

OBSTRUCTIVE JAUNDICE

S1 UNIT

CONTENTS

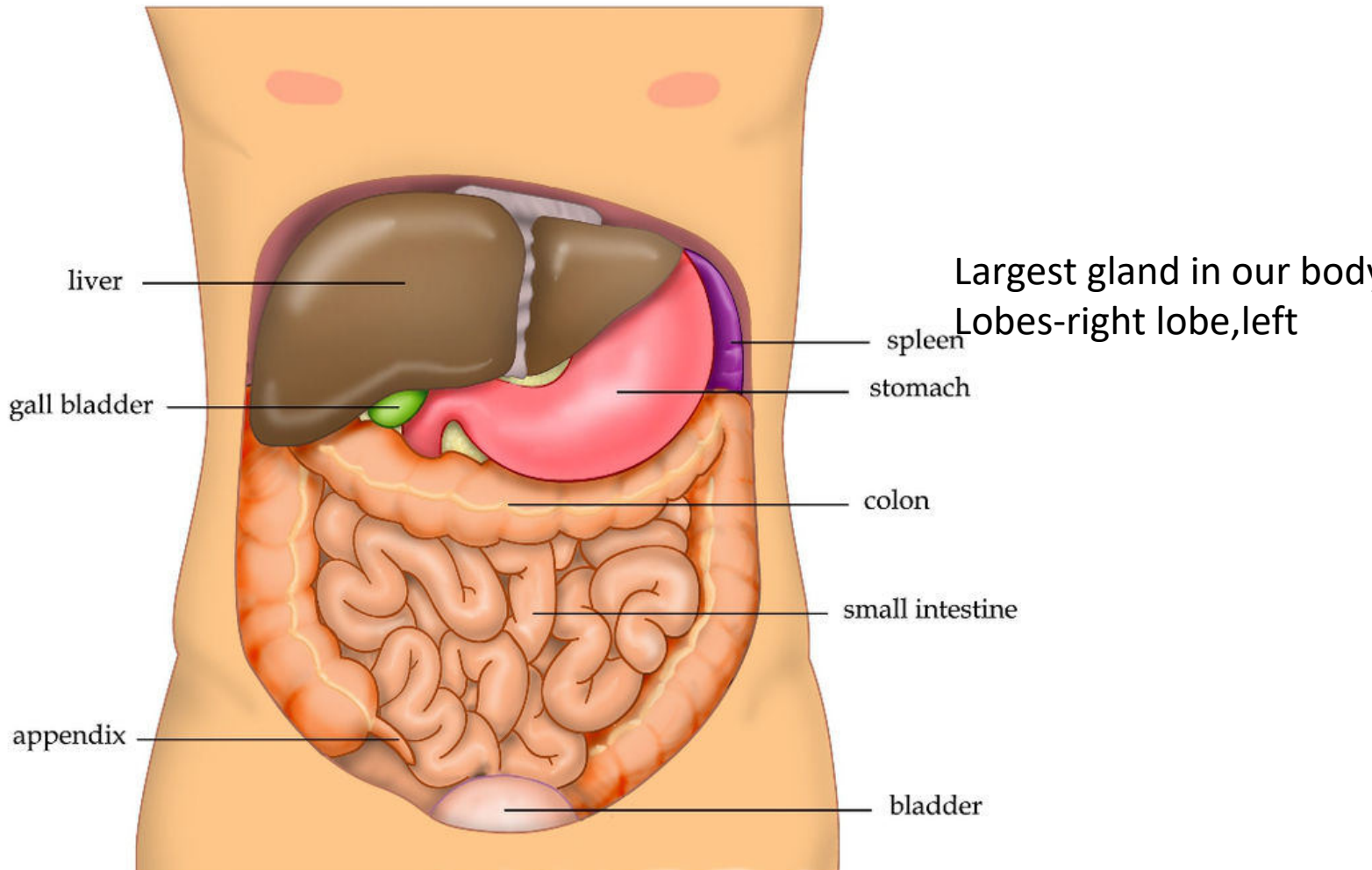
- **Surgical anatomy** : **Lakshmi Parvathy**
 - **Physiology and pathophysiology** : **Leon Francis**
 - **Etiopathogenesis** : **Maria Mathew**
 - **Clinical Evaluation** : **Marlin T Abraham**
 - **Investigations** : **Martin K Sebastian**
 - **Management of calculous conditions** : **Megha Thomas**
 - **Management of benign conditions** : **Muhammed Afnas**
 - **Management of malignant conditions** : **Muhammed Galib**
-

SURGICAL ANATOMY OF HEPATOBIILIARY SYSTEM

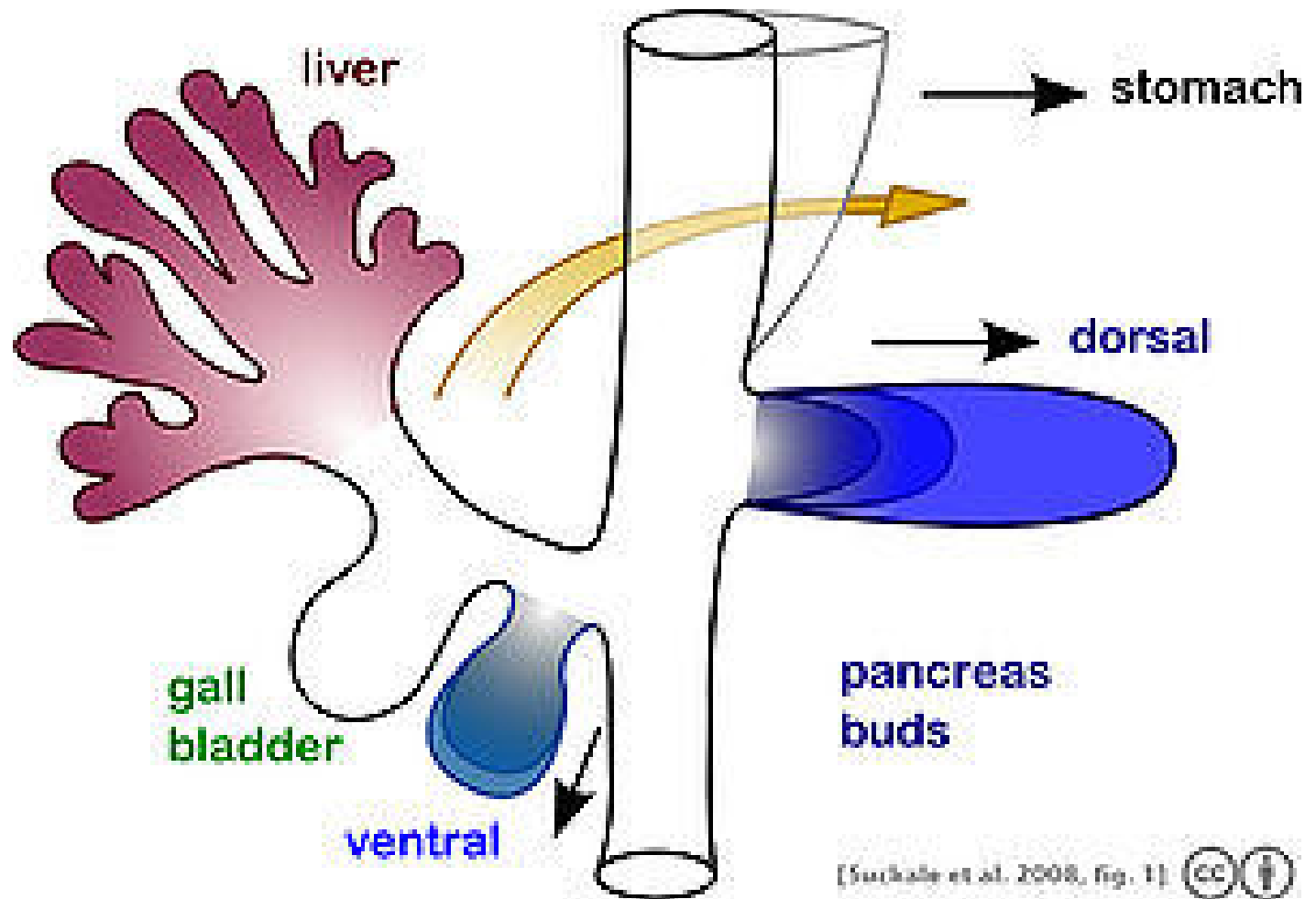
Akshmi Parvathy

Roll No: 84

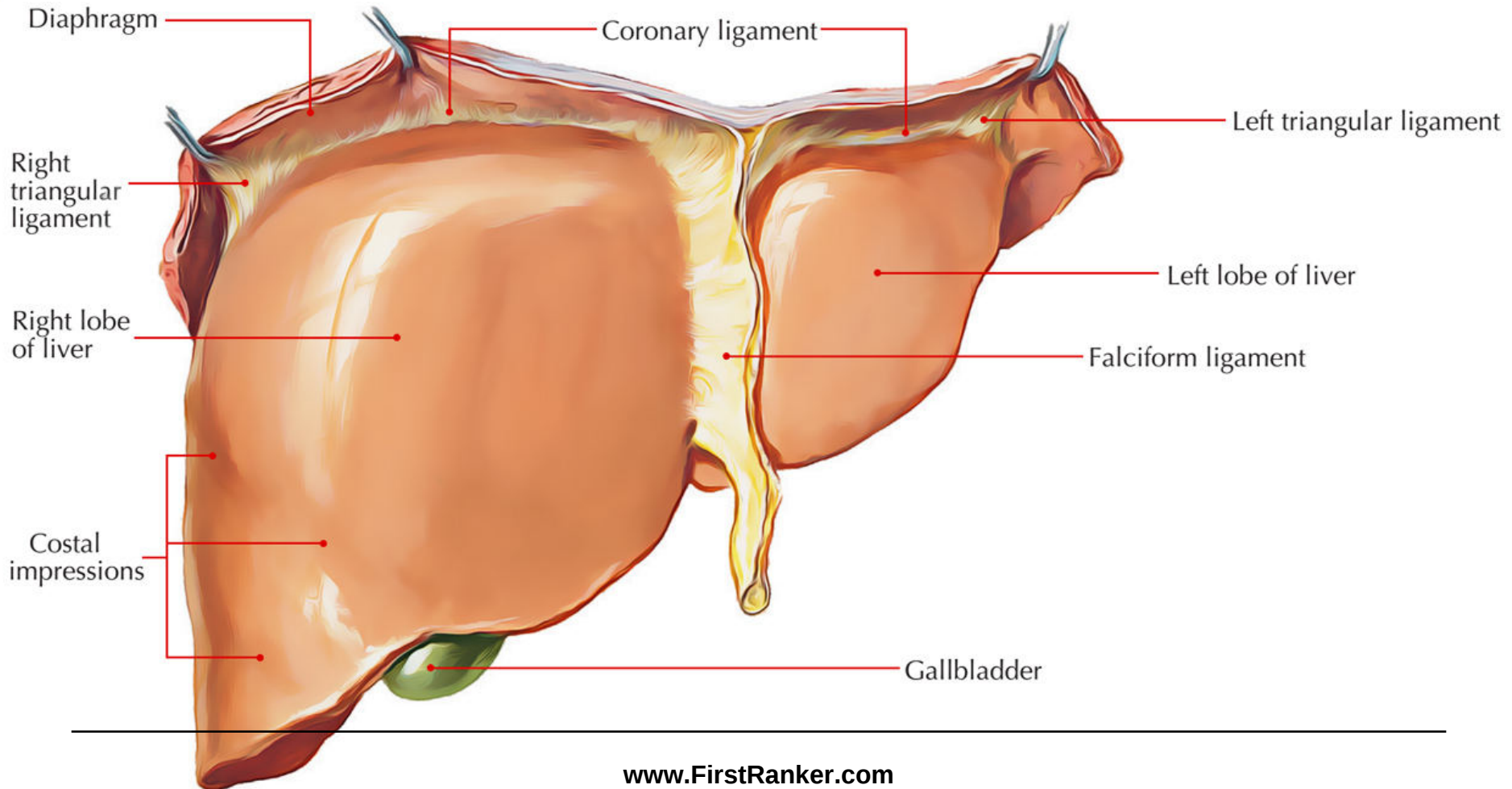
SURGICAL ANATOMY OF LIVER



EMBRYOLOGY



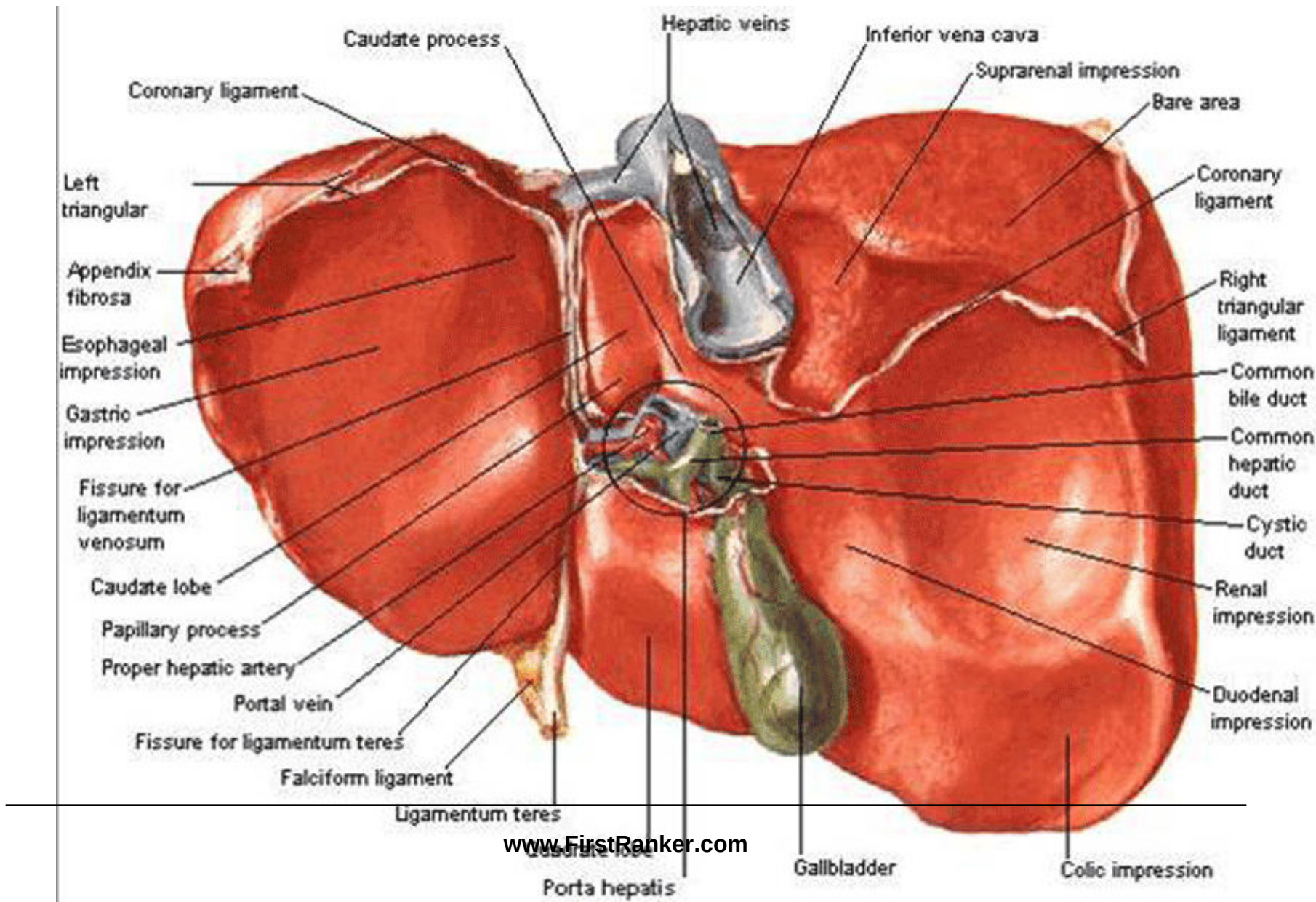
LIGAMENTS OF LIVER



LOBES OF LIVER

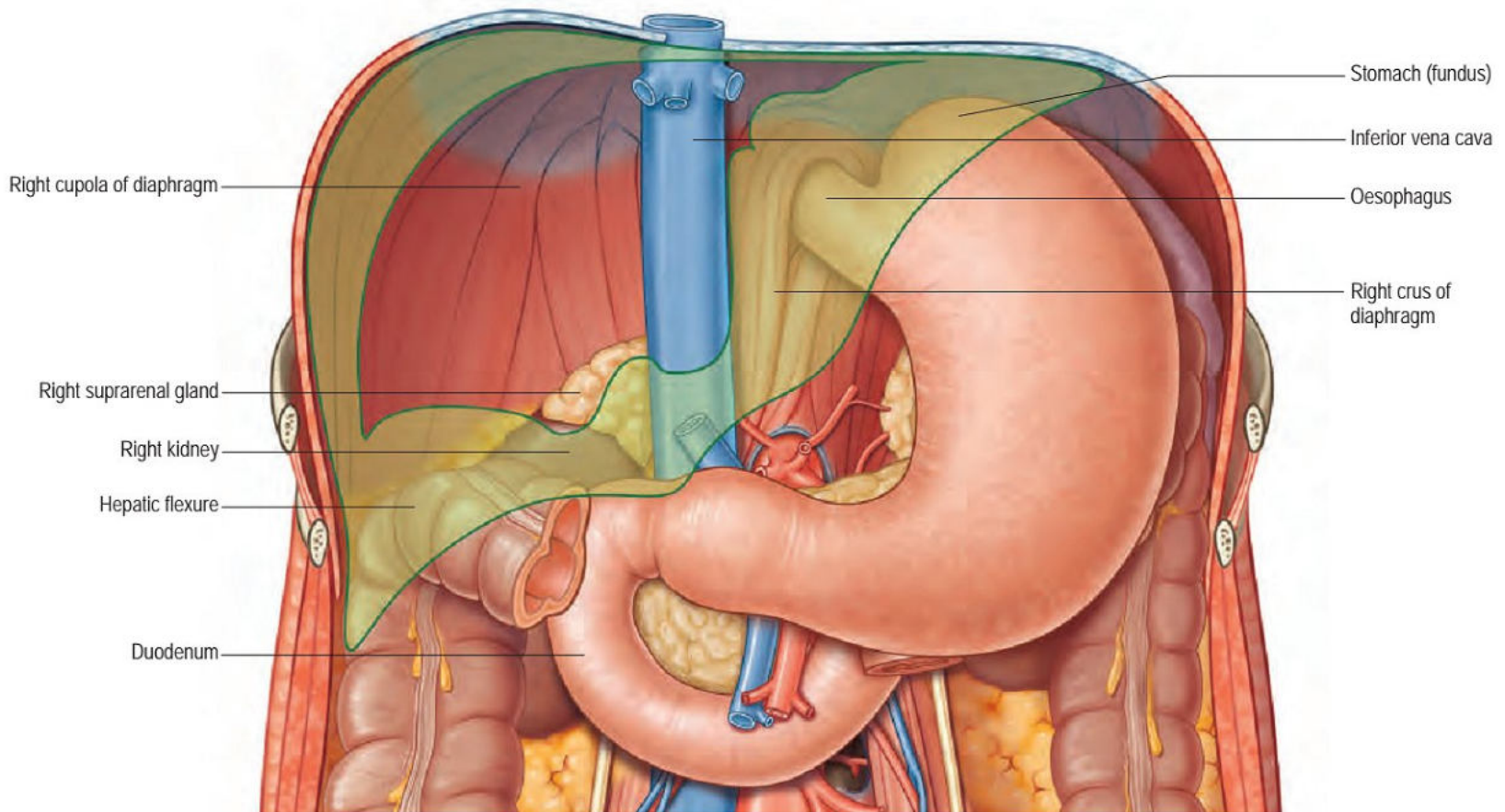
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ANATOMICAL RELATIONS

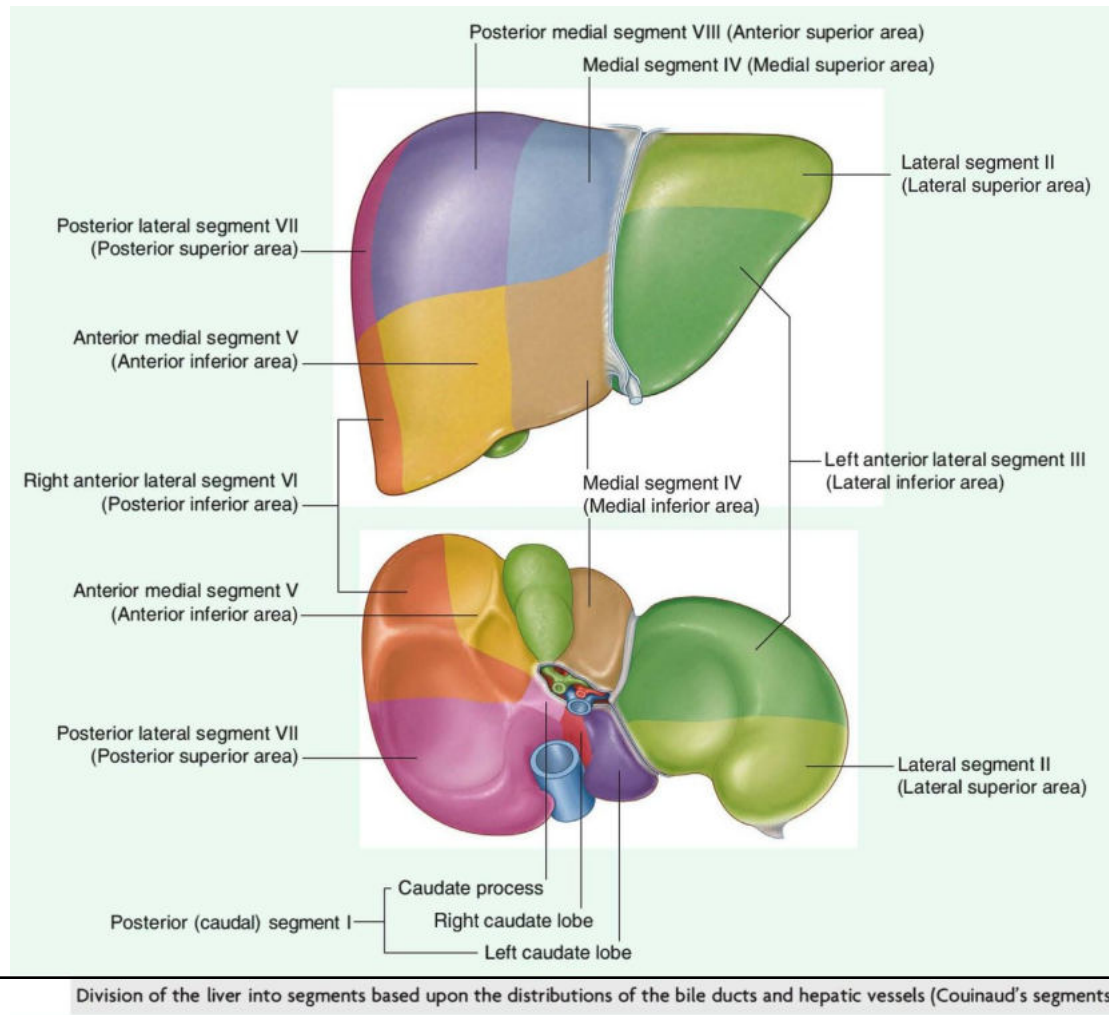


The 'bed' of the liver. The outline of the liver is shaded green. The central bare area is unshaded.

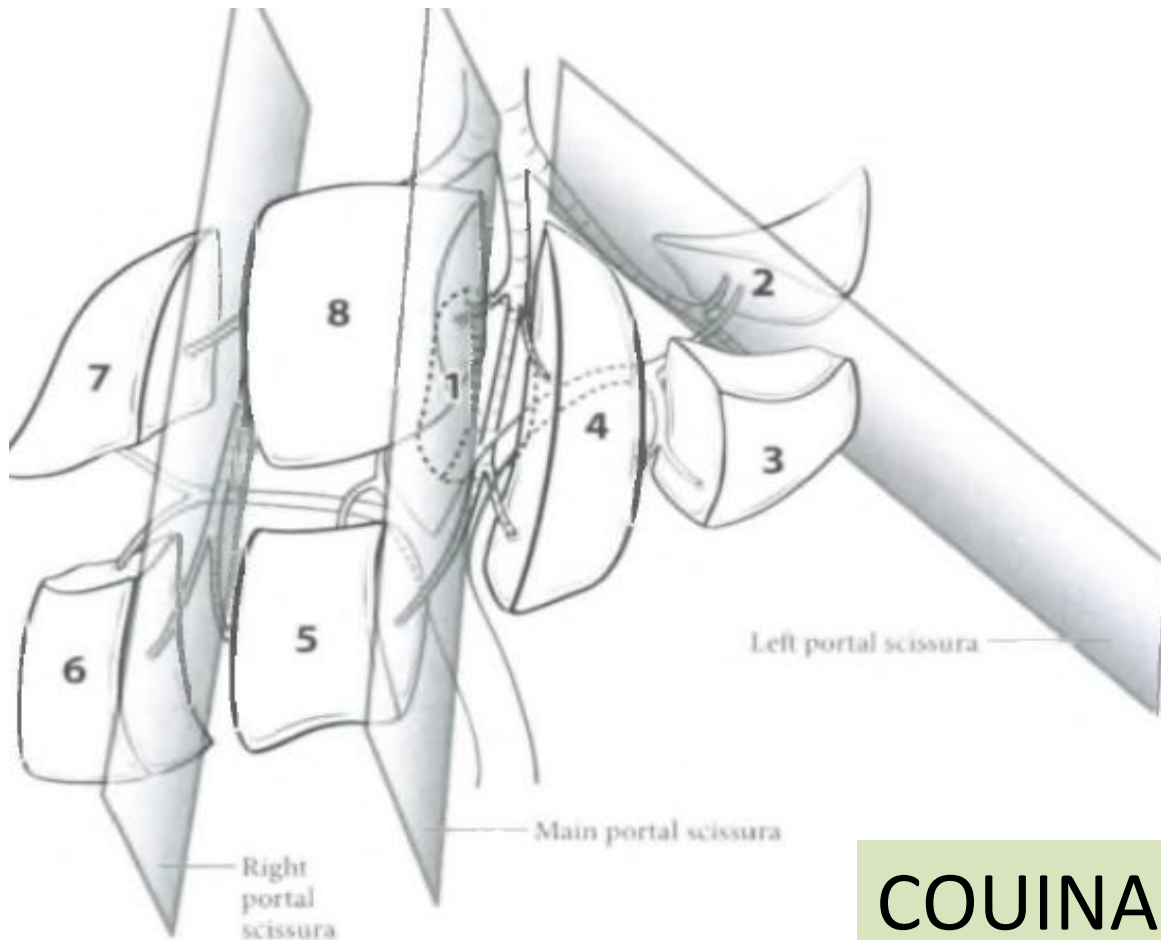
CANTLIE'S LINE

- Imaginary vertical plane
- Divides liver into right and left lobes.
- Extends from IVC (posteriorly) to middle of fossa for GB (anteriorly).

SEGMENTAL ANATOMY

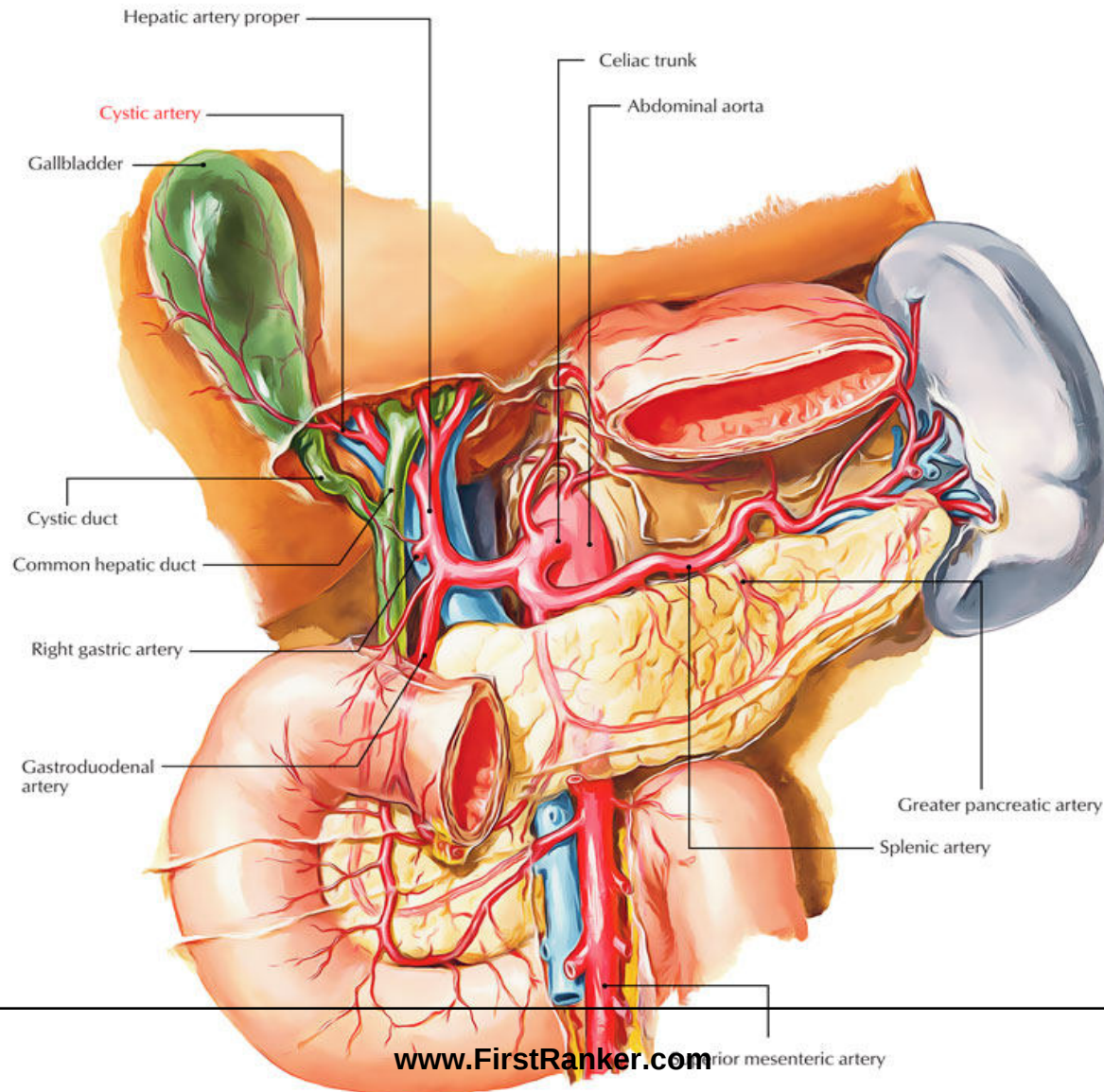


SEGMENTS OF LIVER

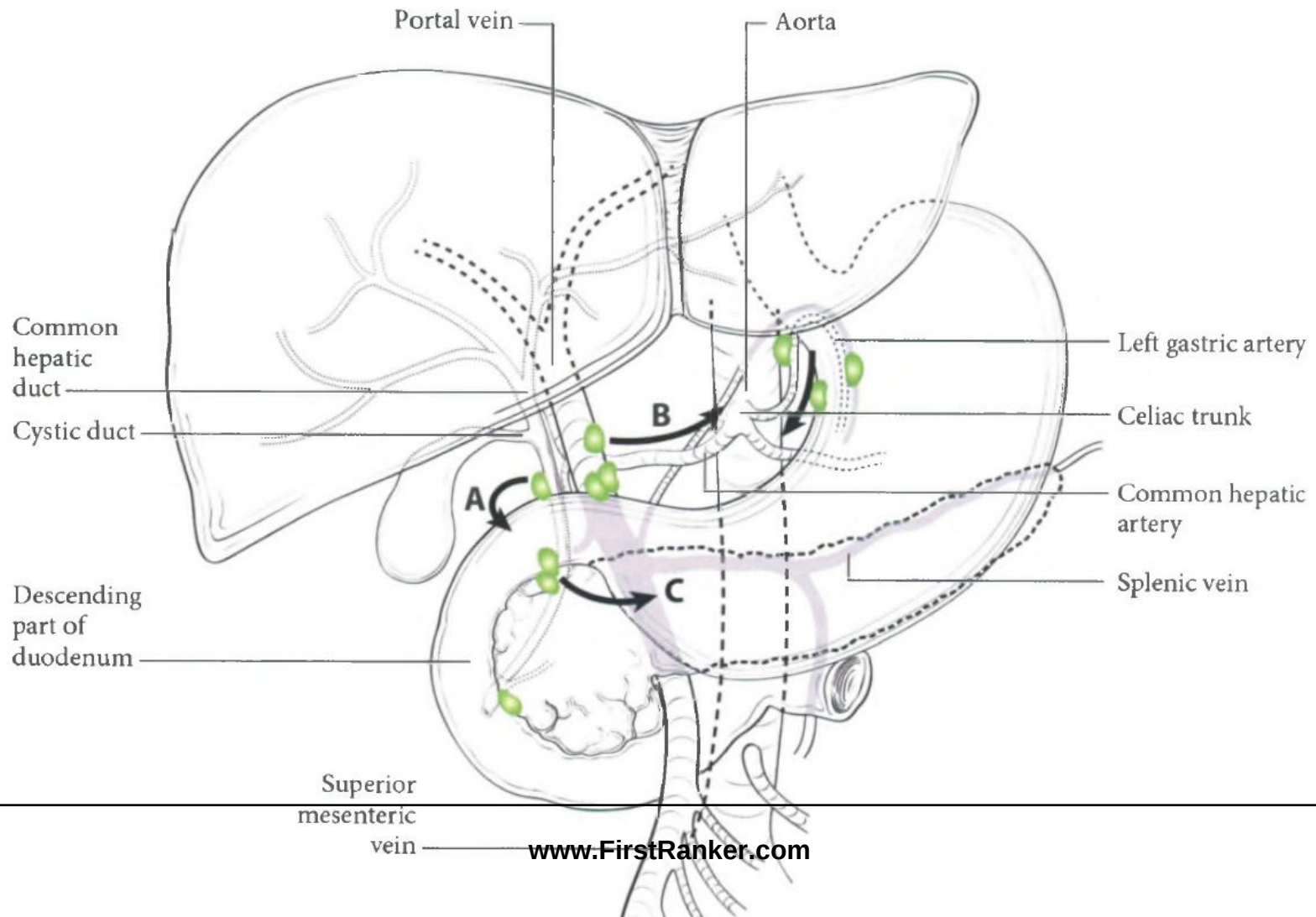


**COUINAUD SEGMENTS
FUNCTIONAL UNIT**

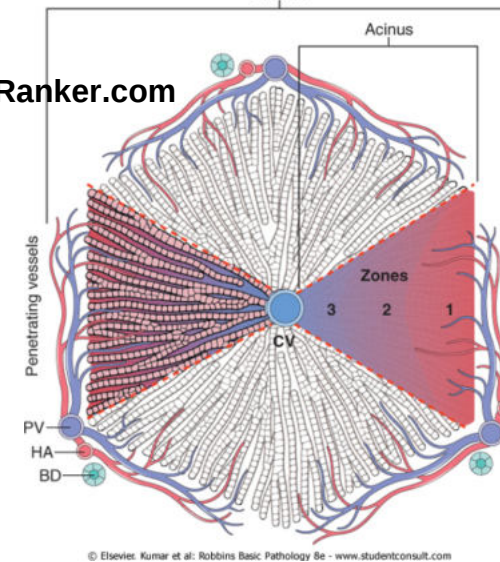
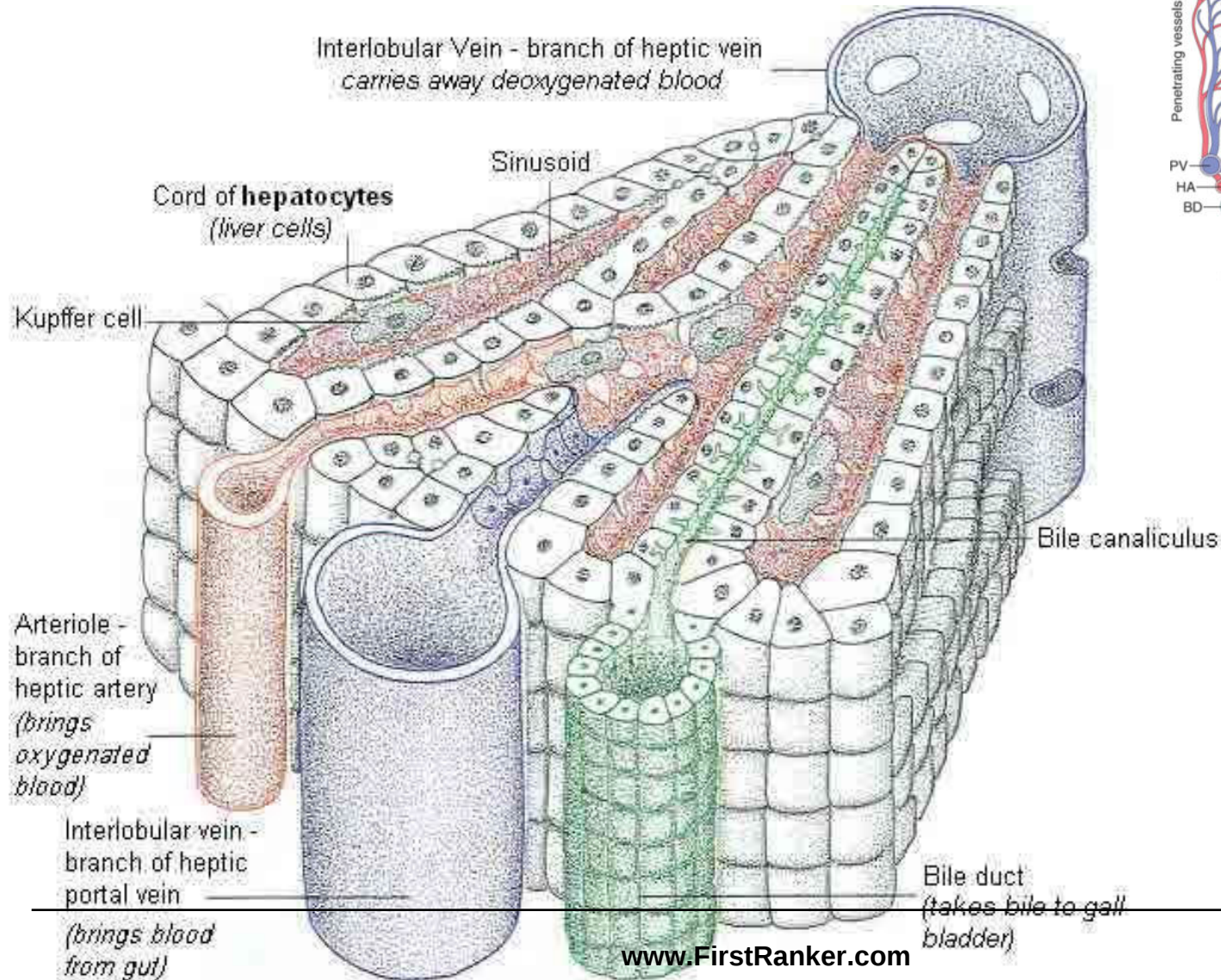
BLOOD SUPPLY



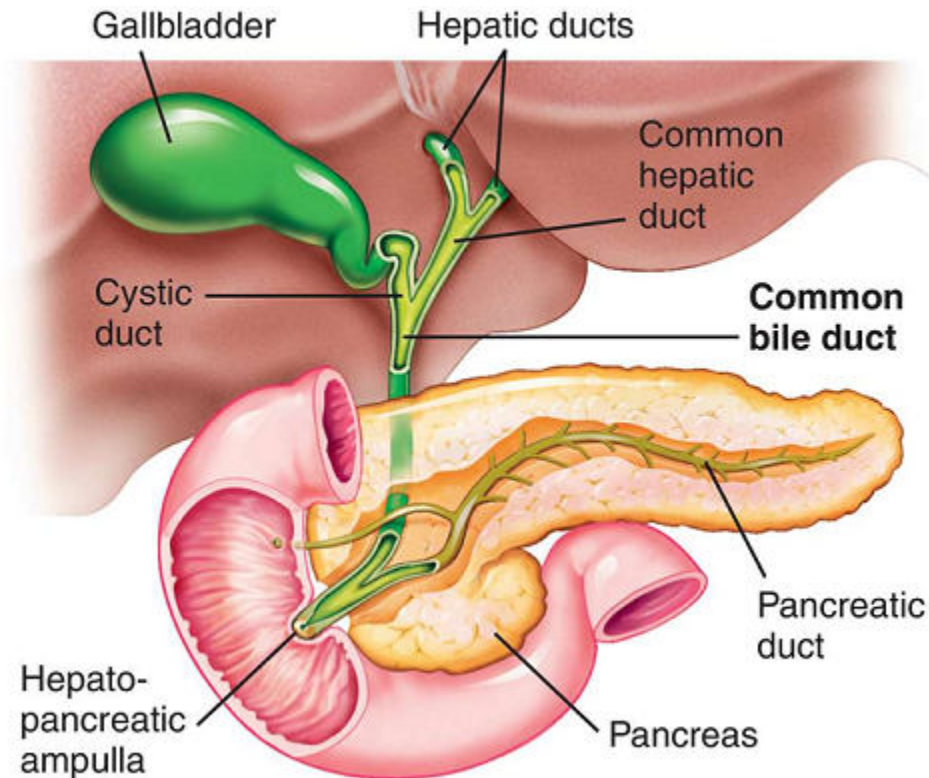
LYMPHATIC DRAINAGE



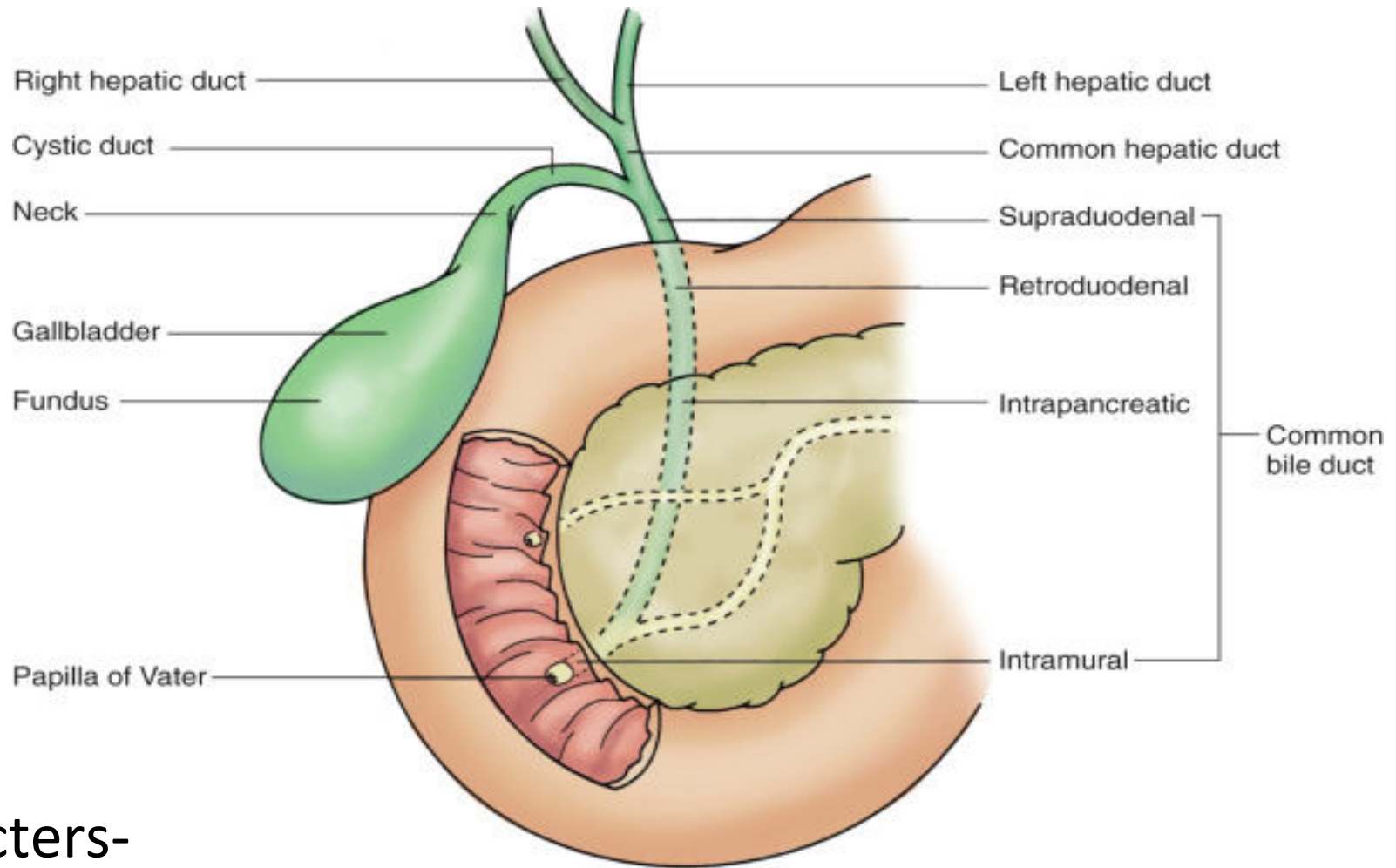
LIVER HISTOLOGY



EXTRAHEPATIC BILIARY SYSTEM

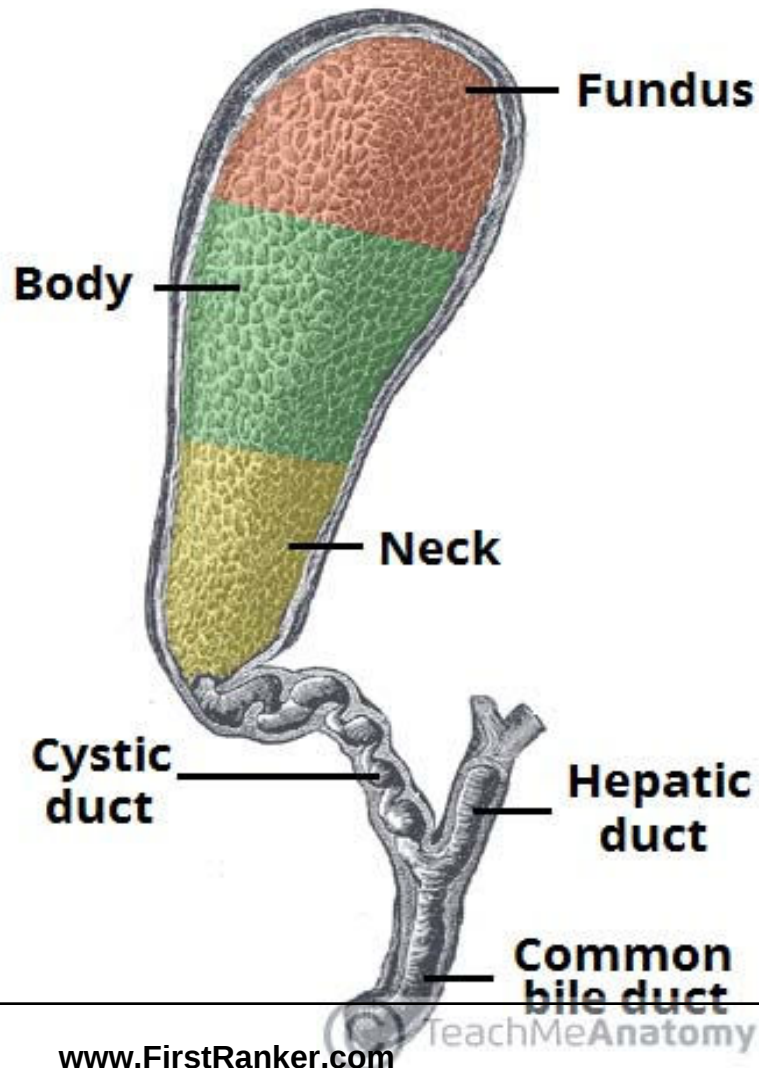


COMMON BILE DUCT- PARTS



Sphincters-
superior & inferior choledochal sphincters,
ampullary sphincter, pancreatic sphincter

GALL BLADDER



HARTMANN'S POUCH

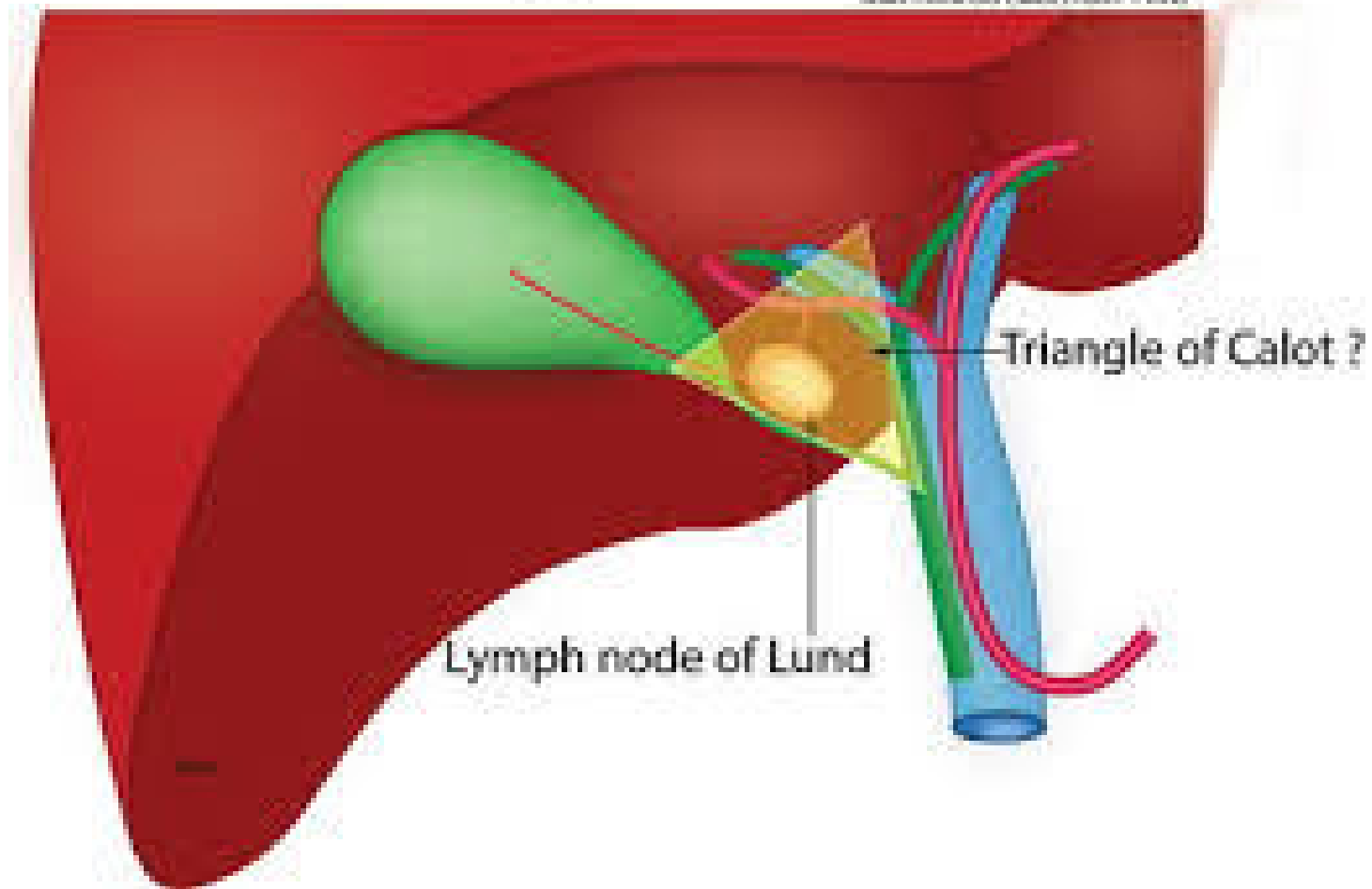
Site for impaction of stone-
leads to mucocele GB.



Triangle of Calot

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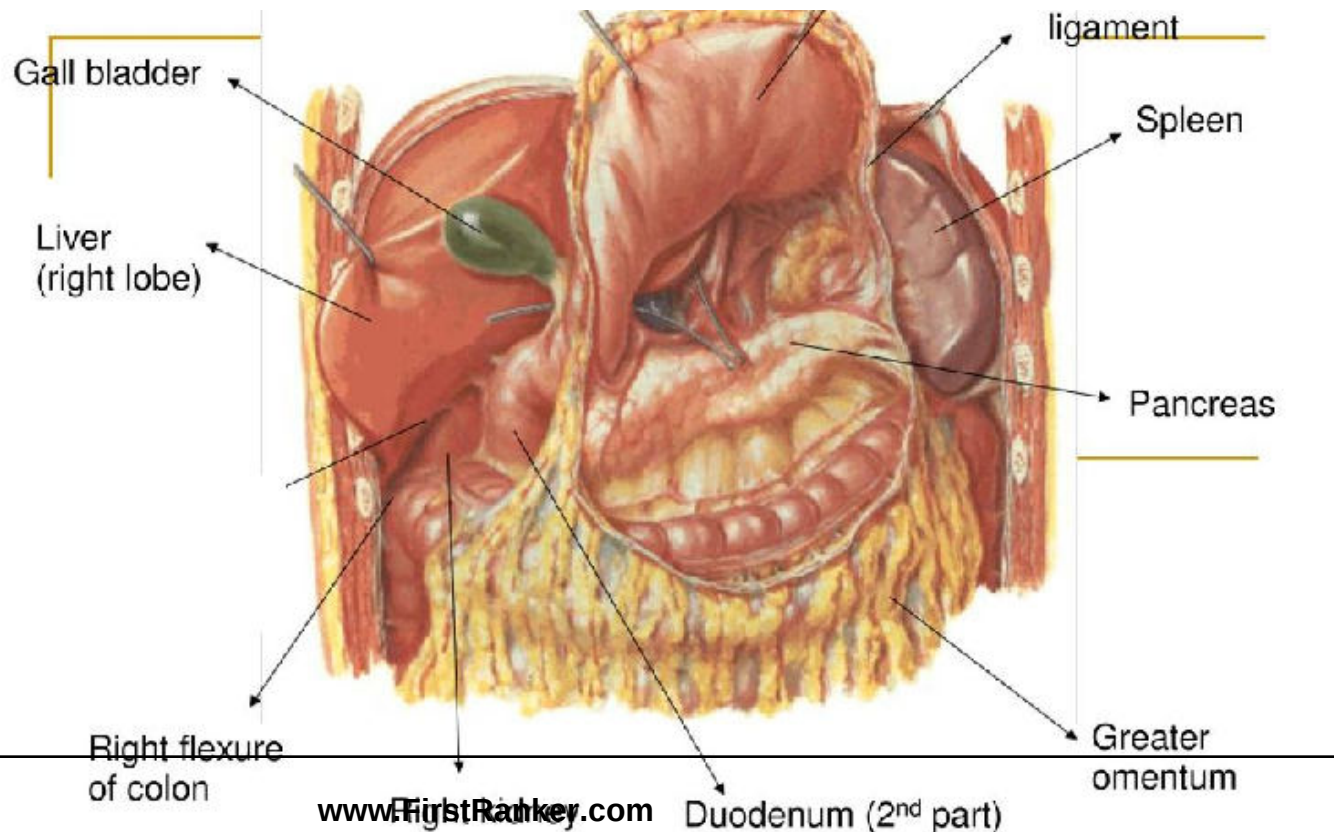


- Above-inferior surface of liver
- Below- cystic duct
- Left-Common hepatic duct

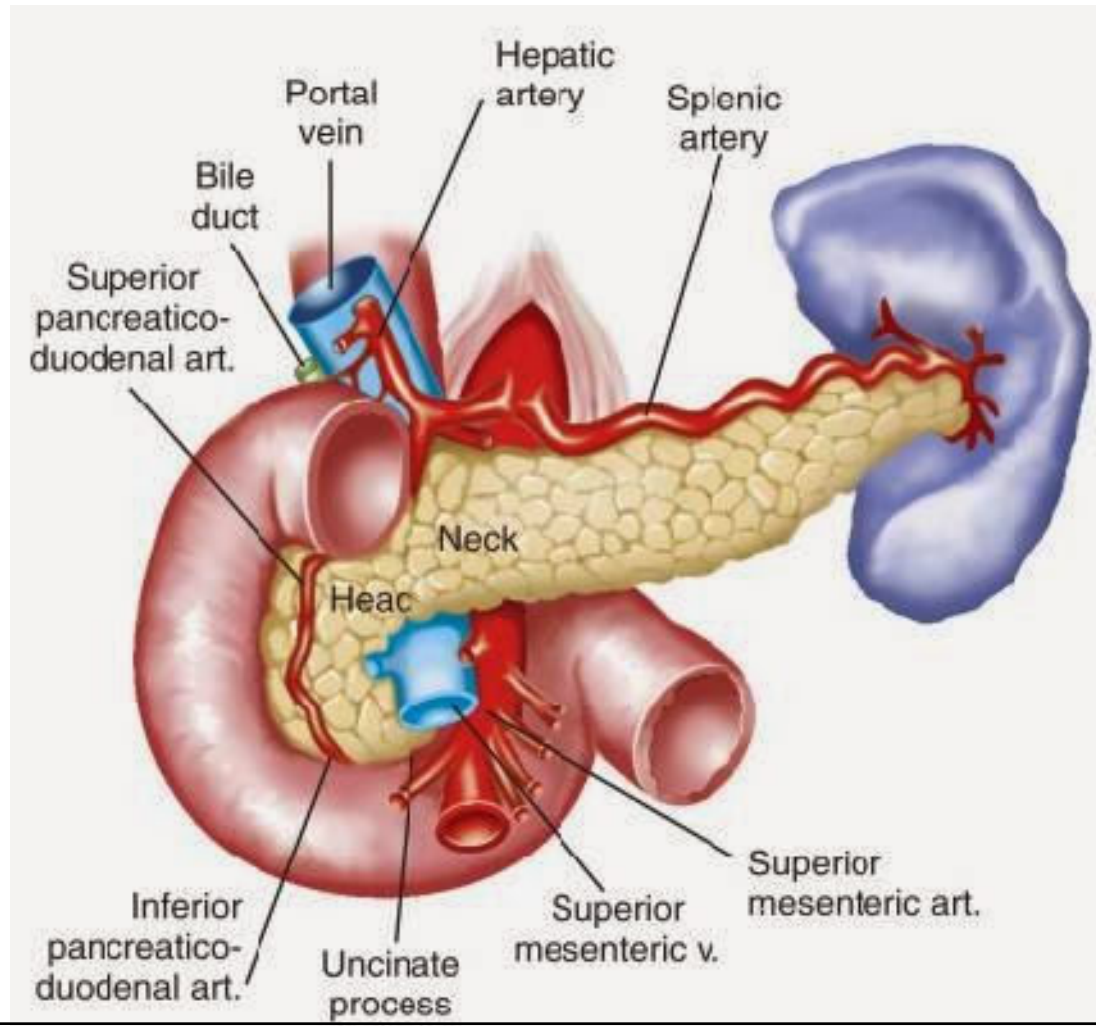
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PANCREAS

Retroperitoneal (L1-L2)
Behind stomach and lesser sac

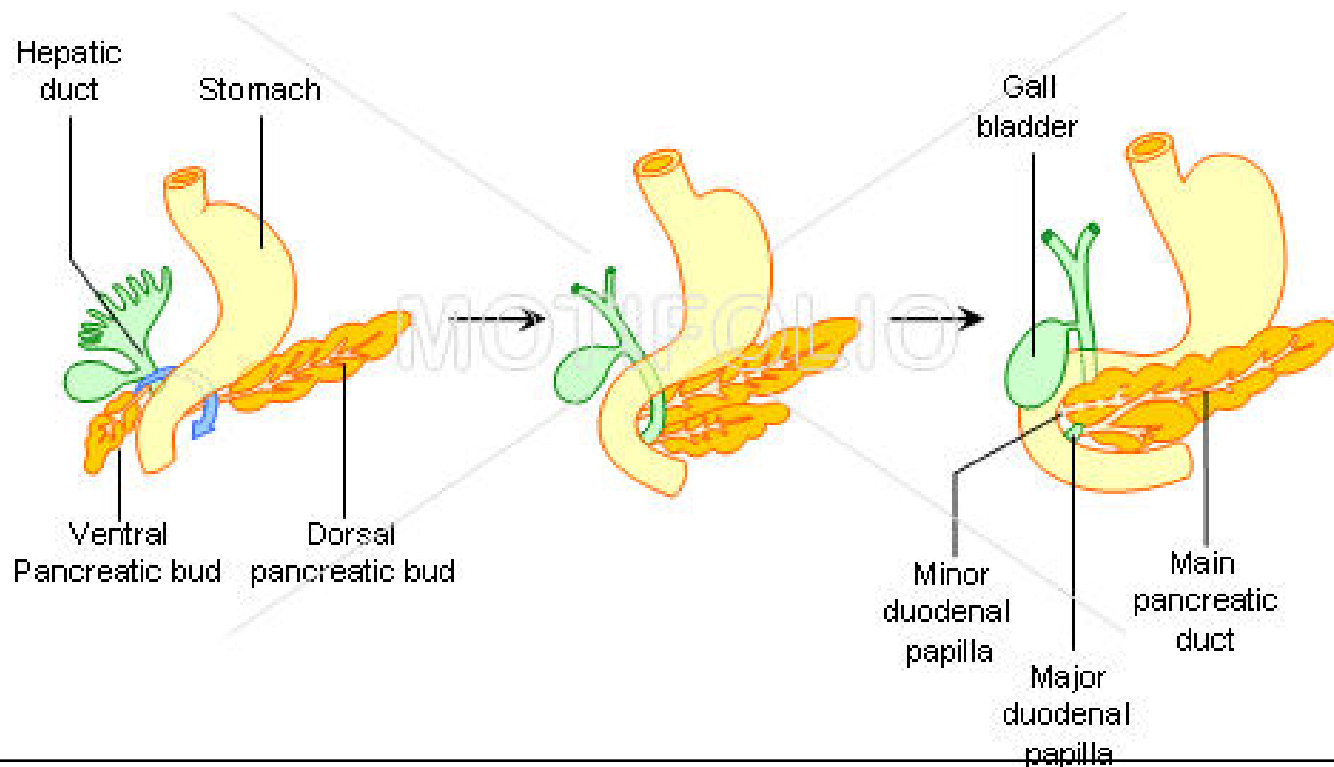


PANCREAS -RELATIONS

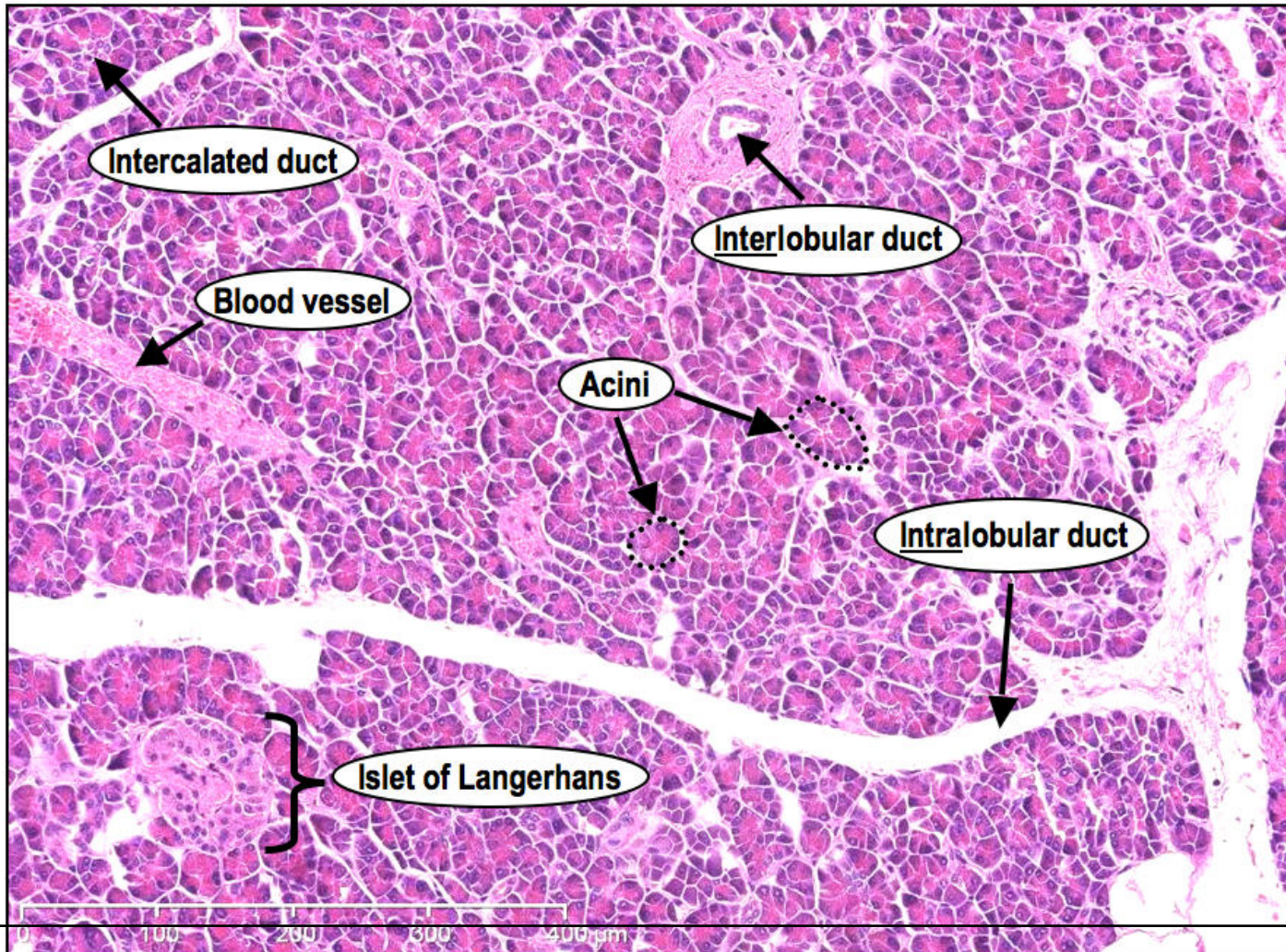


PANCREAS - EMBRYOLOGY

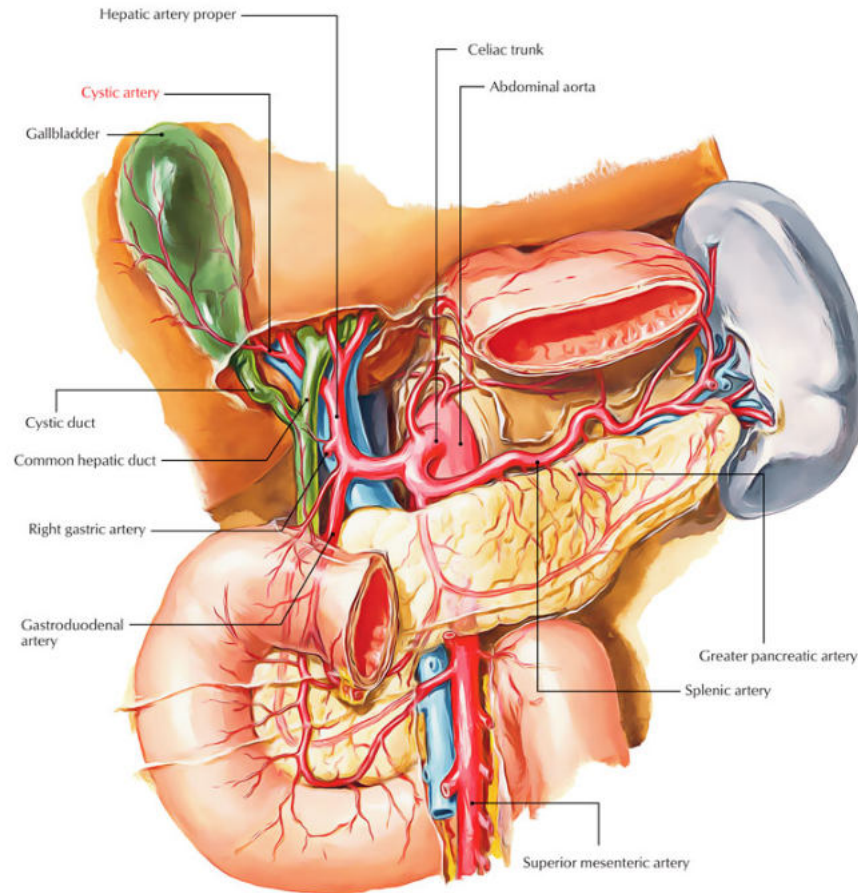
Development of the pancreas and duct system – 4 – 6 weeks



PANCREAS - HISTOLOGY



EHBS & PANCREAS -Arterial supply



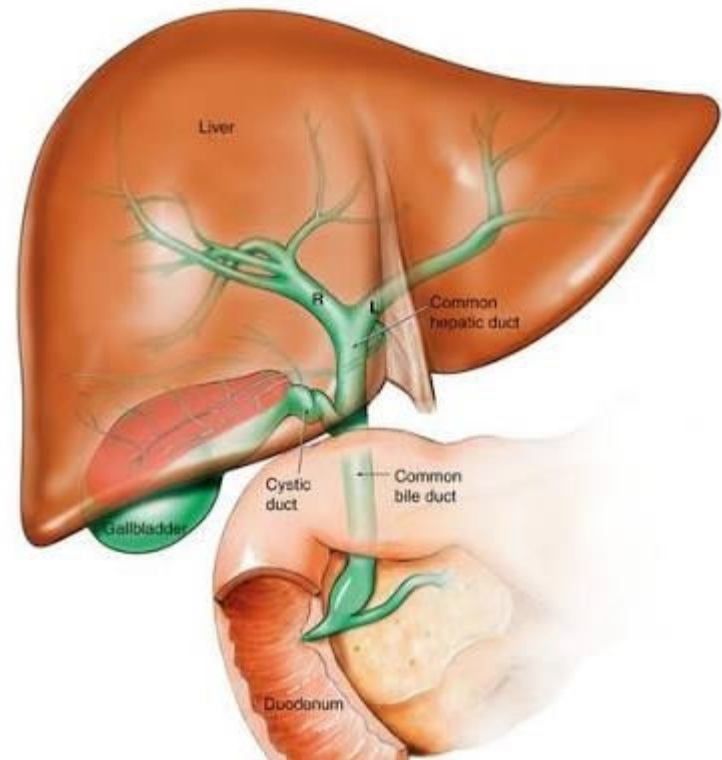
PHYSIOLOGY

Leon Francis

Roll No:85

BILE

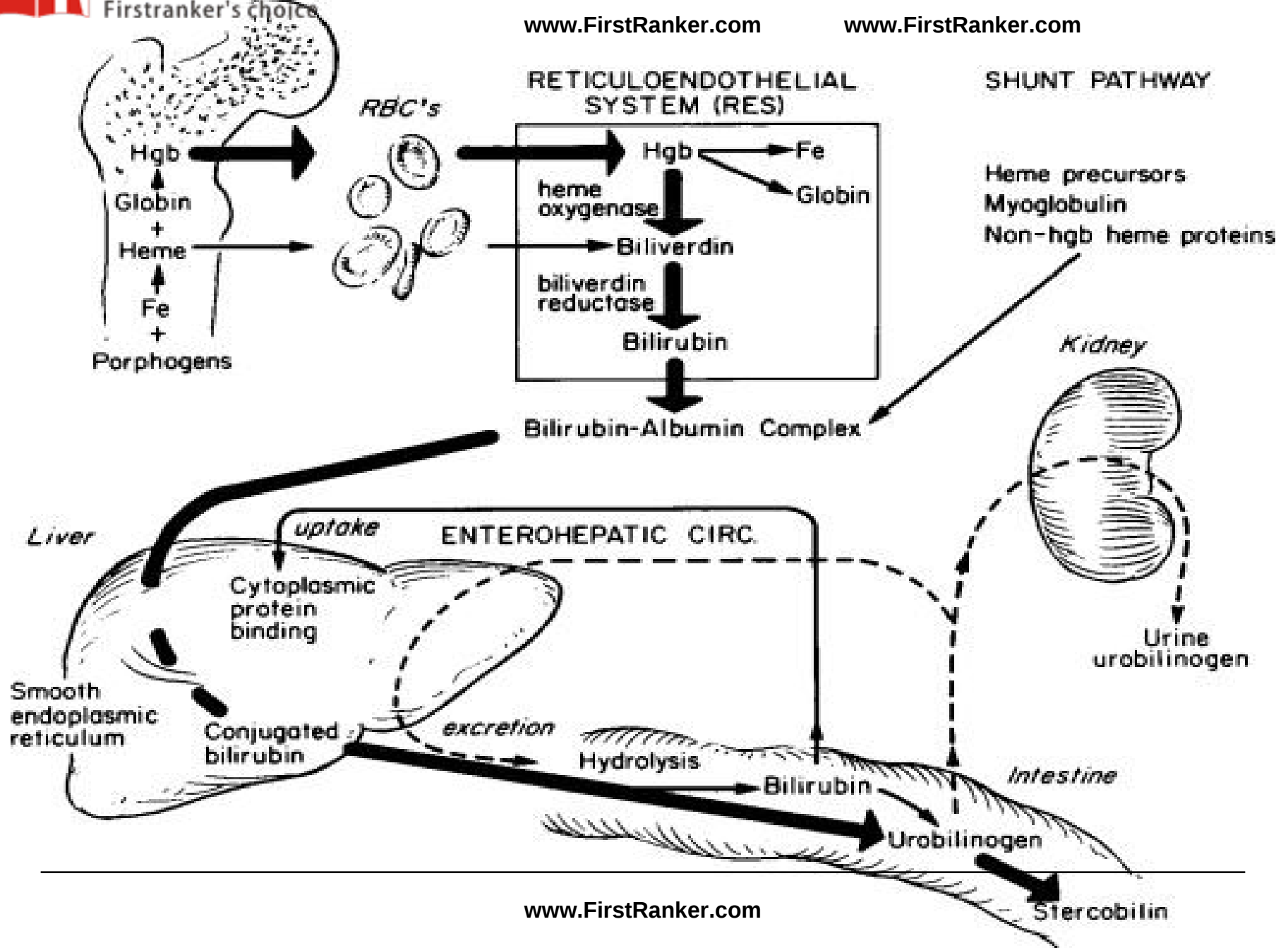
- Complex fluid-
Inorganic & Organic
- Functions: digestion,
absorption, excretion
- 600-1000ml/day



COMPOSITION OF BILE

- **Water(98%)**
- Bile salts
- Bile pigments
- Cholesterol
- Inorganic salts
- Fatty acids
- Phosphatidyl choline
- Fat





MECHANISM OF SECRETION OF BILE

- Hepatocyte secrete bile → Biliary canaliculi
- Additional secretion of Na & HCO₃ ions from epithelial cells lining biliary duct(**Secretin**)

PHYSIOLOGICAL ROLE OF BILE

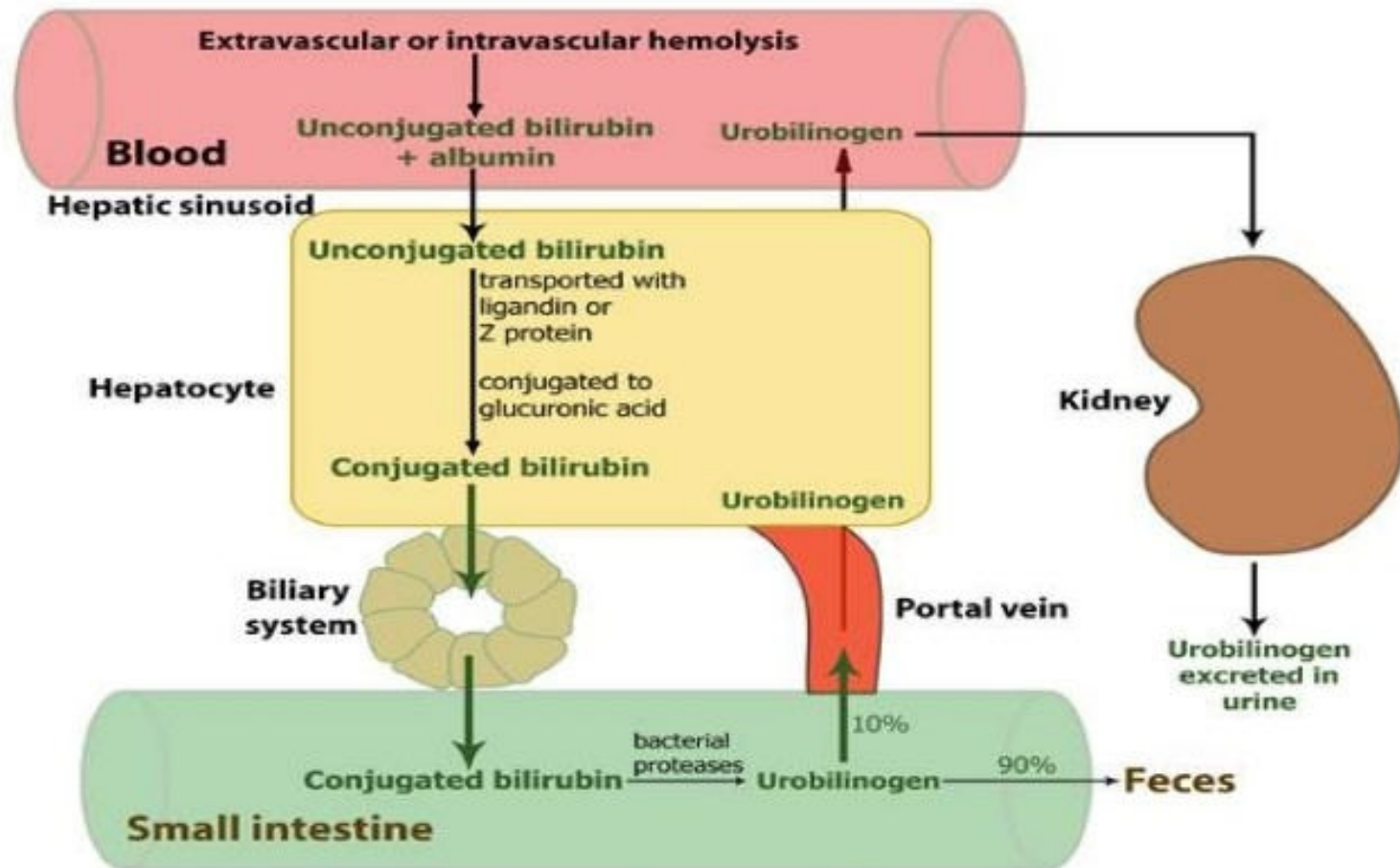
- Digestion and absorption of fats

BILE ACID

- Major excretory route of lipid soluble waste products

BILIRUBIN

BILIRUBIN METABOLISM



PATHOPHYSIOLOGY

JAUNDICE

- Normal serum bilirubin- **0.2 – 0.8mg/dl.**
- Manifested in sclera **exceeds 2-2.5mg/dl.**
- Cutaneous icterus **>5mg/dl**
- Yellowish discoloration of skin , sclera & mucous membrane

CLASSIFICATION OF JAUNDICE

- **PRE-HEPATIC (hemolytic)** – excessive destruction of RBC
- **HEPATIC (hepatocellular)** –liver damage
- **POST-HEPATIC(obstructive)-** obstruction to the bile flow

obstructive jaundice (complete obstruction)

- urine **contains** bilirubin and bile salts
- urine urobilinogen is **absent**
- stool **devoid** of stercobilinogen – clay coloured stools

■ **CARDIOVASCULAR**

- **Decreased cardiac contractility**
- **Bradycardia due to direct effect of bile salts on SA node**
- **Decreased peripheral vascular resistance**
- **Reduced left ventricular pressure**

- **RENAL**

- Renal vasoconstriction
- Shunting of blood from renal cortex
- Tubular and cortical necrosis
- Renal failure

- **IMMUNITY**

- Bacterial translocation from the gut

- **WOUND HEALING**

- Delayed wound healing

- High incidence of wound dehiscence

- Defective synthesis of collagen

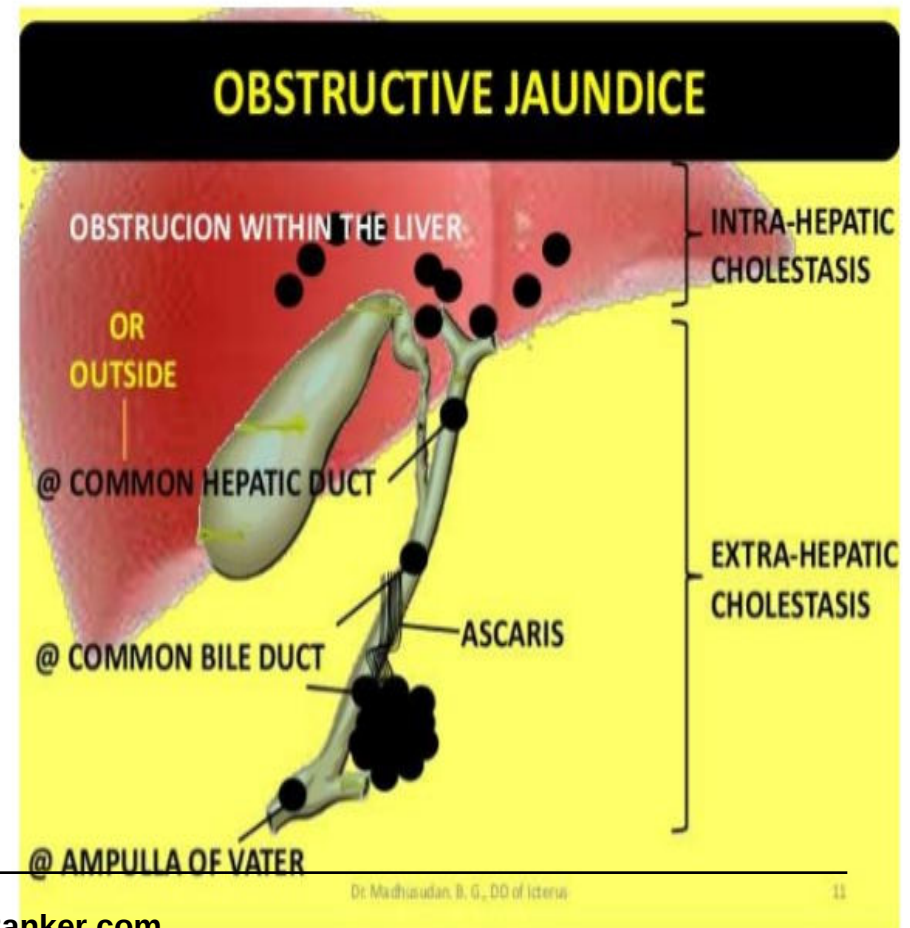
AETIOPATHOGENESIS OF OBSTRUCTIVE JAUNDICE

Maria Mathew

ROLL NO:86

OBSTRUCTIVE JAUNDICE

- Due to obstruction to the outflow of bile.
- Surgical jaundice
- Causes can be:
 - Intrahepatic
 - Extrahepatic



INTRAHEPATIC

BILIARY OBSTRUCTION

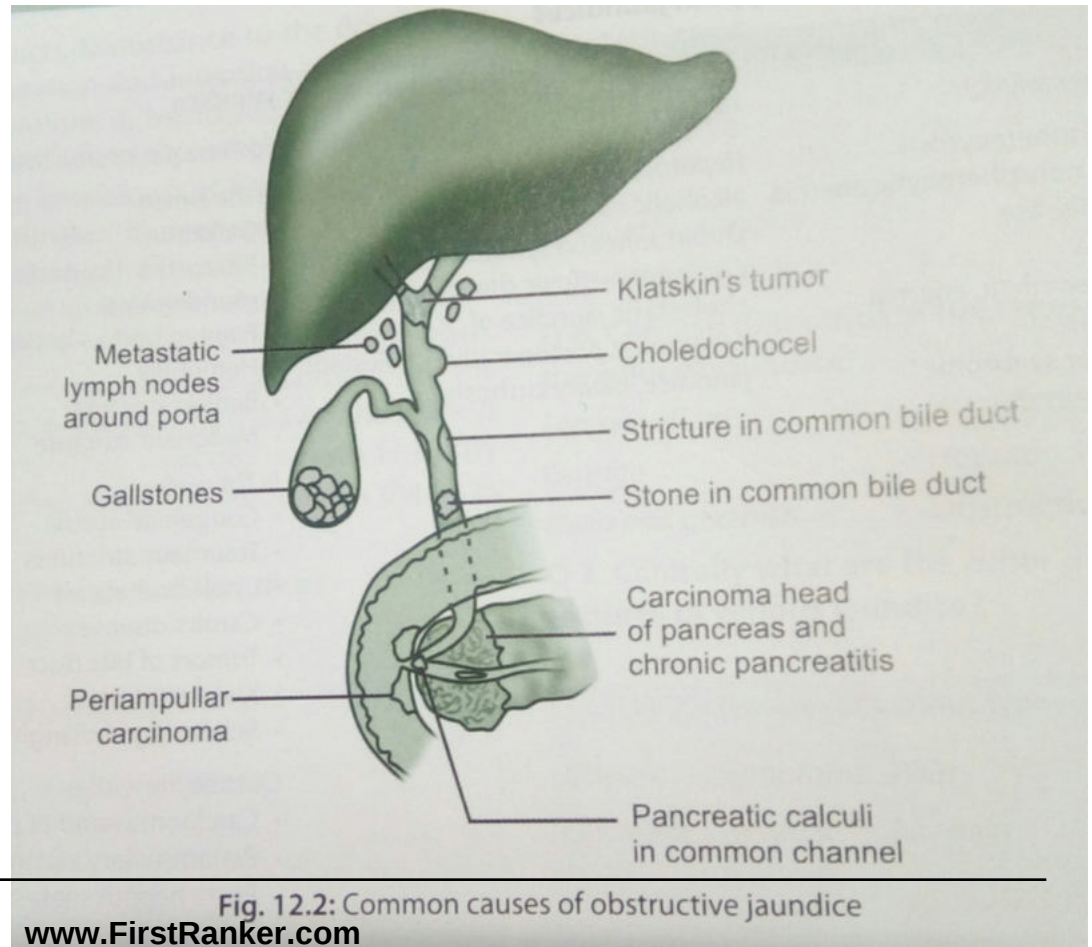
CAUSES

- Primary biliary cirrhosis
- Primary sclerosing cholangitis
- Viral hepatitis
- Cirrhosis
- Alcohol
- Drug induced hepatitis
- Secondaries in liver

EXTRAHEPATIC

BILIARY OBSTRUCTION

- INTRALUMINAL
- INTRAMURAL
- EXTRAMURAL



IN THE LUMEN

- Choledocholithiasis
- Parasite
- Hemobilia
- Foreign body

CHOLEDOCHOLITHIASIS

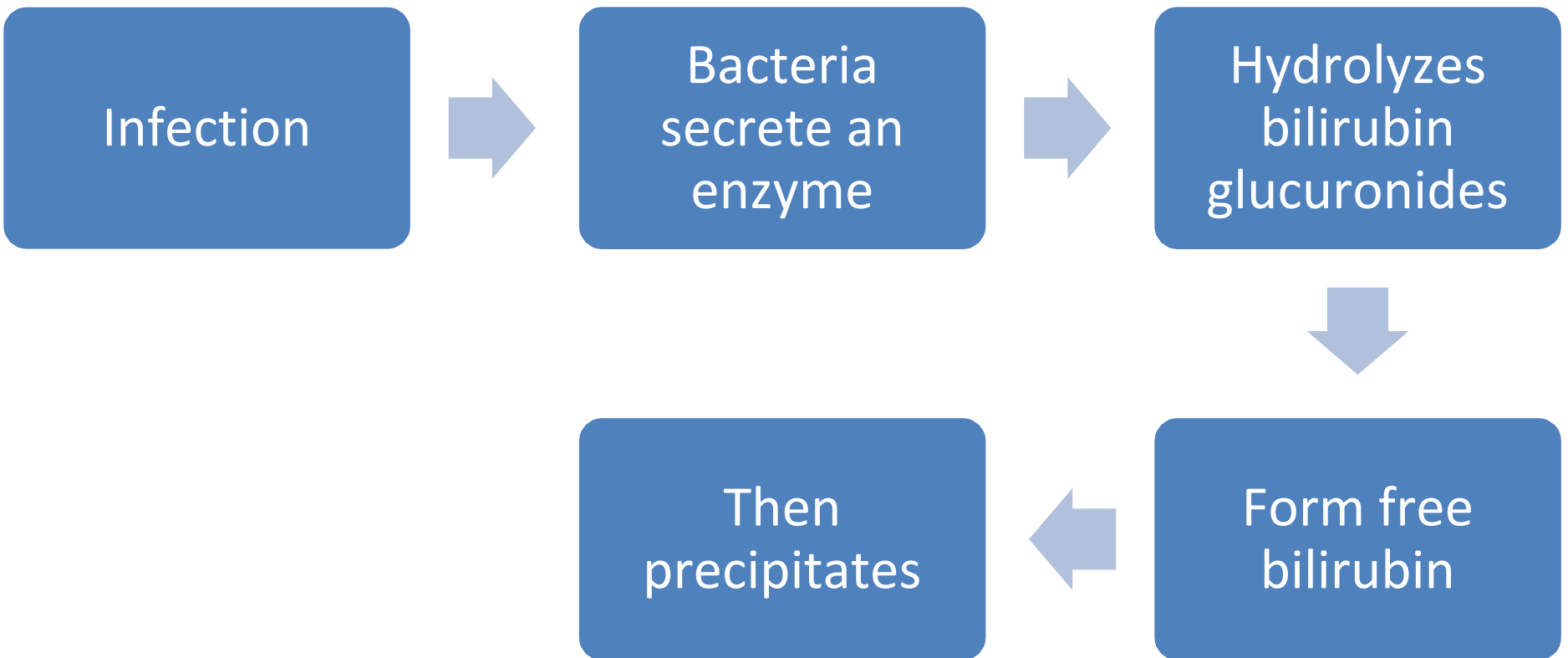
1.PRIMARY 4-12%

- Arise De novo
- Formed within CBD or intrahepatic duct.

CAUSES

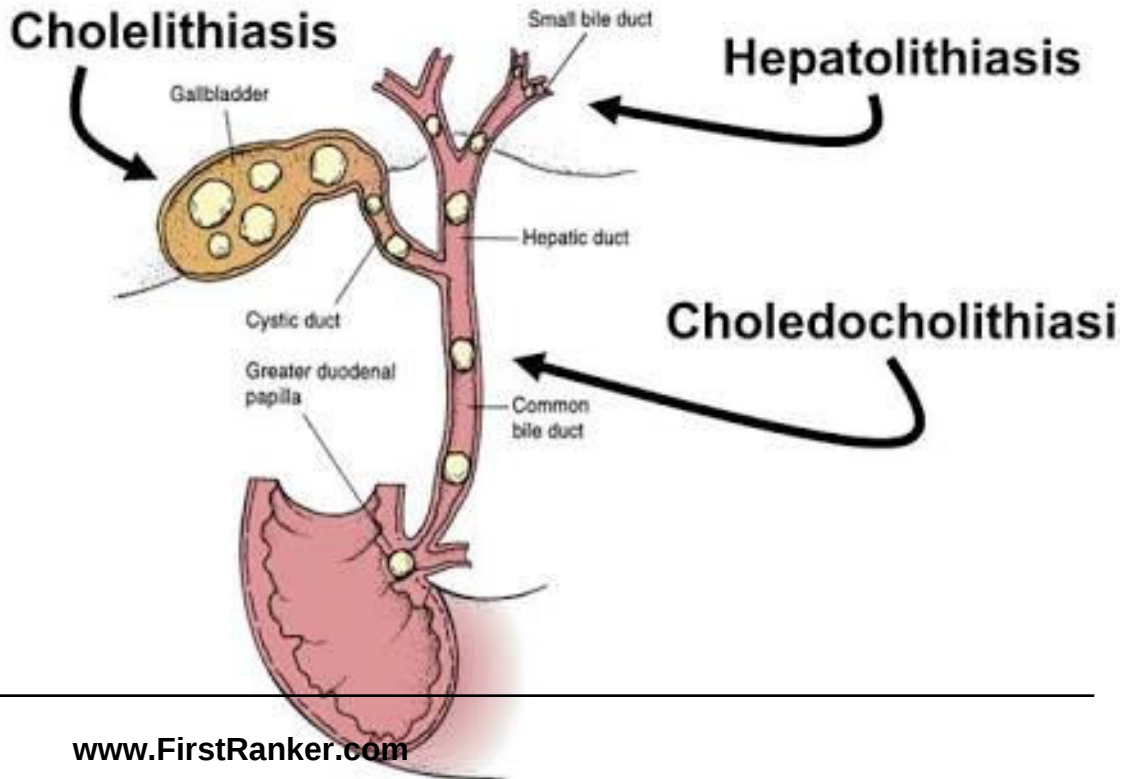
- Infections
- Congenital
- Biliary dyskinesia
- Diabetes,malnutrition

PRIMARY CBD STONE **FORMATION**



2.SECONDARY

- Stones originate in gallbladder and pass into bile duct



PATHOPHYSIOLOGY OF GALL STONE FORMATION

- **Depends on the concentration and type of phospholipids and bile acids in bile.**
- **Micelles formed by phospholipid hold cholesterol in stable state.**

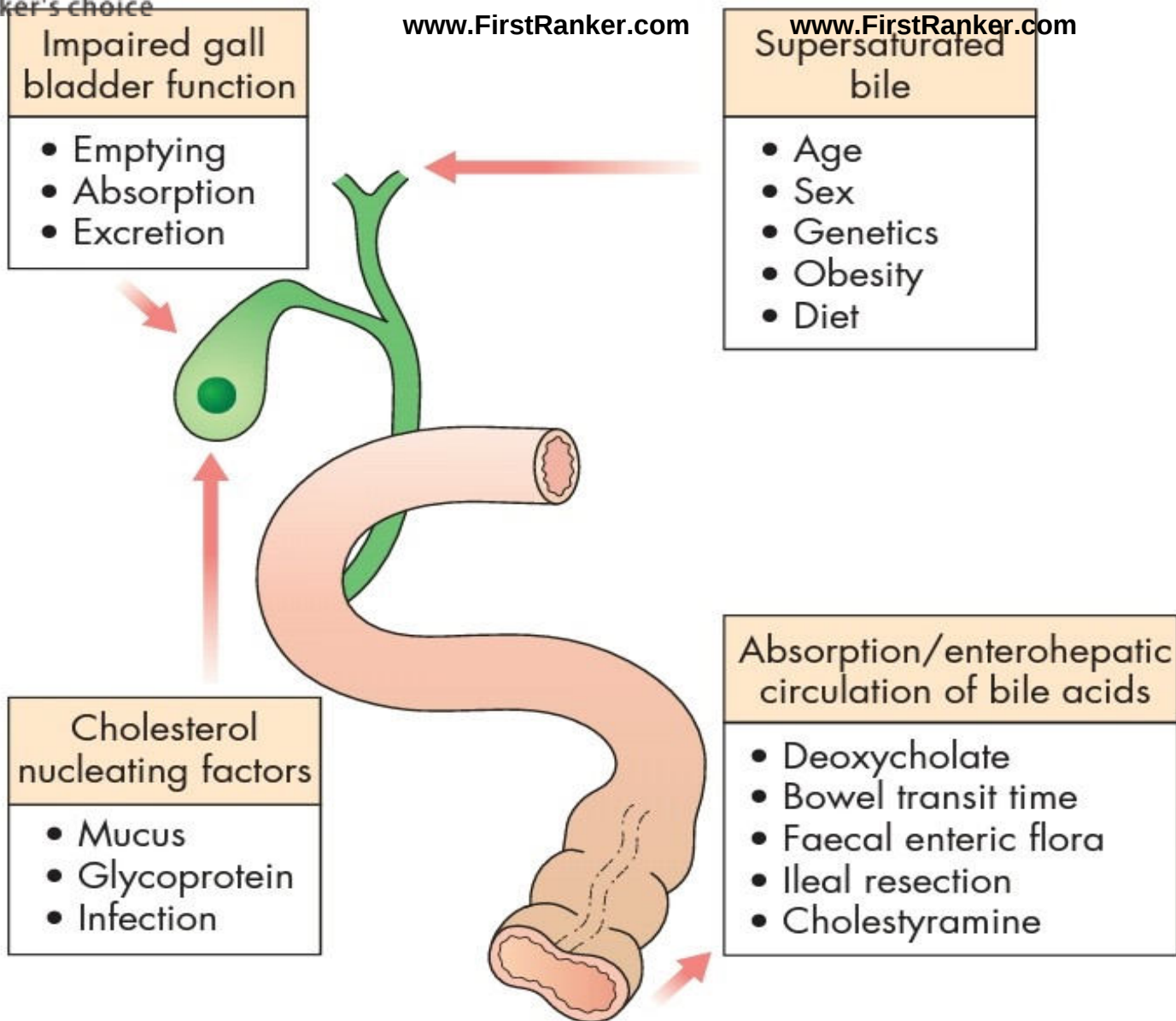
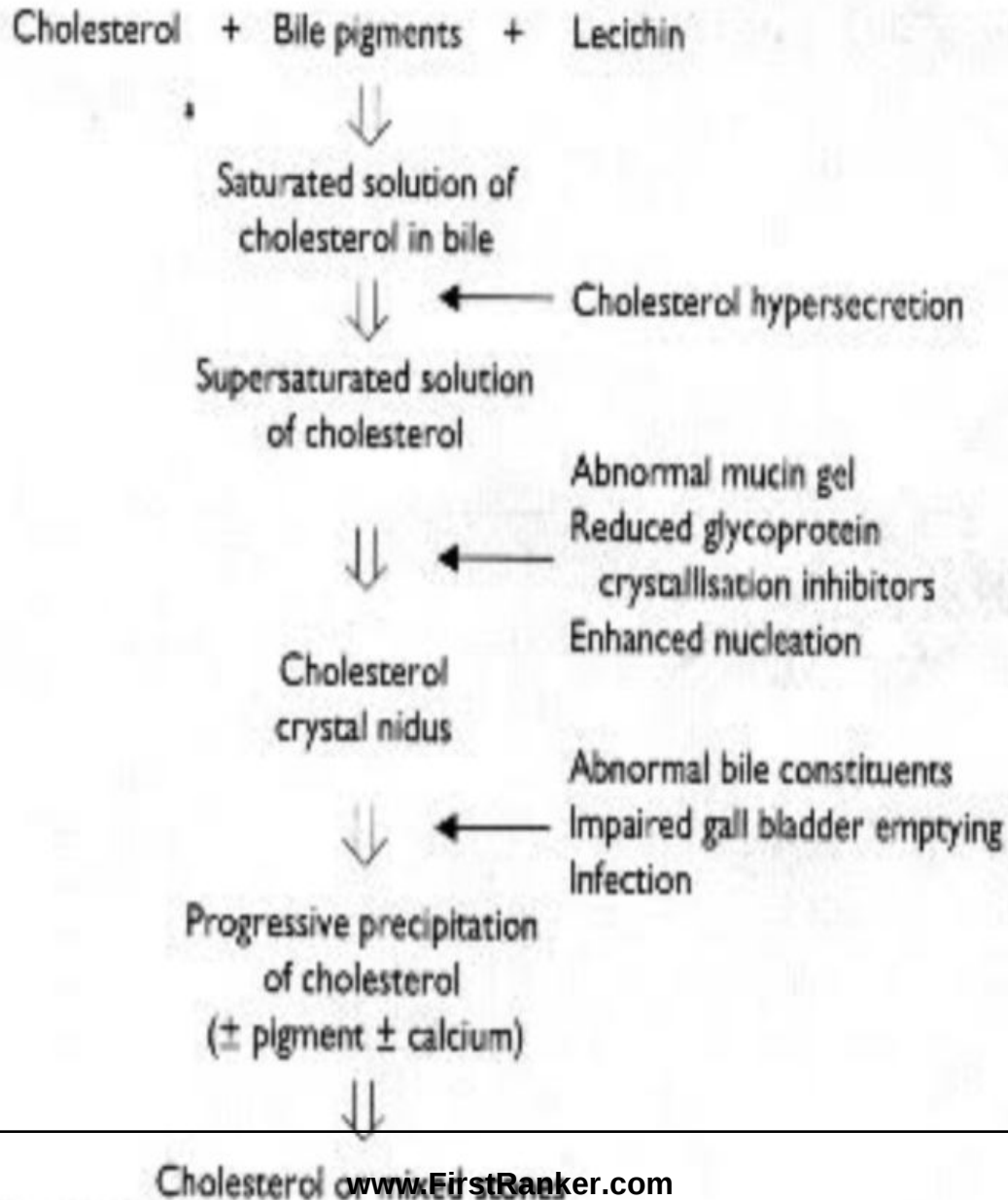


Figure 67.26 Factors associated with gallstone formation.



- **CHOLESTEROL STONES** - Precipitation of cholesterol give rise to stones.
- **PIGMENT STONES**
 1. **BLACK**- Bilirubin pigments mixed with calcium phosphate, calcium bicarbonate
 2. **BROWN**- Calcium bilirubinate, palmitate and stearate and cholesterol
- **MIXED STONES** - Contains cholesterol monohydrate, calcium salts, bile pigments and fatty acids.



FIGURE 54-20 Gallbladder with characteristic yellow cholesterol stones.



BROWN STONE



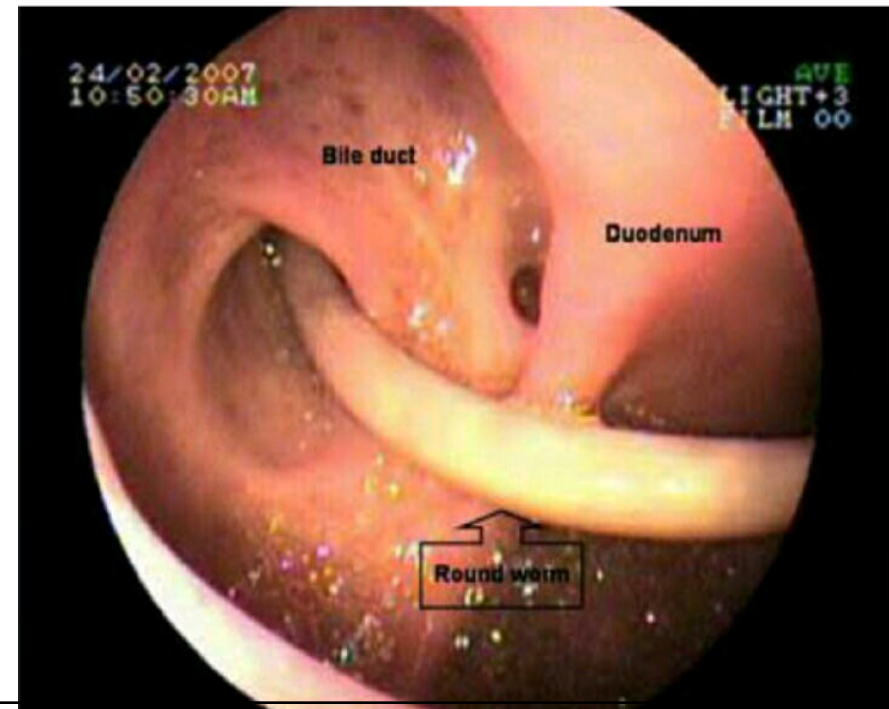
MIXED STONE



PARASITIC INFESTATION

BILIARY ASCARIASIS

- *Ascaris lumbricoides* or Round worm
- Enter biliary tree through the ampulla of Vater
- Complications :
 - strictures
 - supp. cholangitis
 - liver abscess
 - empyema of GB



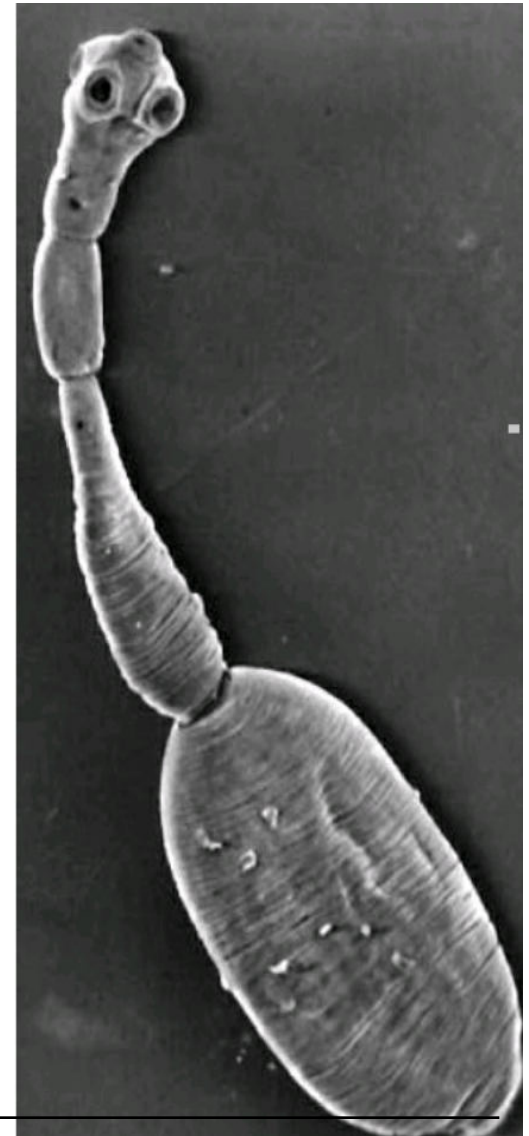
CHLONORCHIASIS

- Oriental cholangiohepatitis
- *Chlonorchis sinensis*
- Inhabits bile ducts including intra hepatic ducts.
- Fibrous thickening of the duct walls



BILIARY HYDATID

- *Echinococcus granulosus*
- Large cyst obstruct the hepatic ducts
- rupture into the biliary tree and its contents cause obstructive jaundice.



HEMOBILIA

- Bleeding into biliary tree from an abnormal communication between a blood vessel and bile duct
- Rare condition
- Causes:
 - Iatrogenic trauma
 - Accidental trauma
 - Gallstones
 - Tumors
 - Inflammatory disorders
 - Vascular disorders



IN THE WALL

- Biliary atresia
- Primary sclerosing cholangitis
- Tumors of bile duct
- Cholangitis
- Choledochal cyst
- Caroli's disease

BILIARY ATRESIA

- Extra hepatic ducts are progressively destroyed by inflammatory process which starts at time of birth.



- Intrahepatic changes



- Biliary cirrhosis and portal hypertension

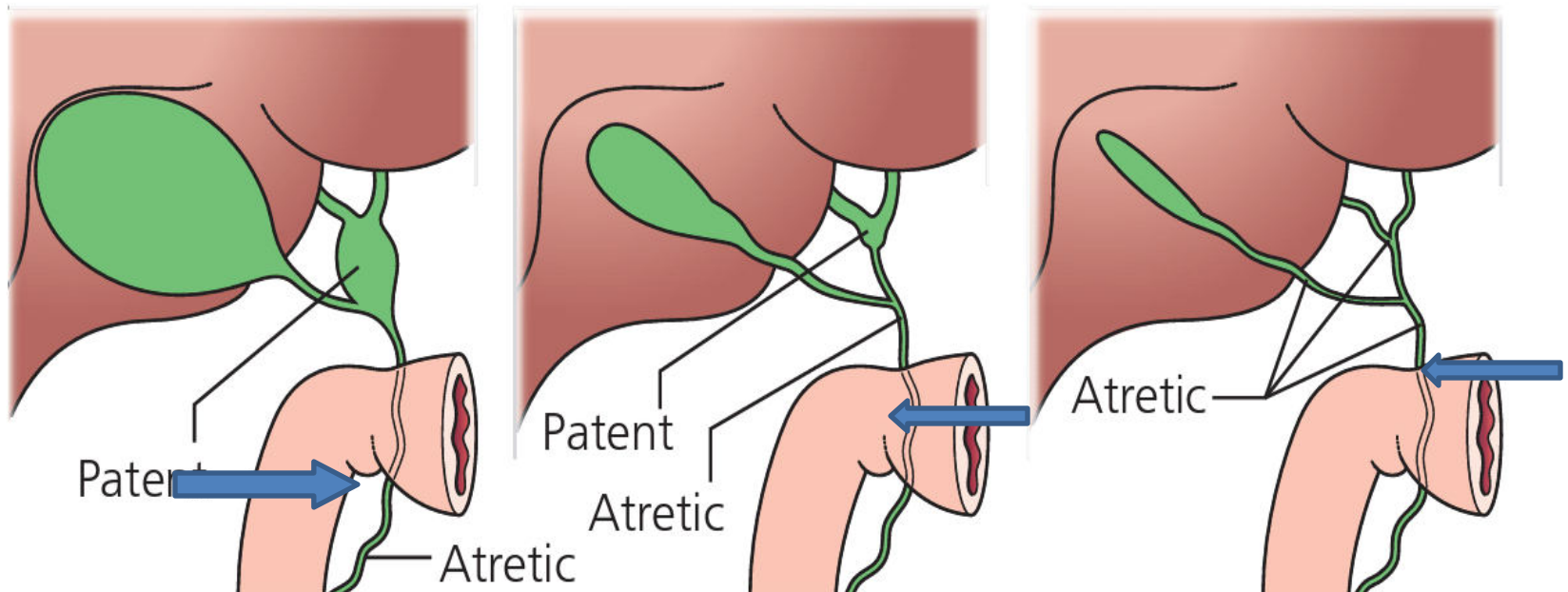
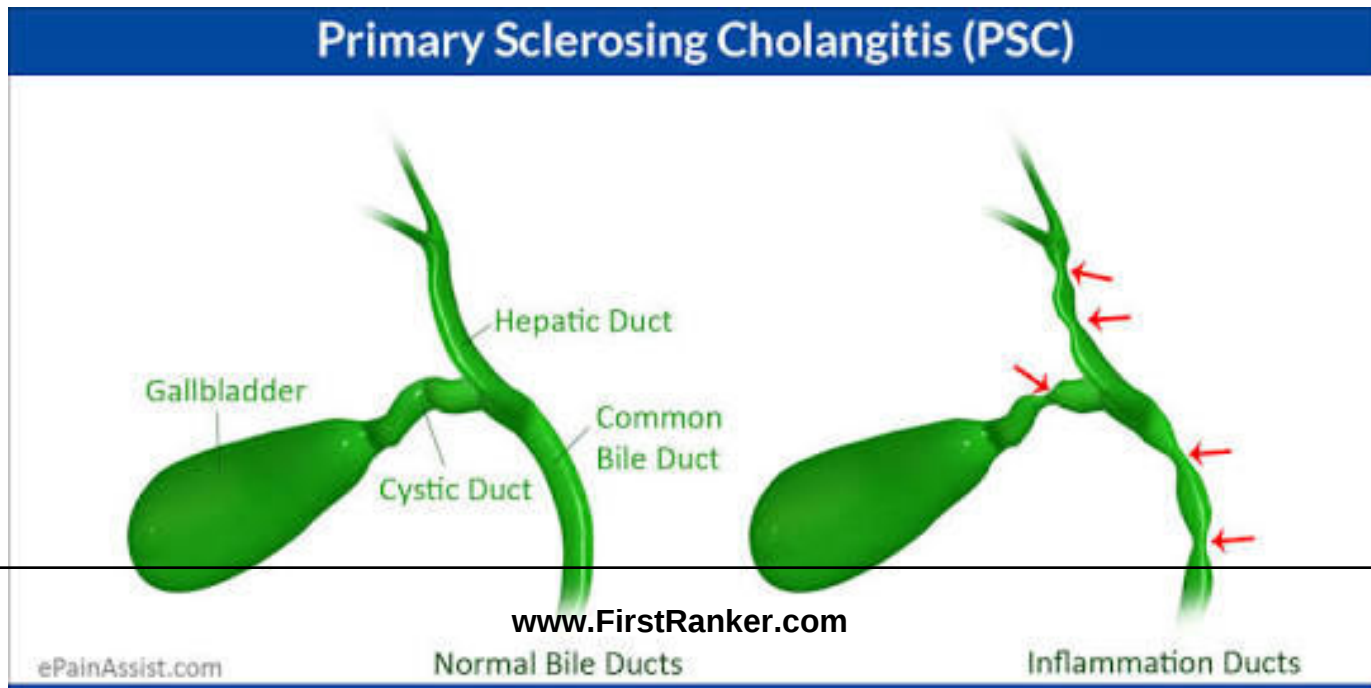


Figure 67.24 Classification of biliary atresia. Gall bladder filling provides a clue to the type of atresia.

PRIMARY SCLEROSING CHOLANGITIS

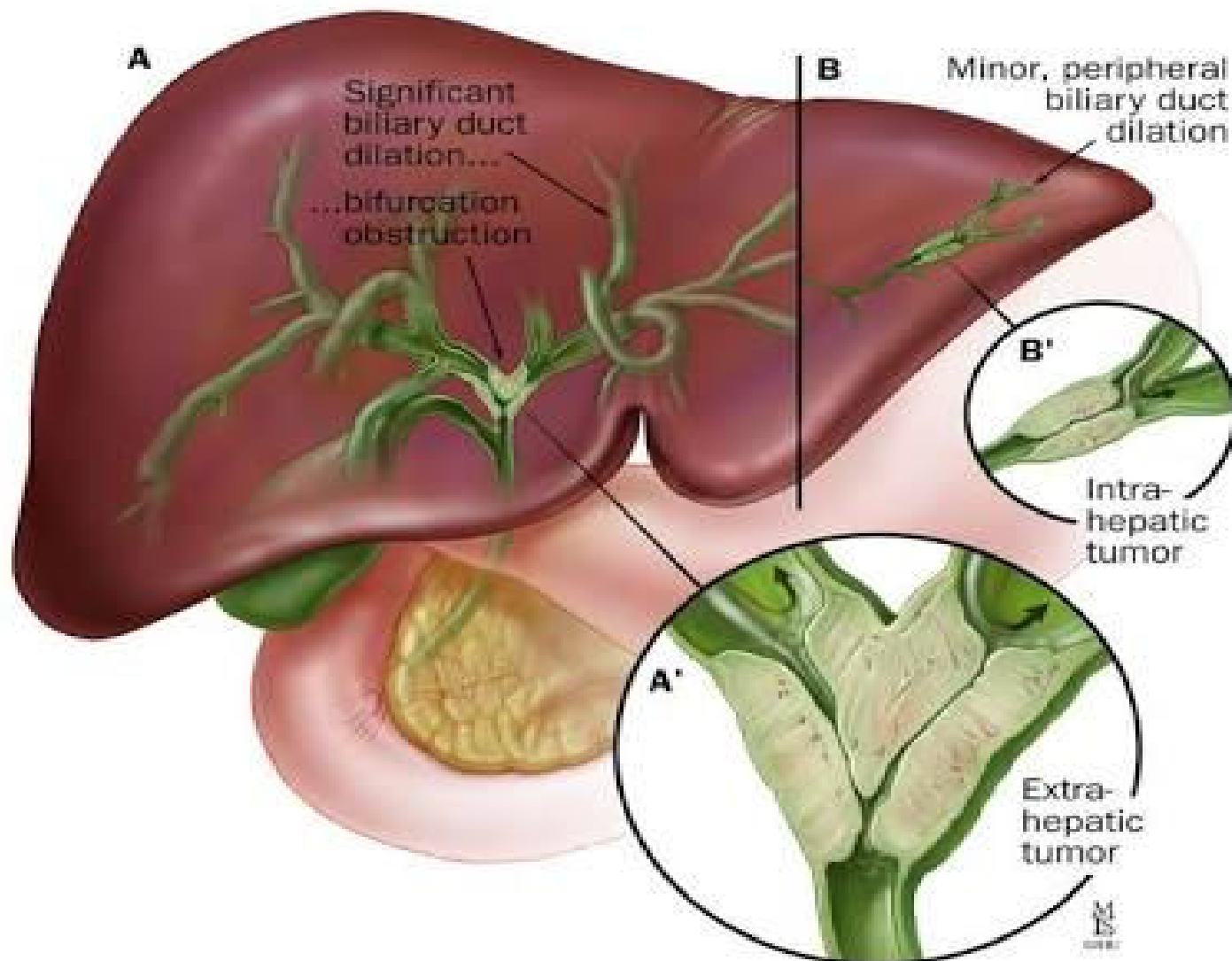
- Fibrosing inflammatory condition of biliary tree
- Age 30-60(males)
- Ass. with other autoimmune conditions



TUMORS OF BILE DUCT

Benign

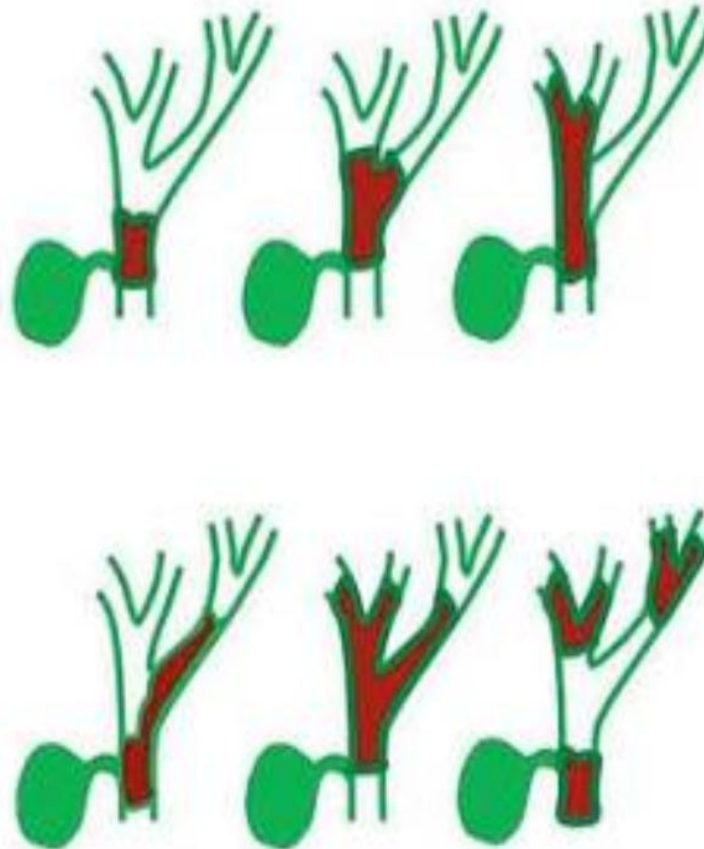
- Papilloma and adenoma- mc
 - arise from glandular epi lining bile ducts
 - more frequently in periampullary region
- Multiple biliary papillomatosis-rare
 - multiple mucus secreting tumors of biliary epithelium.
 - malignant potential
- Granular cell myoblastoma
- Leiomyoma



CHOLANGIOCARCINOMA

- **Risk factors -**
 - **c/c inflammatory conditions**
 - Primary sclerosing cholangitis**
 - **Oriental cholangiohepatitis**
 - Hepatitis C infection**
 - **parasitic infections**
 - **congenital**
 - **chemical agents & medications**
 - **post surgical**
-

Type	Bismuth-Corlette Classification of Perihilar Tumors
I	Tumor involves common hepatic duct
II	Tumor involves bifurcation of the common hepatic duct
IIIa	Tumor involves the right hepatic duct
IIIb	Tumor involves the left hepatic duct
IV	Tumor involves both right and left hepatic ducts



CHOLANGITIS

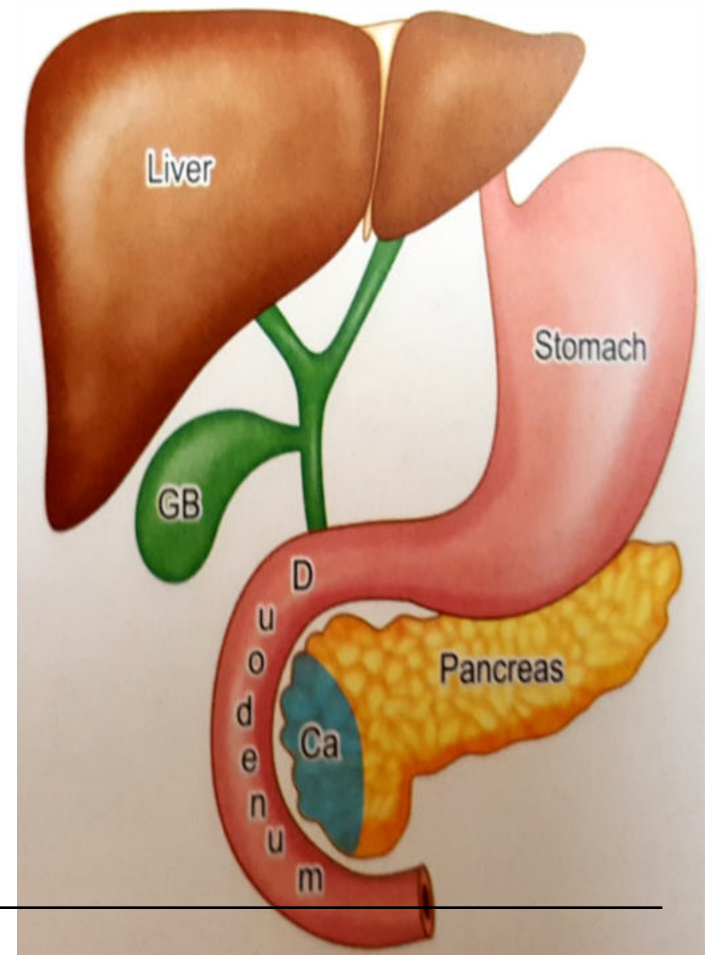
- Inflammation of biliary tree
- Obstruction of bile duct will lead to bacterial infection
- Organisms causing
E.coli
,Klebsiella,Enterococci,Pseudomonas,
Proteus

OUTSIDE THE WALL

- Carcinoma head of pancreas
- Periapillary carcinoma
- Enlarged lymph nodes in porta hepatis
- Mirizzi syndrome
- Pseudocyst of pancreas

PANCREATIC CARCINOMA

- 70% at head of pancreas and periampullary region
- Ductal adenocarcinoma.
- Solid, scirrhous tumours, characterised by neoplastic tubular glands within markedly desmoplastic fibrous stroma.

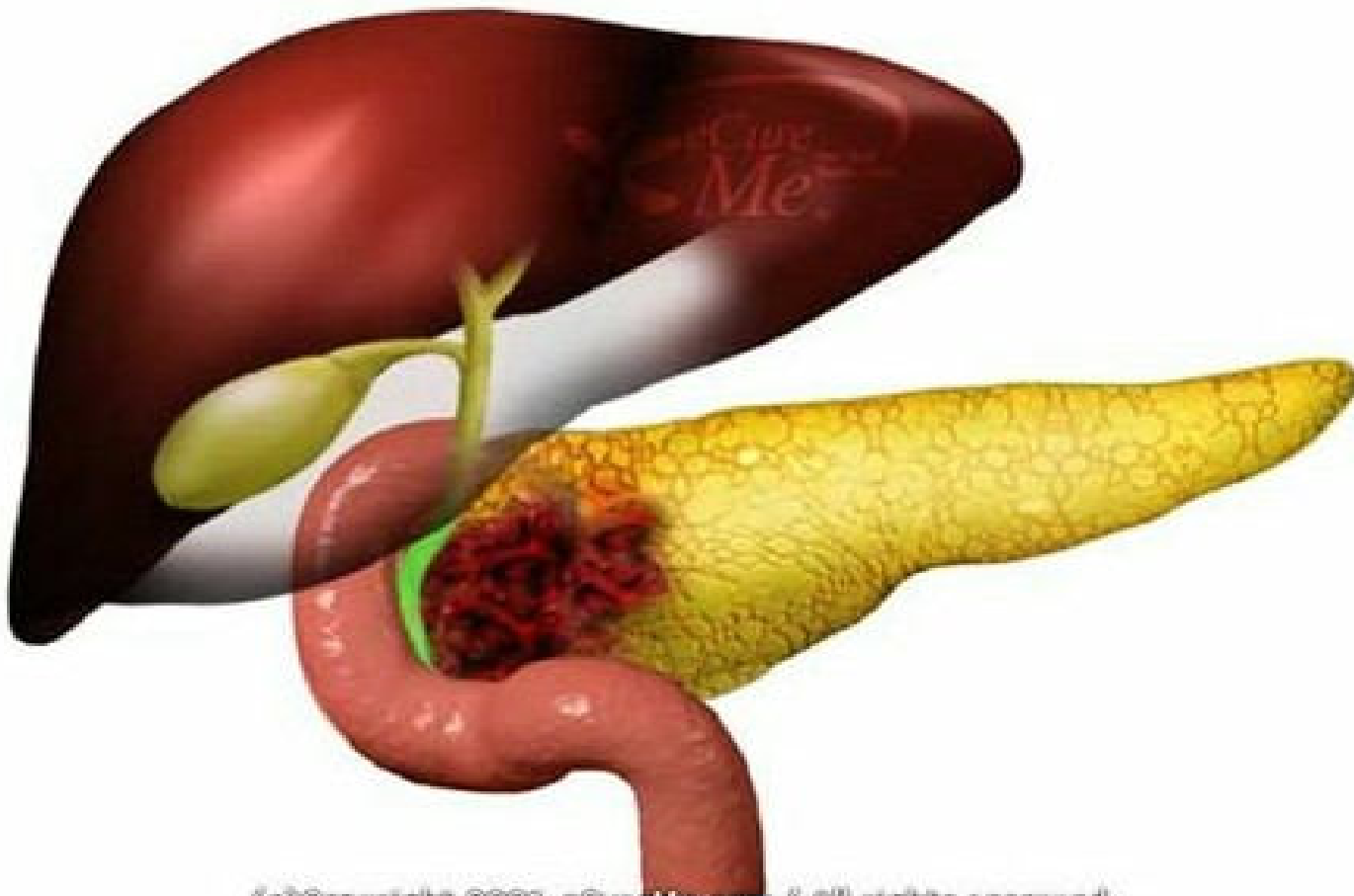


PERIAMPULLARY CARCINOMA

- Carcinoma arising at or near the ampulla of vater

It can arise from

- Head of pancreas close to the ampulla
- Ampulla of vater itself
- Distal common bile duct-10%
- Duodenal mucosa adjacent to ampulla-10%



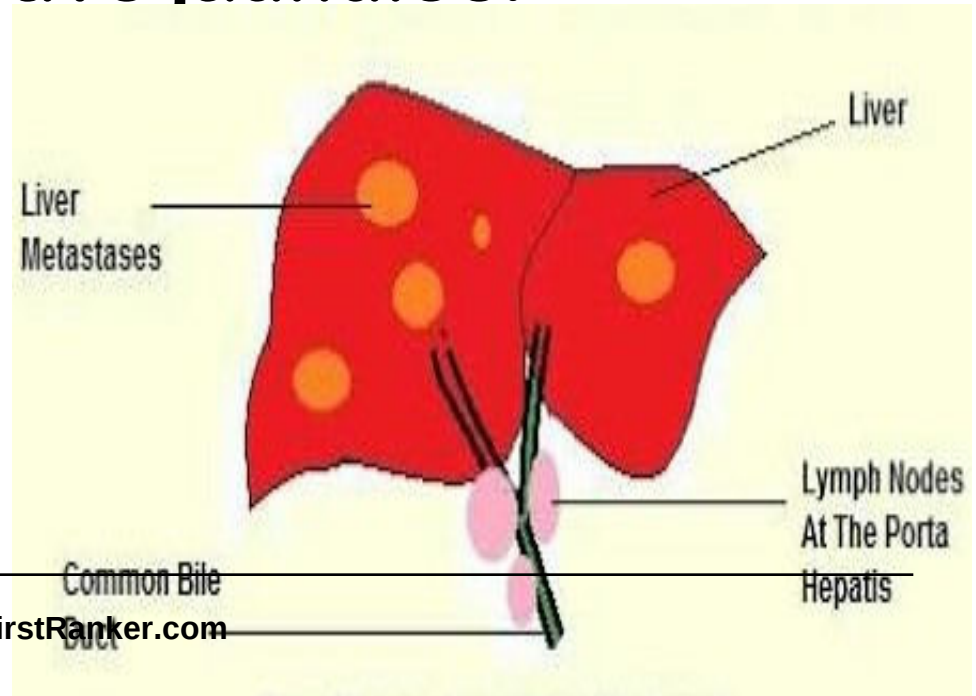
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PORTA HEPATIC

METASTASIS AND NODES

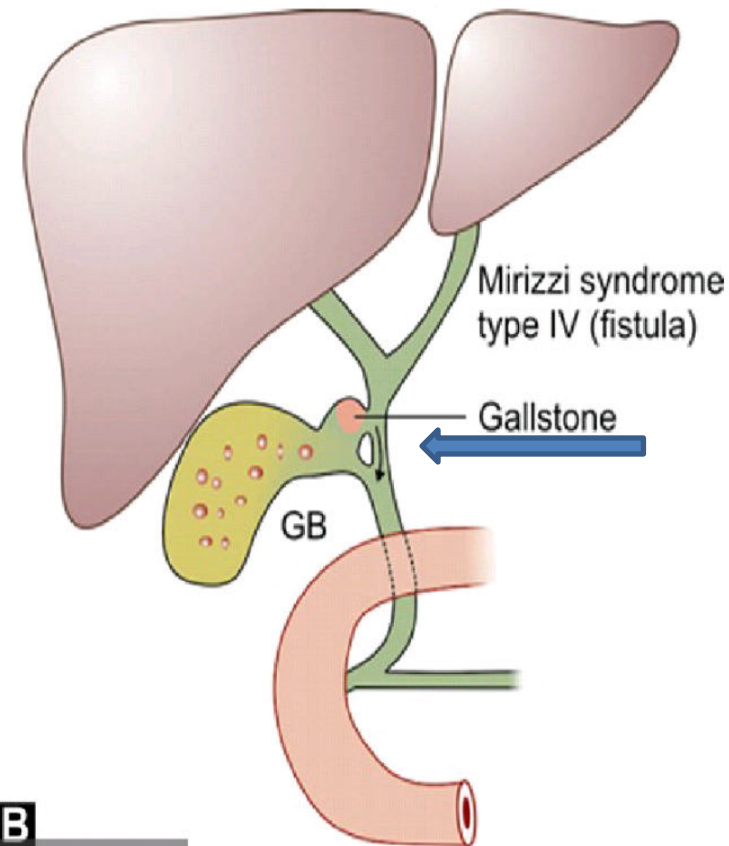
Secondaries from ca-stomach, pancreas and duodenum

All causes compression on the bile duct and leads to obstructive jaundice.



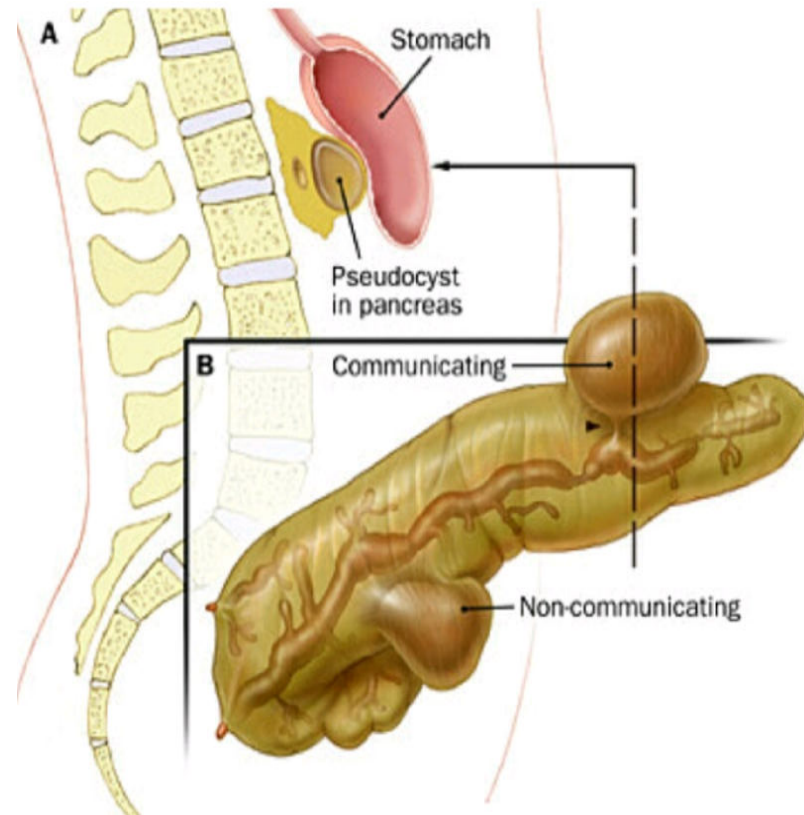
MIRIZZI'S SYNDROME

- Gallstone impacted in cystic duct or neck of gall bladder
- cause compression on common bile duct or common hepatic duct.
- Resultant inflammation cause **cholecystocholedochal fistula**



PSEUDOCYST AT PANCREATIC HEAD

- collection of amylase rich fluid enclosed in a wall of fibrous or granulation tissue
- arises following an attack of acute pancreatitis.
- Enlargement causes pressure effects.
- ultimately leads to obstructive jaundice from biliary compression –



CLINICAL EVALUATION

Marlin T Abraham
Roll No:87

Presenting complaints

- Yellowish discolouration-skin , sclera and mucus membrane
- Generalised itching
- Clay coloured stools
- Dark coloured urine



- **Anorexia, weight loss in malignancy**
- **Melena / Dark silver stools**
- **Pain right upper quadrant**
- **Intermittent fever**

PAST HISTORY

- **h/o blood transfusion(Hepatitis B)**
- **h/o jaundice(Hepatitis B,C)**
- **h/o surgeries – biliary surgery(post operative biliary strictures)**
- **h/o pancreatitis**
- **h/o sudden onset diabetes**

PERSONAL HISTORY

- Diet – high consumption of meat
- Cigarette smoking-carcinoma pancreas
- Use of alcohol – chronic pancreatitis
- h/o injections, drug abuse, tattoos-Hepatitis B

DRUG HISTORY

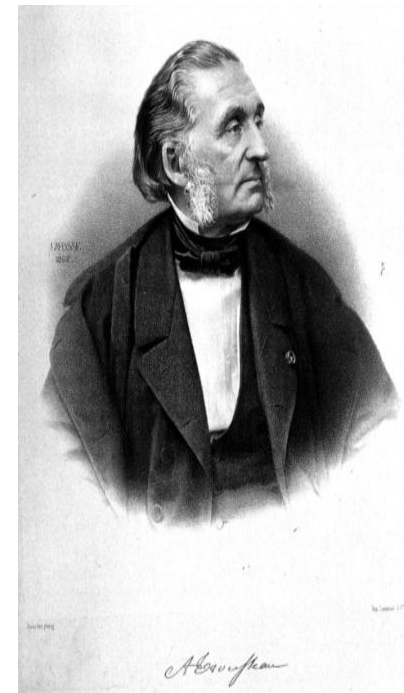
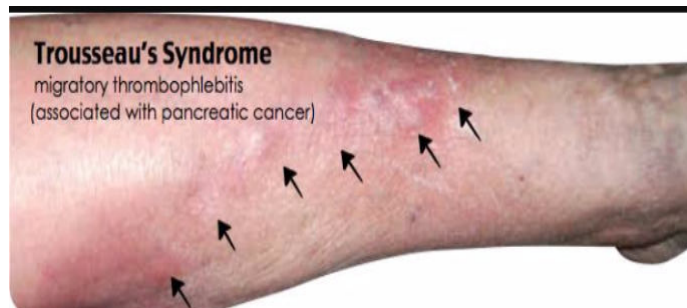
- **Cholestatic** –
 - anabolic steroids
 - chlorpromazine
 - carbamazepine
 - antibiotics – erythromycin, rifampicin
- **Hepatitis** –
 - INH
 - phenytoin
 - halothane
 - methyl dopa



General Examination

- Cachexic
- Pallor
- **Icterus**
- Clubbing
- Pitting pedal edema
- Pulse rate – Bradycardia
- Blood Pressure – hypotension
- Scratch marks, silver nails
- Stigmata of liver disease

- Migratory thrombophlebitis - ***Trousseau's Sign of malignancy***
- Indication of
Pancreatic carcinoma



**Armand
Trousseau**

LOCAL EXAMINATION

Inspection

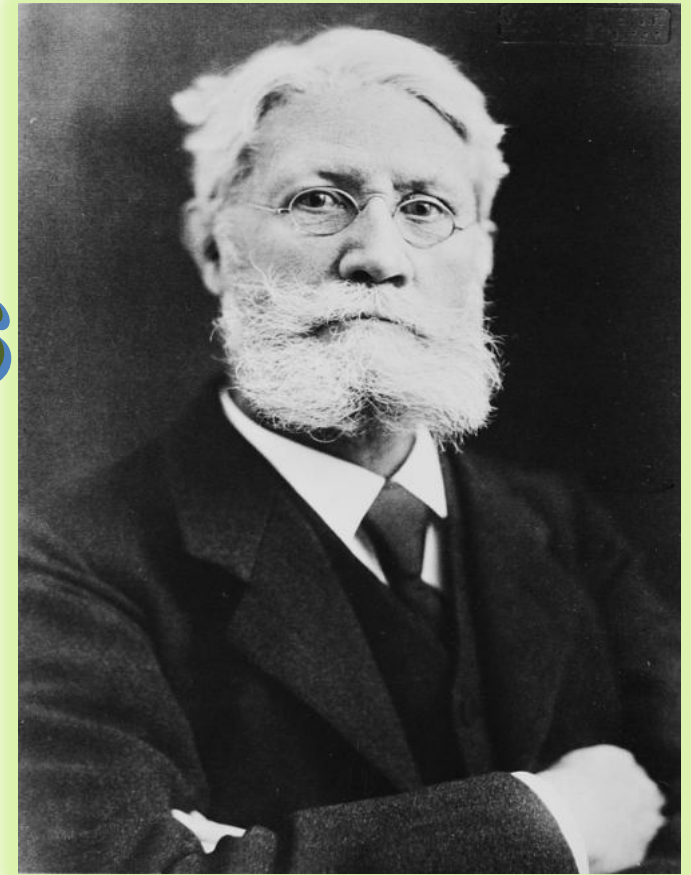
- Abdomen- distended/ scaphoid
- Gall bladder
- Scars of previous surgery



Palpation

- Tender right upper quadrant [cholangitis]
- Liver – non tender, nodular, rounded edge - metastases
- **Gall bladder** – tense globular swelling projecting downwards and forwards.
- ✓ Moves with respiration
- ✓ Better seen than felt
- ✓ Dull on percussion

COURVOISIER'S LAW



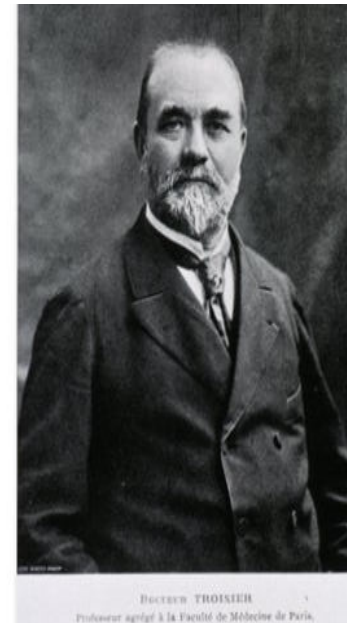
**Ludwig Georg
Courvoisier**

EXCEPTIONS TO COURVOISIER'S LAW

- Double impaction of stone
- Pancreatic calculus obstructing the ampulla
- Oriental cholangiohepatitis
- Mucocele/empyema of gall bladder
- Carcinoma gall bladder with multiple liver metastases
- Mirizzi's syndrome
- Nodes in porta hepatis.

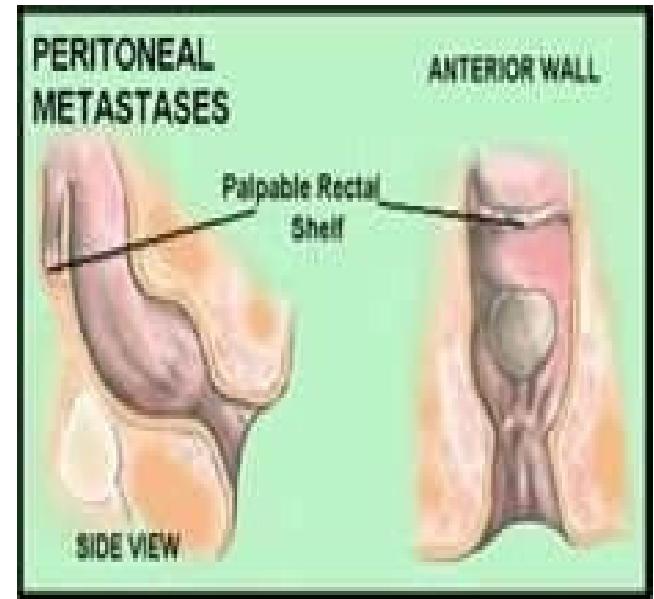
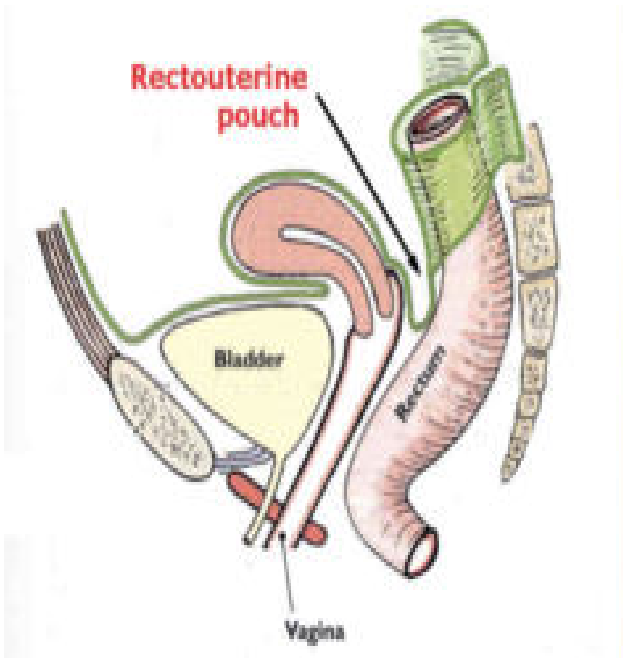
FEATURES OF METASTASIS

- Left supraclavicular lymph nodes enlargement – **TROISIER'S SIGN** [Virchow's node]



Charles Émile
Troisier

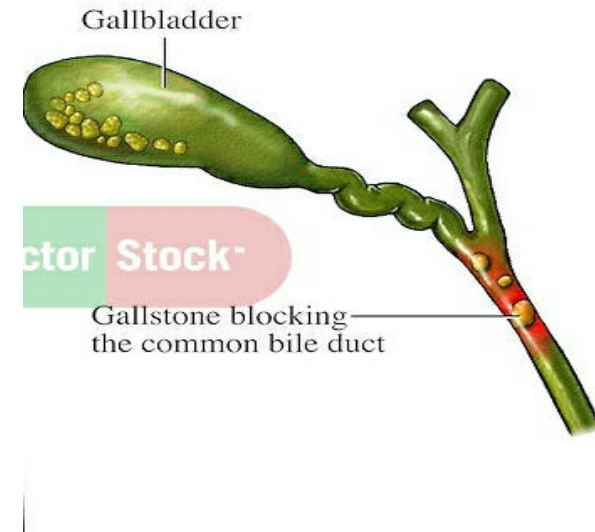
- Per rectal examination – **BLUMER'S SHELF** [secondaries in rectovesical/ rectouterine pouch]



- Ascitis- liver secondaries

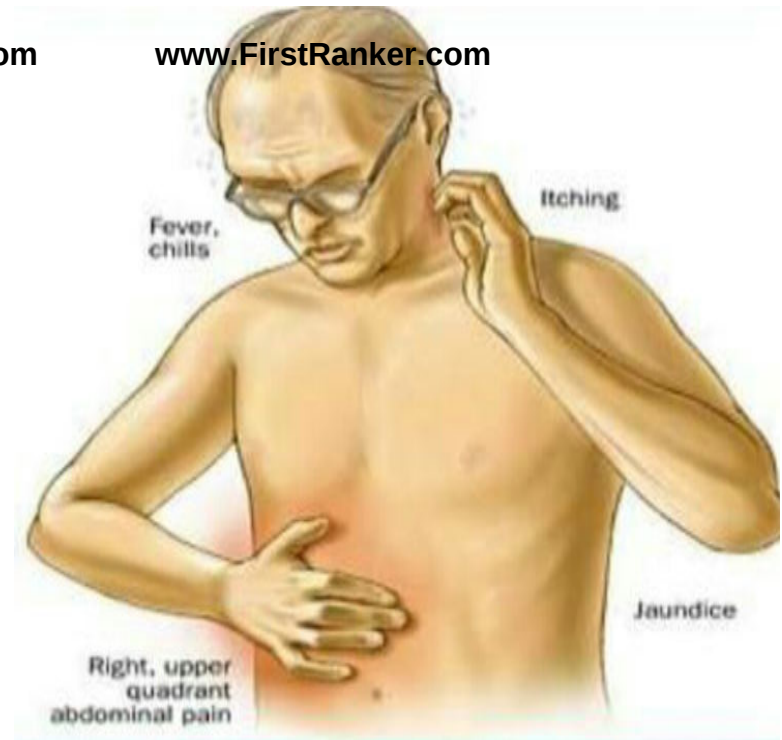
CHOLEDOCHOLITHIASIS

- **Biliary colic**
- **Nausea and vomiting**
- **Intermittent symptoms**
- **Physical examination –**
 - **mild epigastric/RUQ tenderness**
 - **mild icterus**



CHARCOT'S TRIAD

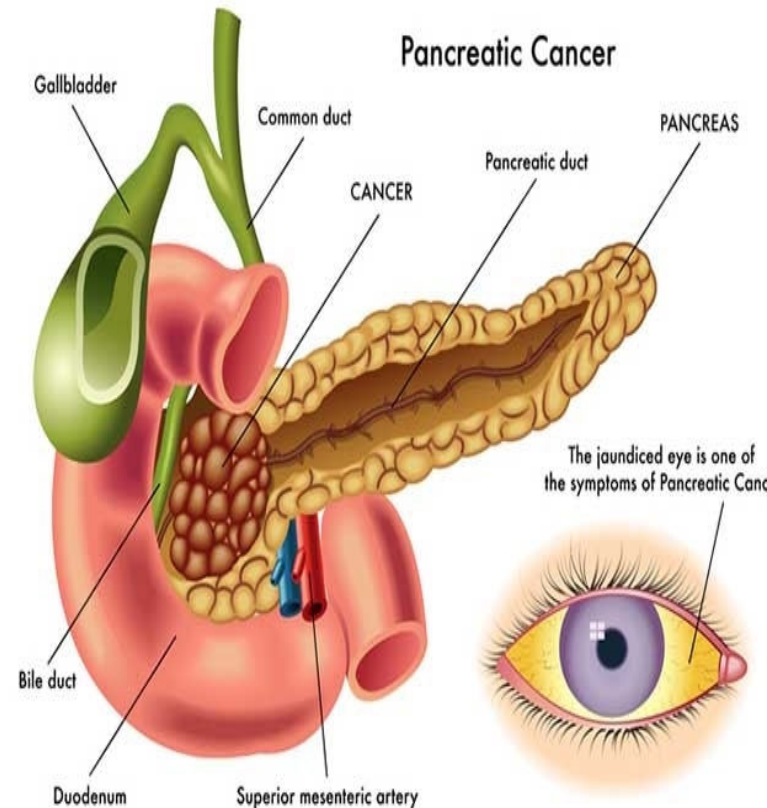
- Intermittent pain
- Intermittent fever
- Intermittent jaundice



REYNOLD'S PENTAD

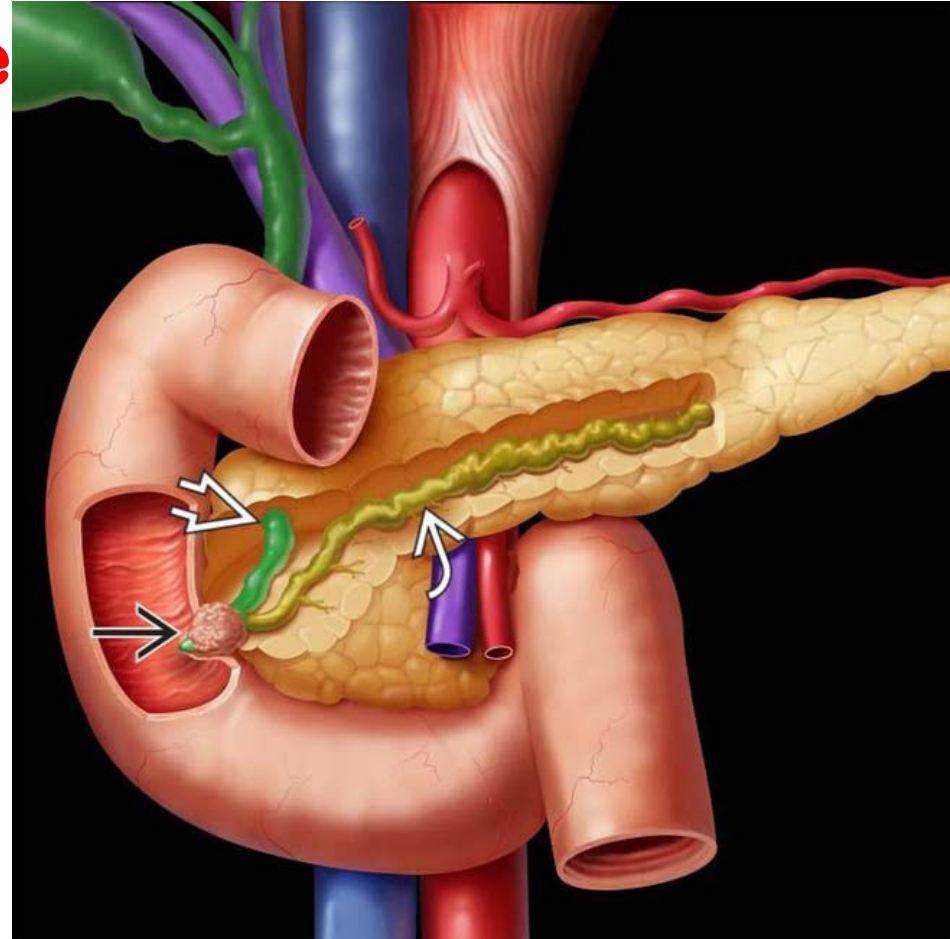
- Intermittent pain , fever and jaundice
- Shock
- Altered mental status

- **PAINLESS PROGRESSIVE JAUNDICE** – 75% cases
- Nausea, epigastric discomfort, pain
- Loss of weight and appetite
- Chills and rigor (cholangitis)
- New onset diabetes
- Palpable liver
- Palpable gall bladder



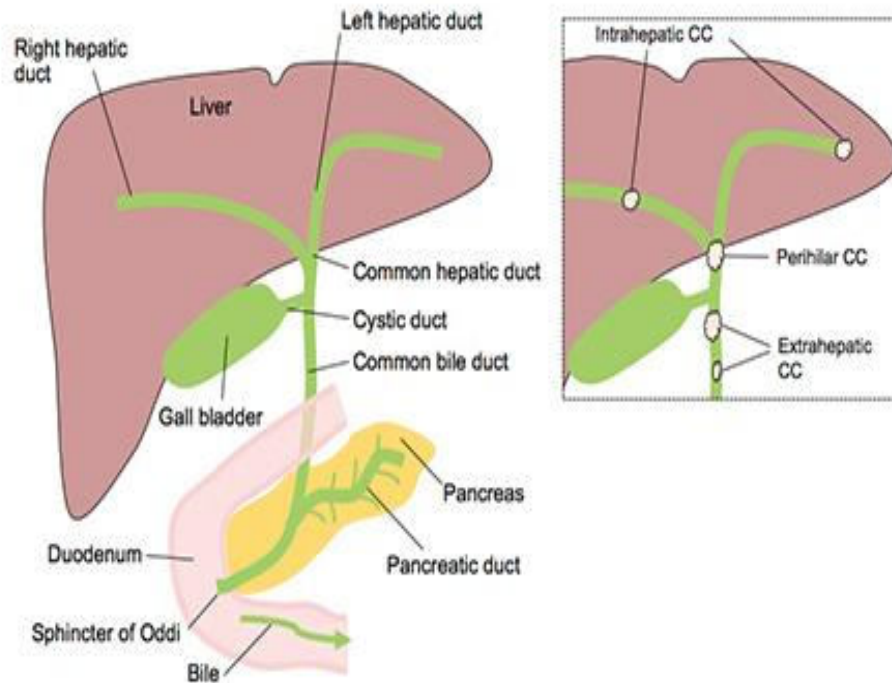
PERIAMPULLARY CARCINOMA

- **Intermittent jaundice**
- Waxing and waning of symptoms
- Dark silvery stools
- Pain and weight loss - late features



CHOLANGIOCARCINOMA

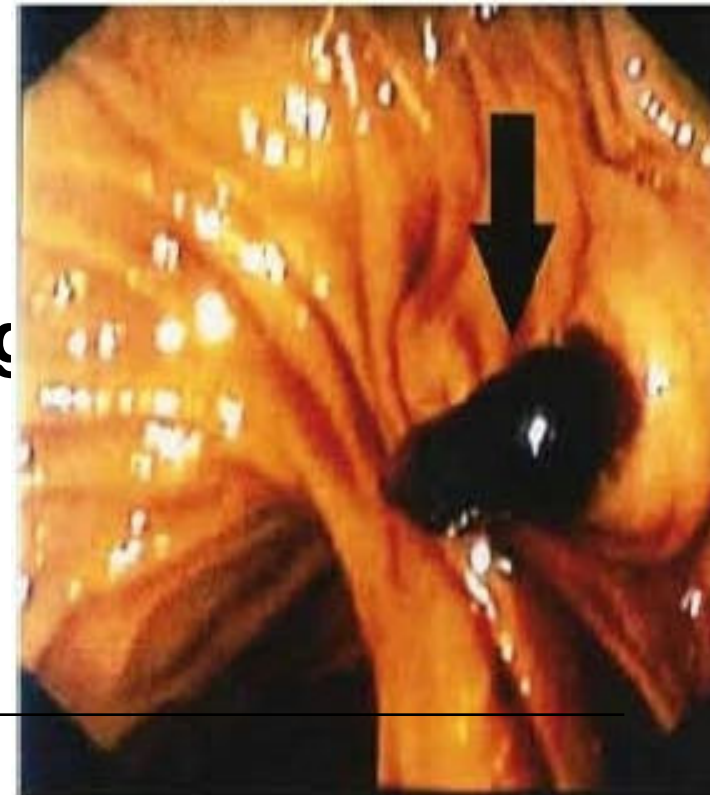
- Abdominal pain, early satiety, anorexia and weight loss
- Pruritus, jaundice
- Cachexia
- Gall bladder palpable (obstruction-distal CBD)



HEMOBILIA

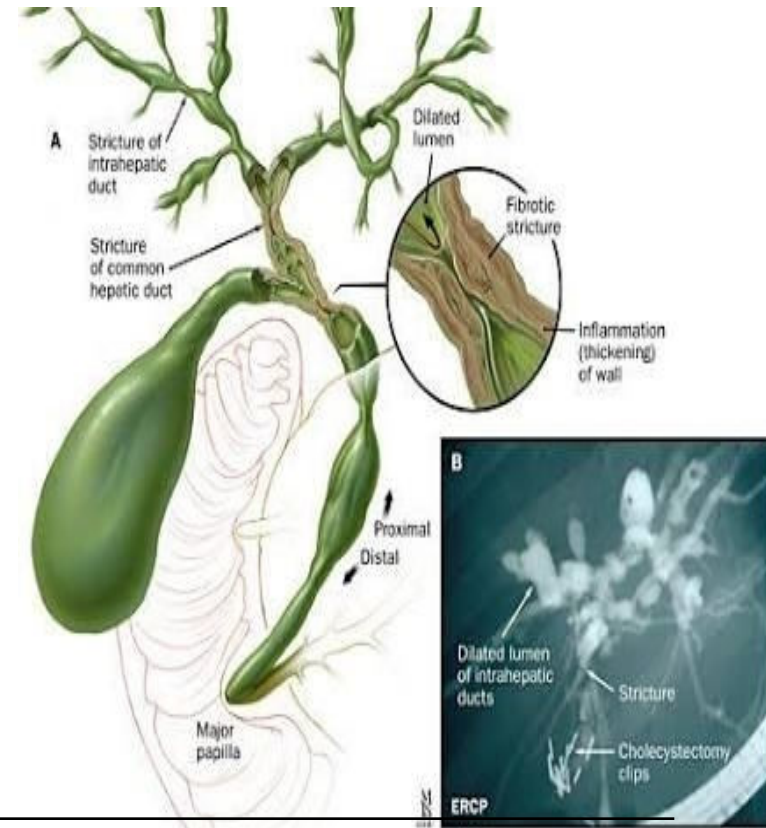
Triad of hemobilia(**Sandbloom's triad**)

1. Biliary colic
2. Obstructive jaundice
3. Occult/gross intestinal bleeding



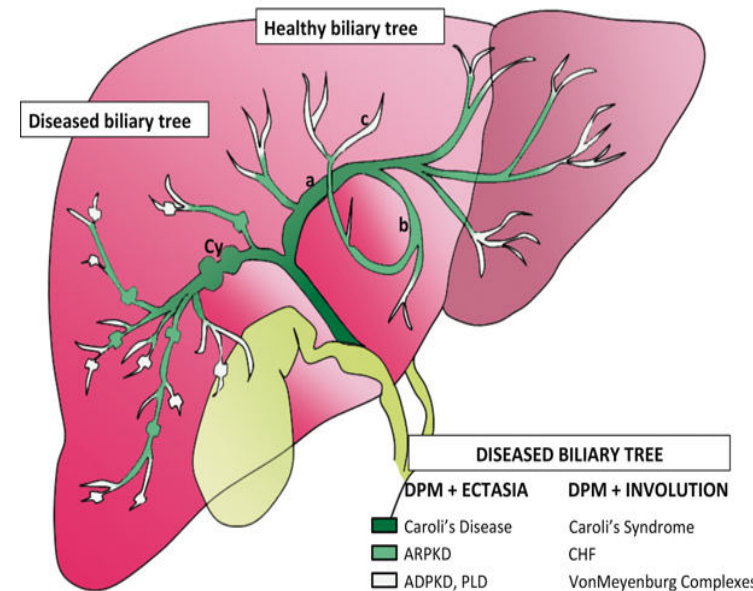
STRICTURES OF BILE DUCT

- Slowly progressive painless jaundice
- h/o cholecystectomy
- Pain abdomen
- Features of ascending cholangitis
- Hepatomegaly due to back pressure



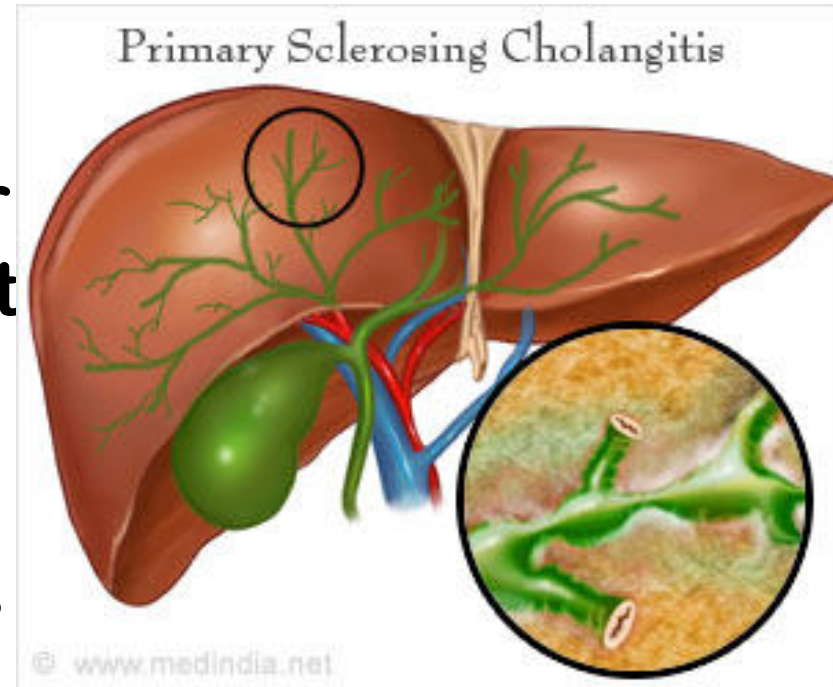
CAROLI'S DISEASE

- Presents with abdominal pain or sepsis
- Biliary stasis & stone formation-biliary sepsis
- **Complication-
cholangiocarcinoma**



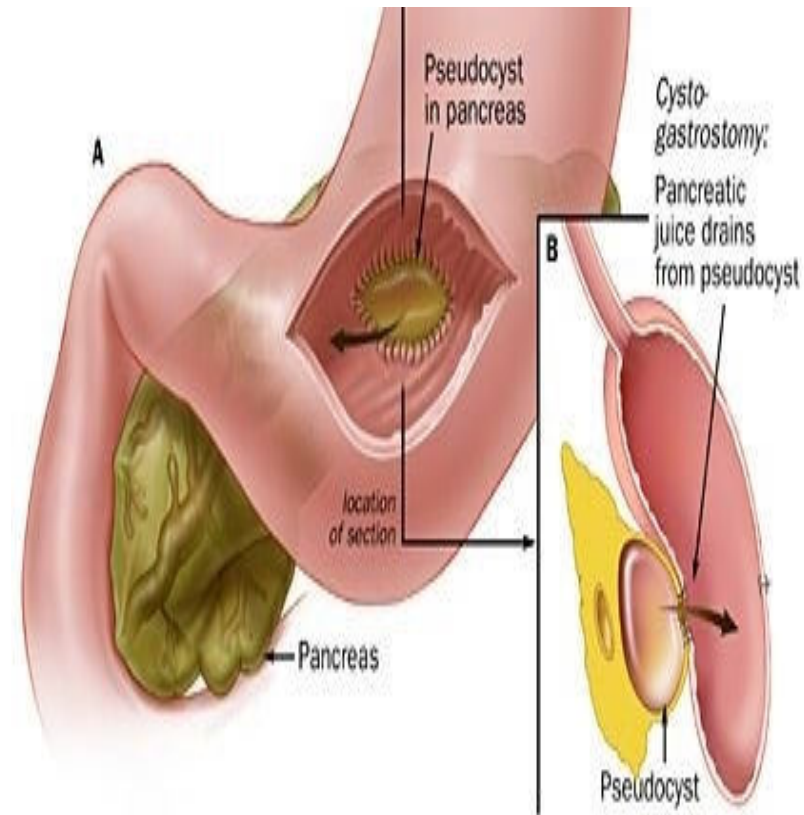
SCLEROSING CHOLANGITIS

- Right abdominal quadrant discomfort, jaundice, fever fatigue, pruritus and weight loss
- secondary biliary cirrhosis and cholangiocarcinoma can develop(long standing)



PSEUDOCYST OF PANCREAS

- Epigastric pain
- Mild icterus and pallor
- Epigastric mass
- Resonant on percussion
- Mass - tender
- Does not move with respiration



INVESTIGATIONS

Martin K Sebastian
Roll No :88

- **Biochemical investigations**
- **Hematological investigations**
- **Imaging and other investigations**

BIOCHEMICAL INVESTIGATIONS

○ **BILIRUBIN**

Normal

Total bilirubin: 0.2- 0.8mg/dL

Direct: 0- 0.2 mg/dL

Indirect :0.2-0.6 mg/dL

❖ Conjugated hyperbilirubinemia

○ **Alkaline phosphatase**

www.FirstRanker.com

Normal: 60-300U/L

>500U/L : suggestive of obstructive
jaundice

○ **SGOT & SGPT**

Modest Elevation

○ **5' Nucleotide**

Elevated

○ **Gamma Glutamyl Transpeptidase**

Elevated

• **CA 19-9**

Gross elevation (normal:0-37 unit/ml)
suggest carcinoma

HEMATOLOGICAL TEST

- **Prothrombin time**

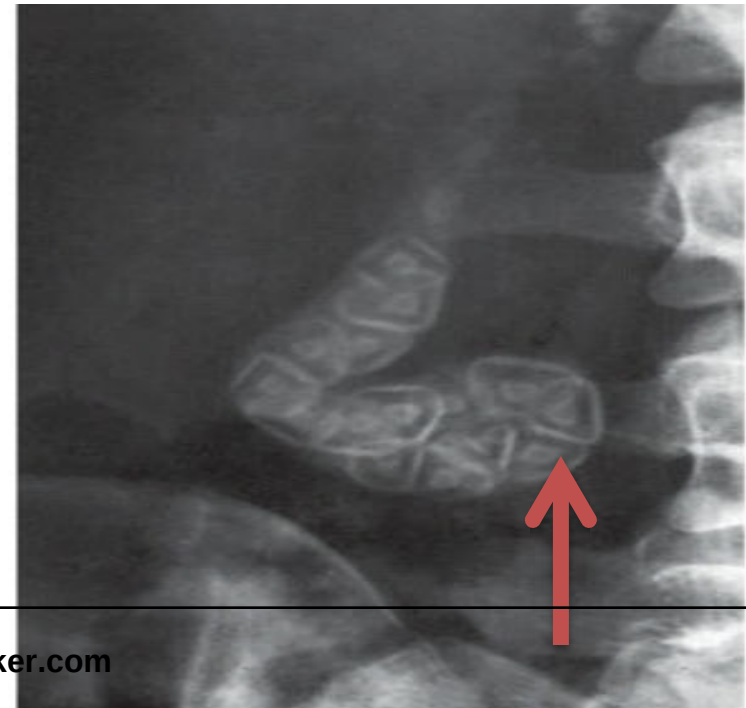
Normal :12-16 sec

❖ **Prolonged but correctable with vitamin K in obstructive jaundice(10mg IM OD 5days)**

IMAGING AND OTHER INVESTIGATIONS

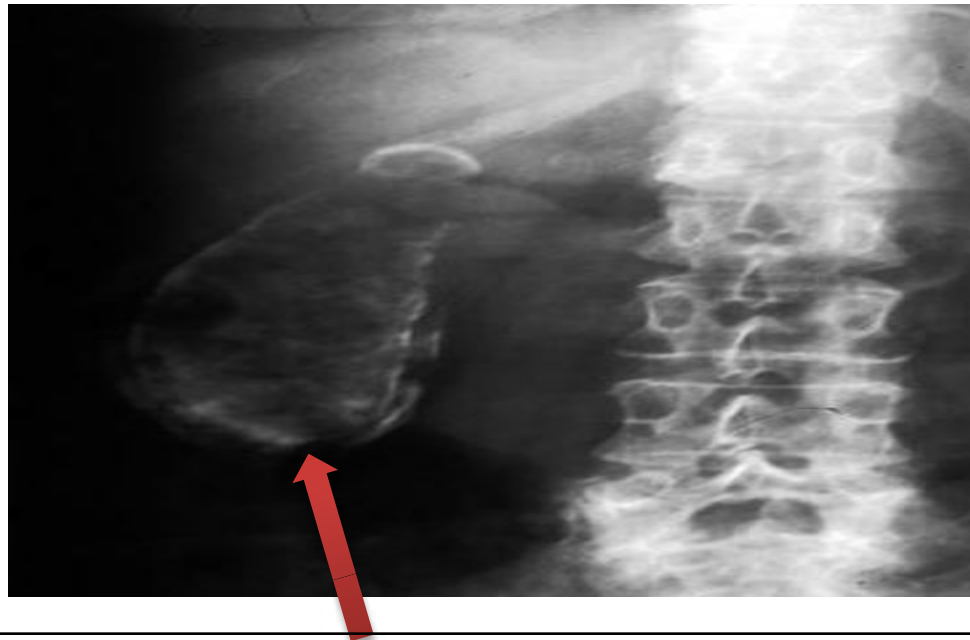
PLAIN X-RAY

- Radio opaque gall stones in 10% of patients
- Mercedes- Benz or sea gull sign



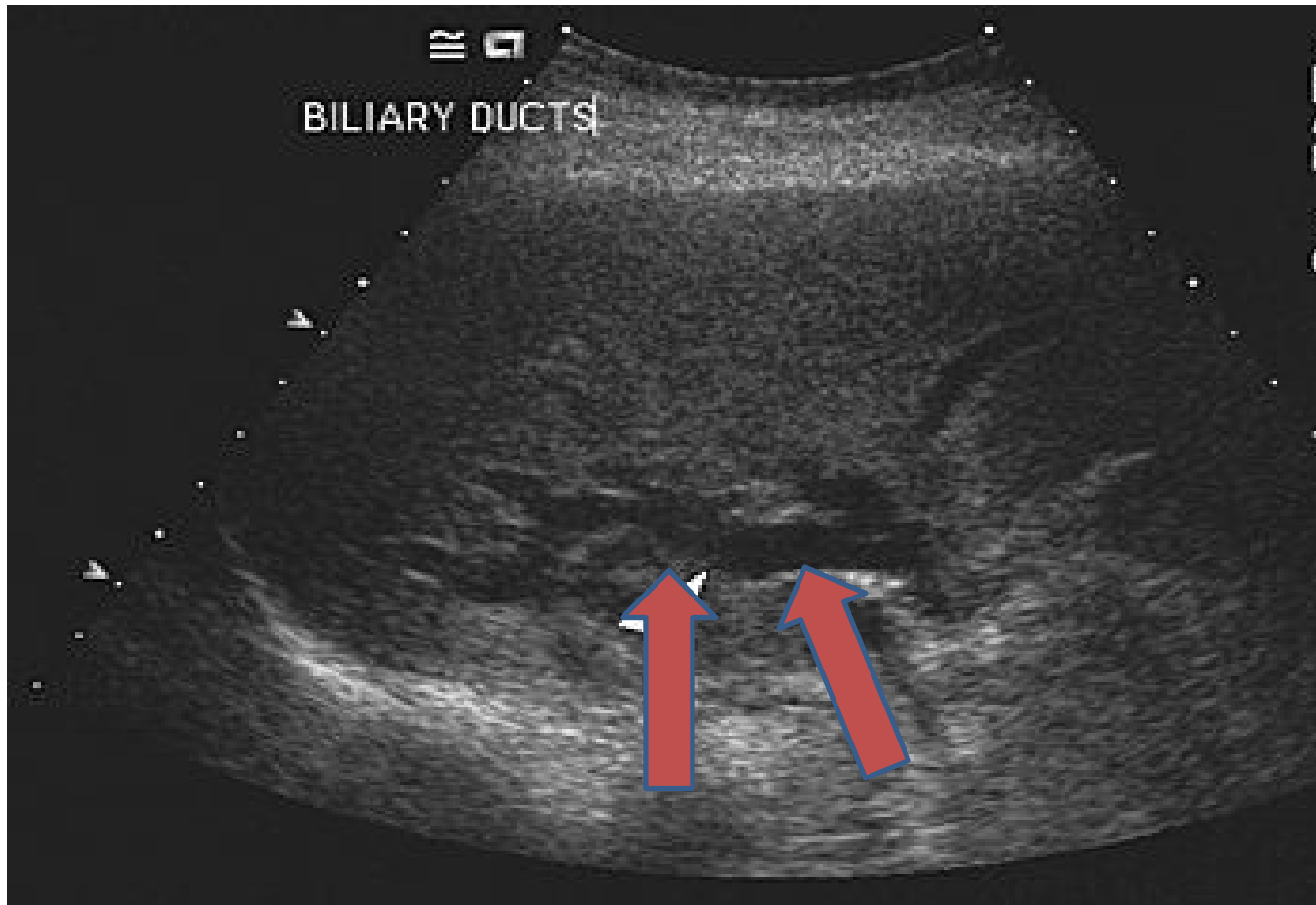
○ Porcelain gall bladder: calcification of gall bladder

❖ Associated with carcinoma up to 25% cases



ULTRASONOGRAPHY

- **Accurate , readily available, inexpensive and quick**
 - **Intra hepatic and extra hepatic Biliary dilation**
 - **level of obstruction**
 - **Cause of obstruction**
 - **gall bladder , CHD or CBD stones**
 - **Cholangiocarcinoma ,**
-
- CA head of pancreas**



Gall stones in USG

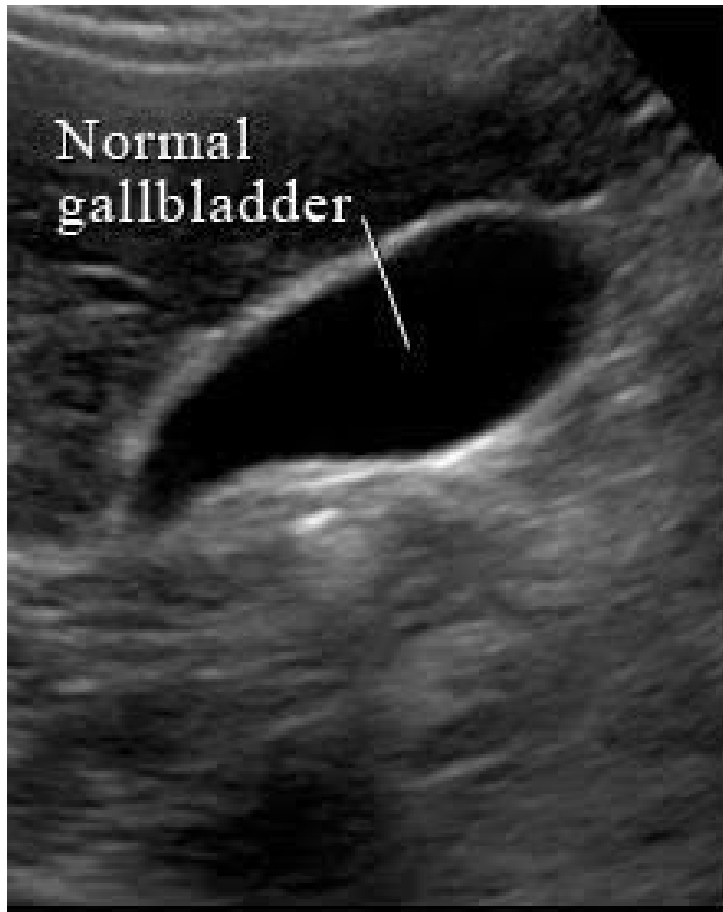


Figure 1

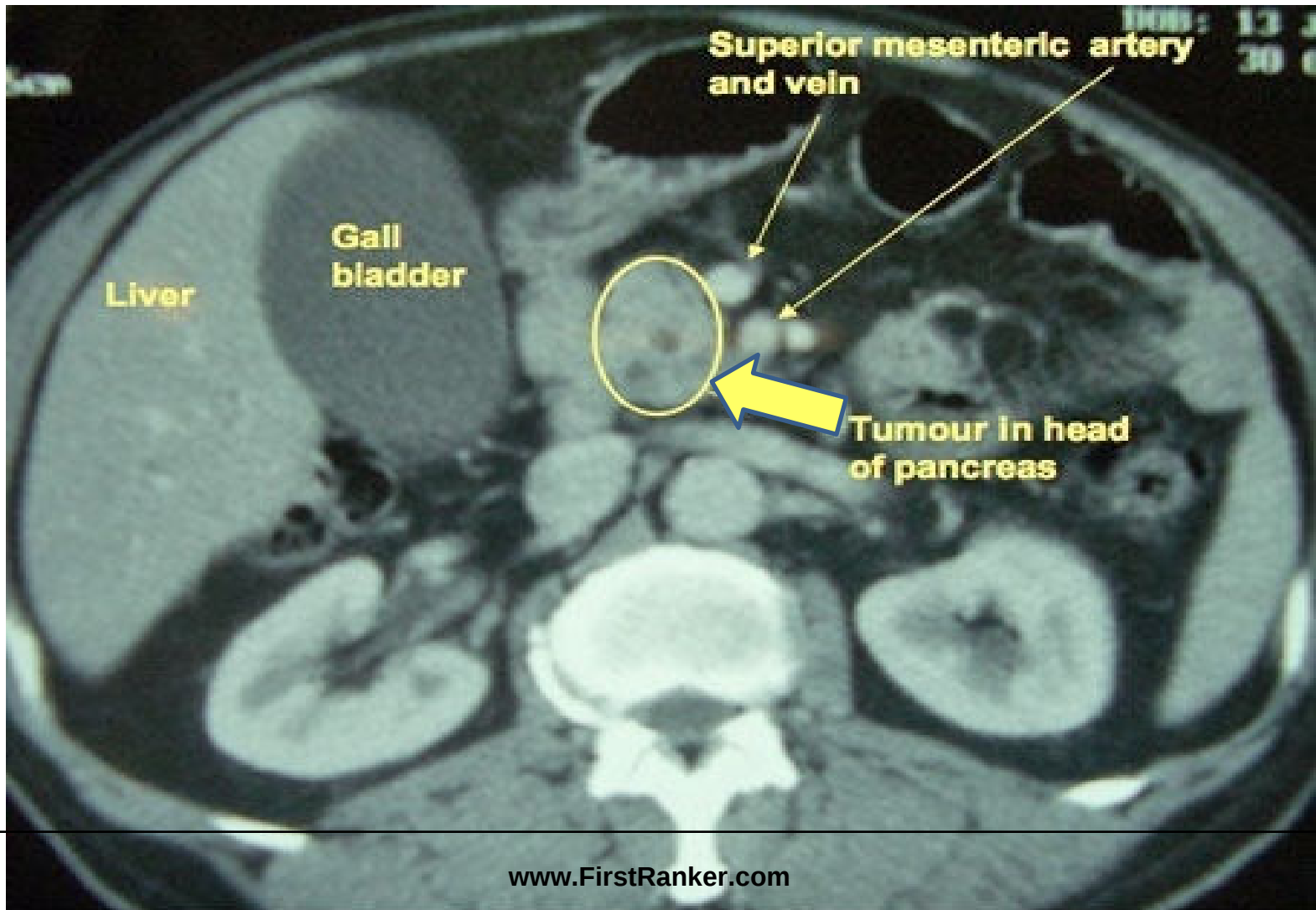


Figure 2

COMPUTED TOMOGRAPHY

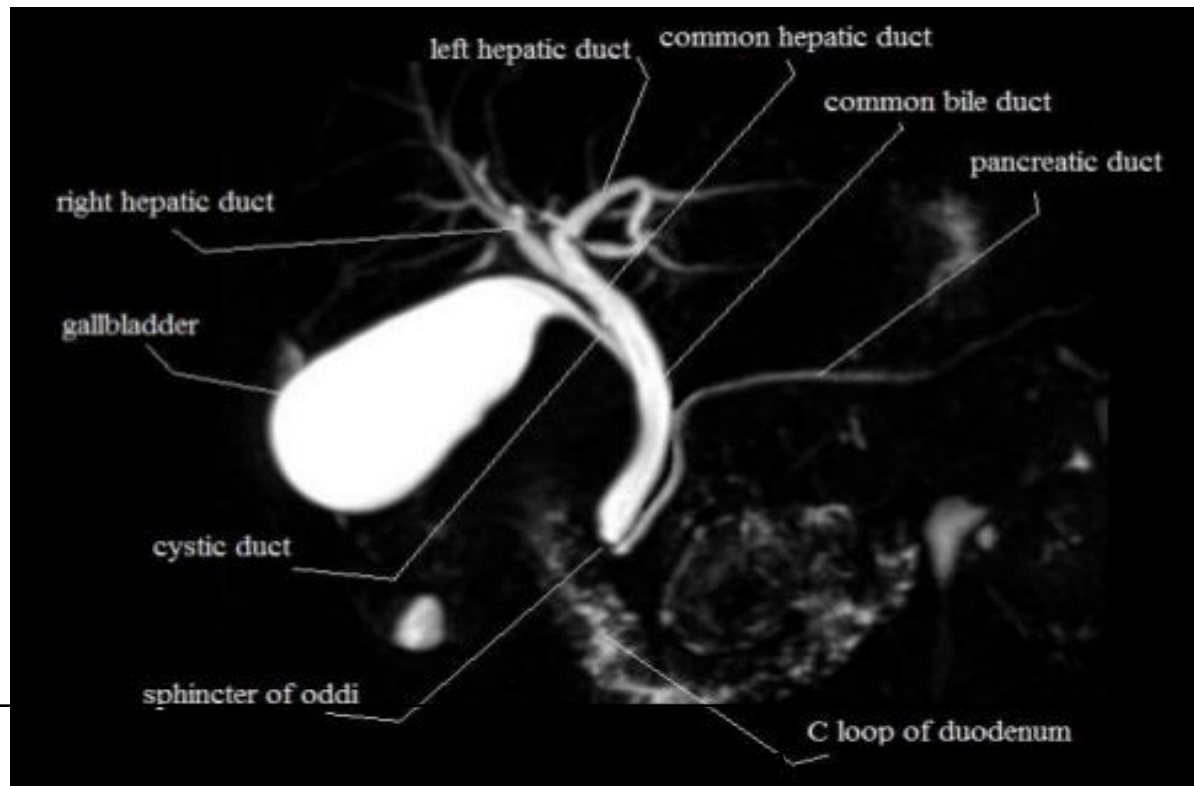
- More anatomical information
- Cause & site of biliary obstruction
- Staging CA liver, gallbladder,
- bile duct, pancreas
- Extend of primary tumour & relationship to other organs & vessels
- Enlarged lymph nodes & metastasis

Carcinoma head of pancreas



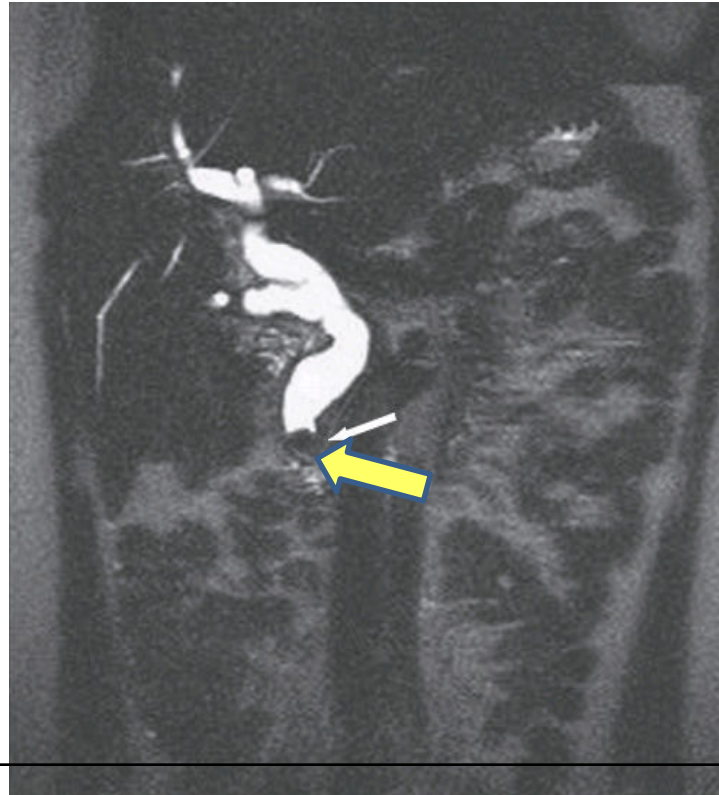
MAGNETIC RESONANCE CHOLANGIOPANCREATOGRAPHY

Ductal obstruction, strictures, intraductal abnormalities



○ **ADVANTAGES**

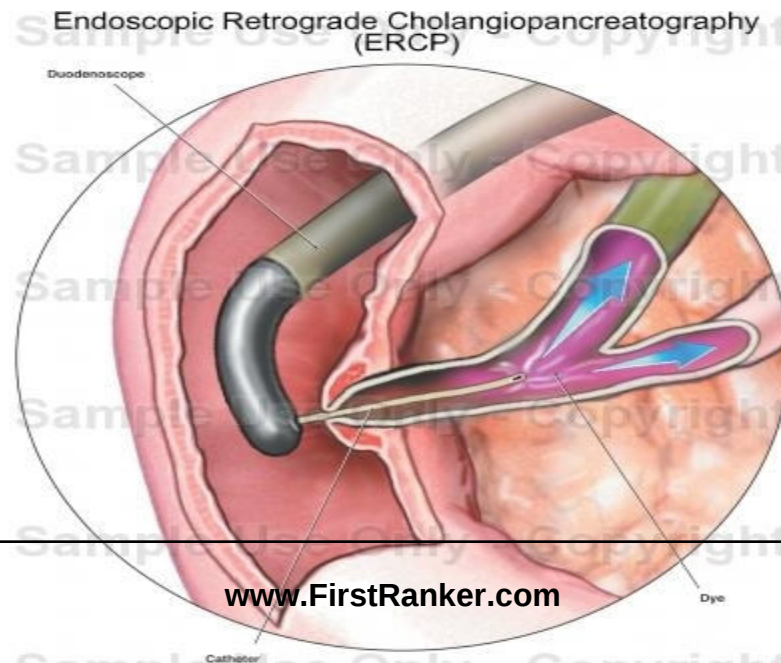
- ❖ Non-invasive
- ❖ Equal or better imaging than ERCP
- ❖ Less complications



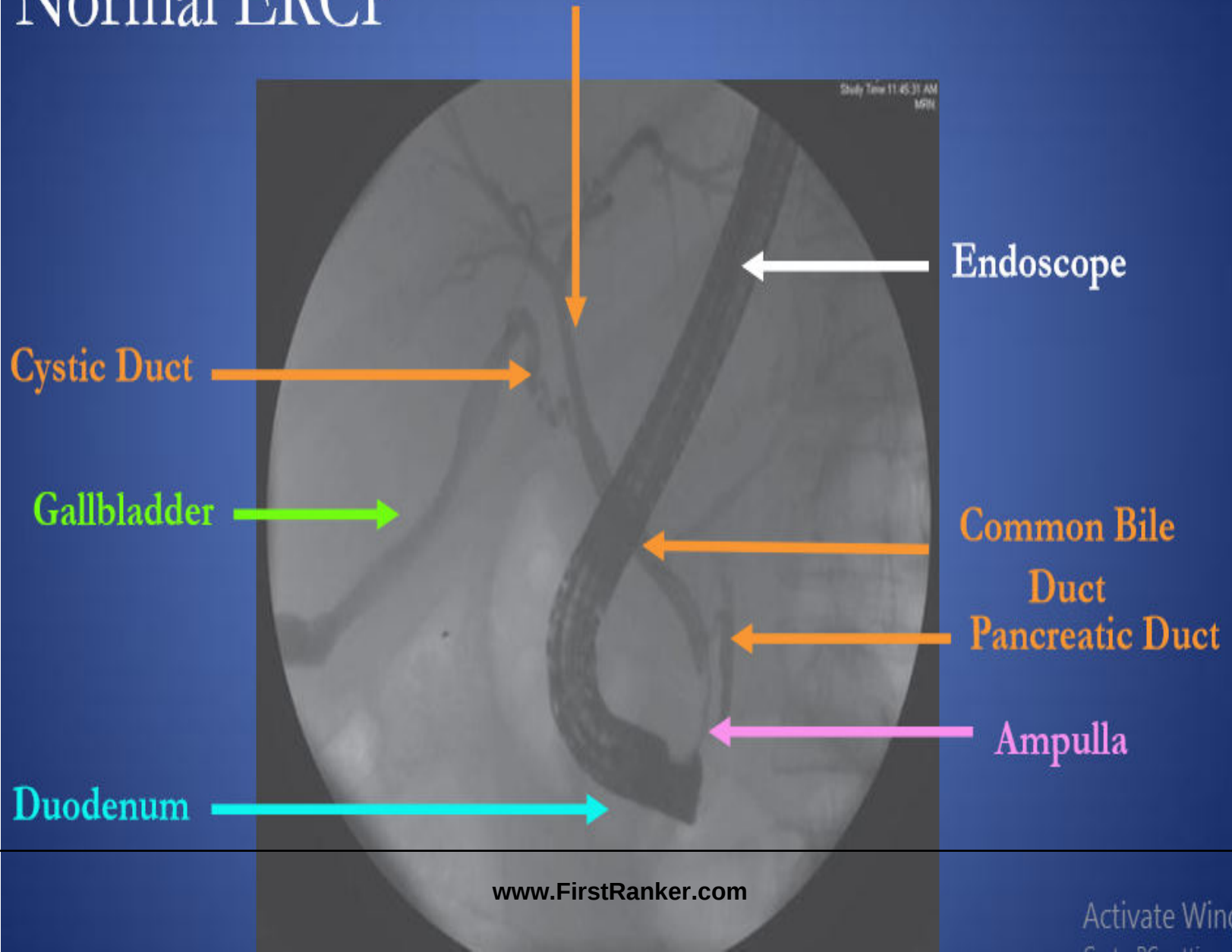
www.FirstRanker.com with choledocholithiasis. The dilated common bile duct ends abruptly, with a convex intraluminal filling defect (arrow) consistent with choledocholithiasis.

ENDOSCOPIC RETROGRADE CHOLANGIOPANCREATOGRAPHY

- Calculi or malignant strictures
- Bile aspirates
- Stone removal and stent placement



Normal ERCP



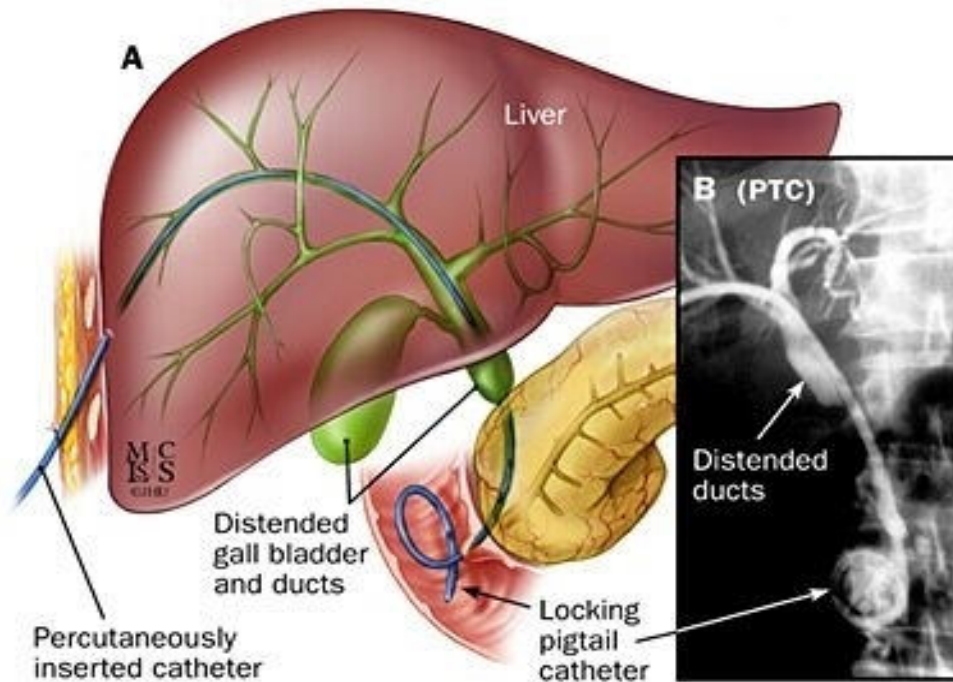
○ **COMPLICATIONS**

❖ Cholangitis (1-2% patients)

❖ Prophylactic antibiotics



PERCUTANEOUS TRANSHEPATIC CHOLANGIOGRAPHY



- **Strictures or obstruction**
- **Bile for cytology**
- **Catheter for external biliary drainage**

- **PRECAUTIONS**

Exclude bleeding tendency

PT should be normal

Prophylactic antibiotics

- **COMPLICATIONS**

- ❖ Infections - cholangitis, septicemia

- ❖ Biliary leak

- ❖ Hemorrhage

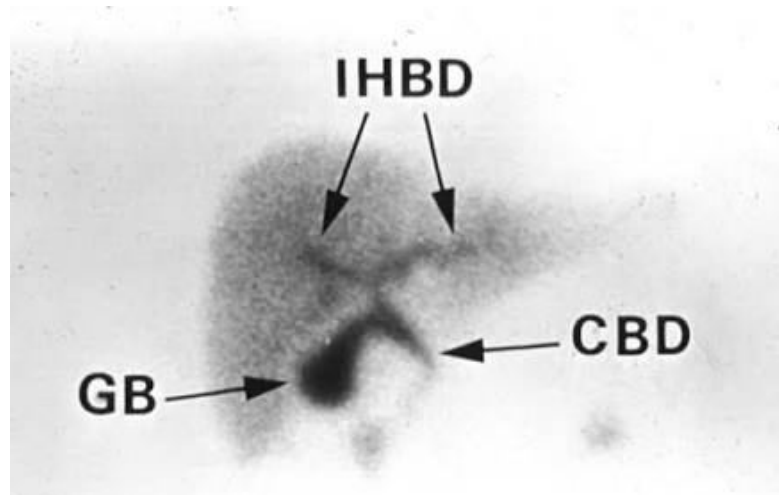
ULTRASONOGRAPHY

- ❖ Endoscopy aided ultrasound
- ❖ Distal common bile duct and ampulla
- ❖ Staging & vascular invasion



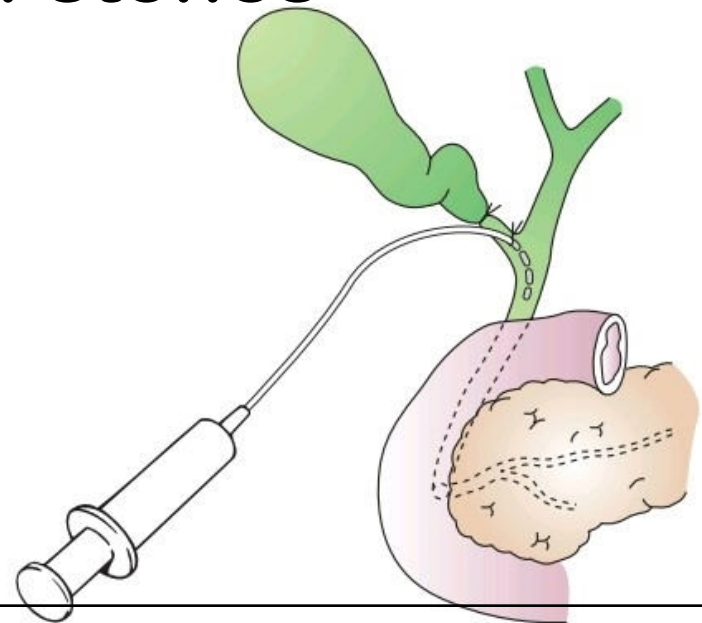
RADIOISOTOPE SCANNING

- ❖ Hydroxy Iminodiacetic acid scan [HIDA]
- ❖ Identification of bile flow
- ❖ Obstruction of biliary tree and bile leaks



PEROPERATIVE CHOLANGIOGRAPHY

- ❖ During open or laparoscopic cholecystectomy
- ❖ Exclude presence of stones within bile duct



OPERATIVE BILIARY ENDOSCOPY

- ❖ **Choledochoscopy**
- ❖ **Flexible fibreoptic endoscope passed via cystic duct**
- ❖ **Enable stone identification & removal under direct vision**
- ❖ **T-tube**

LAPAROSCOPIC ULTRASONOGRAPHY

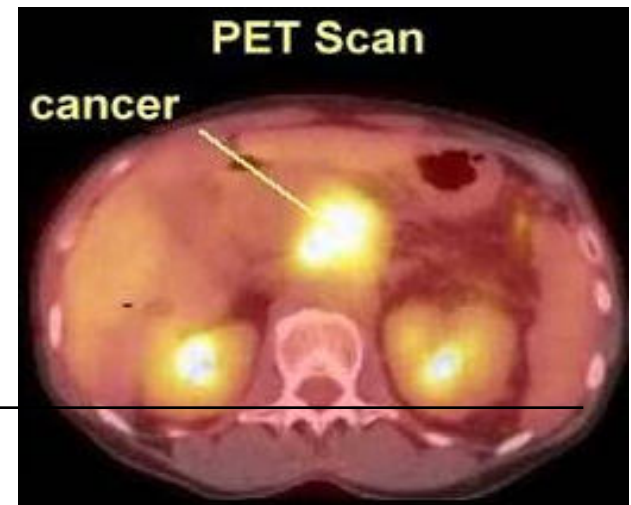
www.FirstRanker.com

www.FirstRanker.com

- ❖ **Biliary & pancreatic tumour staging**
- ❖ **Identify primary tumour and its relationship to major vessels.**
- ❖ **Micrometastasis of liver**

POSITRON EMISSION TOMOGRAPHY SCAN

- Fluorodeoxyglucose
- Differentiate benign and malignant
- Diagnosis of metastatic diseases
- To detect cancerous tissues that may not always be seen through CT/MRI



MANAGEMENT OF CALCULOUS CONDITIONS

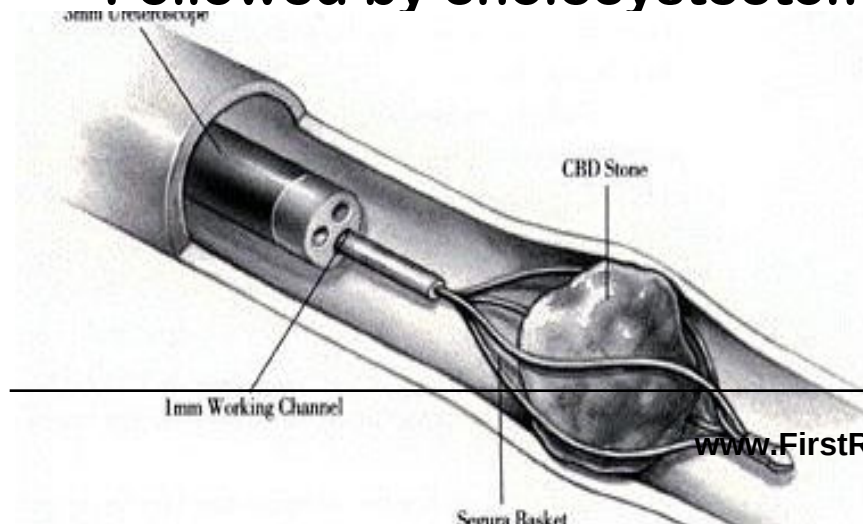
Megha Thomas
Roll No : 89

- ERCP
 - Cholecystectomy
 - a. Laparoscopic Cholecystectomy
 - b. Open Cholecystectomy
 - Common bile duct exploration
 - Common bile duct drainage
 - procedures
-
- Trans duodenal Sphincterotomy

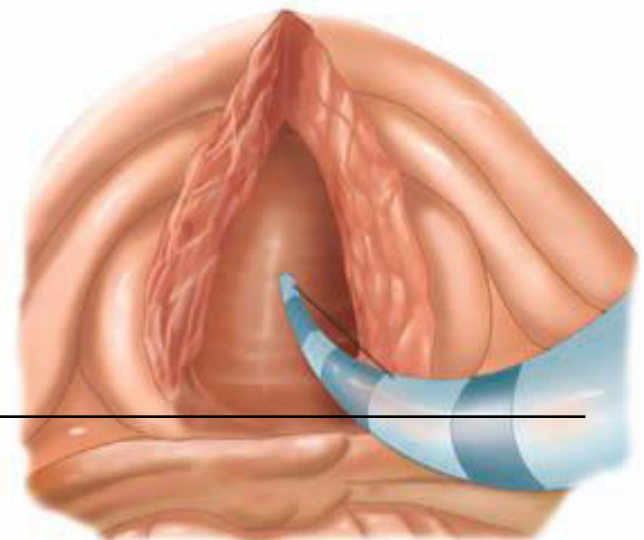
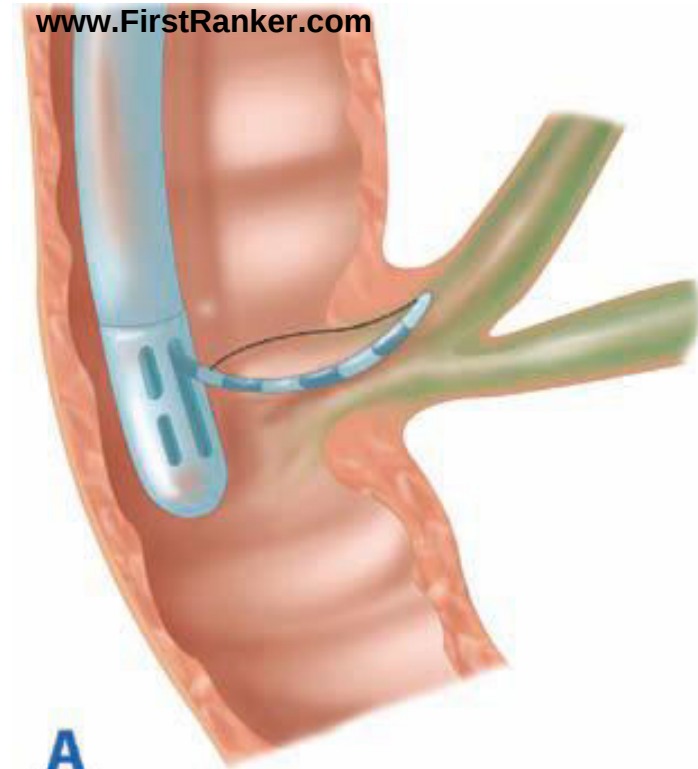
ERCP

www.FirstRanker.com

- Side viewing endoscope is used.
- Ampulla of Vater is identified.
- Sphincterotomy is done with a sphincterotome
- Extraction of stone with a balloon sweep
- Followed by cholecystectomy

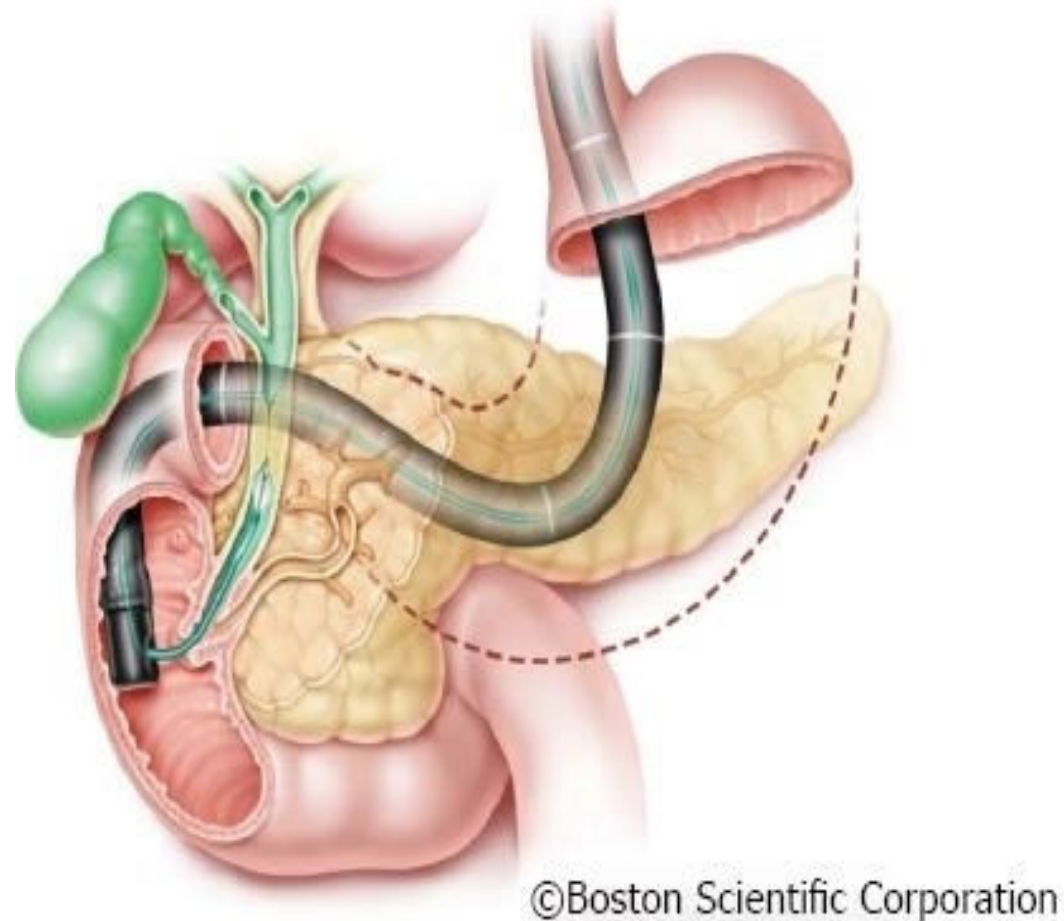


www.FirstRanker.com



CAUSES OF FAILURE

- large stones
- intrahepatic stones
- multiple stones
- altered gastric or duodenal anatomy
- impacted stones
- duodenal diverticula



LAPAROSCOPIC CHOLECYSTECTOMY

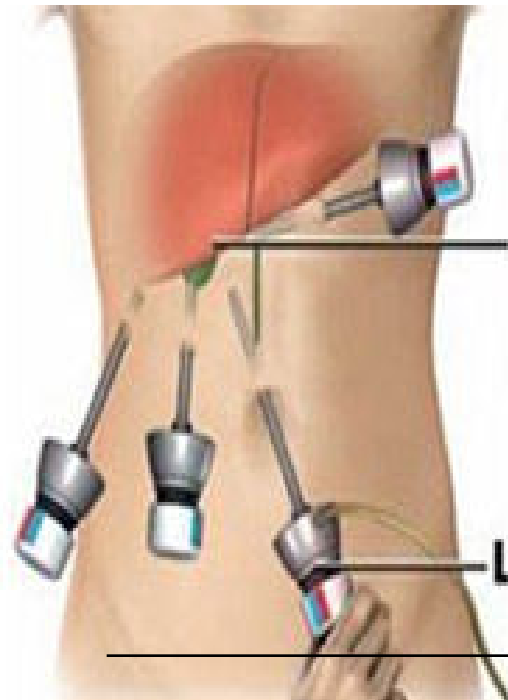
INDICATION

- Symptomatic gall stones
- Acute cholecystitis (early presentation)
- **Acute biliary pancreatitis** (after resolution of signs and symptoms)

POSITION: supine, head end up
(Reverse trendelenburg position) and
right side up

PORTS:

- **10 mm port - subumbilicus - to pass 10 mm telescope.**
- **10 mm port - midline epigastrium- working channel.**
- **Two 5 mm ports - midclavicular & anterior axillary line in subcostal region.**



OPEN CHOLECYSTECTOMY

- Right subcostal incision(Kocher's)
- Right paramedian
- Horizontal incision

TECHNIQUE:

- **Duct-first method:**
 - Calot's triangle is dissected.
Cystic artery and cystic duct
ligated close to the gallbladder.
- GB separated and removed.

■ Fundus-first method:

- Done in the case of dense adhesions.
 - Fundus separated from the liver bed. Dissection is carried proximally until cystic duct and cystic artery are identified, which
-
- are then ligated.

COMPLICATIONS

- **Bleeding from cystic artery, and from liver bed**
- **Injury to CBD or hepatic duct**
- **Injuries to colon, duodenum, mesentery**
- **Infection and subphrenic abscess**
- **Bile leak and biliary fistula formation**
- **Biliary stricture formation**

POST CHOLECYSTECTOMY SYNDROME

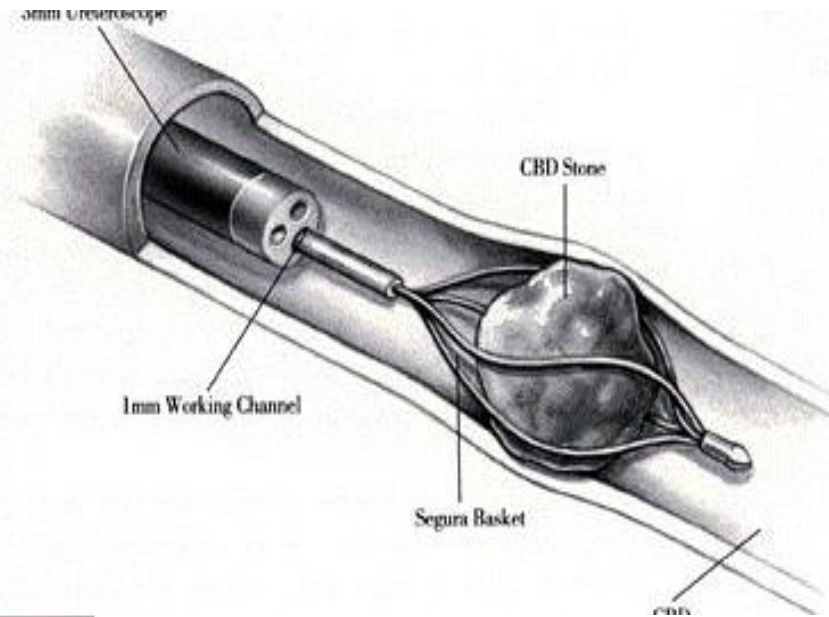
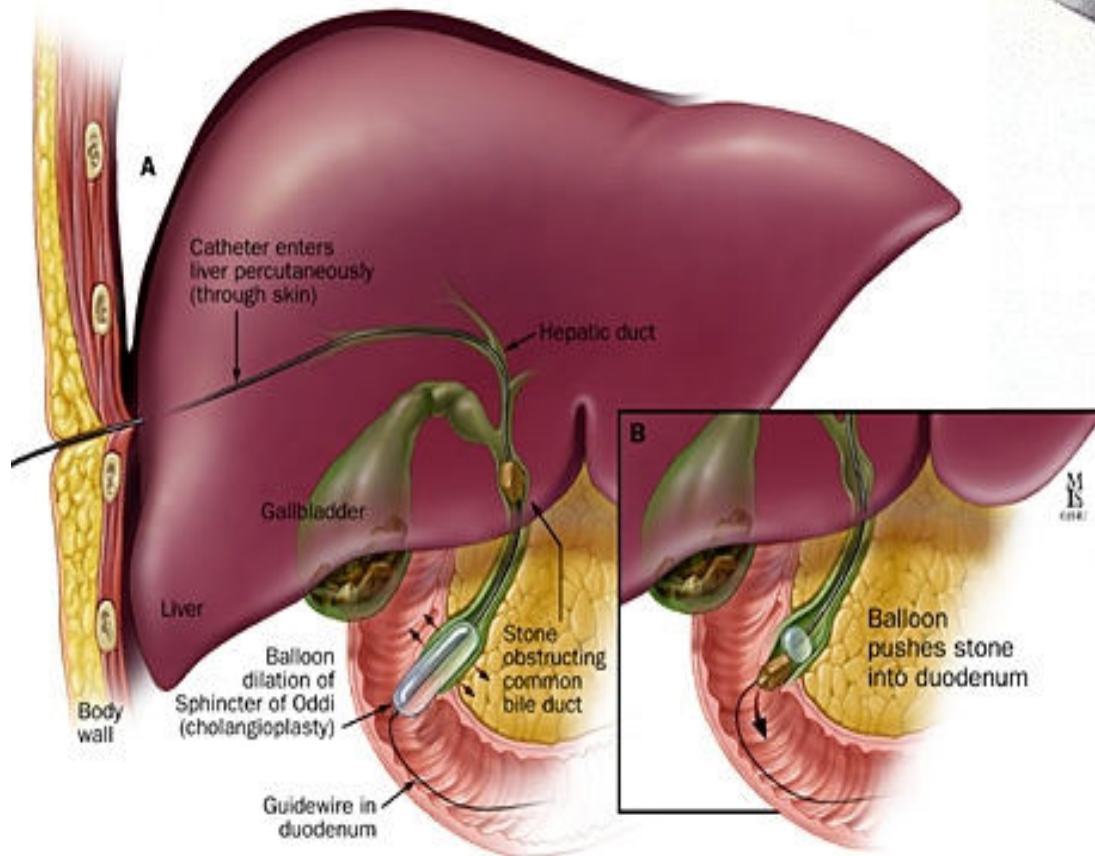
- **Recurrent, new or persistent symptoms after cholecystectomy In patients who have no demonstrable abnormality.**
- **d/t loss of reserving function of GB,or continuous bile flow into duodenum - esophagitis / gastritis or diarrhea and colicky pain.**

COMMON BILE DUCT

EXPLORATION:

1. LAPAROSCOPIC CBD EXPLORATION

- Stone may be flushed with irrigation
- A balloon catheter passed , inflated & withdrawn.
- A wire basket passed under fluoroscopic guidance.
- if required a flexible choledochoscope can be used



Trans cystic approach

- Cystic duct is dilated and flexible
choledochoscope is passed down into CBD.
- With identification of stone, wirebasket
passed to ensnare stone.

- C/I: Small ,friable cystic duct
Large stones(more than 1cm)
Stones in common hepatic duct above
the cystic duct insertion

Through CBD

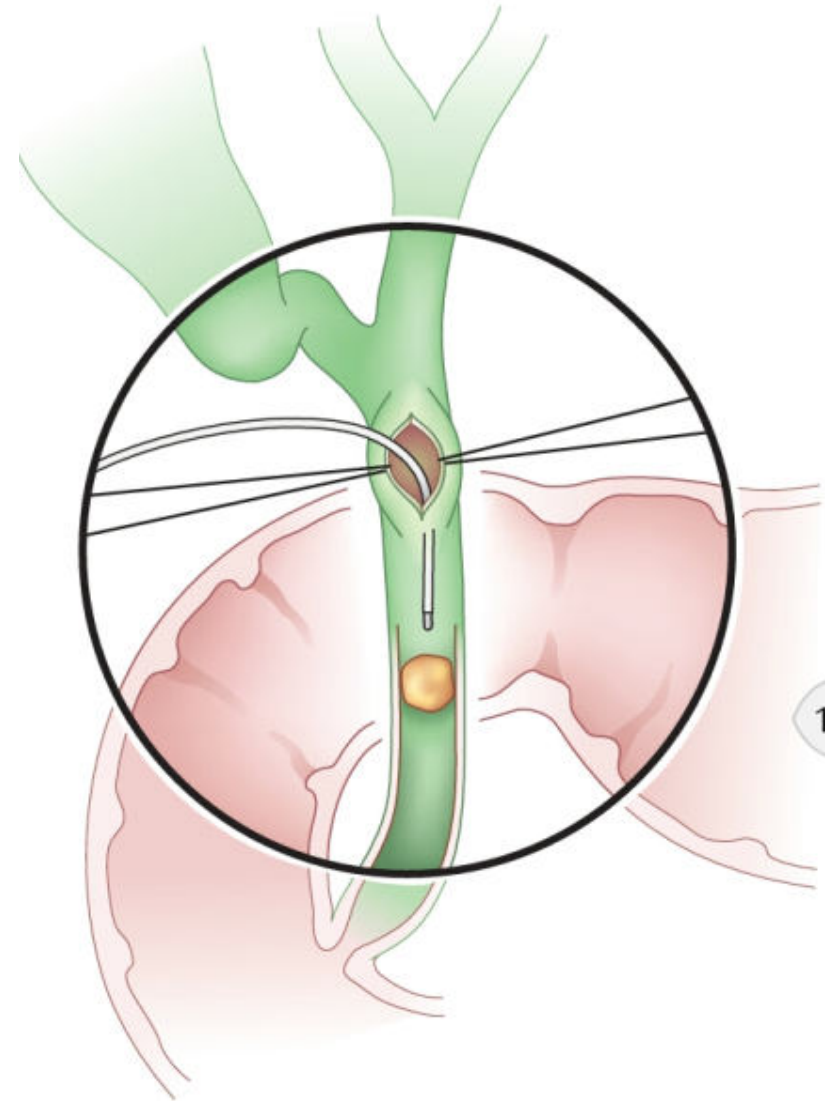
INDICATION

- Jaundice, h/o jaundice or cholangitis
- Palpable stones in CBD
- Dilated CBD (>10 mm)
- Dilated cystic duct
- Abnormal LFT particularly elevated ALP
- Multi faceted stones

C/I: small caliber CBD

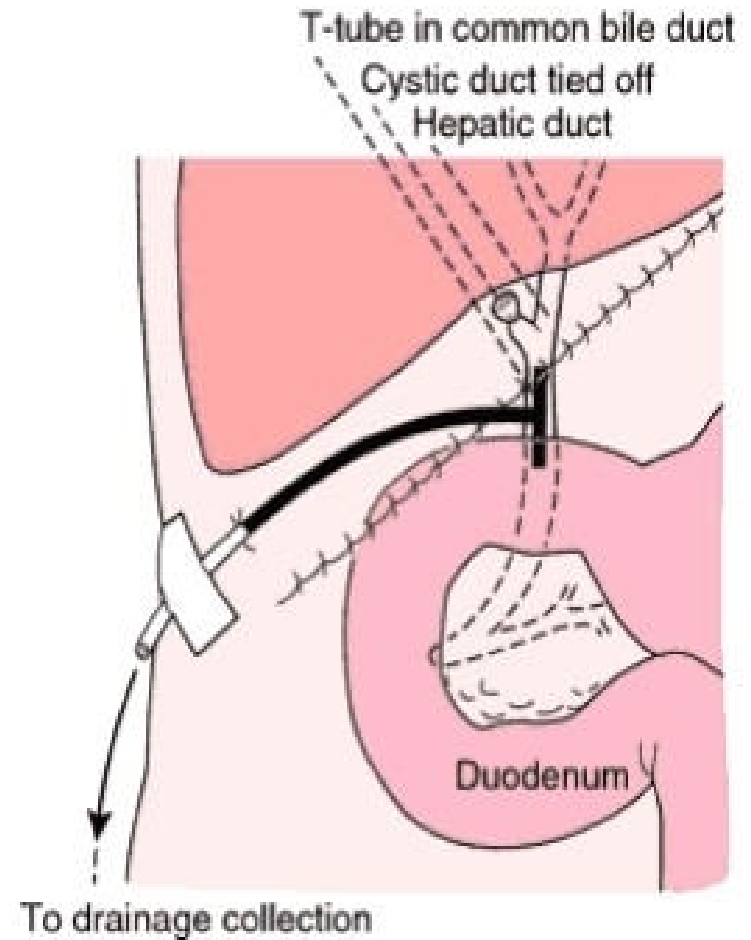
PROCEDURE

- Longitudinal
Incision in common
bile duct
- flexible
choledochoscope
passed into duct
- clearance of stones



1525

- **Choledochotomy is sutured with T tube left inside with one end taken out through the abdominal wall**

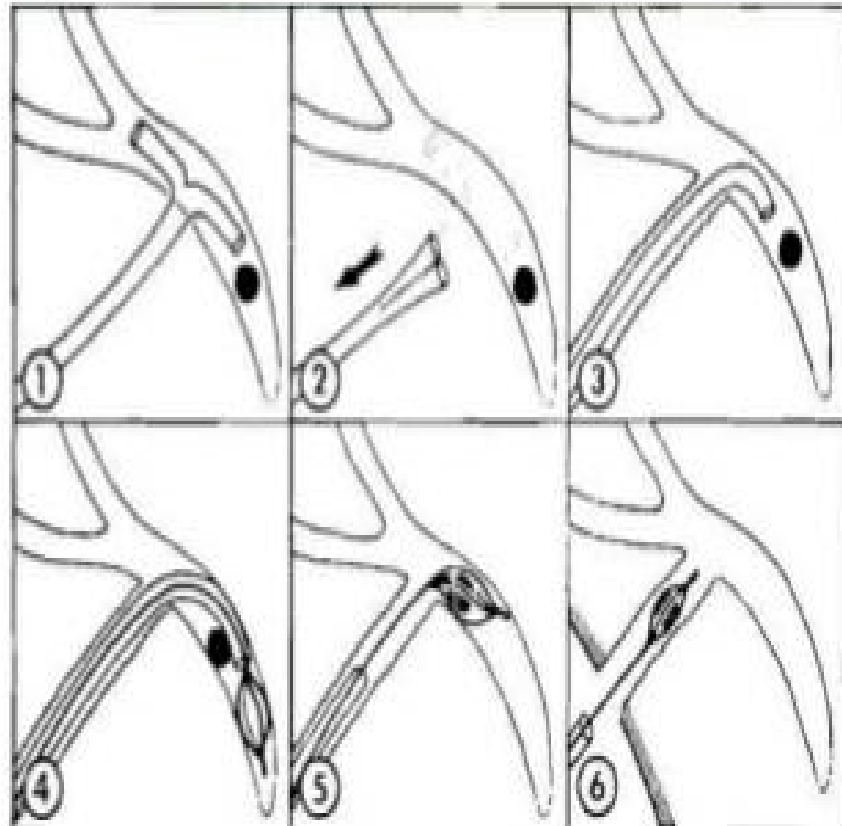


CARE OF T TUBE

- After 14 days ,water soluble dye injected
 - X-ray taken
 - If complete free flow - indicate no block
 - T tube clamped for 24 hrs
 - If no fever, jaundice or abdominal pain
 - T tube is removed
 - If blocked – left for 6 weeks
 - **BURHENNE TECHNIQUE-** After 6 weeks when T-tube tract gets matured, Then either using Dormia basket or Fogarty catheter or choledochoscope, stone is removed through T-tube tract under fluoroscopic guidance.
-



Burhenne Technique



OPEN CBD EXPLORATION

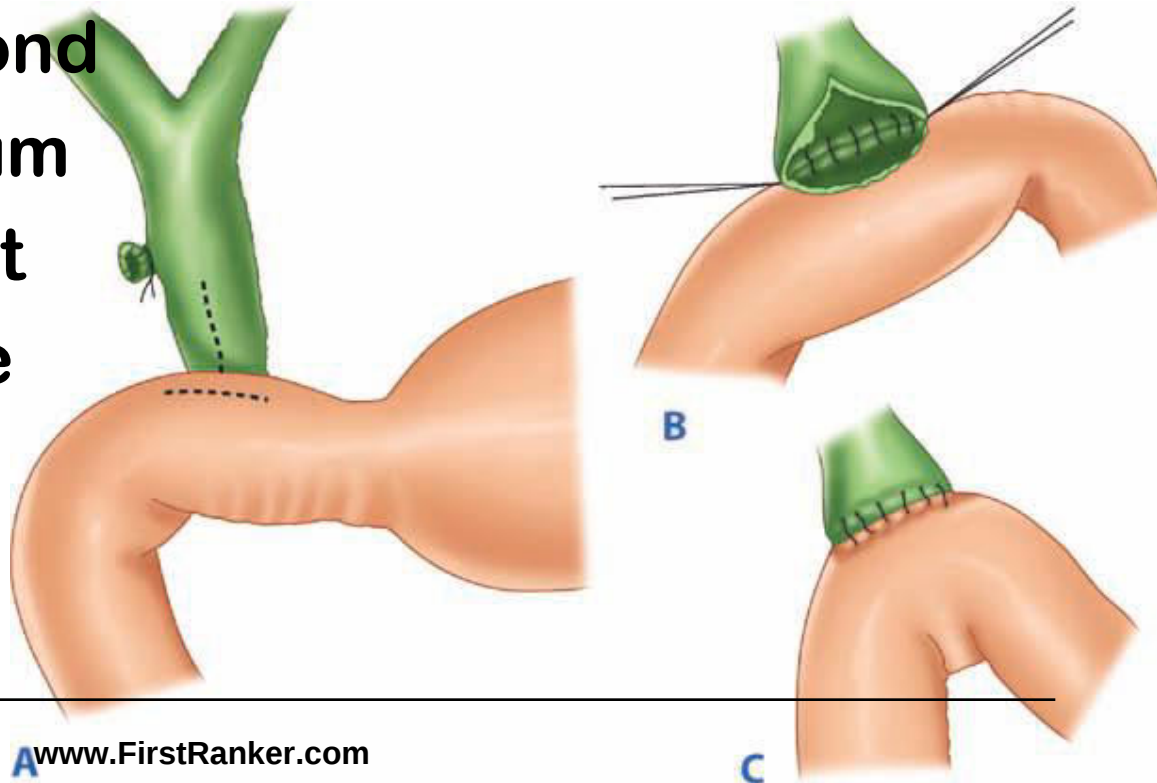
- When endoscopic and laparoscopic methods fails
- Palpate distal bile duct , find the stone which may milked backward.
- Choledochotomy performed in the supraduodenal part.

COMMON BILE DUCT DRAINAGE PROCEDURES

- When stones cannot be cleared
- Duct is very dilated

CHOLEDOCHODUODENOSTOMY

mobilizing the second part of the duodenum and anastomosing it side to side with the common bile duct.

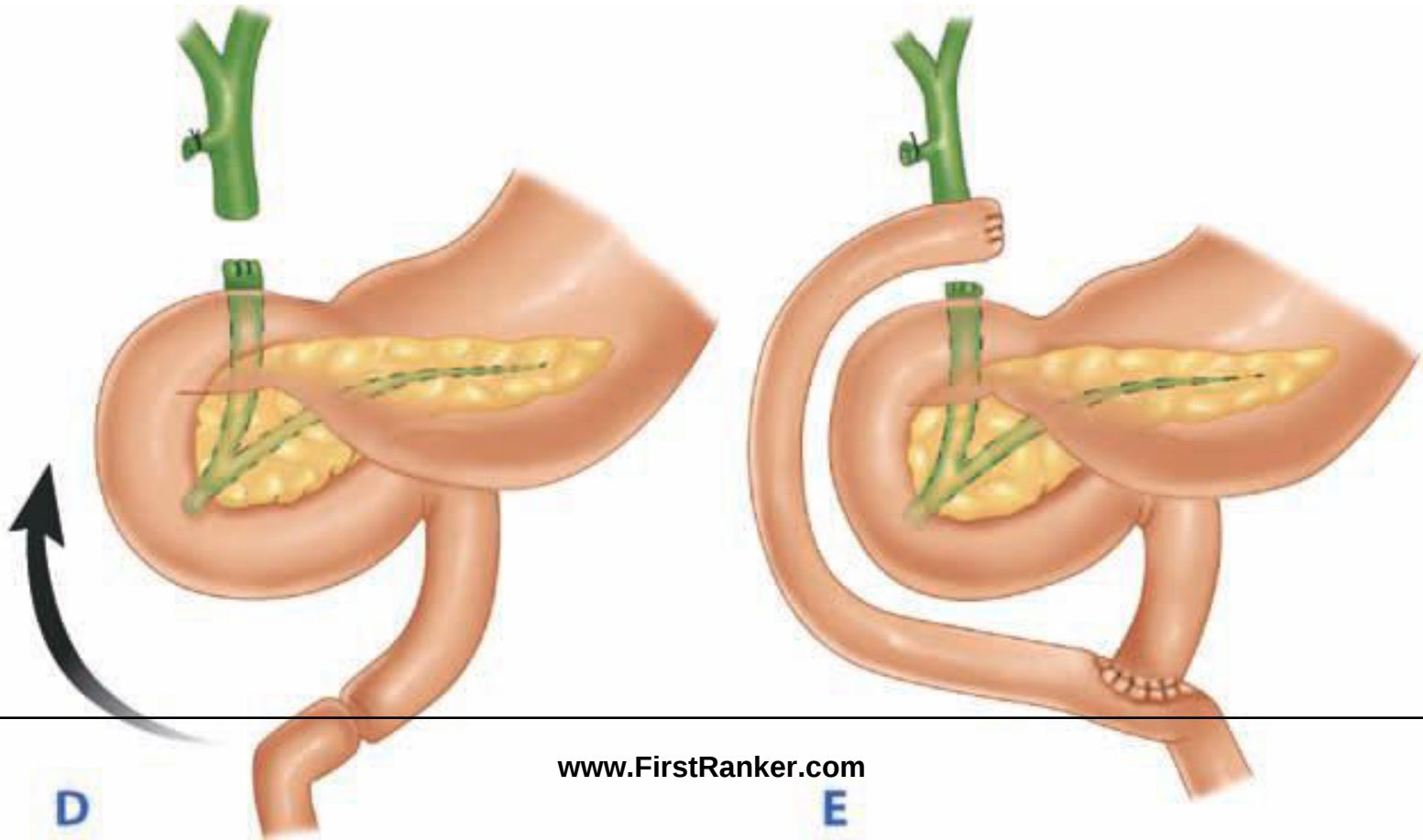


ADVANTAGE: Continues to allow endoscopic access to entire biliary system.

DISADVANTAGE: Bile duct distal to anastomosis , doesnot drain well which collect debris - obstruction of anastomosis/pancreatic duct(**SUMP SYNDROME**)

CHOLEDOCHOJEJUNOSTOMY

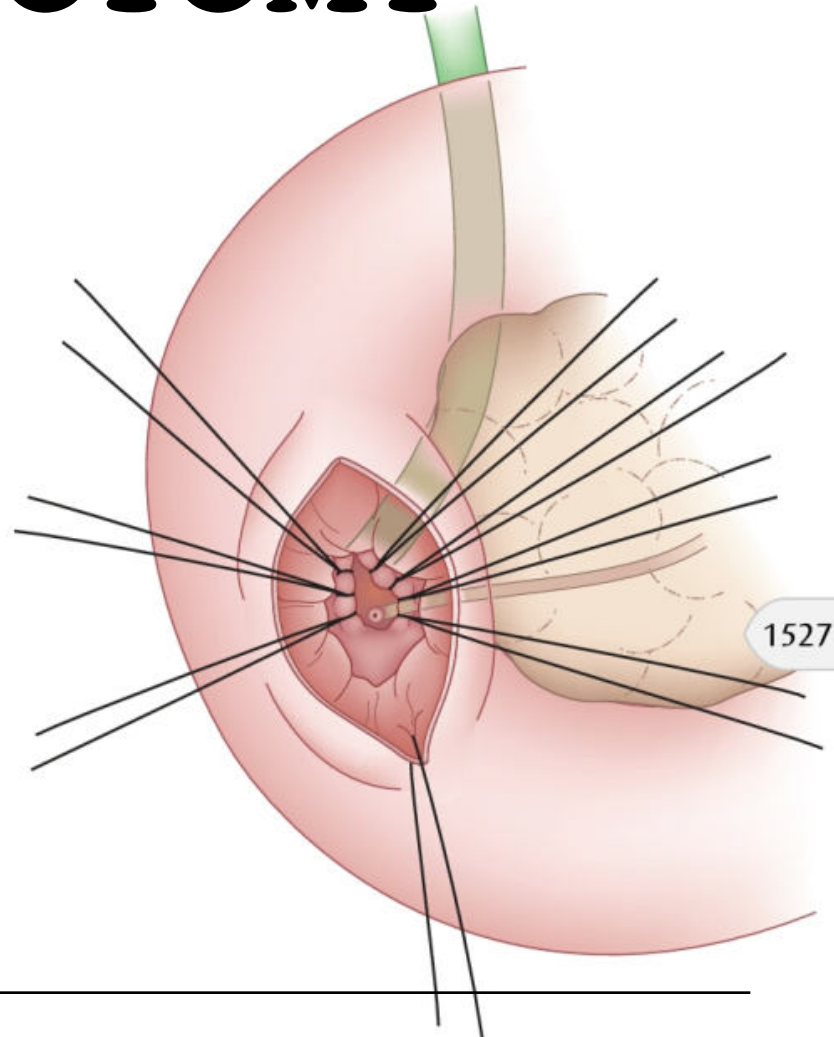
bringing up a 45-cm Roux-en-Y limb of jejunum and anastomosing it end to side to the common bile duct.



- **ADVANTAGE:** No risk of sump syndrome and excellent drainage
- **DISADVANTAGE:** Does not allow future endoscopic evaluation.

TRANSDUODENAL SPHINCTEROTOMY

- Unsuccessful endoscopic attempts with nondilated biliary tree.
- Longitudinal duodenotomy to identify ampulla
- The sphincter is then incised at the **11 o'clock position** to avoid injury to the pancreatic duct
- The impacted stones are removed

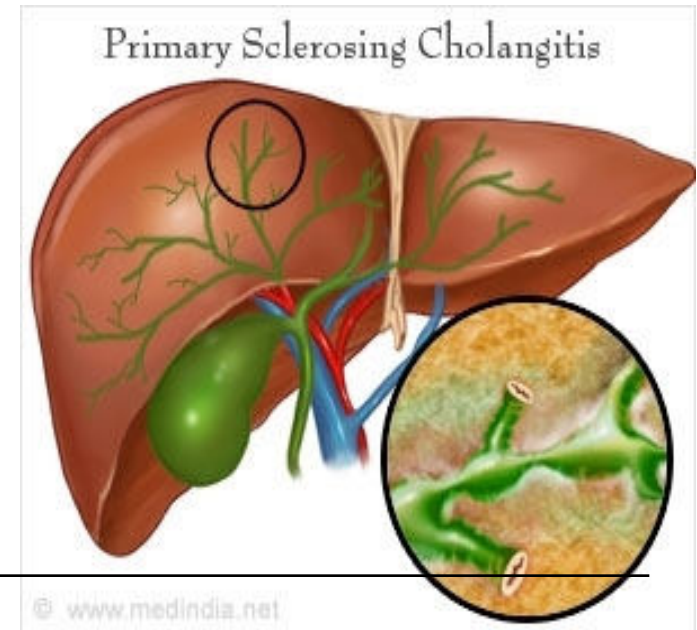


MANAGEMENT OF BENIGN CONDITIONS

Muhammed Afnas
Roll no: 90

PRIMARY SCLEROSING CHOLANGITIS

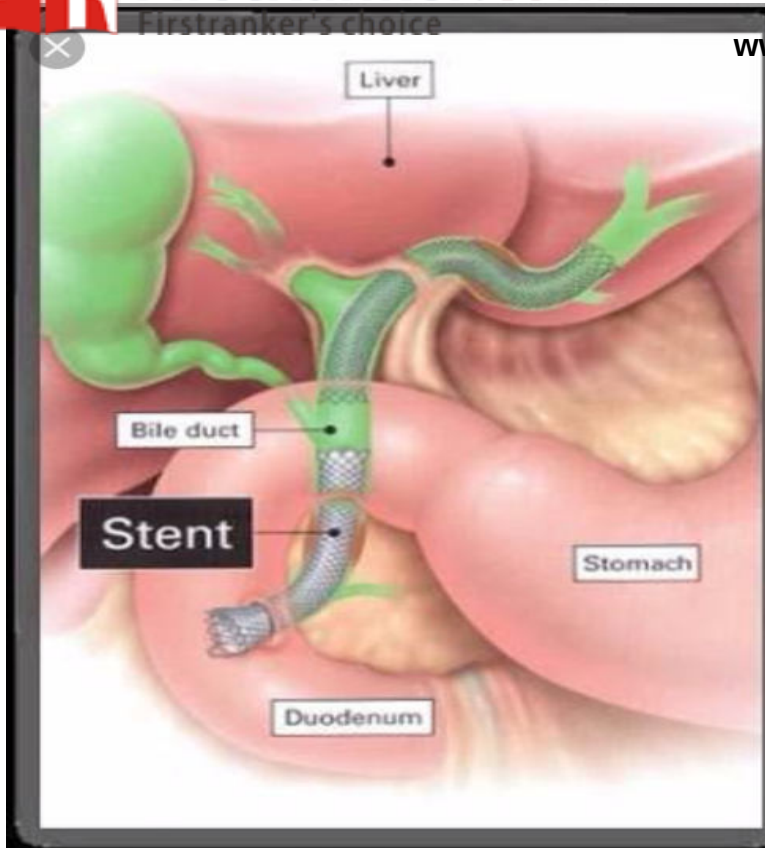
- No specific medical therapy
- Choleretic agent **ursodeoxycholic acid**
- Immunosuppressives
- Antibiotics ,Vitamin K, Steroids



Mx:

- 1. Endoscopic balloon dilatation** of dominant strictures → improve pruritis, cholangitis and prolong survival





2. **Biliary reconstruction** - pts with dominant stricture at biliary bifurcation

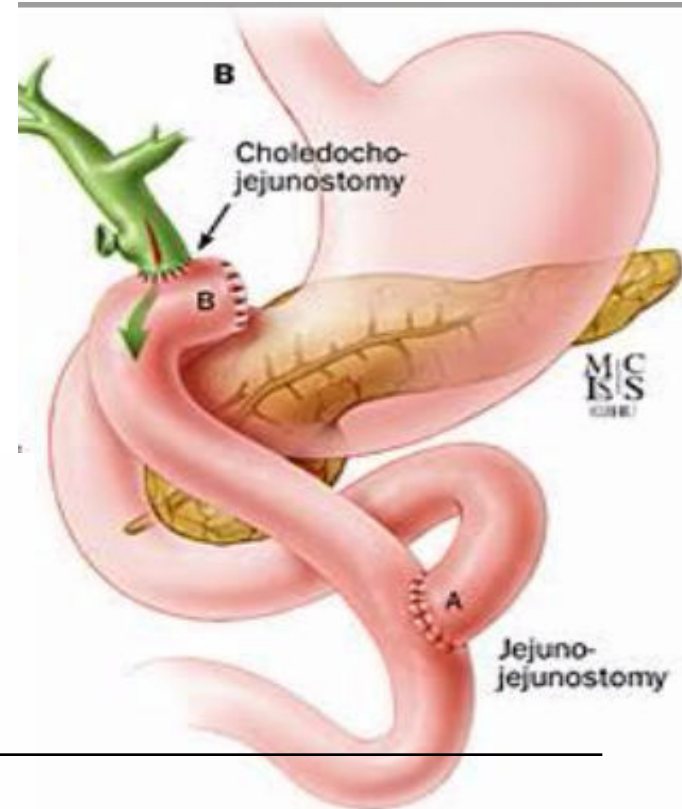
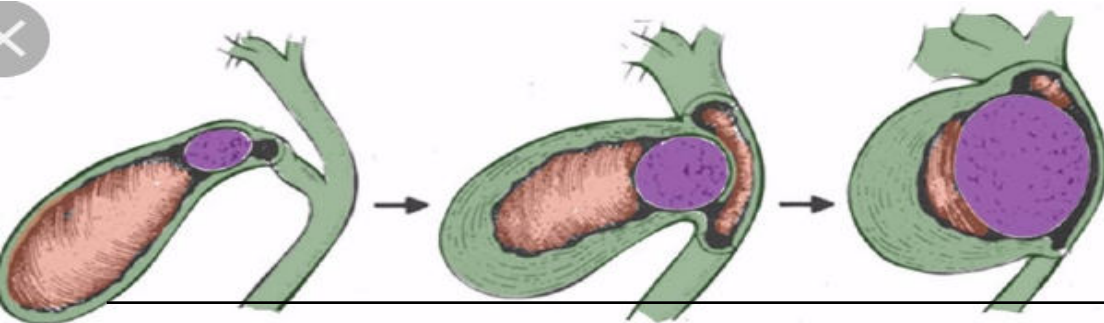


Resection of affected
part & long term
silastic stenting

3. **Orthotopic liver transplantation** - only life saving option

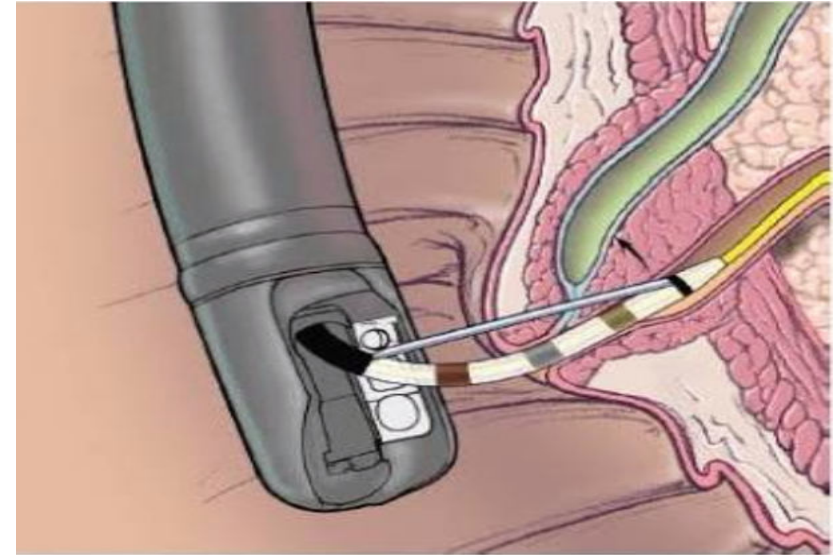
MIRIZZI SYNDROME

- **Cholecystectomy**, which may require repair of the CBD
- In case of cholecysto-choledochal fistula, **choledochojejunostomy**

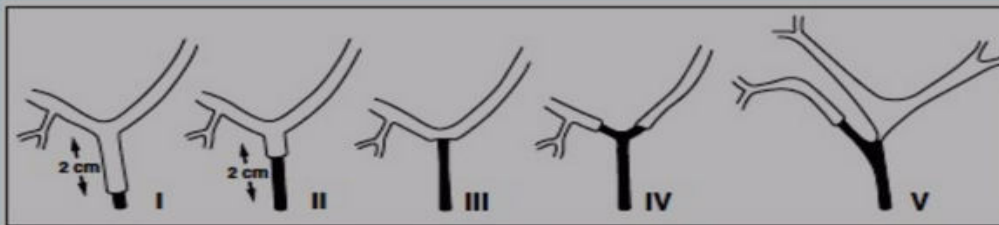


BILIARY STRICTURES

1. **ERCP** with
sphincterotomy,
balloon dilatation,
stent placement



Biliary stricture classification



Type I: > 2 cm distal to the hepatic confluence

Type II: within 2 cm from hepatic confluence

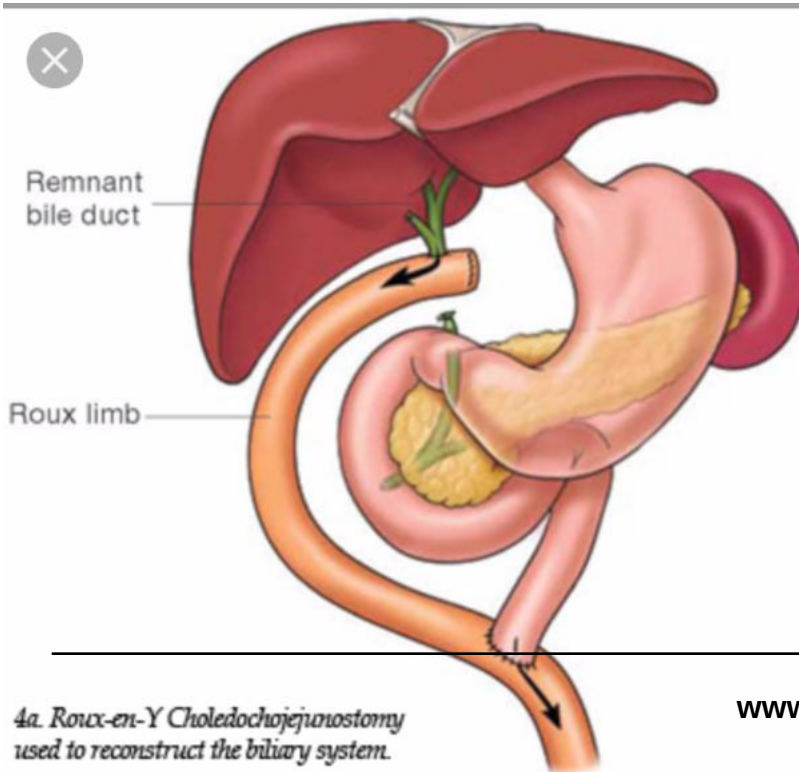
Type III: involve a patent confluence

Type IV: involve and obstruct the confluence

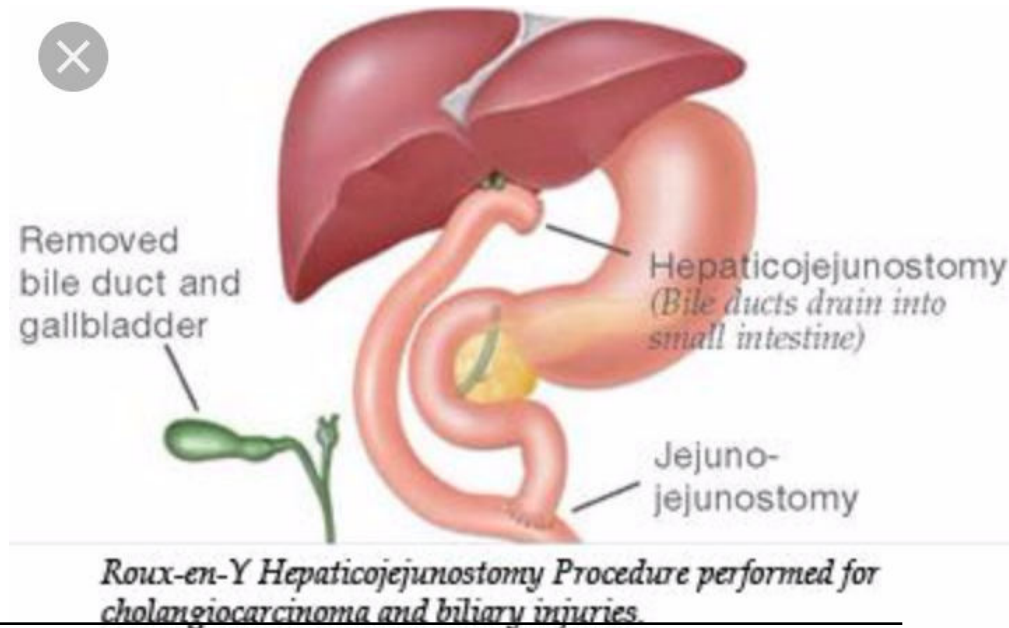
Type V: involve the hepatic duct associated with stricture on aberrant intrahepatic branch

2. Anastomosis a loop of jejunum (**Roux-en-Y** jejunal limb) to dilated portion above the stricture

CHOLEDOCHOJEJUNOSTOMY



HEPATICOJEJUNOSTOMY



CHOLEDOCHAL CYST

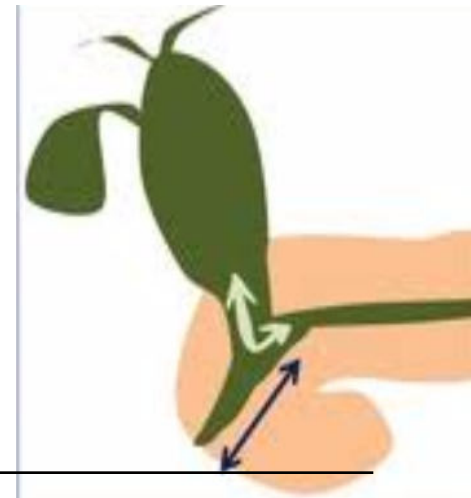
TYPE 1



- Complete surgical excision followed by Roux- en- Y hepaticojejunostomy

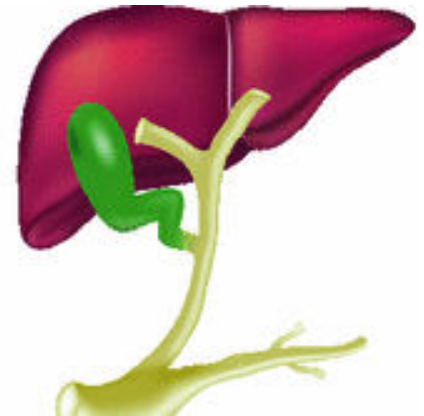
TYPE II

- Excision of diverticulum with suturing of CBD
- Anomalous pancreaticobiliary junction [APBJ] – biliary enteric diversion by Roux-en-Y hepaticojejunostomy

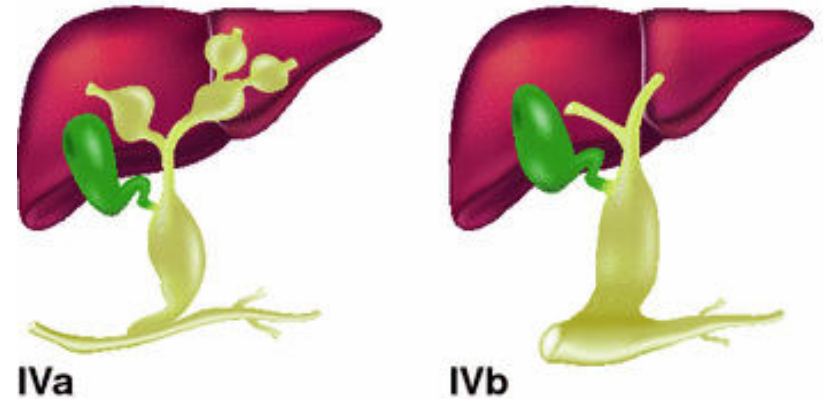


TYPE III - CHOLEDOCHOCELE

- ERCP with sphincterotomy
- (cyst < 3cm)
- Transduodenal excision or
sphincteroplasty - (cyst >3cm)



TYPE IV

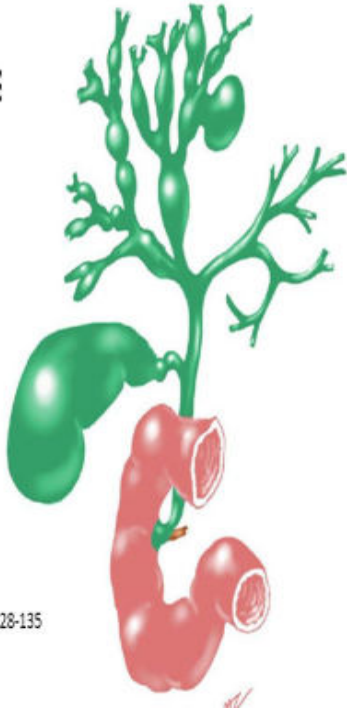


- Only extrahepatic biliary dilatation → excision and hepaticojejunostomy [like type I]
- Intrahep extension (1 lobe) → partial hepatectomy + reconstruction

TYPE V – CAROLI'S DISEASE

Caroli's Disease

Described by Caroli
and coworkers in
1958



Caroli J et al. Semin Hop Paris 1958; 34: 128-135

- UNILOBAR → **Hepatic lobectomy**
- BILOBAR → **liver transplantation**

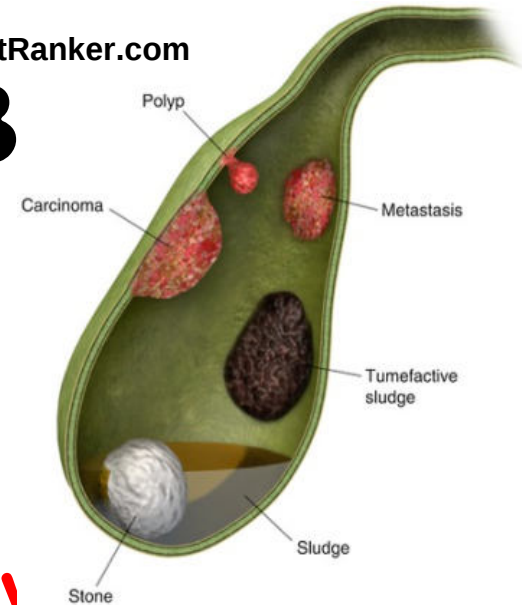
LILLY 'S TECHNIQUE

- If the cyst adheres to portal vein secondary to inflammatory reactions



posterior serosal wall of cyst is left behind & mucosa of cyst is obliterated

POLYPS OF GB



Rx:

- ✓ **Laparoscopic cholecystectomy**
- ✓ **Risks factor for CA**
 - **Radical cholecystectomy**
- ✓ **Asymptomatic/no risk factors / no USG features of CA – observation with seirial USG**

BENIGN BILIARY MASS

- **ADENOMAS**

Complete resection along with small rim of normal epithelium by transduodenal approach

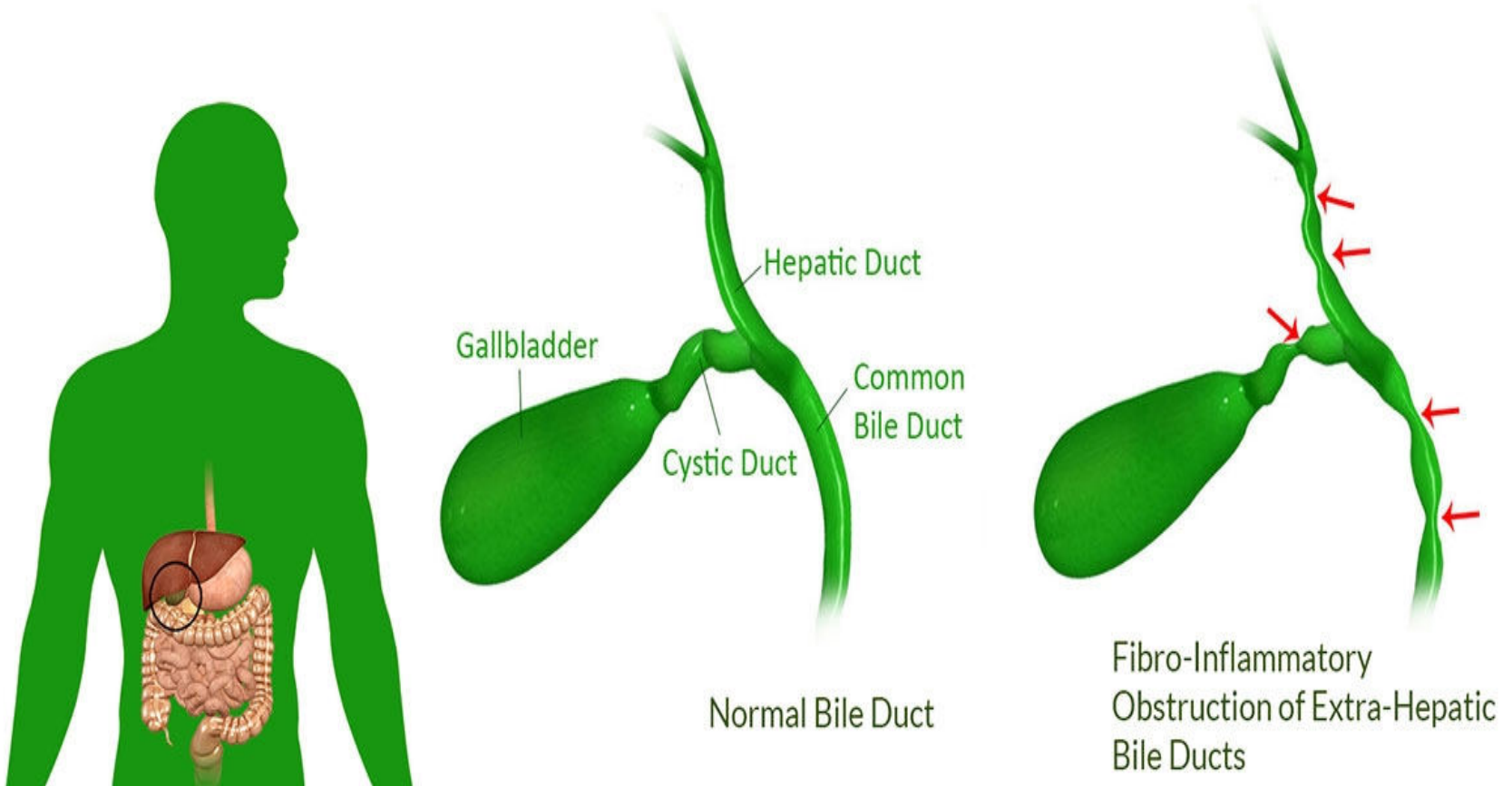
- **Papillomatosis**

liver resection /
liver transplantation



Figure 3: Endoscopy showing papillomatous growth involving ampulla of Vater.

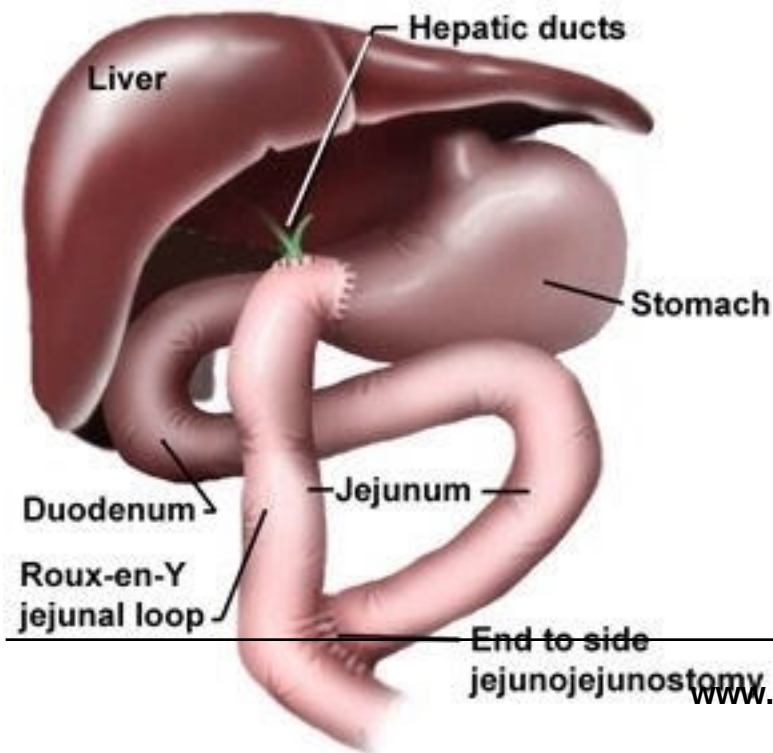
BILIARY ATRESIA



EXTRA HEPATIC BILIARY ATRESIA

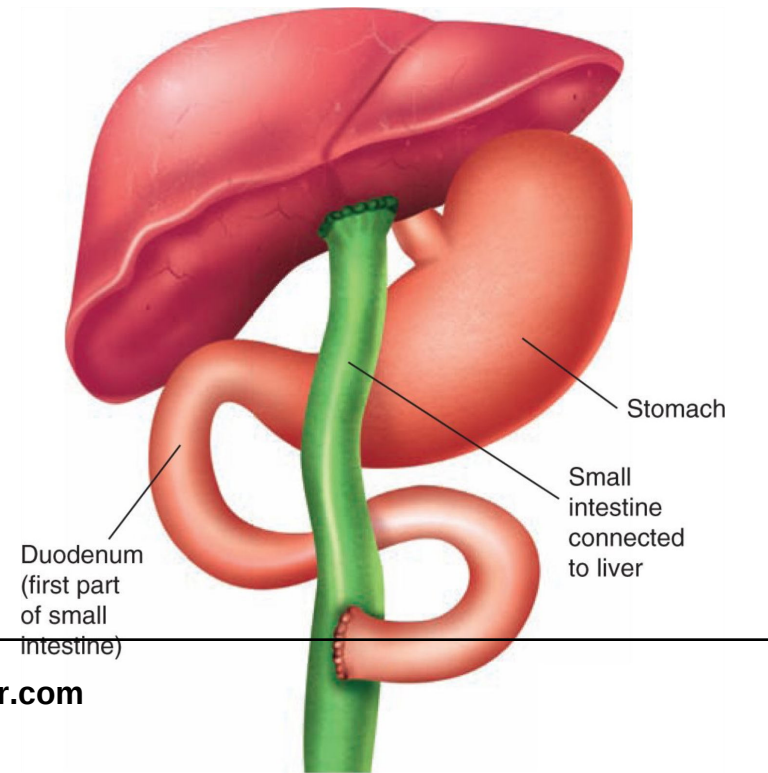
TYPE I

*Roux en Y
hepaticojejunostomy*

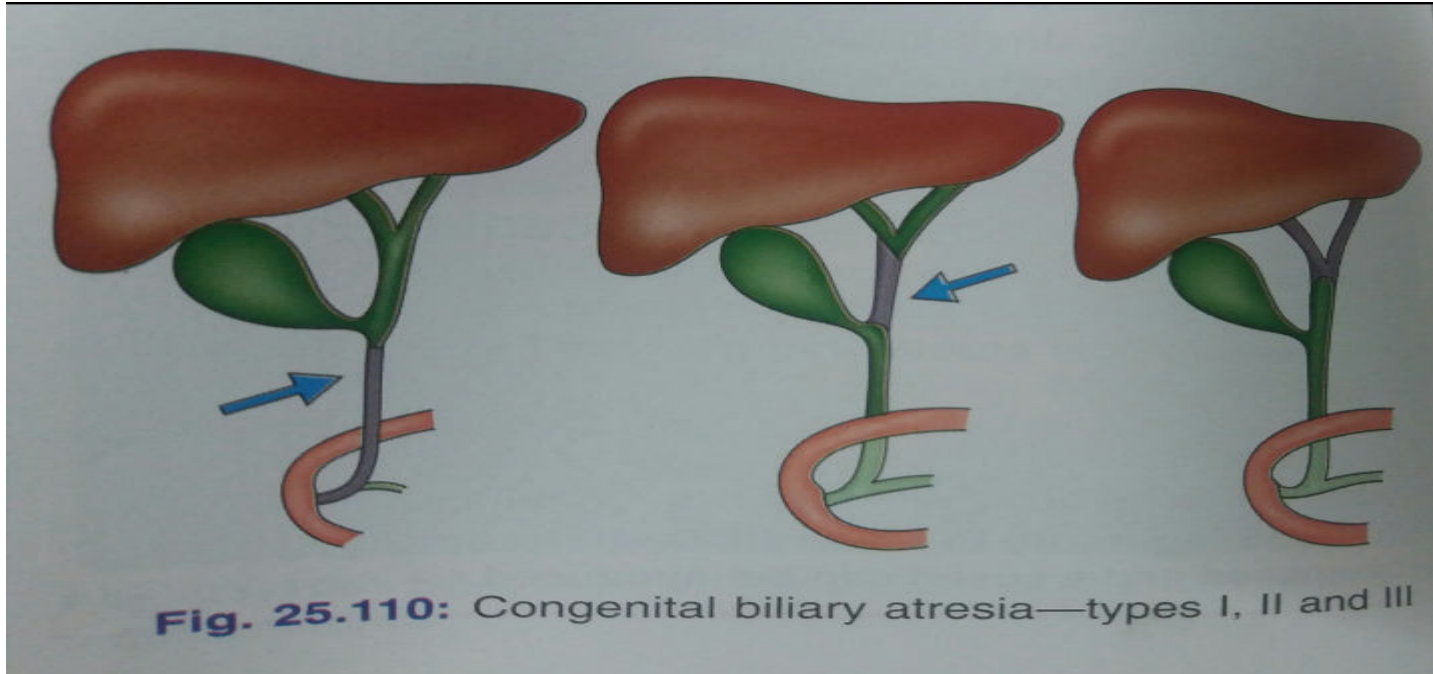


TYPE 2 & 3

*Kasai
portoenterostomy*



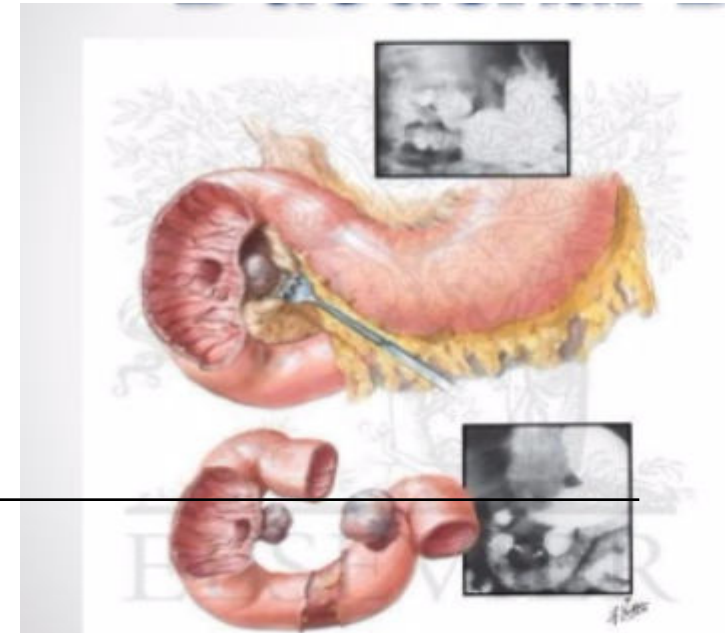
BILIARY ATRESIA



- **INTRAHEPATIC**- Liver transplantation

DUODENAL DIVERTICULUM

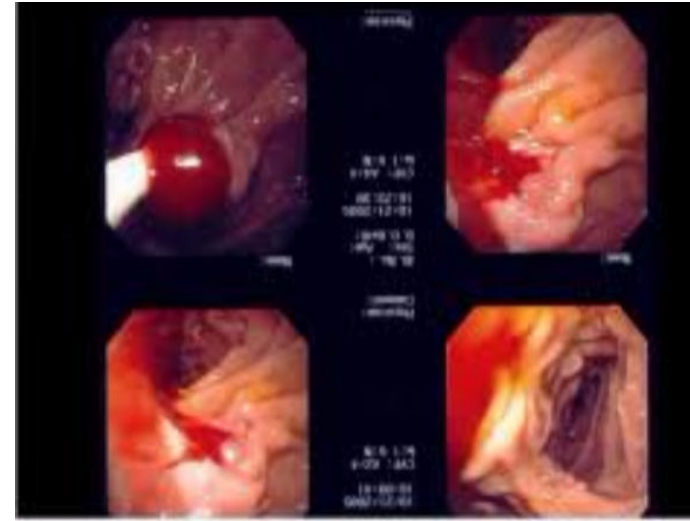
- A/C diverticulitis
IV antibiotics and bed rest
- Surgical removal is done as an interval procedure when the a/c attack subsides



HEMOBILIA

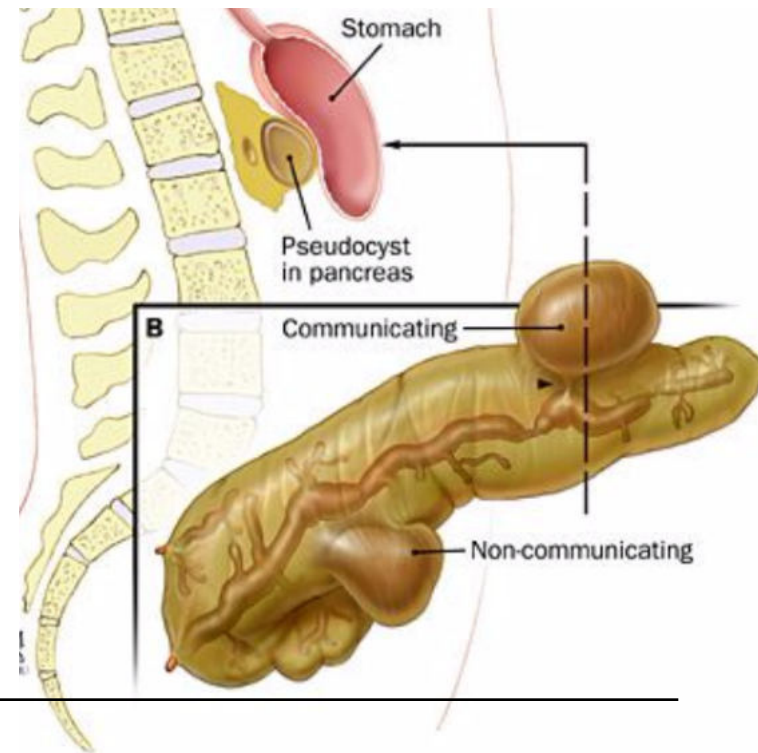
To stop bleeding and to relieve biliary obstruction

- Antibiotics
- Blood transfusions
- Transarterial embolisation (TAE)
- Surgical intervention - ligation of bleeding vessel or hepatic artery or excision of aneurysm



PSEUDOCYST OF PANCREATIC HEAD

- **Endoscopic drainage** under EUS guidance with tube drain
- **Cystoduodenostomy** via laparotomy



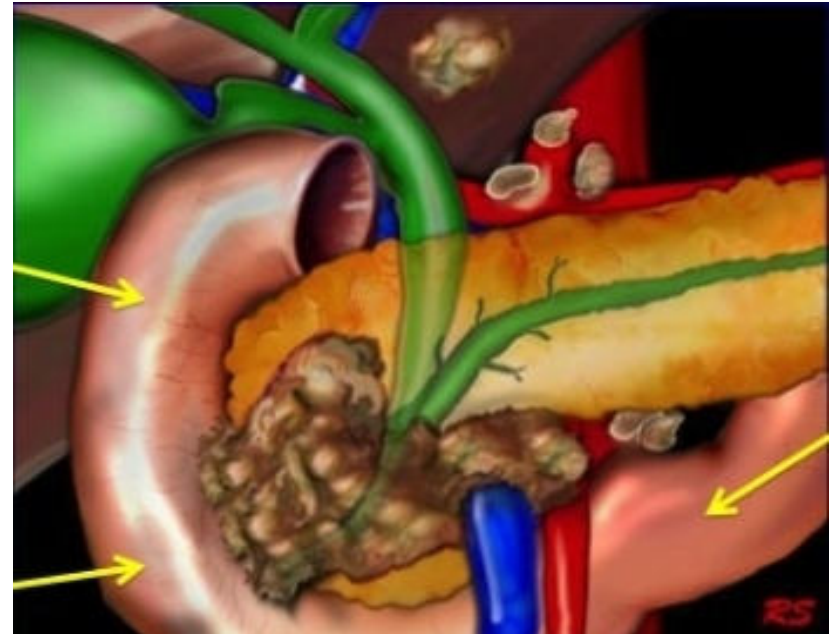
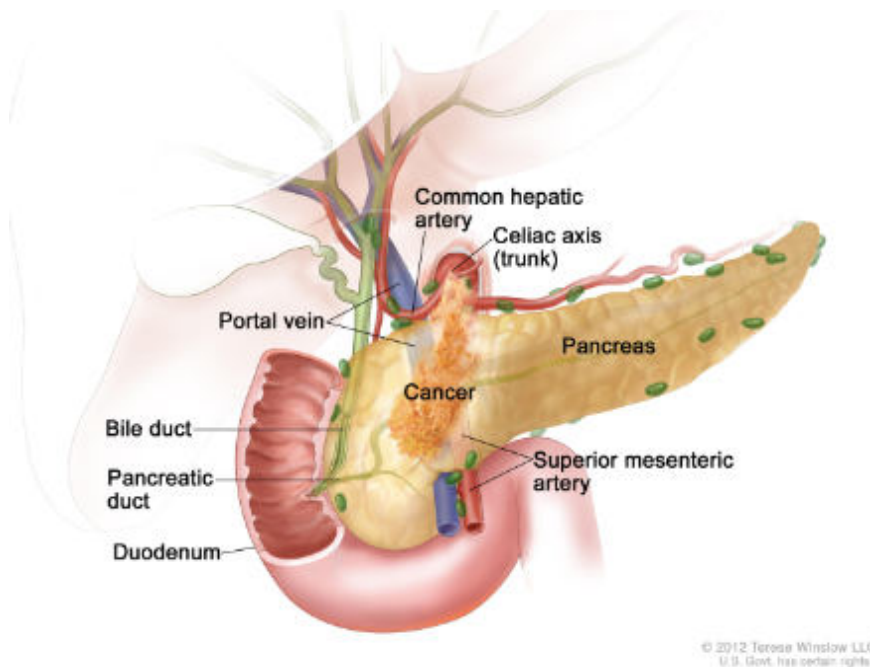
MANAGEMENT OF MALIGNANT CONDITIONS

Muhammed Galib

Roll no:91

- **CARCINOMA HEAD OF THE PANCREAS**
- **PERIAMPULLARY CARCINOMA**
- **CHOLANGIOCARCINOMA**

CARCINOMA HEAD OF THE PANCREAS



MANAGEMENT

- **SURGICAL RESECTION**
- **ADJUVANT THERAPY**
- **NEOADJUVANT THERAPY**
- **PALLIATIVE THERAPY**

SURGICAL RESECTION

SIGNS OF INOPERABILITY

a) Distant metastasis including non regional LN

b) Head/uncinate process:

-solid tumor contact of $>180^\circ$ with SMA or CA

-solid tumor contact with 1st jejunal SMA branch

-unreconstructible SMV/PV d/t tumor/occlusion

-contact with most proximal draining jejunal

c)Body and tail:

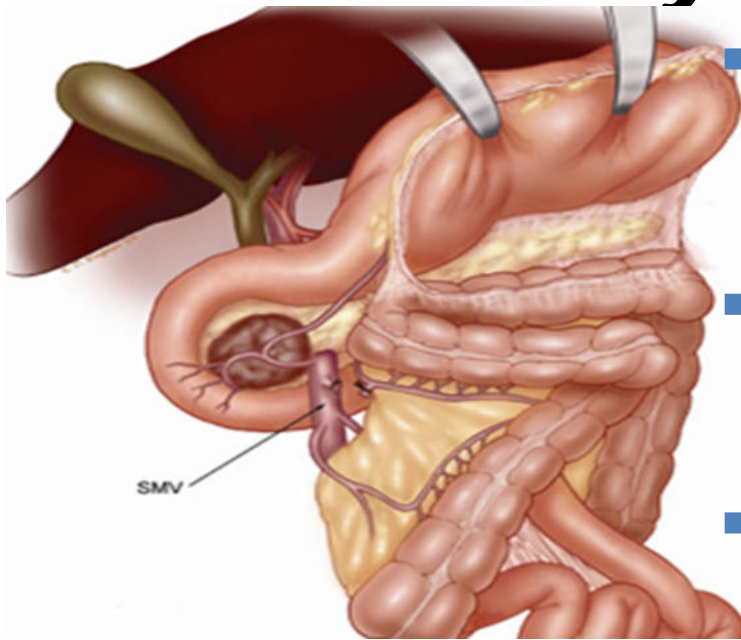
- solid tumor contact of >180deg with SMA or CA**
- solid tumor contact with CA & aortic involvement**
- unreconstructible SMV/PV d/t tumor/occlusion**

PREOPERATIVE PREPARATIONS

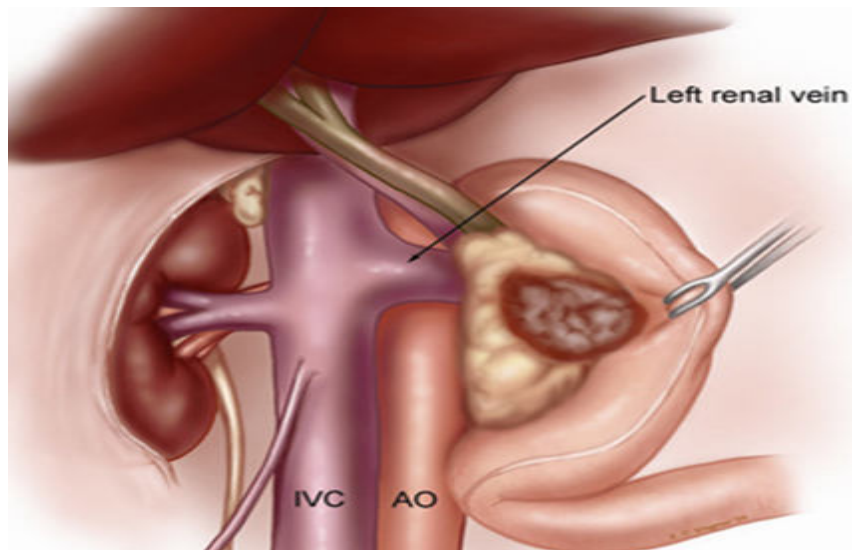
- i. Hydration**
- ii. Nutrition(glucose orally or iv)**
- iii. Vitamin K 10mg IM started 3 days prior to surgery**
- iv. Correction of anemia**
- v. ERCP stenting (severe cholangitis)**
- vi. Antibiotics 1 day prior to surgery**
- vii.Total parenteral nutrition if needed**

WHIPPLE'S RESECTION (PANCREATICODUODENECTOMY)

STEPS

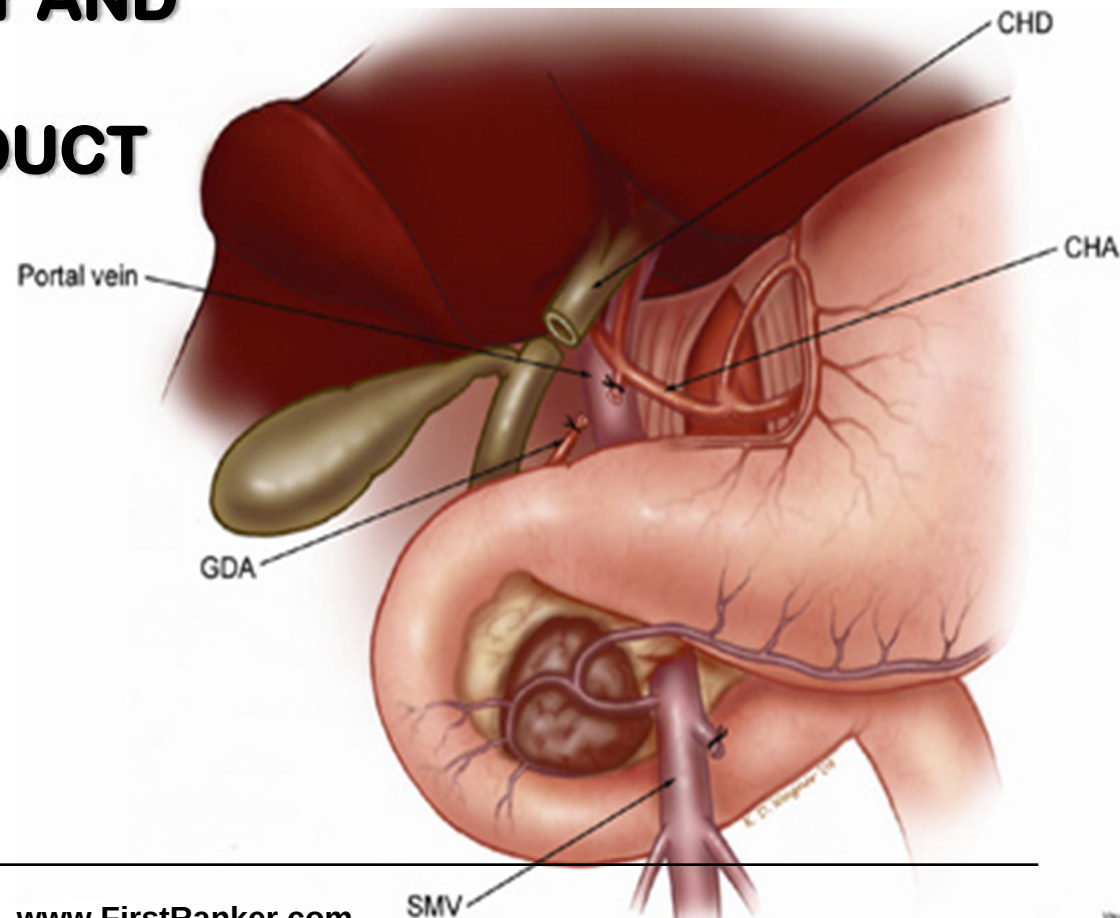


- Incision: midline from xiphoid to umbilicus or bilateral sub costal
- Liver, peritoneal surfaces assessed for metastasis
- Hepatic flexure of colon is reflected medially (Cattell Braasch maneuver)
- Kocher's maneuver done and duodenum along with head of pancreas is mobilised to midline

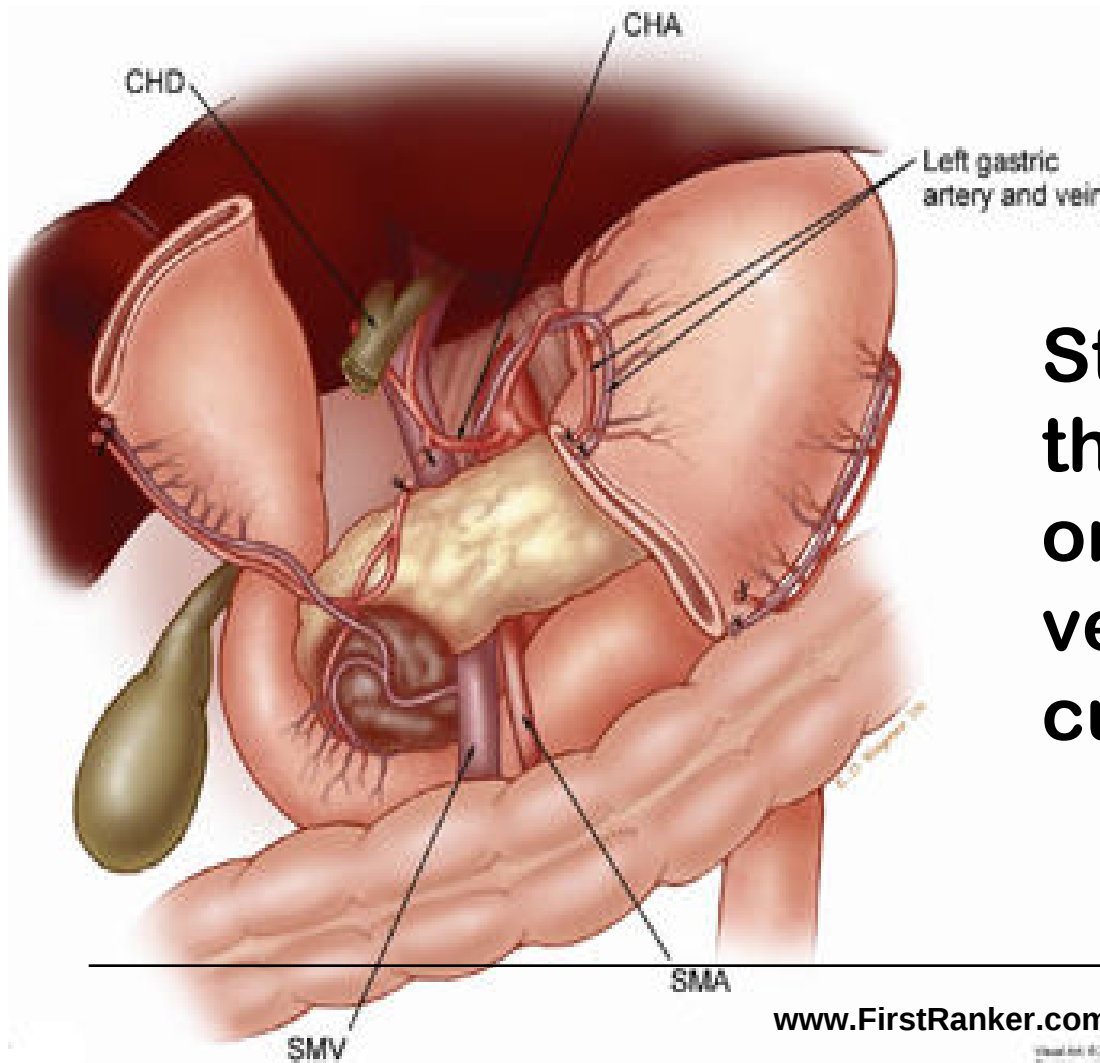


- ➡ **SMV identified and assessed**
- ➡ **Gastroepiploic vein and artery ligated**
- ➡ **Porta hepatis examined**
- ➡ **Assess operability**

- **CHOLECYSTECTOMY AND RESECTION OF COMMON HEPATIC DUCT**

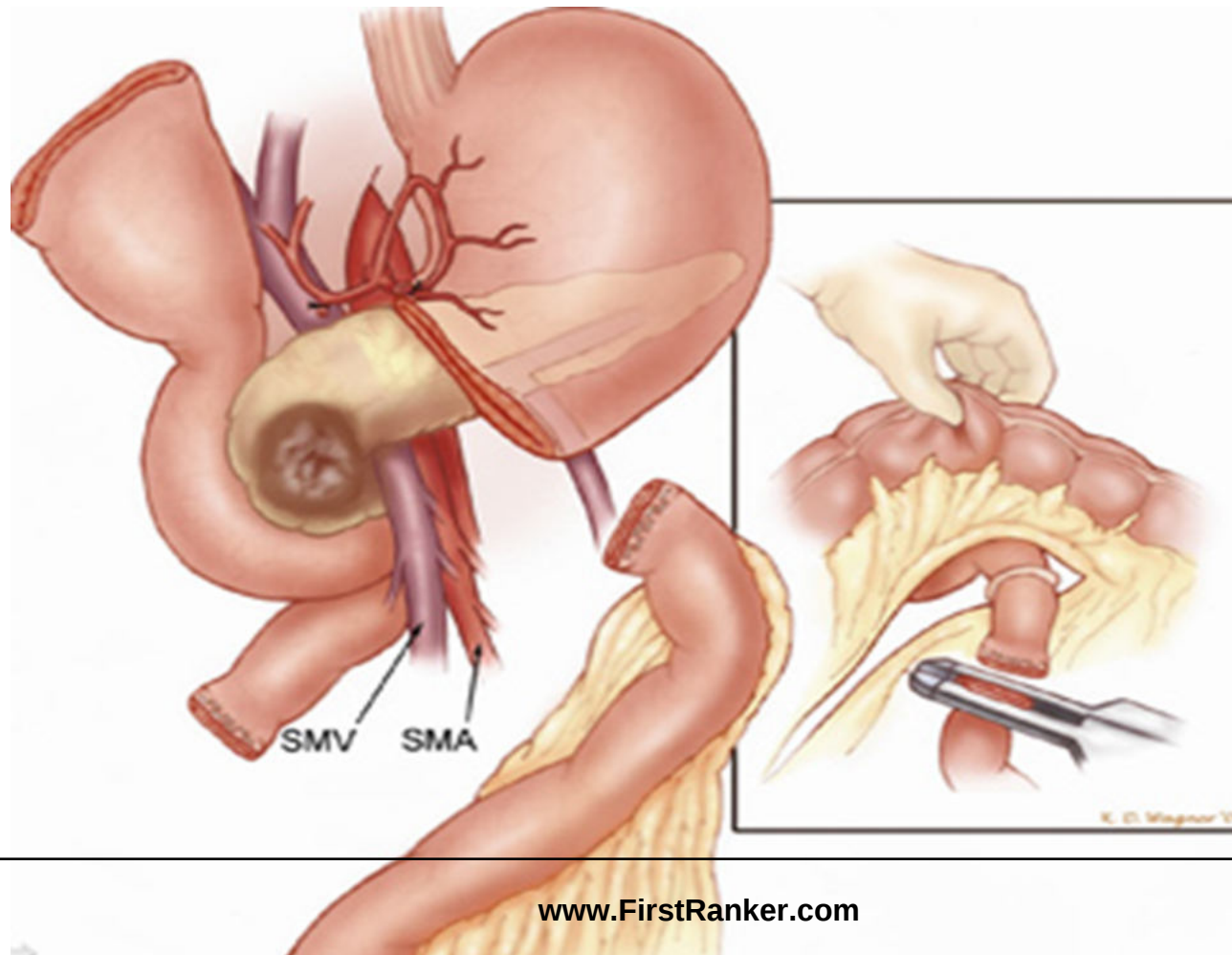


RESECTION OF ANTRUM OF STOMACH



Stomach resected at the level of the third or fourth transverse vein on the lesser curvature

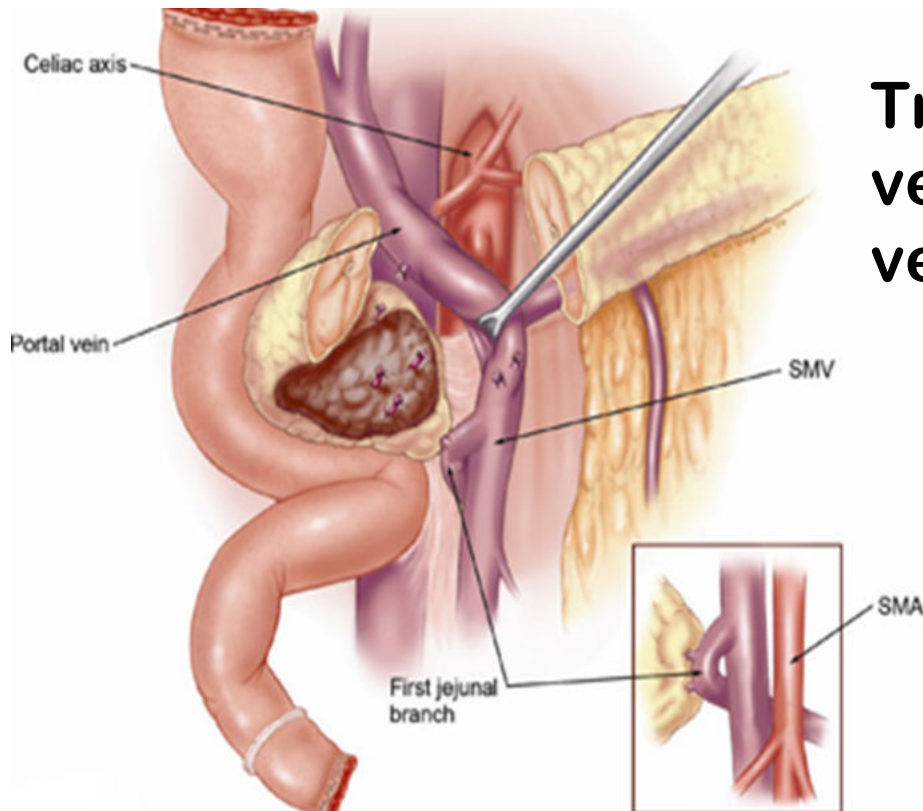
WHOLE DUODENUM ALONG WITH 20 – 30 CM OF JEJUNUM REMOVED



DIVISION OFF NECK AND REMOVAL OF HEAD OF PANCREAS

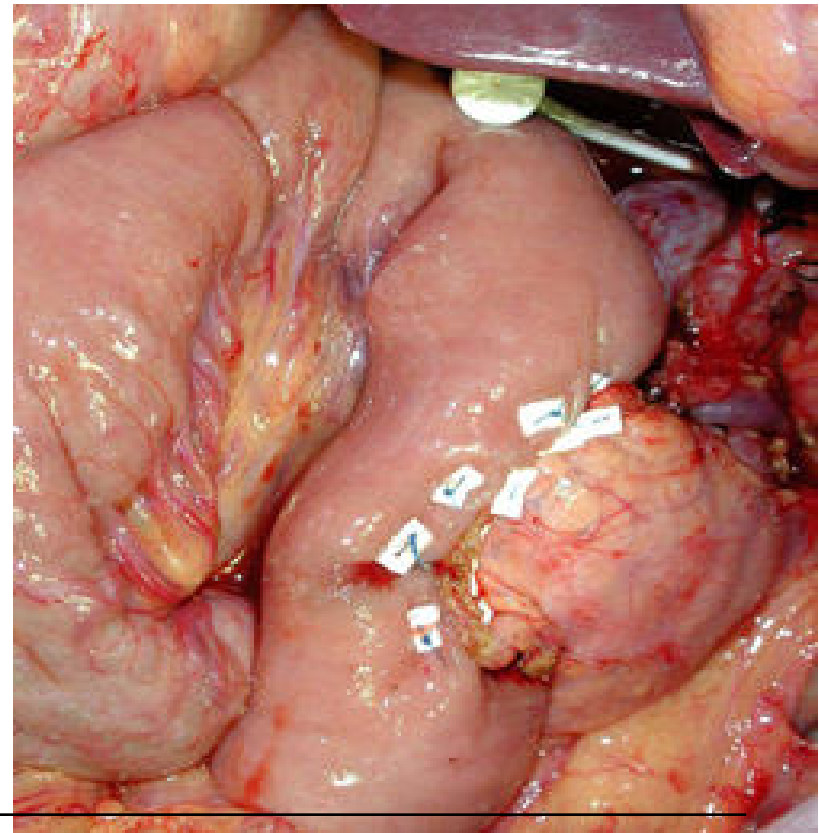
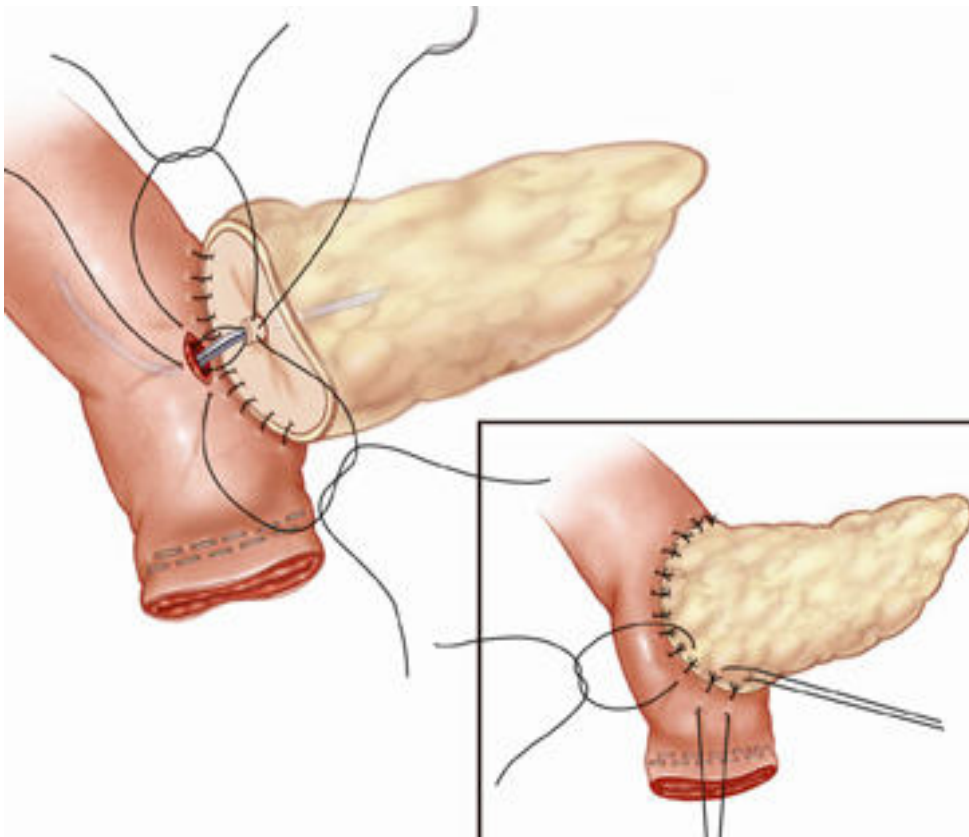
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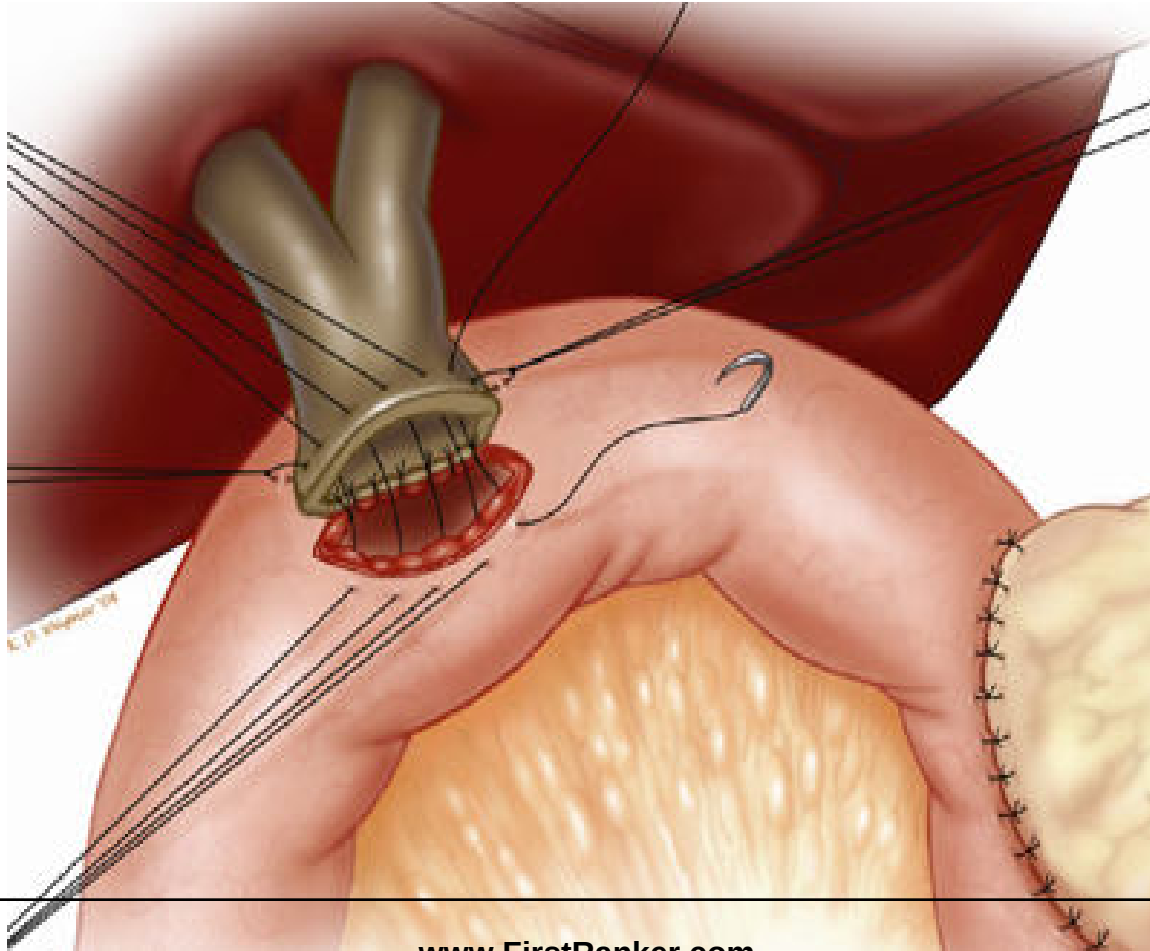


Tributaries from the portal vein and superior mesenteric vein ligated and divided

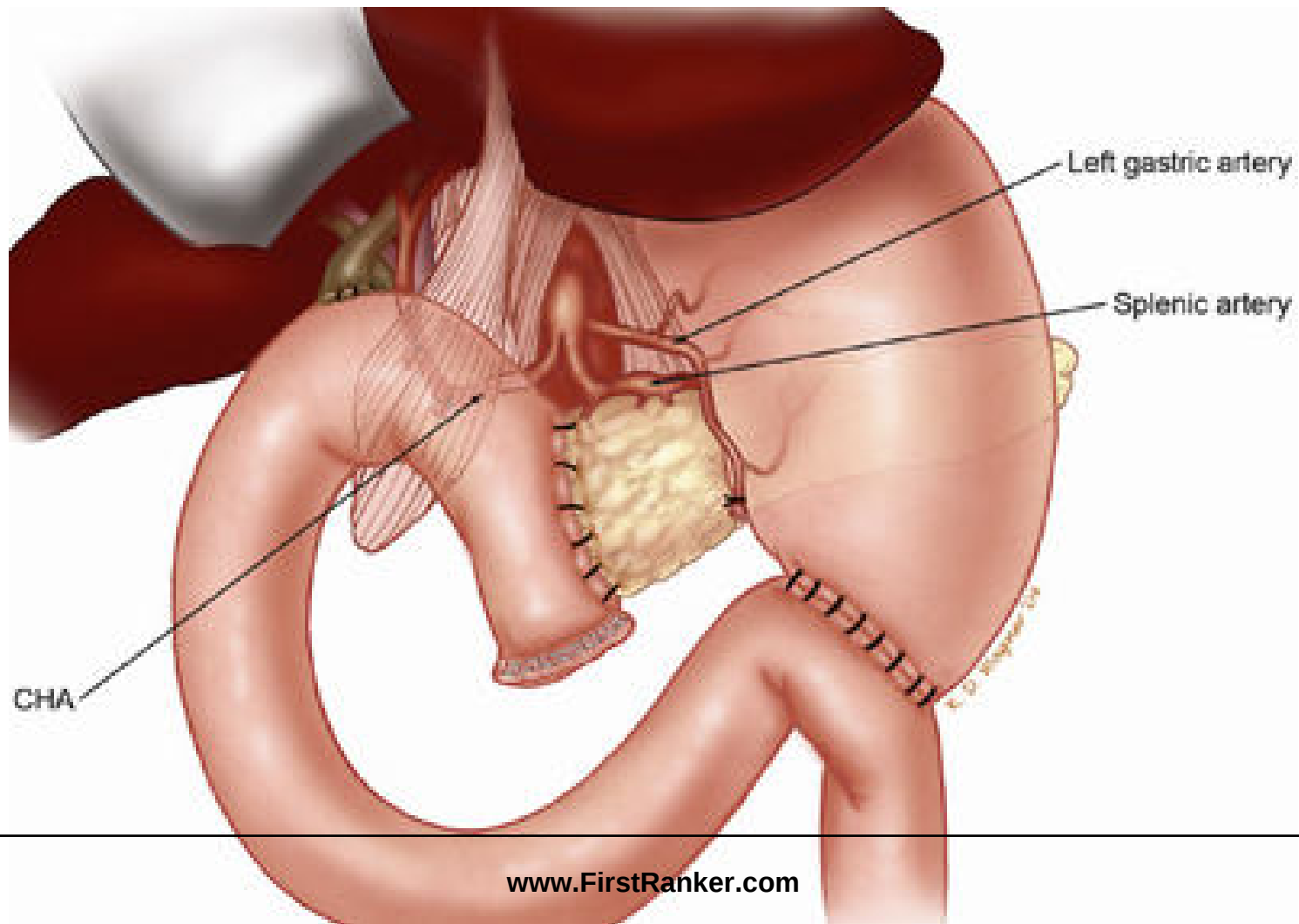
- **PANCREATICOJEJUNOSTOMY**



HEPATICOJEJUNOSTOMY



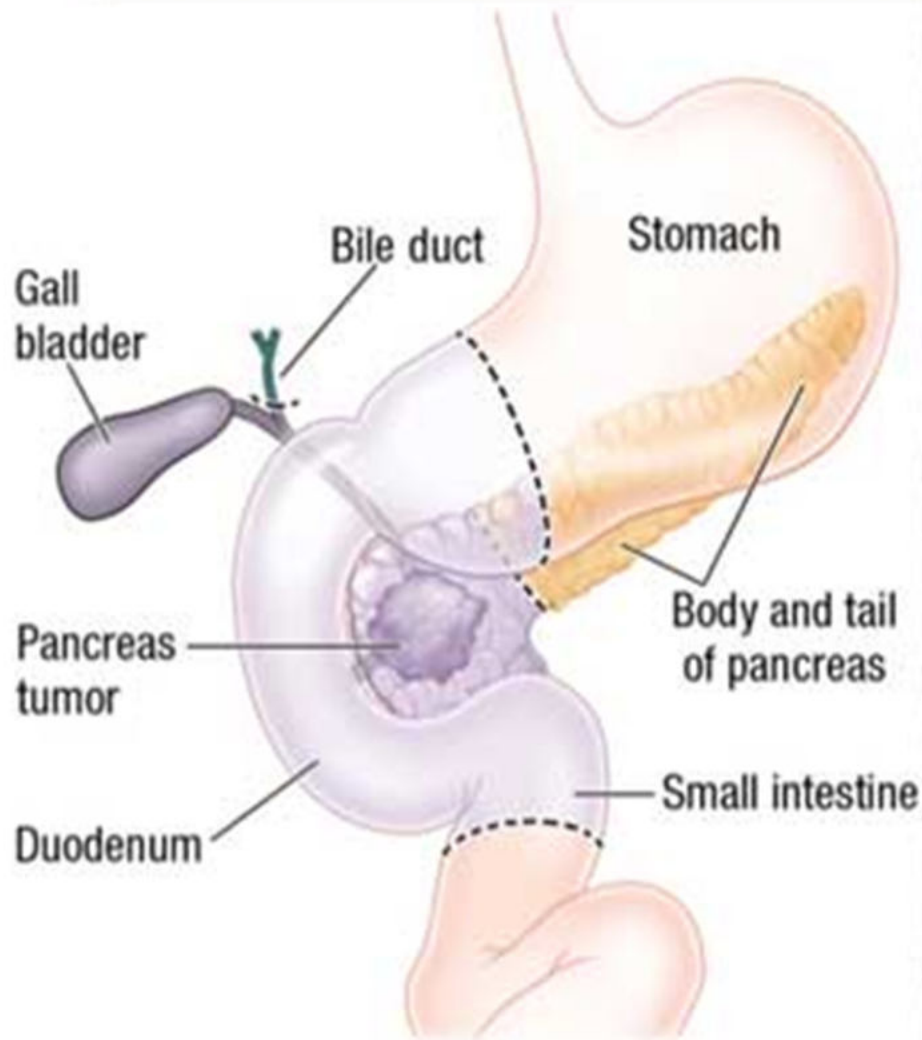
GASTROJEJUNOSTOMY



THE WHIPPLE PROCEDURE

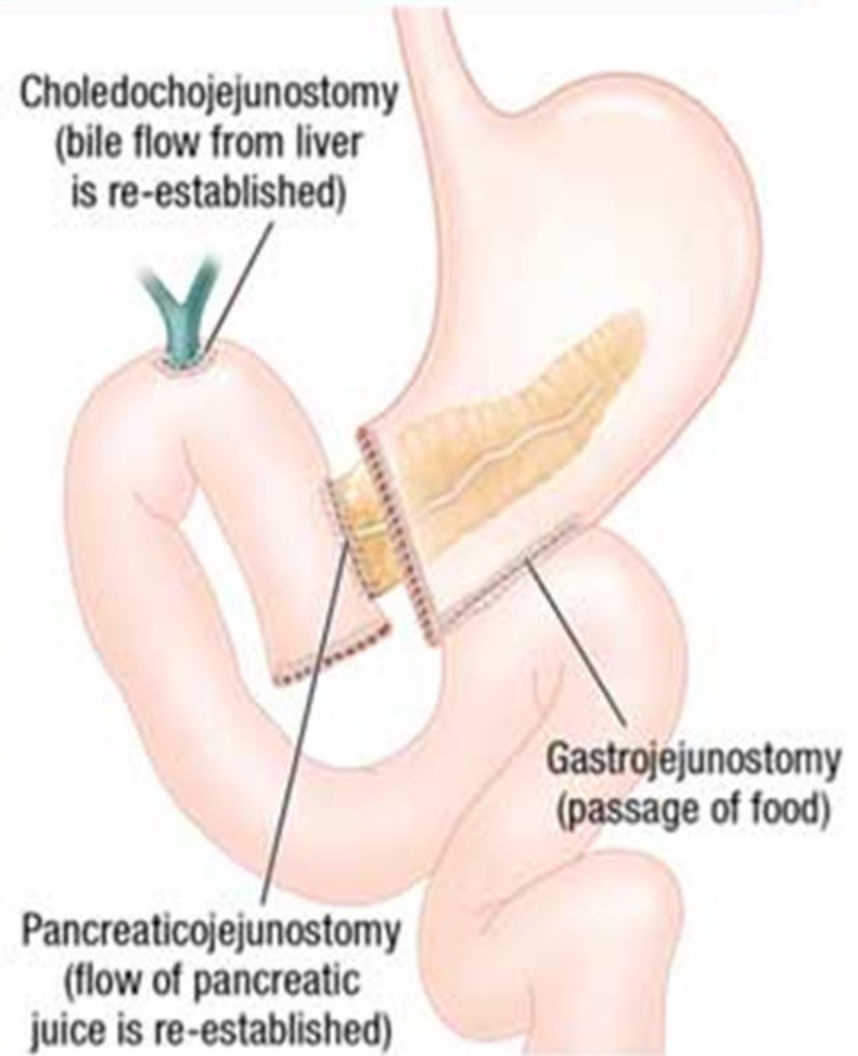
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BEFORE

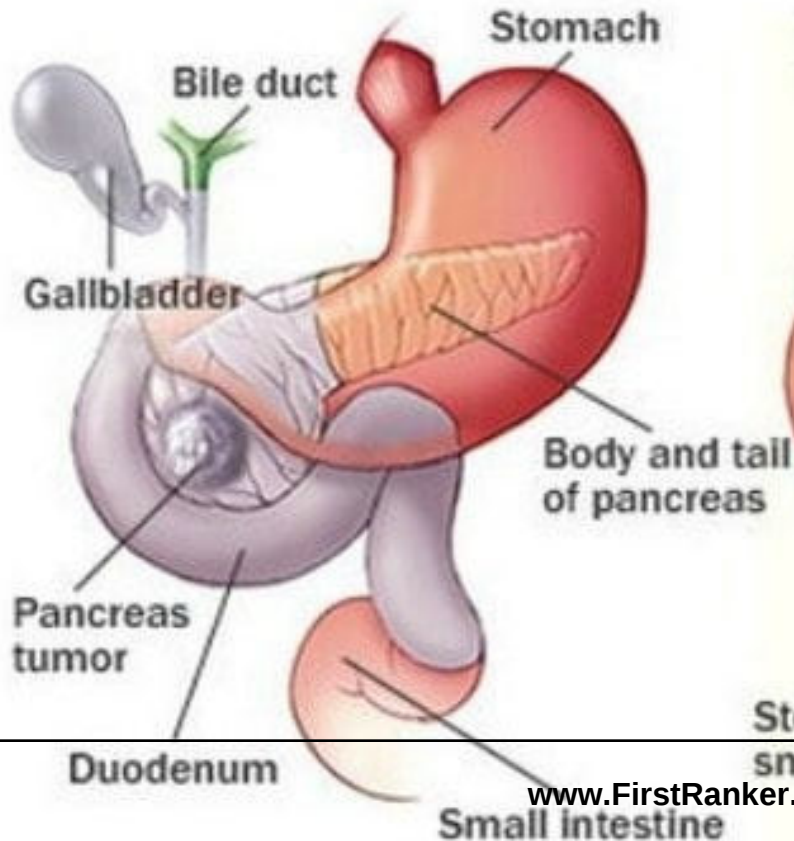
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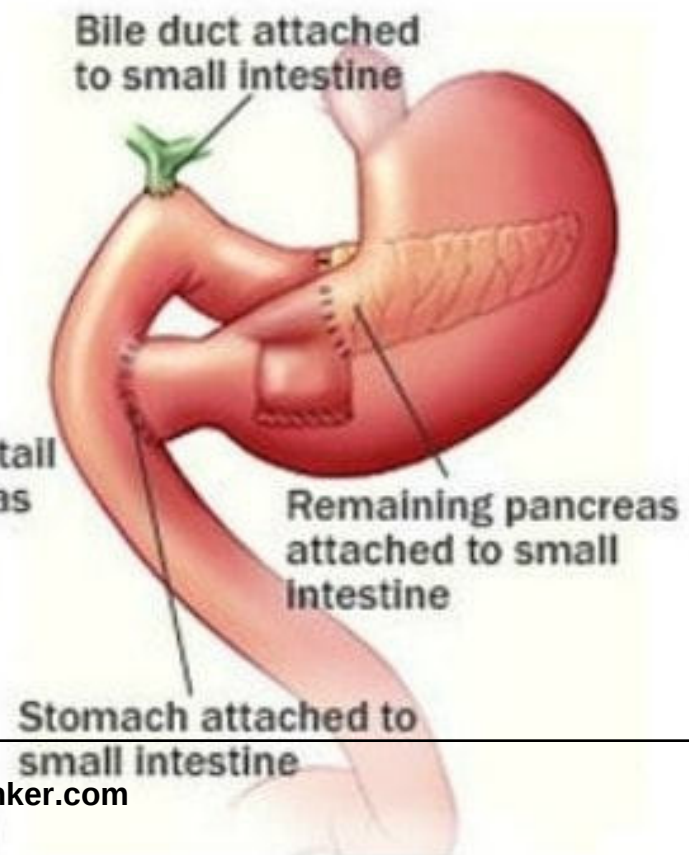
AFTER

TRAVERSO-LONGMIRE PYLORUS PRESERVING PANCREATICO-DUODENECTOMY (PPPD)

Before surgery



After surgery



POST OP MANAGEMENT

- High dependency observation for 1-2 days
- Drain may be put
- Early feeding can be commenced
- Fluid and electrolyte balance
- Observation for feeding and DIC
- Respiratory support (ventilation may be necessary)
- Vitamin K continued for 5 days
- Monitor urine output
- Octreotide for 5 days to prevent leak

COMPLICATIONS

- a. Infections
- b. Haemorrhage
- c. Leak from anastomosis between bowel and pancreas(octreotide)
- d. Pancreatic fistula
- e. Recurrence
- f. Hepatorenal syndrome
- g. Delayed gastric emptying
- h. Bile leak
- i. Mortality 3%(sepsis,hemorrhage, cardiovascular events)

ADJUVANT THERAPY

- High recurrence rate following resection
- **CHEMOTHERAPY AND RADIATION**
- **5FU**
- **Gemcitabine (less toxic)**
- **I¹²⁵ external radiotherapy**
- **Immunotherapy (allogenic tumor cell vaccine)**

NEOADJUVANT THERAPY

- Administration of chemotherapy with or without radiotherapy before surgery
- For borderline resectable
- **ADVANTAGES**
- Increased R0 resection status
- Reduces node positivity rate
- Reduce tumour burden
- Decrease recurrence
- Decrease chance of fistula

PALLIATIVE THERAPY

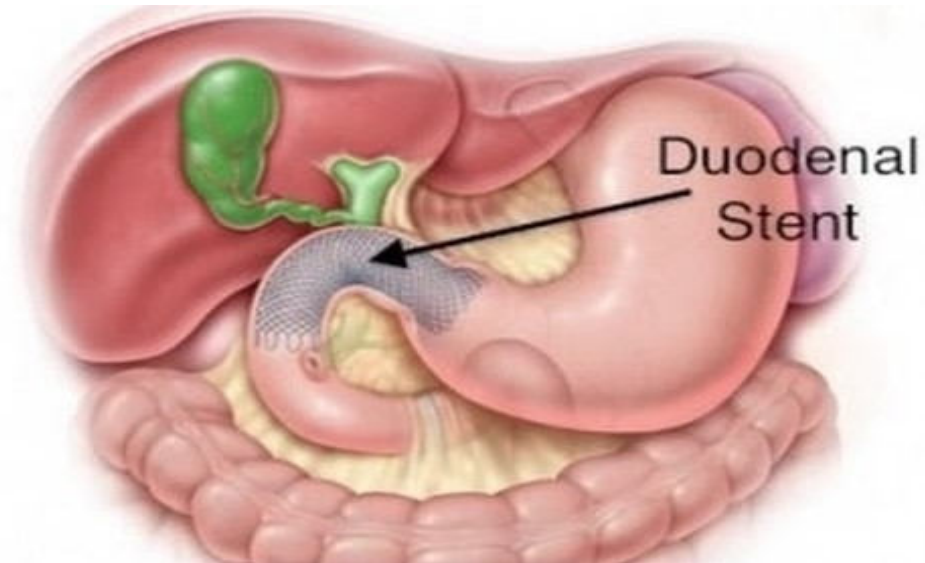
BILIARY OBSTRUCTION

- Surgical biliary bypass(choledochojejunostomy & gastroenterostomy)
- ERCP stenting
- PTC stenting
- PTBD
 - 1.internal drainage
 - 2.external drainage



DUODENAL OBSTRUCTION

- Gastrojejunostomy
- Duodenal stent



PAIN

- Antiinflammatory drugs
- Opioids
- Celiac nerve block(inj.3ml 0.25% bupivacaine and 10 ml absolute alcohol)

ROUX EN Y CHOLEDOCHOJEJUNOSTOMY AND GASTROJEJUNOSTOMY

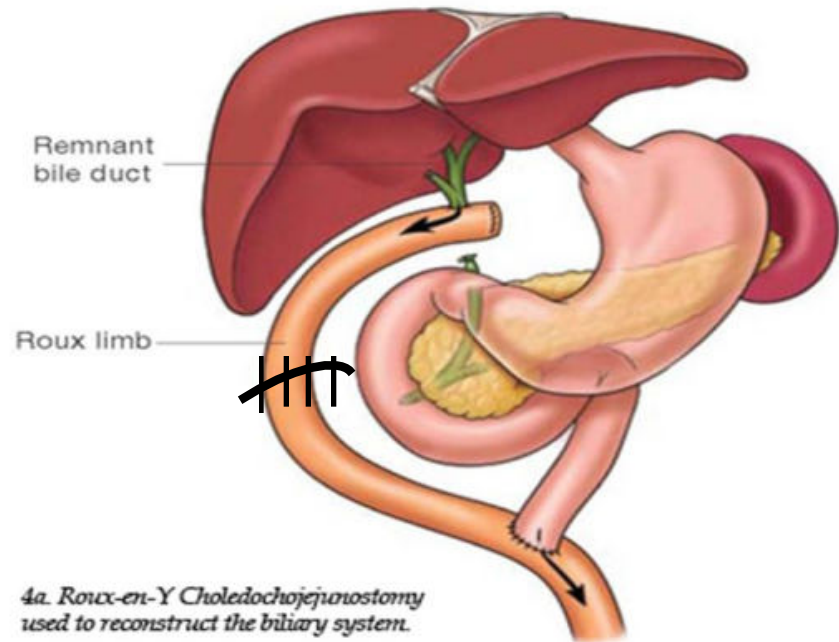
It is a palliative procedure done along with gastrojejunostomy after cholecystectomy

ADVANTAGES

Ease of flow of food

Decreased risk of cholangitis

Easier management of biliary
anastomotic leaks



PALLIATIVE CHEMOTHERAPY AND RADIATION

- Locally advanced unresectable disease and stage 4 diseases
- Folfirinox(5FU+Oxaliplatin+Irinotecan+leucovorin)
- Gemcitabine+nabpaclitaxel(albumin bounded paclitaxel particle)
- Gemcitabine,erlotinib
- 5FU and capecitabine with radiotherapy

PROGNOSIS

- **After surgical resection and adjuvant therapy for CA pancreas, the median survival is approximately 22 months.**
- **5 year survival of 15-20%**

PERIAMPULLARY CARCINOMAS

- **Periampullary cancer includes tumors arising from the distal bile duct, duodenal mucosa, or pancreas just adjacent to the ampulla**
- **Management : Pancreaticoduodenectomy (PD) with or without pylorus preservation**

CHOLANGIOCARCINOMA

- Cholangiocarcinoma(bile duct carcinoma) is a rare malignancy
 - Distal bile duct tumours
 - Proximal bile duct tumours
- Resection and hepaticojejunostomy
- Endoscopic stent placement
- Signs of unresectability : hepatic metastasis,peritoneal metastasis

DISTAL CHOLANGIOCARCINOMA

- **PANCREATICODUODENECTOMY**

CHOLANGIOCARCINOMA

- En block resection of common bile duct with hepatic parenchyma as necessary to achieve negative margins
- Resection of regional lymph node
- Taj Mahal resection: central liver resection > 1,4,5 segments & relevant bile ducts removed

- No proven role for adjuvant therapy
- Adjuvant chemoradiation –patient with nodal disease,R1 resection,undergoing clinical trial.

OUTCOMES

- Depend on stage at presentation
- Negative margins

COLORECTAL LIVER METASTASIS

RESECTION

- To be resectable CRLM must be removable with neg margins with min preservation 2 contiguous supported liver segments
- Vol of FLR depends on parenchymal function
 - n/l liver:20%
 - damaged by chemo:30 or 40%

SMALL FUTURE LIVER REMNANT

CONVERSION

- Chemotherapy conversion-downsizing unresectable liver d/s burden to resectability

Eg: FOLFOX4 regimen

TWO STAGE LIVER RESECTION

Prior to hepatectomy>portal vein occlusion> hypertrophy of small FLR

-operative ligation (PVL)

-percutaneous trans hepatic embolization(PVE)

ASSOCIATING LIVER PARTITION & PORTAL VEIN LIGATION(ALPPS)

- **Stage 1: portal vein ligated & parenchyma transected to separate FLR from hepatectomy specimen**
 - rapid FLR hypertrophy(7-10 days)
 - **Stage 2: completion hepatectomy**
- p-ALPPS: partial transection of FLR in stage 1**

Salvage-ALPPS: FLR refractory to hypertrophic stimulus of portal vein occlusion

COMBINED INTRAOPERATIVE ABLATION & RESECTION

- **Resection of larger & superficial lesions + ablation of sub 4cm, deeper lesions**
- **Minimizing parenchymal loss- FLR preserved**

ABLATION

- Not sufficiently fit to undergo liver resection are considered
- Ablation +systemic chemo
- Radiofrequency ablation
- Microwave ablation

IRREVERSIBLE ELECTROPORATION

- **Non thermal technique**
- **Induce cell death with electric pulse**
- **Preservation of vessels and bile duct**
- **To manage anatomically challenging lesions**

Overview

- Jaundice due to obstruction of flow of bile to intestine.
- Causes are Intrahepatic and Extrahepatic.
- Clinical features are jaundice, clay coloured stools, itching, epigastric discomfort, anorexia etc.
- Investigations include USG, plain X-ray , MRCP, ERCP, CT scan, radioisotope scanning, PTC and endoscopic ultrasound.
- Management is mainly surgical and depends on the cause.

THANK YOU