

# Single Center Experiences In Gallstone Ileus: Analysis of Six Cases

Necat Almalı, İskan Çallı

Van Yüzüncü Yıl University Dursun Odabas Medical Center, Department of General Surgery, Van

## ABSTRACT

Although gallstone-related ileus is rare, it is a serious cause of intestinal obstruction, especially in elderly patients, with a mortality rate of up to 30 %. It occurs when the stone in the gallbladder passes through the cholecysto-duodenal fistula into the gastrointestinal tract due to recurrent cholecystitis attacks and generally causes mechanical obstruction in the small intestines. Computed tomography is the gold standard in a patient whose general condition is not good. Most of the patients are diagnosed intraoperatively during surgery for ileus. Treatment; It is based on stone removal (enterolithotomy) by endoscopic, laparoscopic or open surgical methods. In this retrospective cross-sectional study, 6 patients who were operated for gallstone ileus in the general surgery clinic between May 2017 and May 2022 were included.

This study consists of 6 patients, 4 men and 2 women, who were operated for gallstone ileus within the specified date range. Five of the patients underwent a one-stage procedure, only one patient with poor clinical condition underwent enterolithotomy.

Gallstone ileus is a rare and often difficult to diagnose condition. In the management of these patients, each patient should be evaluated individually, and the treatment method to be chosen should be evaluated by considering the general condition of the patient, patient age and the risks of surgery. Colonoscopy or laparoscopy should be preferred, if possible, rather than open surgery.

**Keywords:** Ileus, Cholelithiasis, Gallstone

## Introduction

Gallstone ileus is one of the rare complications seen in 0.5% of gallstones (1). Gallstone ileus can be defined as a mechanical obstruction in the intestine caused by one or more gallstones, usually larger than 2-2.5 cm (2-4). It constitutes 1-4% of all intestinal obstructions and is more common in elderly patients (5). A fistula occurs between the gallbladder and the intestine due to chronic cholecystitis inflammation or chronic erosion of the gallstone on the wall of the bladder. It has been reported that fistulas may very rarely occur due to gallbladder tumours (6). In addition, one of the much rarer causes is invasive procedures to the bile ducts, such as ERCP or surgery (7). After the spontaneous formation of biliary-enteric fistula, ileus due to gallstones occurs most frequently in the small intestine less frequently in the colon and stomach (8). Due to the narrow anatomical lumen and ileocecal valve, 60% of the cases are located in the ileum, 16% in the jejunum, 15% in the stomach and 2-8% in the colon (9-13).

Gallstones can pass through the ileocecal valve and cause colon obstruction, or they can sometimes erode the colon wall and cause mechanical intestinal obstruction in the transverse colon (gallstone coelus) (12,14,15). Although gallstones usually migrate to the

transverse colon, colon obstructions secondary to diverticular diseases are more common in the sigmoid colon. (16, 17-19).

Bouveret syndrome is a very rare condition in which sized gallstones settle in the duodenum and cause gastric outlet obstruction (20-22). It constitutes approximately 1-3,5% of gallstone ileus (2,10,23).

The preferred treatment option is the mechanical removal of stones impacting the intestine. Open or laparoscopic surgical approaches can be used, and rarely, in the presence of stones embedded in the colon, stones can be removed endoscopically (8,24-26).

## Materials and Methods

In this retrospective cross-sectional study, six patients who were operated on for gallstone ileus in the general surgery clinic between May 2017 and May 2022 were included. Information about age, gender, imaging method for diagnosis, type of surgery, stone localization, ASA score, length of stay in the hospital and intensive care unit, mortality and complications, and pathology results were collected from the patient's files. Statistical analyses of the collected data were performed. The study was approved by the Van

\*Corresponding Author: Necat Almalı, Van Yüzüncü Yıl University Dursun Odabas Medical Center, Department of General Surgery, Van  
E-mail: drnecat@hotmail.com

ORCID ID: Necat Almalı: 0000-0003-3534-1078, İskan Çallı: 0000-0003-1752-2633

Received: 18.07.2022, Accepted: 29.06.2022

Training and Research Hospital Clinical Research Ethics Committee. (11.05.2022 dated and Decision no: 2022/10-01).

## Results

This study consists of 6 patients, four men and two women, who were operated on for gallstone ileus within the specified date range. USG was performed for preoperative diagnosis in five of the cases, and CT was performed in five of them. CT and USG were performed on four patients. All of the patients who underwent CT had cholecystitis and duodenal fistula findings. It was found that all patients with USG had calculus in the gallbladder, and only one patient had gallstones in the small intestine. Five of the patients underwent a one-stage procedure, and only one patient with poor clinical condition underwent enterolithotomy. In this patient, recurrent gallstone ileus developed one month later and was operated on again. Enterolithotomy was applied to the patient in the second operation. The average length of stay of the patients in the intensive care unit was 7 (2-11) days, and the average length of stay in the service was 10 (5-16) days. No complications were observed in the patients in the postoperative period. Only one patient died due to sepsis. Information about the cases is summarized in Table 1.

## Discussion

Gallstone ileus is a late complication of gallstone disease. Gallstone ileus constitutes 1-4% of all mechanical obstructions and 25% of small bowel obstructions in patients over 65 years of age (2). Most of the patients are elderly and female patients with comorbidities (2,27). The mean age in our study was 69 (52-85) years. Unlike the literature, four of our patients were male, and two were female.

Mortality rates due to gallstone ileus vary between 7-30% (27-29). The advanced age and comorbidities of the patients, the late appearance of the symptoms and the delays in the diagnosis of the patients cause high mortality (29,30). Gallstone ileus recurrence can be seen in approximately 5% of patients (31). In some sources, this rate has been reported as 17% (32). In our study, our mortality rate was calculated as 16.6% with one patient. Approximately 85% of biliary-enteric fistulas occurring due to acute cholecystitis attacks occur between the gallbladder and duodenum (33). Hepatoduodenal, choledochoduodenal, cholecystogastric, cholecystojejunal and cholecystocolonic fistulas can be seen more rarely (34,35). In particular, gallstones larger than 2 cm may cause duodenal (stomach outlet obstruction –

Bouveret syndrome) or ileocecal valve obstructions (Barnard syndrome). Cholecystoduodenal fistula was detected in five of the cases in our study, and cholecysto-gastric fistula was present in one case.

Symptoms and signs of patients can vary considerably. Depending on the intestinal segment in which the gallstone ileus causes obstruction, the duration of the patient's admission also varies (31,36). Distention, cramp-like abdominal pain and vomiting are observed in patients due to bowel obstruction. While vomiting is bile in small bowel obstructions, it is fecaloid in colonic obstructions. Although some patients may produce gas and stool in the beginning, constipation occurs later on. Upper gastrointestinal bleeding may occur due to gastroduodenal artery erosion. Patients may experience hematemesis, coffee grounds-like vomiting or melena (23). Very rarely, patients may first present with symptoms of bowel perforation (16). It has been reported that gangrenous appendicitis due to appendiceal lumen occlusion is very rare (37). In cases where there are no signs of abdominal sepsis, the laboratory findings of the patients may be normal. Diagnosis can usually be made by radiological imaging.

Three types of gallstones have been identified. These are pure cholesterol stones, pigment stones and mixed stones. Depending on their content, they can be detected at different rates in radiological imaging. Only about 15% of these gallstones are calcified enough to be detected on radiological imaging. The presence of air-fluid levels, pneumobilia and a stone formation outside of the gallbladder on plain abdominal radiographs is called the "Rigler triad"(38). Because gallstones are mostly radiolucent, this triad can be found in only 14% to 53% of cases (39-41). The best radiological imaging method for the detection of gallstones is ultrasonography, which has high sensitivity and specificity (42). Ultrasound is a radiologist-dependent technique and presents difficulties in the presence of bowel obstruction. Therefore, CT scanning is currently accepted as the gold standard in the diagnosis of gallstone ileus (40,43,44). CT scanning has the highest sensitivity for Rigler's triple signs. It also allows the exact determination of the obstruction site, the cholecystoenteric fistula, and a more accurate investigation of the ectopic stone size (40,43,44). These advantages provide earlier diagnosis and help more accurate patient management (40,43,44).

In patients with stable general condition, if the gallstone is smaller than 2.5 cm, non-surgical conservative methods can be tried. Colonoscopy is rarely used if the stone is in the colon. However, surgical treatment option should be considered in small bowel obstructions. The choice of surgical

**Table 1:** Demographic and General Characteristics of The Cases

Gender	Age	USG	CT	ASA Score	Surgical Procedure	Surgery Time (Min.)	Stone Localization	ICU Hospitalization (Day)	Hospital Stay (Day)	Complication	Discharge	Pathology
Male	74	No	Cholecystitis, Gb-Duodenal Fistula, 25x21 mm Stone in the Intestine	3	One-stage Procedure	120	Distal ileum	7	12	No	Discharge	Full Thickness Duodenum Inflammation, Cholecystitis 4 Cm Stone
Male	52	Cholecystitis	Cholecystitis, Gb-Duodenal Fistula, 28mm Stone in the Intestine	3	One-stage Procedure	120	ileum	2	11	No	Discharge	Cholecystitis
Woman	85	Cholecystitis	Cholecystitis, Gb-Duodenal Fistula, Mesenteric Ischemia	3	One-stage Procedure and Splenectomy	120	jejunum	11	16	No	Ex	Cholecystitis, Spleen Infarction, 4 Cm Stone
Woman	76	Cholelithiasis	Cholelithiasis, Gb-Duodenal Fistula, 28mm Stone	4	One-stage Procedure	120	jejunum	7	7	No	Discharge	Cholecystitis, 3 Cm Stone
Male	67	Cholelithiasis, Ileus And Intestinal Calculus	Cholelithiasis, Gb-Duodenal Fistula, 2.5 cm stone	3	Enterolithotomy	40	jejunum	8	5	No	Discharge	Transmural Necrosis and Perforation
Male	61	Cholecystitis	no	1	One-stage Procedure and Gastrotomy	150	Stomach	8	8	No	Discharge	Cholecystitis, Gastritis, Duodenitis

procedure for gallstone ileus has not been clarified and is a matter of debate (5,45-48). Three different surgical approaches can be considered here: (i) enterolithotomy alone, (ii) enterolithotomy with concurrent cholecystectomy and fistula repair (*one-stage procedure*), or (iii) enterolithotomy with subsequent cholecystectomy and fistula repair (*two-stage procedure*). A one-stage surgical procedure including cholecystectomy and fistula repair in addition to enterolithotomy may be a better approach in eligible patients since there is a recurrence rate of around 17% (32) in patients who underwent enterolithotomy alone. A two-stage surgical approach will be better in patients whose general condition is unstable. A second surgery, including cholecystectomy and fistula repair, should be planned 4-6 weeks after removal of the gallstone causing ileus by enterolithotomy. Reisner et al. They reported the mortality rate of only enterolithotomy as 11.7%, according to the one-stage procedure, with a 16.9% mortality rate (46). In our study, five patients underwent a one-stage procedure, and the mortality rate was calculated as 16.6%, consistent with the literature. Biliary fistulas that may cause recurrence of cholangitis, sepsis and gallstone ileus may develop in patients after enterolithotomy (46,48). Recurrence of gallstone ileus is about 5-9% in patients who underwent enterolithotomy, and only 10% of patients with recurrence need reoperation (46,49-51). In our study, recurrent gallstone ileus developed in the only patient who underwent enterolithotomy one month later, and enterolithotomy was performed for the second time since it was predicted that the general condition of the patient would not be able to sustain the one-stage procedure. With the laparoscopic approach, gallstones can be removed in both the small intestine and the colon (25). However, it is difficult to determine the localization of the intraoperative stone. After the location is determined, laparoscopic surgery can be performed successfully by preventing the proximal passage of the stone.

Gallstone ileus is a rare and difficult-to-diagnose condition. Treatment options should be individualized for each patient, as each has its own advantages and disadvantages. Minimally invasive treatment options such as colonoscopy or laparoscopy are also possible in these cases. We think that the one-stage procedure should be the surgical procedure that should be considered in the first place since it saves the patient from a second surgery.

## References

1. National Institute for health and Resor Excellence (NICE). Gallstone disease:

diagnosis and management: NICE Guideline [CG188]. 2014 available from (<https://www.nice.org.uk/guidance/cg188>) accessed 04.11.17

2. Ploneda-Valencia CF, Gallo-Morales M, Rinchon C, Navarro- Muniz TO, Bautista-Lopez CA, also la Cerda-Trujillo LF meat get (2017) Gallstone ileus: an overview of the literature. *Rev Gastroenterol mex* 82(3):248–254. <https://doi.org/10.1016/j.rgmx.2016.07.006>
3. Muthukumarasamy G, Venkata SP, Shaikh I.A. Somani UK, Ravindran R (2008) Gallstone ileus: surgical strategies and clinical outcome. *J Dig Dis* 9(3):156–161. <https://doi.org/10.1111/j.1751-2980.2008.00338.x>
4. Sahsamani G, Maltezos K, Dimas P, Tassos A, Mouchasiris C (2016) Bowel obstruction and perforation due to a large gallstone A case report. *int J Surg case Rep* 26:193–196. <https://doi.org/10.1016/j.ijscr.2016.07.050>
5. Clavien, P.-A.; Richon, J.; burgan, S.; Rohner, a. gallstone ileus br. *J. Surg.* 1990 , 77 , 737–742. [ CrossRef ] [ PubMed ]
6. Vaughan-Shaw PG, Talwar A (2013) Gallstone ileus and fatal gall- stone coleus: the importance Ugh the second stone *BMJ case Rep* 2013. doi: <https://doi.org/10.1136/bcr-2012-008008>
7. Ivanov I, beuran M, Venter MD, Iftimie-Nastase I, smarandache R Popescu B, Bostinã R (2012) Gallstone ileus after laparoscopic cholecystectomy *J Med life* 5(3):335–341
8. Lou, MB; deziel, DJ unusual Complications Ugh gallstones *Surg. Clin.* 2014 , 94 , 377–394. [ CrossRef ] [ PubMed ]
9. Nakamoto Y, Saga T, Fujishiro S, Washida M, Churiki M, Matsuda K (1998) gallstone ileus with impaction horse the neck Ugh a Meckel's diverticulum *Br J Radiol* 71(852):1320–1322. <https://doi.org/10.1259/bjr.71.852.10319010>
10. Permanent XZ, li GQ, zhang F, wang XH, zhang CY (2013) gallstone ileus: case report and literature review. *World J Gastroenterol* 19(33):5586–5589. <https://doi.org/10.3748/wjg.v19.i33.5586>
11. Reisner RM, Cohen JR (1994) Gallstone ileus: a review of 1001 reported cases. *am Surg* 60(6):441–446
12. Howells L liasis L Demosthenous M (2016) gallstone coleus: a rare relation Ugh gallstone ileus *int J Surg res* 2(4):28–31. 10.19070/2379-156X-150006
13. Osman N, Subar D, Loh MY, Goscimski A (2010) gallstone ileus Ugh the sigmoid colon: moment unusual cause Ugh large-bowel obstruction. *HPB Surg* 2010:153740–153743. <https://doi.org/10.1155/2010/153740>

14. Athwal TS, Howard N, Belfield J, Bushy U (2012) large bowel obstruction due to impaction of a gallstone. *BMJ Case Rep* 2012. doi: <https://doi.org/10.1136/bcr.11.2011.5100>
15. Carr SP, MacNamara FT, Mohammed KM, Boyle E, McHugh SM, Naughton P, Leahy A (2015) Perforated closed-loop obstruction secondary to gallstone ileus Ugh the transverse colon: a rare entity. *Case Rep Surg* 2015:691713–691714. <https://doi.org/10.1155/2015/691713>
16. Halleran DR, Halleran DR (2014) colonial perforation by a large gallstone: a rare case report. *Int J Surg Case Rep* 5(12):1295–1298. <https://doi.org/10.1016/j.ijscr.2014.11.058>
17. Balzarini M, Broglia L, Comi G, Calcara C (2015) Large bowel obstruction due to a big gallstone successfully treated with endoscopic mechanical lithotripsy. *Case Rep Gastrointest Med* 2015: 798746. <https://doi.org/10.1155/2015/798746>
18. Sigmon L Rejeski J, marion B, fina M (2017) colonial gallstone ileus *BMJ case Rep* 2017. doi: <https://doi.org/10.1136/bcr-2017-220898>
19. Heaney RM (2014) Colonic gallstone ileus: the rolling stones. *BMJ case Rep* 2014. doi: <https://doi.org/10.1136/bcr-2014-204402>
20. Gan S, Roy-Choudhury S, Agrawal S, Kumar H, Pallan A, Super P, Richardson M (2008) More than meets the eye: subtlety thigh important CT findings in Bouveret's syndrome. *AJR Am J Roentgenol* 191(1):182–185. <https://doi.org/10.2214/AJR.07.3418>
21. Gallego Otaegui L, Sainz Lete A, Gutiérrez Ríos RD, Alkorta Zuloaga M, Arteaga Martín X, Jiménez Aguero R, Medrano Gomez MA, Ruiz Montesinos I, beguiristain Gomez A (2016) A rare presentation of gallstones: Bouveret's syndrome, a case report. *rev. Esp enferm dig* 108(7):434–436
22. Gavrila D, Galusca C, Berbecel M, Boros M, Dumitrascu T (2016) Bouveret syndrome—an exceptional complication of a very frequent disease. *chirurgia (Squirt)* 111(3):283–285
23. Bruni SG, Pickup M, Thorpe D (2017) Bouveret's syndrome—a rare form of gallstone ileus causing death: appearance on post-mortem CT and MRI. *BJR Case Rep* 3(3). <https://doi.org/10.1259/bjrcr.20170032>
24. sigmon, L.; Rejeski, J.; marion, B.; fina, m. colonial gallstone ileus *BMJ case Rep*. 2017. [ CrossRef ]
25. Ferretti, C.; fuks, D.; wind, P.; le bian, LITTLE laparoscopic management Ugh sigmoid colon gallstone ileus *tech. coloproctol* 2018, 22, 605–606. [ CrossRef ]
26. Panda, N.; Cauley, C.; Qadan, M. Gallstone Ileus. *J. Gastrointest. Surg.* 2018, 22, 1989–1991. [ CrossRef ] [ PubMed ]
27. mallipeddi MK, Pappas TN, Shapiro ML, Scarborough JE (2013) gallstone ileus: revisiting surgical results using national Surgical Quality Improvement Program data. *J Surg Res* 184(1): 84–88. <https://doi.org/10.1016/j.jss.2013.05.027>
28. Chuah PS, Curtis J, Misra N, Hikmat D, Chawla S (2017) Pictorial review: the pearls and pitfalls Ugh the radiological manifestations Ugh gallstone ileus *Abdom radiol (NY)* 42(4):1169–1175. <https://doi.org/10.1007/s00261-016-0996-0>
29. Halabi WJ, Kang CY, Ketana N, Lafaro KJ, Nguyen VQ, Stamos MJ, Imagawa DK, Demirjian MOMENT (2014) surgery for gallstone with- us: a nationwide comparison of trends and outcomes. *Ann Surg* 259(2):329–335. <https://doi.org/10.1097/SLA.0b013e31827eefed>
30. Bass G, Gilani SN, Walsh TN (2013) Validating the 5Fs mnemonic for cholelithiasis: time to include family history. *postgrad Med J* 89(1057):638–641. <https://doi.org/10.1136/postgradmedj-2012-131341>
31. Martin-Perez J, Delgado-Plasencia L Bravo-Gutierrez A, Burillo- Putze G, Martínez-Riera A, Alarcó-Hernández A, Medina-Arana V (2013) gallstone ileus ace a cause Ugh acute abdomen importance Ugh early diagnosis for surgical treatment. *Cir Esp* 91(8):485–489. <https://doi.org/10.1016/j.ciresp.2013.01.021>
32. Clavien PA, richon J, Burgan S, Rohner a. gallstone ileus br. *J. Surg.* 1990; 77: 737–42.
33. Ploneda-Valencia CF, Gallo-Morales M, Rinchon C meat take. gallstone ileus: moment overview Ugh the literature. *Rev. gastroenterol. Max.* 2017; 82: 248–54.
34. Beuran M, Ivanov I, Venter MD. gallstone ileus – clinical and therapeutic aspects. *J.Med. Life* 2010; 3: 365–71.
35. Williams NE, Gundara JS, Roser S, Samra JS. Disease spectrum and use of cholecystolithotomy in gallstone ileustransection. *Hepatobiliary Pancreat External. int.* 2012; 11th: 553–7.
36. Nuño-Guzmán CM, Marín-Contreras ME, Figueroa-Sánchez M, Corona JL (2016) gallstone ileus, clinical presentation, diagnostic and treatment approach. *World J Gastrointest Surg* 8(1):65–76. <https://doi.org/10.4240/wjgs.v8.i1.65>
37. Cruz-Santiago J, Briceño-Sáenz G, García-Alvarez J, Beristain- Hernández JL (2017) Gallstone ileus presenting as obstructive gan-

- grenous appendicitis rev. Esp inferm dig 109(2):150–151
38. Rigs, LG; Borman, CN; Noble, JF gallstone Obstruction: pathogenesis and roentgen Manifestations. J. am. Med. Assoc. 1941 , 117 , 1753. [ CrossRef ]
  39. Lassandro, F.; Gagliardi, N.; Scuderi, M.; Pinto, A.; Gatta, G.; Mazzeo, R. Gallstone analysis of ileus radiological findings of 27 patients eur. J. radiol. 2004 , 50 , 23–29. [ CrossRef ] [ PubMed ]
  40. Yu, C.-Y. value Ugh CT of the diagnosis and management Ugh gallstone ileus world J. gastroenterol. 2005, 11 , 2142. [ CrossRef ] [ PubMed ]
  41. Ploneda-Valencia, CF; Gallo Morales, M.; Rinchon, C.; Navarro-Muniz, TO.; Bautista-López, CA; de la Cerda-Trujillo, LF; Rea-Azpeitia, LA; López-Lizarraga, CR Gallstone ileus: An overview of the literature. Rev. gastroenterol. Mexico Eng. Ed. 2017 , 82 , 248–254. [ CrossRef ]
  42. Trotman BW, Petrella EJ, Soloway RD, Sanchez HM, Morris TA 3rd, Miller WT. Evaluation of radiographic lucency or opaqueness of gall- stones as a means of identifying cholesterol or pigment stones. Correla- tion Ugh lucency or opaqueness with calcium and mineral.
  43. Chang, L.; chang, M.; chang, HM; chang, AI; chang, f. clinical and radiological diagnosis Ugh gallstone ileus: A mini review. Emerg. radiol. 2018 , 25 , 189–196. [ CrossRef ] [ PubMed ]
  44. Lassandro, F.; Romano, S.; Ragozzino, A.; Rossi, G.; Valente, T.; Ferrara, I.; Romano, L.; Grassi, R. Role of Helical CT in Diagnosis of Gallstone Ileus and Related Conditions. am. J. Roentgenol. 2005 , 185 , 1159–1165. [ CrossRef ]
  45. Halabi, WJ; Kang, CY; Ketana, N.; Lafaro, KJ; Nguyen, VQ; Stamos, MJ; Imagawa, DK; Demirjian, AN Surgery for Gallstone Ileus: A Nationwide Comparison of Trends and Outcomes. Ann. Surg. 2014 , 259 , 329–335. [ CrossRef ]
  46. Reisner, RM; Cohen, JR Gallstone ileus: A review of 1001 reported cases. am. Surg. 1994 , 60 , 441–446. [ PubMed ]
  47. Pavlidis, TE; Atmatzidis, KS; Papaziogas, CT; Papaziogas, TB Management Ugh gallstone ileus J. Hepato-Biliary pancreat Surg. 2003 , 10 , 299–302. [ CrossRef ] [ PubMed ]
  48. Rodriguez-Sanjuan, JC; Casado, F.; Fernandez, MJ; Morales, DJ; Naranjo, A. Cholecystectomy and fistula closure versus enterolithotomy alone of gallstone ileus br. J. Surg. 1997 , 84 , 634–637. [ CrossRef ] [ PubMed ]
  49. Fitzgerald, JEF; Fitzgerald, LA; Maxwell-Armstrong, CA; brooks, AJ recurrent gallstone ileus: time to change our surgery? J. dig. External. 2009 , 10 , 149–151. [ CrossRef ] [ PubMed ]
  50. Ravikumar, R.; Williams, JG the operative management Ugh gallstone ileus Ann. r. col. Surg. Eng. 2010 , 92, 279–281. [ CrossRef ] [ PubMed ]
  51. Doogue, MP; Choong, CK; Frizelle, FA Recurrent gallstone ileus: underestimated. ANZ J. Surg. 1998 , 68 , 755–756. [ CrossRef ] [ PubMed ]