

Shiitake mushroom bezoar: a rare cause of small bowel obstruction in Vietnam and lessons in diagnosis and management

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Abstract

Small Bowel Obstruction (SBO) caused by shiitake mushroom bezoars is a rare clinical entity, with no prior cases documented in

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Vietnam despite the frequent consumption of these mushrooms in traditional dishes. We report the case of a 69-year-old male who presented with SBO symptoms after ingesting a whole shiitake mushroom without chewing due to significant molar tooth loss. Computed Tomography (CT) imaging revealed characteristic features of a bezoar, and exploratory laparoscopy confirmed an obstructing shiitake mushroom bezoar, which was removed via enterotomy. This case highlights the diagnostic challenges of radiolucent bezoars and the critical importance of dietary history and characteristic CT findings. Preoperative assessments could facilitate less invasive surgical strategies, reducing the risks associated with enterotomy, such as anastomotic leakage. Clinicians should remain aware of regional dietary practices to enhance diagnostic precision and optimize management strategies, especially in high-risk populations with compromised mastication.

Introduction

Small Bowel Obstruction (SBO) is a common surgical emergency, often caused by adhesions, hernias, or neoplasms.^{1,2} Bezoars, while rare, account for 2% to 5% of all SBO cases globally, and among these, shiitake mushroom bezoars constitute an even smaller subset.³⁻⁶ These bezoars form due to the mushroom's high chitin and insoluble fiber content, which resists enzymatic degradation, particularly when ingested whole.⁷

SBO caused by shiitake mushroom bezoars has been sporadically reported in international literature, primarily from East Asian countries where these mushrooms are a dietary staple.^{3,8-10} The unique challenge of diagnosing SBO due to shiitake bezoars lies in their radiolucency,¹⁰ the overlap of clinical and imaging findings with other causes of SBO, and their relative rarity, which means clinicians often do not consider bezoars in the differential diagnosis.^{3,8}

Management of bezoar-induced SBO typically involves surgical intervention, often requiring enterotomy to remove the obstructing bezoar.^{11,12} This approach, however, carries risks such as anastomotic leakage and bowel stricture. Detailed dietary history and imaging evaluation can suggest the bezoar type preoperatively, enabling appropriate surgical strategies, as discussed in later sections.

In Vietnam, despite the prevalence of shiitake mushrooms in traditional cuisine, this is the first documented case. While media outlets have mentioned such cases, they have yet to be formally recorded in professional medical literature.

Case Report

A 69-year-old male patient presented to the emergency department with a 6-hour history of dull epigastric pain. He denied nau-

sea, vomiting, fever, or changes in bowel habits, having passed normal yellow stools earlier that day. The persistence of pain prompted him to seek medical attention, highlighting the diagnostic importance of persistent abdominal symptoms in such clinical scenarios. His medical history included an open appendectomy over 50 years ago and a mandibular gunshot wound during wartime, resulting in significant tooth loss and subsequent denture use. He had been treated successfully for pulmonary tuberculosis a decade earlier and was under management for hypertension with amlodipine 5 mg daily. On physical examination, the patient was alert, with stable vital signs. Abdominal examination revealed mild distension, an old surgical scar in the right iliac fossa, and tenderness around the umbilical region without peritoneal signs. Increased bowel sounds were noted with hyperactive frequency and tone. Digital rectal examination showed smooth rectal mucosa and minimal stool. He had anterior dentures in both jaws but was missing most lower molars.



Figure 1. Initial imaging findings of small bowel obstruction. **A)** Abdominal ultrasound shows mildly dilated small bowel loops (up to 2.5 cm) with fluid retention, increased peristalsis, and free fluid between loops; **B)** Upright abdominal X-ray demonstrates scattered air-fluid levels without definitive small bowel dilation, suggesting incomplete obstruction.

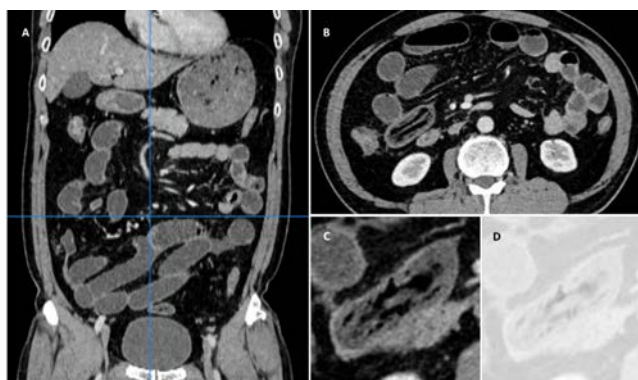


Figure 2. Computed tomography (CT) findings of small bowel obstruction due to shiitake mushroom bezoar. **A)** Coronal non-contrast CT shows dilated small bowel loops and collapsed terminal ileum, indicating a proximal obstruction; **B)** A transition point in the right iliac fossa with an intraluminal mottled gas pattern suggestive of a bezoar; **C)** The bezoar's irregular low-attenuation pattern, consistent with its composition; **D)** The lung window setting on CT distinguishes the bezoar from fecal material by enhancing contrast and revealing its characteristic low-attenuation pattern.

Investigations

Laboratory tests revealed mild leukocytosis (WBC: 11.1 K/ μ L) with normal CRP (1.17 mg/L) and electrolytes. Ultrasound showed mildly dilated bowel loops (up to 2.5 cm) with fluid and increased peristalsis (Figure 1A), while an upright X-ray demonstrated scattered air-fluid levels without clear dilation (Figure 1B).

Given the patient's prior abdominal surgery, adhesions were initially suspected of SBO. A contrast-enhanced Computed Tomography (CT) scan was then performed, which revealed a markedly dilated stomach and multiple small bowel loops (largest 28 mm), with a collapsed terminal ileum and nondilated colon, reducing the likelihood of distal obstruction (Figure 2A). A transition point in the right iliac fossa revealed a food bezoar with a mottled gas pattern and intraluminal mass (Figures 2B, 2C), without evidence of ischemia or perforation. The lung window setting enhanced differentiation of low-attenuation bezoars from fecal material

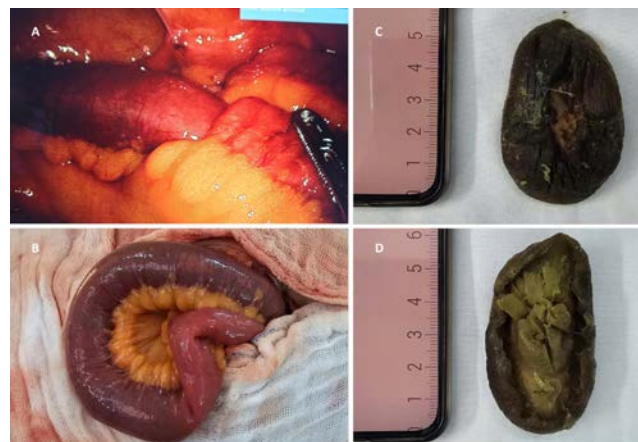


Figure 3. Intraoperative findings and bezoar extraction. **A)** Exploratory laparoscopy reveals dilated small bowel loops and a firm, oval-shaped intraluminal mass located 20 cm proximal to the ileocecal valve; **B)** A 5-cm midline incision is made to exteriorize the affected bowel segment, which appears viable without signs of ischemia; **C,D)** (Bezoar) The removed bezoar is a whole, intact shiitake mushroom, consistent with the patient's dietary history.



Figure 4. Postoperative plain abdominal radiography findings of paralytic ileus. The radiograph shows persistent dilated small bowel loops with multiple air-fluid levels, characteristics of postoperative paralytic ileus.

(Figure 2D). Dietary history revealed the patient consumed a whole shiitake mushroom without chewing as part of braised duck noodle soup the day before admission. This shifted the diagnosis from adhesions to bezoar-induced SBO, attributed to impaired mastication from his dentition and the mushroom's slippery texture. CT survey of the gastrointestinal tract revealed no additional foreign bodies, confirming the patient ingested only one shiitake mushroom.

Differential diagnosis

Prior to CT imaging, the differential diagnosis included SBO due to adhesions, acute pancreatitis, gastritis, and early appendicitis—with adhesions suspected from the patient's prior surgery. However, CT identified a transition point without significant peritoneal scarring, reducing the likelihood of adhesions. Instead, a mottled gas pattern with an intraluminal mass suggested a bezoar, further supported by dietary history. Additional CT findings ruled out tumors, volvulus, intussusception, pancreatitis, and perforation, making bezoar-induced SBO the most consistent diagnosis.

Treatment

Initial management in the emergency department included intravenous fluid resuscitation, ceftriaxone 2 g IV, gastric acid suppression, and nasogastric decompression. Exploratory abdominal laparoscopy was performed for diagnostic and therapeutic purposes. Laparoscopically, dilated small bowel loops were observed with a firm, oval-shaped mass (4 × 6 cm) located 20 cm proximally to the ileocecal valve (Figure 3A). A small amount of serous fluid was found in the Douglas pouch, without purulent fluid or fibrin deposits. No additional transition points, volvulus, intussusception, internal hernia, or intra-abdominal masses were noted upon inspection of the proximal bowel. A 5-centimeter midline incision was made to exteriorize the affected bowel segment. The bowel appeared viable without signs of ischemia (Figure 3B). Enterotomy revealed an intact shiitake mushroom bezoar, which was removed (Figure 3C, 3D). The bowel was thoroughly examined to exclude other intraluminal foreign bodies, and the enterotomy was closed. As the peritoneal cavity was relatively clean, no drain was placed. Alternative surgical strategies, such as manual fragmentation of the bezoar or gently pushing it past the ileocecal valve for retrieval through colonoscopy, were previously considered but deemed unfeasible due to the bezoar's firm consistency and location in the distal ileum.

Outcome and follow-up

Postoperatively, the patient's abdominal pain subsided, and mobility improved. The nasogastric tube was removed on day 1, but by day 3, signs of paralytic ileus emerged—abdominal distension, nausea, no bowel movements or flatus, and diminished bowel sounds. X-ray showed dilated bowel loops with air-fluid levels and colonic gas (Figure 4). Management began with nasogastric decompression, fasting, and total parenteral nutrition. Then, subcutaneous neostigmine was given to boost bowel motility, with careful monitoring for side effects like bradycardia or cramping. By day 6, the patient passed stool and symptoms resolved. He was discharged stably and remained symptom-free at one week. Dietary modifications and mastication were advised to prevent recurrence.

Discussion

Small Bowel Obstruction (SBO) remains a prevalent surgical emergency,^{1,2} and while bezoars account for a small fraction of

cases, their clinical management presents unique challenges. Phytobezoars primarily consist of poorly digested plant fibers, such as fruit seeds and pulpy material. According to large-scale studies, gastric phytobezoars are detected in fewer than 0.5% of endoscopic examinations.¹³ Additionally, SBO due to phytobezoars is estimated to occur in approximately 2% to 5% of cases.^{6,14} While shiitake mushroom bezoars have been sporadically reported internationally,³⁻⁶ no documented cases exist in Vietnamese medical publications according to our literature research.

The shiitake mushroom (*Lentinula edodes*) is a dietary staple in many East Asian countries and increasingly in global cuisine. Its high content of chitin and insoluble fibers, which resist enzymatic degradation, contributes to its potential for bezoar formation, especially when consumed whole or insufficiently chewed. Studies have suggested that even after cutting, shiitake mushrooms possess adhesive properties that enable fragments to coalesce into a mass, particularly under specific gastrointestinal conditions. This unique characteristic distinguishes them from other dietary bezoars. An autopsy of a 74-year-old woman reported fatal duodenal obstruction from a 9-cm shiitake mushroom bezoar, highlighting its expansion potential from fiber and water absorption.⁹

Patients at risk for bezoar-induced SBO typically include those with previous gastrointestinal surgeries, impaired mastication, gastrointestinal dysmotility, diabetes mellitus, or other medical conditions such as hypothyroidism, trichophagia, and anxiety disorders.^{10,12,15} In this case, the patient's hypodontia of posterior dentition likely contributed to insufficient mastication, which, coupled with the mushroom's slippery texture, facilitated ingestion of the intact mushroom. Computed tomography is a crucial imaging modality for investigating SBO, demonstrating a diagnostic sensitivity of 73% to 95% and an accuracy of 83%.^{16,17} Abdominal and pelvic CT scans are effective for identifying the bezoar causing SBO, assessing the degree of obstruction, and detecting multiple bezoars, intestinal ischemia, strangulation, perforation, or other intestinal pathologies. CT imaging, including advanced techniques such as three-dimensional reconstruction, improves diagnostic accuracy by excluding other causes of acute abdominal symptoms. These findings support precise treatment decisions and facilitate optimal surgical planning.^{8,18} The characteristic CT features of SBO caused by shiitake mushroom bezoars have been described in several reports. Previous studies identified the bezoar as a low-density mass resembling a shiitake mushroom, a fusiform low-attenuation region (-162 HU) proximal to the obstruction, or an irregular mosaic low-attenuation pattern consistent with the shape of a whole mushroom.^{19,20} Additionally, distinctive CT signs, such as the “doughnut sign” on axial views and the “crescent sign” on sagittal views, have been proposed, reflecting the mushroom's characteristic morphology.²¹ Intestinal bezoars frequently cause obstruction and ileus, making surgery the primary treatment. Unlike gastric bezoars, they rarely respond to dissolution agents (e.g., Coca-cola, cellulase) or endoscopic removal.^{12,22} The milking technique, which involves advancing the bezoar either proximally toward the stomach or distally through the ileocecal valve, has conventionally been recommended as a primary approach when feasible to avoid enterotomy, thereby reducing risks such as leakage and stricture.²² However, this method isn't suitable for all bezoars as it may cause complications—such as lacerations of the intestinal serosa or mesentery and mucosal bleeding⁶—and lacks prognostic factors. We suggest avoiding milking for bezoars that are large, poorly mobile, difficult to fragment, or whole (e.g., masticated shiitake mushrooms). In our case, enterotomy was performed due to the bezoar's size, firmness, and wholeness. Endoscopic techniques, including intraoperative colonoscopy,

have been described for managing distal bezoars, with reports highlighting successful retrieval of bezoars from the colon using snares and other endoscopic tools.^{4,23} These methods may reduce the need for enterotomy and its associated risks. However, successful implementation requires precise preoperative identification of the bezoar's location and favorable intraoperative conditions. At our institution, the lack of established protocols for combining endoscopic and surgical approaches limited their application in this case. Multiple bezoars are present in 25-45% of cases,^{18,24} making comprehensive imaging essential. Notably, gastric bezoars are more common than small bowel bezoars,¹² and detection of their coexistence is critical, as they may require additional interventions such as intraoperative gastrotomy or endoscopic retrieval. Thus, a thorough imaging examination of the entire gastrointestinal tract, guided by an in-depth history, is key to preventing overlooked bezoars and minimizing recurrence. Postoperative ileus is a common complication following SBO surgery.^{3,10} The absence of bowel movements, reduced bowel sounds, and distension, along with X-ray findings of bowel dilation and air-fluid levels, indicated paralytic ileus. Distinguishing it from mechanical obstruction (due to bezoars or adhesions) is critical, as neostigmine can raise intraluminal pressure and risk of perforation. Neostigmine, a cholinesterase inhibitor, is indicated for refractory postoperative ileus to enhance bowel motility but must be used with caution. In this case, imaging and surgical exploration ruled out missing bezoars, reducing recurrence risk. Neostigmine was then given, with the ileus resolving by postoperative day 6. Future research should focus on validating diagnostic criteria, optimizing imaging strategies, and exploring less invasive techniques. Standardized protocols for managing bezoar-induced SBO are essential, particularly in regions where dietary habits increase risk.

Conclusions

This case underscores the key role of dietary history and CT imaging in diagnosing rare SBO causes like shiitake mushroom bezoars in areas with unique diets. Preoperative assessment enabled early diagnosis and surgical planning. Although enterotomy was needed due to the bezoar's size, earlier identification might allow less invasive treatment. As the first documented case in Vietnam, it fills a literature gap and stresses region-specific strategies. Future research should validate imaging criteria, explore intraoperative endoscopy, and standardize protocols.

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