

# Essentials of Cholecystitis Diagnosis

Subjects: [Gastroenterology & Hepatology](#)

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This comprehensive Q&A series dives into the key aspects of cholecystitis, from pathophysiology to diagnosis and management. Each question explores critical topics such as the differences between calculous and acalculous cholecystitis, the role of imaging and laboratory studies, and strategies for assessing and managing complications like common bile duct stones. Designed for healthcare professionals, this series provides actionable insights for diagnosing and treating gallbladder diseases effectively. Perfect for medical rounds, surgical planning, and exam preparation.

critical care

Cholecystitis

Cholangitis

## 1. What is cholecystitis?

- Cholecystitis is inflammation of the gallbladder. It can present in three primary forms:
  - **Acute Calculous Cholecystitis:** Caused by gallstones obstructing the cystic duct.
  - **Acute Acalculous Cholecystitis:** Inflammation without gallstones, often seen in critically ill patients.
  - **Chronic Cholecystitis:** Recurrent inflammation leading to fibrosis and thickening of the gallbladder wall.

## 2. Why does cholecystitis happen?

- **Primary causes:**
  - Obstruction of the cystic duct, typically by gallstones or sludge.
  - Stasis of bile leading to infection by gut bacteria.
  - Increased intraluminal pressure causing ischemia and inflammation.
- **Predisposing factors:**
  - Female gender, obesity, pregnancy, or rapid weight loss.
  - Chronic illnesses like diabetes.
  - Critical illness leading to biliary stasis (acalculous type).

## 3. What are the pathophysiological mechanisms?

- Obstruction leads to bile stasis and superimposed infection.
- Pressure buildup reduces gallbladder perfusion, causing mucosal ischemia.
- Chronic inflammation weakens the mucosa, increasing susceptibility to further injury.

## 4. How is cholecystitis diagnosed?

- **History:**
  - Symptoms include persistent right upper quadrant (RUQ) pain, nausea, vomiting, and anorexia.
- **Physical Exam:**
  - Fever, RUQ tenderness, and positive **Murphy's Sign** (arrest of inspiration upon RUQ palpation).
- **Laboratory findings:**
  - Elevated white blood cell (WBC) count and C-reactive protein (CRP).
  - Liver function tests (LFTs) may show mild elevations in bilirubin and alkaline phosphatase.
- **Imaging:**
  - **Ultrasound:** First-line tool, showing gallstones, gallbladder wall thickening (>3 mm), and pericholecystic fluid.
  - **HIDA Scan:** Used when ultrasound is inconclusive, assessing cystic duct obstruction.

## 5. What is Murphy's Sign?

- **Definition:** Pain and cessation of deep inspiration when palpating the RUQ under the costal margin.
- **Historical Context:** Described by Dr. John Benjamin Murphy, a 19th-century American surgeon renowned for innovations in general surgery.

## 6. What laboratory tests are important in acute cholecystitis?

- **Key labs:**
  - Complete blood count (CBC): Elevated WBC.
  - CRP: Inflammatory marker often elevated.
  - LFTs: May show mild abnormalities if bile duct involvement is suspected.

## 7. What imaging studies are crucial?

- **Ultrasound:**
  - High sensitivity for gallstones.
  - Detects gallbladder wall thickening, pericholecystic fluid, and a sonographic Murphy's sign.
- **HIDA Scan:**
  - Used to confirm cystic duct obstruction.
  - Sensitivity and specificity are higher when ultrasound is inconclusive.

## 8. What are the treatment options?

- **Acute Cholecystitis:**

- **Medical Management:**
  - NPO (nothing by mouth), IV fluids, and antibiotics.
  - Pain control with NSAIDs or opioids as needed.
- **Surgical Management:**
  - Cholecystectomy (laparoscopic preferred) within 72 hours for most cases.
- **Acalculous Cholecystitis:**
  - Percutaneous cholecystostomy in critically ill or unstable patients.
- **Chronic Cholecystitis:**
  - Elective cholecystectomy after symptom optimization.

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### What is the first-line imaging modality for acute cholecystitis?

- **Ultrasound** is the preferred initial imaging technique for diagnosing acute cholecystitis.
  - Advantages:
    - Widely available.
    - Non-invasive and radiation-free.
    - Cost-effective.
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### What are the key ultrasound findings in acute cholecystitis?

- **Gallbladder wall thickening** > 3 mm.
  - **Wall edema:** Seen as a double-layer or "railroad track" appearance.
  - **Gallbladder distension:** Diameter > 4 cm.
  - **Positive sonographic Murphy's sign:** Pain elicited when the probe is pressed on the RUQ over the gallbladder during inspiration.
  - **Pericholecystic fluid:** Fluid collection around the gallbladder, also referred to as the "C-sign."
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### What are the limitations of ultrasound?

- Operator-dependent results, requiring proper imaging technique.
  - May be limited in patients with obesity or excessive bowel gas.
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### What is the next imaging modality if ultrasound findings are inconclusive?

- **HIDA Scan (Hepatobiliary Iminodiacetic Acid Scan):**
    - Uses a radiotracer (technetium-99m) to assess biliary tree function.
    - High sensitivity and specificity for acute cholecystitis.
    - Diagnostic finding: Absence of gallbladder filling within 60 minutes, indicating cystic duct obstruction.
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### What are the advantages of a HIDA scan?

- Confirms acute cholecystitis when ultrasound findings are equivocal.
  - Provides functional assessment of the biliary system.
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### What are the potential uses of HIDA with adjuncts like CCK?

- Evaluates gallbladder ejection fraction.
  - Can diagnose biliary dyskinesia or functional gallbladder disorders.
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### What critical question must be answered after diagnosing acute cholecystitis?

- Assess for **associated common bile duct stones**:
  - This determines whether additional procedures, such as ERCP or laparoscopic bile duct exploration, are necessary.

### Why is it important to assess for common bile duct stones in acute cholecystitis?

- Associated CBD stones can complicate acute cholecystitis by causing:
    - Obstruction of bile flow.
    - Potential cholangitis or pancreatitis.
  - Identifying CBD stones is crucial for planning additional interventions like ERCP or intraoperative exploration.
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### Can liver function tests alone diagnose CBD stones?

- **No**, liver blood tests (LFTs) should not be used as the sole indicator of CBD obstruction.
  - Transient obstruction may resolve spontaneously, leading to unnecessary interventions.
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### Which lab findings suggest a higher likelihood of CBD stones?

- **Alkaline Phosphatase**:
    - 2× the upper limit of normal has a 97% specificity for CBD stones.
  - **Total Bilirubin**:
    - 1.7 mg/dL: ~60% specificity.
    - 4 mg/dL: ~75% specificity.
  - **Gamma-glutamyl transferase (GGT)**:
    - Also useful, but alkaline phosphatase and bilirubin are more predictive.
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### What are the ultrasound findings for CBD stones?

- Best finding: **Direct visualization of a stone** within the common bile duct.
  - Dilation of the CBD (>6 mm) may suggest stones but is not definitive without direct visualization.
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### What is the best method to stratify risk for CBD stones?

- **SAGES Criteria**:

- **High Risk:**
    - Stone seen on imaging.
  - **Moderate Risk:**
    - Total bilirubin >4 mg/dL or CBD dilation >6 mm with bilirubin 1.8–4 mg/dL.
  - **Low Risk:**
    - None of the above findings.
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### How should the risk stratification guide management?

- **High Risk:**
    - Preoperative ERCP, postoperative ERCP, or laparoscopic CBD exploration.
  - **Moderate Risk:**
    - Additional imaging (e.g., MRCP, endoscopic ultrasound, intraoperative cholangiography, or intraoperative ultrasound).
  - **Low Risk:**
    - No further preoperative evaluation needed.
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### What imaging modalities help confirm CBD stones?

- **MRCP:** High sensitivity and specificity for detecting CBD stones.
  - **Endoscopic Ultrasound:** Useful for detailed imaging of the biliary tree.
  - **Intraoperative Cholangiography or Ultrasound:** Identifies stones during surgery.
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### What are the next steps for confirmed CBD stones?

- Management options include:
  - ERCP for stone removal, either pre- or postoperatively.
  - Laparoscopic common bile duct exploration during cholecystectomy.

### What is acalculous cholecystitis?

- Acalculous cholecystitis is **inflammation of the gallbladder without gallstones**.
  - It commonly occurs in critically ill or septic patients and is associated with high morbidity.
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### What are the risk factors for acalculous cholecystitis?

- **Critical Illness:**
  - Severe trauma or burns.
  - Shock or septic shock.
- **Prolonged Fasting or Total Parenteral Nutrition:**
  - Leads to gallbladder stasis.
- **Systemic Infections:**
  - E.g., typhoid fever.

- **Other Factors:**
    - Major surgeries or long-term ICU stays.
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## What is the pathophysiology of acalculous cholecystitis?

- **Gallbladder Stasis:**
    - Decreased motility and bile drainage lead to bile stasis.
  - **Increased Intravesical Pressure:**
    - Causes mucosal ischemia similar to appendicitis.
  - **Superimposed Infection:**
    - Secondary bacterial infection exacerbates the condition.
  - **Progression:**
    - Can lead to necrosis, perforation, and septic shock.
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## How is acalculous cholecystitis diagnosed?

- **Clinical Context:**
    - Critically ill patient with sepsis, unexplained fever, or RUQ pain.
  - **Imaging:**
    - **Ultrasound:**
      - Markedly thickened gallbladder wall (>1 cm).
      - Absence of stones.
      - Pericholecystic fluid or positive sonographic Murphy's sign.
    - **HIDA Scan:**
      - Confirms diagnosis by showing lack of gallbladder filling.
    - **CT Scan:**
      - Can show gallbladder wall thickening and surrounding inflammation if ultrasound is inconclusive.
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## What are the complications of untreated acalculous cholecystitis?

- Gallbladder necrosis and perforation.
  - Sepsis or septic shock.
  - Peritonitis and abscess formation.
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## How is acalculous cholecystitis managed?

- **Initial Stabilization:**
    - NPO status, IV fluids, and broad-spectrum antibiotics.
  - **Definitive Treatment:**
    - Percutaneous cholecystostomy (preferred in unstable patients).
    - Cholecystectomy (definitive, if the patient is stable).
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