



GALLSTONES BEYOND THE GALLBLADDER: A CASE REPORT OF CHOLECYSTODUODENAL FISTULA

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DOI: <https://doi.org/10.59551/IJHMP/25832069/2026.7.1.140>

How to cite this article: Sah AK, Das N, Gogoi M et al., Gallstones Beyond the Gallbladder: A Case Report of Cholecystoduodenal Fistula. *Indian J. Health Care, Med. Pharm. Pract.* 2026;7(1):319-323.

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Received: 10 May, 2026, Decision for Acceptance: 17 June, 2026

ABSTRACT

Background: Cholecystoduodenal fistula is a rare complication of chronic gallstone disease, accounting for the majority of cholecystoenteric fistulas. Its clinical presentation is often nonspecific, making preoperative diagnosis challenging. The occurrence of gallstone emesis is exceptionally uncommon and may provide an important diagnostic clue to the presence of a biliary-enteric fistula.

Case Presentation: A 30-year-old woman presented with a one-year history of recurrent right upper quadrant abdominal pain and a six-month history of recurrent vomiting. One month before presentation, she reported multiple episodes of vomiting hard, stone-like material and brought the expelled stones for evaluation. Physical examination revealed right hypochondrial tenderness and no scleral icterus. Laboratory investigations were unremarkable. Abdominal ultrasonography demonstrated chronic calculous cholecystitis with choledocholithiasis. Magnetic resonance cholangiopancreatography confirmed gallbladder and common bile duct calculi and suggested a biliary-enteric fistula. Contrast-enhanced computed tomography subsequently demonstrated a fistulous communication between the gallbladder and the duodenum, establishing the diagnosis of cholecystoduodenal fistula secondary to chronic cholelithiasis with choledocholithiasis. The patient underwent open cholecystectomy with fistula takedown, primary duodenal repair, choledocholithotomy, and T-tube drainage. Her postoperative recovery was uneventful, and follow-up cholangiography showed normal biliary drainage without residual stones or leakage.

Conclusion: Cholecystoduodenal fistula is an uncommon but significant complication of long-standing gallstone disease. Gallstone vomiting represents an exceptionally rare clinical manifestation that should prompt consideration of a biliary-enteric fistula. Careful clinical assessment combined with advanced imaging modalities such as CT and MRCP facilitates accurate diagnosis and surgical planning. Early recognition and definitive surgical management are essential for preventing complications and achieving favorable outcomes.

KEYWORDS: Cholecystoduodenal Fistula, Cholelithiasis, Choledocholithiasis, Gallstone emesis, Biliary-enteric Fistula, Chronic Calculous Cholecystitis, Open Cholecystectomy, Case Report.

Introduction

Cholelithiasis refers to the formation of calculi within the gallbladder or biliary tree, arising from an imbalance in the composition of bile. These stones develop when cholesterol or bilirubin exceeds its solubility threshold, leading to precipitation and subsequent stone formation[1]. The prevalence of gallstone disease in the Asian population has been widely reported to range from 5.9% to 21.9%[2]. In India, the prevalence of gallstone disease is even more variable, ranging from 2% to almost 29%[3]. The risk of gallstone development rises progressively with increasing age, and the condition is found to be more prevalent in females compared to males[2].

Patients usually present with epigastric or right upper quadrant pain, which usually occurs 30-60 minutes after meals. Clinical presentations depend on the type of complication and may include abdominal pain, vomiting, nausea, jaundice, and, in some cases, intestinal obstruction symptoms. Gallstone disease is said to be complicated if it is accompanied by conditions such as acute cholecystitis, pancreatitis, choledocholithiasis, ascending cholangitis, cholecystoenteric fistula development, or gallbladder perforation[4].

Gallstones vary in size, which is an important determinant of their clinical presentation and subsequent management[1]. Small gallstones, sometimes described as “sand-like” gallstones, may be asymptomatic and occasionally can be managed conservatively by either dietary changes or medical therapy[5]. Intermediate-sized gallstones, ranging from 5 mm to 2.9 cm, may require intervention if they are symptomatic, such as endoscopic or laparoscopic cholecystectomy[6]. Large gallstones, measuring more than 3 cm, are likely to be symptomatic or cause complications such as biliary obstruction and therefore require definitive surgical removal[7]. Surgical excision of the gallbladder is the mainstay of treatment for symptomatic patients who are suitable candidates for surgery and can be performed on an emergency or elective basis, depending on the presentation[4].

Choledocholithiasis arises either due to primary stone formation within the Common Bile Duct (CBD) or due to the secondary migration of calculi originating in the gall bladder into the ductal system. Cholecystoduodenal fistula is a rare complication of gallstone disease and is characterized by an abnormal communication between the gallbladder and the duodenum. It is the most common type of enterobiliary fistula. Internal biliary fistulation of this type always occurs as a complication of cholelithiasis in more than 90% of cases[8]. The clinical picture is often heterogeneous and nonspecific, which makes it difficult to make a definitive diagnosis before surgical examination[9].

This case report of the patient with presentations of choledocholithiasis complicated by cholecystoduodenal

fistula, she presented with abdominal pain accompanied by recurrent vomiting. The observation of atypical features, most notably the presence of gallstones within the vomitus, prompted heightened clinical suspicion for an underlying biliary-enteric communication and warranted a thorough diagnostic evaluation. Written informed consent was obtained from the patient for publication of this case report and associated clinical details, in accordance with institutional and journal requirements.

Case Report

A 30-year-old female presented to the outpatient department with a one-year history of recurrent abdominal pain. The pain was gradual in onset, predominantly localised to the right upper quadrant, intermittent, and progressively increasing in frequency and intensity. Over the preceding six months, she reported multiple episodes of vomiting, initially non-bilious and non-bloody.

Of particular clinical relevance, during the month before presentation, the patient experienced multiple episodes of vomiting of hard, stone-like material. At the time of her outpatient visit, she brought a small container containing multiple expelled stone. This unusual history prompted immediate evaluation for a complicated biliary pathology.

There was no prior history of abdominal surgery, trauma, or known hepatobiliary disease. She had no significant medical comorbidities and denied symptoms suggestive of peptic ulcer disease, inflammatory bowel disease, or malignancy.

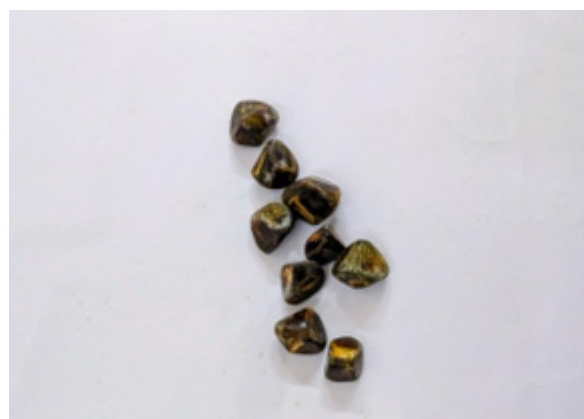


Figure 1. Vomited stones presented to OPD

Clinical Findings

On examination, the patient was conscious, oriented, and haemodynamically stable. Abdominal examination revealed localised tenderness in the right hypochondrium without guarding or rebound tenderness. Scleral icterus was not noted. No palpable abdominal mass was detected, and bowel sounds were normal. The remainder of the systemic examination was unremarkable.

Diagnostic Assessment

Routine haematological investigations were within normal limits. Liver function tests, including serum bilirubin,

transaminases, alkaline phosphatase, and serum albumin, were unremarkable.

Ultrasonography of the abdomen demonstrated features of chronic calculus cholecystitis, with multiple gallstones within the gallbladder, along with evidence of choledocholithiasis. Magnetic resonance cholangiopancreatography (MRCP) confirmed the presence of gallbladder calculi and common bile duct stones. Additionally, an abnormal communication between the biliary system and the duodenum was suspected, raising the possibility of a biliary–enteric fistula, specifically a choledochoduodenal fistula.

To further delineate the anatomy and confirm the suspected diagnosis, contrast-enhanced computed tomography (CECT) of the abdomen was performed. The imaging revealed a well-defined fistulous tract between the gallbladder and the adjacent duodenum, with surrounding inflammatory changes, thereby confirming the diagnosis of a cholecystoduodenal fistula.

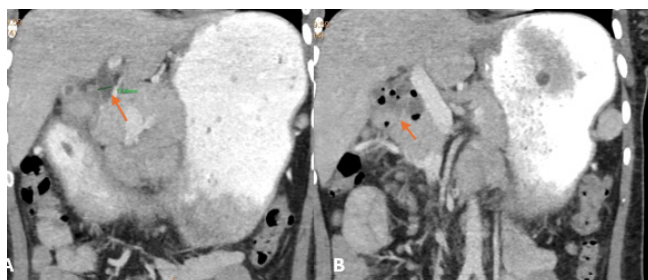


Figure. 2A CECT w/a showing dilated CBD and Figure. 2B CECT w/a showing cholecystoduodenal fistula and Pneumobilia

Diagnosis

Based on the clinical presentation, the unique history of gallstone emesis, and corroborative findings on multimodal imaging, a final diagnosis of cholecystoduodenal fistula secondary to chronic cholelithiasis with choledocholithiasis was established.

Therapeutic Intervention

The patient was planned for elective surgical management. Under general anaesthesia, an open cholecystectomy was performed. Intraoperatively, dense adhesions were noted between the gallbladder and the duodenum, confirming the presence of a cholecystoduodenal fistula.

A controlled fistula takedown was performed, followed by primary repair of the duodenal defect. Choledocholithotomy was performed, and a T-tube was inserted for biliary drainage. Haemostasis was secured, and the abdomen was closed in layers.

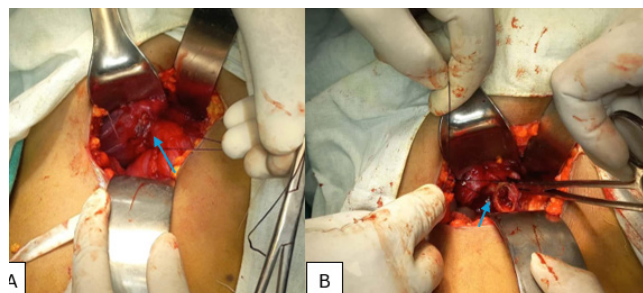


Figure 3A. showing fistula between Gallbladder and Duodenum and Figure 3B. showing exposed fistula



Figure 4. Removed calculi following surgical intervention from Gallbladder and Common Bile Duct

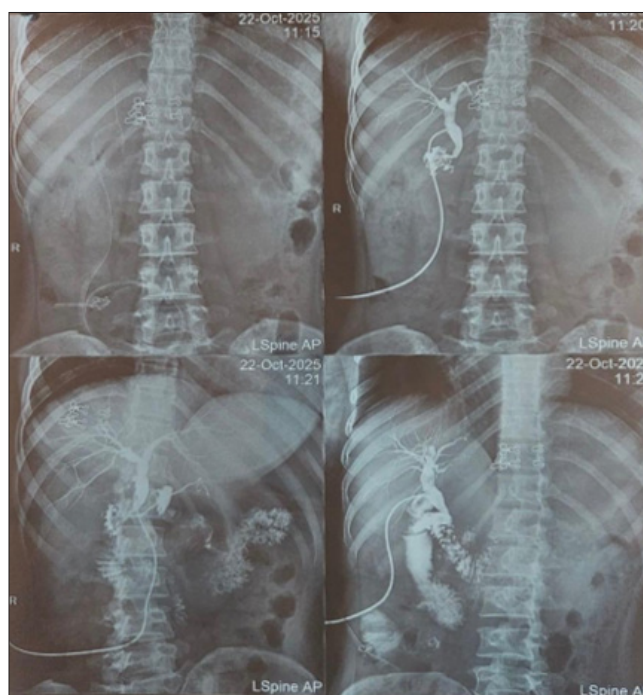


Figure 5. T-Tube Cholangiogram (showing no obvious abnormality)

Follow-Up and Outcomes

The postoperative period was uneventful. The patient resumed oral intake gradually and remained asymptomatic. The T-tube cholangiogram performed during follow-up demonstrated free flow of contrast into the duodenum without leakage or residual calculi. The T-tube was subsequently removed, and the patient reported complete resolution of her preoperative symptoms.

Discussion

Cholelithiasis, or gallstone disease, has long been a common gastrointestinal disorder, and the management of its associated complications places a considerable economic burden on healthcare systems. Most internal biliary fistulas arise spontaneously, whereas the majority of external biliary fistulas are iatrogenic, typically occurring after surgical interventions or percutaneous procedures. Approximately 91–94% of spontaneous internal biliary fistulas are attributable to calculi within the biliary tract[8]. Cholecystoenteric fistula is a rare complication of gallstone disease, with an incidence of 0.1% to 0.5%, and a frequency of 1.2% to 5% in patients undergoing cholecystectomy[10]. It is observed predominantly in women, usually in the sixth decade of life[10,11]. Among the different types of cholecystoenteric fistulas, cholecystoduodenal fistula is the most common type, followed by cholecystocolonic and cholecystogastric fistulas[8].

In this case, the presence of a gallstone in the vomitus provided a clear diagnostic clue, attributable to the retrograde migration of gallstones into the stomach, which allowed their expulsion through vomiting[12]. Bile duct stones can pass spontaneously into the gastrointestinal tract through the common bile duct, especially if the size of the stone is less than 3.5 mm. Another mechanism could be the passage of the stone through the biliary-enteric fistula, a complication observed in 0.3–1.5% of patients with cholelithiasis[14]. However, only two cases of gallstone vomiting without a fistula have been documented so far. The first case was documented in 1951, where a 65-year-old woman vomited a 0.5-cm faceted gallstone[15]. The second case was documented in 2013, where an 83-year-old woman had multiple episodes of gallstone vomiting due to an inflammatory stricture obstructing the presence of a cholecystoduodenal fistula[12].

At the time of the outpatient consultation, the patient presented with vomiting. Computed tomography suggested a type 3A cholecystoduodenal fistula according to the Niemeier classification and recommended correlation with MRCP findings. Based on the combined imaging and clinical features, a diagnosis of cholelithiasis with choledocholithiasis and an associated cholecystoduodenal fistula was established. Gallbladder perforation was initially classified by Niemeier and later revised by Anderson et al. in 1987[17], a system that continues to be the most widely accepted framework for its clinical categorisation.

This classification describes three primary subtypes; acute free perforation (type I), subacute perforation with pericholecystic abscess formation (type II), and chronic perforation leading to cholecystoenteric fistulation (type III), with a fourth subtype subsequently proposed by Anderson et al., namely cholecystobiliary fistula formation (type IV).

History taking continues to play an important role, as a history of gallstone disease may raise the possibility of cholecystoduodenal fistula in the differential diagnosis. Many authors have proposed pneumobilia, a small atrophic gallbladder with adhesions to surrounding viscera, and a history of jaundice as possible indicators of the presence of a cholecystoenteric fistula[10,18,19]. Failure to visualize the gallbladder in the absence of a past cholecystectomy or the presence of a thickened, small gallbladder with adhesions to surrounding structures has been described as a suggestive feature of internal biliary fistulas, especially cholecystoenteric fistulas.

Transabdominal ultrasonography is the first imaging method of choice in patients suspected of having biliary disease, including choledocholithiasis. In most instances, abdominal ultrasonography will show a common bile duct dilatation of more than 6 mm and the presence of calculi within the duct. Although the presence of duodenal gas often precludes visualisation of the common bile duct stones, ultrasonography can show ductal dilatation with an accuracy of up to 90%. However, its sensitivity for the detection of common bile duct stones is only 15% to 40%. Computed tomography is considered to be more accurate than ultrasonography and allows direct visualisation of a fistulous tract between the gallbladder and the duodenum, with pneumobilia often seen as a secondary finding. Magnetic resonance cholangiopancreatography is a reliable imaging technique for the detailed assessment of the biliary tree, with a diagnostic accuracy of nearly 100% in the detection of common bile duct stones[20].

The management of this condition remains challenging, requiring meticulous care and innovative approaches to reduce its burden on both affected individuals and healthcare systems.

Surgery remains the most effective therapeutic option for biliary fistulas. While laparoscopic management is increasingly employed due to advances in surgical techniques and operator expertise, an open approach is favoured in cases with severe inflammation and distorted anatomy.²¹ In the present case, open surgery was performed because of marked inflammatory changes, making definitive surgical management necessary.

Conclusion

In conclusion, this case report draws attention to the rare presentation of cholecystoduodenal fistula in young patient with gallstone disease, and the broad clinical spectrum and diagnostic challenges associated with this condition.

The presence of unusual presentations, such as gallstone vomiting and jaundice, underlines the importance of careful history-taking and a high degree of clinical suspicion. Modern imaging techniques, such as CT and MRCP, have a crucial role to play in making an accurate diagnosis and delineating the anatomy of the fistula. Although there have been advances in minimally invasive surgery, surgical intervention remains the mainstay of treatment, and the choice of surgical procedure depends on the degree of inflammation and anatomical distortion. Early diagnosis and prompt treatment are critical to avoid morbidity and optimize outcomes, and to mitigate the impact of this rare but serious complication on patients and healthcare systems.

Conflict of Interest

The authors declare that there is no conflict of interests regarding the publication of this paper.

Consent

Written informed consent was obtained from the patient for publication of this case report.

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