



Case report

Case report: Closed-loop bowel obstruction secondary to a double gallstone ileus

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ABSTRACT

Introduction and importance: In this paper, we report an unusual case of a closed-loop bowel obstruction secondary to a double gallstone ileus. This type of pathology constitutes an emergency, and requires prompt surgical intervention to prevent further complications.

Presentation of case: The patient was a 90-year-old female who came to our emergency room with a clinical picture compatible with an acute abdomen. Imaging tests performed included a plain radiograph and abdominal CT-scan, which confirmed the diagnosis. The patient was then transferred to the operating room, and an open double enterolithotomy was performed, extracting two cylindrical gallstones with a diameter of over 2.5 cm. No treatment was given for either the gallbladder nor the biliary-enteric fistula due to the patient's physical status.

Clinical discussion: Gallstone ileus is a rare entity, but must be taken into consideration when a patient with an abdominal obstruction arrives to the emergency department, especially when signs such as pneumobilia or visualization of the stones are detected by imaging tests. Early surgical intervention is required to avoid complications. However, addressing the biliary-enteric fistula at the same time is a sensitive procedure that may not be advisable, depending on the status of the patient. This report includes a bibliographic review of existing cases of gallstone ileus and the specifics of its diagnosis and management.

Conclusion: This pathology can lead to serious complications if not managed properly. Prompt diagnosis and surgical intervention are essential to avoid complications such as intestinal gangrene and perforation. Inspecting the entire intestine during surgery is crucial for removing any additional gallstones that may be present to prevent the reappearance of symptoms.

1. Introduction

Gallstone ileus (GI) is an uncommon cause of intestinal obstruction developed by the impaction of a gallstone in the lumen of the intestine. When a swollen gallbladder adheres to an adjacent bowel, a biliary-enteric fistula can originate, allowing gallstones to enter the gastrointestinal tract [1]. First described by Bartolin in 1654 [2], it is considered to be an unusual condition, as only 0.3–0.5% of patients suffering from cholelithiasis will develop a GI. It has been stated that GI could account for 1–5% of all cases of bowel obstruction. Most often, it affects older women, which consistently present serious comorbidities: more than 85% of the patients are classified as ASA III-IV, as described in contemporary reports [1,3].

Most GI are caused by stones greater than 2.5 cm [4] that become

impacted at the ileum, the narrowest segment of the intestine, but it can also affect the jejunum, stomach, and even the colon [5]. It is reported that multiple gallstones can be identified intraoperatively at the intestine lumen in up to 16% of cases. Therefore, it is crucial to inspect the full length of the intestine during surgery, as these stones could lead to recurrent symptoms [1].

GI usually presents itself as an episodic subacute obstruction, with the patient experiencing mild symptoms during certain days; however, when the stone completely occludes the intestinal lumen, typical symptoms of intestinal obstruction develop, such as abdominal pain, nausea, and vomiting.

This entity requires immediate surgical evaluation, as firmly impacted stones can cause localized bowel ischemia, leading to complications such as necrosis, perforation, and, consequently, peritonitis.

Abbreviations: GI, Gallstone ileus; ASA, American Society of Anaesthesiologists; CT-scan, Computerized Tomography scan; HIDA-scan, Hepatobiliary iminodiacetic acid-scan; Tc-99m scan, Technetium 99-metastable scan.

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The latter is of higher prevalence in patients with a double stone occlusion, as was the case for our subject; this is because a closed-loop bowel obstruction can develop in these patients, leading to intestinal ischemia and necrosis appearing faster than in patients with a single GI.

We present the case of a 90-year-old woman with an acute abdomen secondary to a double GI. This work has been reported in line with the SCARE criteria [6].

2. Presentation of case

Our patient was a 90-year-old female, with a previous medical history of obesity, osteoarthritis, diverticulosis, high blood pressure, and an episode of cholecystitis treated with antibiotics two years ago. The patient arrived at our emergency department complaining of strong abdominal pain lasting for the previous 24 h. The pain was diffused all over the abdomen, and associated with nausea, vomiting and abdominal distension. Physical examination revealed a distended abdomen with diffuse rebound tenderness. An increased C-reactive protein level and leucocytosis with neutrophilia were also found in subsequent blood tests.

As a first measure, an abdominal plain radiograph was taken (Fig. 1), revealing a small intestine distension and pneumobilia, but no other relevant findings.

Afterwards, a contrast-enhanced abdominal CT-scan was performed, showing findings compatible with GI (Fig. 2). Two foreign bodies were observed as the source of the intestinal obstruction, as well as pneumobilia, and a probable biliary-duodenal fistula. Moreover, the radiologist described “the contrast enhancement of a significantly dilated segment of small intestine between both foreign bodies”.

Due to these findings, the patient was transferred to the operating room to perform an emergency surgical intervention.

A midline mini-laparotomy was carried out and the entire intestine was eviscerated for inspection. A calibre change was identified in the distal jejunum, where the foreign body was impacted, accompanied by proximal dilatation. A 30 cm segment appeared congested, with significant wall and mesenteric oedema. At this point a second foreign body was located, confirming the diagnosis of a double GI triggering a closed-loop intestinal obstruction (Fig. 3). Proximal to the second stone, the

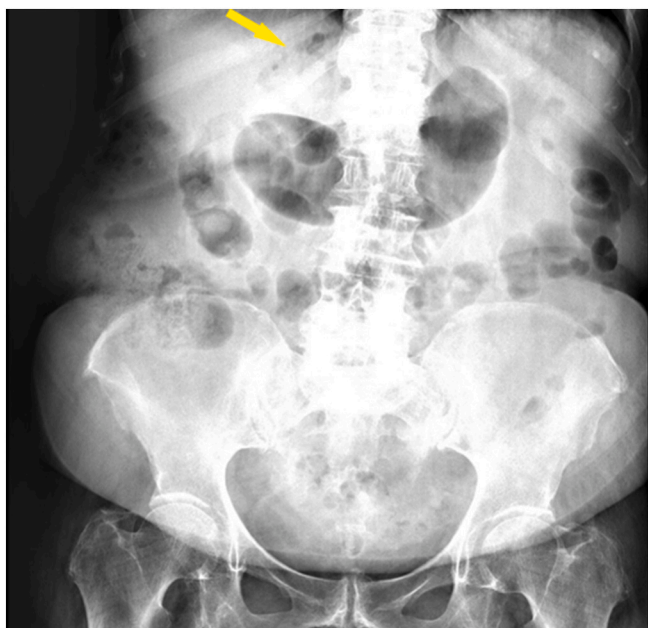


Fig. 1. Plain radiograph showing pneumobilia (yellow arrow) and gastrointestinal dilatation. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

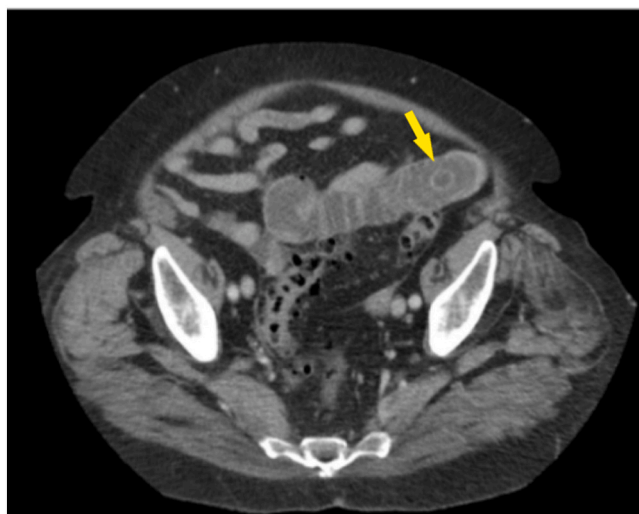
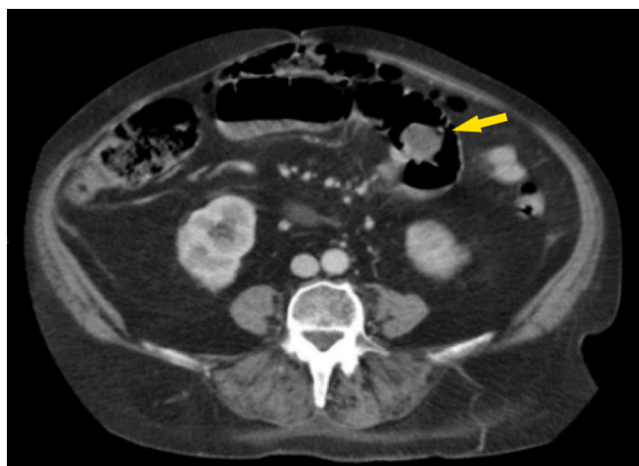


Fig. 2. CT-scan images: yellow arrows pointing at two foreign bodies compatible with gallstones. Red circle around intestinal segment showing a contrast-enhanced wall and mesenteric oedema. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

intestine was dilated, but presented a normal appearance all the way to the duodenum, without any other foreign body, as confirmed by palpation. Two enterolithotomies (Fig. 4) were performed proximally to these foreign bodies, extracting two solid cylindrical masses compatible with gallstones. Transverse closure with two suture layers was

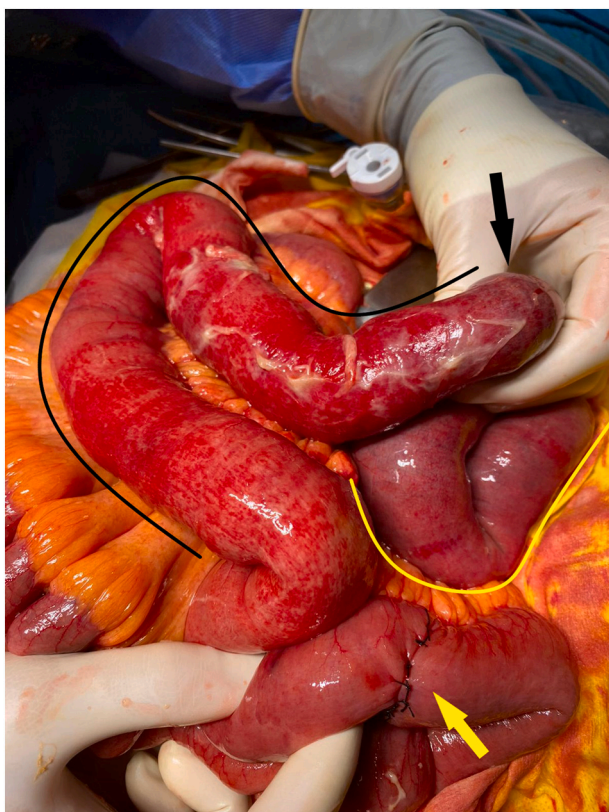


Fig. 3. Yellow arrow points at first transverse closure of enterolithotomy. Black arrow points to the proximal gallstone. Black line follows intestinal segment located between both gallstones, with marked oedema and erythema, constituting a closed loop obstruction. Yellow line follows dilated but normal-appearing intestine, retrograde to proximal gallstone. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)



Fig. 4. Performance of the second enterolithotomy.

performed for both enterotomies. No treatment was given to the gallbladder, hidden behind severe adhesions identified around the duodenum and pyloric region. A single pelvic drain was left in place to assess potential intestine leaks.

Anatomo-pathological analysis confirmed the biliary origin of the stones, composed by bilirubin and cholesterol (Fig. 5).

During post-operative, the patient didn't suffer from any complications, but took four days to full recover her intestinal functions, when oral tolerance was initiated. She was discharged in good condition on the seventh day after the surgery.

3. Discussion

Gallstone ileum is an uncommon condition that requires urgent surgical attention. In the past, clinical diagnosis was challenging, as many patients lacked medical history or symptoms of biliary disease. However, in contemporary series, more than 77% of the patients can be diagnosed preoperatively with the appropriate imaging tests [3].

A plain abdominal radiograph is usually the first imaging test performed in the emergency room, and is able to help in the diagnosis, as it can detect signs as pneumobilia and intestinal dilatation. Direct visualization of the gallstone is unusual. Similarly, it is difficult to find the Rigler's triad (pneumobilia, intestinal obstruction, and visualization of the stone), pathognomonic for GI, in a plain radiograph, appearing in less than one third of the patients [7].

CT-scan is the imaging test of choice, with an estimated sensitivity of 93% [8]. It allows the visualization of more than 90% of the gallstones obstructing the intestine [9]. Although other tests such as HIDA-scans, resonance magnetic imaging, abdominal ultrasonography or endoscopy may be used as supporting tests, all of them have important limitations [9].

CT-scan and plain abdominal radiograph are the preferred tests available in a standard emergency department. In the case of our patient, a final diagnosis could not be made with a plain radiograph; therefore, a CT-scan was performed, which, additionally, allowed us to rule out the presence of further complications.

Handling these patients can be challenging, as it encompasses the management of three key areas: intestinal obstruction, biliary-enteric fistula and cholelithiasis.

When a patient arrives to an emergency department suffering from a gallstone ileum, intestinal obstruction is the main issue to be addressed. Enterolithotomy is a widely accepted procedure, and it should be offered to all patients. It can be performed via open surgery, or laparoscopically. Note that the laparoscopic approach must be reserved for very experienced surgeons in highly select cases, given the technical difficulties associated with extracting the gallstones and performing a complete examination of the intestine [10].



Fig. 5. Postoperative picture of gallstone specimens at anatomo-pathological department.

Closure of the fistula and a cholecystectomy can be offered as a subsequent procedure, or even delayed indefinitely, depending on the status of the patient. Most authors support delaying a biliary surgery in elderly and high-risk patients until the symptoms reoccur. As a general rule, gallbladder and fistula surgery can be performed at the same time as enterolithotomy in low-risk patients, also performing a cholecystectomy with closure of the fistula, and a common duct bile exploration. However, each approach must be individualized [11].

For most patients with advanced age and comorbidities, as was our case, a simple enterolithotomy relieves the intestinal obstruction with low postoperative morbidity [12]. Despite this, the reported overall mortality for these patients is high, with rates of up to 6% [13].

We performed a double longitudinal enterotomy proximally to each gallstone, followed by extraction of the stone and a transverse closure of the enterotomy, to avoid residual stenosis of the lumen. In some cases, local ischemia and gangrene of the intestinal wall forces surgeons to perform an intestinal resection in up to 19% of the patients [1]. Our case presented a highly congested area in the intestinal segment located between both gallstones, but no evidence of necrosis. Intestinal resection was, therefore, not contemplated.

The post-operative recovery was satisfactory, and our patient was discharged after a week of medical care. According to contemporary series, nearly 20% of the patients may present recurrent symptoms [13], but, at present, our patient remains asymptomatic after a year of follow-up.

4. Conclusion

GI is an uncommon condition that requires urgent surgical management. Its natural development and the poor status often presented by the patients make it a serious disease with high mortality rates. Early diagnosis constitutes a key requirement to prevent further complications. During surgery, it is crucial to inspect the entire intestine, checking for any additional gallstones that may be present. In our patient, a double GI was identified, leading to a closed-loop intestinal obstruction; this is in turn associated with a high risk of ischemia and intestinal necrosis.

Credit authorship contribution statement

García-Quijada García J.: study design, data analysis and interpretation, writing and submission of the paper.

Valle Rubio, A.: study design data analysis and interpretation, writing of the paper.

Pastor Riquelme, P.: interpretation of data.

Serantes Gómez, A.: interpretation of data.

Declaration of competing interest

The authors declare no conflict of interest.

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Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Guarantor

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