

# Gallstone Ileus:

## A Review

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### Abstract

This article aims to review gallstone ileus in the literature addressing the pathophysiology, clinical presentation, radiological findings and treatment options of the condition. A literature search was done on gallstone ileus, for the period 1966–2005. Gallstone ileus is a disease of the elderly, causing up to one fourth of non-strangulation intestinal obstructions in patients older than 65 years of age. It is often missed or diagnosed late. The presentation is that of intestinal obstruction preceded by biliary complaints. Radiological features on plain X-rays include features of intestinal obstruction and pneumobilia, and an aberrant gallstone. Treatment depends on the site of the impacted stone, but surgery is needed in many cases.

Gallstone ileus is a rare complication of a common condition. Because it primarily affects the elderly, mortality and morbidity are high, although they have improved over the years. Early diagnosis and treatment improve the outcome.

**Key Words:** Gallstones, fistulae, ileus.

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### Introduction

GALLSTONE DISEASE is a common condition, with 10% prevalence in the United States and Western Europe. It is symptomatic in only 20–30% of the cases, most commonly presenting with biliary colic. Some of the numerous other frequent complications include acute and chronic cholecystitis, mucocele and empyema of the gallbladder, acute and chronic pancreatitis, obstructive jaundice and ascending cholangitis. There are other, rarer complications that require a higher index of suspicion to diagnose, such as gallstone ileus and Mirizzi syndrome (1).

Gallstone ileus is usually a disease of the elderly, with peak incidence between 65 and 75 years of age. The youngest person reported in the literature was 13 years old and the oldest was 97 years of age. As expected, there is female predominance, since biliary tract disease is known to occur more frequently in females (2, 3). Gallstone ileus is a rare entity in the general population, but it accounts for nearly 25% of non-strangulated intestinal obstruction in patients older than 65 years of age. Being a disease of the elderly, it leads to high mortality, because of the co-morbidity of

those affected. Mortality is reported to have been as high as 60% in the 19th century (1), dropping to around 40% by the 1960s and to 15–18% in the 1990s (3).

### Pathophysiology

Gallstone ileus is usually preceded by an attack of acute cholecystitis, causing inflammation and adhesions in the area of the gallbladder bed. The adhesions and inflammation, with the pressure effect of the gallstone, facilitate the formation of a fistula with the small or large intestine (1). Cholecystoenteric fistulae complicate fewer than 1% of gallstones cases. The commonest fistula is between the gallbladder and the duodenum in 60% of the cases, but cholecystocolic, cholecystojejunal and cholecystogastric fistulae have also been described. In most cases the stone is passed with the stool without causing intestinal obstruction, but sometimes the stone is large enough to impact, causing obstruction (1, 3, 5). The size of the stone plays an important role in determining this; while most authors agree that stones less than 2–2.5 cm will pass without causing obstruction, stones more than 5 cm will most probably impact. The presence of strictures or abnormalities in the bowel lumen, causing it to be narrower than usual, will also increase the chances of the stone impacting (1, 6). In cases where there is clinical intestinal obstruction, the stone is most commonly impacted in the terminal ileum, which is the narrowest part of the intestine. To a lesser extent the stone may be impacted in the proximal ileum or in the jejunum, especially if the stone is big enough. Duodenal obstruction is

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relatively rare and accounts for only a minority of the cases (2, 5).

### Clinical Presentation

The presentation of gallstone ileus is that of intestinal obstruction, which is usually preceded by biliary complaints. The diagnosis is usually 2–4 days late, with correct diagnosis preoperatively in only 50–75% of the cases (2, 3, 5). Clinically, the presentation may be of intermittent obstruction that improves only to reappear later. This is called the “tumbling phenomenon,” in which the impacted stone is intermittently passing and lodging in the intestinal lumen and continuing to migrate distally, until the stone either passes through the gastrointestinal tract or is impacted (1, 3, 7).

Bouveret syndrome is a rare complication of gallstones, in which a cholecystoduodenal fistula forms and the stone is impacted in the duodenum, causing gastric outlet obstruction. This condition was first described in the literature by Bouveret in 1896. From then until the year 2000, only 175 cases have been described in the literature (8–10). A variant of Bouveret syndrome, in which the obstruction is secondary to the distended gallbladder, was also described (11). Clinically, Bouveret syndrome presents with signs and symptoms of gastric outlet obstruction, abdominal pain, nausea and vomiting. If the stone is not fully obstructing the lumen, the presentation will be of partial obstruction. Also the presentation may be associated with other complications of gallstone disease, such as pancreatitis. Bouveret syndrome has also been reported to be preceded by or to present as upper gastrointestinal bleeding (12–14).

### Radiological Findings

Radiologically, plain abdominal X-rays are diagnostic for gallstone ileus in about 50% of the cases (5). X-ray findings of gallstone ileus were summarized by Rigler, Borman and Noble in 1941 as a tetrad of (a) partial or complete intestinal obstruction, (b) pneumobilia or contrast in the biliary tree, (c) aberrant gallstone and (d) change of the position of the previously observed stone (15). In 1978, Balthazar and Schechter described a fifth sign, which is the finding of two air fluid levels in the right upper quadrant on abdominal X-ray secondary to air in the gallbladder (16).

In Bouveret syndrome, a dilated stomach is expected to be seen on X-ray, since the obstruction is at the level of gastric outlet (17). CT scan usually shows pneumobilia, intestinal obstruction, and one or more gallstones in the intestinal lumen (13, 17).

Cholecystoenteric fistulae have also been demonstrated on barium studies (8, 18), ultrasound scan (19), endoscopy (12, 14, 19–21), and endoscopic retrograde cholangiopancreatography (ERCP) (22).

### Treatment

The aim of treatment of gallstone ileus is to relieve the intestinal obstruction by removing the stone. Stabilizing the patient and correcting the comorbidities are also important, to improve the outcome (1). Many approaches have been described for the stone removal in gallstone ileus: open surgery (23), laparoscopic or laparoscopic-assisted enterolithotomy (24, 25), endoscopic removal (20, 26), shockwave lithotripsy (27, 28) and lithotripsy using Nd:YAG laser (19, 29).

There are two current approaches to surgery for gallstone ileus: (a) enterolithotomy alone and (b) enterolithotomy, cholecystectomy and fistula closure in one stage. The supporters of the one-stage procedure argue that by doing the cholecystectomy and fistula closure, further attacks of cholecystitis, cholangitis and gallstone ileus are prevented. And they argue that if this is not done at the time of initial surgery, it should be done later (23, 30, 31). On the other hand, the supporters of enterolithotomy alone argue that the mortality of a one-stage procedure is higher than that of enterolithotomy alone, 16.9–19% vs. 12% (2, 3, 23). The recurrence of gallstone ileus following enterolithotomy alone is low, and so is the incidence of complications related to the persistence of the gallbladder fistula (5, 23). If there are no gallstones left, the fistula will most probably close spontaneously, provided that the cystic duct and the biliary tree are patent, allowing the bile to flow freely (2, 5). There is no consensus on the choice of operation, if needed, but enterolithotomy alone is advised especially if the patient is elderly and there are other associated co-morbidities, since it is safest to minimize the amount of surgery performed, and thereby decrease the stress of surgery and anesthesia as much as possible (5, 23).

Because of the relatively high mortality and morbidity, alternative procedures to open surgery have been suggested (19, 20, 24–29). One of these is video-assisted enterolithotomy. The procedure is started laparoscopically and the exact location of the gallstone in the intestine is identified. Then, a small incision is made on top of the stone, the small bowel exteriorized. This is followed by enterolithotomy and enterorrhaphy (24, 25).

In Bouveret syndrome the stone can be visualized on endoscopy. Some surgeons have managed to remove the stone using a basket or to break the

stone into smaller stones in order for it to pass through the gastrointestinal tract (20). The stone can also be broken by using shock wave lithotripsy or laser therapy. But some argue that if the stone is broken, the smaller stones might impact distally, causing further obstruction.

### Conclusion

Gallstone ileus results from an impacted stone that has reached the gastrointestinal tract through a cholecystoenteric fistula. Though it is a rare complication of gallstones, it is not an uncommon cause of non-strangulated intestinal obstruction in the elderly. Presentation is that of intestinal obstruction either preceded or accompanied by biliary complaints. The typical X-ray findings are pneumobilia, intestinal obstruction and aberrant gallstone.

Mortality and morbidity are high, although it has improved over the years. Early diagnosis improves the outcome. Treatment depends on the site of the impacted stone. If it is in the gastric outlet, then endoscopic retrieval or lithotripsy can be helpful; otherwise, open surgery, laparoscopy or laparoscopic-assisted enterolithotomy may be preferable.

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