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Case Series

The tangled truth: understanding pediatric gastrointestinal trichobezoars: a case series and literature review

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ABSTRACT

Trichobezoars are rare gastrointestinal obstructions caused by the accumulation of ingested hair. They are most commonly found in adolescent females with underlying psychiatric disorders such as trichotillomania and trichophagia. If left untreated, trichobezoars can lead to severe complications, including gastric outlet obstruction, perforation and Rapunzel syndrome. This study presents case data and the surgical management of pediatric trichobezoars, emphasizing diagnostic challenges and post-treatment psychiatric follow-up and complication management. A retrospective review was conducted on seven pediatric cases of trichobezoars treated at our institution from 2021 to 2025. Demographic data, clinical presentation, imaging findings, endoscopic trials, surgical approach and postoperative outcomes were analysed. All seven cases involved female patients aged 5 to 15 years, presenting with varying degrees of abdominal pain, weight loss, nausea and palpable abdominal masses. Four cases had gastric trichobezoars, while two had ileal extensions (Rapunzel syndrome). Endoscopic retrieval was attempted in one case but failed, necessitating surgical intervention. Surgery was performed in all except one case, followed by gastrotomy or enterotomy for bezoar removal. Last trichobezoar was removed with robotic assistance. Postoperatively, all patients were referred for psychiatric evaluation. Trichobezoars should be considered in pediatric patients presenting with unexplained abdominal complaints and a history of trichophagia. Imaging plays a critical role in diagnosis and while endoscopic retrieval may be attempted, most cases require surgical intervention. A multidisciplinary approach involving pediatric surgery, gastroenterology and psychiatry is essential to prevent recurrence with meticulous management of post-operative complications.

Keywords: Abdominal pain, Epigastric mass, Gastrointestinal bezoars, Rapunzel syndrome, Trichobezoars, Trichophagia, Trichotillomania

INTRODUCTION

Trichobezoars are rare but significant causes of gastrointestinal obstruction in pediatric patients. Bezoars are categorized based on their composition Phytobezoars (plant fibers), Lactobezoars (milk curds in neonates) Trichobezoars (hair) Phaco bezoars or Pharmaco bezoars (medicines like aluminum hydroxide gel, enteric-coated aspirin, sucralfate, guar gum, cholestyramine, enteral feeding formulas, psyllium preparations, nifedipine extended release and meprobamate) Pseudobezoar (indigestible objects introduced intentionally into the digestive system) and others like metals, ceramics, fungi, plastic paper.[1-3]

Trichobezoars account for less than 6% of bezoars and primarily affect adolescent females with psychiatric conditions, particularly trichotillomania (hair-pulling disorder) and trichophagia (hair-eating disorder). Other illnesses can be like PICA, OCDs and depression.[4] The condition develops when swallowed hair accumulates in

the stomach, forming a dense, indigestible mass due to the pyloric valve's barrier function and the stomach's inability to expel hair. Rapunzel syndrome occurs when the trichobezoar extends into the small intestine, leading to intestinal obstruction and potential perforation.[5] Common presenting clinical symptoms include abdominal pain, early satiety, weight loss, nausea, vomiting or a palpable abdominal mass. Complications can be due to mucosal erosions, ulceration, perforation, intussusception, jaundice, salt-losing enteropathy and even death in unrecognized cases.[6]

This study aims to analyze seven cases of pediatric trichobezoars, focusing on clinical presentations, diagnostic methods and surgical outcomes.

CASE SERIES

Case 1

A 7-years-old girl came to the outpatient clinic with abdominal pain, weight loss for 5 months and a noticeable mass in her upper abdomen. Her mother observed that she had fragile scalp hair. Examination revealed a non-tender, mobile mass in the upper abdomen, about 8 × 8 cm. X-rays were standard. Still, a CT scan showed a mixed-density mass in the stomach extending into the duodenum, measuring 6 × 6 × 10 cm. The patient was admitted, stabilized with intravenous fluids and antibiotics and taken up for surgery. During exploratory laparotomy, a hair mass mixed with food particles was found in the stomach. It was removed through a gastrotomy. She recovered well and was discharged on the fifth postoperative day with a referral for psychiatric evaluation and follow-up there.

Case 2

A 13-year-old girl presented with 1 year of poor appetite and weight loss, along with worsening nausea and vomiting for 2 months. Examination revealed a mobile, non-tender mass in the upper abdomen, about 8×10 cm. X-rays were regular. Still, a CT scan showed a mixed-density mass in the stomach extending into the duodenum, measuring 4×10×12 cm.

She was admitted, given intravenous fluids and antibiotics and underwent exploratory laparotomy. A large hair mass mixed with food particles was removed, extending from the stomach into the jejunum. In the operative period, she developed wound dehiscence which took a very long time to heal. She was referred for psychiatric evaluation and is under their follow too.

Case 3

A 5-year-old girl came to the emergency department with bilious vomiting, a swollen abdomen and no bowel movements for 3 days. Her abdomen was distended and a mobile mass was felt in the lower right abdomen. X-rays showed dilated small bowel loops with little air in the pelvis. She was admitted, stabilized with fluids and antibiotics and taken to surgery. A hair mass was seen in the stomach reaching the proximal ileum during laparotomy. It was removed after incising the anterior wall of the stomach. She recovered completely after surgery and was on follow-up under the Psychiatry department.

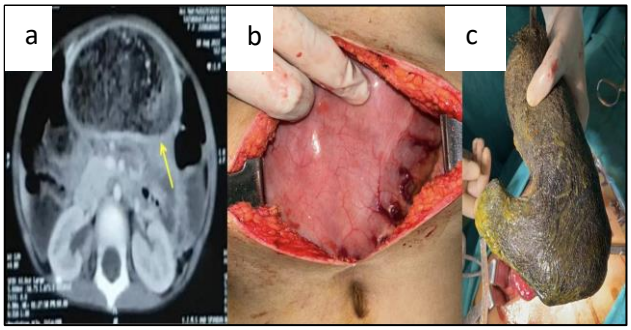

Figure 1: (a) CT scan showing ill-defined intraluminal heterogenous hypoechoic lesion in stomach with internal intensities (b) distended stomach (c) removed trichobezoar.

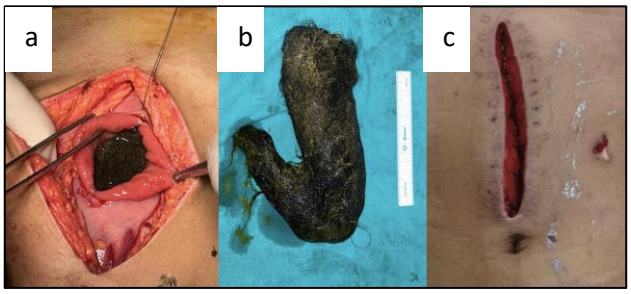

Figure 2: (a) Gastrotomy showing trichobezoar (b) Removed trichobezoar (c) wound dehiscence.

Figure 3: Rapunzel syndrome: gastric trichobezoar with extension upto the ileum.

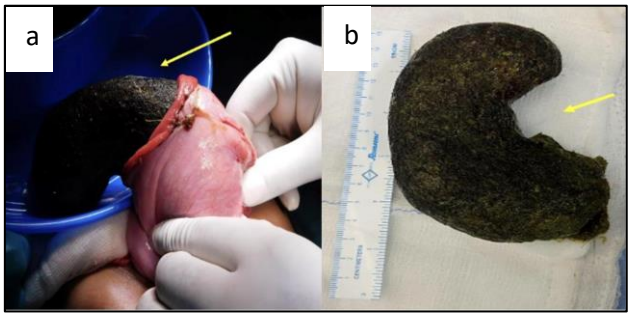

Figure 4: (a) gastrotomy and removing trichobezoar from it (b) removed trichobezoar.

Figure 5: Rapunzel Syndrome: Gastric trichobezoar with extension upto the ileum.

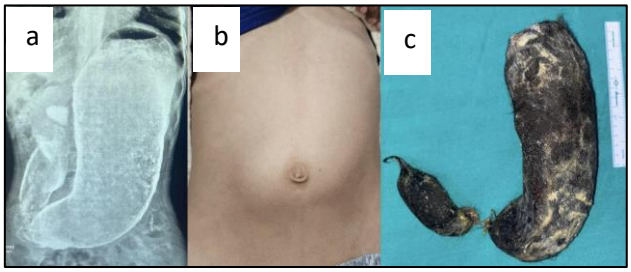

Figure 6: (a) Upper GI contrast study showing large mass occupying stomach and duodenum (b) mass seen occupying stomach seen on examination (c) removed trichobezoar.

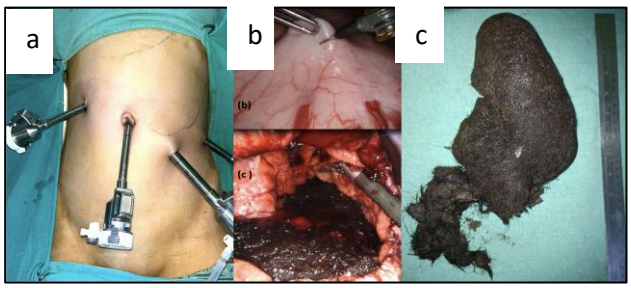

Figure 7: (a) Robotic port insertion sites (b) Incision over anterior gastric wall (c) trichobezoar seen after gastrostomy (d) trichobezoar occupying whole stomach and extending upto duodenum.

Case 4

A 3-year-old girl presented to the emergency department with bilious vomiting, abdominal swelling and constipation. Examination revealed a tender, distended abdomen and a mobile mass on the lower right side. X-rays showed dilated jejunal loops and minimal air in the pelvis. She was admitted, stabilized and taken to surgery. During exploratory laparotomy, a hair mass occupying the whole abdomen was identified and removed through gastrostomy. Her recovery was uneventful.

Case 5

An 11-year-old girl came to the emergency department with bilious vomiting, abdominal pain and constipation. Her abdomen was distended and a mobile mass was felt on the lower right side. X-rays showed dilated small bowel loops with minimal air in the pelvis.

Ultrasound revealed a lesion resembling intussusception in the right upper abdomen. She was stabilized and taken to surgery. Exploratory laparotomy revealed a hair mass obstructing the mid-ileum, which was removed through an enterotomy. She recovered well after surgery.

Case 6

A 15-year-old girl presented with 2 years of central abdominal pain, non-bilious vomiting; she also had habit of plucking hair and eating it during stress since about 2 years. Examination revealed a hard, non-tender mass in the upper and middle abdomen, about 12×8 cm.

Upper GI contrast study showed a large mass occupying whole stomach also extending into the duodenum too. She was taken up for surgery, initially tried for Laparoscopic removal but due to large size it could not be removed so converted to open laparotomy. A large hair mass mixed with food particles was removed, extending from the stomach into the duodenum. Postoperative period was uneventful. She was referred for psychiatric evaluation and is under their follow too.

Case 7

A 14-year-old girl came with central abdominal pain, non-bilious vomiting and a habit of hair ingestion (trichophagia) from almost 2 years. On examination a firm, non-tender epigastric mass was palpated. Imaging confirmed a large gastric bezoar extending into the duodenum in CECT abdomen. She underwent robot-assisted trichobezoar retrieval from a Pfannenstiel incision due to the bezoar's size.

The trichobezoar was successfully removed and the gastrotomy was closed using a stapler. Postoperatively, with early initiation of oral feeds, timely removal of nasogastric tube and drains and gradual return to normal activities, in line with enhanced recovery after surgery

(ERAS) principles were followed. She was also evaluated by psychiatry for underlying behavioral issues. The case highlights successful management of a rare pediatric condition through multidisciplinary care and partial implementation of ERAS protocols, resulting in reduced hospital stay and improved recovery outcomes.

Table 1: Summary of all the cases included in the study.

Age (in years)	Sex	Symptoms	Ultrasound and CT findings	Surgical Approach	Outcome
7	Female	Abdominal pain, weight loss, palpable epigastric mass	CT: 6×6×10 cm mass extending into the duodenum	Gastrotomy via laparotomy	Uneventful recovery, referred for psychiatric evaluation
13	Female	Poor appetite, nausea, vomiting	CT: 4×10×12 cm mass extending into the jejunum (Rapunzel syndrome)	Laparotomy and enterotomy	Developed wound dehiscence, referred for psychiatric evaluation
5	Female	Bilious vomiting, intestinal obstruction	X-ray and CT: Proximal ileal obstruction	Gastrotomy and bowel resection (jejunal diverticulum identified)	Full recovery, monitored under pediatric psychiatry
3	Female	Acute abdomen	CT: Dilated jejunal loops with obstruction	Gastrotomy via laparotomy	Uncomplicated postoperative course
11	Female	Symptoms mimicking intussusception	Ultrasound and CT: Trichobezoar in mid-ileum	Laparotomy with enterotomy	Successful removal, referred for psychiatric counselling
15	Female	acute abdomen with post parandial vomiting	Upper GI contrast study- a large mass occupying whole of abdomen	Laparoscopic converted to laparotomy	Successful removal, referred for psychiatric counselling
17	Female	Epigastric pain and mass with non-bilious vomiting	CECT abdomen showed a large gastric bezoar extending into the duodenum	Robot-assisted trichobezoar retrieval from a Pfannenstiel incision	Successful removal, referred for psychiatric counselling

DISCUSSION

Trichobezoars primarily develop due to the accumulation of indigestible hair in the stomach, forming dense, matted masses. The stomach's smooth lining lacks the necessary peristaltic activity to propel the hair forward, leading to its entrapment within the rugae (folds) of the gastric mucosa. Over time, hair strands become interwoven and mixed with food particles, forming a compact, indigestible mass. The lack of digestive enzymes capable of breaking down keratin further contributes to the persistence of trichobezoars.[7] In Rapunzel syndrome, which is an extreme manifestation of trichobezoars, the hair mass extends beyond the stomach into the small intestine, leading to partial or complete intestinal obstruction. The obstruction may cause mucosal ulceration, bowel perforation, peritonitis and even sepsis if left untreated.[8]

Psychiatric conditions such as trichotillomania (hair-pulling disorder) and trichophagia (hair-eating disorder) play a significant role in the pathogenesis of trichobezoars. Patients with trichotillomania compulsively pull out their hair, often leading to subsequent ingestion (trichophagia), increasing the risk of bezoar formation.[8] Approximately 10-30% of patients with trichotillomania exhibit trichophagia, but only a small percentage develop trichobezoars due to factors like frequency of hair ingestion and gastric motility.[9]

The clinical symptoms of trichobezoars vary based on the size and location of the mass. Small bezoars may remain asymptomatic for years, whereas larger ones cause significant gastrointestinal distress and complications. Chronic or intermittent abdominal pain (due to gastric distension or obstruction), Early satiety and weight loss (caused by reduced stomach capacity), Nausea and vomiting (especially with gastric outlet obstruction), Palpable epigastric or abdominal mass (present in 70-90% of cases).

Halitosis (bad breath) due to bacterial accumulation within the bezoar, Iron deficiency anaemia resulting from chronic gastric mucosal irritation and blood loss. In Rapunzel syndrome, symptoms may extend beyond the stomach: Intestinal obstruction (abdominal distension, constipation and vomiting) and peritonitis (if perforation occurs, leading to sepsis). Diagnostic delays are common because trichobezoars are rare and symptoms often mimic more common gastrointestinal disorders such as peptic ulcers, gastritis or gastric malignancies. [10] Abdominal X-ray may show a soft-tissue mass but lacks

specificity, ultrasonography can reveal an echogenic mass with posterior shadowing, but its accuracy is operator-dependent, CT scan (gold standard), provides a high-resolution image showing a heterogeneous, mottled mass with air trapping, confirming bezoar location and size. CT is particularly useful for diagnosing Rapunzel syndrome when the bezoar extends beyond the stomach and gastroscopy (definitive diagnosis) is direct visualization via endoscopy that allows both diagnosis and potential therapeutic intervention for small trichobezoars.[11]

In this study, all five cases were diagnosed using a combination of CT imaging and gastroscopy. Three patients had gastric trichobezoars, while two presented with intestinal extension (Rapunzel syndrome). Endoscopic retrieval is the least invasive approach but is rarely successful for large trichobezoars due to the dense, fibrous nature of the hair mass. Only small, non-compact bezoars (<3 cm) can be successfully removed endoscopically. Complications of attempted endoscopic retrieval include: Fragmentation and migration, leading to small-bowel obstruction, Esophageal tears or perforation due to repeated manipulation. For large trichobezoars, surgical removal remains the standard treatment, with two primary approaches.[12,13]

Laparotomy (open surgery)

Preferred for large gastric and intestinal trichobezoarsas it allows complete exploration of the GI tract and Minimizes risk of bezoar spillage. It was used in all six cases in our study, leading to uneventful recoveries.

Laparoscopic/robotic-assisted gastrotomy

Minimally invasive with faster recovery.[14] As seen with all minimally invasive surgery it has reduced surgical site infections and shorter hospital stay. The limitation is difficulty in retrieving large and hardened bezoars. Segmental bowel resection (for complications) required when intestinal perforation, ischemia or necrosis is present. Trichobezoars have a high recurrence risk (up to 20%) if the underlying psychiatric disorder is not addressed.[15]

Long-term management and recurrence prevention

Psychiatric evaluation and behavioral therapy

Cognitive behavioral therapy (CBT) for trichotillomania, habit reversal therapy (HRT) to prevent hair ingestion and Selective serotonin reuptake inhibitors (SSRIs) if comorbid psychiatric disorders exist.

Parental counseling

Educating caregivers about warning signs of hair-pulling behavior as well as Encouraging close observation and behavioral modifications.

Nutritional support

Patients often suffer from malnutrition and anaemia, Dietitian consultation for nutrient-rich diet plans to ensure good healing of the wounds.

In this study, all six patients were referred for psychiatric evaluation postoperatively. One patient exhibited signs of relapse of trichotillomania and trichophagia, requiring extended psychiatric care.[7]

CONCLUSION

Trichobezoars, though rare, should be suspected in pediatric patients with unexplained abdominal complaints and a palpable epigastric mass. Early imaging and surgical intervention yield excellent outcomes, but long-term psychiatric support is crucial to prevent recurrence. Future research should focus on minimally invasive techniques and standardized psychiatric interventions for trichobezoar management.[16]

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