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10-MINUTE CONSULTATION

Biliary colic

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What you need to know

- Arrange liver function tests and routine outpatient abdominal ultrasonography for all patients with suspected biliary colic
- Acute, persistent, right upper quadrant pain, systemic upset, and Charcot's triad are suggestive of complicated gallstones and indicate need for emergency hospital referral
- The current recommended management of biliary colic is laparoscopic cholecystectomy, but this might not definitively treat symptoms in all patients. Some people might opt for conservative management, but they remain at risk of developing gallstone related complications

A 30 year old woman presents to her general practice with abdominal pain. It started suddenly yesterday evening and lasted for a few hours, but then it came on again in the morning. She says it feels like a tight band around her upper abdomen. She had a similar, less painful, episode a few weeks ago which resolved with over-the-counter analgesia. She is otherwise healthy and has intentionally lost 5 kg in the past six weeks.

This article outlines how to assess and manage a patient with suspected biliary colic in primary care. Areas covered include criteria for referral, investigations, and discussion of management options.

What you should cover

Abdominal pain is a common presenting symptom with many causes, as outlined in **box 1**. Gallstone pathology is an important differential. **Box 2** describes the spectrum of clinical syndromes that can arise from gallstones.

Box 1: Differential diagnoses in a patient presenting with epigastric/right upper quadrant pain

- *Gastro-oesophageal*—Oesophagitis, gastro-oesophageal reflux disease, gastritis, peptic ulcer, duodenal ulcer, functional dyspepsia
- *Hepato-biliary*—Biliary colic, acute cholecystitis, acute cholangitis, acute pancreatitis, chronic pancreatitis, acute hepatitis
- *Renal*—Renal colic, pyelonephritis
- *Pulmonary*—Basal pneumonia, pulmonary embolism
- *Others*—Acute coronary syndrome, costochondritis, Fitz-Hugh-Curtis syndrome, pelvic inflammatory disease, shingles

Box 2: Spectrum of clinical syndromes caused by gallstones

- *Gallstone disease*—All symptoms caused by gallstones, namely calculi in the gallbladder. The lifetime prevalence of gallstones in Europe is approximately 10-15%.¹ Most are found incidentally. The incidence of gallstones increases with age, and gallstones are more prevalent in European and Northern American populations.²
- *Asymptomatic gallstones*—Around 80% of people with gallstones do not develop symptoms and do not require treatment.^{1 3}
- *Symptomatic uncomplicated gallstones*—For the one in five people with gallstones who do develop symptoms, the most common is abdominal pain known as “biliary colic.” This is due to transient obstruction by a stone of the gallbladder neck or cystic duct.¹ People who experience an episode of biliary colic are at increased risk of pain recurrence and gallstone related complications.¹ However, this is difficult to predict, and there is currently no validated predictive scoring system for risk stratification of symptomatic, uncomplicated gallstones.⁴ The estimated risk of further biliary colic is 50% per annum, and that of gallstone related complications is 1-2% per annum.⁵
- *Complicated gallstones*—Complications can develop after persistent obstruction of the gallbladder neck (acute cholecystitis) or migration of stones into the bile duct (choledocholithiasis, acute pancreatitis, or cholangitis). Rare complications include intra-abdominal sepsis (with perforation of the gallbladder), Mirizzi's syndrome (with compression of the common hepatic duct by an impacted gallstone in the gallbladder neck), and gallstone ileus (with erosion of gallstones through the bowel wall).

Does the patient have biliary colic?

The pain of biliary colic is often described as one of sudden onset that increases in intensity to reach a plateau of steady pain that can last between one and five hours. The intensity of pain varies from moderate to severe, and it may precipitate nausea or vomiting.^{1 6}

Onset of epigastric pain after meals is more commonly linked to dyspepsia,⁷ but biliary colic can occur soon after meals or be unrelated to meals. Therefore, timing of pain in relation to food may not be a reliable discriminating factor. Intolerance to fatty foods is often associated with biliary colic,⁸ but, in our experience, this is not a reliable association.

In a patient presenting with abdominal pain and no history of gallstones, the following symptoms have been positively associated with symptomatic,

uncomplicated gallstones and may help guide clinical diagnosis.⁸

- Epigastric pain or right hypochondrium pain
- Pain radiating to right shoulder
- Pain in the absence of heartburn or unrelieved by bowel movement.

If these symptoms occur together, biliary colic is the most likely cause of abdominal pain. However, a precise symptom complex for symptomatic, uncomplicated gallstones has not been accurately described yet.⁸

Features that have been associated with increased risk of gallstones include:

- Increasing age, female sex, pregnancy, multiparity, obesity, and family history of gallstones⁶
- Insulin resistance, particularly undiagnosed diabetes in women⁹
- Haemolytic diseases
- Rapid weight loss (>1.5 kg/week) secondary to dieting or bariatric surgery.¹⁰

Examination is important to ascertain whether the patient is systemically unwell as this may warrant urgent hospital admission. It will also help determine whether the abdominal pain is gallbladder related or is secondary to other causes⁶:

- Check respiratory rate, heart rate, blood pressure, and temperature. Systemic features and hypotension may indicate complicated gallstones (box 3) or dehydration. Tachycardia alone may be driven by pain.¹⁷
- Inspect the skin and eyes for jaundice, which may indicate complicated gallstones or an alternate diagnosis (acute hepatitis, pancreatic or bile duct malignancy).
- Examine the abdomen to localise tenderness, which, if caused by gallstones, is most likely in the right upper quadrant (RUQ) or epigastrium.
 - A painful, palpable gallbladder, whereby inspiration is arrested on deep palpation of the right upper quadrant, is known as Murphy sign and is suggestive of peritoneal irritation as a result of acute inflammation. It is a clinical sign predictive of acute cholecystitis (likelihood ratio 3.2).¹²
 - A painless, palpable gallbladder, known as Courvoisier sign, is suggestive of extra-hepatic biliary obstruction (likelihood ratio 26), though poor at differentiating malignant from benign causes.¹²
- Examine the lungs to exclude basal lung pathology.
- Urine analysis, to exclude renal and urological causes.
- Urinary pregnancy test in all females of childbearing age to exclude pregnancy.

Box 3: Clinical features of complicated gallstones

- *Acute cholecystitis*—Acute right upper quadrant pain of longer duration (>6.5 hours) is associated with complicated gallstones.¹¹ The only clinical finding predictive of acute cholecystitis is Murphy sign (likelihood ratio 3.2).¹²
- *Acute pancreatitis*—The predominant symptoms of acute pancreatitis are abdominal pain and vomiting. A history of gallstones or alcohol

excess is common.¹³ There is no single or combination of clinical findings with proven value in diagnosing acute pancreatitis. All patients with suspected acute pancreatitis should be referred urgently to hospital.

- *Acute cholangitis*—Charcot's triad (right upper quadrant pain, jaundice, and fever often with rigors) has a low sensitivity (36.3%) but high specificity (93.2%) for acute cholangitis and may be a useful "rule-in" test.¹⁴ The diagnostic criteria for acute cholangitis are summarised in the revised Tokyo guidelines. Together, they are 91.8% sensitive and 77.7% specific for acute cholangitis, but are of limited use in primary care as they rely on imaging results.¹⁵
- *Sepsis*—Patients with suspected gallstone related sepsis may be screened with the quick Sequential Sepsis-related Organ Failure Assessment (qSOFA) scoring system: confusion, respiratory rate ≥ 22 breaths/min, and systolic blood pressure ≤ 100 mm Hg.¹⁶ Presence of at least two of the criteria identifies patients with poorer outcomes requiring urgent hospital admission.

Outcome

When you take a further history, you find that the pain is worse in the RUQ, radiates to the right shoulder and is unrelieved by bowel movement. Examination reveals no systemic upset or jaundice, a soft abdomen with mild RUQ tenderness, negative Murphy sign and clear lung sounds. Urinalysis and urinary pregnancy tests are negative. History and examination are suggestive of symptomatic, uncomplicated gallstones.

What you should do

Does the patient require urgent hospital admission?

- Patients should be urgently referred to hospital if⁵:
 - Systemic observations are abnormal and there is a suspicion of complicated gallstones.
 - Pain is not controlled with analgesia in the community.
- Subsequent, elective referral to a surgical service may be indicated if the patient has radiologically confirmed, symptomatic, uncomplicated gallstones and wishes to consider surgical management.⁵

Investigations in primary care

If referral for urgent hospital admission is not indicated, clinical suspicion of biliary colic can be followed up with confirmatory investigations in primary care. According to guidelines from the National Institute for Health and Care Excellence (NICE), all patients with suspected gallstones should be offered liver function tests and routine referral for abdominal ultrasonography.³ Other blood tests to consider include full blood count, urea and electrolytes, C reactive protein, and random plasma glucose.

In complicated gallstones, persistent obstruction of the biliary tree results in a cholestatic picture with increased alkaline phosphatase (typically 3-4 times higher than the upper limit of normal) and high bilirubin. However, interpretation of abnormal liver function test results may be complicated by other factors such as drugs, alcohol, steatosis, or infection.¹⁸

Abdominal ultrasonography has a high sensitivity (>95%) and specificity (>98%) for identifying gallstones.⁶ Radiologically, gallstones are described as echogenic gallbladder masses with a characteristic posterior acoustic shadowing. In biliary colic, gallstones in the gallbladder are usually the sole radiological finding.¹⁹ Larger gallstone size (>10 mm) and multiple gallstones

have been positively associated with future uncomplicated and complicated gallstone events in a cohort study.⁴

Discussing management options

Patients may ask if biliary colic requires surgery (box 4). NICE recommends offering laparoscopic cholecystectomy to all patients with diagnosed symptomatic, uncomplicated gallstones. People who wish to undergo surgery should be referred electively to a surgical service.^{1,3} Others may wish to discuss conservative management. This may be an appropriate management option in people with high anaesthetic and surgical risk due to underlying comorbidities or frailty. Otherwise, conservative management is currently regarded as a temporary measure due to the ongoing risks of pain recurrence and gallstone related complications. In a systematic review of two randomised controlled trials, participants with conservatively managed biliary colic were at significantly higher risk of developing gallstone related complications (14/102, 14%) compared with those who underwent surgery (2/99; 2%) over 14 years. The commonest complication was acute cholecystitis, the incidence of which was significantly higher with conservative management (9/102; 9%) than with surgery (0/99; 0%). Of the 102 participants randomised to observation, 46 (45%) eventually required surgery due to complicated gallstone disease.²¹ A clinical trial is ongoing to compare surgery with conservative management for preventing recurrence of pain and complications in people with symptomatic, uncomplicated gallstones.²⁴

Box 4: Surgical management of biliary colic

Elective surgery, in the form of laparoscopic cholecystectomy, is the current recommended treatment for symptomatic, uncomplicated gallstones.³ Cholecystectomies are one of the most common procedures in surgical practice, with a low risk of postoperative mortality (0.1-0.7%). Advanced age, comorbidities, and emergency procedures are risk factors for poorer surgical outcomes.²⁰ Decision to undergo surgery is patient centred with guidance from the surgeon, including discussion of gallstone related complication risks, surgery related complication rates, and individual patient factors.⁵

Surgery may not be a definitive treatment in all patients with biliary colic. Around 10-40% of patients continue to experience abdominal pain and dyspepsia postoperatively, described as post-cholecystectomy syndrome.²¹⁻²³ This may be due to organic causes (including physiological changes following absence of gallbladder and bile), intraoperative biliary tract injury, or undiagnosed extra-biliary disease before surgery.²³

Lifestyle modification with exercise and a low fat diet has traditionally been advised to prevent recurrence of biliary colic, but evidence for this approach remains insufficient. A systematic review to assess the benefits of lifestyle modification for preventing recurrence of gallstone-related pain is ongoing.²⁵

The recommended initial analgesics for biliary colic are paracetamol and diclofenac.¹ A meta-analysis found non-steroidal anti-inflammatory drugs (NSAIDs) to be as effective as opiates and superior to antispasmodics in relieving gallstone related pain.²⁶ Use of NSAIDs should be rationalised against contraindications, particularly gastrointestinal ulceration which may be a differential diagnosis in patients presenting with epigastric pain. Antibiotic therapy is not indicated in biliary colic. There is insufficient evidence to support the use of proton pump inhibitors, hyoscine, or gallstone dissolution therapies (ursodeoxycholic acid, extracorporeal lithotripsy) in the management of symptomatic, uncomplicated gallstones.⁵

How this article was created

This article is based on the National Institute for Health and Care Excellence (NICE) clinical guideline on diagnosis and management of gallstone disease (2014)³ and the Royal College of Surgeons of England commissioning guide on gallstone disease (2016).⁵ Information was supplemented by the authors' clinical experience and ongoing monitoring of the academic literature on gallbladder disease.

Education into practice

- What are the differences in presentation and examination findings of symptomatic, uncomplicated gallstones versus complicated gallstones?
- In a patient presenting with symptoms of gallstones, how would you rationalise between urgent referral for hospital admission versus non-urgent referral to a surgical service?

How patients were involved in the creation of this article

Two patients who had had gallstones and underwent surgery for gallbladder removal shared their experiences with us. They reviewed article drafts, provided comments to reflect patient perspective, and suggested we develop the sections on conservative management of biliary colic and pain relief. We thank them for their contribution.

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