

## The Trolling Stones: Cholecystitis

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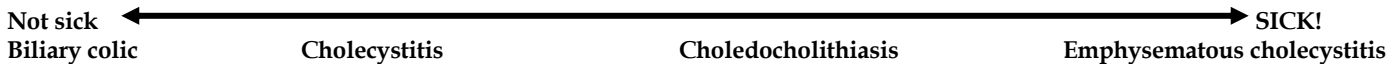
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### INTRODUCTION

Gallstone disease, most commonly manifesting as cholecystitis, is seen in up to 10% of patients who have symptomatic gallstones. This guide will serve as a succinct outline to approaching patients with RUQ pain suspected of having gallstone pathology. One of the trickiest parts of these pathologies is keeping all these “C names” straight.

It is best to think of related diagnoses of biliary pathology on a spectrum:



In this document we will focus on biliary colic and cholecystitis, we will also touch on emphysematous cholecystitis.

**Cholelithiasis:** stone in the gallbladder. Simple as that. It does not indicate if the patient is symptomatic or not. In fact, ~6% of Westerners walk around with gallstones (women more than men), and only about 10% end up having cholecystitis.

**Biliary colic:** RUQ pain due to gallbladder contraction. It typically comes in phases after eating and lasts a total of a few hours (always <6). Fever and peritoneal signs are *always* absent, but the RUQ pain can mimic cholecystitis. 70% of patients develop recurrent symptoms in 2 years. Furthermore, biliary colic usually does not present with fever or leukocytosis (no inflammatory component).

**Acute cholecystitis:** obstruction of the cystic duct with subsequent inflammation of the gallbladder. Although it is most commonly due to cholesterol or bilirubin stones obstructing the cystic duct, in 5-10% of cases acalculus cholecystitis is the cause. Look for acalculous cholecystitis as the cause in ICU patients or those usually on TPN (outside the scope of this review).

**Presentation:** RUQ or epigastric pain lasting > 4 hours, often has referral pain to shoulder or back. Patients may experience fever, nausea/vomiting, and anorexia, however these are not seen in the majority of patients. The episode is most likely post-fatty food ingestion.

On exam, patients can often be ill-appearing, with voluntary and involuntary guarding of the RUQ.

**Murphy's sign** can be elicited when palpating the RUQ and on asking the patient to take a deep breath there is cessation of inspiration. On inspiration the gallbladder is displaced from beneath the liver to be against the examiner's fingers. *Murphy's Sign is NOT simply palpable tenderness of the RUQ (this is a common misconception).* Murphy's Sign is very sensitive but poorly specific (97% and 48% respectively).

Rarely, if the patient has another form of gallbladder pathology, they can look very sick (think fever and jaundice for choledocholithiasis, generalized peritonitis and sepsis for emphysematous cholecystitis, etc).

In fact, those with emphysematous cholecystitis are by far the most critical biliary pathology patients who roll into the ED. Gas-forming organisms (classically, *Clostridium welchii*) invade the gallbladder wall, causing fever, RUQ pain, and early markers for sepsis. Classic patient is a male diabetic in 5<sup>th</sup> to 7<sup>th</sup> decade of life. These patients have a high risk of perforation and necrosis, with rapid progression to perforation.

**Diagnosis:** Labs are not sensitive or specific, usually CBC, CMP, lipase. Leukocytosis with left shift is expected with pretty much any major pathology on the planet. Very rarely there is a mild elevation in bilirubin, also nonspecific.

Alkaline phosphatase and LFT elevation are NOT expected, and their elevated presence should raise suspicion for choledocholithiasis or other hepatic pathology.

**Ultrasound:** the best, initial test. Findings that diagnose cholecystitis:

- wall thickening >5mm, pericholecystic edema (double wall sign)
- presence of gallstones
- sonographic Murphy sign elicited during visualization with a probe

RUQ US truly is the best “bang for your buck” in terms of ED tests. It is hands down the best initial test and “next step” test. For its ability to quickly acquire images and not requiring much technician skill, it is the most specific test for identification of gallstone disease, with sensitivity about 84% and 99% specificity.

In emphysematous cholecystitis, the US can be false negative because of air in the wall of the gallbladder. The report could falsely report “overlying bowel gas blocks view” or something like that. This is due to gas-forming organisms.

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**HIDA (cholescintigraphy):** if ultrasound is equivocal (if gallstones seen without wall thickening or pericholecystic edema, or if peri-wall edema is appreciated without stone visualization) HIDA scan can be performed. This is when IV tracer (technetium) is given and taken up by bile secreting hepatocytes. The tracer is able to track bile flow from the liver to the gallbladder and also into the common bile duct. Inability to see the tracer fill the gallbladder lumen in 30 minutes to 1 hour is diagnostic of cholecystitis. Its sensitive and specificity approach 90-97% and 70-90%, some pretty wide ranges.

This test should *never* be ordered first line. It should also never be ordered in the ED (huge workflow killer). Patients who undergo this test likely need admission for observation and further investigation.

**CT:** there has been an increase in CT detecting cholecystitis only because the number of patients receiving CT in the ED has increased as well. CT can detect wall edema, pericholecystic fluid, and large gallstones, and its sensitivity approaches 94%, BUT its specificity is extremely poor, 59%. Therefore, we do *not* recommend its routine usage for biliary pathology. *Ultrasound first!*

## MANAGEMENT

Besides calling your friendly general surgeon for cholecystectomy, remember your job doesn't just end there in the ED...

Supportive therapy: IV hydration, electrolyte correction, keep NPO

Pain control: Opioids have long been thought of causing sphincter of Oddi spasm, whether or not this translates into actual clinical medicine is unclear (we think it's mostly hogwash). Opioids should be used for pain control as indicated.

Empiric antibiotics: The goal is to prevent secondary infection such as: gallbladder necrosis with subsequent perforation or pericholecystic abscess. Coverage needs to include gram negative rods AND anaerobes!  
Options: piperacillin/tazobactam, or ciprofloxacin/ceftriaxone and metronidazole

## Who needs an emergent cholecystectomy?

- Anyone with suspected perforation or gangrenous necrosis (the latter is nearly impossible to diagnose until in the OR)
- Those with emphysematous cholecystitis

In those with emphysematous cholecystitis or gangrenous necrosis/perforation, resuscitation needs to be rapid and aggressive, with full sepsis workup and early antibiotics. Very often these are started empirically before US (sometimes they are too sick for US and this is where CT comes into play). Work with the surgery team and get them on board early. They will hesitate to take an incredibly sick patient to the OR who appears to have a "medical problem" (sepsis), but the imaging should show the gallbladder as a cause. If the patient has obvious evidence of perforation (e.g. air under the diaphragm), it's an easier discussion: antibiotics and OR.

## COMPLICATIONS

If untreated, acute cholecystitis often resolves in 7-10 days. However, complications are frequent and have great potential to be life threatening. This is the driving reason for why we operate on gallbladders.

- **Gall bladder gangrene/necrosis:** most common complication, seen in 20% of cases. Patients present *septic*. The elderly and diabetics are especially prone to this.
- **Perforation:** seen in 10% of cases. Usually local but can expand into generalized peritonitis.
- **Cholecystoenteric fistula:** a perforated gall bladder can lead to cholecystoduodenal or cholecystocolonic fistulas. This is rare and more typically seen in chronic gallbladder necrosis, <2% of all gallstone disease cases total. Symptoms include bile acid diarrhea and gallstone ileus.
  - **Gall stone ileus:** cholecystoenteric fistula leading to stone obstructing the ileocecal valve (gallstone size usually >2.5cm). Rare. Patient will have symptoms of small bowel obstruction.

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