








Diagnosis and treatment approaches in gallstone ileus: a case series from a high-volume clinic*Safra Taşı İleuslarında Tanı ve Tedavi Yaklaşımları: Yüksek Volümlü Klinikten bir Vaka Serisi*Hasan Elkan¹ , Mehmet Sait Berhuni¹ , Hüseyin Yönder¹ , Vedat Kaplan¹ , Faik Tatlı¹ , Abdullah Özgönül¹ , Ali Uzunköy¹ ¹Department of General Surgery, Harran University, Faculty of Medicine, Sanliurfa /Türkiye**Abstract****Background:** This study aims to present the patients who underwent surgery for gallstone ileus in our clinic in the light of literature information.**Materials and Methods:** We collected data from patients who had surgery for gallstone ileus in our clinic between January 2016 and January 2024. Demographic data, preoperative symptoms, comorbidities, diagnostic method, surgical method, location of the stones causing the ileus, and postoperative findings were recorded.**Results:** Eight patients underwent surgery for gallstone ileus in our clinic on the specified dates. The average age was 64.1 (55–81) years. All patients experienced nausea, vomiting, and abdominal pain, and six had comorbidities. While the diagnosis was made by computed tomography in six patients, it was made during surgery in two. Seven patients had only enterolithotomy, and one underwent enterolithotomy, fistula repair, and cholecystectomy. The stones were located in the ileum in five patients and in the jejunum in three. No postoperative mortality was observed in our patients.**Conclusions:** Gallstone ileus should be considered in elderly patients with comorbidities and no history of abdominal surgery who present with ileus. While enterolithotomy is the main treatment, we believe that cholecystectomy and fistula repair can also be performed in a single session in patients whose general condition is not critical.**Keywords:** Gallstone, Ileus, Diagnosis and treatment**ÖZ****Amaç:** Bu çalışmada kliniğimizde safra taşı ileusu nedeniyle opere edilen hastaları literatür bilgileri ışığında sunmayı amaçladık**Gereç ve Yöntem:** Veriler, Ocak 2016–Ocak 2024 tarihleri arasında kliniğimizde safra taşı ileusu nedeniyle opere edilen hastalardan toplandı. Demografik veriler, preoperatif semptomlar, komorbiditeler, tanı yöntemi, cerrahi yöntem, ileusa neden olan taşların yerleşimi ve postoperatif bulgular kaydedildi.**Bulgular:** Belirtilen tarihlerde kliniğimizde 8 hasta safra taşı ileusu nedeniyle opere edildi. Ortalama yaş 64.1 (55-81) yılı. Hastaların tamamında bulantı, kusma ve karın ağrısı görüldü ve 6'sında ek hastalık mevcuttu. Altı hastada tanı bilgisayarlı tomografi ile konulurken iki hastada tanı ameliyat esnasında konuldu. Yedi hastaya sadece enterolitotomi ve bir hastaya enterolitotomi, fistül onarımı ve kolesistektomi uygulandı. Taşlar beş hastada ileumda üç hastada jejunumda yerleşmişti, Hastalarımızda ameliyat sonrası mortalite gözlenmedi.**Sonuç:** Safra taşı ileusu; komorbiditeleri bulunan, abdominal cerrahi öyküsü olmayan ve ileus tablosuyla başvuran yaşlı hastalarda düşünülmelidir. Esas tedavi enterolitotomi olmakla birlikte genel durumu kritik olmayan hastalarda kolesistektomi ve fistül onarımının da tek seansta yapılabileceğini düşünüyoruz.**Anahtar kelimeler:** Safra taşı, ileus, tanı ve tedavi**Highlights**

- Gallstone ileus should be suspected in elderly patients with ileus, comorbidities, and no prior abdominal surgery.
- Enterolithotomy is the preferred surgical method for its speed and suitability for critically ill patients.
- Early diagnosis and prompt treatment are essential for better outcomes.

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Introduction

Gallstone ileus occurs when gallstones enter the gastrointestinal tract through bilioenteric fistulas (1-2). First described by Erasmus Bartholin in 1654, it is a type of mechanical obstruction in the gastrointestinal (GI) system caused by gallstones (3). It accounts for 1–4% of all intestinal obstructions and approximately 25% of obstructions in people over 65 years old (4).

Most gallstones that enter the intestines through a bilioenteric fistula do not induce problems, but larger stones >2.5 cm in diameter can lead to an obstruction (1-2). The most common areas of obstruction are the ileum, jejunum, and colon. Key symptoms include cramp-like pain, nausea, and vomiting (5).

Clinical suspicion is key to diagnosing gallstone ileus. Signs include air-fluid levels on direct abdominal X-rays and air and stone images in the intrahepatic bile ducts on computed tomography (CT) (5-6). Surgery is the preferred treatment for gallstone ileus. Three different approaches have been defined for surgical treatment so far. The patient can only receive enterolithotomy and be followed up, or enterolithotomy, cholecystectomy, and fistula repair procedures can be conducted in the same session. The third approach involves cholecystectomy and fistula repair for at least 4–6 weeks post-enterolithotomy (2,6). The present study aimed to present data from patients who underwent surgery for gallstone ileus in our clinic in the last 8 years, in the light of a review of relevant literature.

Material and Methods

We reviewed data from eight patients who had surgery for gallstone ileus between January 2016 and January 2024. We recorded information on their symptom duration before presentation, preoperative radiological evaluation, previous surgical history, surgery risk assessment based on the physical classification degree by the American Society of Anesthesiologists (ASA), concomitant chronic diseases, surgery duration, surgery method, intraoperative findings, postoperative complications, and 30-day mortality, as well as patient demographics. The study was approved by Harran Clinical Research Ethics Committee (HRÜ/24.06.35. date: 13.05.2024) prior to the commencement of the study.

Results

Of the eight patients in the study, three (37.5%) were female and five (62.5%) were male, with an average age of 64.1 (55–81) years. Two patients had other diseases, four had diabetes mellitus (DM), one had hypertension (HT), and one had DM, HT, and heart failure. None had previous surgeries. All the patients had an ASA score of III. Two (25%) patients were operated on before the COVID-19 pandemic and six (75%) were operated on after. All the patients presented with symptoms of ileus, abdominal swelling, nausea, vomiting, and colicky abdominal pain. The average time from when symptoms started and to when patients came to the hospital was 5.4 (1–9) days. Only three patients had a history of gallstones. All patients had air-fluid levels upon direct abdominal X-rays. Gallstones were identified as the cause of ileus on preoperative CT scans (**Figure 1A**) in six (75%) patients, while two (25%) were diagnosed during laparotomy. Free air image was observed in the bile ducts (pneumobilia) in six patients (75%) diagnosed using CT (**Figure 1B**).

All the patients required emergency surgery. Seven had only enterolithotomy (**Figure 3**), while one patient had enterolithotomy, fistula repair, and cholecystectomy. During surgery, stones causing the obstruction were found in the ileum in five patients and the jejunum in three patients. The average stone size causing the blockage was 5.1 (4–6) cm (**Figure 4**). One patient who had enterolithotomy only received elective surgery 8 weeks later, including cholecystectomy and fistula repair.

Patients' demographic data, comorbidities, complaints at presentation, preoperative CT findings, surgical procedure, localization of the obstruction, and gallstone size operated on due to gallstone ileus are given in **Table 1**. There were no deaths after surgery. A patient was monitored in the intensive care unit due to pleural effusion, and drainage was performed with a catheter. Two patients had wound infections treated with antibiotics. The average hospital stay was 11.4 (5–28) days, and there were no deaths during the 30-day follow-up.

Table 1 Clinical, diagnostic, and treatment characteristics of the patients

| N/Age/sex | Application complaint | Computed tomography | Operation | Concomitant medical illnesses | Stone localization | Diameter of stone (cm) |
|-----------|--|---|---|-------------------------------|--------------------|------------------------|
| 1- 81/F | Nausea, vomiting, inability to pass gas and stool, and abdominal pain. | Intestinal obstruction, pneumobilia, aberrantly located gallstone | Enterolithotomy | DM, HT, CVD | Terminal ileum | 6 |
| 2-61/M | Nausea, vomiting, and abdominal pain. | Intestinal obstruction, aberrantly located gallstone | Enterolithotomy | DM | Terminal ileum | 4 |
| 3-66/M | Nausea, vomiting, inability to pass gas and stool, and abdominal pain. | Intestinal obstruction, pneumobilia, aberrantly located gallstone | Enterolithotomy | - | Jejunum | 5 |
| 4-63/F | Nausea, vomiting, and abdominal pain. | Intestinal obstruction, pneumobilia, aberrantly located gallstone | Enterolithotomy | DM | Terminal ileum | 5 |
| 5-62/M | Nausea, vomiting, inability to pass gas and stool, and abdominal pain. | Intestinal obstruction, | Enterolithotomy | HT | Terminal ileum | 6 |
| 6-57/M | Nausea, vomiting, and abdominal pain. | Intestinal obstruction, | Enterolithotomy | - | Jejunum | 6 |
| 7-55/M | Nausea, vomiting, and abdominal pain. | Intestinal obstruction, aberrantly located gallstone | Enterolithotomy Fistula repair + cholecystectomy after 8 weeks | DM | Jejunum | 4 |
| 8-68/F | Nausea, vomiting, and abdominal pain. | Intestinal obstruction, pneumobilia, aberrantly located gallstone | Enterolithotomy + fistula repair + cholecystectomy | DM | Terminal ileum | 5 |

Abberivariations: N: Number, F:Female, M:Male, DM:Diabetes mellitus, HT:Hypertension, CVD: Cerebrovascular disease

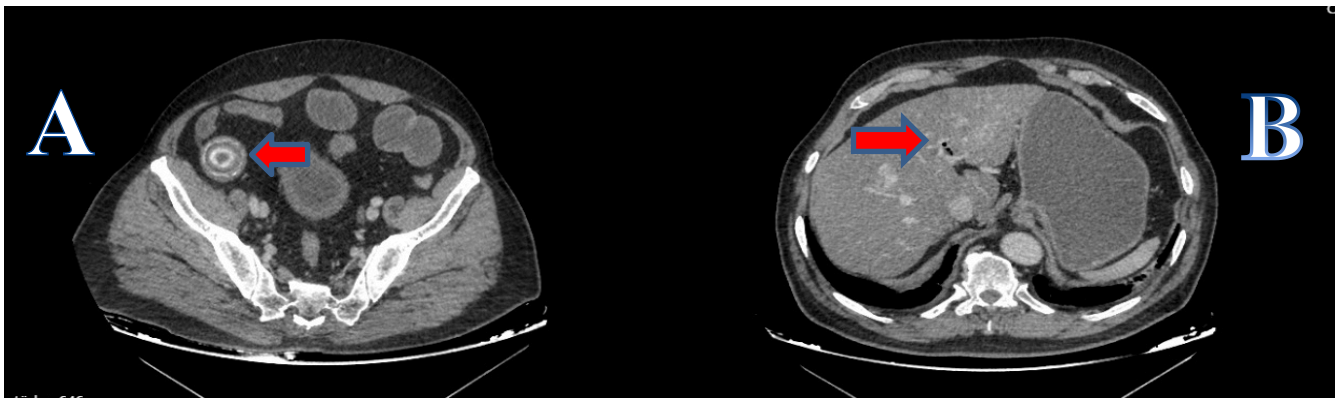


Figure 1 A. Computed tomography image of stones, which caused ileus B. Pneumobilia image on computed tomography (shown with red arrows)

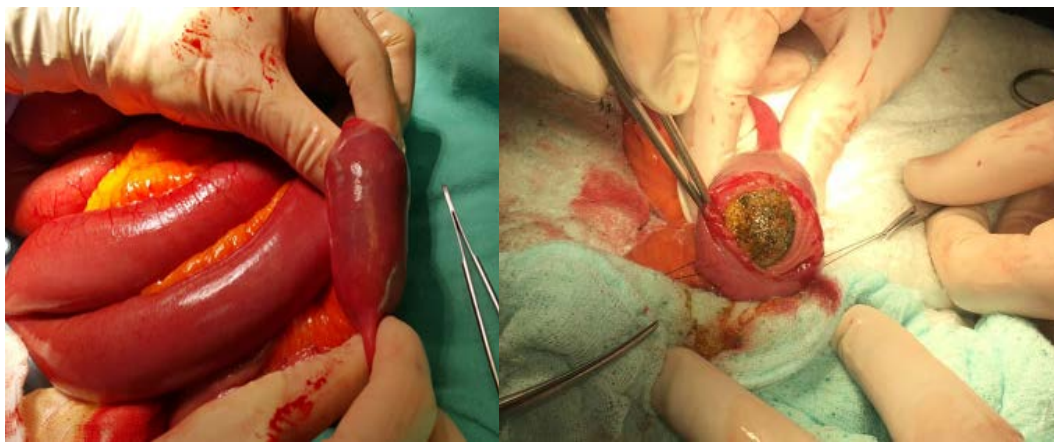


Figure 2. Gallstone removed by enterolithotomy



Figure 3. Gallstones, which caused ileus

Discussion

Gallstone ileus occurs when gallstones pass into the gastrointestinal tract. The most common type is the bilioenteric fistulas (8-9). Bilioenteric fistulas most prevalently develop as cholecysto-duodenal (76%). This is followed by cholecysto-colic (11%), cholecysto-gastric (6%), choledocho-duodenal (4%), and cholecysto-choledochal (3%) fistulas (1,3).

The age of patients in our study aligns with previous research but not sex distribution. Kumar et al. found that the

average age was 83 (61–96) years; female patients constituted 90% of the participants. Lassandro et al. reported an average age of 71.5 (58–96) years, with 85.2% female patients. Yakan et al. had an average age of 63.6 (50–80) years, with 75% female patients (1,9,10). The average age in the present study was 64.1 (55–81) years, and the female sex ratio was 37.5%.

In previous studies, the time between the onset of symptoms and hospital presentation was 3–4 days (3,5,7). In our study, it was an average of 5.4 (1–9) days. The average diameter of biliary stones, which caused ileus, was 5.1 (4–6) cm in this study. As regards the obstructed GI segments, these stones caused obstruction in the ileum in five patients (62.5%) and the jejunum in three patients (37.8%). Kumar et al. found stones averaged 3.3 (2.5–4) cm in their series of ten patients; the obstruction was in the ileum in nine patients and the sigmoid colon in one patient (1). In their series of 12 cases, Yakan et al. reported that obstruction was seen at the ileum level in nine patients and at the jejunum level in three patients (9).

Nonspecific symptoms, difficulty accessing healthcare, and comorbidities, including DM, make diagnosing gallstone ileus challenging. Additionally, most patients with gallstone ileus generally do not have history of cholelithiasis (11). Only 3 (37.5%) of our patients had a history of cholelithiasis. The most common symptoms of gallstone ileus are nausea, vomiting, abdominal distension, and epigastric pain. Previous studies reported abdominal pain and vomiting in approximately 90% of patients with this condition (12-13). In ileus cases detected in the emergency department, more common causes (such as brid, cancer, hernia) should be excluded first. Gallstone ileus should then be suspected and diagnosis approaches such as contrast-enhanced CT should be performed (9-10). All the patients included in our study had abdominal pain and vomiting. Notably, six (75%) of the patients had surgery after the COVID-19 pandemic, while two (25%) had surgery before. To our knowledge, there is no relationship reported in the literature between gallstone ileus and Covid -19 disease. This suggests that patients may have been reluctant to seek hospital care during the pandemic.

Therefore, approximately half gallstone ileus cases are diagnosed intraoperatively (14). The first imaging method for patients with ileus clinic is a direct abdominal X-ray. X-ray is quite insufficient to determine the etiology. Furthermore, stones in the gallbladder may be discovered by ultrasonography (USG). USG is mostly used to evaluate the biliary tract in cases where gallstone ileus is suspected. Another imaging method used for diagnosis purposes is CT, which can detect large stones, intestinal obstruction, and the level of obstruction. The gold standart imaging method for diagnosis of gallstone ileus is contrast-enhanced CT with 90-93% sensitivity and nearly 100% specificity (9). Even CT may sometimes be insufficient in diagnosis due to the structure and composition of the gallstone. Radiologically, the detection of obstruction findings, air bubbles in the biliary system, and ectopic stone images is called "Rigler's Triad," which can be detected in 14.8% of gallstone ileus cases through direct X-rays, 11.1% through USG, and 77.8% through CT. Based on the data from previous studies, CT is the most effective method for diagnosing gallstone ileus (10,14). The diagnosis of gallstone ileus is made intraoperatively in approximately half of the patients despite preoperative imaging methods. In the present study, gallstone ileus diagnosis was made during laparotomy in two (25%) patients and preoperatively using CT in six (75%).

Emergency treatment of gallstone ileus aims to remove the stone and intestinal obstruction. There is debate over the best surgical method (7,15-17). The surgical method to be chosen is closely related to the general condition of the patient. The general approach is to perform enterolithotomy quickly if the surgical risk of the patient is high in the preoperative evaluation. It is more appropriate to add restorative repair to enterolithotomy in patients with low surgical risks (16). Studies suggest that enterolithotomy is the most frequently used method (1,8-9). It is often preferred in emergencies to remove intestinal obstruction and in high-risk patients because it is safer and quicker. In the present study, seven (87.5%) patients had only enterolithotomy. The main purpose of performing enterolithotomy, cholecystectomy, and bile fistula repair in the same session is to prevent the risk of future recurrence of gallstone ileus, cholangitis, and cholecystitis (9,17-19). This procedure is generally associated with significant morbidity and causes mortality in patients at high risk (9,16). One of the patients in our study underwent enterolithotomy, cholecystectomy, and fistula repair during a single-stage operation. Only one of our seven patients, who underwent enterolithotomy, received cholecystectomy and fistula repair 8 weeks later. Previous studies show that surgical morbidities range from 25 to 80% as patient age increases (1,3,7). In the present study, surgical morbidity was seen in a total of three patients (37.5%), including surgical site infection in two patients and pleurisy in one patient.

Recent studies show that laparoscopy surgery for gallstone ileus can achieve similar success rates, while significantly reducing hospital stays (8,13). Kumar et al. reported the average duration of hospital stay was 10 days after surgical treatments involving laparotomy, while the same duration was 5 days in patients who underwent

laparoscopic surgery (1). All our cases were operated by laparotomy method, and the average hospital stay was 11.4 (5–28) days. Shorter hospital stays can help prevent nosocomial infections, especially since it is more prevalent in the elderly population.

Study limitations

The limitations of our study include the fact that it was designed as a retrospective study, there was a relatively smaller number of cases, and the fact that it was a single-center study

Conclusion

In conclusion, the “gallstone ileus” diagnosis should be kept in mind when elderly female patients with comorbidities and without a previous history of abdominal surgery present with ileus. Although enterolithotomy is the primary treatment, we believe that cholecystectomy and fistula repair can be performed in the same session if the patient’s condition allows.

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