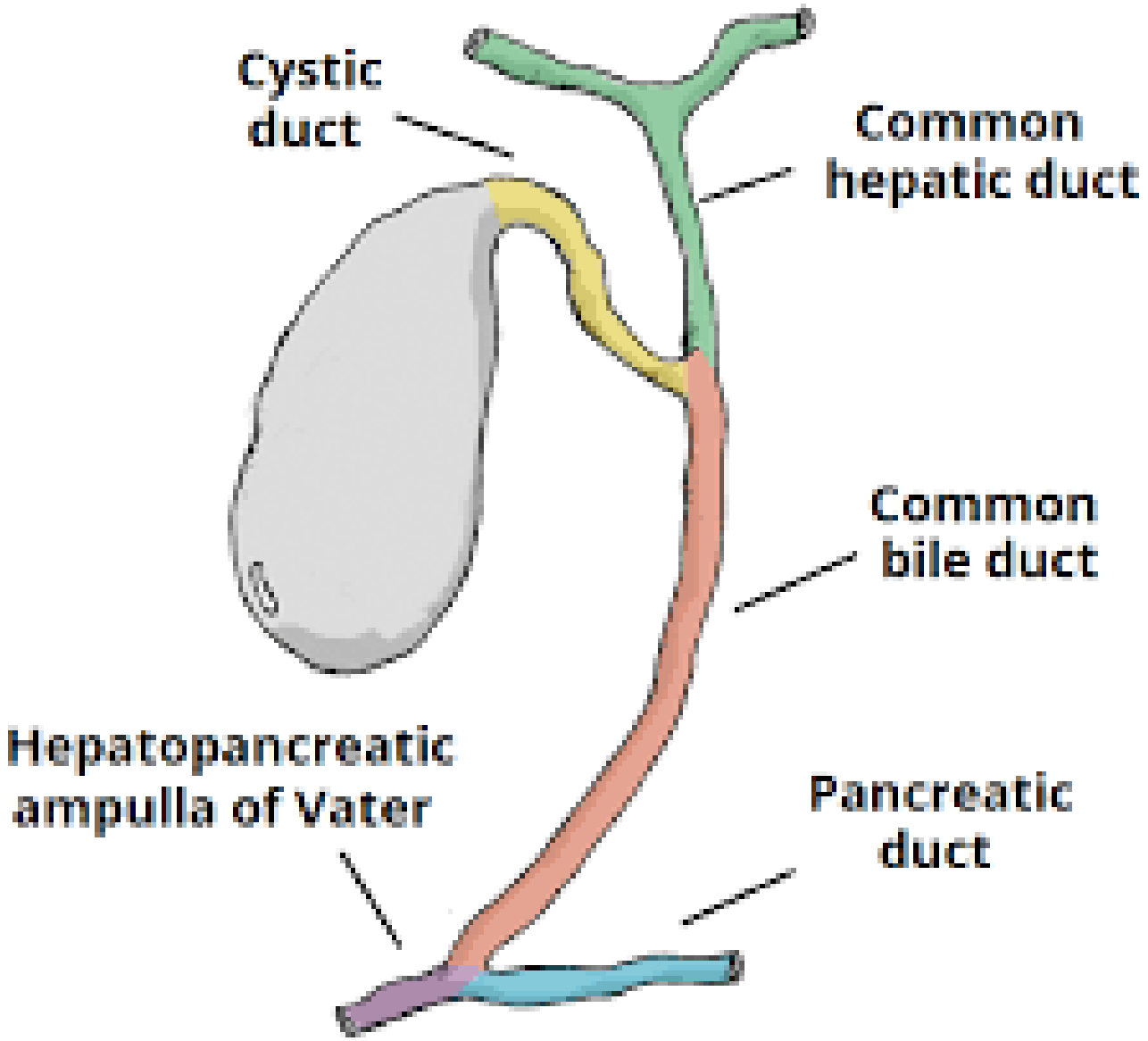
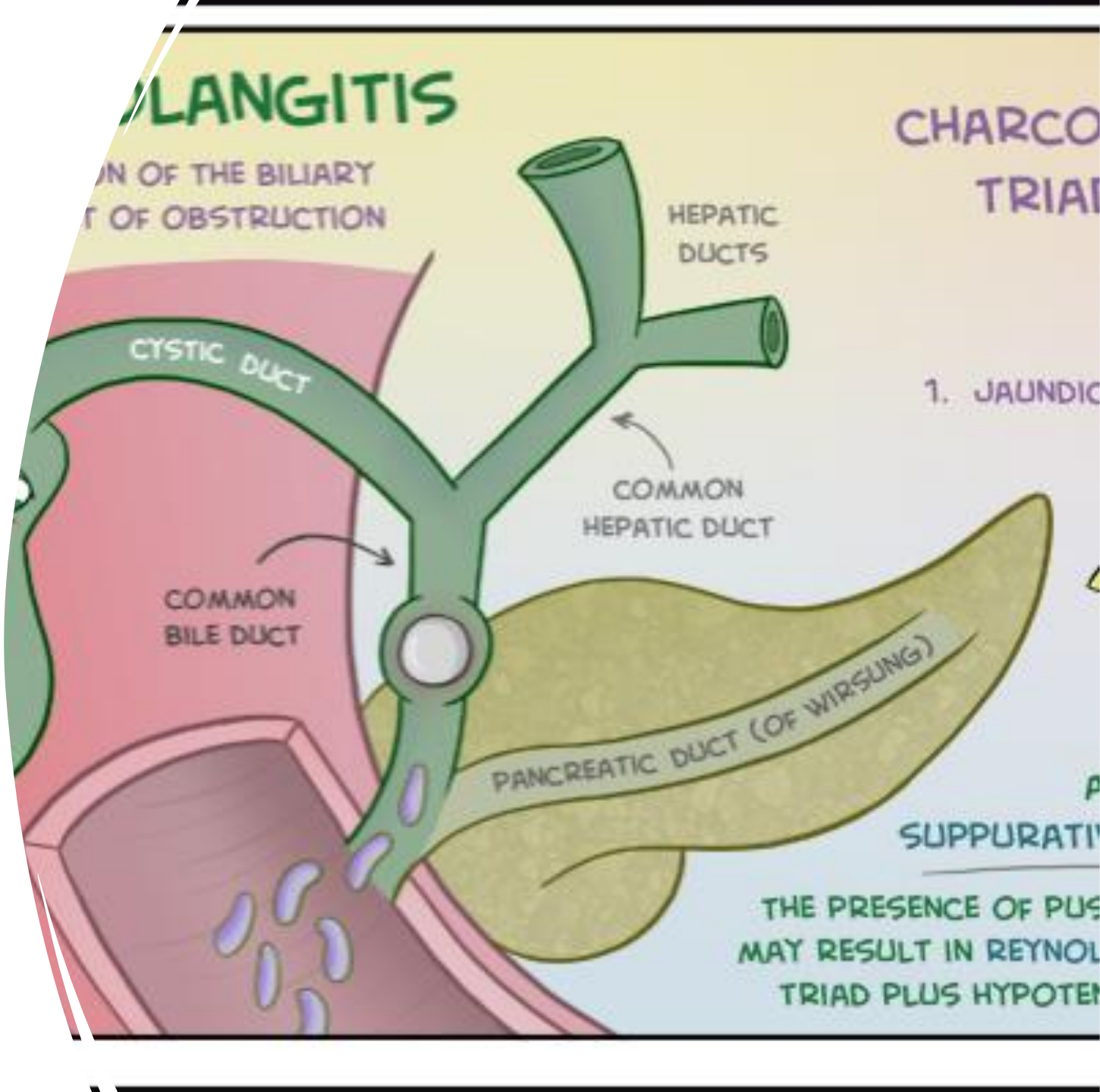
Acute cholangitis



Fever
Jaundice
Abdominal pain
that develops as a result of stasis and infection in the biliary tract

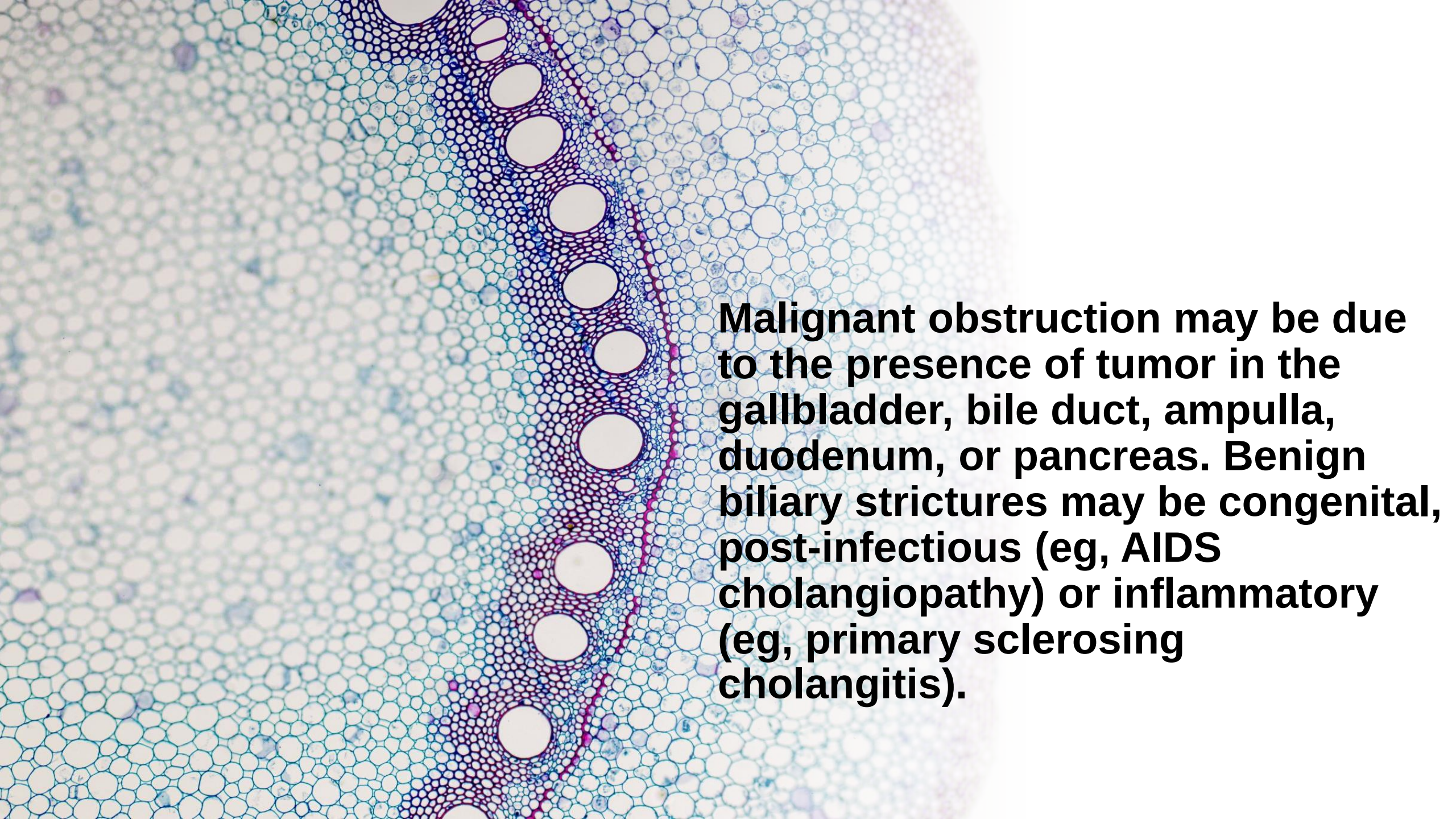
Charcot triad

Cholangitis was first described by Charcot as a serious and life-threatening illness; however, it is now recognized that the severity can range from mild to life-threatening



EPIDEMIOLOGY

The most frequent causes of biliary obstruction in patients with acute cholangitis without bile duct stents are biliary calculi (28 to 70 percent), benign biliary stricture (5 to 28 percent), and malignancy (10 to 57 percent).



Malignant obstruction may be due to the presence of tumor in the gallbladder, bile duct, ampulla, duodenum, or pancreas. Benign biliary strictures may be congenital, post-infectious (eg, AIDS cholangiopathy) or inflammatory (eg, primary sclerosing cholangitis).

PATHOGENESIS

Acute cholangitis is caused primarily by bacterial infection in a patient with biliary obstruction. The organisms typically ascend from the duodenum.

Mechanisms to prevent entry of bacteria into the biliary tract

sphincter of Oddi

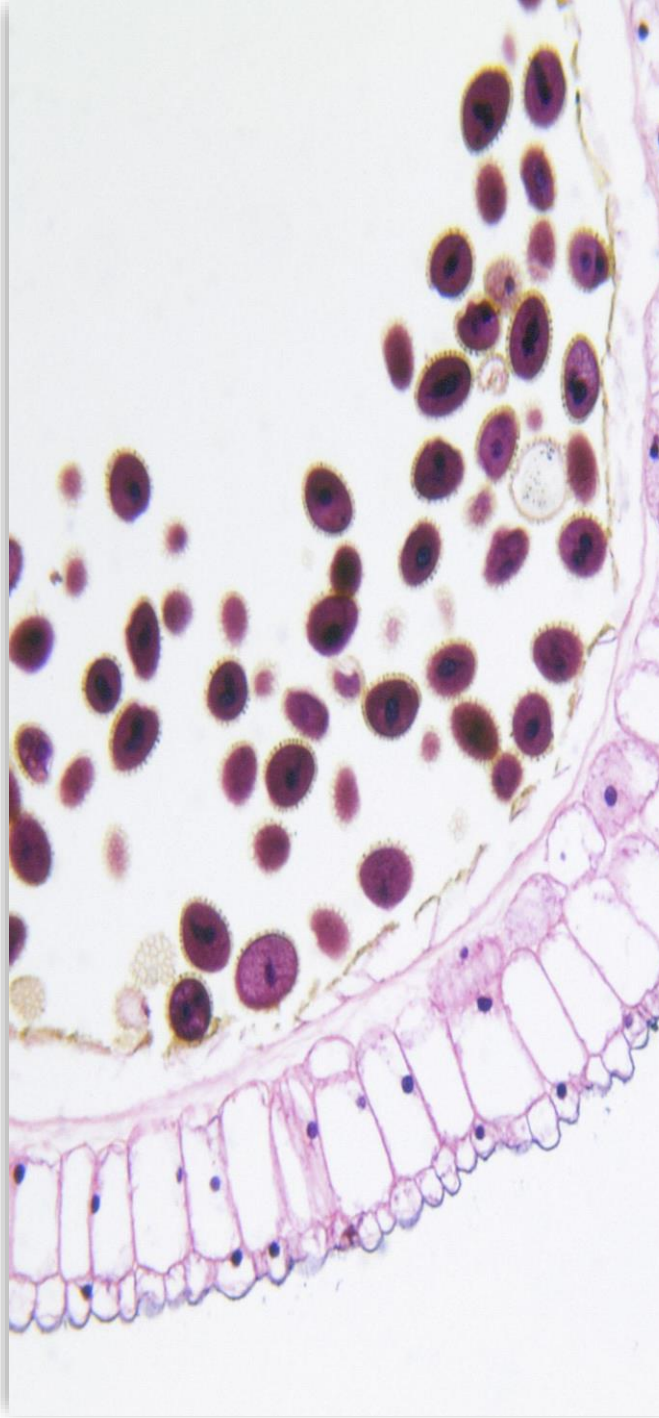
which acts as an effective mechanical barrier to duodenal reflux and ascending bacterial infection. In addition, continuous flushing action of bile, plus the bacteriostatic activity of bile salts, helps maintain bile sterility. Secretory IgA and biliary mucous probably function as anti-adherence factors, preventing bacterial colonization.

Normal barrier mechanisms are disrupted

Endoscopic sphincterotomy, choledochal surgery, or biliary stent insertion

Microbiology

Culture of bile, ductal stones, and blocked biliary stents are positive in over 90 percent of cases of acute cholangitis, yielding a mixed growth of gram-negative and gram-positive bacteria. The most common bacteria isolated are of colonic origin . *E. coli* is the major gram-negative bacterium isolated (25 to 50 percent), followed by *Klebsiella* (15 to 20 percent) and *Enterobacter* species (5 to 10 percent).



CLINICAL MANIFESTATIONS

The classic presentation of acute cholangitis is fever, abdominal pain, and jaundice (Charcot's triad), although only 50 to 75 percent of patients with acute cholangitis have all three findings . The most common symptoms of acute cholangitis are fever and abdominal pain, which are seen in approximately 80 percent of patients. Jaundice is seen in 60 to 70 percent of patients.

Reynolds pentad

In addition to fever, abdominal pain, and jaundice, patients with severe (suppurative) cholangitis may present with hypotension, and mental status changes (Reynolds pentad).

DIAGNOSTIC APPROACH

ERCP

patients with fever, abdominal pain, jaundice (Charcot’s triad), and abnormal liver tests, we proceed directly to endoscopic retrograde cholangiopancreatography (ERCP) to confirm the diagnosis and provide biliary drainage

other patients with suspected acute cholangitis, we perform a transabdominal ultrasonography to look for common bile duct dilatation or stones. An abdominal computed tomography (CT) is performed in patients with abdominal pain and in patients with suspected acute cholangitis who have a normal abdominal ultrasound.

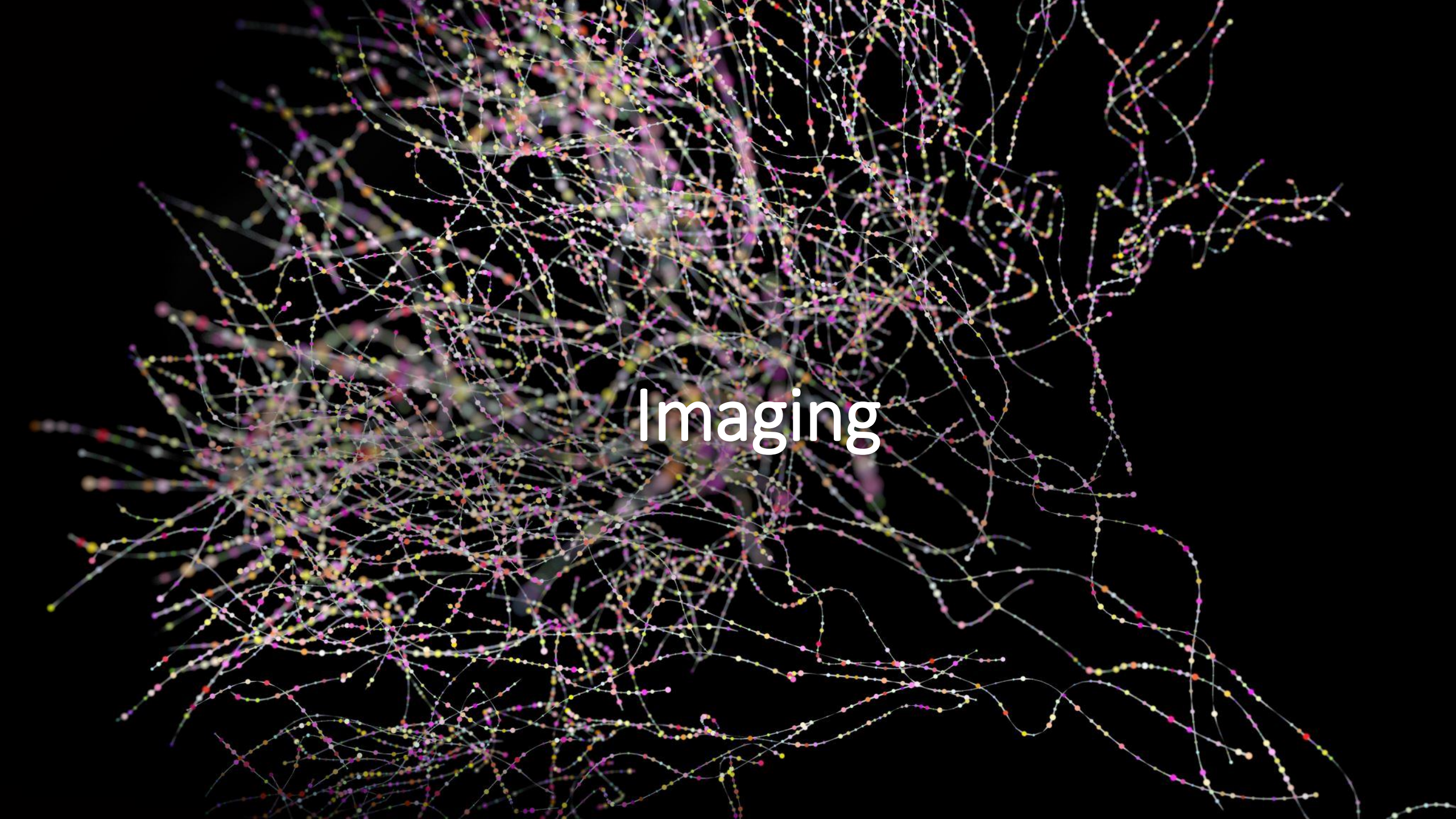
- **if the transabdominal ultrasound and CT are normal in a patients with suspected acute cholangitis, we perform a magnetic resonance cholangiopancreatography (MRCP). For patients who cannot undergo MRCP but have conjugated hyperbilirubinemia suggestive of biliary obstruction, we proceed with ERCP. If the liver tests are normal or if the patient is pregnant or at high risk for complications from ERCP, we perform an endoscopic ultrasound to look for evidence of bile duct stones or obstruction. If the results of ERCP or EUS are negative for biliary tract disease, alternative etiologies should be considered.**

Laboratory tests

Laboratory evaluation to establish the diagnosis and grade the severity include a complete blood count, electrolytes, comprehensive metabolic panel, prothrombin time (PT), and PT-international normalized ratio. A pregnancy test should be performed in all women of childbearing age.

Laboratory tests

Elevated white blood cell count with neutrophil predominance, and a cholestatic pattern of liver test abnormalities, with elevations in the serum alkaline phosphatase, gamma-glutamyl transpeptidase, and bilirubin (predominantly conjugated) concentration . However, a pattern of acute hepatocyte necrosis can be seen in which the aminotransferases may be as high as 2000 IU/L . This pattern reflects microabscess formation in the liver.


Imaging

Abdominal ultrasound

Features suggestive of acute cholangitis include biliary dilation or evidence of the underlying etiology. Abdominal ultrasound has a high specificity for bile duct dilation and bile duct stones (94 to 100 percent), but the sensitivity for the detection of dilated bile ducts and biliary obstruction ranges from 38 to 91 percent . Ultrasound has the advantage of being a noninvasive test that can be performed at the bedside in critically ill patients. However, it is operator-dependent and can be negative either when only small stones are present in the bile ducts (which occurs in 10 to 20 percent of cases) or with acute obstruction when the bile duct has not yet had time to dilate .

Abdominal CT scan

CT imaging has a high sensitivity to identify bile duct dilatation and can identify biliary stenosis (eg, biliary carcinoma, pancreatic cancer, or sclerosing cholangitis) but conventional CT has a low sensitivity for bile duct stones (25 to 90 percent) . Helical CT has shown improved performance over conventional CT for choledocholithiasis, with 65 to 88 sensitivity and 73 to 97 percent specificity . Disadvantages of a CT scan include a higher cost as compared with abdominal ultrasound and radiation exposure.

Magnetic resonance imaging/magnetic resonance cholangiopancreatography (MRI/MRCP)

MRI/MRCP are used for imaging when a diagnosis is unclear despite abdominal ultrasound or CT. MRCP can clearly delineate the bile duct without the use of contrast and has higher diagnostic accuracy in identifying the cause of biliary obstruction as compared with CT and abdominal ultrasound . Imaging findings in acute cholangitis include an increase in signal intensity around the bile duct on T2-weighted images and heterogeneous enhancement of the bile duct wall on contrast-enhanced T1-weighted images .

Endoscopic ultrasound of bile ducts

EUS is occasionally used as a diagnostic tool for evaluating suspected choledocholithiasis in patients who cannot undergo MRCP and can be therapeutic.

Diagnosis

A diagnosis of acute cholangitis is made if a patient has evidence of systemic inflammation with one of the following:

- Fever and/or shaking chills.

- Laboratory evidence of an inflammatory response (abnormal white blood cell count, increased serum C-reactive protein, or other changes suggestive of inflammation).

and both of the following:

- Evidence of cholestasis: Bilirubin ≥2 mg/dL or abnormal liver chemistries (elevated alkaline phosphatase, gamma-glutamyl transpeptidase, alanine aminotransferase, or aspartate aminotransferase, to >1.5 times the upper limit of normal).

- Imaging with biliary dilation or evidence of the underlying etiology (eg, a stricture, stone, or stent).

DIFFERENTIAL DIAGNOSIS

- **Acute cholecystitis** – Patients with acute cholecystitis may present with fever and abdominal pain. However, patients with acute cholecystitis should not have a significantly elevated bilirubin or alkaline phosphatase unless there is a secondary process causing cholestasis. In addition, abdominal imaging in acute cholecystitis typically reveals a normal common bile duct, gallbladder wall thickening, and a sonographic Murphy's sign

- **Biliary leak** – Biliary leaks are a complication of bile duct injury, usually as a complication of laparoscopic cholecystectomy. Patients present with fever and abdominal pain and/or bilious ascites. On abdominal imaging, patients usually have contained, loculated collections in the gallbladder fossa.

- **Acute pancreatitis** – Patients with pancreatitis usually present with acute onset of epigastric abdominal pain. In some patients, the pain may be in the right upper quadrant. Patients with acute pancreatitis have elevation in serum lipase or amylase to three times or greater than the upper limit of normal.

- **Liver abscess** – Patients with a liver abscess can present with right upper quadrant pain, transaminitis, or hyperbilirubinemia. Ultrasound and CT can differentiate between a liver abscess and acute cholangitis.

MANAGEMENT

Assessment of disease severity

Severe (suppurative) cholangitis — Acute cholangitis is considered severe if it is associated with the onset of dysfunction in at least any one of the following organs/systems:

- **Cardiovascular dysfunction** – Hypotension requiring dopamine ≥5 micrograms/kg per min, or any dose of norepinephrine
- **Neurological dysfunction** – Disturbance of consciousness
- **Respiratory dysfunction** – PaO2/FiO2 ratio <300
- **Renal dysfunction** – Oliguria, serum creatinine >2.0 mg/dl
- **Hepatic dysfunction** – Prothrombin time-international normalized ratio >1.5
- **Hematological dysfunction** – Platelet count <100,000/mm

Moderate acute cholangitis — Acute cholangitis is defined as moderate if it is associated with any two of the following:

- Abnormal WBC count (>12,000/mm3, <4,000/mm3)
- Fever 39°C (102.2°F)
- Age (≥75 years)
- Hyperbilirubinemia (total bilirubin ≥5 mg/dl)
- Hypoalbuminemia

Mild acute cholangitis — Mild acute cholangitis does not meet the criteria for moderate or severe cholangitis at initial diagnosis.

General measures

Supportive care — Patients diagnosed with acute cholangitis should be admitted to the hospital. Based on the severity, patients with acute cholangitis require intravenous hydration and correction of associated electrolyte disorders, and analgesics for pain control. In addition, patients require close monitoring for organ dysfunction and septic shock.

Antibiotics — In general, empiric regimens for intra-abdominal infections include antimicrobials with activity against enteric streptococci, coliforms, and anaerobes.

Drainage

ENDOSCOPIC DRAINAGE

PERCUTANEOUS DRAINAGE

SURGICAL DRAINAGE

Choice of procedure

Endoscopic sphincterotomy with stone extraction and/or stent insertion (depending on the cause of the obstruction) is the treatment of choice for establishing biliary drainage in acute cholangitis .

Timing based on disease severity

- 70 to 80 percent of patients with acute cholangitis respond to initial management with antibiotic therapy. In patients with mild to moderate cholangitis, biliary drainage should be performed within 24 to 48 hours.
- Patients with mild to moderate cholangitis that fail to respond to conservative management for 24 hours, and patients with severe (suppurative) cholangitis require urgent (within 24 hours) biliary decompression.

underlying predisposing cause

- Antimicrobial therapy and biliary drainage, management of the underlying cause is warranted to prevent recurrence.
- ●In patients with gallstones, elective cholecystectomy after the resolution of cholangitis is recommended in order to prevent future attacks of biliary colic and complications of gallstone disease.
- ●In patients with a benign biliary stricture, as a consequence of bile duct injuries, endoscopic therapy or surgical repair may be required
- ●In patients with recurrent pyogenic cholangitis, regular endoscopic surveillance may be required to remove as many stones as possible and/or surgical resection of the affected hepatobiliary segment with a biliary-enteric anastomosis.
- ●In patients with malignant stenoses, management is typically with stent placement at the time of endoscopic biliary drainage. The specific type chosen will depend on the patient's life expectancy and the likelihood of stent occlusion.

Patients who are pregnant

In general, women with acute cholangitis who are pregnant are managed the same way as patients who are not pregnant, with antibiotics and biliary drainage. However, antibiotic choices should take into account potential fetal toxicity. In addition, fetal shielding should be used during fluoroscopy and exposure time should be minimized.

PROGNOSIS

Reported mortality rates for acute cholangitis are highly variable, ranging from 2 to 65 percent . Studies of patients with severe cholangitis who were treated in the 1970s found mortality rates that exceeded 50 percent . With advances in treatment, the mortality rate for cholangitis has dropped, with mortality rates in more recent studies of 11 percent or less . However, while improved, mortality rates for patients with severe acute cholangitis remain high (20 to 30 percent)

Thanks for your attention