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Case Report

Spontaneous resolution of gallstone ileus followed by imaging: A case report and a literature review ☆,☆☆

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ABSTRACT

Gallstone ileus (GI) is a rare cause of acute abdomen in an emergency setting and a rare complication of cholelithiasis in the elderly, with a female prevalence. Radiologists play a key role in the diagnosis and management of this condition and, with a multimodal approach, diagnostic accuracy usually increases. Spontaneous resolution of GI has previously been reported for stones smaller than 2 cm. Gallstones usually require surgical management; however, in patients with comorbidities and at high risk of surgical complications, a conservative approach may be considered. Herein, we report the case of an 84-year-old woman who came to the emergency department with an acute abdomen pain caused by a GI, with a 2.6 cm gallstone that was revealed on computed tomography and which was followed by diagnostic imaging with spontaneous resolution.

Introduction

Gallstone ileus (GI) represents a rare cause of acute abdomen in an emergency setting in the elderly. It is a rare complication of cholelithiasis (gallbladder stones) and a rare cause of

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Fig. 1 – CT with contrast administration performed in emergency at the hospital admission. In image "a," the gallbladder is visible with thickened walls and with air inside the lumen (arrow); in image "b," mild pneumobilia is visible; in images "c" and "d," the gallstone is localized in a distal jejunal loop (black arrow) and is causing SBO.

mechanical bowel obstruction, occurring in fewer than 5% of cases and in 25% of cases in the population over 65 years of age [1–4]. GI is caused by the impact of a gallstone on the intestinal wall and the formation of bilioenteric fistulas between the gallbladder and the gastrointestinal tract, secondary to inflammation that occurs during recurrent attacks of acute cholecystitis, resulting in increased pressure inside the lumen that facilitates the erosion and ischemia of the gallbladder wall. The fistulas occurring in gallstones are most commonly seen in the duodenum but are also possibly cholecystocolonic, cholecysto-duodeno-colonic and, more rarely, cholecystojejunal, cholecystogastric fistulas [1–5]. The clinical manifestations of GI may be aspecific and vary depending on the site of obstruction. It can present as acute, intermittent, or chronic intestinal obstruction. The most impactful site of the stone is the distal or terminal ileum because of its narrow anatomic lumen [1–5]. In fact, the small bowel parameters gradually decreased in size from the duodenum to the terminal ileum, where a stone reaches its smallest diameter, nearly 2.5 cm. In this regard, gallstones have to be at least 2.5 cm in diameter to cause intestinal obstruction in the normal bowel [3,5–8]. Other factors that contribute to GI are reduced peristalsis, which decreases progressively from the jejunum to the ileus, and the angulation of the intestinal wall [1–6]. However, the gallstone can be located on other sides, such as the duodenum, causing Bouveret's syndrome, or the stomach, proximal ileum, jejunum, and colon [1–5]. The prevalence of GI is much higher in the age group over 65 years, with a female prevalence and a female-to-male ratio of 3.5:1 [3,4,7]. The mortality rate of GI ranges from 7% to 30% and increases with risk factors such as advanced age, presence of multiple comorbidities, and a late presentation from the onset of symptoms (average 4-8 days) [1–9]. The resulting diagnostic delay is a feature of a worsening outcome. In abdominal plain radiography, the typical sign of GI is the classic triad of small bowel obstruction, pneumobilia, and ectopic gallstone [1,3,5,7,9]. However, contrast-enhanced computed tomography (CT) is the modality of choice in an emergency setting for a rapid diagnosis of underlying causes of acute abdomen and bowel obstruction [1,5,8–11]. Magnetic resonance imaging (MRI) is the modality of choice to visualize gallbladder pathologies complications (complications of gallbladder pathologies) as it depicts the biliary tract [1,5,9]. Management of GI is also challenging. The spontaneous resolution of GI, after the passage of the gallstone, has been previously

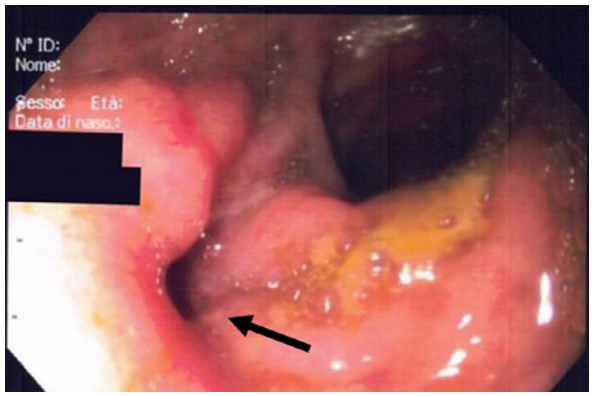

Fig. 2 – Patient's gastroscopy performed at the hospital admission showed the visualization of the cholecystoduodenal fistula on the posterior wall of the duodenal bulb (black arrow).

reported for stones smaller than 2 cm, and initial conservative treatment can be considered in a high-risk surgical patient.

Case presentation

An 84-year-old woman was admitted to the emergency room of our hospital with sudden onset of left abdominal pain and coffee-ground vomitus. The patient had a history of arterial hypertension, ischemic heart failure, and venous insufficiency. On physical examination, the abdomen was soft and mildly diffusely tender. Blood tests revealed high white blood counts (93% of neutrophils with a mild low percentage of lymphocytes at 4.4%), elevated C-reactive protein (27.41 mg/dL) (normal value <0.5 mg/dL), and D-Dimer level (12.88 mg/dL) (normal value <0.5 mg/dL). The other laboratory values were within the normal range. A contrast-enhanced CT was requested in emergency and showed the presence of air in the gallbladder and mild pneumobilia. Intestinal distension with a stone of 2.6 cm in a jejunal loop on CT was also visible and a diagnosis of GI was formulated (Fig. 1). The patient underwent a gastroscopy that showed a fistulous tract on the duodenum communicating with the gallbladder (Fig. 2). The patient started intravenous fluids combined with antibiotic therapy (Tazobactam 2 g with endovenous infusion for 8 days). The patient's clinical conditions remained stable and clinicians managed the patient conservatively, monitoring the gallstone with imaging. An abdominal X-ray (ABXR) was requested the next day and showed the gallstone progression in the right iliac fossa (Fig. 3). An MRI was also performed to rule out other gallbladder stones. However, the MRI examination was limited by the patient's motion artifact and no other stones were visualized in the gallbladder, and only the presence of air was confirmed (Fig. 4). Afterward, the passage of a hepatic-specific MRI contrast agent (Primovist) was visualized in the duodenum. Four days after the hospital admission, CT and showed

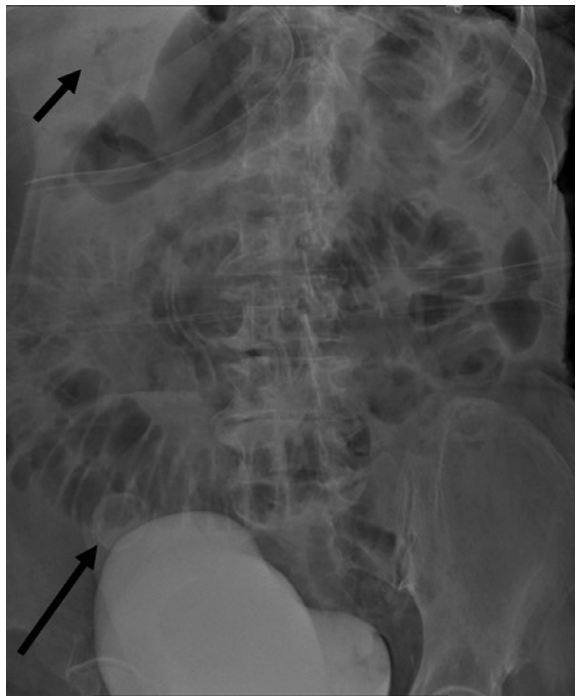

Fig. 3 – ABXR performed 1 day after the hospitalization, showing Rigler's triad with mild pneumobilia (short black arrow), the aberrant location of the gallstone in the right iliac fossa (long black arrow), and SBO.

the gallstone in the right colon (Fig. 5). Three days later, the patient spontaneously evacuated the gallstone through feces.

Discussion

Cholelithiasis can be rarely complicated by the migration of one or more gallstones to the gastrointestinal tract through the formation of adhesion or fistulas. This event occurs in 0.3%-0.5% of cases [2,11]. However, some cases of GI have also been reported in patients in which the gallbladder was previously removed [4]. The GI can cause migratory pain due to the "rolling phenomenon," which is caused by the movements of the stones in the different tract of the intestinal walls with alternations of stops and restarts (with alternate stopping and resuming) of migration through the peristalsis to a more distal section of the intestine, and causing symptoms of intermittent and discontinuous bowel obstruction [1,2,4]. GI can also be recurrent in 5%-8% of cases [9,12]. Recurrence of GI can happen if other stones are present in the gallbladder and if the cholecystoduodenal fistula has not been closed [11,12]. Imaging continues to play an important role in the diagnosis of GI and in defining the location of the gallstones. The sensitivity of imaging usually increases using a multimodality approach [1,5,9]. ABXR is usually the front-line tool used in an emergency setting in cases of abdominal obstruction. In cases of GI, it is possible to research 3 typical signs also known as Rigler's triad [1,3,5,8,9,13]. These signs increase the specificity of the pathology and point us toward the diagnosis of GI.

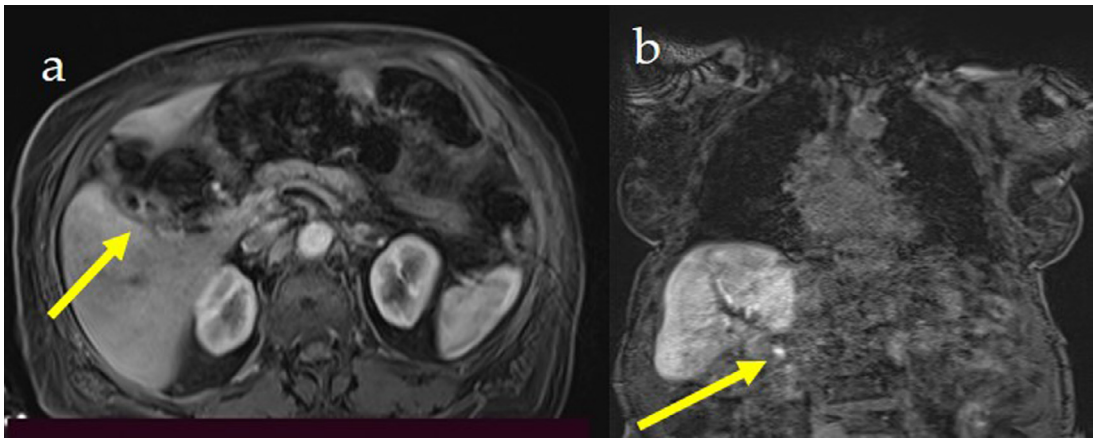

Fig. 4 – MRI examination performed 2 days after the hospitalization. MRI fat-saturated sequence after administration of paramagnetic contrast administration (Primovist) showing on the axial plane "a" the gallbladder with thickened walls and hypointense nuclei compatible with air (yellow arrow) and in the image picture "b," the hepatobiliary phase after 20 minutes, showing on the coronal plane the paramagnetic contrast in the duodenum (yellow arrow).

Fig. 5 – On CT examination, performed without contrast administration 4 days later, the gallstone was visible in the ascending colon (black arrow).

These radiological signs on ABXR are represented by intestinal obstruction (partial or complete), pneumobilia, and aberrantly located gallstone. Furthermore, 2 additional radiological signs have been added to Rigler's triad: a change in the location of the stone in a second ABXR (Rigler's tetrads) and the presence of various fluid levels adjacent to the upper-right quadrant. However, all these combined signs can be absent in more than 50% of cases [1–5,9]. Lassandro et al. [11] found the classical triad on ABXR in only 14.81% of patients. On the other hand, the presence of pneumobilia is not only a radiological feature of GI, since it can occur after surgical or endoscopic biliary procedures, as well as in cases of incompetence of the sphincter of Oddi. Rare cases of Bouveret's syndrome may be visualized on ABXR as a prominent gastric shadow. However, the sensitivity of ABXR for the diagnosis of GI remains low and ranges between 40% and 70% [5–7]. It can be increased using a combined approach with abdominal ultrasound up to a value of 74% [5,9]. Bedside abdominal ultrasound (ABUS) has greater sensitivity in the detection of gallbladder pathologies as the presence of cholelithiasis or the presence of air-filled gallbladder, and in some cases, it is possible to visualize the fistulous tract and ectopic gallstones [1,5,9]. Distended abdominal walls and the presence of aerobilia can also be visualized on ABUS. However, some issues have been encountered with US, such as higher body mass index, the presence of air, and also the experience of the physician. Contrast-enhanced CT is the modality of choice in the emergency setting for the diagnosis of acute abdomen because of its speed and for the panoramic view through the multiplanar reconstruction. CT has a higher sensitivity and also a high specificity, accounting for 93% and 100%, respectively [1,5,8,9,13]. It is usually very accurate in the diagnosis of GI because it provides information on gallbladder abnormalities, the fistulous tract, the gallstone location, and the grade of the intestinal obstruction. Information obtained with CT is also important for determining the therapeutic decision, allowing the stratification of patients at a higher risk of complications, and CT may also be useful for decreasing diagnostic delay [1,5,8,9,11,12]. All signs of Rigler are visible on CT and it is also possible to visualize the indirect signs of the presence of the fistulous tract as the presence of air in the gallbladder and pneumobilia. However, with multiplanar reconstruction, it is possible to directly recognize the fistulous tract, which is also well depicted after oral contrast administration with the visualization of the Petren sign, which is the transfection of the oral contrast agent from the fistula tract to the gallbladder [8]. After oral contrast administration on CT, it is also possible to visualize the forchet sign, which is seen as the obstruction of the bowel lumen due to gallstones

[8]. MRI with magnetic cholangiopancreatography sequence is the modality of choice for visualizing the biliary tree, detecting even small gallstones with a sensitivity of 97.7%, and it can demonstrate Rigler's triad in almost 100% of cases [1,3,5,9]. However, it is more time-consuming and less readily available than CT. GI usually requires emergency surgery to resolve the bowel obstruction. The 2-stage procedure (enterolithotomy followed by cholecystectomy and repair of the biliodigestive fistula after 4-6 weeks) is a treatment that is suggested for younger patients and in cases of recurrent symptoms [14–17]. Endoscopic treatment is another valid alternative approach [9].

Spontaneous resolution is reported in only 1.3% of cases of gallstones larger than 2-2.5 cm [7]. The literature reports that, in cases of spontaneous resolution, gallstone dimensions vary from 2 to 6 cm [18–30]. We were able to find only 13 previously published cases of GI with spontaneous resolution [18–30] and in the most of cases, the patients were women. The timing for the spontaneous resolution ranges from 16 hours to 7 days and the site of impaction was in the most of cases, the right iliac fossa [20–27,30]. In 2 cases, the gallstone was found in the rectosigmoid area [28,29]. In 3 cases, any gallstones were visualized on imaging [18,19,21] but in 2 cases [19,21] multiple gallstones were visualized on the spontaneous evacuation. In one case, multiple gallstones were described on CT [24]. CT was the most widely used imaging tool to make the diagnosis of GI. Adhesions and cholecystoduodenal fistulas were found on CT in 6 cases [21,22,24–27]. In one case, a cholecystocolonic fistula was found on CT and MRI [19]. In one case, a cholecystoduodenal fistula was suspected on ABUS [21]. In our case, the gallstone progression in the intestinal tract, was followed by imaging and was spontaneously evacuated in about 7 days.

Therefore, in elderly patients and in the presence of comorbidities, initial conservative management could be considered, especially in the presence of high-risk factors for surgery. On the other hand, spontaneous fistula closure can occur in 50% of cases [7]. However, in this case, there is a potential risk from 5% to 33% of repeated impact from further stones [7]. In our case, clinicians chose a conservative management for the high risk of surgery complications arising from the older age of the patient and also due to the presence of comorbidities.

Conclusions

Gallstones ileus represents a rare cause of intestinal obstruction. Spontaneous resolution of gallstones greater than 2 cm is rare, though possible. A multimodal imaging approach usually increases the diagnostic accuracy. Conservative management should be considered mainly in patients with underlying comorbidities that are at higher risk of surgical complications. Imaging is essential for the diagnosis of GI and should also be used in the follow-up if conservative management can be considered.

Institutional review board statement

The authors comply with international and national ethical standards.

Patient consent

Patient consent was obtained to publish this report.

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