

Cholelithiasis

● **Important**

● Notes (Doctors'/students')

431

SURGERY TEAM

Done By:

Saleh AlHejjei



Revised By:

Raghdah AlAmri

Leaders

Abeer Al-Suwailem

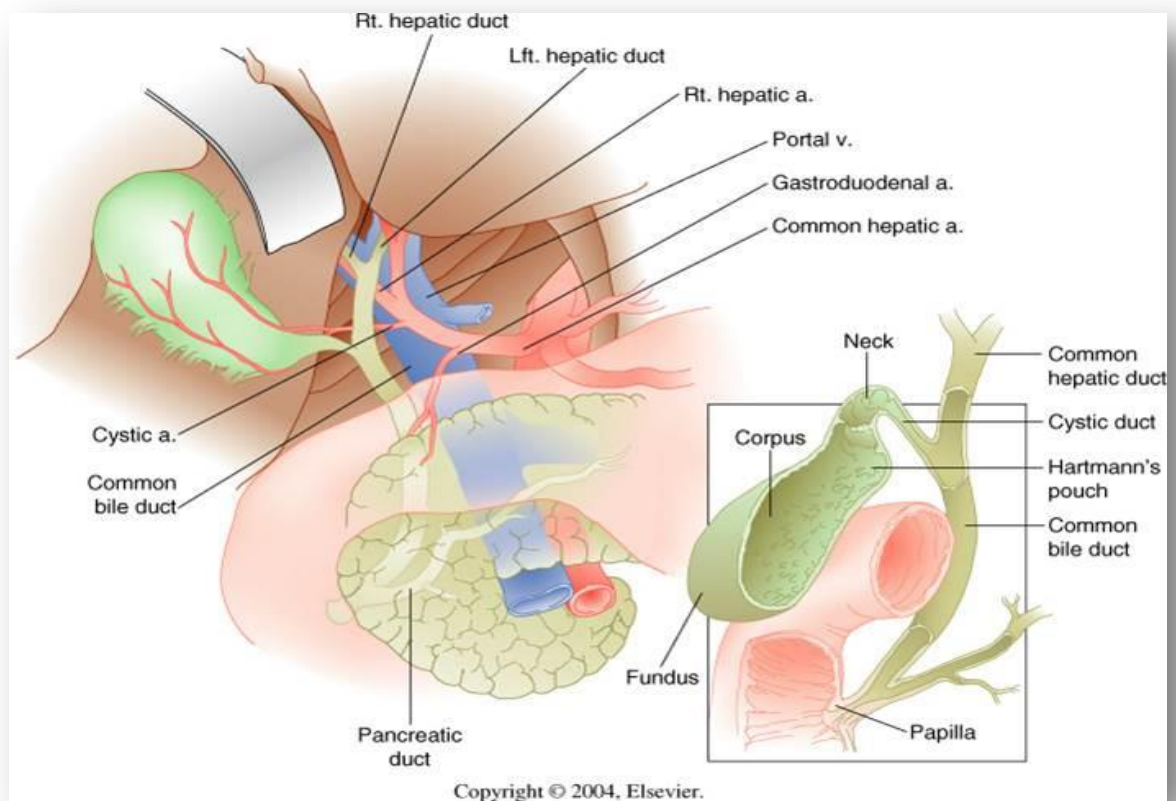
Mohammed Alshammari

IMPORTANT Notes on the last page!!

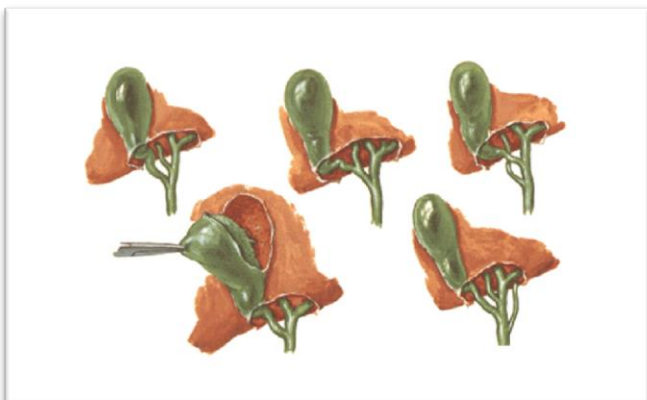
Background

- ◆ Presence of gallstones in the gallbladder.
- ◆ Spectrum ranges from asymptomatic, colic, cholangitis, choledocholithiasis (Presence of a gallstone in the common bile duct), and cholecystitis.
- ◆ Colic is a temporary blockage, cholecystitis is inflammation from obstruction of CBD or cystic duct, cholangitis is infection of the biliary tree.

Anatomy

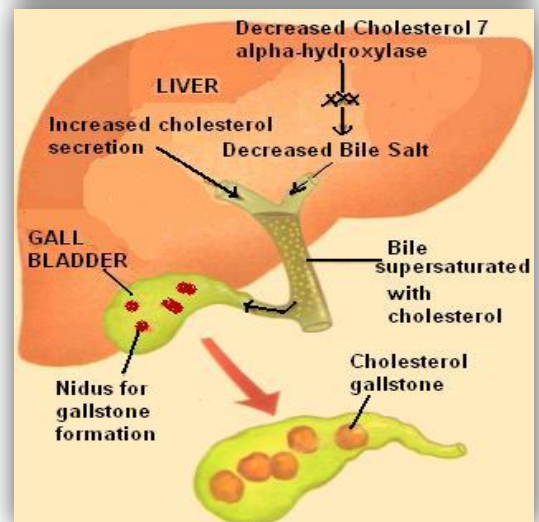
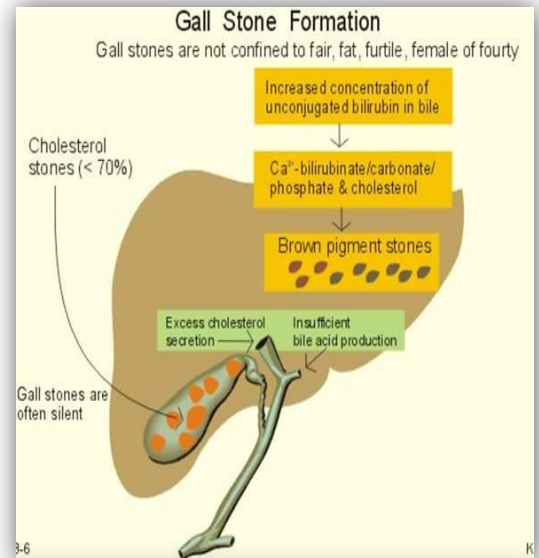


Variations of Bile Duct



Pathophysiology

- ◆ Three types of stones, cholesterol, pigment, mixed.
- ◆ Formation of each types is caused by crystallization of bile.
- ◆ **Cholesterol stones most common.**
- ◆ Bile consists of lethicin, bile acids, phospholipids in a fine balance.
- ◆ Impaired motility can predispose to stones.
- ◆ Sludge is crystals without stones. It may be a first step in stones, or be independent of it.
- ◆ Pigment stones (15%) are from calcium bilirubinate. Diseases that increase RBC destruction will cause these. Also in cirrhotic patients, parasitic infections.



Frequency

- ◆ US: affected by race, ethnicity, sex, medical conditions, fertility.
- ◆ 20 million have GS.
- ◆ Every year 1-2% of people develop them. Hispanics are at increased risk.
- ◆ Internationally: 20% of women, 14% of men.
- ◆ Patients over 60 prevalence was 12.9% for men, 22.4% for women.

Morbidity/Mortality

- ◆ Every year 1-3% of patients develop symptoms.
- ◆ Asymptomatic GS are not associated with fatalities.
- ◆ Morbidity and mortality is associated only with symptomatic stones.

Race

- ◆ Highest in fair skinned people of northern European descent and in Hispanic populations.
- ◆ High in Pima Indians (75% of elderly). In addition Asians with stones are more likely to have pigmented stones than other populations.
- ◆ African descent with Sickle Cell Anemia.

Sex

- ◆ **More common in women.** Etiology may be secondary to variations in estrogen causing increased cholesterol secretion, and progesterone causing bile stasis.
- ◆ Pregnant women more likely to have symptoms.
- ◆ Women with multiple pregnancies at higher risk
- ◆ Oral **contraceptives**, estrogen replacement tx.

Age

- ◆ It is uncommon for children to have gallstones. If they do, it's more likely that they have congenital anomalies, biliary anomalies, or hemolytic pigment stones.
- ◆ Incidence of GS increases with age 1-3% per year.

History

- ◆ 3 clinical stages: asymptomatic, symptomatic, and with complications (cholecystitis, cholangitis, CBD stones).
- ◆ Most (60-80%) are asymptomatic
- ◆ A history of **epigastric pain with radiation to shoulder** may suggest it.
- ◆ A detailed history of pattern and characteristics of symptoms as well as US make the diagnosis.
- ◆ Most patients develop symptoms before complications.
- ◆ Once symptoms occur, severe symptoms develop in 3-9%, with complications in 1-3% per year, and a cholecystectomy rate of 3-8% per year.
- ◆ Indigestion, bloating, fatty food intolerance occur in similar frequencies in patients without gallstones, and are not cured with cholecystectomy.

Obstructive Jaundice can be caused by two:

- Stone obstructing biliary ducts.
- Cancer of Head of Pancreas, Ampulla of Vater or distal CBD.

Age of >60: Cancer!

- ◆ Best definition of colic is pain that is severe in epigastrium or RUQ that last 1-5 hrs, often waking patient at night.
- ◆ In classic cases **pain is in the RUQ**, however visceral pain and GB wall distension may be only in the epigastric area.
- ◆ Once peritoneum irritated, localizes to RUQ.
- ◆ Small stones more symptomatic.

Physical

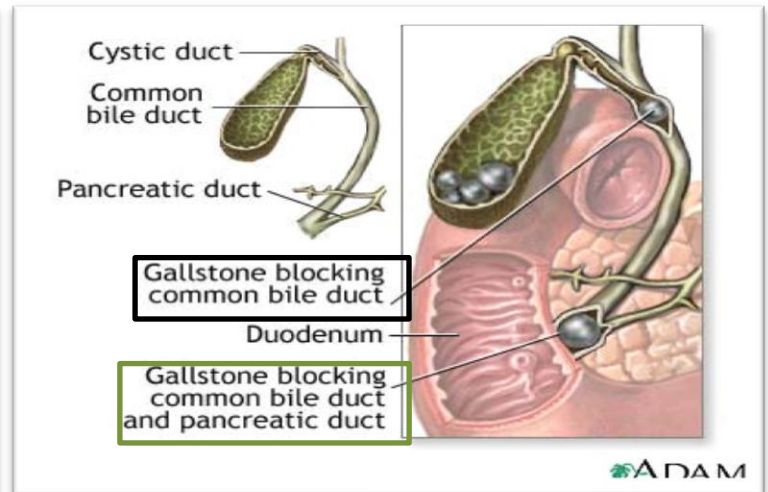
- ◆ Vital signs and physical findings in asymptomatic cholelithiasis are completely normal. (Good Hint!)
- ◆ **Fever, tachycardia, hypotension**, alert you to more serious infections, including **cholangitis, cholecystitis**.
- ◆ **Murphy's sign**.

Murphy's Sign:

Sign of gallbladder diseases consisting of pain on taking a deep breath when the examiner's fingers are on approximate location of the gallbladder.

Symptoms

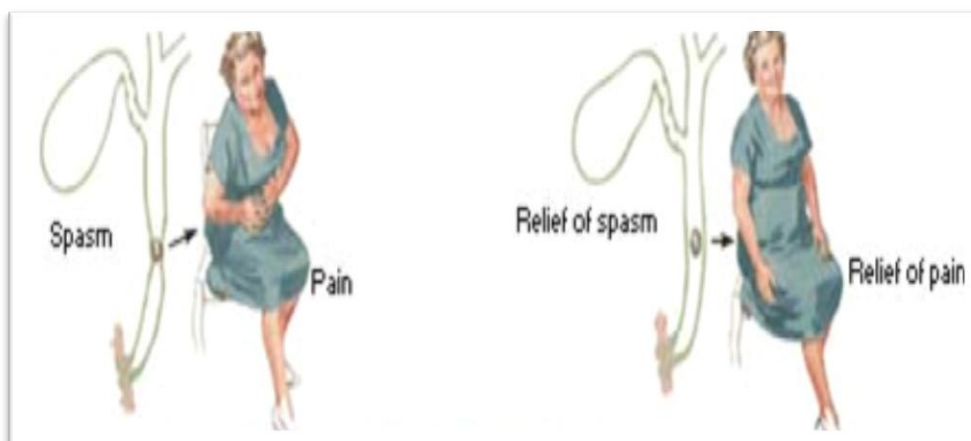
- ◆ The majority of cases (approximately 80%) are asymptomatic (silent) gall stones , discovered accidentally by abdominal Ultrasound (Sonar).



- ◆ Other symptoms are related to site of movement of stone causing pain (in Cholecystitis).
- ◆ A gall stone may impact in the neck of gall bladder or in the cystic duct.
- ◆ Biliary pain usually occurs in the epigastrium and right hypochondrium
- ◆ Gall stones increase risk of carcinoma of the gall bladder and **Pancreatitis**.
- ◆ Obstruction of common bile duct leading to pain & **jaundice**

Painless Jaundice:
Cancer!

If stone obstructs
Ambula of Vater, it can
cause Obstructive
Jaundice and
Pancreatitis!



Risk Factors

- ◆ Obesity.
- ◆ 4 Fs (**Female, Fertile, Fatty, Forty**).
- ◆ **Contraceptives**.
 - ❖ Gallstones are also **associated with**:
 - ◆ Diabetes
 - ◆ Liver disease
 - ◆ Crohn's disease
 - ◆ Blood disorders like sickle-cell anaemia
 - ◆ **Stomach surgery - gallstones are more common if you have had surgery to remove part of your stomach.**

Causes

- ◆ **High fat diet**
- ◆ **Rapid weight loss**, TPN, Ileal disease, NPO.
- ◆ Increases with age, alcoholism.
- ◆ Diabetics have more complications.
- ◆ Hemolytics
- ◆ **Massive sudden loss of weight → increased metabolism → increased Cholesterol in bile → Cholesterol Stones (< 70% of gallstones).**

Differentials

- ◆ AAA (Abdominal Aortic Aneurism).
- ◆ Appendicitis
- ◆ Cholangitis, cholelithiasis
- ◆ Diverticulitis
- ◆ Gastroenteritis, hepatitis
- ◆ IBD, MI, SBO
- ◆ Pancreatitis, renal colic, pneumonia

Investigations

- ◆ Labs with asymptomatic Cholelithiasis and biliary colic should all be normal.
- ◆ WBC, elevated LFTS may be helpful in diagnosis of acute cholecystitis, but normal values do not rule it out.
- ◆ Study by Singer et al examined utility of labs with chole diagnosed with HIDA, and showed no difference in WBC, AST,ALT Bili, and Alk Phos, in patients diagnosed and those without.
- ◆ Elevated WBC is expected but **not reliable**.
- ◆ In retrospective study, only 60% of patients with cholecystitis had a WBC greater than 11,000. A WBC greater than 15,000 may indicate perforation or gangrene.
- ◆ ALT, AST, AP more suggestive of CBD stones
- ◆ Amylase elevation may be GS pancreatitis.

Alkaline Phosphatase and Gamma Glutamyl Transferase are elevated only in Obstructive Joundice.

Imaging Studies

CT is used to investigate the head of the pancreas while MRCP is the Best way to investigate the distal CBD. MRCP is used in case of cholangiocarcinoma

- ◆ US and Hida best. Plain x-rays, CT scans ERCP are adjuncts.
- ◆ X-rays: 15% stones are radiopaque, porcelain GB may be seen. Air in biliary tree, emphysematous GB wall.
- ◆ CT: for complications, ductal dilatation, surrounding organs. Misses 20% of GS. Get if diagnosis uncertain.

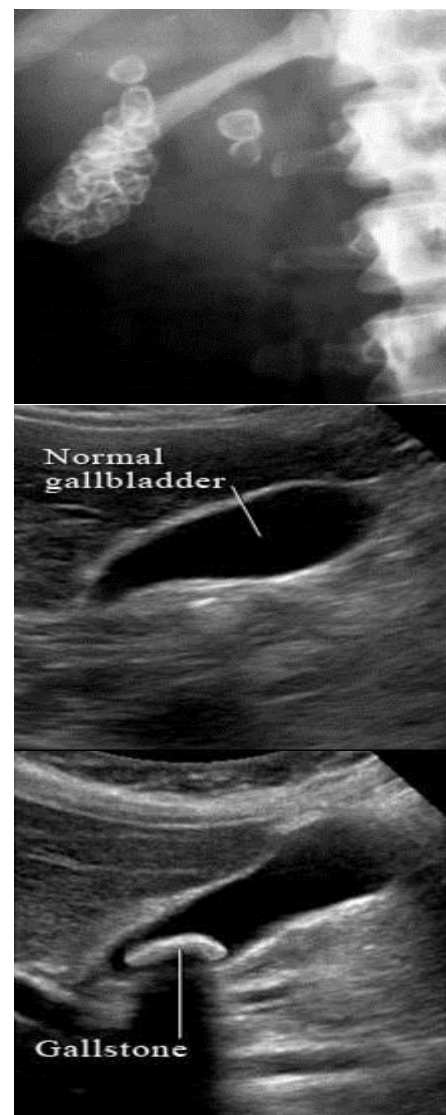
Ultrasound

Ultrasound is the BEST!!

- ◆ Ultrasound is 95% sensitive for stones, 80% specific for cholecystitis. It is 98% sensitive and specific for simple stones.
- ◆ Wall thickening (2-4mm) false positives!
- ◆ Distension
- ◆ Pericholecystic fluid, sonographic Murphy's.
- ◆ Dilated CBD(7-8mm).

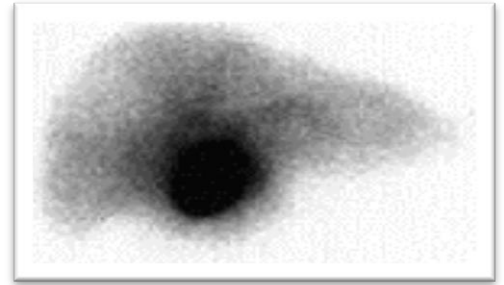
Imaging Importance:

- 1- Presence of stones.
- 2- Thickening of the wall (If present, Cholesistitis!).
- 3- Dilatation of biliary system (intra-or-extrahepatic), Obstruction!



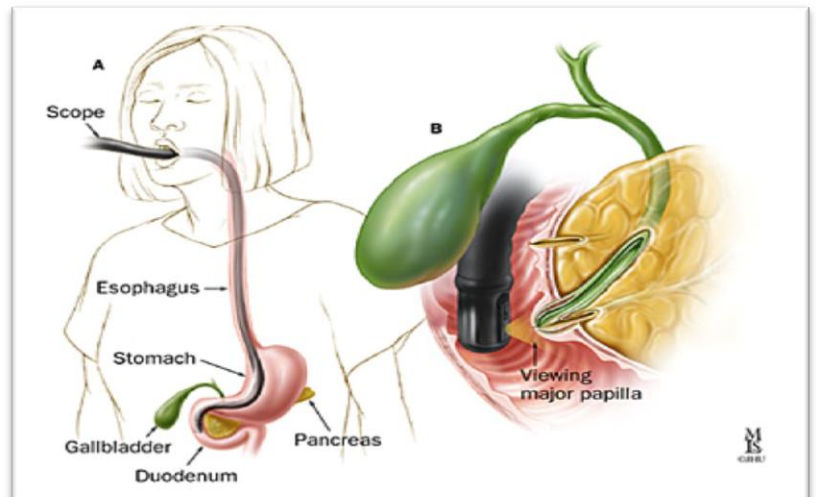
HIDA scan: Cholescintigraphy or Hepatobiliary Imino-Diacetic Acid scan

- ◆ Hida scan documents cystic duct patency.
 - ◆ 94% sensitive, 85% specific
 - ◆ GB should be visualized in 30 min.
 - ◆ If GB visualized later it may point to chronic cholecystitis.
- ◆ CBD obstruction appears as non visualization of small intestine.
- ◆ False positives, high bilirubin.



ERCP: Endoscopic Retrograde Cholangiopancreatography

- ◆ ERCP is diagnostic and therapeutic.
- ◆ Provides radiographic and endoscopic visualization of biliary tree.
- ◆ Do when CBD dilated and elevated LFTs.
- ◆ **Complications include bleeding, perforation, pancreatitis, cholangitis.**



ERCP is contraindicated in patient with suppurative cholangitis without decompression or in patient with pancreatitis

- The most common complication post-ERCP is Pancreatitis!
- Treat Obstructive Jaundice with ERCP!

Emergency Department Care

- ◆ Suspect **GB colic** in patients with **RUQ pain of less than 4-6h duration radiating to back.**
- ◆ Consider **acute cholecystitis** in those with **longer duration of pain, with or without fever.** Elderly and diabetics do not tolerate delay in diagnosis and can proceed to sepsis.
- ◆ After assessment of ABCs, perform standard IV, pulse oximetry, EKG, and monitoring. Send labs while IV placed, include cultures if febrile.
- ◆ Primary goal of ED care is diagnosis of acute cholecystitis with labs, US, and or Hida. Once diagnosed, hospitalization usually necessary. Some treated as OP.

- ◆ In patients who are **unstable or in severe pain, consider a bedside US to exclude AAA** and to assist in diagnosis of acute cholecystitis.
- ◆ Replace volume with IVF, NPO, +/- NGT.
- ◆ Administer pain control early. A courtesy call to surgery may give them time to examine without narcotics.

Consults

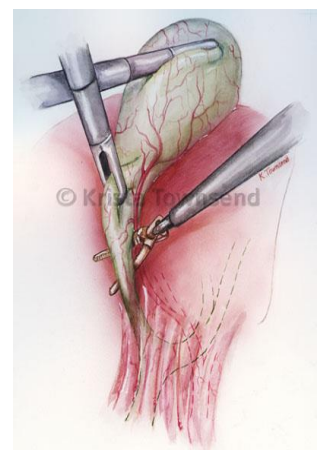
- ◆ Historically cholecystitis was operated on emergently which increased mortality.
- ◆ Surgical consult is appropriate, and depending on the institution, either medicine or surgery may admit the patients for care.
- ◆ Get GI involved early if suspect CBD obstruction.

Medications

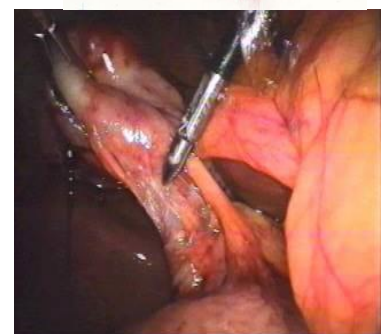
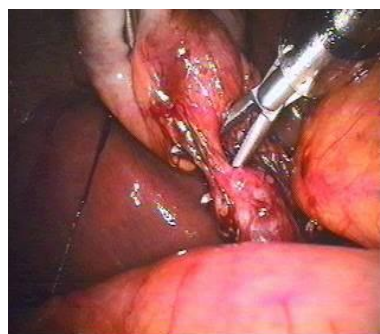
- ◆ Anticholinergics such as Bentyl (dicyclomine hydrochloride) to decrease GB and biliary tree tone. (20mg IM q4-6).
- ◆ Demerol 25-75mg IV/IM q3
- ◆ Antiemetics (phenergan, compazine).
- ◆ Antibiotics (Zosyn 3.375g IV q6) need to cover Ecoli(39%), Klebsiella(54%), Enterobacter(34%), enterococci, group D strep.

Further Inpatient Care

- ◆ Cholecystectomy can be performed after the first 24-48h or after the inflammation has subsided. Unstable patients may need more urgent interventions with ERCP, percutaneous drainage, or cholecystectomy.
- ◆ **Laparoscopic Cholecystectomy is very effective with few complications (4%). 5% convert to open. In acute setting up to 50% open.**



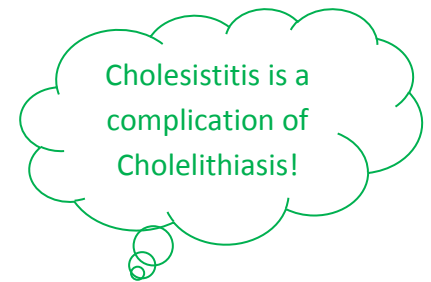
- Laparoscopic Cholecystectomy (shown in images)



- ◆ Afebrile, normal VS
- ◆ Minimal pain and tenderness.
- ◆ No markedly abnormal labs, normal CBD, no pericholecystic fluid.
- ◆ No underlying medical problems.
- ◆ Next day follow-up visit.
- ◆ Discharge on oral antibiotics, pain meds.

Complications

- ◆ **Cholangitis, sepsis**
- ◆ **Pancreatitis**
- ◆ Perforation (10%)
- ◆ GS ileus (mortality 20% as diagnosis difficult).
- ◆ Hepatitis
- ◆ Choledocholithiasis



Prognosis

- ◆ Uncomplicated cholecystitis as a low mortality.
- ◆ Emphysematous GB mortality is 15%
- ◆ Perforation of GB occurs in 3-15% with up to 60% mortality.
- ◆ Gangrenous GB 25% mortality.

Continue on for IMPORTANT notes!



Important Notes!**DOCTOR ALSO SAID:****If patient presented to ER within:**

- 24h of episode, possibility of 1% conversion. Immediate surgery recommended.
- 48-72h of episode, possibility of 4% conversion. IV AB, the oral for 6 weeks, then surgery.
 - Prescribing antibiotics for late patients is because of that the dilatation of vessels caused by inflammation can make it more prone to bleeding if immediate surgery is operated. This will force surgeon to open!

After AB treatment, if no response and WBC is still elevating, immediate surgery!

(conversion: from Laparoscopic to Open surgery)

Cholangitis:

- Systemic infection.
- Treat by drainage of the infected pus in the obstructed and dilated hepatic duct.
 - Indication of local anesthesia prior to drainage is important. Because, sedation lowers the patient's BP at the same time that infection does. So patient is hypotensive. This can be fatal!
 - If drainage needle is removed before ERCP, bile will leak to peritoneum causing **Biliary Peritonitis! (Most common peritonitis)**.
- If ERCP is operated alone,
 - Pain will be relieved,
 - Infected pus will be unobstructed and will excreted naturally.
- ✓ So, in Nonsuppurative Cholangitis, ERCP can be a shortcut!!
- **PTT (Percutaneous transhepatic cholangiography):**
 - Used before drainage to confirm site of obstruction and dilatation.

Question & Notes taken from Surgical Recall:**Charcot's triad** (Pronounced "char-cohs")

Seen with cholangitis: (IMPI, Mentioned by male doctor too)

1. Fever (chills)
2. Jaundice
3. Right upper quadrant pain

What is the most common cause of cholangitis?

- Gallstones in common bile duct (choledocholithiasis)

What is suppurative cholangitis?

- Severe infection with sepsis—"pus under pressure"

What is the management of cholangitis?

- **Nonsuppurative:** IVF and antibiotics, with definitive treatment later (e.g., lap chole /- ERCP)
- **Suppurative:** IVF, antibiotics, and decompression; decompression can be obtained by ERCP with papillotomy, PTC with catheter drainage, or laparotomy with T-tube placement