Gall Stone Disease and Safe Cholecystectomy

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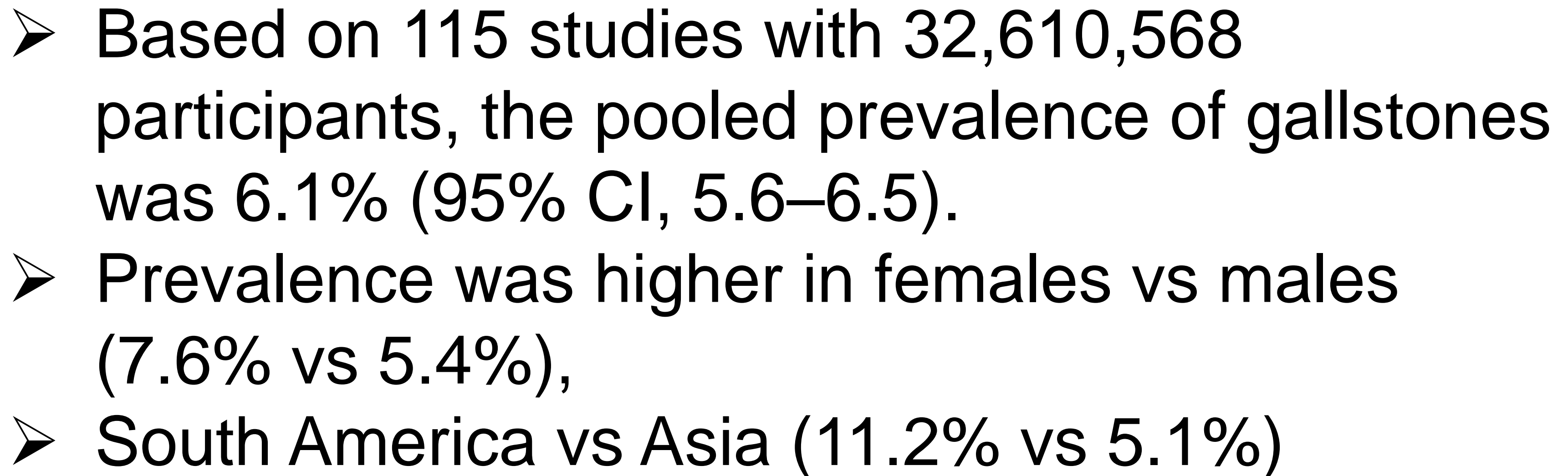
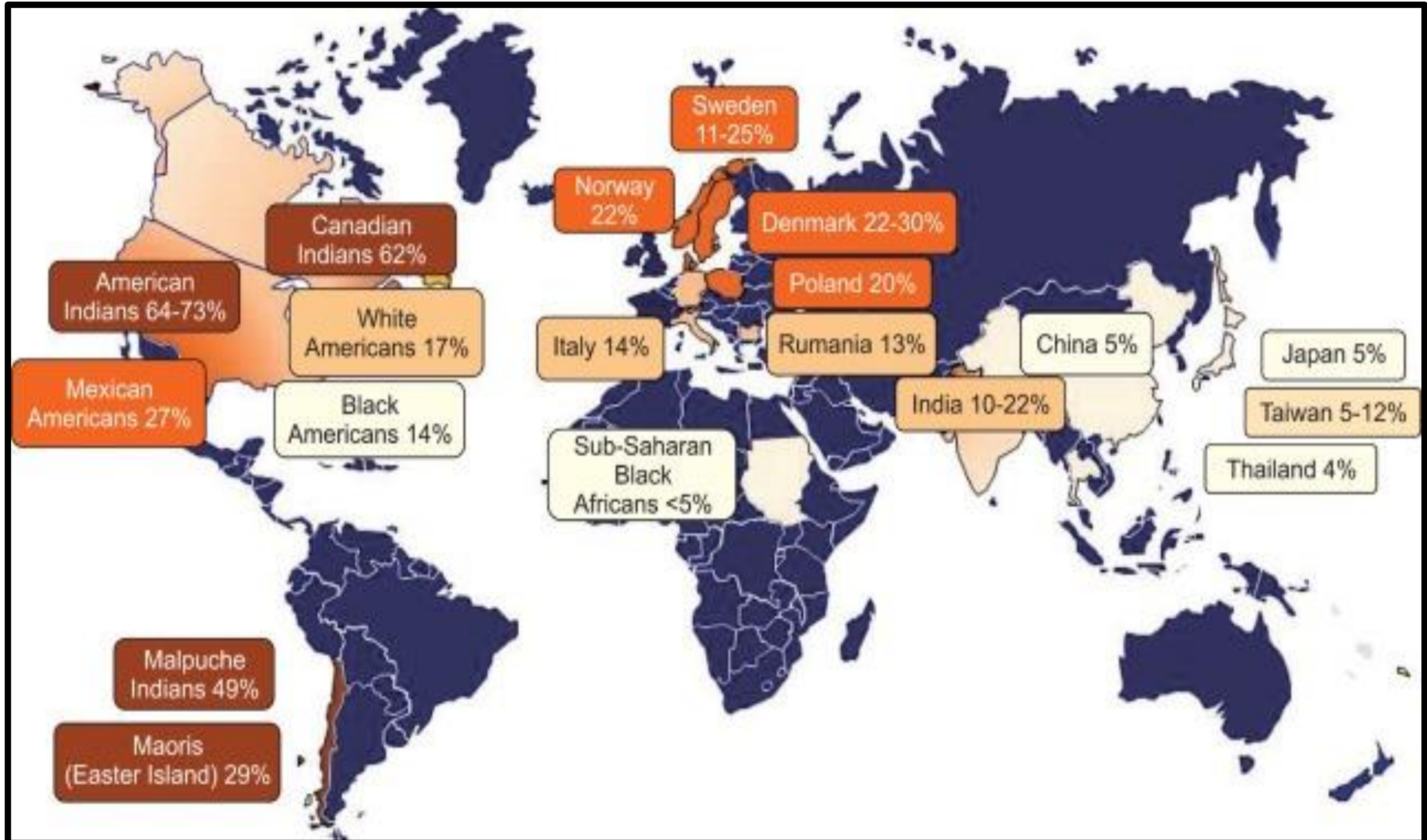
Prevalence of Gall stone



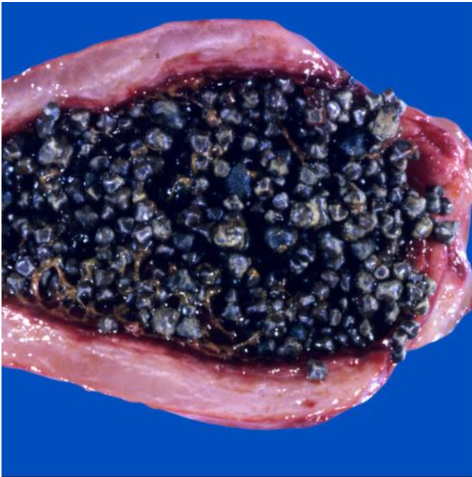
- Based on 115 studies with 32,610,568 participants, the pooled prevalence of gallstones was 6.1% (95% CI, 5.6–6.5).
- Prevalence was higher in females vs males (7.6% vs 5.4%),
- South America vs Asia (11.2% vs 5.1%)

Global prevalence of Gall stone

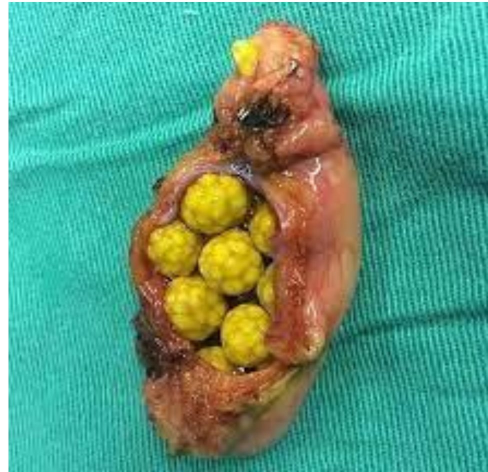


Types of Gall stone

- Cholesterol
- Mixed (cholesterol + bilirubin)
- Pigment stone (bilirubin)



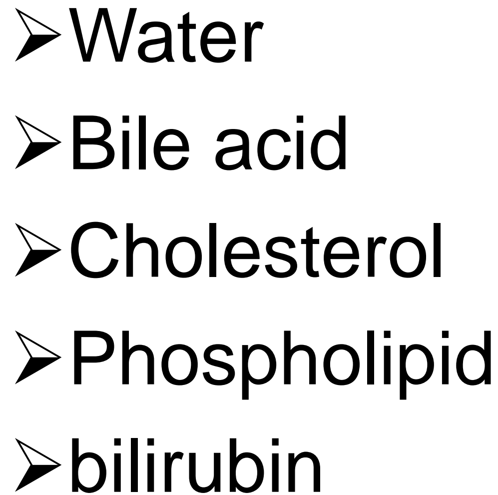
Pigment stones



Cholesterol stones

Multifaceted mixed type Gall stone

Composition of bile



- Water
- Bile acid
- Cholesterol
- Phospholipid
- bilirubin

Types of bile acid

- **Primary bile acid**

- Cholic acid

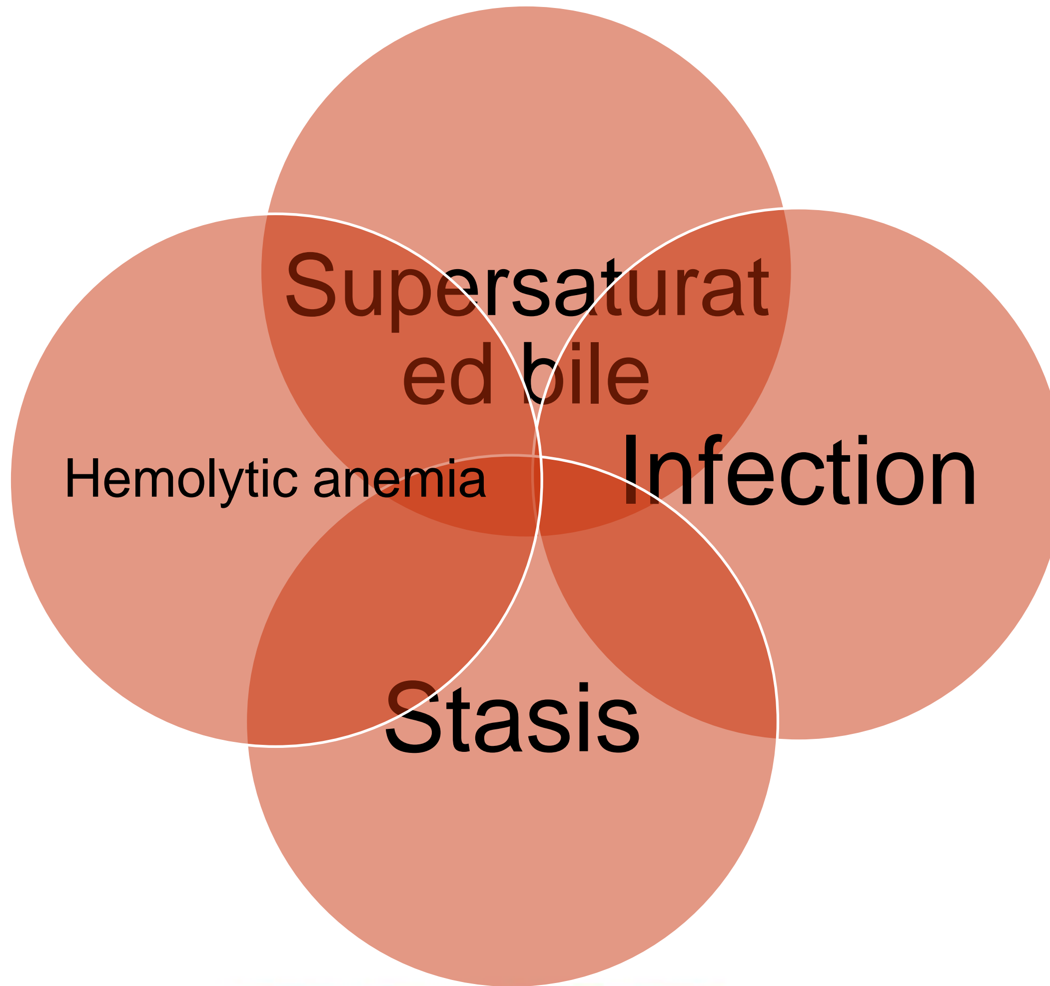
- Cheno-deoxy cholic acid.

- **Secondary bile acid**

-Deoxy cholic acid

-Lithocholic acid

Causes of stone formation



Supersaturated bile

- Cholesterol in bile remains in solution by bile acid(in salt form)
- If ratio between cholesterol and bile acid increases, Cholesterol precipitates resulting in stone formation.

or

Stasis

Poor gallbladder contractility or obstruction to the flow of bile may cause precipitation of cholesterol

Infection

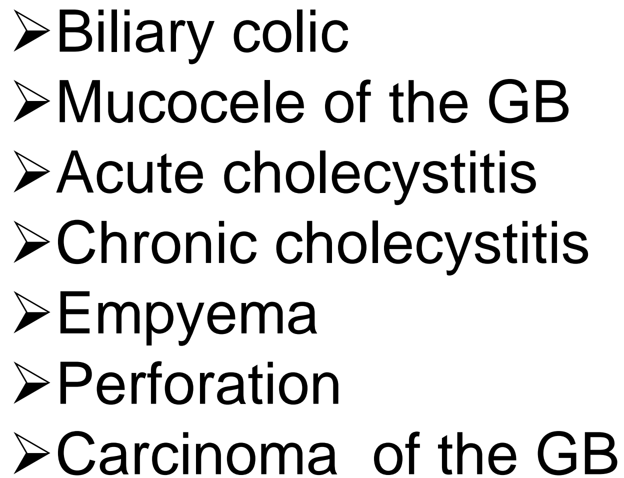
Presence of infection may cause ulceration on the mucosa of the G.B mucosa may form a nydus for stone formation.

Hemolytic jaundice

Excess RBC hemolysis causes excess bilirubin production. These bilirubin can deposit in the GB as stone.

- Sickle cell anaemia ,
- Hereditary spherocytosis
- Thalaessemia
- Hypersplenism

Effect of Gall stone in the GB

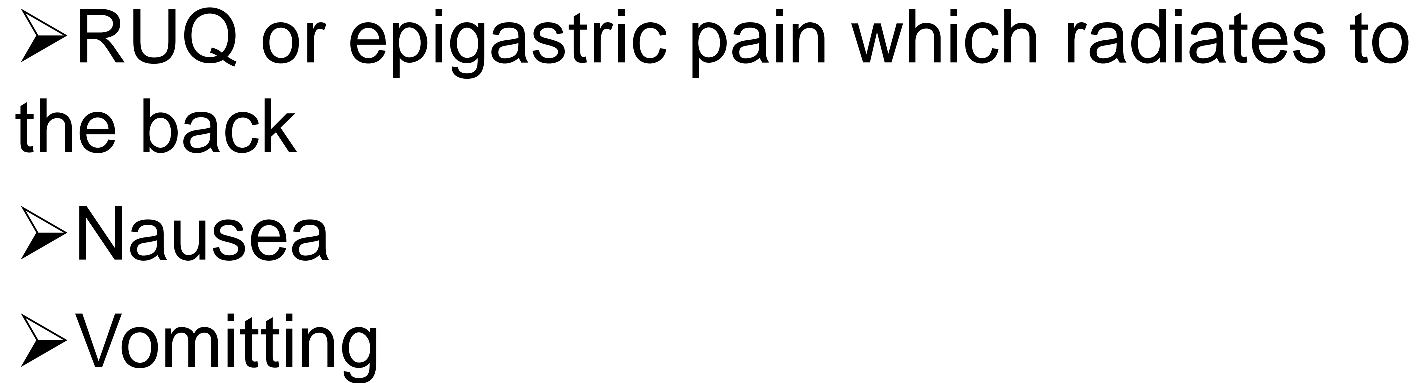


- Biliary colic
- Mucocele of the GB
- Acute cholecystitis
- Chronic cholecystitis
- Empyema
- Perforation
- Carcinoma of the GB

Biliary colic

- When a stone obstructs the neck of the GB, bile can not pass through the cystic duct → the GB contracts → Severe colicky pain develops
- This pain is felt in the epigastrium or Rt hypochondrium and radiates to the back at the angle of the scapula. Pain may radiate to the chest also.
- GB gets distended → Stones slips back to the GB or passes to the CBD → pain is releived.

Clinical feature of biliary colic

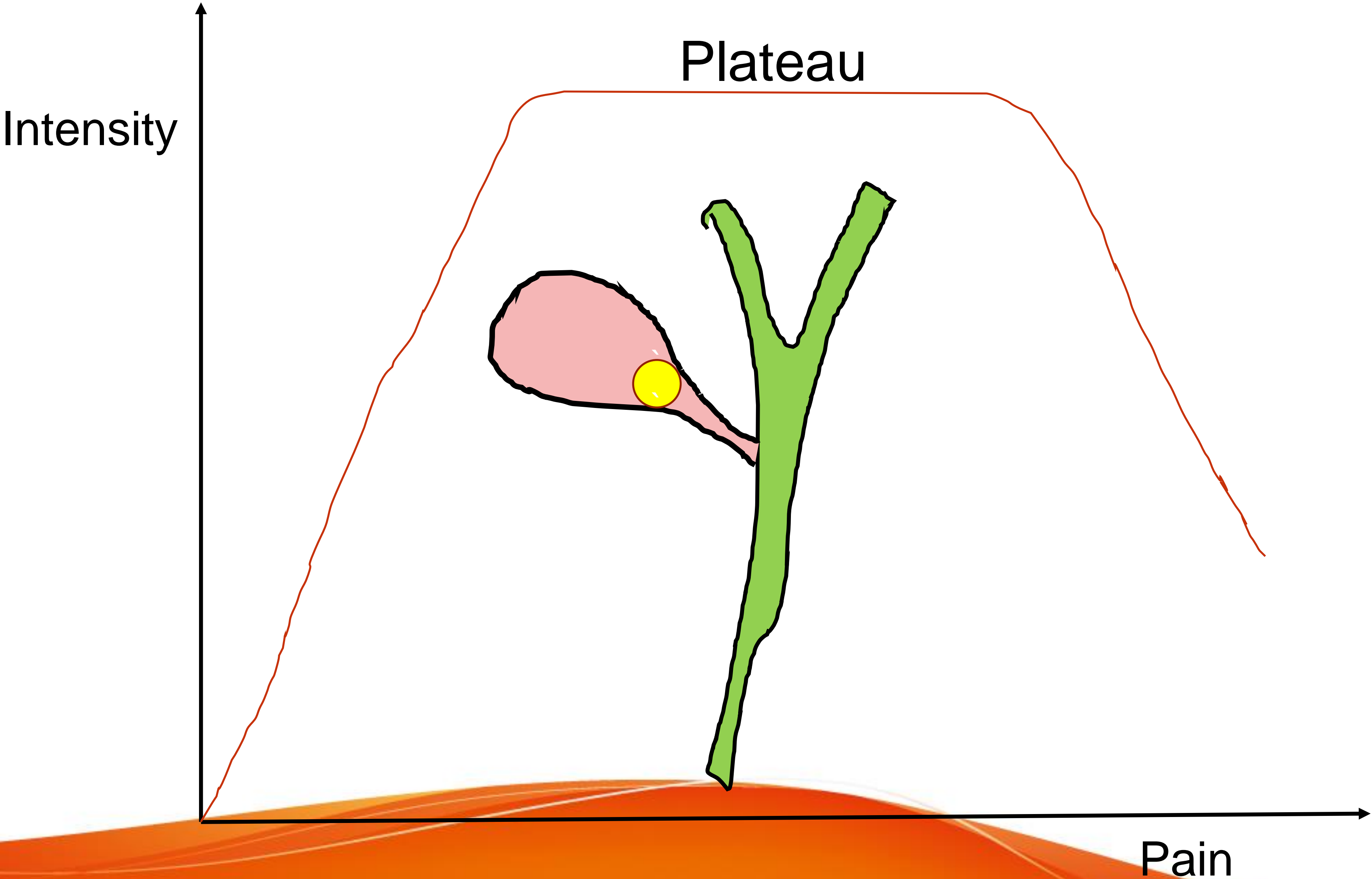


- RUQ or epigastric pain which radiates to the back
- Nausea
- Vomitting

Pain in RUQ radiating to back

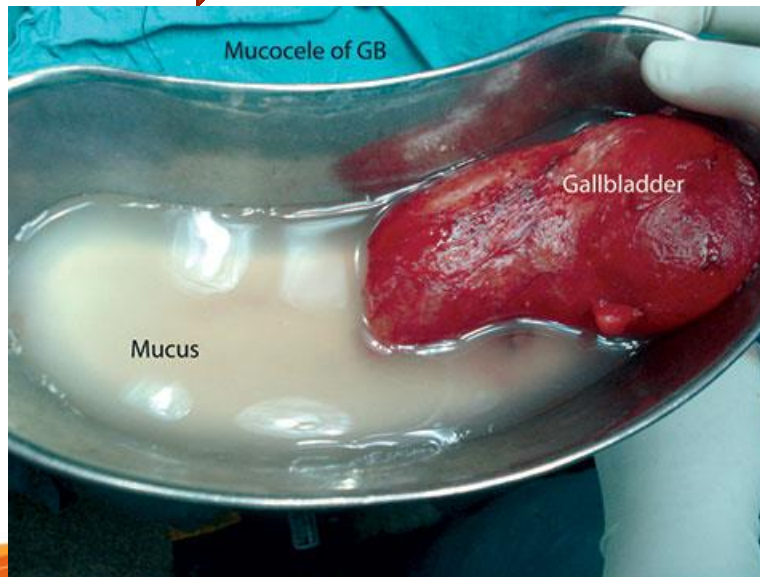
right shoulder
tip of scapula
diaphragm
gallbladder
C
ureter
inguinal canal
gallbladder pain
diaphragmatic pain
ureteric pain

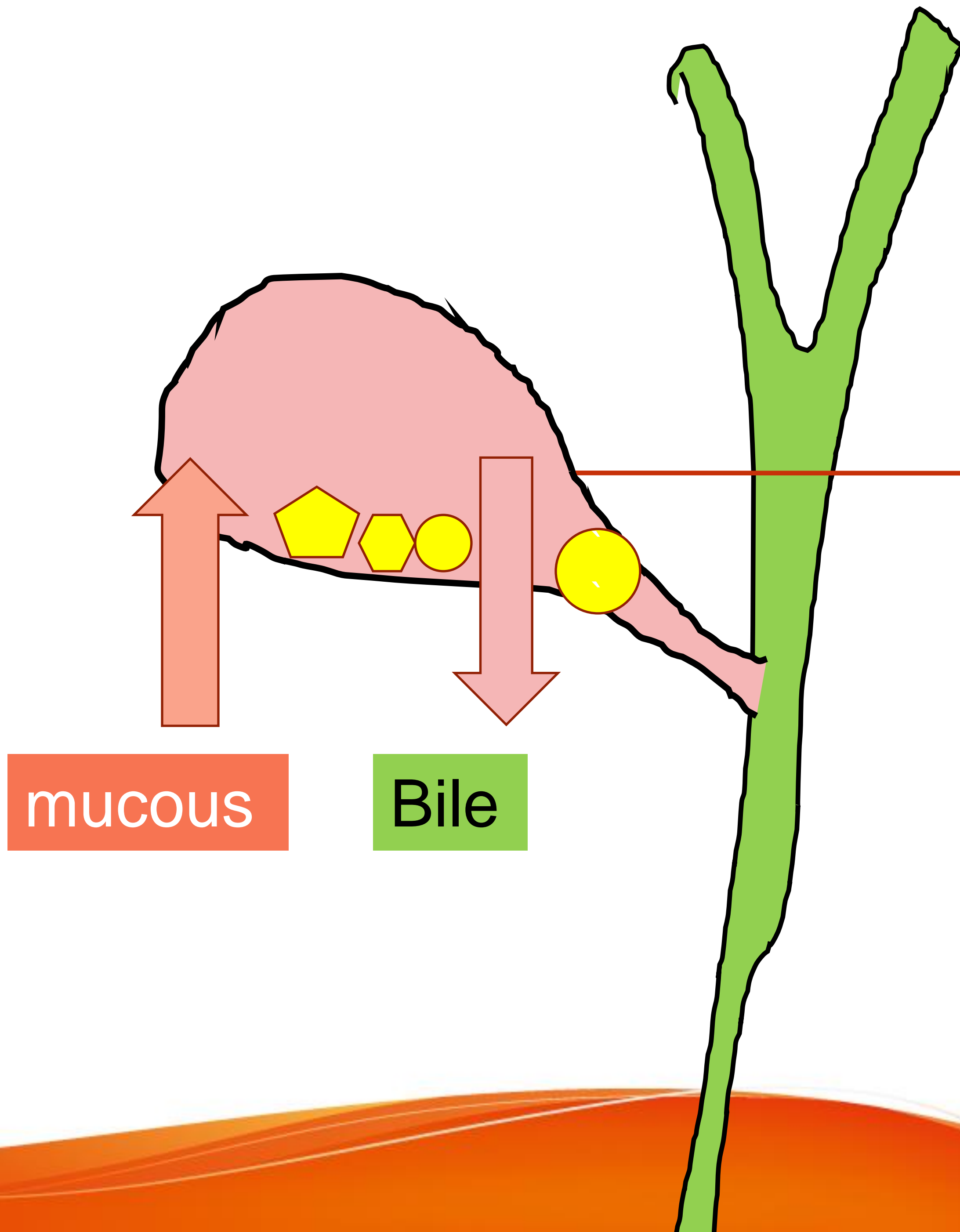
Pain pattern in atypical biliary colic



Mucocele of the GB

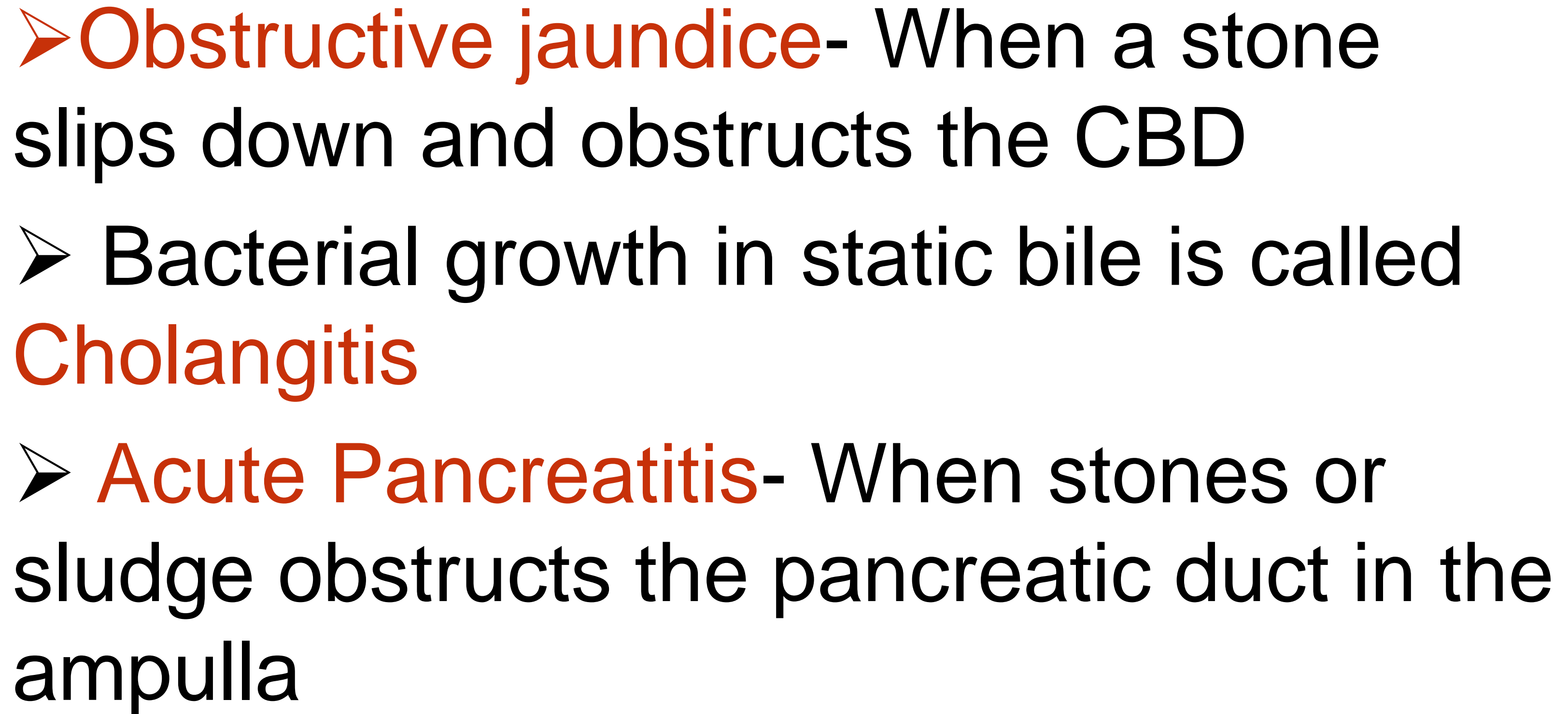
- If stone does not slip → GB gets more and more distended → stored bile gets reabsorbed but mucous secretion continues → GB bile is replaced by mucous → mucocele of the GB.





Mucocele of the GB

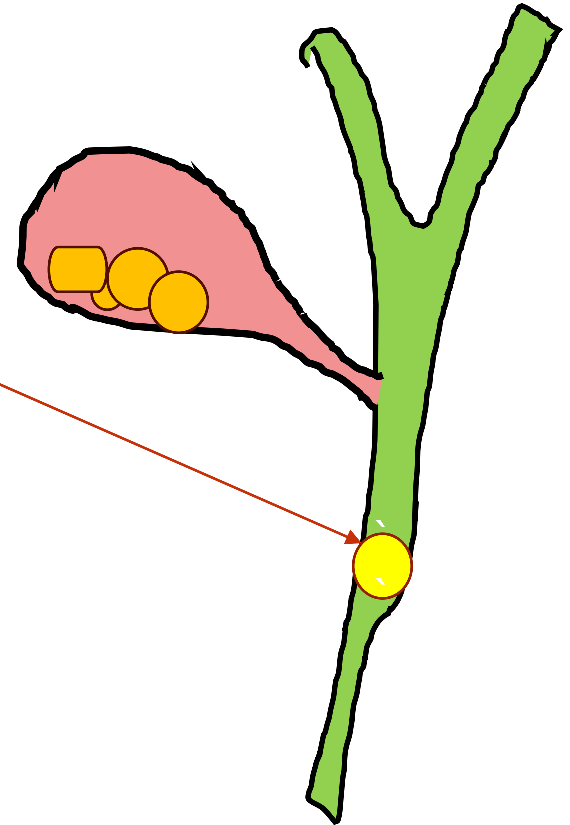
Effects or Complications of stones in the bile duct



- Obstructive jaundice- When a stone slips down and obstructs the CBD
- Bacterial growth in static bile is called Cholangitis
- Acute Pancreatitis- When stones or sludge obstructs the pancreatic duct in the ampulla

Effects of stone in the CBD

- Obstructive jaundice
- Acute Cholangitis
- Acute pancreatitis

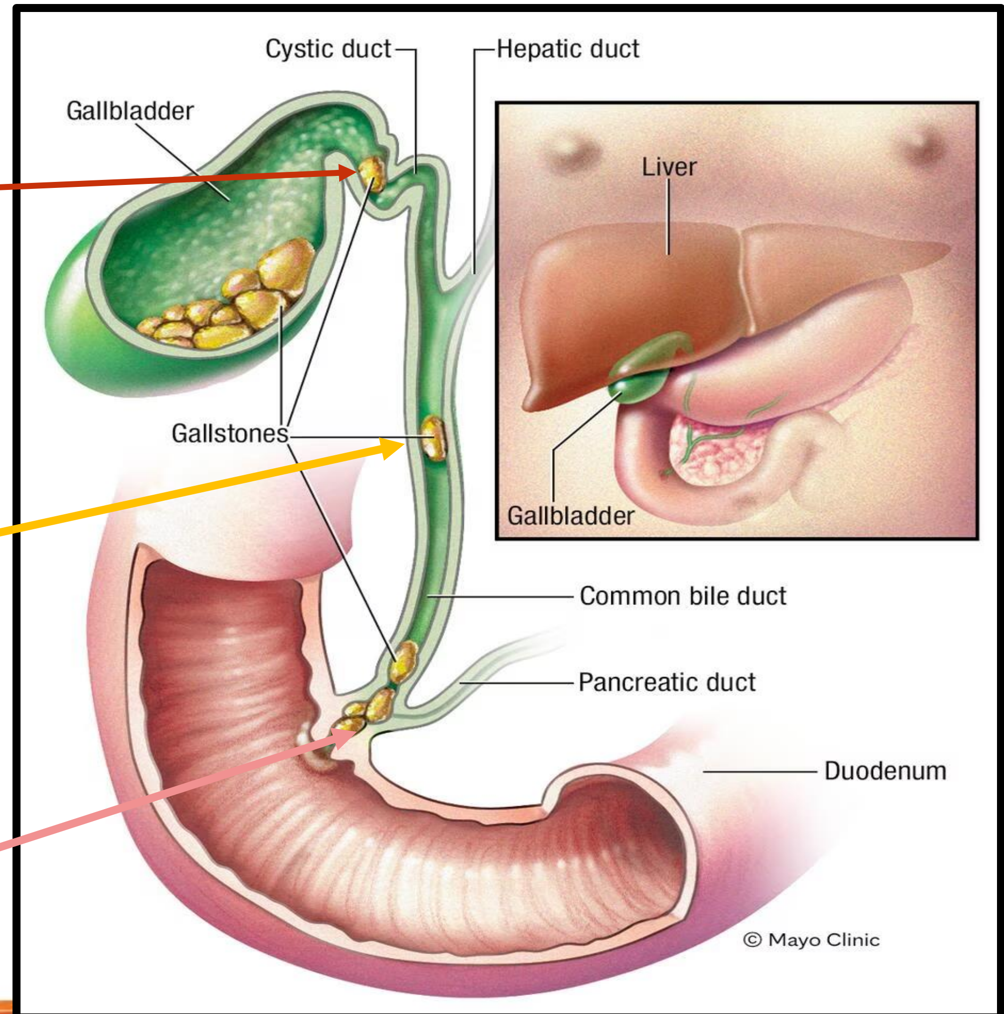


Complications of Gall stone

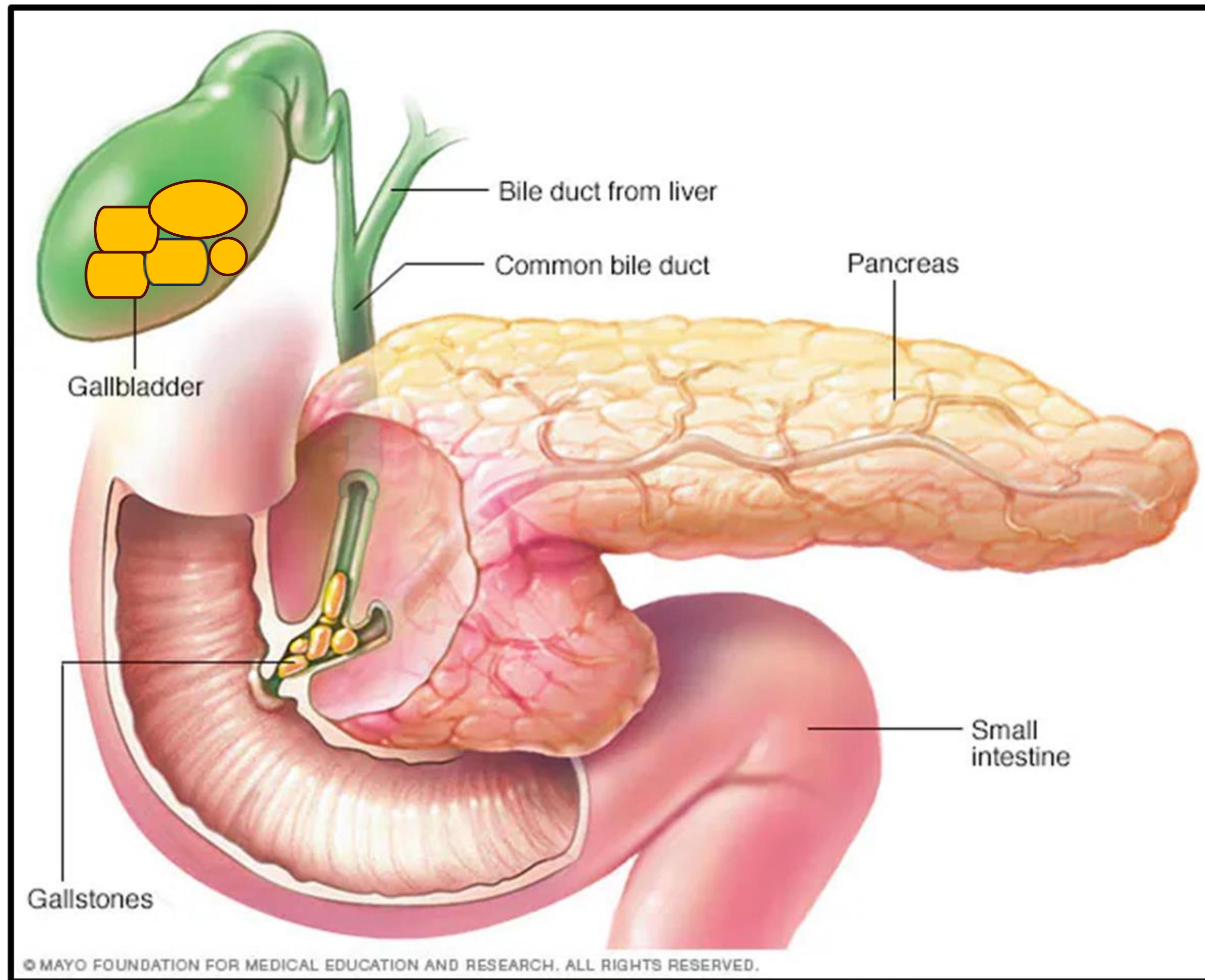
Biliary colic

Obstructive jaundice

Acute Pancreatitis



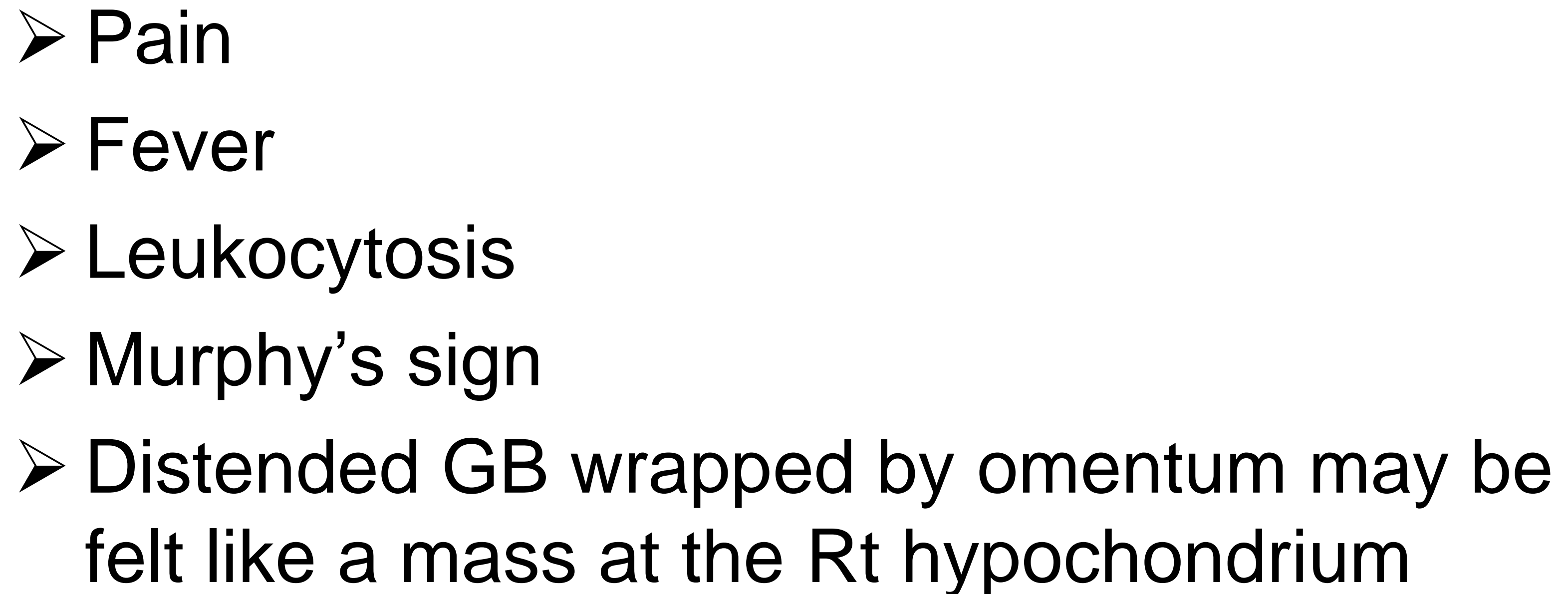
Pathogenesis of acute pancreatitis



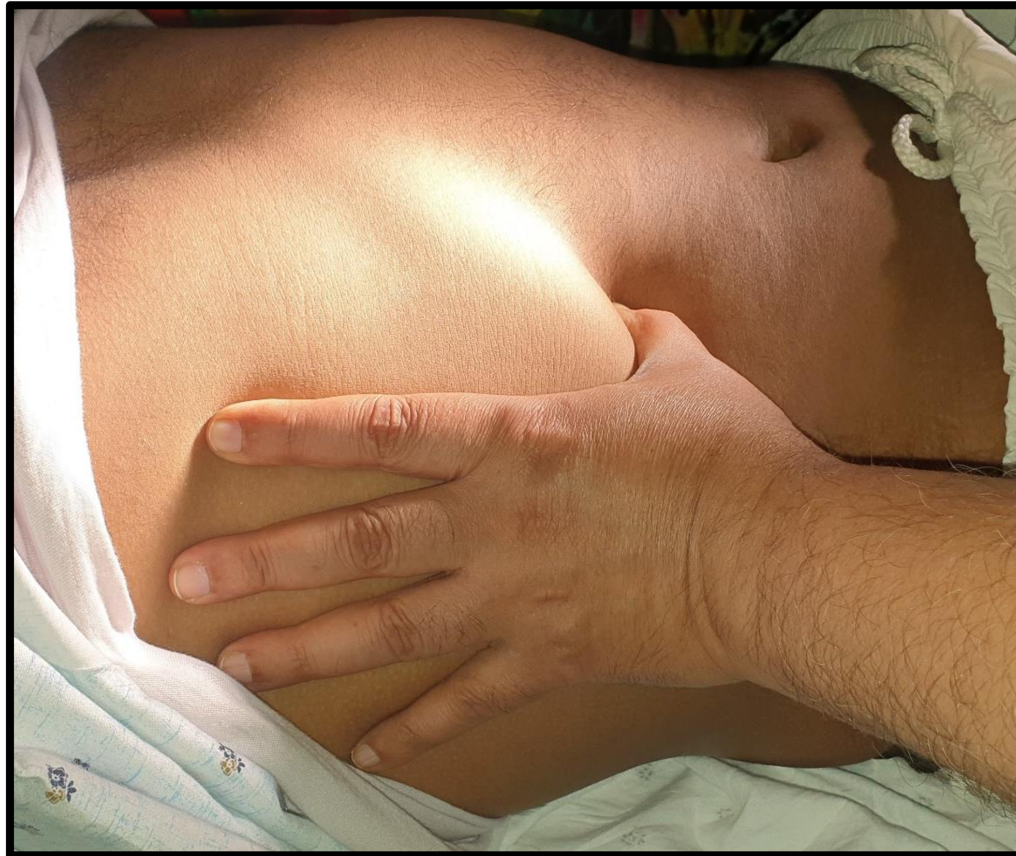
Acute cholecystitis

- Obstructed GB develops a chemical peritonitis → Superadded infection occurs due to bacterial translocation from surrounded intestines → AcuteCholecystitis

Features of acute cholecystitis

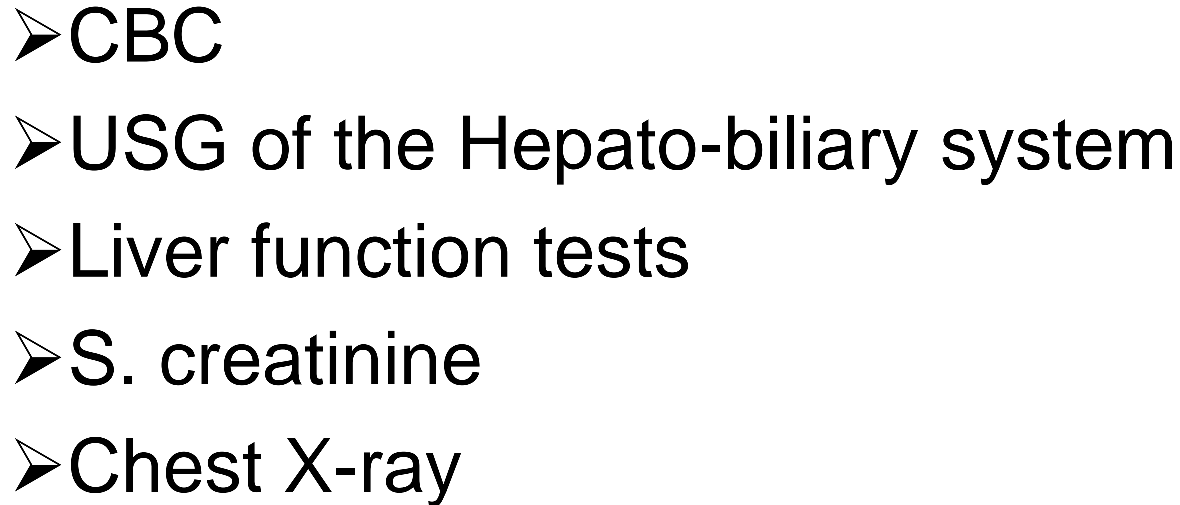


- Pain
- Fever
- Leukocytosis
- Murphy’s sign
- Distended GB wrapped by omentum may be felt like a mass at the Rt hypochondrium



Murphy’s sign

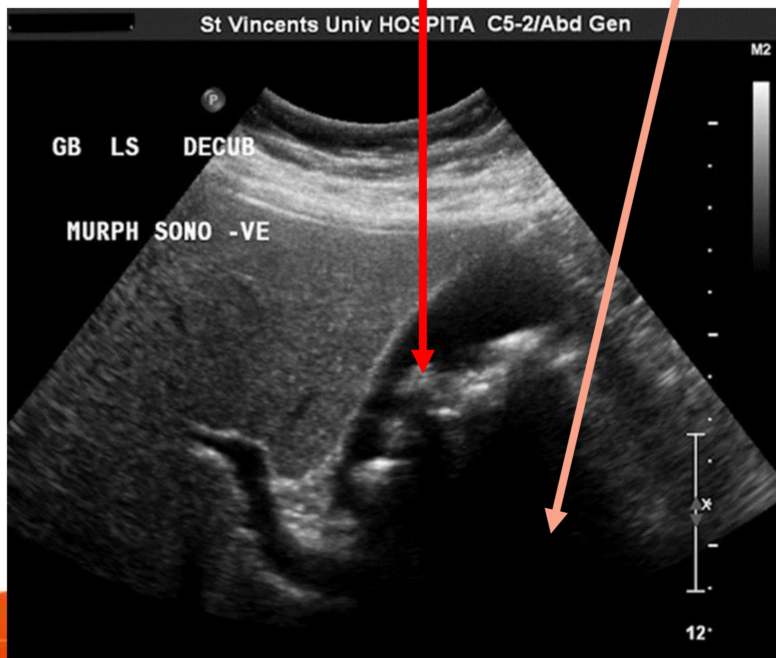
Investigation

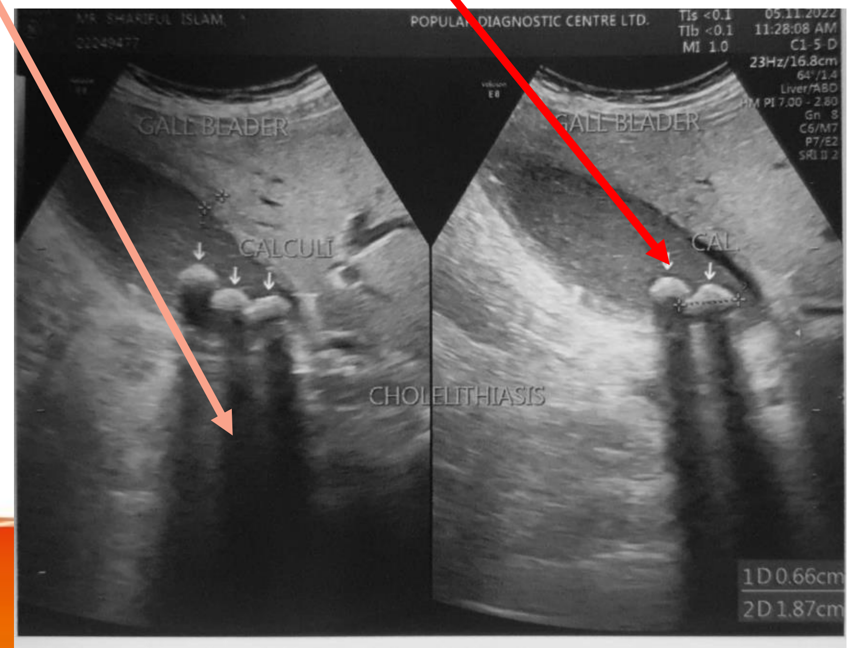


- CBC
- USG of the Hepato-biliary system
- Liver function tests
- S. creatinine
- Chest X-ray

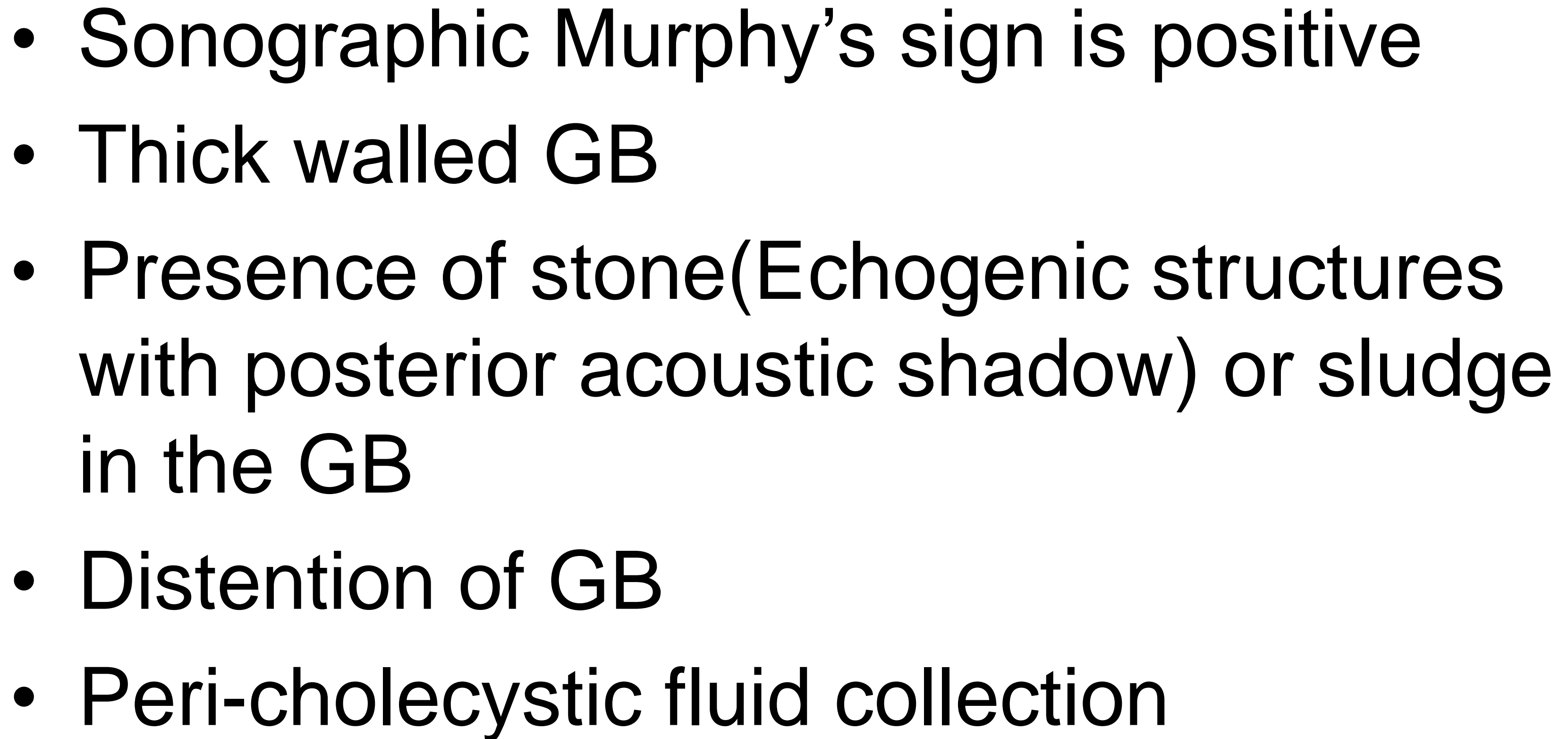
Sonographic sign of Gall stone

-Multiple echogenic structures with
-posterior acoustic shadow



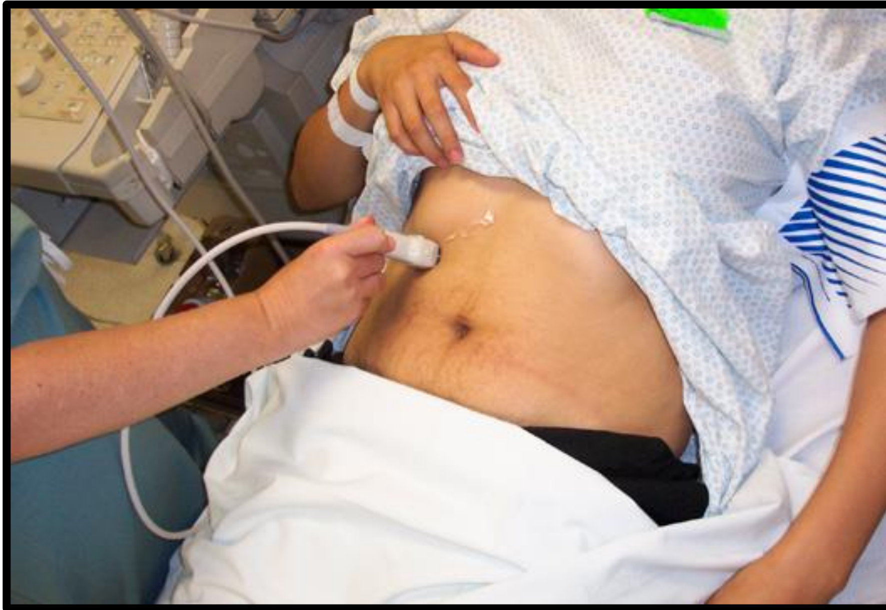


Sonographic findings of Acute Cholecystitis

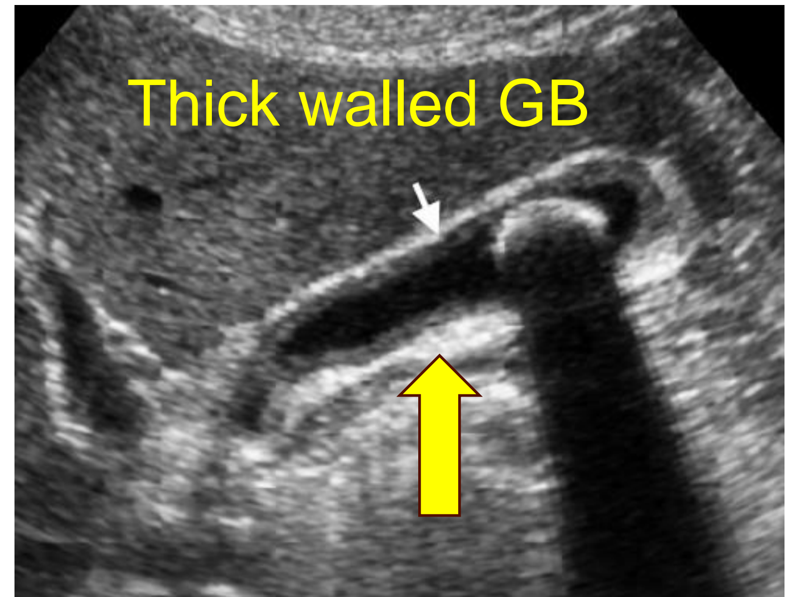


- Sonographic Murphy’s sign is positive
- Thick walled GB
- Presence of stone(Echogenic structures with posterior acoustic shadow) or sludge in the GB
- Distention of GB
- Peri-cholecystic fluid collection

Sonographic sign of acute calculous cholecystitis

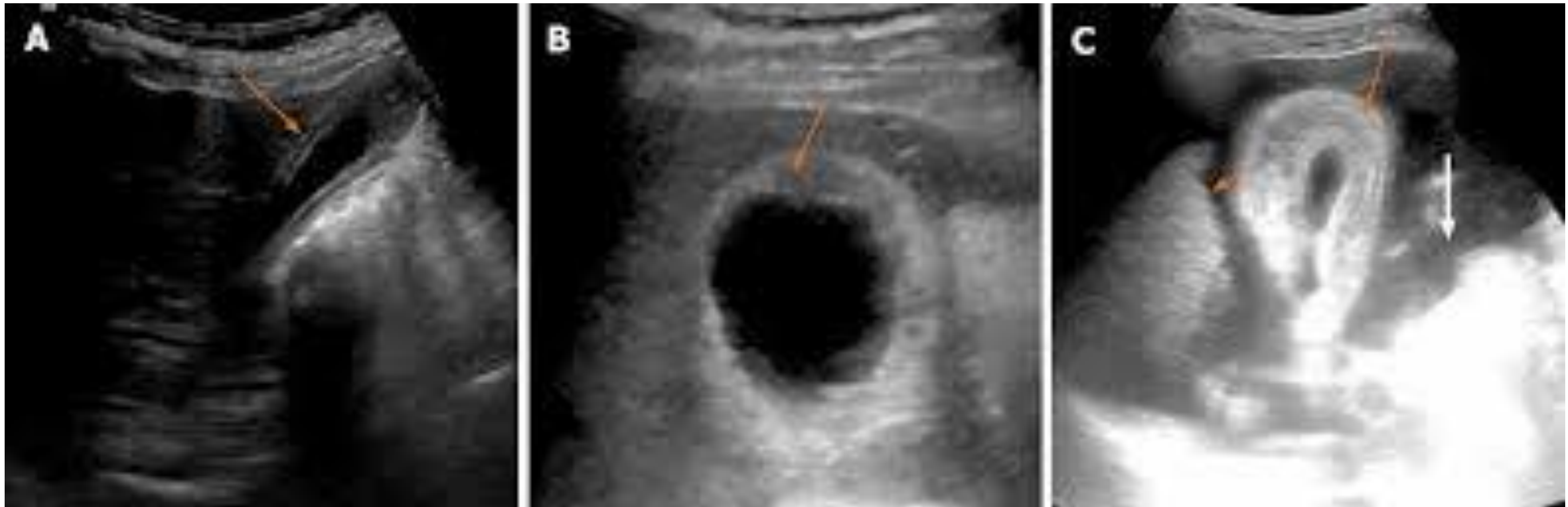


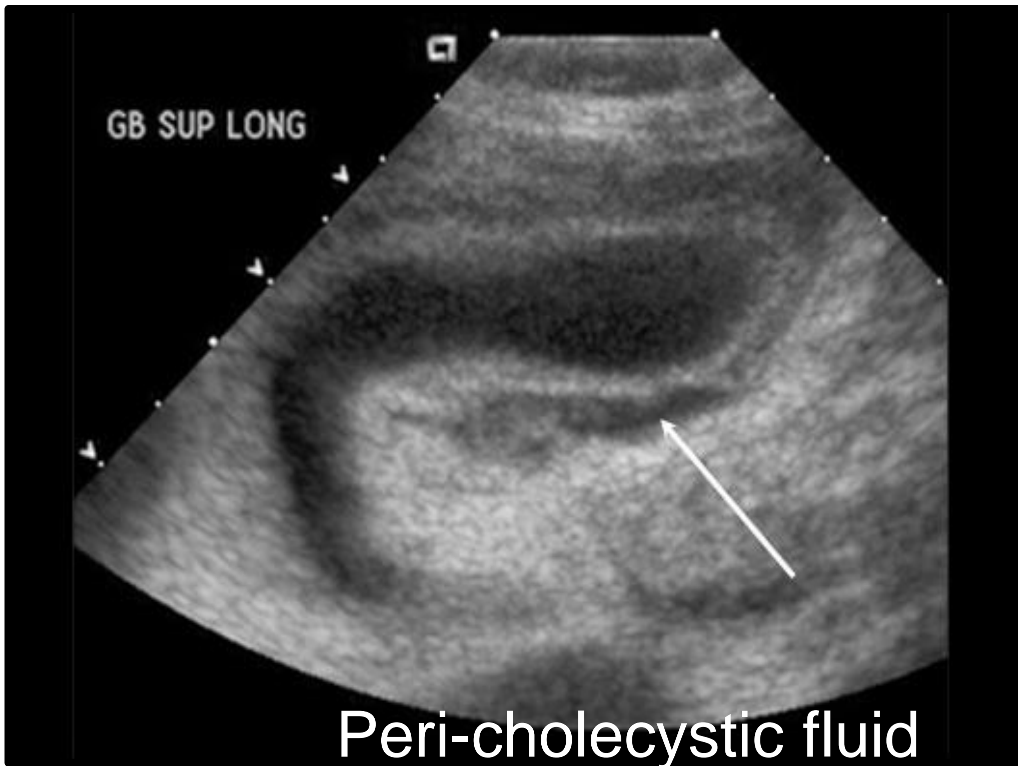
Sonographic Murphy's sign



Sonographic findings of acute Cholecystitis

Sonographic findings of Acute Acalculus Cholecystitis

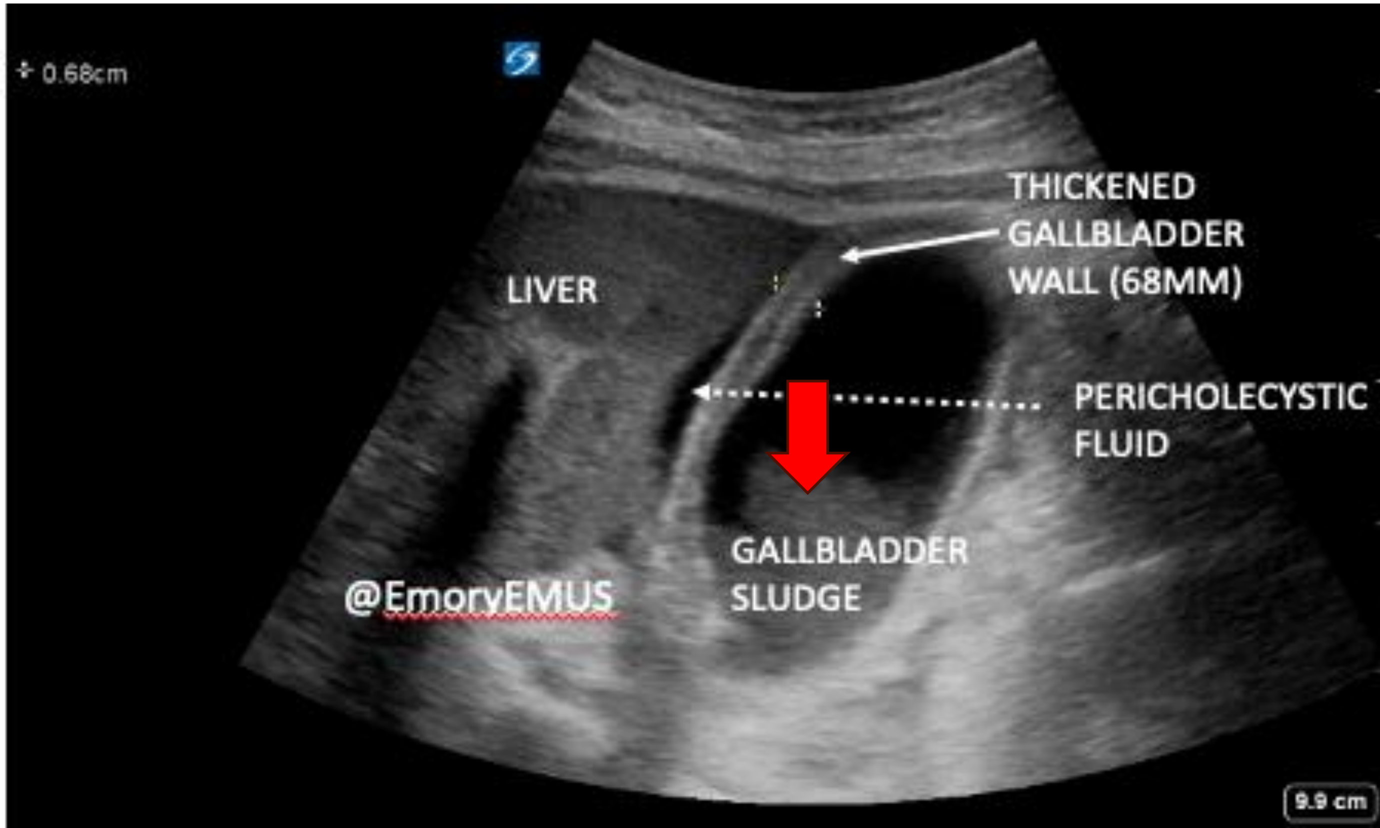




1)Thick walled GB
2)Pericholecystic fluid collection
3)GB distention

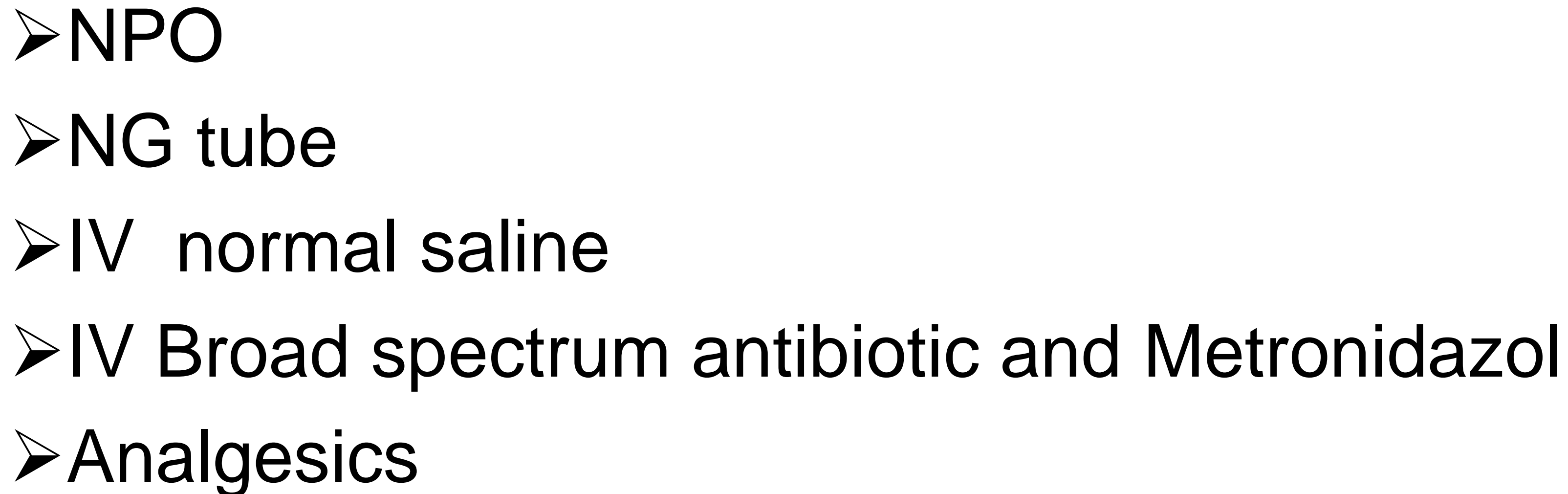
Acute attack of Acalculus cholecystitis has higher chance of perforation than calculus cholecystitis. So patient with acute attack of acalculus cholecystitis should be undergone cholecystectomy.

Acalculous cholecystitis with sludge



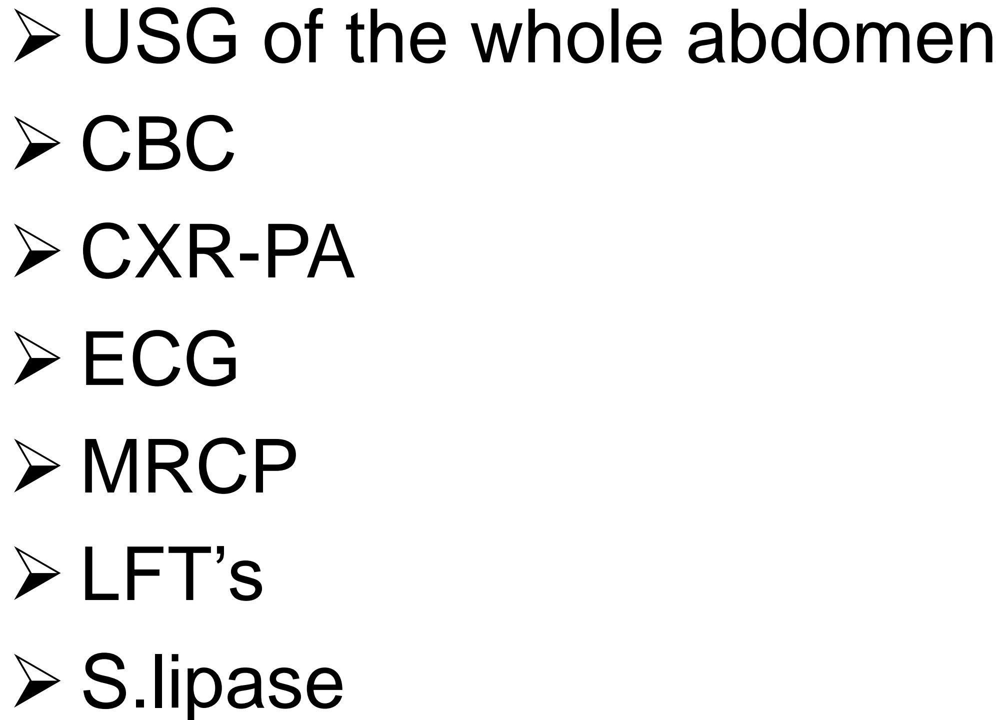
Sludge is more notorious to cause pancreatitis

Immediate treatment of Acute cholecystitis



- NPO
- NG tube
- IV normal saline
- IV Broad spectrum antibiotic and Metronidazol
- Analgesics

Investigation



- USG of the whole abdomen
- CBC
- CXR-PA
- ECG
- MRCP
- LFT’s
- S.lipase

Surgical treatment

- Laparoscopic cholecystectomy in the same admission
- Or Interval cholecystectomy after 4-6 weeks

TOKYO Guideline of severity grading for acute cholecystitis

GRADE-3 : -Hypotension requiring vasopressors
(severe) -Decreased level of consciouness
-PaO2/FiO2 ratio <300
-oliguria, S.creatinine > 2 mg/dl
-PT INR >1.5
-platelet < 100000/mm3

Surgery is contraindicated

GRADE-2 : -WBC >18000/mm3
(moderate) -palpable tender mass in RUQ
-duration of complaints >72 hrs
-Marked local inflammation(gangrenous cholecystitis, pericholecystic abcess,peritonitis,emphysematous cholecystitis)

Surgery can be done with expert team and ICU support

GRADE-1 : doesn't meet any criteria of grade 2/3 acute cholecystitis
(mild) Healthy patient with no organ dysfunction and mild inflammatory changes

A safe and low risk cholecystectomy can be done.

Chronic Cholecystitis

-Recurrent bouts of biliary colic leading to chronic GB wall inflammation / fibrosis

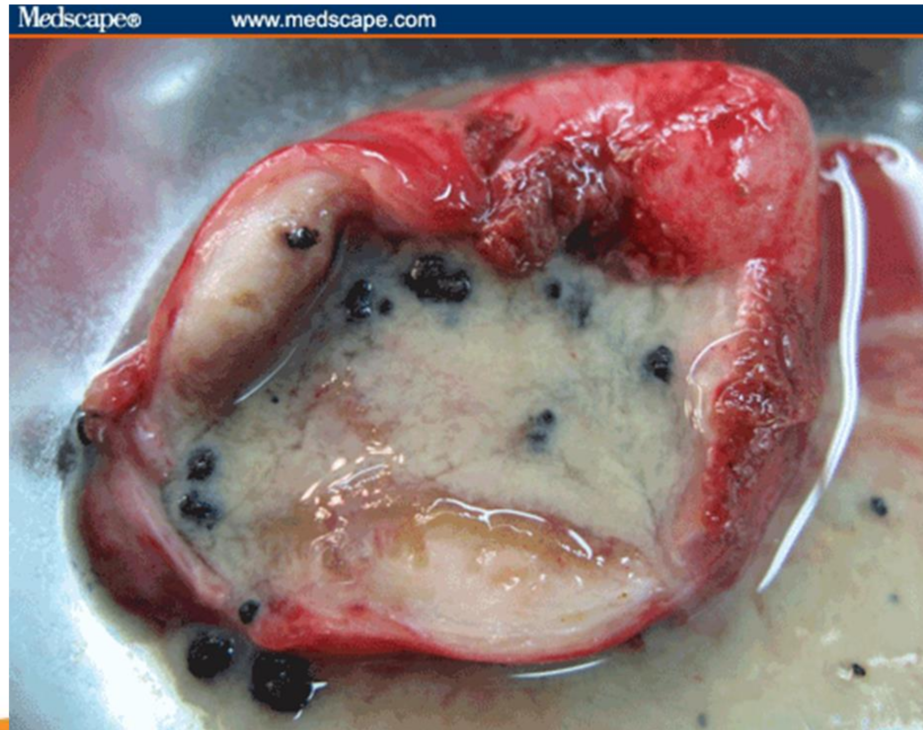
-No fever,no leucocytosis, normal LFTs

Surgical Management:

Laparoscopic cholecystectomy

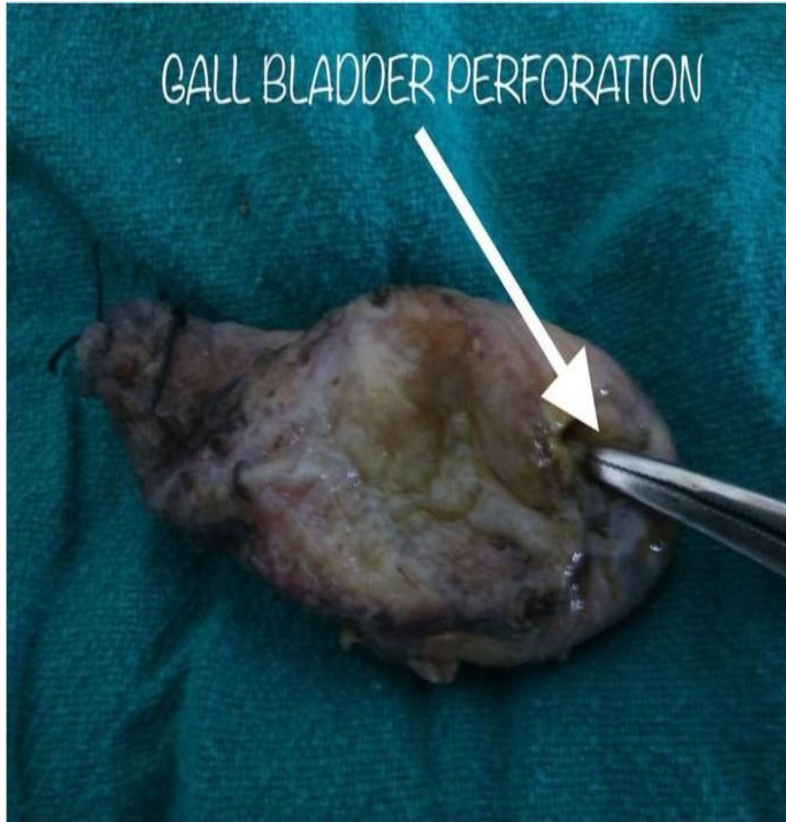
Empyema

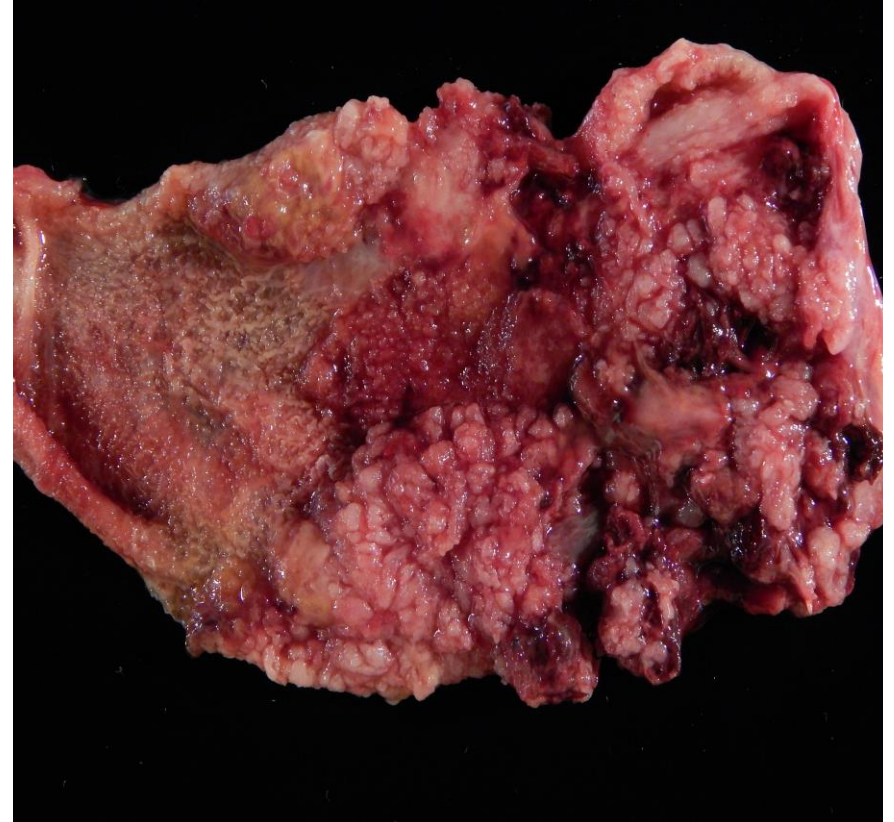
If pus accumulation occurs inside the GB, that is called empyema



Perforation

Carcinoma





THANK YOU!