Closed perforation of the small bowel secondary to a phytobezoar: imaging findings

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Phytobezoars are conglomerates of poorly digested fruit and vegetable fibers that are found in the alimentary tract (1–3). They most often develop in patients who have undergone gastric resection or ulcer surgery. The most frequent clinical manifestation of phytobezoars is complete mechanical small bowel obstruction, frequently occurring in the jejunum or proximal ileum (4). It is known that phytobezoars can cause perforations and peritonitis due to pressure necrosis of the bowel wall (5); however, to the best our knowledge, this type of closed perforation secondary to phytobezoars has not been previously reported in the English language medical literature, which makes our presented case unique. The associated clinical signs and symptoms are non-specific and include abdominal cramping pain, vomiting, nausea, abdominal pain, fever, and an elevated leukocyte count (2, 6). As a result, definitive diagnosis of a small bowel obstruction or perforation caused by a phytobezoar is rarely established on clinical grounds; radiological studies are the mainstay of early diagnosis (2–4).

We present imaging findings of a closed small bowel perforation secondary to a phytobezoar, with a large interloop pouch showing continuity with the small bowel loops. The radiological findings of this type of perforation is not well-documented in the literature.

Case report

A 69-year-old man admitted to our hospital with abdominal pain that had begun 6 days earlier. The patient had undergone a Billroth II partial gastroenterostomy 11 years ago due to a gastric ulcer, refractory to medical treatment. The physical examination revealed left-sided tenderness without rebound pain. Bowel sounds were hypoactive. Laboratory data were unremarkable, except for a slightly elevated leukocyte count. Abdominal ultrasound (US) examination revealed a collection containing air at the left lower quadrant as well as neighboring intraluminal masses suggestive of bezoars. We propose that appropriate CT examination is a very useful imaging modality for evaluating this kind of bowel perforation.

Key words: • intestinal perforation • ultrasonography • computed tomography
During surgical exploration, a phytobezoar, which caused a closed intestinal perforation at the distal jejunal segment and was communicating with a large pouch, as well as an additional smaller phytobezoar located proximally, were observed. The phytobezoars were removed and primary repair was performed. There was no histopathological or surgical evidence of any pathology, such as Crohn’s disease, small bowel tumor, or lymphoma, which might have caused the closed perforation of the bowel wall (7). An enterocutaneous fistula developed following surgery, which responded well to supportive medical therapy.

**Discussion**

Small bowel obstruction due to phytobezoar impaction is an uncommon clinical entity, which has become increasingly recognized since truncal vagotomy associated with drainage or gastric resection was introduced in the treatment of gastroduodenal peptic ulcers. A small bowel perforation secondary to a bezoar, on the other hand,
is less frequently reported in the literature (3–10).

The mechanism by which phytobezoars are formed is through an alteration in gastric emptying due to decreased gastric motility caused by vagotomy and an enlarged gastric outlet caused by pyloroplasty or gastroenterostomy. Other factors predisposing to phytobezoar formation are poor mastication, excessive consumption of food with high fiber content, and diabetic gastroparesis (1–3, 9, 11).

Radiological studies for identifying bezoars include plain abdominal radiography, barium examinations, US, and CT. Plain abdominal radiography may reveal a mottled gas collection and dilated small bowel loops containing air/fluid levels if an obstruction is present. Barium studies are also reported to be useful in the detection of phytobezoars and in the diagnosis of complications. In barium studies, phytobezoars may be detected as an intraluminal filling defect of variable size that does not appear to be fixed to the bowel wall; however, it is difficult to differentiate these filling defects from intraluminal tumors (1, 3). Additionally, barium may interfere with other imaging modalities and may complicate surgery, even leading to peritonitis.

US or CT may be very effective in the preoperative diagnosis of bezoars and related complications. Sonographically, bezoars can be detected as an intraluminal mass with a hyperechoic, arc-like surface and prominent posterior acoustic shadowing. The appearance of bezoars may, however, be confused with other conditions, like gallstones, various calcifying masses, or calcified rim cysts (1, 2, 12). US also has difficulties in revealing multiple bezoars, probably because of the impossibility of exploring the entire course of the bowel loops. Moreover, air-fluid interfaces in obstructed dilated bowel loops or intraperitoneal air may obscure the underlying pathology. In the presented case, an echogenic area with a strong posterior shadowing, which was consistent with a phytobezoar containing gas, was observed. However, the other phytobezoar could not be visualized, probably because the air-fluid interfaces of the collection area obscured the lesion.

CT is reported to be a useful and powerful tool in the detection of small bowel phytobezoars because of its superior resolution. Characteristically, bezoars are observed as intraluminal masses with a mottled appearance, owing to the air retained in the interstices having a mottled pattern. Fluid or orally given contrast agent in the small bowel loop, which is normally devoid of luminal content. Small bowel feces may appear more amorphous and affect longer segments than a bezoar, which appears at the site of obstruction or perforation as a well-defined, focal, ovoid intraluminal mass with a mottled gas pattern (14, 15).

CT may be considered the imaging technique of choice for confirming the diagnosis of bezoars and their complications; however, it may not be sufficient for the evaluation of a closed perforation showing continuity with the small bowel loops. Upper gastrointestinal barium studies may be helpful in demonstrating the relationship of the pouch to the intestinal segments, as in our case. Inadequate appreciation of this clinical condition because of the non-specificity of its symptoms and signs may result in delayed diagnosis; therefore, radiologists must be aware of the radiological appearance of phytobezoars and the associated complications in cases involving previous gastric surgery or suggestive dietary history.

In this report, the radiological findings of an unusual case of a closed perforation with a large pouch, which developed secondary to a phytobezoar and showed continuity with the small bowel, were presented. In conclusion, we think that an appropriate CT examination is a very useful and time-efficient imaging modality for evaluating this kind of complex bowel perforation as it enables immediate and appropriate patient management.

References


