

Ans: b. CT pulmonary angiography

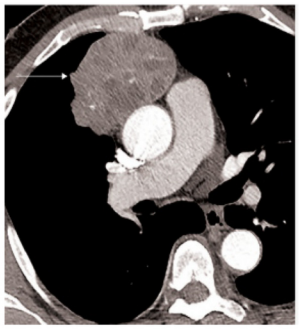
Q. A 65-year-old female patient is diagnosed with pure red cell aplasia and a mediastinal mass. Which of the following is a likely cause?

a. Thymoma
b. Non-Hodgkin lymphoma
c. Bronchogenic carcinoma
d. Germ cell tumour

Ans: a. Thymoma

Yourwish

Q. 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?



a. Thymoma
b. Pancoast tumor
c. Adenocarcinoma
d. Small-cell lung cancer

Ans: a. Thymoma

Yourwish

30. BURNS

CAUSES OF DEATH IN BURNS

00:00:15

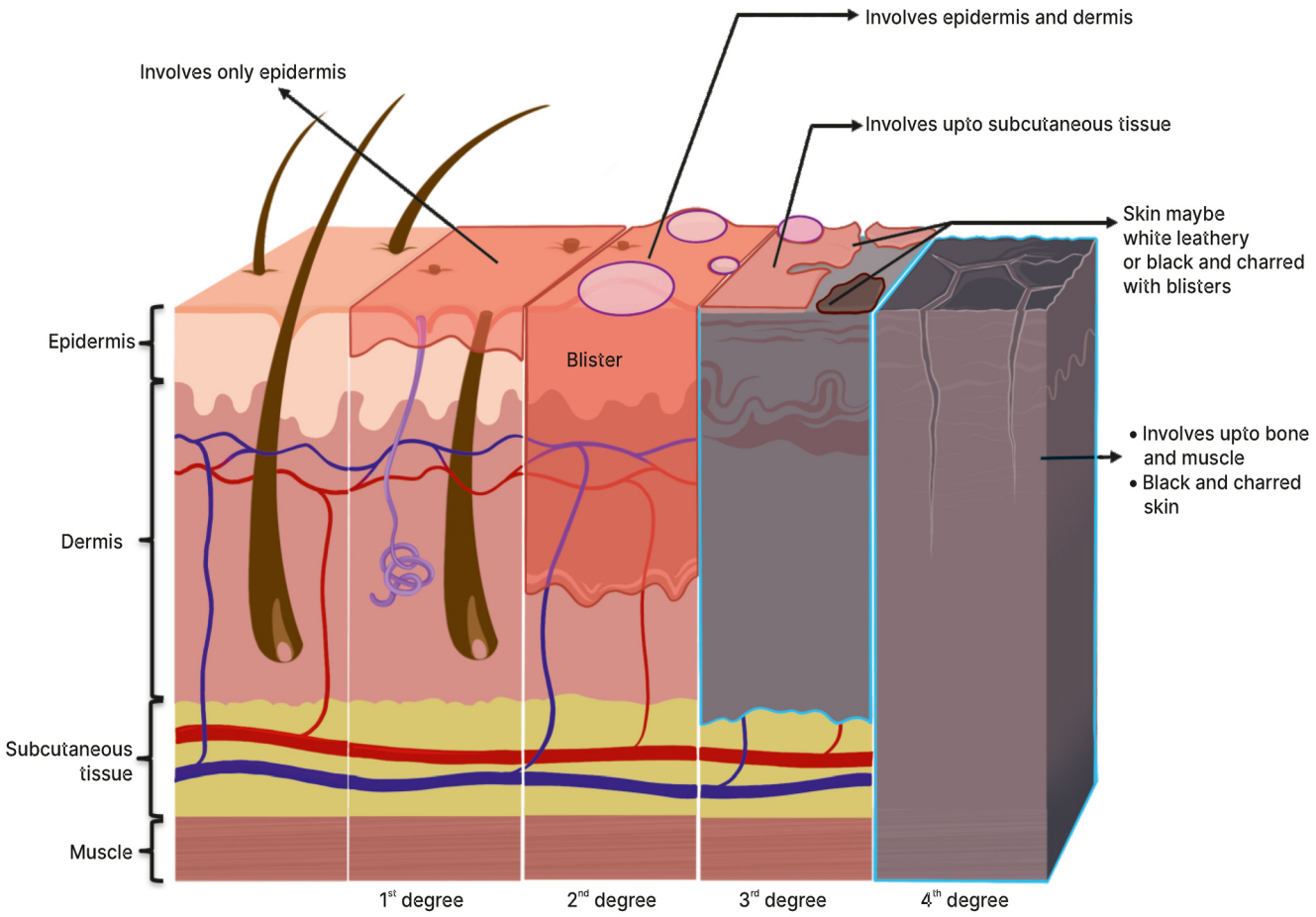
- MC cause of death at the site of burn/accident: Asphyxia
- MC cause of early death in burns: Hypovolemia or shock
- MC cause of late death in burns: Sepsis
- Overall, the MC cause of death in burns: Sepsis
- MC organism causing sepsis in burns: Pseudomonas
  - Green color in dressing after 7 to 10 days

BURN CLASSIFICATION

00:01:49

INICET Nov 2025

- First-degree burn: Epidermal burn
- Second-degree burn: Partial thickness burn
- Third-degree burn: Full-thickness burn
- Fourth degree burn: Skin plus underlying structure involvement



First Degree Burn

- Involves epidermis only
- Other name: Epidermal burn

Yourwish

- Features:
  - Painful & Erythematous
  - No blisters
- Heals without scarring in 5 to 10 days
- Example :
  - Sunburn
  - Hot iron touch injury



Epidermal burn

Second Degree Burn

- Other name: partial thickness burn
- Types :
  - Superficial partial thickness burn
  - Deep partial thickness burn

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Superficial Partial Thickness Burn

- Involves epidermis plus the papillary dermis
- Most characteristic feature: Blister
- Features :
  - Painful
  - Redness present
  - Blisters present
- Heals without scarring in 7 to 14 days
- Example: Hot liquid spillage burn



Deep Partial Thickness Burn

- Involves epidermis plus the reticular dermis
- Burn surface: Mottled
  - Appearance: Whitish and pinkish areas
- Features :
  - No pain
  - No blisters
  - Pinprick sensation preserved
- Heals with scarring in 3 to 9 weeks



Third Degree Burn

- Involves epidermis, dermis plus subcutaneous tissue
- Other name: Full-thickness burn
- Most characteristic feature: Black colored leathery eschar
- Features :
  - No pain
  - No blisters
  - No pinprick sensation
- Healing occurs with contracture
- Circumferential eschar can cause compartment syndrome
- Treatment for circumferential eschar: Escharotomy



Fourth Degree Burn



- Involves skin plus underlying structures
- Extensive damage
- Underlying structures involved :
  - Muscle
  - Bone
  - Brain

INDICATIONS OF REFERRAL TO BURN CENTER

00:11:30

- Partial thickness burn involving > 10% body surface area
- Any full-thickness burn
- Burns involving :
  - Face
  - Hands
  - Feet
  - Genitalia
  - Perineum
  - Major joints
- Electrical burns, including lightning injury
- Chemical burns
- Burns with pre-existing medical conditions
  - Diabetes
  - Chronic kidney disease
  - Congestive heart failure
- Burn with trauma
- Burns in children without resources dedicated to pediatric patients
- Burn injuries with social, emotional, or rehabilitation needs

ABCDEF OF EMERGENCY BURN CARE

00:13:10

- A: Airway
- B: Breathing (Oxygenation & ventilation)
- C: Circulation
- D: Disability
- E: Exposure with environmental control
- F: Fluid resuscitation

Airway burns

Danger signs

- Burns involving the face, head, or neck
- Singed or burned nasal hair
- Carbonaceous deposits in sputum
- Hoarseness of voice
- History of burn in a closed room

Yourwish

Management of Airway Burns

- Safest management in suspected airway burn: Elective intubation
- Patient develops laryngeal edema within 4 to 6 hours of fluid resuscitation
  - Once laryngeal edema develops, intubation becomes difficult
  - Emergency procedure if intubation is not possible: Emergency cricothyroidotomy

Burn surface area estimation

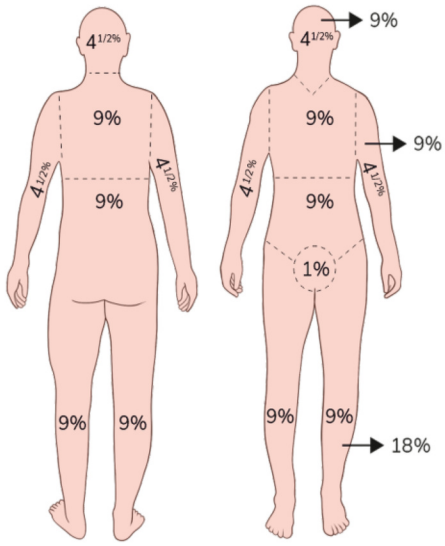
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NEET PG 2022
INICET Nov 2023, May 2025, Nov 2023
FMGE Jan 2025

Rule of 9

- Given by Wallace
- Applicable for: Adults and children
  - More accurate in: Adults
  - Less accurate in: Children

Region	Percentage	Subdivision
Head and neck	9%	Anterior: 4.5%, Posterior: 4.5%
Each upper limb	9%	Anterior: 4.5%, Posterior: 4.5%
Chest and abdomen	18%	Chest: 9%, Abdomen: 9%
Back	18%	Upper back: 9%, Lower back: 9%
Each lower limb	18%	Anterior: 9%, Posterior: 9%
Genitalia	1%	-



Burn Surface Area Estimation In Children

- Most accurate for estimation of true burn size in children: Lund and Browder chart
- Berkow formula- Used in children

Palmar Method

- Used in :
  - Mixed distribution burns
  - Splash burns
- Area of open hand with extended fingers: 1%
- The patient's own palm is used



Yourwish

Fluid Resuscitation

00:20:20

- Fluid resuscitation needed in :
  - Children with burns > 10% body surface area
  - Adults with burns > 15% body surface area
- Fluid of choice in burns: Ringer lactate
- Maintenance fluid of choice in burns in children: DNS

Burns Shock

- Burns shock: Patient not improving despite crystalloid
  - Due to capillary leak with extravasation
- Fluid used in burns shock: Hypertonic saline
  - Hypertonic saline concentration : 3%

Moir-Barclay Formula

- Fluid of choice: 4.5% human albumin solution

Parkland Formula

- MC used formula
- Formula: 4 × body weight in kg × percentage of burn surface area
- Gives: 24-hour fluid requirement in ml
- Fluid distribution:
  - 50% in first 8 hours
  - Remaining 50% in the next 16 hours
- Maximum fluid calculation done up to 50% burns
- Even if the burn size > 50%: Calculate according to 50% only
- Second day fluid requirement: 40 to 60% of the first day fluid
- Average second-day fluid requirement: 50% of the first-day fluid

Atls Modification of Parkland Formula

ATLS Modification of Parkland Formula		
Category of Burn	**Age and Weight**	**Adjusted Fluid Rates**
Flame or Scald	Adults and older children (≥14 years old)	2ml x kg x % TBSA
	Children (<14 years old)	3ml x kg x % TBSA
	Infant and young children (≤ 30kg)	3ml x kg x % TBSA Plus a sugar-containing solution (DNS) at maintenance rate
Electrical injury	All ages	4ml x kg x % TBSA until urine clears.
• TBSA: Total Body Surface Area		

Monitoring After Fluid Resuscitation

- Best clinical indicator of tissue perfusion: Urine output
- Adults :

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- Minimum urine output: 1 ml per minute
- Hourly urine output: 60 ml per hour

- Children :
  - Minimum urine output: 0.5 to 1 ml per minute
  - Hourly urine output: 30 to 60 ml per hour

Initial Care of Burn Wound

00:26:25
NEET PG 2025

- First step: Cool the burn wound
- Cooling provides analgesia
- Optimal water temperature: 15 °C
- Cooling should be done for a minimum of 10 minutes
- Effective up to 1 hour after burn
- Ice or very cold water should not be used → Causes intense vasoconstriction and increases tissue damage.

Superficial Partial Thickness Burn Management

- Management: Topical antimicrobials only
- Dressing not required
- Healing without scarring in 7 to 14 days

Escharotomy

- Indication: Circumferential eschar in a third-degree burn
  - Increased risk of compartment syndrome
- Escharotomy involves longitudinal incision over :
  - Skin
  - Superficial fascia
  - Deep fascia

Topical Antimicrobials

- Most commonly used topical antimicrobial:
  - 1% silver sulfadiazine- MC
    → Provides broad-spectrum antimicrobial prophylaxis against: Pseudomonas, MRSA
  - Silver nitrate 0.5%
  - Mafenide acetate 5%
  - Silver sulfadiazine & cerium nitrate

PYQs

00:30:40
NEET PG 2025

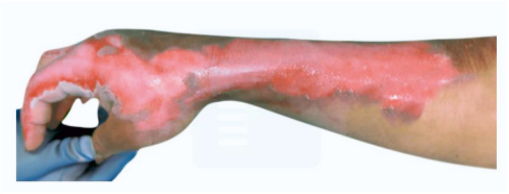
Q. A 30-year-old female was brought to the emergency after a fire accident. On examination of the lower limb, full-thickness burns and deep partial-thickness burns were present, involving it circumferentially. The procedure was performed as given below. Identify the procedure:



a. Escharotomy
b. Debridement
c. Excised to healthy tissue fat/fascia
d. Early skin grafting

Answer: a. Escharotomy

Q. A person spilled hot milk/drink on his hand. Image of the burn is given below. Identify the degree of burn? INICET Nov 2025



a. Superficial partial thickness burn
b. Full-thickness burn
c. Deep partial thickness burn
d. Fourth-degree burn

Answer: **a. Superficial partial thickness burn**

Yourwish

30. PLASTIC SURGERY AND SKIN LESIONS

GRAFTING

00:00:16

- Grafting: Application of graft over a vascularized recipient bed
- Phases of graft take:
  - Plasma imbibition
  - Inosculation
  - Revascularization

PLASMA IMBIBITION	INOSCULATION	REVASCULARIZATION
• Graft survives for the first 48 hours by diffusion • Nutrition is received by free absorption of nutrients via diffusion	• Donor and recipient capillaries align together • Completed in 4 to 5 days	• Established arterial supply and venous drainage develop • Occurs after >5 days

Instruments Used For Skin Graft Harvesting

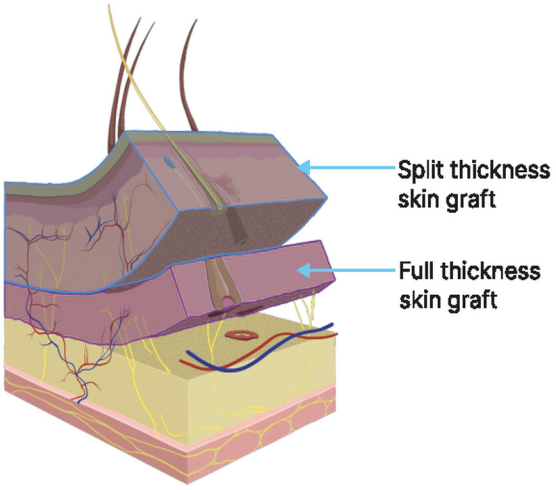
- Humby knife
- Electric dermatome





Skin Grafts

- Types :
  - Split-thickness skin graft
  - Full-thickness skin graft



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Yourwish

Split Thickness Vs Full Thickness Skin Graft

Feature	Split-Thickness Skin Graft	Full-Thickness Skin Graft
Other name	Thiersch graft	Wolfe graft
Tissue taken	Epidermis + part of dermis	Epidermis + full-thickness dermis
Size of graft	Large graft can be taken	Only a small graft can be taken
Graft survival	Easy	Difficult
Donor site	Heals spontaneously	Develops a permanent defect
Repeat graft possible	Yes	No
Primary contraction	Lesser	Significant
Secondary contraction	Significant	Lesser
Cosmetic appearance	Poor	Better

- Secondary contraction is more common in split thickness skin graft
- MC donor site for split-thickness skin graft is inner aspect of thigh

Flaps in Skin Grafting

00:09:52

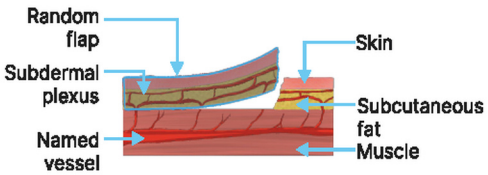
- Flap: Tissue transferred with its own blood supply

Types of Flaps Based On Vascular Supply

- Random flap
- Axial flap
- Free flap

Random Flap

- Based on: Unnamed subdermal vessels
- Relies on low pressure found in subdermal plexus of vessels
- Used for: Reconstruction of small full-thickness defects

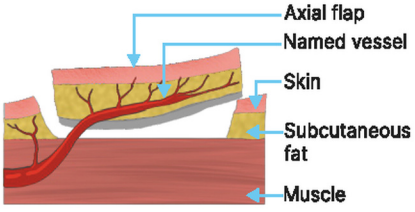


Axial Flap

- Based on: named vessel

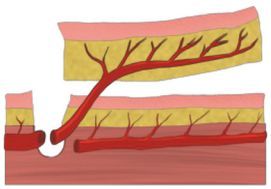
Pedicle Flap

- Type of axial flap
- Remains attached to proximal vascular supply



Free Flap

- Type of axial flap
- Devascularized from the donor site
- Revascularized at the recipient site
- Autogenous transplant of vascularized tissue from one body part to another body part



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Absolute Indications For Flap

- Exposed bone
- Exposed brain
- Radiated vessels- Obliterative end-arteritis after radiotherapy
- Pressure sore over bony prominence
- Open joint or non-biological implant materials

Flap tecniques

00:14:40

Local flaps

- Tissues moved adjacent to the defect
- Types remembered by mnemonic RAT:
  - Rotational flap
  - Advancement flap
  - Transpositional flap

Regional Flap

- Tissue transferred from the region close to the defect
- Classical example: Pedicle flap
  - edicle flap retains its vascular supply

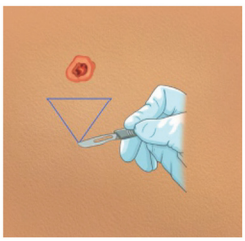
Free Flap

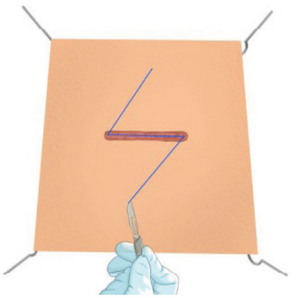
- Devascularized from the donor site
- Revascularized at the recipient site using microvascular surgery
- Used for complex reconstructions

Specific flap procedures

00:16:23

Z-plasty





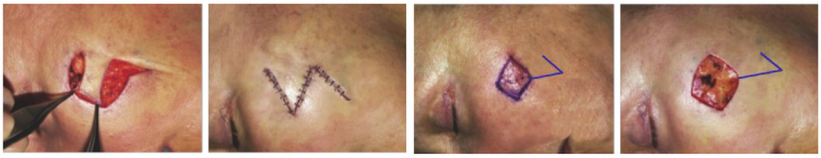
- Incision shape: Z-shaped
- Angle between incisions: 60°
- Used to :
  - Lengthen scar
  - Improve function
- Scar lengthening possible: 75%

V-Y Advancement Flap



- Initial incision: V-shaped
- Final closure: Y-shaped
- Used to cover defects while maintaining the blood supply

Rhomboid Flap



- Used for defects involving a flat surface
- Examples :
  - Basal cell carcinoma on the cheek
  - Pilonidal sinus

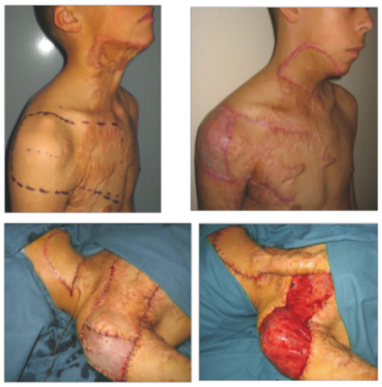
Types Axial Flaps

00:19:20

Flap	Vessel
Latissimus dorsi flap	Thoracodorsal vessel
Deltopectoral flap	Internal mammary vessel
PMMC flap	Pectoral branches of the thoracoacromial vessel
TRAM flap	Inferior epigastric vessel

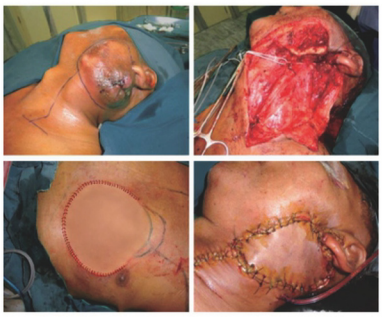
Deltopectoral Flap

- Based on: Internal mammary vessel
- Used for reconstruction of head and neck defects



PMMC Flap

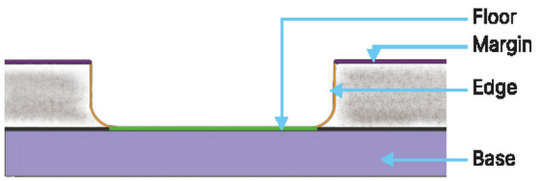
- Pectoralis major myocutaneous flap
- Most commonly used flap for reconstruction of head and neck defects
- Based on: Pectoral branches of the thoracoacromial vessel



PARTS OF ULCER

00:22:30

- Base: Surface on which the ulcer rests (bone/muscle)
- Floor: Exposed surface of ulcer
- Margin: Junction between normal epithelium and ulcer
- Edge: Area between floor and margin

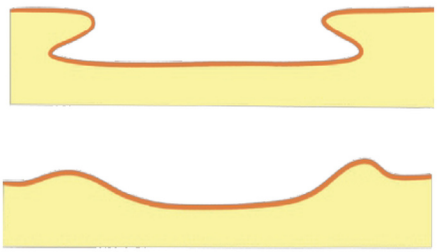


Types of Ulcer Edge

NEET PG August 2024

Type of Edge	Example
Sloping edge 	Venous ulcer or varicose ulcer 

Yourwish

Punched out edge 	Ischemic ulcer or arterial ulcer 
Undermined edge 	Tuberculous ulcer 
Rolled or pearly white beaded edge 	Basal cell carcinoma 
Everted edge 	Squamous cell carcinoma 

Marjolin Ulcer

00:27:50

- Malignant transformation in chronic wound or scar
- Common scar: Burn scar
- Malignancy arising from chronic venous ulcer or scar: Marjolin ulcer
- Histology: Low-grade squamous cell carcinoma
- Characteristic features:
  - Painless- No nerves
  - Relatively avascular
  - Slow growing
  - Radioresistant
  - No regional lymph node metastasis
- Diagnosis: Biopsy
- Treatment:
  - Wide local excision
  - Flap closure

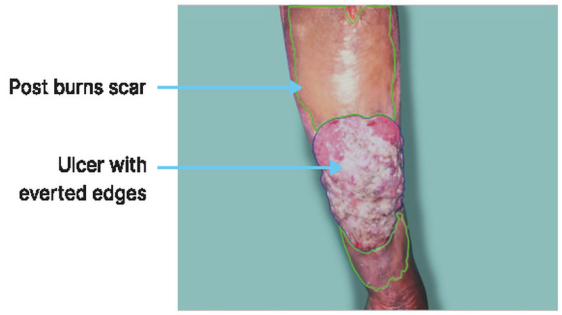
Yourwish

Yourwish

SKIN MALIGNANCIES

FMGE June 2021, July 2023 00:30:37

- MC skin malignancy worldwide: Basal cell carcinoma
- 2nd MC: Squamous cell carcinoma
- 3rd MC: Malignant melanoma



FMGE June 2021 NEET PG 2022

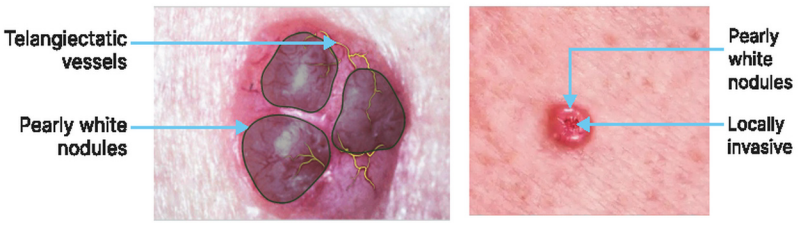
Basal Cell Carcinoma

- Arises from: Basal layer of epidermis
- MC site: Nose > Inner canthus
- Also called: Rodent ulcer/Tear cancer
- Characteristic features :
- Pearly white nodules at the periphery
- Central ulceration or depression
  - Rolled edges
  - Telangiectasia on the surface
  - Bleeds easily on touch
- Diagnosis:
  - Wedge biopsy
  - Biopsy taken from the edge
- Treatment :
  - Non-aggressive tumor: Wide local excision with 2 cm margin
  - Large, aggressive, recurrent, cosmetic area or vital area tumor: Moh's micrographic surgery

Squamous Cell Carcinoma

FMGE Jan 2024

- Second most common skin malignancy
- MC skin malignancy in darkly pigmented skin
- Arises from: Prickle cell layer
- Characteristic features :
  - Rolled out or everted edges
  - Indurated base
- Risk factors :
  - Sunlight- MC causative factor
  - Senile or actinic keratosis
  - HPV infection
  - Arsenic exposure
  - Immunosuppression
  - Radiation exposure
- Histopathology :
  - MC variety: Ulcerative variety
  - Cell nest/Epithelial pearl/Keratin pearl
- Clinical presentation
  - Scaly, erythematous leions



Basal Cell Carcinoma (Nodular)



Yourwish

- Can ulcerate & metastasize
- Diagnosis: Wedge biopsy from the edge
- Treatment :
  - Small or non-invasive lesion: Wide local excision
  - Large, recurrent, aggressive, cosmetic area or vital area lesion: Moh's micrographic surgery

Malignant Melanoma



- Caused by malignant transformation of Junctional melanocytes
- MC site in males: Back and trunk
- MC site in females: Lower limb
- Markers :
  - Positive- Vimentin, S100, HMB45
  - Negative marker: Cytokeratin 20

Types of Malignant Melanoma

Type	Feature
Superficial spreading melanoma	MC type overall
Nodular melanoma	2nd MC, most malignant
Lentigo maligna melanoma	Least malignant
Acral lentiginous melanoma	Least common, worst prognosis

Nodular Melanoma

- Most malignant type
- Vertical growth phase
- MC site: Head and neck

Lentigo Maligna Melanoma

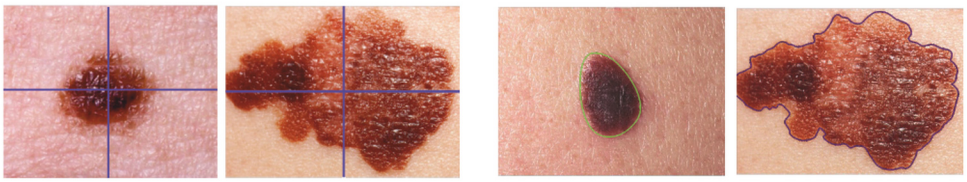
- Least malignant type
- Seen in sun-exposed areas
- MC site: Face

Acral Lentiginous Melanoma

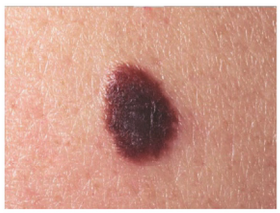
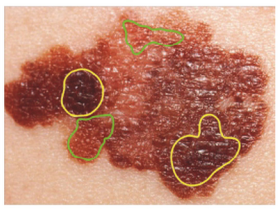
- Least common type
- Worst prognosis
- Most common site: Sole
- Classical site: Under the great toenail

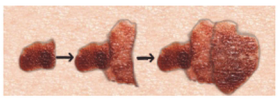
Abcde Of Malignant Melanoma

- A: Asymmetry



- B: Border irregularity
- C: Color variation



- D: Diameter >6 mm
- E: Evolution in size, shape, and color

Malignant Melanoma Spread

- MC route of spread: Lymphatic
- MC site of metastasis: Lymph nodes

Biopsy In Malignant Melanoma

- Small lesion: Full-thickness excisional biopsy
- Large lesion: Incisional biopsy

Treatment Of Malignant Melanoma

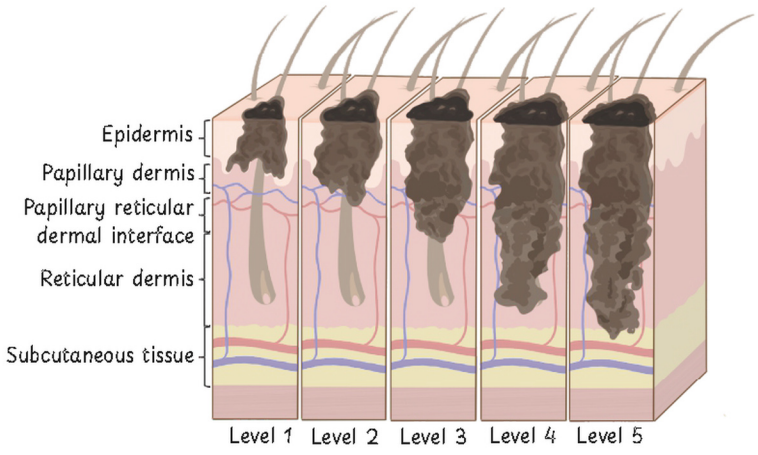
- Wide local excision with sentinel lymph node dissection
  - Usually margin: 2 cm

Prognostic Indicators

- MC important prognostic factor- Depth of invasion

Clark Levels- Based On Depth of Invasion

Level	Invasion
Level 1	Epithelium
Level 2	Papillary dermis
Level 3	Junction of papillary and reticular dermis
Level 4	Reticular dermis
Level 5	Subcutaneous tissue



Yourwish

Breslow Staging

- Based on the actual depth of invasion
- Measurement taken from the granular layer
- Better prognostic indicator than Clark level

Stage	Depth of Invasion
Stage 1	<0.75 mm
Stage 2	0.75 to 1.5 mm
Stage 3	1.6 to 4 mm
Stage 4	>4 mm

SEBACEOUS CYST

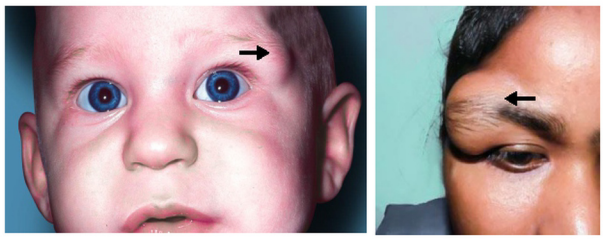
00:45:18

- Also known as: Epidermal cyst/Epidermoid cyst
- Proliferation of epidermal cells
- Caused by: Follicular obstruction with retention of secretions
- Type of cyst: Retention cyst
- Contents: White creamy material
- Characteristic feature: Black colored punctum
- Punctum absent in :
  - Scalp
  - Scrotum
- Treatment :
  - Complete excision with wall removal
  - I&D with antibiotics if infected
- Recurrence occurs if the wall is left behind

ANGULAR DERMOID

00:47:50

- Located at external angular process of the frontal bone
- Relation: Frontozygomatic suture
- Features:
  - Painless
  - Soft
  - Slow growing
  - Underlying bone indentation or resorption
- Treatment: Excision



VASCULAR ANAMOLIES OF SKIN

00:48:45

Port Wine Stain

- Present at birth
- Grows along with the child
- Persists throughout life
- Common site: Face
- Related to trigeminal nerve distribution



Yourwish

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Strawberry Angioma

- Type: Capillary hemangioma
- Not present at birth
- Appears at: 1 to 3 weeks after birth
- Grows till: 1 year of age
- Complete involution by 9 years in 90% patients
- Emptying sign: Positive

Salmon Patch

- Also known as: Stork bite or macular patch
- Present at birth
- Site: Midline from forehead to occiput
- Disappears by: 1 year of age



ONE LINERS

00:51:45

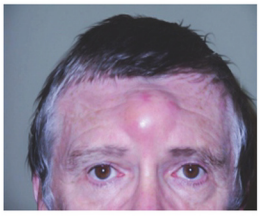
COCK'S PECULIAR TUMOR

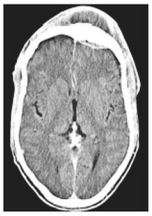
- Infected sebaceous cyst of the scalp



POTT'S PUFFY TUMOR

- Osteomyelitis of the frontal bone





PILOMATRIXOMA

- Benign hair follicle-derived tumor
- Also known as: Calcifying epithelioma of Malherbe



CYLINDROMA

- Also known as: Turban tumor
- Characteristic feature: Piling of tissues one over another



Yourwish

PYQs

00:53:53

NEET PG August 2024

Q. Which type of ulcer is given below?

a. Venous ulcer
b. Arterial ulcer
c. Trophic ulcer
d. Diabetic foot



Ans: b. **Arterial ulcer**

Q. A 56-year-old female was treated for a burn wound in the lower limb 5 years ago. Now she has developed an ulcer in the burn scar, as shown in the image below. What is the most probable diagnosis?

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a. Marjolin's ulcer
b. Venous ulcer
c. Arterial ulcer
d. Cellulitis



Ans: a. **Marjolin's ulcer**

Q. A 65-year-old man who has the following lesion over the face. He complains of bleeding while itching. The most likely diagnosis is

FMGE June 2021

a. Dermatofibrosarcoma
b. Marjolin's ulcer
c. Basal cell carcinoma
d. Naevus



Ans: c. **Basal cell carcinoma**

Q. What is the preferred management of an angular dermoid cyst?

a. Surgical excision
b. Wait and watch
c. Wide local excision with a 2 cm margin
d. Laser ablation



Ans: a. **Surgical excision**

31. WOUND HEALING, TISSUE REPAIR, AND SCAR

SURGICAL CLASSIFICATION OF WOUNDS

00:00:24

Class	Type	Features	Examples
Class 1	Clean wound	• Uninfected operative wound • No inflammation • Respiratory tract, GIT, GU tract not entered • Usually closed primarily with or without a drain	**Mnemonic: IMTJAR** • **I**: Inguinal hernia repair • **M**: Mastectomy • **T**: Thyroidectomy • **J**: Joint replacement • **AAR**: Aortic Aneurysm Repair
Class 2	Clean contaminated	• Operative wound in the respiratory tract, GIT, and GU tract entered • Entered under controlled conditions • No unusual contamination	• Cholecystectomy • CBD exploration • Elective GI surgery
Class 3	Contaminated	• Open a fresh accidental wound • Major break in sterile technique • Gross GI spillage • Acute non-purulent inflammation	**Mnemonic: AGE HO** • **A**: Appendicular perforation • **G**: Gastric perforation • **E**: Enterotomy • **H**: Human bite • **O**: Open fracture / Open cardiac massage
Class 4	Dirty wound	• Organism causing infection is already present • Purulent inflammation present • Devitalized tissue or pus already present • Old traumatic wounds with retained devitalized tissues • Clinical infection or perforated viscera	**Mnemonic: FNP** • **F**: Fecal peritonitis • **N**: Necrotizing soft tissue infection • **P**: Perforated diverticulitis

Risk of Infection

Class	Risk of Infection	ANTIBIOTIC PROPHYLAXIS
Clean	5%	Not required
Clean contaminated	10%	Usually required
Contaminated	20 to 30%	Required always
Dirty	30 to 40%	Treatment needed, not prophylaxis

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Avoiding Surgical Site Infection

00:09:15
FMGE June 2022

- Hand washing: Most effective
- Minimize hospital stay
- Avoid preoperative shaving
- Prefer on-table clipping of hair
- Standardized antibiotic skin preparation
- Bowel preparation if needed
- Best time to give pre-OP antibiotics: At induction or within 60 minutes before surgery
- Maintain theater technique & discipline
- Avoid pre-OP hypothermia
- Prefer monofilament sutures over polyfilament sutures
- Proper wound opposition to avoid dead space and hematoma

CHRONIC WOUNDS

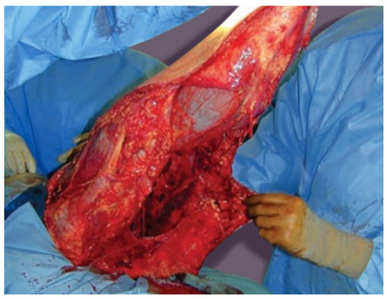
00:11:45

- Definition: Wound not healing within 3 months
- Examples:
  - Bed sore
  - Pressure sore
  - Pressure ulcer

DEGLOVING INJURY

00:12:45

- Skin & subcutaneous tissue stripped off from the underlying fascia by avulsion
- Usually seen in a crush injury
- Exposed structures:
  - Muscle
  - Tendon
  - Bone
  - Neurovascular structures



COMPARTMENT SYNDROME

00:13:48

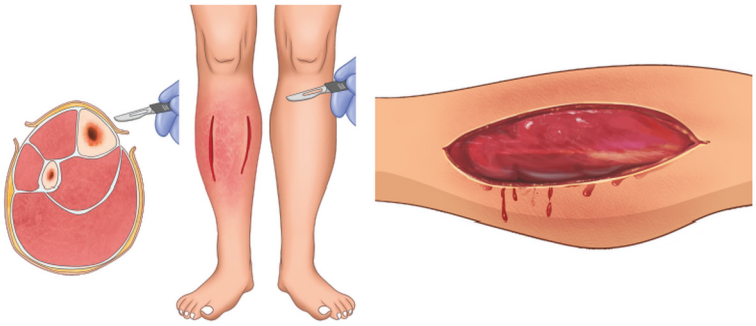
- Typically seen in closed lower limb injuries or fractures
- Bleeding and hematoma collect beneath the fascia
- Pressure rises above 30 mmHg
- Leads to ischemia of muscles
- Symptoms due to increased compartment pressure :
  - Severe pain- Pain on passive stretching
  - Distal sensory disturbance- Paresthesia
  - Pulselessness- Late sign
  - Paralysis- Associated with the worst prognosis
- Classic 5 Ps :
  - Pain
  - Pallor
  - Paresthesia
  - Pulselessness
  - Paralysis
- Diagnostic compartment pressure: >30 mmHg

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Treatment Of Compartment Syndrome

- Fasciotomy
- Indications:
  - Compartment pressure >30 mmHg
  - Presence of symptoms and signs of compartment syndrome
- Fasciotomy done on:
  - Medial side
  - Lateral side
- After fasciotomy: muscles bulge out



FMGE Dec 2021
00:18:05

PRESSURE SORE / PRESSURE ULCER

- Caused by prolonged pressure
- Also known as:
  - Bed sore
  - Decubitus ulcer
  - Trophic ulcer
  - Penetrating ulcer
- Seen in:
  - Quadriplegia
  - Paraplegia
- External pressure more than capillary occlusive pressure causes :
  - Ischemia
  - Necrosis
  - Ulceration
- Ulcer type: Painless punched-out ulcer
- Advanced ulcer: Bone seen in the base

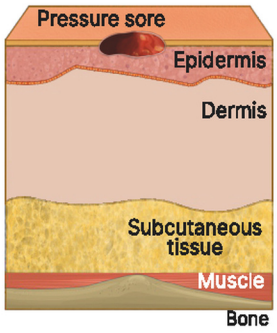
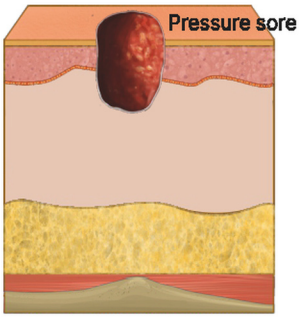
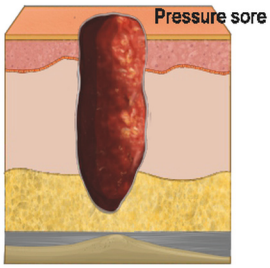
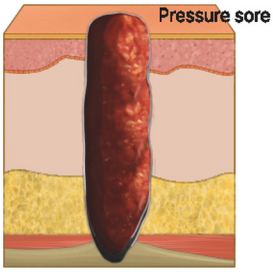
Common Sites Of Pressure Sore

Mnemonic: Indira Gandhi Stadium inaugurated by Home Minister Office

Order	Site
1	Ischium
2	Greater trochanter
3	Sacrum
4	Heel
5	Malleolus (Lateral > Medial)
6	Occiput

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Staging of Pressure Sore

Stage	Features
Stage 1	Non-blanchable erythema without breach in epidermis INICET Nov 2024 NEET PG 2022  
Stage 2	Partial thickness skin loss involving epidermis and dermis  
Stage 3	Full-thickness skin loss with subcutaneous tissue involvement  
Stage 4	Full-thickness skin loss with involvement of muscle, bone, tendon, or joint  

Management of Pressure Sore

- Good skin care
- Pressure dispersion cushions or foams
- Low air loss or air-fluidized bed
- Urinary or fecal diversion if needed
- Bed-bound patient: Turn every 2 hours
- Wheelchair-bound patient: Lift every 10 minutes for 10 seconds

Surgical Management Of Pressure Sore

- Debridement if slough or necrotic tissue is present
- Vacuum-assisted closure if non-healing
- Flap cover if required
- Most commonly used flap: Extensor fascia lata flap, based on the Lateral cutaneous nerve of the thigh

Vacuum-assisted Closure (vac)

00:26:10



- Also known as: Negative pressure wound therapy
- Pressure used: -125 mmHg
- Applies a vacuum through a special sealed dressing

Advantages Of Vac

- Draws out excess fluid
- Increases blood flow to the wound area
- Promotes wound healing

Primary Effects Of Negative Pressure Wound Therapy

- Macrodeformation: Draws wound edges together
- Stabilizes wound environment: Protects wound from outside organisms
- Reduces edema: Removes wound secretions and exudate
- Microdeformation: Increases cellular proliferation on the wound surface

Contraindications Of Vac

Mnemonic: MUNNa

- **M**: Malignancy in wound
- **U**: Untreated osteomyelitis
- **N**: Non-enteric and unexplored fistula
- **N**: Necrotic tissue with eschar

SCAR FORMATION

00:29:49

- Phase responsible for scar formation: Maturation phase
- Maximum tensile strength achieved after: 12 weeks or 3 months
- Maximum tensile strength achieved: 80% of uninjured skin

Hypertrophic Scar

- Excessive scar tissue present
- Does not extend beyond original wound boundaries
- Cause:
  - Prolonged inflammatory phase
  - Poor scar sighting
    → Improves spontaneously over time
    → Histology:
  - Excess well-organized type 3 collagen
  - Hypervascularity

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Treatment Of Hypertrophic Scar

- Silicone gel sheet application: Pressure therapy
- Intralesional triamcinolone if ongoing hypertrophy
- Excision with primary closure if it persists beyond 1 year

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Keloid

- Excessive scar tissue extending beyond original wound boundaries
- Etiology: Unknown
- More common in darkly pigmented skin
- Genetic predisposition present
- MC site: Sternum

Histology Of Keloid

- Excess disorganized collagen
- Type 1 and type 3 collagen increased
- Hypervascularity present
- Thick collagen bundles present

Treatment Of Keloid

- Refractory to medical & surgical treatment
- 1st treatment
  - Silicone sheet application
  - Intralesional triamcinolone injection
- Refractory Keloid
  - Defined as no improvement after 12 months of treatment
  - Treatment: Excision and Postoperative radiotherapy

PYQs

00:36:05

Q. A patient presents to the clinic with a lesion as shown in the image. He had a traumatic injury to the affected area years ago, and the scar has grown beyond the boundary of the initial injury. What is the most likely diagnosis?

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a. Hemangioma
b. Hypertrophic scar
c. Keloid
d. Neurofibroma

Ans: c. Keloid

Q. A patient who underwent surgery for a lipoma 5 weeks ago now presents with a scar at the incision site that is limited to the original wound boundaries. What is the most likely diagnosis?

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a. Keloid
b. Exuberant granulation
c. Hypertrophic scar
d. Granulation tissue

Ans: c. Hypertrophic scar

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Q. An 84-year-old man who had a stroke 2 years ago and has been on extended bed rest develops a pressure ulcer with partial skin thickness loss and a clean base. What is the grade of his pressure sore? INICET Nov 2024

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

Ans: b. 2

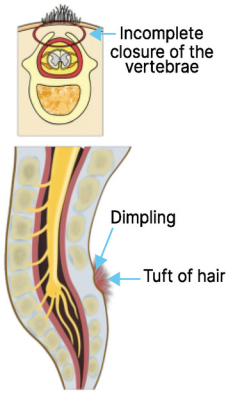
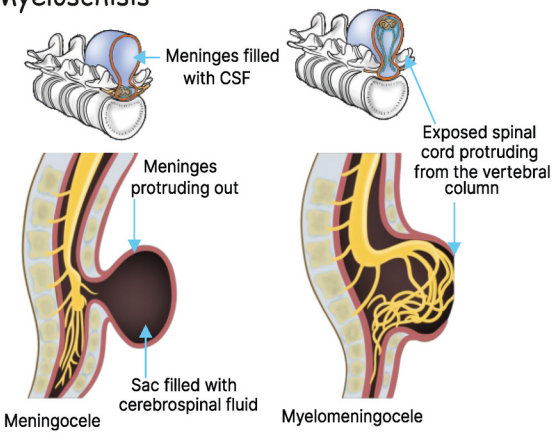
Yourwish

21. NEUROSURGERY

NEURAL TUBE DEFECTS

00:00:22

Types

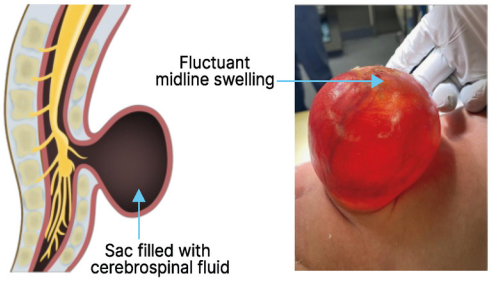
Spina Bifida Occulta	Spina Bifida Aperta
• Closed spina bifida • Associated with incomplete closure of one or more vertebrae without herniation of meninges or spinal cord • Dimpling or a tuft of hair at the site of the defect.  Spina bifida occulta	Types • Meningocele • Myelomeningocele • Myeloschisis 

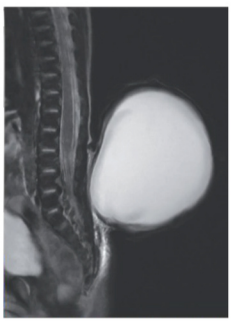
Spina Bifida Aperta

- Includes
  - Meninges
  - Spinal cord

Meningocele

- Herniation involves the meninges only.
- Contains clear CSF: Brilliantly transilluminant
- Presents as a fluctuant midline swelling along the vertebral column (lower back) covered by skin.
- Development is normal
- Position in the spinal canal is normal





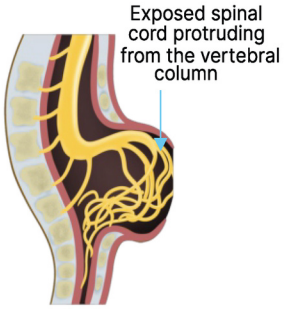
Diagnosis

- X-ray reveals the vertebral defect.

Treatment

- Immediate surgery indications
  - Leaking CSF
  - Thin skin covering
- Delayed surgery if

- Normal neurological findings
- Full-thickness skin covering





Myelomeningocele

- The most severe form of dysraphism. Involving the vertebral column
- Incidence 1 in 4000 live births
- MC site lumbosacral region

Etiology

- Genetic predisposition
- Risk of occurrence
  - If one child is affected, the risk of occurrence 3%-4%
  - If two children are affected, the risk of occurrence 10%
- Periconceptional use of folic acid supplementation decreases the incidence of neural tube defects in high-risk pregnancies by 50%

CEREBROVASCULAR ACCIDENTS

00:07:30

Ischemic 85%	Hemorrhagic 15%
• Embolic 75% • Throbotic 25%	• Parenchymal 10% • SAH 1-2% • EDH <1-2% • SDH <1%

Intracerebral Hemorrhage

- MC type of intracranial hemorrhage.
- MC Cause: Rupture of small perforating arteries or arterioles.
- Primary risk factor: Uncontrolled hypertension.
- M/C site: Basal ganglia.
- MC specific site: Putamen.

Subarachnoid Hemorrhage

- MC cause: trauma>rupture of berry aneurysm

Clinical Features

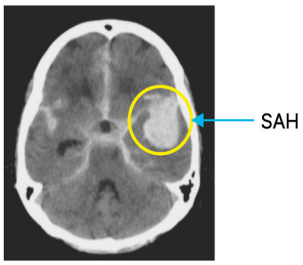
- Sudden transient loss of consciousness
- Worst headache of life/thunderclap headache
- Excruciating severe headache
- Neck stiffness and vomiting are common
- Focal neurological deficits: Uncommon.
- Sudden headache in the absence of focal neurological deficits.→ hallmark of aneurysmal rupture

Diagnosis

- IOC: Non-Contrast CT (NCCT).
- CSF Tap: Shows Xanthochromic spinal fluid (hallmark of rupture of Berry aneurysm)

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- Indications:
  → If a CT scan fails to establish the diagnosis of SAH
  → No mass lesion or obstructive hydrocephalus is found in the presence of subarachnoid blood



Management

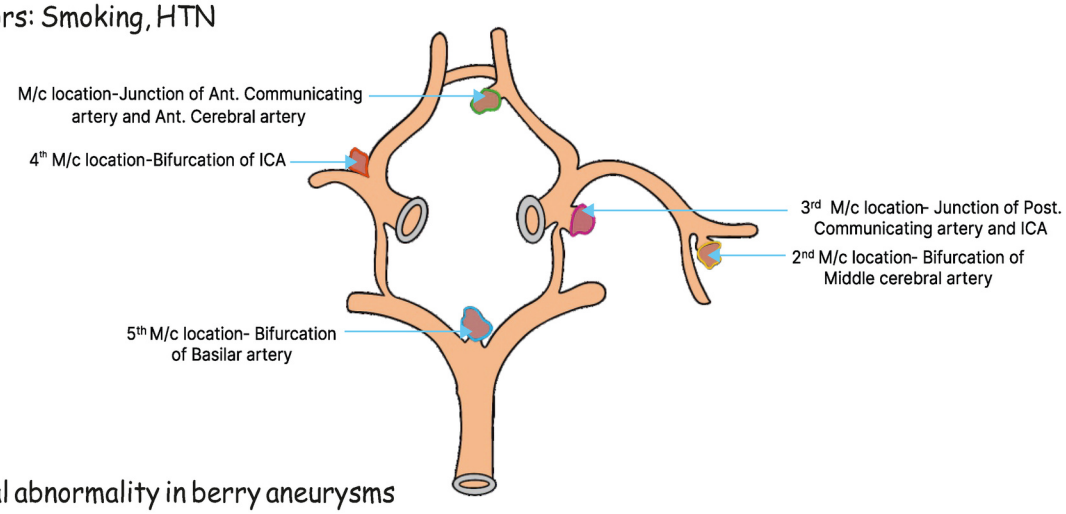
- Traumatic SAH: Managed conservatively.

Prognosis

- Hunt and Hess Scale: Based on neurological symptoms.
- World Federation of Neurological Scale based on GCS.

Berry Aneurysms

- MC type of intracranial aneurysms
- Saccular
- Arises from the bifurcation of the arteries
- Site
  - MC(85% of aneurysms) anterior circulation of the circle of Willis
  → At the junction of the anterior communicating and the anterior cerebral artery
  - 2nd MC: Bifurcation of the middle cerebral artery
  - 3rd MC: Junction of the Posterior Communicating Artery and the Internal Carotid Artery
  - 4th MC: Bifurcation of ICA
  - 5th MC: Bifurcation of the basilar artery
- Risk factors: Smoking, HTN



Pathlogy

- Structural abnormality in berry aneurysms
  - Absence of SMILE: Smooth muscle and Internal elastic lamina
- Wall of berry aneurysm made of thickened hyalinised intima (THI)

Clinical Presentation

Unrupted	Ruptured

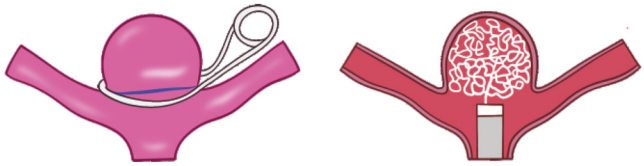
• Completely asymptomatic
• Diagnosed incidentally on radiological investigations
	• Can lead to
	  ○ Intracranial hemorrhage
	  ○ SAH
	  ○ Or both
	• MC site of rupture is dome/apex

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Management

- Preferred treatment: Endovascular coil occlusion or embolisation
- If not possible: Carotid endarterectomy followed by surgical clipping



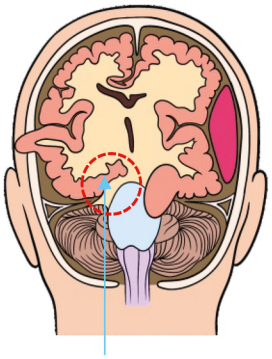
Surgical clipping Endovascular embolization

Kernohan's Notch Pohenomenon

- Cerebral peduncle indentation associated with transtentorial or uncal herniation
- Compression of the contralateral cerebral peduncle against the free edge of the tentorium
- I/L 3rd nerve palsy and I/L hemiparesis

Kernohan Woltman Sign

- Lateral displacement of the midbrain
- Compression of the opposite cerebral peduncle
- Positive Babinski sign
- Hemiparesis C/L to original hemiparesis



Kernohan's notch

Duret Hemorrhage

- Hemorrhage in the upper brainstem, specifically the ventral and paramedian aspect.

Pathogenesis

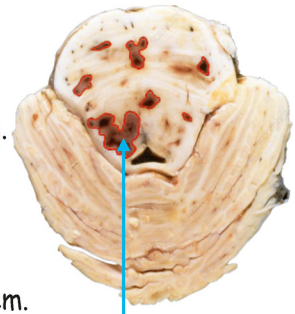
↑ Intracranial tension → downward displacement of the brainstem.

↓

Stretching and injury of the basilar artery perforators.

↓

Bleeding into the ventral and paramedian part of the upper brainstem.



Duret hemorrhage

- Mnemonic (BBBB):
  - B: Brainstem downward displacement.
  - B: Basilar artery perforator stretching.
  - B: Bleeding.

BRAIN TUMORS

00:24:43

Risk Factors

- Radiation exposure
- Genetic abnormalities.
  - Mnemonic (RL NOT IN MTV GT):
    - → R: Retinoblastoma
    - → L: Li-Fraumeni syndrome.
    - → N: Neurofibromatose 1 (Nf1). Neurofibromatose 2 (NF2).
    - → M: MEN 1 syndrome
    - → T: Turcot syndrome.
    - → V: VHL (Von Hippel-Lindau)-Syndrome.
    - → G: Gorlin syndrome.
    - → T: Tuberous sclerosis.

Associations

- MEN1 Syndrome → ↑ risk of Pituitary adenoma.
- Turcot Syndrome (Variant of FAP) → ↑ risk of Medulloblastoma.
- VHL Syndrome → ↑ risk of Cerebellar hemangioblastoma.

One Liners

Brain Tumors

- MC brain tumor overall: Metastasis.
- MC source for brain metastasis: Lung carcinoma > Breast carcinoma.
- MC source for leptomeningeal metastasis: Breast carcinoma.
- MC primary brain tumor: Meningioma > Glioma.
- MC malignant brain tumor and most radiosensitive in children: Medulloblastoma MC suprasellar mass:
  - Adults: Pituitary adenoma.
  - Children: Craniopharyngioma (associated with calcification).
- Brain tumors with calcification
  - Mnemonic (COM):
    → C: Craniopharyngioma (Seen in almost 100% of cases).
    → O: Oligodendroglioma (Seen in ~90% of cases).
    → M: Meningioma (Seen in ~25% of cases).

Spinal Tumour

- MC spinal tumor: Metastasis.
- MC primary spinal tumor: Nerve sheath tumor.
- MC site of primary spinal tumors: Intradural extramedullary.

Clinical Presentation of Brain Tumors

- 3 Cardinal symptoms
  - Seizures.
  - Focal neurological deficits.
  - ↑ Intracranial Tension (ICT) manifestations.
    → Morning Headache
    → Nausea and vomiting.
- Pituitary Adenoma: Presents with endocrine abnormalities.

Diagnosis

- IOC for diagnosis: MRI.

Management

Medical Management

- Dexamethasone: ↓ Peritumoral edema by stabilizing cell membranes.
- Anti-epileptics: Used if the tumor is near the sensory-motor strip.
- Mannitol: Hypertonic solution used before dural opening/resection → ↓ ICP via osmotherapy.

Surgical Management

- The main purpose of surgical treatment is to

- Histological diagnosis
- Reduction of mass effect while preserving neurological function.

Postoperative Radiotherapy

- Indicated for positive margins
- Infiltrating tumors surrounding the brain (e.g., Glioblastoma Multiforme).

Craniospinal Irradiation

- Indication: Tumors with CSF spread.
- Mnemonic for CSF Spread Tumors (CPM GERM CAP):
  - C: CNS Lymphoma.
  - P: Pineoblastoma.
  - M: Medulloblastoma .
  - GERM: Germ cell tumors.
  - C: Choroid plexus carcinoma.
  - A: Anaplastic ependymoma.
  - P: (Primitive Neuroectodermal Tumor).

GLIOMAS

- Includes
  - Astrocytoma
  - Oligodendroglioma
  - ependymoma

Astrocytoma

- Arise from astrocytes.

Children	Adults
• Infratentorial • MC site cerebellum • MC type pilocytic • Prognosis best	• Supratentorial • MC site cerebral cortex • MC type glioblastoma multiforme • Prognosis is worst

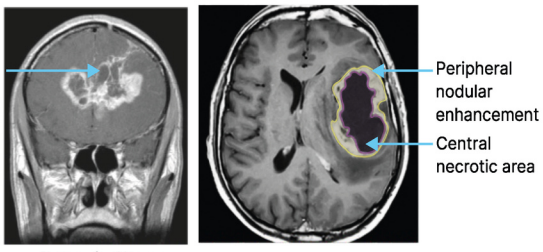
Glioblastoma Multiformae

Pathology

- Necrosis is required for diagnosis.

Radiology

- Butterfly Tumor: Crosses the midline.
- Ring Enhancement: Central necrosis with peripheral enhancement.



Butterfly Glioma

Treatment

- Cytoreductive surgery (maximum resection), followed by EBRT (External Beam Radiotherapy)
- Temozolomide: New agent used for newly diagnosed or recurrent GBM.

Yourwish

Oligodendroglioma

- MC site: Frontal lobe.
- MC genetic alteration: Loss of Heterozygosity (LOH) on 19q>> 1p.
  - Predicts a better prognosis and a robust response to Temozolomide.

Pathological Feature

- Fried egg cytoplasm.
- Chicken wire vasculature.
- Microscopic calcification

Clinical Features

- MC symptoms are seizures

Diagnosis

- MRI (IOC),
- But CT is better for detecting calcification.
- **Treatment**
  - Surgical excision followed by chemotherapy.

Ependymoma

- Arises from the ependymal lining of the ventricles or the central canal of the spinal cord
- MC site in Children: 4th ventricle.
- MC histology in Adults: Myxopapillary ependymoma (Remnants of central canal)
- Association: High risk for CSF spread → requires craniospinal irradiation.
- Treatment: Tumor resection + EBRT.

Medulloblastoma

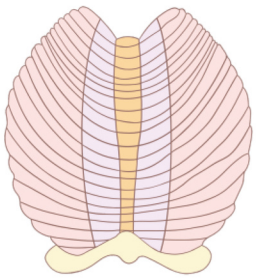
- MC malignant brain tumor in children;
- Most radiosensitive brain tumors
- MC site in
  - Children: Vermis (Midline).
  - Adults: Lateral cerebellar hemisphere.Associated with Turcot's syndrome

Clinical Presentation

- Children: ↑ ICT, headache, and papilledema.
- Adults: Ataxia and unilateral dysmetria.
- CSF spread is seen, so craniospinal irradiation is given
- The most important prognostic factor is tumor dissemination.

Treatment

- Surgical resection + Radiotherapy + Chemotherapy.



Meningioma

- MC primary brain tumor: meningioma > glioma
- MC intracranial, extraaxial, dural-based neoplasm

Yourwish

- Arises from meningomesothelial cells of the arachnoid
- Located along the superior sagittal sinus.

Risk Factors

- More common in females; obese

Pathologic Features

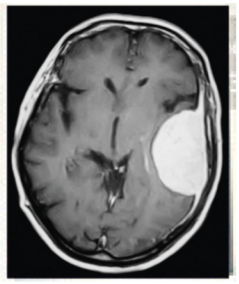
- Slow growing
- En plaque growth pattern.
- Psammoma Bodies: Dystrophic calcification.
  - Mnemonic for Psammoma Bodies (PSM):
    - → P: Papillary carcinoma of Thyroid/Papillary variant of Renal Cell Carcinoma (RCC).
    - → S: Serous cystadenoma of the Ovary.
    - → M: Meningioma.

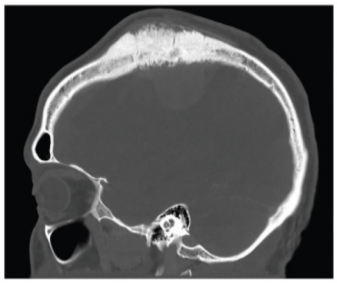
Symptoms

- Motor: Spasticity and lower limb weakness (Paraplegia or monoplegia) - 90%
- Sensory deficits -60%
- Sphincter dysfunction of the bladder

Diagnosis

- IOC for diagnosis MRI
- Radiological features
  - Dural Tail Sign: Extra-axial lesion with dural thickening
  - Bony Hyperostosis: Sunray spicules.
  - Calcifications in 25% patients
  - Signs of raised ICT
  - Enlarged foramen spinosum
  - Abnormal vascular markings.
  - Bony hyperostosis
  - Sunray spicules





Treatment

- Surgical resection.
- Simpson Grading is used for meningioma resection.

Metastatic Brain Tumour

00:51:20

- MC brain tumor
- MC site of brain metastasis: Frontal lobe
- 70% are multiple.

Diagnosis

- IOC: MRI with Gadolinium contrast.

Yourwish

Management

- Up to 3 metastases in a solitary organ (Liver/Lung/Brain) are resectable.
  - Metastasectomy: Surgical excision if ≤ 3 lesions.
- Whole Brain Radiotherapy (WBRT): If ≥ 4 lesions.
- Stereotactic Radiosurgery: If the tumor size is < 3 cm.
- Chemotherapy
  - Small-cell lung cancer
  - Seminoma

PYQ

00:53:20

Q. What is the most common site of Berry aneurysm in the circle of Willis?

a. Anterior cerebral artery
b. Middle cerebral artery
c. Basilar artery
d. Vertebral artery

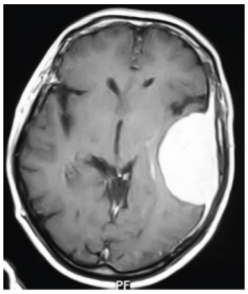
Ans: a. Anterior cerebral artery.

Q. Which of the following is most likely to be seen due to rupture of a saccular aneurysm in the brain?7

a Subdural hemorrhage
b. Subarachnoid hemorrhage
c. Hydrocephalus
d. Intracerebral hemorrhage

Ans: b. Subarachnoid hemorrhage

Q. A. A 40-year-old patient presents to OPD with complaints of recurrent headaches and nausea. The MRI brain is shown below. What is the diagnosis?



a. Meningioma
b. Glioma
c. Ependymoma
d. Pilocytic astrocytoma

Ans: a Meningioma

27. ORAL CAVITY

CARCINOMA ORAL CAVITY

00:00:20

- M/c mutation: P53
- Histological type: Squamous cell carcinoma
- M/c site
  - Worldwide: Tongue > lip
  - India: Buccal mucosa
- Pattern of Spread: Local extension + Regional lymphatic spread
- M/c site of metastasis: Lungs
- B/l lymphatic spread
  - Lo - Lower lip
  - S - Supraglottis
  - S - Soft palate
  - Penis
- IOC for Diagnosis: Edge biopsy
- IOC for Staging: MRI
- M/c flap used in head and neck reconstruction: PMMC flap
  - Based on Pectoral branches of thoracoacromial vessels

Risk Factors

- Tobacco
- Alcohol
- Betel nut / areca nut
- Gutka / pan masala
- Sharp jagged tooth, Ill-fitting dentures → ↑ risk of Ca tongue
- Plummer-Vinson syndrome
- Syphilitic Glossitis
- HPV infection
- Poor nutrition (Vitamin A deficiency)

Premalignant Conditions

Leukoplakia	Erythroplakia

• White patch / plaque in oral cavity
• More common
• Lesser risk of malignancy
• Risk factor
  ○ Smoking, Alcohol
  ○ Jagged tooth
  ○ Ill-fitting dentures
	• Red patch / plaque in oral cavity
	• Less common
	• Higher risk of malignancy
	• Diagnosis: Biopsy
	• Management: Surgical excision

Yourwish

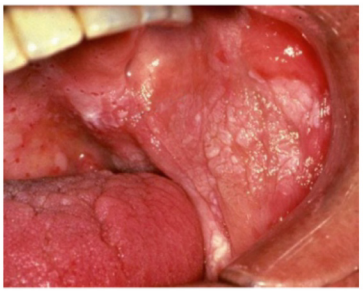
- Diagnosis: Biopsy
- Management
  - Stop tobacco / alcohol
  - Correct dentures / tooth problem
  - Moderate to severe dysplasia → surgical ablation





Speckled Erythroplakia

- Speckled leukoplakia / Erythroplakia
  - Combination of leukoplakia + erythroplakia
- White patch over erythematous base
- Malignancy risk: Speckled erythroplakia > erythroplakia > leukoplakia



Oral Submucous Fibrosis

- Formation of fibrous bands in submucosa of oral cavity
- Risk factors: Areca nut chewing
- Population: Asian - Female
- Features:
  - Restricted mouth opening
  - Restricted tongue movement
- Increased Risk of: Squamous cell carcinoma
- Treatment:
  - Preferred: Intralesional injection of triamcinolone
  - Alternate treatment : excision + grafting





Carcinoma Oral Cavity - Clinical Features

00:14:00

- Persistent ulcer or swelling
- Sore tongue
- Difficulty swallowing
- Jaw / Facial swelling
  - D/t Local extension of tumor
- Painless neck mass : Cervical lymph node metastasis
- Trismus : Restricted mouth opening

Carcinoma Oral Cavity - Diagnosis

- IOC for diagnosis: Edge biopsy
- IOC for staging: MRI

Yourwish

Yourwish

Treatment of Carcinoma Oral Cavity

- Main modality: Surgery with reconstruction
  - T1 & T2: Wide local excision with 2 cm margin
  - T3 / T4: Surgery + radiotherapy
- Chemotherapy regimen:
  - Most preferred regimen: Cisplatin + 5-FU
  - Concurrent chemoradiation > concurrent chemotherapy

Radiotherapy

- M/c used: External beam radiotherapy
- Complications
  - M/C complication : Xerostomia
  - Mucositis
  - Dysgeusia
  - Osteoradionecrosis: Increased risk with carious tooth

Carcinoma LIP

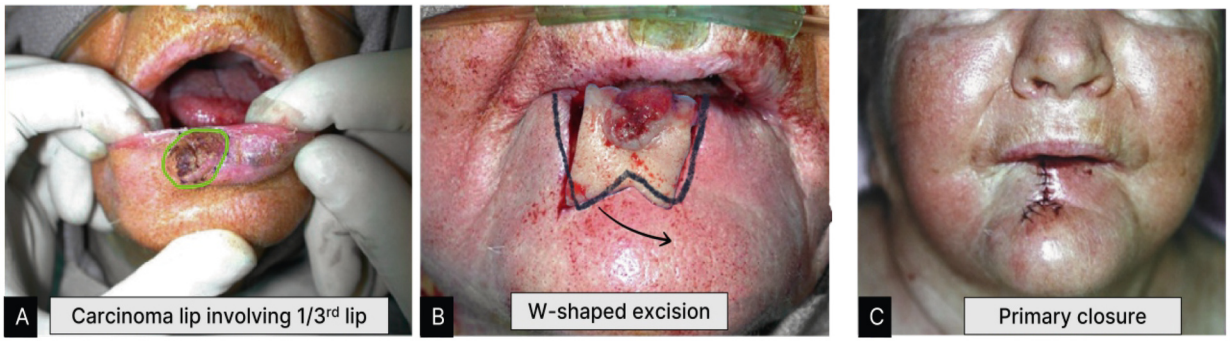
00:18:45

- M/c site: Lower lip (Vermilion border)
- Risk factor: Ultraviolet radiation exposure
- More common in: Males
- Clinical Features:
  - Swelling, Ulceration
  - Ca Lower lip: Bilateral lymph node involvement
- Diagnosis
  - IOC for diagnosis: Edge biopsy
  - IOC for Staging: MRI



Treatment

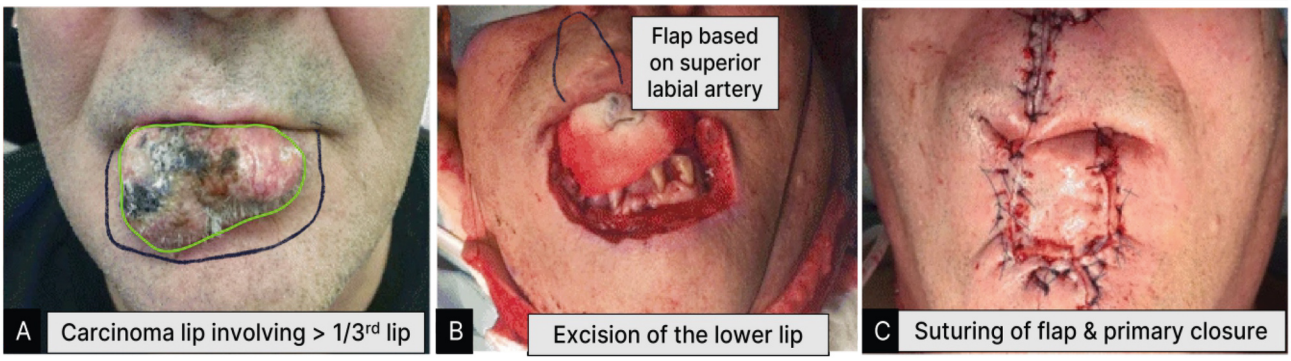
- T1 / T2 : Wide local excision with 2 cm margin
  - Up to one-third lip involvement: V-shaped / W-shaped excision + primary closure





Yourwish

- More than one-third lip involvement: Excision + flap closure (Abbe-Estlander flap)



→ Abbe-Estlander flap: taken from upper lip, Based on superior labial artery

- T3 / T4 : Surgery + radiotherapy

Carcinoma Tongue

00:24:43

- M/c site: Lateral border of Junction of middle one-third and posterior one-third
- M/c type: Ulcerative variety
- Features:
  - Non-healing ulcer
  - Unable to tolerate hot and spicy food
- M/cly involved lymph node: Level 2 - Upper jugular lymph node
- Diagnosis
  - IOC for Diagnosis: Edge biopsy
  - IOC for Staging: MRI
- Treatment
  - T1: Partial glossectomy + primary closure
  - T2: Hemiglossectomy + radiotherapy
  - T3: Total glossectomy + mandibulectomy
  - T4: Total glossectomy + mandibulectomy + MRND + laryngectomy + radiotherapy



Carcinoma Buccal Mucosa

00:28:10

- M/c oral cavity malignancy in India
- M/c site: Buccal mucosa
- Clinical Features :
  - Lesion with Minimal pain
  - Stenson duct obstruction → Parotid enlargement
- Treatment
  - T1 / T2 : Wide local excision + reconstruction
  - T3 / T4 : Surgery + radiotherapy



Carcinoma Hard Palate

00:29:32

- Arises from: minor salivary gland
- MC type: Adenoid cystic carcinoma
- SCC: Rare
- Risk factor: Reverse smoking



PYQ 00:31:16

Q. A 32-year-old patient who is a chronic alcoholic presents with oral ulcers and a burning sensation. A picture of the oral cavity is given below. What is the most likely diagnosis?



a. Leukoplakia
b. Erythroplakia
c. Submucosal fibrosis
d. Malakoplakia
Ans: **a. Leukoplakia**

Q. Which is the M/c site for head and neck cancer in India?

a. Nasopharynx
b. Oropharynx
c. Oral cavity
d. Hypopharynx
Ans: **c. Oral cavity**

Q. What is the condition depicted in the given image, and what is the next investigation required for management?



a. Erythroplakia and biopsy
b. Erythroplakia and observation
c. Leukoplakia and biopsy
d. Leukoplakia and observation
Ans: **a. Erythroplakia and biopsy**

Q. An elderly chronic smoker male is diagnosed with squamous cell carcinoma of the lower lip with no lymph node involvement. What is the treatment of choice?

a. Radiotherapy
b. Combined chemoradiotherapy
c. Wide local excision with negative borders
d. Wide local excision with frozen section
Ans: **c. Wide local excision with negative borders**

Q. A patient is diagnosed with squamous cell carcinoma at the base of the tongue. What is the M/c causative agent?

a. EBV
b. HPV
c. HCV
d. CMV
Ans: **b. HPV**

Yourwish

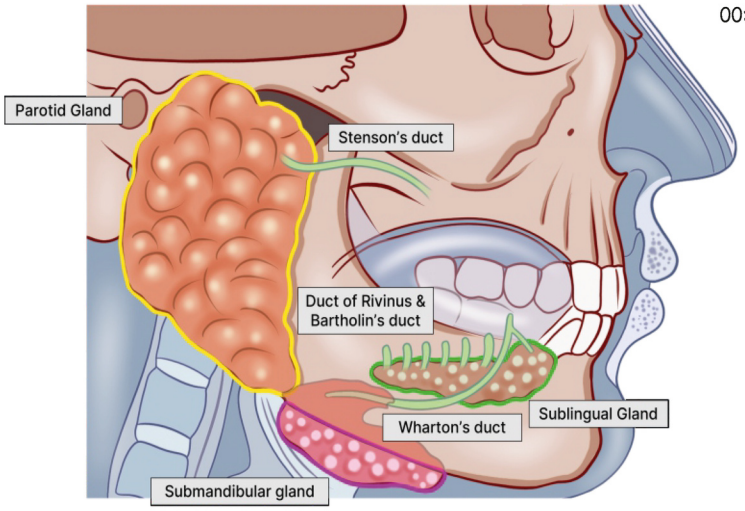
26. SALIVARY GLAND

ANATOMY AND TYPES OF ACINI

00:00:25

Types Of Acini

- Parotid gland: serous acini
- Submandibular & sublingual gland: serous + mucinous acini
- Minor salivary gland : mucinous acini



Ducts of Various Glands

- Parotid duct : Stenson's duct, opening near upper second molar
- Submandibular duct : Wharton's duct, open just lateral to frenulum
- Sublingual ducts: Duct of Rivinus & Bartholin's duct

SALIVARY GLAND TUMORS

00:02:41

FMGE 2023
NEET PG 2022

- M/c salivary gland tumor: pleomorphic adenoma
- M/c malignant salivary gland tumor: mucoepidermoid carcinoma
- M/c neoplasm of salivary gland in children: hemangioma
- M/c malignant tumor of minor salivary gland: adenoid cystic carcinoma
- Most of the salivary gland tumors are more common in Parotid
  - Tumors include
    - → Pleomorphic adenoma
    - → Warthin tumor
    - → Mucoepidermoid carcinoma
    - → Acinic cell carcinoma
    - → Lymphoma
    - → Metastasis
  - Exceptions :
    - → Adenoid cystic carcinoma: M/c site is minor salivary gland
    - → Squamous cell carcinoma: M/c site is submandibular gland

Diagnosis

- IOC for diagnosis: FNAC
- Best imaging investigation: MRI
- Open incisional biopsy: avoided
  - To prevent tumor dissemination
  - Can lead to Parotid duct injury

Yourwish

Yourwish

Risk Of Malignancy

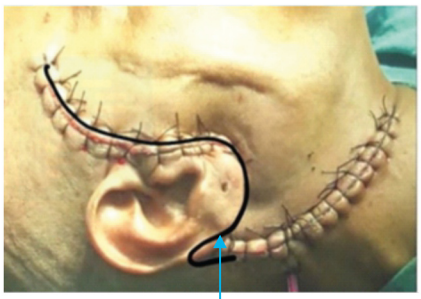
- Risk of malignancy is inversely proportional to gland size
- Parotid: 75% benign, 25% malignant
- Submandibular & sublingual: 50% benign, 50% malignant
- Minor salivary gland: 25% benign, 75% malignant

Management Of Salivary Gland Tumors

- Principal treatment: surgery
  - In some cases: Surgery in combination with radiotherapy
- Neck dissection: done in case of Lymph node metastasis
  - Clinically palpable nodes
  - High-grade malignancy
- Radiotherapy indications:
  - Large primary tumor
  - High-grade tumor
  - Cervical LN Metastasis
  - Bone invasion
  - Perineural invasion
  - Positive margins
- Chemotherapy: limited role (salivary gland and thyroid gland tumors)

Parotidectomy

- Surgical Incisions
  - Lazy S.
  - Modified Blair's.
  - Sistrunk incision

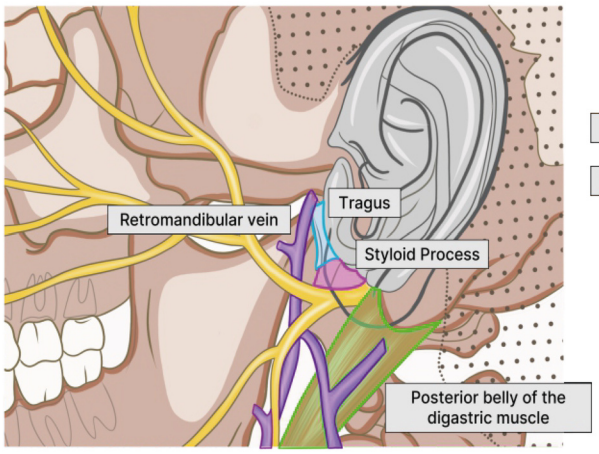


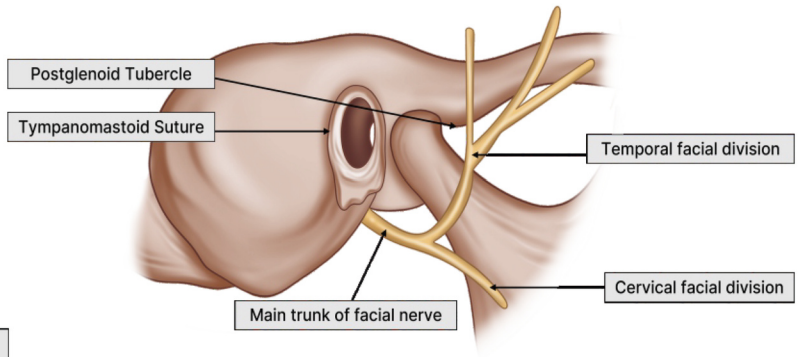
Lazy S incision

00:10:21

Surgical Landmarks For Facial Nerve

- Styloid process.
- Tragal pointer, Tympanomastoid suture.
- Retromandibular vein.
- Posterior belly of digastric.





Yourwish

Complications Of Parotidectomy

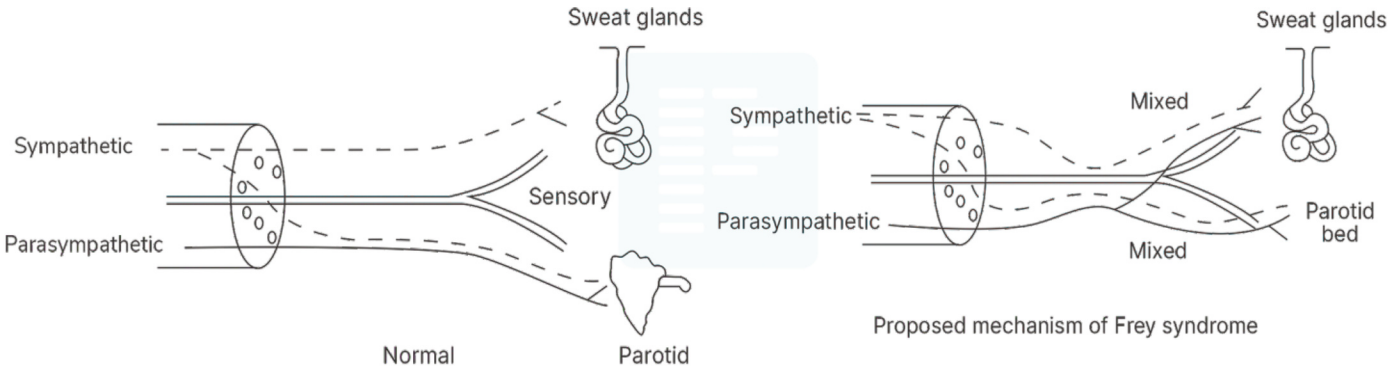
00:12:47

- Facial nerve paresis /Paralysis
  - M/c injured nerve during parotidectomy: Facial nerve
  - M/c injured branch: Marginal mandibular nerve
- Sensory impairment / numbness: Due to Greater auricular nerve injury.
- Frey syndrome → Auriculotemporal nerve injury
- Parotid fistula.

Frey Syndrome

00:14:50

- Also known as Auriculotemporal syndrome or Gustatory sweating
- Clinical feature
  - Sweating + flushing over cheek region during tasting/chewing food
- Mechanism:
  - Aberrant cross innervation between parasympathetic and sympathetic fibres during regeneration
  - During eating → parasympathetic stimulation → sweating (instead of salivation)

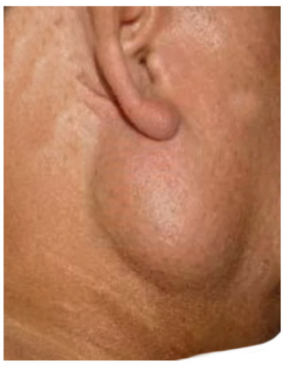


- Diagnosis: Minor starch iodine test
- Management :
  - Conservative: Antiperspirants, Facial exercises, Avoid triggering food
  - Medical: Botulinum toxin injection
    → Uses of botox: Achalasia cardia, Fissure in ano, Frey syndrome
  - Surgery (if persistent) → Tympanic neurectomy

Pleomorphic Adenoma

00:18:11

- M/c benign salivary gland tumor
- Well encapsulated, Slow growing
- M/c site : Superficial lobe / tail of parotid
- Other name: Mixed tumor (Epithelial + mesenchymal origin)
- Special feature: Finger-like projections (pseudopodia like growth)
  - Enucleation is C/I → Leads to recurrence
- Location:
  - In front, below, behind ear lobule
  - Pushes ear lobule upward
- Clinical feature
  - Benign
  - Painless



- Diagnosis
  - IOC: FNAC
- Treatment:
  - Parotid → superficial parotidectomy
  - Sublingual, Submandibular or minor salivary glands → excision of gland

Warthin Tumor

00:22:18



- More common in males
- Common in smokers
- Aka Papillary cystadenoma lymphomatosum / Adenolymphoma
- Site: Exclusively parotid
- Bilateral: 10% cases
- Diagnosis
  - IOC: FNAC
  - Special feature: Hot spot on technetium-99 Pertechnate scan
- Treatment: Superficial parotidectomy

Mucoepidermoid Carcinoma

00:24:39

- M/c malignant salivary gland tumor in children & young adults
- M/c radiation-induced neoplasm of salivary gland
- Site : Exclusively parotid

Adenoid Cystic Carcinoma

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- M/c malignant tumor of minor salivary gland
- M/c site: Hard palate > Sinonasal tract
- M/c Type : Cribriform
- Special feature: Perineural invasion with skip lesions
- Nerve involvement :
  - Facial nerve (M/c)
  - Trigeminal nerve
- Clinical features:
  - Pain
  - Facial nerve paralysis
- K/a Treacherous tumor
- M/c site of distant metastasis: Lung
- Diagnosis
  - IOC: FNAC
  - Radiological IOC: MRI
- Treatment:
  - Wide surgical excision with negative margins
  - Adjuvant radiotherapy: in case of Perineural invasion & Positive margins

SUBMANDIBULAR GLAND

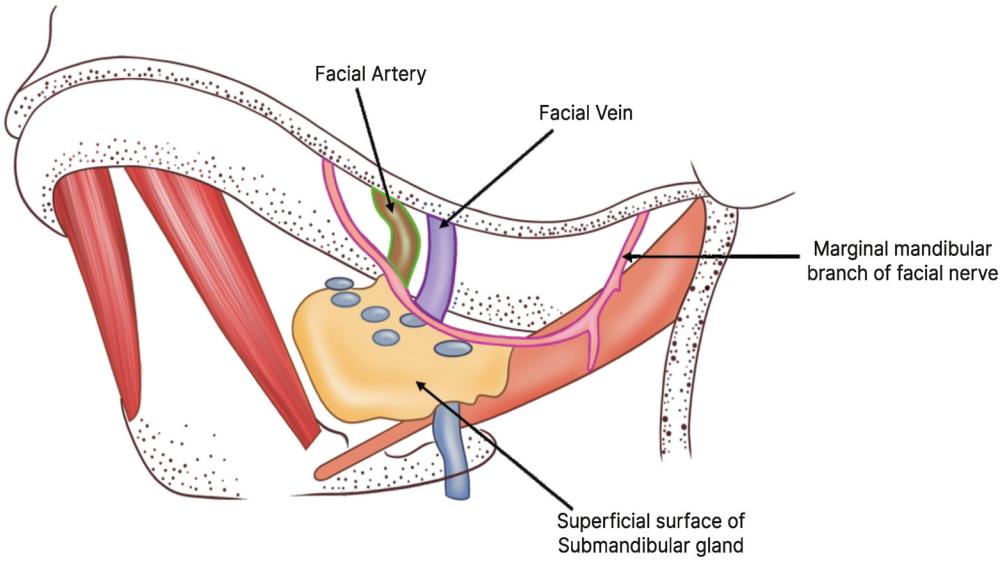
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Important Anatomical Relationships

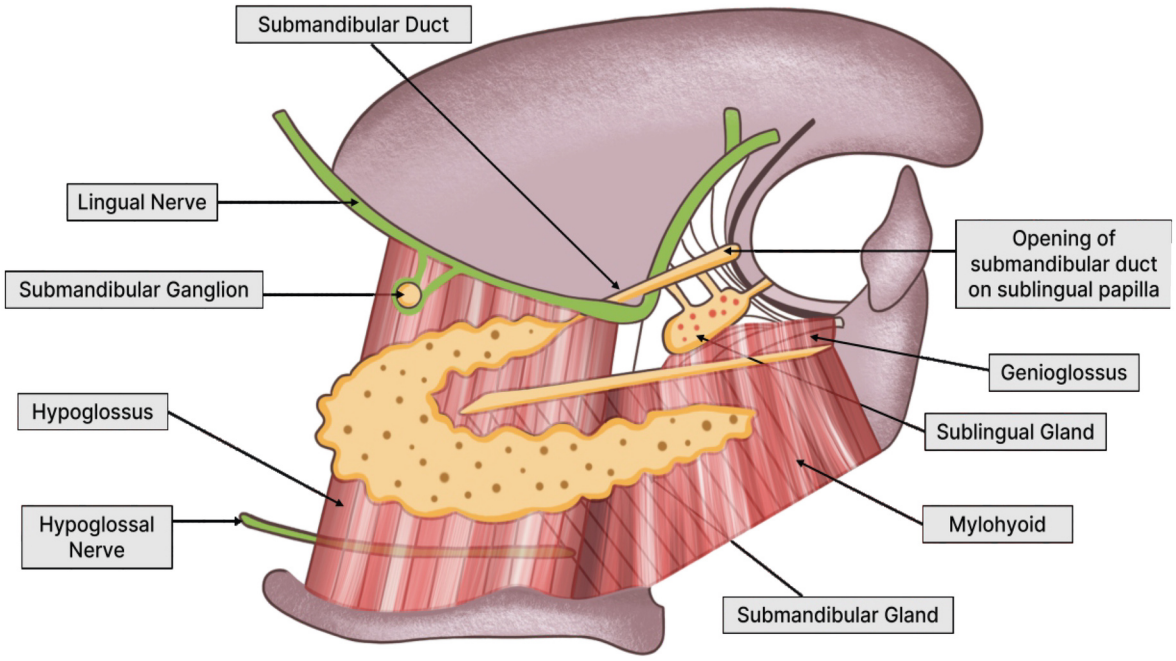
Superficial Surface

Yourwish



- Lingual nerve (M/c injured during submandibular gland surgery)
- Hypoglossal nerve
- Facial artery & Anterior facial vein
- Nerve relation: Marginal mandibular branch of facial nerve

Deep Surface



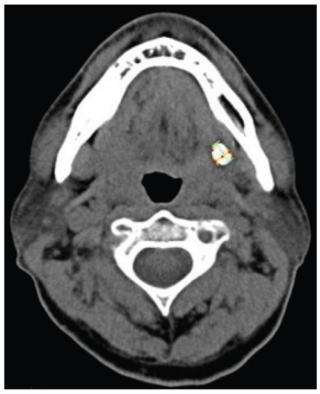
- Duct: Wharton's duct
- Nerve relations
  - Lingual nerve: Hooks Wharton's duct
  - Hypoglossal nerve: Related inferiorly
- Muscles
  - Genioglossus
  - Mylohyoid
  - Hyoglossus

Yourwish

Yourwish

SIALOLITHIASIS

NEET PG 2022 00:31:16

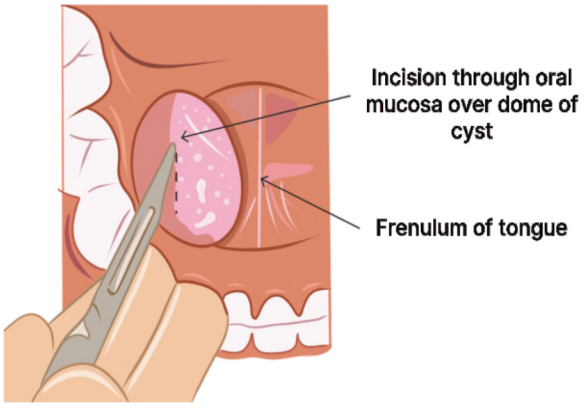


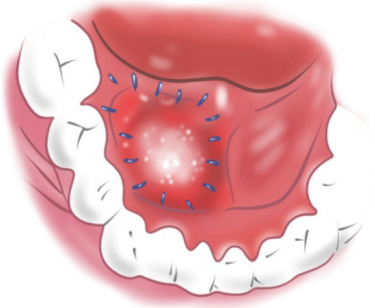
- 80% salivary gland stones are seen in: Submandibular gland
- 80% salivary gland stones: radio-opaque
- Composition: Calcium / magnesium, Phosphate / carbonate
- Clinical Features:
  - Pain & swelling during meals d/t duct obstruction
  - Referred pain to tongue d/t lingual nerve irritation
- Diagnosis:
  - IOC for diagnosis: NCCT
- Treatment:
  - Stone in the duct: Incision over duct + Remove stone (do not suture duct)
  - Stone in the gland: Excision of gland

RANULA



- Cystic swelling
- Bluish (resembles frogs belly)
- Arises from: Sublingual gland
- Types:
  - Mucus extravasation cyst: M/c
  - Mucus retention cyst
- Clinical Features:
  - Unilateral cystic swelling
  - Bluish appearance
  - Painless & dome-shaped
- Diagnosis: Clinical
- Treatment:
  - Marsupialization (Incision + suturing cyst wall to surroundings)
  - Recurrence → Excision





Plunging Ranula

- Exclusively mucus extravasation cyst
- Arises from: Sublingual gland
- Intraoral & cervical components
- Clinical Features:
  - Bluish, painless
  - Dumbbell-shaped





Yourwish

PYQ

00:37:45

Q. A 45-year-old patient complained of pain in one side of the neck. She is afraid of eating food as it worsens the pain. What is the most likely diagnosis?

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a. Sialolithiasis
b. Foreign body
c. Osteoma of the floor of the mouth
d. Cervical lymphadenopathy

Ans: a. Sialolithiasis

Q. Which nerve is most commonly injured during parotid surgery?

a. Facial nerve
b. Auriculotemporal nerve
c. Glossopharyngeal nerve
d. Greater auricular nerve

Ans: a. Facial nerve

Q. Which of the following conditions is associated with perineural invasion?

INICET May 2023

a. Adenoid cystic carcinoma
b. Pleomorphic adenoma
c. Mucoepidermoid tumour
d. Pancreatic cancer

Ans: a. Adenoid cystic carcinoma

31. NECK

CAROTID BODY TUMOR

00:00:14

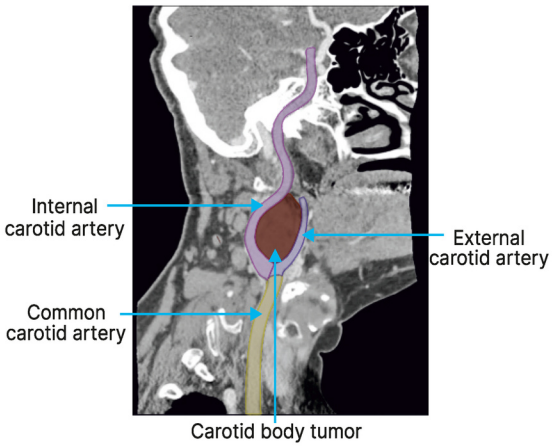
- Chemodectoma / Non-chromaffin paraganglioma
- Origin: chemoreceptor cells on the medial side of the carotid bulb
- Benign, unifocal & non-hereditary
- Classification: Schamblin Classification
- Family history in 10%
- Higher incidence in people staying at high altitude
  - Chronic hypoxia → Carotid body hyperplasia

Clinical Features

- Painless, Slowly enlarging, Firm
- Pulsatile
- Compressible
- Mobile side to side
- Audible bruit on auscultation



Diagnosis



- IOC for Diagnosis: Carotid angiography
  - Lyre sign → splaying of the carotid
- FNAC & Biopsy are Contraindicated

Treatment

- Elderly: Observation (as the tumor is benign and slow growing)
- Tumor >3 cm: Preoperative embolization (decrease the size of the tumor)
- Tumor >5 cm: Excision with carotid artery replacement (Dacron graft)

CYSTIC HYGROMA

00:06:10

- Multi-located cystic spaces lined by endothelial cells

FMGE DEC 2021, Jan 2024
INI CET May 2023

Yourwish



- Origin: Sequestration of jugular lymph sac
- Association: Turner Syndrome
- MC site: Posterior triangle of the neck
- Present at birth in 50% cases → Difficulty in labour
- Spontaneous regression is seen

Clinical Features

- Cystic mass: can lead to airway obstruction
- Infection and hemorrhage
- Soft, compressible swelling
- Transillumination: Brilliantly translucent

Diagnosis

- IOC for diagnosis: MRI

Treatment

- Preferred treatment: Surgical excision
- Alternative treatment: Sclerotherapy
  - Bleomycin, Doxycycline
  - OK-432 / Picibanil (derived from Strep. Pyogenes)

BRANCHIAL CLEFT REMNANTS

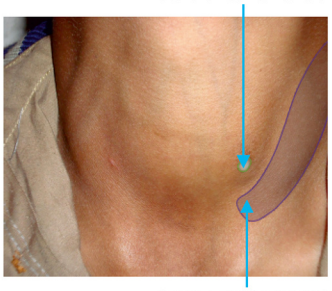
00:10:30

- Presents as lateral neck masses in toddlers
- Present at birth
- Sinus, fistula & cartilaginous rests are more common in infants
- Cysts are more common in older children and adolescents

Branchial Cyst



- Vestigial remnant of the 2nd branchial cleft
- Lined by squamous epithelium
- Content: Thick, turbid with cholesterol crystals
- M/c in early & middle adulthood
- Location: Junction of the upper and middle 1/3rd of the sternocleidomastoid muscle
- Soft, fluctuant, transillumination positive
- Diagnosis: USG/ FNAC
- Treatment: Complete excision

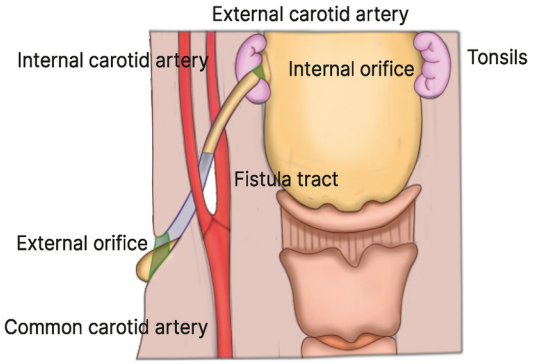


Branchial Fistula

- Persistent 2nd branchial cleft
- Unilateral/bilateral
- Lined by ciliated columnar epithelium
- Discharge: Mucus/ Mucopurulent
- External orifice: located at the lower third of the neck, anterior to the sternocleidomastoid
- Internal orifice: Anterior border of the posterior faucial pillar behind the tonsil
- Treatment: excision by multiple transverse incisions in a stepladder pattern

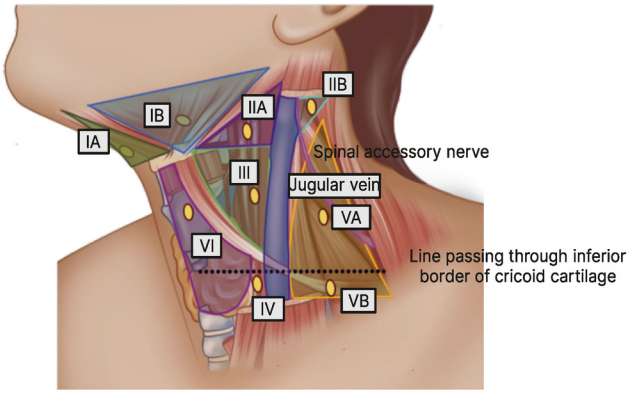
Yourwish

Yourwish



VARIOUS LYMPH NODE LEVELS

00:16:42



Level	Lymph node
IA	Submental
IB	Submandibular
IIA	Upper jugular, anterior to the spinal accessory nerve
IIB	Upper jugular, posterior to the spinal accessory nerve
III	Middle jugular
IV	Lower jugular (Virchow's node)
VA	Posterior triangular, superior to inferior border of arch of cricoid cartilage
VB	Posterior triangular, inferior to inferior border of arch of cricoid cartilage
VI	Central/ anterior compartmental/ Delphian/ Precricoid/ Prelaryngeal
VII	Superior mediastinal

NECK DISSECTION

00:21:04

Radical neck dissection	Modified radical neck dissection
• Removal of level I-V LNs+ Excision of: ○ S: Spinal accessory nerve ○ I: Internal Jugular Vein ○ Sm: Sternocleidomastoid Muscle	• Removal of level I-V LNs+ Preservation of at least one of the following: ○ S: Spinal accessory nerve ○ I: Internal Jugular Vein ○ Sm: Sternocleidomastoid Muscle • Type 1 MRND: If SAN is preserved

	• Type 2 MRND: Preservation of SAN and IJV • Type 3 MRND / Functional Neck dissection: Preservation of all 3 structures

PYQs

00:22:39

Q. In modified radical neck dissection, which of the following structures is NOT preserved? FMGE Jan 2024

a. Sternocleidomastoid muscle
b. Internal jugular vein
c. Spinal accessory nerve
d. Submandibular gland

Answer: d. Submandibular gland

FMGE Jan 2024

Q. What is the most likely diagnosis for a young patient under 5 years of age presenting with a painless, soft, fluctuating mass on the lateral side of the neck?



a. Thyroglossal cyst
b. Cystic hygroma
c. Cervical lymphadenopathy
d. Ranula

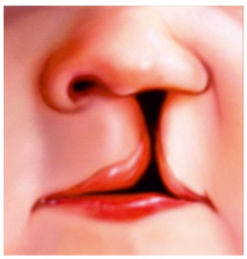
Answer: b. Cystic hygroma

39. FACIAL INJURIES AND ABNORMALITIES

CLEFT LIP AND CLEFT PALATE

00:00:10

- MC congenital abnormalities of orofacial structures:
  - Cleft of lip
  - Cleft of Alveolus
  - Cleft of soft palate & hard palate
- Usually isolated
- Sometimes a/w congenital heart diseases
- Types:
  - Unilateral Cleft Lip: d/t non-fusion of maxillary process from medial nasal process unilaterally
  - Bilateral Cleft Lip: d/t non-fusion of maxillary process from medial nasal process bilaterally



Unilateral Cleft Lip



Bilateral Cleft Lip

- Incidence Rates
  - Cleft lip + Cleft palate: 1:600 live births
  - Isolated cleft palate: 1:1000 live births

Etiology

- Genetic Predisposition
- Environmental Factors:
  - Maternal history of epilepsy → use of antiepileptic drugs
  - Drugs:
    - → D: Diazepam
    - → P: Phenytoin
    - → S: Steroids

Associated syndromes:

- Pierre-Robin syndrome → M/c
- Stickler syndrome, Spritzen syndrome
- Apert's syndrome
- Down's syndrome
- Treacher Collins syndrome

Problems with cleft abnormality:

- Feeding difficulty
- Breathing difficulty

Yourwish

Diagnosis

- Prenatal diagnosis:
  - Isolated cleft palate can be diagnosed at 18 weeks of gestation

Management:

- Surgery → Done for restoration of normal anatomy
- Common Surgical Procedures
  - Millard Rotation Advancement Technique: M/c Performed
  - Le Mesurier's Method
  - Tennison-Randall Technique
  - Thompson Technique

Cleft Lip & Cleft Palate: Timing Of Repair

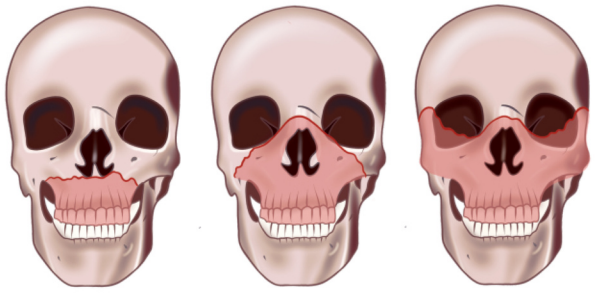
Cleft Lip alone	Cleft Palate alone	Cleft Lip & Palate

• Unilateral: 5-6 months
• Bilateral: 4-5 months
	• Soft Palate Only: 6 months
	• Hard Palate Only: 15-18 months
	• Soft & Hard Palate:
	  ○ Soft palate: 6months
	  ○ Hard palate: 15-18 months
		• Unilateral:
		  ○ Cleft lip & soft palate: 5-6 months
		  ○ Hard palate: 15-18 months
		• Bilateral:
		  ○ Cleft Lip & soft palate: 4-5 months
		  ○ Hard palate: 15-18 months

Midface Fractures (Le Fort's Fractures)

00:09:29

- Le Fort I:
  - The fracture line runs above & parallel to the palate
  - Separates alveolus and palate from facial skeleton
- Le Fort II
  - Pyramidal fracture line involving (Mnemonic: Nose Lao Maxilla Pe)
    → Root of nose
    → Lacrimal bone
    → Orbital floor
    → Maxillary sinus
    → Pterygoid plate
- Le Fort III:
  - Complete disjunction of the facial skeleton from the skull.
  - Fracture line through (Mnemonic: NSE OF Z)
    → Nasal bridge
    → Septum
    → Ethmoid bone
    → Orbit
    → Frontozygomatic suture



Le Fort I Le Fort II Le Fort III

Yourwish

Yourwish

PYQs

00:13:53

NEET PG August 2024

Q. At what age is surgery typically performed for cleft lip?

a. 3 months
b. 6 months
c. 1 year
d. 18 months

Ans: **b. 6 months**

11. ONCOLOGY

SOFT TISSUE SARCOMAS

00:00:24
INICET May 2022

- Overall M/c Soft Tissue Sarcoma: Liposarcoma > Leiomyosarcoma
- M/c Extremity Sarcoma: Malignant Fibrous Histiocytoma (MFH)
- M/c Paediatric Soft Tissue Sarcoma: Rhabdomyosarcoma
- M/c Retroperitoneal Tumour: Liposarcoma

Histopathological Type Based On Location

Location	M/c Type
Extremity	Malignant Fibrous Histiocytoma
Retroperitoneum	Liposarcoma
Viscera	GIST (Gastrointestinal Stromal Tumour)

Clinical Features



- M/c Symptom: Painless mass
- Size at Presentation :
  - Distal extremity (foot, ankle region):
    → Smaller at presentation
    → Best prognosis (because size is small at presentation)
  - Proximal extremity (thigh) & Retroperitoneum:
    → Relatively larger at presentation

Spread & Metastasis

- M/c Route of Spread: haematogenous
- M/c Site of Metastasis: Lungs
- Lymphatic Spread:
  - Usually Not seen in soft tissue sarcoma

Important Information

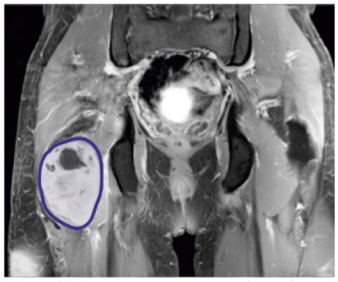
Sarcomas With Lymphatic Spread

- Mnemonic - "MARSES"
  - **M** - Malignant Fibrous Histiocytoma
  - **A** - Angiosarcoma
  - **R** - RMS
  - **S** - Clear cell Sarcoma
  - **E** - Epithelioid Sarcoma
  - **S** - Synovial Sarcoma
- In these sarcomas → lymph node metastasis present → lymph node dissection should be done during surgery

Diagnosis

00:04:55

- IOC for diagnosis of STS → biopsy
- Investigation of Choice to Assess Extent of Disease: → MRI
- Exception: Retroperitoneal Sarcoma
  - Investigation of choice → CECT (Contrast Enhanced CT)



MRI-Soft tissue sarcoma at gluteal region



CECT-Retroperitoneal sarcoma

Management

- Multimodality Treatment: Surgery + Radiotherapy + Chemotherapy
- Type of Surgery: Wide local excision with 2cm margin
  - Achieves clear margins
  - Resection can be done even beyond compartment boundaries
- Radiotherapy
  - EBRT - External Beam Radiotherapy
  - IMRT - Intensity Modulated Radiotherapy
- Chemotherapy- "CID" Mnemonic
  - I - Ifosfamide
  - D - Doxorubicin

Prognosis

- Best Prognosis: Distal extremity soft tissue sarcomas
- Most Important Prognostic Factor: Tumour grade (Not stage)
  - Tumor grade → Most important predictor of metastasis
- M/c cause of death: Metastasis

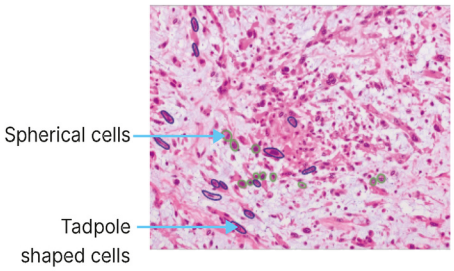
RHABDOMYOSARCOMA

00:8:40

- M/c type of pediatric STS
- M/c Sites (in order)
  1. Head and neck (M/c - near eye, upper eyelid region)
  2. Extremity
  3. Genitourinary tract
  4. Trunk



- Histological Types
  - M/c Type in Children: Embryonal rhabdomyosarcoma
  - M/c Type in Adults: Pleomorphic variant
- Diagnostic Cell: Rhabdomyoblast
  - Appearance: Tadpole-shaped cells or spherical cells
- Variants of Embryonal Rhabdomyosarcoma
  - Spindle cell
  - Sarcoma botryoides
    → Classical tennis racket appearance of cells



Clinical Features

- Bimodal presentation

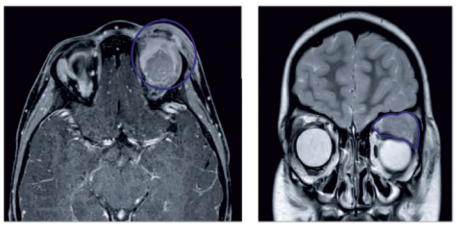
Yourwish

- 1st peak: 2 to 5 years
- 2nd peak: 15 to 19 years

- M/c Presentation: Rapidly growing painless mass (differentiating feature)

Investigations

- IOC For Diagnosis: Biopsy
- To Assess Extent of Disease: MRI
  - Eyeball is displaced out and down



MRI -Hyperdense Soft tissue displacing eye out and down

Treatment

- If Resectable:
  - Wide local excision with 2cm margin
- If Unresectable:
  - Downstage the tumour first → Neoadjuvant chemotherapy
  - Followed by wide local excision
- If Positive Margins After Surgery:
  - Give radiotherapy to kill residual tumour cells

DERMATOFIBROSARCOMA PROTUBERANS (DFSP)

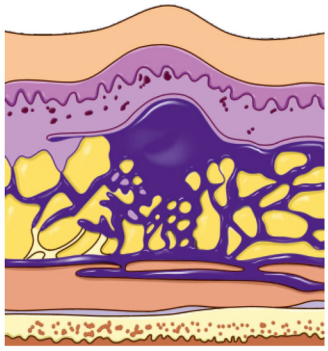
00:12:28

- Involves Dermis + Subcutis
- Type of low grade sarcoma
- Metastasis is rare
- Protrusion above the skin surface
- M/c Sites(TEN)
  - Trunk - 50% (M/c)
  - Extremity - 30%
  - Head and Neck - 20%



Pathology

- Characteristic Feature:
  - Unpredictable radial extension for long distances from the primary nodule
  - Because of this unpredictable radial extension:
- Wide circumferential margin is taken during excision
  - Margin: 2 to 4 centimetres (largest margin among sarcomas)
  - If sufficient margin is not taken → Recurrence
- Satellite nodules present
- Positive for CD 34
- Ring chromosome formation between chromosome 17 and 22
- Translocation between chromosome 17 and 22
- Unpredictable radial extensions



Clinical Presentation

- M/c Presentation: Nodular cutaneous mass
- Slow and persistent growth
- Enlargement of lesion above the skin surface (protrusion)

Yourwish

Yourwish

Diagnosis & Treatment

- Diagnosis: Incisional biopsy
- Treatment:
  - Surgery: Wide local excision with 2 to 4 cm of circumferential margin + removal of underlying fascia
- First line agent for Advanced and Unresectable DFSP: Imatinib
  - Imatinib also given in: CML and Unresectable GIST

ONCOLOGICAL EMERGENCIES

00:17:16

Tumour Lysis Syndrome

- Multiple manifestations occurring because of lysis of tumour cells
- Cause:
  - Destruction of large number of rapidly proliferating neoplastic cells after giving chemotherapy
- Associated with treatment of ("High CAB" Mnemonic)
  - **High** - High grade lymphoma
  - **C** - Chronic lymphoma
  - **A** - ALL
  - **B** - Burkitt's lymPhoma

Pathophysiology

- Hyperuricemia
  - Destruction of malignant cells → Rapid turnover of nucleic acid (Hypoxanthine → Xanthine → Uric acid) → Hyperuricemia
  - Drugs to control hyperuricemia
    → Allopurinol
    → Rasburicase
- Hyperkalaemia
  - Release of intracellular potassium → Hyperkalaemia → prone to develop arrhythmia
  - Emergency Management: IV Calcium gluconate
- Hyperphosphataemia
  - Release of intracellular phosphate
  - Increased phosphate binds with calcium → calcium phosphate
  - Calcium phosphate deposited in renal tubules → precipitate Renal failure
  - To Prevent Renal Failure: Aggressive hydration
  - If Patient Develops Renal Failure: Haemodialysis
- Lactic Acidosis
  - Deranged lactate metabolism → Lactic acidosis
  - Management: Sodium bicarbonate

Hypercalcaemia of Malignancy

00:23:16

- M/c cause: Excessive secretion of PTHRP (Parathyroid Hormone Related Peptide)
- Main factors
  - Increased release of calcium from the bone
  - Increased reabsorption of calcium from distal convoluted tubule
- Management
  - Mainstay of Therapy

Yourwish

→ Rehydration with normal saline f/b Forced diuresis with Frusemide

- Drugs to Lower Calcium Level
  - Drug of Choice: Zoledronate (bisphosphonate)
  - Calcitonin
  - Plicamycin
  - Gallium nitrate
  - Glucocorticoids / Hydrocortisone

Typhlitis (Neutropenic Colitis)

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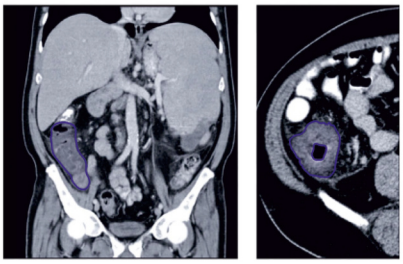
- Typhlitis = Inflammation of caecum
- Pathophysiology
  - Receiving cytotoxic chemotherapy → Cause of Neutropenia, especially in children suffering from leukaemia (ALL, AML)
- Aka Neutropenic colitis / Necrotising colitis / Ileocaecal syndrome
- Classically seen in Neutropenic patients
- More common in Children suffering from ALL and AML

Clinical Features

- Fever
- RLQ pain and tenderness
- Bloody Diarrhea

Diagnosis

- Ultrasound & CT Findings: Thickened caecal wall



CT-Thickened cecal wall

Management

- Medical Management: Antibiotics (sufficient in majority of cases)
- Indications for Surgery:
  - No improvement after 24 hours of antibiotics
  - Perforation (necrotising colitis leading to perforation)

SUPERIOR VENA CAVA (SVC) SYNDROME

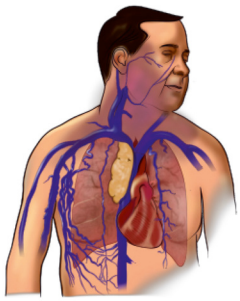
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- Compression of superior vena cava + Clinical manifestations of superior vena cava obstruction → Superior vena cava syndrome
- Severe reduction in venous return from
  - Head and neck
  - Upper extremity
- M/c cause of SVC syndrome: carcinoma lung (Small cell lung cancer > non-small cell lung cancer)
- M/c cause of SVC syndrome in Young Adults: Malignant lymphoma

Pathophysiology

- Ca lung → compress SVC → impaired venous return → collection of deoxygenated blood in Head and Neck, upper extremity
- This leads to edema, cyanosis, distended IJV, Subclavian vein, Axillary vein
- Over Long Period:
  - Formation of collaterals between superior vena cava and inferior vena cava → Dilated veins over anterior chest wall (on right side)

Clinical Features



- D/t vascular congestion
  - Neck & facial swelling
  - Nasal stuffiness
  - Swelling of tongue
  - Headache, dizziness & syncope
- If Tumour Invading
  - Trachea → Dyspnea & cough
  - Oesophagus → Dysphagia
  - Recurrent laryngeal nerve → Hoarseness of voice

Examination Findings

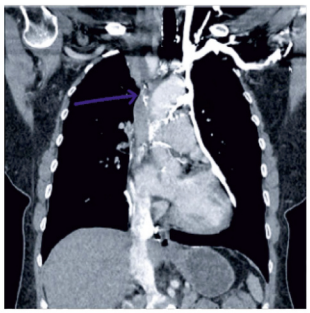




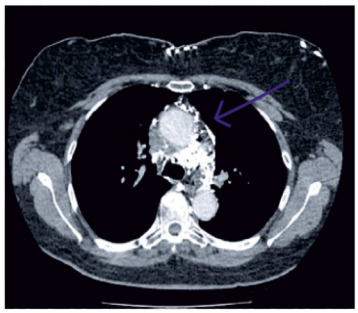
- Oedema: In neck and upper extremity
- Cyanosis:
  - Bluish discolouration
  - Patient has cyanosis + oedema simultaneously
- Distended Veins:
  - Internal jugular vein
  - Subclavian vein
  - Axillary vein
- Collaterals:
  - Increased number of collaterals covering anterior chest wall on right side

Diagnosis

- Investigation of Choice: CECT
- Chest X-ray Finding: Widening of mediastinum



Arrow showing compression of the SVC



Arrow showing bright opacified collaterals

Treatment

- Tracheal Obstruction: Tracheostomy
- Treatment depend of underlying cause
  - Radiotherapy for:
    - → Non-small cell lung cancer
    - → Metastatic solid tumours

Yourwish

- Chemotherapy for:
  → Small cell lung cancer
  → Malignant lymphoma
- Surgery for Rest of the patients

PYQs

00:34:30

Q. What is the M/c site of metastasis in extremity sarcoma?

A. Lungs
B. Liver
C. Kidney
D. Lymph node

Answer: A

Q. M/c type of retroperitoneal sarcoma?

A. Neural tumor
B. Liposarcoma
C. Synovial sarcoma
D. Rhabdomyosarcoma

Answer: B

Q. 53 years old patient admitted with complaints of dyspnoea. On examination, he is having a puffy face, engorged veins over the chest. X-ray shows mediastinal mass. What is the next step to confirm the diagnosis?

A. Total blood count with peripheral smear
B. CT thorax
C. Start cyclophosphamide
D. Urgent referral to RT

Answer: B

Yourwish

Yourwish

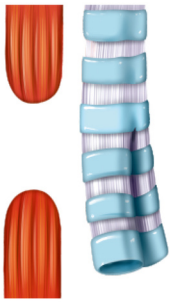
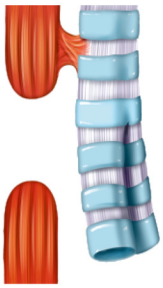
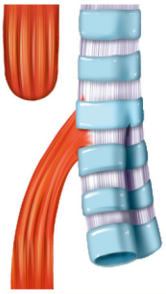
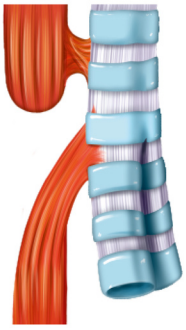
19. PEDIATRIC SURGERY

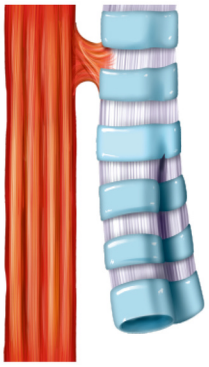
TRACHEOESOPHAGEAL FISTULA

00:00:15

- Abnormal communication between two epithelial-lined surfaces (trachea and esophagus).
- Associated with Esophageal atresia

CLASSIFICATION

TYPES	FEATURES	PICTURES
TYPE A	• Esophageal atresia without TEF	
TYPE B	• Esophageal atresia with proximal TEF.	
TYPE C	• Esophageal atresia with distal TEF • Most common type (90%).	
TYPE D	• Esophageal atresia with both proximal and distal TEF • Least common type	

TYPE E	• TEF without esophageal atresia / H shaped fistula	

CLINICAL FEATURES

- Esophageal Atresia
  - Continuous drooling of saliva.
  - Regurgitation immediately after oral feeds.
- TEF symptom
  - Choking, coughing, cyanosis and Dyspnea

DIAGNOSIS

- Inability to insert NG tube into stomach → Coiling in the esophagus indicates esophageal atresia.
- Presence of gas in GIT below the diaphragm → Confirms TEF communication.
- Inability to insert NG + Absent radiographic evidence of gas in GIT → Pure esophageal atresia (No fistula)
- IOC for diagnosis of type E / H -shaped fistula: tracheobronchoscopy + endoscopy

VACTERL ANOMALIES

- Associated malformations
  - V: Vertebral body segmentation defects.
  - A: Anal atresia.
  - C: Cardiovascular anomalies (VSD is the most common than PDA)
  - TE: Tracheoesophageal fistula.
  - R: Renal abnormalities (Unilateral renal agenesis.)
  - L: Limb anomalies (Radial ray hypoplasia.)

TREATMENT OF TEF

TYPE A	• Small gap → Tension-free esophago-esophagostomy • Large gap → Feeding gastrostomy f/b Delayed tension-free esophago-esophagostomy.
TYPE B,C,D	• Excision of the fistula tract f/b Tension-free esophago-esophagostomy
TYPE E	• Excision of fistula tract f/b repair of the defect.

BILIARY ATRESIA

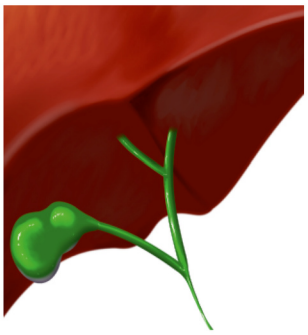
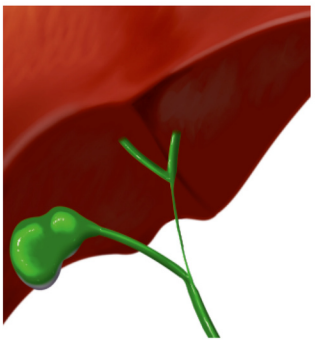
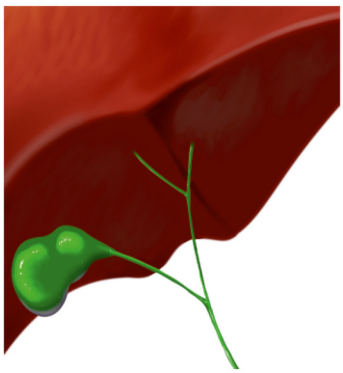
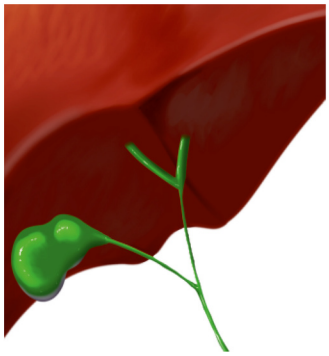
00:11:09

- Characterised by progressive obliteration of intrahepatic and extrahepatic bile ducts
- Most common indication for pediatric liver transplantation

PATHOLOGY

- Bile duct proliferation with severe cholestasis with plugging and Inflammatory cell infiltrate
- If treatment is not done → Cirrhosis → Portal hypertension → Hepatic failure → Death

KASAI CLASSIFICATION

TYPE A	• Obliterated Common Bile Duct with patent common hepatic and cystic ducts	
TYPE 2 A	• Obliterated common hepatic duct with patent cystic duct and CBD	
TYPE 2B	• Obliteration of common hepatic, cystic, and common bile ducts.	
TYPE 3	• Obliteration of CBD, cystic, and common hepatic ducts up to the porta hepatis. • Most common type (90% of cases).	

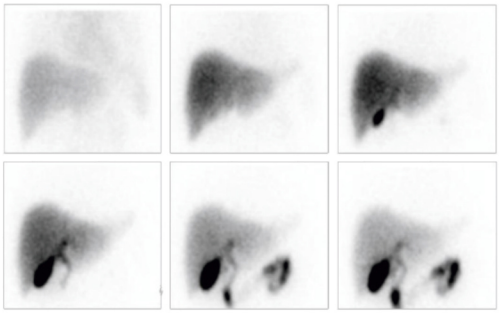
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CLINICAL FEATURES

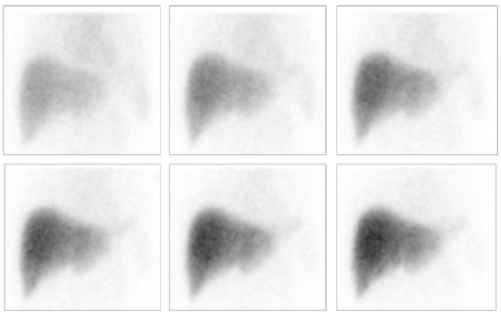
- Obstructive jaundice
- Passage of acholic pale gray (clay-colored) stools
- Failure to thrive
- Portal hypertension & hepatic failure

DIAGNOSIS

- Diagnosis can be made by liver biopsy but the findings are not highly characteristic
- Gold standard
  - Intraoperative (per-operative) cholangiogram
  - Also called cholecystocholangiogram
- Ultrasound
  - Shrunken or non-visible gallbladder
  - CBD not visible
  - Gallbladder Ghost Triad and Triangular Cord Sign
- Hepatobiliary Scintigraphy (HIDA scan):



Normal Hepatobiliary Scintigraphy



Hepatobiliary Scintigraphy of biliary atresia

  - Normal: Tracer uptake by liver → Excretion into duodenum/small intestine.
  - Biliary Atresia: Tracer uptake present in liver → No flow/excretion into the intestine

TREATMENT

- Exploratory laparotomy f/b Intraoperative cholecytocholangiogram
  - To confirm diagnosis
  - Demonstration of fibrotic biliary remnant
  - Definition of absent proximal & distal bile duct patency
- TOC: Kasai procedure / portoenterostomy
  - Excision of gallbladder and bile duct
  - Division of jejunum
  - Portoenterostomy: Distal part of jejunum is attached to porta hepatis
  - Jejunojejunostomy: Proximal jejunum is attached to the side of the distal jejunal limb
- Most common post-operative complication: Cholangitis
- Best results if surgery is performed within 60 days of birth.
- Untreated biliary atresia → Death within 2 years

INTESTINAL ATRESIA

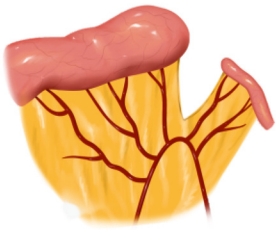
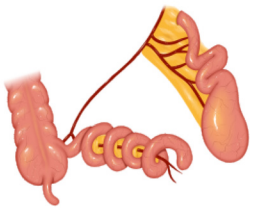
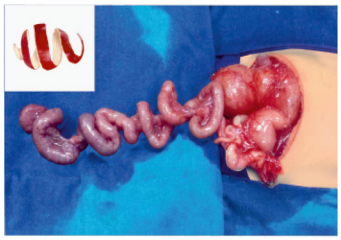
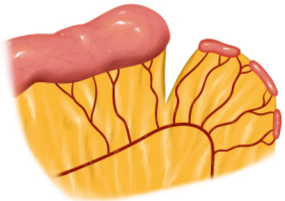
00:20:12

- Most Common Site: Duodenum
- Duodenal Atresia: Most common cause of neonatal intestinal obstruction.

Yourwish

Yourwish

CLASSIFICATION OF JEJUNOILEAL ATRESIA

TYPE 1	• Membranous atresia with intact bowel mesentery	
TYPE 2	• Two blind ends separated by a fibrous cord	 **Type II**-Blind ends are separated by afibrous cord
TYPE 3 A	• Blind ends separated by a V-shaped mesenteric defect • Most common type	
TYPE 3B	• Apple Peel Atresia (or Christmas Tree Atresia) • Appearance of bowel spiraling around a single vessel	 **Type IIIB**- Apple peel atresia/Christmas tree atresia 
TYPE 4	• Multiple atresias • String of Sausages appearance	

CLINICAL FEATURES

- Bilious vomiting on the first day
  - Vomiting is more prominent in Proximal obstruction
- Distal Atresia (Ileal): Abdominal distension is more prominent
- > 60% of patients with jejunal atresia are not able to pass meconium on first day

Yourwish

DIAGNOSIS

- Abdominal X-ray: Dilated proximal bowel segments with an absence of gas distally
- Prenatal Ultrasound: Polyhydramnios (associated with intestinal atresia)

TREATMENT

- Resuscitation (IV fluids and antibiotics).
- Proximal Nasogastric (NG) decompression
- Exploratory Laparotomy → Excision of the atretic segment + anastomosis

SACCROCOCCYGEAL TERATOMA

00:26:14



- Most frequently occur during neonatal period
- M/c site: Sacrococcygeal region
- More common in females
- Most teratomas in neonatal period are benign
- Risk of malignancy increases with age
- Derivative of primitive streak

CLINICAL FEATURES

- External presacral mass with minimal intrapelvic component
- Symptoms include: Weakness, paralysis, bladder or bowel dysfunction

DIAGNOSIS

- Primarily clinical
- CT: To detect intra-abdominal components
- MRI: To detect intrapelvic components

MANAGEMENT

- Complete surgical excision
- Resection of the Coccyx is critical
  - Incomplete resection → ↑ Risk of local recurrence.

PYQ

00:29:06

Q. Most common type of tracheoesophageal fistula:

a. Esophageal atresia without tracheoesophageal fistula

b. Esophageal atresia with proximal tracheoesophageal fistula

c. Esophageal atresia with distal tracheoesophageal fistula

d. Esophageal atresia with proximal and distal tracheoesophageal fistula

Ans.: c

Q. A 13 months old infant was brought to the emergency with progressive jaundice, pale stools and high colored urine. The child was healthy, gaining weight and feeding well. HIDA scan showed no excretion. What is the next step?

a. Breast milk jaundice, stop breast feeding for 2 weeks and give formula feed
b. Galactosemia, do tests to confirm the diagnosis
c. Metabolic condition require further testing
d. Liver biopsy

Ans. d

Q. Which of the following is the most common indication of pediatric liver transplantation?

a. Duodenal atresia
b. Biliary atresia
c. Jejunoileal atresia
d. Intestinal atresia

Ans. b

Yourwish

25. TRANSPLANTATION

HISTORY OF TRANSPLANTATION

00:00:15

- First renal transplantation: Murray
- First liver transplantation: Starzl
- First pancreas transplantation: Kelly and Lillhei
- First heart transplantation: Christian Barnard
- First lung transplantation: Fritz Derom
- First pancreatic islet cell transplantation: Sutherland
- First heart + lung transplantation: Reitz and Shumway
- First successful intestinal transplantation: Deltz

TYPES OF GRAFT

00:01:57

- Autograft: Patients own tissues are used
- Isograft: Identical twins
- Allograft/Homograft: Same species
- Heterograft/Xenograft: Different species

Complications of Immunosuppression

- Infections
  - High risk of opportunistic infection: Viruses
  - Bacterial infection is highest within the first month of transplantation
  - Viral infection is highest within the first 6 months of transplantation
    → MC problem: CMV
    → Results from: Reactivation of latent infection/Primary infection
- Malignancy
  - MC malignancy: Skin cancer/SCC
  - Increased risk of:
    → PTLD
    → Kaposi sarcoma

ORGAN DONORS

00:06:11

Maastricht Classification

- Used for Donation after Circulatory Death (DCD) donor
- Mnemonic: DRACUla

Category	Description
I	Dead on arrival at the hospital
II	Resuscitation attempted without success
III	Awaiting cardiac arrest after withdrawal of support

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IV	Cardiac arrest while brain dead
V	Cardiac arrest and Unsuccessful resuscitation at the hospital

Ecd (extended criteria donors)

Kidney transplant	Liver transplant

• Donor's age: >60 Years
• Donor's age 50-59 years with at least two of the following:
  ○ Cause of death: CVA
  ○ Pre-existing hypertension
  ○ Terminal serum creatinine> 1.5 mg/dL
	• Mild/moderate steatosis
	• Hepatitis C positive
	• Hepatitis B core antibody positive

Maximum and optimal cold storage times of various organs:

Organ	Optimal Storage Time	Safe Maximum Storage Time	
Kidney	<18 Hours	36 Hours	**MAX**
Liver	<12 Hours	18 Hours	
Pancreas	<10 Hours	18 Hours	
Small intestine	<4 Hours	6 Hours	
Lungs	<3 Hours	8 Hours	
Heart	<3 Hours	6 Hours	**MIN**

LIVER TRANSPLANTATION

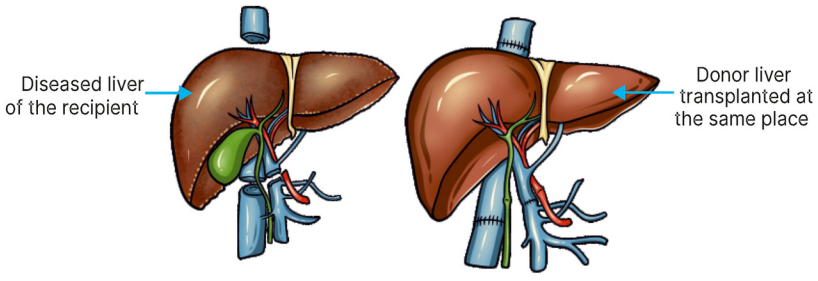
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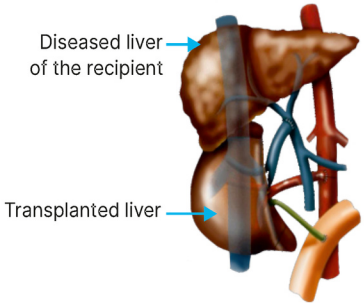
Indications

- MC indication of LT: Alcoholic liver disease
- MC indication of pediatric LT: Biliary atresia
- MC metabolic disorder requiring LT: Alpha-1-antitrypsin deficiency
- MC indication for LT following acute liver failure: Acetaminophen toxicity

Types Of Liver Transplantation

- Orthotopic LT: Graft placed at the normal anatomical position
- Heterotopic LT: Graft is placed at an alternative site
- Auxiliary LT: Native liver remains in situ, and whole or partial transplant is added.



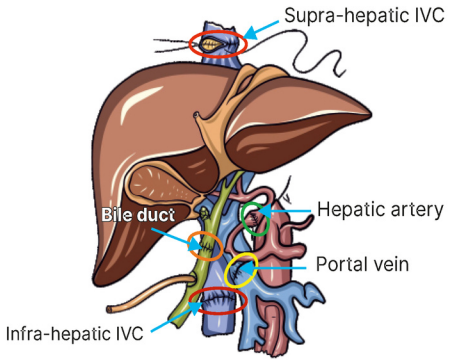


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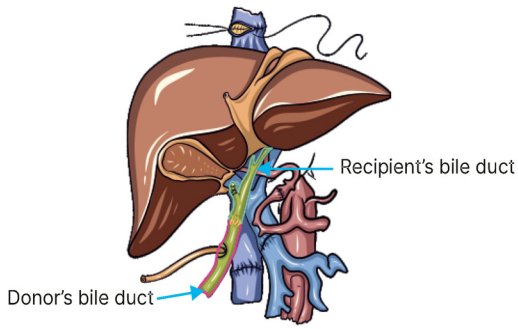
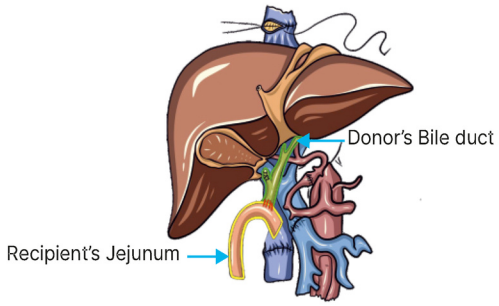
Sequence of Anastomosis In LT

- Mnemonic: SIPHB

Suprahepatic IVC
↓
Infrahepatic IVC
↓
Portal vein
↓
Hepatic artery
↓
Bile duct



Methods Of Biliary Drainage

Choledocho-choledochostomy	Choledochojejunostomy
	

- Preferred method of biliary drainage:
  CD-CD > CD-J
- Indications of Choledochojejunostomy:
  - Diseased recipient Extrahepatic Bile Duct
  - Significant recipient-donor duct size mismatch

Scores

Model for end-stage liver disease (meld) score

- Components of MELD score - CBI
  - Creatinine
  - Bilirubin
  - INR / PT

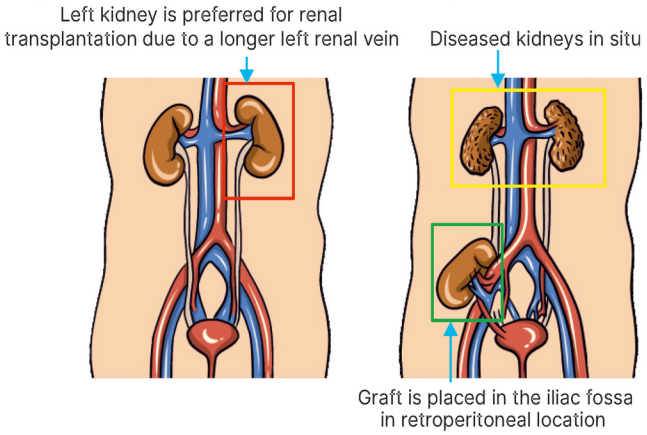
Peld Score - Pediatric End-Stage Liver Disease

- Components of PELD score - NABIA
  - Nutrition
  - Age
  - Bilirubin
  - INR
  - Albumin

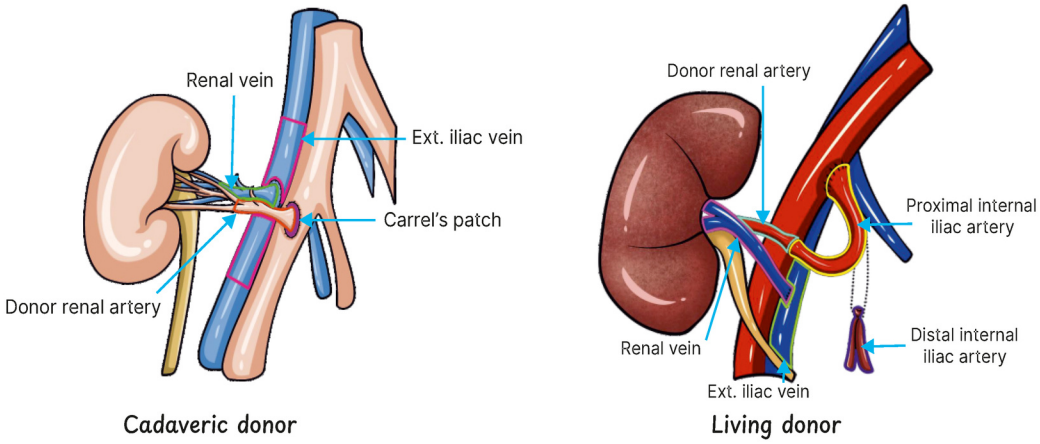
RENAL TRANSPLANTATION

Procedure

- Number of kidneys after transplantation: 3 (2 diseased + 1 healthy)



Types of Donor And Anastomosis



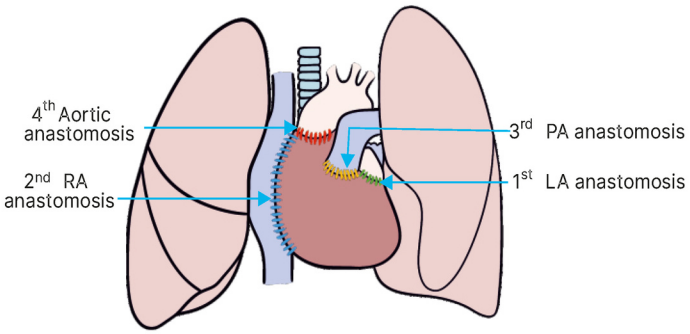
- Cadaveric donor:
  - Donor renal vein is anastomosed to the external iliac vein
  - Donor renal artery with Carrel's patch is anastomosed to the external iliac artery
    → Carrel's patch - a small portion of the aorta
- Living donor:
  - Donor renal vein is anastomosed to the external iliac vein
  - Donor or graft renal artery is anastomosed to the proximal internal iliac artery
  - End-end anastomosis
- Ureter in RT:
  - Length of ureter: Short → To avoid distal ischemia.
  - Ureter is anastomosed to the bladder by:
    → Lich-Gregoir technique: Preferred.
    → Leadbetter Politano technique.

HEART TRANSPLANTATION

0:22:33

- Sequence of anastomosis: LA>RA>P>ArA
  - Mnemonic: LARA PArA

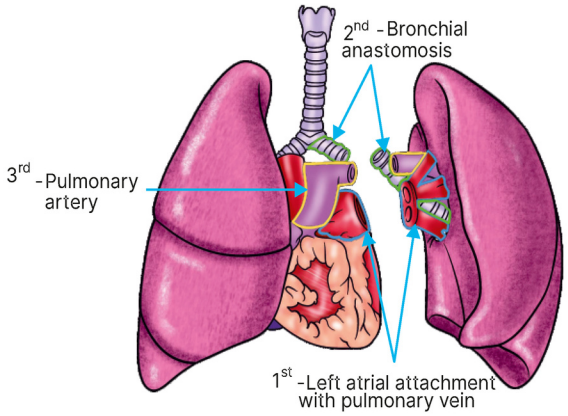
Yourwish



LUNG TRANSPLANTATION

00:23:11

- Sequence of anastomosis: PV>BA>PA



PYQ

00:23:49

Q. What type of graft is used when a patient undergoes skin grafting following a road traffic accident in which the graft is harvested from the patient's own body?



A. Autograft
B. Xenograft
C. Allograft
D. Isograft

Answer: A

Yourwish

2. ROBOTIC, LAPAROSCOPY & BARIATRIC SURGERY

LAPAROSCOPY

00:00:18

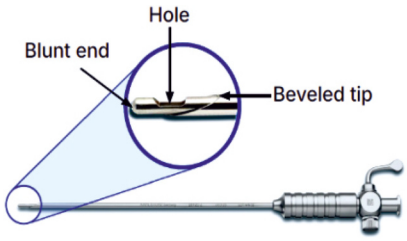
FMGE 2021,
INICET July 2021

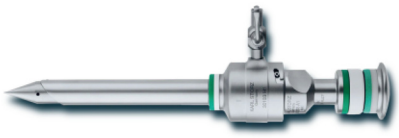
- Needle used to create pneumoperitoneum: Veress Needle



Methods Of Creating Pneumoperitoneum

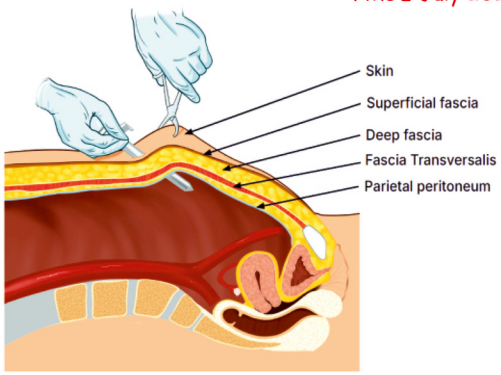
CLOSED METHOD	OPEN METHOD
• Veress needle • Decreased risk of bowel injury	• Hasson cannula • Decreased risk of Vessel injury





- Trocar penetrates the following layers:
  - Skin
  - Superficial fascia
  - Deep fascia
  - Fascia Transversalis
  - Parietal peritoneum
- MC used/preferred gas: CO_2
- Flow of CO_2: 1L/min
- Intra-abdominal pressure (IAP): maintained b/w 12-15mmHg

FMGE July 2023



Advantages Of Minimal Access Surgeries

- Small wound size
- Reduction in:
  - Wound infection
  - Wound trauma
  - Wound pain
  - Dehiscence
  - Bleeding
  - Herniation
  - Nerve entrapment
  - Heat loss

Yourwish

- Improved vision
- Improved mobility
- Faster recovery & shorter hospital stay

DAY CARE SURGERY

00:04:00

FMGE Jan 2024

- Also known as:
  - Day surgery
  - Same-day surgery
  - Day case surgery
  - Ambulatory surgery
- Admitted for 12 Hours with same-day discharge

Postoperative Complications In Day Care Surgery

- Hemorrhage:
  - Primary: Immediately d/t injury/surgery
  - Reactionary: Delayed hemorrhage, occurring within 24 hours
  - Secondary: Caused by sloughing of the vessel wall, occurring 7-14 days after surgery
- M/c complication overall: Post-operative nausea & vomiting
- Pain

OVERNIGHT STAY SURGERY

00:06:11

- Admitted for: 23hrs
- Early morning discharge

SHORT-STAY SURGERIES

- Admitted for: 72 Hours

FAST-TRACK SURGERY

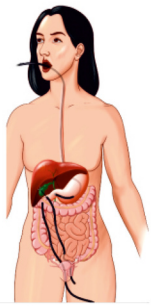
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INICET Nov 2024

- Aka: Enhanced recovery after surgery (ERAS)
- Coordinated perioperative approach
- Aim:
  - Reducing surgical stress
  - Facilitating post-operative recovery
- Components of ERAS:
  - Preoperative informed consent
  - Fasting:
    → Solids: Allowed 6 hours before surgery
    → Liquids: Allowed 2 hours before surgery
  - Atraumatic surgical technique (Laproscopic/ shorter incision/ avoid drain)
  - Reduction of stress: Sweet drink 2-3 hours before surgery
  - Elimination of pain: Short-acting analgesics (avoid opioids)
  - Optimized fluid & temperature management
  - Early enteral diet
  - Prevention of GI atony & Post-Op. nausea & vomiting
  - Rapid postoperative mobilization

NOTES

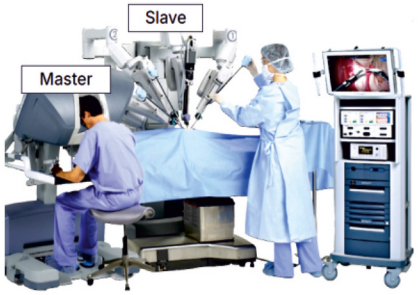
00:10:47



- Natural Orificial Transluminal Endoscopic Surgery
- The peritoneal cavity is entered through a natural orifice like mouth, rectum, or vagina
- Performed for:
  - Cholecystectomy
  - Appendectomy
- Advantage: No scar

ROBOTIC SURGERY

00:12:14



- MC used robot worldwide: Davinci Robot
- Based on: Master slave principle
  - Motions of the surgeon's hands are translated into the motions of the robotic arm
- Indications of Robotic Surgeries:
  - Prostatectomy
  - Cardiac valve repair
  - Gynaecological operations

BARIATRIC SURGERY

00:13:30

- Surgical procedures performed for the treatment of obesity

FMGE June 2022

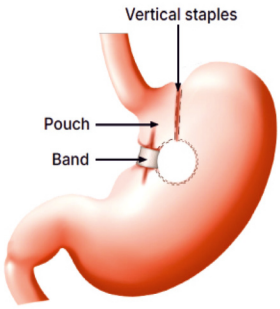
Indications Of Bariatric Surgery

International Population	Asian Population
• BMI ≥ 35Kg/m^2 + comorbidity • BMI ≥ 40 Kg/m^2 with or without comorbidity	• BMI ≥ 32.5 Kg/m^2 + comorbidity • BMI ≥ 37.5 Kg/m^2 with or without comorbidity

Types Of Bariatric Operations

FMGE June 2022

- Purely restrictive
  - Vertical Banded Gastroplasty (VBG)
  - Laparoscopic Adjustable Gastric Banding (LAGB)
- Largely restrictive, partly malabsorptive
  - Roux-en-Y Gastric Bypass (RYGB)
- Partly restrictive, largely malabsorptive
  - Biliopancreatic Diversion (BPD)
  - Duodenal Switch
- MC performed worldwide: Laparoscopic sleeve gastrectomy
- Safest and reversible: LAGB



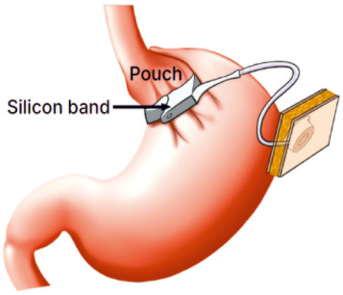
Vertical Banded Gastroplasty (Vbg)

- Purely restrictive operation
- Vertical staples applied to the stomach
- Band along the lesser curvature

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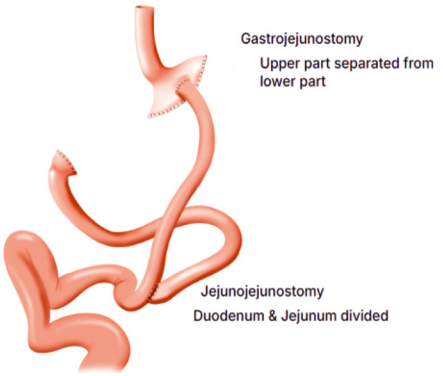
Laparoscopic Adjustable Gastric Banding (Lagb)

- Safest, least invasive, and reversible
- Placement of a silicone band around the proximal part of the stomach



Roux-En-Y Gastric Bypass

The upper part is separated from the lower part
↓
Duodenum & Jejunum are divided
↓
Gastrojejunostomy and Jejunojejunostomy

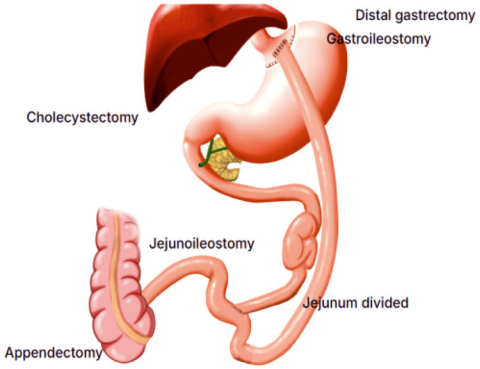


- Quantity of proximal gastric pouch: 30-50ml
- Roux-limb length: 70-100 cm
- Largely restrictive & mildly malabsorptive
- Herniation of bowel loop behind Roux-Limb: Peterson Hernia

Biliopancreatic Diversion

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- Most effective bariatric surgery
- Associated with maximum weight loss
- Components of Biliopancreatic Diversion:
  - Distal gastrectomy
  - Cholecystectomy
  - Appendectomy
  - Gastroileostomy → stromal ulcer
  - Jejunoileostomy
- Length of common channel: 50cm
- Side effect:
  - Passage of malodorous stool
  - Deficiency of vitamins and minerals
- Largely malabsorptive & mildly restrictive
- Disadvantage: Stromal ulcer



Duodenal Switch

- Modification of Biliopancreatic diversion
- Prevents stomal ulcers
- Components of Duodenal Switch:
  - Sleeve Gastrectomy:
  - Cholecystectomy
  - Appendectomy
  - Duodenoileostomy
  - Jejunoileostomy
- Length of common channel: 100cm

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