Gallstone ileus: Case report and literature review

Xin-Zheng Dai, Guo-Qiang Li, Feng Zhang, Xue-Hao Wang, Chuan-Yong Zhang

Abstract

Gallstone ileus (GI) is characterized by occlusion of the intestinal lumen as a result of one or more gallstones. GI is a rare complication of gallstones that occurs in 1%-4% of all cases of bowel obstruction. Mortality associated with GI ranges between 12% and 27%. Classical findings on plain abdominal radiography include: (1) pneumobilia; (2) intestinal obstruction; (3) an aberrantly located gallstone; and (4) change of location of a previously observed stone. The optimal management of acute GI is controversial and can be: (1) enterotomy with stone extraction alone; (2) enterotomy, stone extraction, cholecystectomy and fistula closure; (3) bowel resection alone; and (4) bowel resection with fistula closure. We describe a case to highlight some of the pertinent issues involved in GI management, and propose a scheme to minimize recurrent disease and postoperative complications. We conclude that GI is a rare condition affecting mainly the older population with a female predominance. The advent of computed tomography and magnetic resonance imaging has made it easier to diagnose GI. Enterotomy with stone extraction alone remains the most common surgical method because of its low incidence of complications.

Key words: Gallstone ileus; Fistula closure; Intestinal obstruction; Bowel obstruction; Enterolithotomy

Core tip: We present the case of a 56-year-old female who presented at our institution with symptoms of bowel obstruction. Abdominal computed tomography (CT) and exploratory laparotomy revealed a large gallstone in the terminal ileus. She underwent enterectomy and had an uneventful postoperative course. The literature suggests that gallstone ileus (GI) is a rare condition affecting mainly the older population and has a female predominance. CT and magnetic resonance imaging have made it easier to diagnose GI. Enterotomy with stone extraction alone remains the most common surgical method because of its low incidence of complications.

INTRODUCTION

Gallstone ileus (GI) is characterized by occlusion of the intestinal lumen as a result of one or more gallstones. According to reports from the 1990s, GI is a rare complication of gallstones that occurs in 1%-4% of all cases of bowel obstruction. According to reports from the 1990s, GI is a rare complication of gallstones that occurs in 1%-4% of all cases of bowel obstruction and in ≤ 25% of cases of non-strangled small-bowel obstruction in patients aged > 65 years. The mortality associated with GI ranges between
The gallstone was removed and the enterotomy repaired in two layers (Figure 3). The patient had an uneventful postoperative course and was discharged home on postoperative day 10.

**DISCUSSION**

GI is more common in women, and the ratio of females to males is 3.5 to 1\(^3\). The gallstone may enter the intestine through a fistula and it can impact anywhere in the gastrointestinal tract\(^4\). The gallstone must be ≥ 2-2.5 cm in diameter to cause obstruction\(^{6-9}\). As shown by Reiser and Cohen, impaction of the stone can occur in any part of the bowel, *i.e.*, the ileum (60.5% of cases), jejunum (16.1%), stomach (14.2%), colon (4.1%), and duodenum (3.5%). It can also be passed spontaneously (1.3%)\(^{3,38}\). It occurs most frequently in the terminal ileum and the ileocecal valve because of their narrow lumen and potentially less active peristalsis\(^{10}\).

If GI occurs in elderly patients with comorbidities, the often vague, intermittent symptoms may delay the diagnosis by days\(^3\). Presentation is typically non-specific, and often with intermittent symptoms of nausea, vomiting, abdominal distension and pain. We should pay more attention to those patients who have the history of cholecystolithiasis and with symptoms such as nausea, vomiting, abdominal distension and pain. In the past, confirming the diagnosis was difficult, but the advent of CT and magnetic resonance imaging (MRI) has made it easier to diagnose GI\(^{10,11}\).

Classical findings on plain abdominal radiography include: (1) pneumobilia; (2) intestinal obstruction; (3) an aberrantly located gallstone; and (4) a change in location of a previously observed stone\(^{6,11-14}\). The widespread use of CT with an overall sensitivity, specificity, and diagnostic accuracy of 93%, 100% and 99%, respectively, has aided diagnosis\(^{14}\). Interestingly, no aerobilia which can be easily detected by transabdominal ultrasound may be one reason for the delayed diagnosis. Additionally, the absence of significant calcification of the stone reduces the chance of an early diagnosis. In 50% of cases, the diagnosis is often only made at laparotomy\(^3\).

GI is a mechanical intestinal obstruction caused by impaction of gallstones within the lumen of the bowel. Most reports indicate that stones smaller than 2.5 cm usually pass through spontaneously, so conservative treatment (decompression by nasogastric drainage) is conducted before a decision is made to remove the impacted stone by surgical means\(^{6,9}\).

Management of GI is controversial and includes: (1) enterotomy with stone extraction alone; (2) enterotomy, stone extraction, cholecystectomy and fistula closure; (3) bowel resection alone; and (4) bowel resection with fistula closure\(^{6-13}\).

Enterotomy with stone extraction alone remains the most common surgical method because of its low incidence of complications\(^4\). Spontaneous closure of the fistulous tract is observed in > 50% of cases\(^13\). Small-
bowel obstruction requires enterolithotomy with a longitudinal incision placed on the anti-mesenteric border proximal to the site of impaction. Careful closure of the enterolithotomy is needed to avoid narrowing of the intestinal lumen, and we usually employ a transverse closure for this reason. The choice of surgical procedure is determined largely by clinical status. GI patients are usually elderly and have comorbidities so enterotomy with stone extraction alone appears to be more suitable than more invasive techniques.

However, 5% of patients who undergo enterolithotomy alone go on to develop biliary symptoms, and 10% require an unplanned reoperation. In the presence of residual stones, the estimated prevalence of recurrence ranged from 5% to 17%, and more than half of these recurrences occur within 6 mo of the index presentation.

Retrospective cohort and literature reviews of GI reveal a prevalence of biliary malignancy of 2%-6%.

We noted that fistula closure, if conducted urgently or as an emergency during the initial procedure, was independently associated with a higher prevalence of mortality than enterotomy and stone extraction alone. The reason may be that elderly patients have multiple comorbidities and an edematous surrounding area. Bowel resection is sometimes necessary, particularly in the presence of a perforation.

Laparoscopy-assisted methods have been reported by Sarli et al, who successfully treated three women with GI. Their patients made uneventful recoveries. However, laparoscopy is somewhat more challenging in cases of dilated and an edematous bowel.

Some special types of GI, such as Bouveret’s syndrome (stones impacting in the duodenum causing gastric outlet obstruction), and stones in the stomach or the colon are suitable for non-surgical therapeutic options in around 20% of the patients. For example laser lithotripsy in Bouveret’s syndrome or extracorporeal shock wave lithotripsy or even only endoscopic extraction may be a promising and fast therapeutic alternative.

Historically, wound infections and dehiscence have been cited as being the most common complications after surgery in 25% to 50% of GI cases. In contrast to what has been published so far, the most common post-operative complication is acute renal failure followed by urinary tract infection and wound infections. Gastrointes-
tinal complications related to anastomotic leaks and intra-abdominal abscesses are highest in patients undergoing enterotomy with fistula closure.\cite{1,2,3} If the gallbladder is preserved at the initial procedure, delayed cholecystectomy must be addressed. This is because 5% of patients who have undergone enterolithotomy alone go on to develop biliary symptoms, and the risk of patent fistula reflux and resulting biliary malignancy.\cite{1,2,3} In conclusion, GI is a rare condition affecting mainly the older population with a female predominance. If GI occurs in elderly patients with comorbidities, the often vague, intermittent symptoms may delay the diagnosis by days. The advent of CT and MRI has made it easier to diagnose GI. Enterotomy with stone extraction alone remains the most common surgical method because of its low incidence of complications.

REFERENCES

1. Chatterjee S, Chaudhuri T, Ghosh G, Ganguly A. Gallstone ileus-an atypical presentation and unusual location. Int J Surg 2008; 6: e55-e56 [PMID: 19059138 DOI: 10.1016/j.ijsu.2007.02.004]
2. Chou JW, Hsu CH, Liao KF, Lai HC, Cheng KS, Peng CY, Yang MD, Chen YF. Gallstone ileus: report of two cases and review of the literature. World J Gastroenterol 2007; 13: 1295-1298 [PMID: 17451220]
3. Reissner RM, Cohen JR. Gallstone ileus: a review of 1001 reported cases. Am Surg 1994; 60: 441-446 [PMID: 8198337]
4. 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. Am Surg 2013 Jan 4; Epub ahead of print [PMID: 23295322]
5. Hussain Z, Ahmed MS, Alexander DJ, Miller GV, Chintapatra S. Recurrent recurrent gallstone ileus. Am J Surg Col Res Engl 2010; 92: W4-W6 [PMID: 20529451 DOI: 10.10138/14787801X12659688851753]
6. Kasahara Y, Umemura H, Shiraha S, Kuyama T, Sakata K, Kubota H. Gallstone ileus. Review of 112 patients in the Japanese literature. Am J Surg 1980; 140: 437-440 [PMID: 7425220 DOI: 10.1016/0002-9610(80)90185-3]
7. Syne RG. Management of gallstone ileus. Can J Surg 1989; 32: 61-64 [PMID: 2642721]
8. Ibara E, Ochiai T, Yamamoto K, Kabemura T, Harada N. A case of gallstone ileus with a spontaneous evacuation. Am J Gastroenterol 2002; 97: 1259-1260 [PMID: 12014739 DOI: 10.1111/j.1572-0241.2002.05715.x]
9. Al-Obaid O. Gallstone ileus: a forgotten rare cause of intestinal obstruction. Saudi J Gastroenterol 2007; 13: 39-42 [PMID: 19858612 DOI: 10.4103/1319-3767.30465]
10. Gupta M, Goyal S, Singal R, Goyal R, Goyal SL, Mittal A. Gallstone ileus and jejunal perforation along with gangrenous bowel in a young patient: A case report. N Am J Med Sci 2010; 2: 442-443 [PMID: 22558955 DOI: 10.4297/najms.2010.2442]
11. Ripollés T, Miguel-Dasit A, Errando J, Morote V, Gómez-Abril SA, Richart J. Gallstone ileus: increased diagnostic sensitivity by combining plain film and ultrasound. Abdom Imaging 2001; 26: 401-405 [PMID: 11441553 DOI: 10.1007/s002610000190]
12. Clavien PA, Richon J, Burgan S, Rohner A. Gallstone ileus. Br J Surg 1990; 77: 737-742 [PMID: 2200556 DOI: 10.1002/bjs.1800770707]
13. 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: 23-29 [PMID: 15093220 DOI: 10.1016/j.ejrad.2003.11.011]
14. Yu CY, Lin CC, Shyu RV, Hsieh CB, Wu HS, Tyan YS, Hwang JJ, Liu CH, Chang WC, Chen CY. Value of CT in the diagnosis and management of gallstone ileus. World J Gastroenterol 2005; 11: 2142-2147 [PMID: 15810881]
15. Ravikumar R, Williams JG. The operative management of gallstone ileus. Ann R Coll Surg Engl 2010; 92: 279-281 [PMID: 20501012 DOI: 10.1016/j.00358840.1016.6120647]
16. Doko M, Zovak M, Kopljar M, Glavan E, Ljubicic N, Hochstädtler H. Comparison of surgical treatments of gallstone ileus: preliminary report. World J Surg 2003; 27: 400-404 [PMID: 12658481 DOI: 10.1007/s00268-002-6569-0]
17. Hayes N, Saha S. Recurrent gallstone ileus. Clin Med Res 2012; 10: 236-239 [PMID: 22723467 DOI: 10.3121/cmr.2012.1079]
18. Sarli L, Pietra N, Costi R, Gobbi S. Gallstone ileus: laparoscopic-assisted enterolithotomy. J Am Coll Surg 1998; 186: 370-371 [PMID: 9510270 DOI: 10.1016/S0177-9899(98)00151-8]
19. Okubo H, Nogawa T, Ibiki M. [A case of gallstone ileus which the cholecystoduodenal fistula closed spontaneously after laparoscopic-assisted simple enterolithotomy]. Nihon Shokakibyo Gakkai Zasshi 2006; 103: 1157-1162 [PMID: 1702379]
20. Mais J, Hochberger J, Hahn E, Lederer R, Schneider HT, Muehdorfer S. Successful laserlithotripsy in Bouveret’s syndrome using a new frequency doubled doublepulse Nd: YAG laser (FREDDY). Scan J Gastroenterol 2004; 39: 791-794 [PMID: 15513369 DOI: 10.1080/003569204100059937]
21. Sackmann M, Holt J, Haerlin M, Sauerbruch T, Hoermann R, Heinkelein J, Paumgartner G. Gallstone ileus successfully treated by shock-wave lithotripsy. Dig Dis Sci 1991; 36: 1794-1795 [PMID: 1748051 DOI: 10.1007/BF01296268]
22. Bedogni G, Contini S, Meineri M, Pedrazzoli C, Piccinini GC. Pyloroduodenal obstruction due to a biliary stone (Bouveret’s syndrome) managed by endoscopic extraction. Gastrointest Endosc 1985; 31: 36-38 [PMID: 3979766 DOI: 10.1016/S0016-5107(85)71965-7]
