Gallstone ileus: Diagnostic and therapeutic dilemma

Shireesh Saurabh, Andrew Camerota, Jeffrey Zavotsky

ABSTRACT

Introduction: Gallstone ileus is a rare complication of cholelithiasis but an established cause of mechanical bowel obstruction in the elderly. Concomitant co-morbidities are frequent in older patients and responsible for the high mortality rate. The aim of the present study was to evaluate and discuss different surgical approaches and to analyze the clinical outcome.

Case Series: Over a period of two years, three patients with a mean age of 78 years presented with complains of abdominal pain, nausea and vomiting of approximately two days duration. Diagnosis of gallstone ileus was made on computed tomography (CT) scan, which showed cholecystoenteric fistula and small bowel obstruction at the point of impaction of the gallstone. All the patients underwent enterolithotomy without a follow up biliary tract surgery. The postoperative course was uneventful in all the cases. Conclusion: Gallstone ileus is a rare condition, occurring in elderly with multiple co-morbidities. The appropriate surgical intervention remains controversial. Enterolithotomy alone was performed in all the patients with favorable outcome.

Keywords: Gallstone ileus, Cholelithiasis, Gallbladder

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INTRODUCTION

Gallstone ileus was first described by Bartholin in 1654 [1]. It is defined as a mechanical obstruction of the gastrointestinal tract caused by the presence of a gallstone in its lumen. It accounts for 1–4% of all cases of mechanical intestinal obstruction and up to 25% of those in patients over 65 years of age [2]. Acute or chronic cholecystitis results in extensive inflammation and adhesion between the gallbladder and the gastrointestinal tract, resulting in formation of biliary enteric fistula [3].

Gallstone ileus is associated with high morbidity and mortality as most patients are elderly with multiple co-morbidities. Delay in diagnosis secondary to vague symptoms and signs is another reason for high morbidity. Debate currently exists regarding the appropriate surgical strategy for emergency treatment of gallstone ileus. Most authors recommend enterolithotomy alone on account of its lower morbidity, mortality and reports of spontaneous fistula closure [1, 2, 3, 4, 5, 6].
CASE REPORT

**Patient 1:** A 75-year-old female presented with a three day history of diffuse abdominal pain, distension, nausea and vomiting. Past history was significant for diabetes mellitus, hypertension, anemia and appendectomy. There was no history of biliary symptoms. On examination patient appeared dehydrated, however her vitals were stable. Abdomen was soft, mildly distended, diffusely tender with no peritoneal signs. Laboratory work up revealed a white blood count of 13,200/mm³ and liver enzymes were found to be in the normal range. Abdominal radiograph was inconclusive and diagnosis was made on computed tomography (CT) scan, which demonstrated cholelithiasis, cholecystoduodenal fistula and small bowel obstruction with transition point at the level of impaction of gallstone in distal ileum. Patient was taken to the operating room for exploratory laparotomy and enterolithotomy alone was performed. Longitudinal enterotomy was closed transversely in two layers. Postoperative course was uneventful.

**Patient 2:** A 74–year-old male presented with a one day history of diffuse abdominal pain, nausea and vomiting. Past history was significant for diabetes mellitus, hypertension, diverticulitis, total colectomy for lower gastrointestinal bleeding and ventral hernia. On examination patient was afebrile, his vitals were stable, his abdomen was soft, mildly distended, mildly tender in right upper quadrant with no peritoneal signs.

White blood count was 25,000/mm³ and liver function tests was within normal limits. Diagnosis of gallstone ileus was made on abdominal CT scan, which showed pneumobilia, small bowel obstruction and impacted gallstone in small bowel. Assuming that the patient had significant adhesions from previous surgery, a exploratory laparotomy was performed. Gallstone was found to be impacted at the site of angulation of small bowel caused by adhesions. Enterolithotomy alone was performed to remove a 5 cm × 3 cm gallstone from proximal ileum. Postoperative course was uneventful.

**Patient 3:** A 84–year-old male presented with a two day history of abdominal pain, distension, nausea and vomiting. Past history included coronary artery disease, stroke, hypertension, diabetes mellitus, dementia and right hemicolecction for colon cancer. On examination patient’s abdomen was mildly tender in the periumbilical region.

Laboratory findings showed a white cell count of 15,900/mm³. Electrolytes and liver enzymes were within the normal limits. Abdominal CT scan was used to make the diagnosis of gallstone ileus. Patient was adequately hydrated and taken to the operating room for exploratory laparotomy. Considering the long history of medical problems the patient had, a decision to perform enterolithotomy alone was taken. Postoperative course was uneventful.

![Figure 1](image-url)  
*Figure 1: A) Abdominal computed tomography scan of patient showing, cholecystoduodenal fistula (arrow) and, B) an ectopic gallstone (arrow) impacting the distal ileum lumen and accompanying dilated proximal small bowel loops.*

DISCUSSION

Gallstone ileus as a complication of gallstone disease is a diagnostic as well as therapeutic challenge. It is assuming an increasing significance because of the
Table 1: Demographics (number of patients, mean age) and mortality rates of different operative approaches.

| References | One-stage (n) Mortality (%) | Enterolithotomy (n) Mortality (%) | Mean age |
|------------|----------------------------|----------------------------------|---------|
| 1. Ramos DM, et al. (2009) | 4 25 | 27 15 | 78.3 |
| 2. Reisner RM, et al. (1994) | 13 17 | 801 12 | – |
| 3. Ayantunde AA, et al. (2007) | 2 50 | 20 20 | 77 |
| 4. Doko M, et al. (2003) | 19 11.1 | 11 9.1 | – |
| 5. Tan YM, et al. (2004) | 12 0 | 7 0 | 74.6 |
| 6. Riaz N, et al. (2008) | 5 0 | 5 0 | 61.8 |
| 7. Muthukumarasamy G, et al. (2008) | 3 0 | 10 0 | 74.3 |
| 8. Rodriguez-Sanjuan JC, et al. (1997) | 9 33 | 16 19 | 75 |
| 9. Sfari A, et al. (1997) | 8 0 | 2 0 | 74.5 |
| 10. Clavien PA, et al. (1990) | 8 25 | 6 0 | 78 |

Figure 2: Demonstrates 5x3 cm gallstone within distal ileum.

progressive rise in the proportion of aging population in the western world. The mean age of these patients in our study was 78 years. The median duration of symptoms prior to surgical intervention was three days. Most authors report a period of 3 – 5 days in average between first symptoms and the time of admission [5, 7].

Non-specific symptoms are the primary cause of delayed diagnosis, which in turn leads to high morbidity and mortality associated with this condition. Plain abdominal radiographs are not always conclusive, because some gallstones are not dense enough to be detected radiologically. The classical rigler’s triad of pneumobilia, small bowel obstruction and an ectopic gallstones are seen in less than 50 % of cases on abdominal film [5, 8, 9]. Ripolles et al. showed that preoperative diagnosis of gallstone ileus is increased to 74 % by combining plain abdominal radiograph with ultrasound [10]. An ultrasound may detect impacted stone and the site of fistula, in addition to confirming the presence of choledolithiasis. The use of computed tomography (CT) scan has widely been accepted as the investigation of choice for detection of gallstone ileus [8, 9, 11]. In our case series abdominal radiograph was inconclusive and diagnosis in all three patients was made by abdominal CT scan. It provides information regarding the exact number, size and location of the gallstone. It also helps in direct visualization of the biliary enteric fistula. Yu et al. showed an overall sensitivity, specificity and accuracy of CT scan in diagnosis of gallstone ileus to be 93%, 100% and 99% respectively [9]. CT scan helps in recognizing intraluminal stones that are non-obstructing at presentation but can lead to recurrent gallstone ileus on a later date. Abdominal CT scan offer prompt and rapid diagnosis of gallstone ileus, and also helps in decision making for management strategy.

The surgical procedure continues to be a matter of debate. The one stage procedure includes enterolithotomy, cholecystectomy and fistula repair. The two stage procedure involves initial emergent enterolithotomy followed by cholecystectomy and fistula closure in 4–6 weeks. However, most authors favor
enterolithotomy alone without a follow up biliary tract surgery [1, 2, 3, 4, 5, 6]. In table 1 the different operative approaches, one stage procedure and enterolithotomy alone are compared regarding incidence and mortality.

Enterolithotomy has been shown to be associated with lower morbidity and mortality, lower operative time and shorter hospital stay. A large meta-analysis by Reisner et al. showed a mortality rate of 12% for simple enterolithotomy in comparison to 17% for one stage procedure. Upto 50% of the biliary enteric fistula closed spontaneously and postoperative biliary symptoms requiring surgery were seen in only 10% of patients [2]. Ayantunde et al. reported lower morbidity and mortality rate in simple enterolithotomy group, but Riaz et al. showed no difference between the two groups [3, 6].

Doko et al. showed that postoperative complications like wound infection, wound dehiscence, myocardial infarction, pneumonia are more likely to occur with one stage procedure when compared with simple enterolithotomy (61.1% to 27.3%) [4]. However, few authors like Sfairol et al. recommend one stage procedure for gallstone ileus to prevent future recurrence. Most of the patients in their study underwent one stage procedure with no mortality. Enterolithotomy alone group had one mortality secondary to biliary complication [12].

There have been several recent publications regarding the use of laparoscopic approach in gallstone ileus [13, 14, 15]. Moberg et al. compared laparoscopically assisted enterolithotomy with open shorter hospital stay for the laparoscopic group. There was no difference in the duration of operation between the two groups [13]. However, experience with laparoscopic enterolithotomy is limited to a very small number of patients. Whether this approach will help in reducing morbidity and mortality rates requires further investigation.

Based on our results and the results of other published studies, we believe that simple enterolithotomy should be the procedure of choice for patients with gallstone ileus. Complications related to the fistula are rare as most of them undergo spontaneous closure and only 10% of these patients will have postoperative biliary symptoms. One stage procedure should be reserved only for highly selected patients with absolute indications like acute cholecystitis and/or gangrene of the gallbladder.

**CONCLUSION**

Gallstone ileus is a difficult clinical entity to diagnose and requires a high index of suspicion. Abdominal CT scan is the diagnostic modality of choice. Majority of these patients are elderly with multiple co-morbidities and will benefit from relief of obstruction by enterolithotomy alone in the emergency setting. The one stage procedure should be reserved for highly selected patients with absolute indications.

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Shireesh Saurabh – Substantial contributions to conception and design, Acquisition of data, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published

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The corresponding author is the guarantor of submission.

**Conflict of Interest**

Authors declare no conflict of interest.

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**REFERENCES**

1. Ramos DM, Jose JM et al: Gallstone ileus: Management options and results on a series of 40 patients. Rev Esp Enferm Dig 2009; 101(2):117-124.

2. Reisner RM, Cohen JR: Gallstone ileus: a review of 1001 reported case; Am Surg. 1994 Jun;60(6):441-6.

3. Ayantunde AA, Agarwal A: Gallstone Ileus: Diagnosis and Management. World J Surg 2007; 31:1292-1297.

4. Doko M, Zovak M, Kopjar M, et al. Comparison of surgical treatments of gallstone ileus: preliminary report. World J Surg 2003; 27: 400-404.

5. Tan YM, Wong WK. A comparison of 2 surgical strategies for the emergency treatment of gallstone ileus, Singapore Med J 2004; 45(2):69-72.

6. Riaz N, Khan MR, Tayeb M. Gallstone ileus: retrospective review of a single center’s experience using two surgical procedures. Singapore Med J 2008; 49(8):624-626.

7. Haasselfeldt P, Jess P. Gallstone ileus. Acta Chir. Scand 1982; 148:431-433.

8. Lassandro F, Gagliardi N et al. Gallstone ileus: analysis of radiological findings in 27 patients. Eur J Radiol 2004; 50(1):52-2.

9. Yu CV, Linn CC et al. Value of CT in diagnosis and management of gallstone ileus: World J Gastroenterol 2005; 11:2142-2147.
10. Ripolles T, Miguel-Dasit A, Errando J et al. Gallstone ileus: increased diagnostic sensitivity by combining plain film and ultrasound. Abdom Imaging 2001; 26:401-405.
11. Lassandro F, Romano S, Ragozzino A et al. Role of helical CT in diagnosis of gallstone ileus and related conditions. AJR 2005; 185:1159-1165.
12. Sfairi A, Patel JC. Gallstone ileus: plea for simultaneous treatment of obstruction and gallstone disease. J Chir (Paris) 1997; 134(2):59-64.
13. Moberg AC, Montgomery A: Laparoscopically assisted or open enterolithotomy for gallstone ileus: Br J Surg 2007; 94(1):53-57.
14. Owera A, Low J: Laparoscopic Enterolithotomy for Gallstone Ileus: Surg Laparosc Endosc Percutan Tech 2008; 18(5):450-2.
15. Allen JW, McCurry T, Rivas H et al. Total laparoscopic management of gallstone ileus. Surg Endosc 2003; 17:352.