Gallstone ileus: retrospective review of a single centre's experience using two surgical procedures

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ABSTRACT

Introduction: Gallstone ileus is responsible for 1–3 percent of cases of mechanical small bowel obstruction. Debate continues regarding choice of optimal surgical procedure. One-stage procedure includes enterolithotomy, cholecystectomy and repair of fistula at the same setting, whereas staged procedure includes enterolithotomy alone, with fistula repair at a later stage. This study aims to determine factors influencing choice of surgical procedure in patients with gallstone ileus.

Methods: Data was collected for patients diagnosed with gallstone ileus between 1990 and 2005. Five patients underwent enterolithotomy alone (Group 1), while the remaining five patients underwent enterolithotomy with cholecystectomy and repair of fistula as a single stage procedure (Group 2).

Results: In Group 1, patients presented late with deranged physiological parameters and pre-existing comorbidities accounting for an American Society of Anesthesiologists (ASA) score of 3 or above. In Group 2, patients presented early with preserved physiological status accounting for an ASA score of 2. The mean operative time was 126 +/- 23 minutes in Group 1 and 245 +/- 54.4 minutes in Group 2. There was no mortality, three patients in Group 1 had superficial wound infection, and one patient in Group 2 had injury to the common bile duct necessitating hepaticojejunostomy. The mean follow-up period was 3.5 +/- 1.5 years. None of the patients in both groups had recurrent symptoms requiring further intervention.

Conclusion: Choice of surgical procedure was largely determined by the clinical status of the patient. Single-stage procedure was performed in haemodynamically-stable patients, while enterolithotomy alone was considered sufficient for unstable patients.

Keywords: biliary-enteric fistula, cholecystoduodenal fistula, enterolethotomy, gallstone ileus, small bowel obstruction

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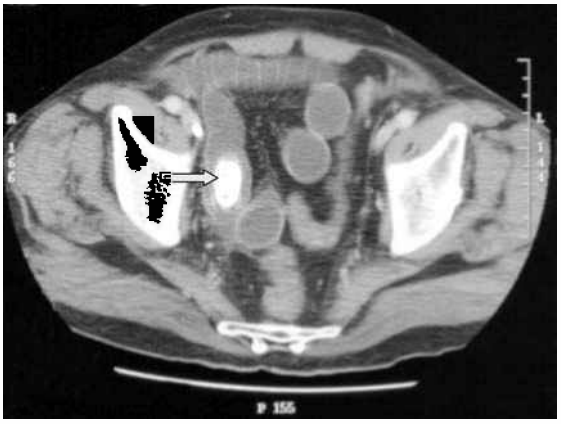

Fig. 1. Axial CT image of a patient with gallstone ileus shows the stone (arrow) impacted in the terminal ileum.

INTRODUCTION

First described by Bartolin in 1654,[1] gallstone ileus is an infrequent complication of symptomatic cholelithiasis. It accounts for 1%–3% of cases of mechanical small bowel obstruction and these migrated gallstones are responsible for intestinal obstruction in one-third of the elderly population.[2-4] Despite the improvements in the 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] There exists controversy regarding the choice of the surgical procedure for this rare surgical emergency.[4,5] One-stage procedure includes enterolithotomy, cholecystectomy with repair of the biliary fistula in the same setting, whereas a staged procedure includes enterolithotomy alone with a delayed repair of the biliary fistula. If enterolithotomy alone is performed at the time of initial surgery, it may predispose the patient to subsequent attacks of recurrent cholecystitis, cholangitis and gallstone ileus.[8] On the other hand, a definitive procedure in the same setting is related to a prolonged operative time and higher perioperative morbidity and mortality in these sick patients.[5,6] In our clinical practice, both surgical strategies have been employed, and the purpose of this retrospective audit was to analyse the management of gallstone ileus at our institution with a view to determine the factors influencing the choice of the surgical procedure.

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METHODS

We retrospectively reviewed the medical records of all patients with the diagnosis of gallstone ileus at our institution between 1990 and 2006. Records were retrieved using the ICD-9-CM coding system. A total of 11 patients were treated for gallstone ileus. One patient was excluded from the study due to missing data in the records. Data was analysed for the demographic features, duration of symptoms, clinical condition at presentation including haemodynamic status, metabolic acidosis and American Society of Anesthesiologist Score (ASA), duration of operation, postoperative complications and follow-up with regard to recurrence of symptoms.

RESULTS

There were a total of seven women and three men, with a mean age of 61.8 ± 9.6 years. Preoperative diagnosis was established in only seven patients. Five patients presented with symptoms suggestive of intestinal obstruction while the remaining patients presented with a vague history of abdominal distension, constipation and disorientation. Abdominal radiographs were performed in all patients, while ultrasonography of the abdomen was done in six patients. Computed tomography (CT) of the abdomen was performed in only four patients, and an upper gastrointestinal contrast study was performed in one patient. The CT of a patient with gallstone ileus is shown in Fig. 1. Abdominal radiographs showed dilated small bowel loops in all patients, while pneumobilia and calcific shadow suggestive of gallstone ileus was present in six patients. CT of the abdomen was suggestive of gallstone ileus in only two patients.

The patients were divided into two groups with five patients in each group. Group 1 included patients undergoing enterolithotomy alone, and Group 2 included patients undergoing enterolithotomy, cholecystectomy with repair of biliary fistula. In Group 1, the mean interval between onset of symptoms and surgery was 8.2 ± 6.4 days. All patients were hypertensive and diabetic, and two patients had a history of ischaemic heart disease. All patients were haemodynamically-unstable with evidence of metabolic acidosis and pre-renal azotemia. These parameters were responsible for an ASA score of three or above in all patients. Mean operative time in this group of patients was 126 ± 23 minutes.

In Group 2, the mean interval between onset of symptoms and surgery was 4.2 ± 1.1 days. Only two patients were hypertensive and all were haemodynamically-stable at presentation with an ASA score of two. Mean operative time was 245 ± 54.4 minutes. There was no operative mortality in both groups. In Group 1, there were three superficial wound infections, and in Group 2, one patient had intraoperative injury to the common bile duct necessitating hepaticojejunostomy. Mean follow-up period was 3.5 ± 1.5 years, and none of the patients in both groups had recurrent symptoms requiring further intervention.

DISCUSSION

Gallstone ileus is often a geriatric surgical emergency accounting for 1%–3% of cases of mechanical intestinal obstruction.[9-11] The disease occurs predominantly in females, with a female-to-male ratio of 4:1 and 16:1 in different series.[11,12] We reported a female-to-male ratio of 2.3:1. The mean age in our study was 61.8 years.This is lower than the usually reported age range of 65–75 years.[8] The youngest patient in our study was 45 years of age, though gallstone ileus has been reported in patients aged as young as 13 years.[13] Clinical presentation of gallstone ileus is rarely specific and more than one-third of the patients have no prior history of symptomatic cholelithiasis.[9,13] In our series, 30% of the patients had history suggestive of biliary colic. Due to nonspecific symptoms, diagnosis is seldom established preoperatively and leads to delay in diagnosis. Advanced age and presence of multiple comorbidities are related to not only perioperative morbidity but high mortality rates. Atherosclerotic cardiovascular disease, pulmonary disease, and diabetes mellitus were most commonly observed by various authors in up to 80% of the patients,[14,15] and this was observed in all our patients except for two patients in Group 2.

The characteristic radiological sign of gallstone ileus is Rigler's triad, comprising: small bowel obstruction, pneumobilia and an atypical, migrating mineral shadow on radiographs of the abdomen.[16] The presence of two of these radiological signs have been considered pathognomic of gallstone ileus and are encountered in 40%–50% of the cases.[13,17] Finding pneumobilia in patients with gallstone ileus implies presence of biliary enteric fistula. In our series, abdominal radiographs were characteristic of gallstone ileus in 60% of the patients. Ultrasonography may be helpful in delineating biliary anatomy and presence of biliary fistula.[18] In our study, ultrasonography was done in six patients and revealed a contracted gall bladder with cholelithiasis in five patients and pneumobilia in only one patient. CT of the abdomen is valuable in these sick patients presenting with atypical symptoms. It helps to identify the level and cause of obstruction and may yield information about the presence of biliary fistula. CT of the abdomen was done in four patients in our series and revealed features of gallstones ileus in two patients.

Due to the atypical presentation, exact preoperative

diagnosis is established in only 31%–48% of patients.[4,19] In most patients, the correct diagnosis is not established until surgery. In our series, the preoperative diagnosis was established in 70% of patients. The most frequent site of fistula reported in literature is the duodenum.[20] This was noted in our series as well, as all five patients in Group 2 had cholecystoduodenal fistula. The remaining five patients in Group 1 had obscured anatomy due to dense adhesions in the right upper quadrant. The most common site of impaction of the gallstone is the terminal ileum, but other sites of obstruction have also been described, such as jejunum, colon and Meckel's diverticulum.[19-22] In our series, the stone was impacted at the terminal ileum in eight patients and mid ileum in two patients.

There exists a controversy regarding the surgical management of these patients.[4,5,23] Prompt surgical relief of the obstruction is the mainstay of management, as most of these patients have metabolic derangements at presentation.[11] Proponents of enterolithotomy performed alone question the need to repair the biliary fistula in the same setting as this would prolong the operative time.[24,25] Although single stage procedure with enterolithotomy, cholecystectomy and repair of biliary fistula is performed to avoid future risk of recurrent gallstone ileus, cholangitis and cholecystitis,[8] some authors have pointed out that the spontaneous closure of the biliary fistula following the passage of the stone, particularly when the cystic duct is patent and/or when there are no residual stones, therefore questioned the need of a delayed repair of the biliary fistula.[11,15,17] In the review of 1,001 reported cases of gallstone ileus, the reported mortality rate of the single staged procedure was 16.9% compared to 11.7% for enterolithotomy alone.[3] 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.[3,4]

Options of the surgical treatment to date have been dictated by the clinical condition of the patient at presentation, with enterolithotomy alone being performed for haemodynamically-unstable patients and the single-stage procedure being reserved only for stable patients. In our series, in patients undergoing enterolithotomy alone, the mean interval between the onset of symptoms and surgery was 8.2 days, compared to 4.2 days for the patients undergoing the single-stage procedure. This delayed presentation probably accounted for the instability of the haemodynamic status and metabolic derangements, leading to higher ASA score in Group 1 patients compared to the Group 2 patients.

In conclusion, the choice of the surgical procedure was largely determined by the clinical condition of the patient. Single-stage procedure was performed in haemodynamically- stable patients, while enterolithotomy alone was considered sufficient for unstable patients with metabolic derangements. Outcome was satisfactory in both groups with no mortality or long-term complications.

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