Small bowel obstructions secondary to bezoars

Bezoarın neden olduğu ince bağırsak obstrüksiyonları

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BACKGROUND
We aimed to present our experience on computed tomography (CT) findings of small bowel obstruction due to bezoar impaction.

METHODS
CT scans of seven patients (3 males, 4 females, age range; 30-93 years) who were diagnosed as small bowel obstruction due to bezoars were reviewed.

RESULTS
In each patient, an intraluminal mass with a mottled gas pattern on CT enabled specific preoperative diagnosis of bezoars, and postoperative changes such as anastomotic lines and afferent-efferent loops.

CONCLUSION
CT imaging is useful in making the diagnosis of bezoar associated with small bowel obstruction, and greatly helps assessing the detailed abdominal anatomy.

Key Words: Bezoars/etiology/radiography; computed tomography; ileal diseases/radiography; small bowel obstruction/etiology/radiography.

AMAÇ
Bezoar nedeniyle oluşan ince bağırsak tıkanmalarının tanısında bilgisayarlı tomografi (BT) tekniklerini ve görüntüleme bulgularımızı sunmayı amaçladık.

GEREÇ VE YÖNTEM
Bu çalışmada bezoarların neden olduğu ince bağırsak tıkanması bulunan 7 olgunun (3 erkek, 4 kadın, yaş aralığı; 30-93) BT görüntüleri değerlendirmeye alındı.

BULGULAR
Tüm olgularda, bezoarın BT'de preoperatif tanınmasına yardımcı olan en belirgin özelliği bağırsak lümeni içinde, içerisinde hava kabarcıkları bulunan kitle lezyonu gözlemlendi. Ayrıca anastomoz hattı, affarent ve efferent segmentler gibi ameliyat sonrası değişiklikler de BT ile belirlenebildi.

SONUÇ
İnce bağırsak tıkanmasına yol açan bezoarlara tanı koyabilmesi ve detaylı abdominal anatomik bilgi sunması nedeniyle BT görüntüleme yararlıdır.

Anahtar Sözcükler: Bezoar/etyoloji/radyografi; bilgisayarlı tomografi; ileal hastalıklar/radyografi; ince bağırsak tıkanması/etyoloji /radyografi.

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Intestinal obstruction remains a diagnostic and therapeutic dilemma.[1] Many controversies surround the diagnosis and management of small bowel obstruction (SBO), an entity that clinically mimics many other acute abdominal disorders.[1] Radiology plays an important role in the clinical decision-making of patients with suspected or known SBO because it can answer specific questions that may have a major impact on surgical management. These questions include: Is the small bowel definitely obstructed? What are the level, cause, and severity of obstruction? Is strangulation likely to be present? Should treatment be operative or non-operative? In this article, we determined the role of contrast-enhanced axial computed tomography (CT) and three-dimensional reconstructed images in the diagnosis and treatment of SBO due to bezoars.

The most common causes of SBO are intussusception, volvulus around an associated fibrous or omphalomesenteric band, adhesions from an inflammatory process, or incarceration within a hernia sac. Primary small bowel bezoar is rarely a cause of acute SBO and it is not commonly diagnosed preoperatively.[2-4] Bezoars are concretions of poorly digested fruit and vegetables fibers, and fruit seeds, which begin as gastric phytobezoars and then migrate to the small bowel, where they cause SBO.

Small bowel obstruction due to phytobezoar is usually treated surgically and whenever possible the concretion must be fragmented and milked to the cecum. A more conservative approach, such as enzymatic dissolution or endoscopic fragmentation is, however, ideal for treating gastric phytobezoar.[2]

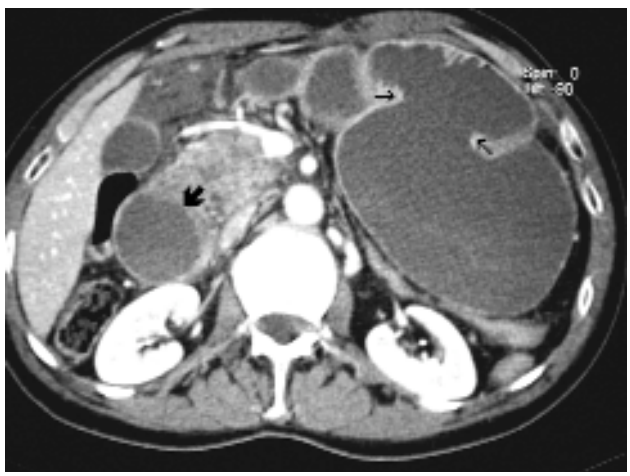

Fig. 1. 58 year-old woman who underwent a Billroth II operation. Axial curved planar reformatted CT image shows distention of residual stomach and anastomosis line (thin arrows) and efferent loop (thick arrow) as postoperative changes.

However, SBO can also be caused by primary bezoars formed in the small intestine in association with underlying small bowel or gastric disorders, such as diverticulum, stricture, tumor, gastric surgery, or truncal vagotomy. Other predisposing factors include poor mastication, autonomic neuropathy, and a high-fiber diet. The aim of this study was to present our observations on CT technique and imaging findings of SBO secondary to bezoar, and review the literature.

MATERIALS AND METHODS

Between November 2003 and October 2005, CT scans of seven patients (3 males and 4 females, age range; 30-93 years) with a diagnosis of SBO due to bezoars were reviewed. Two patients refused to take oral contrast agent. In the remaining five patients oral contrast agent was administered via nasogastric tube. All the CT scans were obtained using a four-channel MDCT scanner (Sensation 4; Siemens, Erlangen, Germany). The portal phase images were acquired 60 seconds after a 120-150 mL intravenous bolus of non-ionic contrast material (iohexol, 300 mg/mL; Omnipaque™, Amersham, Cork, Ireland). The scanning parameters were 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, 5 mm thick slices secondarily reconstructed at 1 mm intervals. All CT scans of each patient were analyzed by two experienced abdominal radiologists (Volume Wizard; Siemens Medical Systems) using post processing (three-dimensional reconstructions).

RESULTS

Clinical, demographic and CT findings of seven patients are summarized in Table 1. The reconstructed CT findings of two patients, who previously underwent abdominal surgery (case 2 and 3) show surgical differences including afferent-efferent loops and anastomosis line (Fig. 1). In each patient, preoperative diagnosis of the level and cause of intestinal obstruction was accurate and it was later confirmed surgically (Figs. 2, 3).

Table 1. Clinical, demographic and CT findings of 7 patients with SBO due to bezoar

Clinical and demographic features						CT findings			
No	Sex/Age	Clinical symptoms	Location	Previous operation	Additional pathology	Distended intestinal loops	Intraluminal masses with gas bubbles	Thickened SB wall	Oral contrast
1	M/70	Abdominal pain, nausea, vomiting	Jejunal	No	No	+	+	+	–
2	F/58	Abdominal pain, nausea, vomiting	Jejunal	Vagotomy, gastric surgery	No	+	+	–	+
3	M/59	Abdominal pain, vomiting	Jejunal and gastric	Vagotomy, gastric surgery	Band	+	+	–	+
4	F/93	Abdominal pain, vomiting	Ileal	Colon tumor	Band	+	+	–	–
5	F/72	Abdominal pain, nausea, vomiting	Jejunal	No	No	+	+	–	+
6	F/64	A bdominal pain	Jejunal and gastric	Gastric surgery	No	+	+	–	+
7	M/30	Abdominal pain, nausea, vomiting	Jejunal	Gastric surgery	No	+	+	–	+

SB: Small bowel; SBO: Small bowel obstruction.

Contrast-enhanced CT of the abdomen showed distended small bowel loops with air-fluid levels, seen proximal to collapsed loops. In each patient, an intraluminal mass with a mottled gas pattern on CT enabled specific preoperative diagnosis of bezoars. Bezoars appeared as an ovoid mass in three patients, a round mass in another three patients, and a tubular mass in the remaining patient. In two patients there were multiple bezoars in both of the stomach and jejunum. The bowel wall of a patient who did not have underlying small bowel disease was thickened at the obstructed site (Fig. 4).

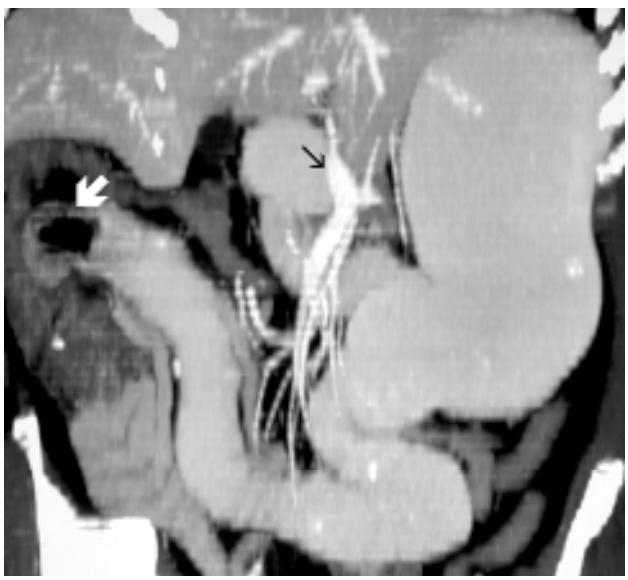

Fig. 2. 59 year-old man presenting with abdominal pain and vomiting. Three dimensional CT coronal volume rendering image shows level of the bezoars (arrows). No oral contrast agent reached into the small bowel distal to the bezoar (arrowhead: superior mesenteric artery).

Fig. 3. 72 year-old woman presenting with ileus, coronal curved planar reformatted CT shows afferent (thin arrow) loop as postoperative changes. Thick arrows show bezoars at residual stomach and proximal jejunum.

Fig. 4. 70 year-old man presenting with abdominal pain, nausea, and vomiting, contrast-enhanced axial CT image shows an ovoid mass containing mottled gas at distal ileum. White arrowheads show diffuse concentric bowel wall thickening at obstructed site.

At laparotomy, palpated bezoars were fragmented manually in six patients and the pieces were milked into the cecum by surgeons; in the remaining patient, the bezoars were fragmented and removed endoscopically. Enterotomy and extraction of bezoars is not recommended because enterotomy is associated with additional complications.[5]

DISCUSSION

The CT diagnosis of SBO has yielded sensitivities of 81-96%, with up to 96% specificity and 95% accuracy.[1] The CT diagnosis of SBO is based on the finding of small bowel dilatation (caliber >2, 5 cm) above a transition point that between distended and collapsed bowels. The typical bezoar findings are an intraluminal ovoid or round mottled-appearing mass with soft-tissue density, containing air in its interstices, and outlined by fluid or oral contrast material in the dilated small bowel at the site of obstruction.[2-5] These typical CT findings were present in all patients of this present series.

The truncal vagotomy and gastric resection performed for the treatment of gastric and duodenal peptic ulcers may lead to the formation of some bezoars.[2-5] Similarly, three patients from the present study underwent vagotomy and gastric resection. Various other anomalies result in a predisposition to bezoar formation in the small intestine. These include Meckel diverticulum adhesions, and congenital bands.[3-9] Correspondingly, two patients had adhesive bands postoperatively.

Small bowel bezoars are often found in association with gastric bezoars. Two patients also had jejunal and gastric bezoars. Nevertheless, primary small bowel bezoars are very rare and present with intestinal obstructions.[2-12] In current study, five patients had primary small bowel bezoars.

The radiology literature includes few reports about small bowel bezoars.[1-12] However, CT findings are typical, and CT permits rapid and accurate diagnosis of the cause of the SBO. Three-dimensional CT reconstructions greatly assist in defining the intestinal segments, vascular anatomy, levels of the SBO, and postoperative changes such as anastomotic lines and afferent-efferent loops.

Early diagnosis of phytobezoar is important as it can provoke pressure ulcer and necrosis, perforation, and even strangulation if the diagnosis is delayed. Preoperative identification of the predisposing factors of bezoar formation such as diverticulas, adhesions, postoperative changes or congenital bands may be helpful for management of the treatment. Identifications of these findings become easy using post processing 3D technique.

In conclusion, CT imaging is useful in making the diagnosis and identifying the predisposing factors of bezoar associated with small bowel obstruction, which it is useful in showing postoperative changes.

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