

SURGERY

Nerve Injuries

-Breast surgery axilla clearance- ICBT (T2)

-Thyroid surgery- SLN-ELN (mc) injured - Ansa cervicalis



ILN
↓
Pyramiform fossa

-Parotid surgery- a) Deviation of angle- Marg mand N (VII)

b) Anesthesia at angle- Great auricular N (C2, C3)

c) Frey- gustatory sweating → Auriculotemp N
parasy + symp

-Submandibular surgery- Marg mand N (Wharton duct → lingual N) · Hypoglossal N

-Hernia surgery-

a) Loss of sensation over lateral thigh - LCNT = LFCN → MC N injured in lap Hernia (Δ of pain)

b) Loss of sensation over suprapubic region Iliohypogastric N (mc - mesh entrapment)

c) Loss of sensation over root of penis Ilioinguinal N (mc - Rutherford-Morrison)

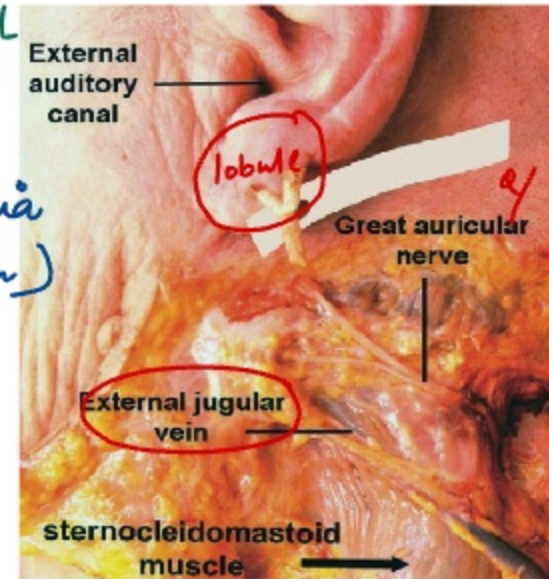
d) Loss of Cremasteric reflex - Genitofemoral N (off left) (mc open hernia)

-Thymectomy Phrenic N

-Rectal Ca Surgeries (IMA ligation) Sup hypogastric plexus - Symp → SHOOT → Retrograde ejac

-Pelvic dissection Parasymp- Nervi erigentes → POINT → impotence

	Dermatome
T2	Apex of axilla
T4	Nipples
T6	Xiphoid process x
T10	Umbilicus 0 - 13
T12	Inguinal ligament



SUTURES

monofilament vs polyfilament → stronger
↳ p/r/o info

Absorbable

Non - Absorbable

Mechanism:

Synthetic

Hydrolysis

Natural

enzymatic degradation
max tissue rxn

Synthetic

Natural

Monocryl: Polyglycaparone

subcuticular sutures
WHITE

PDS: Polydioxanone

Whipple (RJS)
port site closure - lap

Vicryl: Polygalactin VIOLET

ureter / bowel / FT
tube

Dexon: Polyglycolic acid

Contact admin
Join our group
p/r/o info

CATGUT

(Hunter)
Sheep's ileum Submucosa
isopropyl alcohol
- 60d
Chronic catgut - 90d
tubal lgn

Nylon-Polyamide/ Ethilon QA

nerves tendons
Cataract
micro Sx
neuro Sx

Prolene - Polypropylene BLUE

↑ tensile strength → MESH
vascular rectus sheath

Novafil - Polybutester

Polyester- Ethibond

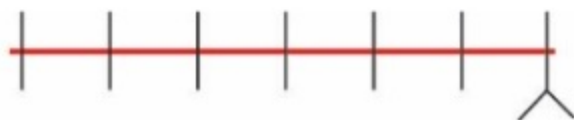
SILK

BLACK

secure drains

SUTURING TECHNIQUES

Continuous



Interrupted



Subcuticular

cosmesis



Horizontal mattress

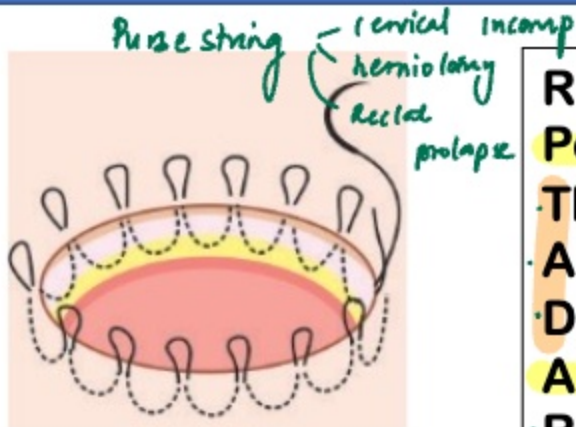
least cat-through



Vertical mattress → eversion

SKIN

(barel-inversion)



RECTAL PROLAPSE

Perineal-

'TAD'

- Thiersche cerclage
- Altemier's procedure
- Delorme procedure
- Abdominal-
- Ripstein rectopexy
- Wells



SURGEON'S KNOT



JENKIN'S RULE:

Length Of Suture Should Be 4 Times The Length Of Wound

Angle Of Entry Of Suture Needle, IM injection: 90°

Veress Needle Angle, SC Injection: 45°

ID injection: 10-15°

INSTRUMENT NEEDED FOR SUTURES ^{QA}



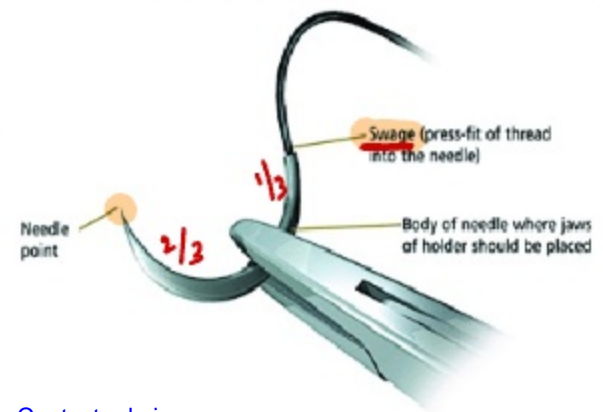
10: skin/muscle
 11: IBD, vascular
 12: removal sutures
 15: precise cut, minor OT
 22: abdominal incision



BP Handle



Needle holding



Adson's tissue holding forceps

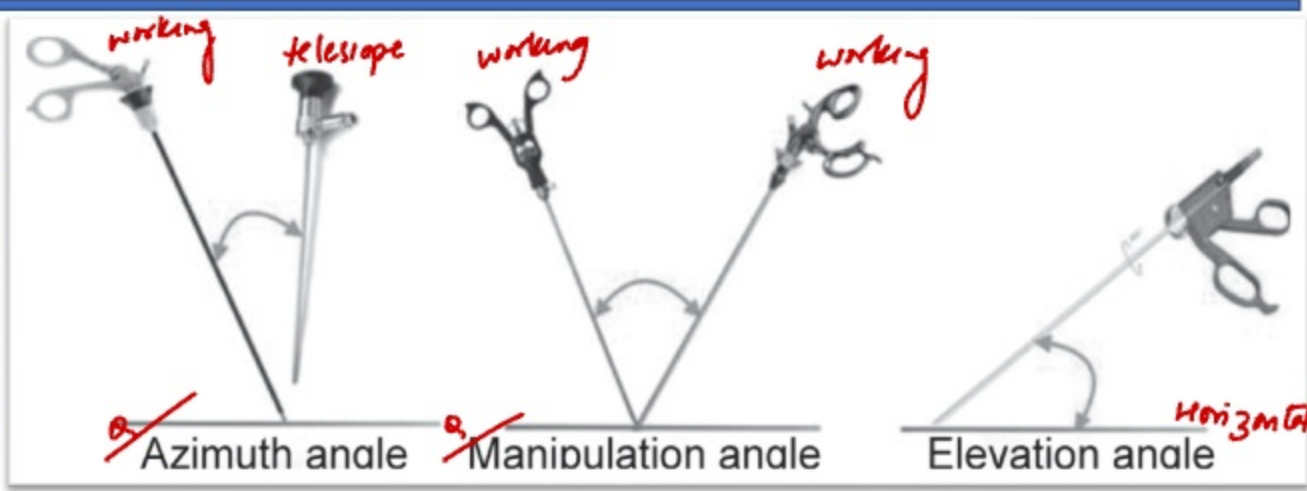
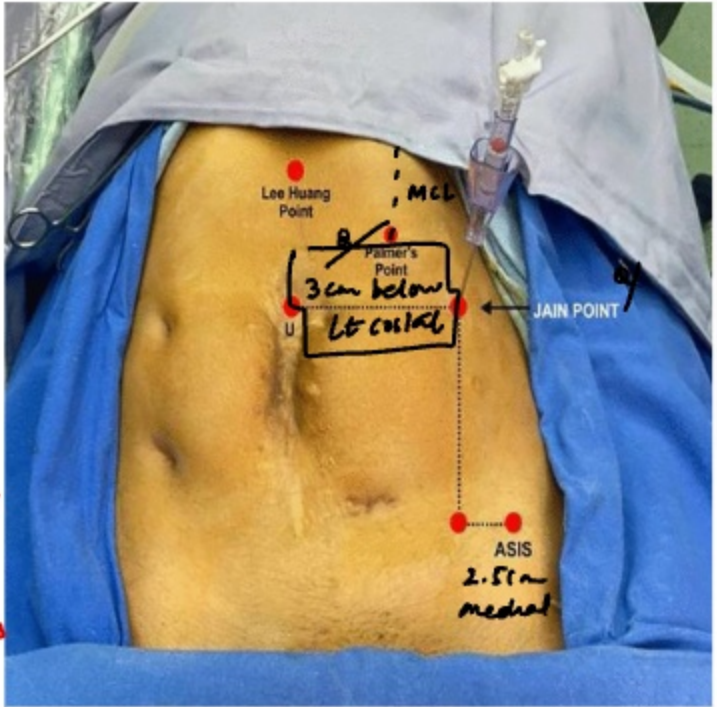


LAPAROSCOPY *qqq*



• Closed technique

Umbilicus ✓
Palmer's pt } past
Jain's pt } w/o
 } Sx
 } adhesions



Open Technique – Hasson Technique

Confirmation of intraperitoneal position:

- push saline - free flow
- aspirate - air bubble
- Hanging drop method

Gas: CO_2 ✓ soluble ✓ non combustible (avoid in COPD)
 N_2O , air, He

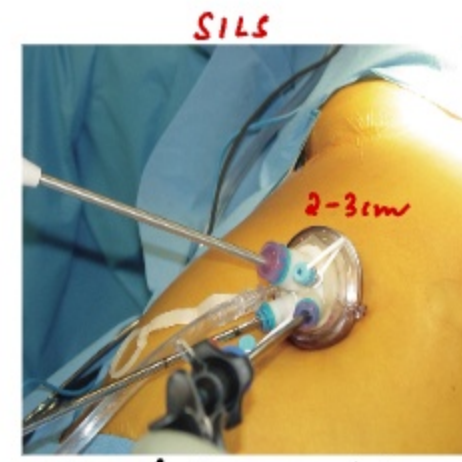
Ideal Pressure: 12-15 mm Hg

Ideal volume: 2L (1L/min)

J-reflex: transient ↓HR / heart block



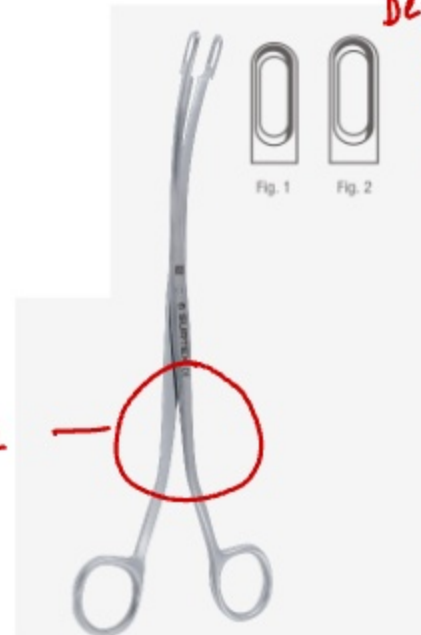
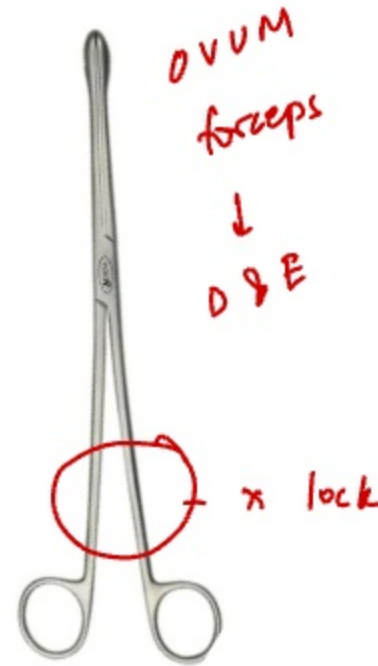
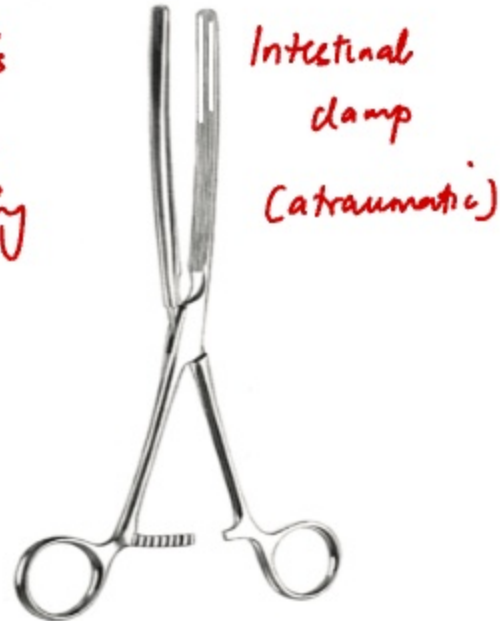
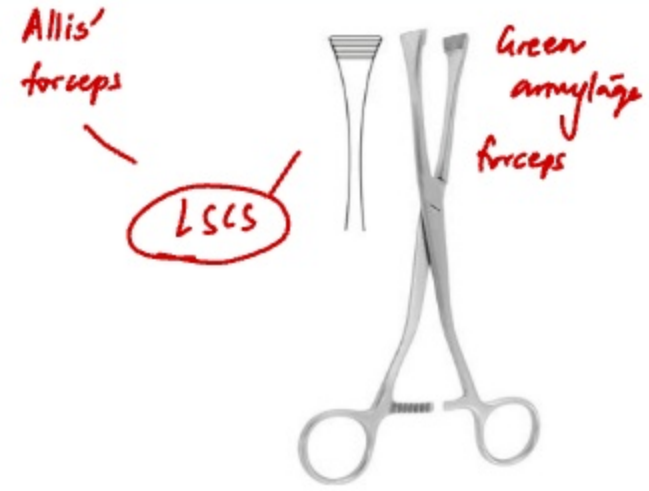
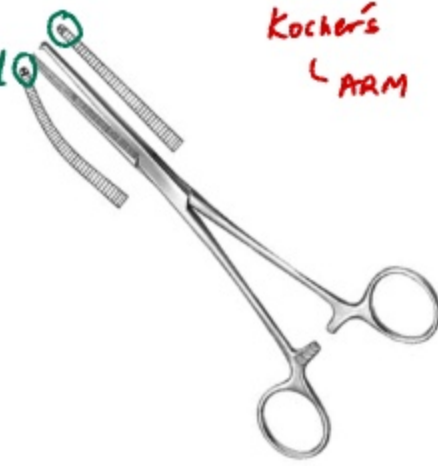
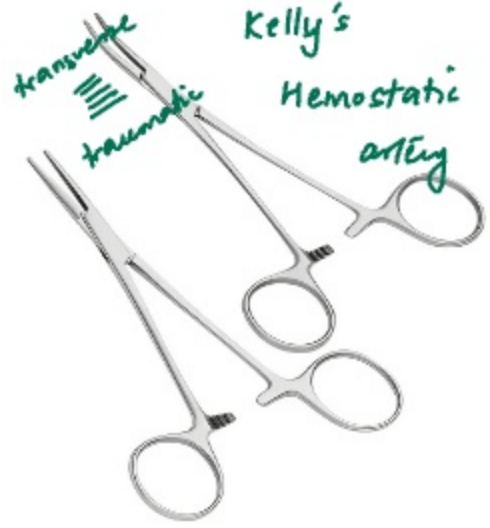
Better precision, tremor reduction
Loss of tactile feedback
DOF in Lap Sx: 4
Robotic Sx : 7



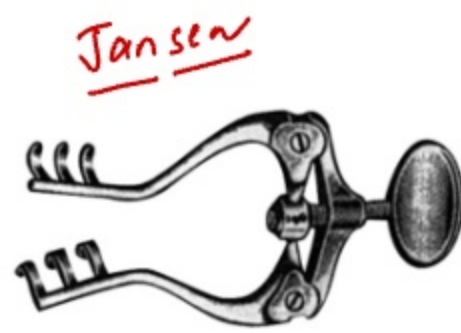
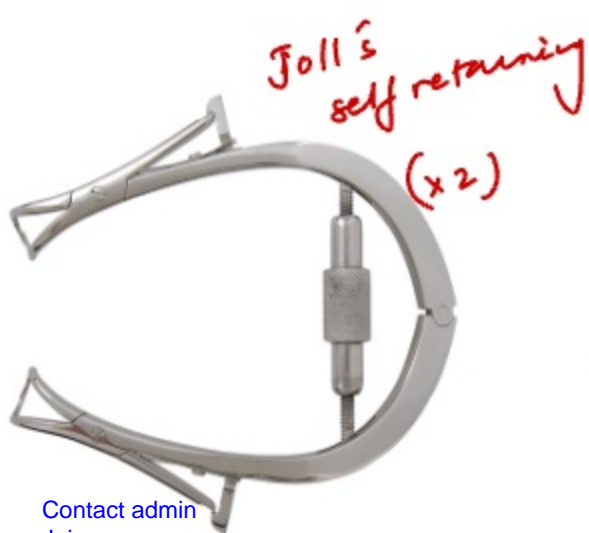
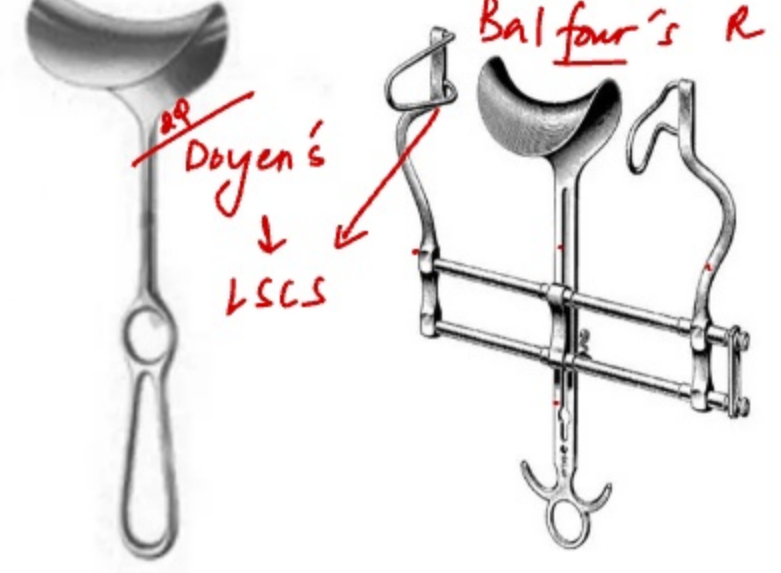
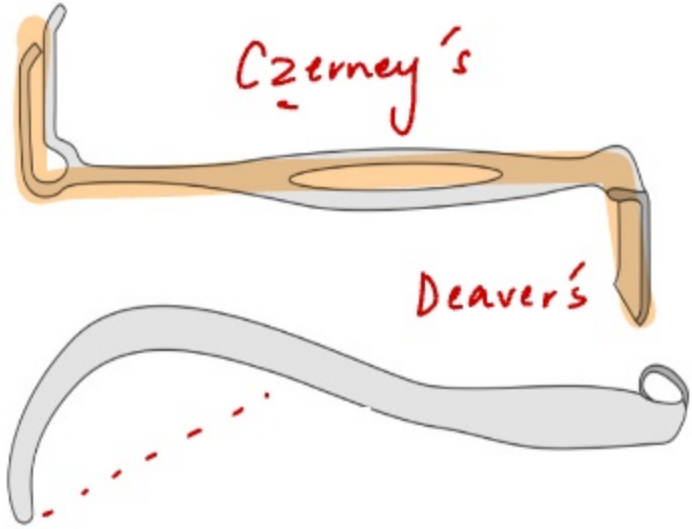
- faster recovery
- Scar x
- 1/10 incisional H

Contact admin
Join our group

FORCEPS

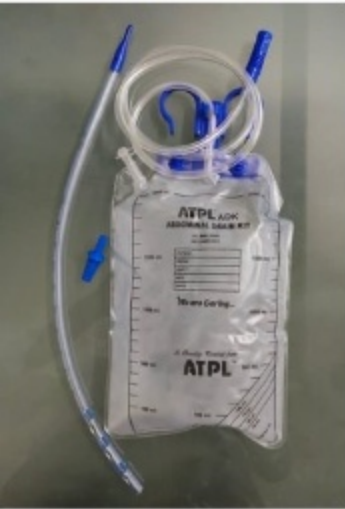


RETRACTORS



Mastoid retractors

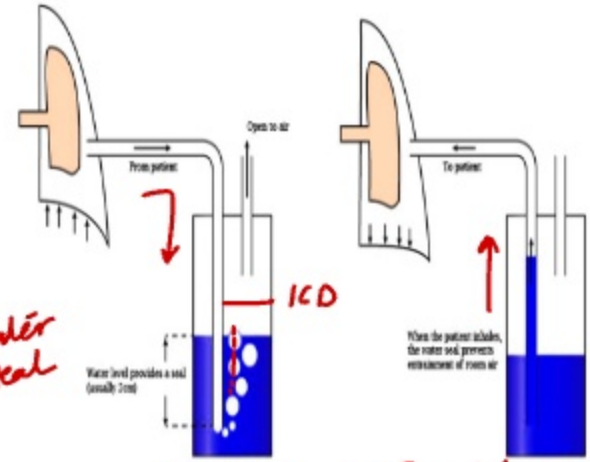
BAGS AND DRAINS



abdominal drainage bag



chest drainage bag



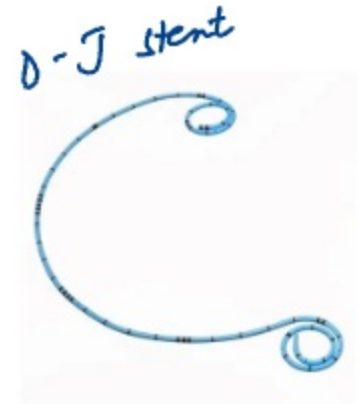
Water seal
 oscillating water column
 (N)
 persistent
 Bronchopleural F



Romora suction



Jackson Pratt suction



ureteric stent

CLOSED
 (-ve pressure)

T-tube (Kehr's)
 - CBD exploration



thick abscess
 Malecot's - SPL



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 Join our group



HEMOSTATIC DEVICES



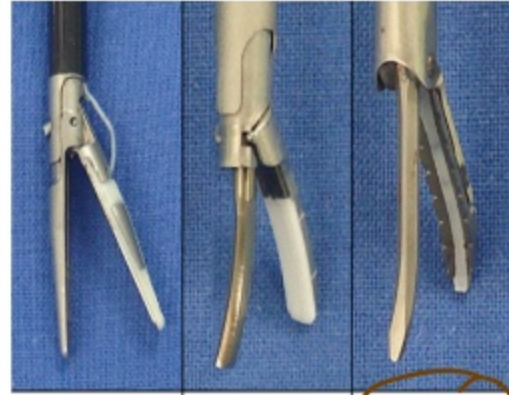
Monopolar cautery

- grounding pad
- Distilled water >> glycine
- x RL/NS



Bipolar cautery

- x
- ✓ RL/NS



Ligasure®
LS

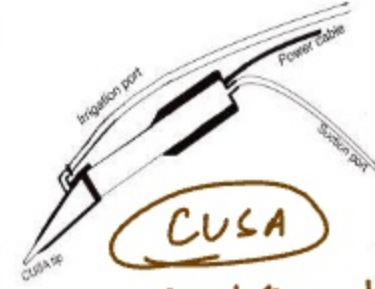
HARMONIC ACE®
HA

THUNDERBEAT®
TB

vascular seal
|
Pressure +
RF waves

ossicle
AA

RF +
ossicle



CUSA
Cavitary USA
Sx aspirator
(tissue dissector)



Linear stapler
Zerkow's



Circular stapler
Hemorrhoids

Surgical safety checklist

WHO

<p>N/A</p> <p>Before induction of anesthesia</p>	<p>N/A/S*</p> <p>Before skin incision</p>	<p>Before patient leaves operating room</p>
<p>Sign In</p>	<p>Time Out</p>	<p>Sign Out</p>
<p>PATIENT HAS CONFIRMED IDENTITY SITE PROCEDURE <u>CONSENT-Written</u></p>	<p><input type="checkbox"/> CONFIRM ALL TEAM MEMBERS HAVE INTRODUCED THEMSELVES BY NAME AND ROLE</p>	<p>Nurse verbally confirms with the team:</p> <p><input type="checkbox"/> The name of the procedure recorded</p>
<p><u>SITE MARKED</u></p>	<p><input type="checkbox"/> Surgeon, anesthesia professional and nurse verbally confirm</p> <ul style="list-style-type: none"> • <u>Patient</u> • <u>Site</u> • <u>Procedure</u> 	<p><input type="checkbox"/> That instrument, sponge and needle counts are correct How the <u>specimen is labelled (including patient name)</u></p> <p><input type="checkbox"/> <u>Any equipment issue</u></p>
<p>ANAESTHESIA SAFETY CHECK COMPLETED</p>	<p>Anticipated Critical Events</p>	
<p>PULSE OXIMETER ON PATIENT AND FUNCTIONING</p>	<p><u>Has antibiotic prophylaxis been given within the last 60 minutes?</u> <i>yes</i> <u>Cefazolin</u> <i>30-60 min prior to incision</i> Essential imaging displayed</p>	<p><input type="checkbox"/> Surgeon, anesthesia professional and nurse review the key concerns for recovery and management of this patient</p>
<ul style="list-style-type: none"> • DOES PATIENT HAVE A KNOWN <u>ALLERGY</u>? • DIFFICULT AIRWAY? • RISK OF >500ML BLOOD LOSS? 		

OT ZONES

Zone 1:

-Protective reception, waiting, trolley bay, change rooms

Zone 2:

-clean area -preoperative, recovery, plaster room, staff lounges, stores

Zone 3:

-Sterile area-Operating room, Anesthesia room

Zone 4:

-Disposal area -dirty utility, disposal corridor

ERAS protocol ^{QQ}

Phase	Key Components
Pre-op	No prolonged fasting (solids: 6hr, clear liquid: 2hrs) Carbohydrate loading ✓ night prior ✓ 2hr prior No bowel prep
Intra-op	Minimal access Maintenance fluids Normothermia PONV prophylaxis (2 classes of drugs) ← ondansetron 5HT ₃ ⊖ steroid Long acting LA (bupivacaine) or epidural analgesia
^{QQ} Post-op	✓ Early feeding within 24hrs ✓ Early ambulation Discontinue iv fluids Multimodal analgesia (opioid-sparing) ✓ Early catheter removal

Post - Op Fever

Timing	Etiology	Prevention	Mnemonic
Anytime	Drug reactions, malignant hyperthermia	-	Wonder drugs
POD 1-3	MCC ON D1- <i>atelectasis</i>	Incentive spirometry Early mobilization Antibiotics	Wind
POD 3-4	MCC OVERALL- UTI	Short-term foley use	Water
POD 4-5	Deep venous thrombosis	Early mobilization, Sequential compression socks, LMWH - <i>most effective</i>	Walking
POD 7+	Surgical site infection	Dressing changes, preoperative antibiotics	Wound



*Intermittent pneumatic
compression
(IPC) stockings*

*MAST
Military
anti shock
garment.*

SSI

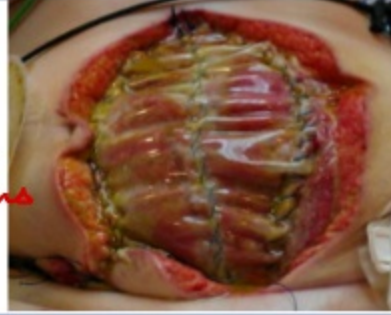
Southampton score

SSI definition- *in 30d of Sx*
in 3y of implant

BURST ABDOMEN

Day: *~ 6*

Pathognomic sign: *salmon coloured*
Serous sanguinous
Mx: *Bagot's bag / mo bag*
obscure
congo red



Intra-abdominal abscess

MC site: **Supine-** *HR /* **Overall/ Ambulatory-** *Pelvic*
IOC *CECT* *Morrisan*
TOC *Pigtail drainage* *pouch*

- Grade I – Normal healing with mild bruising or erythema
- Grade II – Erythema plus other signs of inflammation *'too'*
- Grade III – Clear or haemoserous discharge
- Grade IV – Pus
- Grade V – Deep or severe wound infection with or without tissue breakdown; hematoma requiring aspiration

Criterion	<i>ACEPSIS</i>
A Additional Treatment	<i>- Ab / IBD</i>
S Serous discharge	
E Erythema	
P Purulent exudates	
S Separation of deep tissues	
I Isolation of bacteria	<i>trabecular?</i>
S Stay in hospital prolonged	<u>over 14 days</u>

Ger Hurt
BNS
>15d

HAND HYGEINE

- most effective to prevent SSI ^{QA}



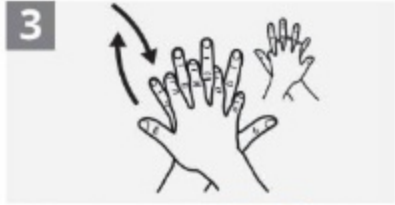
Wet hands with water;



Apply enough soap to cover all hand surfaces;



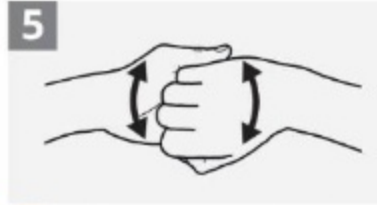
Rub hands palm to palm;



Right palm over left dorsum with interlaced fingers and vice versa;



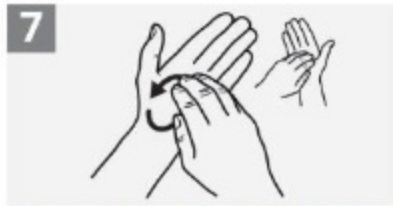
Palm to palm with fingers interlaced;



Backs of fingers to opposing palms with fingers interlocked;



Rotational rubbing of left thumb clasped in right palm and vice versa;



Rotational rubbing, backwards and forwards with clasped fingers of right hand in left palm and vice versa;



Rinse hands with water;



Dry hands thoroughly with a single use towel;



Use towel to turn off faucet;



Your hands are now safe.

Alcohol rub → except: soiled hands
visibly
Soap & water

Types of surgery

1/0 SSI

Ab

- Gross purulence or existing infection?
- Perforated viscera > 4 hours old?
- Traumatic wound open > 4 hours?
- Penetrating injury > 4 hours old?

YES →

Class IV-Dirty /Infected
e.g. Surgical management of abscess, Repair of perforated bowel, Gangrene

>20%

9%

↓ NO

- Acute, non-purulent inflammation?
- Unplanned entrance into GI/GU/respiratory tracts?
- Major break in sterile technique?

YES →

Class III-Contaminated
e.g. Non-sterile debris in field, cholecystectomy with bile spillage or acute inflammation, Open cardiac massage qd

10-20%

6%

↓ NO

Controlled/intentional entry into the GI, GU, or respiratory tracts?

YES →

Class II-Clean-Contaminated
e.g. Hysterectomy, lobectomy, laryngectomy, small bowel resection, TURP, LSCS

2-10%

3%

NO →

Class I- Clean
e.g. mastectomy, hernia repair, thyroidectomy, TKR, THR, CABG

<2%

<2%

implant
≠ Ab

↳ (X) need to give Prophylactic Ab

Sepsis

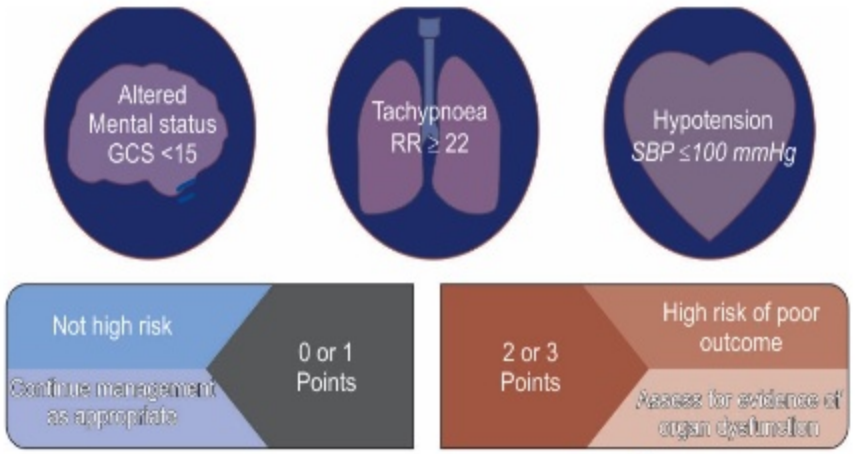
SIRS -2 or more +: 'white THR'
 Core Temperature $<36^{\circ}\text{C}$ or $>38^{\circ}\text{C}$
 HR $>90\text{bpm}$
 RR $>20/\text{min}$ or $\text{P}_{\text{CO}_2} <32\text{ mmHg}$
 White blood cell count $>12,000/\mu\text{L}$,
 $<4000/\mu\text{L}$, 10% bands x BP

OLD:
 SIRS: white THR

Sepsis: + injw
Severe sepsis: + organ dysfn
Septic shock: $\downarrow\text{LBP}$ - iv fluids \pm vasopressors

NEW:
Sepsis - SOFA ≥ 2
Septic shock: shock - iv fluids \pm vasopressors

SURVIVING SEPSIS TARGETS:
 CVP: 8-12 mm Hg \rightarrow RAP
 MAP: $>65\text{ mm Hg}$
 MvO2: $>70\%$
 UO: $>0.5\text{ ml/kg/hr}$ adult (child: >1)



Ein 1hr

THE SEPSIS SIX

1. Give O2 to keep SATS above 94%
2. Take blood cultures ✓
3. Give IV antibiotics
4. Give a fluid challenge
5. Measure lactate ✓
6. Measure urine output ✓

JUSTASK



Give 3 Take 3!

Shock

	CO	SVR	CVP
Cardiogenic	↓↓	↑	↑
Hypovolemic	↓	↑	↓
Obstructive <small>tension Ptx ♥ atmp</small>	↓	↑	↑
Distributive <small>(septic)</small>	<u>Hyperdynamic</u> ↑↑	↓↓	↓
Neurogenic <small>(spinal)</small>	↓	↓	↓

↳ vascular pooling

SHOCK

Minimum Monitoring	Additional Modalities
ECG	Central venous pressure (CVP)
Pulse oximetry	Invasive blood pressure
Blood pressure (non-invasive)	Cardiac output monitoring
Urine output	Base deficit & serum lactate

SHOCK + WARM EXTREMITIES + $MVO_2 > 70\%$: Septic shock

Shock index- HR/SBP

Modified shock index- $HR/MAAP$ } $> 0.9 \rightarrow$ critical shock

ROPE: $HR/PP > 3$ 😞

- Best clinical indicator of adequacy of resuscitation: Urine output
- Best indicator to estimate fluid required for resuscitation: CVP
- Best lab parameter to monitor tissue perfusion: Lactate / Base deficit
- Best marker of systemic perfusion: Lactate + mVO_2

FLOW PHASE- Response to trauma/stress

↑↑ metabolic BMR ↑↑

Acute:

- ↑ Cortisol, ↑ Catecholamines, ↑ Glucagon,
- ↑ Growth hormone, ↑ ACTH
- ↑ IL-1, IL-6, IL-8, TNF- α

Chronic:

- ↓ Insulin, ↓ IGF-1, ↓ Testosterone, ↓ T3

Sick euthyroid Sx

$T_4 \rightarrow rT_3 \uparrow$
 $T_4 \rightarrow T_3 \downarrow$

Trauma-Basics

TRIAGE	Examples
Immediate: immediately life-threatening injuries	Severe facial trauma, tension pneumothorax, profuse external bleeding, haemothorax, flail chest, major intra-abdominal bleed, extradural haematomas
Delayed/ Urgent: injuries requiring treatment within 6 hours	Compound fractures, degloving injuries, ruptured abdominal viscus, pelvic fractures, spinal injuries
Minimal/ Non-urgent: walking wounded	Simple fractures, sprains, minor lacerations
Dead: Unsalvageable	Severe brain damage, very extensive burns, major disruption/loss of chest or abdominal wall structures

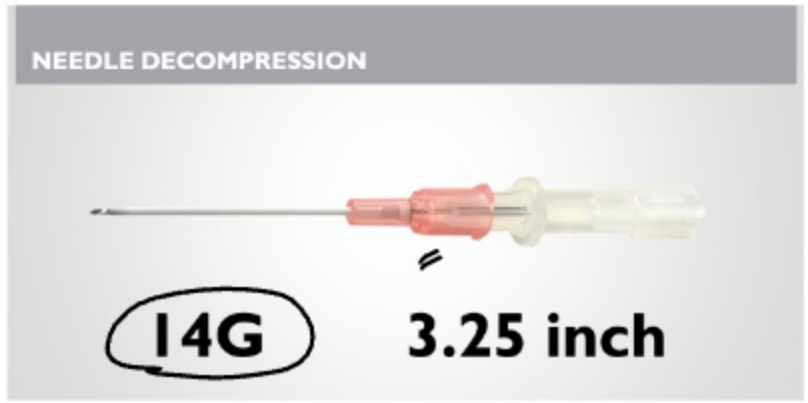
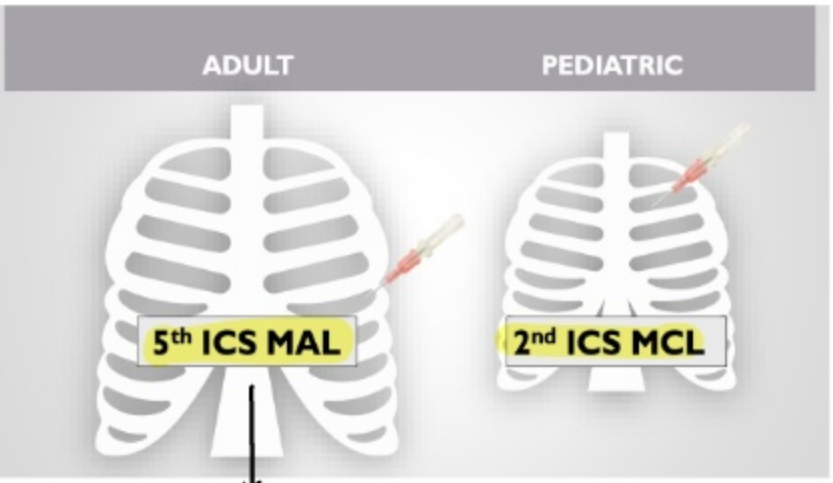
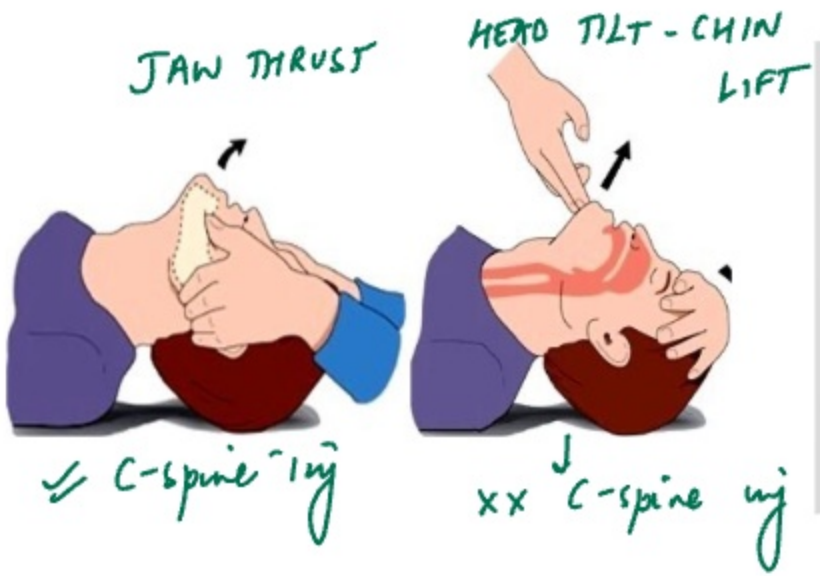
Primary survey	Identify what is killing the patient ADJUNCTS: CXR / PXR / EFAST
Resuscitation	Treat what is killing the patient
Secondary survey	Identify other possible injuries CT AMPLE Allergy Medications - Past medical - Pregnancy Events w/ trauma Last meal
Definitive care	Make a management plan

PRIMARY SURVEY:

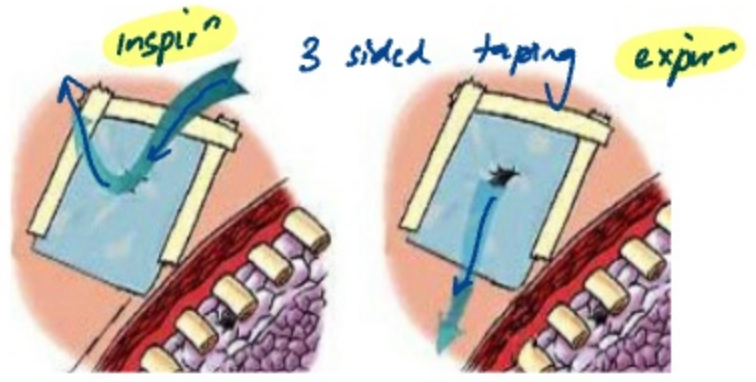
- ✓ A - C-spine stabilisation (1st) → Airway
- ✓ B - Breathing & ventilation
- ✓ C - Circulation
- ✓ D - Disability
- ✓ E - Exposure & environmental control

Field:
CABCDE
↓
control exsanguinating bleed

unable to talk
gaspig
subcut emphysema
GCS 5E
"unresponsive"
obstantated



Definitive airway of choice → ET intubation



• suspected facio maxillary injury → FONA

Definitive: tracheostomy

1st: Needle Cricothyroidotomy

~ 30-60 min

- Structures pierced:
- skin
 - subcut F
 - sup/deep F
 - serr ant
 - intercostal muscles (3 layers)
 - Endothoracic fascia
 - parietal pleura

open pneumothorax

Q. A 25-year-old man was stabbed in the chest during a street fight. Blood pressure is 90/58 mm Hg, pulse is 124/min, and respirations are 30/min. The patient is in severe respiratory distress. Breath sounds are present on the left and absent on the right. Heart sounds are normal. The neck veins are distended. The patient becomes obtunded during examination. Which of the following is the best next step in management?

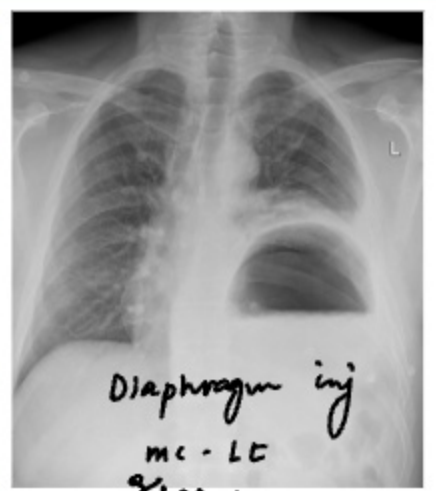
- A. Cricothyroidotomy
- B. Needle thoracostomy ✓
- C. Endotracheal intubation ✓
- D. Rapid volume resuscitation ✗✗

tension Pt

A

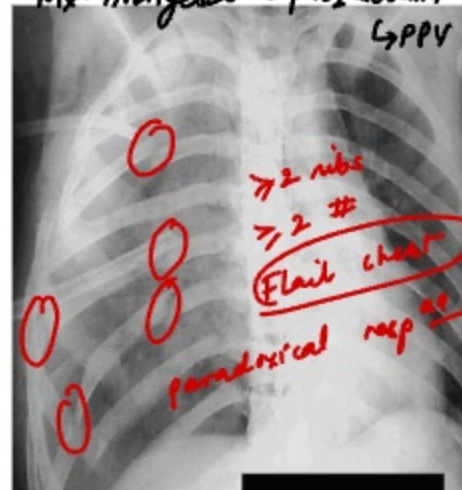
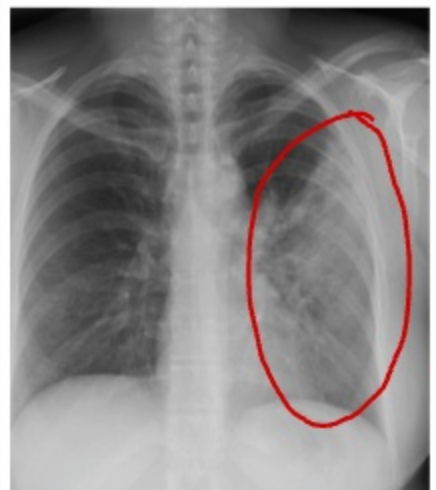
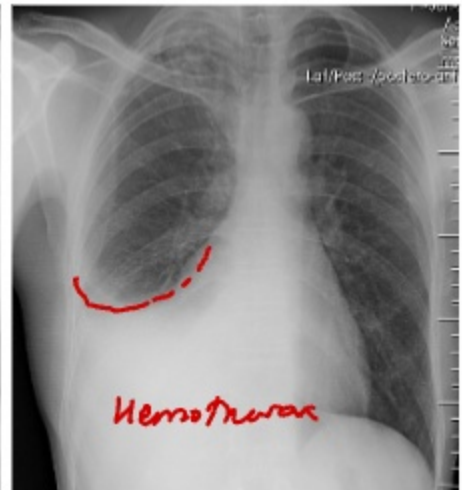
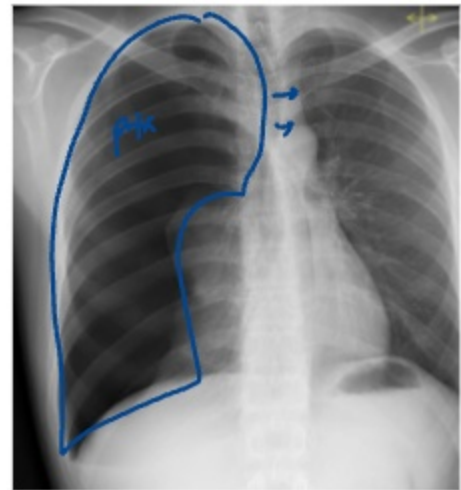
Chest trauma

	TENSION PTX	MASSIVE HEMOTHORAX	CONSOLIDATION / CONTUSION	CARDIAC TAMPONADE
TYPE OF SHOCK	obstructive	Hypovolemic	-	obstructive
JVD	↑	↓	N	↑
TRACHEAL SHIFT	c/L	c/L	No	No
BREATH SOUNDS VOCAL FREMITUS	↓	↓	↑ ^{oo}	N
PERCUSSION	Hyperresonant	Dull	dull	Ewart sign: dull
Management	(stable) ICP (unstable) Needle thoracostomy ↓ ICD	ICD ↓ >1.5l in one hr >200cc/hr in 2-4hrs open thoracostomy	ventil ⁿ / O ₂ if needed (P _{O2} < 60mm)	INTERSCAPULAR THORACOTOMY subx / Anterior lat



loc - Diagn > CECT
 laparoscopy
 Bergvist - mb II
 diaphragm
 pelvic / spine #

Mx: Analgesia → pO₂ < 60mm
 ↳ PPV



Hypovolemic Shock

external
 thorax
 abdomen
 pelvic #
 long bones

Parameter	Class I	Class II (Mild)	Class III (Moderate)	Class IV (Severe)
Blood loss	<15% <750ml	15-30% 750 - 1500 ml	31-40% 1500 - 2000 ml	>40% >2000ml
Heart rate	↔	↑	↑	↑↑
Blood pressure	↔	↔	↓	↓
Pulse pressure	↔	↓	↓	↓
Respiratory rate	↔	↔	↑	↑
Urine output	↔	↔	↓	↓↓
Glasgow coma scale score	↔	↔	↓	↓
Base deficit*	0 to -2mEq/L	-2 to -6mEq/L	-6 to -10 m Eq/L	-10mEq/L or less
Need for blood products	Monitor	Possible	Yes	Massive Transfusion

Mx of hypovolemic patients in shock (ATLS):

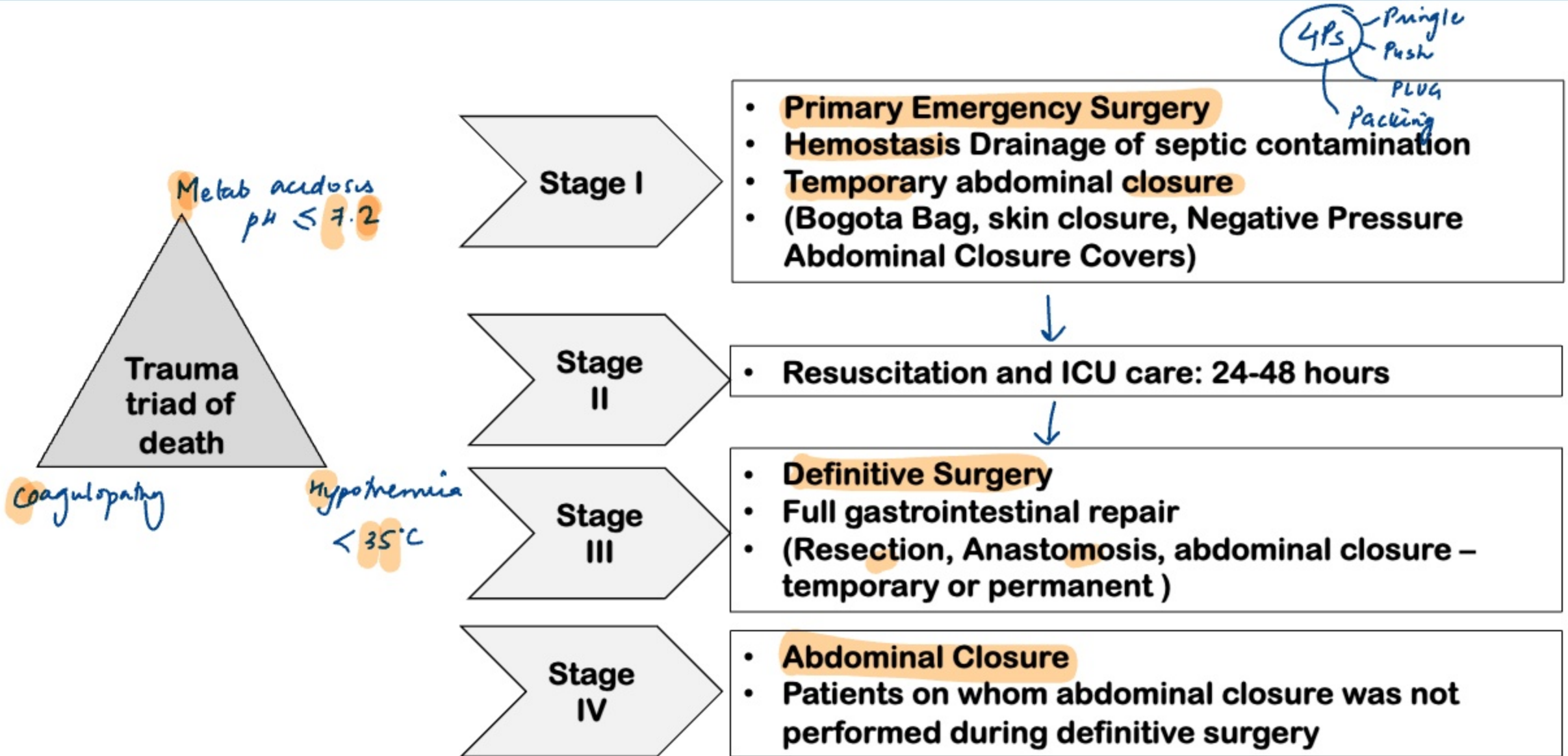
Min Cannula- 18G Fluid type- 1L bolus isotonic crystalloid NS/RL Fluid volume- 1L

Damage control resuscitation

Crash-2 trial: tranexamic acid 1g over 10min → SBP < 90 HR > 110
 (2 in 3hrs)

→ 1:1:1 - TEG / ROTEM
 PRBC : FFP : P/B

DAMAGE CONTROL SURGERY



ABDOMINAL TRAUMA



Subxiphoid



SR pouch



Pneumothorax



HR/ Morrison pouch

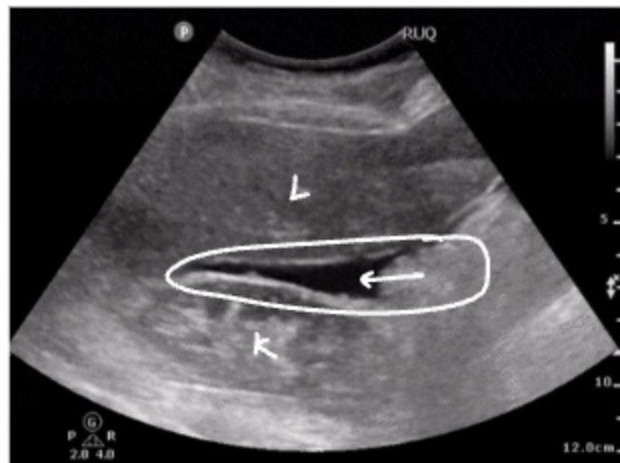


Pelvis

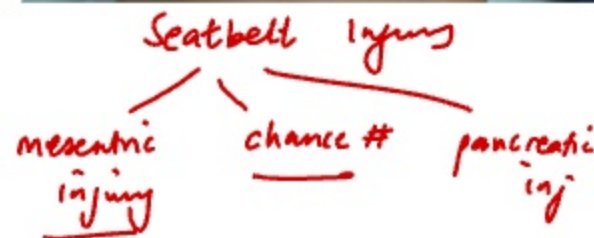


Hemothorax

Extended



eFAST (+)



- MC organ injured in BTA: *Spleen*
- MC organ injured in PTA: *Liver > stomach*
- MC organ injured in GSW: *SI*

-Kehr sign → *Lt shoulder pain*
pensplenic hematoma

-Balance sign → *dull on percussion*

eFAST: *extended Focused Assessment Sonography in Trauma*

Sensitivity: *≥100ml*

LIMITATIONS: *Pneumoperitoneum, mesenteric, banel, RT hematoma, subcut emphysema*

eFAST not available

Positive DPL

- 100,000 red cells/ μ L
- >500 white cells/ μ L
- 175 units amylase/dL
- Bacteria on Gram stain
- Bile
- Food particles

ABDOMINAL TRAUMA

BLUNT TRAUMA

Unstable

eFAST

↓ + / -

OT

Stable

eFAST

+

CECT

IOC to localise injury
grade

observe

aa

PENETRATING TRAUMA

- Unstable
- Gunshot
- Peritoneal breach
- Impaled object
- Bleeding via orifice
- Evisceration



Next: Further explor

Stable

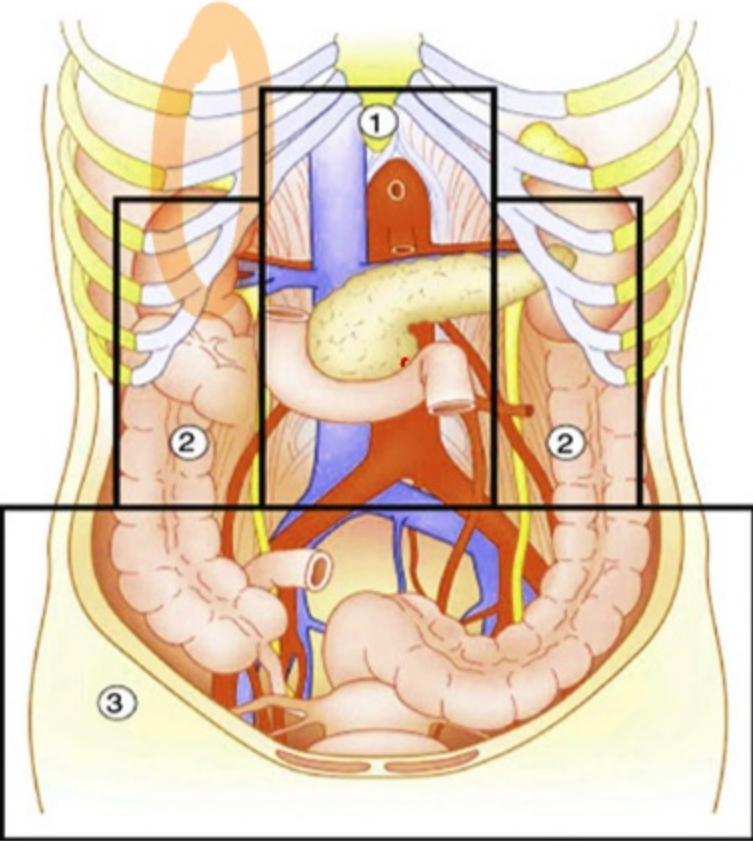
eFAST

OT

→ OT



RP TRAUMA



Zones	Contents	Management
Zone I	Central vascular structures such as aorta and IVC	Exploration <i>Q/</i> Left medial visceral rotation: Mattox <i>- Aorta</i> Right medial visceral: Kocher's/ Cattle Brasch
Zone II	Kidneys and adrenal glands	Observation <i>Expanding H → explore</i>
Zone III	Retroperitoneum associated with pelvic vasculature	External pelvic compression and fixation
Zone IV	Retro hepatic IVC and hematoma behind portal vein	Observation

*IAP > 20mm Hg + organ dysfunction - GFR ↓ - VO ↓
CO ↓ (preload ↓)*

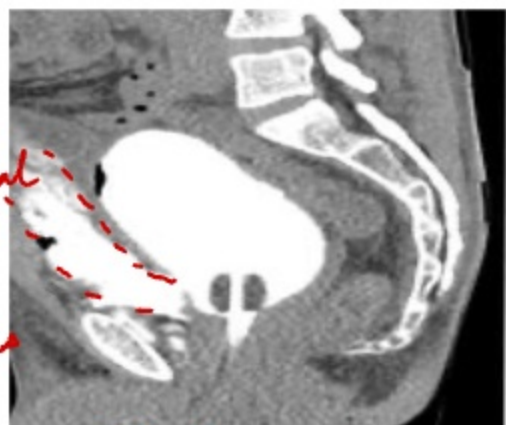
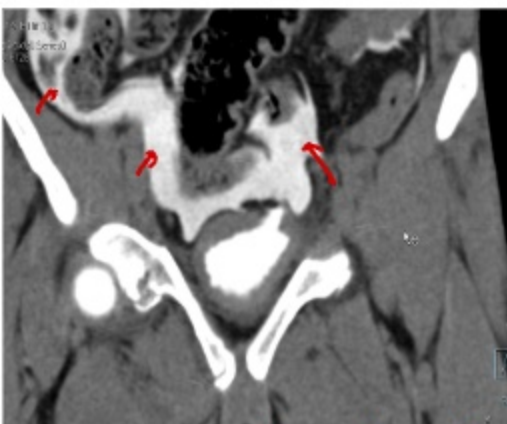
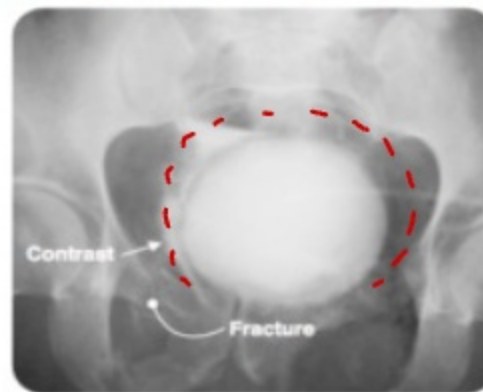
Abdominal compartment IOC:

Anuria: *decompression*

GU Trauma

- IOC for renal trauma in stable: **CT urography / CECT**
- IOC for renal trauma in unstable: **delayed w/ SM**
- IOC for bladder injury: **CT cystography** **single shot IVU**
- IOC for urethral injury: **RGU**

Foley's - 200ml contrast

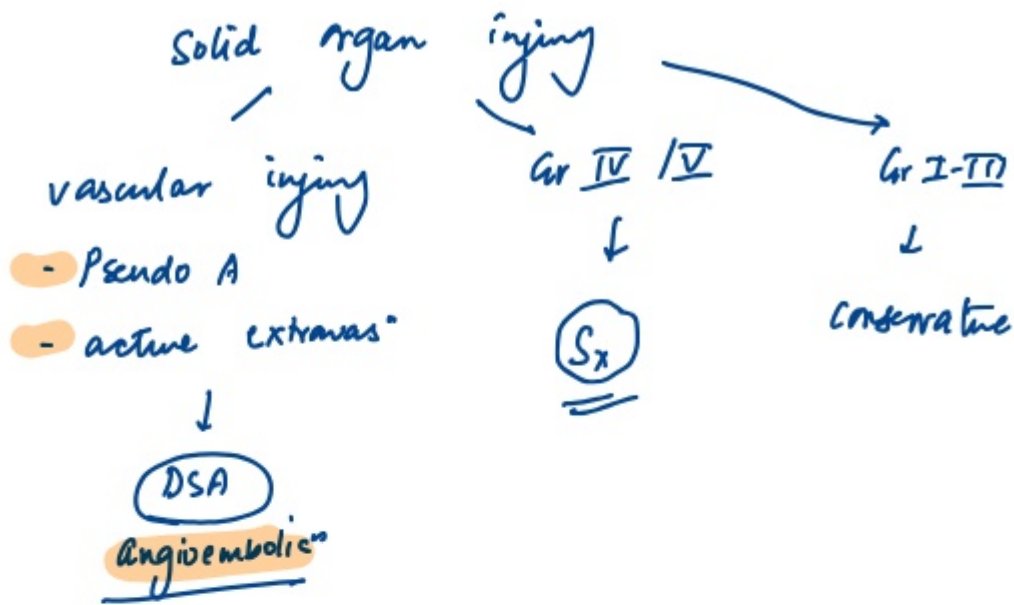


IPBR = Intrapelvic
 Contact admin
 Join our group
 severe → Mx: Sx

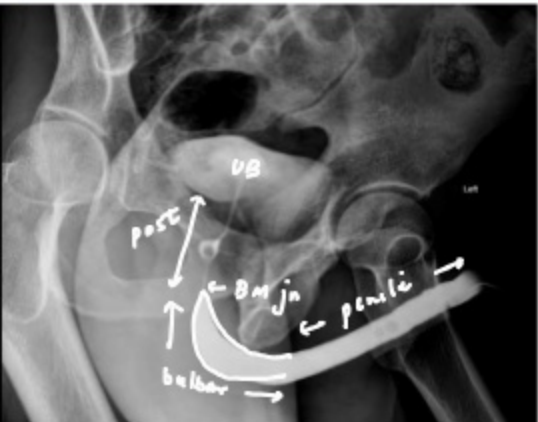
EPBR = extraperitoneal
 Lmc Mx: conservative

Renal AAST grading

- Grade I: Subcapsular hematoma or contusion
 - Grade II
 - Superficial laceration ≤ 1 cm depth not involving the collecting system
 - Perirenal hematoma confined within the fascia
 - Grade III
 - Laceration >1 cm not involving the collecting system
 - Vascular injury or active bleeding confined within the perirenal fascia
 - Grade IV
 - Laceration involving the collecting system with urinary extravasation
- URINOMA
 ↓
 conservative → infection Pigtail drainage
 ↓ x (persistent)
 DJ stent
- Vascular injury to segmental renal artery or vein
 - Segmental infarctions without associated active bleeding
 - Active bleeding extending beyond the perirenal fascia
- Grade V
 - Shattered kidney
 - Avulsion of renal hilum or laceration of the main renal artery or vein: Devascularised kidney with active bleeding



URETHRAL TRAUMA



R&V
Ⓝ

C/F: blood at meatus + inability to void

Ant: Straddle inj Post: Pelvic #

mc → BMJ

IOC: R&V

UB not palpable

⊕

Bulbar urethral rupture

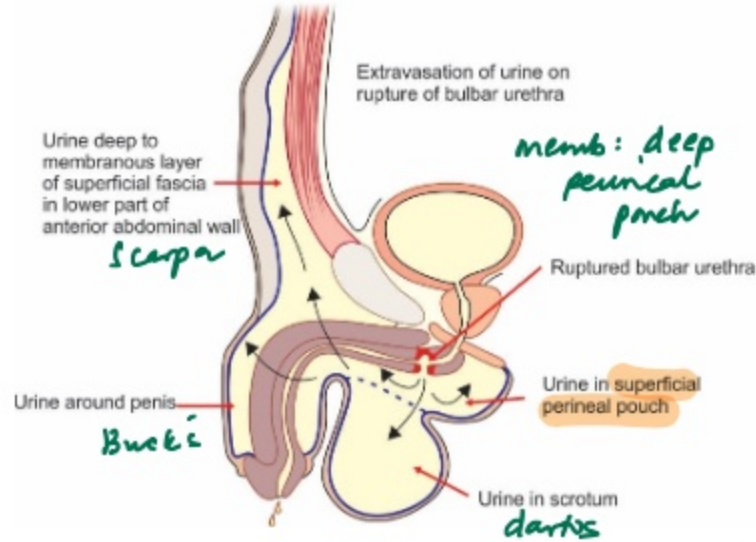
SPC

wait & watch

4-6wks

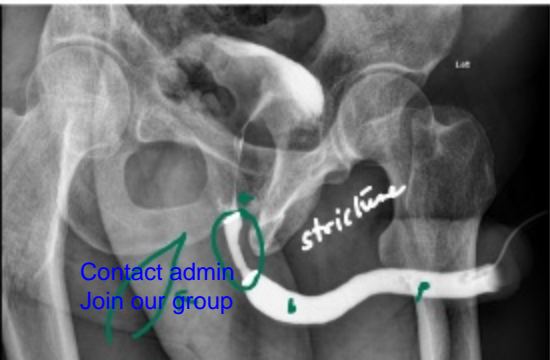
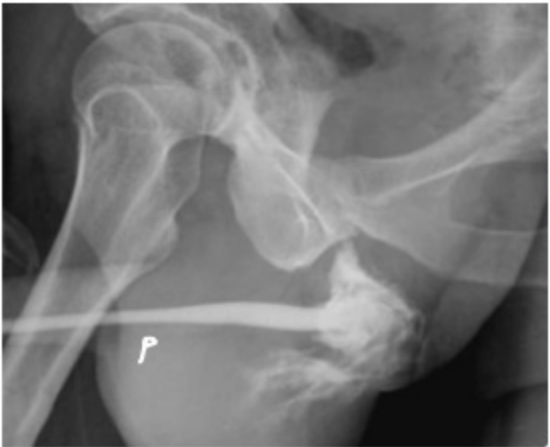
Delayed urethroplasty

(buccal mucosa graft)



Q. A 14 year old boy presents to the ED after a straddle injury and rupture of bulbar urethra. Extravasated urine can be seen in:

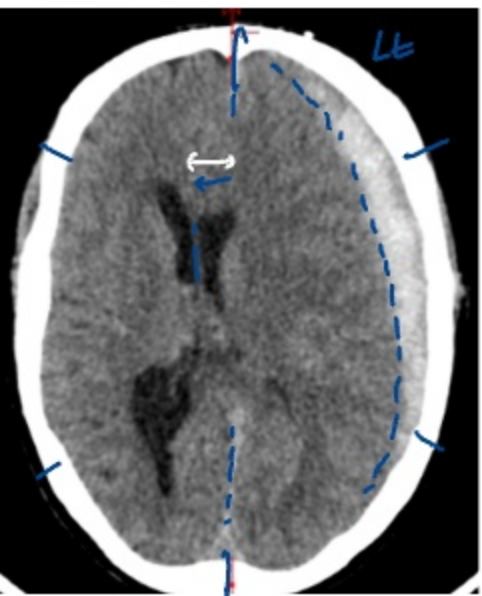
- a) Scrotum
- b) Thigh x
- c) Ischiorectal fossa x
- d) Deep perineal space x



HEAD TRAUMA

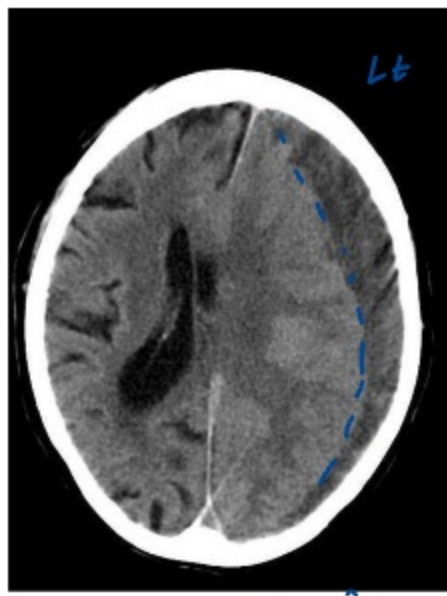
IOC - NCCT

Alcoholic-fall



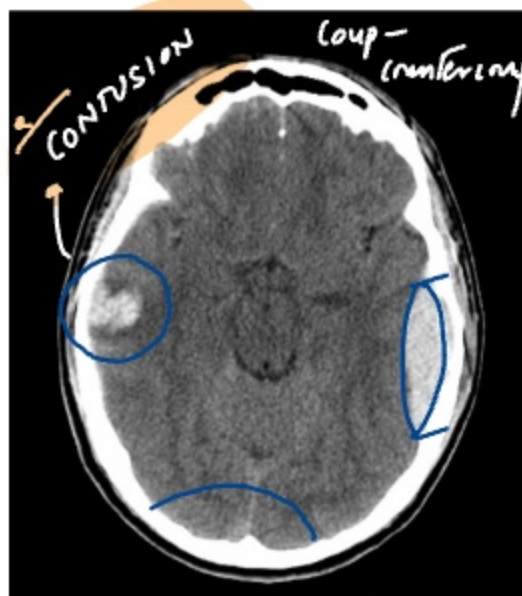
Acute SDH

- Bridging veins
- Trivial trauma
- Sutures: ✓
- Midline ✗



Lt chronic SDH

H/o RTA



Acute EDH

- Artery - MMA ant
- RTA Pterion
- Sutures: ✗
- Midline ✓

✗ Mannitol

Concussion: NCCT ⊕ / minor Neuro deficit
L mild

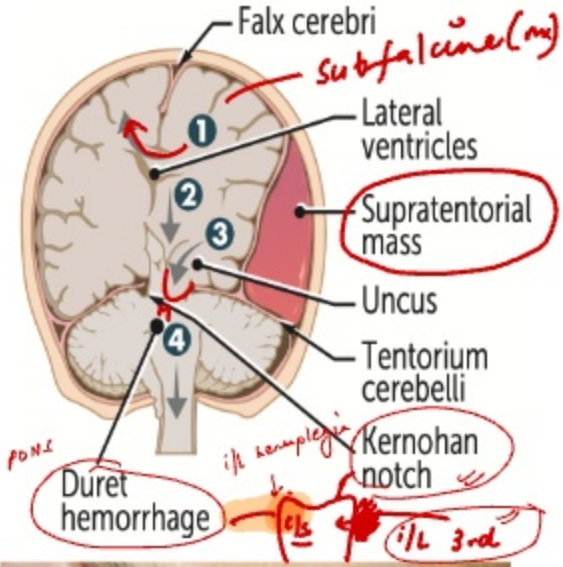


EDH c

Swirl sign
⊕

Indicator of decompression

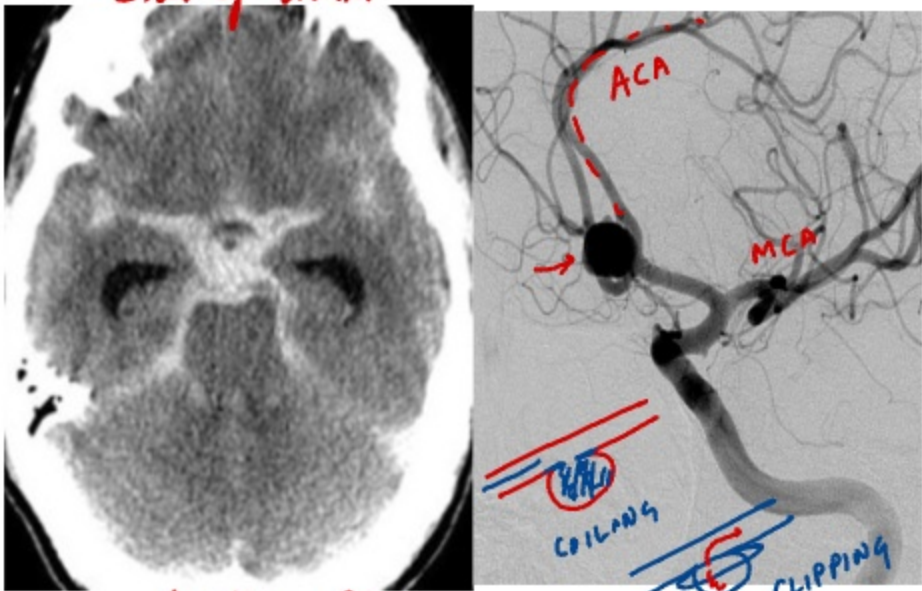
Decompressive craniectomy >> BURR-HOLE
Midline shift > 5mm
EDH dia > 1.5cm vol > 30cc
Hemiatitis
no localising: Lt
- i/L to dilate pupil



HEAD TRAUMA

H/o RTA

Star of death



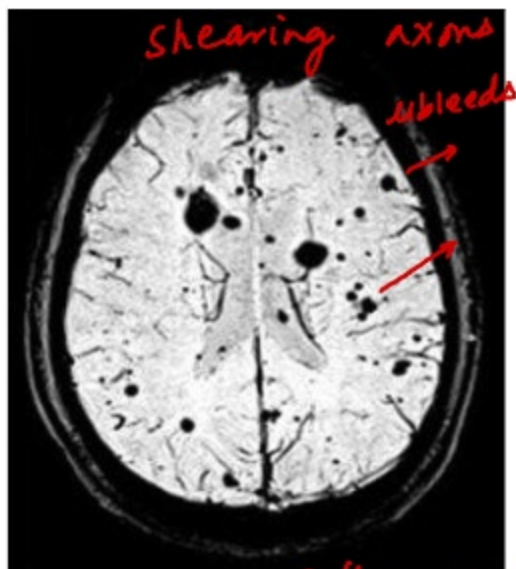
Acute SAM

"worst headache" / "thunderclap" + meningeal irrita
XX fever

- Trauma > Aneurysm
- MC site: ACA-ACOM jn
- IOC: CT angiography
- Gold standard: DSA
- Treatment: Endovascular coiling
- Clipping if: wide neck A
- Preventing vasospasm- Nimodipine
- 3H: Hypovolemia, Hemodilution, Hydr

Contact admin
Join our group

H/o RTA, GCS-9
NCCT normal/ petechiae



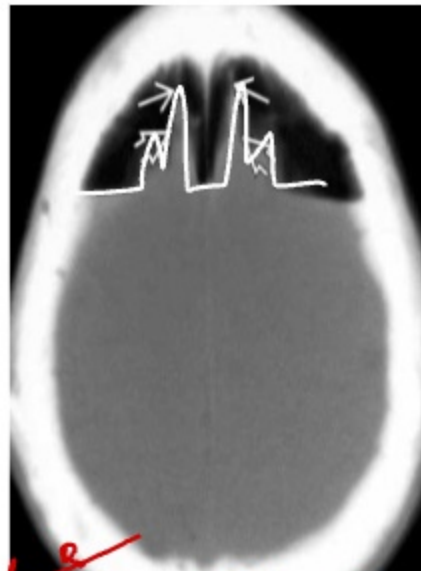
shearing axonal bleeds

DAI - Diffuse axonal injury

- IOC: MRI (SWI)
- Adam's staging:
 - 1- GM-WM jn
 - 2- CC
 - 3- brainstem

worse prognosis
- H/P: retraction balls
- Mx: Conservative

PNS #, Open #



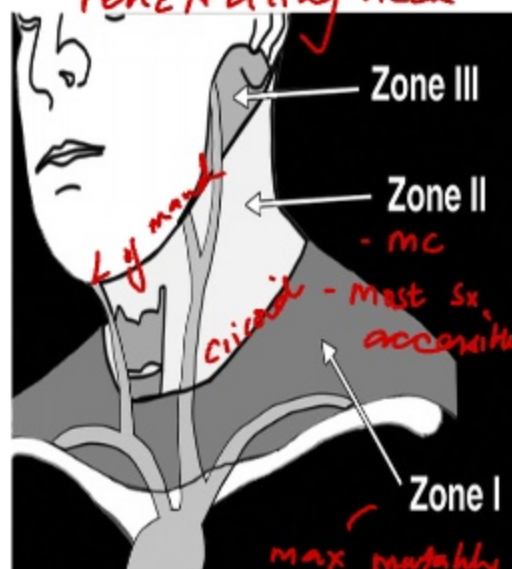
MT. Fuji sign

tension pneumocephalus

- ✓ Expanding or pulsatile hematoma
 - ✓ Active bleeding
 - ✓ Shock
 - ✓ Airway compromise
 - ✓ Massive subcutaneous emphysema
 - ✓ Neurologic deficit
 - ZONE 2
- Sx

PLATYSMA BREACH

Penetrating neck



Zone III

Zone II - MC

Zone I

max mobility

INDICATIONS OF NCCT HEAD AND C-SPINE

NICE guidelines - NCCT Head

CT Within 1 Hour	CT Within 8 Hours
GCS <13 at any point	Age >65
GCS <15 at 2 hours	Coagulopathy (aspirin, warfarin, rivaroxaban)
Focal neurological deficit	Dangerous mechanism (fall from height, RTA)
Suspected open, depressed, or basal skull fracture	Retrograde amnesia >30 min
>1 episode of vomiting ^{or}	
Post-traumatic seizure	

NEXUS - CT C-spine

Cervical spine imaging is **NOT** required if the patient has:

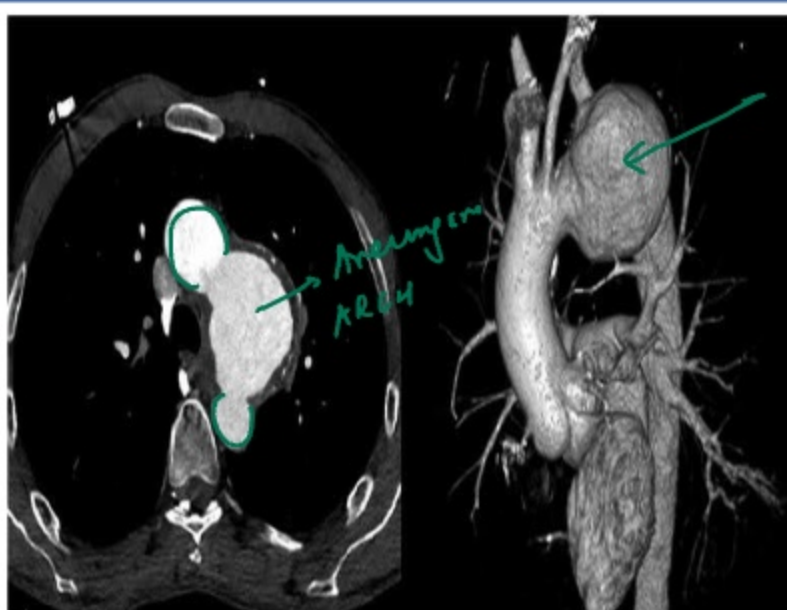
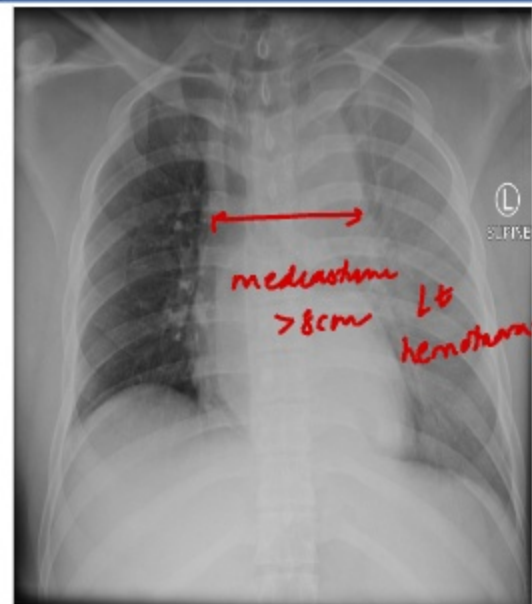
- No midline cervical tenderness
- No focal neurological deficit
- Normal level of alertness (GCS 15)
- No intoxication (alcohol / drugs)
- No painful distracting injury

+ 45° degree sideway

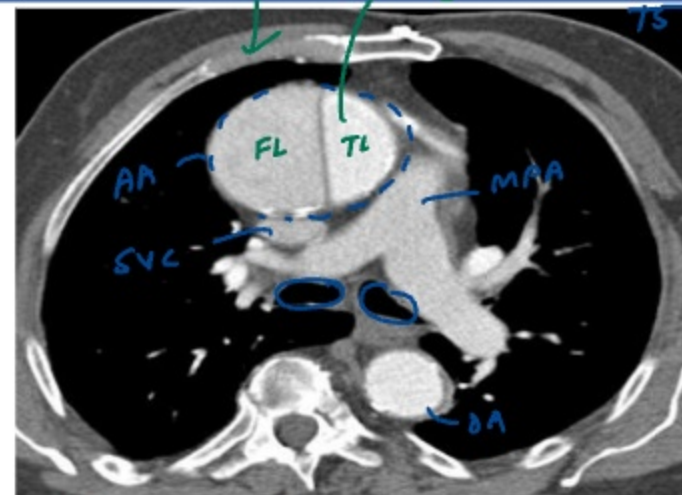
VASCULAR INJURY



IOC - CT angiography
 Unstable - TEE
 brighter



Yin-yang sign



AORTIC DISSECTION
 R/F - hygro > CTD - Marfan / EDS / syphilis

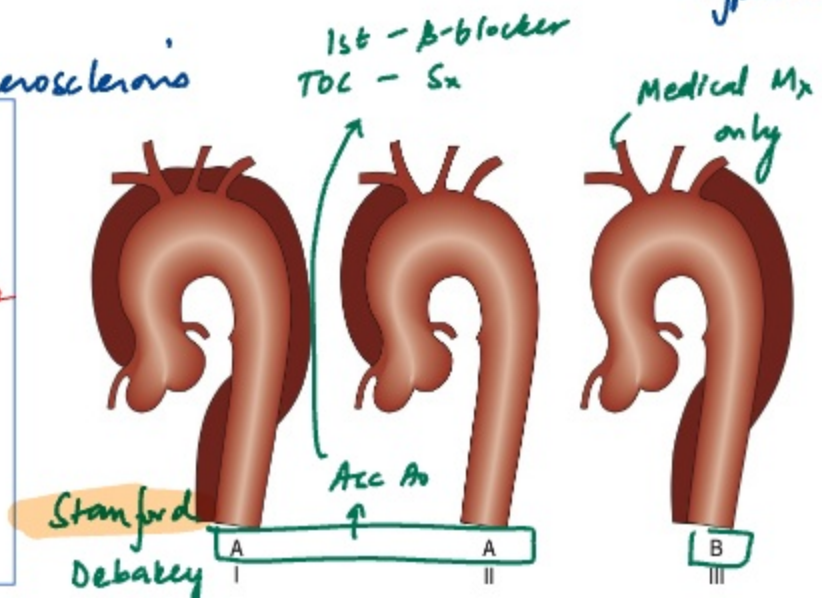
AORTIC INJURY

- MC site: Isthmus
- IOC: CT angiography
- Initial Mx: esmolol
- HR < 80, MAP: 70mm Hg
- Definitive Mx: EVAR



MC vessel - Circle of Willis (Berry's)
 MC extracranial / MC Mycotic - AA
 MC peripheral - popliteal / s. aureus
 IOC: CT angiogram
 Management: EVAR

- Indication:
- asymptomatic, stable + sx if:
 - > 5.5cm (Marfan: > 4.5cm)
 - rapid ↑ in size > 6mm in 6mos > 1cm in 1yr



TRAUMA SCORES

GCS-p - max - 15
min - 1

GCS-P

* Important changes highlighted in red

Motor response Verbal response Eye opening

1. None None None

2. Extension Sounds To pressure

3. Abnormal flexion Words To speech

4. Withdrawal Confused Spontaneous

5. Localizing Oriented Pupil(s) unreactive to light

6. Obeying commands Both pupil 2
One pupil 1
Neither pupil 0

Pupil reactivity score:
Subtracted from the calculated GCS

Pupil reactivity score

For total GCS, subtract pupil reactivity score from calculated GCS

- brain death: GCS-3
- intubated: VNT
- decubate vs decerbrate
- Retrospinal - flex vs - Extension UL
- subspinal - vestibulospinal

Mangled Extremity Severity Score (MESS) ≥ 7 : amputate

ELISA

Type	Characteristic	Injury	Points
1	Low energy	Stab wound, simple closed fx, small-caliber GSW	1
2	Medium energy	Open/multilevel fx, dislocation, moderate crush shotgun, high-velocity GSW	2
3	High energy		3
4	Massive crush	Logging, railroad, oil rig accidents	4
Shock Group			
1	Normotensive	BP stable	0
2	Transiently Hypotensive	BP unstable in field but responsive to fluid SBP <90mmHg in field and responsive to IV fluids	1
3	Prolonged hypotension		2
Ischemia Group			
1	None	Pulsatile, no signs of ischemia	1
2	Mild	Diminished pulses without signs of ischemia	2
3	Moderate	No Doppler able pulse, sluggish cap refill, Paresthesia, diminished motor activity	3
4	Advanced	Pulseless, cool, paralyzed, numb without cap refill	4
Age Group			
1	<30y/0		0
2	>30 < 50		1

E4	V5	M6
3	4	5
2	3 words	4.
1	2 sounds	3 decartical
	1 x	2 decerebrate
		1 x

BURNS

Depth	Histology	Appearance	Sensation	Healing
First-degree	Epidermis only	Erythema; blanches with pressure	Intact; mild to moderate pain ✓	3-6 days without scarring KEEP OPEN
Second degree Superficial	Epidermis and superficial dermis; skin appendages intact	Erythema, Blisters, moist, blanches with pressure	Intact; <u>severe pain</u> ^{max}	1-3 weeks without scarring DRESSING: <u>Paraffin dressing</u>
Second degree Deep	Epidermis and most dermis; most skin appendages destroyed	<u>White, dry, waxy</u> , reduced blanching to pressure	<u>Decreased; less painful</u>	> 3 weeks, Scarring and contractures <u>Hydrocolloid/ Collagen dressing</u> EXCISION AND GRAFTING
Third-degree	Epidermis and all of dermis; destruction of all skin appendages ✓ SUBCUTANEOUS FAT	White, charred, dry and <u>leathery</u> ; <u>does not blanch</u>	<u>Anesthetic; not painful</u>	Does not heal; severe scarring and contractures ESCHAROTOMY & EXCISION AND GRAFTING

Airway injury:

Burns around face, blisters in mouth, Hoarseness of voice, Stridor, Singeing of facial/nasal hair

↓
ELECTIVE Intubation ^{or}

if laryngeal edema → Needle cricothyrotomy

Circumferential burns



BURNS MANAGEMENT

MCC of death in burns:

- Immediate: Asphyxia > Neurogenic
- Early: Hypovolemic shock
- Late/Overall: sepsis
- Organism: Pseudomonas

IV Fluids

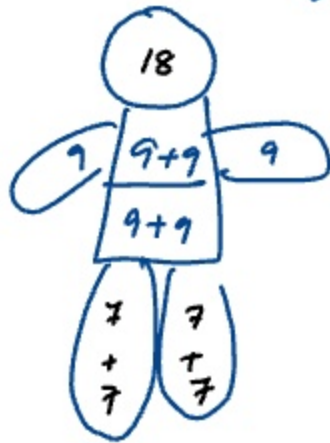
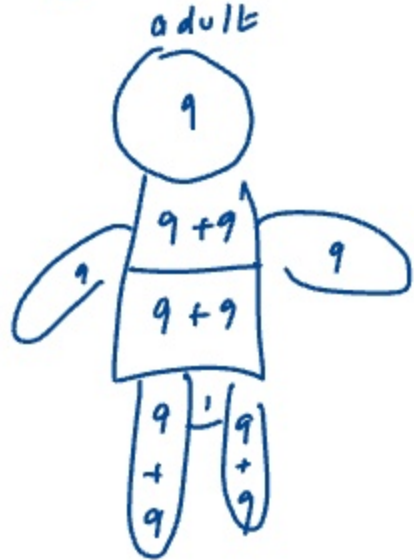
- Fluid of choice in adults- RL
- Fluid of choice in children- RL + 5% dextrose
- Time: $\frac{1}{2}$ 8hr
- $\frac{1}{2}$ 16hr
- since time of burn

Latest ATLS:

- Adults: $2\text{ml} \times \text{kg} \times \% \text{BSA}$
 - <14yr: 3ml " " "
 - Electrical injury: $4\text{ml} \times \text{"} \times \text{"}$
 - PARKLAND: " "
- Mbwin - ATN

Rule of 9 Wallace's

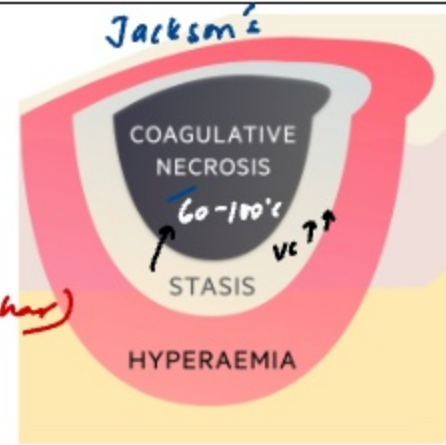
most acc: Lund-Browder
child < 14yr



Cooling burn- NOT ICE

- Effective upto: 1hr
- Ideal temp: $\sim 15^{\circ}\text{C}$
- Don't burst blisters

- Silver sulfadiazine: \checkmark (x penetrate eschar)
- Silver nitrate: s/c: black D
- Mafenide acetate s/c: metab acidosis
- Cerium nitrate - CMI \uparrow elderly \checkmark



Absence of cyanosis	Cyanosis on distal phalanx	Cyanosis up to MP joint	Cyanosis proximal to MP joint
Grade 1 No amputation of bone	Grade 2 Moderate risk of amputation	Grade 3 High risk of amputation	Grade 4 Risk of amputation 100%

Contact admin
Join our group

FROSTBITE COOLING: RAPID DEWARMING $\sim 20^{\circ}\text{C}$

Calculate for Burn Surface Area (BSA) for a patient with burn involving the anterior torso, upper right arm and circumferential right thigh:

- a) 45%
- b) 27%
- c) 36%
- d) 31.5%

4.5

9

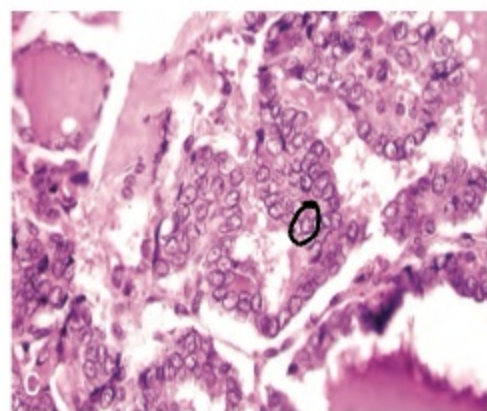
27 + 4.5

9 + 9

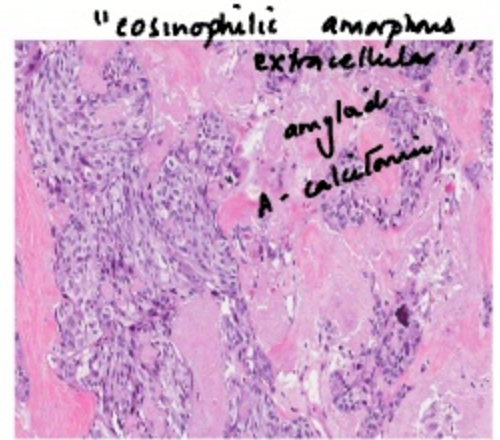


Thyroid Cancers

- MC associated with RT, TGC, Hashimoto: } Papillary
- Most common, Best prognosis, Lymphatic mets: }
- BRAF** mutation, (t 10;17): }
fap/pilo LCH/MCL adenocarcin melanoma 415T
- MC in I deficient areas, MNG, Hematogenous mets: } Follicular
bony mets / lung
- RAS** GOF, PAX8-PPARG(t 2;3): }
- MC in MEN2 (RET point mutation): }
- Calcitonin**, CEA, Dense bodies: *Ca(N) . 5HT ↑ . ACTH ↑* } MTC
- Central LN dissection/ **No role of Radio-iodine:** }
- Worst prognosis: *Anaplastic*
- Stony-hard thyroid: *Riedel's thyroiditis (IgG4 RD) → Bx*
- GNAS** mutation: *Toxic adenoma*
- Wolf chaikoff:** I → Hypothyroid
- Jod Basedow:** I → Hyperthyroid
- Anti-TPO, Struma lymphomatosa: *Hashimoto thyroiditis* } Pap ca
 lymphoma
- Painful thyroiditis following URTI: *de Quervain granulomatous*
- Silent:** *Lymphocytic thyroiditis*

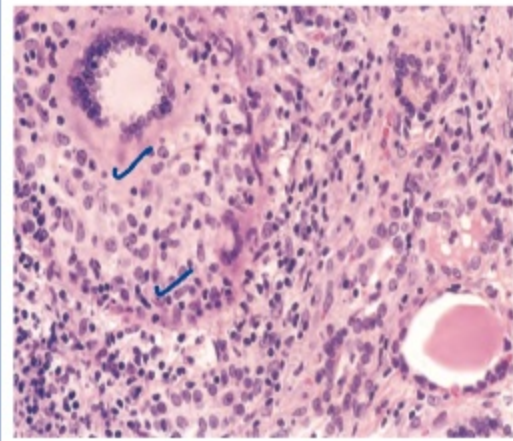


DRPMAN - ANNIE eye
 Papillary ca
 coffee bean nuclei
 Psammoma bodies

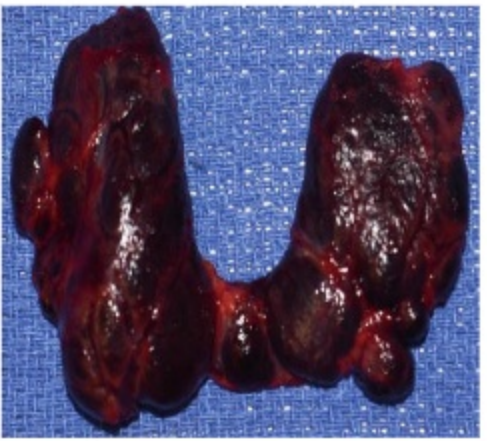


"eosinophilic amorphous extracellular amyloid"
 A - calcitonin

MTC

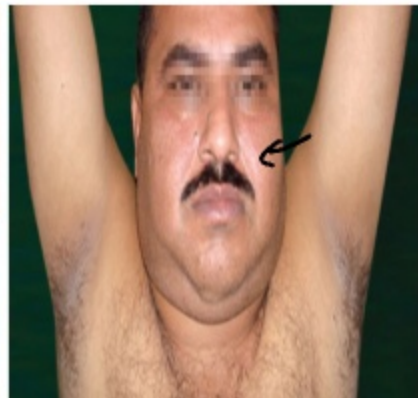


de Quervain



"black" - Minocycline

Thyroid Clinical Examination



Pizzillo
= prominent obese

Lahey

Cille's

Carotid A →
Berry's test

Pemberton sign
↓
SVC compressed

• Kocher's test:
airway

↓
Retrosternal goitre → Ca lung

aa Retrosternal goitre
- only neck incision
- deriva - neck vessels
↓
except:
- 1st mediastinal goitre
- size ↑↑ ectopic



THYROGLOSSAL CYST < RTA → PTZ
↑ recurrence

MC location: infrathyroid
Management: Sistrunk → track

Approach to Solitary Thyroid Nodule (STN)

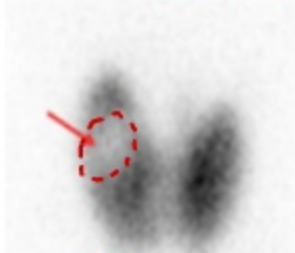
1st : TSH ± T3/T4

TSH LOW : Hyperthyroid

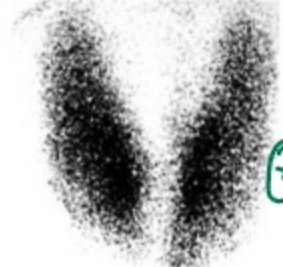
Next : RAIU Scan : I-123 > Tc⁹⁹ pertechnetate

TSH HIGH / (N) -Hypo / Eu

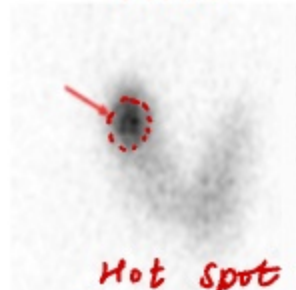
RADIOLOGICAL IOC: USG



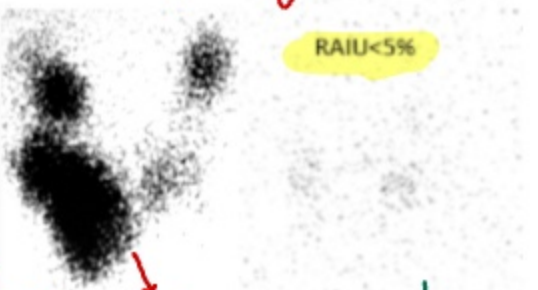
Cold spot ~20%
↓
FNAC
% malignancy



Graves' D



Hot spot
↓
-4%
TOXIC ADENOMA



Plummer's D

RAIU < 5%

1. Thyroiditis
2. Struma ovarii (teratoma)
3. Factitious

TIRADS: Imaging Reporting & Data System

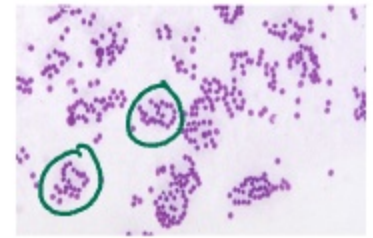
- Composition-Solid
- Echogenicity-Hypoechoic
- Shape-Taller than wider
- Margin-Irregular
- Echogenic foci-Punctate

Diagnostic category

- I. Nondiagnostic → Repeat under USG
- II. Benign
- III. AUS - atypia undetermined sign
- IV. FN - Follicular neoplasm
- V. SFM - suspicious
- VI. Malignant

IOC: FNAC
Bethesda grading 2023
Can't distinguish: Follic adenoma / Carcinoma
Next step: Hemithyroidectomy

Adequacy: ≥ 6 groups of well visualized follicular cells (≥ 10 per cluster)



Thyroid Surgery

Max RLN injury at: Berry lig (pretracheal thickened)

Baehr's triangle:

CCA-ITA-RLN

Triangle of concern: (ITA)

Berry ligament-RLN-Trachea

RLN: Berry lig / Baehr's / inf pole

(x) strap M dissecⁿ

Upward extension prevented by:

Stap muscles

Downward extension into mediastinum is prevented by:

Berry lig

Thyroid moves during deglutition:

Pretracheal fascia

Hemithyroidectomy:



Well diffⁿ (DTC) < 4cm < 55 yrs.

-Subtotal:



-Near total/ Hartley-Dunhill:



Total Thyroidectomy ⇐ MTC / R^{et} / Familial

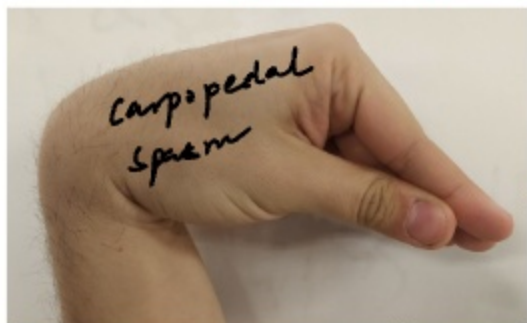
PROGNOSTIC < AGES < AMES

Parameter	Low Risk	High Risk
Age <i>most imp^a</i>	< 45 years	> 45 years
Size	< 4 cm	> 4 cm
Extra-thyroid extension	No	Yes
Metastasis (distal)	No	Yes
High grade	No	Yes

MACIS: Completeness of Sx



Chvostek



Trousseau sign

↓Ca²⁺

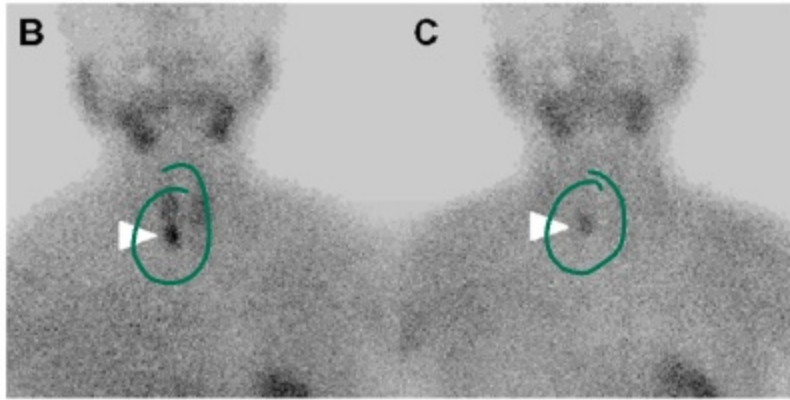
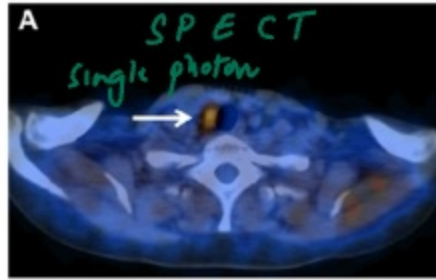
COMPLICATIONS

MCC- Hypo PTM (vascular - ITA) PTM Thyroid.
C/F time- 2-3d

Inability to extubate- B/L RLN injury

MCC of intra-op thyroid storm: Inadequate ptnt prep
↳ Bblockers / steroids / PTU / Lugol's I

Parathyroid Surgery



SESTAMIBI SCAN ($Tc^{99m} < SPECT$)

100 - PTH adenoma

^{OR}
MIAMI CRITERIA: >50% decline in 10 minutes
MCC of hypercalcemia in hospitalized patient: ^{a malignancy}
PTH hyperplasia: 3 1/2 glands remove
Implanted in: 1/2 gland → Brachioradialis
Accidental removal of PTH during thyroid Sx: strap muscles

Indication for Surgery in asymptomatic primary HPT

- Calcium 1.0 mg/dL above normal (8.5-10)
- Osteoporosis on DEXA or Vertebral fracture
- Creatinine clearance < 60 mL/min
- < 50 years

MEN syndromes

	Inheritance	Gene	Manifestations
MEN 1 = <u>Wermer</u>	AD	11 menin	3Ps = Pit adenoma / PTM adenoma / Panc NET (PRL)
MEN2a= <u>Sipple</u>	AD	10 RET	PTH Hyperplasia > adenoma . MTC . Pheo
MEN2b=3	AD	10 RET	MTC / Pheo / 4Ms mucosal neuroma Marfanoid megacolon medullated corneal fibres
MEN 4	AD	CDNK1B 12	GUTomas ^{eo} + Pit / PTM
MEN 5	AD	MAX 14	Pit + Pheo / PGs

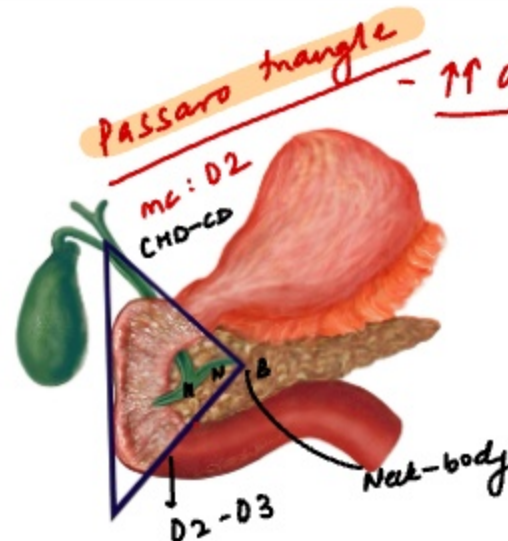
Prophylactic thyroidectomy: (MTC)

MEN2a - 5y
26 - 3y



* Werner - progeria

MC Pancreatic NET: nonful > Insulinoma
 MC NET in MEN1: Gastrinoma^{eo}
 IOC: DOTANOC (Ga) PET → SSTR



- ↑↑ acid → Gastrin ↑↑ -

Zollinger Ellison S₁

1st → Gastrin > 1000 pg/ml

↓
 10c - Secretin stimⁿ test
 ↳ (Gastrin ?)

Breast Cancer

Screening Mammography: Annual ≥ 40 yrs (0.1-0.2c4y)

High-risk/ BRCA +/ RT: MRI annual ≥ 25 yrs

Diagnosis of lump in young / lactating female: VSG

Rp: Antibiotics \rightarrow Aspirin \rightarrow abscess galactocele
IBO \leftarrow

Ca breast quadrant: VQR

MC gene mutation in sporadic/TNBC: p53

MC gene in familial breast ca/ aggressive/ Ovarian ca: BRCA 1

Ca breast in men/ Prostate ca/ Pancreatic ca: BRCA 2 \rightarrow 13

IOC for breast implants: MRI

IOC for Post-op scar VS recurrence: MRI

Most sensitive for DCIS: MRI \downarrow

Most sensitive for microcalcifications: mammography

Mitotic rate, tubule, nuclear atypia: Bloom Richardson

Grade, Age, Margin, Size: Van Nuys - DCIS recurrence

LN, Grade, Size: Nottingham

Nulliparity, Early menarche, Late menopause (R/F)

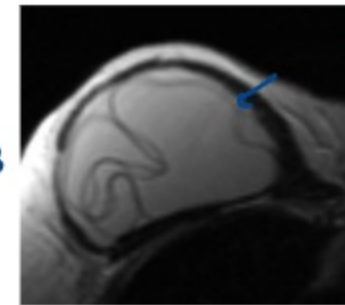
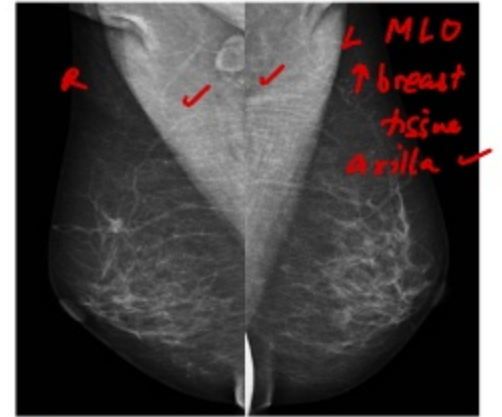
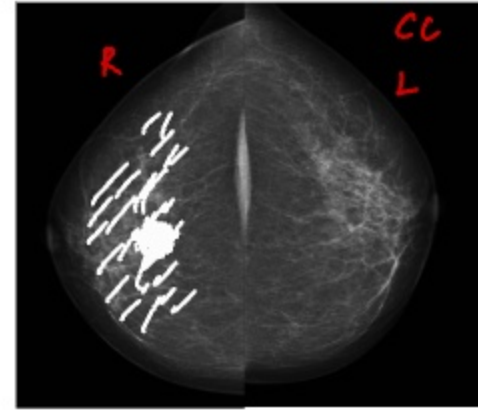
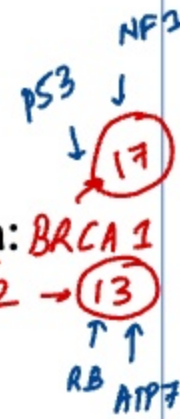
OCP? \rightarrow Not protective

Smoking R/F: x fibroadenoma

Mondor's disease, Duct ectasia, Ca breast, Zuska disease

chest wall mononucleosis

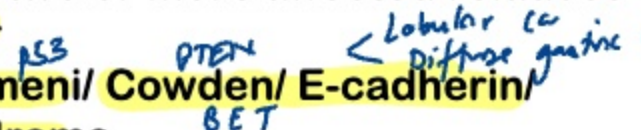
periductal mastitis



Lingual sign
 \downarrow
intracapsular rupture

Indications of genetic testing:

- Breast cancer diagnosed ≤ 50 years
- TNBC diagnosed ≤ 60 years
- BRCA1/2 gene mutation in a blood relative
- Breast cancer with one or more relative with: Breast cancer diagnosed ≤ 50 years / BRCA associated cancers
- Breast cancer with two or more affected relatives
- Male breast cancer
- Suspected Li-Fraumeni/ Cowden/ E-cadherin/ Peutz Jeghers syndrome



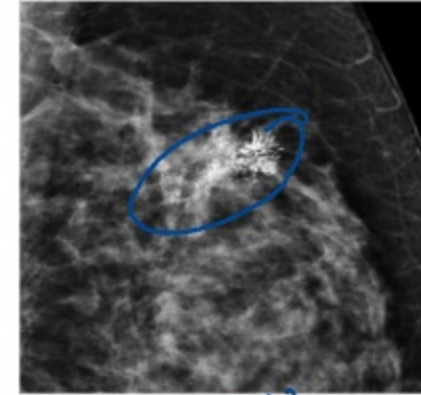
BIRADS

Triple assessment: Clinical + Radiological + Pathological
BIRADS: Breast Imaging Reporting & Data System
Modalities: USG / Mammography / MRI

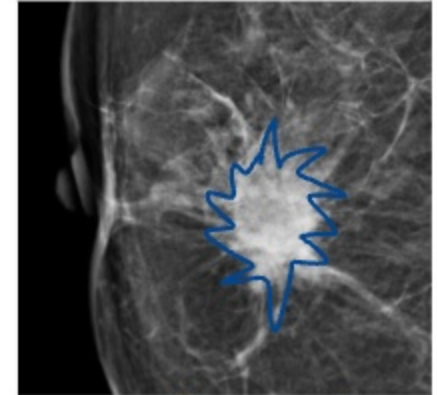


14G biopsy core needle

BIRADS	Category	% risk	Further Mx
0	Incomplete assessment	N/A	Complete
1	Normal	0	screening
2	Benign	0	"
3	Probably benign	0-2%	F/U x 6mon
4	Suspicious for malignancy	2-95%	Bx
5	Highly suggestive of malignancy	>95%	Bx
6	Known biopsy proven malignancy	N/A	Continue



microcalcific
clustered



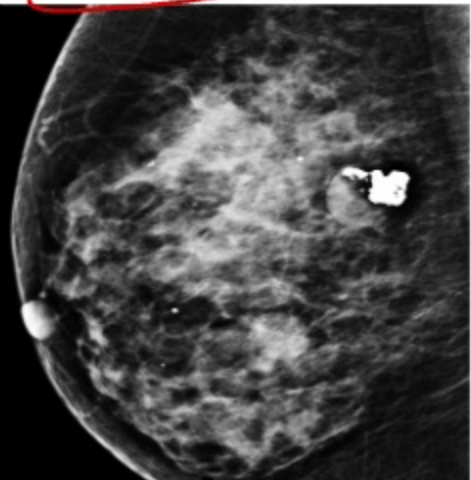
Spiculated

BIRADS-5

Intralobular stroma - MED12 mutation - FA, Phylloides, Fibroid

HIFU: High intensity focussed USG

VAB: Vacuum assisted bx → FA



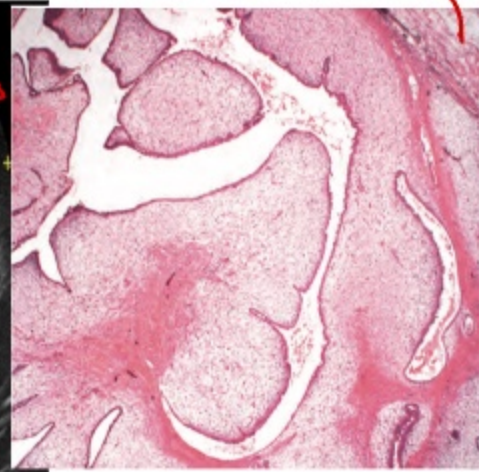
Popcorn sign

↓

- Fibroadenoma (involuting)

BIRADS - 2

③ → noncalcified
"breast mouse"

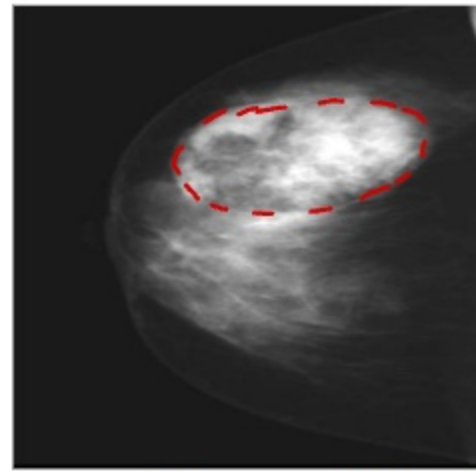


PHYLLOIDES TUMOR

→ LN xx

→ Recurrence ↑

Rx - simple mastectomy



Breast in breast

Hamman-riehmann

Approach to nipple discharge:

Unilateral
Bloody
Multiple ducts

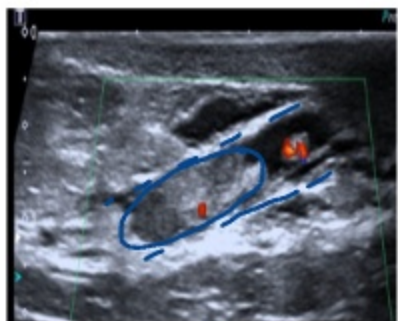
U/I or B/I
Bloody
Single duct

Ductal
papilloma

U/I or B/I
Green
Single duct

duct
ectasia

Ca breast
(TDLU)
terminal ductal
lobular unit



Mino dochectomy



Hadfield procedure

Granulomatous mastitis

Fever +



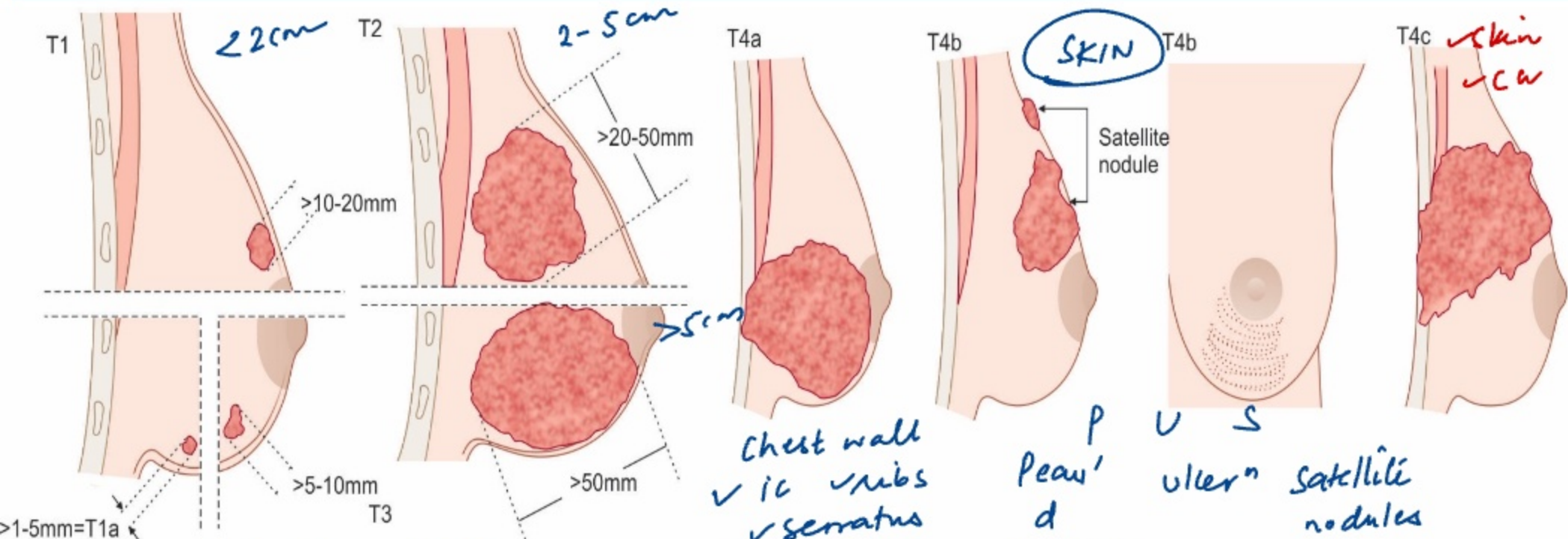
TB

No fever ⊖



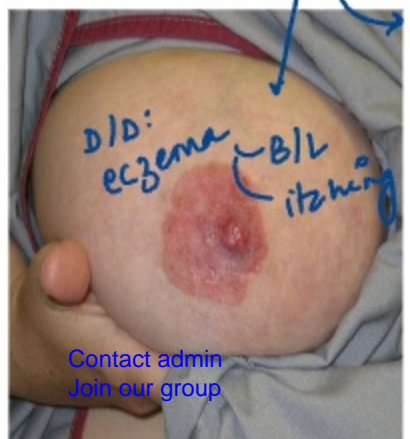
C. Kropensteddi

Staging of Ca-Breast



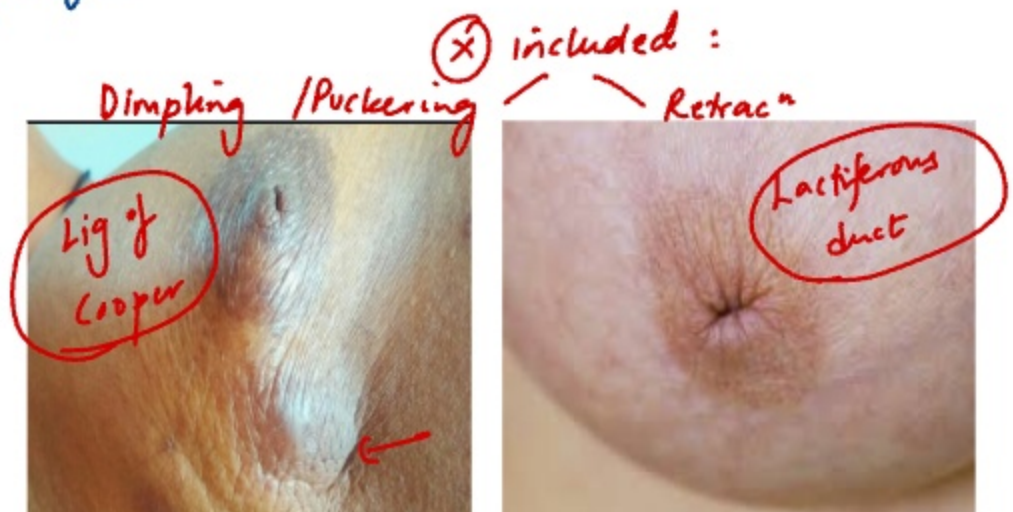
Inflammatory Ca
 $> 1/3$ skin LVSI
 (* Peau d'orange)

DCIS Paget's (Not LCIS)
 T1s

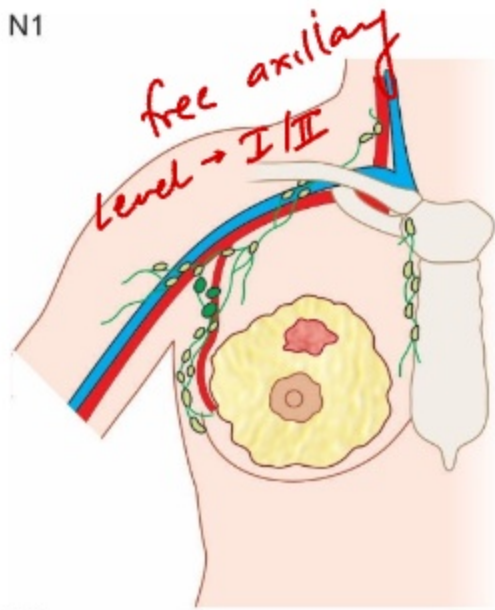


Chest wall
 ✓ ic ✓ ribs
 ✓ serratus
 (x) pectoralis

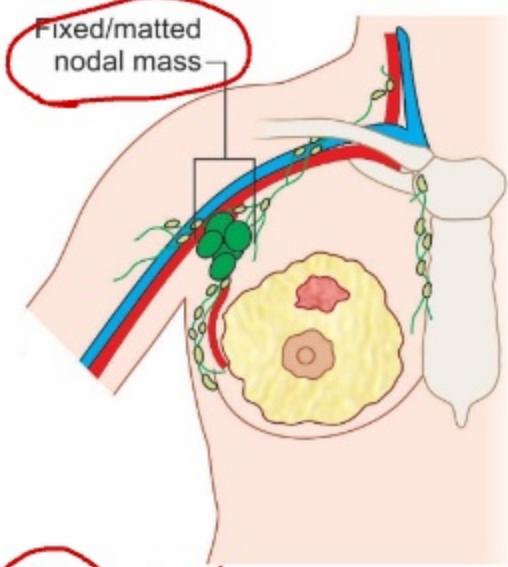
P U S
 Peau d'orange
 ulcerⁿ satellite nodules



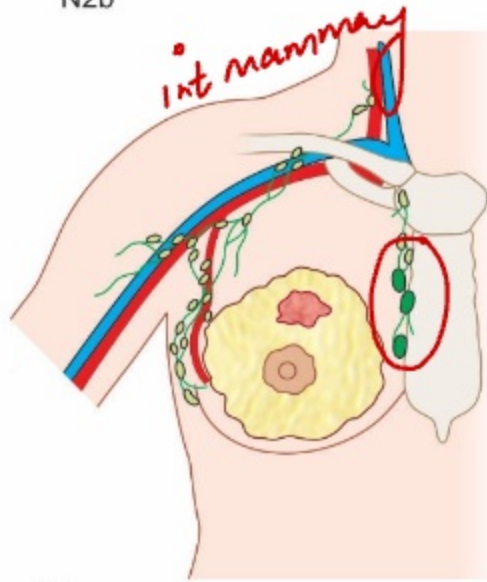
N1



N2a



N2b



AXILLARY LN

LEVEL I: Lateral

APL (Ant post lat)

LEVEL II: Post

- Central
- Rotter - interpectoral

LEVEL III: Medial

apical

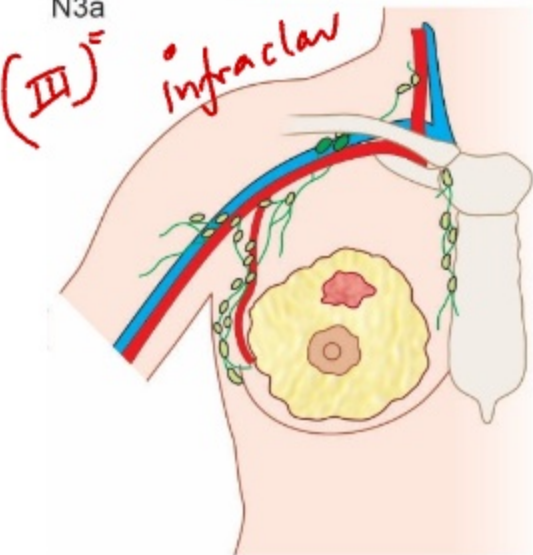
MC DISTANT METS: (spine) bone (lytic > blast) *Bateson's*



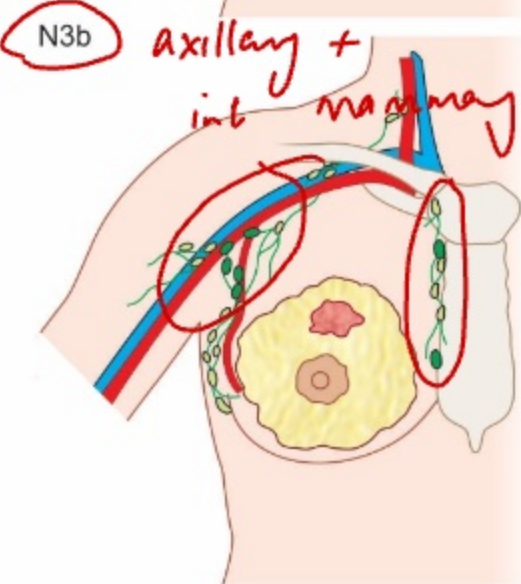
PREFIXES:

- c- clinical
- p- pathol
- r- recurrent
- y- neoadj
- m- multiple
- a- autopsy

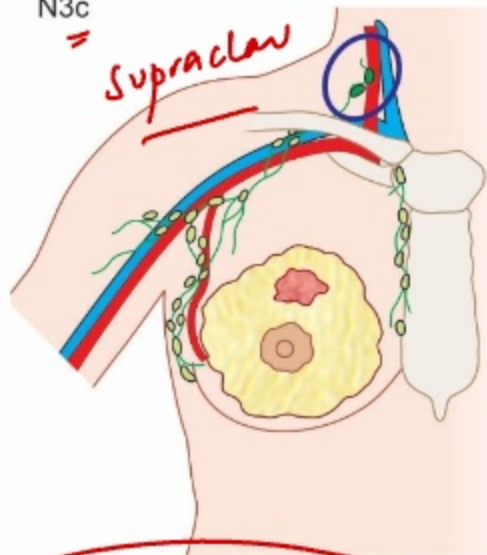
N3a



N3b



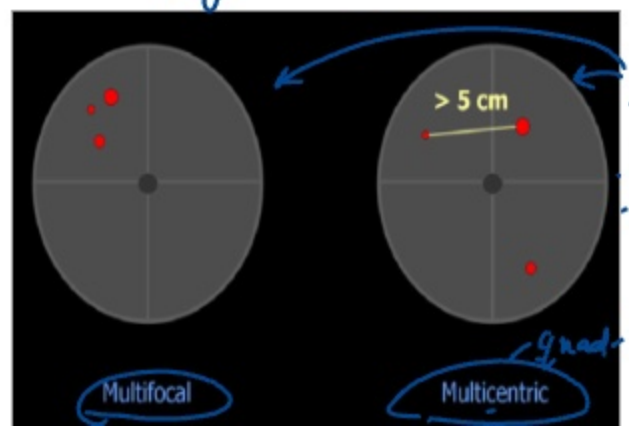
N3c



C/L LN -> M1

Thb NO

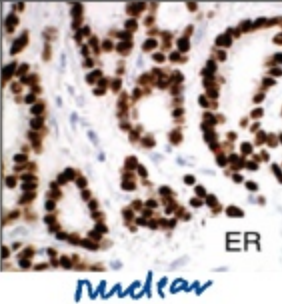
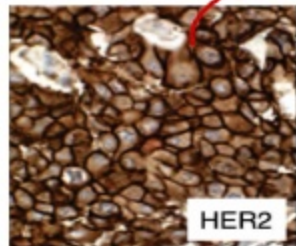
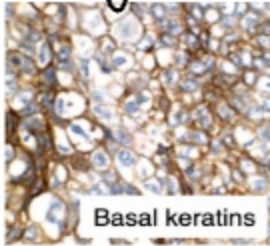
C/L supraclav LN
 ↳ M1



LCIS
 ↓
 E. cadherin
 Indian file

Molecular Classification of Ca-Breast

IHC → DAB stain

<p>Luminal (ER+, PR+) Allred score</p>	 <p>ER nuclear</p>	<p>HER2 + <i>cell surface</i></p>  <p>HER2</p>	<p>TNBC (ER-, HER2-) CK5/6 + EGFR + } - basal type - claudin - low</p> <p><i>medullary Infiltrative</i></p>	 <p>Basal keratins</p>
<p>Ki67: Low (<14%) HER2 - LUMINAL A</p>	<p>Ki67: High (>14%) HER2 +/- LUMINAL B</p>	<p>Ki67: High</p>	<p>Ki67: High</p>	

- Worst prognosis
- Best pathological response to CT
- young ♀

mc *best prognosis*
PTM
papillary tubular carcinoma & DCIS

1+ → -ve
2+ → FISH^{ss}
3+ → +ve

Hormonal treatment: ER/PR+ 1st line

Premenopausal: Tamoxifen (SERM) s/e: ^{DVT} cystic endometrial H

Postmenopausal: Letrozole (Aromatase ⊖) s/e: osteoporosis

Advanced/metastatic HR+, HER2- breast cancer:

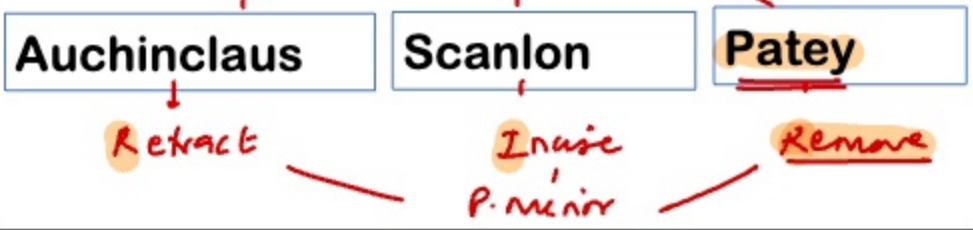
- Cyclin-dependent kinase 4/6 inhibitors *Paloma-3 trial*
- Palbociclib (CDK4/6 inhibitor) + Letrozole/ Fulvestrant (SERD)
- Everolimus (mTOR-)
- Buparlisib (PI3k-)
- Ipatasertib (AKT-)

Her2neu+: trastuzumab → Lapatinib
s/e: ♥ toxicity

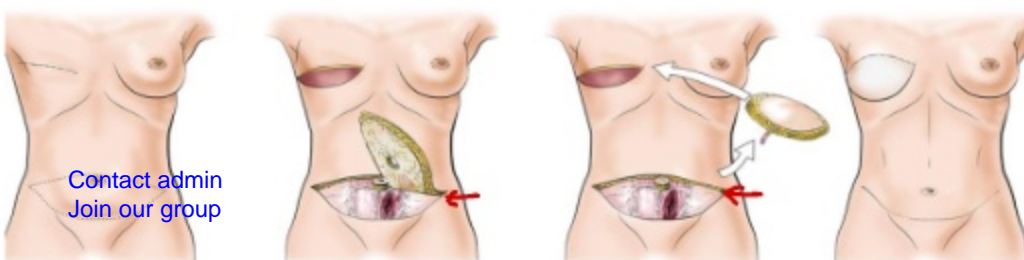
Ca-Breast Management

Early (ST I/II) : **BCS** / **MAM** + **LN** ^{WLE + Adjuvant RT}
LABC (ST III) : **T3N1** or **T4** or **N2/N3**
 ↳ **NACT** → **MRM** → Adjuvant RT

Halstead: Radical Mastectomy
MRM - Stewart Incision
 Preserve: Axillary vein, Bell's nerve, Cephalic vein, Dorsal thoracodorsal N
 MC complication: **Seroma**



FLAPS: DIEP: Deep inf epig A - best
TRAP: sup epig A (↑ abdo wall morbidity)
LD: thoracodorsal A



- BCS CI:**
1. **Pregnancy**
 2. **Prior RT to CW**
 3. **Collagen vascular diseases**
 4. **Multicentric > Multifocal**
 5. **Lobular ca**
 6. **LABC**



↓ yrs
 Lymphangiosarcoma (Stewart Treves S₂)

MOLECULAR TESTS: Predict recurrence
 Role of chemo in **T1/T2 NO LUMINAL A**
 Oncotype Dx: 21 PCR
 Mammprint: 70 genes
 Endopredict: 12
 PAM 50: 50
 CAN assist: India → IHC based

Peripheral Artery Disease

CHRONIC PAD

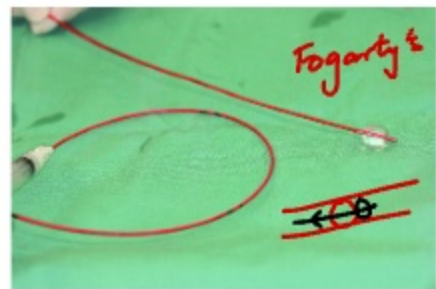
ACUTE:

Source- A.Fib

MC- SFA

Pain / Pulselessness / Pallor / Paralysis / Paresthesia / Poikilothermia

Mx: LMWH \rightarrow Sx / endovascular embolectomy



Boyd's

C/I: Intermittent claudication - fixed buttock claudication distance + impotence

Aorto-iliac- SYNDROME: LERICHE

Iliac- thigh

Femoral- calf (mc)

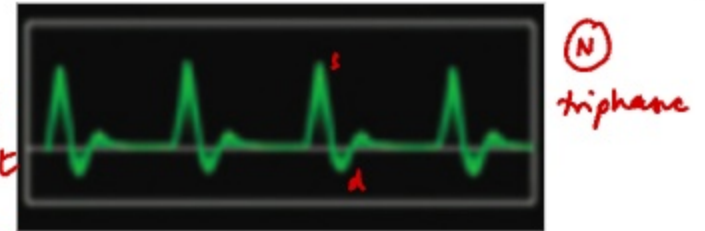
Popliteal- heel

Initial Ix- Doppler USG

IOC- CT angiography

Gold standard- DSA + balloon angioplasty + stent

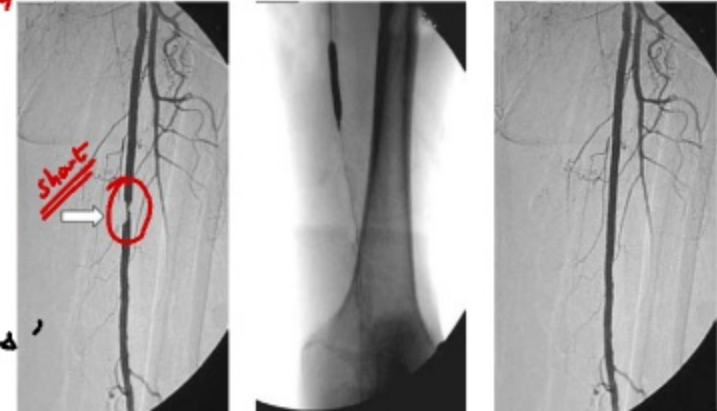
ABI	INTERPRETATION
>1.4	Heavily Ca ²⁺ -DM / CKD Next: TBI
0.9-1.3	(N)
0.5-0.9	Intermittent claudication
0.3-0.5	Rest pain
<0.3 CLI	Gangrene



Grade	Pain
I	Pain relieved on continued walking
II	Walks in pain
III	Compelled to take rest
IV	Pain at rest



\downarrow x / LONG Sx bypass



Nicoladoni-branham sign - Compromised AVF proximal

(HR)

IF

CRIBOID ANEURYSM

L AVM - STA = nidus

Venous Diseases & Lymphatic Diseases

BRUNNER'S

VARICOSE VEINS/ DVT IOC: Doppler usg
 Tredelenburg / Morrissey/ Schwartz: SFJ Incomp
 Fegan - Perforator
 Pratt/ Perthes - DVT

CEAP: clinical etiology anatomy pathophysiological

Rx: SFJ incompetence: EVLA > RFA

Perforator: sclerotherapy (sclerol)

Hunterian thigh

Dodd above knee

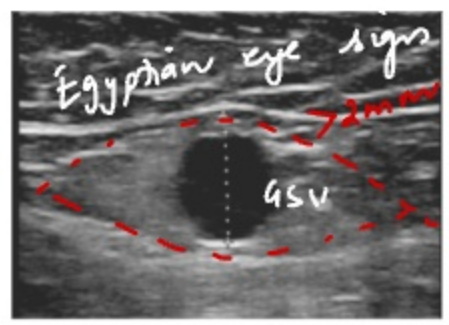
Boyd below knee

Cockett MM

May Kusterr heel

Nerve injury: GSV- Saphenous N (medial x x)

SSV - Sural (lat x x)



C ₁	Telangiectasias or reticular veins
C ₂	Varicose veins
C _{2r}	Recurrent varicose veins
C ₃	Edema 3E
C ₄	Changes in skin and subcutaneous tissue
C _{4a}	Pigmentation or eczema
C _{4b}	Lipodermatosclerosis or atrophie blanche
C _{4c}	Corona phlebectatica
C ₅	Healed
C ₆	Active venous ulcer
C _{6r}	Recurrent active venous ulcer

I Pitting edema, Subsides with elevation

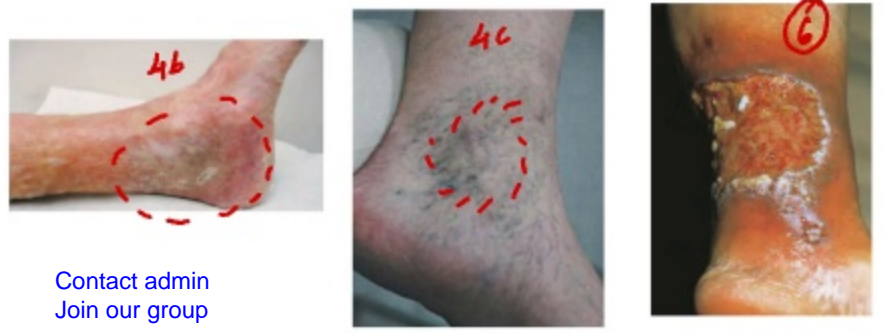
Stemmer sign

II Non pitting edema Not relieved with elevation

III Irreversible skin changes, Fibrosis, papillae



Milroy disease: cong lymphedema FLT 4



Approach to Ulcers

APPROACH TO ULCERS:

- Tip of toes, lateral malleolus, thin and shiny skin

- Gaiters area-medial malleolus, sloping edge

Bisgaard regimen - elevⁿ / compression

- Ischium > GT > Sacrum > heel, Pressure > 30mm

- Plantar aspect of foot, loss of sensation

- Post-burn scar / inflammation

ARTERIAL

VENOUS

PRESSURE

TROPHIC / Neuropathic
↓
2hrly position change

Marjolin's ulcer → SgCC



foot core
Debride + Ab.

Marjolin's



Vacuum-assisted dressing
-125mm Hg
↑ healing / ↓ bact load



Hypertrophy
VV
lateral marginal vein
Klippel-Trenaunay Sx



- Grade 1: Non-blanchable erythema of intact skin
- Grade 2: Partial thickness skin loss
- Grade 3: Full thickness skin loss
- Grade 4: Damage to muscle, bone

Wound Healing & Skin Grafts

WOUND HEALING

10%- 2wk
80%- 3mon
100%- Never

Collagen- III → I

(4:1 (N))
I:III

WOUND HEALING intention

Primary- closed immediately -sutures

Secondary- open

Tertiary- open initially → sutured (contaminated/infected)



Hypertrophic scar

↓ Rx - dressing
4-6wks

↑ collagen / haphazard "better scar"

KELOID (AD)
↑ 3mon
↑ Africane
Rx - intratestinal or triamcinolone

	SPLIT / THIERSCH	FULL / WOLFE
Part:	E + PD	E + CD
Site:	Thigh (meshing)	supraclav / post auricular
Contracture:	2°	1°
Cosmesis:	-	better

Graft "take"

0-48hrs: Imbibition

48-72hrs: Inosculation

>72hrs: Revascularis"

CI of graft: β-hemolytic Strep

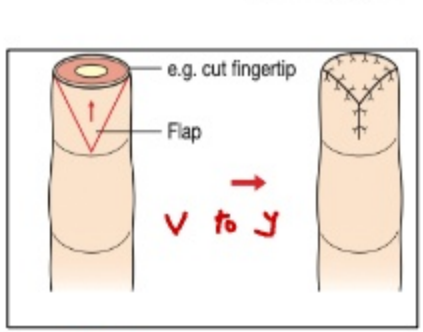
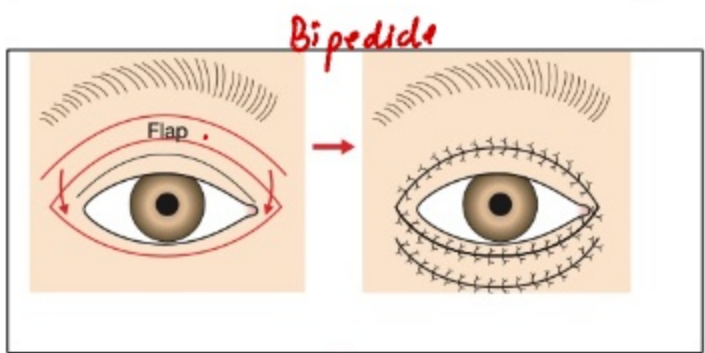
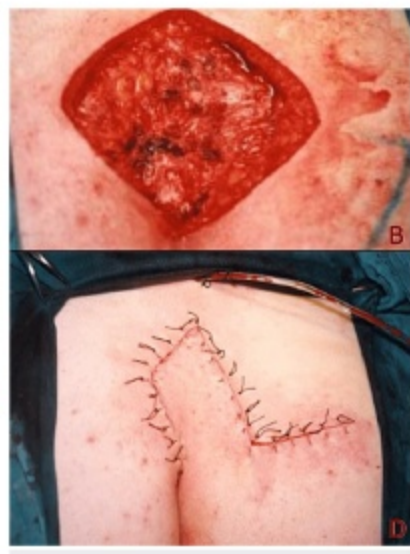
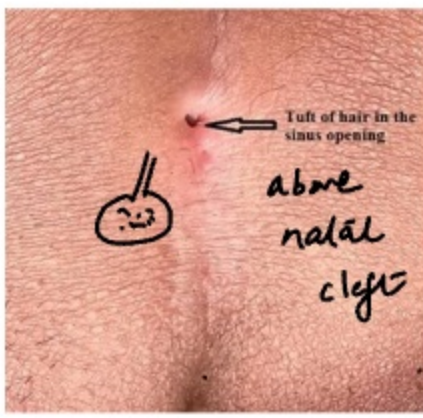
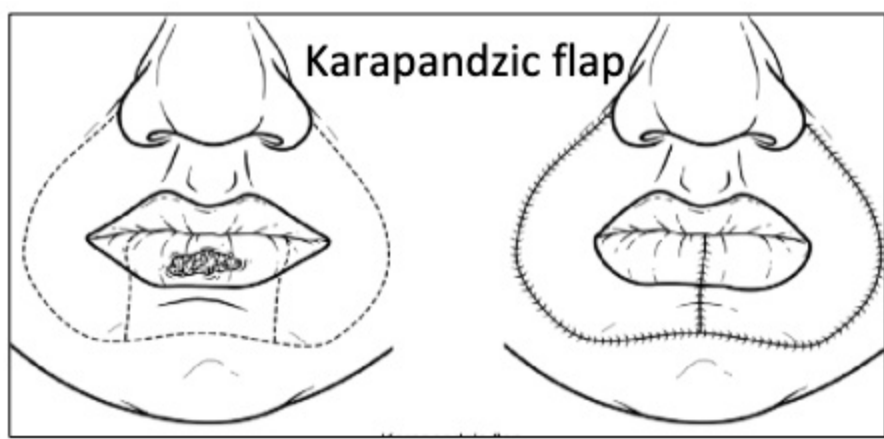
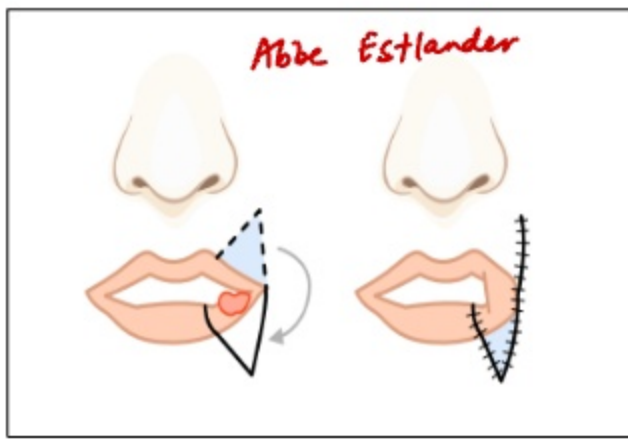
earliest : 3mon
CLEFT LIP ALONE: 5MONTHS (MC: MILLARD)
CLEFT PALATE ALONE: SOFT AT 6MON, HARD AT 15-18MON (MC: Wardill-Kilner repair)
BOTH: CL + SOFT AT 5MON, HP AT 15-18MON
Rule of 10: Hb >10 / >10wks / ≥10 pounds

Humberg knife
SSG



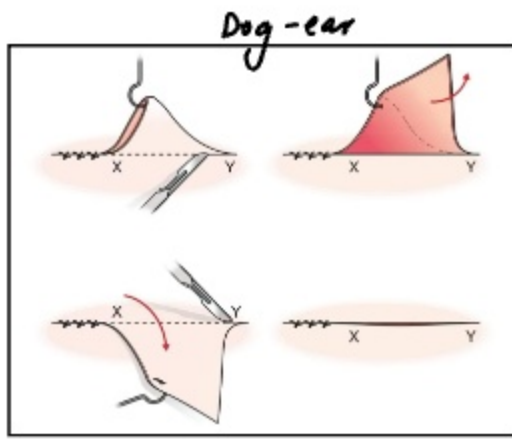
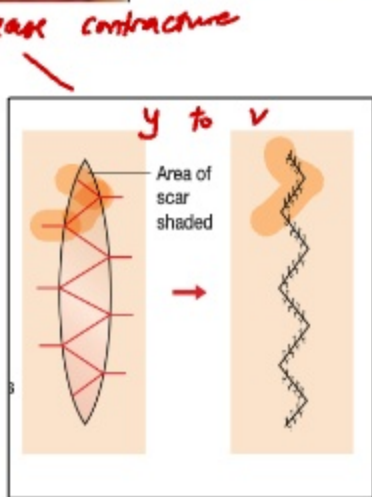
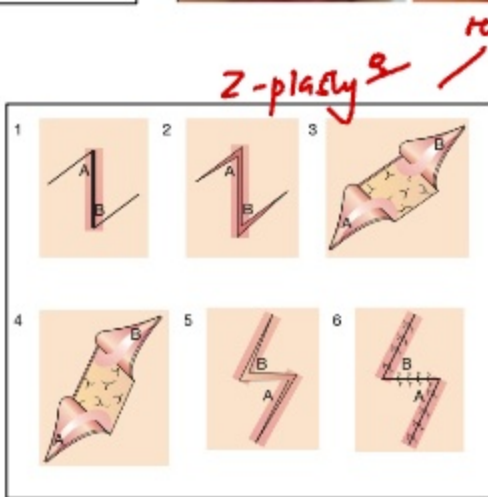
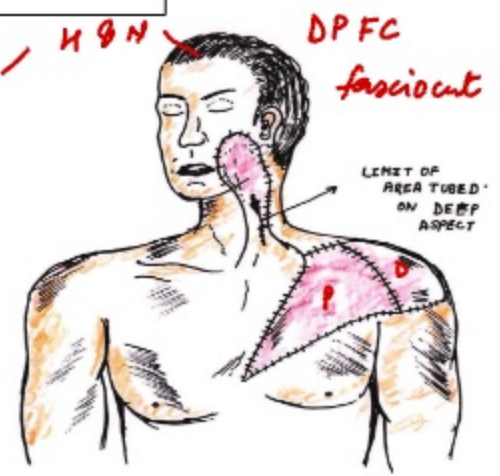
Skin Flaps + vasc pedicle

PILONIDAL SINUS

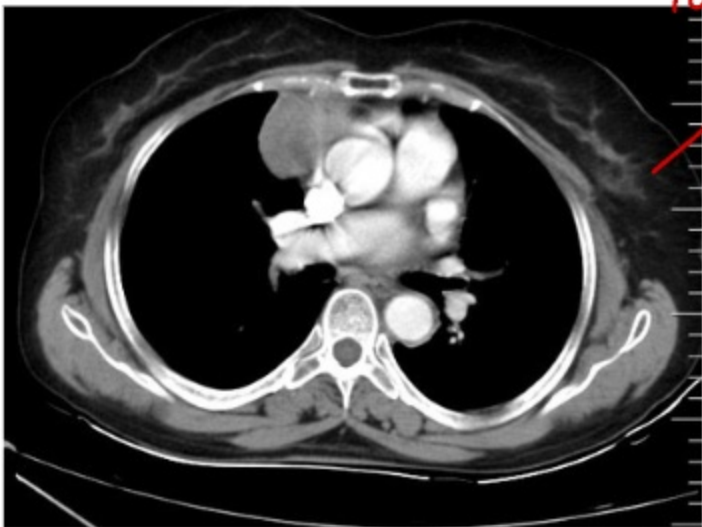


Bascom / Karydakis / Limberg

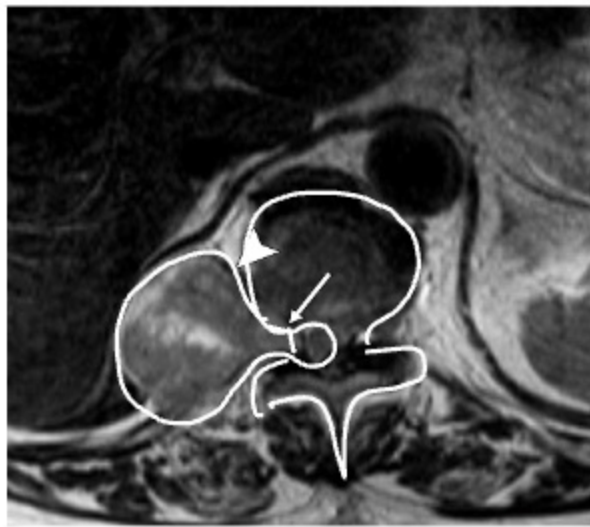
Rhomboid > transposition flaps



Mediastinal Masses



10L-CECT



Thoracosc

Age (years)

Gender (male)

ASA

Performance status

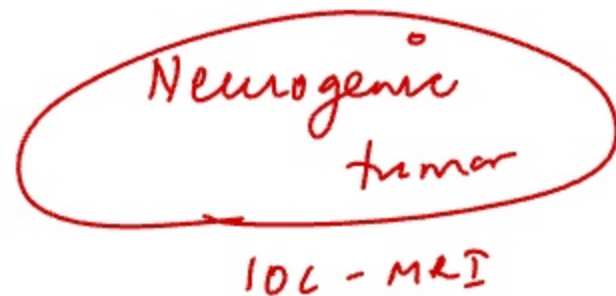
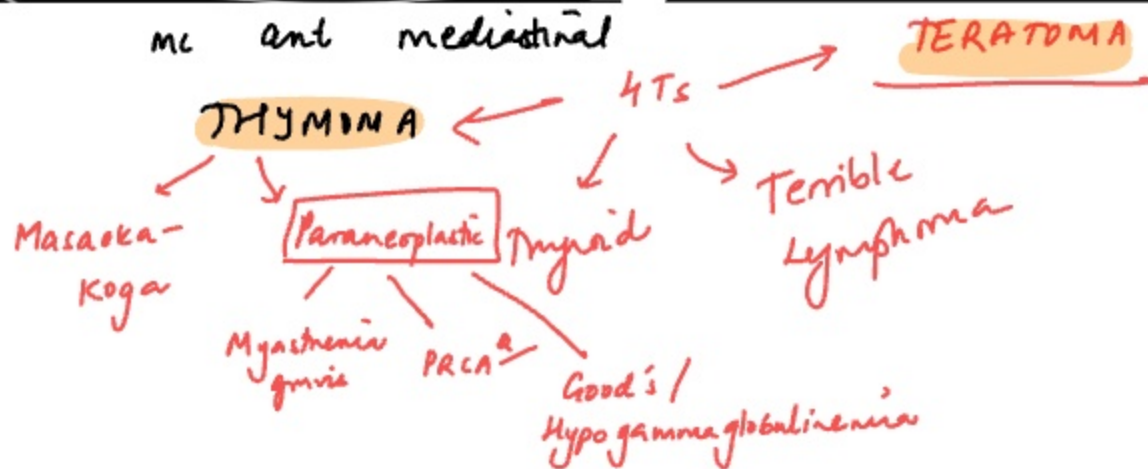
Dyspnoea score

Priority of surgery

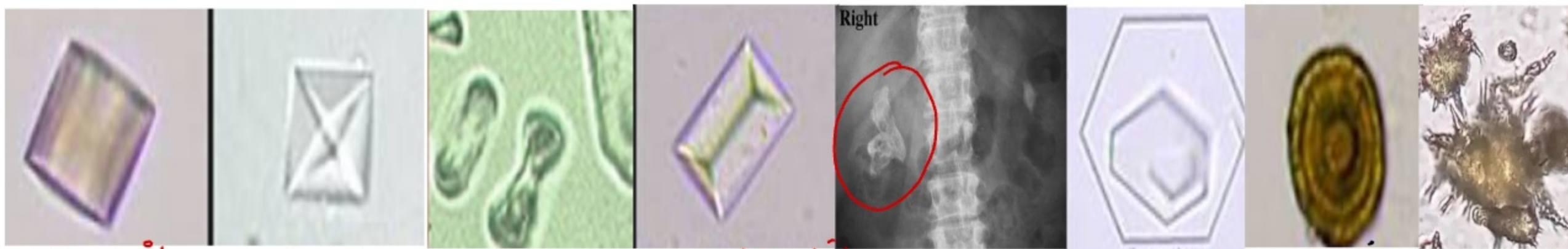
Procedure class

Diagnosis group

*Not complication of surgery



Urolithiasis



Rhomboid
↓
Uric acid
-acidic pH - tumor lysis
↳ - citrate (alkalinise)

Envelope
↓
Ca oxalate dihydrate (mic)

Dumbbell
↓
Ca oxalate monohydrate
* Strong

Coffin lid
↓
Struvite
MgNH₄PO₄
- alkaline pH
- Proteus

Staghorn
Calculi

Cystine
Cystinuria
COLA
ornithine lysine arginine

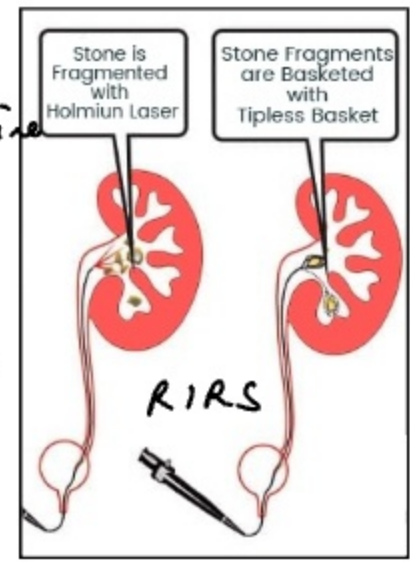
Leucine
Thorn apple
NH₄ bicrate
Laxative abuse



Initial Investigation: Xray > USG
IOC: NCCT
Radiolucent calculi: (Xray)
Struvite / Uric acid /
Xanthine / Orotic acid /
Indinavir
↳ Xray / CT

ESWL
<2cm soft stones
CI: Pregnancy, infection, obstruction, bleeding diathesis, pacemaker, obese, children

<5mm / ureter
↳ water
PCNL
>2cm
Infection
Obstruction
Cystine / COM / brushite

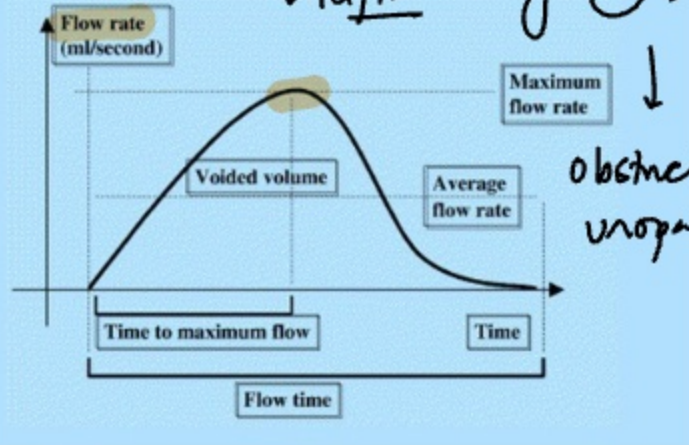


<2cm lower pole

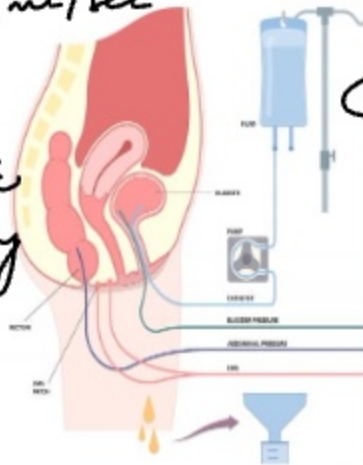
Contact admin
Join our group
↳ Xray / CT

UB Pathologies

Uroflowmetry (N) > 15 ml/sec

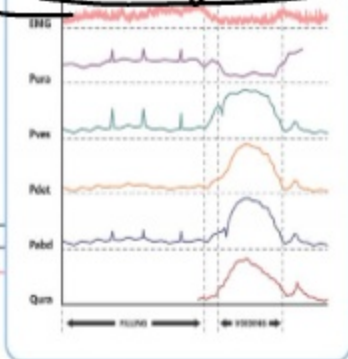


obstructive uropathy



Urodynamics study

Neurogenic UB



CA UB

Painless hematuria

Smoking, Dye, Benzidine

Cyclophosphamide:

Stones, Schistosomiasis: (Smoking) - sq cc

Ectopia vesicae, Urachal remnant: Adenoca

NMP22: marker

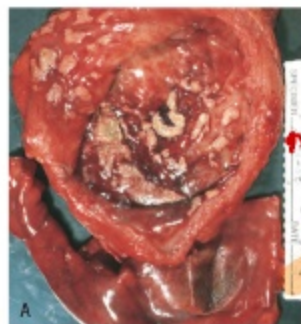
IOC: Cystoscopy

Radiological IOC: MRI (VIRADS)

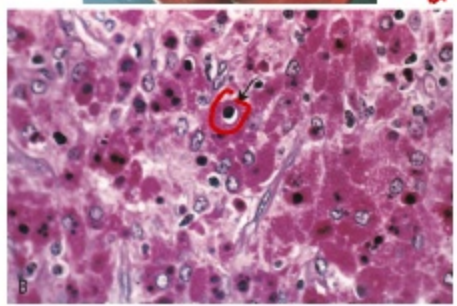
Whitaker test: B / UB pressure - HDN



Interstitial cystitis



malakoplakia
M6 bodies
Michelis-Guthmann



ectopia vesicae
epispadias

Ta/T1-Till submucosa excision + contact CT
Mitomycin C/BCG

T2-Superficial muscle cystectomy

T3/T4-Deep muscle/adjacent NACT → cystectomy

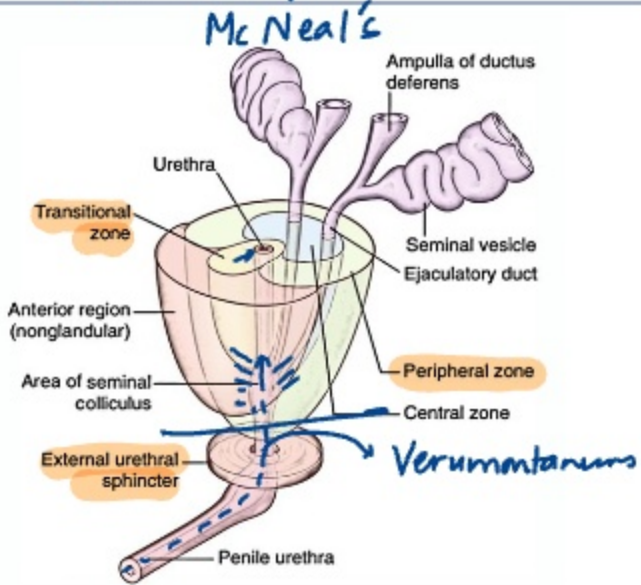
Urinary diversion: ileum conduit

→ NAGMA

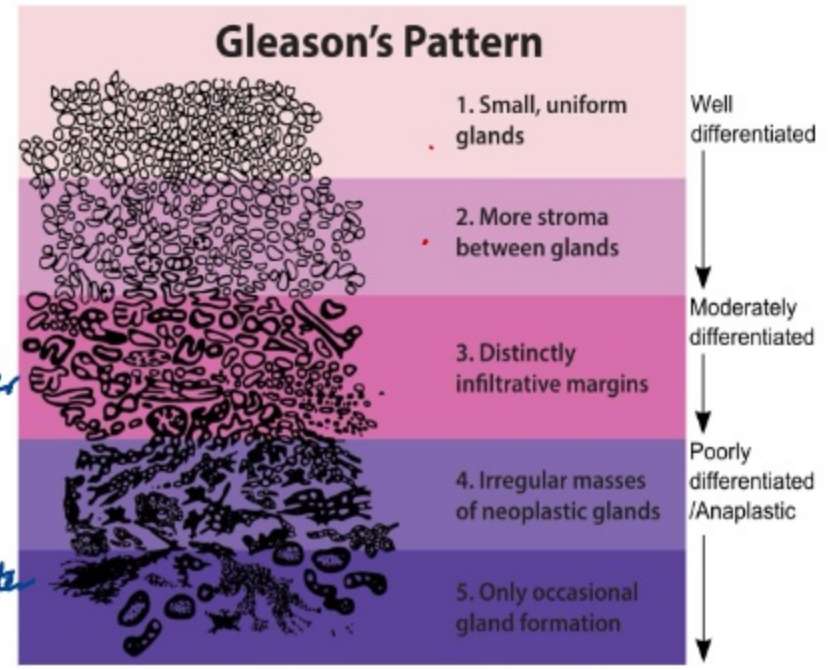
Prostate

③ ④

TZ: BPH → LUTS (obstructive)
 PZ: Adenocarcinoma prostate



CA PROSTATE
 Initial: PSA > 10 + TRUS
 IOC: CE-MRI - PIRADS
 PMSA PET
GOLD STANDARD- TRUS guided bx
 No. of cores- 6 x 2 cores
TURP
 DISTAL LIMIT- Verumontanum
 MC complication- Retrograde ejac
 TURP syndrome- DW ↑ - altered sensorium, ↓ Na
 Badenoch arteries- Hge.



T1/ T2: Confined to prostate
 <10yr survival, PSA < 10, Gleason < 6: Active surveillance
 >10yr survival: Radical prostatectomy
T3/T4: Capsular invasion / Adjacent organ invasion
 Androgen ablation +/- RT: Palladium / Gold / Cs (interstitial)
 GnRH agonist continuous: Goserelin/Leuprolide
 Flutamide Androgen R ⊖
 Orchiectomy

Risk Group*	Grade Group	Gleason Score
Low/Very Low	Grade Group 1	Gleason Score ≤ 6
Intermediate (Favorable/Unfavorable)	Grade Group 2	Gleason Score 7 (3 + 4)
	Grade Group 3	Gleason Score 7 (4 + 3)
High/Very High	Grade Group 4	Gleason Score 8
	Grade Group 5	Gleason Score 9-10

Consultant
 Join our group

Testes

Painless testicular mass

MC OVERALL- Seminoma MC in children- teratoma

MC in elderly- Lymphoma

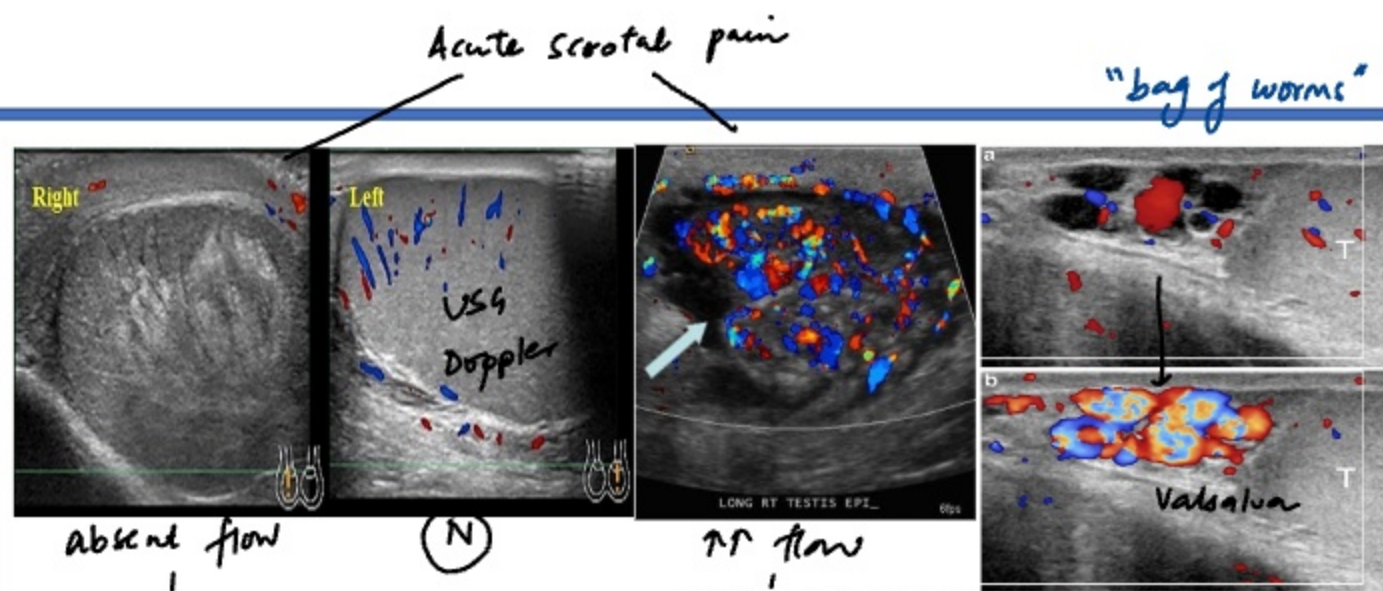
Initial- USG + tumor markers : HCG, AFP, LDH

Biopsy/FNAC? NO

IOC for T staging- HIRO

Chevassu's maneuver- Frozen section

IOC for RP LN- CECT



Undescended testes

MC site: SIR

Secondary sexual characters? (N) - Leydig cells

Fertility? ↓

R/o tumors? (↑) seminoma

IOC: Diagnostic lap > MRI

Time to operate: 6-12 mon

B/L non-palpable testes:

HCG loading - test ↑ → DL
 No ↑ in test → Anorchia

U/L non-palpable: DL

Blind ending vessels: 'Stop' (x) testes

Prehn's sign - Chlamydia > E.coli < 40yo > 40yo
 relieved on lying

Bell-Clapper ↑ attachment

VARICOCELE (Lt > Rt)
 Varicocelectomy
 Palomo procedure

Hydrocele

Spermatocele "barley water"
 Epididymal cyst

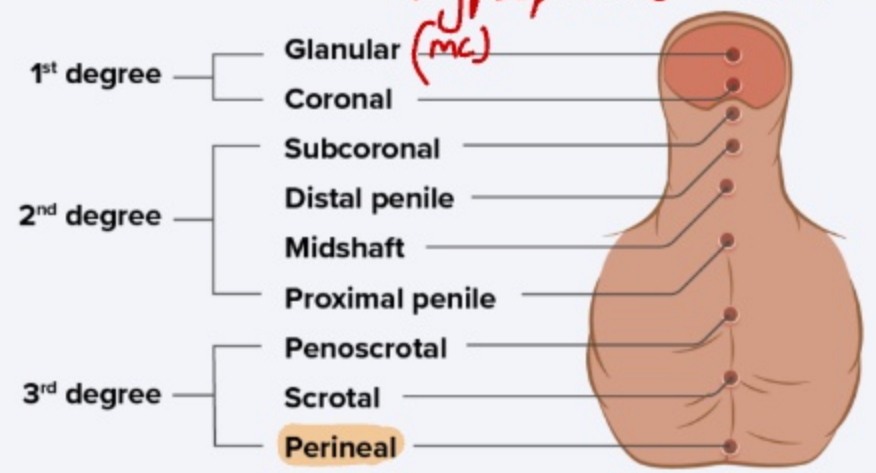
Mx: detorsion
 → gangrene → remove
 → viable → orchidopexy

Deming sign → higher
 Angel sign → transverse

Lord's plication
 Jaboulay excision/eversion

Penis

Hypospadias - ventral



CA PENIS

HPV - 16, 18

Phimosis

BXO balanitis xerotica obliterans - penile structure ²⁰

Not Peyronie's - calcific plaque + chordee R - Neebitt procedure

Bowen's disease (shaft)

Erythroplasia of Queyrat (glans)

CIS R - 5FU / Laser

Jackson staging

- Moh's micrographic surgery
- Distally placed → Partial penectomy (if residual stump ≥ 2 cm)
- Proximally placed → Total amputation + Perineal urethrostomy
- FNAC/ SLNB for inguinal LN

• Do NOT circumcise

• Age: 6-18 months (preferred)

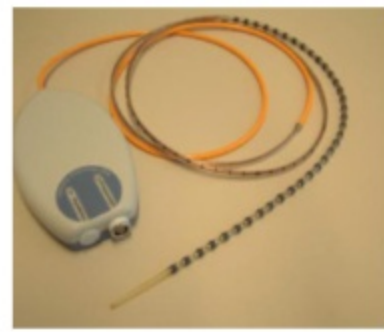
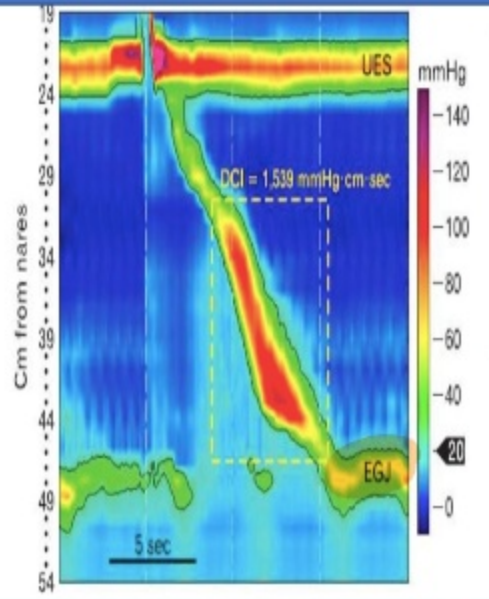
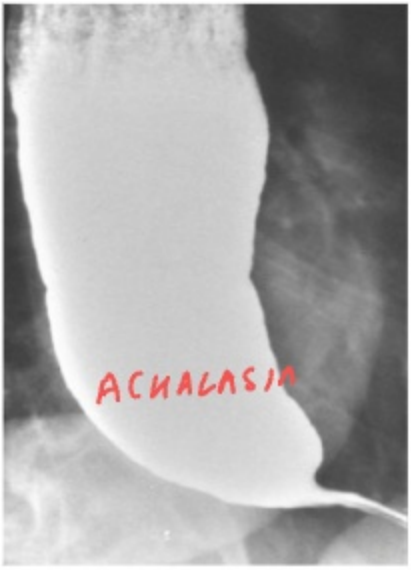
Orthoplasty-Urethroplasty-

Glanuloplasty-Meatoplasty-

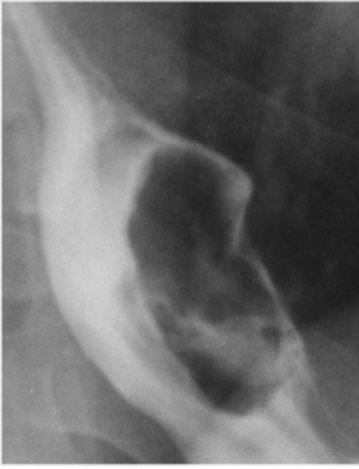
Skin cover

Esophagus

15cm - narrowest - cricopharyngeus - iatrogenic perforation (mc)
 25cm - LMB, Arch of aorta - FB
 40cm - GEJ



VIP/NO xx
 relax xx



Leiomyoma (Ca⁺⁺)
 - mc benign
 Rx - Enucleation

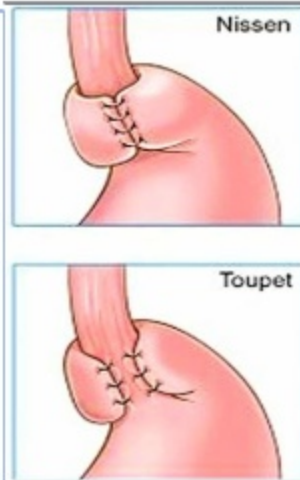


Sign: Rat tail sign
 Dysphagia: solid > liq
 IOC: UGIE + bx
 IOC for-T/N staging: EUS
 M staging: PET-CT
 Esophagectomy Conduit: Stomach
 10cm proximal, 5cm distal
 -McKeown proximal 1/3 -> 3 incisions
 -Ivor Lewis mid 1/3 -> 2 "
 -Orringer distal 1/3 -> transhiatal

Sign: Bird beak > Rat tail sign
 Dysphagia: liquids > solids
 Eckardt scale
 Hurst phenomenon
 Algrove syndrome (3A): Achalasia Atacramia Addison D
 IOC: Manometry
 Classification: CHICAGO
 IRP > 15mm + No peristalsis ACHALASIA
 • 100% failed peristalsis - type I
 • Pan-esophageal pressurization type II
 • Spasm type III 2/1 -> POEM
 • DCI > 8000 Jackhammer / Nutcracker / Hypercontractile
 • Distal latency < 4s DES
 • Management: Heller's myotomy / POEM (NOTES)
 personal endosc myotomy

GERD & PUD

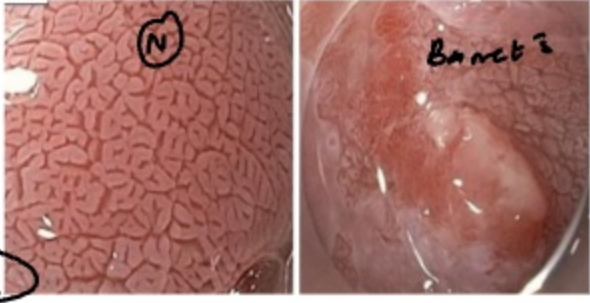
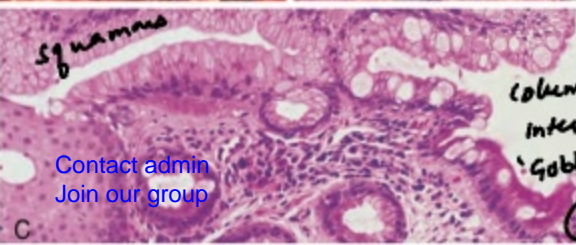
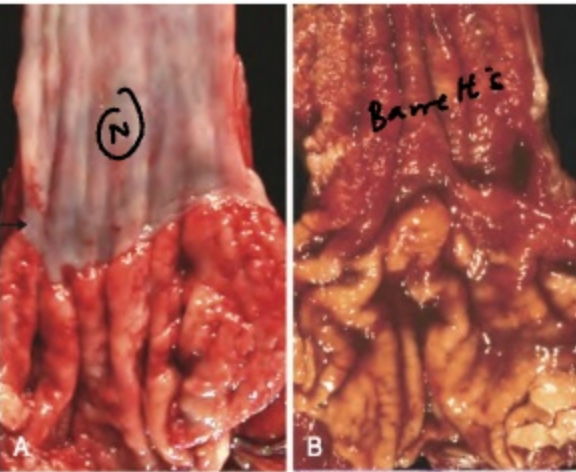
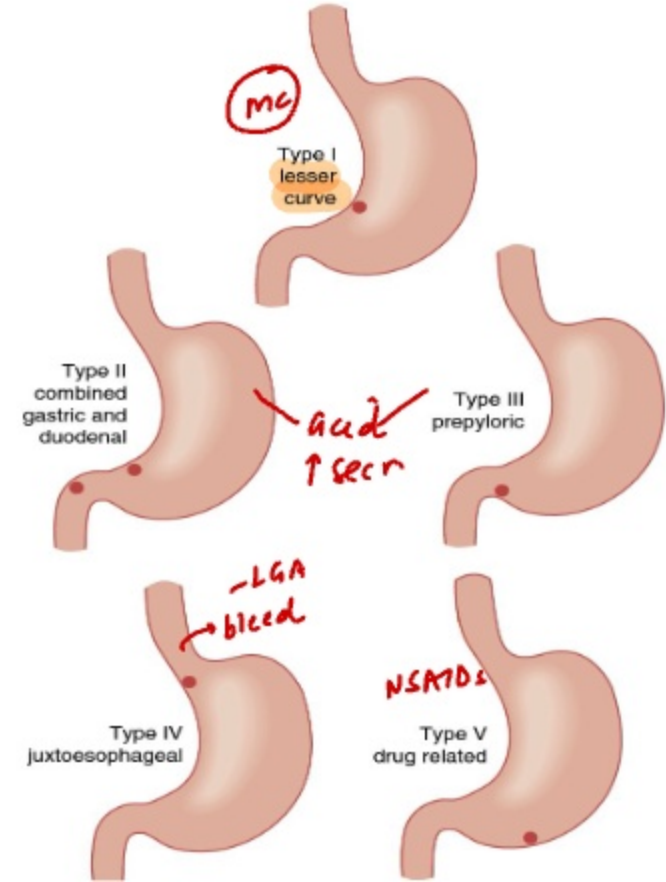
<2cm intra-abdo length R/F
 IOC for GERD: VGE < 24hr pH monitor
 DeMeester's score >14.7
 Management: Lifestyle + PPI $\xrightarrow{\text{Complic}^{\text{ns}}}$ (Sx)
 360° Nissen: Gas bloat Sx
 270° anterior Thal / Besley (transthoracic)
 270° posterior Toupet
 180-200° anterior Dor
 LINX reflux Mx



PEPTIC ULCER DISEASE
 Duodenal ulcer > gastric ulcer
 Ant DU: Perform / Pneumoperitoneum
 Mx: Omental patch repair (Graham's)
 Post DU: bleeding (GDA)
 JOHNSON classification of GU:

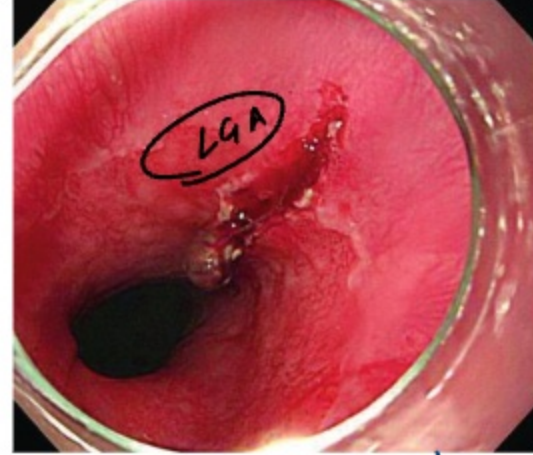
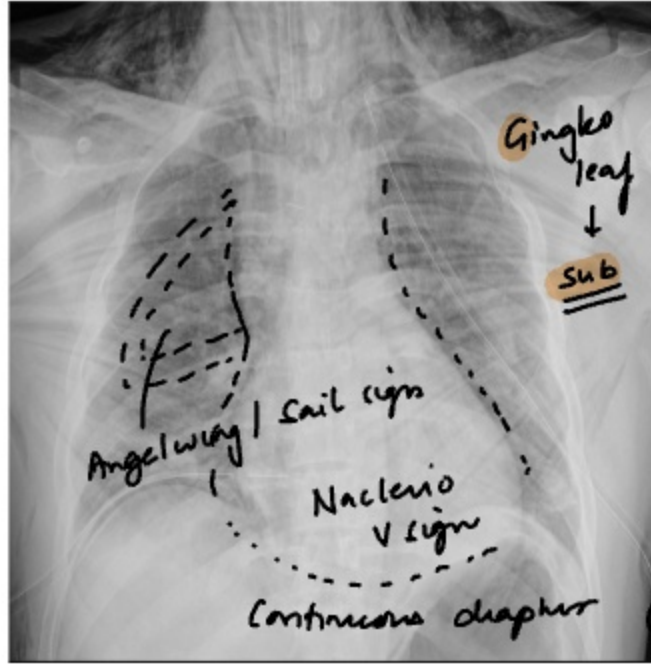
BARRET'S ESOPHAGUS

Seattle protocol: 4 quadrant at 2cm intervals
 Prague staging C / M - curving / maximum
 Vienna classification
 No neoplasia - 0.4% → F/U
 Low grade dyspl - 0.7% → F/U >> RFA
 High-grade dyspl - 5% → RFA



Contact admin
 Join our group

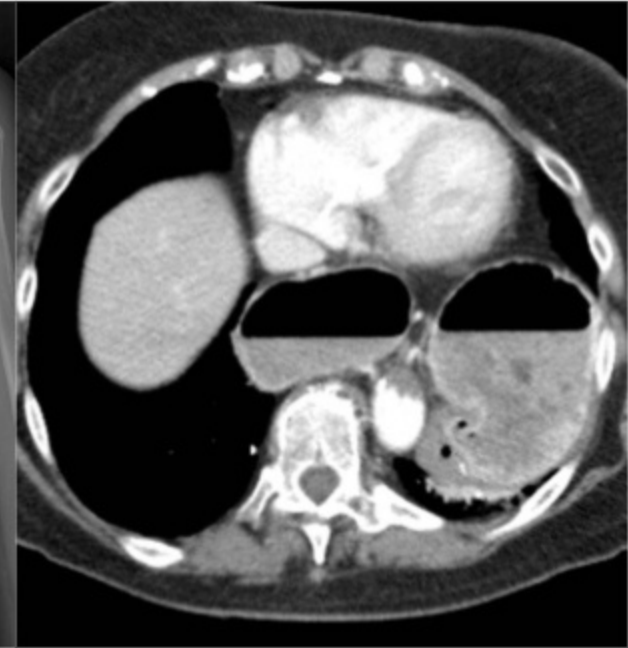
Other Esophageal Pathologies



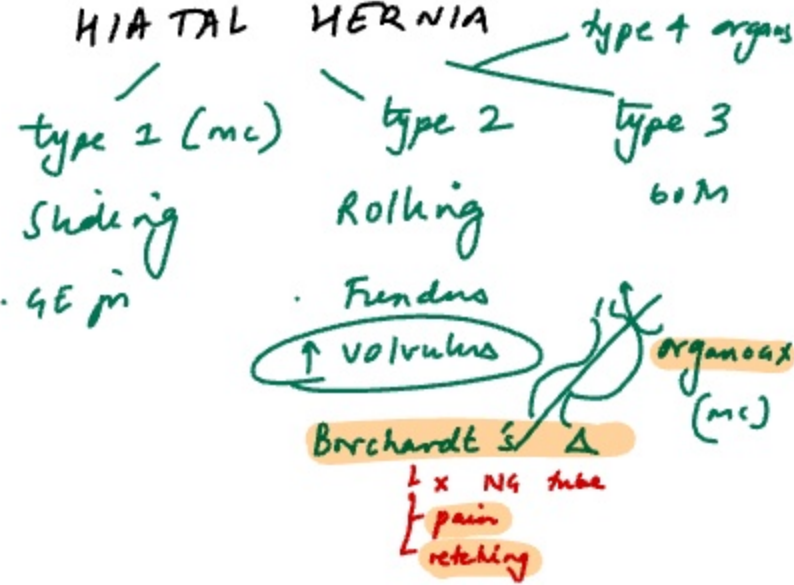
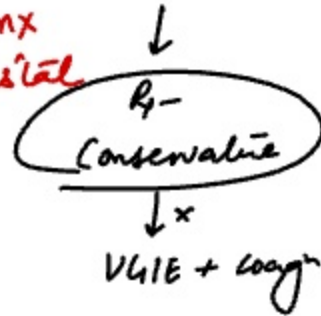
ALCOHOLIC + retching
Hematemesis

vs Holly leaf
 ↳ asbestosis

Mallory Weiss
 ↳ mucosal tear



MCC of esophageal rupture: iatrogenic → cricopharynx
Boerhave syndrome: spontaneous → Lt posterolateral distal
Mackler's Triad: chest pain + vomiting + Hamman's crunch
IOC: CECT + oral iodinated contrast
Bartim CT
 R₂ → S₂ repair

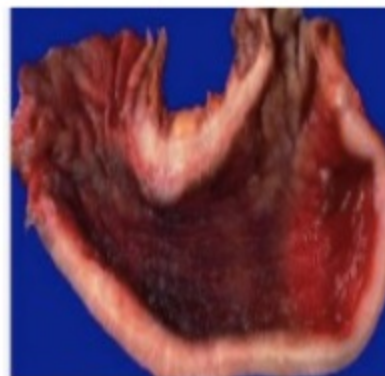
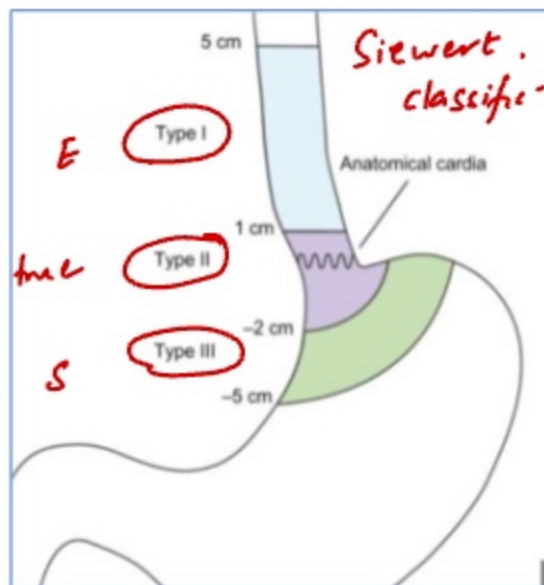
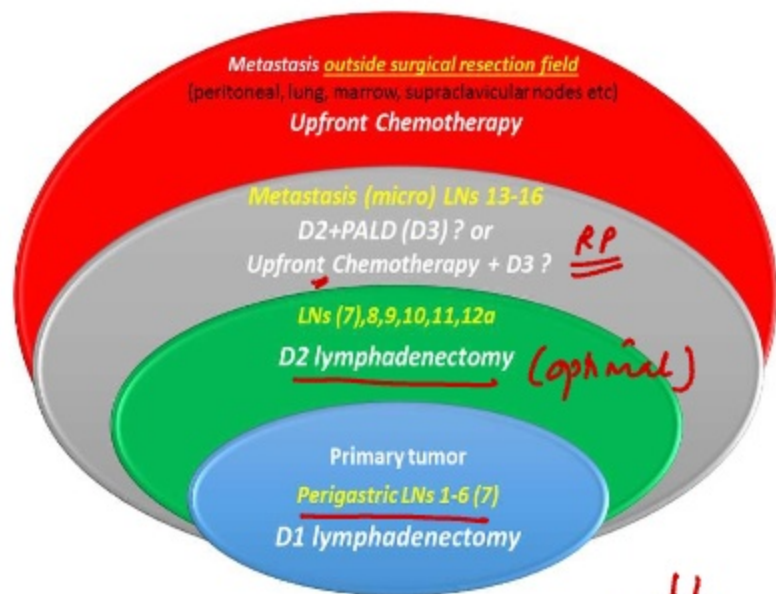


Stomach Cancer

Japanese classification: *Early → muc xx*
Borman classification: *Advanced → muc in/ady*
Irish LN: *lt axillary*
Virchow / Troiser sign: *lt supraclav LN*
Sister Mary Joseph: *umbilical*
Blummer shelf: *POD*
Krukenberg mets: *signet ring → BLV ovary.*
DAWSON criteria: *GI lymphoma 1°*

LAUREN classification:

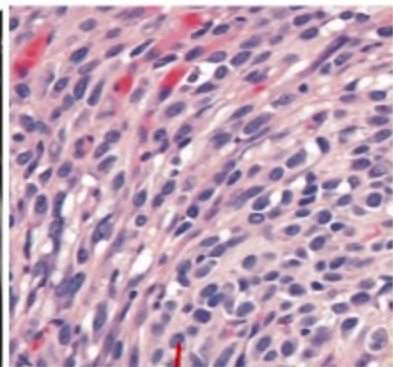
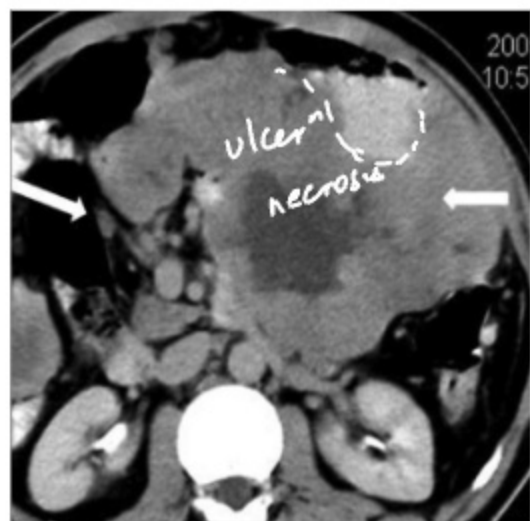
Diffuse Type	Intestinal Type
Blood group A Younger individuals	<i>ca/vac</i> H. pylori, diet, Metaplasia, atrophy
Signet ring cells Linitis plastica <i>Krukenberg</i>	Glandular/tubular structures
CDH1 (E-cadherin) mutation	APC-MSI
Lymphatic spread	<u>Hematogeneous spread</u>



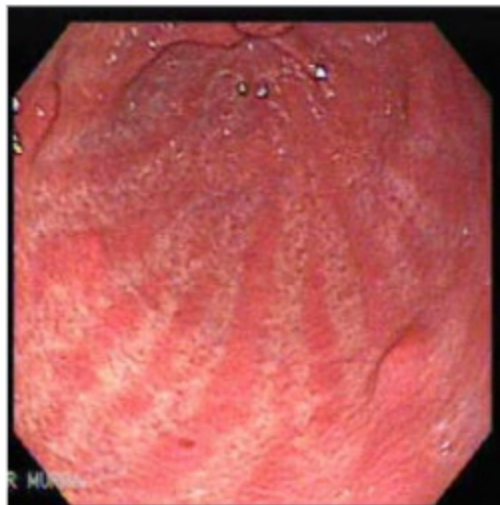
Linitis plastica



Other Stomach Lesions



Spindle cells



Watermelon

GAVE

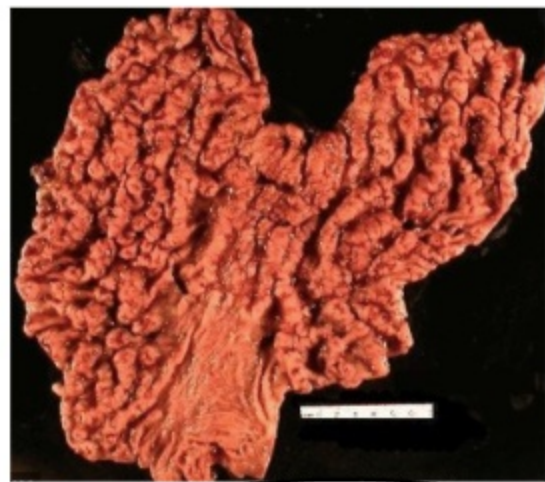
Rx - Argon laser phototherapy



LGA

Dieulafoy's lesion

Rx - VGE + Coag.



Menetrier's D

Cerebriform

- foveolar cell ↑↑

- TGF α (+)

- protein losing E

Rx → Cetuximab
= EGFR (-)

Diagnosis: GIST - Interstitial cells of Cajal

IOC: CECT

LN: No

Endoscopic Biopsy: NO

Markers: mc: CKIT = CD117 most sp: DOG3

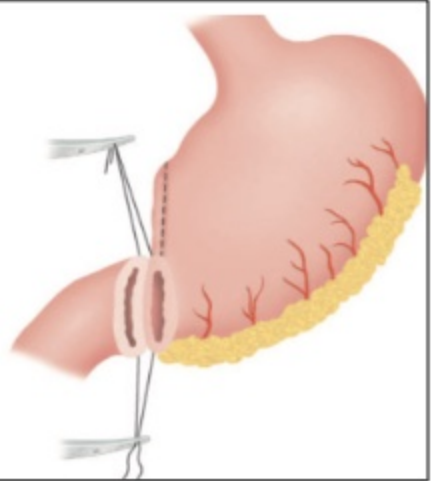
• CD34 • BRAF • SDH • PDGFRα • NF2
• KRAS

Carney triad: GIST + PG + Pulm chondroma
C-Stratokia

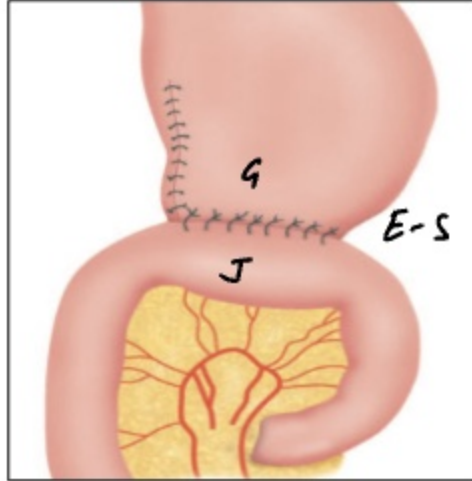
Fletcher grading- Size, mitotic index

Rx: Imatinib → sorafenib / Regorafenib
Sunitinib

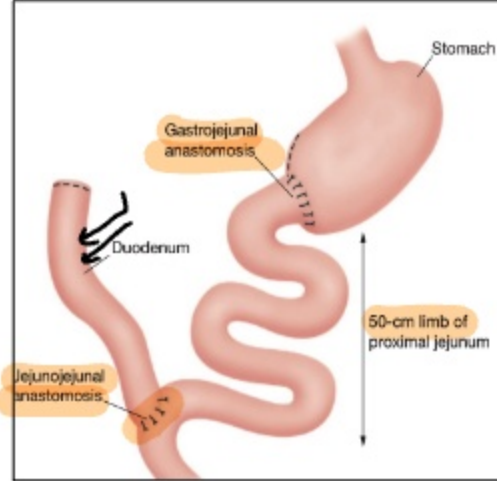
Gastric Resections



Bilroth I



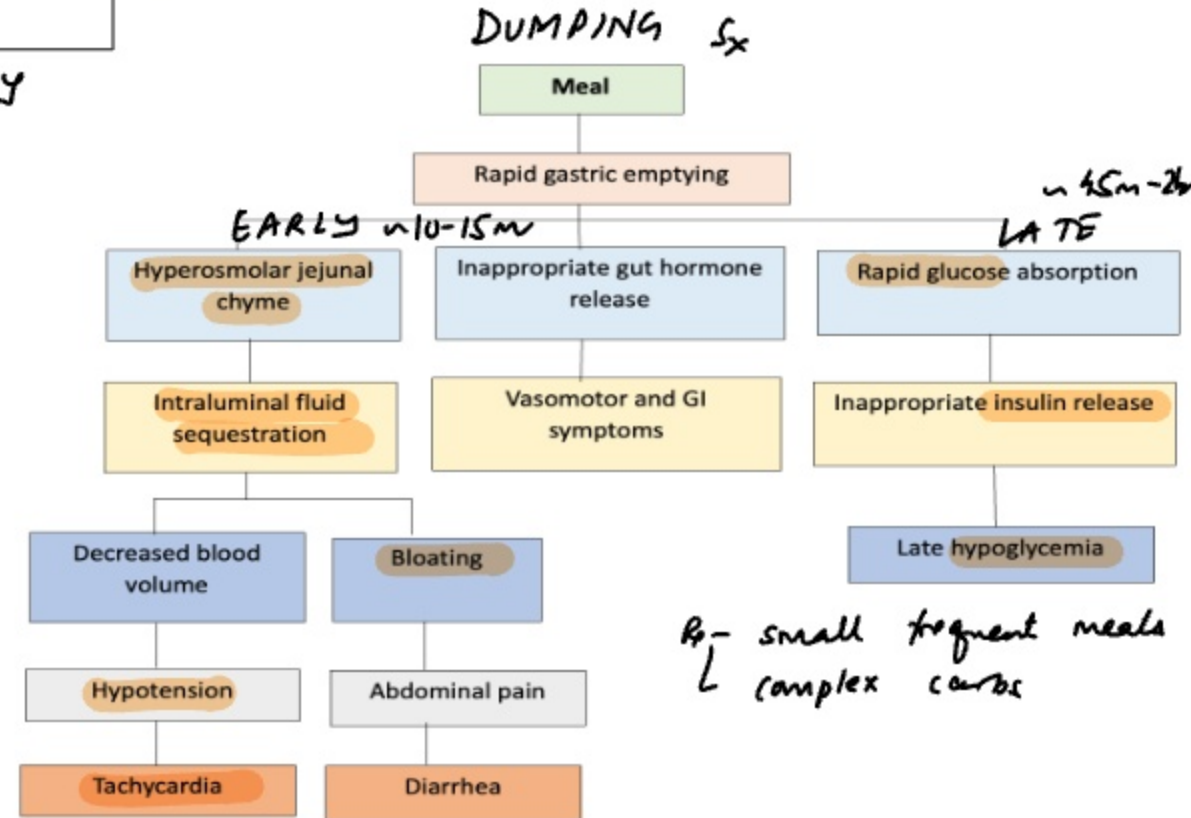
Bilroth II



Roux-en-Y

Internal hernia

- **Petersen's hernia** (Antecolic reconstruction): Bowel loop herniates behind Roux limb
- **Stemmer hernia** (Retrocolic reconstruction): Bowel loops herniate through the transverse mesocolon



Acronym	NOTES PROCEDURES
POSE	Primary Obesity Surgery Endoluminal
ROSE	Restorative Obesity Surgery Endoluminal
ESG	Endoscopic Sleeve Gastroplasty
TOGA	Transoral Gastroplasty

Contact admin
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Bariatric Surgery (Metabolic Surgery) QQQ

Indication of Bariatric surgery:

> 40 / > 35 + comorbities

MCC of death: PE

Obesity Sx Risk mortality score (xpm)

Arterial hypertension

Age > 45 years

Male gender

Body Mass Index (BMI) ≥ 50 kg/m²

Risk factors for PTE

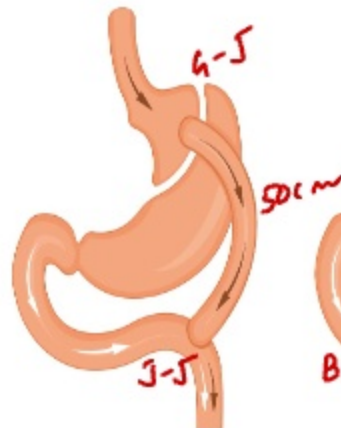
Classification	Procedures
Restrictive (anast + Ghrelin ↓)	<ul style="list-style-type: none"> Vertical band gastroplasty Adjustable band gastroplasty Sleeve gastrectomy
Malabsorptive and restrictive (ideal balanced)	<ul style="list-style-type: none"> Roux-en-Y gastric bypass
Mainly malabsorptive and mildly restrictive	<ul style="list-style-type: none"> Biliopancreatic diversion 200cm Duodenal switch (DS-BPD) 150cm / DS SADI-S (Single anastomosis duodenal-ileal sleeve gastrectomy)



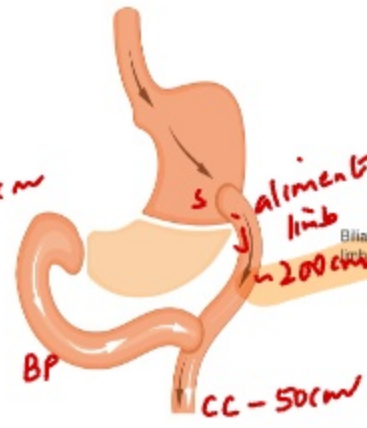
Adjustable Gastric Band (AGB)



Vertical Sleeve Gastrectomy (VSG) (mc)



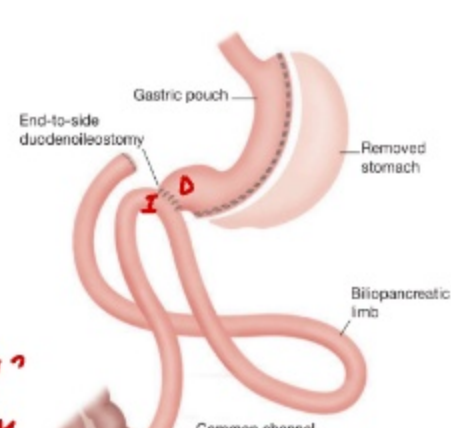
Roux-en-Y Gastric Bypass (RYGB)



Biliopancreatic Diversion (BPD)



BPD-DS



SADI-S

GI Bleed

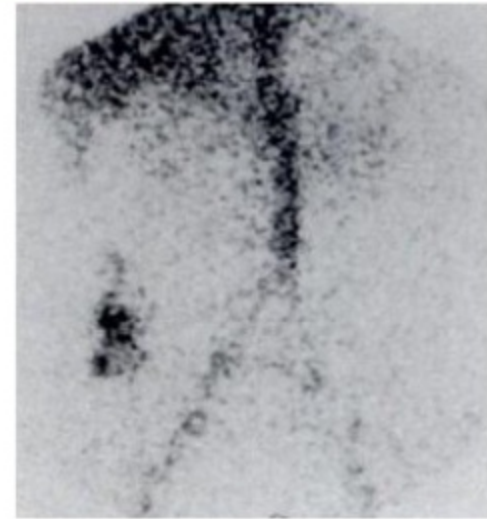
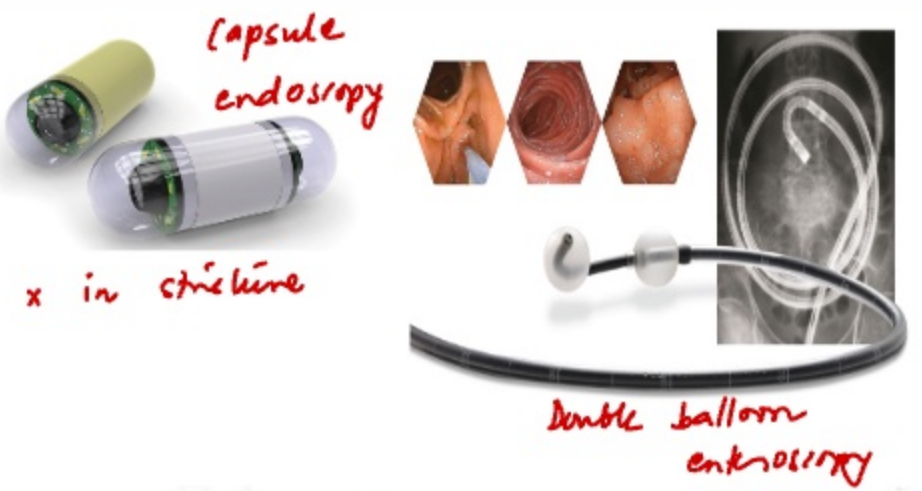
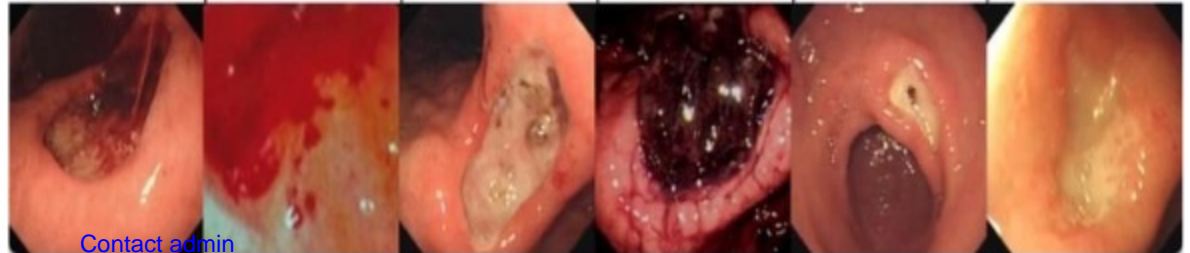
Tc^{99m} - RBC

MCC of UGIB- (prox to D5 flexure) - PUD > varices
 MCC of LGIB- Diverticulosis > Angiodysplasia
 Hematemesis- UGIB
 Malena- dark black stools - UGIB
 Hematochezia- LGIB
 Occult- pt x rebleed ; FGBT (+)
 Obscure- x source : UGIE + colonoscopy (N)
 Rockall score prognostic- Comorbidity/
 Age/ Shock / Endoscopy diagnosis

PUD → iv PPI + UGIE
 ↓

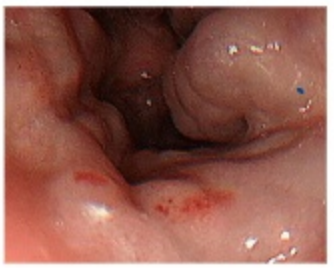
FORREST

Ia	Ib	IIa	IIb	IIc	III
Spurting bleed	Oozing bleed	Non-bleeding visible vessel	Adherent clot	Flat spot in ulcer crater	Clean base ulcer



Approach to Variceal Bleed

Portal hypertension
 varices: LGV - Azygos
 Hemorrhoids: MAV - IRV
 Caput - paraumb veins - epig



Resuscitate / ABC

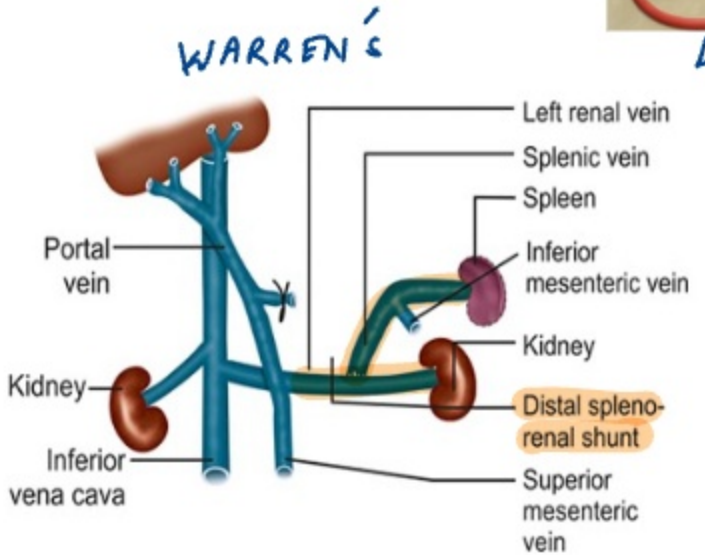
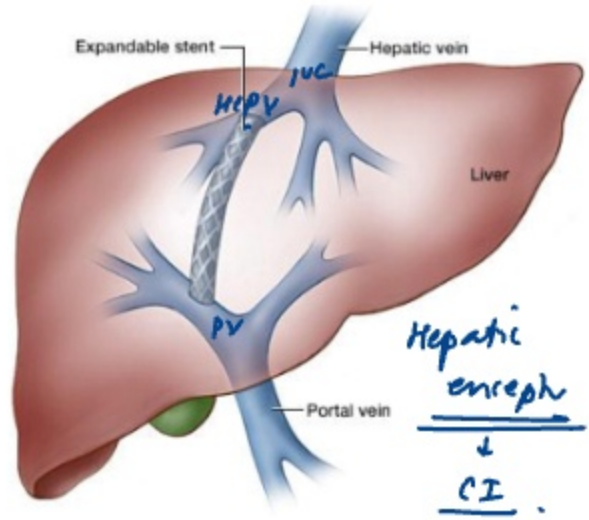
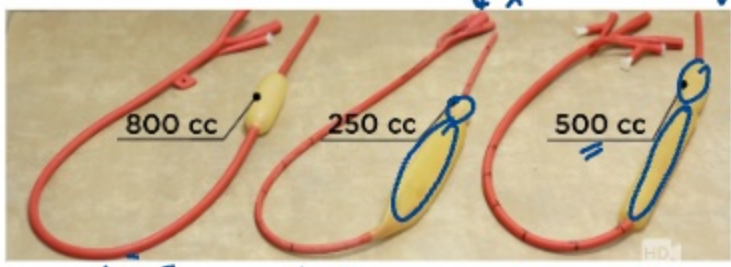
DOC- Terlipressin } splanchnic ve
 MC- octreotide }
 Not used- PROPRANOLOL

VGIE + Banding / sclerotherapy

No bleed

Re-bleed → VGIE + banding / sclerotherapy

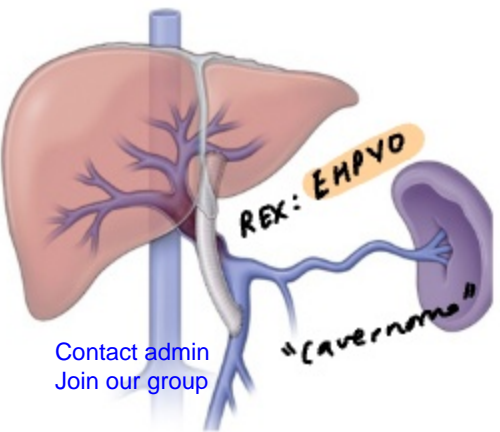
Propranolol



Liver transplant
 BRIDGE: TIPSS

Proximal splenectomy
 Leino renal shunt
 = LINTON

MC early complication- Capsular rupture
 MC late complication- Stent thrombosis

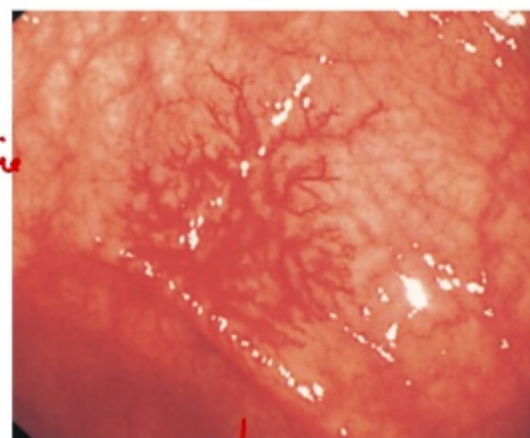


Contact admin
 Join our group

Intestinal Pathologies



Short bowel syndrome: $< 200\text{cm}$
 MCC CHILD- NEC / jejunal atresia
 MCC ADULT- CD $>$ mesenteric ischemia
 Mx:
 Teduglutide DGC^{QR} GLP-2 (+)
 Bianchi, Step, Kimura procedure



↓
 Angiodysplasia
 Heyde's Sx = II + AS

Tillaux sign: chylomesenteric cyst
 more \perp to mesentery
 Rx: Enucleation

Sigmoid diverticulosis
 painless LGIB
 False

DIVERTICULITIS → ID: CECT
 RIF - constipⁿ
 Acute LIF pain + fever + WBC ↑

Hinchey Classification ^{QR}

1a	Pericolonic Phlegmon and inflammation
1b	Pericolonic abscess $< 4\text{cm}$
2	Pelvic or inter-loop abscess or abscess $> 4\text{cm}$
3 ^{QR}	Purulent peritonitis
4	Feculent peritonitis

no sudden wt loss
 SMA Sx / cast Sx / Wilkie Sx
 Nutcracker Sx
 3rd duodenum
 wt gain
 Strong procedure
 Lig of Treitz release
 SMA $< 25^\circ$
 ↓
 LAV - Hematuria

Miscellaneous

S - Sepsis elimination and skin protection
N - Parenteral nutrition trial
A - Anatomical assessment
P - Definitive planned surgery

Max risk of malnourishment: Duodenal FB/ Radiation/ Infection/ Epithelisation/ Neoplasia / Distal obstruction
 >500ml/ day: Bad prognosis (High output)

Intra-op LN removed (min)

GB C R eST - stomach
 6 10 12 15 16

Mesenteric ischemia m.c - SMA

Chronic ischemia: 'postprandial pain'

↳ R: anti-wags → (Sx) / endovase

Acute ischemia: A.F.b

↳ bowel perforate → Q: Exploratory Lap

Watershed areas:



(i) BMI (kg/M2)
 0 = >20.0
 1 = 18.5-20.0
 2 = <18.5

The MUST tool

malnourishment

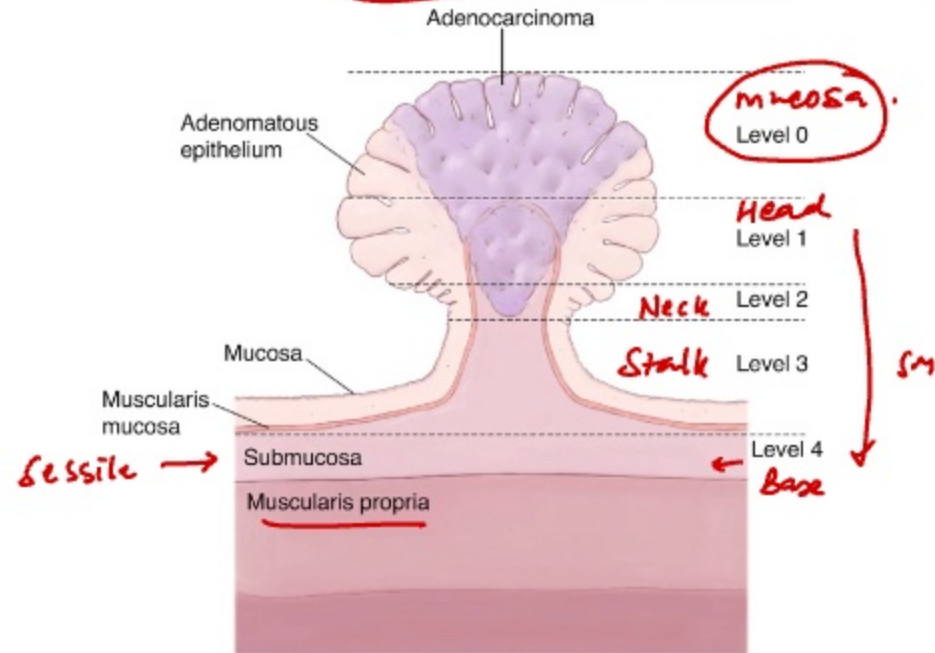
(ii) Weight loss in 3-6 months

0 = <5%
 1 = 5-10%
 2 = >10%

(iii) Acute disease effect:

little nutrition intake for >5 days

HAAGIT CLASSIFICATION

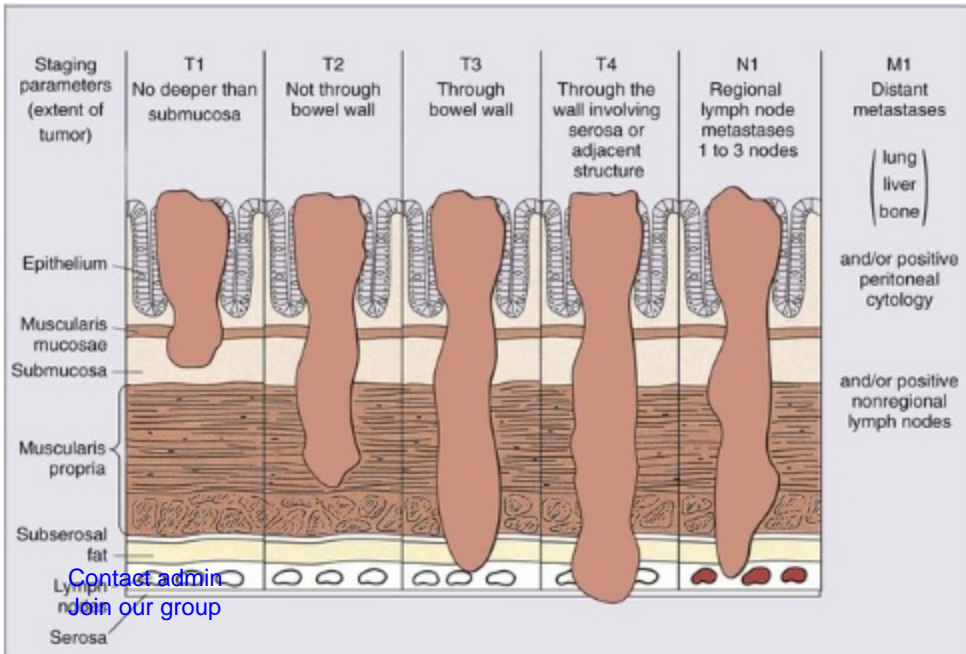


Ca-Colon Staging

mucosal: CIS → st 0

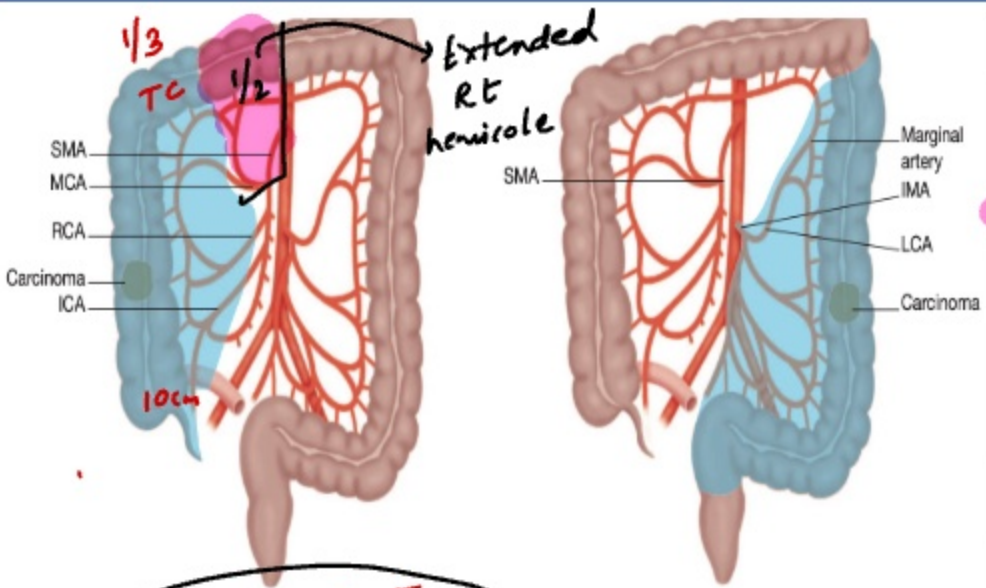
Dukes' Stage	Extent of Tumors
A	Limited to submucosa
B1	Into muscularis propria
B2	Through serosa; no nodal metastases
C1	1-4 regional nodes
C2	>4 regional nodes
D	Distant metastases

AJCC Stage	TNM Stage	Definition
I	T1; N0; M0	T1: tumour invades submucosa
I	T2; N0; M0	T2: tumour invades muscularis propria
IIa	T3; N0; M0	T3: tumour invades through muscularis propria into subserosa or non-peritonealised pericolic tissues
IIb	T4; N0; M0	T4: tumour directly invades other organs/structures and/or perforates visceral peritoneum
IIIa	T1 or T2; N1; M0	T1/2; N1: metastases to 1-3 regional lymph nodes
IIIb	T3 or T4; N1; M0	T3/4; N1: metastases to 1-3 regional lymph nodes
IIIc	Any T; N2; M0	N2: metastases to ≥4 regional lymph nodes
IV	Any T; Any N; M1	M1: distant metastases

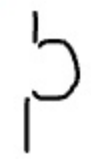
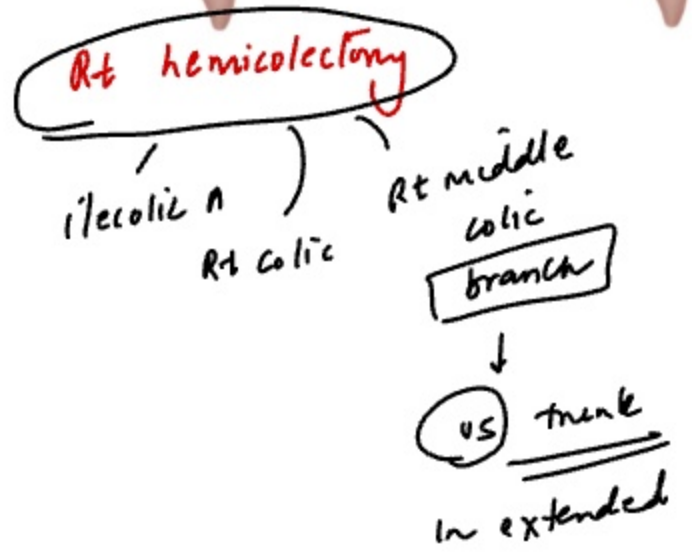
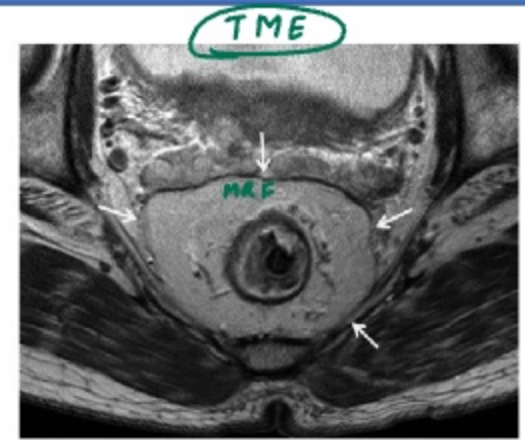


Screening for Ca colon: ≥ 50 yrs
 Colonoscopy 10 yrs
 Sigmoidoscopy 5 yrs
 FOBT annual

Intestinal Pathologies



Ileostomy	Colostomy
More irritant to skin	Less skin irritation
High output 600–1200 ml/day	200–600 ml/day
High Na^+ , K^+ , HCO_3^- loss Dehydration MC	Minimal
Less odorous	More odorous
Retraction more common	Prolapse, Parastomal hernia more common
Pouting	Flush with skin

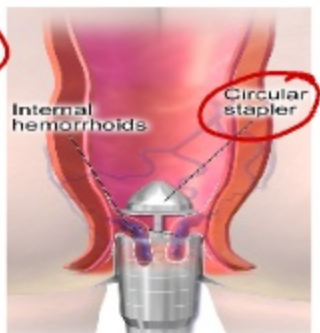


IOC for ca rectum: MRI
 Proximal 5cm
 Distal 2cm
 TOC: Low ant resec #
 Within 2cm of anorectal ring: APR
 * FRAIL / acute obstr - Hartmann
 Ca anal canal:
 NIGRO: CT-RT

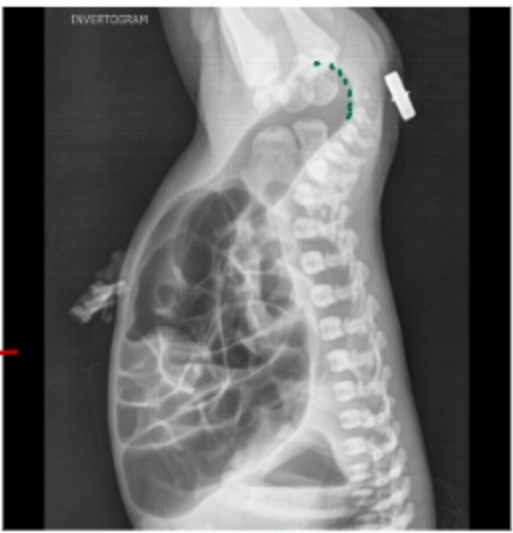
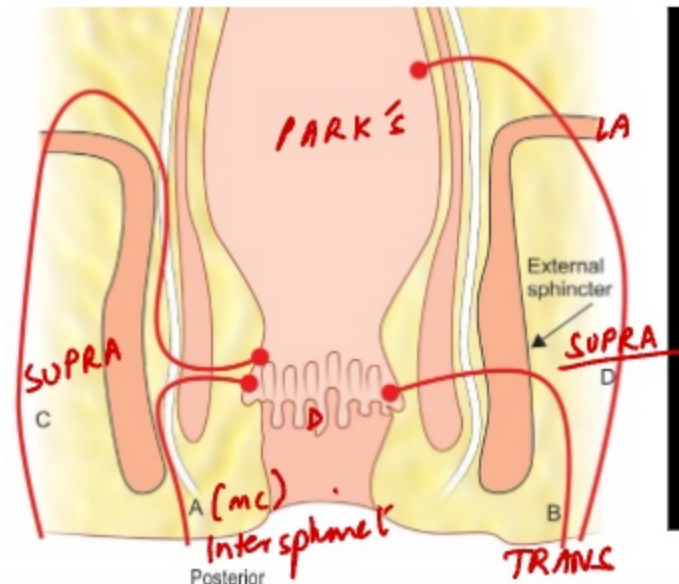
Anal Canal

PERIANAL FISTULA

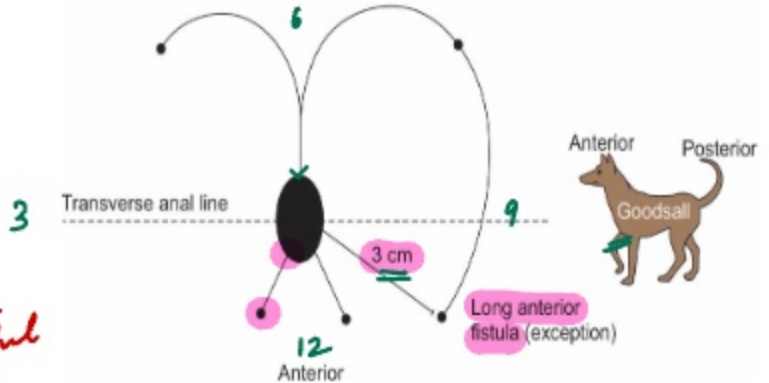
Grade	Description
1st	Hemorrhoids do not protrude but may bleed. <i>- Conservative</i>
2nd	Hemorrhoids protrude with defecation but reduce spontaneously. <i>BARRON'S BANDING</i>
3rd	Hemorrhoids protrude but cannot reduce spontaneously; however, they can be reduced manually. <i>Circular stapler</i>
4th	Hemorrhoids are permanently prolapsed. <i>Sx</i>



Open: Milligan Morgan hemorrhoidectomy
Closed: Ferguson ✓



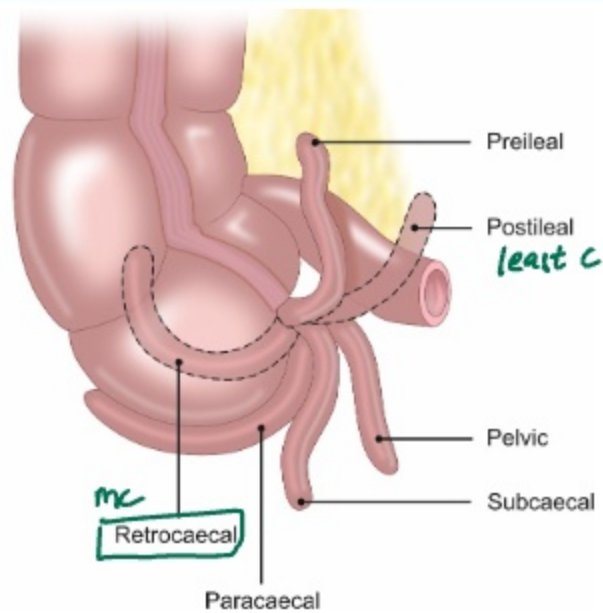
ARM
Wingspread classify
Invertograms



Goodsall's rule
IOC: MR fistulography
TOC- Fistulotomy / ectomy
HIGH FISTULA- Seton

Appendix

Alvarado score



Feature	Score
Migration of pain	1
Anorexia	1
Nausea	1
Tenderness in RIF	2
Rebound pain	1
Elevated temperature	1
Leukocytosis	2
Shift of WBC to left	1
Total	10



Initial Ix- USG
 IOC- CECT
 IOC in pregnancy- MRI

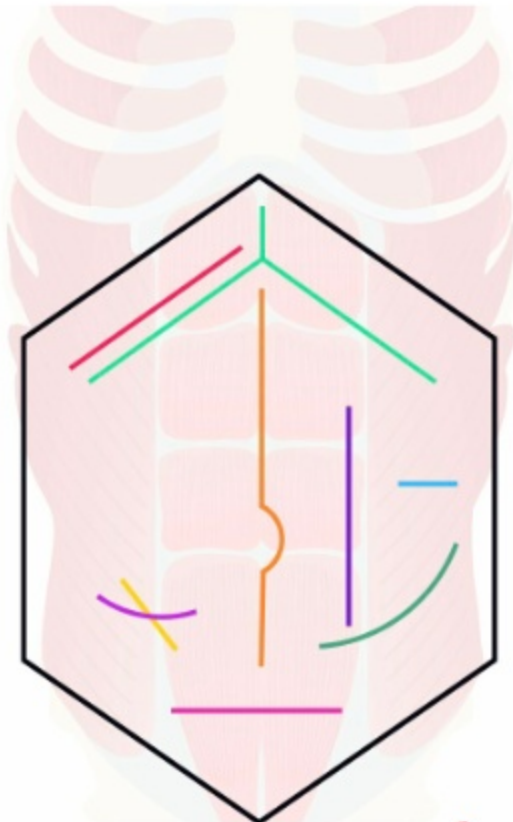
7 - acute appendicitis

McBurney's point tenderness $\frac{2}{3}$ \nearrow $\frac{1}{3}$ \searrow ν ASIS
Psoas / Cope sign pain flex/ext hip
Rovsing sign LIF \rightarrow RIF
Ten Horn sign traction sp cord (testes)
Blumberg's sign rebound tenderness

Appendiceal lump- OSCHNER-SHERRIN regimen
 conservative: pulse / temp / size of mass study
 Delayed \downarrow appendicectomy - 6-8wks

Appendiceal Carcinoid: mc site
 <2cm: appendicectomy
 >2cm: " + Rt hemicolectomy

Incisions & Named Surgeries



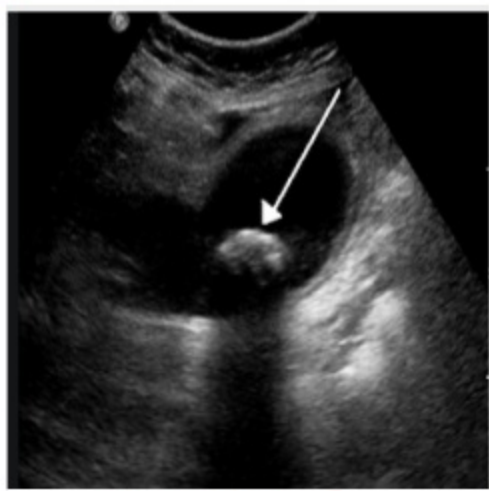
- KOCHER (OPEN CHOLECYSTECTOMY) *thyroidectomy*
- 'MERCEDES BENZ' (LIVER TRANSPLANT) *Chevron*
- MIDLINE LAPAROTOMY (INTRA-ABDOMINAL ACCESS)
- PARAMEDIAN (INTRA-ABDOMINAL ACCESS)
- TRANSVERSE (STOMA CLOSURE/FORMATION)
- RUTHERFORD-MORRISON (KIDNEY TRANSPLANT - R/L)
- GRIDIRON (OPEN APPENDIECTOMY)
- LANZ (OPEN APPENDIECTOMY)
- PFANNENSTIEL (GYNAECOLOGICAL, OBSTETRIC)



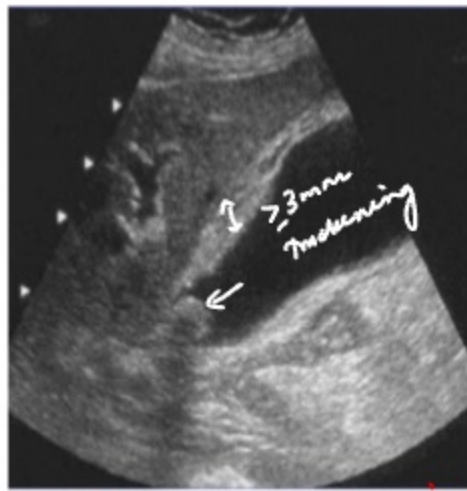
appendix
 - Rutherford - muscle cutting
 - Gridiron - " splitting
 - Lanz - skin crease

Battle
 ↓
para-rectal
 (rectus abdom)
Gibson's
 Urological

Gall Bladder



GALLSTONE
- shadowing



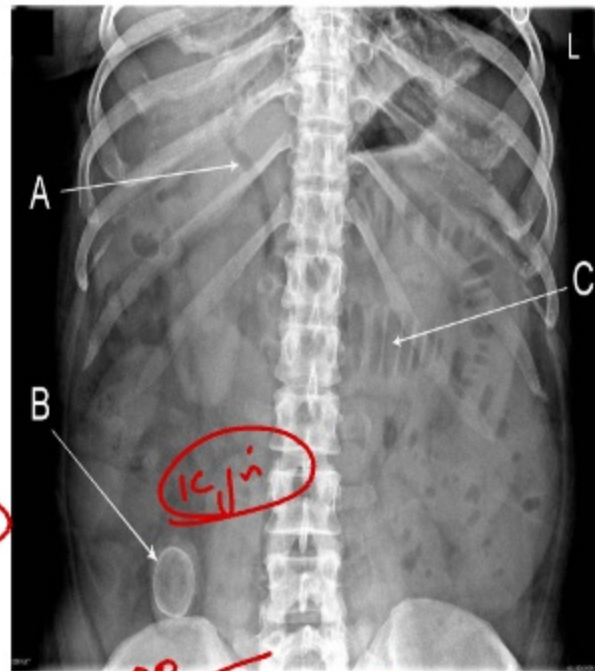
Acute cholecystitis
 • Fever + Murphy's sign
 • IOC-UCG
 • most accurate - Tc 99m HIDA
 L non visualization of GB



POLYP
 ≥ 1cm: Prophylactic cholecystectomy

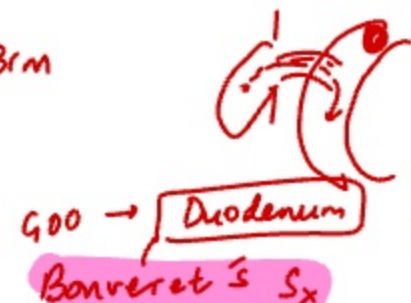


Porcelain GB
 R/F ca GB



RIGLER'S Δ
 Gallstone ileus
 SBO
 Stone in bowel
 pneumo-bilia

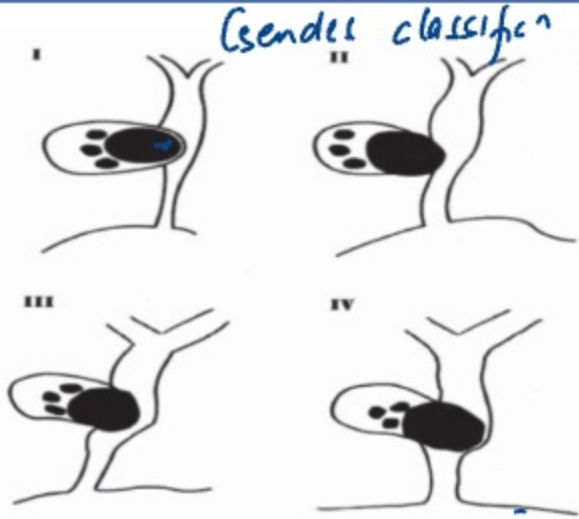
GB stone ≥ 3cm (ml)



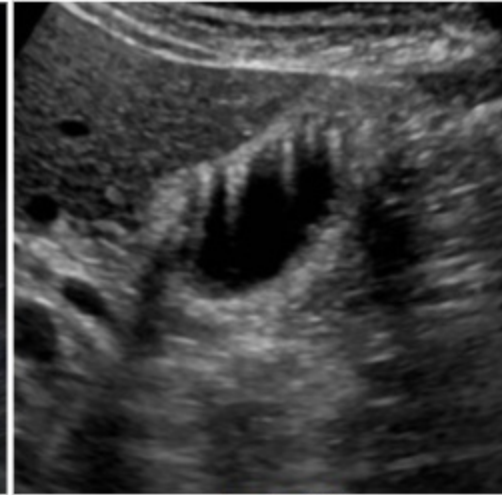
TOKYO CLASSIFICATION
Mild: Mild gallbladder inflammation
Moderate: one or more of the following: <ul style="list-style-type: none"> • Elevated WBC >18,000/mm³ • Palpable, tender mass in the right upper quadrant • Duration of symptoms >72 hours • Marked local inflammation
Severe: Evidence of MODS → cholecystostomy

R/F for ca GB - **smoking?** → No
 Non muscle infiltrating: LP (T1a) → Cholecystectomy
 Muscle infiltrating ca GB: Extended cholecy → 4b/5
 LN

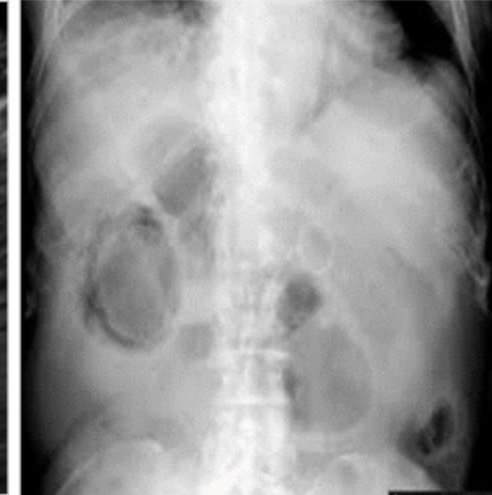
Other GB Pathologies



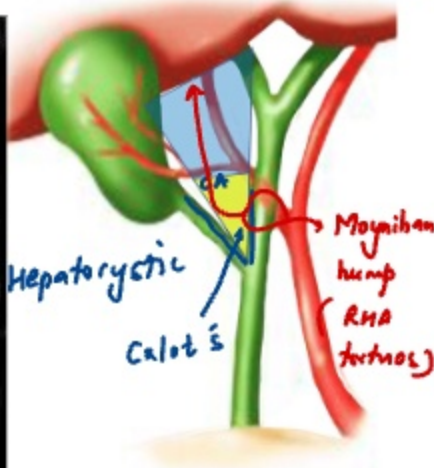
Phrygian cap
(N) variant



Comet tail
Cholesterolemia



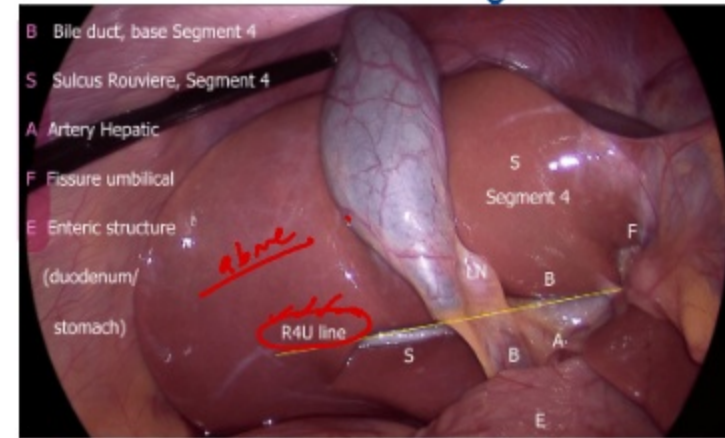
emphysematous cholecystitis
- DM (comorbidity) → re-emergent Cx



GS → obstructive jaundice
MIRIZZI'S Sx

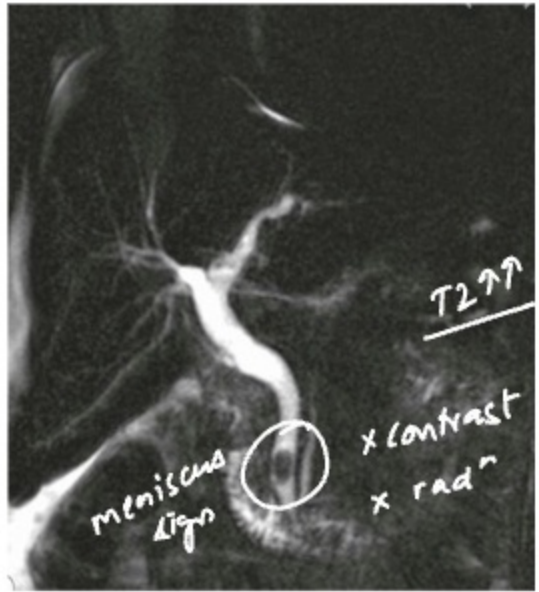
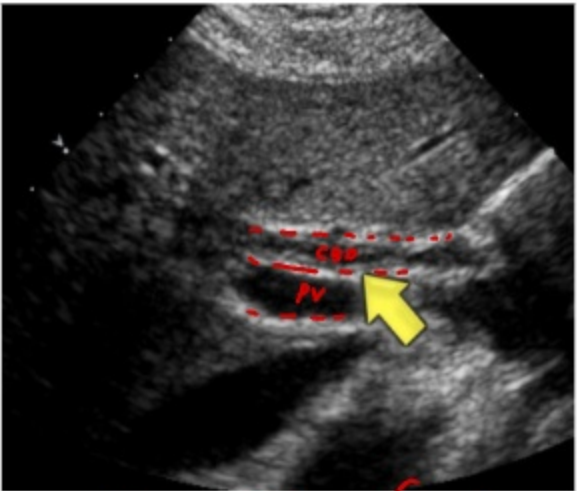


Strawberry GB
↳ cholesterolemia
↳ xx R/F CaGB



Approach to Obstructive Jaundice

Clay-colored stools, dark urine, pruritus with elevated conjugated bilirubin and ALP



1st. USG (Double barrel)
(CBD ≥ 6mm)



IOC: MRCP → Gold std: ERCP
dx + tx
choledocholithiasis
≤ 2yr → Residual
> 2yr → Recurrent

DOUBLE DUCT sign
↳ periamp ca

CURVOISIER'S LAW

Periampullary Ca

In a jaundiced patient, a palpable, non-tender gallbladder suggests:

Charcot's triad: RUQ pain + fever + jaundice
Reynold's pentad: Altered mental status + shock } cholangitis

Q. A 56yrs old male with obstructive jaundice reveals dilated CBD and intrahepatic biliary radicles on USG. No stone was identified. CT confirmed the findings. Which of the following investigation would be most useful to localize the cause?

- A. Endoscopic USG
- B. ERCP
- C. MRI
- D. PET scan

Q. A 48-year-old lady presents with right upper quadrant abdominal pain. USG reveal multiple GB calculi but no wall thickening, CBD diameter 12mm, gamma glutamyl transferase 5times increased, alkaline phosphatase was high also 400IU. Other parameters are normal. What is the next step ?

- A. MRCP
- B. ERCP
- C. Semi-urgent cholecystectomy ~~XX~~
- D. EUS

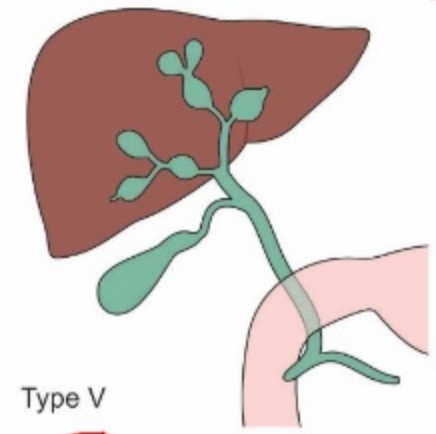
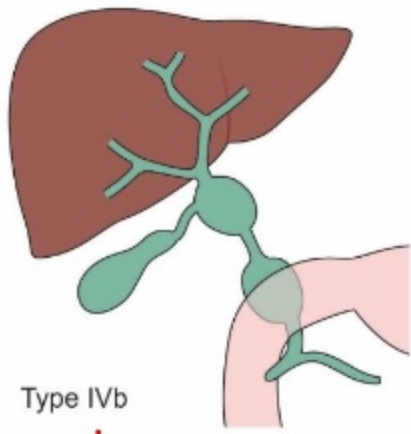
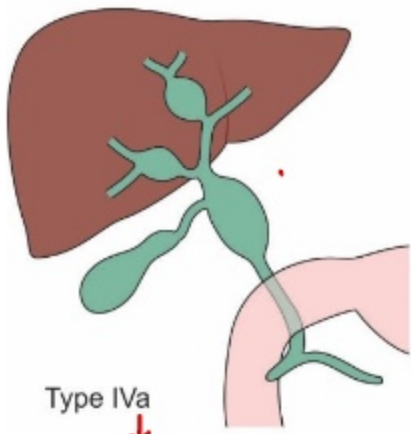
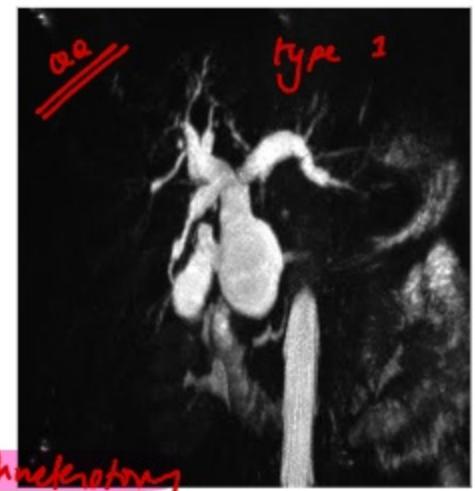
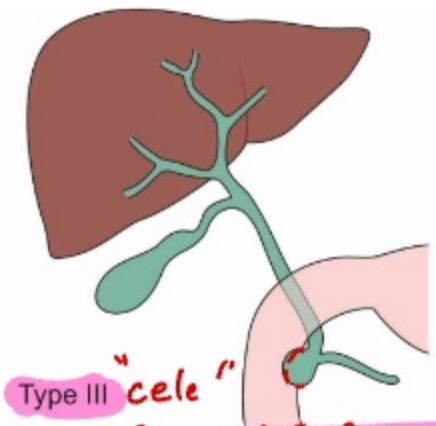
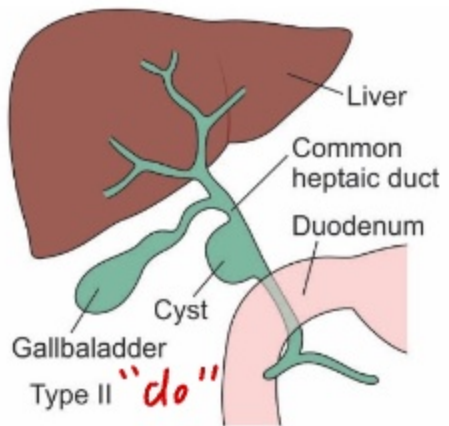
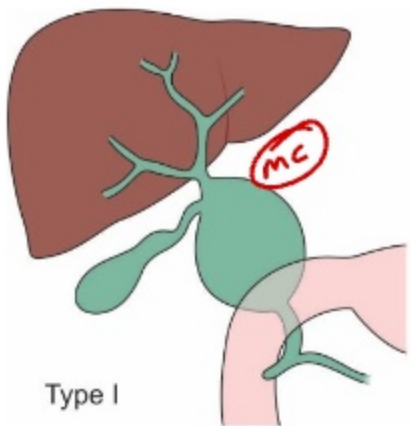


Q. 40 year old female presents with jaundice and pain abdomen. LFT reveals raised bilirubin and GGT. USG reveals scleroatrophic GB with dilated CDB with impacted calculi. What is the next step of management?

- A. Cholecystectomy
- B. ERCP
- C. PET scan
- D. MRCP



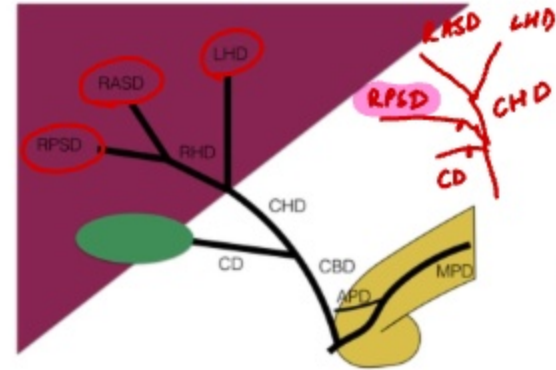
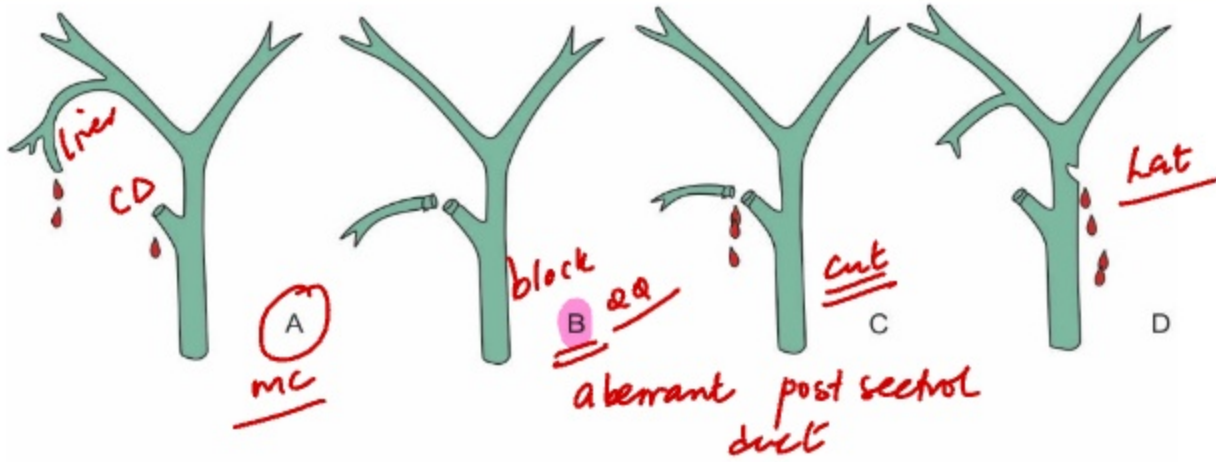
Choledochal Cysts- Todani Classification



→ Anomalous panc-biliary jn
 → pre-malignant → ca GB / CCA
 Resection + hepaticojejunostomy

Liver transplant

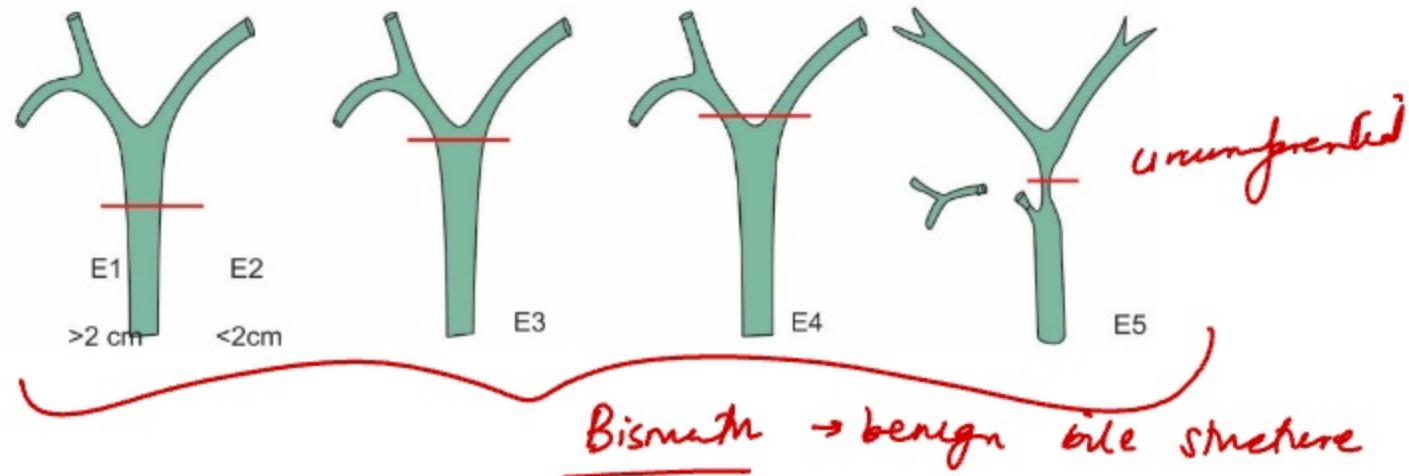
Bile Duct Injuries - Strasberg Classification



cholecystectomy
jaundice bile output

< 48 hrs / > 500ml / day
 ↓
 Exp lap / Repair

x → USG 1st
 'biloma'
 ↓
 pigtail ee
 ↓ x



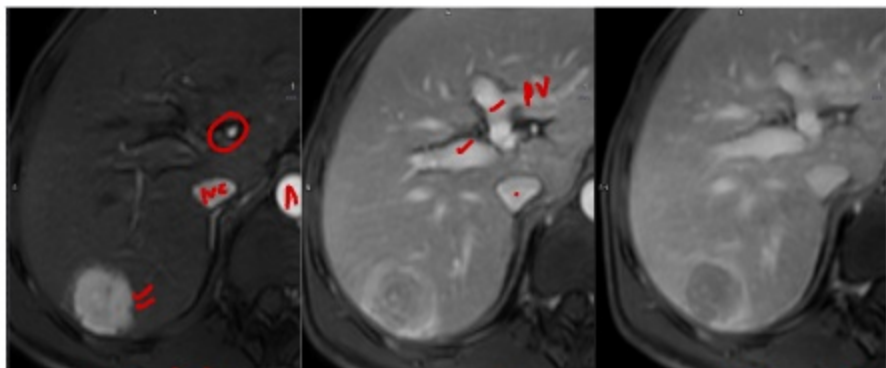
IOC - MRCP
 Gold std - ERCP
 & most cn - HIDA

mjr: re-expose → stent

- Stewart-Way: Laparoscopic
- Hannover: Bile duct + vasc inj perichol (mc)
- Bismuth-Corlette Classification: CCA - Klatskin tumor

Hepato-Cellular Ca

BCLC staging



arterial enhancement

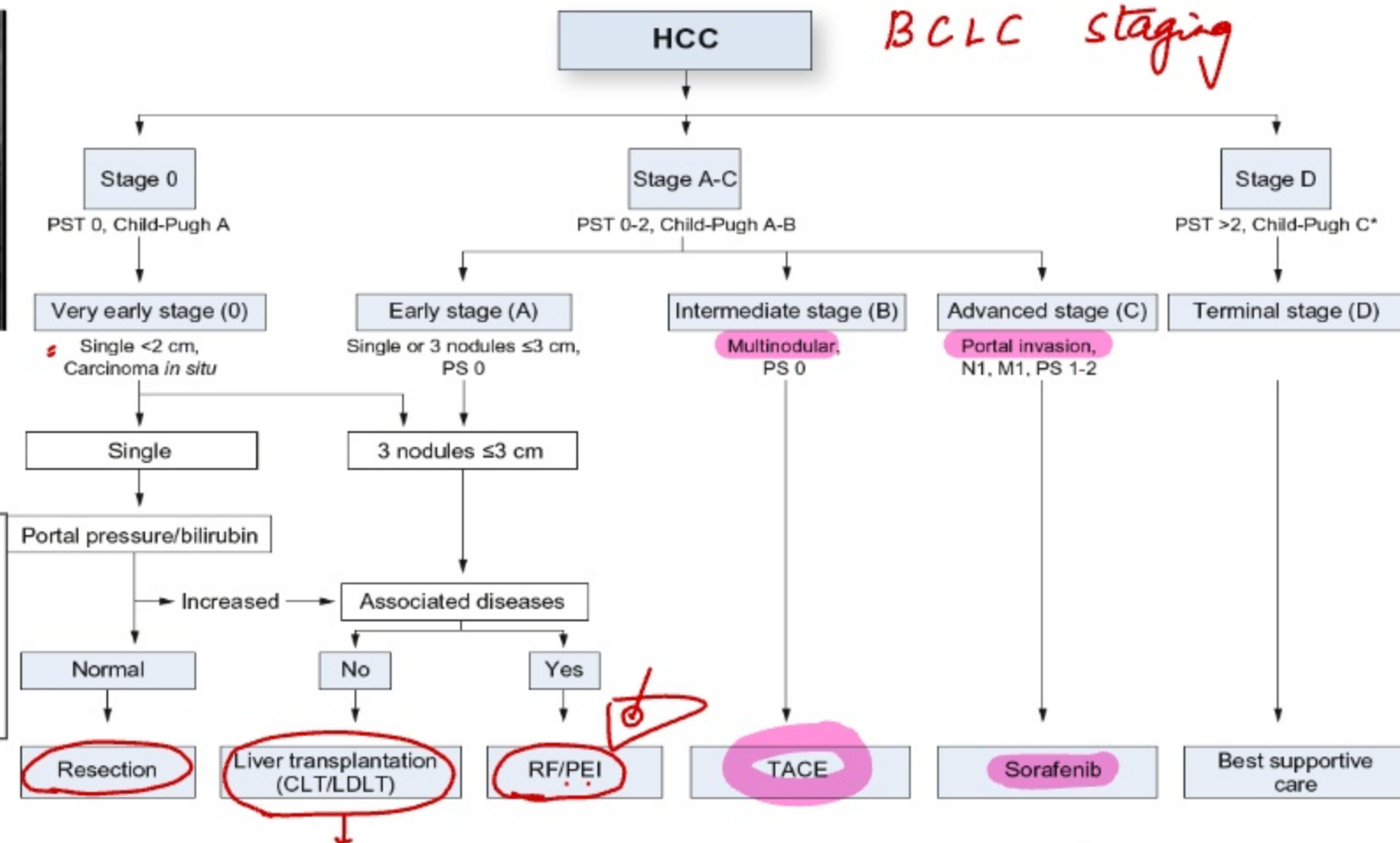
venous washout

delayed capsule

IOC: triple phase MR > CT

HCC

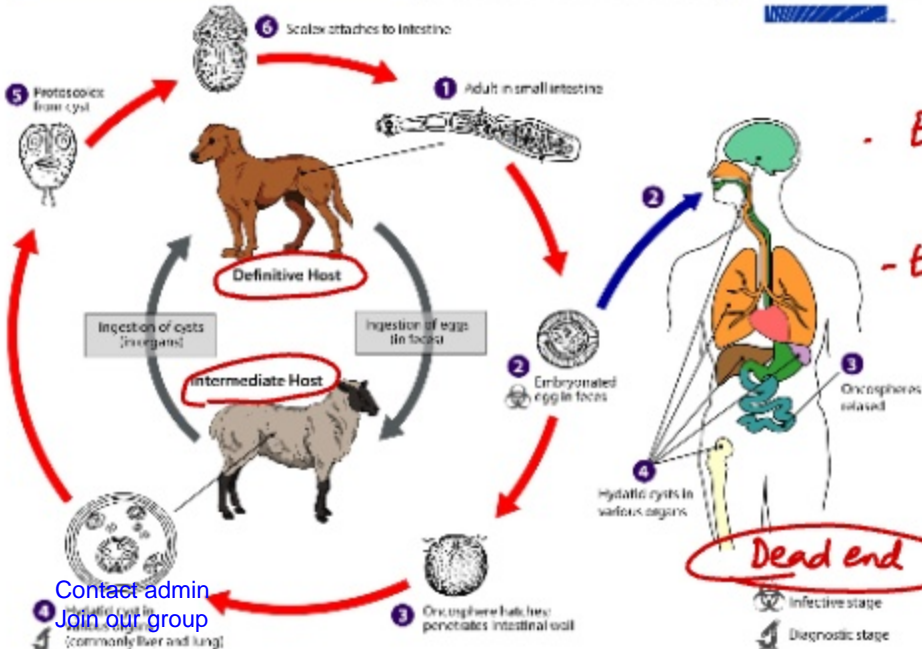
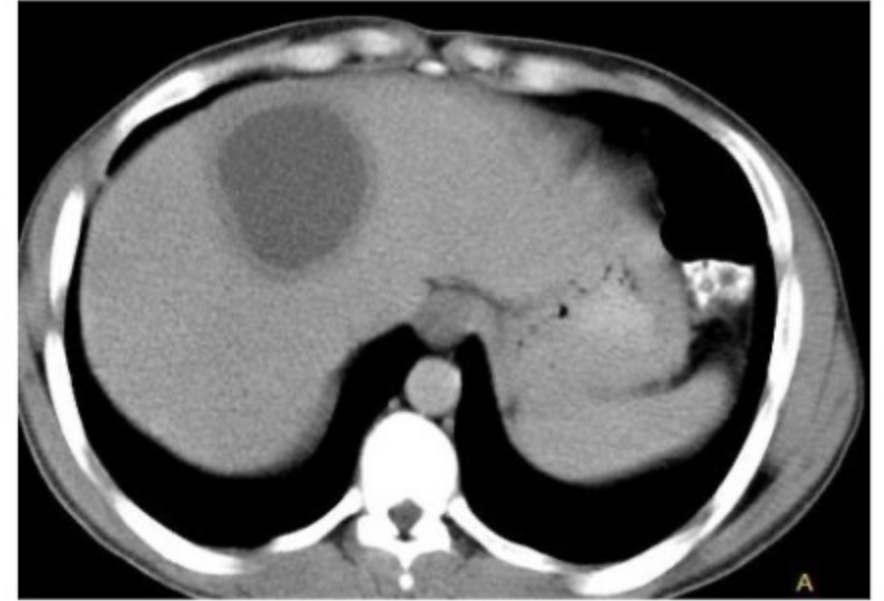
AFP, PIVKA II, GPC3, OPN - HCC
 Neurotensin - Fibrolamellar HCC
 Central scar + Calcification
 Central scar + Hot spot on sulfur colloid: FNH



Milan Criteria: Single tumor ≤ 5 cm, or 2-3 tumors < 3 cm
 UCSF Criteria: Single tumor ≤ 6.5 cm, or 2-3 lesions, < 4.5 cm

Liver Infections

Gharbi	1	3	2	4	5
WHO	CE1	CE2	CE3	CE4	CE5
		Honeycomb. 	Waterlily as 	heterog 	Ca ²⁺ inactive



- *E. granulosus* (mc)
 - *E. multilocularis*
 ↳ mimic malign

mc: Liver > Lung

Rx: Albendazole
 → PAIR: Perit
 → Sx

CE: ~~multiloculated~~
 CE 4/5
 biliary commur
 aspir^o → inject cotrimox
 ↑ saline / spirit
 &
 Reaspirate

FEVER + RUQ PAIN
Liver abscess

Amebic
 - h/o dysentery
 - "anchovy" pus
 - single
 Rx: Metrogyl
 ↓ xx
 Pigtail

Pyogenic
 - cholangitis
 - multifocal
 ↓
 Rx - antibiotics
 + pigtail

Contact admin
Join our group
(commonly liver and lung)

Liver Scores

Model For End Stage Liver Disease (MELD)

Creatinine (mg/dL)

Bilirubin (mg/dL)

INR

Revised: Na^+ / 3.0 → \uparrow / albumin

Pediatric End-Stage Liver Disease (PELD)

-Total bilirubin

-Albumin

-Age (< 1 Y)

-Growth failure

-INR



C-P score

KING'S COLLEGE

ABCDE	1	2	3
Encephalopathy	None	Mild to moderate (grade 1 or 2)	Severe (grade 3 or 4)
Ascites "distension"	None	Mild to moderate (diuretic responsive)	Severe (diuretic refractory)
Bilirubin (mg/dL)	<2	2-3	>3
Albumin (g/dL)	>3.5	2.8 - 3.5	<2.8
PT	<4	4-6	>6
INR Coagn	<1.7	1.7-2.3	>2.3

Acetaminophen-induced ALF	Non-acetaminophen-induced ALF
Arterial pH <7.30	Prothrombin time >100 sec (INR >6.5)
Or all of the following: <ul style="list-style-type: none"> Prothrombin time >100 sec (INR >6.5) Serum creatinine > 3.4 mg/dL Grade 3 or 4 hepatic encephalopathy 	Or any 3 of the following: <ul style="list-style-type: none"> Non-A, non-B viral hepatitis, drug-induced or indeterminate etiology of ALF Time from jaundice: encephalopathy >7 days Age <10 years or >40yrs Serum bilirubin >17.4 mg/dL

Class A = 5 to 6 points (least severe liver disease)
 Class B = 7 to 9 points (moderately severe liver diseases)
 Class C = 10 to 15 points (most severe liver disease)

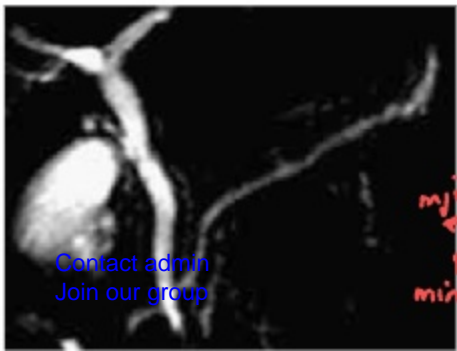
NAZER index: Wilson's
 Bilirubin AST PT/INR

Pancreas

Acute pancreatitis ^{2/3}
 Diagnosis: Revised Atlanta ^{Cx}
 Initial Ix: USG ^{Lab: amylase / lipase}
 IOC: CECT -> 48-72hrs - NECROSIS ^{radiol} ^{7sp}

BISAP Score

BUN	• BUN > 25 mg/dL (8.9 mmol/L)
Impaired mental status	• Glasgow coma score < 15
SIRS	• Evidence of SIRS
Age	• Age > 60 years old
Pleural effusion	• Pleural effusion

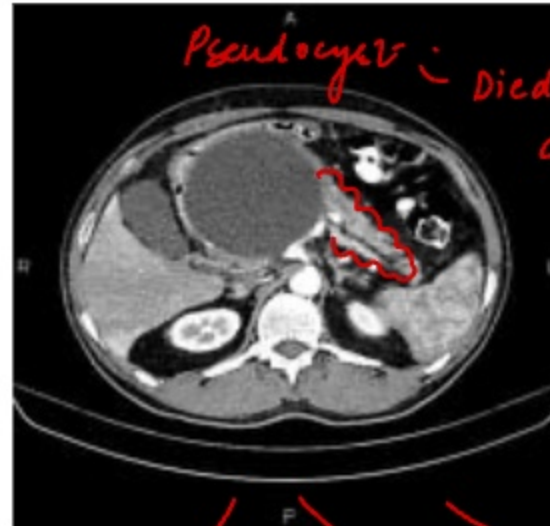


MRCP Recurrent panc
 panc divisum



Contact admin
 Join our group

Revised Atlanta classification
Interstitial Oedematous Pancreatitis (IOC)
 < 4 weeks: Acute Peripancreatic Fluid Collection (APFC)
 > 4 weeks: Pseudocyst
Necrotising Pancreatitis -> ↑↑ mortality
 < 4 weeks: Acute Necrotic Collection (ANC)
 > 4 weeks: Walled-Off Necrosis (WON) -> drain ✓



Pseudocyst - Dieulafoy's classification

Symptomatic >6cm >6wks
PIGTAIL



"sausage"
 IgG4RD - Autoimmune pancreatitis
 ↓
steroids

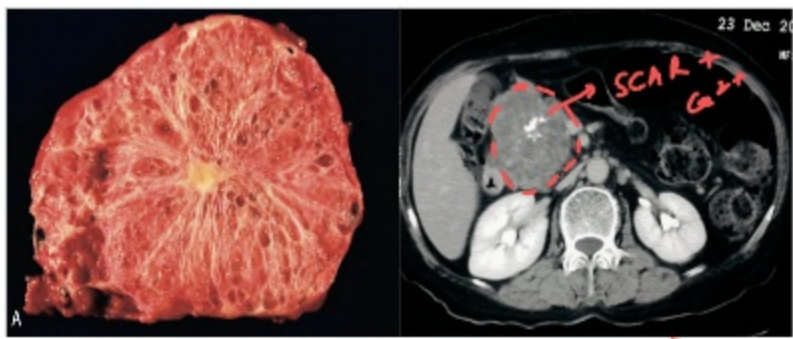
Pancreatic Cystic Neoplasms

young ♀ - solid cystic - SPEN
"daughter" - - - -

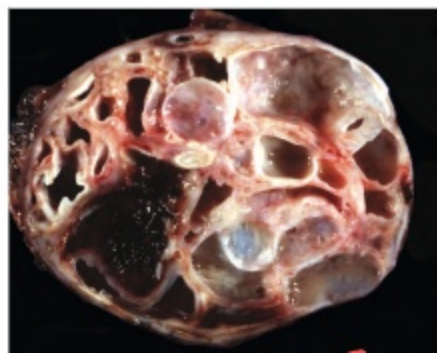
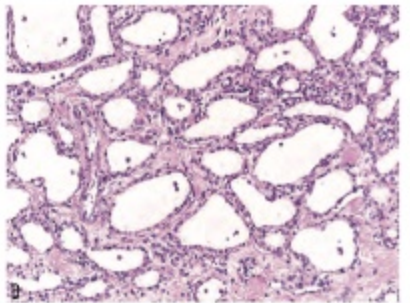
Features	Serous CA	MCN	IPMN
Age	Grand mother	Mother	Grand father
Pathology	Benign	30% malignant	65% malignant
Epithelium	Glycogen-rich cuboidal	Columnar mucin-producing with ovarian stroma	Columnar mucin-producing
Aspirate	Low CEA Low amylase	High CEA Low amylase	High CEA High amylase

Tanaka criteria

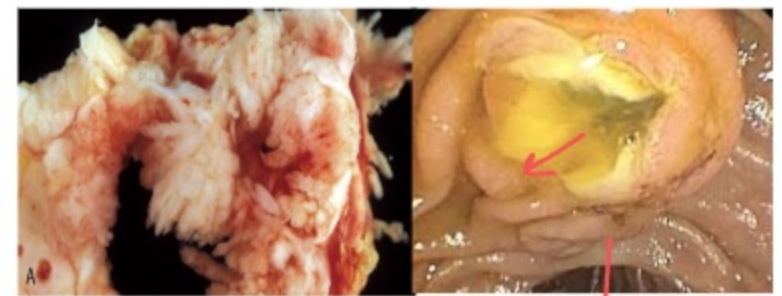
Q/Q



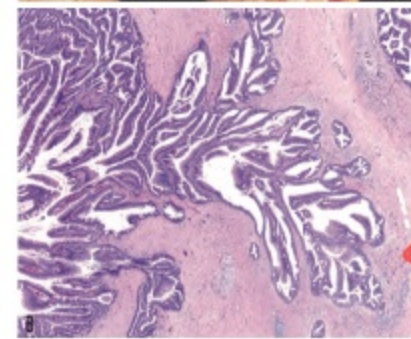
Microcystic



macrocystic



fish mouth



←

Chronic Pancreatitis

TIGARO CLASSIFICATION *etiological*

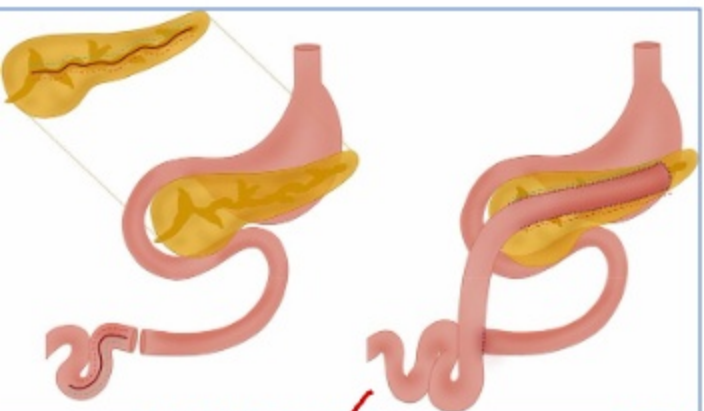
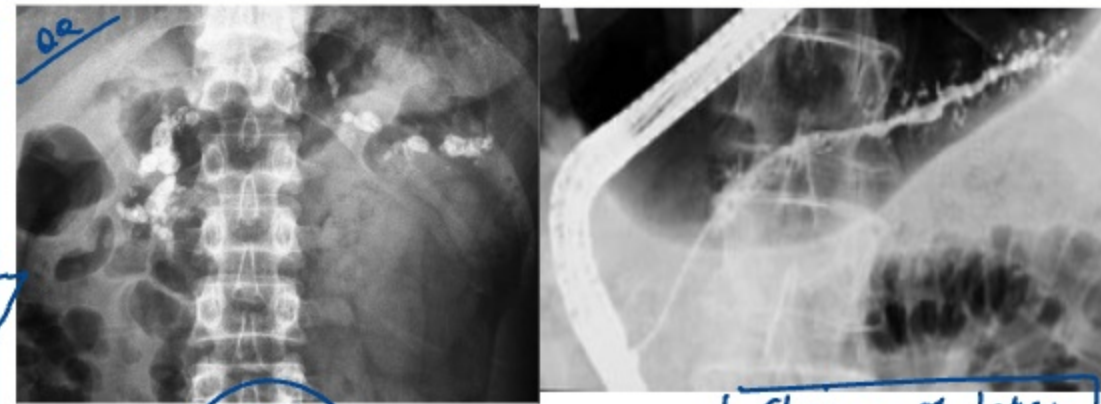
idiop *genetic* *AI*
IOC: MRCP (functional) - secretin
PRSS2 / SPINK2

GOLD STANDARD: ERCP

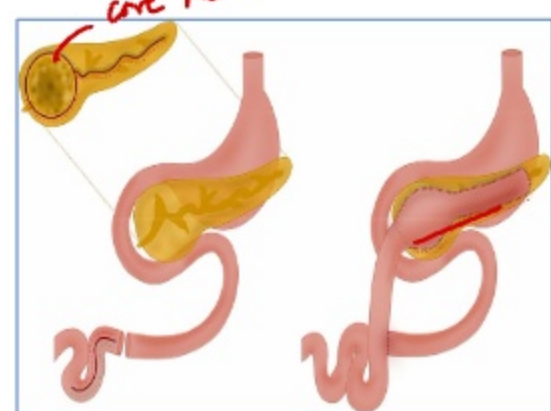
Indications for Surgery

- Intractable pain despite medical + endoscopic therapy
- Dilated pancreatic duct (>5mm) with obstructive stones/strictures

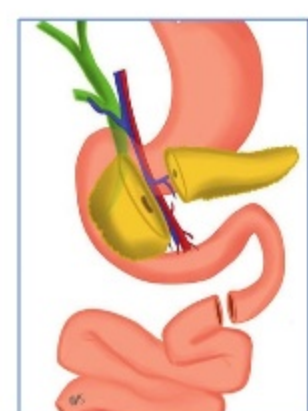
duct < 5mm - ERCP + sphincterotomy



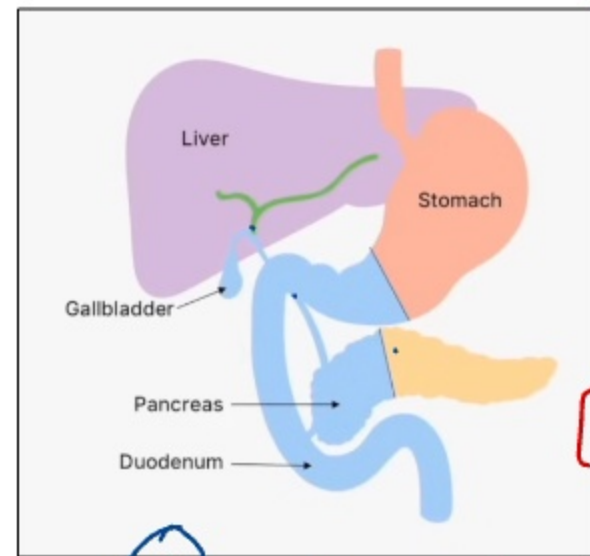
PUESTOW'S Long P-J



Frey's



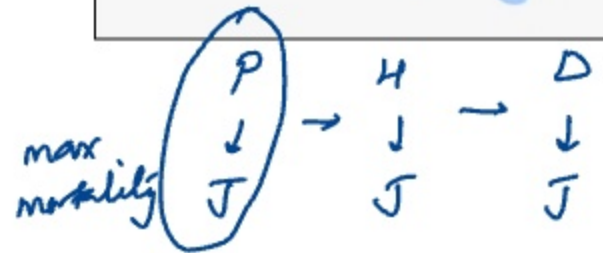
*Panc head
↓
Beger's*



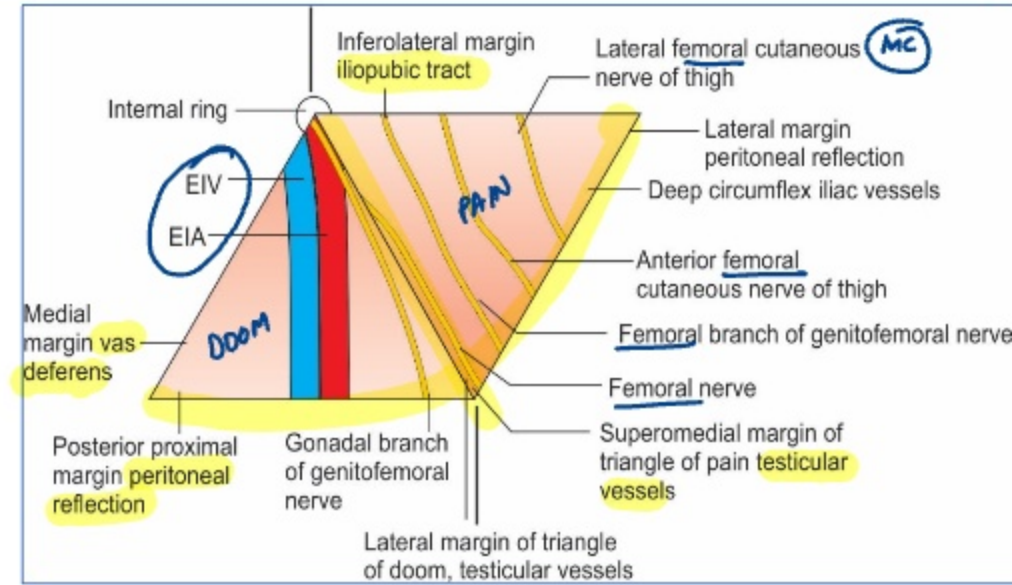
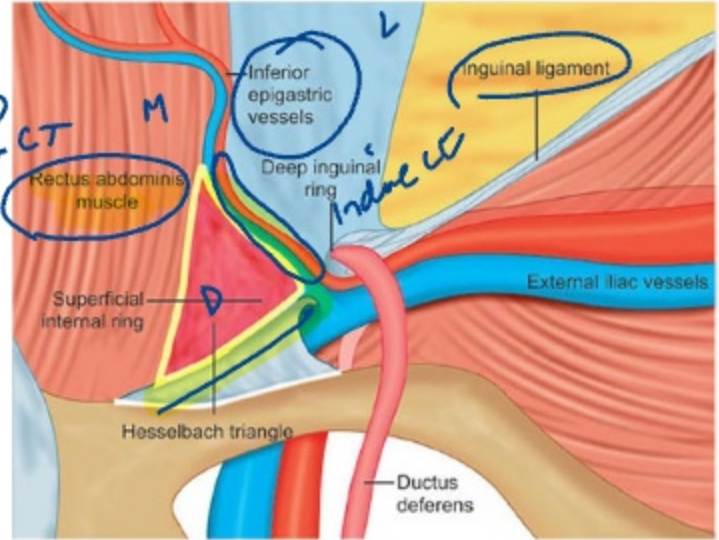
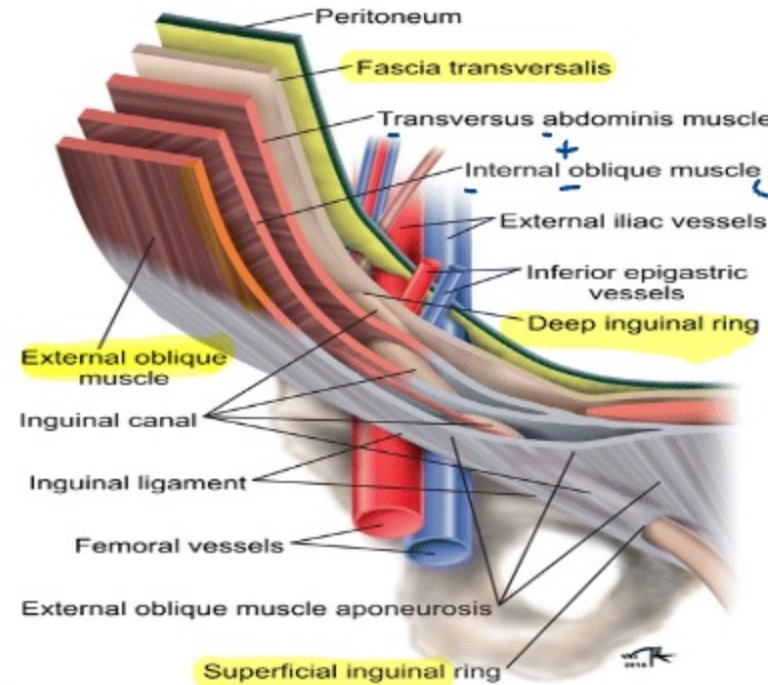
*Mod's Whipple's
↓
Ca panca*

IOC: CECT

Only distal: Duval's



Hernia



Direct

Due to weakness of conjoint tendon

Int oblique + Transversus abdo: Roof

Lacunar lig Posterior post wall

External oblique: LIP

Indirect ing - child
♀/♀ (MC)

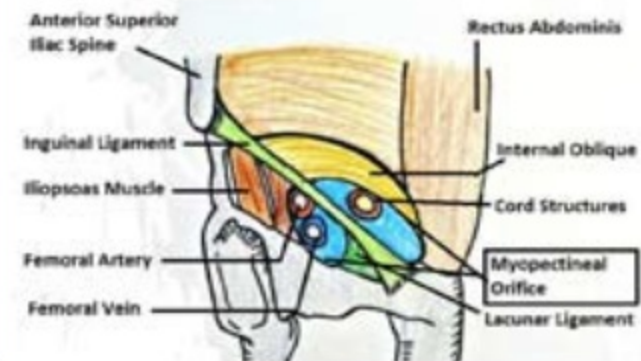
MC in ♀ > ♂

Femoral: Below and lateral to PT

Inguinal: Above and medial to PT

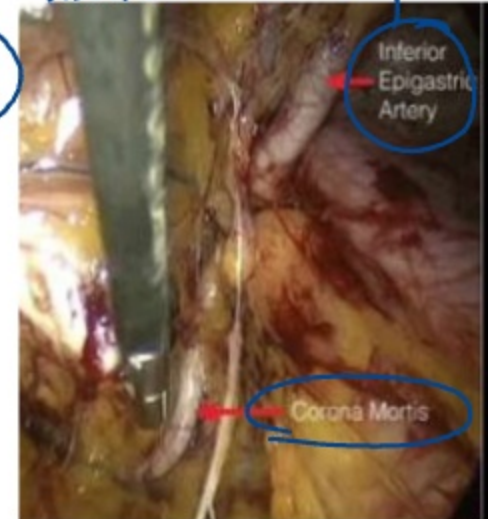
MYOPECTINEAL ORIFICE: Fouchard
Rectus abdominis
Conjoint tendon
Iliopsoas muscle
Lacunar ligament

F/D/I



obt A
↳ int iliac

"CORONA MORTIS"
aberrant obt A



Other Hernias

Midline (M) EHS

- Subxiphoidal – M1
- Epigastric – M2
- Umbilical – M3 *aa*
- Infraumbilical – M4
- Suprapubic – M5

Lateral (L)

- Subcostal – L1
- Flank – L2
- Iliac – L3
- Lumbar – L4

P = Primary hernia EHS

R = Recurrent hernia

0 = No hernia detectable

1 = < 1.5 cm (one finger)

2 = < 3 cm (two fingers)

3 = > 3 cm (more than two fingers)

L = Lateral / Indirect hernia

M = Medial / Direct hernia

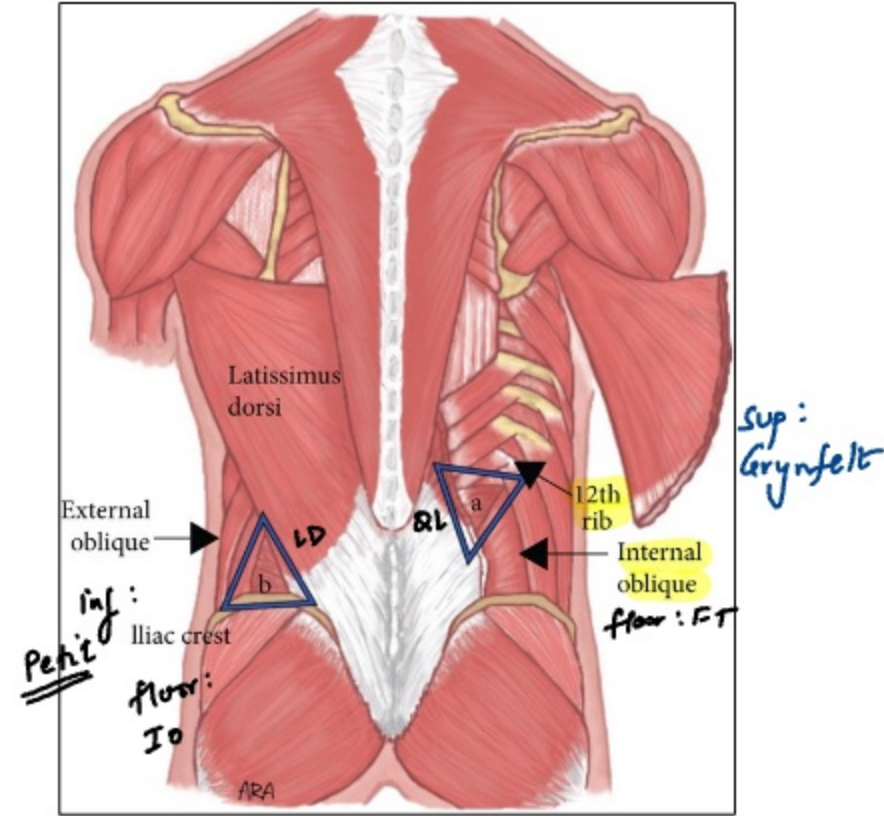
F = Femoral hernia

L P 2

• **Infraumbilical, above arcuate line: Spigelian**

- Litter *aa* - Meckel's *aa*
- Amyand - appendix
- Gibson - hernia + hydrocele
- Pantaloon → DH + Indirect H
- Sliding - sigmoid colon
- Richter - wall of bowel → diarrhea
- Ogilvie - congenital direct H
- Maydl *aa* → necrosis: apex

Contact admin
Join our group



Omentocoele VS Enterocoele

1st - reduce easily

"doughy"

1st - reduce difficult

"tympanic"

Hernia Surgeries

Congenital inguinal hernia/ hydrocele (Patent processus vaginalis) : *Herniorrhaphy*

Conjoint tendon sutured to the inguinal ligament *BASSINI*

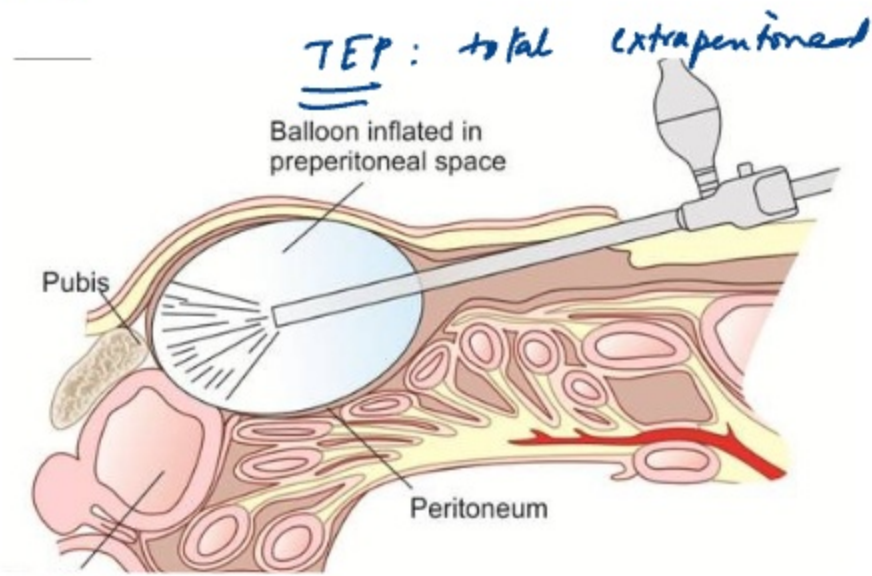
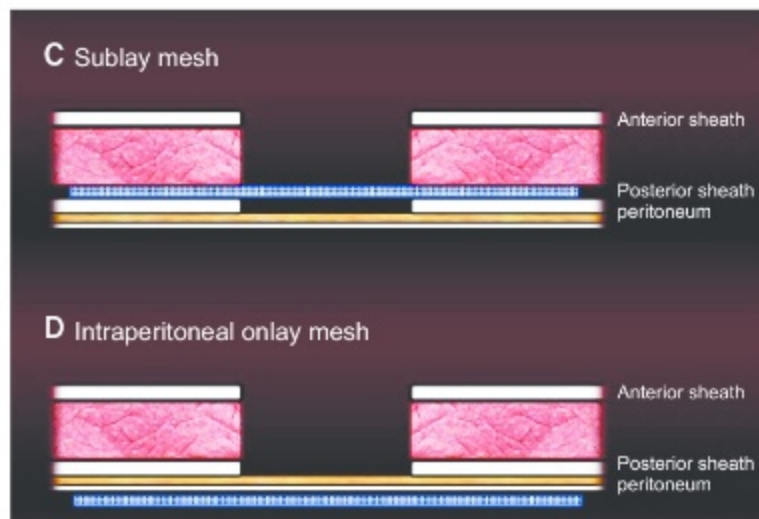
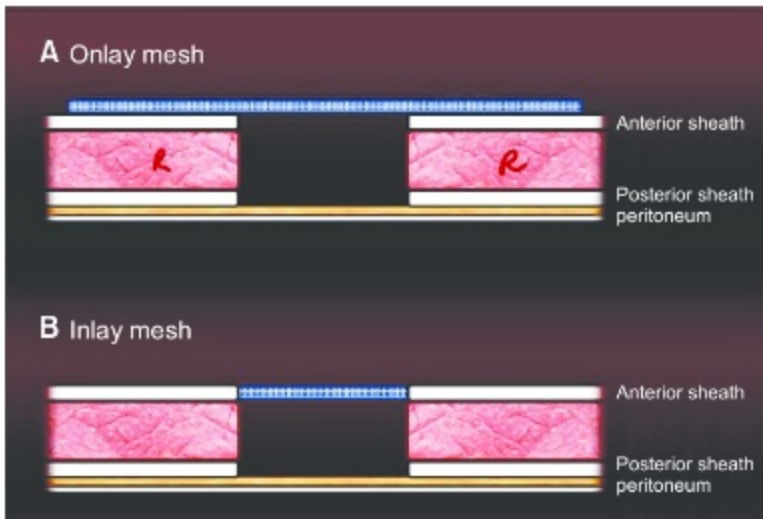
Four-layer imbrication/ double-breasting of the transversalis fascia *SHOULDICE*

Strip from the external oblique aponeurosis *DESARDA*

Tension-free, suturing the mesh to the inguinal ligament and conjoint tendon *Lichtenstein*

Herniorrhaphy

Appropriate mesh for hernia: *Prolene - Low wt / Large pore*



TAPP: transabdo pre-peritoneum

Transplant Surgery

UW solution :

Adenosine
Allopurinol
Hydroxyethyl starch (HES)
Glutathione
Lactobionate



Warm Ischemia time: Time after devascularization before it is cooled *~ 30 min*

Cold ischemia time: Time organ can be preserved in cold preservation solution

Min (3-6hrs)- *♥ > Lung / SI*

Max(24-36hrs)- *kidney*

	Maastricht <i>DRACULA</i> <i>=====</i>	DCD Situation
I	Dead on arrival	Uncontrolled
II	Unsuccessful resuscitation	Uncontrolled
III	Anticipated cardiac arrest	Controlled
IV	Cardiac arrest in brain dead donor	Controlled
V	Unexpected cardiac arrest in a hospital inpatient	Uncontrolled

Renal transplant

MC indication adult *DM*

MC indication child *glomerulonephritis*

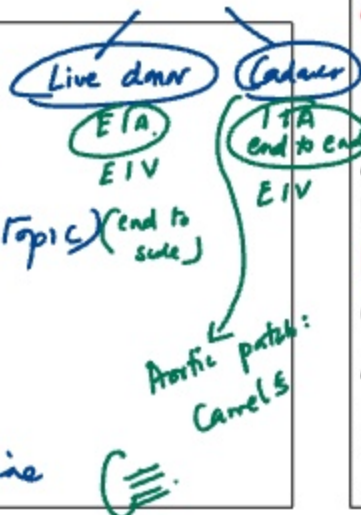
Placed in RIF extraperitoneal (*Helicotropic*) *(end to side)*

MC infection(3-6mon) : *CMV*

MC malignancy: *sq cc*

PTLD: *EBV*

Graft dysfunction: *>10% creat baseline*



Contraindications to Renal Transplantation

Absolute

Untreated malignancy

Active infection / HIV

Any condition with a life expectancy < 2 years

Malignant melanoma within the previous 5 years

Relative

Co-morbidities (e.g., diabetes mellitus/ obesity)

Age > 65 years

HBV or HCV infection

Previous malignancy

Liver Transplant

MC indication adult: *Cirrhosis - Hepc > alcohol*

MC indication child: *EHBA*

TYPES OF LT:

Split LT: *Lt → child Rt - adult*

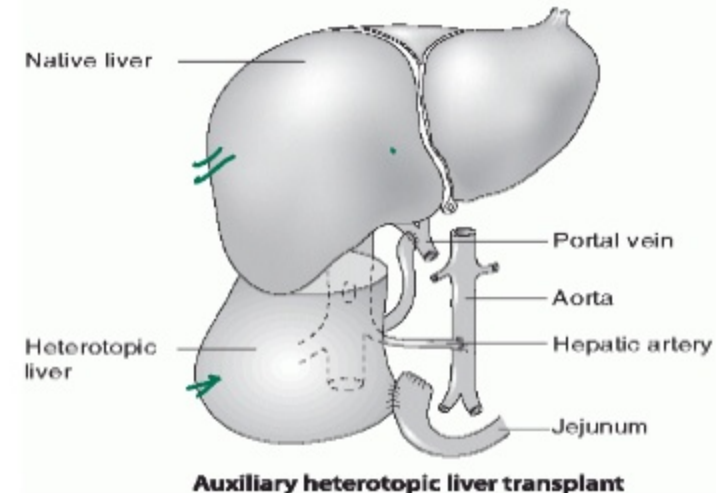
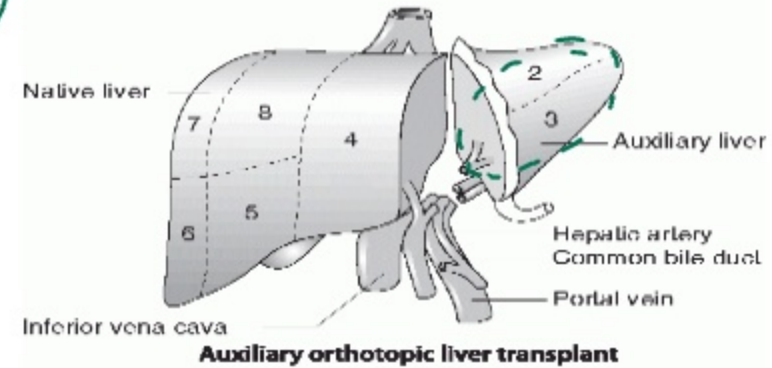
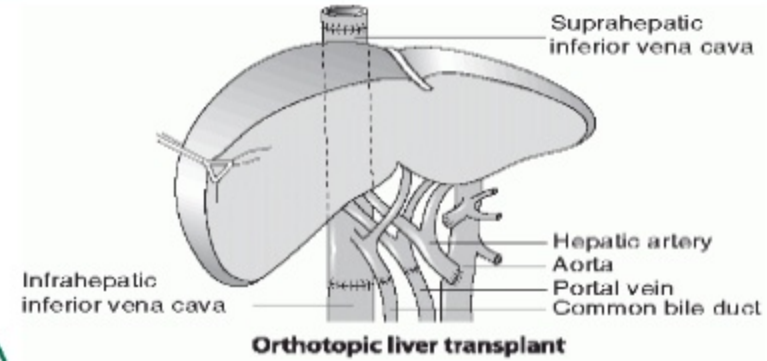
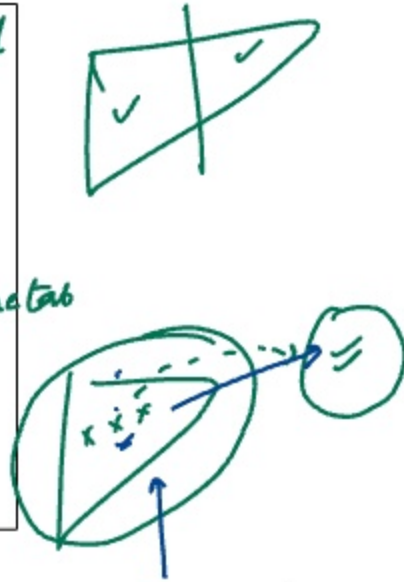
HALT: *Heterotopic auxiliary*

APOLT: *Auxiliary partial orthotopic → reversible metab*

Domino LT: *MSUD/ amyloidosis*

Orthotopic LT Sequence:

Suprahep IVC - Infrahep IVC - PV - Hep A - CBD



Contraindications to Liver Transplantation

Absolute

- Uncontrolled sepsis
- Active alcohol or substance abuse
- Advanced cardiac or pulmonary disease
- Extra-hepatic malignancy (**Except:** *Colorectal (a)*)

Relative

- Multi-system organ failure with fulminant liver failure
- Active infection
- Advanced age, frailty, or extensive co-morbidities
- Medication-resistant HBV cirrhosis