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Two-Stage Laparoscopic Management of Gallstone Ileus Secondary to Cholecystoduodenal Fistula in an Elderly Female: A Rare Case Report

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Abstract | **Case Report**

Gallstone ileus is an uncommon but potentially life-threatening consequence of chronic cholelithiasis, typically affecting elderly women. It arises when a large gallstone erodes through the gallbladder wall into an adjacent part of the gastrointestinal tract, forming a cholecystoenteric fistula, most commonly a cholecystoduodenal fistula. The stone then migrates into the bowel and can cause obstruction, most frequently at the ileocecal valve because of its small lumen. The clinical presentation often mimics other causes of intestinal obstruction, making diagnosis challenging and frequently delayed. Radiologic imaging, especially computed tomography (CT), plays a vital role in identifying features such as pneumobilia, ectopic gallstone, and bowel distension—collectively known as Rigler's triad. Surgical intervention remains the cornerstone of treatment, with debate persisting between one-stage versus two-stage procedures. In this report, we describe the effective management of gallstone ileus in an 82-year-old female patient using a two-stage laparoscopic procedure. This case highlights the diagnostic challenges, surgical decision-making, and the potential role of minimally invasive techniques in high-risk patients.

Keywords: gallstone ileus, cholecystoduodenal fistula, laparoscopic enterolithotomy, intestinal obstruction, two-stage surgery.

INTRODUCTION

Gallstone ileus is an uncommon cause of gastrointestinal obstruction, accounting for approximately 1–3% of all cases, with a significantly higher incidence in the elderly population, where it constitutes up to 25% of non-strangulated small intestinal obstructions in individuals over 65 years of age [1]. It is a rare complication of chronic cholelithiasis and is more common in females, with a ratio of 3.6:1 to 6:1 between them and males [2].

The pathophysiology includes pressure necrosis brought on by a big gallstone and chronic inflammation that results in the development of a cholecystoenteric fistula. The most frequently encountered type is a cholecystoduodenal fistula, although cholecystocolic and cholecystogastric variants have been described [3,4]. Through the fistulous tract, the stone migrates into the gastrointestinal tract and may traverse the bowel harmlessly. However, in some instances, particularly when the stone is >2.5 cm in diameter, it becomes impacted, commonly at the ileocecal valve due to its relatively small lumen and sluggish motility [5].

Clinically, gallstone ileus manifests as small intestinal obstruction symptoms such as nausea, vomiting, distension, abdominal discomfort, and constipation. These vague symptoms often lead to delayed or incorrect diagnosis. Rigler's triad, which includes intestinal obstruction, ectopic gallstone, and pneumobilia, is the radiologic hallmark of gallstone ileus. It is visible on plain abdominal radiographs in only about half of the cases [6,7]. Computed tomography (CT) has emerged as the most sensitive and specific diagnostic tool [8]. Treatment typically involves surgical extraction

of the gallstone. However, debate persists regarding the optimal surgical strategy. In a one-stage operation, enterolithotomy is performed along with cholecystectomy and fistula closure, but in a two-stage approach, these procedures are postponed. The two-stage approach is often favored in elderly patients or those with poor general condition due to lower operative risks [9].

In this report, we present an elderly female with gallstone ileus successfully managed with laparoscopic enterolithotomy followed by planned elective biliary surgery.

Case Presentation

An 82-year-old woman reported to the emergency room with complaints of acute abdominal pain located in the right and left hypochondrium for two days, accompanied by 2-3 episodes of non-bilious vomiting with undigested food particles. She also reported the non passage of flatus for the past 24 hours. Her medical history included known cholelithiasis for the previous year and a prior episode of pulmonary embolism.

When examined, the patient's vital signs were steady and afebrile. No signs of icterus, cyanosis, edema, or pallor were observed. Abdominal examination revealed generalized tenderness without guarding, rigidity, or distension. Cardiovascular examination was remarkable for a systolic murmur, but other systemic examinations were within normal limits.

Initial blood investigations revealed normocytic anemia (low hemoglobin and red blood cell count), leukopenia, thrombocytopenia, and elevated serum urea and creatinine levels, suggestive of early acute kidney injury secondary to dehydration. Liver function tests were within normal limits (Table 1).

Table 1: Laboratory Investigations at Admission

Investigation	Observation result	Reference range
Hemoglobin	9.8 g/dL	13.0 – 17.0 g/dL
Platelet Count	110,000 /mm³	150,000 – 450,000 /mm³
Total Leukocyte Count	3,200 /mm³	4,000 – 11,000 /mm³
Red Blood Cell Count	3.5 million/µL	4.2–5.4 million/µL
Serum Urea	65 mg/dL	15 – 45 mg/dL
Serum Creatinine	2.1 mg/dL	0.6 – 1.3 mg/dL
Serum Sodium	140 mEq/L	135–145 mEq/L
Serum Potassium	4.1 mEq/L	3.5–5.0 mEq/L
Total Bilirubin	0.8 mg/dL	0.3–1.2 mg/dL
Aspartate Aminotransferase	34 U/L	10-40 U/L
Alanine Aminotransferase	28 U/L	7-56 U/L
Alkaline Phosphatase	120 U/L	44-147 U/L

Ultrasonography of the abdomen showed a contracted gallbladder with an 11 mm calculus, dilated fluid-filled bowel loops, and bilaterally contracted kidneys (Figure 1).

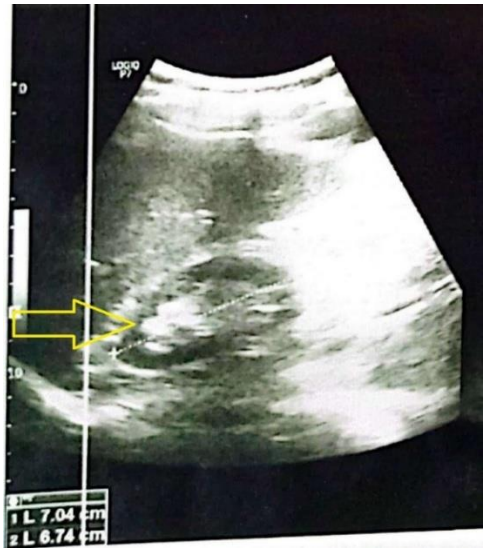

Figure 1: Abdominal ultrasonography demonstrating a contracted gallbladder with a hyperechoic shadowing calculus measuring approximately 11 mm.

A plain abdominal X-ray revealed distended air-filled bowel loops (Figure 2).

Figure 2: Supine abdominal radiograph demonstrating multiple air-filled, dilated small bowel loops, consistent with mechanical small bowel obstruction.

To confirm the diagnosis, a CT scan was performed, which demonstrated a 3 cm radiopaque mass within the ileum, pneumobilia, and dilated proximal small bowel loops, consistent with Rigler's triad (Figure 3). A diagnosis of gallstone ileus was made.

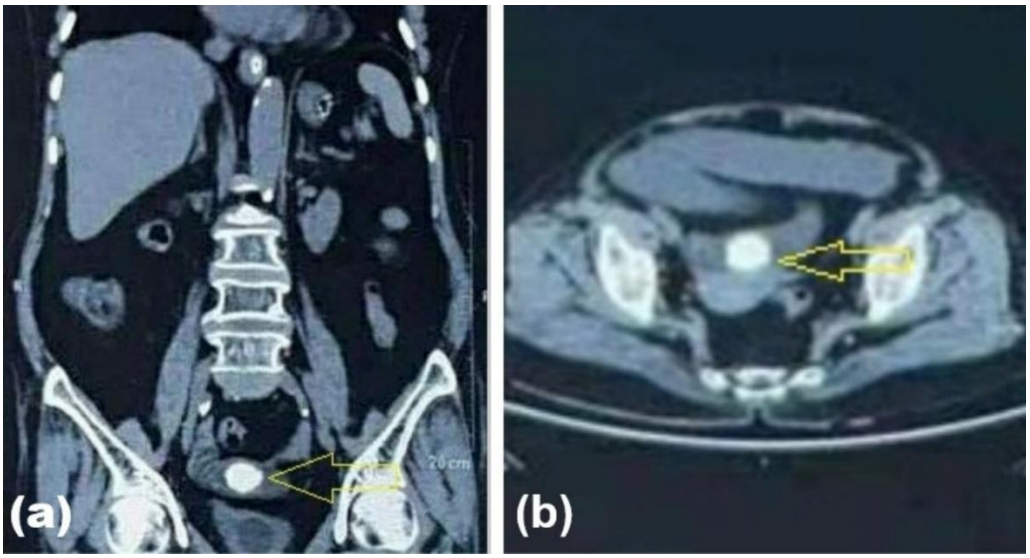

Figure 3: (a) Coronal contrast-enhanced CT of the abdomen and pelvis showing a large gallstone (yellow arrow) impacted in the distal ileum, causing small bowel obstruction consistent with gallstone ileus. (b) Axial CT abdomen with contrast showing impacted gallstone (3 cm) in the terminal ileum

The patient was scheduled for laparoscopic enterolithotomy under general anesthesia. Due to her age and borderline renal parameters, a two-stage surgical plan was adopted. The patient was kept nil per oral (NPO) from midnight and preoperative preparations were undertaken, including prophylactic antibiotics, fluid resuscitation, and pre-anesthetic evaluation. After informed consent was obtained, she was shifted to the operating room.

A three-port laparoscopic approach was used. Pneumoperitoneum was established via the umbilical port. Upon exploration, a 3 cm × 2.5 cm gallstone was identified lodged in the terminal ileum (Figure 4). Multiple bowel adhesions and significant fibrotic changes in the area of Calot's triangle were observed, consistent with previous subclinical inflammation. The cholecystoduodenal fistula could not be visualized due to dense adhesions and inflamed omentum.

Figure 4: Laparoscopic image showing an impacted gallstone within the terminal ileum, causing visible bowel bulging.

A longitudinal enterotomy was made at the antimesenteric border proximal to the site of impaction. After the gallstone was carefully removed, two layers of intracorporeal interrupted sutures were used to close the enterotomy. A pelvic drain was placed, and all port sites were closed using subcuticular sutures. After securing hemostasis, the patient was shifted to the post-anesthesia care unit in a stable state.

The time following surgery went smoothly. On the third postoperative day, the patient started taking oral intake, and by the fourth day, bowel function had returned. Serial blood tests showed improvement in renal function. On the sixth postoperative day, she was discharged with a plan for an interval laparoscopic cholecystectomy and fistula closure once her condition stabilized and nutritional status improved.

Discussion

Bartholin originally described gallstone ileus in 1654, and it is still an uncommon but challenging surgical condition, especially in individuals who are older [10]. The condition is a late complication of chronic cholelithiasis, often occurring after repeated episodes of cholecystitis resulting in development of a biliary-enteric fistula. The cholecystoduodenal fistula is the most prevalent, accounting for 75–80% of cases [11].

Gallstone ileus presents insidiously with intermittent or subacute symptoms of small bowel obstruction. The phenomenon of "tumbling obstruction" may occur as the stone intermittently occludes the lumen while migrating through the bowel [12]. Diagnostic imaging plays a pivotal role. Although plain radiographs may suggest obstruction, CT remains the gold standard, providing high sensitivity (93%) and specificity (100%) [8].

Whether to use a one-stage or two-stage surgical approach is determined by patient's condition and intraoperative findings. Although one-stage procedures definitively address the fistula and reduce recurrence, they are associated with higher operative time, morbidity, and mortality, especially in frail elderly patients [13]. A recent retrospective review demonstrated that mortality associated with one-stage procedures was significantly higher compared to enterolithotomy alone [14]. Laparoscopic enterolithotomy is less frequently reported but has shown success in select cases. Benefits include a quicker return to baseline activity, a shorter hospital stay, and less postoperative pain [15]. However, it requires advanced laparoscopic skills and is technically demanding in the presence of distended bowel loops and dense adhesions, as observed in our patient.

In this case, a two-stage laparoscopic approach was justified due to the patient's advanced age, comorbidities, and intraoperative difficulty visualizing the fistula. A delayed cholecystectomy with fistula closure was planned to prevent recurrent symptoms, gallstone ileus, or cholangitis.

Conclusion

Gallstone ileus, though uncommon, continues to pose a significant diagnostic and therapeutic challenge, particularly in elderly patients who often present with multiple comorbidities and atypical clinical

features. Prompt recognition through careful clinical assessment and supportive imaging is essential in preventing delays that can lead to high morbidity and mortality. This case demonstrates that a two-stage laparoscopic approach is a viable and effective treatment strategy when immediate fistula closure is not feasible, particularly in unstable patients or when dense adhesions obscure the anatomy. By prioritising stone removal to relieve obstruction and deferring fistula management to a later stage, surgical risks can be minimised while still achieving good clinical outcomes. Moreover, the successful use of laparoscopy in this setting highlights the growing role of minimally invasive surgery, even in rare and technically demanding conditions such as gallstone ileus. Ultimately, the key takeaway from this case is that patient-centred surgical planning, guided by intraoperative findings and the overall clinical condition, is critical to achieving safe and effective outcomes.

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