



ORIGINAL RESEARCH PAPER

Radiology

SMALL BOWEL OBSTRUCTION CAUSED BY A SHIITAKE MUSHROOM: A CASE REPORT

KEY WORDS: small bowel obstruction; a shiitake mushroom; CT

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ABSTRACT

A 77-year-old male farmer sustained severe abdominal cramping pain for one hour. Contrast-enhanced multidetector computed tomography (MDCT) showed a 5.2 cm, oval lesion with interior mottled gas and slightly hyperdense component in the small bowel loop causing distension of the proximal small bowel loop. CT diagnosis of a bezoar in the small bowel causing bowel obstruction was made. Exploratory laparotomy disclosed a foreign body of soft texture in the jejunum located at 150 cm from the ligament of Treitz. A whole, undigested shiitake mushroom was noted after incision of the bowel. The patient had an uneventful course during the 9 days of hospitalization. The patient had recalled that he did not have any teeth and did not use dentures during eating, and accidentally swallowed the shiitake mushroom 2 days before the incident occurred.

INTRODUCTION

Small bowel obstruction is a common acute presentation in the emergency department. Small bowel obstruction secondary to bezoar impaction is much less common, with a reported frequency of around 4%, and is rarely diagnosed preoperatively [1-3]. Phytobezoar is a type of bezoar comprising an aggregate of indigestible vegetables or fibers in the gastrointestinal tract [1,2,4,5]. Shiitake mushroom is full of insoluble dietary fiber, uneasy to ingest in an uncut form, soft and slimy and can lead to accidental swallowing, especially in an aged person without teeth [6-8]. Herein, we present a case of small bowel obstruction in an old man without teeth caused by a shiitake mushroom.

Case Report

A 77-year-old male farmer experienced severe abdominal cramping pain for one hour before he was sent to the emergency department. Diffuse abdominal pain was found. On physical examination, diffuse abdominal tenderness was noted without rebound pain. The laboratory examination including the white count was unremarkable. The kidney, ureter, bladder radiograph showed distension of the bowel loop. Contrast-enhanced multidetector computed tomography (MDCT) was performed. A 5.2 cm, oval lesion with interior mottled gas (with attenuation value > -200 Hounsfield units, HU), fat (-50 to -100 HU) and slightly hyperdense component (30 to 40 HU) on the longitudinal section and concentric circle sign on the transverse section was found in the small bowel loop causing distension of the proximal small bowel loop (Fig. 1). CT diagnosis of a bezoar in the small bowel causing bowel obstruction was made. Conservative treatments including nasogastric decompression and intravenous fluid administration were initially carried out. However, the symptoms of the patient did not improve.

The plain abdominal radiograph performed two days later showed worsening of the distension of the small bowel loop with interior air-fluid level, indicating worsening of bowel obstruction. Emergency exploratory laparotomy was carried out, which disclosed a foreign body of soft texture in the jejunum located at 150 cm from the ligament of Treitz causing bowel obstruction (Fig. 2a). Attempt to milk the foreign body into the colon was failed. Longitudinal incision of the bowel was performed to extract the foreign body, which turned out to be a whole, undigested shiitake mushroom (Fig. 2b). The wound was then closed. The patient had an uneventful course and was discharged on the 9th postoperative day. On detailed history taking, the patient had recalled that he did not have any teeth and did not use dentures during eating, and accidentally swallowed the shiitake mushroom 2 days before the incident happened.

DISCUSSION

Obstruction of the small bowel loop is most commonly caused by adhesions secondary to previous intraabdominal surgery or hernia [1]. Small bowel obstruction due to bezoar impaction is considerably less common, with a reported frequency of about 4% [1-3]. The word bezoar comes from the Arabic word "bazahr", which means the hardened gastric contents of the Syrian goat [1,2]. According to the composition of the content, bezoars are classified into 5 types: lactobezoar formed by milk curd and unique to neonates, trichobezoar caused by hairball and found in children and young adults, phytobezoar formed by vegetable and fruit and typically seen in the elderly and postgastrectomy patients, pharmacobezoar caused by medications, and lithobezoar due to sand, stone, etc [1,2,4].

Bezoars are often created in the stomach, but after fragmentation, they may migrate into the small bowel and result in mechanical obstruction [2,3]. Therefore, small bowel bezoars are often in coexistence with gastric bezoars. The most common presenting symptoms of small bowel obstruction are abdominal pain, nausea, vomiting, constipation, abdominal distension as a sign of intestinal obstruction, and peritonitis caused by perforation. The clinical presentations are nonspecific, and the diagnosis is rarely made preoperatively [2,4]. The predisposing factors for bezoar formation are prior gastric surgery, poor mastication, ingestion of high-fiber food such as persimmon, vegetarian diet, decreased gastric secretion and motility, diabetic neuropathy and hypothyroidism [1,2,4].

The phytobezoars are the most common type of bezoars to cause bowel obstruction. They are aggregates of indigested food material (vegetables or fibers) in the gastrointestinal tract, especially in the stomach and in the narrowest locations of the small bowel loop (i.e., 50-100 cm proximal to the ileocecal valve) or at the valve itself [2,5,7]. The shiitake mushroom (*Lentinus edodes*) is a rare type of phytobezoar which has a rich source of insoluble fiber and causes difficult digestion, which may lead to intestinal obstruction if the whole piece of the mushroom is ingested. The shiitake mushroom has a soft and slippery texture, making it susceptible to accidental ingestion without proper chewing [1]. The patient in our case did not have any teeth and did not wear dentures during eating. The slippery shiitake mushroom can easily escape to swallowing without cutting for this patient, who unintentionally swallows the food whole [6,7].

CT is the imaging modality of choice for evaluation of the patients with acute abdomen because it can show the cause, location, and degree of obstruction [2]. The CT appearance of the shiitake mushroom includes a round and ovoid mass

containing mottled gas with a concentric circle sign at the obstructive site [2]. The varying attenuation values (from 40 HU to less than -200 HU) of the shiitake mushroom on CT is due to the fact that the latter is fiber-rich and easily absorbs consumed oils, intestinal fluid and gas [7,8].

The treatment of the bowel obstruction caused by the phytobezoars is surgery [1,2]. Milking the bezoars into the cecum is the treatment of choice. If the bezoar has a soft texture, crushing it and passing it into the cecum can be performed. If this is not possible, enterotomy with extirpation of the bezoar may become necessary. In case of bowel ischemia and bowel wall necrosis secondary to the bezoar, segmental resection of the bowel loop may be required. Recently, laparoscopic surgery is increasing performed for the treatment of phytobezoars.

CONCLUSION

Shiitake mushroom, although very rare, should be taken into consideration as a cause of bowel obstruction in a patient with no teeth and no dentures for eating, showing signs of bowel obstruction, and a typical CT appearance of intraluminal mottled gas, concentric circle sign, and varying attenuation values indicating a phytobezoar.

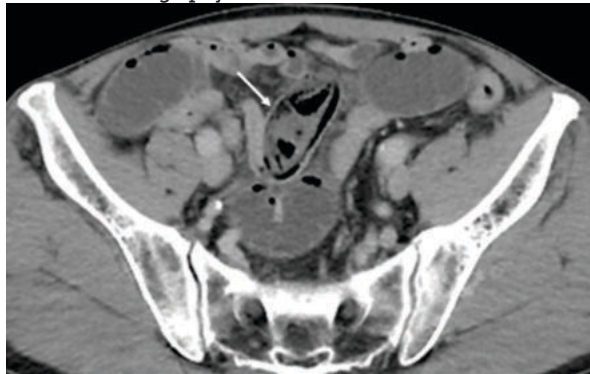


Fig. 1A:



Fig. 1B:

Figure 1. Contrast-enhanced CT of the abdomen with the axial image (a) and the reformatted coronal image (b) demonstrates an intraluminal oval mass-like lesion in the jejunum. The lesion has an interior mottled gas and hyperdense component with varying attenuation values (from 40 HU to less than -200 HU) on the longitudinal section (arrow in a) and shows a concentric circle sign on the transverse section (arrow in b). Dilatation of the proximal small bowel loop is found (a and b).

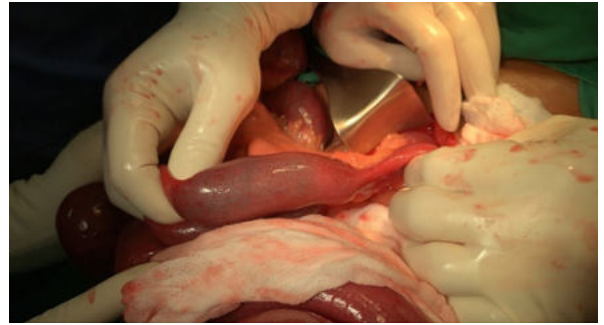


Fig. 2A:



Fig. 2B:

Figure 2. During exploratory laparotomy, the mass-like lesion is in the lumen of the jejunum (a). The lesion is a whole, undigested shiitake mushroom after incision of the jejunum, and is soaked in formalin in the plastic bag (b).

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