

Management of Complicated Gastric Bezoars in Children and Adolescents

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ABSTRACT: **Background:** Gastric bezoars in children are infrequent. Most are trichobezoars. Surgical intervention is sometimes necessary. **Objectives:** To describe the clinical findings and radiological workup, as well as treatment and outcome of patients with complicated gastric bezoars who underwent surgery in our institution. **Methods:** We conducted a retrospective review of all cases of surgery for gastric bezoars performed in our institution between 2000 and 2010. Data collected included gender and age of the patients, composition and extent of the bezoar, presenting signs and symptoms, imaging studies used, performance of endoscopy, and surgical approach. Outcome was measured by the presence of postoperative complications. **Results:** We identified seven patients with gastric bezoars who underwent surgery. All were females aged 4–19 years. Six had trichobezoars and one had a mass composed of latex gloves. Presenting symptoms included abdominal pain, vomiting, weight loss, and halitosis. All patients had a palpable epigastric mass. A large variety of imaging modalities was used. Endoscopic removal was attempted in three patients and the laparoscopic approach in one patient, but both routes failed. All patients eventually underwent laparotomy with gastrotomy and recovered without complications. **Conclusions:** The presence of gastric bezoars should be suspected in any child with unexplained abdominal pain, vomiting, weight loss, or halitosis, or with a palpable abdominal mass, especially in girls. A variety of imaging modalities can aid in diagnosis. Endoscopic removal might be attempted, although failure of this approach is frequent, necessitating surgical intervention, preferably laparotomy and gastrotomy, which has an excellent outcome.

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In children, gastric bezoars, collections of undigested material in the stomach, are frequently composed of hair as a result of trichophagia (swallowing hair). These classically present in

females with long hair, over the age of 10, secondary to trichotillomania (pulling out one's hair) [1]. Other types of bezoars reported include phytobezoars, composed of plant material, bezoars composed of concretions of medications, and those formed from ingested foreign bodies. The latter can be associated with mental retardation. In a variant of trichobezoar that has been described as "Rapunzel syndrome" [2], these can become large and extend past the pylorus, which makes endoscopic removal more difficult, increasing the need for operative removal of the trichobezoar. A rare complication in cases of Rapunzel syndrome, which mandates surgical intervention, is gastric perforation [3].

PATIENTS AND METHODS

After obtaining approval from our Institutional Review Board, we retrospectively identified all patients at our institution who required surgical treatment for gastric bezoars between 2000 and 2010. Charts were retrospectively reviewed and the data collected included demographic parameters (age and gender), symptoms and physical examination findings, the presence of acute complications (bowel obstruction and perforation), and the composition, location and extent of the bezoars. Management parameters included the diagnostic workup, history of previous endoscopic intervention, and operative technique. Outcome parameters included the presence of early and late complications and were collected by reviewing inpatient records as well as outpatient follow-up records.

RESULTS

We identified seven patients who underwent surgery for the treatment of gastric bezoars between 2000 and 2010. All were females and the age range was 4–19 years. Only one patient had a history of mental retardation. All bezoars were trichobezoars except for one case (in the patient with mental retardation) where it was a mass of ingested latex gloves. Two patients had extension of the trichobezoar past the pylorus. The most common presenting symptoms were abdominal pain (in four patients) and vomiting (in two). One patient presented with halitosis and one with a palpable abdominal mass. One patient

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Table 1. Summary of 7 cases of surgically treated gastric bezoars

Patient	Age (years)	Gender	Symptoms	Composition	Extent	Imaging	Acute presentation	Endoscopic attempt	Surgical technique	Postoperative complications
1	12	F	Abdominal mass	Trichobezoar	Stomach	Done, details missing	No	Yes	LG	None
2	9	F	Abdominal pain	Trichobezoar	Stomach	UGI	No	No	LG	None
3	19	F	Vomiting	Latex gloves	Stomach	Plain films, UGI	Yes, gastric outlet obstruction	yes	Laparoscopy converted to LG, Ladd's	None
4	12	F	Abdominal pain, vomiting, weight loss	Trichobezoar	Stomach	Plain films, ultrasound	No	No	LG	None
5	18	F	Abdominal pain, reflux, weight loss	Trichobezoar	Duodenum	UGI	No	No	LG	None
6	4	F	Halitosis	Trichobezoar	Stomach	Done, details unknown	No	Yes	LG	None
7	11	f	Acute severe abdominal pain + chronic pain	Trichobezoar	Jejunum	Plain films, CT		No	LG	None

F = female, UGI = upper gastrointestinal contrast study, LG = laparotomy and gastrostomy

presented with severe acute abdominal pain, peritonitis on examination, and free air on abdominal computed tomography (CT), and on surgical exploration was found to have gastric perforation as a consequence of her trichobezoar. Physical examination revealed a large epigastric mass in all patients. Preoperative imaging was obtained in all cases and included plain films (three cases), upper gastrointestinal series (UGI) (three cases), abdominal ultrasound (one case) and abdominal CT (one case). In three patients endoscopic retrieval of the bezoar was attempted prior to surgery but failed in all. All patients underwent a laparotomy and gastrostomy for removal of the bezoar. In one case, the laparoscopic approach was attempted but converted to laparotomy. All patients recovered without complications and were discharged home on their previous diets. Table 1 summarizes the collected data for all seven patients.

PATIENT 1

A 12 year old girl was noted to have an asymptomatic abdominal mass. Her parents reported trichophagia since the age of 4. Further imaging led to referral to a gastroenterologist and upper endoscopy revealed a large gastric bezoar. It could not be removed endoscopically and an elective laparotomy and gastrostomy were performed to extricate the bezoar.

PATIENT 2

A 9 year old girl with trichotillomania since toddlerhood presented with 2 years of intermittent abdominal pain. UGI demonstrated what appeared to be a large gastric trichobezoar. It was removed via laparotomy and gastrostomy.

PATIENT 3

A 19 year old mentally retarded female presented to the emergency room with intractable vomiting of feedings. UGI and abdominal X-rays showed likely malrotation and gastric bezoar [Figure 1]. Endoscopy demonstrated a mass of latex gloves in the

stomach that could not be retrieved. A laparoscopic approach was attempted but was converted to laparotomy since the bezoar was large, Ladd's bands appeared to be diffuse, and bowel distension from the failed endoscopy was significant. Gastrostomy and removal of the bezoar were performed, as was Ladd's procedure.

PATIENT 4

A 12 year old girl presented with 6 months of abdominal pain, diarrhea, weight loss and emesis after 2 years of trichophagia. Physical examination revealed epigastric abdominal mass. Abdominal X-rays and ultrasound confirmed the presence of a bezoar, which was removed via laparotomy and gastrostomy.

Figure 1. Patient 3: UGI demonstrating a large gastric bezoar composed of latex gloves (arrow)

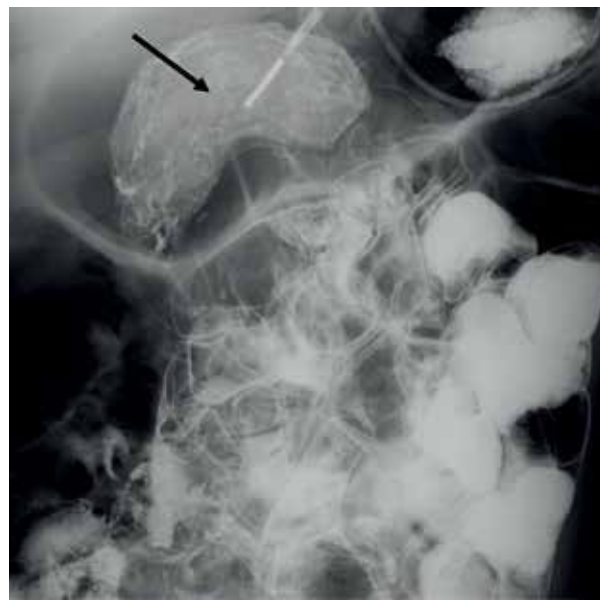
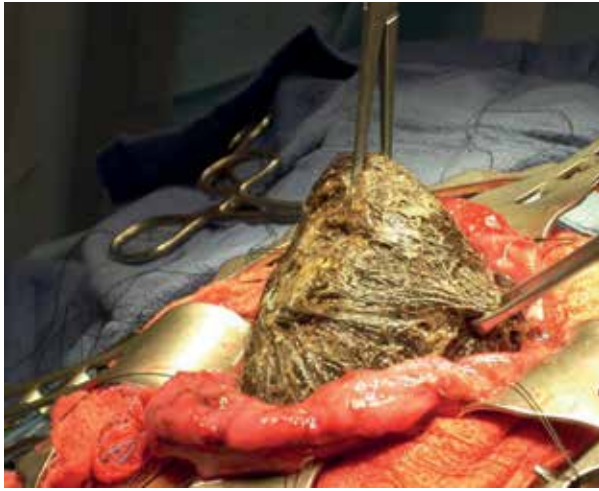


Figure 2. Patient 5: Intraoperative findings demonstrating a large trichobezoar



PATIENT 5

An 18 year old female presented with recent-onset abdominal pain, reflux symptoms and weight loss. She reported 2 years of trichophagia. A large mass was palpable on abdominal exam and an UGI demonstrated a bezoar. At laparotomy she was found to have two large gastric bezoars, with the second extending into the duodenum [Figure 2].

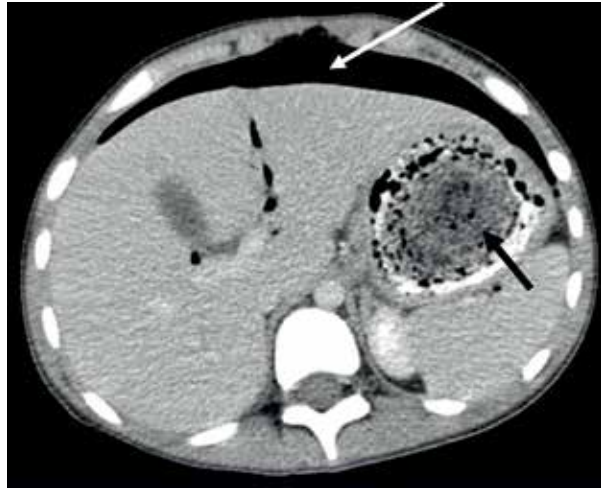
PATIENT 6

A 4 year old girl with a 2 year history of trichophagia presented with halitosis and on imaging was found to have a gastric bezoar. It could not be removed endoscopically but was removed by laparotomy and gastrotomy.

PATIENT 7

An 11 year old girl presented to the emergency department with severe abdominal pain. The pain had been less severe for a few months before admission. She had known trichophagia since early childhood. Physical examination revealed a large left upper quadrant mass with generalized peritonitis, and CT demonstrated a large gastric bezoar extending to the jejunum with free intra-abdominal air [Figure 3]. At laparotomy she was found to have perforation of the stomach. Gastrotomy revealed a large trichobezoar that filled the stomach and extended into the jejunum. The entire bezoar was removed through the gastrotomy.

Figure 3. Patient 7: Abdominal CT image demonstrating gastric bezoar (black arrow) and free intraperitoneal air (white arrow)



seven cases that occurred over an 8 year period. It has been estimated that only 1% of patients with trichophagia develop a trichobezoar [6]. However, the possibility of gastric bezoars as the etiology of abdominal pain, vomiting, weight loss, halitosis or abdominal mass, should be kept in mind. Obstructive jaundice has also been previously described with gastric trichobezoar [7]. Epigastric mass was found on physical examination in all our patients, and this finding in a patient with the above mentioned symptoms should raise the suspicion of gastric bezoar. History of trichotillomania and trichophagia must be sought, especially in girls, and if present, can lead to the correct diagnosis and workup. Alternatively, mental retardation is another medical condition that should raise the suspicion of gastric bezoar secondary to ingestion of foreign bodies.

Various imaging modalities have proved to be sensitive in demonstrating gastric bezoars and their complications. Therefore, we recommend starting with plain films, and performing more advanced imaging only if the above are equivocal.

Endoscopy is infrequently helpful in evacuating gastric bezoars. Reports of successful endoscopic removal are scarce, while reports of unsuccessful endoscopic attempts are more common [8-13]. Moreover, attempted endoscopic fragmentation might lead to complications such as gastric and esophageal perforations [14,15] and distal “embolization” of fragments causing bowel obstruction [16]. In our series, all three attempted endoscopic retrievals failed, and in four cases endoscopy was not attempted. In the previous series reported by Gorter, endoscopy was attempted in two of four cases and failed in both [4]. Therefore, failure of endoscopy should prompt surgical intervention. Moreover, surgical intervention a priori may be appropriate in cases where the trichobezoar is strongly suspected, especially with large and extended trichobezoars or in cases where gastric perforation is suspected.

DISCUSSION

Our 10 year retrospective review revealed that surgical treatment for gastric bezoars is a rare entity. In a previous series reported by Gorter et al. [4], four cases were identified over an 18 year period. In another case series Fallon et al. [5] identified

Gastric perforation, as occurred in one of our patients, is a rare complication but has been previously described in the setting of Rapunzel syndrome [3,17]. It must be suspected in any child with peritonitis and concomitant epigastric mass.

Surgical removal, when indicated, is generally accomplished via laparotomy and gastrotomy with removal of the bezoar [18]. Rapunzel syndrome, defined as extension of the bezoar into the duodenum and jejunum [19], does not necessitate multiple enterotomies as it can generally be removed through the gastrotomy. However, one should be aware of possible fragmentation of the bezoar on pulling back, which may cause small bowel obstruction. Therefore, extracting the bezoar through the gastrotomy should be done very carefully.

All the gastrotomies in our series were performed via laparotomy, with one case of initial laparoscopy converted to laparotomy. In the literature, laparoscopic removal of bezoars continues to be controversial. The first described case of laparoscopic removal of a gastric trichobezoar was in 1998 [20], and since then a few case reports described successful laparoscopic removal of gastric bezoars, generally in adults and adolescents. Cintolo and team [21] describe the laparoscopic removal of a large gastric trichobezoar from a 4 year old girl, during which the bezoar was fragmented in order to allow removal through the 12 mm port site. In their literature review in 2010, Gorter and colleagues [4] found only six case reports of the use of laparoscopy to remove gastric bezoars since the original description in 1998, two of which failed and resulted in conversion to laparotomy. To date, an open approach is still preferred by many because of the difficulty in removing a large bezoar and the risk of spillage in a laparoscopic setting. Recently reported, however, was the successful laparoscopy-assisted removal of gastric trichobezoars in five patients. The technique involves temporary gastrocutaneous, with or without the use of Alexis wound protector [22,23].

The outcome expected after surgical removal via laparotomy and gastrotomy, as found in our series as well as in the literature, is excellent. In our series we did not encounter any complications. The reported rate of postoperative complications in the literature according to the review by Gorter et al. [4] was also very low – 8 of 100 patients, with mostly minor complications (minor wound infections in 3, pneumonia in 2, postoperative ileus in 2, and fecal leakage into the wound in 1). In the case study reported by Fallon and co-authors [5], the rate of postoperative complications was also similar – 1 case (14%) of wound infection [5].

CONCLUSIONS

Gastric bezoars should be considered in cases of unexplained abdominal pain, vomiting, weight loss or halitosis, especially in girls, and especially with a palpable epigastric mass on physical examination. Gastric perforation in the setting of a bezoar is a rare but life-threatening complication. History of trichotillomania with trichophagia should be sought. Even in the absence

of this history, bezoars may occur as a result of eating other foreign objects, especially in mentally retarded children. Plain films can aid in the diagnosis, although when not diagnostic UGI, ultrasound or CT can be used. Endoscopic removal might be attempted in selected cases, although failure of this approach is frequent and necessitates surgical intervention, preferably laparotomy and gastrotomy, which has an excellent outcome.

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