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Single Case

Small Bowel Obstruction Caused by Dried Persimmon

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Keywords

Small bowel obstruction · Dried persimmon · Phytobezoar

Abstract

Dried persimmon is a well-known dried fruit in Asian countries such as Japan, Korea, and China. Small bowel obstruction caused by phytobezoar is a rare but interesting pathogenesis that accounts for 2–4% of all small bowel obstructions. We present the case of an 87-year-old female who suffered from small bowel obstruction caused by ingestion of a huge, dried astringent persimmon. She was initially treated conservatively, but removal by enterotomy was performed after relief failed to be achieved with conservative therapy.

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Introduction

Phytobezoar is one type of bezoar encountered in the gastrointestinal tract, including the stomach and small intestine [1–4]. However, huge phytobezoars are rarely seen clinically because food is usually chewed before swallowing. Most phytobezoars reported in the literature have been 30–50 mm in diameter. Our case represents the second largest phytobezoar reported to date in the English literature. Phytobezoar caused by persimmon is rare [5, 6]. We report successful treatment of a huge phytobezoar caused by a dried persimmon with a diameter of 80 mm.

Case Presentation

An 87-year-old female presented to our hospital complaining of epigastric pain, nausea, and dysorexia. She had a surgical history of enterectomy for small bowel ileus 20 years earlier. On physical examination, vital signs were stable. The abdomen was soft and non-distended with normal bowel sounds, but mild tenderness was identified in the epigastric region. The patient showed markedly poor appetite. Laboratory findings were as follows: white blood cell count, 8,200/ μ L (normal, 5,000–8,000); aspartate aminotransferase, 20 U/L (normal, 5–35); alanine aminotransferase, 13 U/L (normal, 5–30); alkaline phosphatase, 441 U/L (normal, 115–359); gamma-glutamyl transferase, 25 U/mL (normal, 0–50); lactate dehydrogenase, 264 U/L (normal, 106–211); albumin, 4.7 g/dL (normal, 3.7–5.5); total bilirubin, 1.01 g/dL (normal, 0.2–1.0); and C-reactive protein, 0.7 mg/dL (normal, 0–0.3). Almost all laboratory findings were within normal range.

Abdominal computed tomography (CT) revealed a mass-like lesion in the jejunum with a diameter of 80 mm and air bubbles retained in the interstices (Fig. 1). A tumor of the small intestine with necrosis was suspected, but CT made 4 days later revealed that the lesion had moved to another part of the jejunum. Based on a history of having eaten dried persimmon, ileus caused by a phytobezoar comprising dried persimmon was diagnosed.

The patient was hospitalized and treated conservatively, but no improvement of the symptoms was identified. The condition of the patient became more serious. On day 3 after admission, she experienced acute aggravation of epigastric distention and pain, and vomited. Laboratory findings were also further aggravated, with a C-reactive protein level increasing to 4.0 mg/dL (normal, 0–0.3). As no relief had been achieved using conservative therapy, surgical treatment was planned.

Under general anesthesia, laparotomy was performed through a low median incision. The mass was palpable in the dilated small intestine. Enterotomy was performed, and a huge, dark-brown, elliptical bezoar 80 mm in diameter was removed (Fig. 2a). The small intestine was closed using a simple interrupted suture.

The surgically exenterated specimen was identified as a dried persimmon. The cut surface of the specimen resembled the image from CT with empty spaces retained in the interstices (Fig. 2b). The specimen was therefore identified as the swallowed dried persimmon. The patient made satisfactory postoperative progress and was discharged without complications.

Discussion

A phytobezoar is one type of bezoar, a concretion of undigested particles that usually forms in the stomach, and descends through the digestive tract where small bowel obstruction can result [1, 7–9]. Four major types of bezoar have been reported: trichobezoars; pharmacobezoars; lactobezoars; and phytobezoars. A trichobezoar is composed of hair, and is associated with psychiatric disorders such as trichotillomania. A pharmacobezoar usually comprises undigested pills from supplements and/or medications. Lactobezoars are more commonly seen in neonates, resulting from the formation of milk curds in the stomach due to the immaturity of the digestive system. Phytobezoars, as present in this case, are composed of vegetable matter and are the most common cause of bezoars [4, 6, 7, 10]. To the best of our knowledge, this case represents the second largest phytobezoar reported in the English literature and involves the oldest patient.

Phytobezoars typically comprise indigestible cellulose, tannin, and lignin derived from ingested vegetables and fruit [11]. Phytobezoar caused by persimmons have been seen in various countries, with about 50 cases reported in the English literature [5, 6, 12].

Dried persimmon is eaten primarily in Asian countries and is made from *Diospyros kaki*. This fruit is so bitter that it is unsuitable for being eaten raw. By drying the astringent persimmon, the tannins shift from soluble to insoluble, and the bitter taste turns sweet. Phytobezoars due to persimmons are generally attributed to overingestion of dried astringent persimmons. As dried astringent persimmons are rich in soluble tannin, this tannin is susceptible to polymerization of the cellulose, hemicellulose, and protein in the presence of the dilute hydrochloric acid in the stomach, forming the basis of the bezoar [6, 13].

Phytobezoars due to persimmons are commonly associated with previous gastric surgery (such as truncal vagotomy plus pyloroplasty or subtotal gastrectomy plus gastroenterostomy), dental problems, poor mastication, and overconsumption of persimmons [3–5]. Gastric operations may reduce gastric motility and delay gastric emptying. Gastric motility disorder and hypoacidity play an important role in the formation of phytobezoars [5, 14]. Diabetes mellitus and hypothyroidism have also been reported as predisposing factors for phytobezoar formation, as they could delay gastric emptying [6, 15]. Our patient had a history of overconsumption of dried persimmon and was using dentures, which most likely contributed to her maldigestion of the dried persimmon. Depending on the location of the phytobezoar, clinical manifestations vary from no symptoms to acute abdomen [6, 16, 17]. Major complications of phytobezoar have been reported to include intestinal obstruction, gastric perforation, gastric ulcer, and gastritis [13]. Abdominal pain (49–100%), epigastric distress (80%), anorexia, vomiting and nausea (35–78%), and small bowel obstruction (94%) are the main clinical symptoms [4, 16]. In this study, the patient presented with epigastric distress, vomiting, and small bowel obstruction.

As for the radiological findings, about 50–75% of all small bowel obstructions due to phytobezoar can be diagnosed from plain abdominal CT [18]. Phytobezoar is demonstrated by CT as a well-defined round mass with internal gas bubbles outlined in the gastrointestinal tract [17]. Conservative treatment (gastric lavage, endoscopic disruption, etc.) and conventional surgery as well as laparoscopic surgery are the therapeutic options for phytobezoar [5]. However, phytobezoars are often resistant to conservative treatment. Gastric lavage has been reported for the treatment of phytobezoars using NaHCO_3 , which has a mucolytic effect, and penetration of CO_2 bubbles into the surface of bezoars could also allow digestion [19, 20]. Interestingly, successful nasogastric Coca-Cola lavage for gastric phytobezoar has been reported [9, 19–22]. We have tried Coca-Cola lavage in vitro with exenterated specimens, but no dissolution was identified.

In conventional surgery, bezoar removal is commonly achieved by gastrotomy and/or enterotomy. If complicated with small bowel obstruction, gastric perforation, or gastric hemorrhage, patients can be treated by gastric and/or intestinal resection [6]. Our patient showed a huge phytobezoar in the jejunum that was safely extracted by enterotomy. Moreover, a laparoscopic approach may be the treatment of choice when surgery is indicated. In our case, open laparotomy was selected due to the past history of surgery. When suitable expertise is available, laparoscopy is safe and effective in the management of bezoar-induced small bowel obstruction and offers superior postoperative outcomes to the conventional open approach.

In conclusion, phytobezoar due to persimmon is rare. Plain abdominal CT is helpful in the diagnosis of phytobezoar. Treatment can be either conservative or surgical, but surgical treatment is reliable and more rapid than conservative treatment.

Statement of Ethics

The authors have no ethical conflicts to disclose.

Disclosure Statement

The authors have no conflicts of interest to disclose.

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Fig. 1. Computed tomography. The white arrow indicates a mass-like lesion in the jejunum (diameter, 80 mm) with air bubbles retained in the interstices.



Fig. 2. Surgically exenterated specimen. **a** The huge, dark-brown, elliptical bezoar (diameter, 80 mm) after removal. **b** The cut surface of the specimen resembled the image from CT, with empty spaces retained in the interstices.