# Gastric Trichobezoar: Case Report and Literature review

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## *Abstract*

Bezoars are one of the uncommon causes of gastric outlet obstruction and mechanical intestinal obstruction. It is clinically challenging to distinguish them from other common causes of intestinal obstruction. Therefore, diagnosing and managing bezoars can be difficult. This article reports a case of a 15-year-old female, who presented to the emergency with features of gastric outlet obstruction, in which CT and upper GI endoscopy revealed a trichobezoar requiring surgical intervention. Diagnosing bezoars is difficult because of their rarity and their nonspecific presentation. However, considering bezoar as a differential diagnosis is important as their treatment is not always surgical and a correct diagnosis will guide towards the proper therapy. This article will also discuss the definition, types, risk factors, clinical presentation, diagnostic tools, and management of gastric bezoars.

**Keywords:** Gastric Bezoars; Phytobezoars; Trichobezoars; Intestinal Obstruction; Endoscopy.

## Introduction

A bezoar is defined as a hard mass that results from the accumulation of ingested indigestible substances in the gastrointestinal tract (GIT). The stomach is the most common site of bezoar consolidation. However, it may move distally in other sites of the GIT and cause small bowel obstruction. Gastric bezoars are categorized into different types based on their composition: trichobezoars, phytobezoars, pharmacobezoars, and other uncommon types.

The commonest type is phytobezoar, which accounts for approximately 40% of the reported bezoar cases [1]. It is a bulk form of indigestible plant fibers like orange pits, seeds, pulpy fruits, roots, or leaves. Trichobezoar is the next most commonly reported type.[2] It is formed primarily from hair, which is resistant to digestion and peristalsis and therefore accumulates in the gastric folds, and sometimes it can extend beyond the stomach into the intestine. Young females before the third decade of life with psychiatric issues are the most frequent presenting population. Pharmacobezoars are composed of medications or components of medication accumulation. A lactobezoar is composed of undigested milk concretions. Other types of bezoars like lithobezoar, Ascaris, and Candida are extremely rare.

Multiple risk factors predispose certain patients to bezoar formation including poor gastric motility, anatomical abnormalities, ingestion of implicated materials (i.e. fibers, hair, medications), and several comorbid conditions. Poor gastric motility usually occurs secondary to gastric surgeries, gastroparesis, and other medical disorders like scleroderma, amyloidosis, and hypothyroidism. The most common anatomical abnormalities are gastric outlet obstruction and pyloric stenosis. Moreover, inadequate fluid Intake reduces mucus production in the GIT which

reduces gastric motility. Gastric bezoars especially trichobezoar have been reported in patients with significant psychological or behavioral abnormalities such as trichotillophagia, trichotillomania combined with trichophagia, anorexia nervosa, and bulimia nervosa. Some cases are associated with certain coexisting medical disorders including gastrointestinal amyloidosis, Guillain–Barre syndrome, cystic fibrosis, hypothyroidism, diabetes mellitus, renal failure, scleroderma, and myotonic dystrophy.

## Case Reports

A 15-year-old female, known to have iron deficiency anemia not on iron supplements, with no previous surgical history, presented to the emergency with the complaint of four months history of on-and-off moderate lower abdominal pain that was colicky and worsening in the last 3 days, associated with nausea, projectile non-bilious and non-bloody vomiting and constipation for more than 1 month. Clinically, she was not in distress and was vitally normal. Abdominal examination revealed a soft distended abdomen with a palpable mildly tender mass in the upper abdomen with a smooth surface. Bowel sounds were present.

An abdominal x-ray was done and did not show features of bowel obstruction, air was present in the rectum and the colon was loaded with stool. The gastric bubble was absent [Figure 1].


**Figure 1:** supine abdominal X-ray.

Contrasted CT abdomen with IV and oral contrast proceeded and showed a distended stomach with features of gastric bezoar [Figure 2].

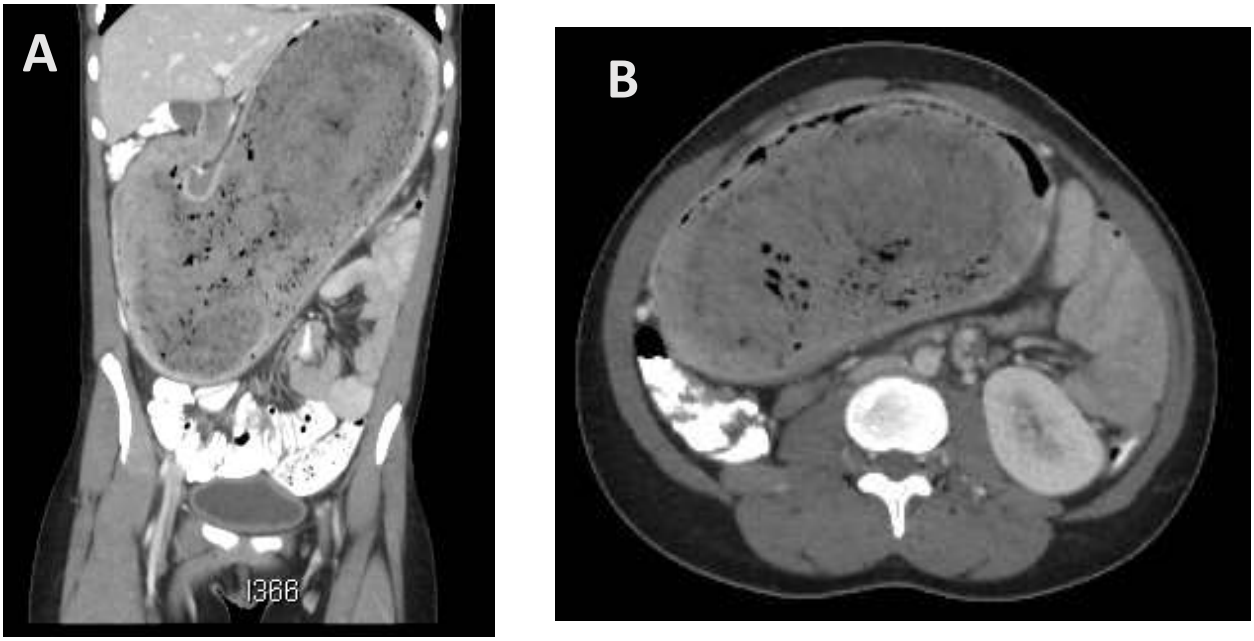



**Figure 2:** A, B: CT abdomen coronal and axial views respectively showing distended stomach with features of stomach bezoar.

The patient was managed initially with IV fluids and analgesia and she was allowed to take sips of water. Diagnostic esophagogastroduodenoscopy was done and showed a large trichobezoar occupying the whole volume of the stomach up to the gastroesophageal junction, therefore the trial of endoscopic removal carried high risk of aspiration [Figure 3].

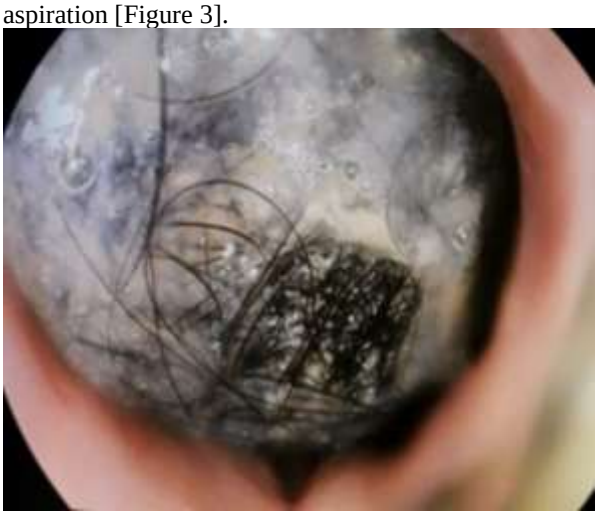


**Figure 3:** large gastric trichobezoar seen via esophagogastroduodenoscopy.

After the diagnosis was confirmed, the patient was taken for laparotomy, gastrotomy, and removal of the gastric bezoar, which was done (Figure 4). A huge trichobezoar of almost 2.5kg was found and carefully removed in pieces. The gastrotomy was closed in layers and the leak test was negative. Thorough peritoneal lavage was carried out. A drain was inserted in the right subhepatic area. The abdominal wall then was closed in layers. NGT was inserted intraoperatively and was kept on free drainage.

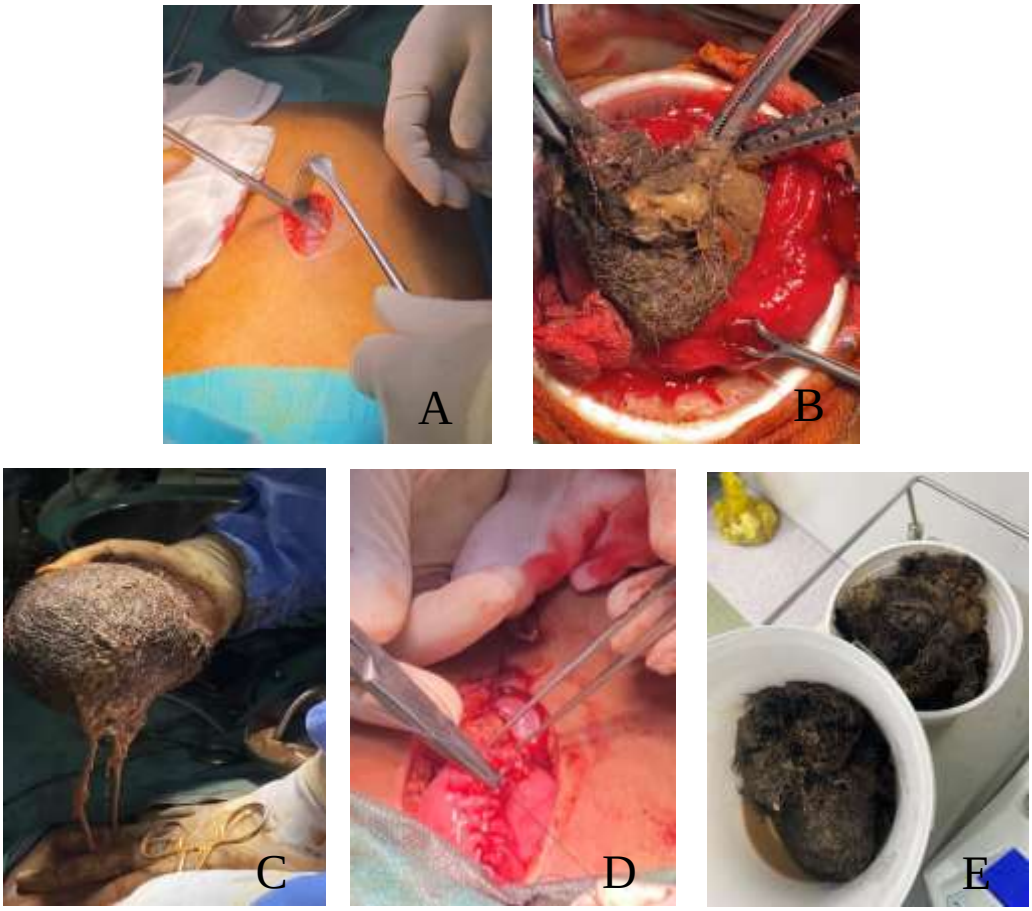


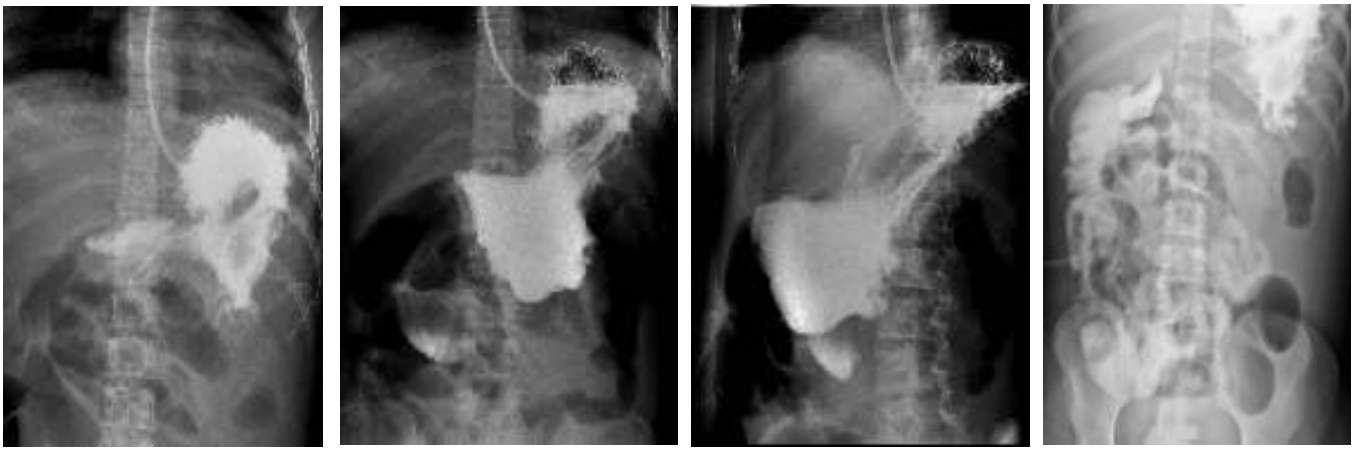

**Figure 4:** Intra-operative steps: (a) mini-laparotomy, (b) gastrotomy, (c) removal of gastric bezoar in pieces, (d) closure of stomach and abdominal wall, and (e) removed gastric bezoar.

Post-operatively, the patient was kept in a monitored bed in the surgical ward and was allowed to take sips of water as tolerated. The patient started to spike fever on postoperative day 1. The septic workup was negative. On post-operative day 3, the patient was doing well clinically and the oral intake was upgraded to clear fluid. Inflammatory markers were trending down (Table 1).

**Table 1:** laboratory results throughout the patient's hospital admission.

| Test | POD-1 | POD-3 | POD-5 | POD-6 | POD-7 |
|---|---|---|---|---|---|
| **Hb** | 9.7 | 8 | 8 | 7.5 | 7.7 |
| **WBC** | 20.3 | 10.94 | 10.95 | 7.93 | 10.95 |
| **Neutrophil** | 18.7 | 9.7 | 9.0 | 5.9 | - |
| **CRP** | 312.4 | 189.3 | 180.0 | - | - |

On postoperative day 5, she had a low-grade fever and was noted to have mild surgical site infection (pus culture showed no growth). The upper Gastrografin study was done to rule out leaks and showed a normal study (Figure 5). NGT was clamped and oral intake was upgraded to free fluids. On postoperative day 6, NGT was removed. The patient was covered with a 7-day course of broad-spectrum antibiotics. The drain output was minimal and thus was removed on postoperative day 7. She was discharged home the following day with Augmentin, ferrous sulfate, and folic acid with the advice of daily dressing. Follow-up appointments with general surgery, hematology, psychiatry, and dietician were given.



**Figures 5:** shows serial fluoroscopy showing the advancement of the contrast in the upper GIT.

Post-operative day 46, the patient presented again to the emergency with a 1-day history of fever and discharge from the surgical wound. The wound showed a 1-2 cm gap in the upper and lower ends with pus discharge. Inflammatory markers were normal and pus culture later showed growth of Enterobacter Cloacae. CT abdomen was done which showed large two collections in the left iliac fossa and pelvis, measuring 46*107*127 mm and 22*67*37 mm respectively (figure 6).

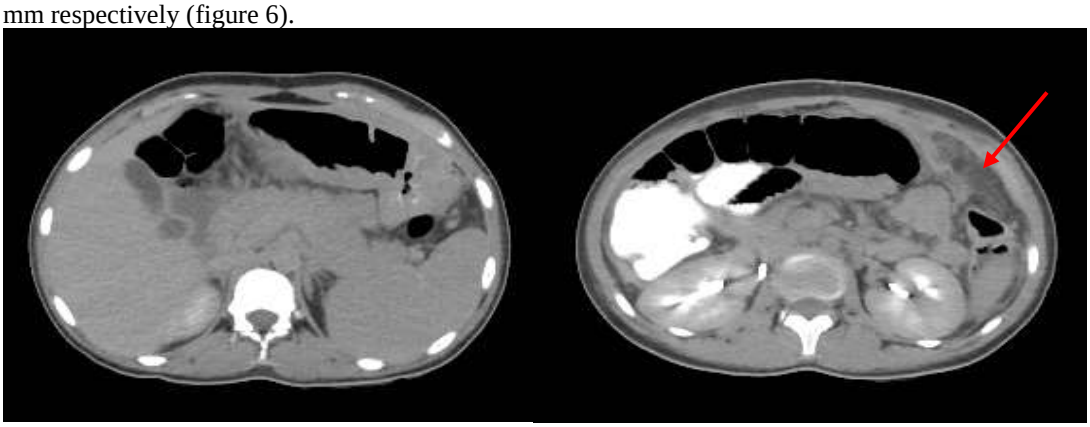


**Figure 6:** intra-abdominal collection.

The patient was readmitted with the impression of post-surgical intra-abdominal collection, which was managed by IV antibiotics and ultrasound-guided drainage.

The patient was started on Escitalopram 10 mg once daily by a psychiatrist. She denied any history suggestive of hair-pulling disorder, obsessive-compulsive disorder, or any other impulsive behavior. She failed 2 times at school but she is independent at home. Examination of her hair didn't show localized alopecia. A referral to another hospital was done for IQ testing.

On day 10 post-ultrasound-guided drainage, contrast CT abdomen was repeated and showed a residual small collection in the pelvis (14*52*28mm) which did not require further drainage as per the interventional radiologist. The drain was removed on day 14 post-image guided drainage and the patient was discharged in good condition

## Discussion

Gastric bezoars are quite rare and usually discovered incidentally in asymptomatic patients who were investigated for other indications. Clinical presentation differs according to the type of undigested material, size, and location of the bezoar. The most common symptoms of gastric bezoars are vomiting, nausea, abdominal distention, abdominal pain, dyspepsia, weight loss, halitosis, bloody stool, anemia, and upper gastrointestinal bleeding. In our case, the patient presented with on and off chronic history of abdominal pain, associated with nausea, vomiting, and constipation for more than 1 month. Bedside abdominal examination has limited sensitivity in identifying gastric masses, although occasionally a mass can be felt during palpation. Gastric bezoars can complicate due to pressure necrosis into ulceration, and rarely perforation and peritonitis. Therefore, an early diagnosis and early management of gastric bezoars are very crucial.

The main diagnostic tool for gastric bezoar is a thorough clinical history. Confirmative diagnostic tests include upper GI endoscopy and radiological imagining, mainly CT. In our case, a basic abdominal x-ray was done initially and intestinal obstruction was ruled out followed by a CT image which showed features of gastric bezoar. Finally, OGD was done, and confirmed the diagnosis of a trichobezoar.

Endoscopy is the gold standard diagnostic tool and should be the initial step in diagnosis if gastric bezoar is suspected.[3] It can be used both as a diagnostic tool and as a minimally invasive treatment at the same time. However, an endoscopic approach is insufficient if the bezoar is detected in the small bowel. Bezoar types can be differentiated endoscopically by inspecting the color, phytobezoar may be, yellow-green, beige, or black whereas lactobezoar is white. Standard abdominal radiographs are usually sufficient for a radiologist to identify the signs of bowel obstruction. However, radiologists are usually unable to identify a bezoar as the cause of bowel obstruction using conventional radiographs only. Bezoar diagnosis using sonography is established by the detection of an intraluminal mass with a hyperechoic arc-like surface and a marked acoustic shadow (Figure 7).[4] It is difficult to identify a bezoar as a cause of obstruction using sonography especially when located at a distance from the abdominal surface.

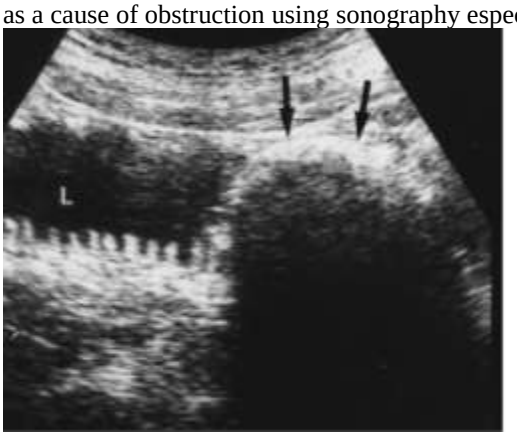



**Figure 7:** sonographic image showing intraluminal mass with a hyperechoic arc-like surface and a marked acoustic shadow.

CT is a more accurate modality in identifying bowel obstruction. It facilitates the visualization of multiple small bowel bezoars, which is valuable in surgical patients. Suggestive features of bezoar in CT are a well-defined low-density intraluminal mass, oval in shape, with air bubbles retained inside the interstices, a dilated small bowel proximal to the mass, and normal or collapsed distal loops. A discrepancy between the CT localization and surgical localizations of the bezoar could be explained by the migration of the bezoar. Bezoars sometimes could be missed in the CT scans, especially those aggregating inside the stomach, if images were printed at standard abdominal soft-tissue window setting (level, 40 H; width, 350 H).[4] Adjusting the window setting by decreasing the level to 100 H may better identify the bezoar's characteristics and appearance (Figure 8).

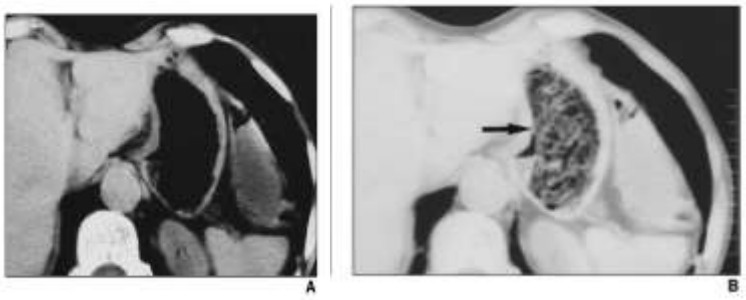



**Figure 8:** A, CT scan attained at routine abdominal soft-tissue window and level settings (level, 35 H; window, 200 H). Note that it is not possible to detect gastric bezoar. B, CT scan of the same region attained with a level of –119 H. Note that the characteristic of bezoar (arrow) is easily identifiable, ovoid mass extending into the stomach with an inhomogeneous mottled appearance.

Using a CT image, it is possible to discriminate the retained food particles in the stomach from the small gastric bezoars visualized in an image.[4] Small bezoars are ovoid or rounded, tend to float on the water-air surface surrounded by the gastric contents, and have lower density than food particles (Figure 9). Large bezoars tend to fill all the lumen, showing air bubbles diffusely distributed throughout the mass. However, sometimes it can be challenging to differentiate a bezoar from a large amount of retained food.

**Figure 9:** CT scan attained without oral or IV contrast material shows an inhomogeneous mass with a mottled gas pattern (arrow) floating into the distended stomach. This appearance differs from that of ingested food (arrowheads).

The first goal of treatment is bezoar removal. Small-size bezoars can pass through the GIT spontaneously without external interference. Some types of bezoars may be managed by less aggressive methods. Holding oral intake along with administration of intravenous fluid and gastric lavage resolves 85% of gastric lactobezoar in infants.[5] Treating lactobezoar with N-acetylcysteine in gastric lavage also have been reported to be effective.

There are three generally accepted approaches for bezoar removal: enzymatic disintegration, endoscopic removal, and surgical intervention. Asymptomatic patients or those with mild symptoms are generally treated with enzymatic disintegration and endoscopic removal.

Enzymatic disintegration is most effective on phytobezoars, as plant fibers are vulnerable to dissolution.[2] Even if it requires further additional therapy by endoscopic maneuvers or surgery, enzymatic disintegration may soften the bezoar consistency to aid in further intervention. Enzymatic treatment includes dark soda (i.e., Coca-Cola, Pepsi), enzymes cellulase, and gastroprokinetic agents. Dark soda creates an acidic environment which allows for fiber digestion, 3L over 24 hours is the dose often reported, to be given either through the oral route or nasogastric tube or during endoscopy, however, this differs in clinical practice based on the patient's tolerance.[2] It has the advantages of being widely available, easy to administer, cheap, safe, and well-tolerated. A 2013 systematic review concluded that Coca-Cola is 50% efficient in disseminating phytobezoars, only 23% effective in disseminating diospyrobezoars due to the hard consistency, a 60.6% effective for all other phytobezoars and 91.3% effective when combined with endoscopy.[6] Interestingly, according to a newly published review in which the author reviewed 24 articles published

during a 10-year period between 2002 and 2012, it concluded that in 50% of cases, drinking Coca-Cola appears to be an effective treatment for gastric phytobezoar, and combining the soda with additional endoscopic methods may lead to resolution up to 91.3% of phytobezoars.[7] Other additive or alternative therapies should be considered, especially if the patient has no tolerance to low pH due to severe GERD or peptic ulcer. In the past, cellulase has been utilized at a dose of 3-5 grams in 300-500ml of water over 2-5 days [8]. As fruits contain large amounts of cellulose, hence cellulase is used for the chemical fragmentation of phytobezoars [5]. Though it is seen to be inferior to soda, it is found to be effective for a more resistant diospyrobezoar when combined with soda in the context of acid suppression therapy by a proton pump inhibitor.[9] Prokinetic agents, like metoclopramide and erythromycin, improve gastric emptying and may facilitate bezoar fragmentation by fragmenting small bezoars smaller and soft enough to be further broken by gastric peristalsis [10].

Endoscopic management includes several methods for managing a bezoar. For example, phytobezoars which are feasible for fragmentation, a polypectomy snare (a wire loop used in polyps' removal), or endoscopic forceps can be used to fragment the bezoar into smaller pieces. For larger pieces or remaining pieces that could not be fragmented, a Roth net could be used to collect the pieces and remove them through the endoscope.[11] In 2014, Kurt et al. reported a case describing Bezoaratom, a new snare device for bezoar fragmentation.[5] Lavage with soda or cellulase is usually used for bezoar fragmentation before endoscopy. In more than 90% of cases, a combination of pharmacological and endoscopic management approaches is found to be effective [5]. Many bezoars are found incidentally during endoscopy, hence the endoscopist may attempt removal at the same setting if appropriate pre-procedural precautions have been taken for airway protection against the bezoar remnant.[2] Sometimes, enzymatic dissolution and endoscopic fragmentation can result in serious complications including gastric outlet obstruction and gastric pneumatosis.

Surgical removal is an option for bezoars that are not amenable to fragmentation and endoscopic removal, very large bezoars, are complicated, or are too challenging to access endoscopically. It should be reserved only when chemical resolution and endoscopic therapy fail because gastrectomy itself is the leading cause of gastric bezoars.[12] Trichobezoars particularly are resistant to fragmentation; in one review, 40 out of 108 cases were attempted endoscopically, and only 2 (5%) were successful; whereas the rest mandated surgery.[2] Segmental resection may be required in the case of bezoars with complications such as ulcerations and signs of necrosis. Surgical management is usually preserved for patients with gastric outlet obstruction as the initial therapy because gastric bezoars causing gastric outlet obstruction are usually too large to extract and too hard to fragment, and often patient clinical situations would be critical. Depending on the location and size of the bezoar, it may be amenable to being milked down and passing the ileocecal valve, and there it may pass spontaneously through the rectum. The majority are surgically removed either through a less invasive laparoscopic approach or through the traditional open laparotomy. Recently, a laparoscopic procedure with Alexis wound retractor was successful in bezoars management [3]. More recently, promising results have been shown from holmium: YAG (Ho: YAG) laser lithotripsy for huge bezoar and a laparoscopic technique with an endo bag in the stomach to avoid bezoar spillage. Almost 9% of the patients undergoing surgical management for intestinal bezoars may develop recurrent bowel obstruction, probably caused by the presence of residual bezoars requiring a second operation [4].

After bezoar removal, prevention of recurrence is the second goal of management, by addressing and identifying the risk factors. The recurrence rate of a bezoar may be 13.5% [5]. If the patient has comorbidities concerning gastric dysmotility, the patient will likely benefit from a gastroparesis diet of small frequent meals, reduced whole fiber, and emphasis on liquids. For patients having phytobezoars, reducing the amount of causative fibrous foods may be beneficial for the patient. For pharmacobezoars, alternating the causative medications and dose adjustments should be considered. For those with trichobezoars, a psychiatric assessment is warranted.

## Conclusion

Gastric bezoars are an uncommon cause of mechanical intestinal obstruction which results from the accumulation of ingested indigestible substances. Considering bezoars as a differential diagnosis of intestinal obstruction is a must. Diagnosing bezoar as a cause of obstruction can be challenging because they are indistinguishable clinically from other common causes of intestinal obstruction. Types are categorized according to their composition: trichobezoars, phytobezoars, pharmacobezoars, and other rare categories. Risk factors that predispose patients to bezoar formation include poor gastric motility, anatomical abnormalities, ingestion of implicated materials, and several comorbid conditions. The main diagnostic tool for gastric bezoar is a thorough clinical history however, it is often found

incidentally in asymptomatic patients who were investigated for other indications. Confirmative diagnostic tests include upper GI endoscopy and radiological imaging mainly CT. The first goal of treatment is bezoar removal. Some small size bezoars may pass without intervention and some could be managed conservatively. Others may need intervention through one of the generally accepted approaches for bezoar removal: enzymatic disintegration, endoscopic removal, and/or surgical removal.

## Disclosure

The authors declare no conflicts of interest. A written consent was obtain from the mother of the patient.

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