

Biliary Tract Disease

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Differential Diagnosis of RUQ pain

- ▶ Gallstone disease (and its related complications)
- ▶ Gastritis/duodenitis
- ▶ Peptic ulcer disease/perforated peptic ulcer
- ▶ Acute pancreatitis
- ▶ Right lower lobe pneumonia
- ▶ MI

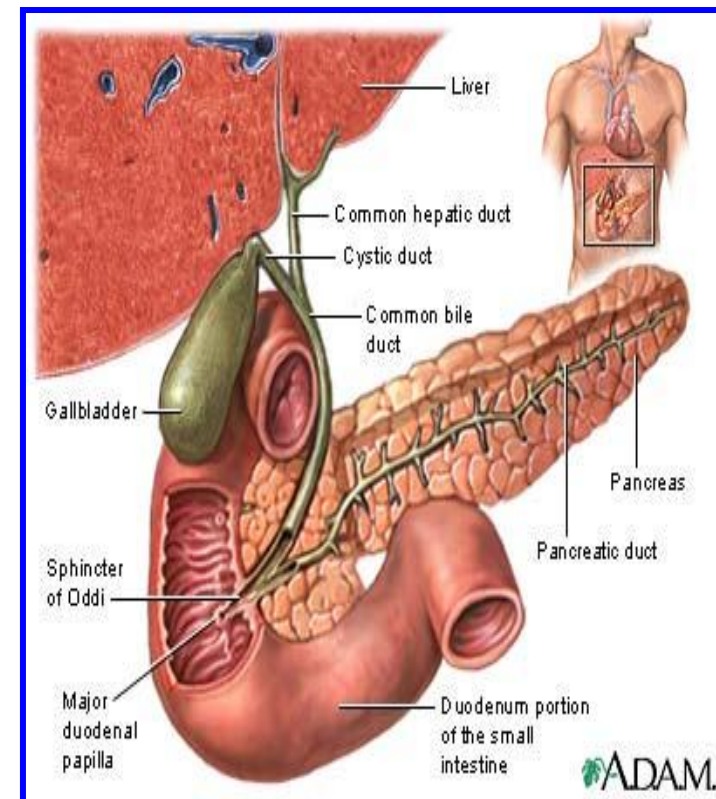
- ▶ If presenting with RUQ pain all patients should get
 - Blood tests
 - Obstruction series [CXR (to exclude perforation/pneumonia)Abdominal X-ray supine ,upwright
 - ECG

Biliary Tract

Part of the digestive system.

Consists of:

- ▶ Intra hepatic ducts
- ▶ Extra hepatic ducts
- ▶ Gallbladder
- ▶ Common Bile Duct

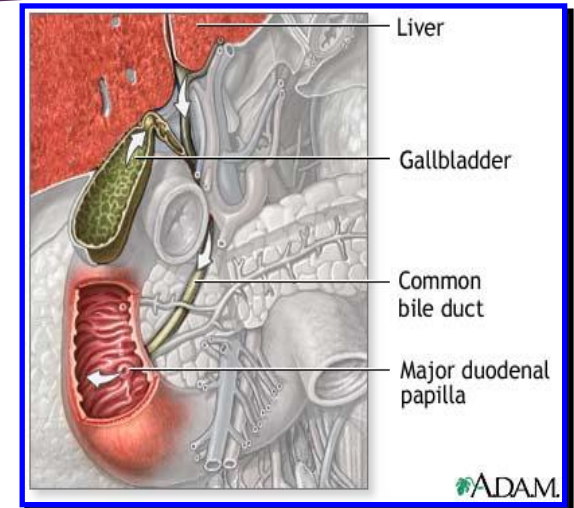


The Gallbladder

The gallbladder concentrates and stores bile.

Bile:

- ▶ Secreted by the liver
- ▶ Contains cholesterol, bile pigments and phospholipids
- ▶ Flows from the liver, through the hepatic ducts, into the gallbladder.
- ▶ Exits the gallbladder via the cystic duct.
- ▶ Flows from the cystic duct into the common bile duct, into the small intestine
- ▶ In the small intestine, aids digestion by breaking down fatty foods and fat-soluble vitamins



Pathogenesis

- ▶ Composition of bile:
 - ▶ Bilirubin (by-product of haem degradation)
 - ▶ Cholesterol (kept soluble by bile salts and lecithin)
 - ▶ Bile salts/acids (cholic acid/chenodeoxycholic acid): mostly reabsorbed in terminal ileum(entero-hepatic circulation).
 - ▶ Lecithin (increases solubility of cholesterol)
 - ▶ Inorganic salts (sodium bicarbonate to keep bile alkaline to neutralise gastric acid in duodenum)
 - ▶ Water (makes up 97% of bile)

Gallstones – Pathophysiology

- ▶ Cholesterol, ordinarily insoluble in water, comes into solution by forming vesicles with phospholipids
- ▶ If ratio of cholesterol, phospholipids, and bile salts altered, cholesterol crystals may form
- ▶ Gallstone formation involves a variety of factors:
 - ▶ Cholesterol supersaturation
 - ▶ Mucin hypersecretion by the gallbladder mucosa creates a viscoelastic gel that fosters nucleation.
 - ▶ Bile stasis
 - ▶ Occurs in diabetes, pregnancy, oral contraceptive use, and prolonged fasting in critically ill patients on total parenteral nutrition.

Gallstones

▶ Types of gallstone

- ▶ Cholesterol stones (20%)
- ▶ Pigment stones (5%)
- ▶ Mixed (75%)

▶ Epidemiology

- ▶ Fat, Fair, Female, Fertile, Forty inaccurate, but reminder of the typical patient
- ▶ F:M = 2:1
- ▶ Genetic predisposition – ask about family history



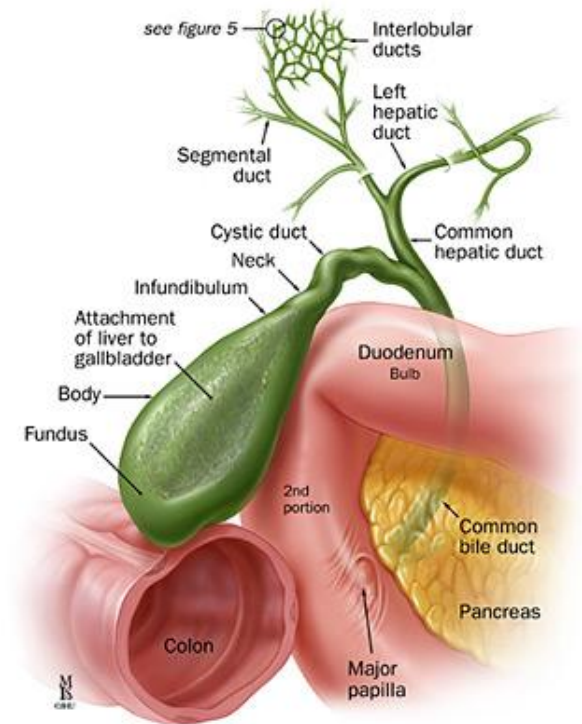
Gallstones – Types

- ▶ Two main types:
 - ▶ Cholesterol stones (85%):
 - ▶ 2 subtypes—pure (90-100% cholesterol) or mixed (50-90% cholesterol).
 - ▶ Pure stones often are solitary, whitish, and larger than 2.5 cm in diameter.
 - ▶ Mixed stones usually are smaller, multiple in number, and occur in various shapes and colors.
 - ▶ Pigment stones (15%) occur in 2 subtypes—brown and black.
 - ▶ Brown stones are made up of calcium bilirubinate and calcium-soaps. Bacteria involved in formation via secretion of beta glucuronidase and phospholipase
 - ▶ Black stones result when excess bilirubin enters the bile and polymerizes into calcium bilirubinate (patients with chronic hemolysis)



Complications of Gallstones

- ▶ Biliary Colic
- ▶ Acute Cholecystitis
 - ▶ Gallbladder Empyema
 - ▶ Gallbladder gangrene
 - ▶ Gallbladder perforation
- ▶ Obstructive Jaundice
- ▶ Ascending Cholangitis
- ▶ Pancreatitis
- ▶ Gallstone Ileus (rare)



Gallstones – Natural History

- ▶ 80% of patients, gallstones are clinically silent.
- ▶ 20% of patients develop symptoms over 15-20 years
- ▶ About 1% per year.
- ▶ Almost all become symptomatic before complications develop.
- ▶ Biliary-type pain due to obstruction of the bile duct lumen.
- ▶ Predictive value of other complaints (eg, intolerance to fatty food, indigestion) too low to be clinically helpful.



Gallstones – Diverse symptoms

- ▶ Abdominal pain
 - ▶ Aching or tightness, typically severe and located in the epigastrium
 - ▶ May develop suddenly, last for 15 minutes to several hours, and then resolve suddenly
- ▶ Referred pain – posterior scapula or right shoulder area
- ▶ Nausea and vomiting
- ▶ Jaundice
- ▶ Pruritus:
 - ▶ Itching, typically worse at night.
- ▶ Fatigue
- ▶ Weight loss
- ▶ Miscellaneous:
 - ▶ Fatty food intolerance
 - ▶ Gas
 - ▶ Bloating
 - ▶ Dyspepsia

Complications of Gallstones

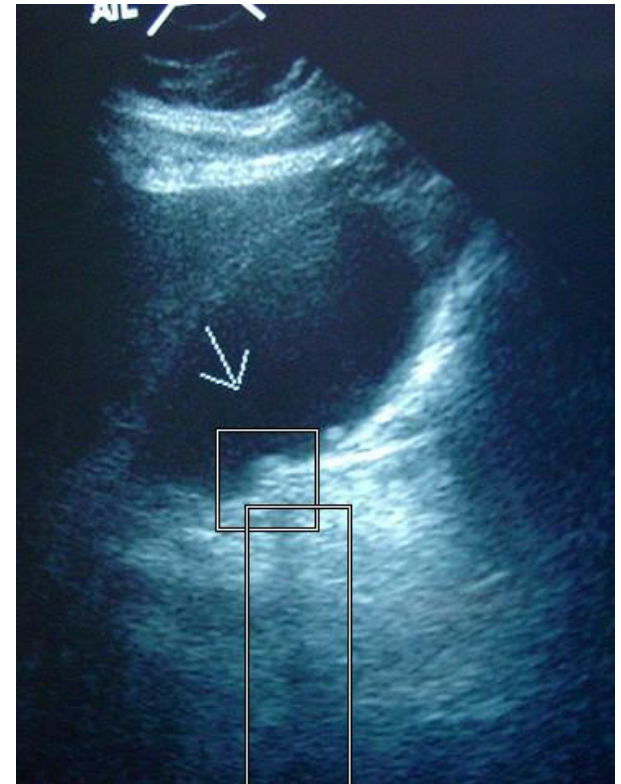
- ▶ In the gallbladder
 - ▶ Biliary colic
 - ▶ Acute and chronic cholecystitis
 - ▶ Empyema
 - ▶ Mucocoele
 - ▶ Carcinoma
- ▶ In the bile ducts
 - ▶ Obstructive jaundice
 - ▶ Pancreatitis
 - ▶ Cholangitis
- ▶ In the Gut
 - ▶ Gallstone ileus

Which Gallstone Complication?

- ▶ Can differentiate between gallstone complications based on:
 - ▶ History
 - ▶ Examination
 - ▶ Blood tests
 - ▶ FBC
 - ▶ LFT
 - ▶ CRP
 - ▶ Clotting
 - ▶ **Amylase**

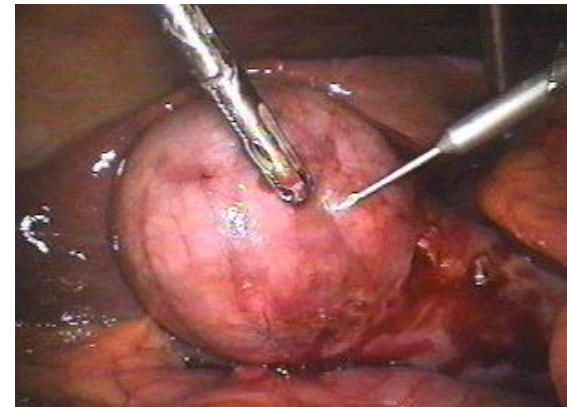
Biliary Colic

- ▶ Symptoms
 - ▶ Right upper quadrant pain
- ▶ Signs
 - ▶ Usually none
- ▶ Investigations
 - ▶ CBC, U/A, LFT, Amylase,
 - ▶ Ultrasound of abdomen
 - ▶ OGD (Oesophagogastroduodenoscopy)
- ▶ Treatment
 - ▶ Analgesia
 - ▶ Cholecystectomy



Acute Calculous Cholecystitis

- ▶ Inflammation of the gallbladder that develops in the setting of an obstructed cystic duct.
- ▶ Most patients have complete remission within 1-4 days.
- ▶ 25-30% of patients either require surgery or develop some complication.
- ▶ Perforation occurs in 10-15% of cases.



Acute Calculous Cholecystitis

- ▶ Symptoms
 - ▶ Right upper quadrant pain – continuous, longer duration
- ▶ Signs
 - ▶ Fever, Local peritonism.
 - ▶ Murphy's sign
- ▶ Investigations
 - ▶ CBC, U/A, LFT, Amylase,
 - ▶ Ultrasound of RUQ
 - ▶ Thickened gallbladder wall, pericholecystic fluid and stones
 - ▶ OGD (Oesophagogastroduodenoscopy)
- ▶ Treatment
 - ▶ NPO
 - ▶ Analgesia
 - ▶ Intravenous antibiotics
 - ▶ Cholecystectomy

Empyema / Mucocoele

- ▶ Empyema refers to a gallbladder filled with pus due to acute cholecystitis.
- ▶ Mucocele refers to an overdistended gallbladder filled with mucoid or clear and watery content.



Empyema / Mucocoele

▶ Symptoms

- ▶ Right upper quadrant pain – continuous, longer duration

▶ Signs

- ▶ Fever, Local peritonism.
- ▶ Murphy's sign

▶ Investigations

- ▶ CBC,U/A, LFT, Amylase, Ultrasound of abdomen
- ▶ Thickened gallbladder wall, distended gallbladder, pericholecystic fluid, stones

▶ Treatment

- ▶ NPO
- ▶ Analgesia
- ▶ Intravenous antibiotics
- ▶ Cholecystectomy



Obstructive Jaundice

Pathogenesis:

- ▶ Stone obstructing CBD (bear in mind there are other causes for obstructive jaundice) – danger is progression to ascending cholangitis.
- ▶ USS
 - ▶ Will confirm gallstones in the gallbladder
 - ▶ CBD dilatation i.e. >8mm (not always!)
 - ▶ May visualise stone in CBD (most often does not)
- ▶ MRCP
 - ▶ In cases where suspect stone in CBD but USS indeterminate

Treatment

- ▶ Must unobstruct biliary tree with ERCP to prevent progression to ascending cholangitis.
- ▶ Whilst awaiting ERCP monitor for signs of sepsis suggestive of cholangitis.
- ▶ Surgical unobstruction (dilated CBD)

Obstructive Jaundice

- ▶ Blockage of the biliary tree by gallstones
- ▶ Symptoms
 - ▶ Pain, Jaundice, dark urine, acolic stools
- ▶ Signs
 - ▶ Jaundice.
- ▶ Investigations
 - ▶ CBC, U/A, LFT, Amylase, Hepatitis screen, Coagulation screen
 - ▶ Ultrasound of abdomen
 - ▶ MRCP
- ▶ Treatment Drainage of the biliary tree
 - ▶ ERCP
 - ▶ T-Tube or choleducenteric anastomosis
 - ▶ PTC



Ascending Cholangitis

- ▶ Stone obstructing CBD with infection/pus proximal to the blockage
- ▶ Symptoms
 - ▶ Charcot triad (ie, fever, right upper quadrant pain, jaundice) occurs in about 50% of cases
- ▶ Signs
 - ▶ Sepsis (Fever, tachycardia, low BP), Jaundice.
- ▶ Investigations
 - ▶ CBC,U/A, LFT, Amylase, Coagulation screen,Hepatitis screen test
 - ▶ Ultrasound of abdomen
- ▶ Treatment
 - ▶ Intravenous antibiotics,resuscitation
 - ▶ Drainage of biliary tract Pus must be drained* - this is done by decompressing the biliary tree
 - ▶ ERCP
 - ▶ T-TUBE
 - ▶ PTC

Acute Pancreatitis

- ▶ Acute inflammation of pancreas and other retroperitoneal tissues.
- ▶ Symptoms
 - ▶ Severe central abdominal pain radiating to back, vomiting
- ▶ Signs
 - ▶ Variable – None to Sepsis (Fever, tachycardia, low BP), Jaundice, acute abdomen
- ▶ Investigations
 - ▶ CBC,U/A,electrolytis, LFT, Amylase,
 - ▶ Ultrasound of abdomen
 - ▶ CT Pancreas
- ▶ Treatment
 - ▶ Supportive
 - ▶ Analgesia
 - ▶ **Fluid resuscitation**
 - ▶ Pancreatic rest

Acute Pancreatitis

- ▶ 95% settle with above conservative management
- ▶ 5% who do not settle or deteriorate need CT scan to look for pancreatic necrosis

Gallstone ileus

- ▶ Obstruction of the small bowel by a large gallstone
 - ▶ A stone ulcerates through the gallbladder into the duodenum and causes obstruction at the terminal ileum
- ▶ Treatment
 - ▶ Laparotomy (will not settle with conservative management) – enterotomy + removal of stone
- ▶ Diagnosis of gallstone ileus usually made at the time of surgery

Mirizzi Syndrome

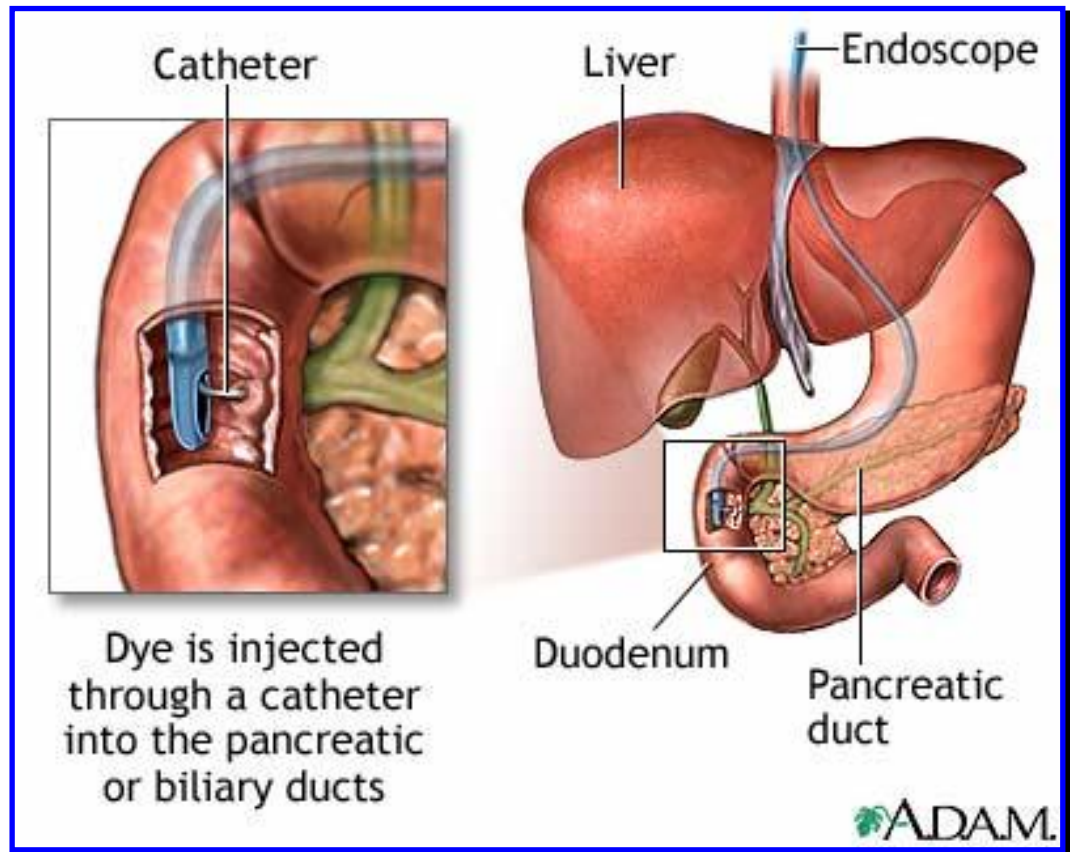
- ▶ Refers to common hepatic duct obstruction caused by an extrinsic compression from an impacted stone in the cystic duct
- ▶ Estimated to occur in 0.7-1.4% of all cholecystectomies
- ▶ Often not recognized preoperatively, which can lead to significant morbidity and biliary injury, particularly with laparoscopic surgery.

Acute Acalculous Cholecystitis

- ▶ Presence of an inflamed gallbladder in the absence of an obstructed cystic or common bile duct
- ▶ Typically occurs in the setting of a critically ill patient (eg, severe burns, multiple traumas, lengthy postoperative care, prolonged intensive care)
- ▶ Accounts for 5% of cholecystectomies
- ▶ Etiology is thought to have ischemic basis, and gangrenous gallbladder may result
- ▶ Increased rate of complications and mortality
- ▶ An uncommon subtype known as acute emphysematous cholecystitis generally is caused by infection with clostridial organisms and occlusion of the cystic artery associated with atherosclerotic vascular disease and, often, diabetes.

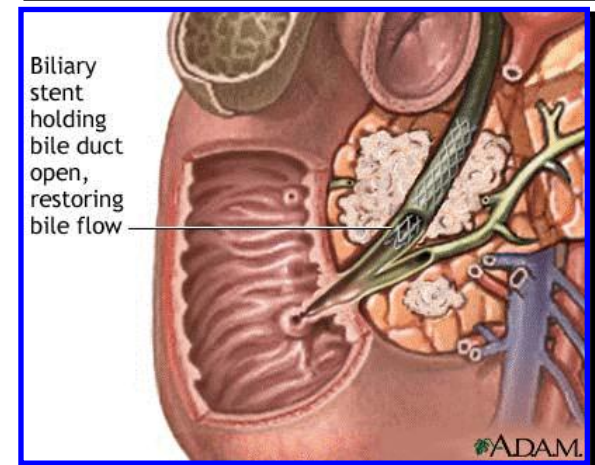
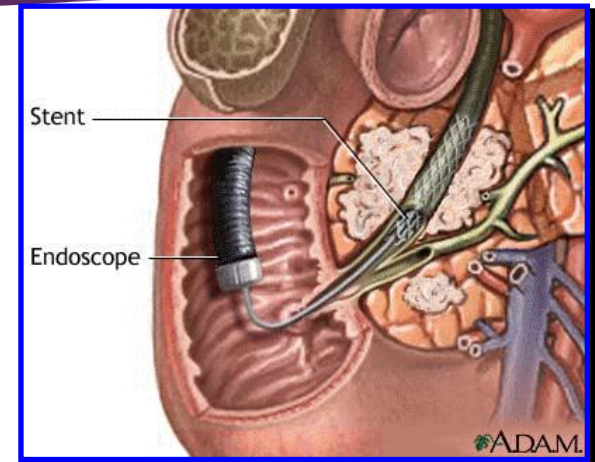
Stent Placement

The Endoscope is positioned in the duodenum at the opening of the bile duct.



Stent Placement

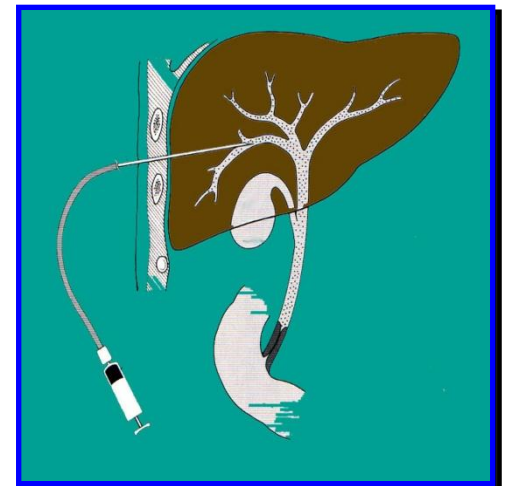
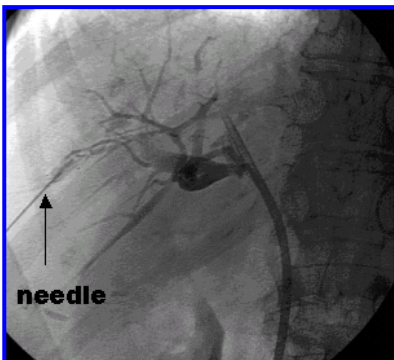
- ▶ A catheter is inserted through the endoscope into the ostium of the common bile duct .
- ▶ While maintaining the endoscope position in the duodenum, a wire is inserted through the catheter into the bile duct .
- ▶ The stent delivery system is then inserted over the wire to the site of obstruction, where the stent is deployed .



PTC

For biliary stent placement using a percutaneous approach:

- ▶ A fine needle is inserted between the 4th and 5th rib on the patient's right side
- ▶ The puncture is through the liver
- ▶ The needle is inserted into an intrahepatic duct under image guidance.



Complication	History	Examination	Blood tests
Biliary Colic	- Intermittent RUQ/epigastric pain (minutes/hours) into back or right shoulder - N&V	-Tender RUQ -No peritonism -Murphy's – -Apyrexial, HR and BP (N)	-WCC (N) CRP (N) - LFT (N)
Acute Cholecystitis	-Constant RUQ pain into back or right shoulder -N&V -Feverish	-Tender RUQ -Periotnism RUQ (guarding/rebound) -Murphy's + -Pyrexia, HR (↑)	-WCC and CRP (↑) -LFT (N or mildly (↑))
Empyema	-Constant RUQ pain into back or right shoulder -N&V -Feverish	-Tender RUQ -Peritonism RUQ -Murphy's + -Pyrexia, HR (↑), BP (↔ or ↓) -More septic than acute cholecystitis	-WCC and CRP (↑) -LFT (N or mildly (↑))
Obstructive Jaundice	-Yellow discolouration -Pale stool, dark urine -painless or associated with mild RUQ pain	-Jaundiced -Non-tender or minimally tender RUQ -No peritonism -Murphy's – -Apyrexial, HR and BP (N)	-WCC and CRP (N) -LFT: obstructive pattern bili (↑), ALP (↑), GGT (↑), ALT/AST (↔) -INR (↔ or ↑)
Ascending Cholangitis	Becks triad -RUQ pain (constant) -Jaundice -Rigors	-Jaundiced -Tender RUQ -Peritonism RUQ -Spiking high pyrexia (38-39) -HR (↑), BP (↔ or ↓) -Can develop septic shock	-WCC and CRP (↑) -LFT : obstructive pattern bili (↑), ALP (↑), GGT (↑), ALT/AST (↔) -INR (↔ or ↑)
Acute Pancreatitis	-Severe upper abdominal pain (constant) into back -Profuse vomiting	-Tender upper abdomen -Upper abdominal or generalised peritonism -Usually apyrexial, HR (↑), BP (↔ or ↓)	-WCC and CRP (↑) -LFT: (N) if passed stone or obstructive pattern ifstone still in CBD -Amylase (↑) -INR/APTT (N) or (↑) if DIC
Gallstone Ileus	- 4 cardinal features of SBO	-distended tympanic abdomen -hyperactive/tinkling bowel sounds	

Imagings for gallstone disease

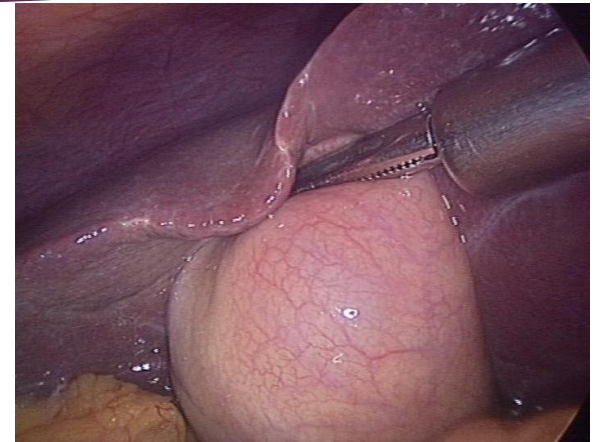
- ▶ **USS: first line investigation in gallstone disease**
 - ▶ Confirms presence of gallstones
 - ▶ Gall bladder wall thickness (if thickened suggests cholecystitis)
 - ▶ Biliary tree calibre (CBD/extrahepatic/intrahepatic) – if dilated suggests stone in CBD (normal CBD <8mm).
 - ▶ Sometimes CBD stone can be seen.
- ▶ **MRCP: To visualise biliary tree accurately (much more accurate than USS)**
 - ▶ Diagnostic only but non-invasive
- ▶ **CT: Not first line investigation. Mainly used if suspicion of gallbladder empyema, gangrene, or perforation and in acute pancreatitis**

Cholecystectomy

- ▶ Asymptomatic gallstones do not require operation
- ▶ Indications
 - ▶ A single complication of gallstones is an indication for cholecystectomy (this includes biliary colic)
 - ▶ After a single complication risk of recurrent complications is high (and some of these can be life threatening e.g. cholangitis, pancreatitis)
- ▶ Whilst awaiting laparoscopic cholecystectomy
 - ▶ Low fat diet
 - ▶ Dissolution therapy (ursodeoxycholic acid) generally useless

Cholecystectomy

- ▶ All performed laparoscopically
- ▶ Advantages:
 - ▶ Less post-op pain
 - ▶ Shorter hospital stay
 - ▶ Quicker return to normal activities
- ▶ Timing
 - ▶ Early
 - ▶ After acute cholecystitis, cholecystectomy traditionally performed after 6 weeks [not any more recommended]
 - ▶ After gallstone pancreatitis cholecystectomy should be performed within 3 weeks.



Cholecystectomy when to perform?

- ▶ Arguments for 6 weeks later
 - ▶ Laparoscopic dissection more difficult when acutely inflamed
 - ▶ Surgery not optimal when patient septic/dehydrated
 - ▶ Logistical difficulties (theatre space, lack of surgeons)
- ▶ Arguments for same admission
 - ▶ Research suggests same admission lap chole as safe as elective chole (conversion to open maybe higher)
 - ▶ Waiting increases risk of further attacks/complications which can be life threatening
 - ▶ Risk of failure of conservative management and development of dangerous complication such as empyema, gangrene and perforation can be avoided
- ▶ National guidelines state



The End

QUESTIONS?