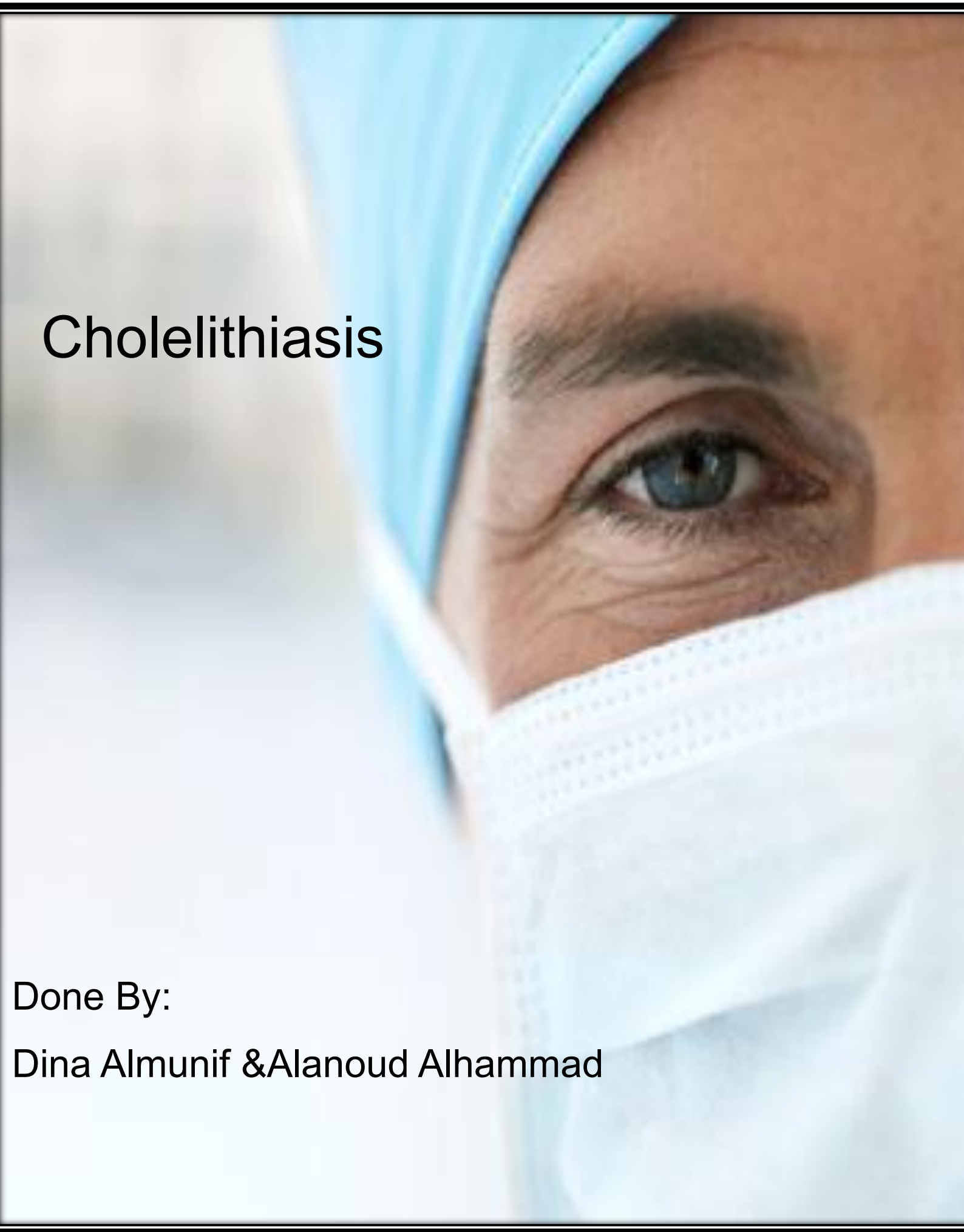
430 Surgery Team



Cholelithiasis

Done By:

Dina Almunif &Alanoud Alhammad

Summery of what the doctor said during the lecture.

70% of patients with gall stone are asymptomatic and 30% are symptomatic.

Patient with gall stone and asymptomatic >>> do nothing

Symptomatic patients require surgery, could be electively done or urgent (Remember that jaundice is an advanced sign). The severity of signs and symptoms/complications determine if this patient should do the surgery electively or operate now.

Those stones will never transfer to cancer.

Q: When do patients with gall stones come to the doctor?

A: When there is severe pain and the pain didn't go away spontaneously.

Symptoms/signs of cholilethiasis:

1. Pain

- Right upper quadrant (RUQ) and sometimes in the epigastric region.
- Character: colicky
- Timing: usually after eating fatty food or at night (aggravated by fatty food)

Relieving factors: vomiting or not eating.

After eating the stomach increase in size > releases CCK which causes gallbladder contraction on the stones > pain!

- Radiating to the back and right shoulder
- Episodes?

Ask if this is the first episode, he will usually say NO

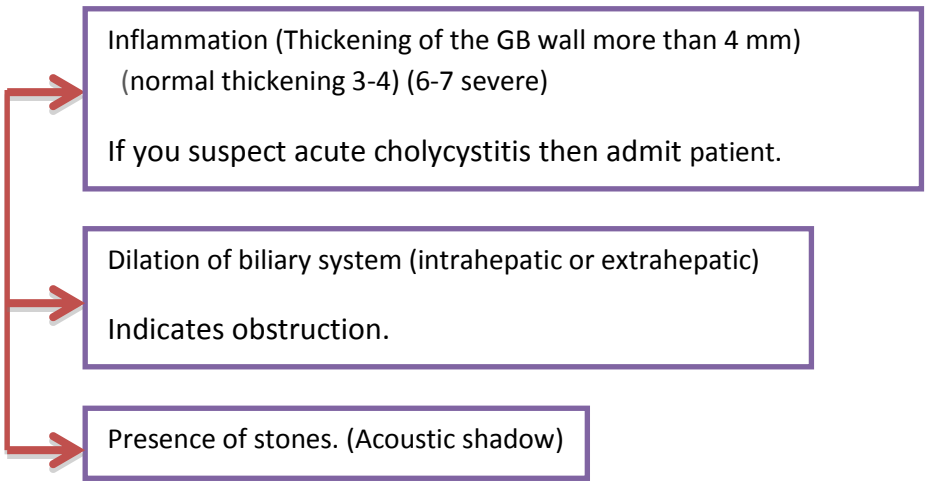
**Then ask him why did he come to the hospital this time?

A: because the pain didn't go away on its own

- Associated symptoms? N&V

If a patient came to the ER with acute RUQ pain, Afebrile with normal vital signs, normal WBC, normal liver function test (LFT)(AST, ALT, Alkaline phosphate, total and direct bilirubin) and no inflammation on US >> give fluids (hydration) + pain killers then discharge and do surgery electively (not complicated cholelithiasis)

Q: What do we see on US?



Cholecystitis: Inflammation of the gallbladder secondary to calculi.

- The pain is CONTINOUS
- Febrile patient (fever)
- High WBC count due to inflammation

Murphy's sign (Distended gall bladder and thickening of the wall)

If the patient was tachycardiac or ↑ WBC or pain not relieved by analgesics or US showed thickening of the GB wall >> admit pt. > Stabilize pt. > give IV (antibiotic & analgesics) >> if the pt. responded we wait for about 6 weeks till the inflammatory process cools down (decrease wall thickening) >> then do surgery (cholecystectomy) electively. **WHY??** Because operating on a patient while the gallbladder is acutely inflamed has been shown to have more complications.

If the pt. did not respond to antibiotics gangrenous cholecystits may develop (results when extensive inflammation causes thrombosis of the cystic artery and results in necrosis of the GB) >> require urgent surgery (open surgery).

** See the difference between cholecystits and cholilethiasis?

Cholecystitis is a complication of cholilethiasis, the pt. will present with fever, high WBC and US shows GB wall thickness due to inflammation.

Obstructive Jaundice:

Means there is an obstruction in the bile duct that causes obstruction to the flow of bile from the liver to the small bowel (one of the stones went down to CBD and caused obstruction). (Can be a mass *cancer* or stone)

If the stone went down the ampulla of vatar > Acute pancreatitis

- Obstructive type

Symptoms and signs:

- Jaundice:
  - Look for it in sclera (specially dark skinned people and during the sun light), skin and mucosa
  - The bilirubin level in the blood is at least double the normal (Upper normal level is 17 mmol)
  - The whiter your skin is the less bilirubin you need to develop jaundice.
  - The darker your skin is the more bilirubin you need to develop jaundice.
- Pale stool
- Dark urine
- Itching (due to accumulation of bile salts under the skin)

What to ask a pt. with jaundice? 4 important questions:

1. Is there any discoloration in your eyes or skin?
2. Is your stool pale?
3. Is your urine color dark?
4. Do you have itching?

- Stone removal:

To relieve obstructive jaundice: admit for ERCP

ERCP (Endoscopic retrograde cholangiopancreatography) (can be used as a diagnostic and therapeutic tool)

- Endoscope + guide wire + contrast + x-Ray (fluoroscopy)
- First we do shpincterotomy to widen the diameter of the sphincter of Oddi
- Take the stone out by the basket.

**After doing ERCP we wait for one day before removing the gall bladder (cholecystectomy) to make sure the pt. didn't develop pancreatitis. (Pancreatitis is a complication of ERCP)

**Painless obstructive jaundice with significant weight loss >> cancer (obstruction develops gradually)

It could be:

- Head of pancreas cancer
- ampulla of Vater cancer
- Distal CBD cancer

Cholyangiitis: inflammation of biliary tree.

- Charcot's triad:
  1. Fever
  2. Jaundice
  3. Right upper quadrant pain RUQ

Treatment: ERCP

Important MCQ's at the end of the lecture.

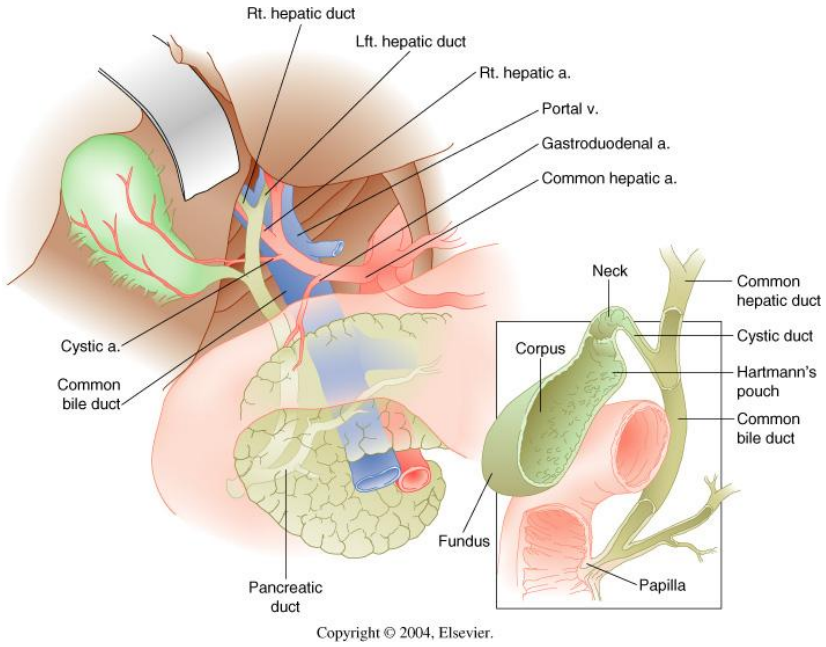
If the pt. was hypotensive > send to ICU for ionotrops before doing ERCP.

Background:

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

Cholelithiasis: gall bladder stones
Cholecystitis: inflammation of gall bladder
Cholangitis: inflammation of biliary tree
Choledocholithiasis: stones in common Bile duct not necessary cause obstructive jaundice.

Anatomy:



Contents of porta hepatis OR hepatoduedenal ligament: portal vein, hepatic artery and bile duct NOT THE HEPATIC VEIN.

MCQ !!!!

Pathophysiology:

- Three types of stones, cholesterol, pigment, mixed.
- Formation of each type is caused by crystallization of bile.
- Sludge is crystals without stones. It may be a first step in stones, or be independent of it.
- Cholesterol stones are the most common stones.

Bile consists of lethicin, bile acids, and phospholipids in a fine balance.

Bile: 1Liter/day

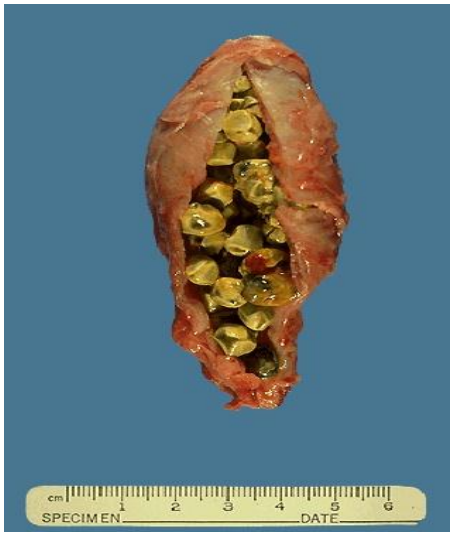
Sludge: beginning of stones, you can find it on U/S.

The solubility of cholesterol in bile depends on the concentration of lethicin, bile salts and cholesterol. Lethicin and cholesterol are insoluble aqueous solution but dissolve in bile salt-lethicin micelles.

Failure of the liver to maintain a micellar liquid can be caused by increase in the concentration of cholesterol or decrease in the concentration of bile salts or lethicin; either way it can result in cholesterol stone formation.

Conversely, increasing the biliary concentration of lethicin and bile salts should hinder cholesterol stone formation.

- Pigment stones (15%)
    - Pure pigment (bilirubin) stones: associated with diseases that increase RBC destruction will cause these kind of stones, such as sickle cell anemia or spherocytosis.
    - Calcium bilirubinate stones: in cirrhotic patients and parasitic infections. (Infection result in an increase in biliary calcium as well as increase in B-glucuronidase (which converts conjugated bilirubin to the unconjugated form). The calcium binds to unconjugated bilirubin and precipitate to form calcium bilirubinate stones.
- Normal bile contains glucaro-1,4-lactone, which inhibit the conversion of conjugated to unconjugated bilirubin, and thus stop the formation of calcium bilirubinate stones
- Impaired motility can predispose to stones.



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 were 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

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.

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.

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.

CBD = Common bile duct

A detailed history of pattern and characteristics of symptoms as well as US make the diagnosis.

•70% of patients are asymptomatic, 30% symptomatic >>> 20% of Symptomatic patients will have the complications
" Very rare but it happens pt comes with complication without any previous symptoms "!

- 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 occurs in similar frequencies in patients without gallstones, and is not cured with cholecystectomy.
- 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:

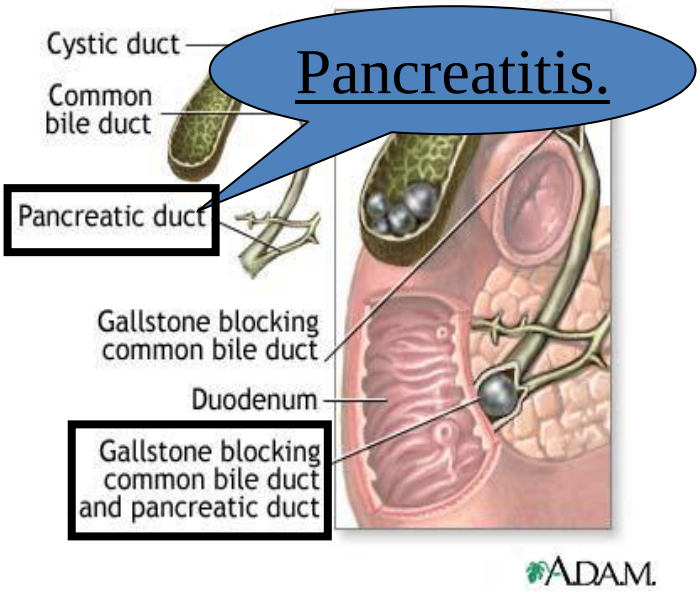
- Vital signs and physical findings in asymptomatic cholelithiasis are completely normal.
- Fever, tachycardia, hypotension, alert you to more serious infections, including cholangitis, cholecystitis.
- Murphy's sign

The majority of cases (approximately 80%) are asymptomatic (silent) gallstones, discovered accidentally by abdominal sonar.

A gallstone may impact in the neck of gall bladder or in the cystic duct giving biliary pain or cholecystitis >> Biliary pain usually occurs in the epigastrium and right hypochondrium (RUQ).

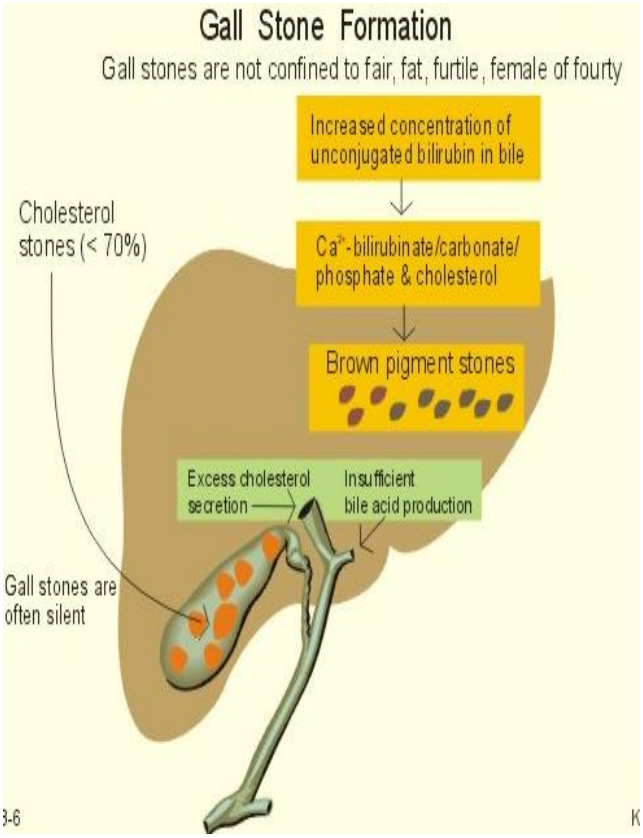
Other symptoms are related to site of movement of stone.

Obstruction of common bile duct leading to pain & jaundice



Risk factors:

- 5 F's (female, fertile, fatty, forty, family history)
- Obese.
- Sudden loss of weight.
- Hormone Replacement Therapy.



Causes:

- Fair, fat, female, fertile of course.
- High fat diet
- Obesity
- Rapid weight loss, TPN (total parenteral nutrition), Ileal disease, NPO.
- Increases with age, alcoholism.
- Diabetics have more complications.
- Hemolytics

Differentials:

- AAA (abdominal aortic aneurysm)
- Appendicitis
- Cholangitis, cholelithiasis
- Diverticulitis
- Gastroenteritis, hepatitis
- IBD, MI, SBO (small bowl obstruction)
- Pancreatitis, renal colic, pneumonia

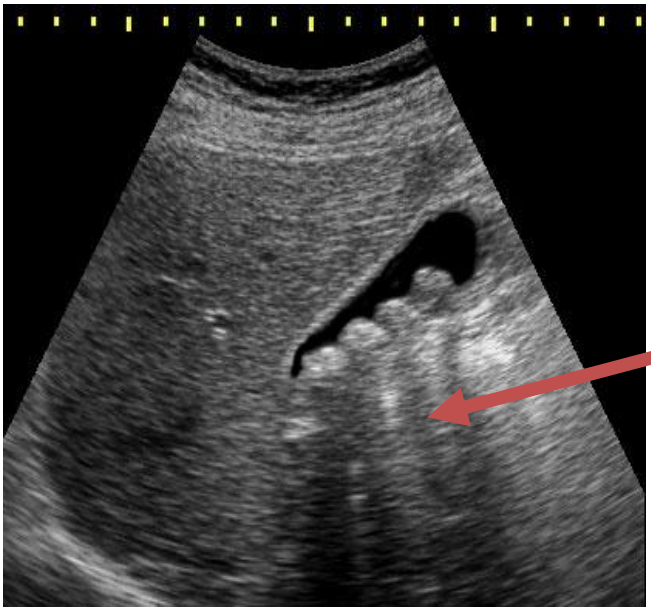
Workup:

- 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 cholecytitis 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

Imaging studies:

- US and Hida are the 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:**
  - 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).

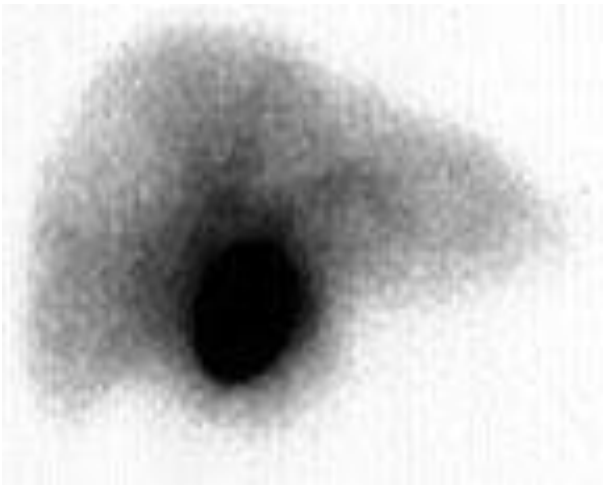


What is the first exam?
U/S "95% Sensitivity"
What is the Best exam?
CT
MCQ!!!

Acoustic shadow

♦ **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.

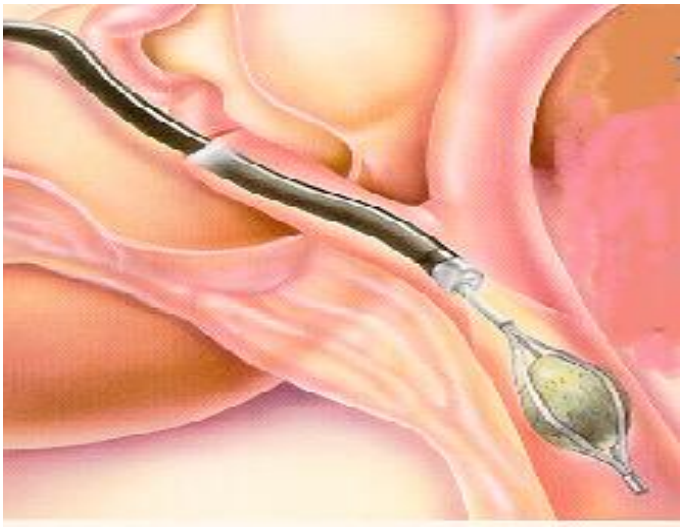


(**HIDA scan**)
cholescintigraphy or **Hepatobiliary Imino-Diacetic Acid scan,**

♦ **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, and cholangitis.

- ERCP needs: endoscope + fluoroscopy (X-ray and contrast and guide wire) **MCQ!!!**
- If a patient presented with jaundice you admit him for ERCP **MCQ!!**



Emergency department care:

- Suspect GB colic in patients with RUQ pain of less than 4-6h duration radiating to back.
- Consider acute cholecystits 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.

If patient present with acute cholycysitis and low BP admit to ICU and give ionotrops then relieve obstruction "
MCQ!!

- 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 cholecystits 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.

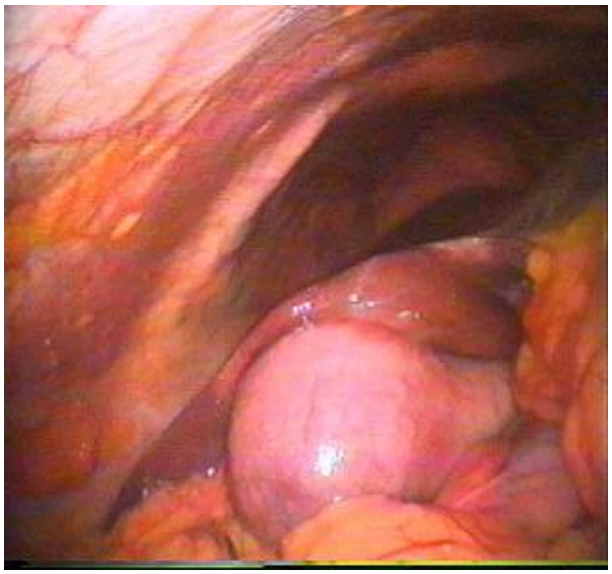
Medications:

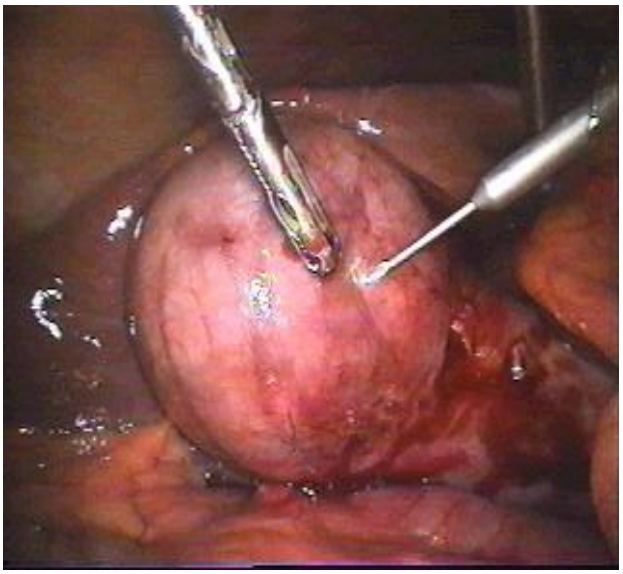
- Anticholinergics such as Bentyl (dicyclomine hydrochloride) to decrease GB and biliary tree tone. (20mg IM q4-6).
- Demerol 25-75mg IV/IM q3
- Antiemetics (phenergan, compazine).
- Antibiotics (Zosyn 3.375g IV q6) need to cover Ecoli (39%), Klebsiella(54%), Enterobacter(34%), enterococci, group D strep.

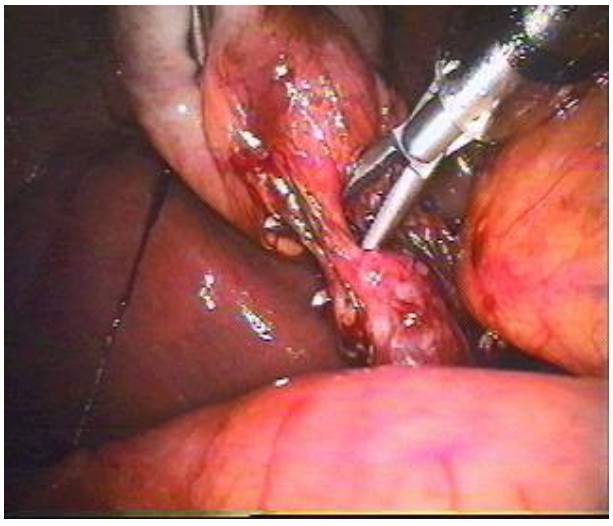
Further inpatient care:

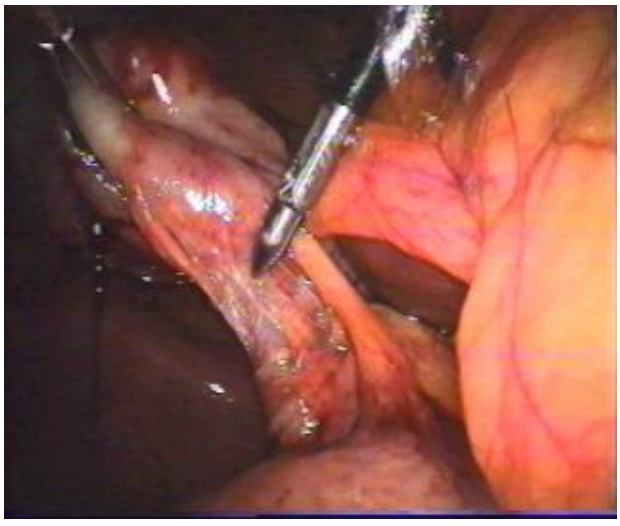
- Cholecystectomy can be performed after the first 24-48h or after the inflammation has subsided. Unstable patients may need more urgent interventions with ERCP, percutaneous drainage, or cholecystectomy.
- Lap chole very effective with few complications (4%). 5% convert to open. In acute setting up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

Laparoscopic Cholecystectomy:









Further Outpatient Care:

- 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

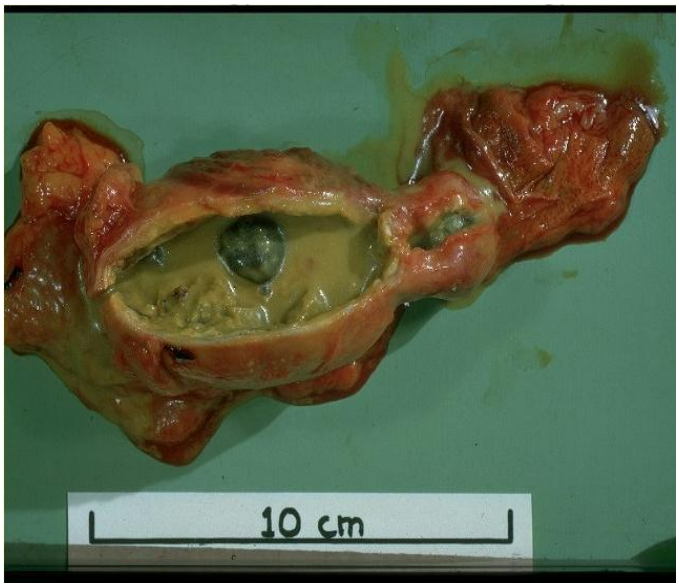
Complications:

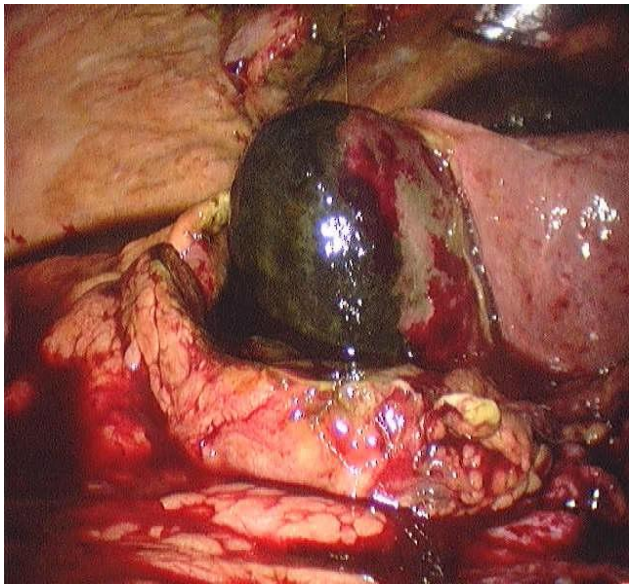
- Cholangitis, sepsis
- Pancreatitis
- Perforation (10%)
- GS ileus (mortality 20% as diagnosis difficult).
- Hepatitis
- Choledocholithiasis

How to diagnose Cholangitis?

By Charcot's triads (RUQ pain, jaundice and Fever)

MCQ!!





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

MCQ's

Q1: A 73-year old previously healthy man presents to the emergency room with several days of jaundice followed by 12 hours of RUQ pain and fever. He is mildly hypotensive. CT scan of the abdomen revealed dilation of the biliary tree.

** What is the likely diagnosis?

Answer: Cholyangiitis

** Management includes which of the following?

A- Laproscopic cholecystectomy.
B- Open cholecystectomy and T tube replacement.
C- Open cholecystectomy and choledochojejunostomy.
D- Fluid resuscitation, antibiotics, and ERCP.
E- Fluid resuscitation and hepatitis serologies.

Answer: D

Q2: What is the most common cause of chronic pancreatitis?

A- Gall stones
B- Alcohol

Answer: A (80%) gall stones is the cause either in acute or chronic pancreatitis.

Q3: How much bile produced by the liver?

A- 100 – 200 ml/day
B- 300-400 ml/day
C- 500-1000 ml/day (1Liter)

Answer: C

Q4: In Endoscopic ERCP stone extraction from common bile duct (CBD) is not possible in all except?

A- Multiple stones in CBD > it's possible !
B- Intrahepatic stone
C- Multiple gall stones
D- Pt has CBD stone with prior gastrectomy

Answer: A

Q5: Patient had CBD stones but he had prior gastrectomy (or post gastric resection B2 " **Billroth's operation II**")?

Answer: No gastric > we cannot reach the duodenum > never do ERCP

So open the abdomen > open the CBD and extract the stones (intraoperative cholangiogram)

Q6: Patient had post gastric resection B1 "**Billroth's operation I"**?

Answer: We can do ERCP b\c duodenum is still open

Q7: Abdominal pain, increase WBCs and increase amylase?

B1: an operation in which the pylorus is removed and the distal stomach is anastomosed directly to the duodenum.
B2: an operation in which the greater curvature of the stomach is connected to the first part of the jejunum in a side-to-side manner. This often follows resection of the lower part of the stomach (antrum). The antrectomy (resection of the stomach antrum) is not part of the originally described procedure. The surgical procedure is called gastrojejunostomy

Answer: Acute pancreatitis

Q8: A 45 Y/O obese female with cholelithiasis, presents to the ER complaining of N/V & severe continuous abdominal pain, high grade fever, slightly elevated WBC (12,000), & increased serum amylase... What's her most likely Dx.?

Answer: Acute Pancreatitis

Q9: 70 years old male come with progressive **painless** jaundice?
Answer:
It could be:
•Head of pancreas cancer
•ampulla of Vater cancer
•Distal CBD cancer

Q10: 70 years old male with progressive painless jaundice is referred to your clinic. You order LFT that shows abnormal pattern of obstruction jaundice, US shows dilated CBD 2 cm, which procedure you suggest to do?
a) ERCP
b) Laparoscopic Cholecystectomy
c) Modified barium swallow
d) Laparoscopic abdominal exploration
e) Upper GI endoscopy

Answer: A

Q11: You suspect patient to have gall stone as a cause of chronic nausea and mild right upper quadrant pain what is the **best** image study in this case?

Answer: CT

Q12: You suspect patient to have gall stone as a cause f chronic nausea and mild right upper quadrant pain what is the **first** image study in this case?

Answer: US

Q13: Which of the following structure does not found in hepatodeudenal ligament?

a) Hepatic vein
b) Hepatic artery
c) CBD
Answer: A

Q14: Which of the following is not an ultrasonic finding in acute cholecystitis?

A- Sonographic Murphy's sign > Distended gall bladder and thickening of the wall
B- Pericholecystic fluid
C- Gall bladder wall thickening more than 6 mm
D- Absences of gall stones

Answer: D