Computed Tomography Findings of Small Bowel Obstruction due to Bezoar Impaction: A Case Series

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Abstract

Background: This study presents computed tomography (CT) findings of small bowel obstruction due to bezoar impaction.

Methods: CT scans of four patients (two males and two females with an age range of 49 to 86 years) diagnosed with small bowel obstruction due to bezoars were reviewed.

Results: In this patient series, two diospyrobezoars and two bezoars were detected. Typical bezoar findings demonstrated an intraluminal ovoid or round mottled-appearing mass with soft-tissue density containing air in its interstices. Diospyrobezoars were intraluminal calcified masses with or without a typical mottled gas pattern in the jejunum.

Conclusion: Multiple-slice CT effectively aids the diagnosis of small bowel obstruction due to bezoar impaction before surgery.

Keywords: Bezoar; Intestinal obstruction; Computed tomography

Introduction

Intestinal obstruction is one of the most perplexing clinical situations encountered by a surgeon in the emergency room. Computed tomography (CT) has become the most useful and powerful tool in diagnosing intestinal obstructions. CT was reported to yield sensitivities of 81% to 96%, with up to 96% specificity and 95% accuracy for the diagnosis of small bowel obstruction (SBO) [1]. The most common cause of SBO is adhesions. Bezoars are by far one of the most uncommon causes. Bezoars are not commonly diagnosed preoperatively unless calcified. In this study, we describe non-enhanced CT findings of intestinal obstruction secondary to bezoars.

Materials and Methods

Between March 2011 and November 2011, CT scans of four patients (two males and two females with an age range of 49 to 86 years) diagnosed with SBO due to bezoars were reviewed. All patients underwent non-enhanced CT without an oral contrast agent because contrast-enhanced CT was not routinely preformed in our hospital. All the CT scans were obtained using 64-slice MDCT scanners. The scanning parameters were as follows: contiguous 2.5 mm collimation, 12.5 mm/0.5-second table speed per 360° gantry rotation with a resultant pitch value of 1.25, and 5.0 mm thick slices secondarily reconstructed at 1.0 mm intervals (Aquilion 64, Toshiba, Japan), or 0.625 mm detector collimation, 2.0 mm slice thickness, and 1.0 mm reconstruction intervals (Brilliance 64, Philips, Netherlands). All CT scans of each patient were analyzed by two experienced abdominal radiologists on the picture archiving and communication system (PACS) workstation (Neusoft PACS, China).

Results

Clinical, demographic, and non-enhanced CT findings of the four patients are presented in the subsequent sections.

Case 1

A 62-year-old male presented with a week of abdominal pain and distention. CT of the abdomen showed distended small bowel loops with air-fluid levels. At the transition zone of the ileum, a mottled intraluminal mass (3.1 cm×2.8 cm×4.5 cm) was found with soft-tissue density containing air bubbles in its interstices (Figure 1). The bowel wall was thickened at the obstructed site. Ascites were also detected. Considering the possibility of bezoar formation with underlying bowel carcinoma, conventional laparotomy was implemented. The thickened ileal wall was finally identified as an oppressive edema caused by bezoar impaction.

Case 2

An 86-year-old male was admitted with 3 days of right lower...
abdominal pain, which was suspected to be acute appendicitis. CT showed typical signs of SBO and an intraluminal mottled-appearing mass (2.8 cm×3.1 cm×3.6 cm) with soft-tissue density in the terminal ileum (Figure 2). The appendix was normal. Bezoar without any underlying intestinal disease was confirmed through conventional laparotomy.

**Case 3**

A 72-year-old female was admitted for upper abdominal pain, nausea, and vomiting after consuming persimmon cake 17 days earlier. Plain film of abdomen showed ring-like calcified mass in the left upper quadrant. CT showed an ovoid, hyperdense calcified lesion (2.2 cm×2.6 cm×3.3 cm) in the jejunum lumen (Figure 3). The patient had a history of laparoscopic cholecystectomy 24 years ago. Neither gastric bezoar nor biliary stone was detected via CT and ultrasound. Given that the sign of intestinal obstruction was not obvious, she was initially treated conservatively with IV fluids and without oral intake or nasogastric tube suction. However, the abdominal pain became more severe, and the conventional treatment was rendered ineffective 10 days later. The pre-surgical X-ray film of abdomen showed the calcified mass in the right pelvis. Finally, the patient was subjected to laparoscopy. A hard mass was palpated intraoperatively in the terminal ileum, with the bowel dilated proximally. The entire small bowel was carefully inspected. No diverticula were identified, and the gallbladder ileus was excluded. The cause of the SBO was verified as a calcified diospyrobezoar.

**Case 4**

A 49-year old female suffered from upper abdominal pain, nausea, and vomiting for 8 days. She had taken in persimmon cake on an empty stomach before symptoms occurred. An ineffective conventional treatment was performed for 5 days in another hospital before she was transferred to our hospital for surgery. A large, well-defined calcified mass (2.9 cm×3.2 cm×4.2 cm) with a mottled gas pattern accompanied by a significant dilation of the proximal jejunum, was detected in the jejunum through preoperative CT (Figure 4). No gastric bezoar was found. The diagnosis of a calcified diospyrobezoar was made after laparotomy, given the absence of findings for gallstone ileus and the composition of the stone. In addition, no diverticula were identified.

**Discussion**

SBO is a common cause of abdominal pain. The clinical signs and symptoms of SBO are not always diagnostic. Identifying the cause of obstruction is important for early management. The multiplanar reformatted imaging feature of CT may help accurately characterize the presence, site, degree, cause, and associated complications of obstruction [2]. SBO is diagnosed when abdominal CT scans show distended small bowel loops with air-fluid levels proximal to collapsed loops. Determining the cause of SBO is facilitated by locating the transition zone.

Bezoars have four types, of which phytobezoars are the most common. Phytobezoars are composed of vegetable matter such as celery, pumpkin, grape skin, prune, and persimmon, as well as nondigestible fibers such as cellulose, hemicellulose, lignin, and fruit tannins. Phytobezoars usually begin in the stomach and then migrate to the bowel, where they cause intestinal obstruction [3]. The jejunum and distal ileum are the two common sites of SBO secondary to bezoar impaction. If the diagnosis is delayed, bezoars can provoke pressure ulcer and necrosis, perforation, and even strangulation. Therefore, the early diagnosis of bezoars is important.

We present four cases of SBO secondary to bezoar impaction diagnosed via CT and confirmed through surgery. Similar to previous reports [4-7], the bezoars determined in the present study were typically intraluminal ovoid or round mottled-appearing masses with soft-tissue density and air in their interstices. These typical CT findings were observed in three patients in the present series. The mottled gas pattern detected may be similar to the “small bowel feces” described in patients with or without SBO [8-10]. Several differences can be identified between small bowel bezoars and small bowel feces on CT scans. Small bowel feces appear more amorphous than defined and affect longer segments without an encapsulating wall [4]. By contrast, small bowel bezoars are well-defined, focal, ovoid, intraluminal masses with mottled gas patterns at the obstruction site [4,5,11]. Moreover, small bowel bezoars are typically found at the transition zone between dilated and collapsed small bowel loops, whereas small bowel feces appear to be in dilated small bowel loops [12].

A diospyrobezoar is a phytobezoar formed from persimmons. The diospyrobezoar in case 3 appeared as intraluminal calcified mass without typical mottled gas patterns, resembling a stone in the
jejenum. SBO resulting from stone impaction is very rare, with most cases caused by a gallstone ileus [13], or by an enterolith formed in a small bowel diverticulum [14,15]. To our knowledge, few cases of primary enteroliths causing SBO have been reported [16]. The patients in case 3 and 4 both had persimmon cake intake before the occurrence of SBO symptoms. The biliary system was unremarkable through ultrasound or CT and during surgery. This finding further proves that case 3 is primary diospyrobezoar. The cases presented in the current study were unique because of the absence of gastric bezoars and small bowel diverticula.

In conclusion, CT enables radiologists to determine the point of obstruction and to reveal the bezoar as the underlying cause of obstruction by analyzing the transition zone in SBO. The typical CT image of a bezoar causing SBO is a mottled intraluminal mass with soft-tissue density and air bubbles in its interstices located at the site of the obstruction. Diospyrobezoar also appears as intraluminal calcified mass without typical mottled gas patterns.

References