

## Ascending Cholangitis

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- Background:
  - Ascending cholangitis is defined by the presence of increased hepatic intraductal pressure with concurrent infection of the obstructed bile.
  - “Ascending” refers to the migration of bacteria from the duodenum into the hepatopancreatic duct, which can then spread to the bloodstream.
  - Cholangitis can quickly progress to septic shock.
  - Mortality approaches 100% if untreated. Even with appropriate diagnosis and therapy in the current era, mortality remains high (2%-30%).
- Pathophysiology:
  - Infection is not just limited to the gallbladder (eg, cholecystitis where the disease is contained) but also the biliary system, which can spread to the blood (and thus is not contained).
  - There are 2 factors in cholangitis: biliary obstruction and bacterial growth in the bile, which can spread to the bloodstream. This is the cause of the rapid progression to septic shock.
- History and exam:
  - Patients may present with a variety of signs/symptoms, including altered mental status or sepsis of unknown source.
  - Charcot’s triad of fever, right upper quadrant pain, and jaundice has a specificity of 85% and sensitivity of 25%.
  - Reynold’s pentad is Charcot’s triad plus hypotension and altered mental status, which has a sensitivity of <7%.
  - Fever occurs in 40%-100% and abdominal pain occurs in 60%-100%, but these are not specific.
  - Jaundice is present in 60%-70% of patients.
  - Takeaway: Don’t rely on Charcot’s triad or Reynold’s pentad. Think about cholangitis in patients with abdominal pain, jaundice, and/or toxic appearance. Also think about the disease in the older patient with sepsis without a source who is toxic or altered.
- Laboratory evaluation:
  - Liver function tests are typically elevated but the degree of elevation varies.
    - Gamma-glutamyl transferase (GGT) and alkaline phosphatase are elevated in close to 90% of patients.
    - Bilirubin >4 mg/dL is more specific for cholangitis.

- 80% of patients have an elevated white blood cell (WBC) count.
  - High neutrophil:lymphocyte ratio (NLR) >5.3 predicts cholangitis with 68% sensitivity and 95% specificity, based on one study.
- Blood cultures are positive in 70% of cases.
- Takeaway: Think about cholangitis with laboratory results demonstrating biliary obstruction. Also consider cholangitis in patients with high NLR and unexplained gram-negative bacteremia.
- Imaging:
  - Several options: ultrasound, CT, endoscopic retrograde cholangiopancreatography (ERCP), and magnetic resonance cholangiopancreatography (MRCP).
  - Ultrasound can identify dilated intrahepatic ducts, as well as a dilated common bile duct (CBD) to indicate CBD stone or other distal obstruction.
    - Transabdominal ultrasound is approximately 25%-60% sensitive for the detection of CBD stones but is highly specific.
    - CBD >7 mm is dilated, but in those with prior cholecystectomy, dilation can be up to 10 mm. CBD may be normal early in the disease course.
    - Perform serial ultrasound exams at the bedside to evaluate for progression; a single ultrasound exam is just a snapshot in time.
  - CT with IV contrast can identify dilated intrahepatic and common bile ducts and may also identify a nearby mass causing external compression of the biliary structures.
    - Multidetector CT with IV contrast demonstrates a sensitivity of 85%-97% and specificity of 88%-96% in the identification of biliary duct dilation and strictures. CT can also evaluate for complications.
    - 2013 Tokyo guidelines recommend that contrast-enhanced dynamic CT be used in diagnosis of suspected cholangitis and conclude that CT is the most effective imaging method for evaluating etiology and complications of cholangitis.
  - MRCP is used if there is a high clinical suspicion but inconclusive or negative CT/ultrasound.
  - Takeaway: Don't rely on one negative right upper quadrant ultrasound to rule out cholangitis. Instead, perform serial bedside ultrasound exams. CT with IV contrast is a good first-line test as well.
- Diagnosis:
  - The Tokyo guidelines have offered improved sensitivity over 2 iterations. The updated Tokyo guidelines (TG13) have a sensitivity of 92% and specificity of 78%.
  - Takeaway: There are 3 components for diagnosis (if 2 are present, suspect disease): systemic inflammation (fever/rigors or evidence of inflammatory response

on laboratory evaluation), cholestasis (jaundice or abnormal liver function tests), and imaging (biliary dilatation or imaging evidence of etiology of obstruction) (Table 1).

Table 1. TG13 Diagnostic Criteria for Acute Cholangitis

## Diagnostic Criteria for Acute Cholangitis






Category	Threshold
<b>A</b> Systemic Inflammation	
<ul style="list-style-type: none"> <li>Fever or Chills</li> </ul>	Body Temperature >38°C
<ul style="list-style-type: none"> <li>Laboratory evidence of inflammatory response</li> </ul>	WBC <4,000 or >10,000 CRP >1
<b>B</b> Cholestasis	
<ul style="list-style-type: none"> <li>Jaundice</li> </ul>	T-Bili ≥2 mg/dL
<ul style="list-style-type: none"> <li>Abnormal LFTs</li> </ul>	Alk Phos >1.5x upper limit normal GGT >1.5x upper limit normal AST >1.5x upper limit normal ALT >1.5x upper limit normal
<b>C</b> Imaging	
<ul style="list-style-type: none"> <li>Biliary dilatation</li> <li>Evidence of etiology on imaging</li> </ul>	

Source: Tokyo Guidelines 13






Table 2. TG13 Severity Criteria for Acute Cholangitis

### Severity Criteria for Acute Cholangitis


**Grade III: Severe**

Dysfunction in at least one of following systems:	Criteria
 Cardiovascular	Hypotension requiring dopamine $\geq 5$ mcg/kg/min, or any dose of norepinephrine
 Neurologic	Altered mental status
 Respiratory	PaO <sub>2</sub> /FiO <sub>2</sub> ratio <300
 Renal	Oliguria, or serum creatinine >2.0 mg/dL
 Hepatic	INR > 1.5 Platelet count <100,000/mm <sup>3</sup>

**Grade II: Moderate**

Two or more of the following:	Criteria
 Abnormal WBC count	>12,000/mm <sup>3</sup> or <4,000/mm <sup>3</sup>
 High Fever	$\geq 39^{\circ}\text{C}$
 Advanced Age	$\geq 75$ years
 Hyperbilirubinemia	Total bilirubin $\geq 5$ mg/dL
 Hypoalbuminemia	<70% lower limit normal

**Grade I: Mild**

 Does not meet criteria of Severe or Moderate at diagnosis.
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Source: Tokyo Guidelines 13

- Treatment
  - Treatment involves broad-spectrum antibiotics, resuscitation (fluids, vasopressors), symptomatic therapy (analgesics, antiemetics), and consultation.
  - Consult gastroenterology in all patients for decompression with ERCP. Surgery should also be consulted if the patient is toxic with end-organ injury.
  - Antibiotics: cover enteric streptococci, coliforms, and anaerobes.
    - There is no solid evidence for using antibiotics with high biliary penetration but still must be considered in cholangitis.
    - Vancomycin is typically not needed.
    - If patient is not sick: Administer piperacillin/tazobactam or ertapenem **or** metronidazole **plus** cefazolin or cefuroxime or ceftriaxone or cefotaxime or ciprofloxacin or levofloxacin.
    - If patient is sick: Administer piperacillin/tazobactam, meropenem, imipenem-cilastatin **or** metronidazole **plus** cefepime or ceftazidime.
    - Health-care associated: Add ampicillin or vancomycin.
  - **Disease grading can assist with treatment decisions and timing of treatment.**
    - Grade III needs near-immediate/urgent decompression.
    - Grade II needs urgent/early decompression.
    - Grade I may require only medical management or delayed surgical intervention to relieve obstruction.
    - 70%-80% of patients with mild or moderate cholangitis improve with antibiotics and can undergo drainage in 24-48 hours. If they don't respond in the first 24 hours, they need urgent decompression.
  - Delayed biliary decompression after failure of medical therapy carries a mortality rate up to 80%. Delayed ERCP beyond 24 to 48 hours has been associated with prolonged hospital stay, increased risk of death, increased need for vasopressor support, persistent organ failure, and increased ICU length of stay.
  - ERCP
    - Lower morbidity and mortality compared to open surgical biliary decompression in those patients with severe cholangitis; however, this benefit is blunted in the elderly population. Success rate is >90%.
    - **ERCP should not be delayed because the patient is toxic or "too sick." This is actually an indication, as you need source control. Toxic patients will likely need intubation before ERCP.**
  - Percutaneous drainage of the gallbladder or biliary tree remains an option when ERCP is unsuccessful or not feasible (Roux-en-Y anastomosis or Whipple resection or duodenal narrowing).

- Surgical drainage is the final option when other treatments have failed.
- **Takeaway:** For the emergency physician, the most important factors are suspecting the disease, resuscitating, providing antibiotics, and recognizing those patients who require urgent surgical or gastroenterology evaluation to improve outcomes in moderate or severe disease.

#### References:

[CorePendium: Biliary Disease](#)

[Crunch Time: Gastro: Cholecystitis & Cholangitis](#)

## EMA Ultra Ultra Summary October

Mel Herbert

Abstract 1: [Laryngospasm During Pediatric Procedural Sedation](#)

Abstract 2: [Restriction of IV Fluid in ICU Patients with Septic Shock](#)

Abstract 3: [Restrictive Fluids in Adults with Sepsis in the ED \(REFACED\)](#)

Abstract 4: [Testing for Respiratory Pathogens and Antibiotic Use in Children](#)

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Abstract 9: [Periosteal Block for Reduction of Distal Radius Fractures](#)

## Mailbag

Jan Shoenberger, Anand Swaminathan, and Reuben Strayer

Dexmedetomidine for sedation

- Dexmedetomidine is an alpha-2-noradrenergic agonist approved for intravenous use for sedation and analgesia.
  - It reduces norepinephrine release by the brain, leading to a light sleep-like state.
  - The patient can be easily aroused but is comfortable.
  - It is a close relative to clonidine (although clonidine is more vasoactive and cardiotropic).