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### Gallstone Coleus: A Rare Relation of Gallstone Ileus

Review Article

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#### Abstract

**Background:** Intestinal obstruction due to gallstones is a rare condition accounting for 1-4% of cases of a mechanical small bowel obstruction. Gallstone coleus (gallstone obstruction of the large bowel) is an even more uncommon cause of a mechanical bowel obstruction.

**Methods:** We performed a search of the PubMed database in December 2014. To the best of our knowledge all available case reports and case series were included. Reference sections were searched manually for additional potential cases. Search terms for gallstone coleus were used in all possible combinations. Our exclusion criteria embraced reports of gallstone obstruction of the small bowel, and duplicate cases. We found 57 publications that together produced a total of 63 case reports of gallstone coleus.

**Conclusion:** Gallstone coleus is a rare entity that carries a high mortality. It usually occurs in the elderly, who frequently suffer a wide variety of comorbidities. To lower mortality, it is advocated that in the elderly co-morbid patient, non-invasive options of stone extraction should be trialled as the treatment option of first choice.

**Keywords:** Gallstones; Gallstone Coleus; Gallstone Ileus; Intestinal Perforation.

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#### Introduction

Intestinal obstruction due to gallstones (gallstone ileus) is rare. The condition has, however, been widely documented with one review reporting as many as 1001 cases [1]. Gallstone obstruction of the large bowel (gallstone coleus) is much more rarely reported, and accounts for less than 8% of gallstone related intestinal obstruction [2]. Grey Turner first described the condition in 1932. His patient was a rotund man of 81 years, who had suffered bouts

of absolute constipation associated with intermittent abdominal pain. A large gallstone, wedged at the level of the sigmoid colon, was extracted [3].

#### Methods

A search of the PubMed database was conducted in December 2014. To the best of our knowledge all available case reports and case series were included, without restriction on language. Reference sections were searched manually for additional potential cases. Search terms for gallstone coleus were used in all possible combinations. Our exclusion criteria embraced reports of gallstone obstruction of the small bowel, and duplicate cases. We found fifty-seven publications that together produced a total of sixty-three case reports of gallstone coleus.

#### Results

##### Presentation & Pathogenesis

The presentation of gallstone coleus resembles that of large bowel obstruction from other causes. Typically, the patient will complain of abdominal pain, constipation, bloating, and nausea. Rarer presentations such as diarrhoea or ascending cholangitis can occur [4]. The right side of the transverse colon is in such close proximity to the gallbladder that it is often found to be bile stained after death. In some cases large gallstones may ulcerate through the wall of the gallbladder and into the transverse co-

lon (autocholecystotransversecolostomy) [5]. This usually results from episodes of cholecystitis. Once inside the bowel lumen, the usual site of stone impaction is the sigmoid colon. A pathological process, such as diverticulitis, often narrows this location [6, 7].

**Patient demographics**

Gallstone ileus causes less than 5% of cases of intestinal obstruction, but accounts for up to 25% of cases of small bowel obstruction in elderly patients [8]. The prevalence of gallstones is two or three times higher in women than in men, but this difference is less marked beyond the sixth decade. Our literature review showed that 58% of cases of gallstone coelus were women. The mean age of all patients reported was eighty-one years (Figure 1).

**Diagnosis**

Three findings in gallstone ileus – pneumobilia, small bowel obstruction and an ectopic gallstone seen on plain abdominal x-ray – comprise Rigler’s triad. The combination, however, is seen in less than 50% of cases [9]. This classic triad is sometimes, but not always seen in gallstone coelus, featuring large bowel obstruction rather than that of the small bowel [10]. In this review, plain abdominal x-ray demonstrated gallstones in thirteen cases (21%). Calcification aids identification of a gallstone on plain x-ray. Computed tomography (CT) scanning was frequently used and in our review supported diagnosis in forty cases (65%) of gallstone coelus. CT is recognised to be the gold standard imaging modality in the diagnosis of gallstone coelus [11].

**Treatment Options**

There was only one published case of the spontaneous resolution of gallstone coelus. It was thought that a failed endoscopic attempt at removal had facilitated passage of the gallstone through the bowel [7]. The chances are that spontaneous outcome, when it occurs, is simply an event that passes unnoticed. Definitive surgical intervention appeared necessary in the remainder of cases. The literature demonstrated, however, an absence of consensus about what constitutes the most appropriate treatment.

In just over one third of reported cases, endoscopic methods of stone retrieval were first trialled (Figure 2). Such techniques require the use of a colonoscope, with a snare or basket attachment, or a mechanical or laser lithotripter. The use of ultra-sound guided extracorporeal shock wave lithotripsy has, in addition, been described. Of these non-invasive treatment options, the failure rate slightly exceeds that of success; 55% and 45% respectively.

Eighty percent of patients diagnosed with gallstone coelus in published cases were subjected to definitive surgical stone extraction, via laparotomy (75%) or laparoscopy (5%). Seventeen (27%) underwent a Hartmann’s procedure, four (6%) underwent colonic resection and primary anastomosis, whilst the creation of a de-functioning loop colostomy was chosen in five (8%). Colotomy also appeared to be widely used; an open colotomy with primary closure in twenty-one cases (34%), and a laparoscopic colotomy in three (5%). Conservative management was successful in just two cases (Figure 3).

**Discussion**

Patients who are diagnosed with gallstone coelus are usually elderly and co-morbid – so-called ‘high-risk surgical patients’. It is

Figure 1.

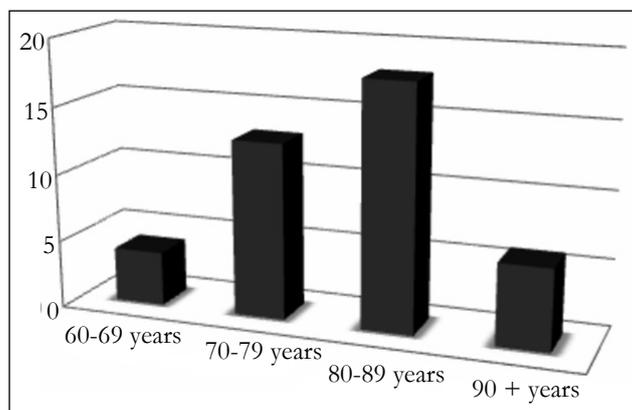


Figure 2.

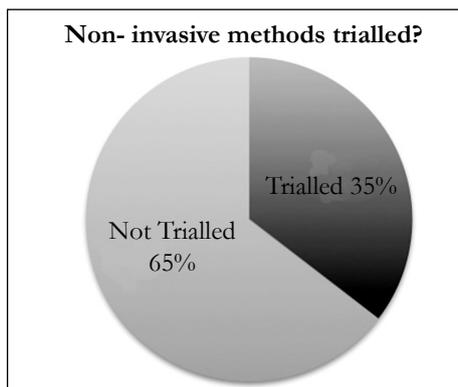
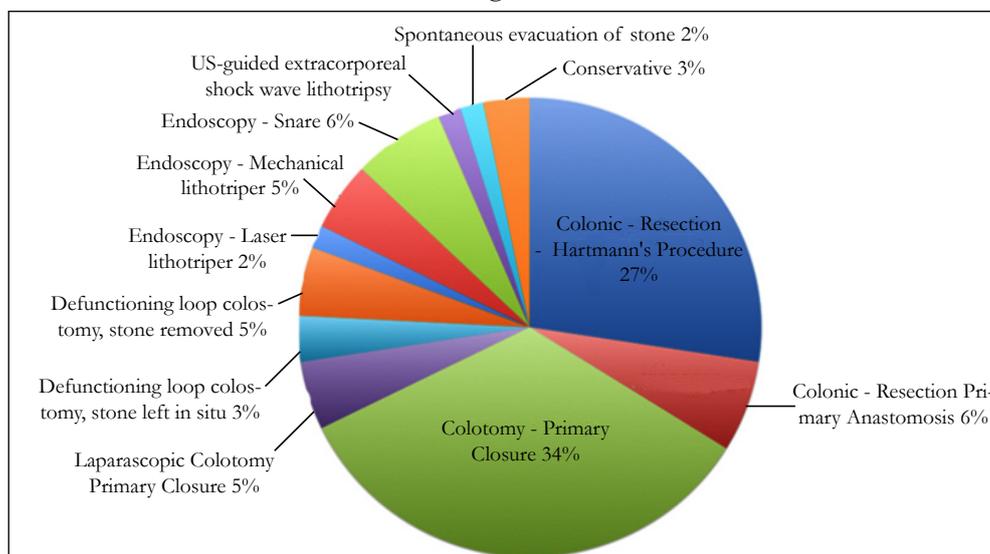


Figure 3.



recognised that this minority contribute to the vast majority of postoperative deaths [12]. The mortality of a patient undergoing emergency laparotomy is around 25% [13]. To improve the situation it has become good practice to apply physiological scoring systems such as the P-POSSUM score, to predict the risks of mortality and morbidity, and guide appropriate clinical decision-making [14]. The 30-day mortality of patients who presented with gallstone coleus in this review of published cases reaches 21%. Of those who died, 77% had undergone laparotomy (Figure 4).

Patients with gallstone coleus can be stratified into two groups based on the presence or absence of intestinal perforation. In the first group, there is clinical or radiological evidence of intestinal perforation and definitive surgical intervention offers the best prospect of reducing mortality. If CT scan confirms perforation, with free air and minimal local contamination, then laparoscopic attempts could be applied if the expertise is available. This would involve laparoscopic washout of the collection, plus segmental colonic resection with primary anastomosis, and proximal diverting ileostomy. Laparoscopic washout with laparoscopic segmental colonic resection and end colostomy provides an alternative.

When a laparoscopic surgeon is unavailable, emergency laparotomy should be performed. Patients undergoing emergency laparotomy have been the subject of ongoing quality improvement work [13]. Traditionally, Hartmann's procedure would be the operation of choice. This entails resection of the affected segment of bowel together with the gallstone, and formation of an end colostomy. In the unstable surgical patient, a diverting proximal loop colostomy is an option. Where there is deemed to be reversal potential, a primary anastomosis with a diverting loop ileostomy provides a suitable alternative.

In the second group of patients, there is no evidence of intestinal perforation. Recognising the high mortality and morbidity rates of surgery, a conservative approach should be adopted whenever feasible. The first steps may consist of only the avoidance of anything by mouth, the correction of fluid and electrolyte imbalances, and nasogastric decompression if the patient is vomiting. Faecal softening enemas containing arachis oil can promote bowel movement, and offer the possibility of spontaneous passage of the gallstone.

When expectant treatment proves ineffective, non-invasive endo-

scopic stone retrieval, in techniques previously listed, can be trialled. The treatment of gallstone coleus differs appreciably from that of intestinal obstruction due to other causes, including that of gallstone ileus. Firstly, the obstructing gallstone may represent an accessible intraluminal foreign body. Secondly, when the stone is lodged distally, in the sigmoid colon, it may be removable by means of non-invasive surgical techniques. Gallstones can be crushed, fragmented, or lasered prior to transanal extraction of debris. The risks of colonoscopic retrieval compared with those of surgery, are lower, and patients are likely to require shorter periods of rehabilitation [15].

When non-invasive techniques fail in the patient without intestinal perforation, an attempt at laparoscopic stone extraction should be made. This is dependent on the availability of laparoscopic expertise. In cases where endoscopic retrieval has been attempted but failed, the endoscopist may have achieved proximal bowel deflation. In this situation, laparoscopic colotomy with stone removal and primary closure is more achievable.

Definitive surgical management may include enterolithotomy, cholecystectomy and fistula closure in one operation or as separate procedures [7]. In this review, however, the chosen method of stone extraction was combined with another surgical procedure in just ten reports (16%). The recurrence rate for gallstone ileus is reported to be less than 5% [16]. Moreover, the cholecystocolic fistula is usually symptomless. This would serve to negate the requirement for fistulectomy. The combined treatment choice with cholecystectomy may be viewed as superior, as it provides definitive treatment. It is, however, complex, prone to complication, and unsuitable in elderly patients [17]. Although the cholecystocolic fistula is usually symptomless, its repair serves to prevent recurrence [18]. The primary objective of treatment in this group of patients is to reverse the colonic obstruction to reduce mortality.

## Conclusion

Gallstone coleus is a rare entity that carries a high mortality. It usually occurs in the elderly, who frequently suffer a wide variety of comorbid conditions. To lower mortality, it is advocated that in the elderly co-morbid patient, non-invasive options of stone extraction should be trialled as the treatment option of first choice.

Figure 4.

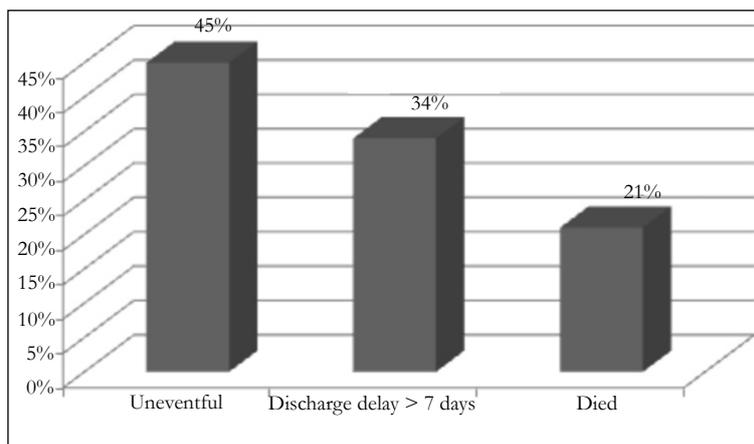
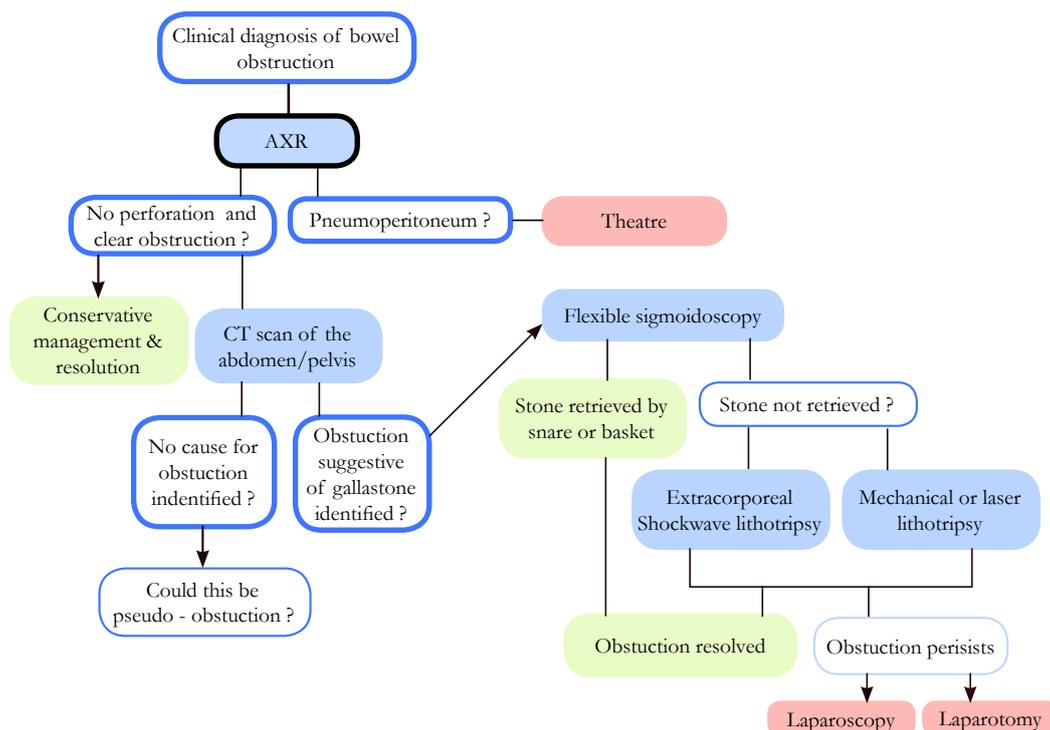


Figure 5.



Currently there is no consensus on optimal management. Figure 5 shows a flowchart which summarises our proposed systematic approach to the treatment of patients with gallstone colexus.

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