

Case Report

Laparoscopic Management Of Gallstone Ileus: A Surgical Case Report.

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Abstract

Background: Gallstone ileus is a rare but important cause of mechanical intestinal obstruction, accounting for approximately 1–4% of all cases. It occurs as a complication of cholelithiasis due to the formation of a cholecystoenteric fistula, allowing the passage of gallstones into the gastrointestinal tract. The terminal ileum is the most common site of impaction due to its narrow lumen and reduced peristalsis. The condition is more frequently encountered in elderly patients with multiple comorbidities and is associated with significant morbidity and mortality, particularly in cases of delayed diagnosis.

Case Presentation: A 61-year-old female with a medical history of poorly controlled type 2 diabetes mellitus, hypertension, ischemic heart disease, and previous abdominal surgeries (right nephrectomy and appendectomy) presented to the emergency department with a five-day history of abdominal pain, vomiting, abdominal distension, and constipation. Clinical examination revealed signs of dehydration and hemodynamic instability. Laboratory investigations showed elevated inflammatory markers and impaired renal function. Imaging with computed tomography confirmed the diagnosis of gallstone ileus, demonstrating features of intestinal obstruction and an ectopic gallstone in the ileum.

Intervention: Following initial resuscitation and optimization, the patient underwent laparoscopic exploration. Intraoperative findings included dilated small bowel loops and a transition point at the terminal ileum. Laparoscopic enterolithotomy was performed with successful extraction of a large gallstone measuring more than 3 cm in diameter, followed by primary closure of the enterotomy. A staged surgical approach was adopted due to the patient's high operative risk, with interval cholecystectomy planned.

Outcome: The postoperative course was uneventful. The patient was monitored in the intensive care unit for 24 hours, followed by transfer to the surgical ward. She demonstrated good recovery and was discharged on the fourth postoperative day in stable condition without complications.

Conclusion: Gallstone ileus remains a diagnostic and therapeutic challenge, particularly in elderly patients with significant comorbidities. Computed tomography plays a pivotal role in early and accurate diagnosis. Laparoscopic enterolithotomy is a safe and effective minimally invasive option in selected patients, offering reduced morbidity, shorter hospital stays, and faster recovery compared to traditional open surgery.

Keywords: Gallstone ileus; intestinal obstruction; laparoscopic enterolithotomy; cholecystoenteric fistula; minimally invasive surgery; small bowel obstruction.

INTRODUCTION

Gallstone ileus is a rare complication of cholelithiasis and an uncommon cause of mechanical intestinal obstruction, accounting for approximately 1–4% of cases and 0.3–0.5% of patients with gallstone disease [1]. It develops as a result of recurrent episodes of acute and chronic cholecystitis, leading to the formation of a cholecystoenteric fistula, most commonly between the gallbladder and the duodenum, although it may involve other parts of the small intestine [2]. The condition is more frequently observed in females, with a reported female-to-male ratio ranging from 3.6:1 to 6:1, and an estimated incidence of 30–50 cases per million hospital admissions [3]. Despite its name, gallstone ileus represents

a true mechanical obstruction rather than a paralytic ileus. The underlying pathophysiology involves inflammation and pressure necrosis between the gallbladder and adjacent bowel, allowing the passage of a large gallstone into the intestinal lumen. The stone typically becomes impacted in the terminal ileum, usually within 5–10 cm of the ileocecal valve, due to its relatively narrow diameter and decreased motility, particularly when the stone exceeds 2.5 cm in size [4]. Clinically, patients present with features of acute mechanical intestinal obstruction, including abdominal pain, nausea, vomiting, abdominal distension, and constipation. In some cases, intermittent or subacute symptoms may occur, known as Karewsky syndrome, resulting from temporary impaction and migration of the gallstone within the bowel [5].

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Radiological evaluation is essential for diagnosis, with Rigler's triad—comprising intestinal obstruction, pneumobilia, and an ectopic gallstone—being the classic diagnostic finding. Computed tomography (CT) is considered the cornerstone of diagnosis, offering high sensitivity (93%), specificity (100%), and overall diagnostic accuracy (99%). In addition to identifying the obstructing stone, CT imaging can also detect the presence of a biliary-enteric fistula [6].

Management is primarily surgical and aims to relieve the obstruction. Treatment options include a one-stage procedure involving enterolithotomy with cholecystectomy and fistula closure, or a two-stage approach consisting of enterolithotomy followed by interval cholecystectomy. The latter is generally preferred in elderly or high-risk patients due to reduced operative morbidity. Both approaches can be performed laparoscopically in selected cases [7].

In this report, we present a case of gallstone ileus in an elderly female, successfully diagnosed radiologically and managed with laparoscopic enterolithotomy, followed by planned elective biliary surgery.

CASE PRESENTATION

This case is reported in accordance with the SCARE (Surgical CAse REport) guidelines. A 61-year-old female presented to the emergency department at Prince Mohammed bin Salman Hospital, Aden, Yemen, with a five-day history of abdominal pain, repeated vomiting, abdominal distension, and constipation. Her medical history was significant for poorly controlled type 2 diabetes mellitus on insulin therapy, hypertension, and ischemic heart disease. She also had a history of previous abdominal surgeries, including right nephrectomy and appendectomy.

On admission, the patient appeared clinically dehydrated and hemodynamically unstable, with tachycardia and hypotension. She was obese, with a body weight of approximately 135 kg.

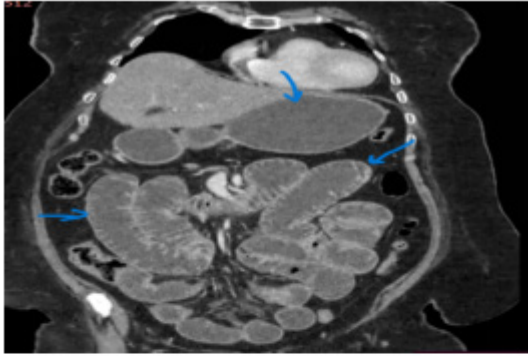
On physical examination, the patient was alert, conscious, and oriented. Abdominal examination revealed a mildly distended abdomen with generalized tenderness, more pronounced in the right iliac fossa. Per rectal examination demonstrated an empty rectum. Following insertion of a nasogastric tube, feculent output was noted.

Laboratory investigations showed a white blood cell count of $9 \times 10^9/L$, elevated C-reactive protein (CRP) of 69.5 mg/L, serum creatinine of 1.5 mg/dL (likely secondary to dehydration and a solitary kidney), hypoalbuminemia (2.8 g/dL), and hypocalcemia (7.9 mg/dL).

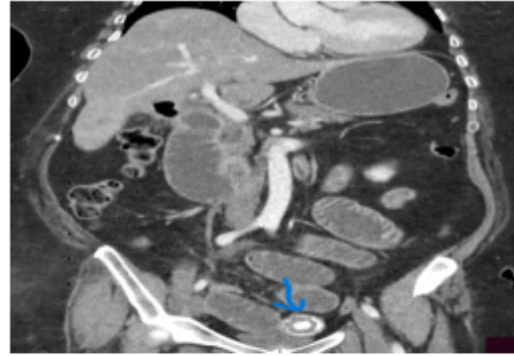
Initial abdominal ultrasound demonstrated bowel distension with the presence of gallstones but was inconclusive for the diagnosis. Computed tomography (CT) of the abdomen confirmed the presence of an ectopic gallstone within the ileum associated with features of intestinal obstruction (**Figure 1**). After adequate resuscitation and optimization, the patient was prepared for surgery with high-risk informed consent, including the possibility of conversion to open laparotomy. Pneumoperitoneum was established, and laparoscopic exploration revealed dilated proximal small bowel loops with collapsed distal bowel (**Figure 2**). Extensive adhesiolysis was performed involving the ileum, right colon, and abdominal wall due to prior surgeries (**Figure 3**).

The site of obstruction was identified approximately 20 cm proximal to the ileocecal junction (**Figure 4**). A longitudinal enterotomy was performed using diathermy (**Figure 5**), followed by extraction of a large gallstone measuring more than 3 cm in diameter (**Figure 6**). The enterotomy was closed primarily in two layers using absorbable sutures (**Figure 7**). The extracted specimen is shown in **Figure 8**.

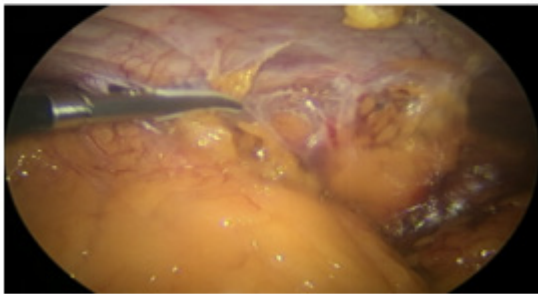
Postoperatively, the patient was monitored in the intensive care unit for 24 hours, followed by transfer to the surgical ward. Her recovery was uneventful, and she was discharged on the fourth postoperative day in good clinical condition.



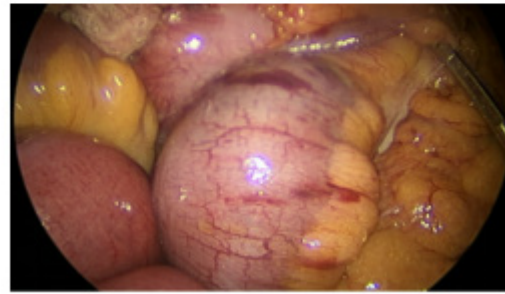
(Fig. 1)



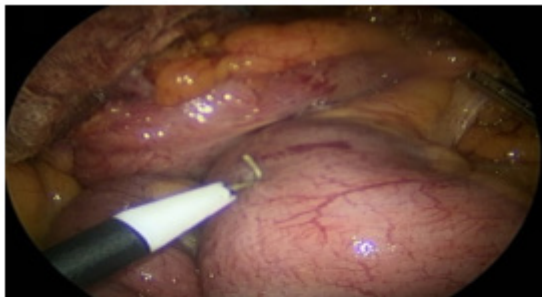
(Fig. 2)



(Fig. 3)



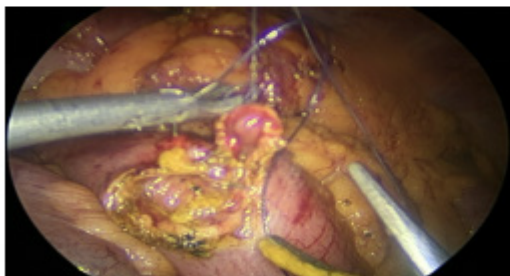
(Fig. 4)



(Fig. 5)



(Fig. 6)



(Fig. 7)



(Fig. 8)

ANESTHETIC TECHNIQUE

A 61-year-old female with morbid obesity (BMI 58.5), hypertension, and poorly controlled type 2 diabetes mellitus presented with intestinal obstruction after being bedridden for five days without anticoagulant prophylaxis, increasing her risk of thromboembolic events.

Preoperative evaluation revealed significant electrolyte imbalance, notably hyponatremia (serum sodium 120 mEq/L), and hyperglycemia with a random blood sugar level of 300 mg/dL. The main anesthetic concerns included morbid obesity, increased risk of thromboembolism, electrolyte disturbances, uncontrolled diabetes, and perioperative pain management.

The anesthetic plan aimed to provide effective analgesia while minimizing opioid-related complications. Intrathecal pethidine was administered for analgesia, followed by standard general anesthesia induction using midazolam, propofol, fentanyl, and vecuronium.

Anesthesia was maintained with isoflurane inhalation, along with intraoperative insulin-dextrose infusion for glycemic control. The patient remained hemodynamically stable throughout the procedure.

The surgery was completed successfully without anesthetic complications. Postoperatively, the patient was transferred to the intensive care unit for close monitoring, where she remained stable and recovered without adverse events.

DISCUSSION

Gallstone ileus is an uncommon cause of mechanical intestinal obstruction caused by the migration of gallstones through a cholecystoenteric fistula, most commonly a cholecystoduodenal fistula, and typically impacted at the terminal ileum [8,9]. While cholecystoenteric fistulas may rarely involve the stomach, colon, or other parts of the small intestine, the duodenum remains the most frequent site [10]. Clinically, gallstone ileus presents with features of small bowel obstruction, including abdominal pain, distension, constipation, and feculent vomiting. Most patients (80–90%) have associated comorbidities, such as hypertension, diabetes mellitus, ischemic heart disease, or pulmonary disease, which increase the risk of complications and worsen prognosis when diagnosis is delayed [11]. Our patient had multiple risk factors, including morbid obesity, diabetes mellitus, hypertension, and ischemic heart disease.

Diagnosis can be challenging due to the nonspecific nature of the symptoms. Rigler's triad—pneumobilia, intestinal obstruction, and an ectopic gallstone—is pathognomonic but only observed in a minority of cases (approximately 15% on plain imaging) [10]. Laboratory tests are typically nonspecific. Plain radiography may detect radiopaque stones, but sensitivity is limited (40–70%) due to the radiolucent nature of

many stones and masking by intestinal gas [12]. Ultrasound is highly sensitive for gallbladder stones (approximately 95%) and may detect a fistula, but visualization of stones in the ileum is often limited by overlying bowel gas [13]. In our case, ultrasound was inconclusive, necessitating contrast-enhanced CT, which remains the diagnostic modality of choice, with sensitivity of 90–93% and specificity of 100%. CT can identify the obstructing stone, fistula, and pneumobilia, although complete Rigler's triad is observed in only 78% of cases [14]. MRI is less practical in emergency settings due to longer acquisition times and potential patient instability; therefore, CT is preferred. In our patient, Rigler's triad was incomplete, demonstrating only intestinal obstruction and an ectopic gallstone.

Surgical management aims to relieve obstruction. Delayed diagnosis and intervention, particularly in elderly patients, are associated with high mortality (12–27%) [15]. Traditionally, open laparotomy was standard, but it carries significant morbidity (20–57%) and mortality (7–18%). Advances in laparoscopic surgery now allow minimally invasive management, even in cases of bowel obstruction, though the procedure remains technically challenging [16]. Gari MKM et al. reported successful laparoscopic enterolithotomy in an elderly female with small bowel obstruction and classical Rigler's triad, resulting in an uncomplicated postoperative course [17]. The first laparoscopic enterolithotomy was reported by Montgomery in 1993, followed by Franklin et al. in 1994; since then, laparoscopic approaches have become increasingly utilized [18,19].

Surgical strategies include a one-stage procedure (enterolithotomy plus cholecystectomy and fistula closure) and a two-stage procedure (enterolithotomy alone, followed by interval cholecystectomy). The one-stage procedure carries higher morbidity and mortality and is reserved for selected patients with symptomatic gallstones [10]. The two-stage approach is typically favored in elderly or high-risk patients due to shorter operative time and reduced perioperative risk, with interval cholecystectomy performed only in patients with persistent biliary symptoms or recurrent episodes [20]. Reported mortality ranges from 11–33% for one-stage and 9–18% for two-stage procedures [21]. In our patient, a two-stage approach was adopted: laparoscopic enterolithotomy was performed alone due to advanced age and multiple comorbidities, with interval cholecystectomy planned. The patient recovered smoothly without postoperative complications.

Endoscopic techniques have been described in selected cases, particularly when the gallstone is located in the stomach or duodenum. While endoscopic extraction may be feasible, it carries risks of bleeding, and closure of any resultant enterotomy can be technically challenging, especially in the setting of inflamed or friable bowel [22].

CONCLUSION

Gallstone ileus is a rare condition that predominantly affects elderly patients with multiple comorbidities. Early diagnosis is critical to reduce morbidity and complications, with computed tomography serving as the cornerstone of accurate diagnosis. The primary goal of management is relief of intestinal obstruction, which can be achieved through open laparotomy or laparoscopic intervention.

Laparoscopic management is increasingly feasible and offers significant advantages in selected high-risk patients, including reduced perioperative complications, lower mortality, faster recovery, and shorter hospital stay compared to open surgery. In appropriately selected cases, laparoscopic enterolithotomy should be considered the preferred approach for elderly patients with comorbidities.

Patient Consent

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

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