Liver surgery

E J Arteen
FRCSI

* The liver lobules is hexagonal → زي السداسي
- in the middle there is central vein..
- in peripheral there is portal triad [hepatic duct - portal vein - hepatic Artery]...

* 70% of portal vein supply the liver..
* 30% of hepatic vein " " "...
→ But O_2 supply for liver → 50% from portal vein..
→ 50% from hepatic vein..

* Portal vein:- SMA + splenic Artery..
↳ 8cm in length - 1cm in wideth-

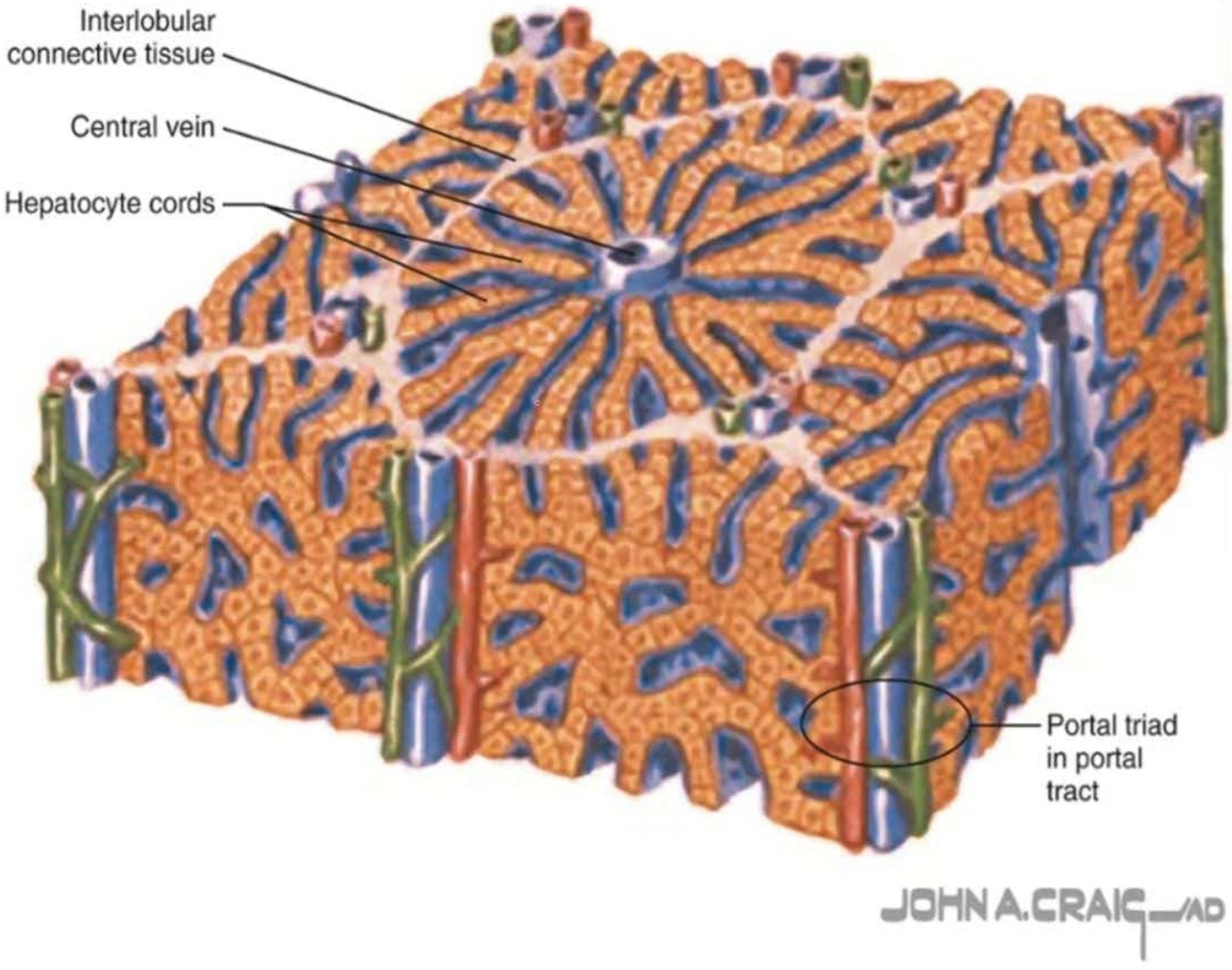
SURGICAL ANATOMY

- liver is the largest gland in the body (1.5 Kg), وزن essential for life .
  (we can't live without liver or SI..)
- The functional unit is the ***Liver Lobule.***
  (Hepatocytes around a Central vein separated by Blood Sinusoids).
  ↳ in the middle..
- The sinusoids are wide fenestrated channels, contain large Kupffer cells. immunity cell..
- Rt. Lobe = ¾ the liver, Lt. lobe = ¼
- Covered by a CT sheath (***Glisson Capsule***).
- ***Hepatic vascular system :***
  - 1.5 L / minute (27% of CO) , 1L from portal vein (deoxygenated blood), 500ml from hepatic artery.
  - Rich lymphatic drainage.

* The Boundries of the Portal vein:- ↳ post in the portal triad...
- Anterior + If there is hepatic Artery...
- Anterior + Rt there is Bile duct...

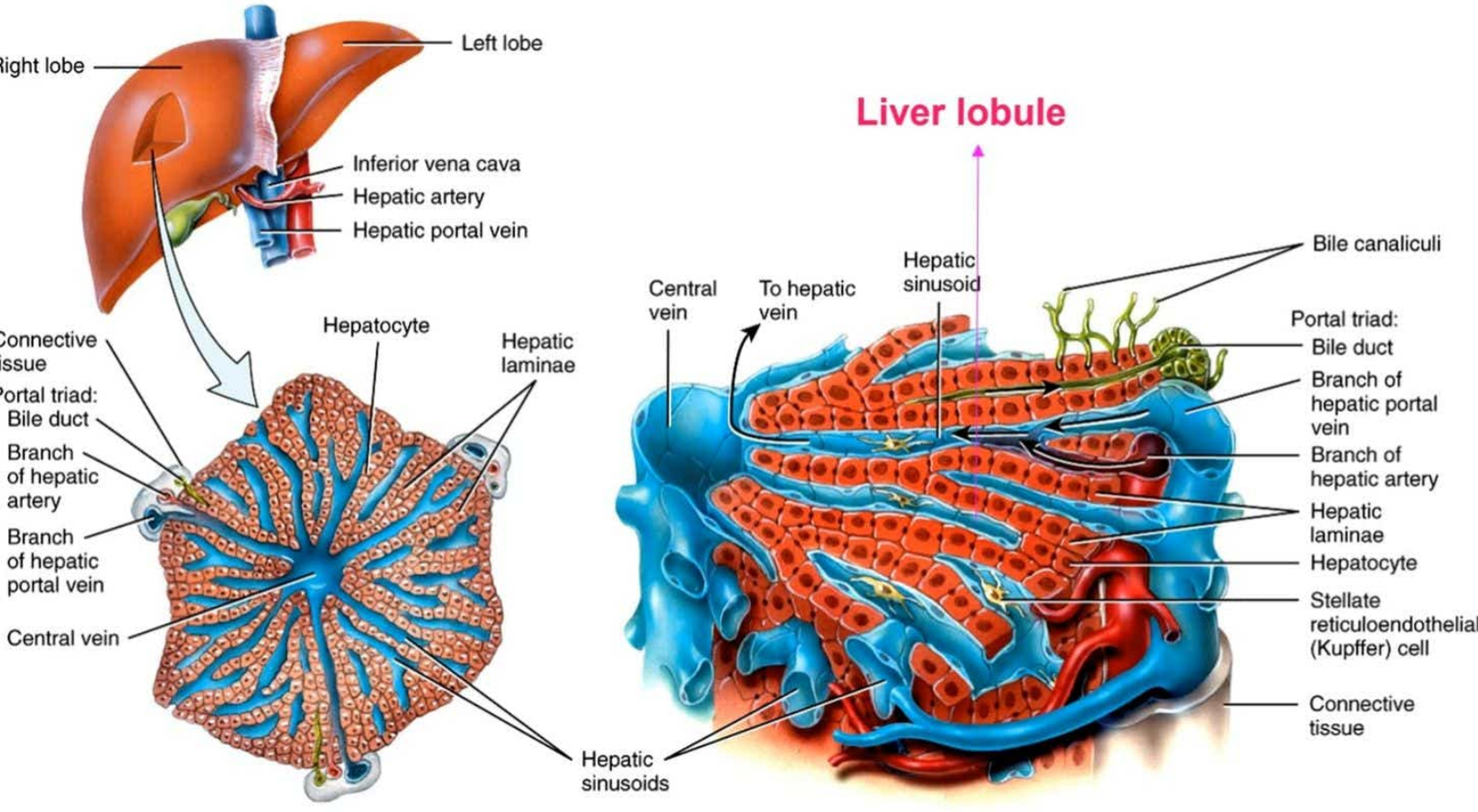
* There is 50000 - 100000 lobules in the liver...

* The falciform ligament :- divid the liver into lf 1/4 liver and Rt 3/4 liver...
→ The true liver lf - Rt [1/2 of the liver divided from the fossa of the gall bladder to the lf side of the IVC] : the Rt lobe 55-60% and lf lobe 45-40% ...



Hepatic Lobule. Liver arranged as series of hexagonal lobules, each composed of series of hepatocyte cords (plates) interspersed with sinusoids. Each lobule surrounds a central vein and is bounded by 6 peripheral portal triads (low magnification).

Histology of the Liver



(a) Overview of histological components of liver

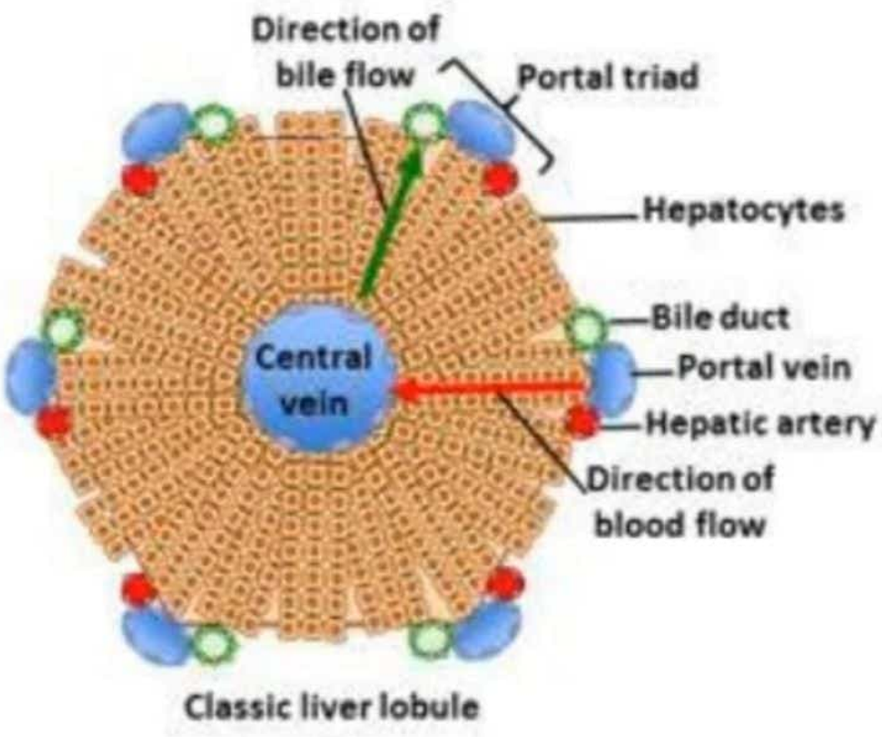
(b) Details of histological components of liver

Figure 24.15ab Tortora - PAP 12/e

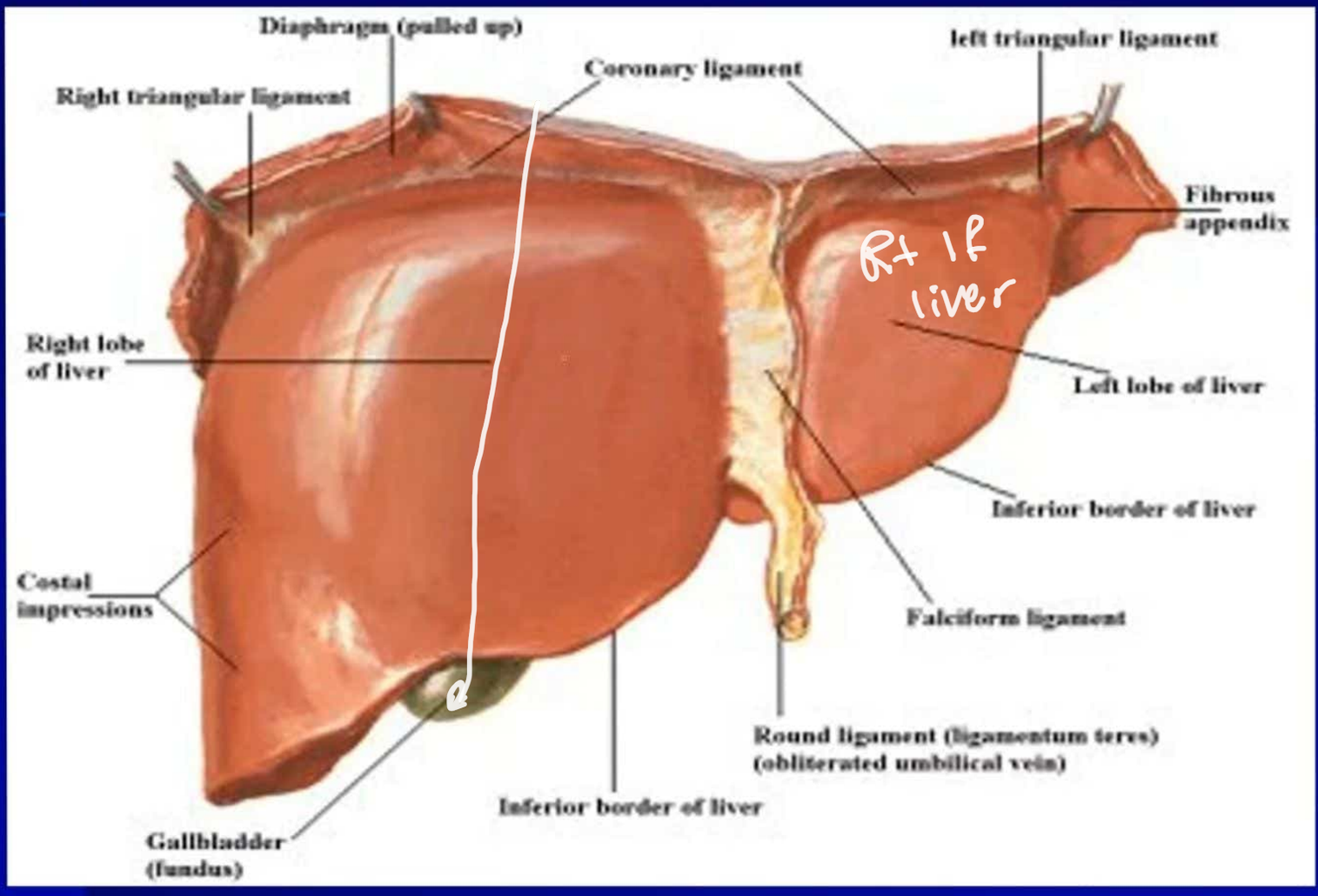
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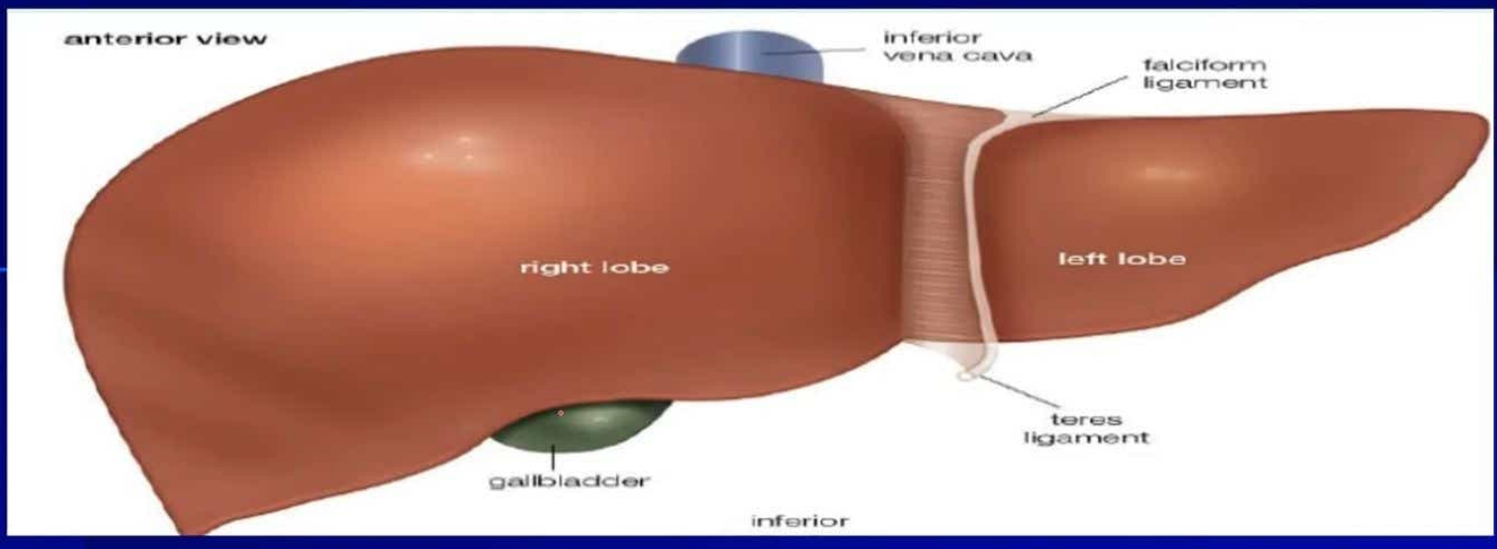
2. Hepatic Lobules

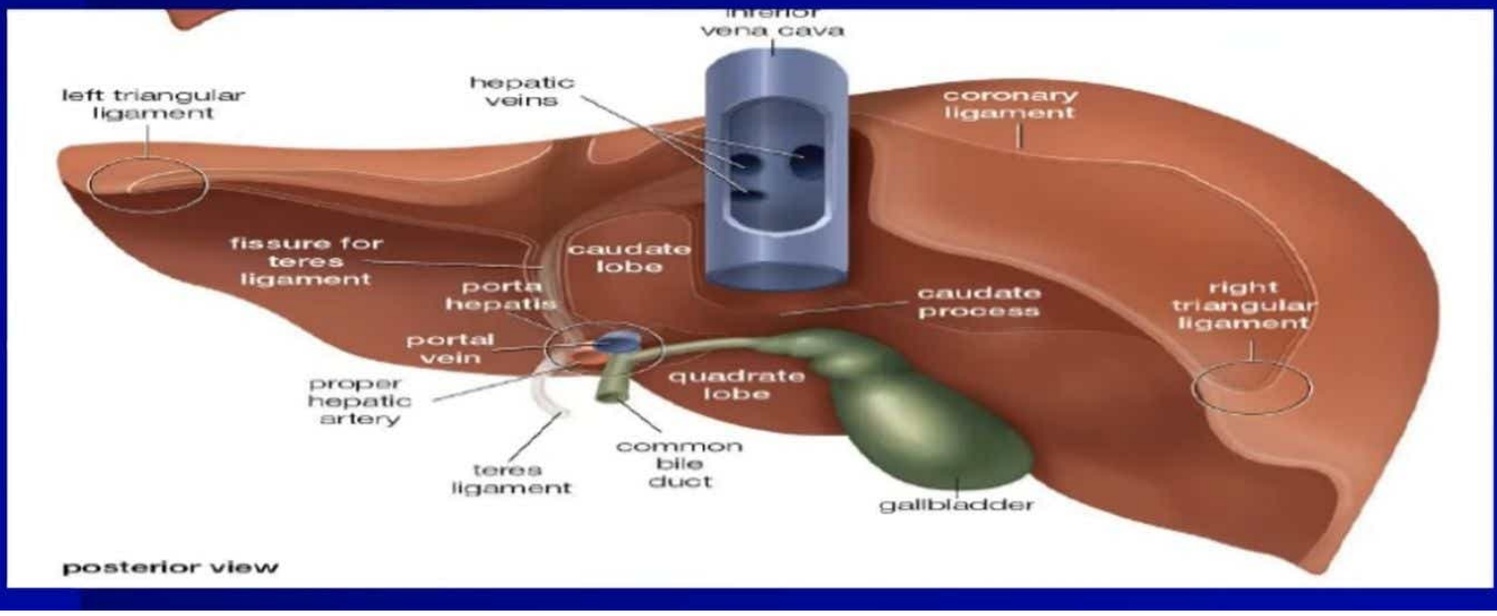
1. Hepatic lobule is the structural and functional unit of liver.
2. There are about 50,000 to 100,000 lobules in the liver.
3. The lobule is a **honeycomb-like structure** and it is made up of liver cells called hepatocytes.



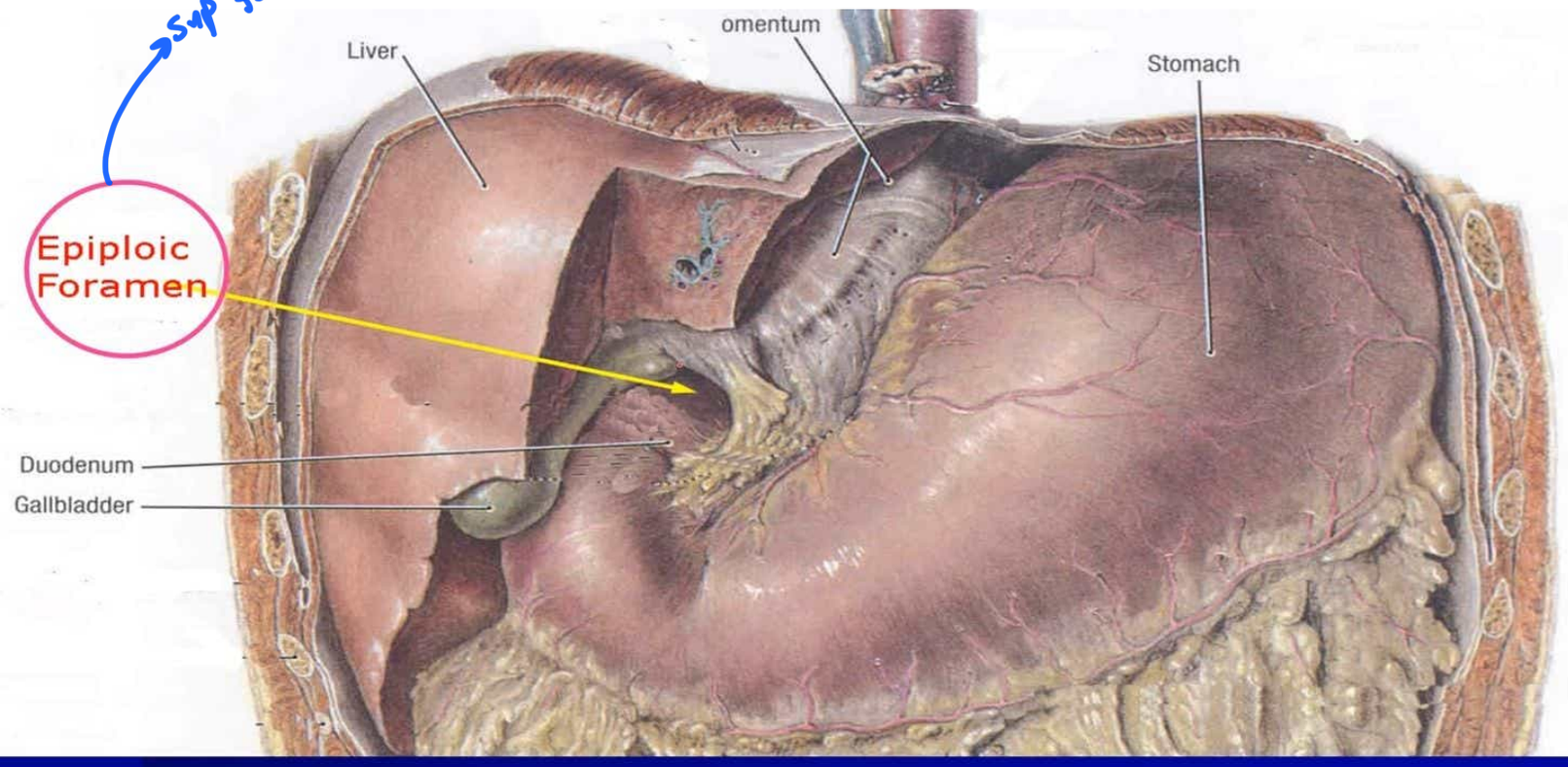
Classic liver lobule


Diaphragm (pulled up)
Coronary ligament
left triangular ligament
Right triangular ligament
Fibrous appendix
Rt lf liver
Right lobe of liver
Left lobe of liver
Inferior border of liver
Costal impressions
Falciform ligament
Round ligament (ligamentum teres) (obliterated umbilical vein)
Inferior border of liver
Gallbladder (fundus)


anterior view
inferior vena cava
falciform ligament
right lobe
left lobe
teres ligament
gallbladder
inferior


inferior vena cava
left triangular ligament
hepatic veins
coronary ligament
fissure for teres ligament
caudate lobe
porta hepatis
caudate process
right triangular ligament
portal vein
proper hepatic artery
quadrate lobe
common bile duct
teres ligament
gallbladder
posterior view

Sup to it :- hepatic Art. - Portal vein.



- The greater sac communicates with the omental bursa through the ***Epiploic foramen (of Winslow)***. in free border of lesser omentum.
- The epiploic foramen can be located by running a finger along the edge of the gall bladder to the free edge of the lesser omentum.
- The epiploic foramen usually admits two fingers.

* The epiploic foramen admitt one or two finger
* in the free border of lesser omintum

→ presented the portal vein and hepatic A-Bile duct [above my fingers] and IVC below it...

SURGICAL ANATOMY cont…

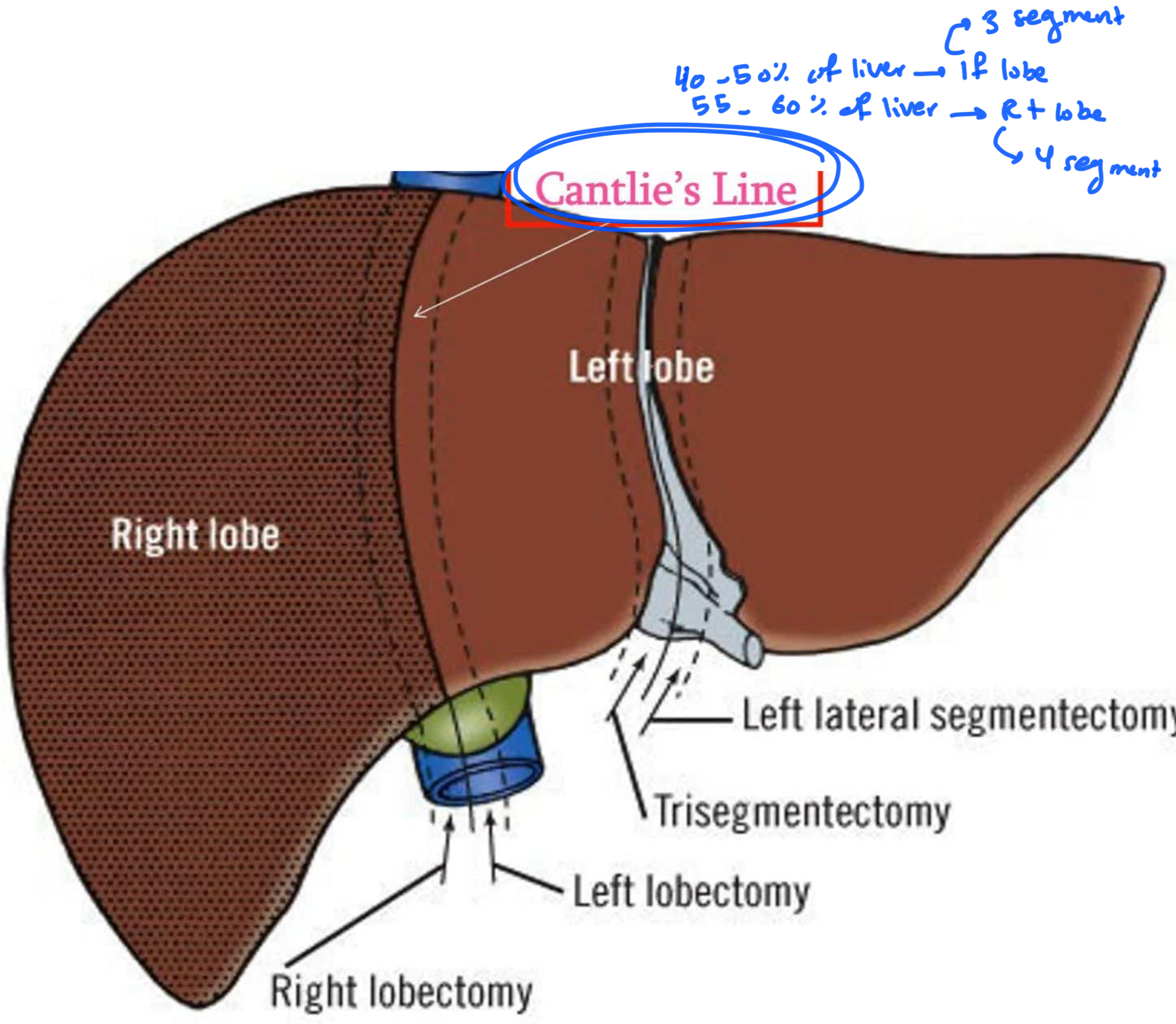
- **Cantlie's Line:** The overall anatomy of the liver is divided into a ***Functional Right and Left lobes*** along the line *between the gall bladder fossa and the middle hepatic vein* ***(8 Segments).***
- ***Surgical segments :*** Each of these segments can be considered as a ***Functional Unit***, with a branch of the hepatic artery, portal vein and bile duct, and drained by a branch of the hepatic vein.

* segment 2-3-4 → in lf lobe… (a, b → quadrate lobe…)
* segment 1 → most post. called quaclate lobe…
* segment 5-6-7-8 → Rt lobe…
* if there is tumor mets in quaclate lobe difficult to remove it… (deep [IVC & ins])
* segment 5-8 ⇒ Anterior
* segment 6-7 ⇒ posterior…

* There is 3 hepatic vein:- lf - middle - Rt hepatic vein...

→ in 80% of cases the middle hepatic vein drain in the lf hepatic vein...

→ in 20% of cases the middle hepatic vein seperate...



- Cancer colon metz to liver — on dignosis 20% - 25%
  — over all 50 - 60%

[stage IV of colon cancer mean liver metz]...

↳ Best way to cure your pt is lives resection...

* if we don't resict the metz segement the pt will die.

* in liver surgery we can remove 6 segment in pt... [if the liver is healthy]...

لـ شرط ال 2 الضايلين يكونوا طبيعيين وماعندهم حاجة...

* The supradiaphragmatic IVC lenght is:- 0.5 ich then drain in the Rt Atrium..

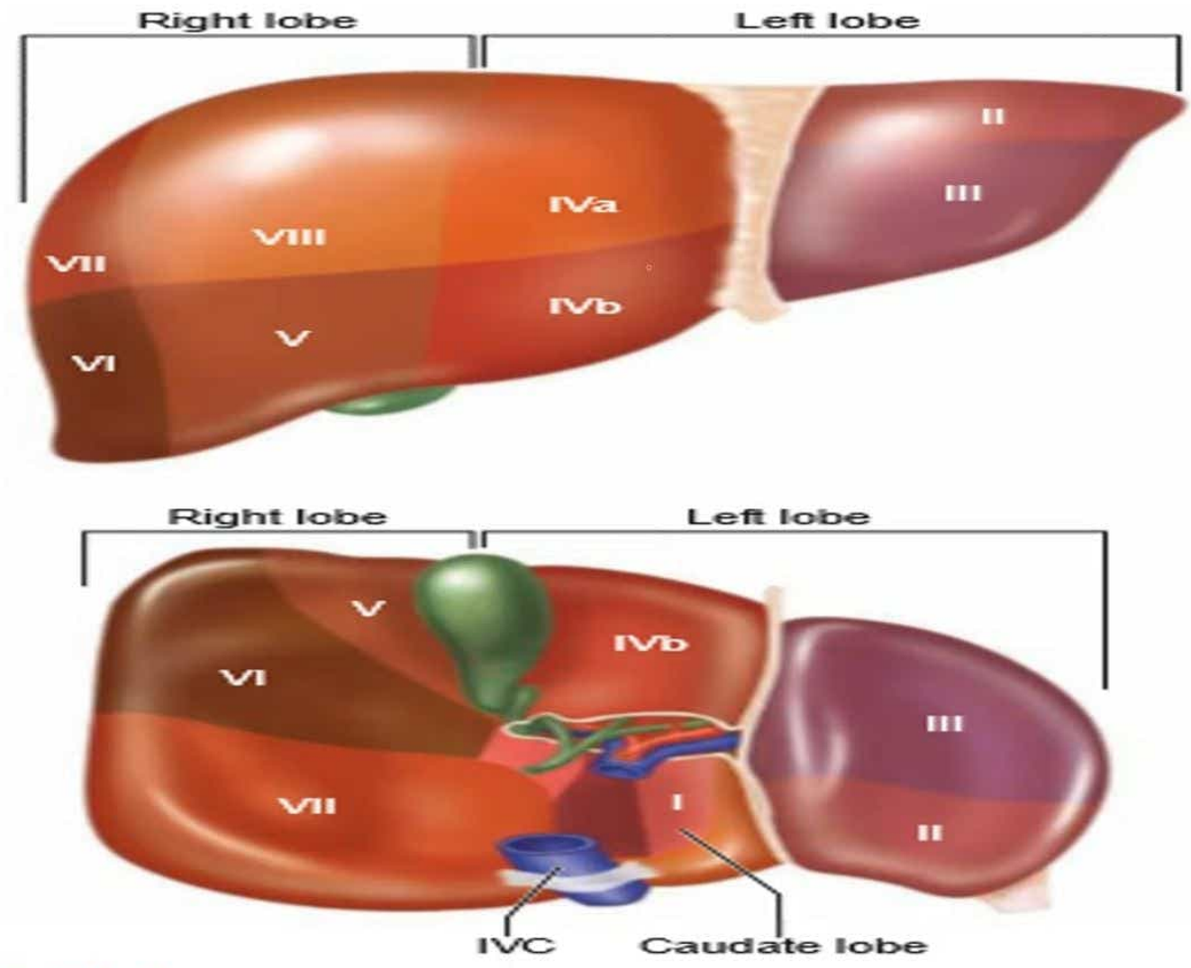
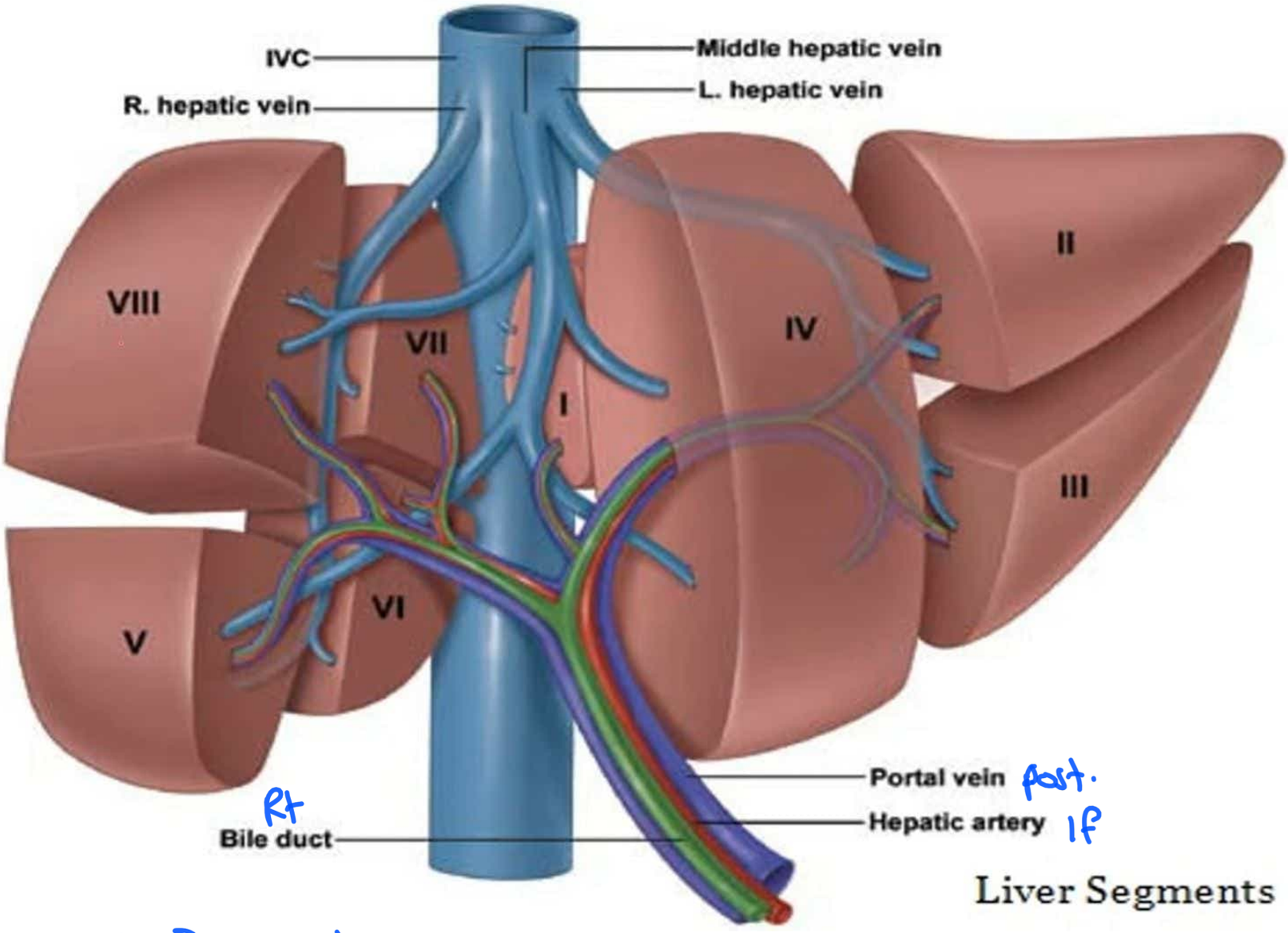
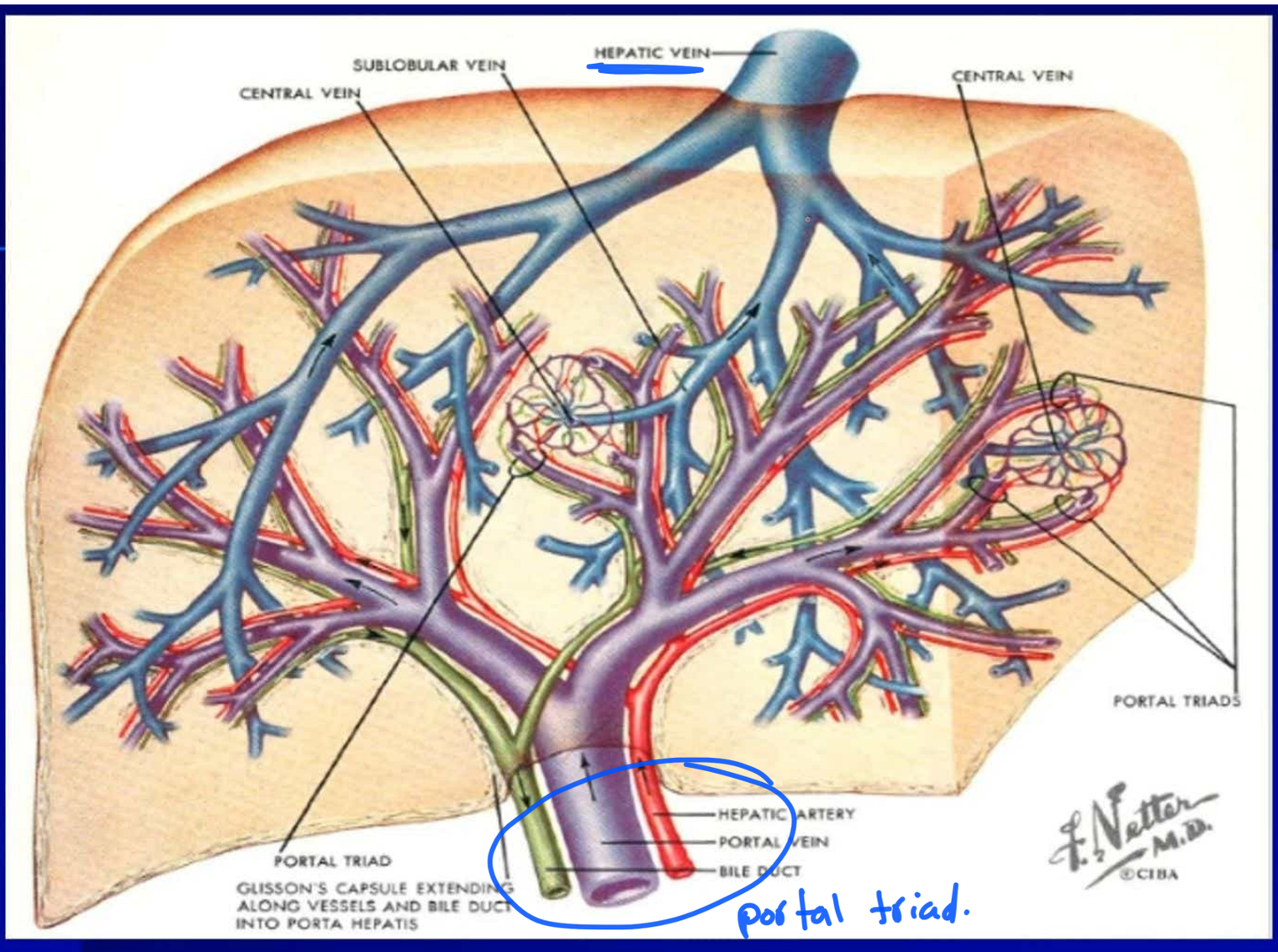


Figure 31-3. Couinaud's liver segments (I through VIII) numbered in a clockwise manner. The left lobe includes segments II to IV, the right lobe includes segments V to VIII, and the caudate lobe is segment I. IVC = inferior vena cava.



5, 8 → ant.

6, 7 → post



portal triad.

* 80% of

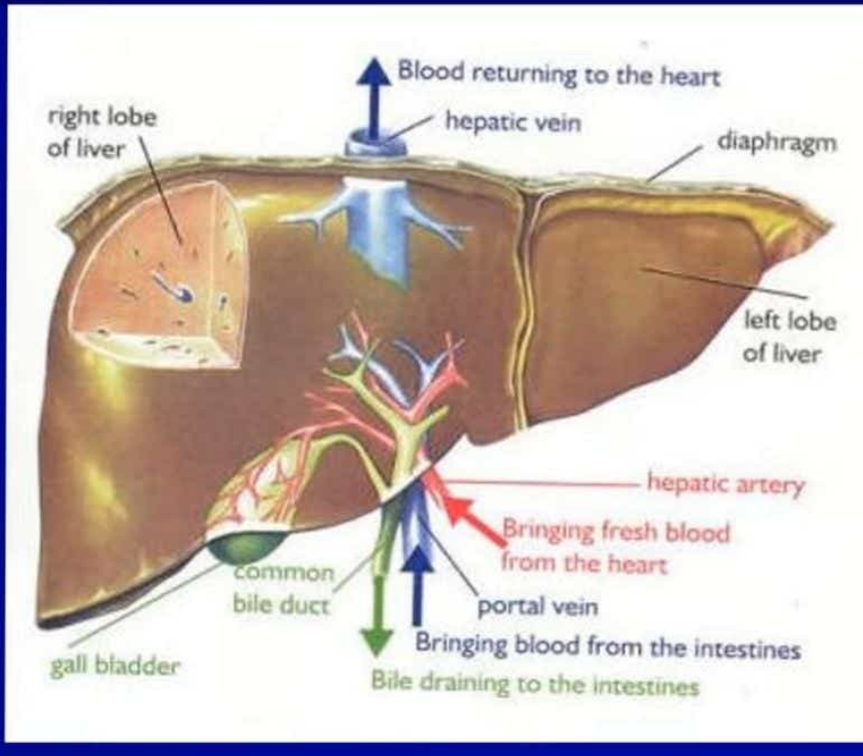
- middle hepatic vein seperatly. [caudly]

SURGICAL ANATOMY cont…

- ***Dual*** **Blood supply**

1. **Hepatic artery** ***30%***
2. **Portal vein** ***70%***
3. **Hepatic veins**

- **Regeneration ability.**



* There is 2 important composition of the Bile:- 1- Bile salt for digestion of fat
2. Bilirubin

* The fx of the Bile:- 1- digestion of fat by Bile salt...
2- to get rid of waste product...

↓ lipase ↓ bile salt → no digestion of fat

* without bile salt 50-60% of fat loss in stole [steatorhea].

Functions of the liver

1. Formation of Bile , B salts & Bilirubin. , cholesterol metabolism excreted by bile
2. Synthesis of Albumin , Prothrombin & Fibrinogen. (Prothrombin = factor II ; Fibrinogen = factor I ; all of Albumin synthetized in the liver... ; all toxic materials)
3. CHO metabolism & storage of glycogen.
4. Formation of cholesterol & phospholipids
5. Formation of urea .
6. Heat production , maintaining core body temp.
7. Reticulo - endothelial activity Kupffer cells. (immunity ↓)

* malabsorption of fat in celiac dz → the fat will become FA and monosaccharide. in stole

* malabsorption of fat due to ↓ Bile salt or ↓ lipase → undigested fat in stool.

* liver fx test asseset liver injury. [ALT. AST - ALP - GGT - 5' nucleatase]
true liver fx test → albumen - PT or INR

* Ingestrectomy → there is B12 malabsorption...
* In terminal ileum resiction → there is B12 malabsorption...
* In B12 deficiancy anemia → there is megaloblast [MCV > 100]...
  ∟ indicate terminal ileum or gastric problem...
* If the MCV < 80 [microblastic Anemia] → indicate iron deficiancy anemia
  [there is chronic Blood loss - ceccum cancer - Colon cancer... etc]

Functions of the liver cont.....

8. Storage of Vit B12 & Vita A & vit D.
   فيتامين ← absorped in terminal ileum and need the intrensic factor to be absorped...
9. Storage of iron & copper.
10. Detoxication of drugs.
11. Destruction of bacteria specially Gam +ve cocci.
12. PH balance and correction of lactic acidosis.
13. Removal of gut endotoxins and foreign antigens.

* unconjugated (indirect) Bill → fat soluble so need carrier [bind with Albumin]...
* The Jaundice clinically appear if there is increase in Bill 2-3 times [3 mg Bill]
  But if it less called subclinical jaundice...
* The Albumin and pT asses the realy liver fx...
  & normaly 12 sec...
* α feto protein in 40% of HCC increased..
* if ALT, AST in thosands indicate Acute liver injury [fatal]...

Methods of investigations

direct / indirect > total ← direct 20% of total

- S. Bilirubin T/D 5-17 µmol / l
- **Liver function tests (LFTs).** (not asses the liver fx but asses the liver injury)
- S. Alkaline phosphatase (bone, liver, placenta) 35-130 IU / l — GGT بيزيد بس
- S. Albumin indicate liver fx 35-50 g / l
- Serum Aspartate Transaminase (AST) & Alanine Transaminase (ALT) 5-40 IU/l
- Gama Glutamyl Transferees' 0-48 IU / l
- Prothrombin Time (indicater liver fx) INR 12-16 sec

Prothrombin Time → 12sec.

INR → ① if >1.4 don't do surgery.. if emergancy give him FFP..etc

* The child Pugh classification for liver cillhosis [pT_ Albumin - Bill - Ascitis hepatic enchephalopathy]

متخلكها بتوفي هاد المريض بتحمل بنج العمليات الجراحية او لا

- The mortality rate in class A [5-6 points]:- 10%
- The mortality rate in class B :- 30%
- The mortality rate in class C :- 75%
- The mortality rate in class D :- 80%

→ [in elective surgery]

[if there is ≥ 10 point never do the surgery]...

Methods of investigations cont…

- **Alpha fetoprotien** elevated in HCC → 40% ↑ α fetoprotein. 60% normal
- **Specific tests hemochromatosis, Wilson's dis…**

The standard method of Monitoring liver function in patients with Chronic liver disease is serial measurement of :

1. **Bilirubin.** ✓ the hepatocyte do → active uptake of Bill [unco.] to liver; conjugation; excretion..
2. **Albumin .** ✓
3. **Prothrombin time .** ✓

→ to Know the mortality rate

Child's- Pugh classification of hepatocellular function

Clinical and Lab Criteria	Points*		
	1	2	3
Encephalopathy	None	Mild to moderate (grade 1 or 2)	Severe (grade 3 or 4)
Ascites	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
Prothrombin time			
Seconds prolonged	<4	4-6	>6
International normalized ratio	<1.7	1.7-2.3	>2.3

Child-Turcotte-Pugh Class obtained by adding score for each parameter (total points)

Class A = 5 to 6 points (least severe liver disease) → mortality rate 15-10 %

Class B = 7 to 9 points (moderately severe liver disease) → mortality rate 30%.

Class C = 10 to 15 points (most severe liver disease) → mortality rate 75- 80%.

] → in elective surgery

if the score [< 10 do surgery...
[> 10 don't do surgery..

Imaging techniques

- **US:** first-line test owing to its safety & availability. (easy to do it [used as FAST])
- It is excellent for diagnosing **Biliary Pathology** and **Focal liver lesions +FAST.** ([GB stone - Cholecystitis - liver hemiangioma lesion or cyst] * Commonest liver problem is liver cyst... 2nd " " " hemangioma...)
- **CT + CT Cholonography:** current '**Gold Standard**' (Triple-Phase, Multi-Slice, Spiral). (just for Stage tumor in hepato biliary.. gold method fo acute pancreatitis Dx:- hyda scan.)
- **MRI:** Alternative to spiral CT.
- **MRCP:** First-line, non-invasive cholangiography. (non invasive so more benefit than ERCP.. [diagnostic])
- **ERCP:** If Endoscopic intervention is anticipated. (through the liver...)
- **PTC :** When ERCP impossible or failed . (theraputic)
- **Angiography:** ? Vasc involvement by tumor.
- **Nuclear medicine scan: PET CT** diff. benign from malig.
- **Laparoscopy:** ? peritoneal tumor superficial mets. (for staging the Cancer.)

Lo for all gastric or pancreatic Cancer.

FAST → focus assessment sonography of trauma..

dis advantage of CT cholangiography:- not effective in → ↑Bill... → dilatation of Bile duct.. → Jaundice pt...

secretion in the hepatocyte بيجي من الدم ثم يفرز ↵
then to the Bile → if there shadow in the Bile duct indicate Biliary store...

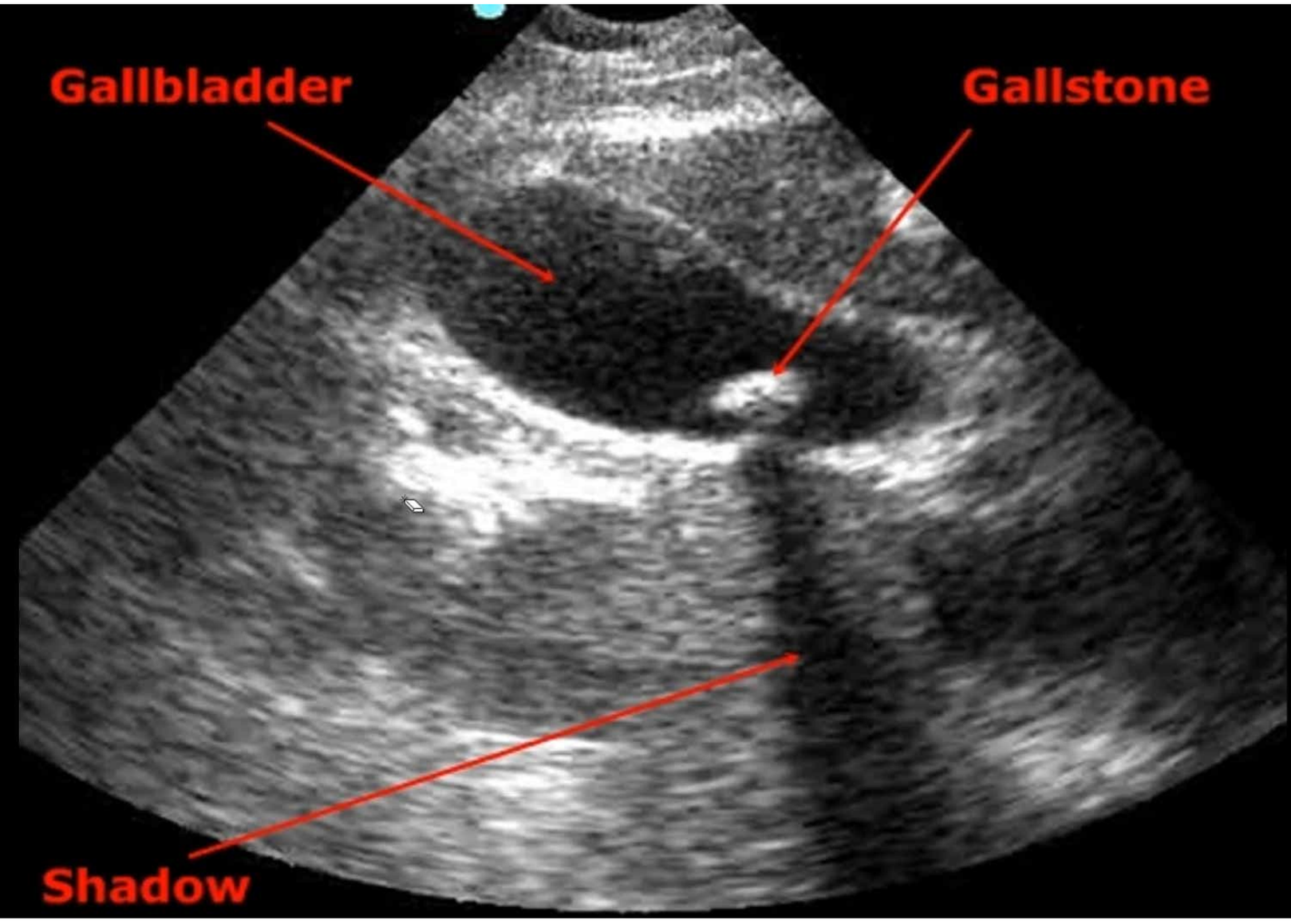
CT cholangiography بتشوف هل hepatocyte fx or not + to see if there is Bile leake or filling defect + Biliary anatomy + Bile duct store

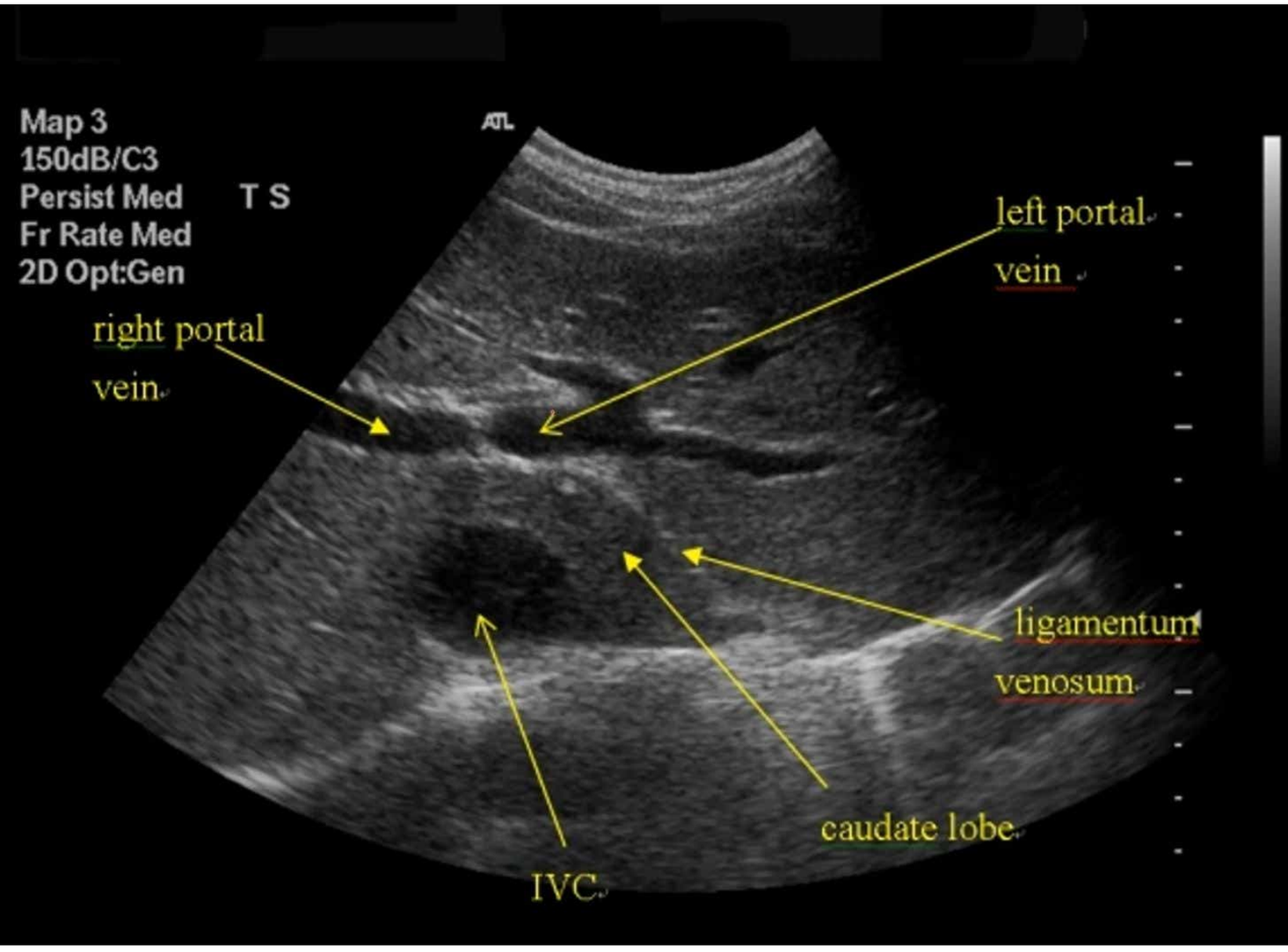
* Hide scan done to see if there is choke cystitis or cystic duct obstruction...

* 10% of pancreatic cancer are operable...
  ↳ 90% not operable so they died with 1year...

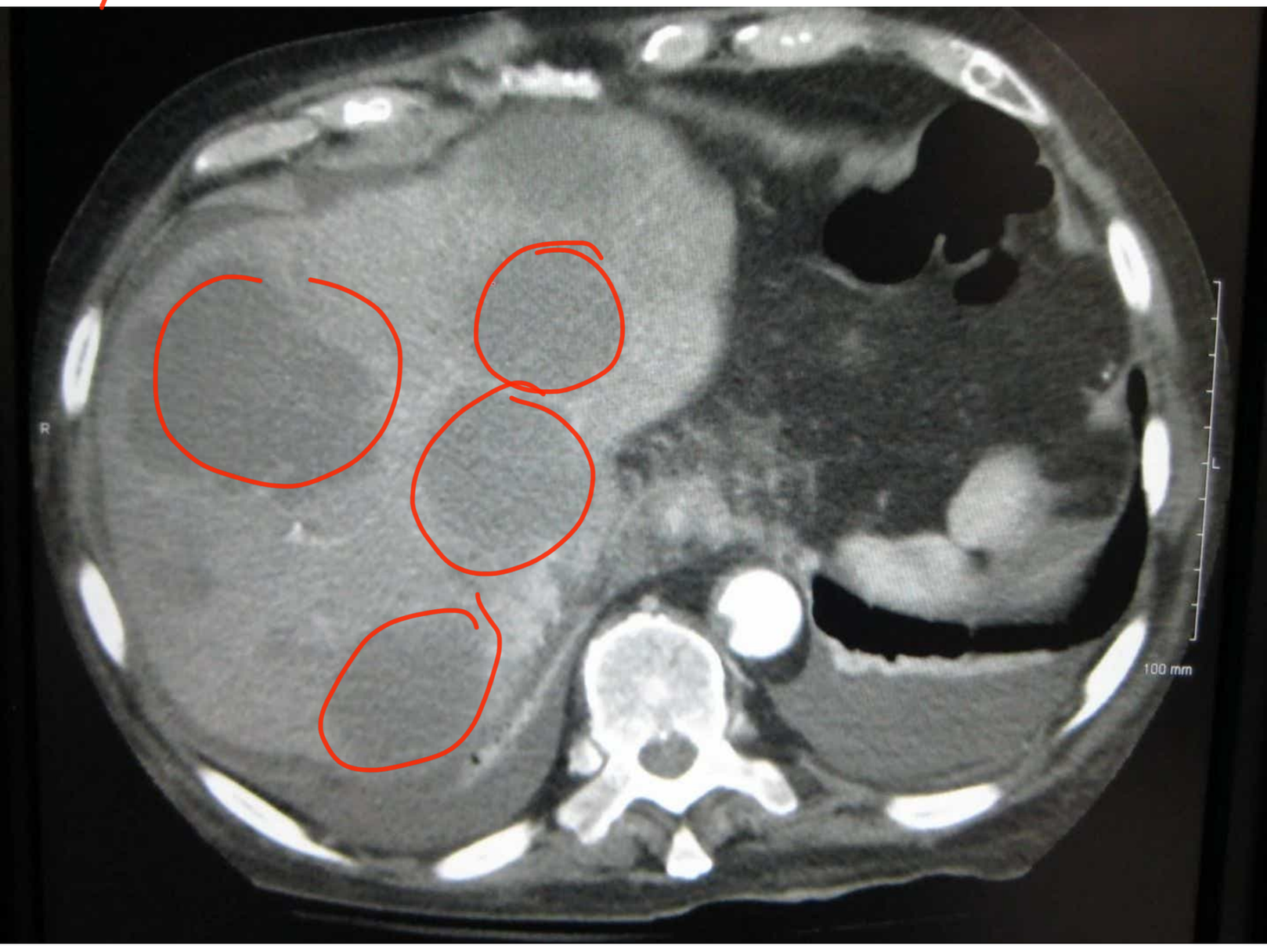
* The diameter of Gall Bladder is 2-3 mm...
  ↳ if it > 3 mm indicate Acute cholycystitis...

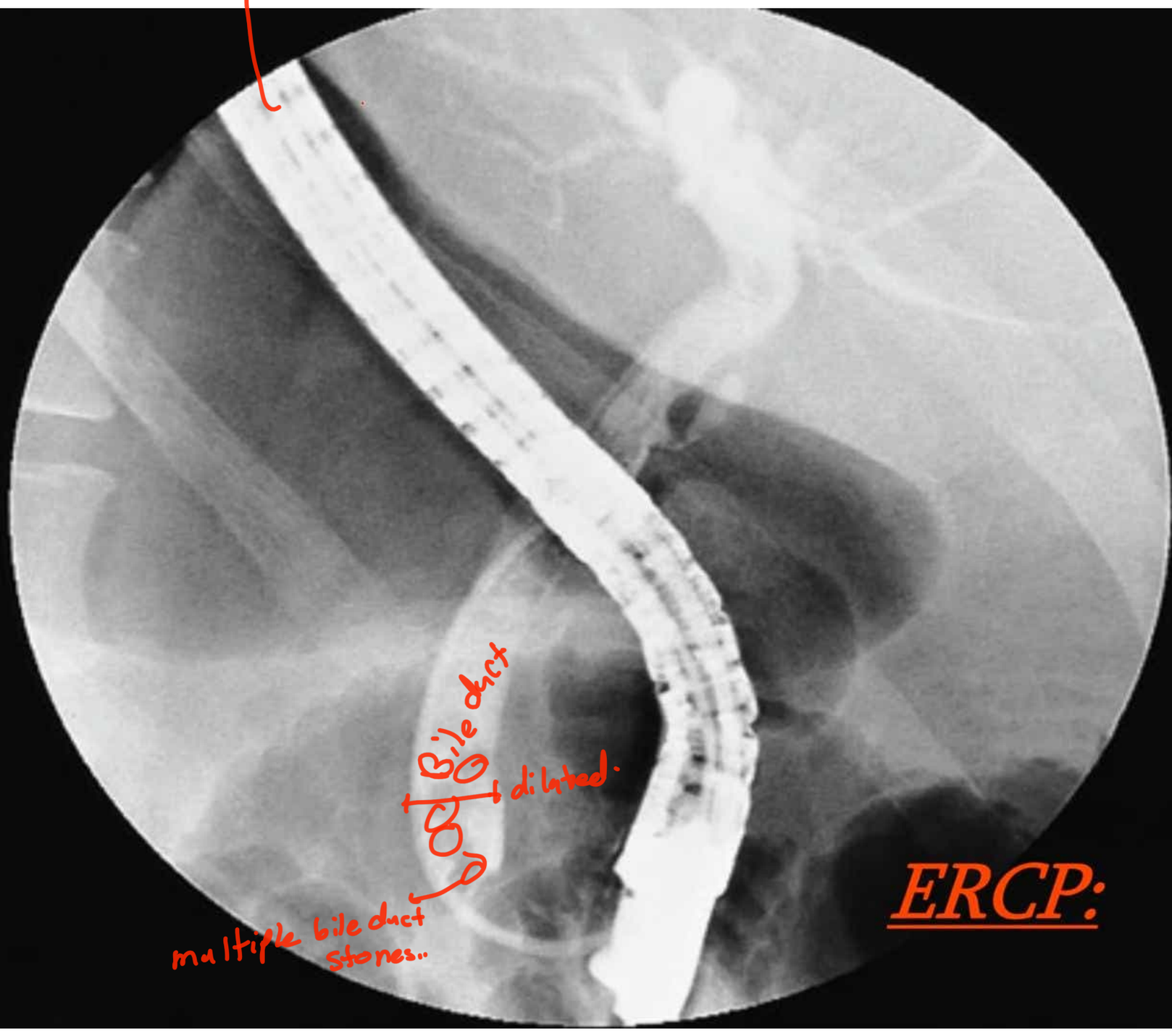
* Stone of Distal Bile duct → 2ry in 90-95%
  → 1ry in 5-10%

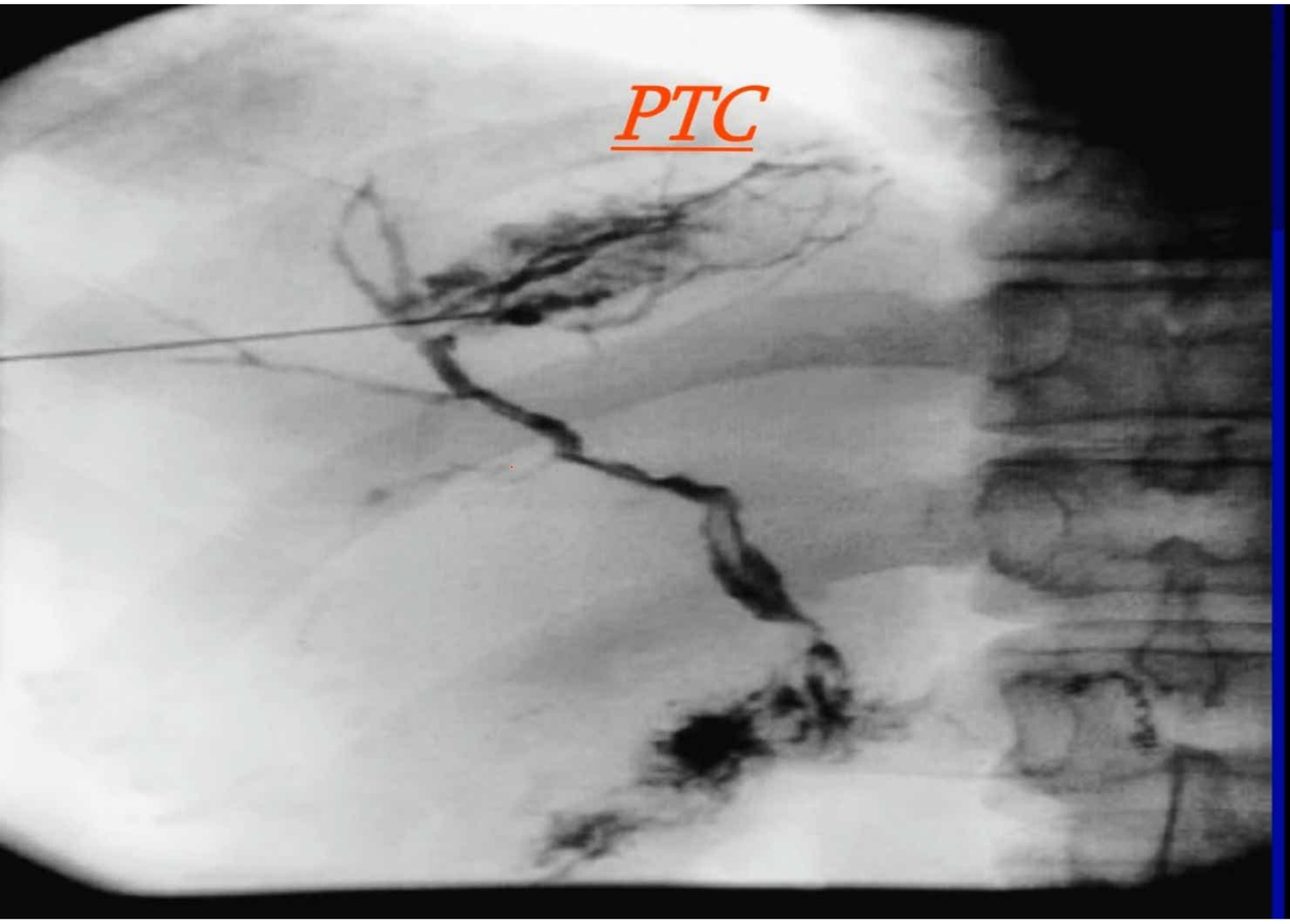



Map 3
150dB/C3
Persist Med
Fr Rate Med
2D Opt:Gen
T S
ATL
left portal vein
right portal vein
ligamentum venosum
caudate lobe
IVC

Multiple mets.




endoscope
Bile duct
dilated.
multiple bile duct stones..
ERCP:


PTC

Jaundice

- **Definition:** Yellow discoloration of skin and mucus membranes due to presence of excess level of bilirubin (Free or Conjugated).

	Hemolytic jaundice	Hepatocellular J	Obstructive J
Causes	Excessive hemolysis of RBCS Hemolytic anemia, drugs, Autoimmune disease	Liver disease Infection viral hepatitis Chemicals chloroform Drugs	Cholestasis Intrahepatic cirrhosis Extra-hepatic GBS Carcinoma stricture
Mechanism	↑ Production of free bill	Liver cannot uptake Conjugate and excrete bill	Liver conjugate but cannot excrete bill to intestine
Blood Bill Bile salts	Haem billi↑↑ Absent	Both Present ↑	Chole bill Present ↑↑
Urine Billi Color	Absent normal	Present Chole billi Dark brown	Present Chole Billi Very dark brown

* The obstructive jaundice important in surgery
  ↳ has dark urine - pale stool with itching due to Bile salt accumulate in the skin...

* dark urine + Jaundice indicate:- obstructive or hepato cellular Jaundice...

* 60% of liver Biopsy Bleeding occur after 2hr...

بتكون بعد ساعتين بجيب فيبرينوجين

→ In life saving surger if the INR>1.6 we should prepare plt - Plasma substitute

if INR > 1.6 don't do it due to ↑ risk of bleeding...
if platlet < 60000 we don't do it

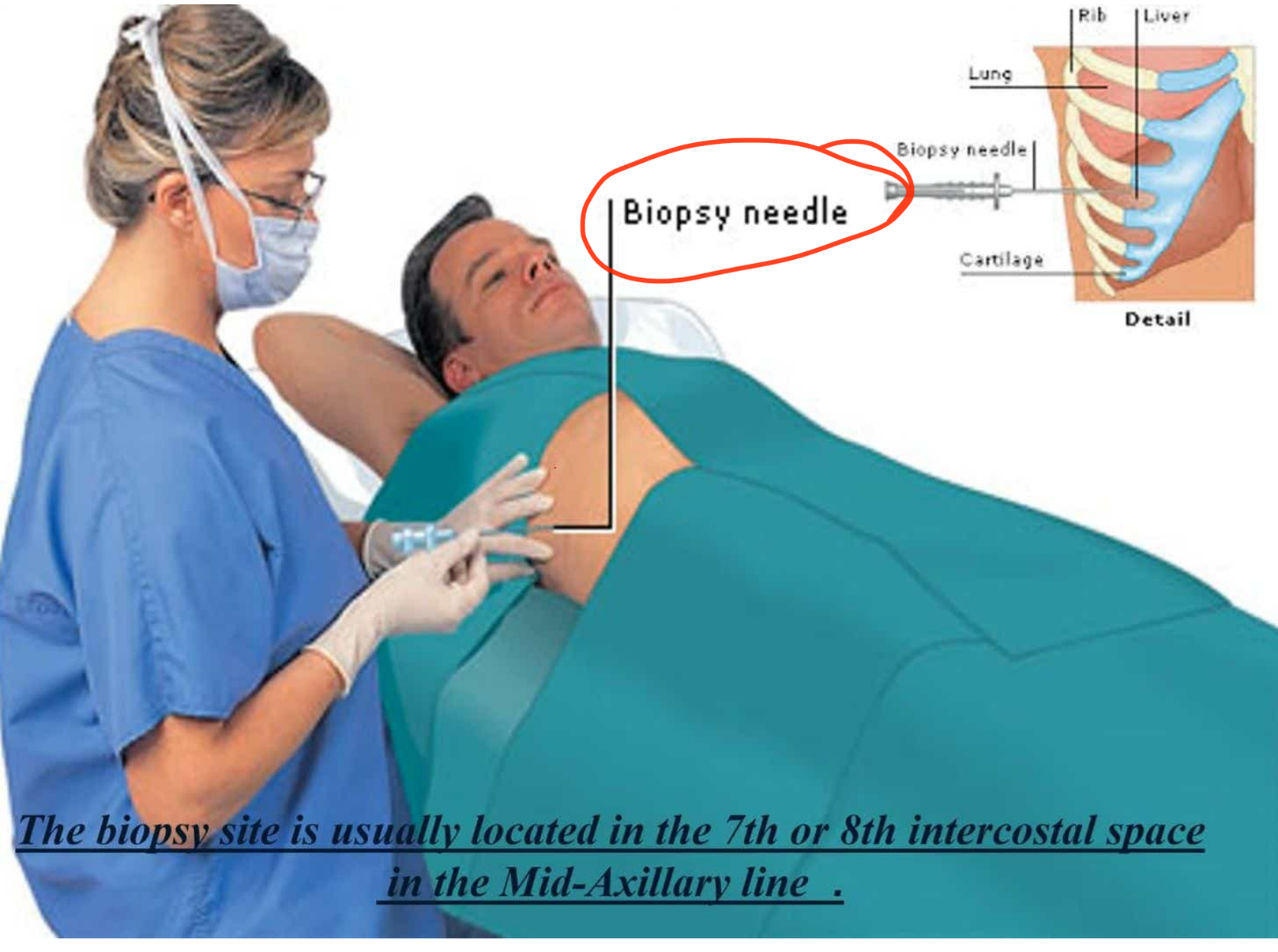
Liver Biopsy [medical problem]

لانه Bleeding بخاف منه ← لازم نشوف Coagulation Profile

→ should be under observation 24 hour...

Indications

- Evaluation of *Abnormal Hepatic lab test* results.
- Confirmation of Diagnosis& Prognosis of the dis.
- Suspected hepatic *Neoplasm*.
- *Diagnosis of Cholestatic liver* disease.
- Evaluation of infiltrative or granulomatous disease.
- Following a case of liver transplant ? Rejection
- To evaluate Unexplained Jaundice or suspected drug reactions.



The biopsy site is usually located in the 7th or 8th intercostal space in the Mid-Axillary line .

Liver Biopsy cont……

Contraindications

- Increased prothrombin time , INR > 1.6
- Thrombocytopenia, platelet count < 60,000
- *Ascites* (transjugular route preferred)
- Suspected hemangioma.
- Suspected Echinococcal infection.
- Uncooperative patient.

Liver Biopsy cont…



Complications

- Rare but potentially are lethal , Mortality < 0.3%
- *The majority (60%) of complications occur within the first 2 Hours.*
- *96% occur during the first 24 hours.*
- Approximately 2% of patients undergoing biopsy require hospitalization.
- Pain, Bleeding , haem-obilia (biliary colic, GI bleeding & jaundice) bacteremia , pneumothorax…

LIVER TRAUMA

- Aetiology

  Blunt or penetrating

- Mortality up to 20%
- Site : Rt. Lobe > Lt.
- Clinical picture .....

Treatment of liver trauma

- Resuscitation , ABC, cross match & Bl clotting factors transfusion
- Spiral CT if the patient is hemodynamically stable .
- ***Penetrating Injuries:*** *should be* ***Explored****, via* Roof Top Incision :

1. Suture lacerations.
2. Resect if major vascular injury.
3. Packing if diffuse parenchymal injury.

- ***Blunt injuries CT:*** *?* ***Treated Conservatively.***

This incision called roof top [marceeeles] for liver transplantation
hemi roof top incision for splenectomy with cholecystectomy..

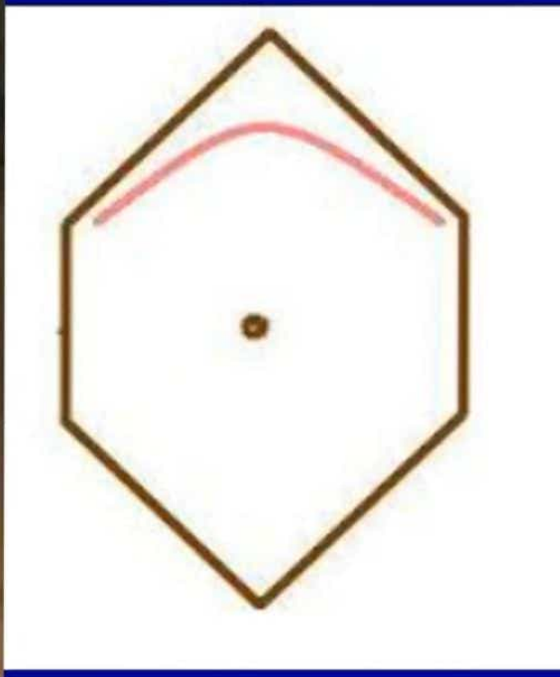


* most common complication of laproscope to GB:-

① local [Bile duct [transection lead to peritonit. - Bleeding - duodenal injury
[cliping → post. jundice

② general [UTI - DVT .. etc].





* The commonest solid lesion in the liver is:- hemiangioma...
* The commonest problem occur in the liver overall is:- simple liver cyst...

Diff. dx.

DD cystic liver lesions

simple [mcc] 1st but 2nd mcc is liver hemiangioma...

MCQ MCQ MCQ

you should know how to treat with liver abscesses and liver trauma...

Infectious	Non-Infectious
Parasitic	**Cystic component**
Hydatid cyst ↳ due to echinococcosis	Simple cyst ↳ commonest lesion
Amoebic ↳ amebic dysentry.	PCLD
Non-parasitic	Cyst adenoma
Pyogenic liver abscess.	
Fungal abscess. ↳ 80% due to candidia we give them fluroclo---	

* 50% of Rectal cancer diagnosed by PR...
* Rectum length :- 5 inch [12 cm] } 16 cm
* Anal canal length: 4cm...
* by PR we reach 8-9 cm [half of rectum]
* 40% of Colon cancer are Rectal cancer...
* The absorption from rectum quicker than gastric absorption...

Liver cysts

- **Simple cysts** are the commonest cyst and found in 10% of the population.
- The majority of cysts are < 3 cm and asymptomatic single or multiple.
- No malignant potential.
- M:F 1:4 hormonal ?
- ***Early satiety*** can occur when cysts compress the stomach.
- Vague abdo pain.
- US clear cyst no septation.
- ***Treatment:*** Sclerotherapy Alcohol 95%. and aspiration

5-10%

not increase in size

وكان لو كانت كبيرة بدأت تحمل كأنها بالحمل
↳ may compress on stomach
وتحس كأنها شادية تاكل
وتشبع بسرعة...

all Benign liver problem more common in female but the malignant more ♂ in Male...

if it large

due to strich of glisson liver capsule...

Hydatid cyst وهذا ما يفرقها عن

for short duration لازم تنفض خلال ١٠ دقائق

حتى لا يسكر

↳ 120 cm

لو بتنفض تفضل كمال جرعة ترجع

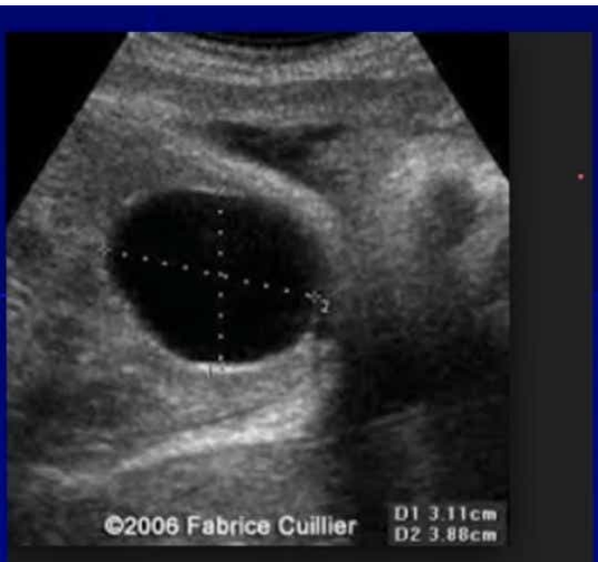
لو حتى تفضل الجراح وبكبه ما تعزز

No need surgical intervention...

or 20% Saline...

* mucinous tumor of pancreas :- there is septation
↑ mucin
↑ tumor marker [CEA]
normal amylase

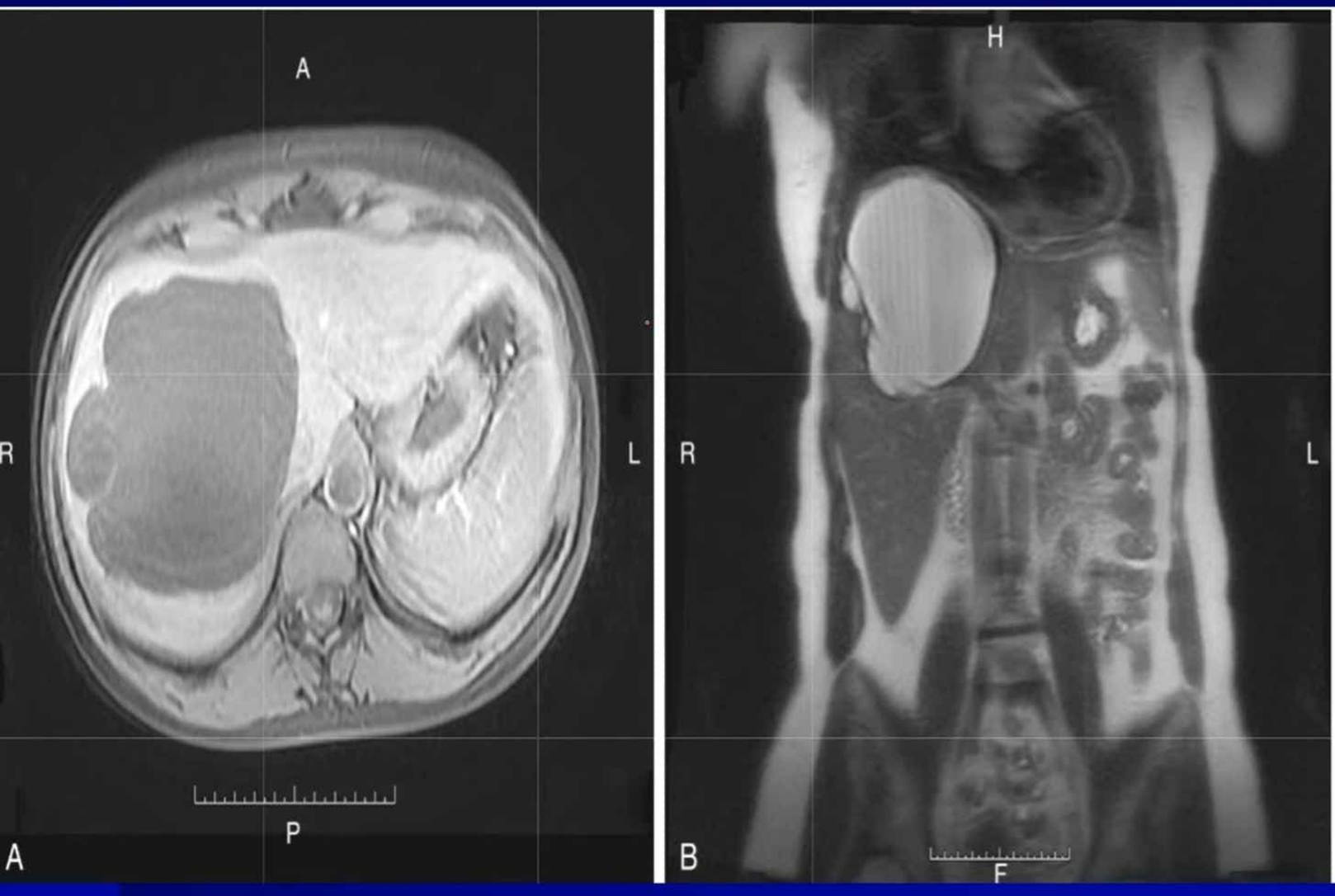
* pancreatic pseudo cyst:- No mucin
normal CEA
amylase > 10000 كالي باوكس



× 300 - Images may be subject to copyright. Find out more






A
R
L
P
A
H
R
L
B
F

liver tumor need special center...

Pyogenic liver abscess

M : F → 1:1

- Most common Abscess in liver in west .
- Single or multiple. But usually single
- More in Rt lobe. any liver dz..
  [so need Broad spectrum antibiotic]
- 40% mono-microbial, 40% poly-microbial , 20% Sterile.
  ↳ mono Bacteria
  → use for it 1st - 2nd generation cephalosporine..
- Gram –ve bacteria, E.coli is found in 2/3 of cases. in 65% of cases..
  then klebsela then streptococcus

* M : F ⟶ 1 : 1

* The lactation mastitis and Breast abcesses → are due to single organism...
* The mcc of pyogenic abcesses is FColi...

Pathophysiology liver abcesses

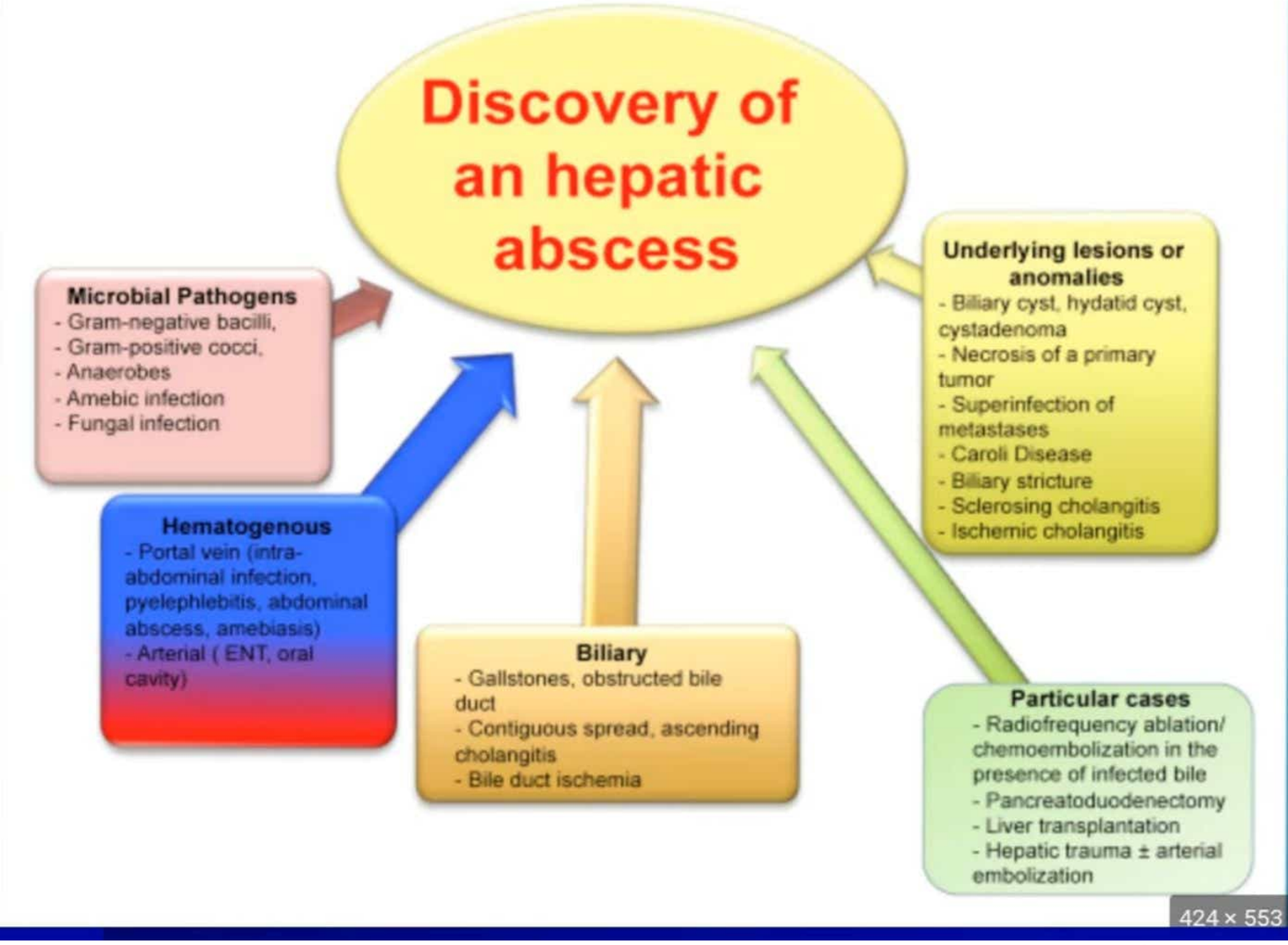
- **Biliary Duct System :** Ascending cholangitis 40% [1st mcc] 1st mcc غالباً
- **Portal Blood Flow :** Appendicitis, UC, CD diverticulitis 20% . 2nd mcc غالباً
  - Appendicitis → from GIT → tender RIQ
  - diverticulitis → tender if iliac fossa
- **Hepatic artery :** Septicemia: 12% .
  - due to infective endocarditis - tooth or tonsiles abcesse or osteomyelitis lead to bactermia and reach the hepatic artery.
  - [mc in ENT or dental surgery] Antibiotic لازم ناخد
- **Direct Extension:** Acute cholecystitis 6%
  - presented with fever not respond to antibiotic
- **Trauma liver Directed therapy:** 4% .
  - ① angio liver embolization [to see + stop the Bleeding]
  - ② RFA of liver tumor [radio-frequency ablation]
  - ③ micro radio ablation for liver cancer...
- **Cryptogenic:** 20% . غير معروف السبب

- Bacteria from portal vein.. → diverticulitis or appendicitis → in Rt IF
  - ↳ anerobe [bacteroid flagella]
  - Ascending infection → E coli
- If IF → so when we know the microorganism we give the pt the acurret ATB [anti biotic]...

* the diverticulitis → lf sided appendicitis...

* GB Carcinoma very Bad → no thin serosa + جنب liver ← بيروح → lead to direct spread to the liver → death...
  + thin wall 2mm

* GB Cancer → F:M → 3:1 [60:40 %]
* GB stones → M:F → 1:9
* Third of liver abcesses is due to hematogenous spread [30%]
  - portal 20%
  - hepatic 12%
* RFA:- Raedio frequnce ablation...
* In pancreatitis we do cholecystectomy in 85% of cases befor discharge to prevent the recurrance...
  ...تقليل الخطر لـ 35-40% احتمال ع



antibiotic ← لازم نغطي ... في abcesses لازم نعالج source of infection

.. اللي بخصيه وبكده نغطي البكتريا المتقاديه سبب الوفاه

* In Biliary duct system the Ecoli mcc so we give antibiotic cover the gram-ve
* In colon [diviriticulatis - colitis - appendicitis] there is Anarobe Bacteria [mcc.]
  Broad spectrum + flagel غطيه (زي Bacteroid flagelles) عشان
  Anti Biotic...
* In infective endocarditis the staph is mcc so give it vancomycin.

* The Amebic liver abcesses occur in young age + healthy pt...
  - M:F → 10:1
  - has better prognosis than pyogenic abcesses..

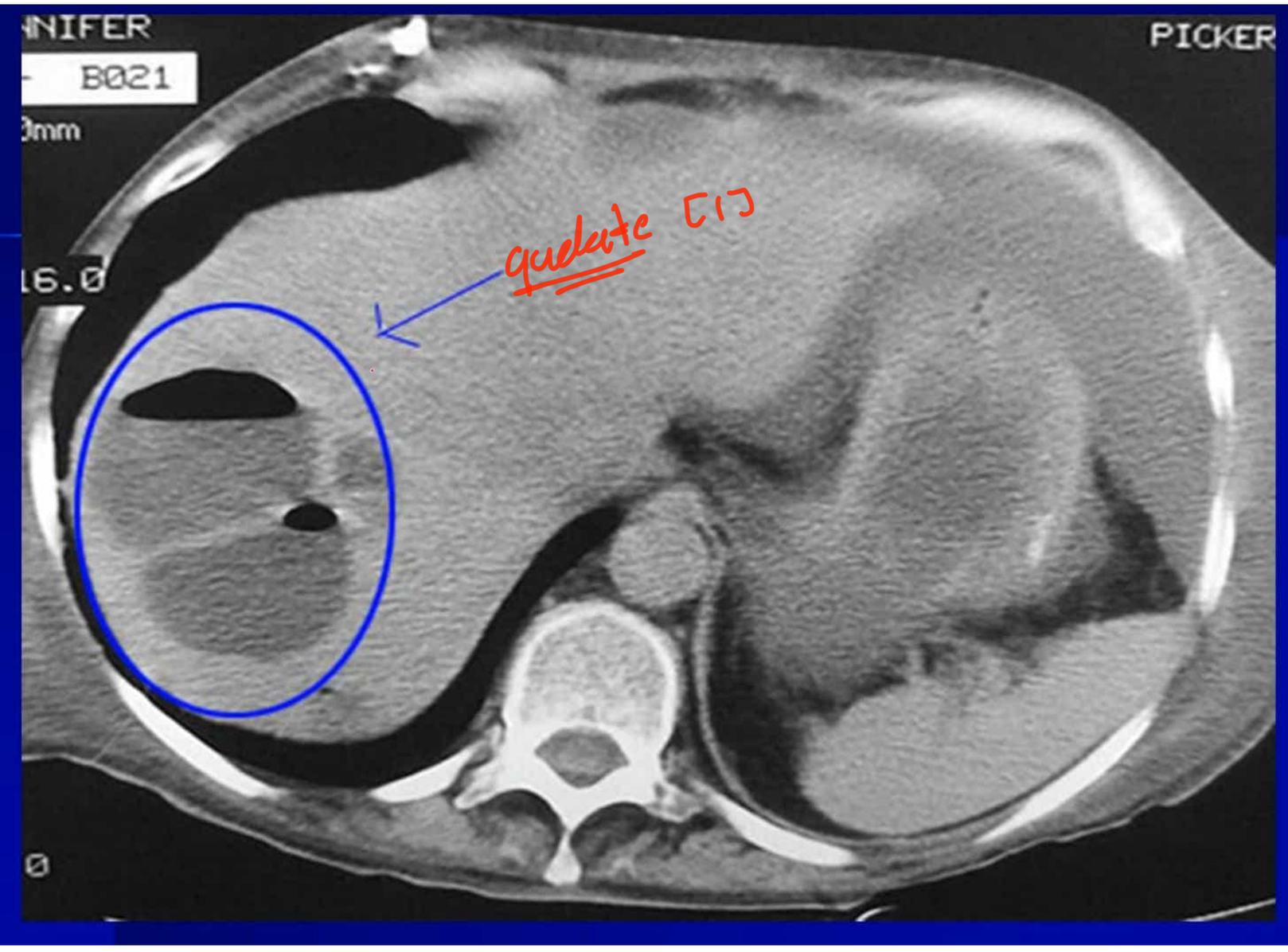
Pyogenic liver abscess

- ***Incidence :*** More in the Elderly (1), Diabetics (2) and the Immunosuppressed (cryptogenic) (3).

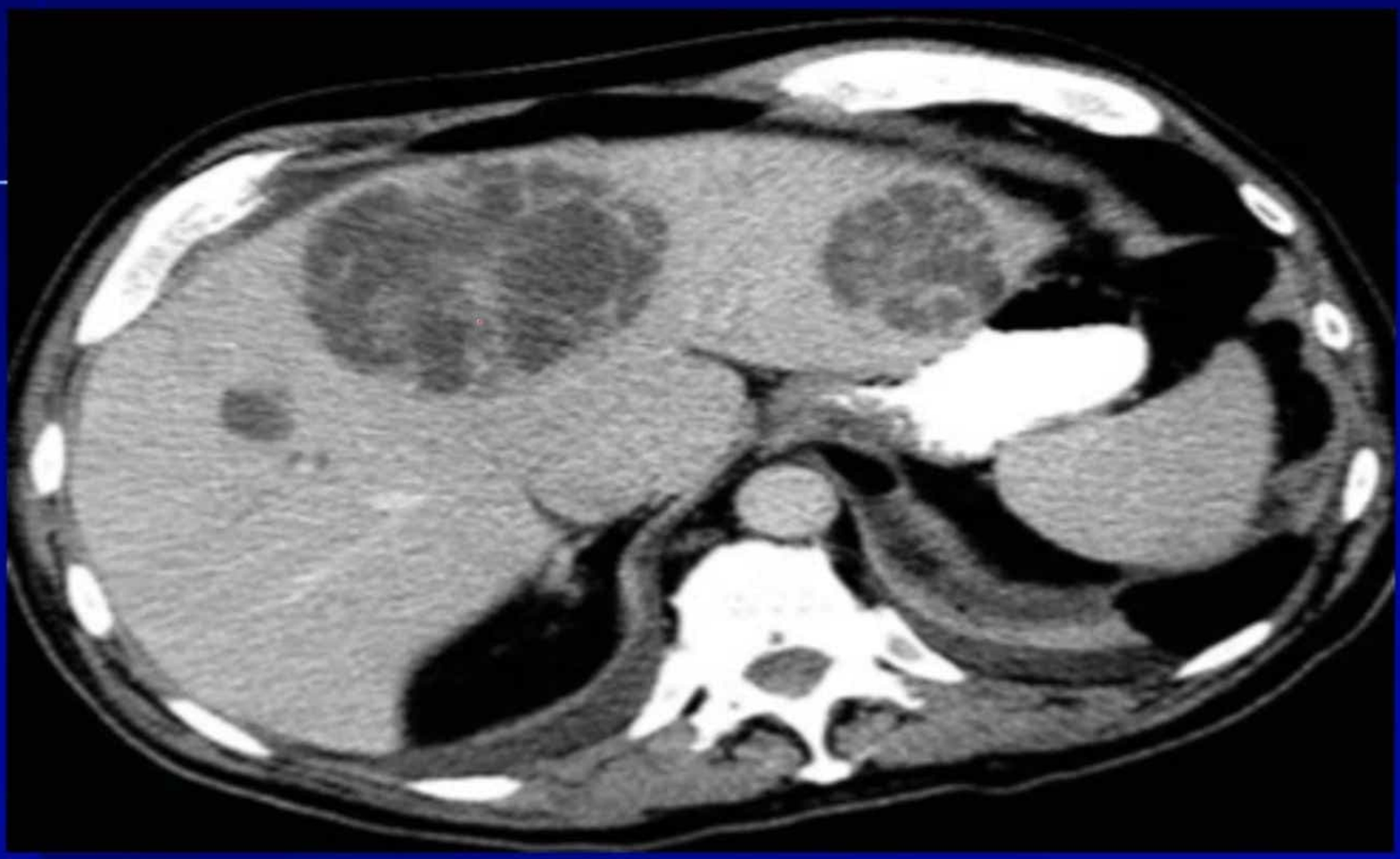
Clinical presentation

- Fever 90% continuous or hectic (تقطعي) . occur in lymphoma - abcesses...
- Chills (رعشة) , Malaise (تعب) .
- Anorexia, Weight loss .
- Nausea & Vomiting.
- Right upper pain, Pleuritic pain , cough diarrhea.
  - if the abcesses below the diaphragm...
- jaundice in 1/3 of cases.
- PUO Temp > 38.3°C , 3week unknown cause or 1week admitted unknown cause

appendix in → young age more localized symptoms than elderly → pyogenic
amebic



* Ant. segment → 2-3 :- abcès ↓ dû à ...
* post segment ⊕ segment ± → abcès ↓ dû à ...
  ↳ 6-7



Pyogenic liver abscess

- Diagnosis is suggested by the finding of a Multi-loculated cystic mass on ultrasound or CT and is *confirmed by aspiration for C&S*
- Most common organisms are ***Escherichia Coli*** klebsella.
- Rt. Lobe affected twice as Lt. lobe
- ***Raised ALP is most common LFT abnormality.***

Treatment

Antibiotics and Ultrasound-Guided Aspiration or Drainage (penicillin, aminoglycoside and metronidazole or a cephalosporin)

* The half life of Alkaline phosphatase → one week..
  ↳ high in obstructive jaundice...

An abscess in the left lobe

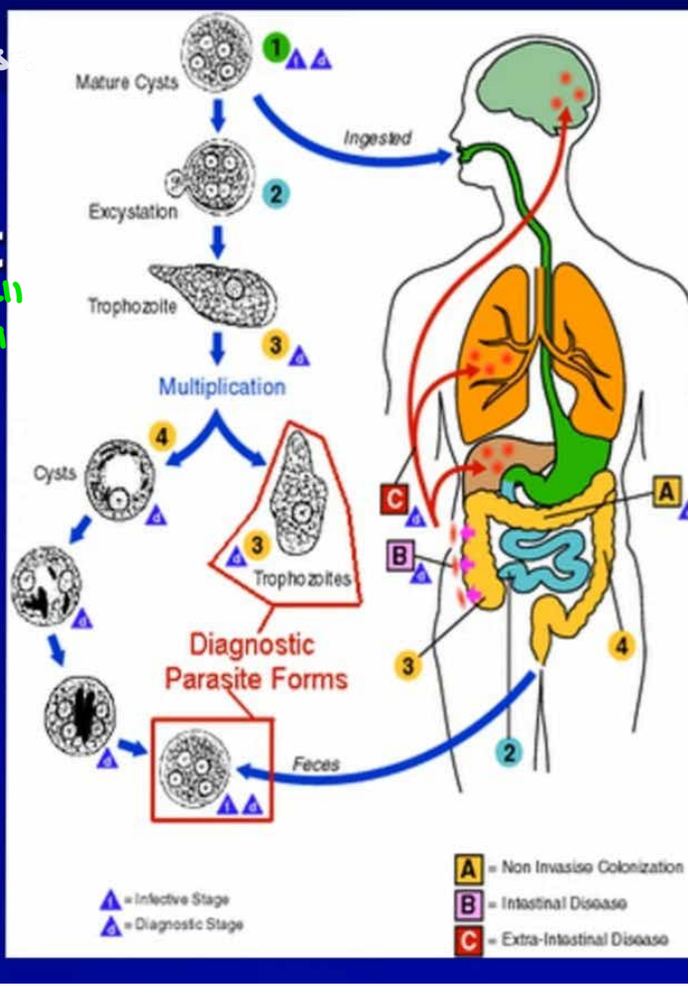


AMOEBIC LIVER ABSCESS

Etiology:

- Entamoeba histolytica cyst
- Feco-oral Transimation
- Reach liver through portal circulation.

* Ceccum and ascending colon → mc area of amobeic abscess..



AMOEBIC LIVER ABSCESS cont…

Pathology : Young age 20-40 > in males. [10:1 M:F]

Site : 80% of cases in upper post surface of Rt. lobe .

Affect 1% of amoebic patients ← has Amoebic abcesses

Solitary in 70%

- Aspirate: Brown Anchovy-Paste-like fluid ← Charachtarstic for Amoebic ← لونها بني بسبب الـ Aspiration
- ***2ry Infection*** in 50% of cases. ← due to other Bacteria





tt / flagel [metranidazole].
or tenidazole if he has flagyl sensitivity
↳ 500mg..

AMOEBIC LIVER ABSCESS cont..

*Antibiotic up to 8 week

*The symptoms more common in Amoebic than Pyogenic liver abcesses...

Diagnosis : Clinical picture , Imaging and Serology (Gel diffusion precipitive test + ve in 95%)

- Isolation of the parasite from the liver lesion or the stool & confirming its nature by microscopy

Treatment : ***Metronidazole*** : 750mg tds for 7-14 days

Guided ? Needle ***Aspiration if :***

1. Lack of response to ***5 days*** treatment
2. Large abscess >10cm
3. Toxic patient [very septic pt]



PYOGENIC VS AMEBIC LIVER ABSCESS

CLINICAL FEATURES	PYOGENIC LIVER ABSCESS	AMOEBIC LIVER ABSCESS
AGE	>50	20-40
M:F RATIO	1.5:1	>10:1
SOLITARY VERSUS MULTIPLE	SOLITARY 50%	SOLITARY 80%
LOCATION	USUALLY RIGHT LOBE	USUALLY RIGHT LOBE
TRAVEL IN ENDEMIC AREAS	NO	YES
DIABETES	MORE COMMON	UNCOMMON
ALCOHAL USE	COMMON	COMMON
JAUNDICE	COMMON	UNCOMMON
ELEVATED ALKALINE PHOSPHATASE	COMMON	COMMON
POSITIVE BLOOD CULTURE	COMMON	POSITIVE AMEBIC SEROLOGY

* The incidance in M > F ..

* Fungal hepatic abcesses:- Rare cause ..
  - if the pt not improved indicate:- 1- immuno compromized.
    2- liver transplant
  - may be due to long term of antibiotic → lead to ungal throat so if we give him antibiotic not respond and lead to ↑ the fungal infection...
  - tt :- drainage or treat the fungus [fluroconazole]...
  - 80% of fungal abcesses are has candida so the fluroconazole is the drug of choice...

* People → intermidate accident host...

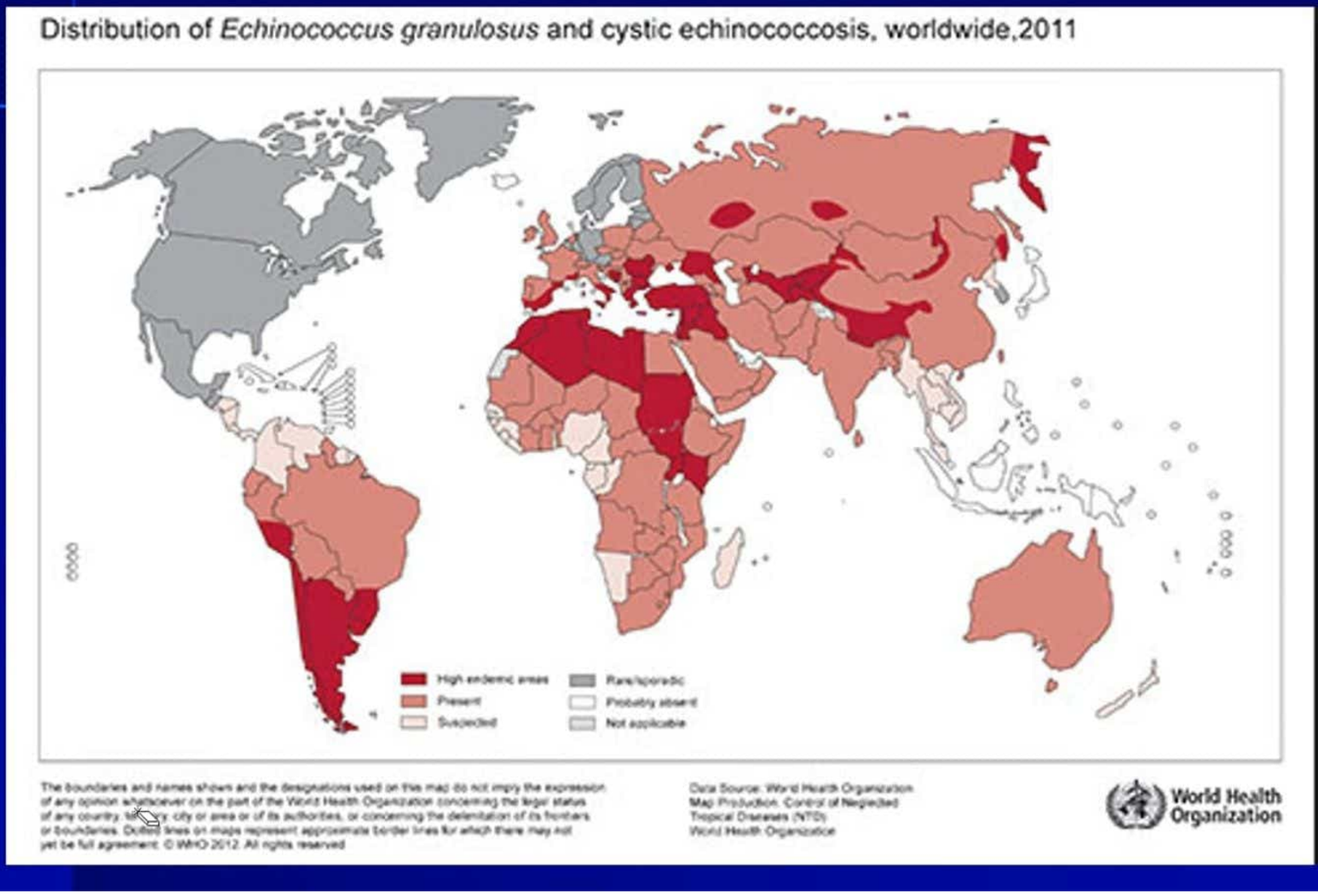
HYDATID DISEASE OF LIVER

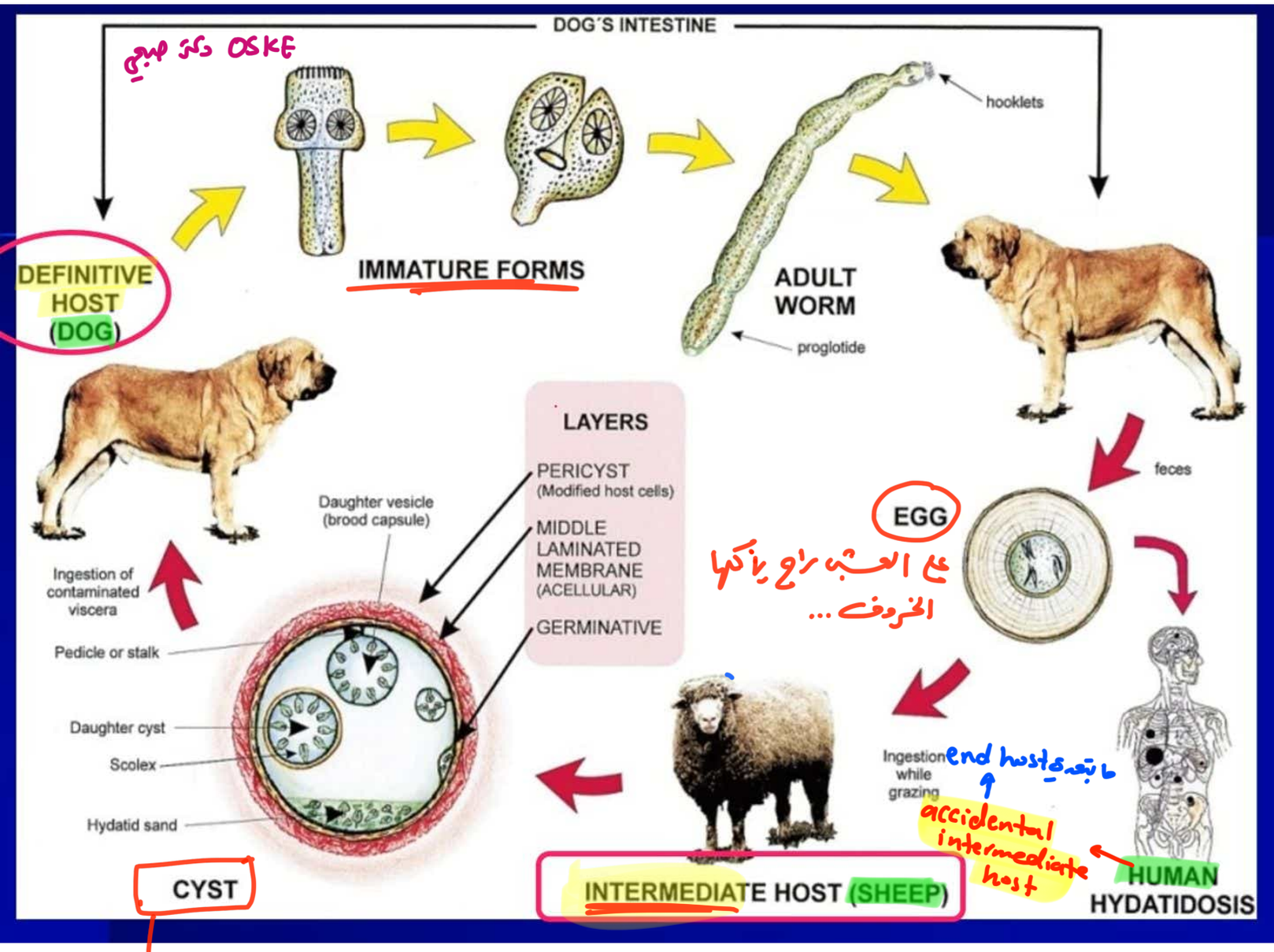
- Hydatid disease is due to infection by the tape worm Echinococcus Granuloses in its Larval or Cyst Stage equal male to female 45 y. [متساوي ذكور وإناث]
- **Pathology :** The liver is the most common site for Hydatid disease (75%), lungs (15%), the spleen (5%),and other organs (5%). (trapped the Larval of hydiated cyst)
- 30% of infected people have multiple cysts
- **Clinical picture :?** Asymptomatic 50%. [70% has solitary cyst]..
- Right upper quadrant pain.
- Fevers, jaundice resulting from biliary obstruction, portal hypertension.
- secondary cyst infection leading to liver abscess

* ttt :- Alpentazole 400mg twice daily for 8 weeks + Prasaquntile once weekly...
[10-15mg/kg].

* we should know if the parasite still life or dieed :-
① if there is wall calcification → dieed, not infective..
no need for antibiotic ✓

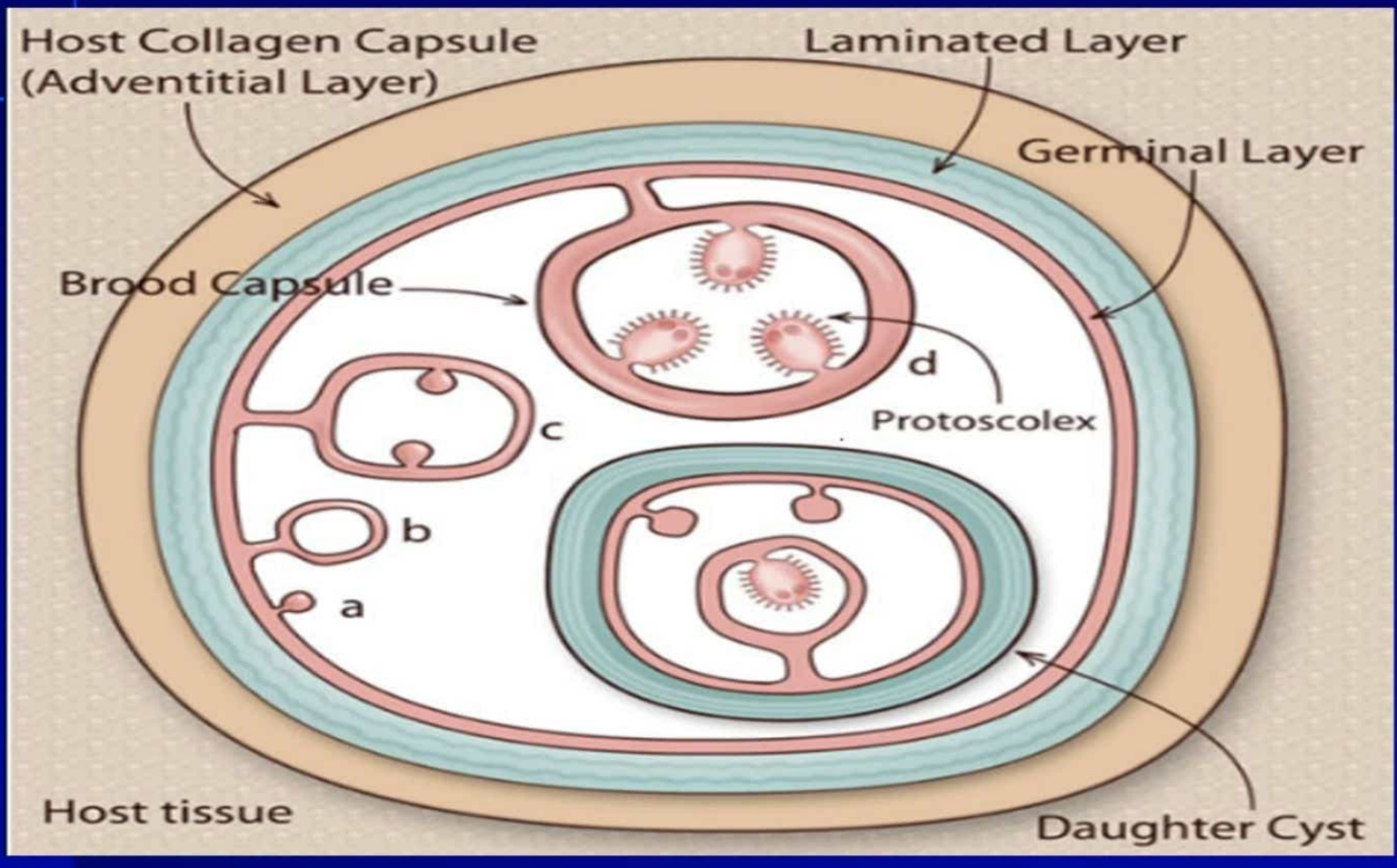
Epidemiology



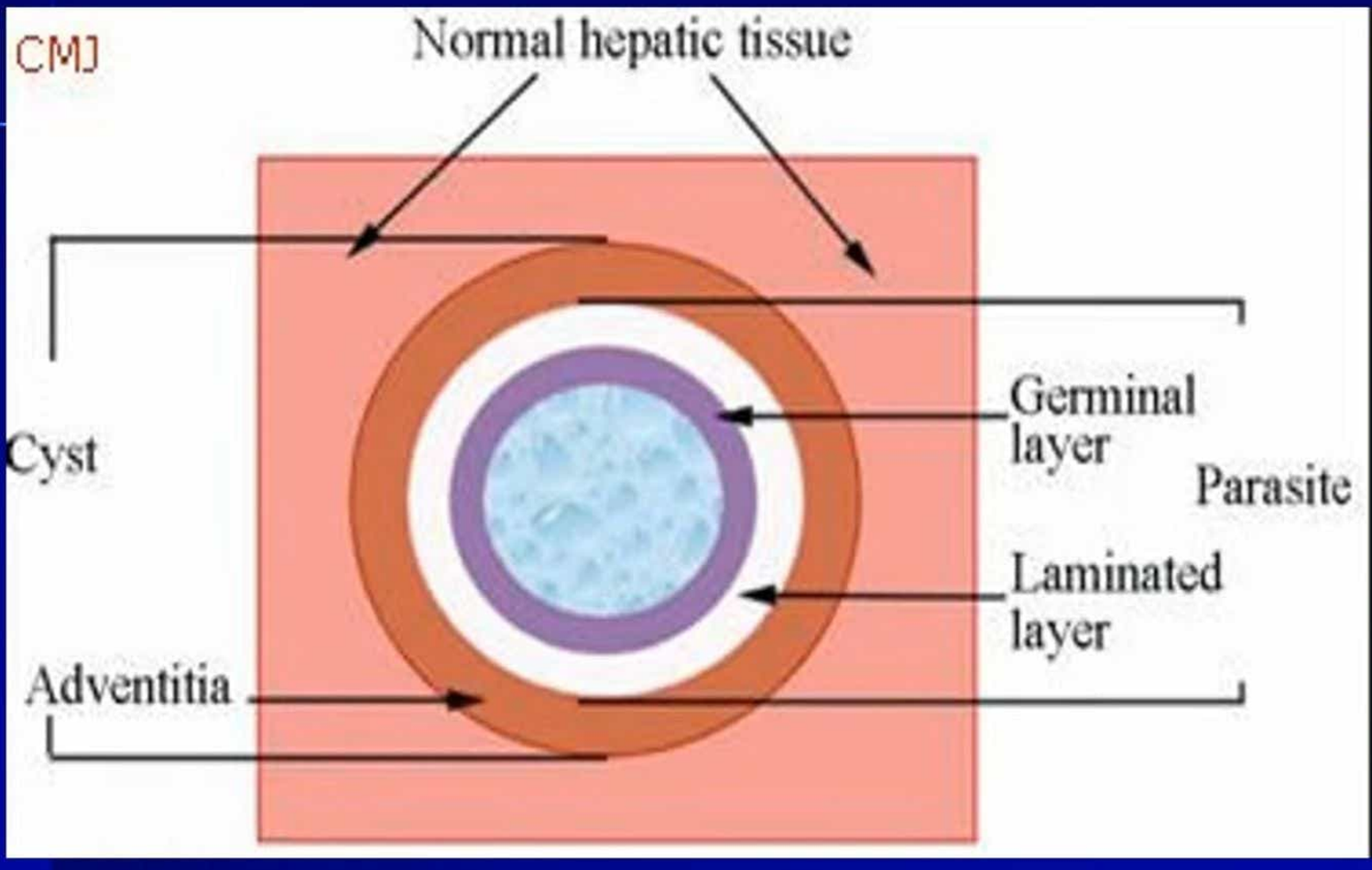


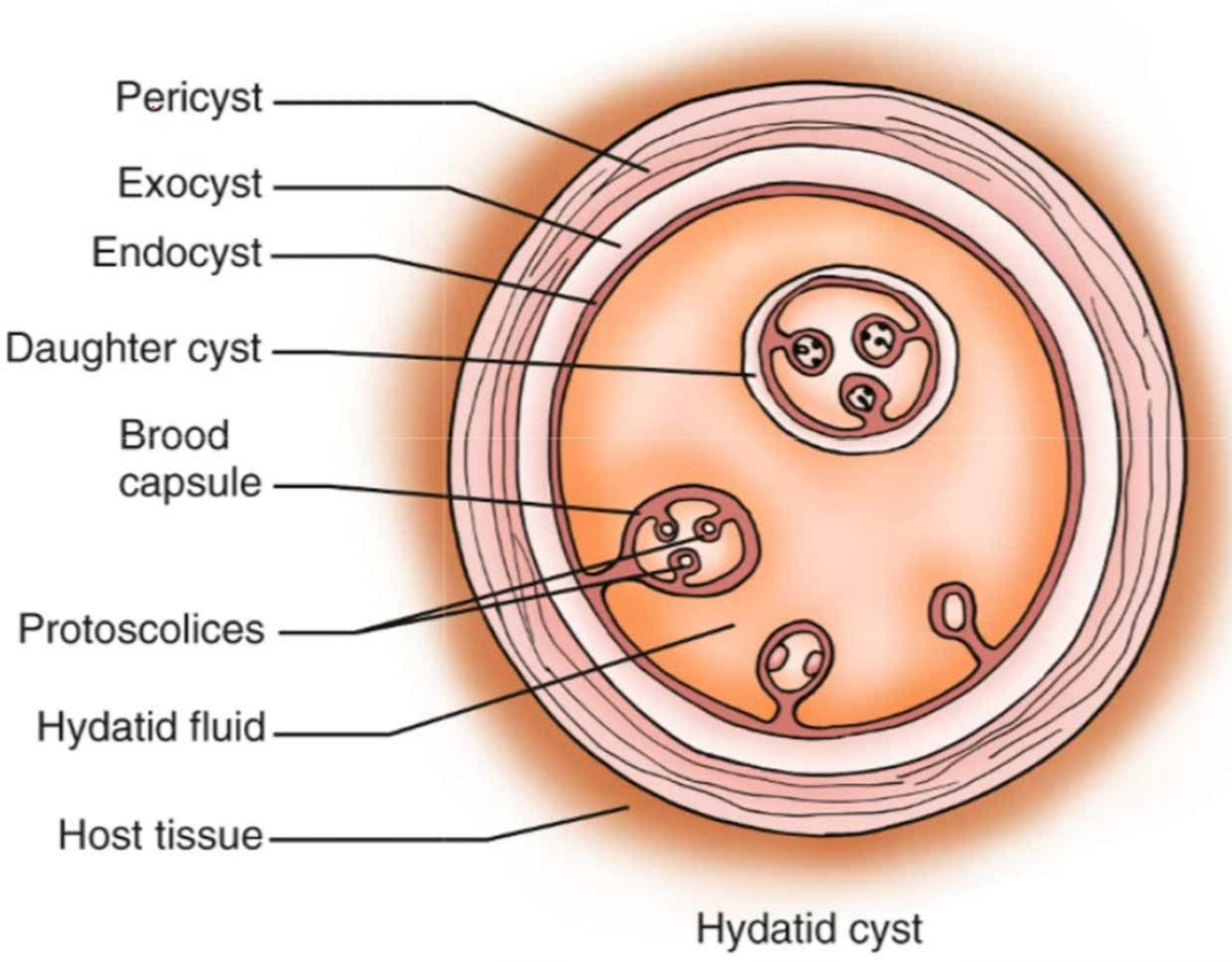
- has 3 layer
  - liver tissue healthy [endo cyst] ← germinal layer → release the cells..
    - normal
  - compressed liver tissue [peri cyst]
  - exo cyst [charbohydrate layer - A cellular layer]
    - called laminated

Layers of cyst



Layers of cyst




Pericyst
Exocyst
Endocyst
Daughter cyst
Brood capsule
Protoscolices
Hydatid fluid
Host tissue
Hydatid cyst

Diagnosis

- ***Radiology & Serology*** US - CT - MRI ← Best modality for diagnosis

1. Enzyme-linked immunosorbent assay (***ELISA***) (high sensitivity above 90%),
2. Indirect Immunofluorescence Assay (***IFA***) is the most sensitive test (95%) in patients with hepatic disease.
3. (? Casoni) skin test.

من التقرير كاندا يعملوه..

* 1st mc mass in the liver is → simple liver cyst..
* 1st mc solid mass in the liver is → hemiangioma... [Completely Bengin]
* 2nd mc solid mass in the liver is → focal nodular hyperplasia... [Completely Bengin]
* The most dangerous Bengin mass in the liver is → fibroadenoma [pre cancerous]

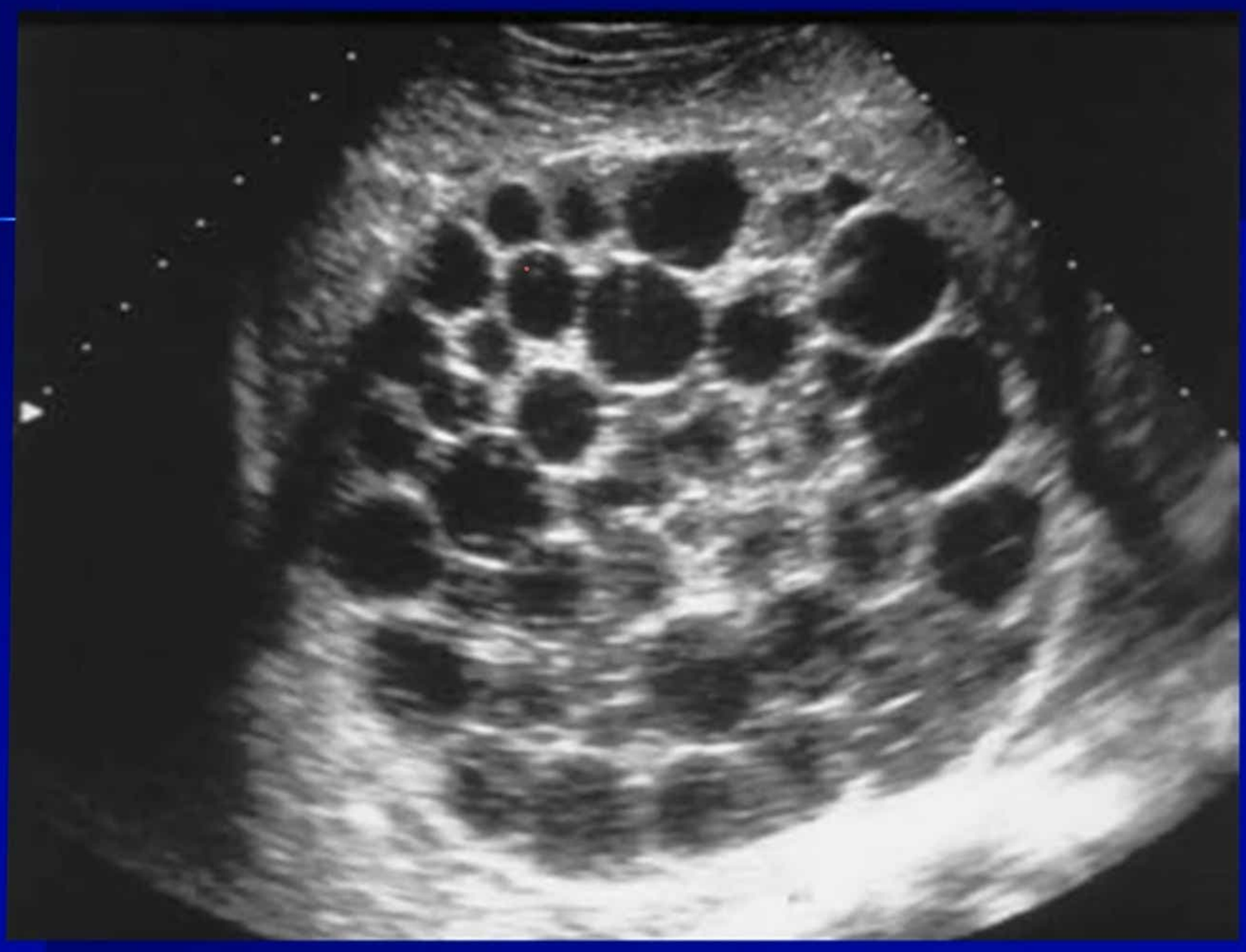

A

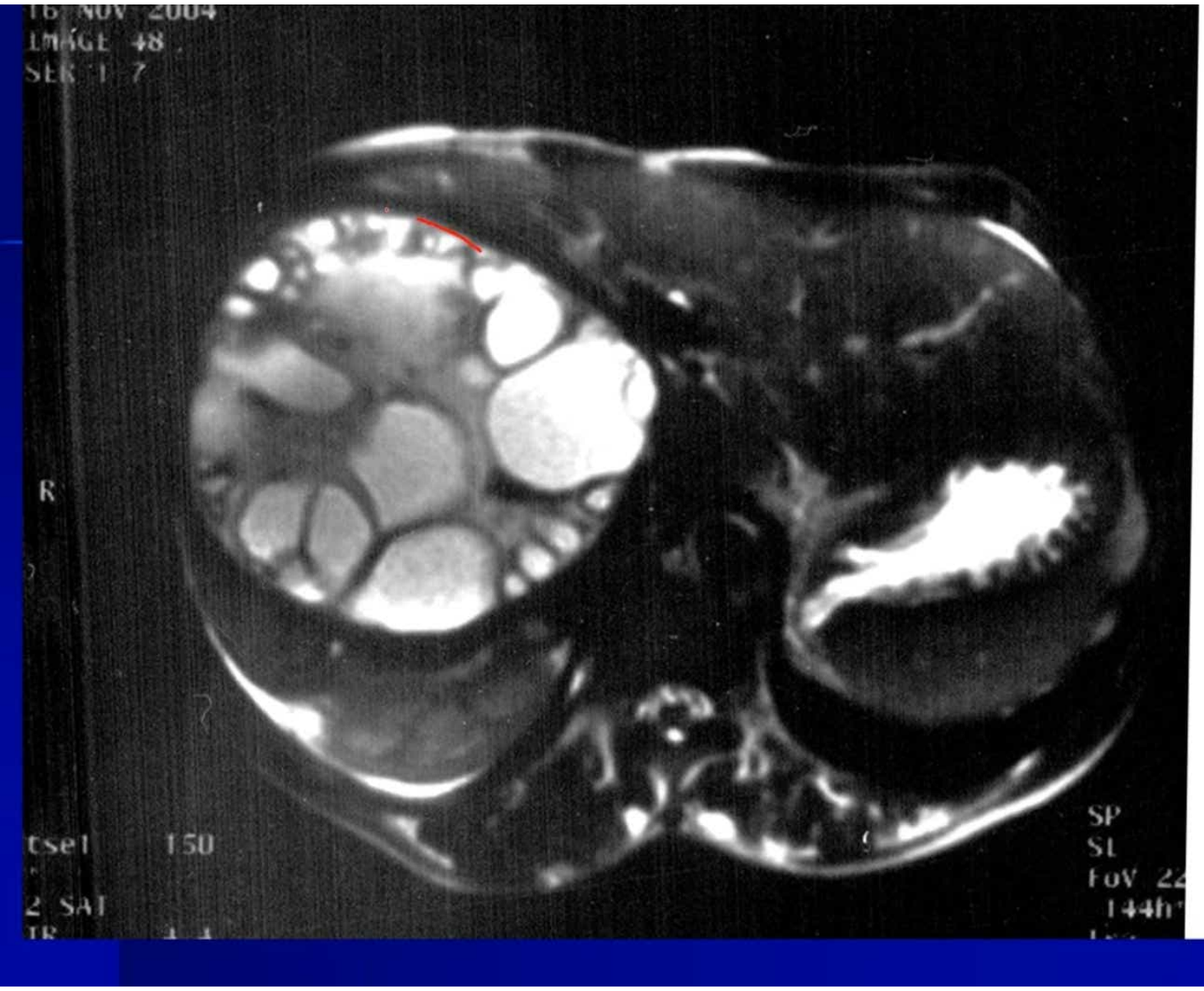




Hydatid disease






IMAGE 48
R
tse1 150
2 SAT
SP
SL

Complications common..

- Occur in about 40% of cases.
- The most common complications in order of frequency are:

1. 2ry *Infection* (Abscess).
2. *Rupture to the:*

A- *Biliary tree* .

(Causing Jaundice, acute cholangitis) بتخافي منه

B- *Rupture to the peritoneal cavity*

:Anaphylaxis

C-Rupture to the pleural cavity. if it in the lung (15%)

Treatment

1. Medical :

400 mg twice daily for 8 weeks..

Albendazol 10-15mg/kg/day for eight weeks in two divided doses. + Praziquantel once weekly... [40mg/kg]

↳ help in death of larva...

↳ used for bilharsi

if no response :

laparoscopic

2. Surgery with Special Precautions → to prevent the shock - perforation to peritoneal cavity...

- Gold standard treatment for Hydatid liver disease.
- Marsupialization , Cystectomy ,Hepatic resections.

3. Percutaneous treatment PAIR

new modality for treat the most of hydiated cyst...

if the cyst < 5cm [small cyst]...

(1) (2) (3) (4)

(Puncture, Aspiration, Injection& Re Aspiration)

↳ of alcohol for 10-20 min.

↳ of alcohol within 20 - 30 min.

.

PORTAL HYPERTENSION

↳ medical problem.

Definition:

Elevation of hepatic venous pressure gradient to > 5 -7 mmHg

Clinically

- No Symptoms in Early Cases
- Variceal hemorrhage portal gastropathy.
- Ascites , Hepatic encephalopathy.
- Increased risk of spontaneous bacterial peritonitis .
- Increased risk of hepatorenal syndrome .
- Splenomegaly with mild pancytopenia .
- Porto - caval anastomoses .

Diagnosis

- Most commonly found in the presence of liver cirrhosis 90%.
- Subclinical cases are more difficult to diagnose
- ***Duplex scan :*** Findings of hepatic echogenicity , splenomegaly, portal vein dilation, thrombotic occlusion, collaterals, and gallbladder wall thickening are indicative of portal hypertension.
- Portal pressure measurement is not generally indicated (invasive).
- Gastrointestinal endoscopy.

Etiology of portal hypertension

- ***Pre sinusoidal :***
  - Extrahepatic: splenic vein thrombosis
  - Intrahepatic: Schistosomiasis
- ***Sinusoidal : Intrahepatic like Cirrhosis***
  - *HBV, HCV, Alcohol*
  - Autoimmune hepatitis
- ***Post sinusoidal :***
  - *Intrahepatic : VOD*
  - *Post hepatic : BCS*

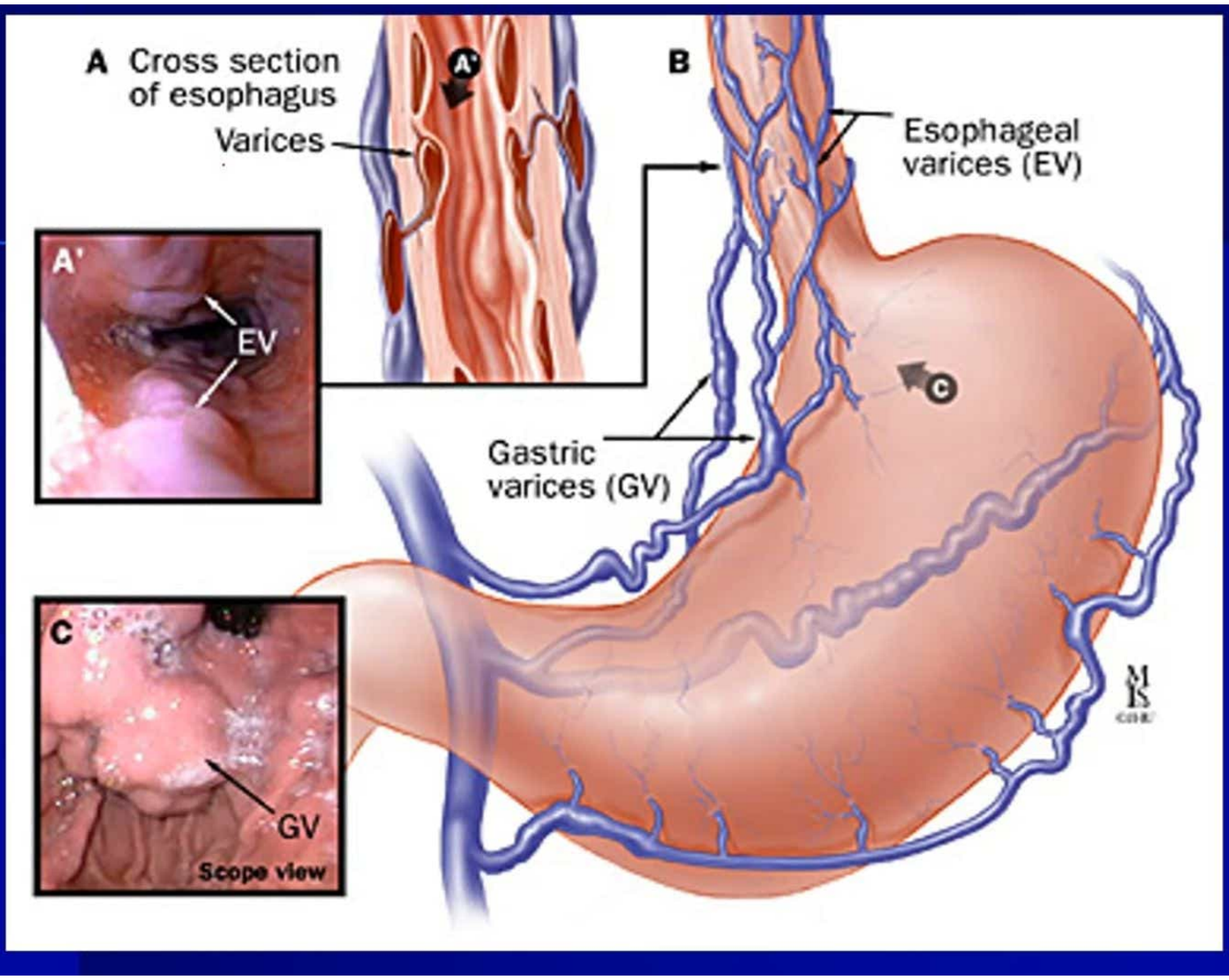
Management of bleeding varices

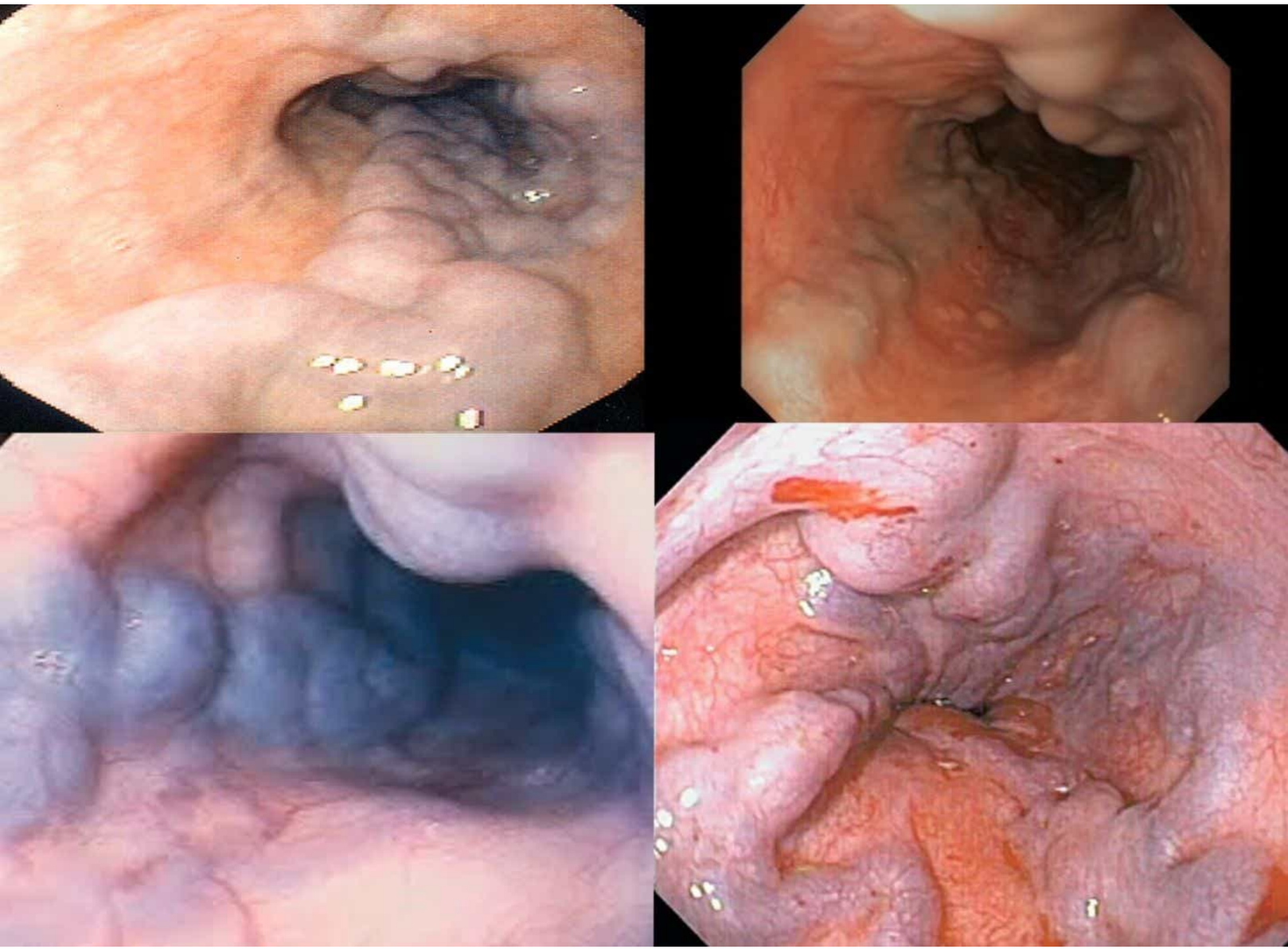
* 80% of Bleeding of esophageal varecies is:- peptic ulcer disease → duodenal...
→ peptic...

- Usually present with the *acute onset of a large-volume hematemesis in liver cirrhosis patient.*
- The lower esophagus being the most common site

Resuscitation and confirmation of diagnosis by endoscopy :

1. Central line ,CBC ,LFTS , INR .
2. Cross match 10 units blood central line


A Cross section of esophagus
Varices
A'
EV
B
Esophageal varices (EV)
C
Gastric varices (GV)
C
GV
Scope view



Management of bleeding varices cont..

3. Vit k 10 mg IV
4. ? Platlets if count <50
5. FFP
6. Sengstaken–Blakemore tube if severe bleeding for 12 hours then deflate it
7. Drugs : ***Vasopressin*** is the most extensively used drug for initial control of variceal Hg *(20 U in10 ml of 5% dextrose i.v. over 10 min)*.





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Management of bleeding varices cont..

Octreotide : the long acting somatostatin analogue, may be equally effective.

8. Endoscopic sclerotherapy is the initial treatment in most centers using ethanolamine oleate.

9.Transjugular intrahepatic porto-systemic stent shunts ***(TIPSS)*** If no response to sclerotherapy

10.Surgical shunts rarely indicated in acute cases

Selective (spleno-renal) & non-selective (porto-caval) 11.Oesophageal stapled transection

BENIGN NEOPLASNS OF LIVER

Haemangiomas

Commonest solid lesion in the liver...

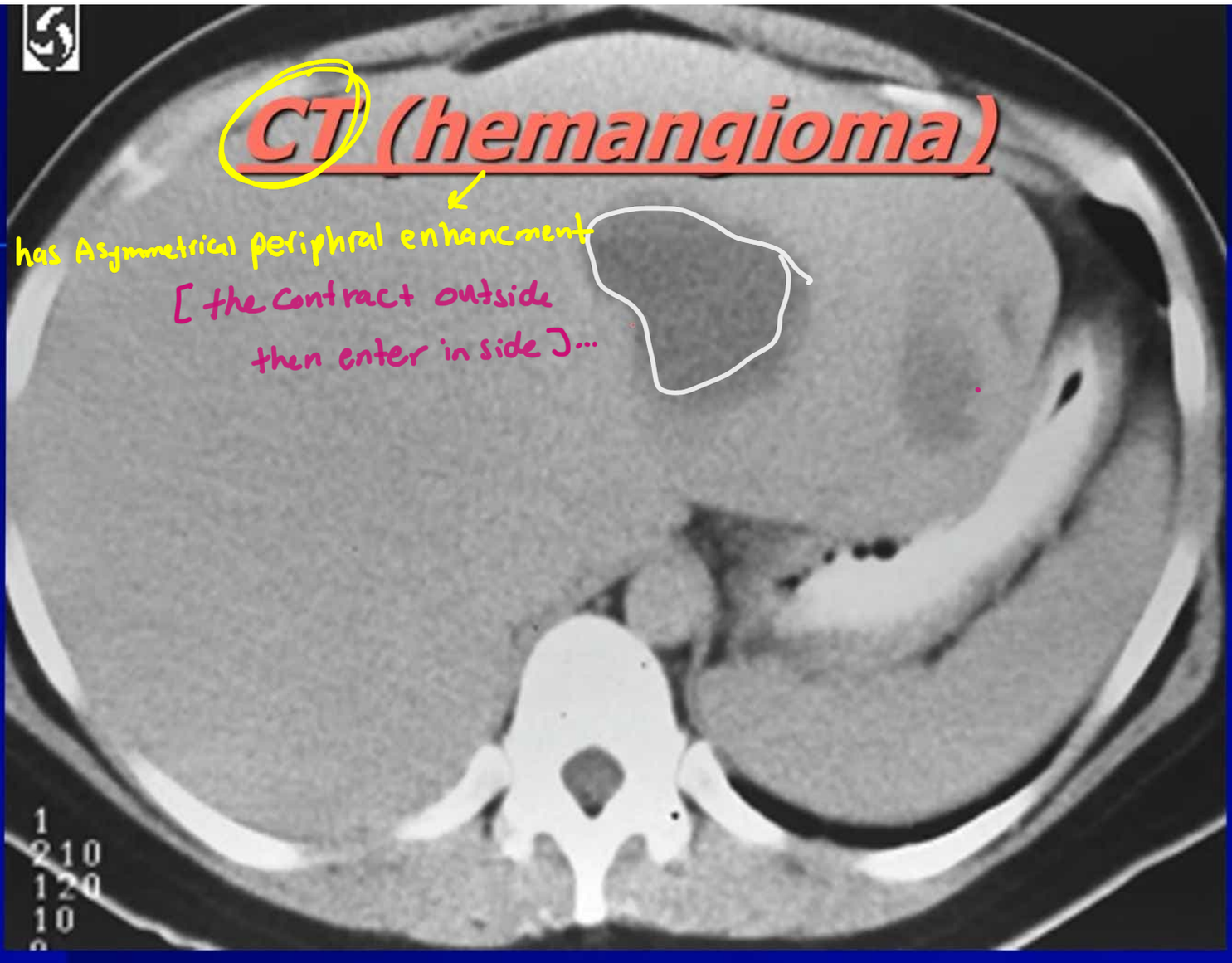
- ***Most Common Solid Benign Masses*** in the liver 7-15 % of population are affected , > 5 cm is giant form .
- Male: female 1:4 hormonal association?? multifocal 50% of cases .
- Usually solitary, 30-50 y, ***usually stable over time***. ما بتكبر غالباً
- ***Clinically:*** Usually Asymptomatic (50-90) %
- Non specific abdominal pain. if it large.
  - ↳ due to strech of the liver capsule..
- No malignant potential.
- Haemangiomas > 5 cm are called ***Giant form.***
- ***Diagnosis*** : US , (contrast CT) ,MRI

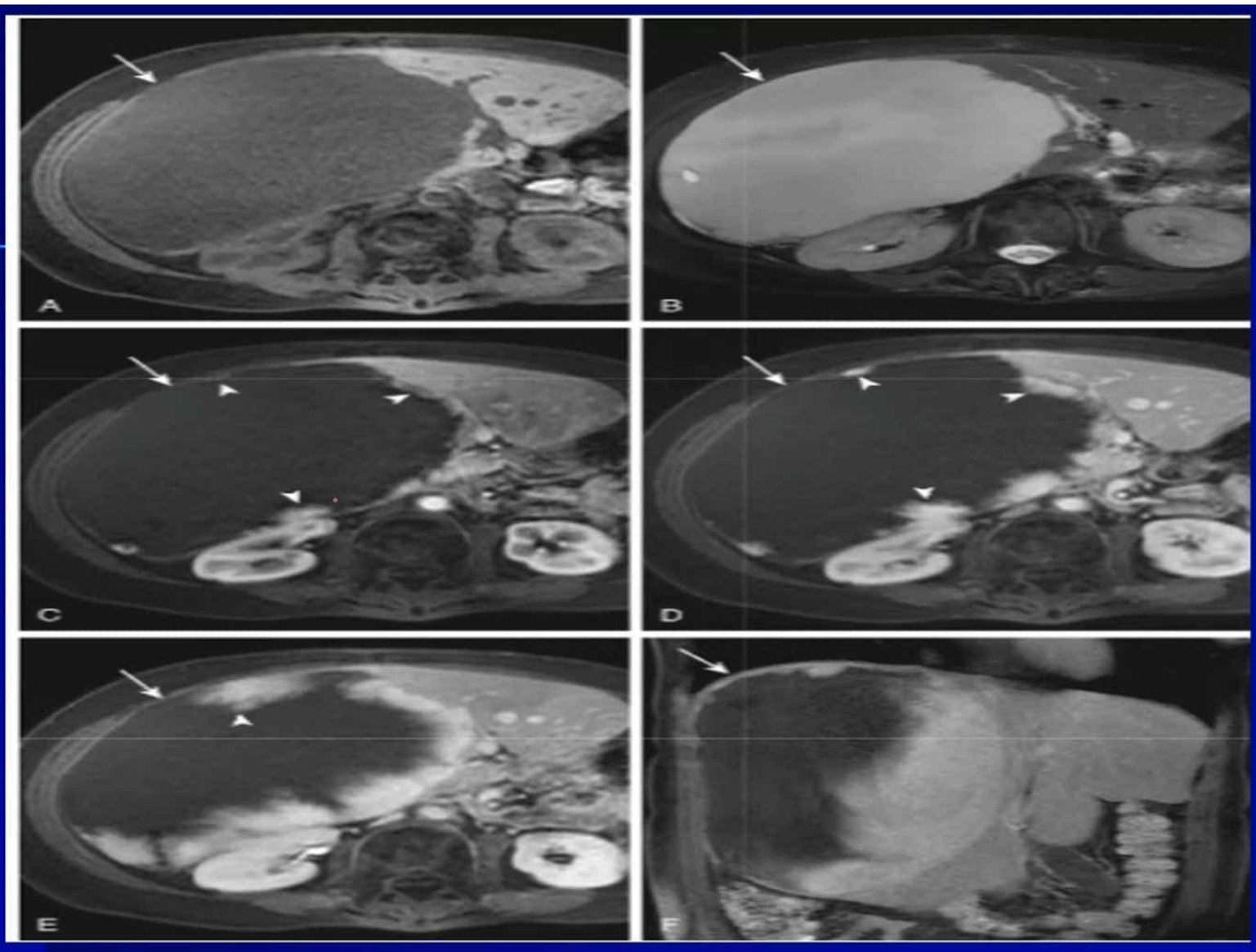
Usually no treatment , ? Embolization, Resection.

لو آكلة حتى بتعمل اشي ما بتفيد — لو نادر عالتشخيص

hydated cyst enlarged:- 1-5 mm / year

* The only Benign dz lead to Cancer is hepatic adenoma...


CT (hemangioma)
has Asymmetrical peripheral enhancment
[the contract outside
then enter inside]...


A
B
C
D
E
F

Hepatic Adenoma

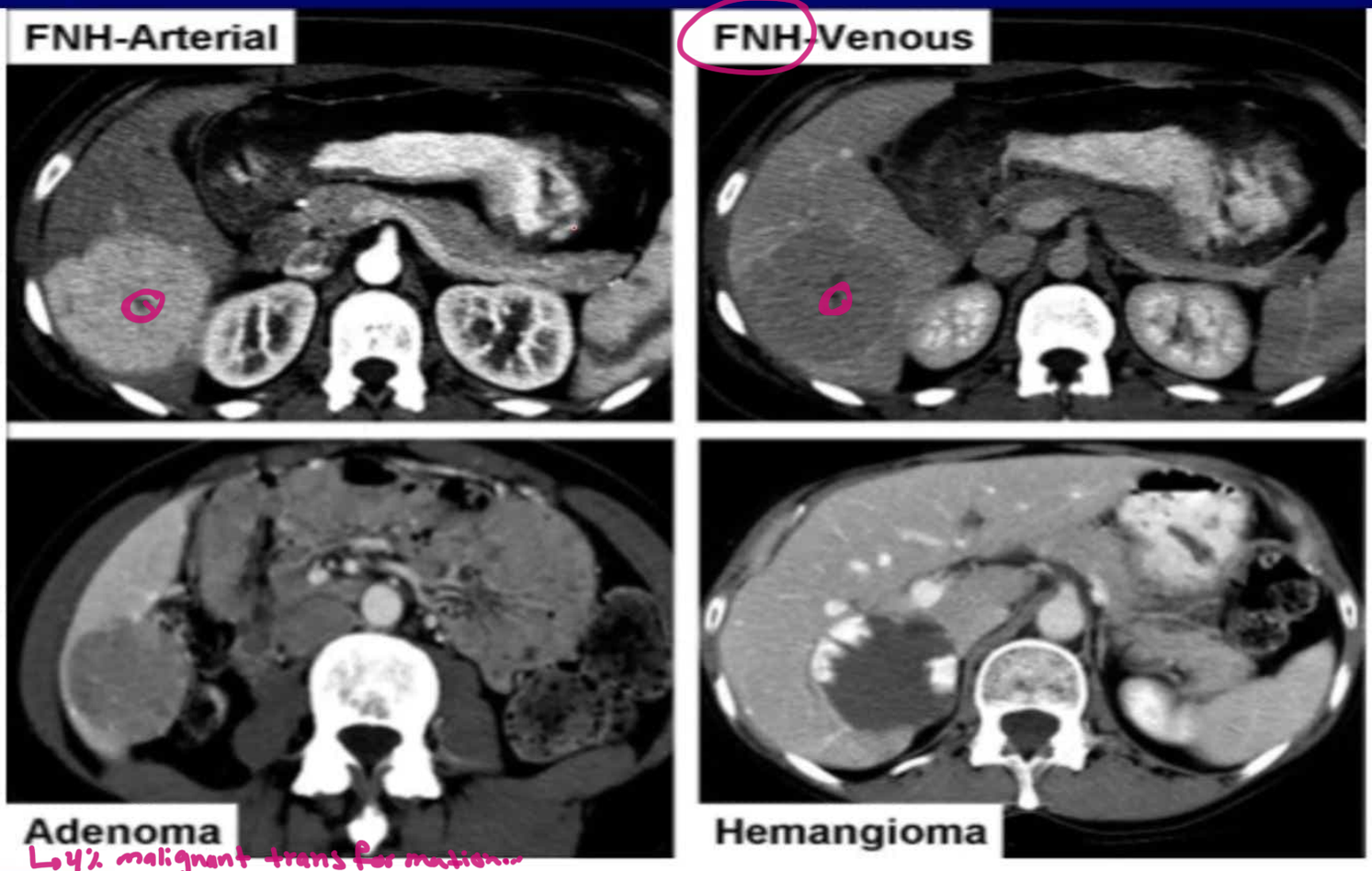
- Rare benign liver tumors , 10% multiple.
- More in females , age 20-40y ? Contraceptive pills hormonal treatment.
- **Size:** 4-30 cm
- Upper abdominal pain 50-70%
- Risk of rupture is 30% , Bleeding .
- **Risk of malignancy is related to size** >5cm HCC 4% Male sex , Symptomatic .

Diagnosis : CT demonstrates a well circumscribed & vascular solid tumor , *Angiography* shows peripheral arterialization.

we do percautanous Biopsy + Histo study to confirm the diagnosis...

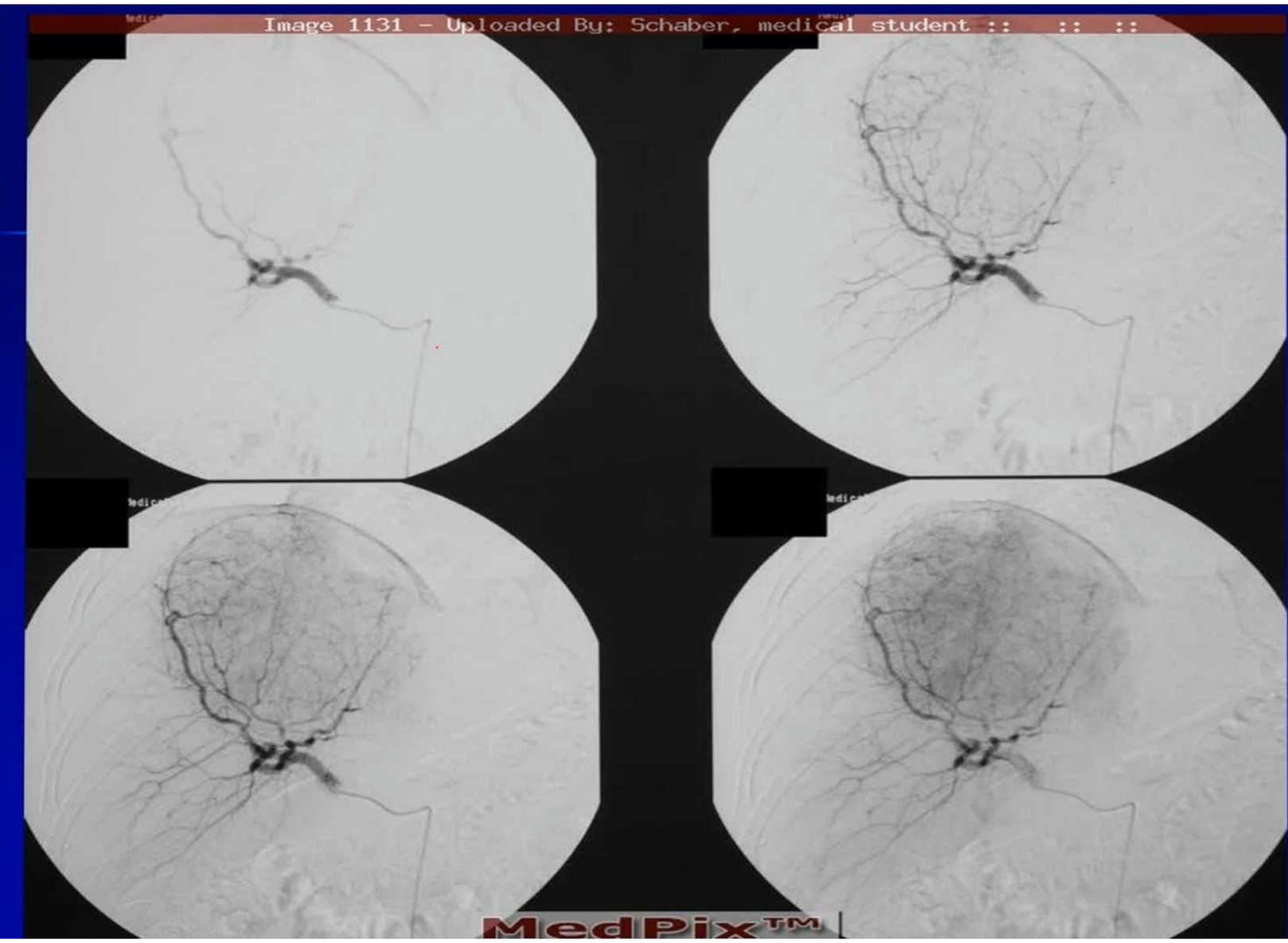
* why we do need to remove the hepatic adenoma :-
  1. for fear of Bleeding...
  2. Malignant transformation...
     - especially in males...
* The risk of Bengin gastric ulcer or hepatic adenoma to became malignant is 4%
* The dudenal ulcer never turn malignant...

focal nodular hyperplasia there is central scar..



Loy's malignant transformation..

Figure 31-18. Computed tomographic scans showing classic appearance of benign liver lesions. Focal nodular hyperplasia (FNH) is hypervascular on arterial phase, isodense to liver on venous phase, and has a central scar (*upper panels*). Adenoma is hypovascular (*lower left panel*). Hemangioma shows asymmetrical peripheral enhancement (*lower right panel*).


Image 1131 - Uploaded By: Schaber, medical student
MedPix™

Hepatoadenoma cont...

- Confirmation of the nature of these lesions is required by either percutaneous biopsy or resection with histological confirmation
- *Adenomas have malignant potential*

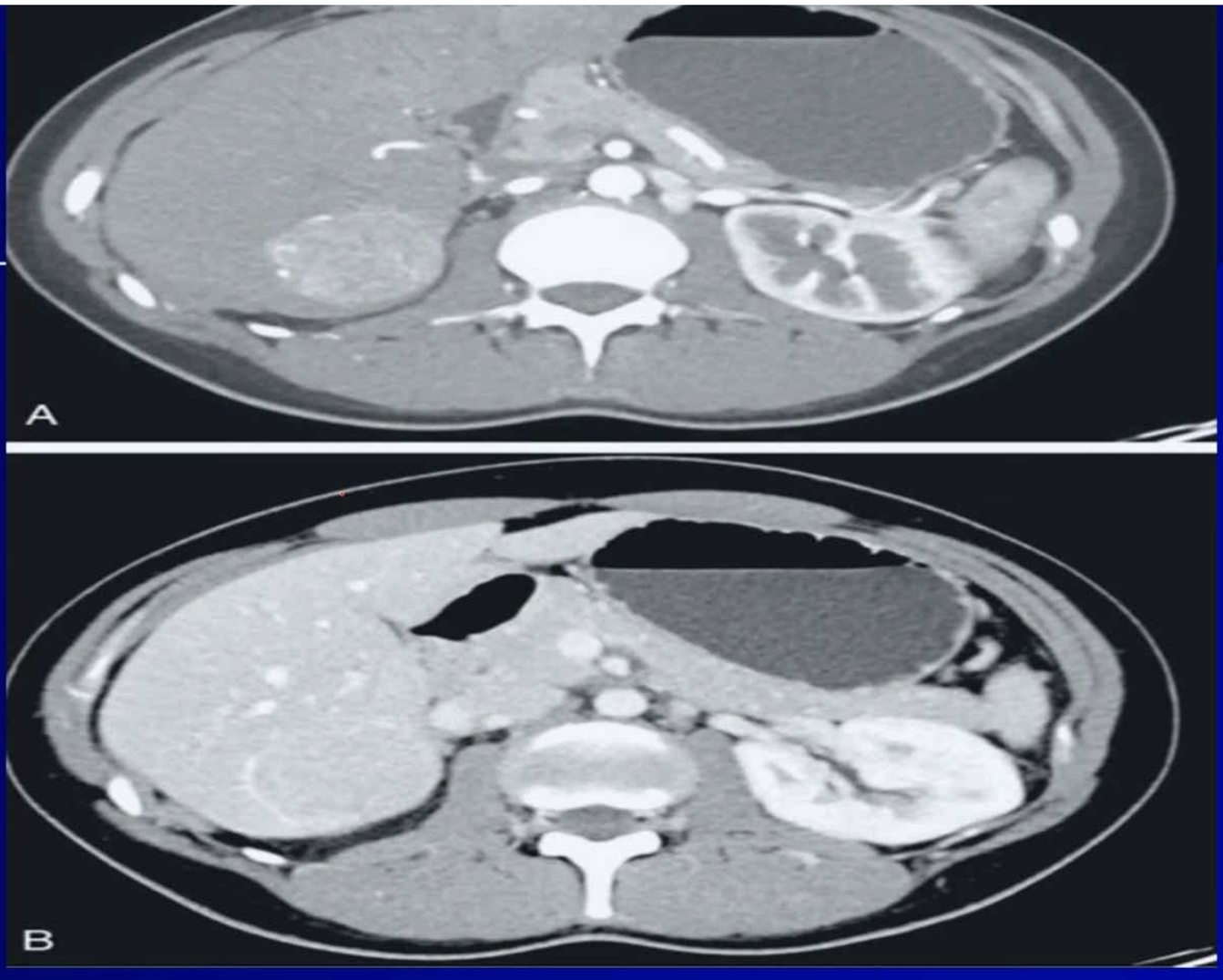
Treatment

- Hge hepatic artery embolization.
  - hemorrhage ↗ Ht
- Resection is the treatment of choice.
  - due to ability to become cancer 4%

Focal Nodular Hyperplasia (FNH)

- 2nd commonest benign liver solid lesion after hemangioma.
- *No malignant potential no hemorrhage*
- *Central stellate* scar in 80 %.
- More common in young and middle age women solitary in 80%. F : M → 8 : 1
- No relation with sex hormones or CSP. or OCP...
- ***Usually asymptomatic.***
- May cause minimal pain
- Diagnosis by US, CT.
- No treatment necessary.

* we do MRI and if it presented / don't do anything. The Best.



Focal Nodular Hyperplasia (FNH)

MALIGNANT TUMORS

Primary or secondary

- **Primary :**

  Is one of the **Commonest** [5th] world wide tumor.

Types

1. Hepato-carcinoma. (HCC)
2. Intra hepatic Cholangio-carcinoma .
   - distally [25%]
   - intra hepatic [25%]
   - in CHD [55-60%]
3. Metastasis from CRC
   - more common than HCC
   - Colorectal carcinoma.

* Distal Bile Duct carcinoma → 25%

* Female Cancers:-
  - Breast : 25%
  - lung 20%
  - colon 12-11%

* Male Cancers:-
  - prostate
  - lung
  - Colon.

Hepatocellular carcinoma HCC

Epidemiology

80% has liver cirrhosis (due to HBV or HCV or Alcohol or Autoimmune ...etc.)

- 5th cancer world wide , 3rd cause of cancer death.
- Most common primary malignant liver tumor world wide .
- World wide metastatic liver tumors are more common.
- HCC is *Four to Eight times* more common in men
- *Rarely occurs before the age of 40 years and reaches a peak at approximately 70 years of age.*
- *Fibro lamellar HCC*, occurs in patients with no underlying liver disease 30% .

has Better prognosis + affect younger age [45-50 y/o]

[denovo]

liver cirrhosis now

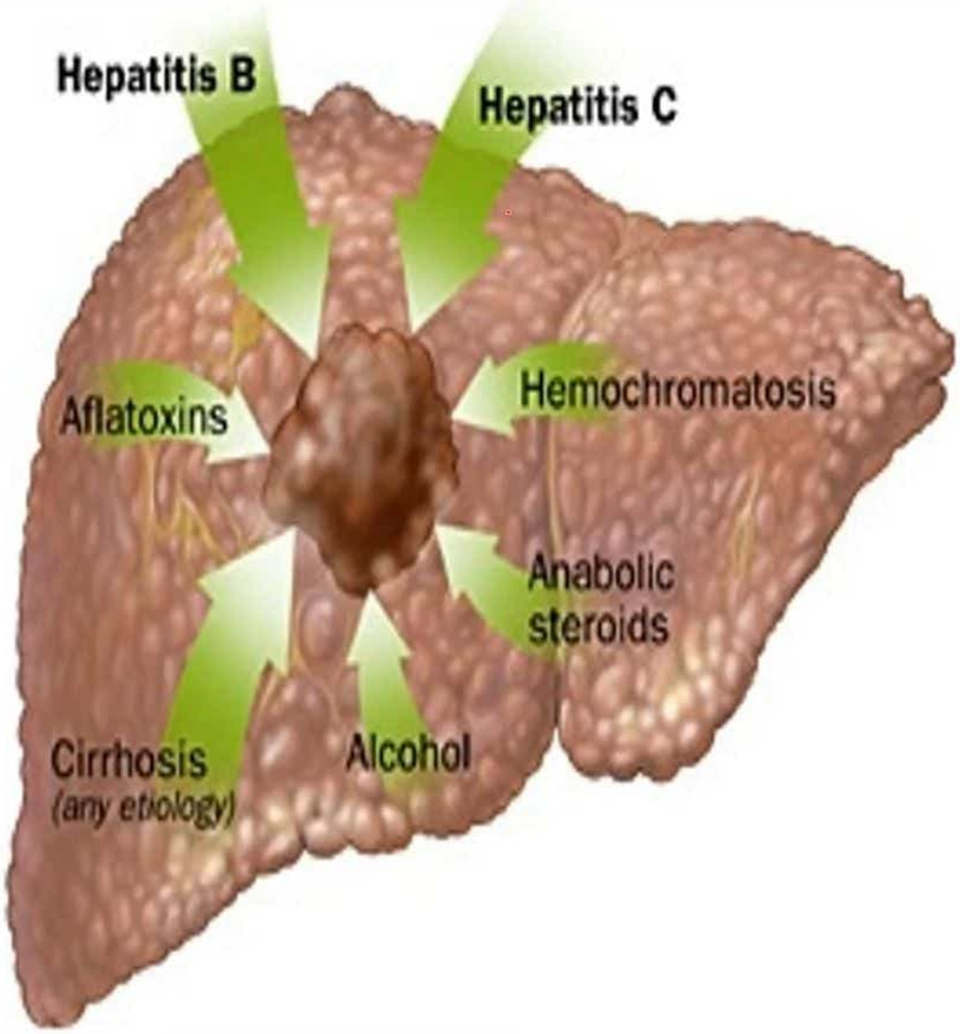
Aetiology & Risk factors

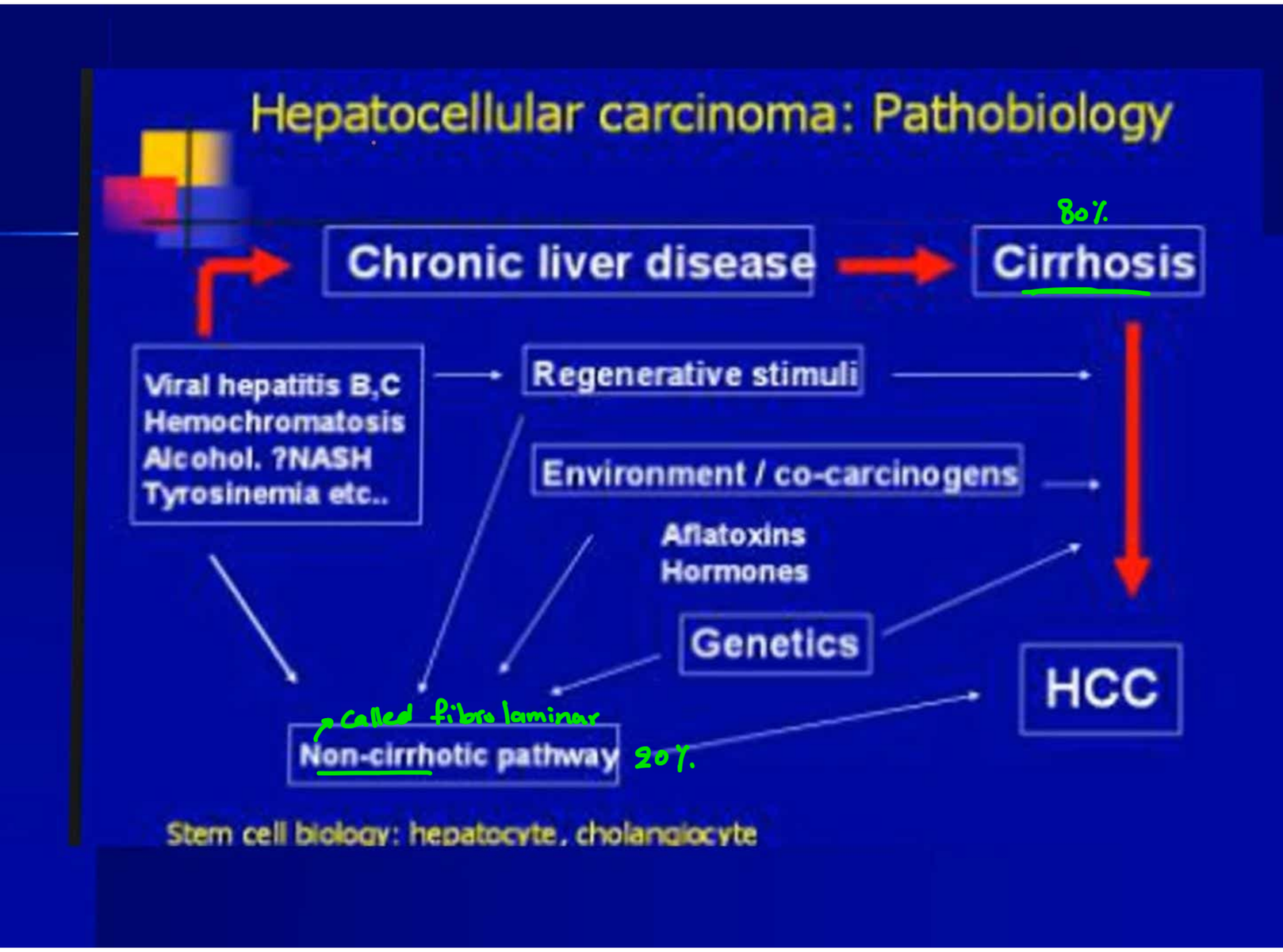
- Develop on top of cirrhosis, 70-80% of cases globally, ***Commonest*** cause.
- In a person with Cirrhosis, the annual conversion rate to HCC is ***2% to 6%.*** so need good followup for liver cirrhosis pt...
- Hepatitis B-C virus.
- Alcoholism.
- Auto immune chronic active hepatitis
- Hemochromatosis .
- Wilson's disease , DM .
  - ↑ copper
- Obesity.

risk factors of HCC...

* The Asymptomatic Gall stone became symptomatic annually 2-3% ...

Causes of HCC




Hepatocellular carcinoma: Pathobiology
Chronic liver disease
Cirrhosis
80%
Viral hepatitis B,C
Hemochromatosis
Alcohol. ?NASH
Tyrosinemia etc..
Regenerative stimuli
Environment / co-carcinogens
Aflatoxins
Hormones
Genetics
HCC
called fibro laminar
Non-cirrhotic pathway
20%
Stem cell biology: hepatocyte, cholangiocyte

Clinical presentation

* if the pt symptomatic he has liver cirrhosis [chronic liver dz] symptoms
HCC symptoms وليس

- Most people don't have signs and symptoms in the early stages .
- Patients often present in middle age .
- Either because of the symptoms of chronic liver disease (malaise, weakness (fatigue), jaundice, ascites, variceal bleed, encephalopathy).
- Anorexia & wt. loss of an advanced cancer.

GIT: lactulose...

* The UC may become cancer 1% after 10 years then each year increase the risk of cancer 0.5-1% ...

... CLD الـ جبب وافض بتؤدي لـ late presentation

late presentation of cancer :- UC الـ جبب انتكاسة وافض بتؤدي لـ

Hepatocellular Carcinoma on top of HBV



Hepatocellular carcinoma cont...

metachronous tumor يعني site في نفس الوقت بنفس الوقت 2 tumor لكن
reccurance بيكون site الـ نفس الـ أما لو

Pathology

Colon cancer زي ده synchronous tumor يعني في نفس الوقت 2 primary

- In cases of chronic liver disease multifocal by the time of diagnosis.

liver cancer زي ده

Metastasize within liver (1cy or 2cy), HLN (hilar LN), mediastinum, lungs, and bones, peritonieum.

-

* The papillary (80%) thyroid cancer has multifocal tumor in the neck...
  - spread to lymphatic...
  - has 5 P:- psammoma body - come in pediatric - popular - good prognosis - has projection [sun rays]


Pathology

Diagnosis

Radiology :

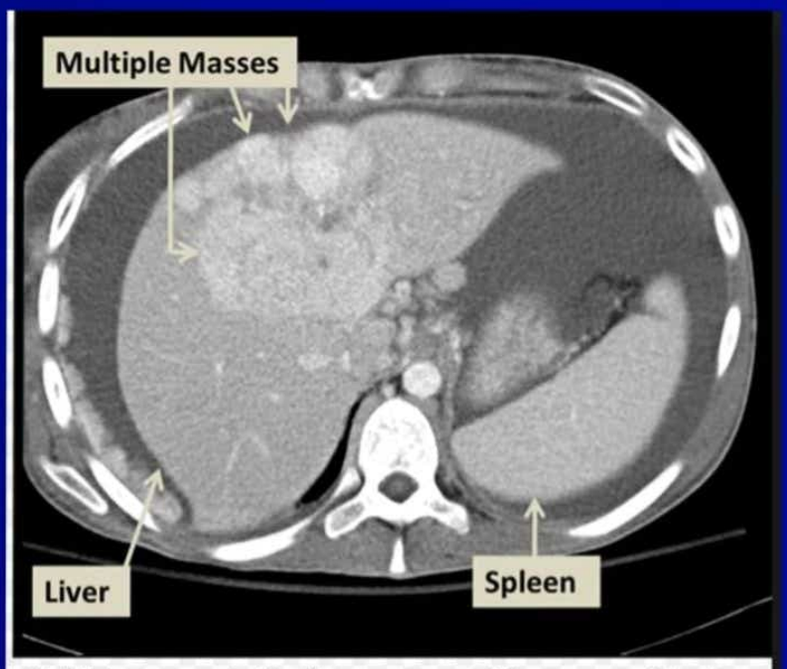
- ① **US:** is often the 1st imaging & screening modality.
- ② ③ *Spiral CT scan & contrast MRI* .

Tumor markers :

- **Alpha-Fetoprotein** : for liver tumor but not specific [30% increased in HCC]
  ↳ increased in Cholangiocarcinoma...
- ***Image-Guided Biopsy:*** **Should be considered for focal hepatic masses with *atypical imaging features* or discrepant findings on CT and MRI, or for lesions detected in the absence of cirrhosis.**

HCC





Multiple masses in the liver seen on a CT scan, consistent with hepatocellular carcinoma.


Pathology

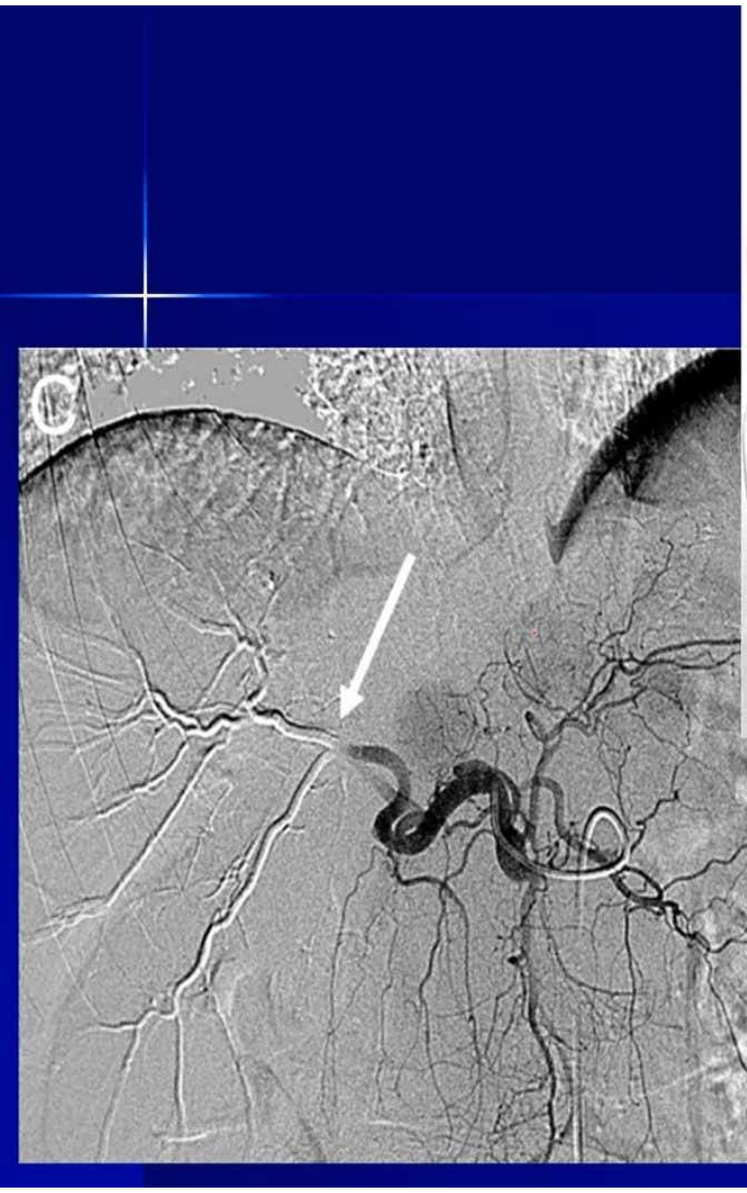
Treatment of HCC

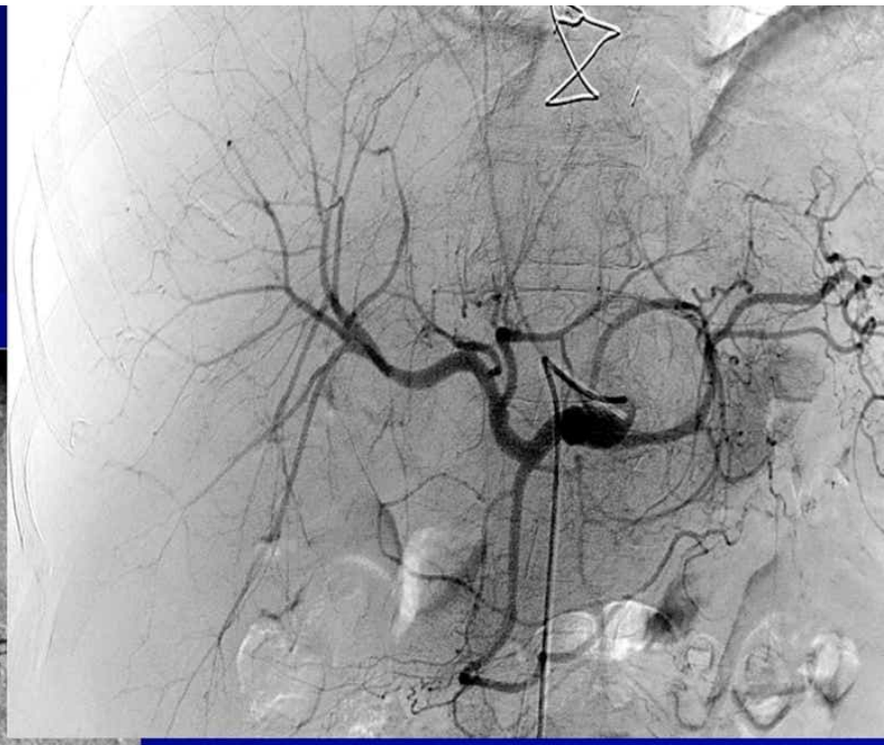
1. Surgical resection with 2cm safety margin.

for small tumor ≤ 5cm [تختفي liver segment تشيل منها على الأقل 20-30% of healthy liver]

- The majority of patients diagnosed with HCC will not be amenable to surgical resection (85%) because of the advanced stage of the cancer or the severity of the underlying liver disease.
- Recurrence rates up to 70% in 5 years.
- liver transplant . [Best and last choice] ..

2. Trans arterial embolization (TAE), transarterial chemo-embolization.


C



Treatment of HCC cont..

3. Radiofrequency ablation → for multifocal tumor.

- Has become the most frequently used form of local ablation therapy.
- It is the best treatment alternative for patients with early-stage hepatocellular carcinoma who are not eligible for surgical resection or transplant .
- ***No systemic chemotherapy*** was shown to be consistently efficacious in treatment of HCC

Prognosis : : 31% in localized HCC

11% in regional disease

if it multifocal → Bad Prognosis [↑ mortality rate]

④ liver transplantation. [Best and last choice]..

* 25% of colon cancer associated with liver metz on presentation + 25% lately are stage IV
* 8% of colon cancer is stage A ...
  └ localized mucosa - submucosa...
* 66% colon cancer is stage B and C ...
* on presentation of colon cancer pt we should do US to see if there is liver metz...

Secondary tumors → colorectal metz... 25%

- The *most common types* of cancer that spread to the liver are:
  Bowel, Breast, Pancreas, Stomach, Lung, Ovary & Malignant Melanoma .
- *CRLM is more common than PLT.*
- Multiple , Most resistant.
- Mild cholestatic picture (ALP, LDH)
- Dx imaging or FNA
- ***Treatment :*** Depends on the primary cancer

In some cases resection or chemoembolization
↳ of liver or RFA or liver transplantation...