

Gallstone ileus as an unexpected complication of cholelithiasis: diagnostic difficulties and treatment

Kolelitiazisin beklenmedik komplikasyonu, safra taşı ileusu:
Tanı zorlukları ve tedavi

Savaş YAKAN,¹ Ömer ENGİN,¹ Tahsin TEKELİ,¹ Bülent ÇALIK,²
Ali Galip DENEÇLİ,¹ Ahmet ÇOKER,³ Mustafa HARMAN⁴

BACKGROUND

Gallstone ileus is a rare complication of cholelithiasis, mostly in the elderly. The aim of this study was to evaluate our experience with 12 gallstone ileus cases and discuss current opinion as reported in the literature.

METHODS

Data of 12 patients operated between January 1998 and January 2008 with gallstone ileus were retrospectively studied.

RESULTS

There were 12 cases (9 F, 75%; 3 M, 25%) with a mean age of 63.6 (50-80) years. Median duration of symptoms before admission to the hospital was 4.1 (1-15) days. Preoperative diagnosis was made in only five cases (41.6%). Enterolithotomy was done in nine cases (75%). Enterolithotomy and resection of the small intestine - required for decubital necrosis from the gallstone - was performed in one case (8.3%). In one case (8.3%), enterolithotomy was completed in one stage with cholecystectomy and closure of the fistula during acute surgery, and in another case (8.3%), enterolithotomy + primary suturing of the jejunal perforation was performed. There were two (16.6%) perioperative mortalities.

CONCLUSION

Gallstone ileus remains a diagnostic challenge despite advances in imaging techniques, and pre-operative diagnosis is often delayed. Gallstone ileus should be suspected in all cases admitted to the emergency service with acute intestinal obstruction with a history of cholelithiasis, especially in the elderly and females.

Key Words: Gallstone; diagnosis; ileus; treatment.

AMAÇ

Safra taşı ileusu safra taşı hastalığının nadir ve genelde yaşlılarda görülen bir komplikasyondur. Çalışmamızın amacı safra taşı ileusu tanısı alan 12 hastayla ilgili deneyimimizi değerlendirmek ve güncel literatür eşliğinde tartışmaktır.

GEREÇ VE YÖNTEM

Kliniğimizde Ocak 1998-2008 yılları arasında safra taşı ileusu nedeniyle ameliyat edilen 12 olgunun dosyaları retrospektif olarak incelendi.

BULGULAR

Hastaların 9'u (%75) kadın, 3'ü (%25) erkek olup ortalama yaş 63,6 idi (dağılım, 50-80). Semptomların başlamasından hastaneye başvurmaya kadar geçen süre ortalama 4,1 (dağılım, 1-15) gün bulundu. Preoperatif tanı sadece 5 (%41,6) olguda konuldu. Hastaların 9'una (%75) enterolitotomi, 1'ine (%8,3) enterolitotomi + ince bağırsak rezeksiyonu, 1'ine (%8,3) tek aşamalı cerrahi, 1'ine (%8,3) ise enterolitotomi + jejunal perforasyona primer dikiş ameliyatı uygulandı. Perioperatif mortalite 2 (%16,6) olguda görüldü.

SONUÇ

Görüntüleme tekniklerindeki ilerlemeye rağmen safra taşı ileusu halen tanılabilir bir problemdir ve ameliyat öncesi tanı genellikle gecikmektedir. Safra kesesi taşı öyküsü bulunan ve acil servise akut intestinal tıkanıklık bulgularıyla başvuran özellikle yaşlı ve kadın hastalarda safra taşı ileusu akıldan tutulmalıdır.

Anahtar Sözcükler: Safra taşı; tanı; ileus; tedavi.

¹İzmir Bozyaka Training and Research Hospital, İzmir;

²Buca State Hospital, İzmir;

Departments of ³General Surgery, ⁴Radiology, Ege University Faculty of Medicine, İzmir, Turkey.

¹İzmir Bozyaka Eğitim ve Araştırma Hastanesi, İzmir;

²Buca Devlet Hastanesi, İzmir;

Ege Üniversitesi Tıp Fakültesi, ³Genel Cerrahi Anabilim Dalı, ⁴Radyoloji Anabilim Dalı, İzmir.

Gallstone ileus is a mechanical intestinal obstruction caused by impaction of a gallstone that has migrated from the gallbladder toward the intestine. It constitutes 1-3% of the overall causes of intestinal obstructions, but the incidence increases to 25% in patients older than 65 years.^[1-3] It is more frequent in women than in men, with ratios ranging from 4:1 to 16:1 in several series.^[1-4] Despite the improvements in perioperative care, the reported mortality rates are as high as 12-18%.^[5,6] The contributing factors for these high rates have been attributed to advanced age, concomitant diseases, delayed presentation, and subsequent delayed intervention.^[7]

Debate currently exists regarding the appropriate surgical strategy for emergency treatment of gallstone ileus. This relates to the need for definitive biliary tract surgery after relief of obstruction.^[3,8] Enterolithotomy alone can predispose to complications related to the persistence of the biliary-enteric fistula. This includes the possibility of recurrent gallstone ileus,^[9] cholecystitis and recurrent cholangitis.^[2] On the other hand, definitive cholecystectomy and fistula closure is related to prolonged operation time and a higher mortality rate.^[3]

In this study, we present our experience regarding the diagnostic difficulties and treatment of 12 patients with gallstone ileus over the last 10 years.

MATERIALS AND METHODS

Data of 12 patients operated between January 1998 and January 2008 with the diagnosis of gallstone ileus were retrospectively studied.

The following data were acquired from the medical records: gender, age, duration of symptoms before admission, preoperative radiological assessment, operative risk assessment according to the American Society of Anesthesiologists (ASA) physical classification grade, duration of surgery and intraoperative findings, postoperative complications, hospital stay, and 30-day mortality.

RESULTS

From January 1998 to January 2008, 412 patients were treated in our clinics for small bowel obstructions. Of these, 12 (2.9%) gallstone-induced small bowel obstructions were included in this series. Median patient age was 63.6 (50-80) years; nine (75%) of the patients were female and three (25%) were male, with a female to male ratio of 3:1.

Patients were admitted to the emergency department with the symptoms of ileus or subileus, which included abdominal colicky pain, vomiting, abdominal distension, constipation, and the absence of flatus. Presenting symptoms are shown in Table 1. Median

Table 1. Presenting symptoms

Symptoms	Number of patients (%)
Abdominal pain	12 (100)
Vomiting	11 (91.6)
Abdominal distension	8 (66.6)
Constipation	4 (33.3)
Fever (>38°C)	2 (16.6)
Jaundice	1 (8.3)

duration of symptoms before admission to the hospital was 4.1 (1-15) days. On admission, none had undergone previous biliary surgery, while nine cases had a known history of cholelithiasis.

Preoperative plain abdominal radiographic examination was nonspecific and inconclusive in all patients. Multiple intestinal air-fluid levels were detected in all patients on plain abdominal radiography. Six (50%) patients who were diagnosed as gallstone ileus in the operating room showed serious signs of acute intestinal obstruction and were not preoperatively diagnosed as gallstone ileus because they were transferred to the operating room without further radiologic evaluations. Barium-contrasted abdominal X-ray was not performed because of the presence of signs and symptoms of acute intestinal obstruction.

Preoperative ultrasonographic (USG) evaluation revealed multiple gallstones in the gallbladder in six cases. There were small intestinal loops consistent with ileus in three cases, echogenicity consistent with ectopic stone in the ileum in one case, and intraabdominal free fluid in two cases.

Preoperative abdominal computed tomography (CT) revealed ectopic stones in the ileum in four cases (Fig. 1), and air in the biliary ducts was also remark-

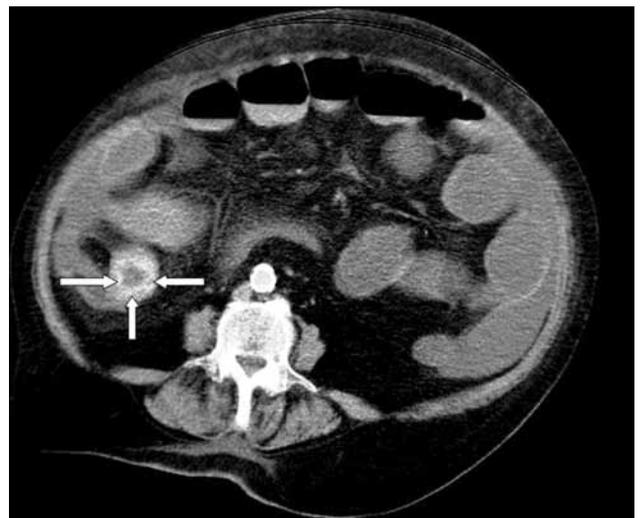


Fig. 1. Abdominal computed tomographic appearance of ectopic gallstone (white arrows).

Table 2. Details of the patients' features, operative findings and surgical procedure

No	Age	Gender	ASA status	History of cholelithiasis	Duration of the symptoms (days)	Preoperative diagnosis	Location of the stone	Surgical treatment
1	55	F	3	+	1	+ (CT)	Ileum	Enterolithotomy
2	58	F	3	-	2	- (urgent)	Jejunum	Enterolithotomy
3	67	F	4	+	15	- (urgent)	Ileum	Enterolithotomy + Small bowel resection
4	70	F	3	+	3	+ (CT)	Ileum	Enterolithotomy
5	63	M	4	-	2	- (urgent)	Jejunum	Enterolithotomy
6	73	F	3	+	4	- (urgent)	Ileum	Enterolithotomy
7	66	F	3	-	2	- (urgent)	Jejunum	Enterolithotomy
8	50	M	2	+	5	+ (CT)	Ileum	Enterolithotomy + cholecystectomy + fistula closure
9	62	M	3	+	3	- (urgent)	Ileum	Enterolithotomy + Primary suturing of jejunal perforation
10	54	F	3	+	3	+ (CT)	Ileum	Enterolithotomy
11	68	F	4	+	4	+ (USG)	Ileum	Enterolithotomy
12	80	F	4	+	6	- (urgent)	Ileum	Enterolithotomy

able. Proper diagnosis of the gallstone ileus prior to surgery was assessed in only five cases (41.6%). The median duration from hospitalization to surgical intervention was 2 (1-4) days. Details of the patients' features, operative findings and surgical procedures are shown in Table 2.

Enterolithotomy alone (without cholecystectomy and closure of the fistula) was used in nine cases (75%) (Fig. 2). Enterolithotomy and resection of the small intestine - required for decubital necrosis from the gallstone - was performed in one case (8.3%). In one case (8.3%), enterolithotomy was completed in one stage with cholecystectomy and closure of the fistula during acute surgery, and in another case (8.3%), enterolithotomy + primary suturing of the jejunal perforation was done. The gallstone was manipulated in a retrograde manner into the distended small intestine and removed through a longitudinal enterotomy. The incision was closed transversely using a single-layer suture to repair in the Heineke-Mikulicz pyloroplasty fashion in order to avoid any possible stricture or future narrowing of the lumen.

One case suffered from wound infection postoperatively. She was discharged without any problem after appropriate antibiotherapy and dressing. No other morbidity was observed.

There were two mortalities (16.6%). In the first case, a 67-year-old woman, diffuse peritonitis from the decubital necrosis of the small intestine was found during the first operation. This patient had advanced cardiorespiratory disease, and died two days after surgery from myocardial infarction. The second case, an 80-year-old woman, had many internal problems, and she died on the 10th postoperative day due to systemic sepsis. The mean duration of hospitalization was 9.5 (2-15) days.

Further biliary symptoms after enterolithotomy were observed in only two cases (16.6%). One of them was associated with common bile duct stones; no residual stones were detected in the gallbladder. Endoscopic management was successful and no subsequent biliary symptoms arose in this case. The other case underwent cholecystectomy due to recurrent biliary symptoms and cholelithiasis six months after primary enterolithotomy.

DISCUSSION

Gallstone disease is a common condition, with 10% prevalence in the United States and Western Europe. It is symptomatic in only 20-30% of the cases, most commonly presenting with biliary colic. The most common complications of gallstone disease include acute cholecystitis, acute pancreatitis, choledocholithiasis with or without cholangitis, and a gangrenous gallbladder. Other uncommon complications include



Fig. 2. Operational findings: longitudinal incision of the small bowel and extraction of the gallstone ("enterolithotomy").

Mirizzi syndrome, cholecystocholedochal fistula and gallstone ileus.^[10]

The term “gallstone ileus” was first coined by Bartolin in 1654 and referred to the mechanical intestinal obstruction due to impaction of one or more large gallstones within the gastrointestinal (GI) tract. Biliary-enteric fistula is the major pathologic mechanism of gallstone ileus.^[3,11] The gallstone enters the GI tract through a fistula between a gangrenous gallbladder and the GI tract. Occasionally, a stone may enter the intestines through a fistulous communication between the common bile duct and the GI tract. Although the gallstone can impact anywhere in the GI tract, its size should be at least 2 cm to 2.5 cm in diameter to cause an obstruction.^[12] The most common site of gallstone impaction is the terminal ileum, but other sites of obstruction have also been described, such as the jejunum, colon, or even Meckel’s diverticulum.^[13,14] In our study, the ileum was the most common site of obstruction (75%), followed by the jejunum (25%).

Clinical presentation of gallstone ileus is rarely specific and more than one-third of the patients have no prior history of symptomatic cholelithiasis.^[15] In our series, 75% of the patients had history suggestive of biliary colic and cholelithiasis. Due to nonspecific symptoms, diagnosis is seldom established preoperatively and leads to delay in diagnosis. The most common symptoms include nausea, vomiting and epigastric pain. Moreover, a small portion of patients may present with hematemesis secondary to duodenal erosions.

The diagnosis of gallstone ileus is difficult, usually depending on the radiographic findings. In 50% of cases, the diagnosis is made at laparotomy.^[3] The classic Rigler’s triad of radiography includes mechanical bowel obstruction, pneumobilia and an ectopic gallstone within the bowel lumen. Moreover, air in the gallbladder is also a frequent finding in gallstone ileus.^[16] Plain abdominal radiographs usually show nonspecific findings because only 10% of gallstones are sufficiently calcified so as to be visualized radiographically. Abdominal ultrasound is a fast, simple and useful investigation and should be used. Small bowel obstruction and ectopic stone are usually evident. Pneumobilia, more frequently in the left hepatic duct, may be visible. Absence of stones in the gallbladder in patients with known cholecystolithiasis can also be an important sign.

Abdominal CT becomes the more important modality in diagnosing gallstone ileus because of its better resolution. By comparing with plain abdominal X-ray and abdominal USG, it can provide a more rapid and specific diagnosis in emergency use. Recent series have compared the clinical value of plain abdominal

film, abdominal USG and abdominal CT in diagnosing 27 cases of gallstone ileus, and found that the Rigler’s triad is present in 14.81% in plain abdominal radiography, 11.11% in abdominal USG, and 77.78% in abdominal CT.^[17] Additionally, the value of abdominal CT in the diagnosis and management of gallstone ileus was evaluated and it was concluded that abdominal CT offers crucial evidence not only for the diagnosis of gallstone ileus but also for decision-making in management strategy.^[18]

The aim of the treatment of gallstone ileus is to relieve the intestinal obstruction by removing the stone. The choice of surgical procedure for gallstone ileus is still a matter of debate.^[2,3,7,8,10,19,20] There are two current approaches for surgical treatment of gallstone ileus: (a) enterolithotomy alone and (b) enterolithotomy, cholecystectomy and fistula closure in one stage. Support for enterolithotomy alone results from its being the minimalist surgery possible in order to relieve bowel obstruction in the emergency situation. It is safe in both low- and high-risk patients and requires a shorter operating time than the one-stage procedure.

In the one-stage procedure, enterolithotomy, cholecystectomy and repair of biliary fistula are performed to avoid future risk of recurrent gallstone ileus, cholangitis and cholecystitis;^[3,8,19,21] however, the procedure is usually associated with significant morbidity and mortality in these high-risk patients.^[2,7,8] The two-stage surgical procedure involves an initial enterolithotomy as an emergency operation followed by interval cholecystectomy and fistula closure, and the optimum time is 4-6 weeks later.^[2,3,10] In the review of 1,001 reported cases of gallstone ileus, the reported mortality rate of the one-stage procedure was 16.9% compared to 11.7% for enterolithotomy alone. The recurrence rate of gallstone ileus after simple enterotomy is reported to be about 5%. However, 10% of these patients may require reoperation due to recurrent biliary symptoms.^[3,8] In our study, further biliary symptoms after enterolithotomy were observed in only two cases (16.6%).

Small bowel resection and anastomosis is another therapeutic option in patients with an impacted gallstone that has caused irreversible damage to the bowel wall.

In this study, six (50%) patients with the signs and symptoms of acute intestinal obstruction were operated urgently after plain abdominal radiography without further imaging techniques. In one of the six USG evaluations and four of the five CT evaluations, ectopic gallstone and pneumobilia were detected, and our preoperative diagnosis rate was similar to other series. In contrast with the literature, Rigler’s triad was not present on plain abdominal radiography in any of the patients.

We are not able to compare the outcomes of the various surgical approaches in this study because most of our patients had enterolithotomy alone.

According to results of our study and the current literature, we can conclude that in spite of the improvements in imaging techniques, preoperative diagnosis of gallstone ileus remains a challenge for the surgeons.

As a result, in all patients with acute intestinal obstruction with a history of cholelithiasis, especially in women and the elderly, gallstone ileus should be suspected.

REFERENCES

1. Deitz DM, Standage BA, Pinson CW, McConnell DB, Krip-paehne WW. Improving the outcome in gallstone ileus. *Am J Surg* 1986;151:572-6.
2. Clavien PA, Richon J, Burgan S, Rohner A. Gallstone ileus. *Br J Surg* 1990;77:737-42.
3. Reisner RM, Cohen JR. Gallstone ileus: a review of 1001 reported cases. *Am Surg* 1994;60:441-6.
4. Balthazar EJ, Schechter LS. Gallstone ileus. The importance of contrast examinations in the roentgenographic diagnosis. *Am J Roentgenol Radium Ther Nucl Med* 1975;125:374-9.
5. Coulier B, Coppens JP, Broze B. Computed tomographic diagnosis of biliary ileus. *J Belge Radiol* 1998;81:75-8.
6. Grassi R, Pinto A, Rossi E, Rossi G, Scaglione M, Lassandro F, et al. Nine consecutive patients with gallstone ileus. Personal experience. [Article in Italian] *Radiol Med* 1998;95:177-81. [Abstract]
7. Doko M, Zovak M, Kopljar M, Glavan E, Ljubicic N, Hochstädter H. Comparison of surgical treatments of gallstone ileus: preliminary report. *World J Surg* 2003;27:400-4.
8. Rodríguez-Sanjuán JC, Casado F, Fernández MJ, Morales DJ, Naranjo A. Cholecystectomy and fistula closure versus enterolithotomy alone in gallstone ileus. *Br J Surg* 1997;84:634-7.
9. Doogue MP, Choong CK, Frizelle FA. Recurrent gallstone ileus: underestimated. *Aust N Z J Surg* 1998;68:755-6.
10. Abou-Saif A, Al-Kawas FH. Complications of gallstone disease: Mirizzi syndrome, cholecystocholedochal fistula, and gallstone ileus. *Am J Gastroenterol* 2002;97:249-54.
11. Glenn F, Reed C, Grafe WR. Biliary enteric fistula. *Surg Gynecol Obstet* 1981;153:527-31.
12. Rodríguez Hermosa JI, Codina Cazador A, Gironès Vilà J, Roig García J, Figa Francesch M, Acero Fernández D. Gallstone Ileus: results of analysis of a series of 40 patients. [Article in Spanish] *Gastroenterol Hepatol* 2001;24:489-94. [Abstract]
13. Schutte H, Bastías J, Csendes A, Yarmuch J, De la Cuadra R, Chiong H, et al. Gallstone ileus. *Hepatogastroenterology* 1992;39:562-5.
14. Nakamoto Y, Saga T, Fujishiro S, Washida M, Churiki M, Matsuda K. Gallstone ileus with impaction at the neck of a Meckel's diverticulum. *Br J Radiol* 1998;71:1320-2.
15. Riaz N, Khan MR, Tayeb M. Gallstone ileus: retrospective review of a single centre's experience using two surgical procedures. *Singapore Med J* 2008;49:624-6.
16. Balthazar EJ, Schechter LS. Air in gallbladder: a frequent finding in gallstone ileus. *AJR Am J Roentgenol* 1978;131:219-22.
17. Lassandro F, Gagliardi N, Scuderi M, Pinto A, Gatta G, Mazzeo R. Gallstone ileus analysis of radiological findings in 27 patients. *Eur J Radiol* 2004;50:23-9.
18. Yu CY, Lin CC, Shyu RY, Hsieh CB, Wu HS, Tyan YS, et al. Value of CT in the diagnosis and management of gallstone ileus. *World J Gastroenterol* 2005;11:2142-7.
19. Pavlidis TE, Atmatzidis KS, Papaziogas BT, Papaziogas TB. Management of gallstone ileus. *J Hepatobiliary Pancreat Surg* 2003;10:299-302.
20. Ayantunde AA, Agrawal A. Gallstone ileus: diagnosis and management. *World J Surg* 2007;31:1292-7.
21. Zuegel N, Hehl A, Lindemann F, Witte J. Advantages of one-stage repair in case of gallstone ileus. *Hepatogastroenterology* 1997;44:59-62.