Title

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Journal

Radiology Case Reports, 18(5)

ISSN

1930-0433

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Publication Date

2023-05-01

DOI

10.1016/j.radcr.2023.02.031

Peer reviewed

Radiology Case Reports 18 (2023) 1993–1996

Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.elsevier.com/locate/radcr

Case Report

Bezoar in a periampullary duodenal diverticulum causing pancreaticobiliary obstruction and ascending cholangitis ☆,☆☆

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ARTICLE INFO

Article history:
Received 7 January 2023
Revised 13 February 2023
Accepted 15 February 2023

Keywords:
Bezoar
Periampullary duodenal diverticulum
Pancreaticobiliary obstruction
Ascending cholangitis

ABSTRACT

Ascending cholangitis is a clinical syndrome characterized by fever, jaundice, and abdominal pain. It is caused by stasis and infection in the biliary tract with severity ranging from mild to life threatening. The most frequent causes of biliary obstruction and ascending cholangitis are choledocholithiasis, benign biliary stricture, and obstructing malignancy. In this report, we describe a rare case of a large periampullary duodenal diverticulum impacted with a food bezoar, causing pancreaticobiliary obstruction and ascending cholangitis.

Case report

A 98-year-old Asian female patient with history of type 2 diabetes presented to the emergency department with low-grade fever, hypotension, tachycardia, mild jaundice, and vague right upper quadrant abdominal pain. The patient's vital signs were suggestive of sepsis: temperature of 100.8°F, heart rate of 105 bpm, blood pressure of 83/39 mm Hg, and respiratory rate of 21. The patient's laboratory values revealed sepsis due to acute ascending cholangitis with elevated liver function tests, WBC, and procalcitonin, which is a sign of bacterial infection: total bilirubin of 3.6 mg/dL, alkaline phosphatase of 976 IU/L, ALT of 135 IU/L, AST of 168 IU/L, WBC of 40 × 103 /L, procalcitonin (PTC) of 16.4 ng/mL, and lactic acid of 1.8 mmol/L. The patient's physical examination was unremarkable with a nontender and nondistended abdomen. The patient was placed on broad-spectrum intravenous (IV) antibiotics and vasopressors to raise her blood pressure. Her blood cultures grew *Escherichia coli* after 3 days [1].

☆ Acknowledgments: No funding was received for this work.
☆☆ Competing Interests: We wish to confirm that there are no known conflicts of interest associated with this publication and there has been no significant financial support for this work that could have influenced its outcome.
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https://doi.org/10.1016/j.radcr.2023.02.031

Fig. 1 – Duodenal diverticular bezoar. Coronal CT image with IV contrast demonstrating a 5.2 x 6.1 cm duodenal diverticulum containing a bezoar (yellow arrow), at the junction of the second and third portions of the duodenum, causing biliary obstruction with a dilated common bile duct (CBD) (red arrow). The bezoar (yellow arrow) appears as a smooth round mottled mass with diffuse bubbles of air trapped in the interstices of the bezoar.

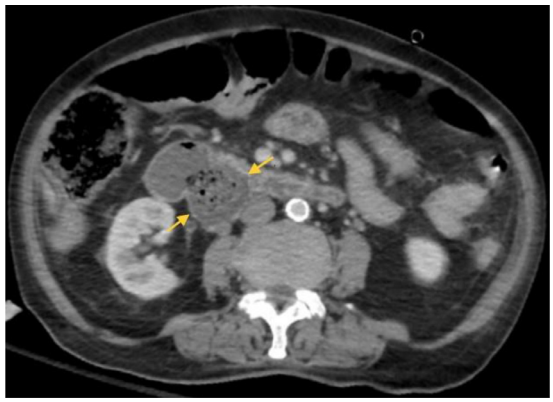

Fig. 2 – Duodenal diverticular bezoar. Axial CT image with IV contrast demonstrates the duodenal diverticulum containing a round mottled mass, which has bubbles of trapped air, representing the bezoar (yellow arrows).

Computed tomography (CT) scan of the abdomen and pelvis with IV contrast demonstrated a distended gallbladder with gallbladder wall thickening and pericholecystic fluid, intrahepatic biliary ductal dilation, a dilated common bile duct (CBD) measuring 18 mm, a dilated pancreatic duct measuring 5 mm, and a large duodenal diverticulum (Figs. 1 and 2).

Fig. 3 – Gallbladder ultrasound demonstrates minimal dependent sludge without calculi. There is distention of the gallbladder with marked gallbladder wall thickening and minimal pericholecystic fluid. During scanning, there was negative sonographic Murphy sign.

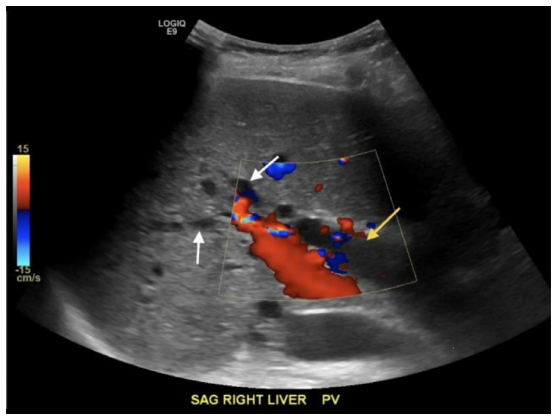

Fig. 4 – Ultrasound at the level of the portal vein with color doppler demonstrates a patent main portal vein and a markedly dilated common bile duct (CBD) (yellow arrow), measuring 18 mm, and dilated intrahepatic biliary ducts (white arrows).

No calcified gallstones or pancreatic head mass were seen. The duodenum diverticulum was mentioned in the body of the radiology report. However, the bezoar in the duodenal diverticulum was not detected by the interpreting radiologist, and it was not reported. An abdominal ultrasound was performed and demonstrated gallbladder sludge without evidence for cholelithiasis, gallbladder wall thickening measuring 8 mm, and trace pericholecystic fluid (Fig. 3). The patient did not have a positive sonographic Murphy sign [2]. There was dilatation of the intrahepatic ducts, CBD, and pancreatic duct (Fig. 4). No pancreatic mass was detected by ultrasound. Given the sonographic findings and the clinical presentation of sepsis, the general surgeon suspected acalculous cholecystitis and recommended cholecystectomy. Magnetic resonance cholangiopancreatography (MRCP) performed the following day demonstrated similar findings found on CT

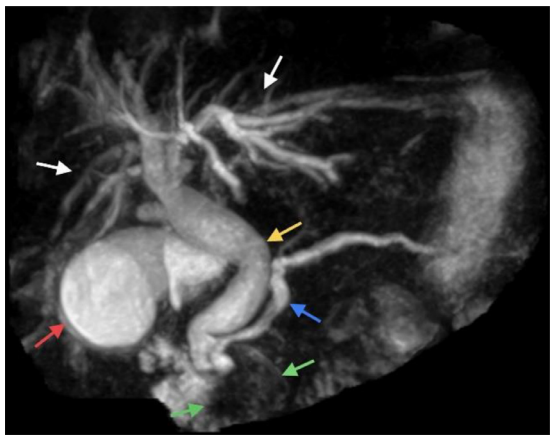

Fig. 5 – Magnetic resonance cholangiopancreatography (MRCP) demonstrates dilated common bile duct (CBD) (yellow arrow), intrahepatic ducts (white arrows), and pancreatic duct (blue arrow). The gallbladder (red arrow) was also distended. There was no evidence of cholelithiasis, choledocholithiasis, or ampullary cancer. The duodenal diverticulum was filled with low signal intensity mass, representing the bezoar (green arrows), which can be better seen on CT.

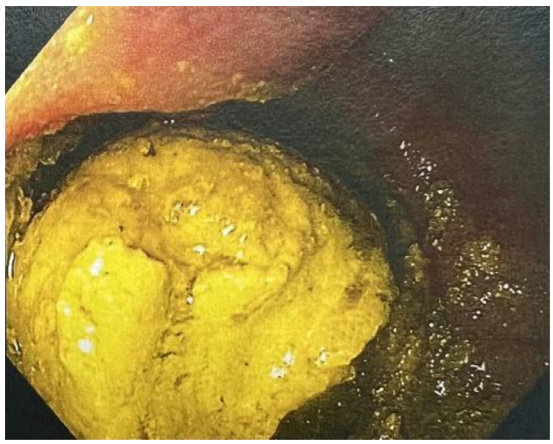

Fig. 6 – Endoscopic retrograde cholangiopancreatography (ERCP) demonstrates a large periampullary diverticulum impacted with a large bezoar.

and ultrasound. There was no evidence of choledocholithiasis, cholelithiasis, or pancreatic head mass by MR imaging. The bezoar in the duodenal diverticulum was difficult to detect on MRCP due to lack of intrinsic fluid in the bezoar (Fig. 5).

The patient underwent endoscopic retrograde cholangiopancreatography (ERCP) to exclude missed choledocholithiasis or a small ampullary cancer causing pancreaticobiliary obstruction. During ERCP, there was no evidence of biliary calculi or obstructing ampullary cancer. However, the endoscopist was surprised to find an impacted food bezoar in a large periampullary duodenal diverticulum (Fig. 6). The major papilla and ampulla were located entirely within the wide-necked duodenal diverticulum. It took the endoscopist 45 minutes to fragment and disimpact the bezoar from the duodenal diverticulum using alligator forceps and a Roth Net retriever. The endoscopist then performed biliary sphincterotomy and placed a covered metal biliary stent, resulting in immediate biliary drainage. The patient fully recovered after her biliary drainage procedure without the need for the proposed cholecystectomy.

Discussion

The most common causes of biliary obstruction in patients with acute cholangitis are choledocholithiasis (28%-70%), benign biliary stricture (5%-28%), and malignancy (10%-57%). Benign biliary strictures can be congenital, postinfectious (eg, AIDS cholangiopathy), or inflammatory (eg, primary sclerosing cholangitis). Malignancy causing biliary obstruction can be due to tumor of the pancreas, ampulla, bile ducts, gallbladder, or duodenum. Less common causes of acute cholangitis include complications of ERCP, surgical injuries to the CBD, acute pancreatitis, blood clots, parasitic infections (mainly liver flukes and the roundworm Ascaris), and duodenal diverticula [3].

Duodenal diverticula are common with an incidence of 5%-22% in the population. Most duodenal diverticula are acquired with false lumens. They are bulging pouchlike herniations of the duodenal wall consisting of mucosa, submucosa, and serosa, without a tunica muscularis [4]. These diverticula typically arise at weak points of the bowel wall, such as entry sites of the common bile duct, pancreatic duct, or perivascular connective tissue sheath. Most of the duodenal diverticula are incidental findings, which remain asymptomatic throughout a patient's life, and they are under-reported on imaging. An uncomplicated duodenal diverticulum typically requires no treatment or follow-up [5]. Complications, however, can rarely arise from duodenal diverticula, including perforation, acute duodenal diverticulitis, upper gastrointestinal tract (GI) obstruction, and pancreaticobiliary duct obstruction. Complicated duodenal diverticula often require surgical or medical interventions [6].

A bezoar is a collection of ingested material which is incompletely digested and remains within the GI tract. Bezoars can be composed of vegetable matter (phytobezoars), hair (trichobezoars), concentrated milk formulas (lactobezoars), mixed medication bezoars, food bolus bezoars, or other unusual materials [7]. Bezoars mostly occur in the stomach and are usually related to previous gastric surgeries, such as vagotomy or partial gastrectomy, which reduce gastric motor activity and delay gastric emptying. Bezoars also can be caused by gastroparesis due to diabetes or hypothyroidism, poor mastication, or ingestion of indigestible materials. Although rare with only a handful of case reports identified in the literature, bezoars can occur in duodenal diverticula [8,9,10]. Bezoars often appear as ovoid or round intraluminal masses on CT with a mottled appearance due to trapped bubbles of gas. The air bubbles are distributed diffusely throughout a bezoar, trapped in the interstices of the mass [11]. An uncomplicated diverticulum normally does not contain a bezoar. Instead, an uncomplicated diverticulum is typically filled with fluid, air, or both,

resulting in an air-fluid level. Bezoars are more difficult to detect on MR imaging due to the lack of intrinsic fluid.

Treatment of bezoars may include gastric lavage, enzymatic dissolution, endoscopic fragmentation, and surgery [12]. A periampullary diverticulum contains or is adjacent to the ampulla of Vater, which is formed by the union of the pancreatic duct and the CBD. Thus, a bezoar in a periampullary diverticulum can cause mechanical obstruction of both the CBD and the pancreatic duct as in our case report, resulting in pancreaticobiliary obstruction and ascending cholangitis. Primary treatment of periampullary diverticula impacted with bezoars is endoscopy. Depending on the size of the bezoar, endoscopic fragmentation and disimpaction can fail, requiring surgical intervention [13].

Conclusion

Periampullary duodenal diverticulum impacted with food bezoar is a rare cause of pancreaticobiliary obstruction and ascending cholangitis. It is important for the radiologist to recognize the appearance of bezoars in duodenal diverticula, which may alter treatment plan. Identification of a bezoar may open the door for endoscopic treatment as occurred in our case.

Patient consent

Patient consent was obtained and can be provided as needed.

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