Management of Gallbladder Disease

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PGY-5
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Financial disclosures

- None

Content

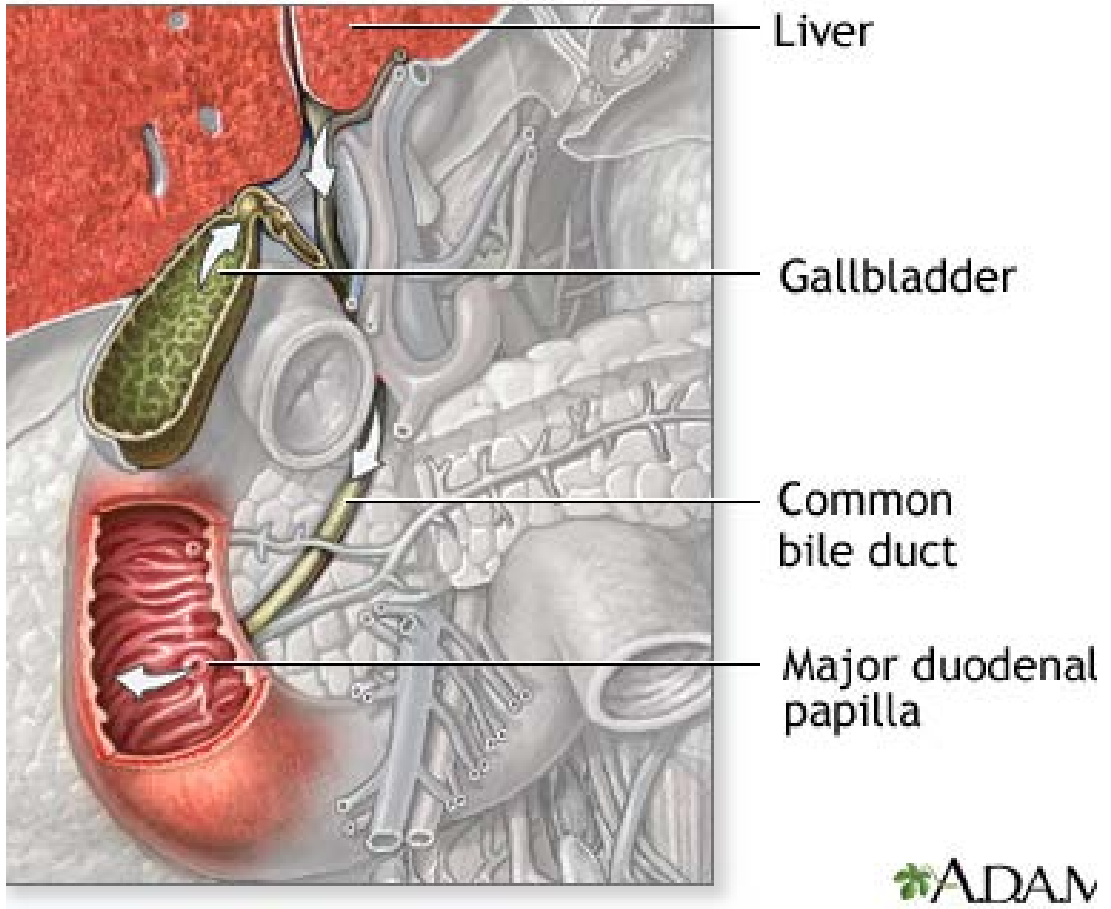
- Scope of gallbladder diseases
- Evaluation
  - H&P
  - Labs
  - Imaging
- Cholecystectomy vs cholecystostomy
- Ancillary procedures
- Special populations
- Post-op expectations and complications

Gallbladder Disease

- Spectrum of disease involving the biliary tract, usually related to gallstones
- Prevalence of gallstones: 10-15% of general population
  - Increases with age
  - Ethnicities- Pima Indian, Latinos
- 50% of stones remain asymptomatic
- Complication of stones is 1-4% per year
- Most costly digestive disease in the US
  - 1 million hospitalizations, 700k operations, $5B/year

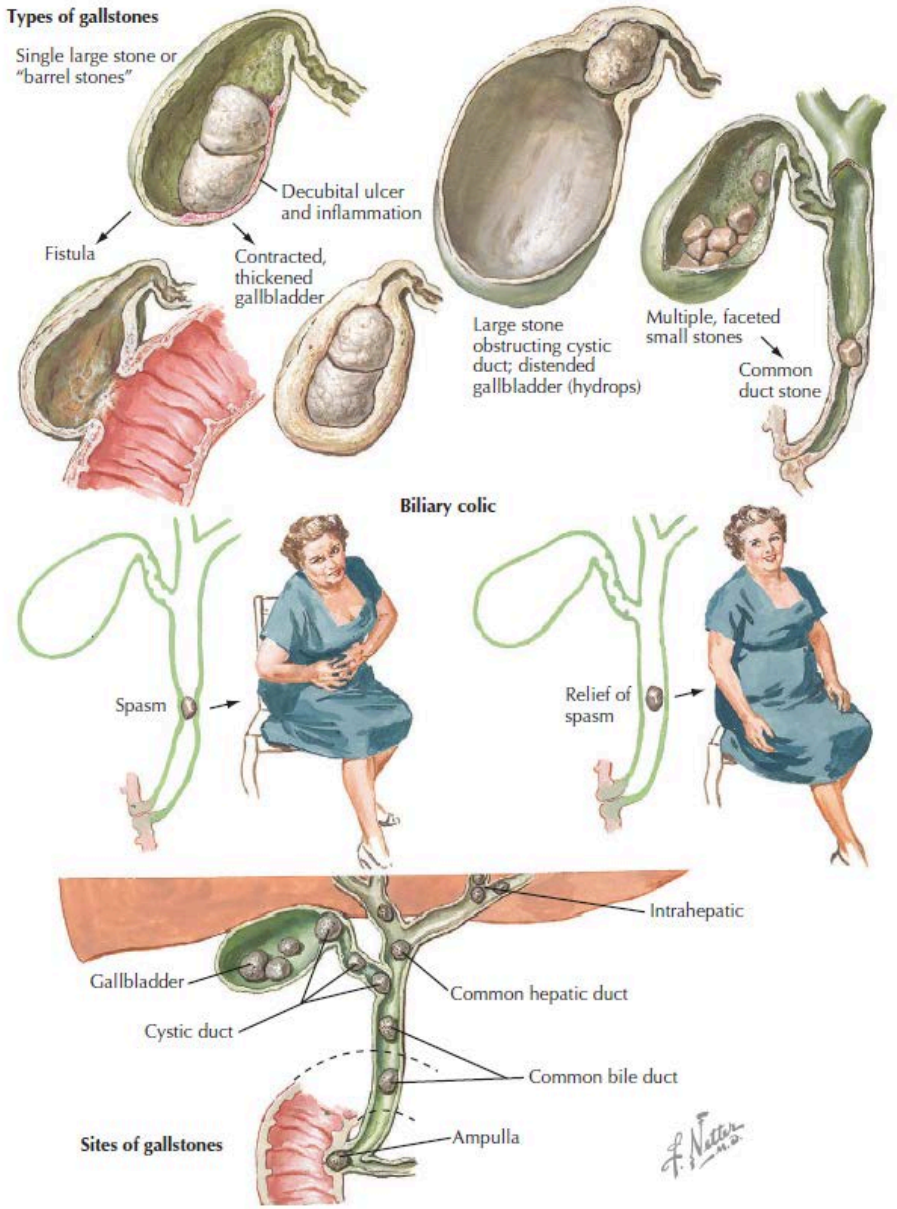
Gallbladder Diseases

- Asymptomatic cholelithiasis*
- Symptomatic cholelithiasis*
- Biliary dyskinesia*
- Sphincter of Oddi Dysfunction
- Acute cholecystitis*
- Choledocholithiaisis (asymptomatic)*
- Choledocholithiaisis (cholangitis)*
- Gallstone pancreatitis*
- Acalculous cholecystitis*
- Gallstone ileus
- Gallbladder polyp*
- Gallbladder cancer*
- Porcelain gallbladder
- Cholangiocarcinoma



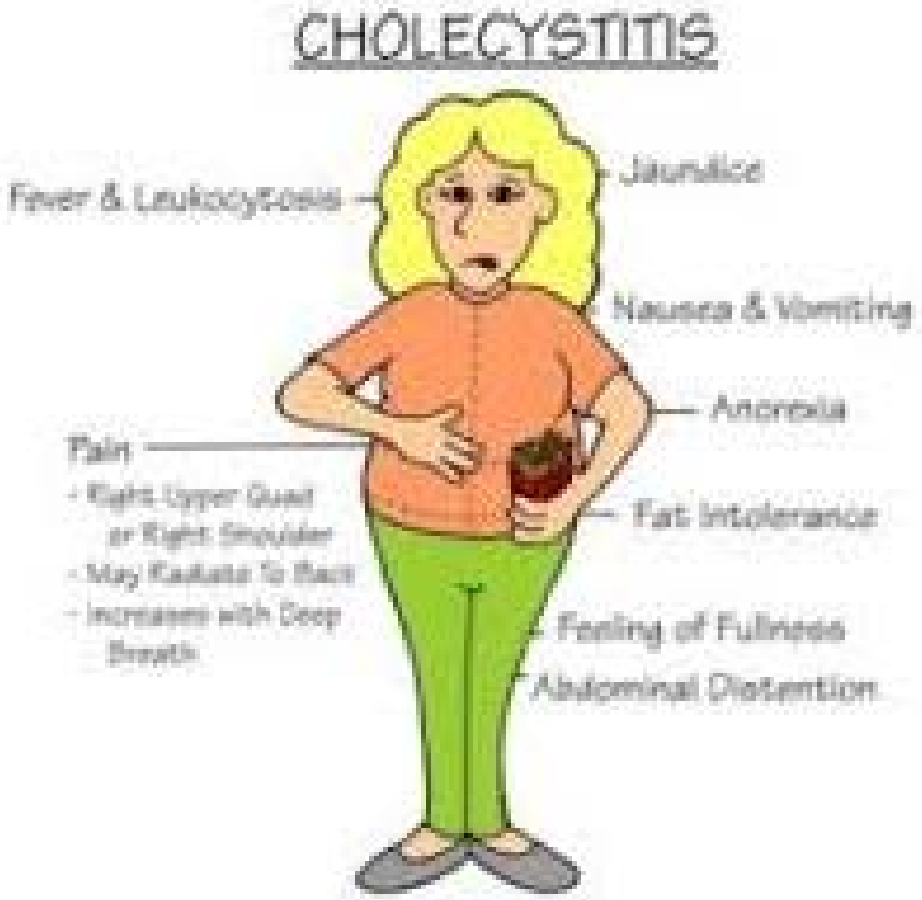
Gallbladder Workup

- H&P
- Labs
- Imaging
- Management
- Post-op course



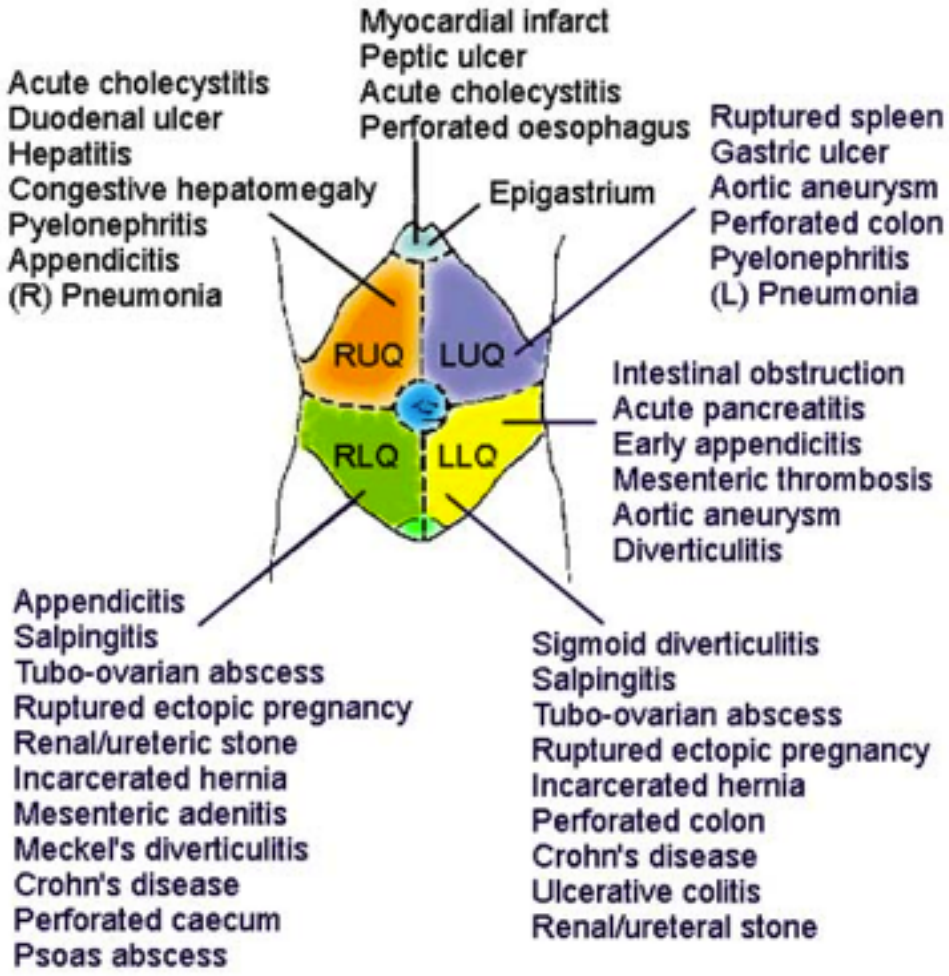
Biliary Colic

- Constant, intense, dull discomfort
  - Epigastrium, RUQ, substernal
- Radiates to right shoulder blade
- Associated with nausea, vomiting and diaphoresis.
- Onset ~30 minutes after fatty meal, plateaus ~1hr, resolves ~6hr
- Atypical symptoms:
  - non-specific abdominal pain, distension, bloating, early satiety
  - nausea and vomiting without AP
  - Chest pain, epigastric/retrosternal burning



Differential

- GERD
- PUD
- Hepatitis
- Pancreatitis
- Nephrolithiasis
- RLL PNA
- Appendicitis
- MI

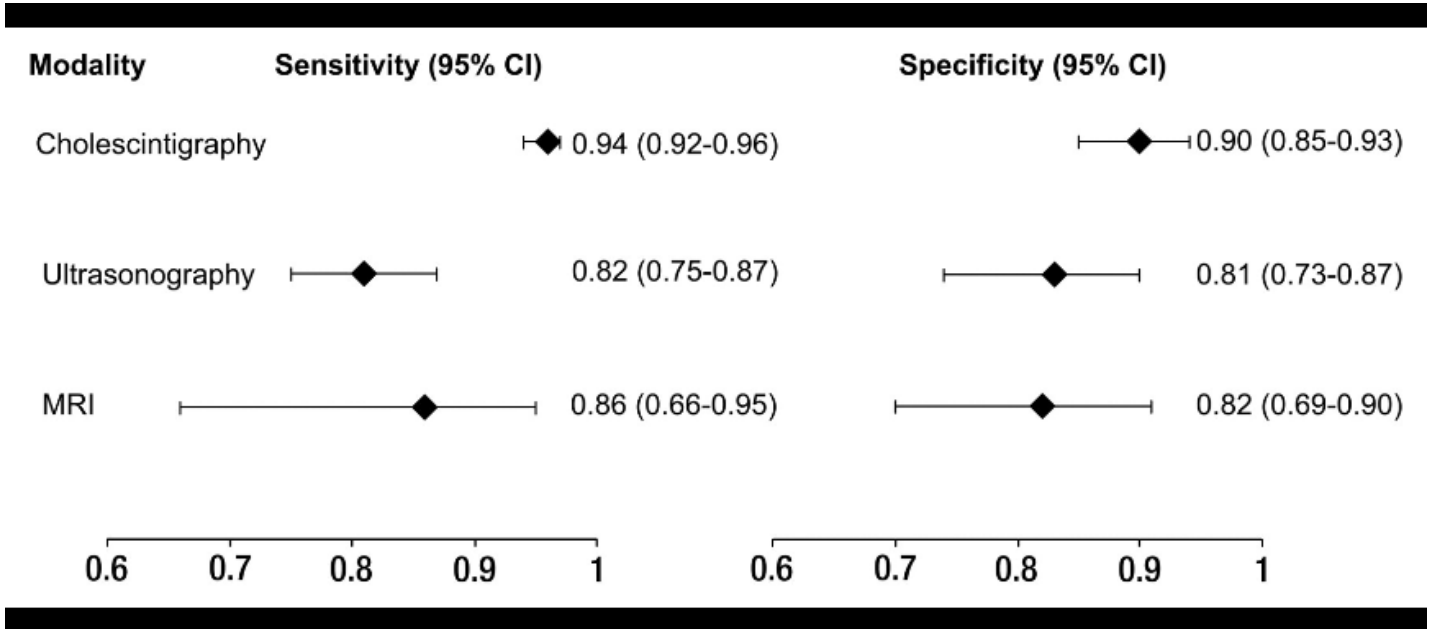


Serologic Tests

- Systemic inflammation
  - CBC
- Hepatocellular inflammation/damage
  - AST/ALT
- Cholestasis, biliary obstruction, impaired conjugation
  - Bili/AP
- Synthetic Function
  - PT/INR, albumin
- Pancreatic Inflammation
  - Lipase, amylase

Imaging

- US
- Scintigraphy (HIDA)
- Cholangiography
- ERCP
- MRCP
- CT



Kiewiet et al. A systematic review and meta-analysis of diagnostic performance of imaging in acute cholecystitis. Raiology 2012 Sep;264(3): 708-20.

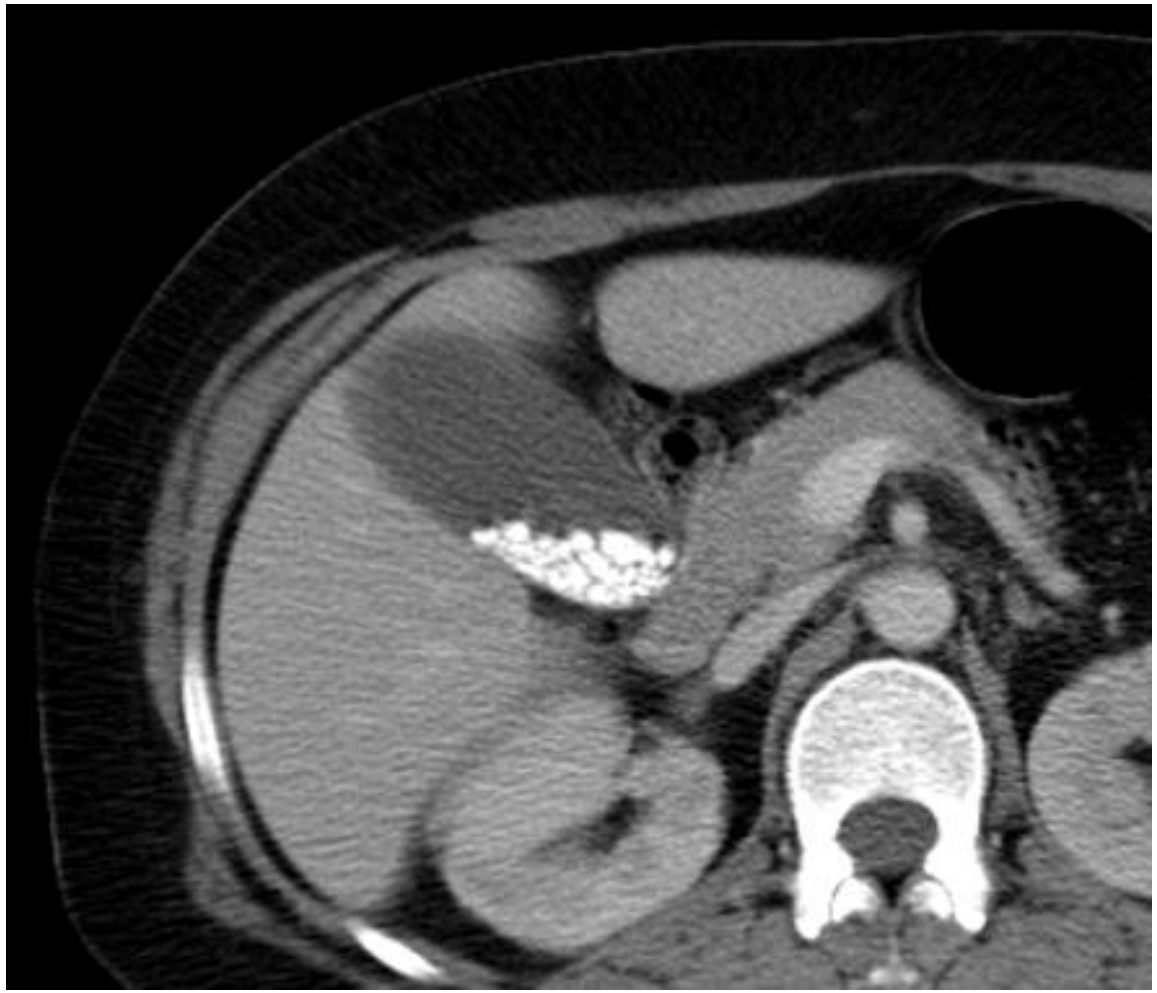
Diagnostic Accuracy in Acute Cholecystitis

- Cholescintigraphy has the highest diagnostic accuracy of all imaging modalities in detecting acute cholecystitis
  - Sensitivity 96% and specificity 90%
- US
  - Sensitivity 82% and specificity 81%
- MR
  - Diagnostic accuracy is comparable to US
- CT
  - Evidence of diagnostic accuracy of CT for suspected cholecystitis is scarce.

Kiewiet et al. A systematic review and meta-analysis of diagnostic performance of imaging in acute cholecystitis. Raiology 2012 Sep;264(3): 708-20.

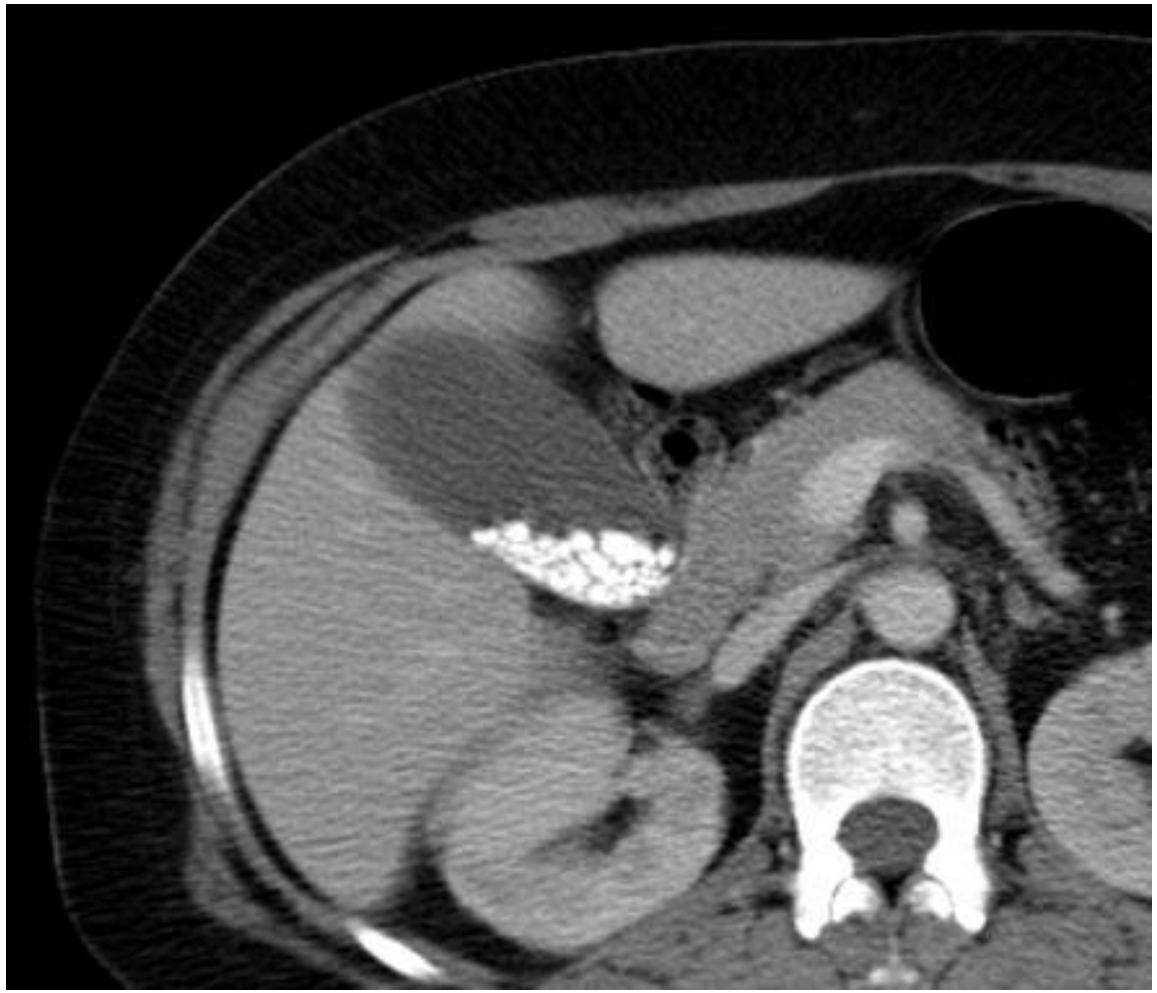
Case 1.1

- 41F presents to the ED after minor MVC.
- AF, HR 110, BP 140/70, RR 18, 98% on 2L NC
- CT A/P negative for acute injuries, however..



Next you…

- A. Obtain more history
- B. CBC, CMP, lipase
- C. Ultrasound
- D. MRCP
- E. Consult surgeon



Risk factors for Cholelithiasis

- Cholesterol- supersaturation
- Pigmented- hemolytic conditions/infections
- Age- increases 30s-50s
- Female Gender
- Pregnancy/multiple children
- Hormonal therapy
  - Estrogen: increases biliary cholesterol secretion
  - Progesterone: Decreases bile acid secretion
- Family medical history
- Obesity/rapid weight loss

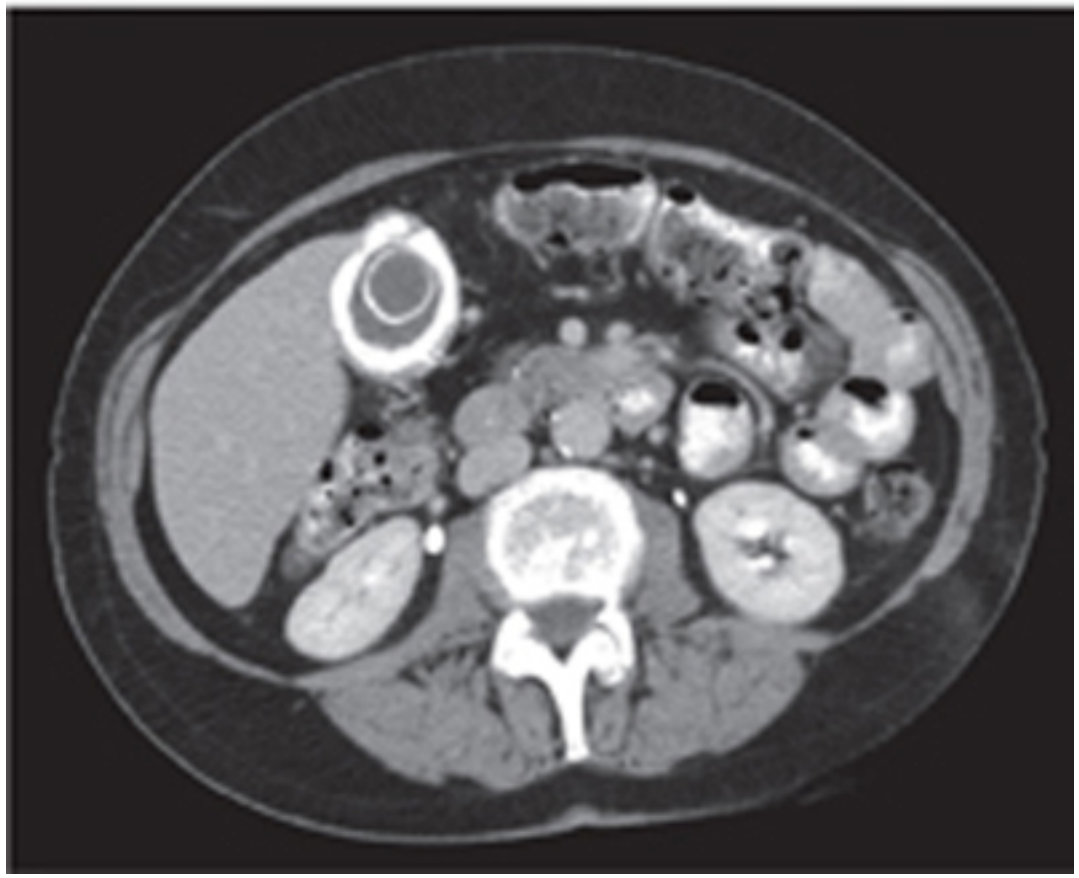
Asymptomatic Cholelithiasis

- Asymptomatic Stones
  - 1-4% complication rate/year
  - 5 years- 10 % symptomatic
  - 10 years- 15% symptomatic
  - 15 years- 18% symptomatic

- Symptomatic Stones
  - 90% initially present with symptomatic cholelithiasis
  - 50% develop recurrent symptoms
  - 1-2% develop complications of gallstone disease per year

Indications for Cholecystectomy- Asymptomatic

- GB adenoma >1 cm
- Porcelain gallbladder
- Some transplant patients
- Mars



Case Presentation 1.2

- The same woman presents to the ED for epigastric/RUQ after eating a fatty meal.
- Radiates to right flank/scapula.
- Associated with nausea and vomiting
- Does not feel like her usual acid reflux, did not improve with antacid.

Differential Diagnosis of Epigastric Pain

- Biliary etiology
- Gastroenteritis
- Peptic ulcer disease
- Pancreatitis
- Hepatitis
- Small bowel obstruction
- Myocardial infarction

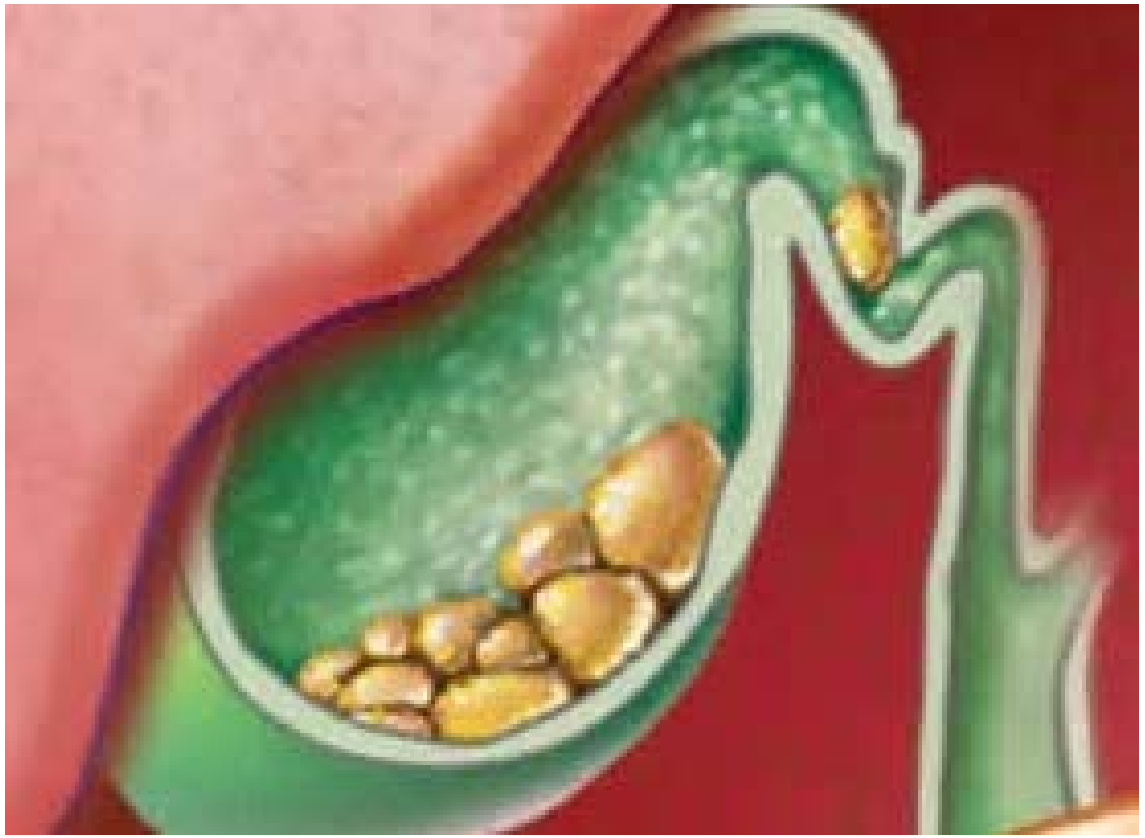
- As you are waiting for CBC, CMP, and lipase results you would order…

A. US
B. CT
C. HIDA
D. MRCP
E. Call surgeon

Cholelithiasis

Diagnostic Criteria for Symptomatic Cholelithiasis/Biliary Colic

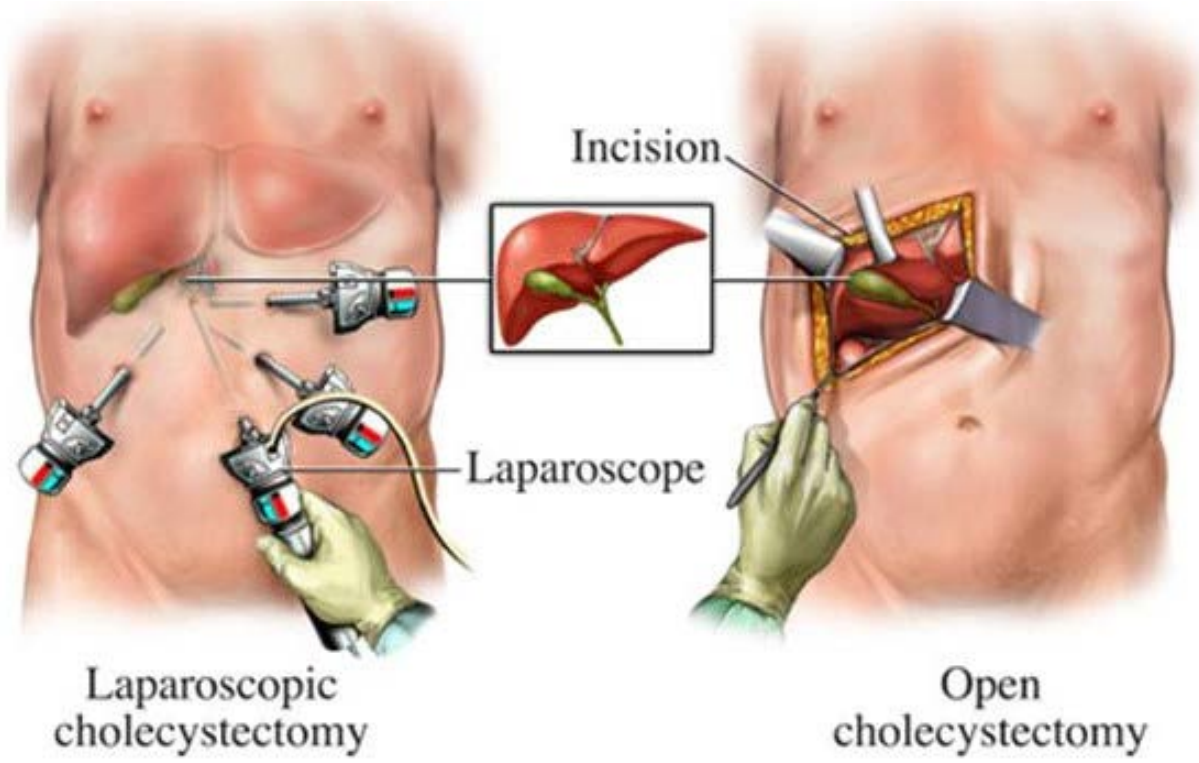
- Clinical signs and symptoms
- Radiographic confirmation of stones
- No evidence of inflammation/infection
- No evidence of jaundice, pancreatitis, CBD stones or dilatation.



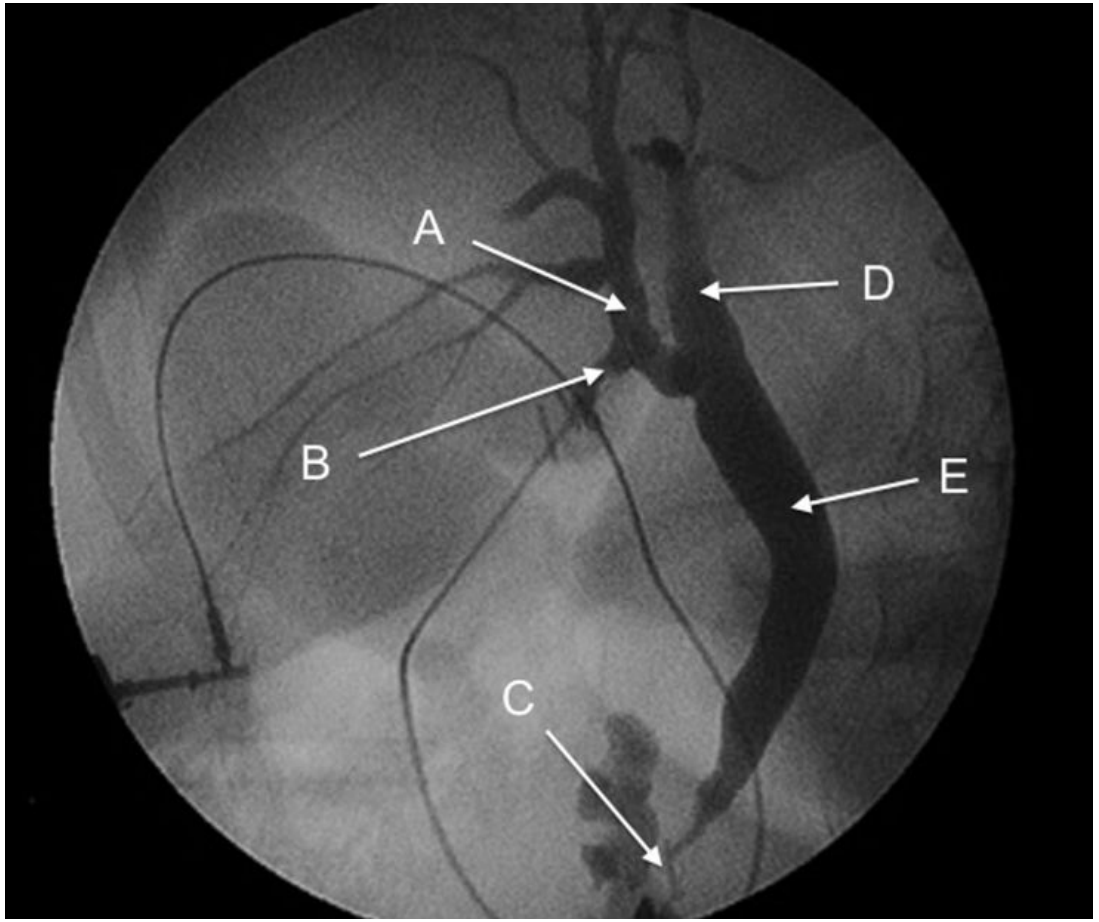
CAVEAT: If it doesn't completely resolve in ED or at home between episodes, WBC or LFTs are elevated, or there are signs of gallbladder inflammation consider (early) acute cholecystitis.

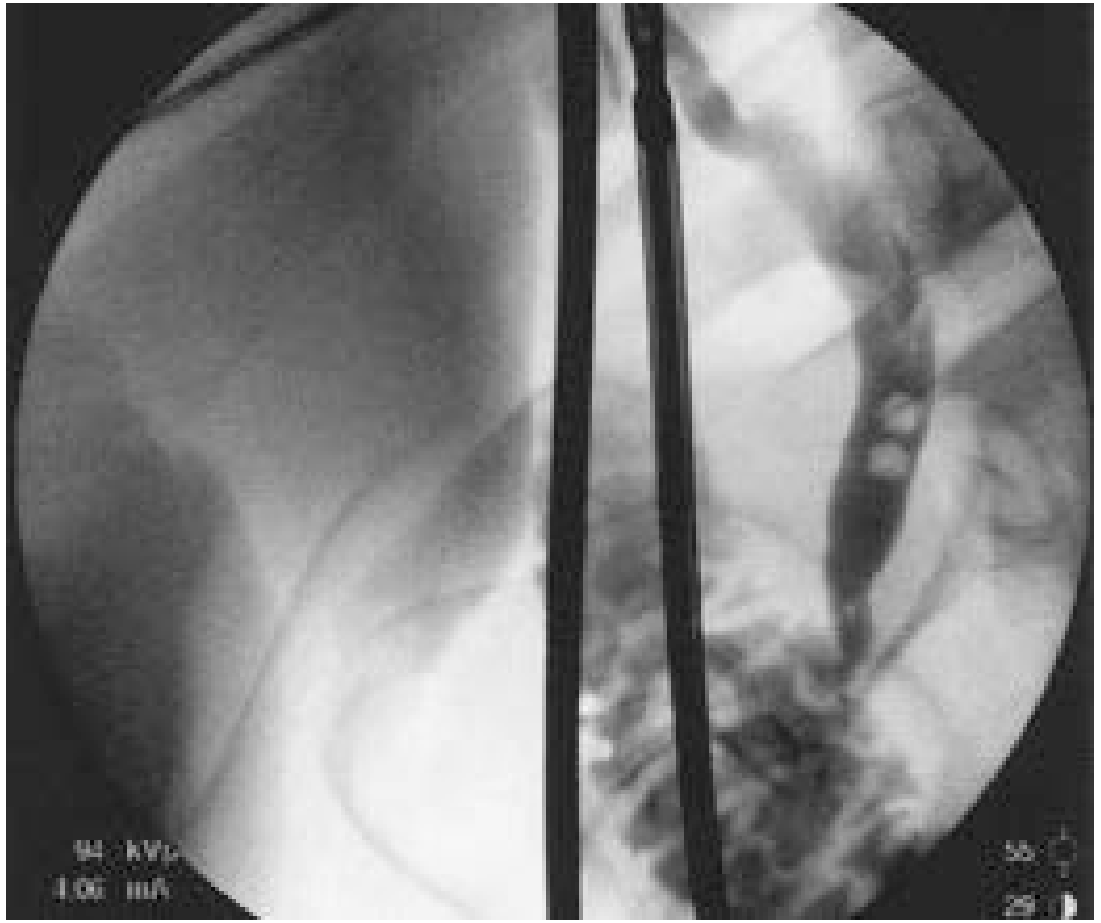
Symptomatic Cholecystitis

- Low fat diet until…
- Elective cholecystectomy +/- intraoperative cholangiography



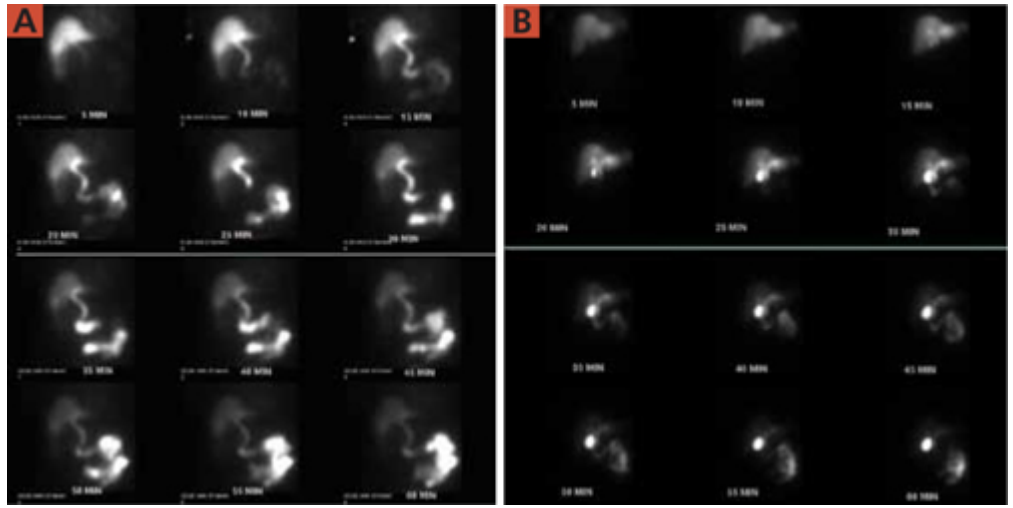
Cholangiography





Biliary Dyskinesia

- Caused by dysfunctional contraction of GB
  - Classic biliary colic symptoms
  - Absence of cholelithiasis
  - GB EF <30% on HIDA
  - Symptoms re-created by CCK
- Treatment
  - Same as asymptomatic cholelithiasis
  - 70-80% long term pain relief



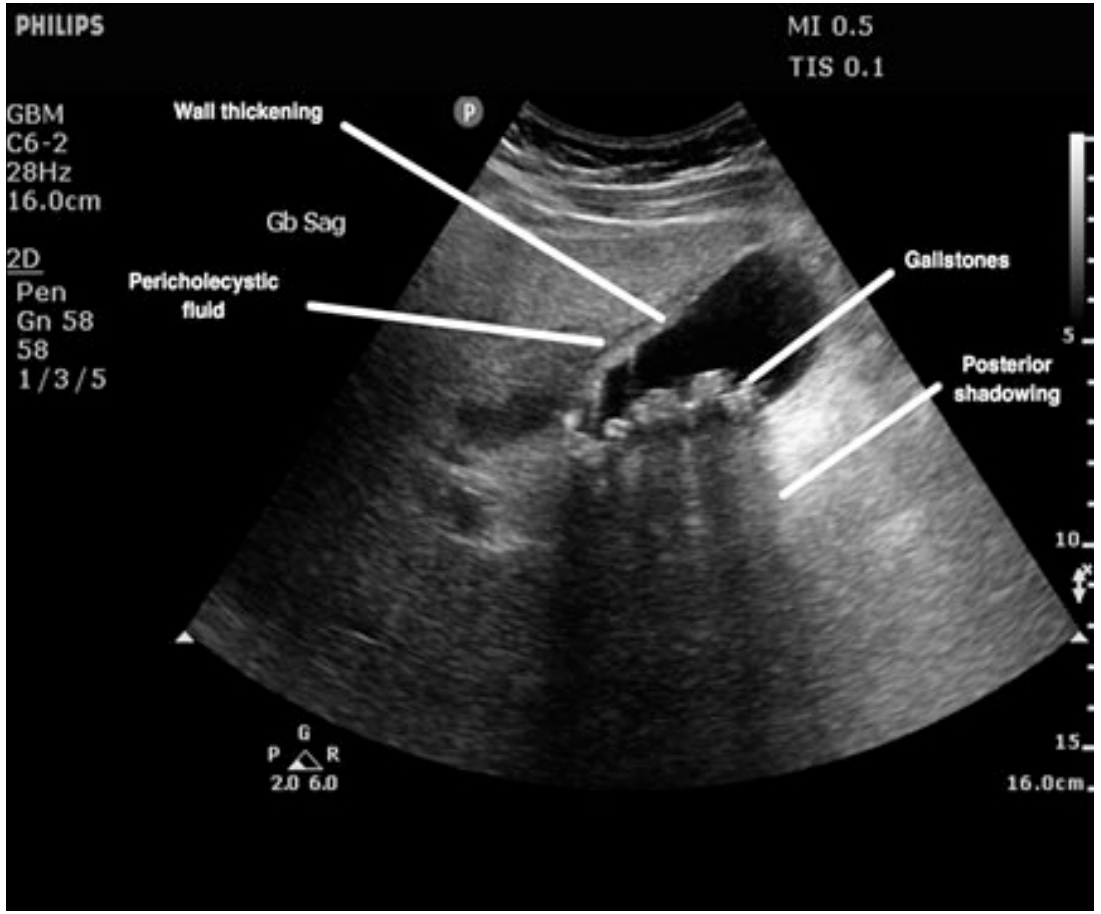
Case

- Patient is scheduled for elective laparoscopic cholecystectomy in 2 weeks, but…

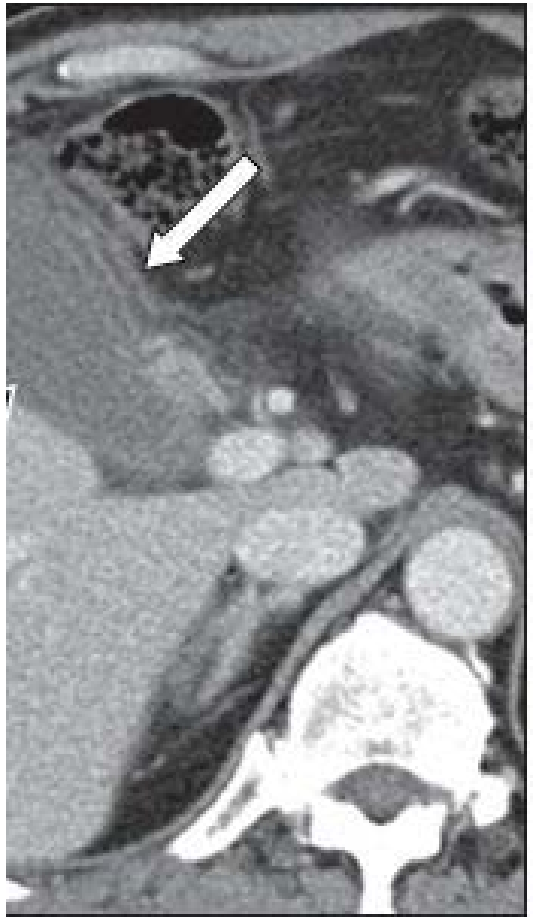
1.3

- 2 days of RUQ, fever, nausea, vomiting, murphy’s sign
- WBC 16
- Bili/ALT/AST/AP 1.8/35/26/150
- Lipase 46
- US consistent with acute cholecystitis

- Cholelithiasis
- Gallbladder wall thickening >3 mm
- Pericholecystic fluid
- Sonographic Murphy's sign
- 90-96% sensitive
- Also important: CBD size and presence of stones



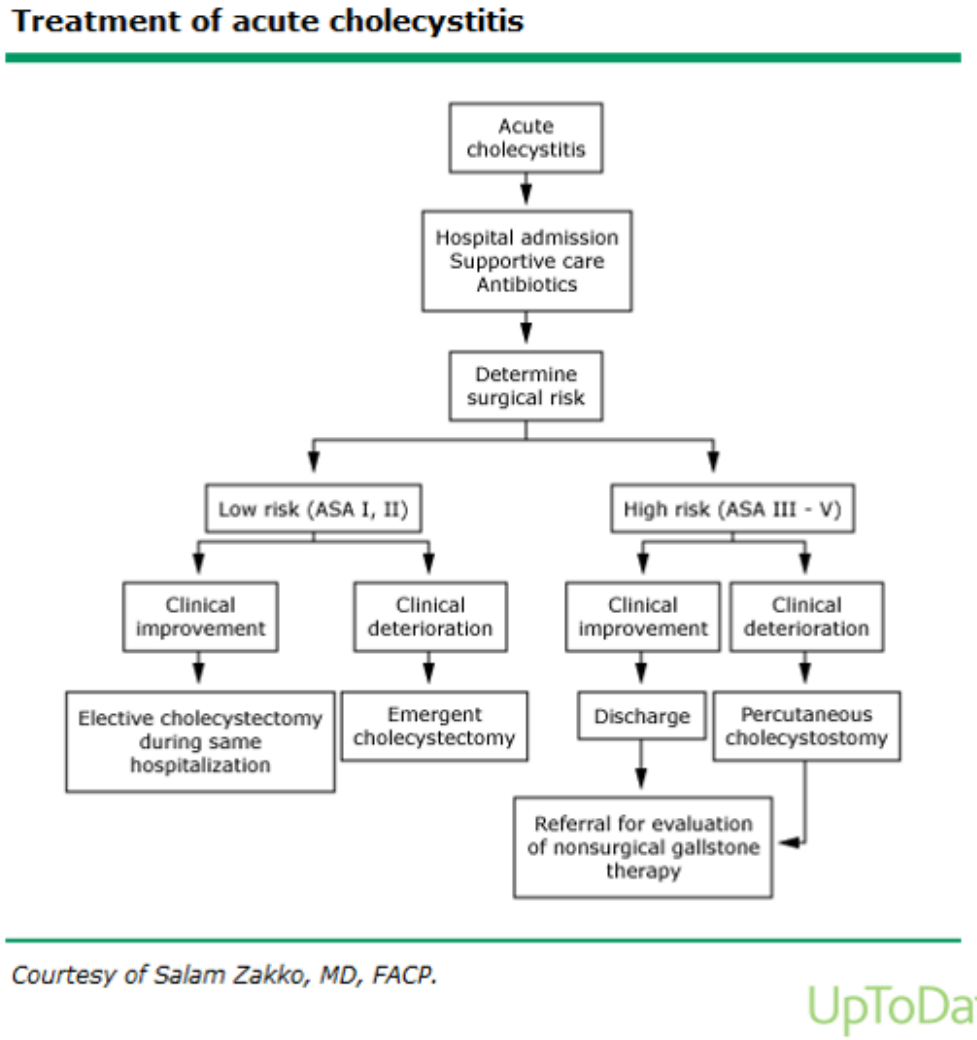

10-07-2008-0005
74/F
Abdomen
#127
C3-7ED /
Res TIs 0.1
[2D] G49 / 92dB
FA2 / P100
HAR
GB STAND




4b

Management

- Frequently infected by gram negatives and anaerobes
- NPO, IVF resuscitation, IV Abx
- Consider surgical intervention
  - Cholecystectomy vs cholecystostomy



Timing of Surgery

- Preferably without 72h
  - Acute inflammation progresses to fibrotic changes
  - Higher rate of conversion to open cholecystectomy and biliary duct injury
- High risk patients should be considered for cholecystostomy tube placement
  - ICU with severe comorbidities
  - Cirrhosis

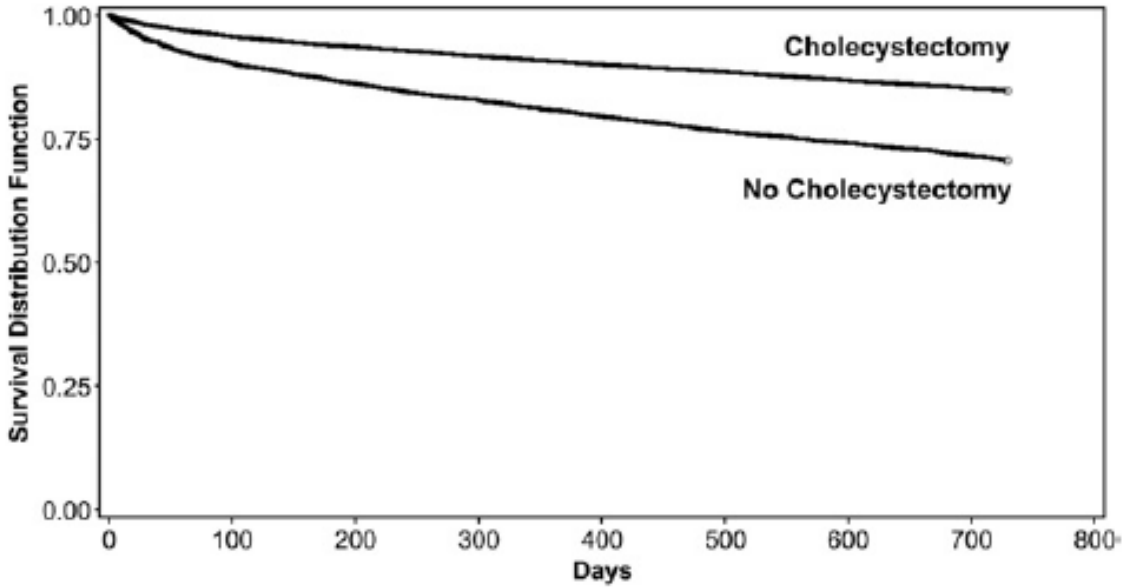
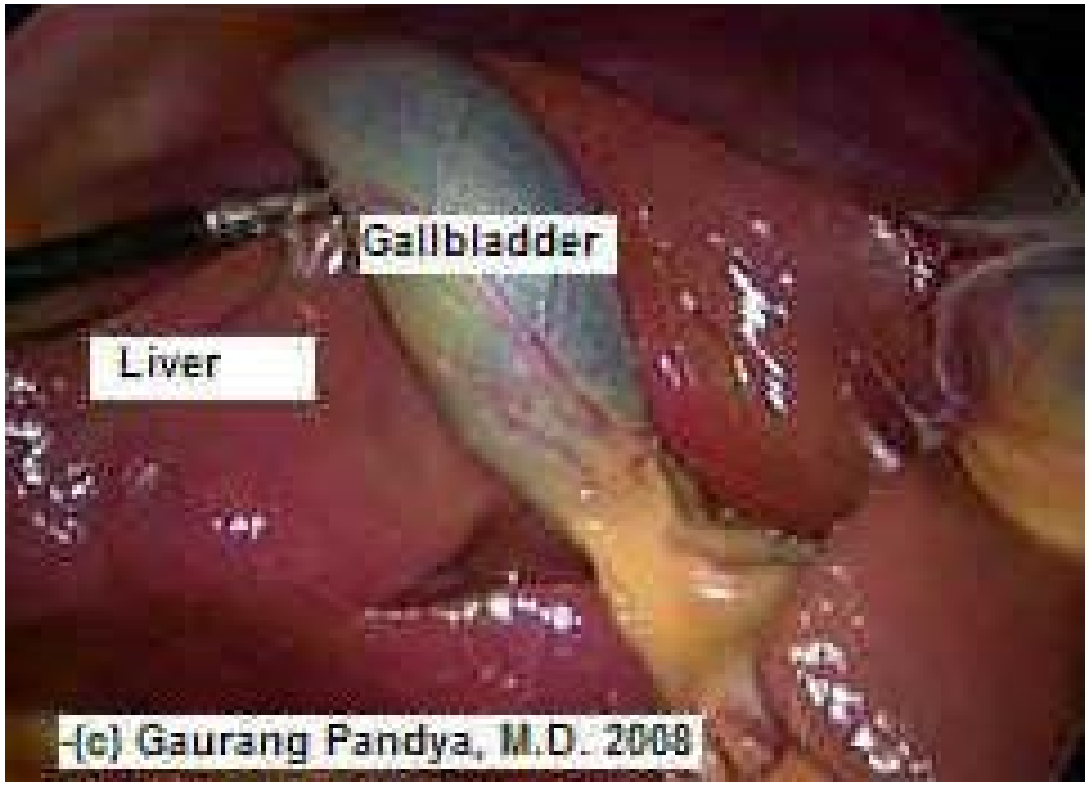


Figure 4. Kaplan-Meier unadjusted 2-year survival in patients who do and do not undergo cholecystectomy during initial hospitalization for acute cholecystitis. The 30-day, 1-year, and 2-year cumulative death rates were 2.0%, 9.0%, and 15.2%, respectively, in the cholecystectomy group and 5.0%, 19.4%, and 29.3%, respectively, in the no cholecystectomy group ($p < 0.0001$).

Am CollSurg210:668, 2010

Laparoscopic Cholecystectomy

Normal gallbladder

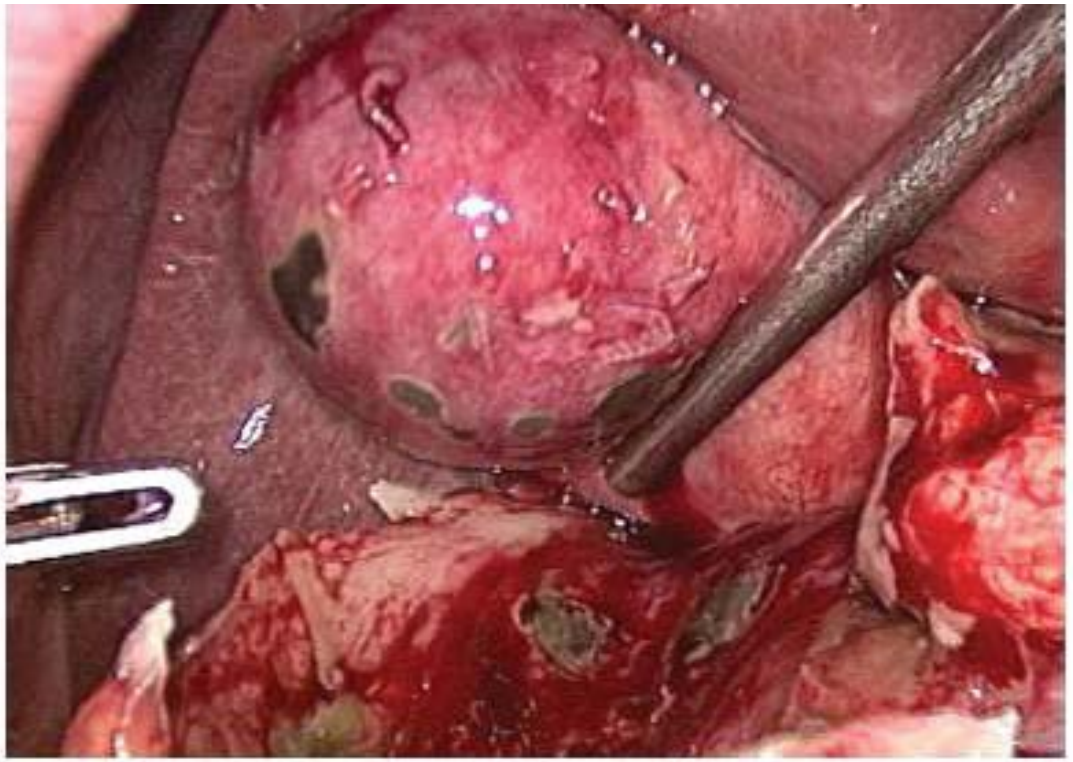


Simple acute cholecystitis

Laparoscopic Cholecystectomy

Phlegmonous acute cholecystitis

Gangrenous acute cholecystitis



The following day

- Tmax 102.5, BP 90/40, HR 130, jaundice, confusion
- WBC 22
- Bili: 4.8<-1.8
- Lipase 60
- US IH and EH bile duct dilatation, CBD 9 mm

Acute Cholangitis

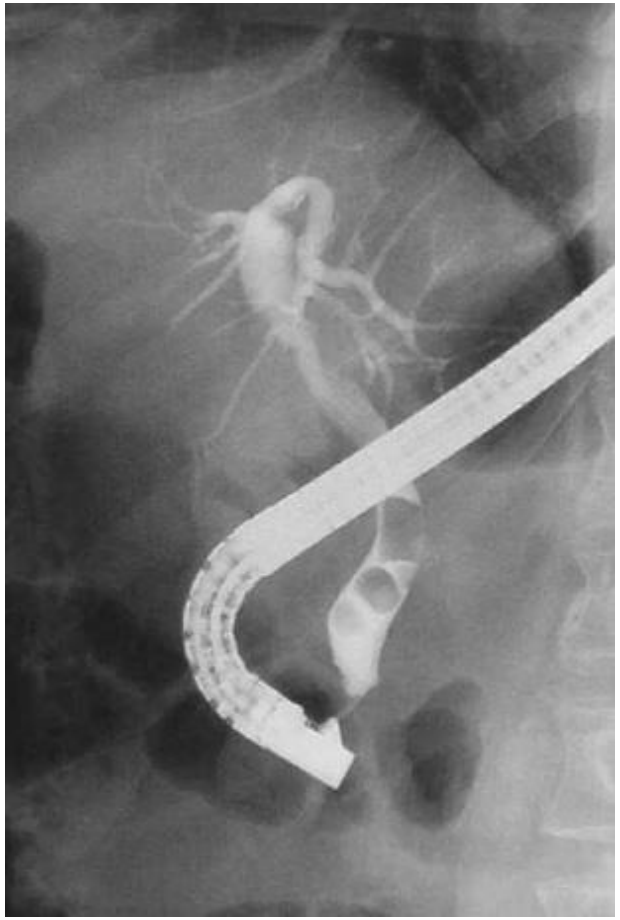
- Sepsis related to infected, obstructed biliary duct occlusion
- Usually
  - Bili in cholecystitis <2
  - Bili in cholangitis >4
- Treatment?
  - Abx, fluid resuscitation and bile duct decompression

Choledocholithiasis Risk Factors

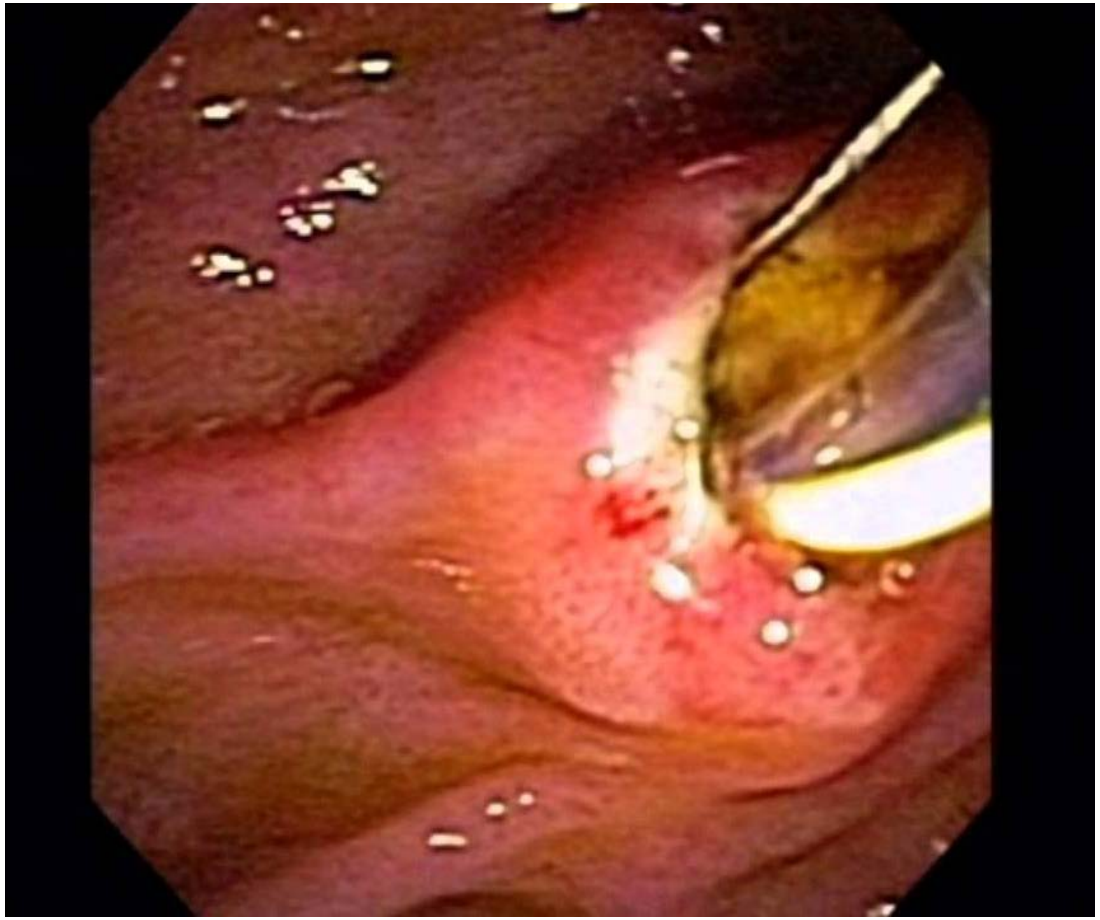
- Jaundice
  - Bili >2
- AP >normal
- CBD >8 mm
- Pancreatitis
- Confirmed by US, CT, MRCP evidence of CBD stone

ERCP

- Cannulation of ampulla
- Sphincterotomy
- Removal of stones
- +/- biliary stent
- If unsuccessful
  - surgical decompression
    - Lap CBD exploration
    - Open CBDE
  - Percutaneous transhepatic cholangiography

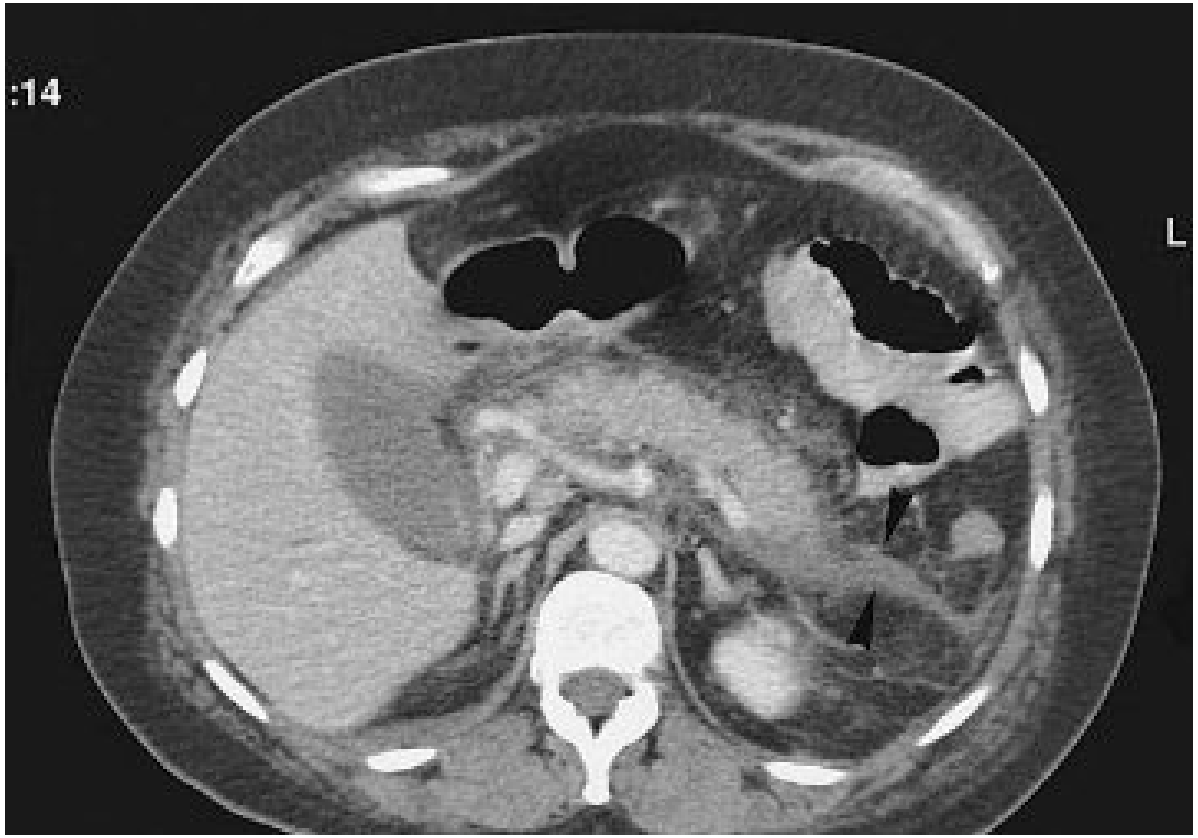


Endoscopic Sphincterotomy and Stone Retrieval



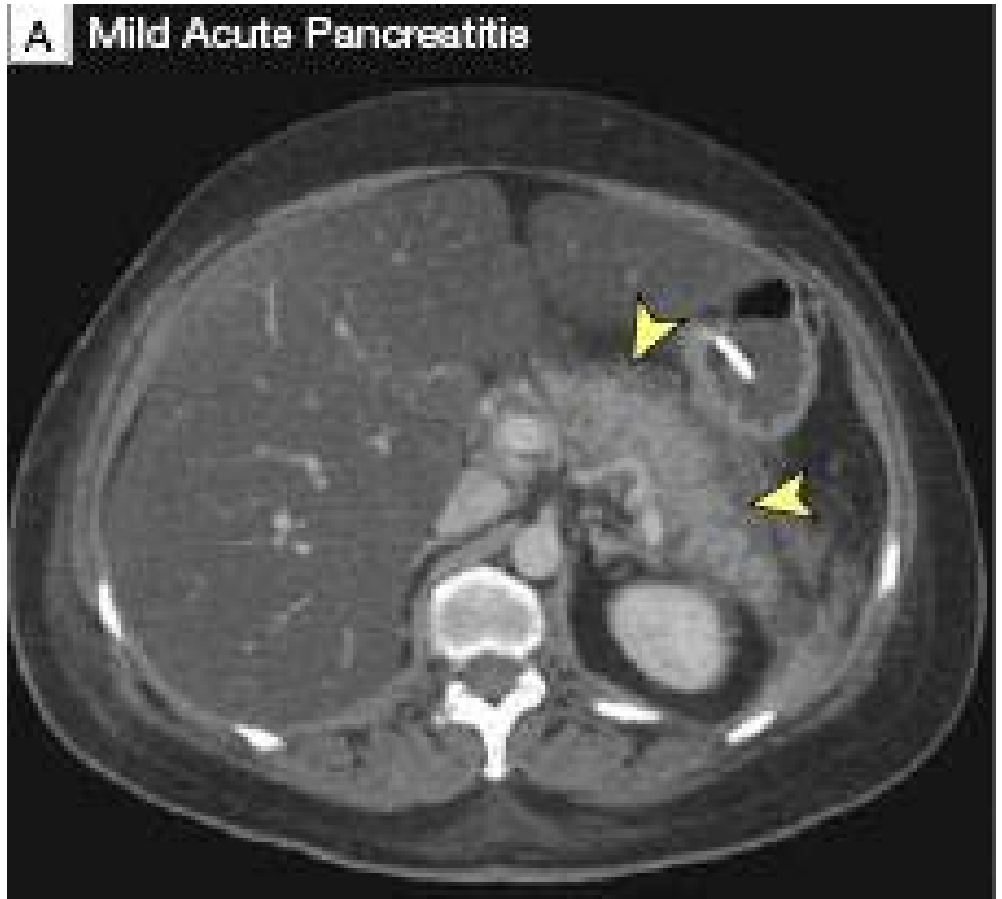
Case Presentation

- ERCP with ES and removal of multiple CBD stones
- Pain worse, epigastric, remains febrile
- Following day
  - WBC, Bili 2.8
  - Lipase 4500
  - CT A/P

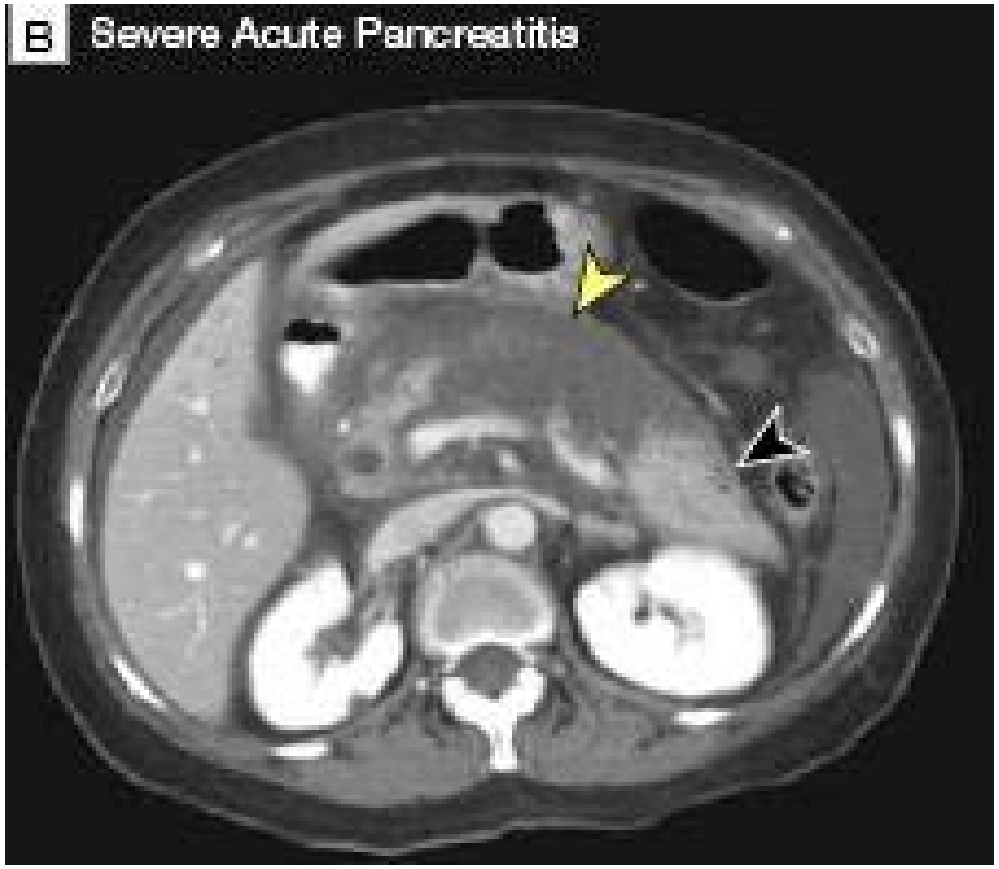


Gallstone Pancreatitis

Pancreatic edema- mild

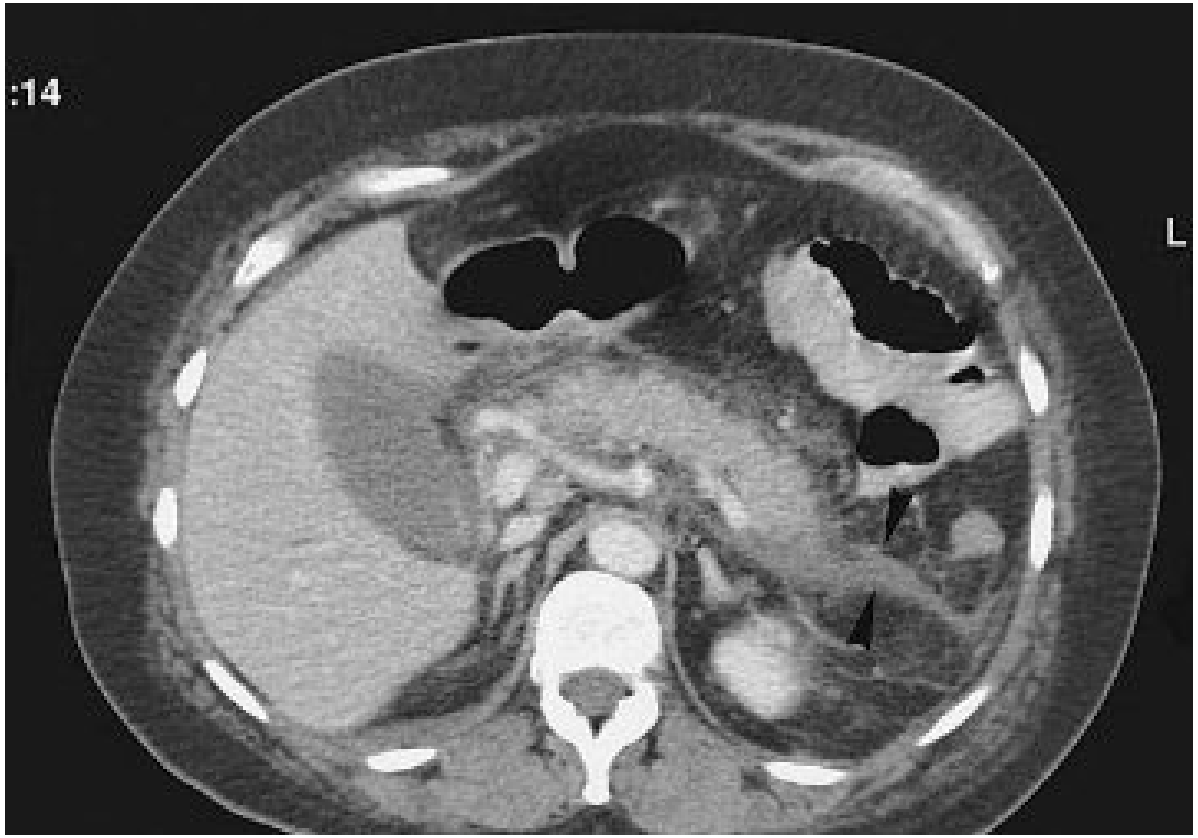


Pancreatic necrosis- severe



Case Presentation

- When do you operate?
  - Once tenderness has resolved
  - Before discharge
  - Usually in a couple days
- 33-50% recurrence within 4-6 weeks

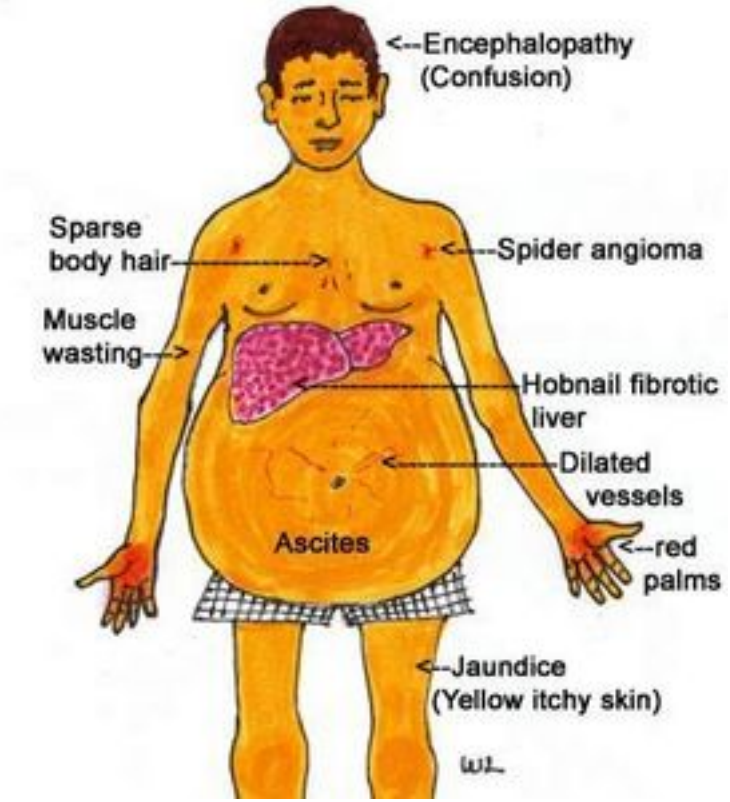


High rates of Recurrence after Initial Presentation for Symptomatic Stones

- 6-50% acute cholecystitis
- 5-50% for CBD stones
- 16-76% gallstone pancreastitis

Special Scenario 1

- 3 cirrhotics present with
  - RUQ pain
  - Biliary colic
  - Acute cholecystitis
  - Gallstone pancreatitis/CBD stone



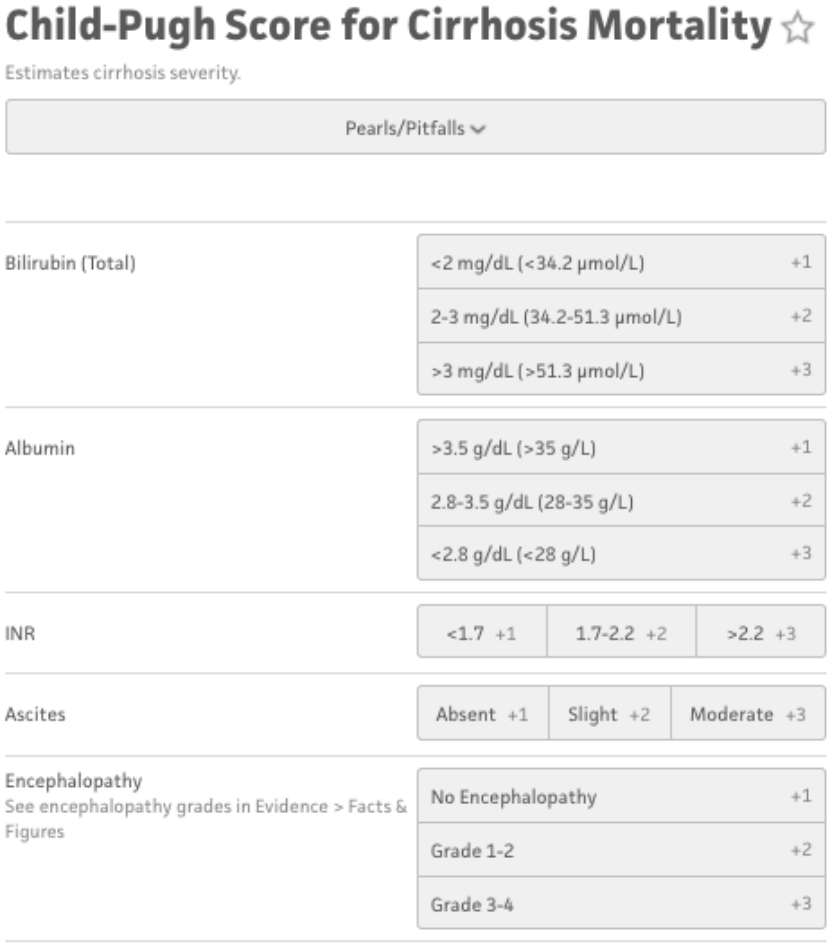
DDX of Gallbladder Wall Thickening

- Cholecystitis
- Post prandial physiological state
- **HEPATIC CIRRHOSIS**
- Hepatitis
- **CONGESTIVE HEART FAILURE**
- Fitz-Hugh-Curtis syndrome
- Hypoalbuminemia
- Acute pancreatitis
- Perforated duodenal ulcer
- Gallbladder cancer
- Adenomyomatosis of the gallbladder

Radiopaedia.org

Cirrhosis

- The Child Pugh Score
  - No prospective validation
  - Used to assess severity of cirrhosis and to predict their risks of perioperative morbidity and mortality for both elective and emergency surgery.
    - CTP A mortality 10%
    - CTP B mortality 30%
    - CTP C mortality 75%



Child-Pugh Score for Cirrhosis Mortality ☆

Estimates cirrhosis severity.

Pearls/Pitfalls

Bilirubin (Total)	<2 mg/dL (<34.2 µmol/L) +1		
	2-3 mg/dL (34.2-51.3 µmol/L) +2		
	>3 mg/dL (>51.3 µmol/L) +3		
Albumin	>3.5 g/dL (>35 g/L) +1		
	2.8-3.5 g/dL (28-35 g/L) +2		
	<2.8 g/dL (<28 g/L) +3		
INR	<1.7 +1	1.7-2.2 +2	>2.2 +3
Ascites	Absent +1	Slight +2	Moderate +3
Encephalopathy See encephalopathy grades in Evidence > Facts & Figures	No Encephalopathy +1		
	Grade 1-2 +2		
	Grade 3-4 +3		

Special Scenario 2

- Pregnant women with
  - Biliary colic
  - Acute cholecystitis/Gallstone pancreatitis/CBD stone

Gallbladder Disease in Pregnancy

- **Guideline 15: Laparoscopic cholecystectomy is the treatment of choice in the pregnant patient with gallbladder disease, regardless of trimester (Moderate; Strong).**

Pearl et al. Guidelines of the use of Laparoscopy during Pregnancy. Society of American Gastrointestinal and Endoscopic Surgeons. May 2017.

Pregnancy

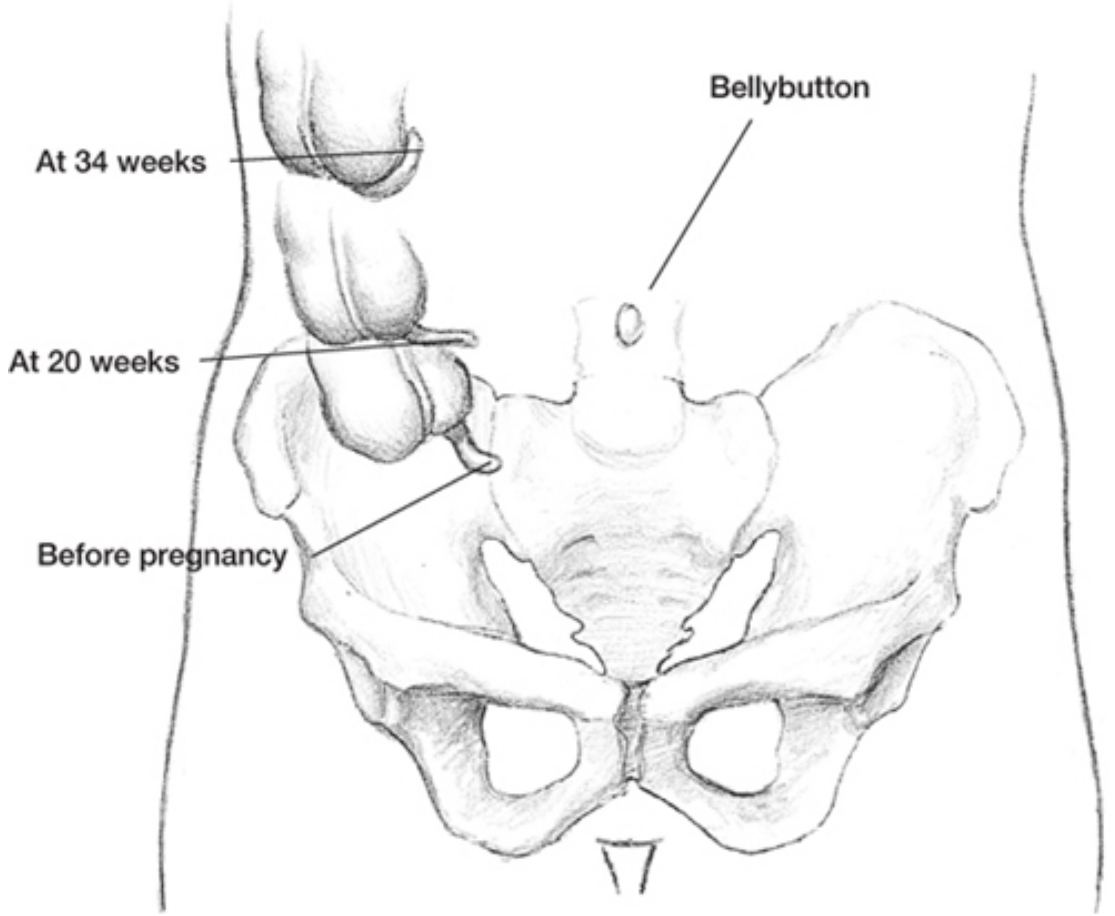
Present in	Recurrence of Symptoms During Pregnancy
First trimester	92%
Second trimester	64%
Third trimester	44%

Delays in surgical management lead to increased rates of hospitalization, spontaneous abortions, preterm labor, and preterm delivery compared to those undergoing surgical cholecystectomy.

Overall, 50% of patients experience recurrence of symptoms. 23% develop acute cholecystitis or gallstone pancreatitis.
Pancreatitis results in fetal loss in 10-60% of pregnant patients.

Special Scenario 3

- Pregnant women with RUQ.
- Elevated WBC
- Normal LFTs
- GB normal on US

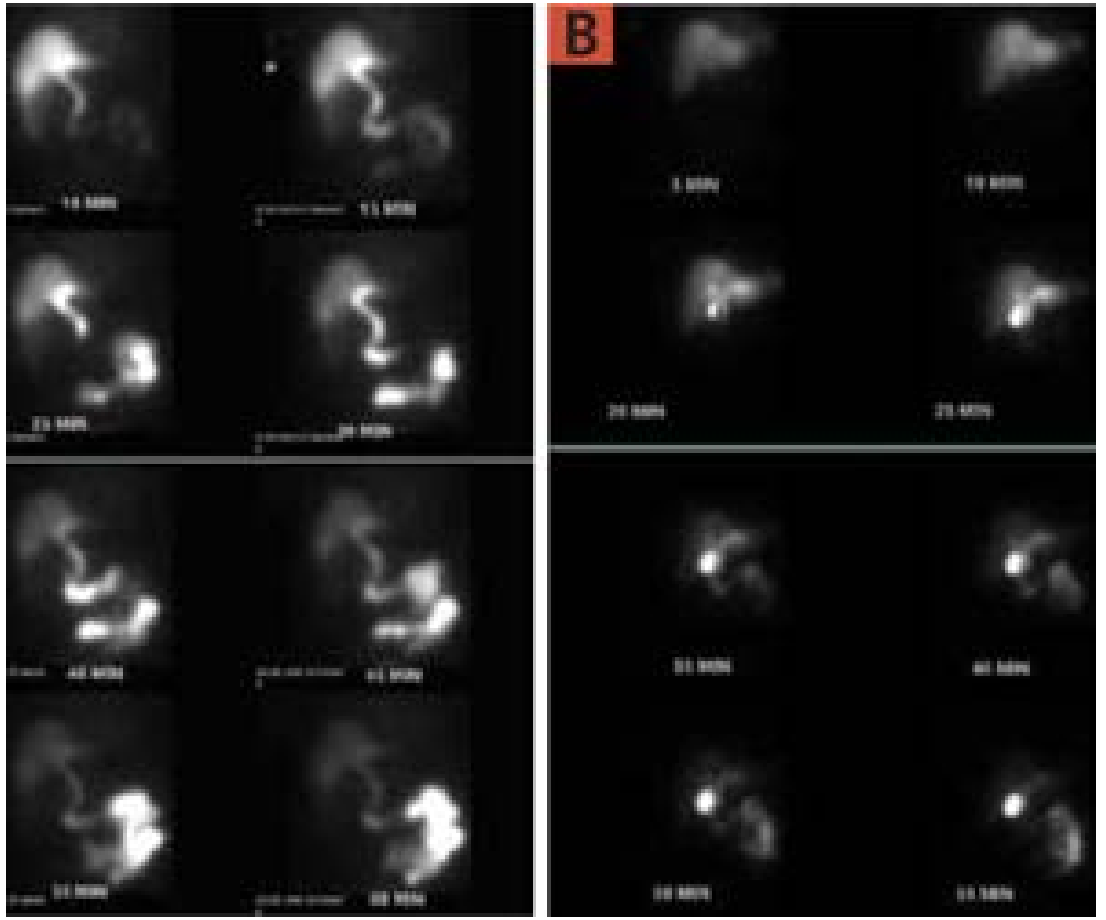


ICU Patient

- Intubated, on pressors, rising WBC->CT
- US on admission shows no gallstones.

Acalculous Cholecystitis

- Acute cholecystitis without cholelithiasis
- Probably ischemic in etiology
- Disease of ICU patients
- TPN is risk factor
- Diagnosis made by US and or HIDA
- Treatment depends on overall condition
  - Mild to moderate illness- cholecystectomy
  - Severely ill- Perc chole



Percutaneous Drainage

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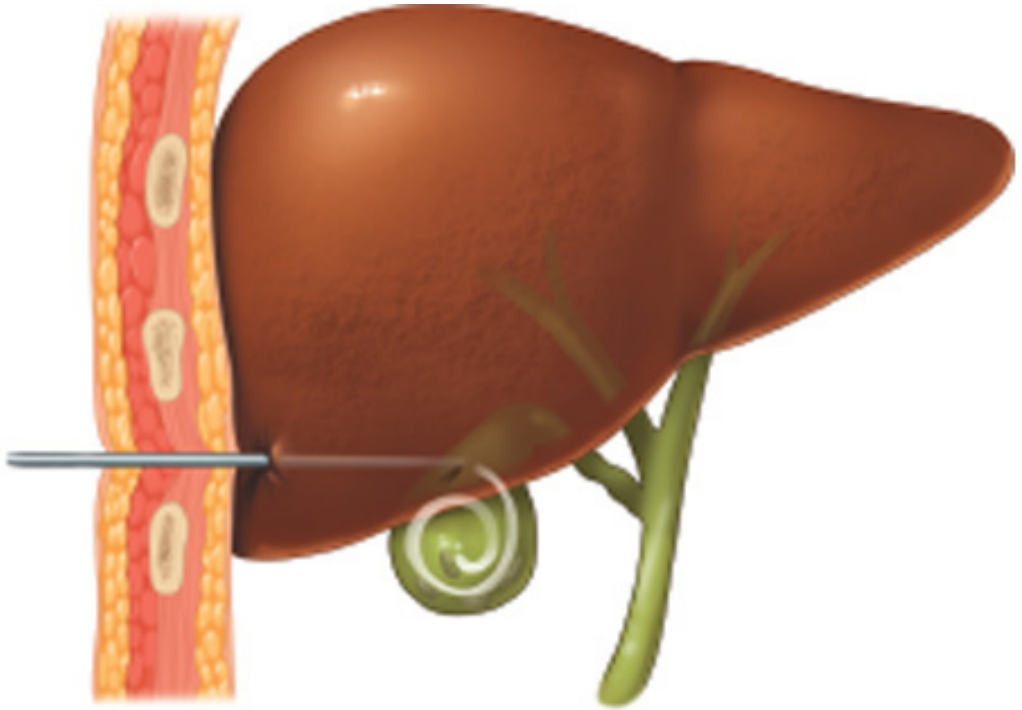

Source: Brunicardi FC, Andersen DK, Billiar TR, Dunn DL, Hunter JG, Matthews JB, Pollock RE: *Schwartz's Principles of Surgery, 9th Edition:* http://www.accessmedicine.com

Early Cholecystectomy vs Percutaneous Drainage

Table 3 Complication rates, mortality, and length of hospital stay

	PD group	EC group	*P*
N	23	19	
Overall complication rate	2(8.7%)	9(47%)	0.011
Minor complications[a]	2(8.7%)	5(26%)	0.21
Major complications[a,b]	0	4(21%)	0.03
90-day mortality	3(13%)	3(16%)	1.0
Overall hospital stay in days	25(7–97)	23(5–65)	0.39
ICU stay in days	10.5(2–71)	3(2–31)	0.17

World J Surg 35:826, 2011

Post-op Course

- Depends on severity of initial indication
- Laparoscopic vs open cholecystectomy
- Normal Post-op Course
  - Decline in acute pain and return of bowel function 1-3 days
    - Shoulder pain
  - Return to usual activities and energy in 1-2 weeks
- CAUTION: fevers, worsening AP inability to tolerate PO, new or persistent jaundice suggest possible complications

Post-op Complications

- CBC, CMP, lipase, imaging
- Bleeding, infection, bile leak, CBD injury, retained stone
- Small CBD with fluid: HIDA, MRCP, ERCP to evaluate for leak
- Dilated CBD: MRCP, ERCP to evaluate for obstruction
- Cystic duct leak/duct of Luschka: ERCP c stent +/- percutaneous subhepatic drain
- CBD stricture: ERCP stent, possibly surgery
- CBD obstruction ERCP + stent, likely surgery

Closing Comments

- Gallbladder disease has a wide spectrum of presentations
- Asymptomatic stones are observed, may become symptomatic
- Symptomatic gallbladder conditions usually benefit from cholecystectomy
- Laparoscopic cholecystectomy is preferred to open cholecystectomy
- Cholecystostomy has role in critically ill and high-risk operative candidates
- Deviations from expected post-op course are concerning for post-op complication. Maintain high level of suspicion, especially if fever, worsening pain, or jaundice