

GBD

E J Arteen
FRCSI

Gall Bladder

Stores & concentrate 50 -80cc of bile

Anatomy: pear shape sac has

Fundus, body & neck

Fundus project from LB of liver, come in contact of AA wall

Surface anatomy of Fundus of GB

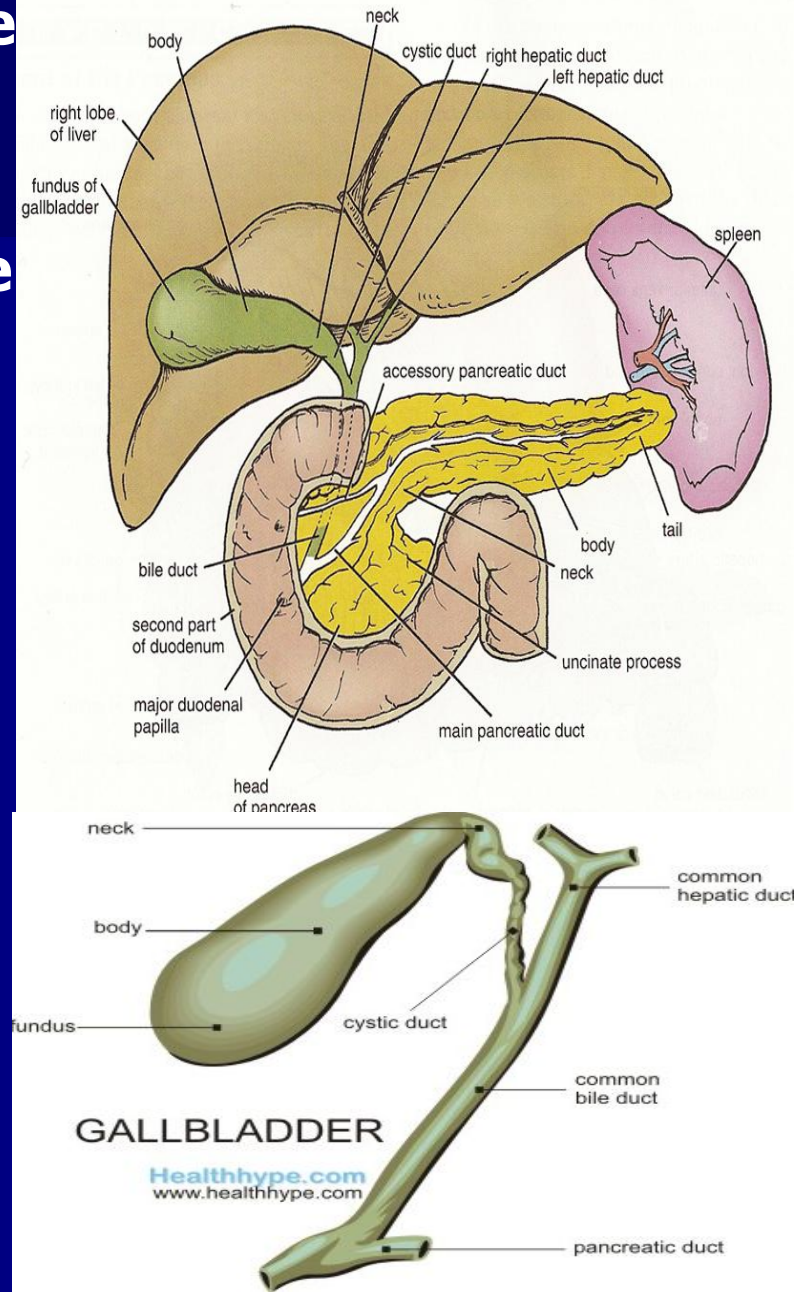
Body of GB is related to

- T colon
- Junction of D1-D2
- Cystic duct: 1.5 inch long, MM is folded.

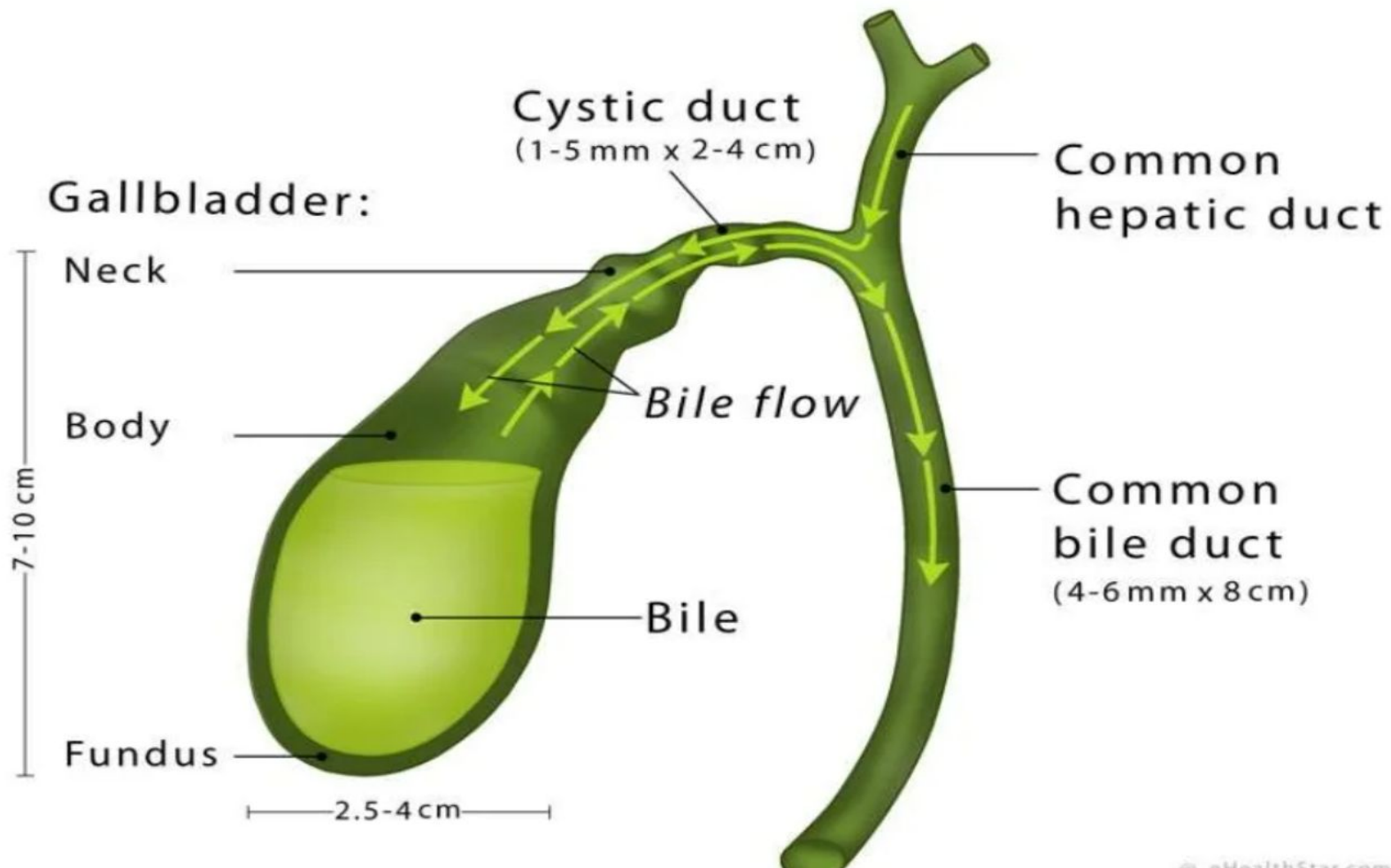
Joins CHD To form CBD

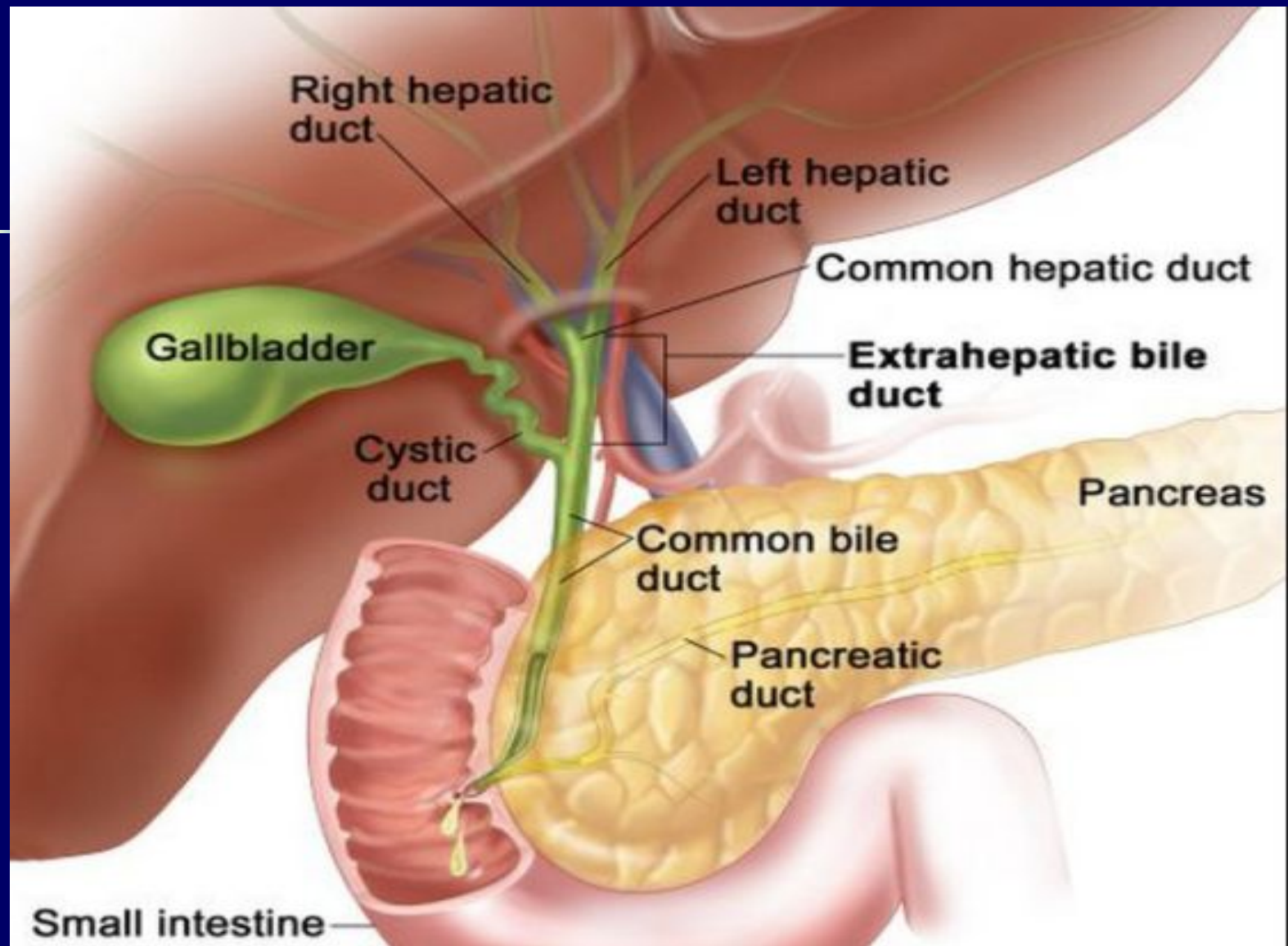
Bld. Supply:

- Cystic a. from right hepatic artery.
- liver Bed direct branches

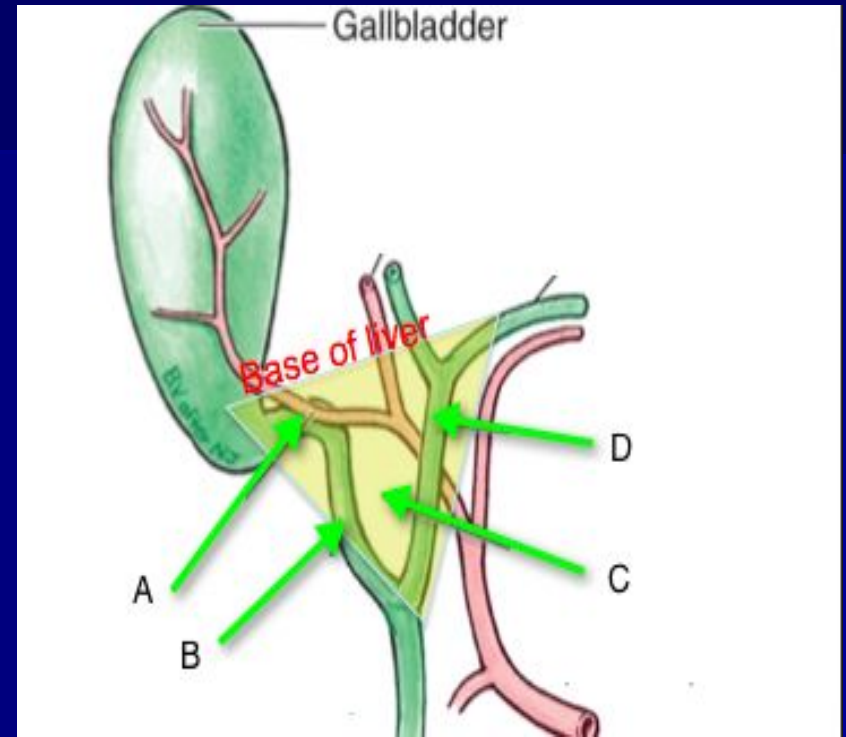
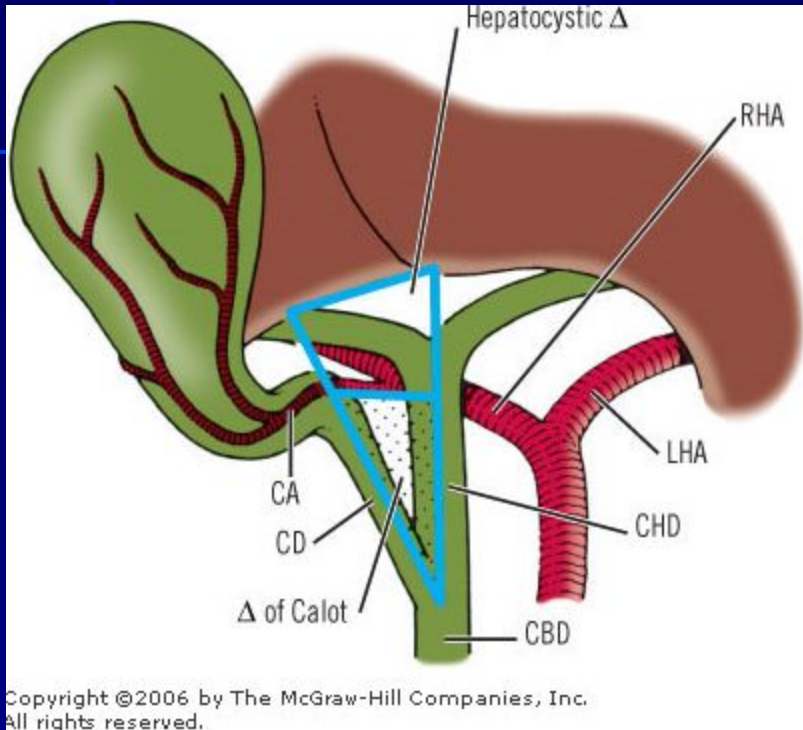


Biliary anatomy

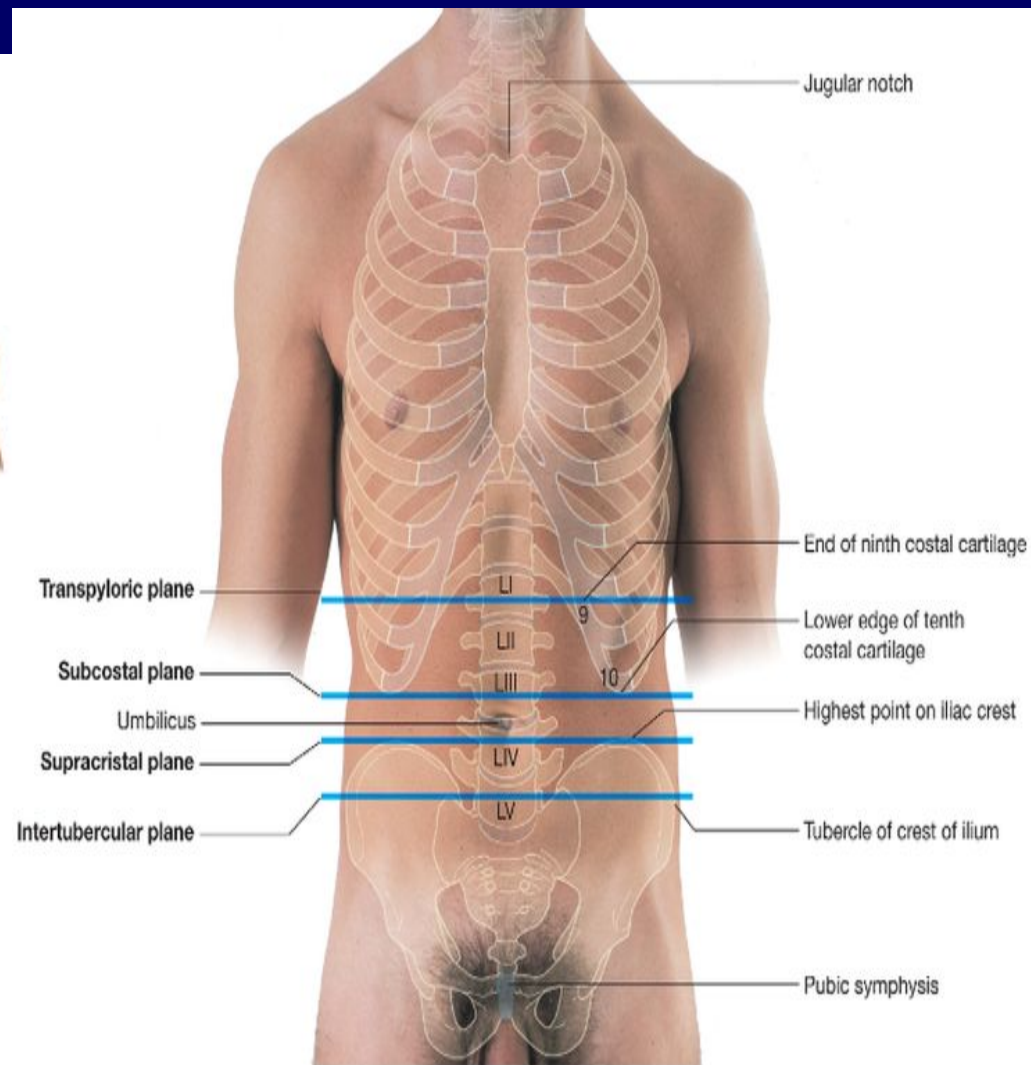
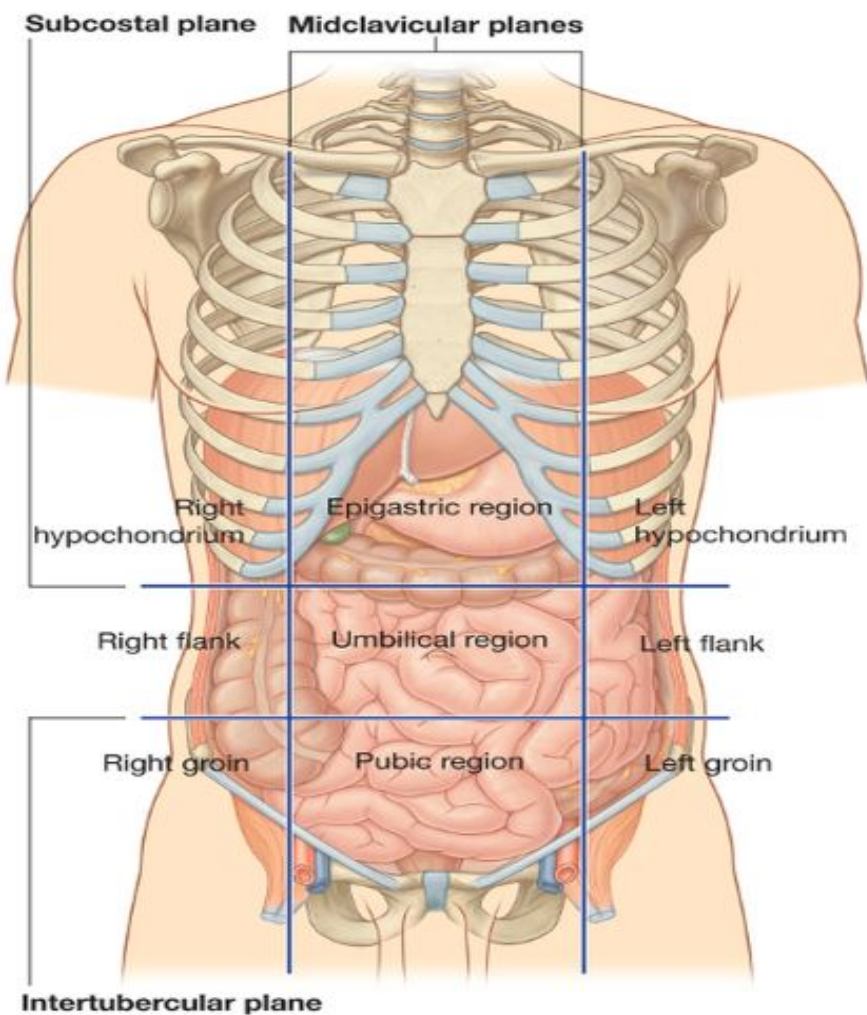




Calot's Triangle



At the junction of the neck of the gallbladder and the cystic duct, there is an out-pouching of the gallbladder wall forming a mucosal fold known as Hartmann's pouch, where Gall Stones commonly get stuck.



Anatomy of biliary system

Common Bile Duct (CBD)

Formed by union of: CHD + Cystic Duct (3-4 Inches long
5-6 mm wide).

Descends down behind 1st part
of D1

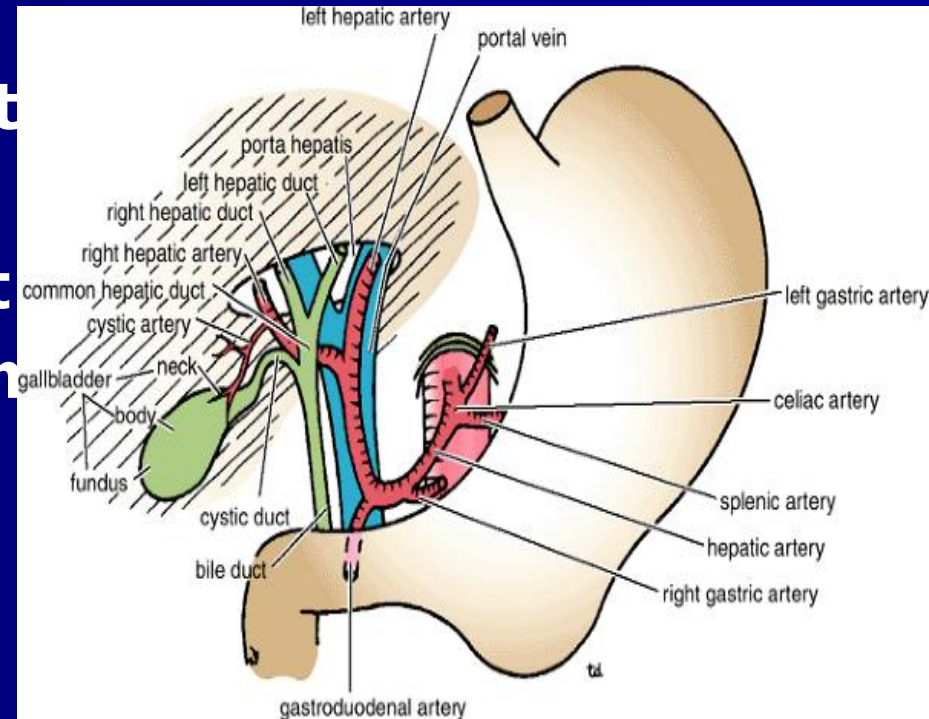
Joins the main pancreatic duct

Opens in *2nd part* of duodenum

Through:

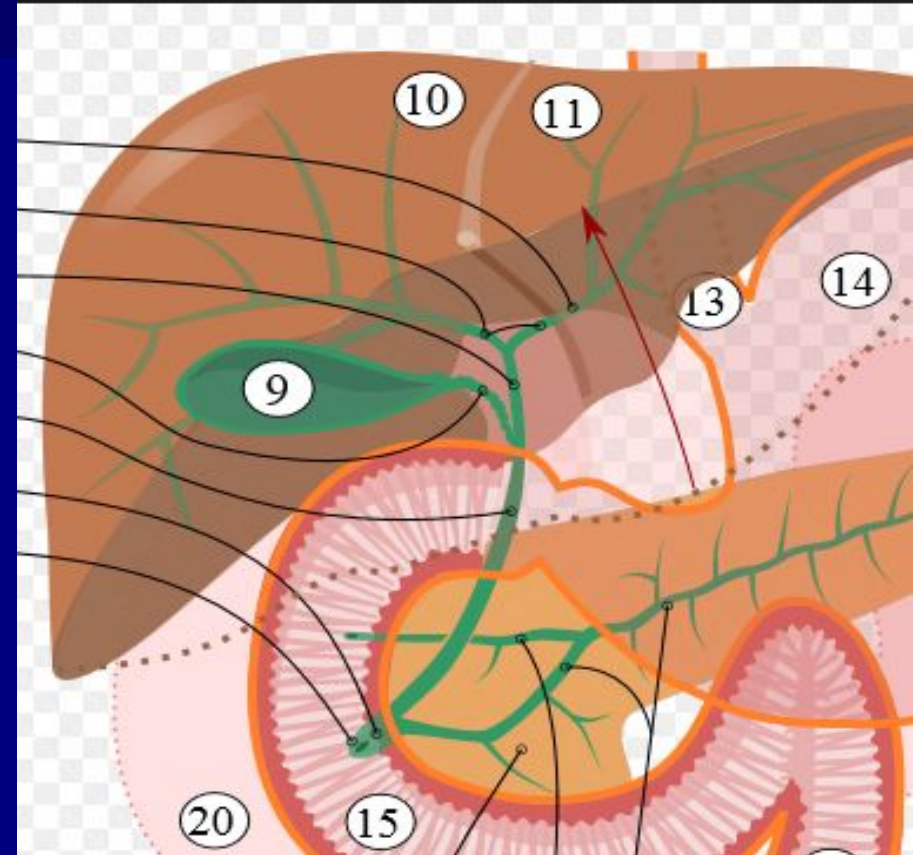
Ampulla of Vater
Into major duodenal papilla

Blood supply; Run longitudinally, at 3-9 o'clock from Gastro
duod, Sup Pd, Hepatic a

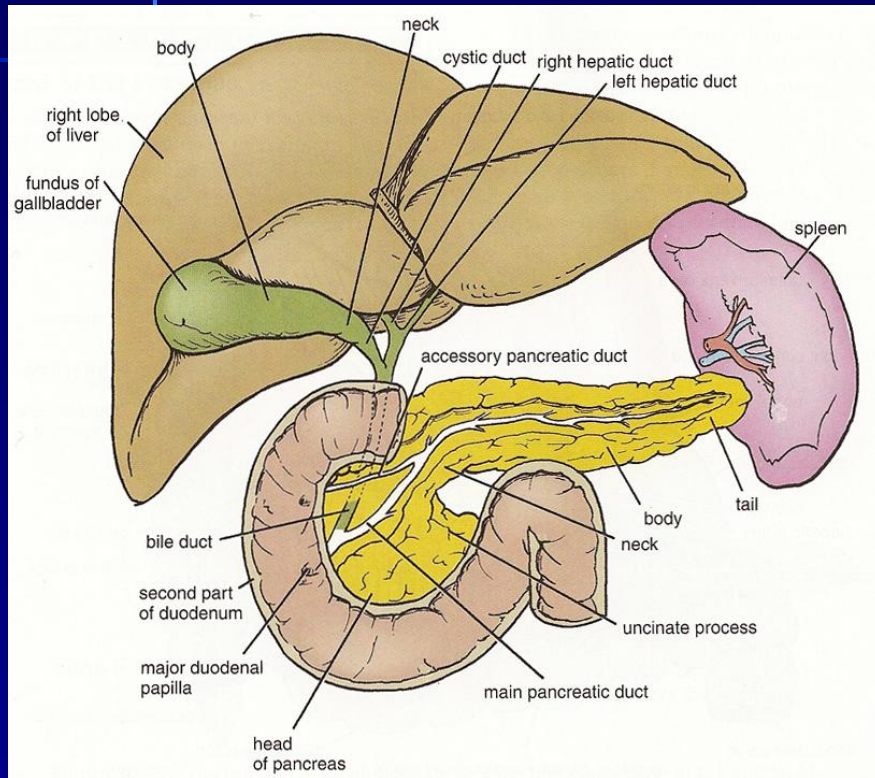


CBD

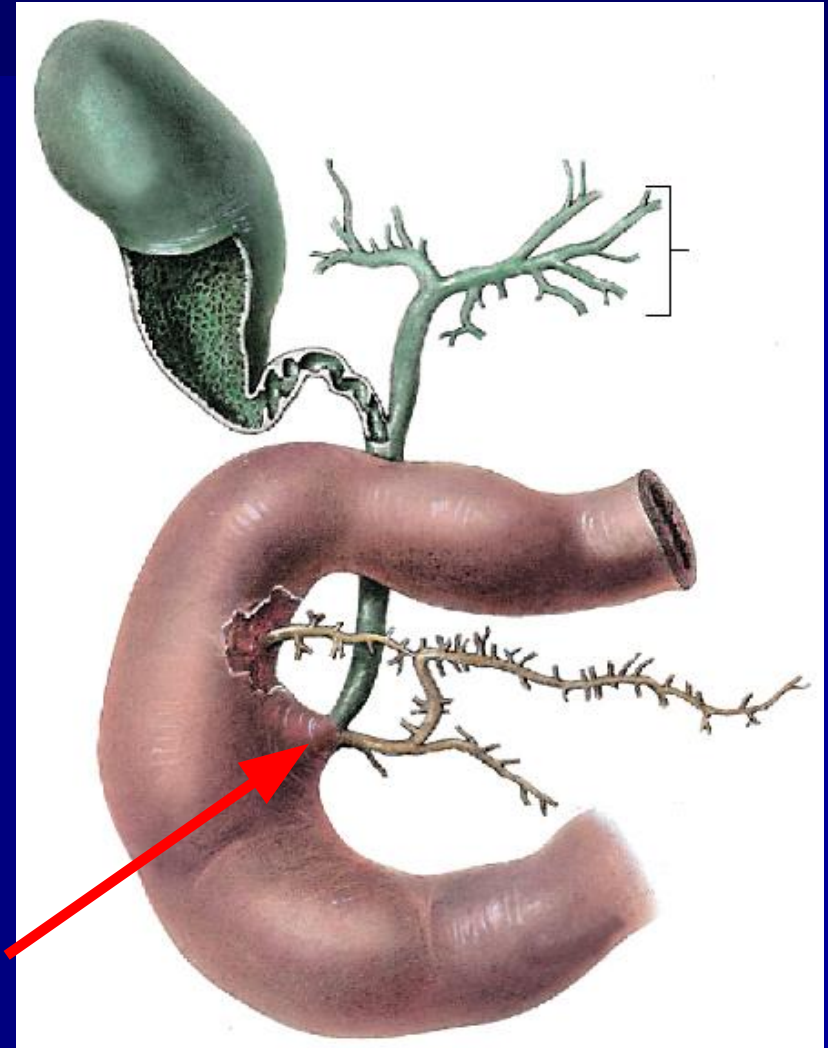
- Bile duct has 4 parts
- In and just below porta hepatis
- In free margin of lesser omentum: lie on Rt side of Hepatic artery
- Behind D1 : lie on Rt side of gastro duod a, in front of portal v
- Behind head of pancreas; Lie in front of IVC



Ampulla of Vater & Major duodenal papilla



Ampulla of Vater



GBD

- Genetic and environmental factors contribute to GBD.
- 80% are asymptomatic 20% develop symptoms in 15-20 years.
- Complication is typically in late 40s.
- Female gender 9:1 , pregnancy, family history are risk factors .
- 60% of AC are women , disease is more severe in men.
- Increase lipids and carbohydrates in diet.
- High cholesterol ,and triglycerides , Type II DM.

Types of GBS

Cholesterol Stones :Obesity , Pregnancy ,Gallbladder stasis ,Drugs , Heredity.

■ These are divided

● **Pure 90%-100% cholesterol** : Pure , whitish
>2.5cm

● **Mixed (50%-90% cholesterol)**: Small , multiple
variable shape and size.

■ **Pigment stones (15%)**

■ Pigment stones occur in 2 subtypes .

● **Brown stones** :formed of Calcium Bilirubinate.

GBS

- 17% of population has GBS , 50% remains asymptomatic over 10Y periods .
- Types of GBSs
- Cholesterol stones.
- Pigmented stones (Bilirubin Stones).
- Mixed stones.
- Calcium bile salts.



Stages of GBS

- Lithogenic state, in which conditions favour gallstone formation.
- Asymptomatic stage.
- Symptomatic stage.
- Stage of complications.

Rome Criteria for Biliary Pain

- Located in the Epigastrium and or RUQ.
- Occur at variable intervals.
- Severe enough to interrupt daily activity and lead to ED visit.
- Last at least 30 minutes.
- Builds up to steady level.
- Less than 20% reduced by bowel motion, or acid suppression, Or postural change.
- N.B : May be associated with nausea and vomiting ,radiates to back Rt infra-scapular region , awakes Pt from sleep.

How to differentiate BC from AC

- **Uncomplicated Biliary Colic** : Pain that is Poorly localized and visceral; an essentially benign abdominal examination without rebound or guarding; absence of fever.
- **Acute Cholecystitis** : Well-localized parietal pain in the RUQ, usually with rebound and guarding; +ve Murphy sign (nonspecific); frequent presence of fever; absence of peritoneal signs; frequent presence of tachycardia and diaphoresis; in severe cases, absent or hypoactive bowel sounds, 70% previous similar attacks

Hematologic Studies

- **CBC**
- **LFTS**
- **Serum amylase & Serum lipase .**
- **FBS.**
- **RFT.**

Investigation of Biliary tract

Plain Xray abdomen PFA:.

- Done to investigate causes of abdomen pain.
- Exclude intestinal obstruction or air under diaphragm , renal stones.
- In biliary disease used to identify GB stones, mural gases ,air in biliary tree, mural calcification.

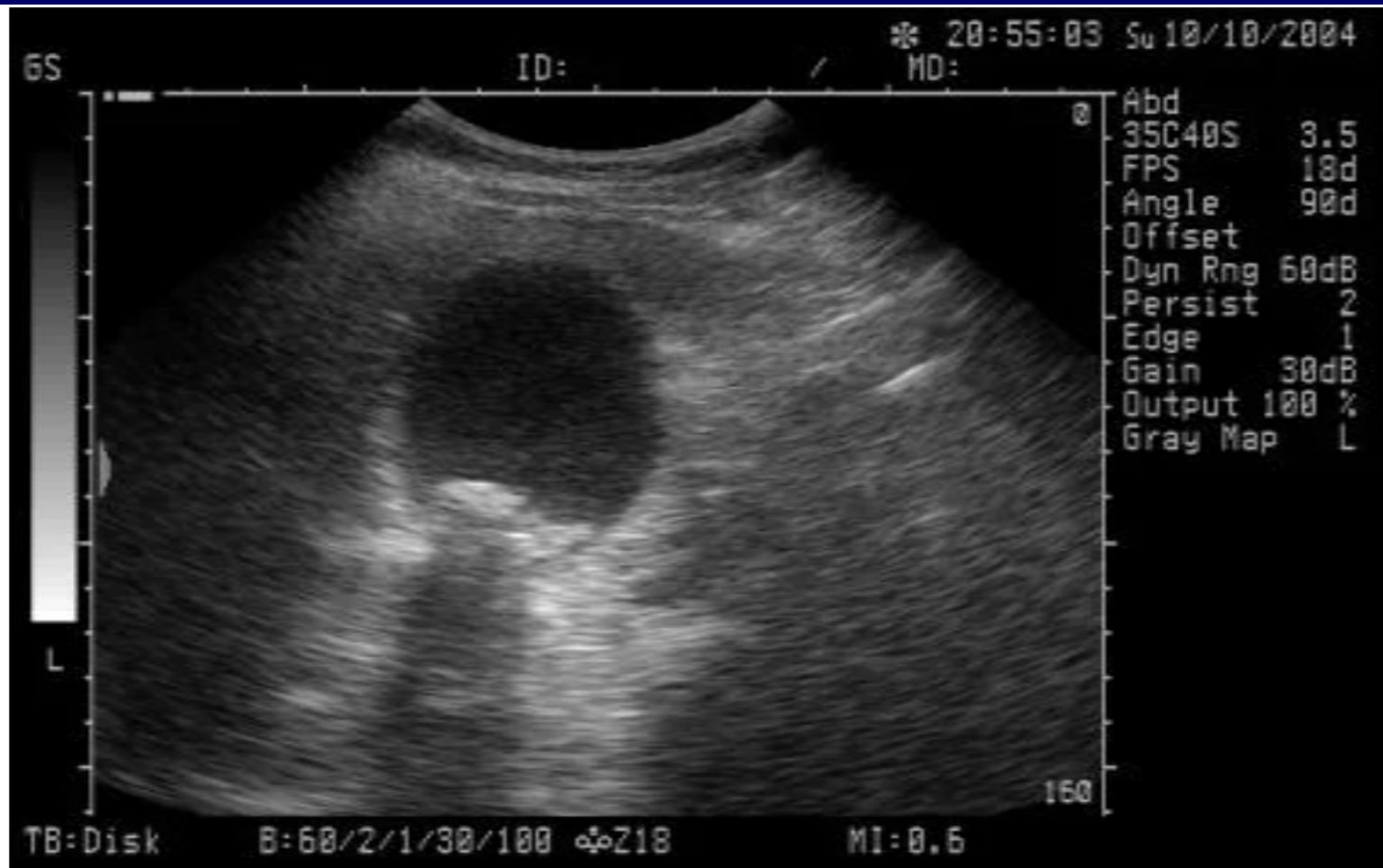


U/S

- Accurate more than 98% in identify GB stones.
- Done in supine and lateral decubitus.
- Diagnose intra-extra hepatic biliary dilatation.
- Detect GBS ,and bile duct stones.
- GB polyps , Choledochal cyst
- Detect Acute cholecystitis.

- EUS
- Laparoscopic US





The sonogram only shows gallstones within the gallbladder but no evidence of cholecystitis (ie, gallbladder wall thickening, pericholecystic fluid, common bile duct dilatation, sonographic Murphy sign).

[View Media Gallery](#)

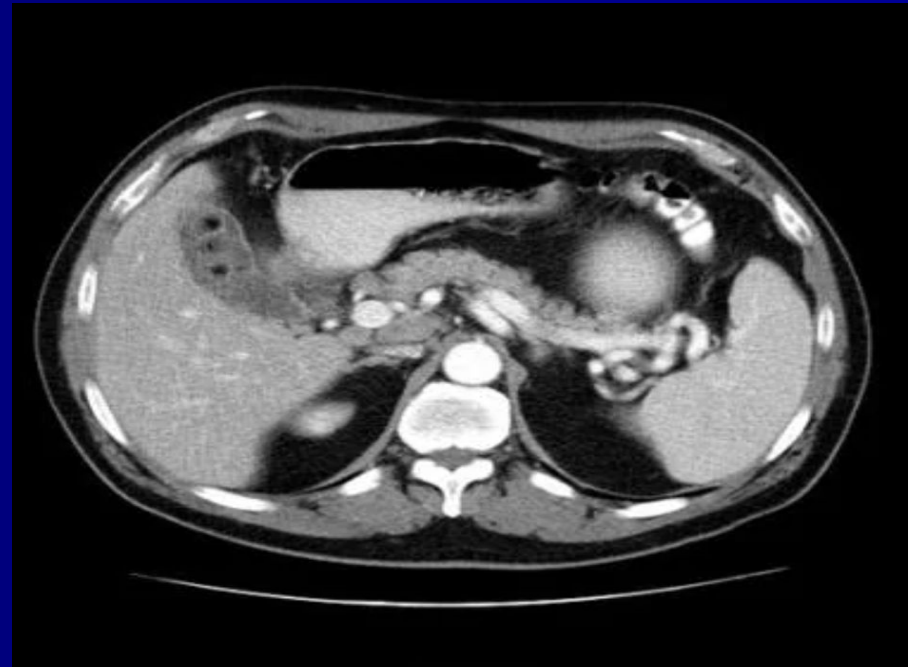
■ General ultrasonographic features of AC

Findings include Gallstones or Sludge and one or more of the following conditions:

- Gallbladder wall thickening (>2-4 mm) -
Gallbladder distention (diameter >4 cm, length >10 cm)
- Pericholecystic fluid from perforation or exudate
—
- Air in the Gallbladder wall (indicating gangrenous cholecystitis)
- Ultrasonographic Murphy sign (86-92% sensitive, 35% specific) - pain when the probe is pushed

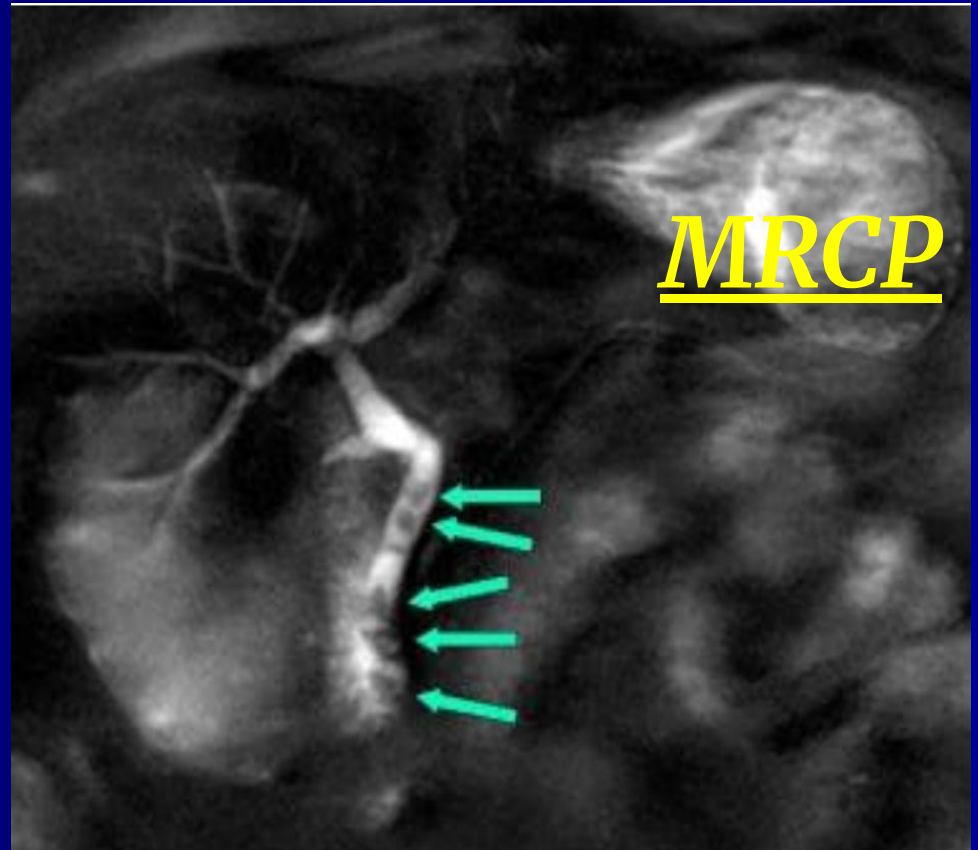
CT Scan

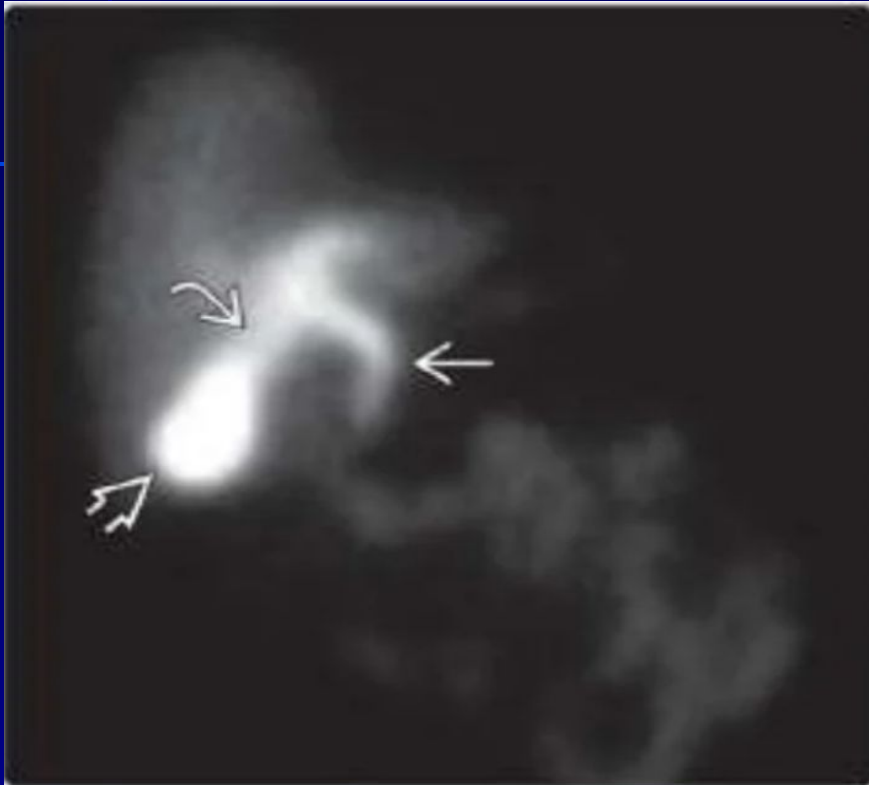
- Although approximately 20% of gallstones are not identified on CT.
- The sensitivity of CT is not higher than us for obstructive jaundice.
- It is important for Staging of Biliary tumors.



Continue

- HIDA 99 T Scan.
- PTC.
- EUS.
- ERCP
- MRCP



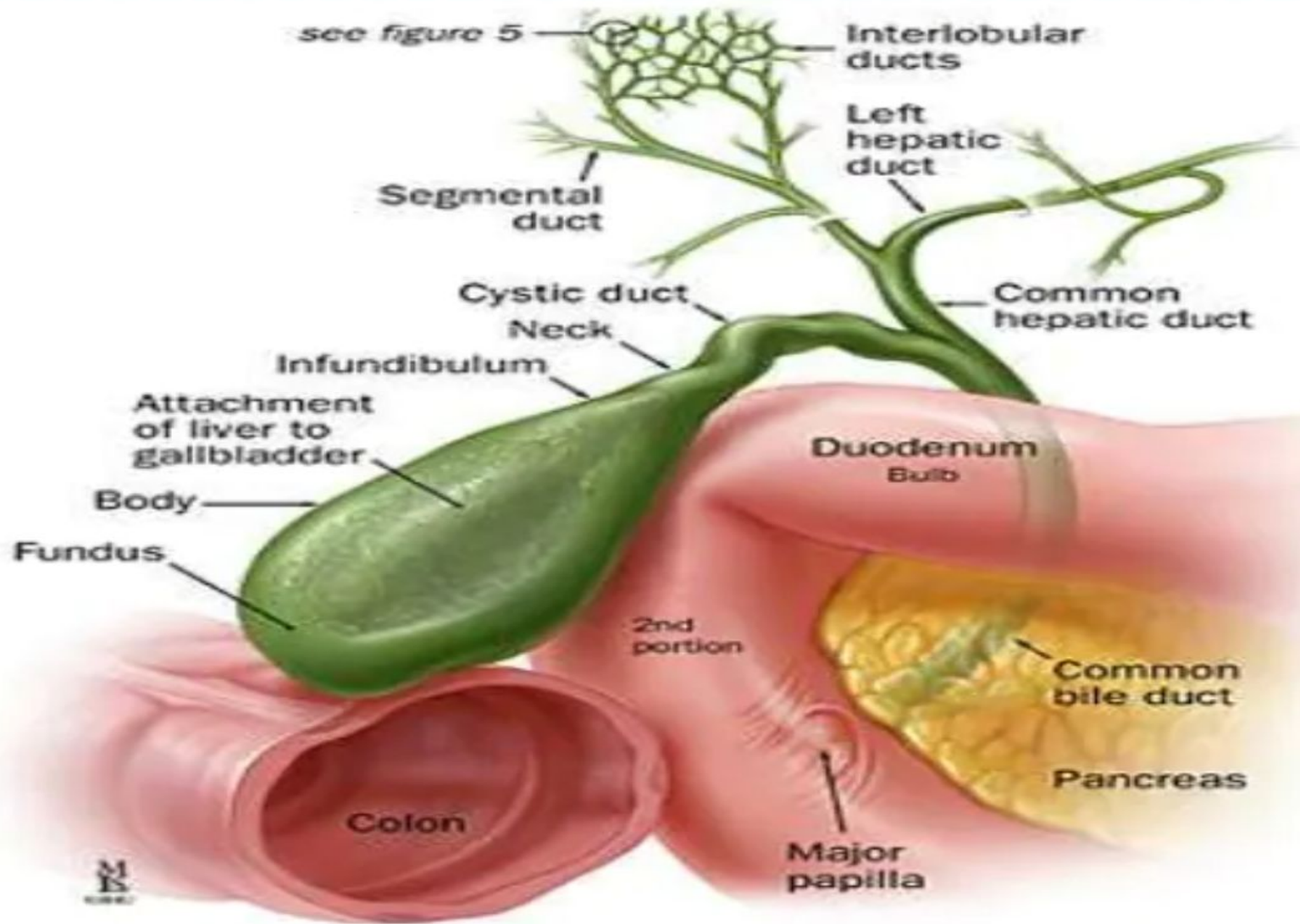


(Left) Normal hepatobiliary scintigraphy study shows. GB , cystic duct and CBD
Note faint radiotracer in the liver and bowel.



(Right) MRCP 3D reconstruction of the biliary system in patient post
cholecystectomy is shown. Left and right intrahepatic ducts , CBD , second
portion of duodenum, gallstone in the distal CBD.



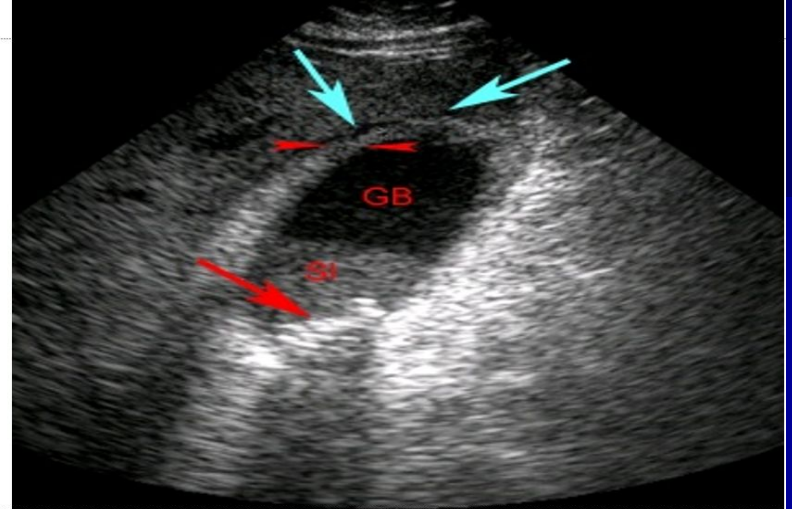


Cholecystectomy in pt with increase risk of GBC

- Porcelain GB.
- Stones larger than 3 cm .
- Family history of GBC.
- Cholecystectomy at time of Bariatric surgery

Symptoms of Biliary Disease

- Abdominal pain.
- Jaundice.
- Nausea and vomiting.
- Loss of appetite.
- Fever , chills.
- Fatigue, Itching
- Clay colored stool ,tea colored urine.



Acute cholecystitis

- Surgical Emergency require in hospital admission.
- AC is caused by stone blocking the cystic duct continuously.
- Pain in RUQ & Epigastrium more than 4-6 hours.
- Nausea and vomiting.
- Fever not common , Leukocytosis.
- RUQ mass.
- Mild elevation of bilirubin level.
- Most diagnostic sign is Rt upper abdominal tenderness.
- **Murphy's Sign:** *Inspiratory Arrest with Palpation over GB.*

AC

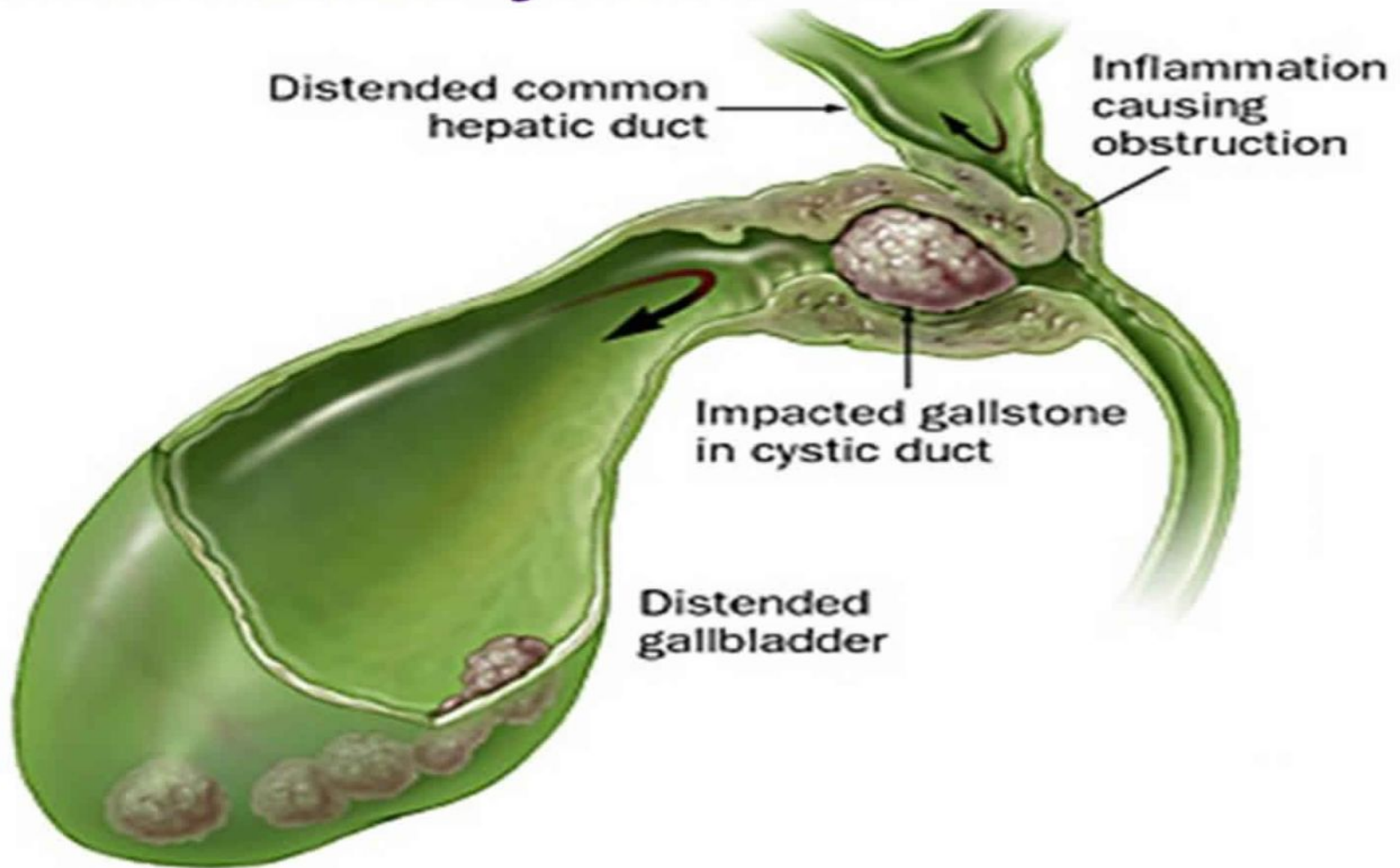
- *Symptoms may be Muted or Absent in*
 - Obese.
 - Immunocompromised.
 - DM.
 - On steroids
 - Change of level of consciousness.

CBD Stones

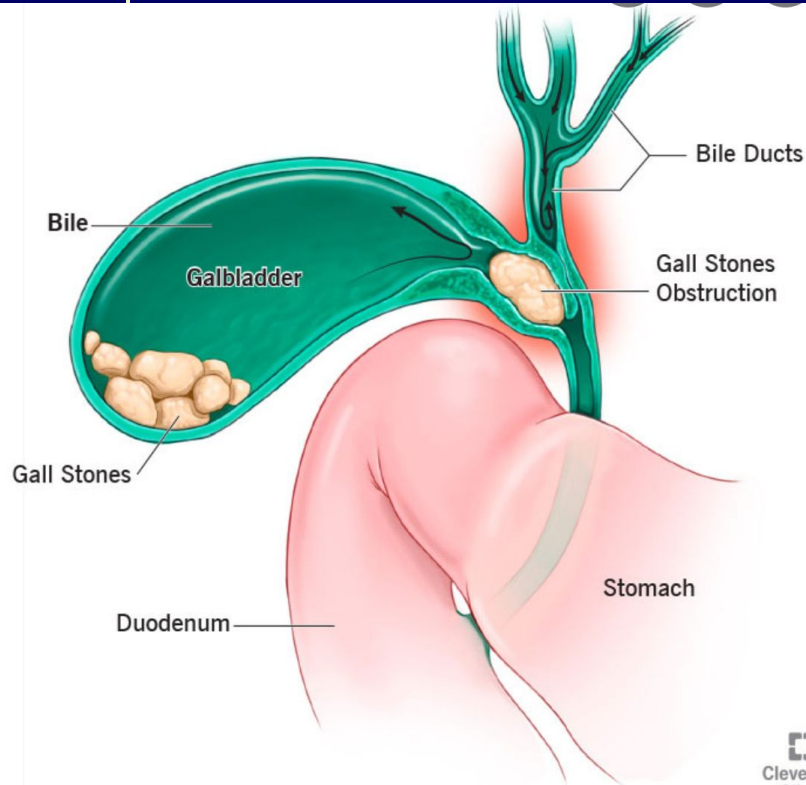
- CBD stones is found in 6-12% of gall stones.
- It is the commonest cause of Obstructive jaundice.
- Mirizzi syndrome: is the presence of a stone impacted in the cystic duct or the GB neck, causing inflammation and external compression of the CHD and thus biliary obstruction. A fistula may form between the gallbladder and the CBD and the gallstone may then come to lie in the CBD.



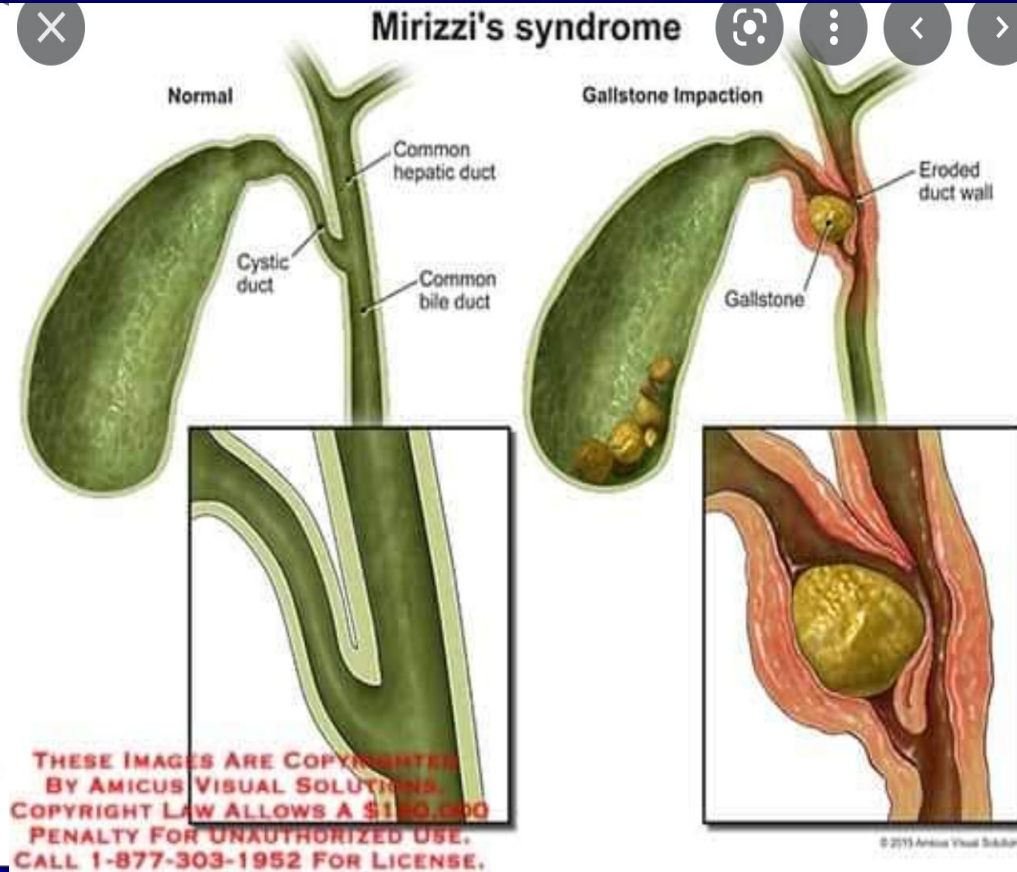
MIRRIZI's syndrome



Types of Mirizzi's syndrome



Cleveland
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Extrahepatic causes of CBD obstruction

- Extrahepatic causes are subdivided into those that are intraductal and those that are extraductal.
- Intraductal Causes: include stone disease, neoplasms, biliary stricture, parasites, primary sclerosing cholangitis (PSC).
- Choledochal cysts cause functional biliary obstruction.
- Extraductal Obstruction: caused by external compression of the biliary ducts may be secondary to neoplasms, pancreatitis (acute and chronic), pancreatic pseudocysts, collaterals of portal hypertension (portal biliopathy), or cystic duct stones with subsequent gallbladder.

Tumors which leads to biliary obstruction

- **Cholangiocarcinomas** :& ampullary carcinomas , and gallbladder carcinomas , cause obstruction within the ducts.
- **Pancreatic tumours**: 60% occur in the head of the pancreas and manifest early with obstructive jaundice.
- **Metastatic tumours**: usually from the gastrointestinal tract or the breast and the secondary adenopathies in the porta hepatis that may be associated with these tumours can cause external

Mirizzi syndrome

- MS refers to Common Hepatic Duct Obstruction caused by an Extrinsic Compression from an impacted stone in the cystic duct.
- It has been estimated to occur in 0.7-1.4% of all cholecystectomies.
- It is often not recognized preoperatively, which can lead to significant morbidity and biliary injury, particularly with laparoscopic surgery.

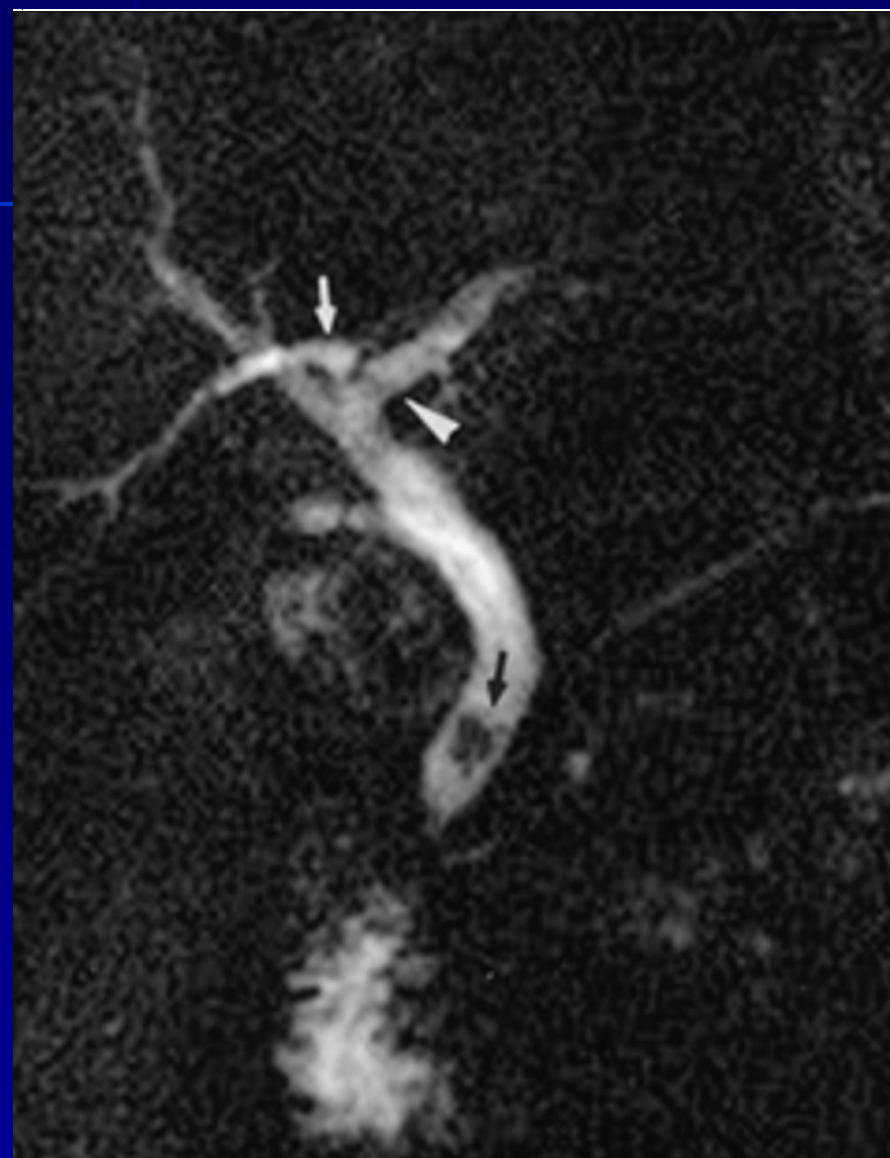
Cholangitis

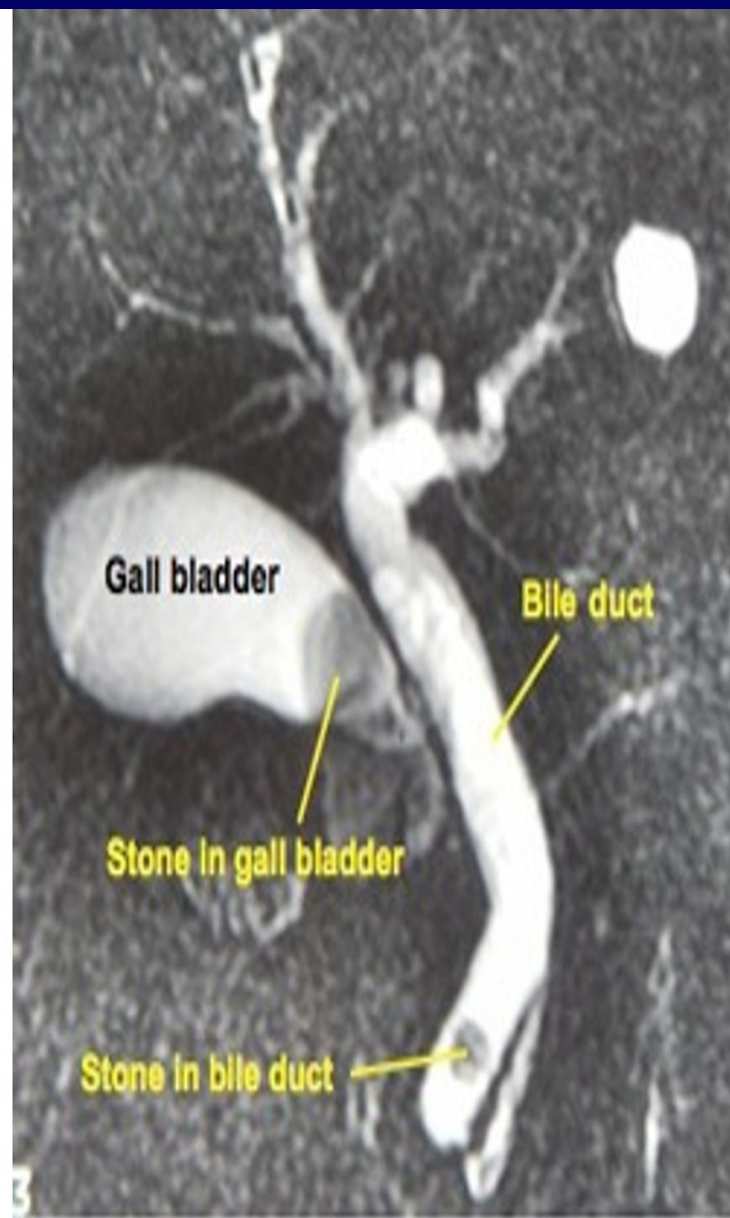
Cholangitis : Infection of the biliary system, complicating benign and malignant obstruction of the BT.

The clinical presentation depends on the nature of the illness, patient age, and condition of the patient.

Charcot Triad: (*Fever, Right upper quadrant pain, Jaundice*) occurs in only 20%-70% of cases.

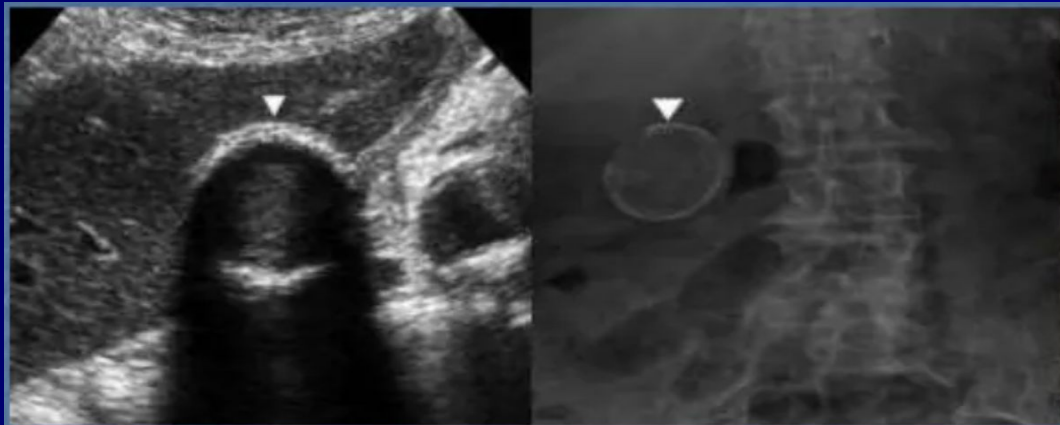
Reynolds Pentad : (*Hypotension and Mental status changes*) also may accompany severe infection . The organisms typically identified are **Enteric in origin**, they probably enter the biliary system via portal bacteraemia.





Porcelain GB

- Rare condition where chronic cholecystitis predispose to mural calcium deposition in GB.
- Precancerous condition.
- Treatment: prophylactic cholecystectomy



U/S AND PLAIN RADIOGRAPH SHOWING GB WALL
CALCIFICATIONS i.e. PORCELAIN GALL BLADDER

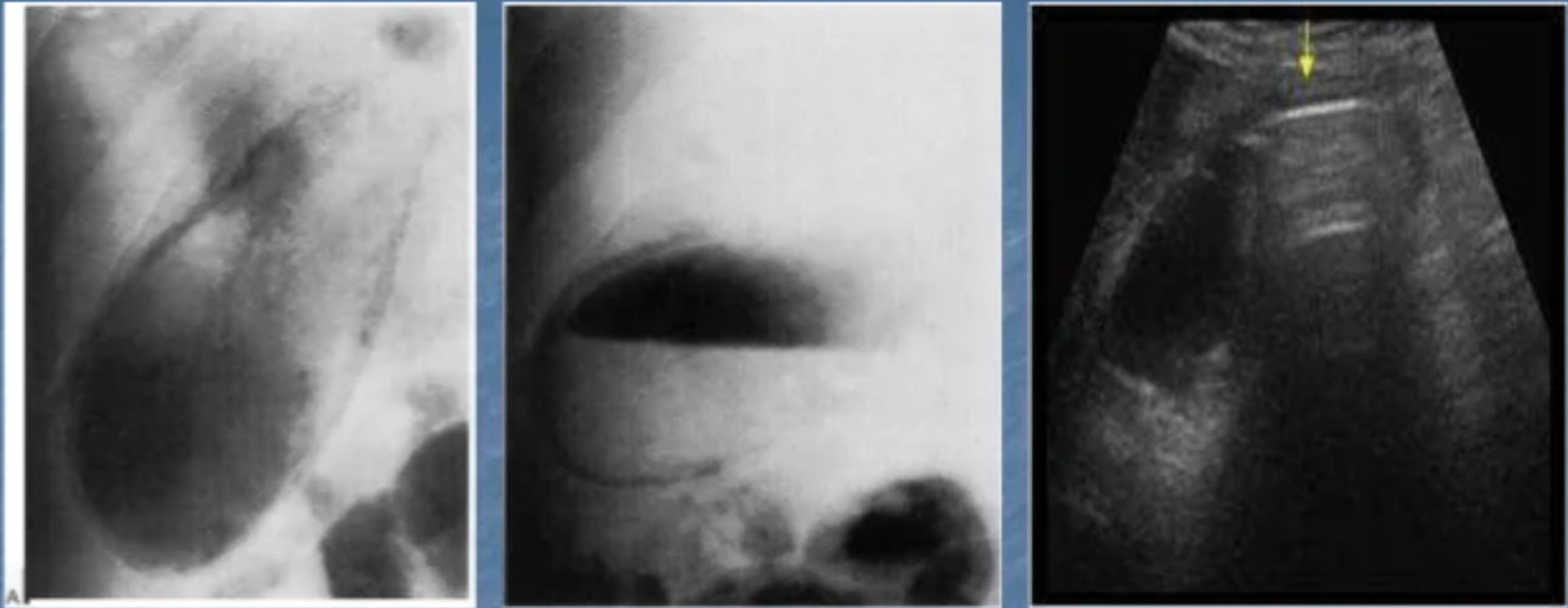
Acalculous cholecystitis

- 5% of patients have cholecystitis with no gall bladder stones.
- Etiology: Multifocal include Cystic Duct obstruction , infection and GB ischemia.
- It is common in ICU elderly patients with co morbidities.
- Risk factors include diabetes, human immunodeficiency virus (HIV) infection, vascular disease, TPN, prolonged fasting.
- Usually present with Fever and Sepsis with No symptoms and signs of GBD.

Emphysematous cholecystitis

- Infection from gas forming organism like CW.
- Most common in DM Immunocompromised patients.
- Perforation of GB is 5 times more common.
- Plain X-ray show gas in GB
- U/S:

Emphysematous cholecystitis



Emphysematous cholecystitis showing (A) gas in the lumen and wall of the gallbladder and (B) a gas-fluid level in the erect posture.

Cholesterosis

- Deposition of cholesterol in GB mucosa.
- Generally asymptomatic
- Deposition is 1-2 mm thick

Adenomyomatosis

- Benign, asymptomatic condition.
- Produce local or diffuse wall thickening.
- Mucosal herniation to muscle layer

Asymptomatic gallstones

- IN US 25% of females ,12% of males have GBS by age of 60Y.
- 1-2% becomes symptomatic each year.
- Find accidentally in routine U/S abdomen
- Two types
- Asymptomatic GS in Asymptomatic pt
- Asymptomatic GS in symptomatic pt

Long-Term Monitoring

- Following cholecystectomy, about 5%-10% of patients develop Chronic Diarrheal. This is usually attributed to bile salts.
- The frequency of enterohepatic circulation of bile salts increases after the gallbladder is removed, resulting in more bile salt reaching the colon.
- In the colon, bile salts stimulate mucosal secretion of salt and water.

Post-Cholecystectomy Syndrome

- Following cholecystectomy, a few individuals experience Recurrent Pain Resembling Biliary Colic. The term is sometimes used for this condition is PCS.
- Many patients with PCS have long-term functional pain that was originally misdiagnosed as being of biliary origin.
- 50% biliary ,50% non biliary.
- Biliary dyskinesia is the most important biliary cause.
- Non-biliary PUD,HH, Diverticular disease , IBS.

GB polyp

- Usually asymptomatic benign produce cholesterol polyp.
- U/S: non mobile non shadowing ball in the wall.



Neoplasms of Biliary Tract

■ Carcinoma of the biliary system manifests with clinical symptoms of Weight Loss, nausea, anorexia, abdominal pain, fatigue, pruritus, fever, malaise, diarrheal constipation and abdominal fullness. Symptomatic patients usually have advanced disease, with spread to hilar lymph nodes before obstructive jaundice occurs. It is associated with a poor prognosis.

Gallbladder cancer

- **90% have GB Stones.**
- **M:F 3:1.**
- **Porcelain GB and Sclerosing cholangitis are risk factors.**
- **CT, US ,soft tissue mass in GB and near it ,direct extension to the liver.**
- **This uncommon malignancy It represents 54% of biliary tract cancers.**
- **Cancer that develops in the infundibulum can produce hydrops of the gallbladder that is clinically indistinguishable from an obstructing stone.**

Cholangiocarcinoma

- Cholangiocarcinoma is an adenocarcinoma of the BD .
- It may occur without associated risk factors, but it is associated more commonly with chronic cholestatic liver disease such as PSC, choledochal cysts .
- Cholangiocarcinoma accounts for 25% of biliary tract cancers. Patients usually present with jaundice, a vague upper or right upper quadrant abdominal pain associated with anorexia, weight loss, and pruritus.

Ampullary cancer

- Ampullary cancer accounts for 8% of biliary tract cancers. It most commonly presents with painless

