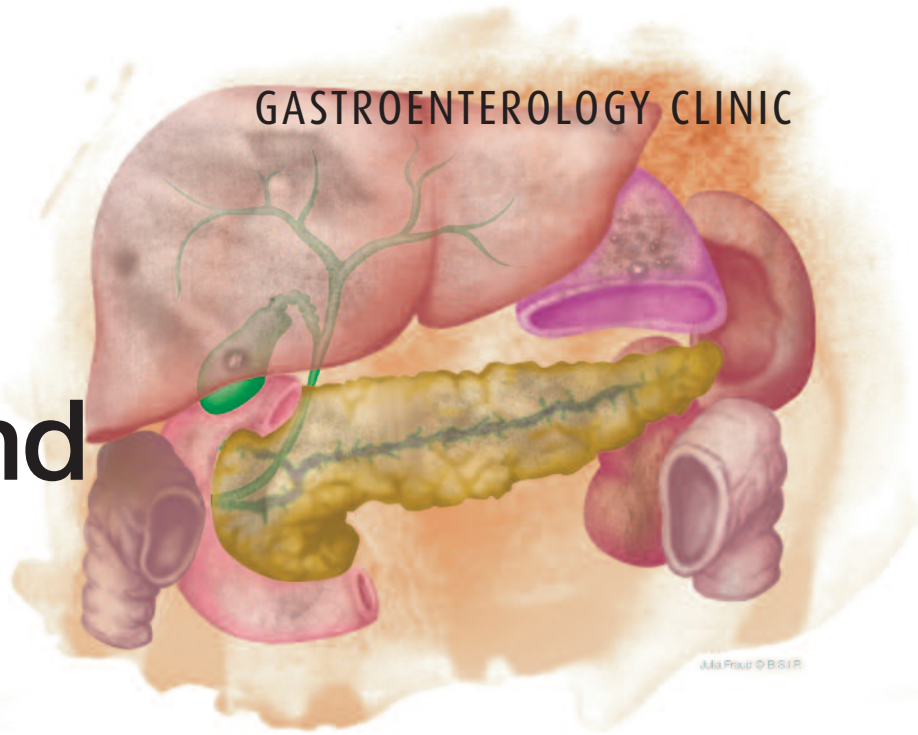


# Gallstone disease and bile duct disorders



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**An algorithmic approach to early recognition and treatment can minimise the potentially serious complications of gallstone disease.**

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## REMEMBER

- Cholelithiasis (one or more gallstones within the gallbladder) is present in 15% of people over 50 years of age, and most patients with an incidental finding of gallstones have no symptoms.<sup>1</sup>
- Complications of cholelithiasis include:
  - biliary colic (about 20% of patients)
  - acute calculous cholecystitis (3% per annum)
  - choledocholithiasis (one or more gallstones within the bile duct; 1 to 2% per annum)
  - ascending cholangitis
  - acute gallstone pancreatitis (0.5% per annum)
  - gallbladder carcinoma (0.5 to 3% lifetime risk).<sup>2,3</sup>

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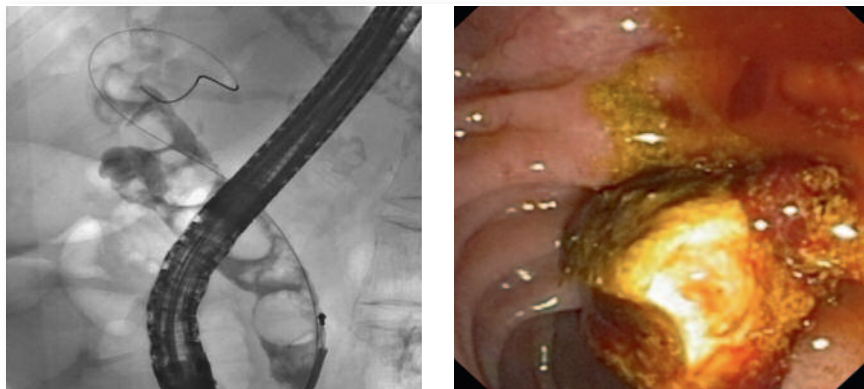


- Risk factors for cholelithiasis include advanced age, female sex, pregnancy, obesity, rapid weight loss and cirrhosis.
- Other bile duct disorders that can mimic gallstone disease include benign and malignant biliary strictures, primary sclerosing cholangitis and autoimmune cholangiopathy.

## ASSESSMENT

- **History.** Biliary colic is a result of increased gallbladder pressure caused by a stone obstructing the gallbladder outlet or cystic duct. Patients typically experience recurrent attacks of intense upper abdominal pain that may radiate to the back or shoulder and, despite being termed 'colic', remains constant for several hours before subsiding. Attacks are often precipitated by meals. The pain is often more prolonged in choledocholithiasis than in cholelithiasis. Associated symptoms may include chest pain, nausea and diaphoresis. The combination of abdominal pain, fever and jaundice suggests the presence of ascending cholangitis.
- **Physical examination.** Peritonism, Murphy's sign (pain on inspiration when the inferior margin of the gallbladder is palpated) and fever suggest acute cholecystitis. If jaundice is present, biliary obstruction from choledocholithiasis should be considered.
- **Initial investigations.** Full blood count may reveal leucocytosis due to cholecystitis, cholangitis or acute pancreatitis. Deranged liver biochemistry results suggest the presence of calculi or sludge within the bile duct. In choledocholithiasis and cholangitis, serum liver transaminase levels are often elevated early on (with alanine and aspartate aminotransferase levels more than twice the upper limit of normal), followed by a more cholestatic picture (bilirubin, alkaline phosphatase and/or gamma glutamyl transferase levels more than twice the upper limit of normal). Serum levels of pancreatic

IMAGES COURTESY OF DR MICHAEL BOURKE, SYDNEY, NSW.



Figures 1a and b. Endoscopic retrograde cholangiopancreatography (ERCP).  
a (left). A wire has been introduced into the common bile duct and contrast released, revealing dilation of the common bile duct and multiple filling defects caused by gallstones.  
b (right). Endoscopic view of a gallstone (pale central area) emerging from the common bile duct into the duodenum after sphincterotomy and extraction.

enzymes should be measured to exclude pancreatitis. Investigations to rule out cardiac ischaemia, pneumonia, peptic ulcer disease and musculoskeletal pathologies should be considered if the clinical context suggests these possibilities.

- **Transabdominal ultrasound examination** is a noninvasive, inexpensive and highly accurate test for cholelithiasis (with sensitivity over 80% and specificity of 99%).<sup>4</sup> It is the initial imaging modality of choice for cholelithiasis, with greater accuracy than CT scanning for its detection. Transabdominal ultrasound allows the diameter of the proximal common bile duct (CBD) to be measured, but the distal CBD and pancreatic head are often obscured by overlying bowel gas. Thus the failure to detect choledocholithiasis on transabdominal ultrasound examination does not exclude its presence (sensitivity of 30 to 80%).
- **Magnetic resonance cholangiopancreatography (MRCP)** is an accurate noninvasive modality to assess for the presence of CBD stones (sensitivity and specificity over 90%).<sup>5,6</sup> In addition to gallstone disease, MRCP may show the changes of primary sclerosing cholangitis within the

intra- and extrahepatic biliary tree, benign and malignant biliary strictures, and pancreatic mass lesions. Potential disadvantages of MRCP include cost, limited local availability and reduced sensitivity for small CBD stones (less than 6 mm) and biliary sludge.

- **CT cholangiography** is another non-invasive modality for imaging the biliary system, with a sensitivity and specificity of around 80% for choledocholithiasis.<sup>5</sup> It is contraindicated if the patient is jaundiced (serum bilirubin level above 50  $\mu\text{mol/L}$ ) because of poor opacification of the bile ducts and hence suboptimal image quality. Other disadvantages include the risks of exposure to contrast (contrast allergy and contrast-related nephropathy) and ionising radiation.
- **Endoscopic ultrasound (EUS)** is a highly accurate technique for the diagnosis of choledocholithiasis, with an accuracy comparable to that of MRCP. EUS is superior to MRCP for the diagnosis of biliary sludge and small CBD stones.<sup>5,6</sup> Fine needle aspiration biopsy under EUS guidance can be performed on suspicious pancreatobiliary mass lesions at the same time. Potential disadvantages of EUS include limited local availability,

cost and the need for intravenous sedation.

- **Endoscopic retrograde cholangiopancreatography (ERCP)** allows accurate diagnosis of choledocholithiasis (sensitivity of around 90% and specificity of 100%) along with definitive therapy (sphincterotomy, extraction of biliary stones and stent insertion)<sup>7</sup> (see Figures 1a and b). Its main drawback is the risk of complications, such as post-ERCP pancreatitis (5%), post-sphincterotomy bleeding, cholangitis and retroperitoneal perforation of the duodenum or bile duct (< 0.1%).<sup>8</sup> In most cases, post-ERCP pancreatitis is mild, but in rare cases it can be severe. A less invasive test (EUS or MRCP) is therefore often considered before ERCP if the likelihood of choledocholithiasis is low or intermediate.
- Factors that increase the likelihood of choledocholithiasis being detected on ERCP include CBD stones visualised on ultrasound examination, an elevated serum bilirubin level, increased CBD diameter (more than 6 mm in patients without cholecystectomy), concurrent visualisation of cholelithiasis and features of cholangitis.
- **Hepatobiliary iminodiacetic acid scanning (HIDA scanning;** also known as cholescintigraphy) uses a radioisotope to measure the ability of the gallbladder to take up and excrete bile, and the subsequent excretion of bile into the duodenum. It can be useful to diagnose cholecystitis or rarer nongallstone-related conditions such as sphincter of Oddi dysfunction.

## MANAGEMENT

- Patients with incidentally detected, asymptomatic cholelithiasis should be educated about potential symptoms but do not require cholecystectomy.
- Patients with cholelithiasis whose symptoms are atypical should be evaluated thoroughly for other disease before the symptoms are attributed to gallstone disease.

## AN ALGORITHM FOR MANAGEMENT OF PATIENTS WITH GALLSTONE SYMPTOMS

**Patient presents with typical gallstone symptoms**

- History and physical examination
- Full blood count, liver function tests, pancreatic enzyme measurements
- Transabdominal ultrasound examination

Cholelithiasis confirmed

Cholelithiasis not found

Assess likelihood of gallstones in bile duct

Low

Medium

High

MRCP or endoscopic ultrasound examination

No gallstones in bile duct

Gallstones in bile duct

Cholecystectomy (and CBD exploration if appropriate)\*

ERCP (sphincterotomy, stone extraction)\*

- Consider:
  - endoscopic ultrasound or MRCP
  - HIDA scan (chronic cholecystitis, acalculous cholecystitis, sphincter of Oddi dysfunction)
- Evaluate for other disease

ABBREVIATIONS: CBD = common bile duct; ERCP = endoscopic retrograde cholangiopancreatography; HIDA = hepatobiliary iminodiacetic acid; MRCP = magnetic resonance cholangiopancreatography.

\* For patients who undergo laparoscopic cholecystectomy as initial management, ERCP is indicated if an intraoperative cholangiogram shows a CBD stone that cannot be extracted with laparoscopic CBD exploration. Patients who undergo ERCP as initial management will require later laparoscopic cholecystectomy for cholelithiasis.

- A management algorithm for patients with typical symptoms of gallstone diseases is shown in the flowchart on this page.
- Patients with uncomplicated biliary colic (symptomatic cholelithiasis) should be referred for laparoscopic cholecystectomy to prevent recurrent biliary colic and other complications, such as choledocholithiasis. Cholangiography is often performed during cholecystectomy to check for the

presence of CBD stones that could be retrieved through surgical exploration of the CBD or might require subsequent ERCP for stone extraction.

- Patients with biliary colic can be managed with simple analgesia, including paracetamol or NSAIDs, but may require admission and opiate analgesia in severe cases.
- Patients with choledocholithiasis require ERCP, biliary sphincterotomy and stone extraction.

- Patients with ascending cholangitis require hospital admission, intravenous antibiotics and ERCP for biliary drainage.
- Patients with acute gallstone pancreatitis require hospital admission, bowel rest and aggressive intravenous fluids. Early ERCP, within 48 to 72 hours of pain onset, should be considered.

## CONCLUSION

- Gallstone disease is common and can have potentially serious complications, such as acute cholecystitis, cholangitis and gallstone pancreatitis.
- An algorithmic approach to early recognition and treatment can minimise the risk of complications. **MT**

## REFERENCES

1. Everhart JE, Khare M, Hill M, Maurer KR. Prevalence and ethnic differences in gallbladder disease in the United States. *Gastroenterology* 1999; 117: 632-639.
2. Festi D, Sottili S, Colecchia A, et al. Clinical manifestations of gallstone disease: evidence from the multicenter Italian study on cholelithiasis (MICOL). *Hepatology* 1999; 30: 839-846.
3. Friedman GD. Natural history of asymptomatic and symptomatic gallstones. *Am J Surg* 1993; 165: 399-404.
4. Wermke W, Schulz HJ. [Sonographic diagnosis of bile duct calculi. Results of a prospective study of 222 cases of choledocholithiasis.] *Ultraschall Med* 1987; 8: 116-120.
5. Verma D, Kapadia A, Eisen GM, Adler DG. EUS vs MRCP for detection of choledocholithiasis. *Gastrointest Endosc* 2006; 64: 248-254.
6. Ledro-Cano D. Suspected choledocholithiasis: endoscopic ultrasound or magnetic resonance cholangio-pancreatography? A systematic review. *Eur J Gastroenterol Hepatol* 2007; 19: 1007-10011.
7. Prat F, Amouyal G, Amouyal P, et al. Prospective controlled study of endoscopic ultrasonography and endoscopic retrograde cholangiography in patients with suspected common-bile duct lithiasis. *Lancet* 1996; 347: 75-79.
8. Cotton PB, Lehman G, Vennes J, et al. Endoscopic sphincterotomy complications and their management: an attempt at consensus. *Gastrointest Endosc* 1991; 37: 383-393.

COMPETING INTERESTS. None.