

Case Report of Gallstone Ileus: CT Findings Before and After Small Bowel Obstruction

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ABSTRACT

Background: Gallstone ileus is a rare complication of cholelithiasis that occurs in about 1-4% of all cases of small bowel obstruction. Timely recognition and intervention are crucial for improving patient outcomes since it is associated with high morbidity and mortality. CT is the method of choice for diagnosis because it shows with high accuracy the location of the impacted stone in the intestinal tract, the distension of the small bowel proximal to the stone and the presence of pneumobilia.

Case Presentation: We present the case of a 74-year-old male with right upper abdominal pain that underwent an initial CT exam that evidenced a 3 cm gallstone abutting on the second portion of duodenum. Conservative management started, but, four days later, a small bowel obstruction occurred. Then, a second CT was performed, showing multiple loops of dilated small bowel, an ectopic gallstone causing obstruction, a punctiform air bubble in gallbladder and a very small amount of air surrounding the gallbladder. The patient was transferred to the operating room where enterotomy and removal of the obstructing gallstone were performed.

Conclusion: CT is the method of choice to diagnose gallbladder ileus. It provides exquisite anatomical detail and can exactly establish the size and the location of the ectopic stone and demonstrate other findings including abnormal fistulous connections, gallbladder anatomy and any additional stones in the bowel.

Keywords: Gallstone Ileus; CT; Imaging; Computed Tomography

Abbreviations: CT: Computer Tomography; ERCP: Endoscopic Retrograde Cholangiopancreatography

Introduction

Gallstone ileus is a rare and potentially life-threatening complication of cholelithiasis, in which a gallstone becomes impacted in the gastrointestinal tract, leading to bowel obstruction [1]. In the majority of cases the elimination route is a fistula between the gallbladder and the duodenum due to erosion by the offending gallbladder stone, but in rare cases a cholecystocolonic or cholecystogastric fistula may occur [2,3]. The impact site depends on the size of the gallstone and on the location of the fistula with

the gastrointestinal tract. Gallstones smaller than 2 cm may pass spontaneously through the gastrointestinal tract while bigger gallstones generally cause intestinal obstruction [4]. Once within the duodenum, the gallstone usually proceeds distally and impacts at the ileocecal valve or, less commonly, in the proximal ileum or in the jejunum. In the case of cholecystocolonic or cholecystogastric fistula, the gallstone generally obstructs the sigmoid colon or the duodenal bulb, respectively. In the latter event, it may cause Bouveret's syndrome, characterized by signs and symptoms of gastric outlet obstruction [5,6].

Gallstone ileus occurs most commonly in elderly patients, particularly women, and is associated with a morbidity and mortality rate of around 7–30% due to delayed diagnosis [7]. The percentage of patients with a known history of cholelithiasis ranges from 25 to 72% but only 0.3% to 1.5% of patients with cholelithiasis will develop gallstone ileus [7]. The diagnosis of gallstone ileus can be challenging due to the nonspecific nature of symptoms and the rarity of the condition. Patients usually present with acute, intermittent or chronic obstructive symptoms, including nausea, vomiting, vague abdominal pain, and distension. These symptoms may be preceded by a history of biliary symptoms, and acute cholecystitis is present in 10%–30% of the patients at the time of bowel obstruction [4].

Radiologists play a key role in the diagnosis of gallbladder ileus. Abdominal x-ray and ultrasound are usually the first-line imaging techniques while abdominal CT represents the gold standard for diagnosis. At abdominal x-ray the most prominent finding is the presence of multiple loops of dilated small bowel; it may be associated with pneumobilia and an ectopic radiopaque stone which causes the obstruction. This triad of radiological findings, known as Rigler's triad, is pathognomonic for gallbladder ileus but is present in only 14–53% of cases [8]. Ultrasound may show the signs of Rigler's triad, but it is usually technically difficult due to patient discomfort and gaseous distension of the bowel [8]. The combination of ultrasound after abdominal plain x-ray may achieve a sensitivity of about 74% for diagnosing gallbladder ileus [9].

Abdominal CT for gallstone ileus has an overall sensitivity, specificity and accuracy of 93%, 100% and 99%, respectively, in patients presenting with acute small bowel obstruction [10]. It is usually performed with intravenous contrast medium; however, non-contrast CT is an alternative option for identifying the ectopic gallstone in patients who have renal impairment or risk of contrast allergy [11]. Yu, et al. [10] described as diagnostic CT criteria for gallstone ileus the presence of small bowel occlusion, an ectopic gallstone and an abnormal gallbladder with complete air collection or air-fluid level or fluid accumulation with irregular wall. In this

report, we present a case of gallstone ileus in an elderly male patient, highlighting the radiological findings in two CTs performed few days before and immediately after small bowel obstruction.

Case Presentation

A 74-year-old male presented to the emergency department with a four-day history of right upper abdominal pain and nausea. In the preceding months he had experienced some episodes of colicky biliary pain controlled by painkillers. The patient had a history of cholelithiasis, hypertension, diabetes and dyslipidemia. His vital signs were stable. At physical examination he had abdominal tenderness with a negative Blumberg's sign. Laboratory data revealed leukocytosis (white blood count = 15000) and elevated C reactive protein; liver function tests were unremarkable. Abdominal ultrasound revealed the presence of diffuse wall thickening of gallbladder, suggesting cholecystitis, with a 3 cm stone abutting in the duodenum. Abdominal CT was requested to confirm and further investigate this finding.

The CT was performed using a 64-channel scanner and included a non-contrast-enhanced scan and a contrast-enhanced scan beginning 75 seconds after the initiation of contrast material intravenous injection. Images were acquired with 0.625 mm collimation, a pitch of 1, 120 kVp, and reconstruction slice thickness and slice interval of 2.5 mm. CT showed the gallstone abutting on the second portion of duodenum (Figure 1). Conservative management was started; however, four days later the patient presented with acute abdominal pain and distension, vomiting and absence of flatus. Small bowel occlusion was suspected and a new abdominal CT with the same technical protocol was performed. Contrast-enhanced CT evidenced that the 3 cm gallstone was passed in the intestinal tract causing small bowel occlusion (Figure 2A & 2B). Additional CT findings were a punctiform air bubble in the lumen of gallbladder (Figure 3A) and a small amount of air that appeared to surround the gallbladder (Figure 3B & 3C). Air was not evidenced in the intrahepatic and extrahepatic bile ducts and there were no signs of bowel ischemia. The patient was transferred to the operating room where enterotomy and removal of the obstructing gallstone were performed.

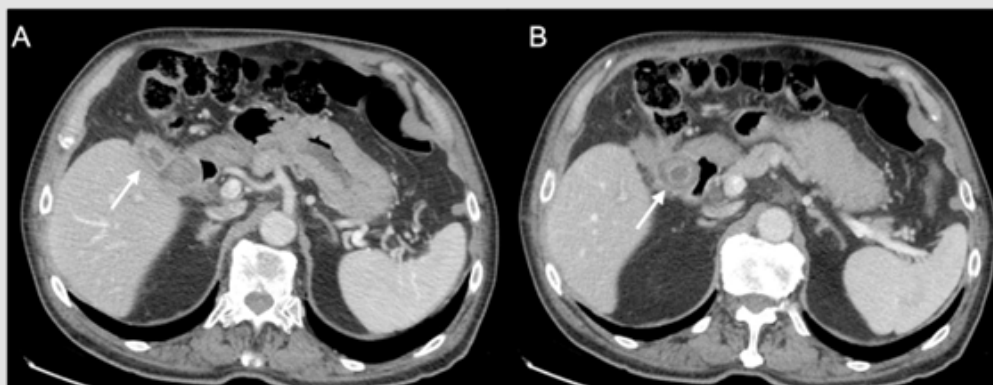


Figure 1: Contrast-enhanced CT scan demonstrates the presence of thickening of gallbladder wall (Figure 1A, arrow) and the presence of a 3 cm gallstone abutting on the second portion of duodenum (Figure 1B, arrow).

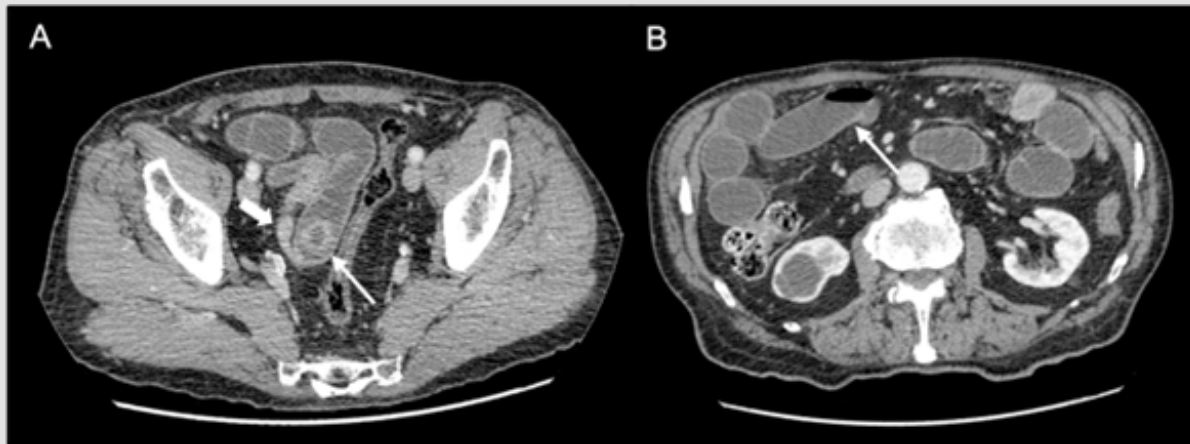


Figure 2: Contrast-enhanced CT shows a stone in the ileum (Fig. 2A, thin arrow) with collapsed small bowel loops distal to the stone (Figure 2A, thick arrow). The small bowel loops proximal to the stone are dilated with some air-fluid levels (Figure 2B, thin arrow).

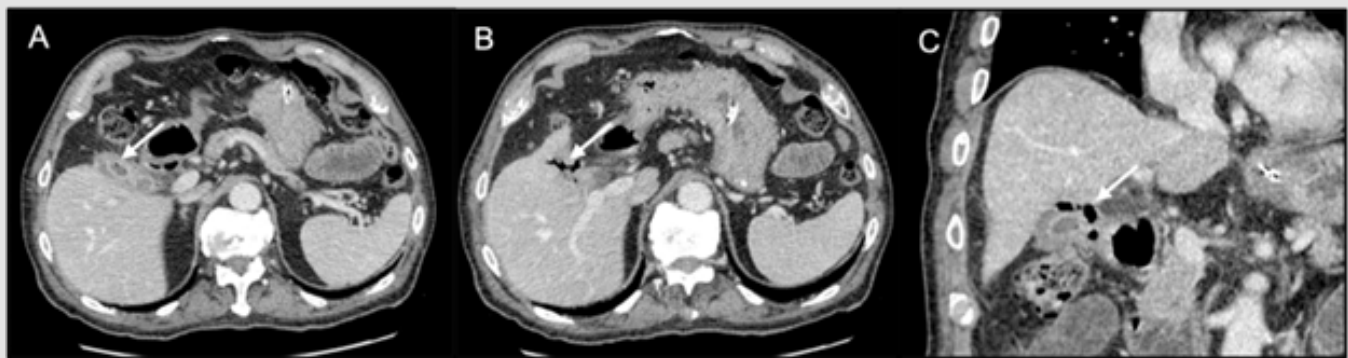


Figure 3: axial contrast-enhanced CT image shows a punctiform air bubble in the lumen of the gallbladder (arrow). B: axial contrast-enhanced CT image demonstrates air surrounding the gallbladder (arrow). C: coronal CT reconstruction shows the presence of air surrounding the gallbladder (arrow).

Discussion

Gallstone ileus is a rare complication of cholelithiasis that occurs in 1-4% of all cases of small bowel obstruction [12]. Timely recognition and intervention are crucial for improving patient outcomes. CT is the method of choice for diagnosis. It provides exquisite anatomical detail and can exactly establish the size and the location of the ectopic stone and demonstrate other findings including abnormal fistulous connections, gallbladder anatomy and any additional stones in the bowel, important to report so that the surgeon can look for them during the intervention [13]. A potential pitfall in the diagnosis of gallstone ileus is represented by stones characterized by isoattenuation relative to bile/fluid at CT [10,14]. Moreover, CT may help identifying signs of bowel ischemia including bowel wall thickening, mesenteric edema and/or fluid in the adjacent mesentery or peritoneal space, abnormal decreased bowel wall enhancement, and pneumatosis with

or without associated gas in mesenteric or portal veins [15]. CT has a high accuracy in detecting pneumobilia, a finding that is present in a significant percentage of patients with gallbladder ileus and is caused by the passage of air through the bilioenteric fistula. In our case only a punctiform air bubble was present in the gallbladder. Gas in gallbladder is a finding that may be also evidenced in other clinical conditions, in particular in case of ERCP-sphincterotomy, gas in gallstones and emphysematous cholecystitis [16]. Moreover, in our case report, we found the uncommon presence of very small amount of air surrounding the gallbladder; this was evidenced in the second CT, performed soon after the passage of the stone from the gallbladder into the intestinal tract. Finally, the aspect that makes our case report very rare is the fact that we documented radiological findings of gallstone ileus few days before and immediately after the intestinal obstruction. We found only one case report describing similar findings in Literature [17].

Conflict of Interest

The authors declare that they have no conflict of interest.

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