Review Article

Overview on Gallstone ileus: An update on management

Abstract

Gallstone ileus is a rare complication of gallstone disease and is seen in less than 5% of cases of intestinal obstruction, The diagnosis is confirmed by a combination of clinical presentation and imaging modalities in the form of abdominal x-ray and computerized tomography which will show gas in the biliary system and dilated bowel. The management of gallstone ileus is by surgical therapy, which can be divided into an enterotomy alone or an enterotomy followed by excision of the cholecystic-enteric fistula and a cholecystectomy. As the choice of surgical therapy is tailor made to the patient, we have conducted this review article to look at the diagnosis and treatment of this condition. We have also looked at the various types of surgical therapy that is done for gallstone ileus.

Keywords: “Gallstone ileus”, “Gallstone coleus”,” enterotomy”,” one-staged procedure”,” two staged procedure”, “laparoscopy” and “Intestinal obstruction”.

Introduction

Gallstone ileus is a rare complication of gallstone disease that is seen in 0.3% to 0.5% of patients with cholelithiasis. It is seen in elderly and predominantly female patients, accounting for symptoms of acute intestinal obstruction. Gallstone ileus occurs when a gallstone is passed into the intestine by a fistulous tract that forms between the inflamed gallbladder and the duodenum, stomach and colon. The average size of the gallstones is 4cm and the most common site of obstruction is at the ileo-cecal valve, followed by the duodenum and colon(1-3).The clinical presentation is depended on the site of obstruction with abdominal pain, vomiting and constipation, as the symptoms progress, they may proceed to acute intestinal obstruction. The diagnosis may be obtained by performing imaging modalities like abdominal Xray which will show a radiopaque stone, air in the biliary system and dilated loops of bowel. This is referred to as the Rigler’s triad, but these findings are only seen in 40% of cases, Computerized tomography is the gold standard in the diagnosis of gallstone ileus with a sensitivity of 90% (4).

The management of gallstone ileus can be divided into conservative treatment of intestinal obstruction which involves fluid resuscitation with intravenous fluids, keep the patients fasted, starting intravenous analgesics and insertion of a Ryles tube. Surgical Intervention is the definitive treatment of choices for gallstone ileus. Surgical therapy can be divided into a one stage procedure which involves an enterotomy, excision of the cholecystic-enteric fistula and a cholecystectomy. This procedure though is associated with a high mortality rate and prolonged anesthesia and is reserved for patients who fit and with no co-morbidities. The two staged procedure involves preforming an enterotomy and removal of the gallstone that is causing obstruction and the excision of the fistula and cholecystectomy is preformed later as a second procedure once the patient's acute condition has improved. The two-stage procedure is associated with reduced mortality when compared to the one staged procedure(5–8).

Laparoscopy has been attempted in the surgical management of gallstone ileus but there are difficulties encountered with finding the site of obstruction, examining the entire length of the bowel, and performing the surgery in the presence of dilated bowel which prolongs the duration of surgery. Laparoscopy will require an advanced laparoscopic surgeon and in an advanced center that can treat these patients(9).Other methods that have been used include extra-corporeal shock wave lithotripsy, endoscopic shock wave lithotripsy but they are not popular in the management of gallstone ileus(10).

We have conducted this review article to investigate the diagnosis and management options in gallstone ileus. The role of abdominal x-ray and computerized tomography in the diagnosis of gallstone ileus is investigated. We have reviewed the single stage enterotomy and the two stage enterotomy, fistula excision and cholecystectomy. We conducted a literature review using PUBMED, Cochrane database of clinical reviews and Google scholar looking for clinical trial, observational studies, cohort studies systemic reviews, and meta-analysis from 1980 to 2024.We used the following keywords, "Gallstone ileus", "Gallstone coleus", "Enterotomy", "One stage procedure "" Two stage procedure "," laparoscopy" and "intestinal obstruction". All articles were in English language only. Further articles were obtained by manual cross referencing of the literature. Case reports and studies with less than 10 patients and editorials were excluded. Adult male and female patients were included in this study. Pregnant patients and pediatric patients were excluded.

Diagnosis of gallstone ileus

Patients with gallstone ileus often present with symptoms of intestinal obstruction and the most common imaging modality that is performed first is an abdominal x-ray. Abdominal x-ray will demonstrate the Rigler's triad and is diagnostic of gallstone ileus, but it is seen in only 40% of patients. Ultrasound of the abdomen may be used to detect any pathology in the biliary system like gallstones, but computerized tomography is the gold standard in the diagnosis of gallstone ileus. Computerized tomography can identify the site of obstruction, the presence of air in the

biliary system and the site of the cholecystic -enteric fistula. Computerized tomography has a sensitivity of 90%-93% and a specificity of 100% in the diagnosis of gallstone ileus. Magnetic resonance imaging can also be used in the diagnosis of gallstone ileus with a sensitivity of 97.7% but it is time consuming to performed and not routinely available in most hospitals and hence is not used(11–14).

Management of gallstone ileus

The management of gallstone ileus can be divided into initial conservative treatment with intra-venous fluids, analgesics, antibiotics followed by definitive surgical treatment. Surgical treatment can be divided into the single stage procedure which involves performing and enterotomy alone to relive the obstruction and the two-stage procedure that involves performing an enterotomy, excision and repair of the cholecystic-enteric fistula and a cholecystectomy(15).Enterotomy with stone extraction was compared with enterotomy, excision of the cholecystic-enteric fistula and cholecystectomy and the operative time, morbidity and mortality was reduced in the enterotomy group when compared to the group that underwent enterotomy, excision of the fistula and cholecystectomy(16–21).As most of the patients of gallstone ileus are elderly and have co-morbidities, the enterotomy and removal of the stone is the safest emergency procedure that is associated with better outcomes(22–25).

The single staged procedure which involves performing an enterotomy, excision of the cholecystic-enteric fistula and a cholecystectomy is considered a definitive procedure and should be performed in young patients with an American Society of Anesthesia (ASA) score of less than 3, and with reduced co-morbidities (like hypertension, heart disease and diabetes mellitus(26).There were no significant differences with regards to the morbidity and mortality rates between the single stage and two stage procedure in some centers(27).One of the important complications from the single stage procedure is the risk of leakage from the enterotomy site or from the site of fistula excision, hence the need to provide this procedure for patients who are fit and have a good American Society of Anesthesia(ASA) score(28).

A systemic review and meta-analysis was conducted on the management of gallstone ileus by Vadher et al.10 studies with 293 patients were in patients this study, and this study showed that there was a reduction in the mortality in patients who underwent a single stage procedure when compared to the two stage procedure, but the morbidity and length of operative time was higher in the single stage procedure when compared to the two stage procedure. This study than concluded that the single stage procedure had a good risk benefit ratio in terms of decreased mortality but the decision on which procedure to preform will depend on patient factors and the risk of surgery(29).

Laparoscopic management of gallstone ileus has been attempted but some of the problems that can be encountered include the lack of space due to the dilated bowel, the difficulty to identify the site of obstruction, removal of the gallstones and the need to perform bowel resection. The prolonged anesthesia and the effect of gas insufflation may influence the intra-operative management of elderly patients. Laparoscopic surgery may be offered in centers where the experience and services is available(30,31).

Table 1 : Table showing the mortality rate between patients with gallstone ileus who underwent enterotomy alone versus enterotomy with fistula excision and cholecystectomy.

Study	Year	Study type	N=numbers	Mortality rate (enterotomy) (%)	Mortality rate (enterotomy +fistula excision cholecystectomy (%)
Doko et al	2003	Retrospective study	30	9.1%	11.1%
Yakan et al	2010	Retrospective study	12	16.6%	33.3%
Alencastro et al	2013	Retrospective study	12	12.5%	25%
Mallipeddi et al	2013	Retrospective study	127	5.3%	7.1%

Recurrent gallstone ileus

The risk of recurrent gallstone ileus is reported at 5%-8% and is predominantly seen in patients who had undergone an Enterotomy. Most patients experienced recurrence of symptoms of gallstone ileus after six weeks of undergoing treatment. The most common site for impaction is still at the ileum or at the ileocecal valve. The management of recurrent gallstone ileus is with the single staged procedure which involves an enterotomy and removal of the stone followed by excision of the fistula, but the mortality is still high(32).A systemic review and meta-analysis was conducted by Alzerwi et al on recurrent gallstone ileus.50 studies with 56 patients were included in this study and 87.3% of the patients were women, the median time for recurrence was 20.5days,the region where the stone was lodged was similar and the mortality rate was 11.8%(33).

Bouveret's syndrome

Bouveret's syndrome is a variant of gallstone ileus which is characterized by gastric outlet obstruction secondary from and impacted gallstone. It is seen in 2% -3% of all cases of gallstone ileus and is predominantly seen in female patients. The diagnosis is usually confirmed by computerized tomography which has a sensitivity of 93% and a specificity of 100%(34).The management of Bouveret's syndrome can be divided into endoscopic and surgical treatment. Endoscopic treatment which involves the use of esophagogastroduodenoscopy and removal of the stone is difficult and associated with a high failure rate. Surgical treatment can be divided into performing an enterotomy and removal of the stone followed by a gastrojejunostomy if the duodenal wall is friable. This is the most common procedure that is performed. The second type of procedure involves performing an enterotomy, removal of the stone, followed by excision of the fistula and performing a cholecystectomy, but it is associated with a higher morbidity and mortality(35–37).

Endoscopic removal of the stone with a net or basket has been attempted in some centers and for stones that are larger than 2cm, mechanical, extra hydraulic, laser and extracorporeal shockwave lithotripsy can be attempted. Endoscopic therapy requires specialist equipment and training, and these are the drawback of this form of therapy(38,39).

Conclusion

Gallstone ileus is a rare complication of gallstone disease that is predominantly seen in elderly, female patients and the diagnosis is confirmed by performing a computerized tomography. The management of gallstone ileus initially involves fluid resuscitation, antibiotics and analgesics. The definitive therapy is surgical treatment, which can be divided into the single stage repair, which involves performing an enterotomy, excision of the cholecystic-enteric fistula and a cholecystectomy and the two-stage procedure which involves performing an enterotomy alone and the cholecystectomy and fistula excision later. The choice of surgical is often tailor made to the clinical presentation and co-morbidities of the patient. The experience of the surgeon and facilities that are available are also factors that will decide what sort of surgical procedure needs to be performed for this patient.

Disclaimer (Artificial intelligence)

Option 1:

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

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