Endoscopic Removal of a Large Gastric Bezoar Using Mechanical Lithotripsy – A Case Report and Review of Management

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BACKGROUND

A bezoar is a congealed concretion of indigestible material within the GI tract. It is a rare entity detected in less than 0.5% of upper endoscopies[1-7]. Depending on the composition, bezoars are classified into phytobezoars (plant materials), trichobezoars (hair), pharmacobezoars (medications), or lactobezoars (milk)[1,6,8-17]. While bezoars can form in any part of the gastrointestinal tract, they most commonly originate in the stomach where they can result in complications including pressure ulceration and necrosis, GI bleeding, and gastric outlet obstruction[1,18-21].

Diospyrobezoar is a special type of phytobezoar originating from persimmons. It has a nearly seamless and firm external surface made up of polymerized tannins, conferring substantial chemical and mechanical resistance[1,9,10]. Because diospyrobezoars are more likely to be refractory to minimally invasive treatment methods, they present a substantial therapeutic challenge. We present a case of a patient with large diospyrobezoar managed endoscopically by fragmentation with mechanical lithotripsy. This case illustrates that with the use of advanced endoscopic methods and combination therapy, it is possible to treat even large obstructing diospyrobezoars without resorting to surgery, although high level of technical skill in endoscopy and, in some instances multiple endoscopic treatments are required for complete resolution.

CASE PRESENTATION

The patient is a 52-year-old diabetic male with a remote history of a large 15cm gastric GIST invading the transverse colon treated at an out-of-state institution. He underwent distal gastrectomy with Billroth-I reconstruction and en bloc transverse colectomy 14 years prior to presentation to our hospital. He received adjuvant chemotherapy and his surveillance imaging and endoscopies were negative for recurrence. He developed an adhesive small bowel obstruction 1 year after the original surgery and underwent exploratory laparotomy with extensive enterolysis and small bowel resection. He was clinically asymptomatic for over a decade after the bowel obstruction surgery. About 3 months prior to presentation, he began experiencing epigastric abdominal pain and fullness with food intake resulting in early satiety. His symptoms continued to worsen over time and were accompanied by nausea and vomiting starting 3 days prior to hospital presentation. He reported recent weight loss of approximately 10kg.

On physical exam, the patient appeared dehydrated, but his vital signs were unremarkable other than sinus tachycardia. His abdomen was distended and tender in the epigastrium with a firm mass felt on deep palpation. His laboratory studies were remarkable for mild pre-renal AKI and leukocytosis of 14,500 cells per mm^3. Abdominal CT revealed a 10x8cm intraluminal gastric mass containing foci of air, consistent with a bezoar, causing a gastric outlet obstruction.

A nasogastric tube was inserted to decompress the stomach with immediate return of 2.5L of gastric contents. The patient was aggressively rehydrated and electrolyte abnormalities were corrected. Our attempts to chemically dissolve the bezoar through gastric lavage with a total of 3L of Coca-Cola over 12 hours were unsuccessful. Upper endoscopy, performed under general anesthesia, confirmed a large 10cm intraluminal mass of stone-like consistency, freely mobile within the stomach (Figure 1).

Because the brownish-black diospyrobezoar was very large and hard-shelled, advanced fragmentation techniques were needed to break it into smaller more manageable pieces before endoscopic removal. We introduced the mechanical gallstone lithotripter (Olympus America Inc., Melville, N.Y.) through the working channel of the therapeutic gastroscope. We grasped a portion of the diospyrobezoar with the lithotripter and crushed it (Figure 2). This was repeated several times until we ended up with several medium-sized pieces that could be easily retrieved with endoscopic snare or basket (Figure 3, 4). The endoscope had to be removed from the patient and re-introduced back into the stomach approximately ten times.

Endoscopic treatment of the bezoar resulted in complete symptom resolution. Patient was placed on clear liquid diet post-procedure and was discharged home within 24 hours. He was placed on oral metoclopramide regimen to stimulate gastric motility and underwent repeat endoscopy 3 months later which was unremarkable.

REVIEW OF MANAGEMENT

The most common symptoms of gastric bezoar are abdominal pain, discomfort, fullness, tarry stools, hematemesis, and anemia[1,2,18]. In about 10% of cases, bezoars are found incidentally on imaging or endoscopy in asymptomatic patients[1]. Signs of GI bleeding in the presence of a bezoar are the result of pressure necrosis causing mucosal ulceration[1,8,18-19]. Gastric ulcers are present in 40-65% of patients with a gastric bezoar[1,7,19]. An uncommon presentation and complication of a bezoar is luminal obstruction. This can present as a gastric outlet obstruction or small bowel obstruction depending on the location of the bezoar[3,4,20-21]. The predisposing factors in formation of bezoars are delayed gastric emptying and impaired gastric motility[1,5,8,18]. Several medical conditions including diabetes mellitus, peripheral neuropathy, hypothyroidism, muscular dystrophy, and scleroderma have been associated with GI dysmotility[1,8]. In addition, gastric surgery is known to contribute to delayed gastric emptying by inducing changes in luminal pH, gastric stasis, and loss of pyloric function[5,18].

There are two main diagnostic modalities for detecting bezoars. CT imaging with oral contrast can reliably locate both gastric and small intestinal bezoars[19,20]. They appear as round or ovoid intraluminal masses, with no connection to the surrounding gastric or intestinal wall, often containing internal foci of air[19,20]. Upper endoscopy excels at detecting gastric bezoars and their complications. It can directly visualize the bezoar, assess for presence of mucosal lesions and ulcerations, gastric outlet obstruction and most importantly, it is not just diagnostic but offers several effective therapeutic options[1,18].

First-line therapy for most phytobezoars is chemical dissolution using Coca-Cola®[22]. No consensus exists regarding standardized treatment protocol with some authors advocating for short term treatment over 12 hours using a total volume of 3-5L delivered in small aliquots via NG tube, while others have reported protocols consisting of daily oral ingestion of 0.5-1L of Coca-Cola® over 3 weeks[2,9,22-25]. The goal of this treatment is either complete chemical dissolution of the bezoar, or failing that decrease in size, softening or fragmentation of the bezoar. The success rate of Coca-Cola® in dissolution of phytobezoars is >90%[9,22].

Alternative enzymatic therapies include papain (ingredient in meat tenderizer) and cellulase, which are scarcely used due to poor side-effect profile and commercial unavailability, respectively[26-29]. It is important to note that diospyrobezoars and trichobezoars are generally resistant to chemical dissolution or enzymatic degradation and require more invasive treatment options[19,21].

In cases when chemical dissolution is ineffective, endoscopic management is the next step. Most bezoars can be removed using common endoscopic devices including polypectomy snare, basket, and biopsy or alligator forceps[30-31]. Large and hard-shelled bezoars (e.g. diospyrobezoars) require more advanced fragmentation techniques before piecemeal removal, including argon plasma coagulation, Nd:YAG laser, mechanical or electrohydraulic lithotripsy[32-36]. More recently, reports of successful endoscopic treatment of hard-shelled bezoars using novel commercially available bezoaratom kits have surfaced. One such bezoaratom uses a guidewire-based seesaw-type fragmentation technique while a second one uses an oval polyfilament snare device to crush large firm bezoars[37-39]. When chemical dissolution or endoscopic techniques alone are insufficient to treat a particularly chemically and mechanically resistant diospyrobezoar, a combination therapy can be beneficial. Using a therapeutic endoscope to directly spray the bezoar with Coca-Cola® or alternatively injecting Coca-Cola® into the bezoar via a sclerotherapy needle can soften the bezoar and make it more prone to fragmentation[9,24]. Trichobezoars, in addition to being resistant to chemical or enzymatic breakdown, are resistant to most fragmentation techniques but can be morcellated endoscopically using electrosurgical knives[1,18].

When endoscopic techniques are insufficient, surgery is indicated but it is the absolute last resort. Traditionally, a surgical treatment of a bezoar involved a laparotomy, gastrotomy or enterotomy, and its closure after removal of the foreign body. This resulted in significant morbidity, long recovery time and hospital stay. Nowadays, either laparoscopic or robotic approach is possible in most cases and leads to better outcomes[4,40-42]. In our patient, failure of endoscopic management would have been particularly morbid because of his prior surgical history. He would have likely required an open operation involving lengthy adhesiolysis had we been forced to surgically intervene.

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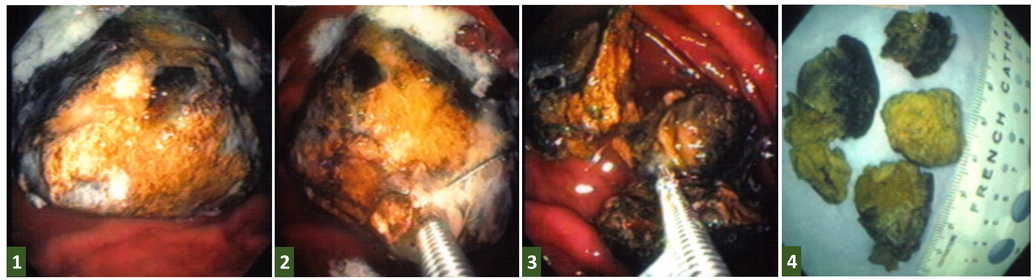


Figure 1. Large, hard-shelled diospyrobezoar in the distal stomach
Figure 2. Grasping a portion of the bezoar with the mechanical lithotripter prior to crushing

Figure 3. Appearance of the bezoar after mechanical fragmentation
Figure 4. Bezoar fragments after removal from the stomach