GALLSTONE DISEASE

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NHS Foundation Trust

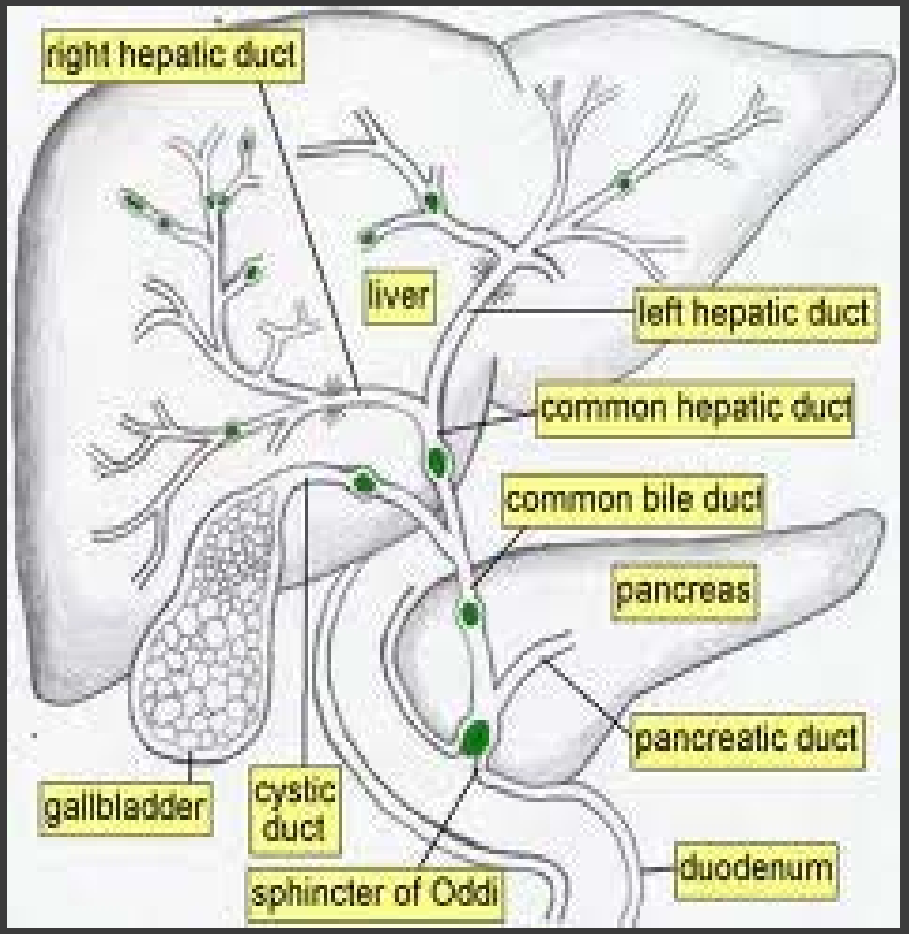
Objectives

- Anatomy of Biliary System
- Epidemiology
- Diagnosis
- Natural History of Gallstone Disease
- Complications

Asymptomatic stones
Biliary colic
Choledocholithiaisis

Acute cholecystitis
Cholangitis
Biliary pancreatitis
Rarities – Gallbladder Fistula
Mirizzi's Syndrome
Porcelain Gallbladder

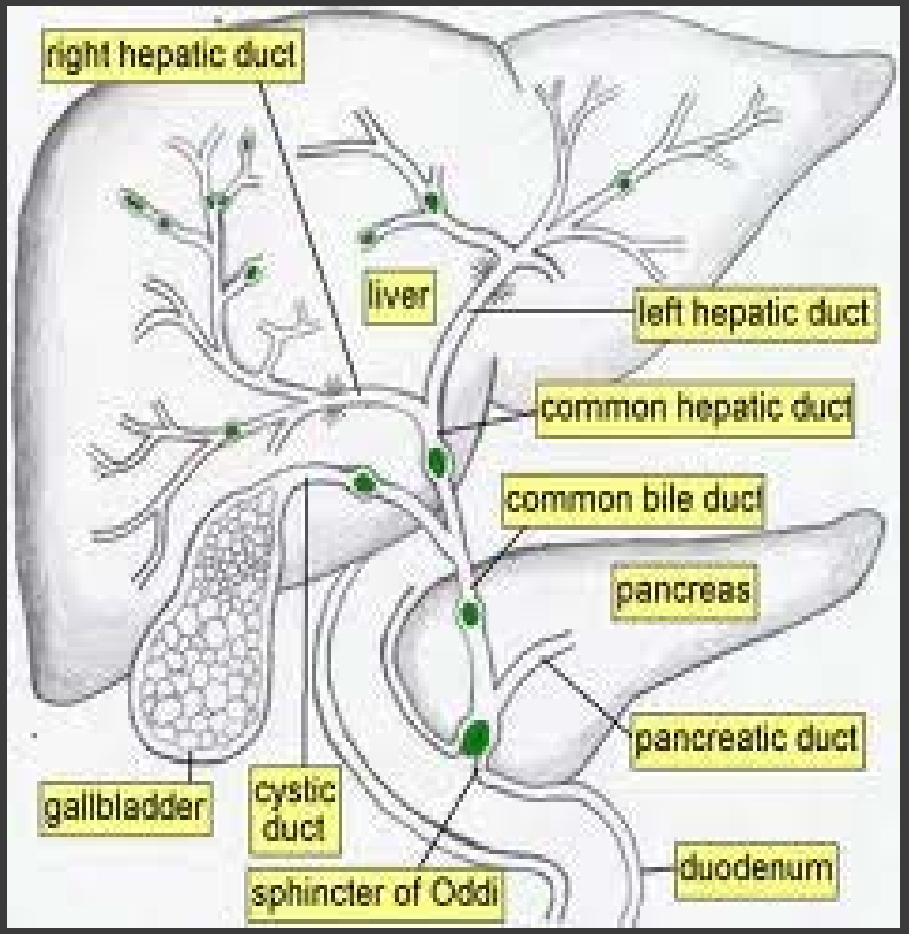
Anatomy of biliary system



Intra-hepatic bile ducts

- BILE CANALICULUS
- INTERLOBULAR BILE DUCTS
- LEFT AND RIGHT HEPATIC BILE DUCTS
- CONFLUENCE OF DUCTS

Anatomy of biliary system

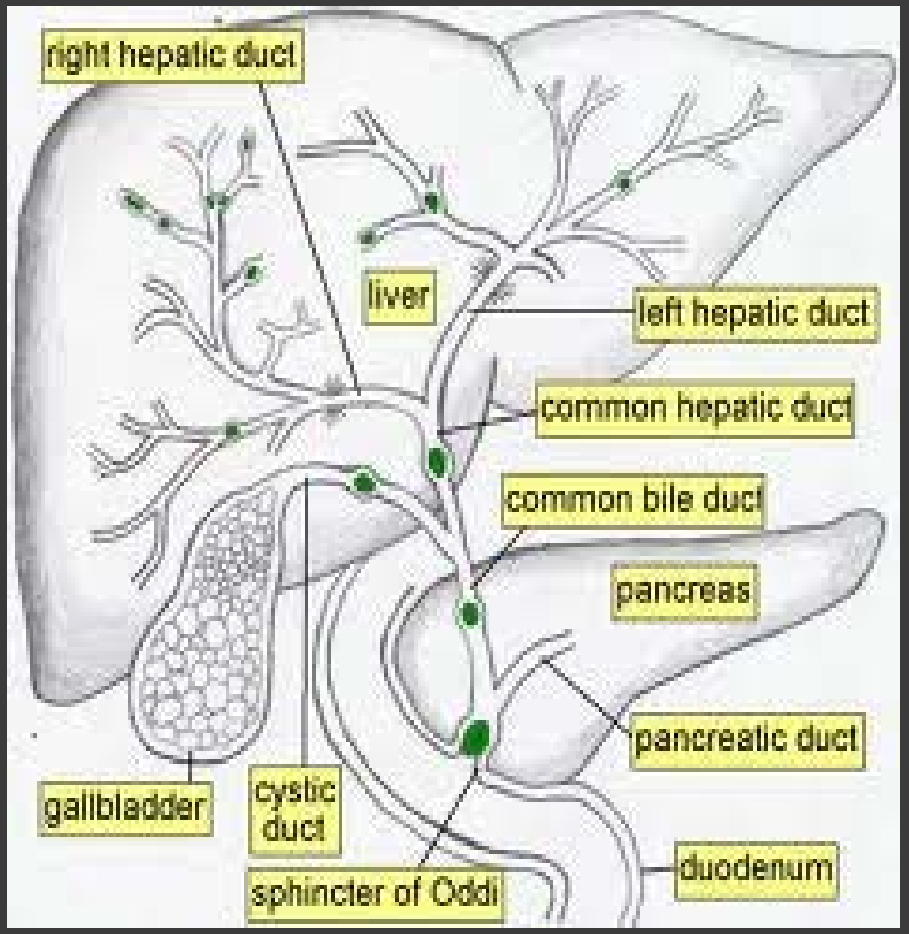


Extra-hepatic bile ducts

- **COMMON HEPATIC DUCT**
  - 3cm in length
  - Diameter < 7mm in <60yrs
    <10mm in >60yrs

- **CYSTIC DUCT**
  - Joins CHD directly in 70%
  - Anatomical variations
    - medial side CHD
    - alongside CBD, low insertion
    - right hepatic duct in 5%

Anatomy of biliary system



Intra-hepatic bile ducts

- **COMMON BILE DUCT**

- 7cm long
- Normal diameter:
  - 4mm at age 40
  - Increases 1mm/decade
  - 5mm at age 50
  - 6mm age 60 etc
- Increases post c-cystectomy
- >8.5mm in elderly with GB
  >10mm in elderly without GB..
  .. probably abnormal

Anatomy of biliary system

Gallbladder

i. Fundus
ii. Body
iii. Hartmann's pouch
iv. Neck
v. Cystic duct

Gallstone Disease

Epidemiology and Risk Factors

- 10% general population
- Increases with age:
  - Cholesterol secretion increases with age
  - Bile acid formation decreases with age
- Female sex:
  - 2 -3 fold higher in women
  - Women older than 50, 25-30% prevalence

Gallstone Disease

Epidemiology and Risk Factors

- Obesity
- Weight loss:
  - 25% of obese who undergo strict weight loss diet develop gallstones
  - 50% of those undergoing gastric bypass develop bililary sludge within 6 months
- TPN: 45% adults on TPN by 3/12
- Diet and Lipid profile
  - Raised triglycerides but not serum cholesterol
  - Dietary cholesterol inversely related to presence of gallstones

Gallstone Disease

Epidemiology and Risk Factors

- Pregnancy
  - Increased cholesterol secretion and g-b stasis
  - Sludge develops in 30%, stones in 2% during pregnancy
- Drugs
  - OCP. Premarin doubles risk
  - Clofibrate, Octreotide, Ceftriaxone
- Systemic disease
  - Type II Diabetes
  - TI Crohn's disease
  - Spinal cord injury (? mechanism)

Gallstone Disease

Types of Stone

- Cholesterol stones
  - 70-80% of stones
  - Pure or mixed (i.e. > 50% cholesterol)
  - Mixed stones tend to be multiple
- Black pigment stones
  - 10-25%
  - Calcium bilirubinate
  - Commoner in cirrhosis and chronic haemolytic states
- Brown pigment stones
  - Minority
  - Calcium salts of unconjugated bilirubin + cholesterol
  - Commoner in infection

Diagnosis of Gallstones

Ultrasound

Diagnosis of Gallstones

Ultrasound

- BUT poor for CBD stones
  - Overlying bowel gas 2nd part duodenum
  - 50% CBD stones can be missed
  - Stone inferred from dilated CBD? Only 75% sensitivity

Diagnosis of Gallstones

MRCP

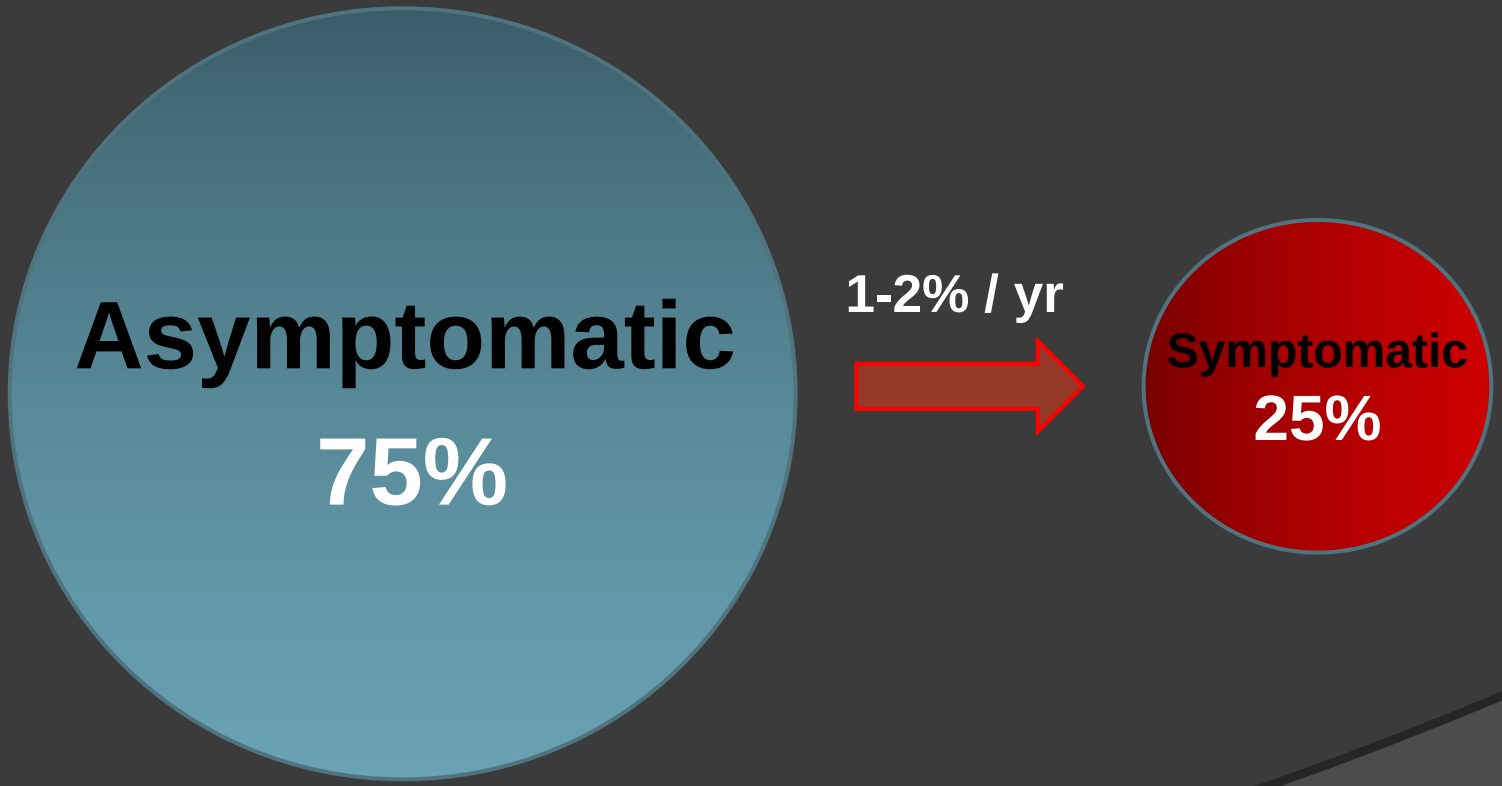
- 93% sensitivity vs. ERCP for CBD stones
- Used pre-cholecystectomy in low risk for CBD stones.

Diagnosis of Gallstones

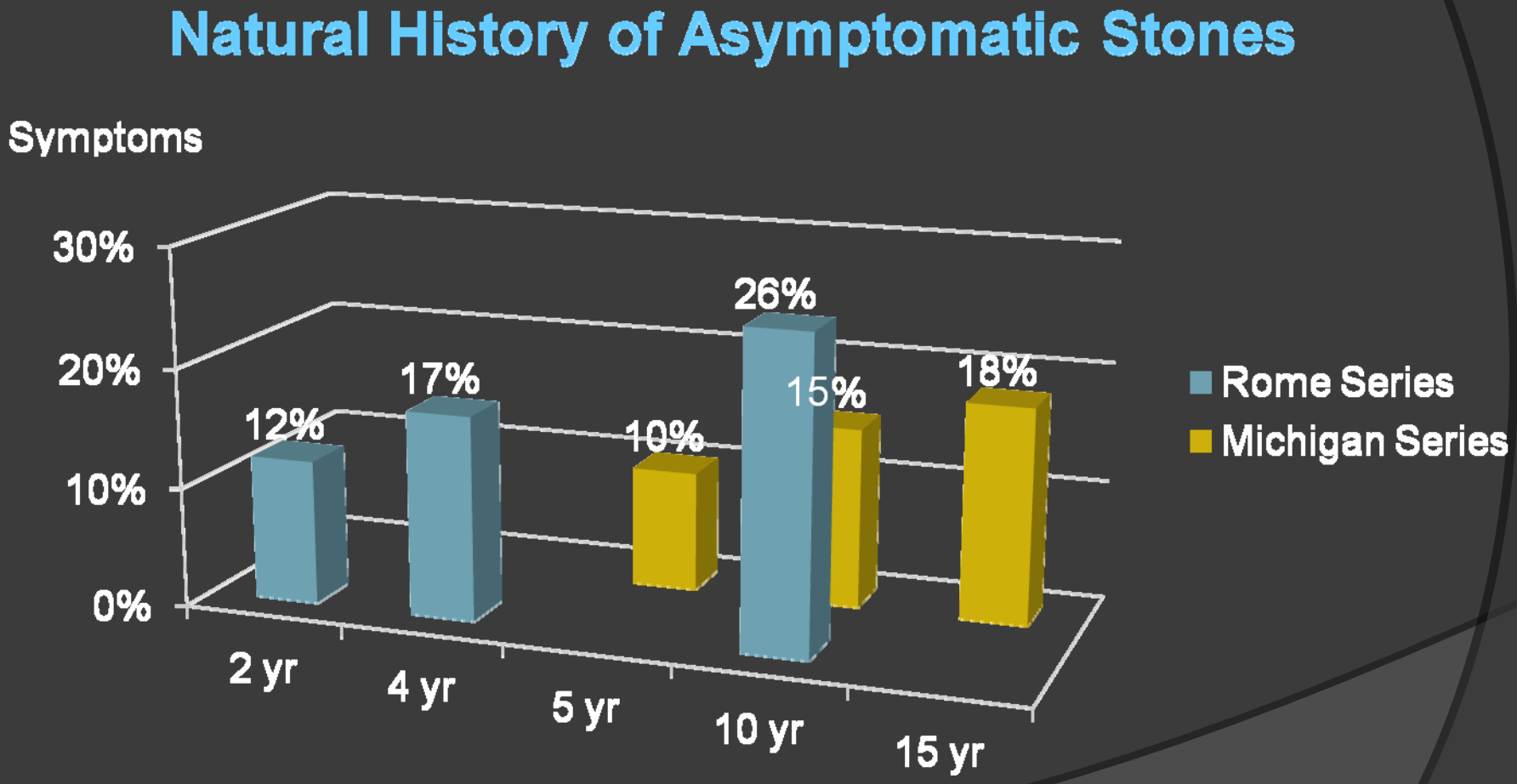
ERCP

- Gold standard test – sensitivity for CBD stones 95%
- Significant risks – pancreatitis in 3-4%
- Only when definite or high probability of stones when intervention likely. No longer a diagnostic test

Natural History of Gallstone Disease



Natural History of Gallstone Disease

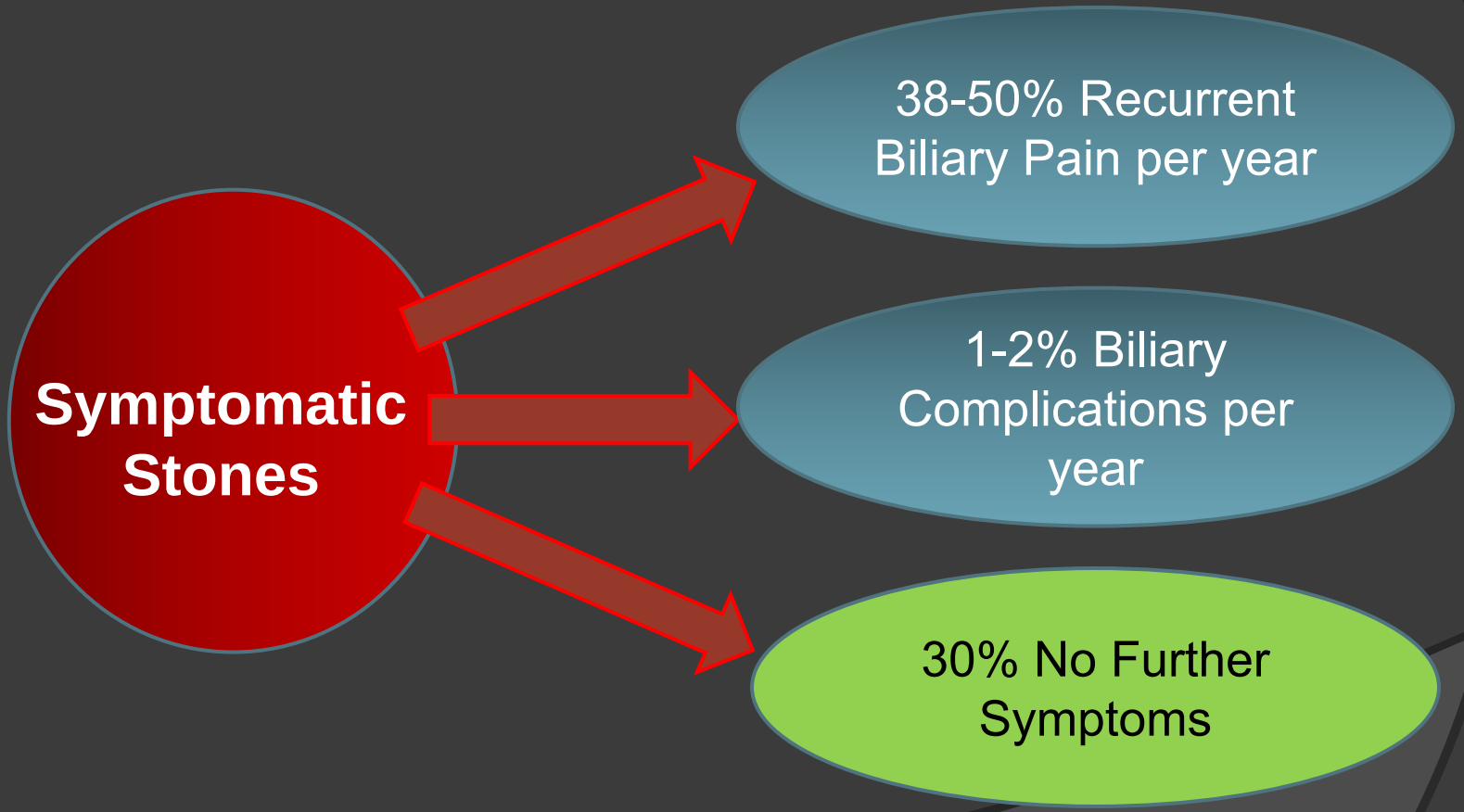


Natural History of Gallstone Disease

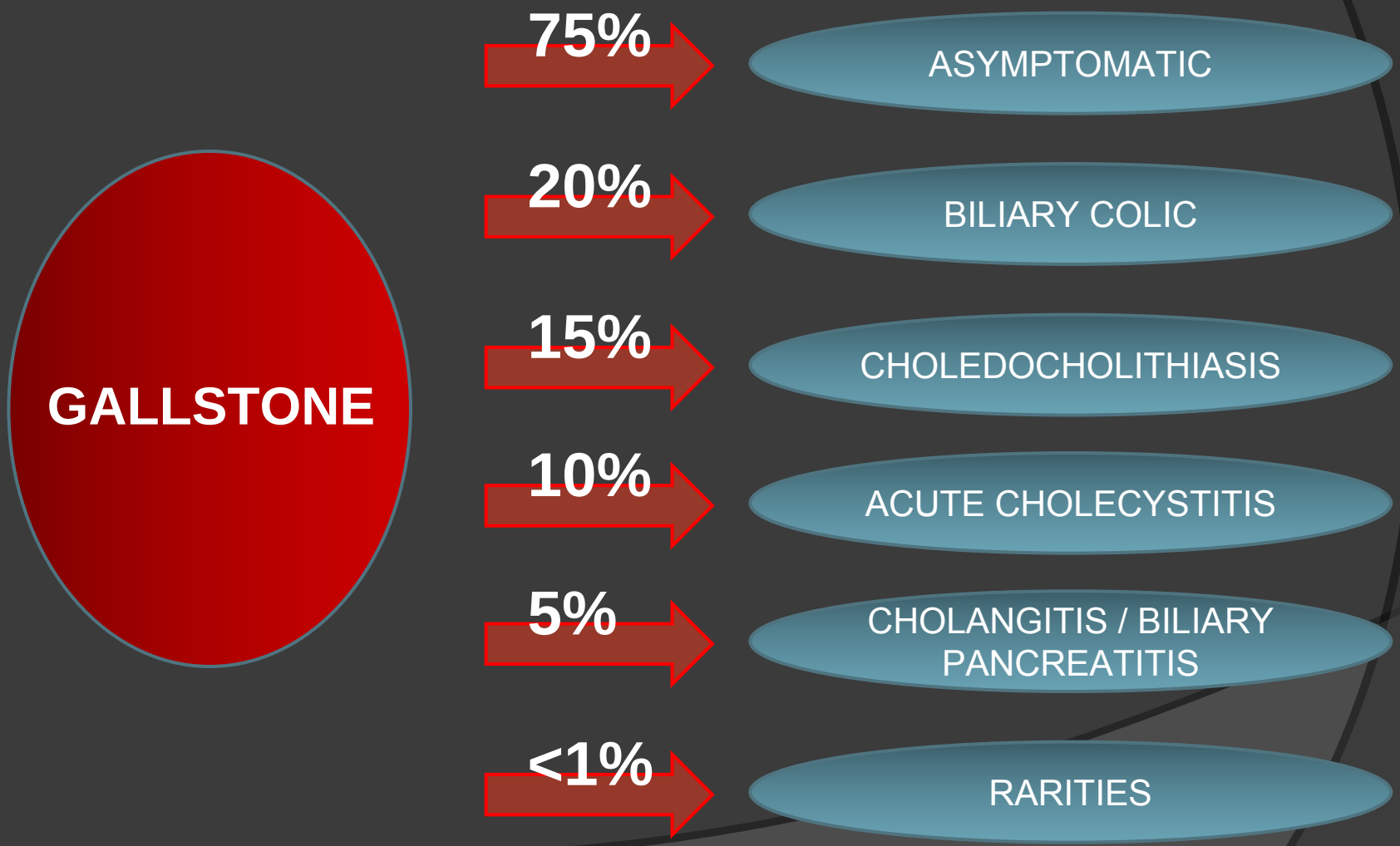
Surgery in Asymptomatic Stones?

- Previous studies suggest prophylactic removal in asymptomatic individuals not warranted
- Except?
  - Sickle patient with cholelithiasis
  - Young woman of American Indian ancestry
  - Patient with gallbladder wall calcification ('Porcelain Gallbladder')
  - Patient with cholelithiasis planning a prolonged and extremely remote trip (e.g. Space Travel)

Natural History of Gallstone Disease



Natural History of Gallstone Disease



Natural History of Gallstone Disease

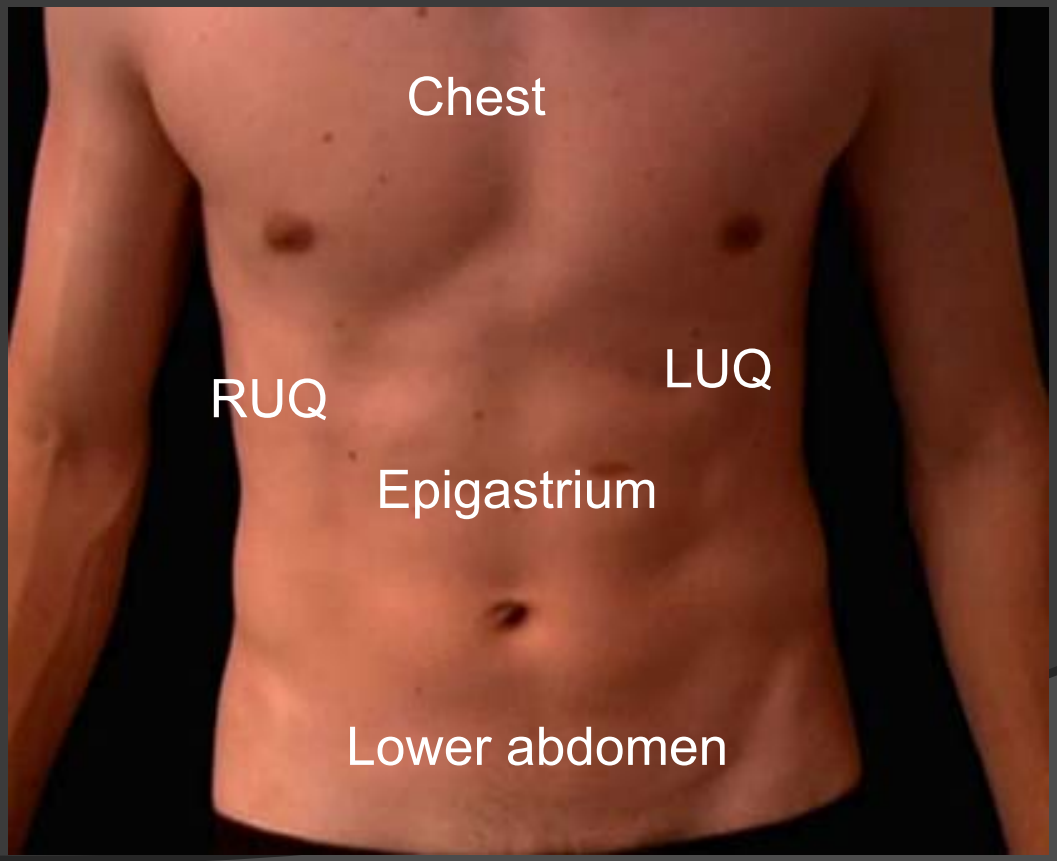
Biliary Colic

20%

- Usually the first gallstone symptom
- Caused by stones / sludge lodging in GB outlet/cystic duct, increasing pressure in GB
- Pain builds to a plateau over 15min-1hr then subsides over several hours.
- Associated nausea/vomiting
- Unrelated to eating in significant proportion

Natural History of Gallstone Disease

Biliary Colic – non-specific presentation



Natural History of Gallstone Disease

Biliary Colic

Symptoms

- May radiate to back / R shoulder tip
- If > 6hrs – suspect developing cholecystitis
- Often not severe, and overlooked as ‘indigestion’

Natural History of Gallstone Disease

Biliary Colic

Often misdiagnosed

- In 2481 patients post cholecystectomy, 27% had persisting symptoms at 6 months[1]
  - Gas bloating in 40%
  - Vomiting, in 6%
  - Dyspepsia
  - Concluded that these symptoms less commonly biliary and most likely to persist post cholecystectomy

[1]Weinert et al, Arch Int Med 2000

Natural History of Gallstone Disease

Biliary Colic

Often misdiagnosed

- In 92 patients with symptomatic gallstones, pain continued in 30 post cholecystectomy[1,2]
  - Classic biliary colic with radiating pain / use of analgesics
  - fatty food intolerance
  - thickened GB pre-op

  ..indicative of painfree outcome

[1]Gui et al, Ann R Coll Surg 1998
[2]Berger et al, Scand J Gastroenterol 2000

Natural History of Gallstone Disease

Choledocholithiasis

15%

- 15% of patients with GB stones have CBD stones
- Can pass from GB or form de novo
- Stones in CBD may stay asymptomatic for years
- BUT when complications occur, tend to be serious i.e. pancreatitis / cholangitis

Natural History of Gallstone Disease

Choledocholithiasis

Investigations

- Jaundice – typically bilirubin 40-50mg/L, rarely > 120mg/L
- Deep painless jaundice in presence of palpable gallbladder likely malignant (Courvoisier's Law)
- ↑ ALP, Bili. Often transient ALT or amylase spike

Natural History of Gallstone Disease

Choledocholithiasis

Treatment

- High risk of complications - intervention required in almost all
- ERCP mainstay
  - Subsequent cholecystectomy
  - High risk patients ERCP + sphincterotomy only?
    - only 10% need subsequent c-cystectomy
- Can be removed at time of open/lap cholecystectomy

Complications of Gallstone Disease

Acute Cholecystitis

10%

- Most common complication of Gallstone disease
- Inflammation of gallbladder wall
- In 90%, 2° chronic obstruction by gallstone stone in cystic duct, GB neck or Hartmann's pouch often with secondary infection with enteric bacteria
- In 10%, occurs in absence of gallstones (Acalculous cholecystitis)
  - Bile stasis in critically ill/shocked – ischaemic and chemical injury to GB, with secondary bacterial infection
  - More common in elderly men
  - High morbidity / mortality

Complications of Gallstone Disease

Acute Cholecystitis

Symptoms

- Pain, RUQ tenderness, fever and leucocytosis
- Biliary pain lasting >6hrs makes colic less likely
- Nausea and vomiting common
- Fever <39°C unless gangrene / perforation
- Mild jaundice in 20%, usually <40mg/L
- >40mg/L – Mirizzi's syndrome or CBD stones
- o/e RUQ tenderness (Murphy's sign)
  Palpable GB in 1/3 in early attacks

Complications of Gallstone Disease

Acute Cholecystitis

Natural history

- Untreated, 83% resolve spontaneously in 7-10 days
- 7% gangrenous cholecystitis
- 6% gallbladder empyema
- 3% perforation of gallbladder
- 1% emphysematous cholecystitis

Complications of Gallstone Disease

Acute Cholecystitis

Treatment

- Patients should be hospitalised
- i.v. fluids if hypovolaemic
- Broad spectrum antibiotics
- Cholecystectomy after acute episodes settled unless complication develops

Complications of Gallstone Disease

Cholangitis

Causes

3%

- Highest mortality rate of all gallstone complications
- 85% 2° gallstone obstruction CBD
- Other causes: neoplasms, biliary strictures, parasitic infections, congenital abnormalities
- Most commonly Gram negative bacteria e.g. E.Coli, Klebsiella and Pseudomonas

Complications of Gallstone Disease

Cholangitis

Symptoms

- Charcot's triad: Fever (95%)
  Jaundice (90%)
  RUQ pain (80%)
- Elderly may present with only confusion, hypotension and delirium – often indicated Gram –ve sepsis

Complications of Gallstone Disease

Cholangitis

Treatment

- Hospitalisation
- Broad spectrum antibiotics to cover Gram negatives
- Clinical improvement in 6-12 hours
- ERCP on next available list
- Deterioration – urgent decompression via ERCP or PTC

Complications of Gallstone Disease

Acute Biliary Pancreatitis

3%

- 40% of all pancreatitis
- 3-7% of patients with gallstones have pancreatitis
- Risk is greater in ♂ (RR 14-35) vs. ♀ (RR 12-25)
- More likely when stones are <5mm (RR 4-5)
- Sludge / microlithiasis may also cause pancreatitis

Complications of Gallstone Disease

Acute Biliary Pancreatitis

- Management – supportive care as for AP of any indication BUT
- Urgent ERCP in severe pancreatitis with evidence of CBD stones +/- sepsis

Complications of Gallstone Disease

Acute Biliary Pancreatitis

- Cholecystectomy indicated after first attack
  - 25-30% risk of AP, cholecystitis or cholangitis within 6-18 weeks
- Cholecystectomy ideally before patient discharged
  - Safe at around 7 days after mild pancreatitis
  - Delay to around 3 weeks after severe pancreatitis

Complications of Gallstone Disease

Rarities: Cholecystoenteric Fistula

- Rare outcome of Gallstone Disease, <0.1%
- Gallstone erodes through GB wall (usually neck) into bowel
- Symptoms similar to acute cholecystitis
- Cholangitis rare as biliary system is decompressed

Complications of Gallstone Disease

Rarities: Cholecystoenteric Fistula

pneumobilia

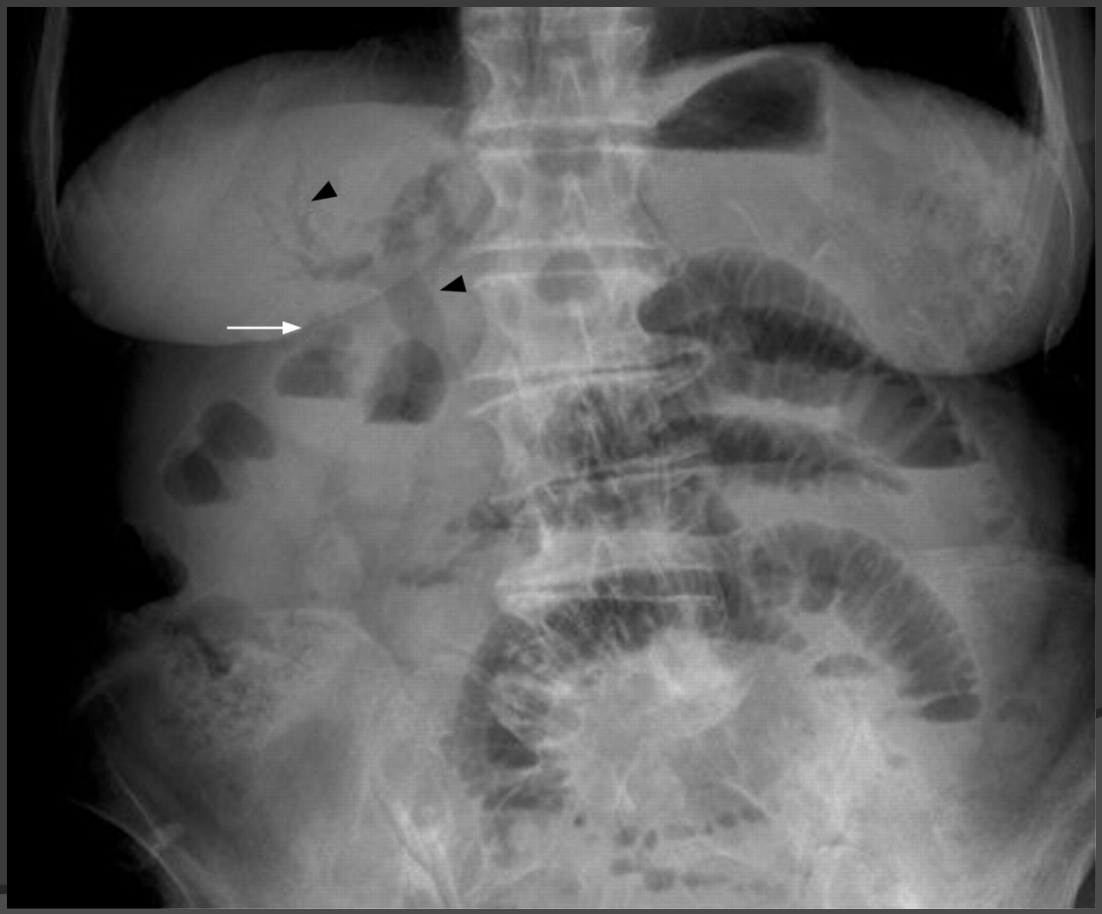
Complications of Gallstone Disease

Rarities: Cholecystoenteric Fistula

- Stone >25mm, may cause small bowel obstruction – ‘Gallstone Ileus’

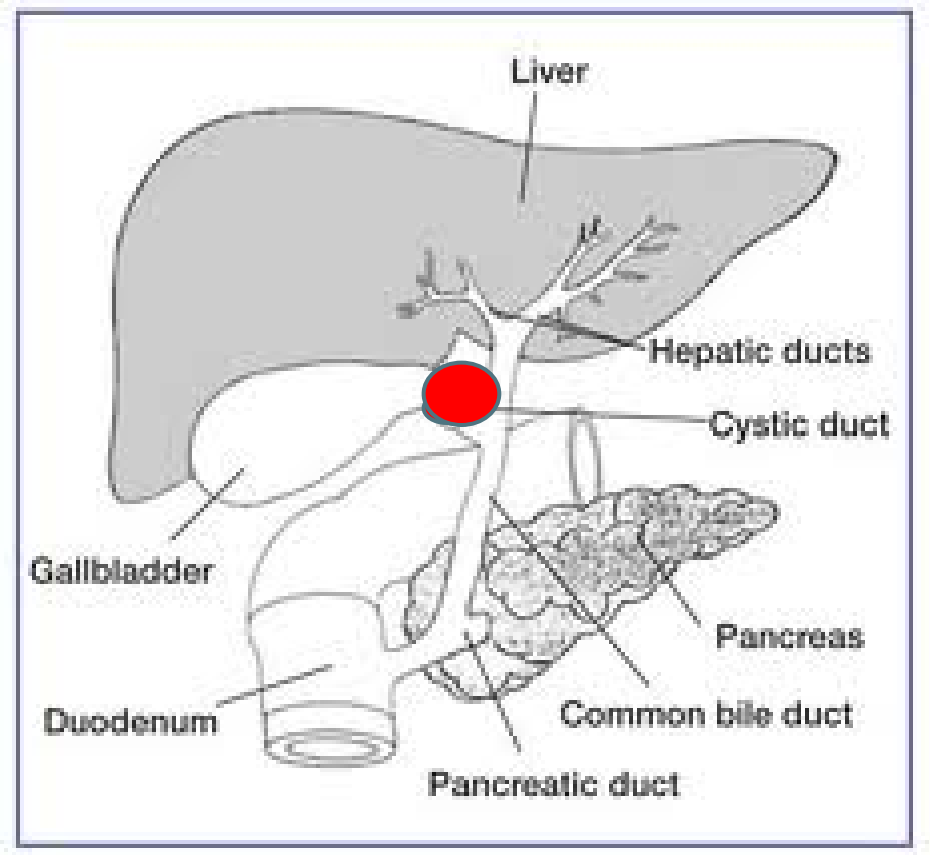
Complications of Gallstone Disease

Cholecystoenteric Fistula and Gallstone Ileus



Complications of Gallstone Disease

Rarities: Mirizzi's Syndrome



Gallstone Disease - Rarities

Rarities: Mirizzi's Syndrome

Gallstone Disease - Rarities

Rarities: Porcelain Gallbladder

Summary

- Gallstones very common, mostly benign and asymptomatic **DO NOT NEED REFERRAL**
- SYMPTOMATIC gallstones are significant as it heralds further symptoms in most and the potential for significant complications in some – should not be ignored **REFER!**
- Other abdominal symptoms often misdiagnosed as biliary in origin and vica versa
- Biliary complications can be life threatening

Thank you!