Acute Cholecystitis

- US
  - Uncomplicated: Positive sonographic "Murphy" sign; gallstone impacted in neck of GB or cystic duct; thickened GB wall (> 4 mm)
  - Complicated: Gallstones; pericholecystic fluid/abscess; intraluminal membranes; gas in GB wall/lumen; sonographic Murphy sign absent in 1/3 of patients; asymmetric wall thickening
- Biliary scintigraphy
  - Non-visualization of GB at 4 hours has 99% specificity
  - or 30 minutes after administration of morphine
- Best imaging tool: US or biliary scintigraphy
- Protocol advice: Longitudinal and transverse images of GB, parasagittal images of GB neck region & cystic duct in LPO position to detect impacted gallstones (i.e., immobile)

Clinical

- Acute RUQ pain, fever
- May progress to gangrenous cholecystitis and perforation if untreated
- Excellent prognosis in uncomplicated cases or with prompt surgery
- Calcified stones in only 15-20% of patients with cholecystitis.
- 95% calculous
  - Obstructing stone in cystic duct
- 5% acalculous
  - Ischemia with secondary inflammation/infection
  - AIDS patients have opportunistic GB infection

US

- Cholelithiasis (usually an immobile, impacted stone in GB neck or cystic duct), sonographic Murphy sign, and GB wall thickening > 3 mm
- GB distension > 5 cm in short axis
- Increased vascularity of GB wall on color Doppler images

Complicated

- **Perforated cholecystitis**: Pericholecystic abscess with collapsed GB
  - High-frequency transducer may allow better visualization of GB fundus to help exclude early perforation
  - Sonographic hole sign: Visualization of GB wall defect on US
- **Gangrenous cholecystitis**: Asymmetric wall thickening, intraluminal linear membranes, and irregularity and ulcerations of GB wall
  - Striated GB, contrary to prior teaching, not convincingly associated with gangrene
  - GB wall hyperemia may be absent on color Doppler images as result of wall necrosis
- **Emphysematous cholecystitis**: Gas in GB lumen and wall (brightly echogenic reflectors with dense "dirty" posterior acoustic shadowing)
  - GB itself may be difficult to visualize as result of shadowing from gas
- **Hemorrhagic cholecystitis**: Echogenic clot within GB lumen or visualized biliary tree

Hepatobiliary scintigraphy

- Tc-99m iminodiacetic acid derivatives
- Nonvisualization of GB 4 hours after radiotracer injection (or 30 minutes after morphine administration)
- Increased uptake in GB fossa (rim sign) due to hyperemia in 35% of patients
  - Very specific (but not sensitive) for acute cholecystitis
  - Positive predictive value of 57% for gangrenous cholecystitis
- Hepatobiliary scintigraphy more sensitive (97%) and specific (90%) compared to US (88% and 80%, respectively)
- False-positive results in patients who have recently eaten, undergone prolonged fasting (> 24 hours), received hyperalimentation, have severe concurrent illness, or who have severe hepatocellular dysfunction

Acalculous Cholecystitis

- **Same imaging findings, except no stones**
- **Not** associated with obstruction of cystic duct by stones
- Most often result of bile stasis and gallbladder ischemia
- Typically occurs in critically ill patients (trauma, surgery, sepsis, mechanical ventilation, immunosuppression, etc.)

Clinical Issues

- Higher risk of morbidity/mortality compared to calculous cholecystitis with ↑ risk of complications
  - More likely than calculous cholecystitis to present atypically
  - Insidious presentation in critically ill patients and diagnosis is often delayed
- Preferred treatment: Cholecystectomy and broad spectrum intravenous antibiotics
- Cholecystostomy used as bridge to definitive cholecystectomy in critically ill, unstable patients