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Complicated Giant Gastric Trichobezoars with Intestinal Extension in Adolescent and Young Adult Females: Critical Care Challenges - A Three-Case Series and Literature Review

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ABSTRACT

Background: Giant gastric trichobezoars are rare intraluminal hair masses that typically present at a complicated stage in young females. When the mass extends beyond the pylorus into the small bowel (Rapunzel syndrome) or precipitates high intestinal obstruction, severe electrolyte disturbance, acute kidney injury or sepsis, the condition becomes a genuine intensive-care emergency. We report three consecutive cases, including one fatal outcome, to highlight the critical-care challenges and the determinants of prognosis.

Case presentation: Three female patients (aged 17, 15 and 23 years), all with trichophagia, were managed between 2022 and 2024. Case 1 presented with high intestinal obstruction and profound hyponatremia (sodium 110 mmol/L) with KDIGO-2 acute kidney injury; surgery was deferred 24 hours for cautious sodium correction (<8 mmol/L/24 h) and she recovered after gastrotomy and enterotomy. Case 2 was hemodynamically stable with anemia and hypoalbuminemia; endoscopic extraction failed and a 28 cm bezoar was removed by gastrotomy with uneventful recovery. Case 3 presented in septic shock (SOFA 8); after extraction of a 36 cm bezoar she developed a gastric fistula complicated by peritonitis, parotitis and meningitis, progressing to refractory septic shock and multiorgan failure and died on postoperative day 12.

Conclusion: Outcome was governed by the precocity and quality of perioperative intensive-care management. Early, rigorous correction of metabolic and hemodynamic derangements and prompt recognition of postoperative sepsis are the principal levers of survival. A multidisciplinary approach - intensivist, surgical and psychiatric - is essential to reduce morbidity and mortality and to prevent recurrence.

Keywords: Trichobezoar; Rapunzel syndrome; Septic shock; Hyponatremia; Acute kidney injury; Surgical intensive care; Trichophagia; Trichotillomania

Introduction

A trichobezoar is an intragastric concretion of ingested hair that grows progressively with continued trichophagia. A giant trichobezoar that moulds the stomach and extends as a tail into the small bowel defines the Rapunzel syndrome[1,2]. The condition is rare: gastric bezoars affect an estimated 0.4-1% of the population and although trichotillomania has a lifetime prevalence of roughly 0.5-2%, only about 30% of affected individuals develop trichophagia and only a small minority - on the order of 1% - ingest enough hair to require surgical removal[2,3]. Rapunzel syndrome itself remains exceptional, reported largely as isolated cases and small series[1,4].

Almost all cases occur in adolescent or young adult females with an underlying psychiatric disorder and diagnosis is frequently delayed because symptoms are non-specific and patients tend to conceal trichophagia[2,4]. As a result, many patients are not identified until a life-threatening complication supervenes - high intestinal obstruction, severe hydro-electrolytic disturbance, acute kidney injury, gastrointestinal ulceration or perforation, peritonitis and sepsis[5,6]. These complications place the disease squarely within the scope of the intensivist, yet the critical-care dimension is rarely emphasized in the surgical literature.

The objective of this series is to characterize the critical-care challenges raised by complicated giant gastric trichobezoars and to analyze how metabolic and septic complications shape prognosis, in order to identify practical levers for improving management in the surgical intensive care unit (ICU).

Methods

We conducted a retrospective descriptive analysis of three consecutive female patients managed for a complicated giant gastric trichobezoar between 2022 and 2024 in the surgical ICU of a tertiary university hospital. We reviewed demographic data, psychiatric history, clinical presentation, metabolic disturbances on admission, severity scores (qSOFA, SOFA, KDIGO stage for acute kidney injury), preoperative ICU management, surgical strategy and operative findings, postoperative course and complications, mortality and psychiatric follow-up. A narrative review of the recent literature complemented the analysis. The report was prepared in accordance with the CARE (CAse REport) guidelines and all clinical information was anonymized; ethical considerations are detailed in the Declarations section.

Case 1 - Severe metabolic presentation requiring preoperative ICU optimization

A 17-year-old female with a one-year history of chronic trichophagia was admitted to the surgical ICU for high intestinal obstruction caused by a giant gastric trichobezoar with jejunal extension (Rapunzel syndrome). She reported chronic epigastric pain evolving over nearly one-year, progressive postprandial vomiting, severe anorexia, asthenia and an estimated 10 kg weight loss over six months. On admission she was in altered general condition with signs of extracellular dehydration; the abdomen was distended and diffusely tender in the epigastrium, with a palpable epigastric mass.

She was tachycardic (126 bpm) and hypotensive (88/54 mmHg; mean arterial pressure [MAP] 65 mmHg), with a respiratory rate of 24/min, temperature 37.6 °C, SpO_2 98% on room air and a Glasgow Coma Scale of 15. Urine output was reduced to 0.4 mL/kg/h. Laboratory workup revealed profound hydro-electrolytic derangement: sodium 110 mmol/L, potassium 2.8 mmol/L, chloride 70 mmol/L and serum osmolarity 244 mOsm/kg. Renal function was impaired (creatinine 2.2 mg/dL, urea 1.08 g/L), consistent with KDIGO stage 2 acute kidney injury. Inflammatory markers were raised (white-cell count 17,800/mm³, C-reactive protein [CRP] 138 mg/L) and arterial blood gas showed metabolic acidosis (pH 7.32, bicarbonate 19 mmol/L, $PaCO_2$ 34 mmHg) with lactate 3.6 mmol/L. The qSOFA score was 2 and the SOFA score 6.

Abdominal computed tomography (CT) demonstrated a large heterogeneous intragastric mass occupying nearly the entire gastric lumen, with marked gastric distension, proximal jejunal extension and moderate small-bowel dilatation without perforation. The trichobezoar measured approximately 34 × 10 cm.

Because of the profound hyponatremia and hemodynamic instability, surgery was deliberately deferred for 24 hours to allow partial metabolic stabilization. Management comprised cautious isotonic-saline resuscitation, deliberately slow sodium correction limited to less than 8 mmol/L per 24 h, potassium supplementation, invasive arterial blood-pressure monitoring, urinary catheterization with strict fluid-balance charting and serial neurological assessment to detect overcorrection. After partial hemodynamic and metabolic optimization, she underwent exploratory laparotomy with anterior gastrotomy and a jejunal enterotomy for complete extraction.

The postoperative course was favorable, with progressive normalization of natremia and recovery of renal function. Postoperative care also included progressive nutritional rehabilitation with resumption of enteral feeding on postoperative day 4 and monitoring for refeeding-related electrolyte disturbances. She was discharged from the ICU on day 3 and from hospital on day 9. Specialized psychiatric follow-up was initiated before discharge.

Case 2 - Giant gastric trichobezoar with favorable outcome

A 15-year-old female with poorly documented trichophagia presented with chronic postprandial vomiting, intermittent epigastric pain, early satiety and an estimated 7 kg weight loss. Examination revealed moderate malnutrition, conjunctival pallor and a firm epigastric mass. She remained hemodynamically stable (heart rate 102 bpm, blood pressure 108/67 mmHg, MAP 81 mmHg, temperature 37.1 °C). Laboratory testing showed anemia (hemoglobin 10.5 g/dL), hypoalbuminemia (28 g/L), mild hypokalemia (3.3 mmol/L) and moderate inflammation (CRP 62 mg/L); creatinine was normal and lactate 1.5 mmol/L.

CT revealed a giant intragastric trichobezoar without intestinal extension, with major gastric distension but no perforation or ischemic complication. Endoscopic extraction was attempted but failed because of the size and density of the bezoar; she therefore underwent laparotomy with anterior gastrotomy and complete extraction of a 28 cm trichobezoar. Recovery was uncomplicated, with oral feeding resumed on day 3, ICU discharge after 48 hours and hospital discharge on day 7. Psychiatric assessment confirmed trichotillomania associated with an anxiety disorder and structured follow-up was arranged.

Case 3 - Fatal septic evolution after postoperative gastric fistula

A 23-year-old female with chronic trichophagia was admitted with diffuse abdominal pain, persistent vomiting, fever, severe malnutrition and major deterioration of general condition. On admission she was in septic shock: tachycardic (142 bpm), hypotensive (82/48 mmHg; MAP 59 mmHg), tachypneic (30/min), febrile (39.1 °C), with SpO_2 95% on room air and oliguria (0.3 mL/kg/h). Laboratory results showed intense inflammation and tissue hypoperfusion (white-cell count 24,500/mm³, CRP 286 mg/L, procalcitonin 16 ng/mL, lactate 5.2 mmol/L), acute kidney injury (creatinine 2.5 mg/dL), hypoalbuminemia (22 g/L), moderate hyponatremia (sodium 129 mmol/L) and metabolic acidosis (pH 7.28, bicarbonate 17 mmol/L). The qSOFA score was 3 and the SOFA score 8.

CT revealed a giant gastric trichobezoar with jejuno-ileal extension, diffuse gastric-wall thickening and major gastric distension without frank perforation. After initial resuscitation she underwent emergency laparotomy with anterior gastrotomy, double enterotomy and complete extraction of a 36 cm trichobezoar. Given the severe malnutrition and hypoalbuminemia, nutritional support was incorporated into postoperative management.

Initial postoperative stabilization was followed by progressive deterioration. On postoperative day 5 she developed a gastric fistula with diffuse peritonitis, a septic syndrome and secondary parotitis. Microbiological sampling (peritoneal fluid, fistula drainage and cerebrospinal fluid) was obtained to guide antimicrobial therapy [isolated pathogens to complete]. Despite broad-spectrum antibiotic therapy, aggressive fluid resuscitation, norepinephrine and organ support, she progressed to severe septic shock (day 6: lactate 4.8 mmol/L, norepinephrine 0.35 µg/kg/min, with subsequently escalating vasopressor requirements). On day 8, meningitis was confirmed, lactate rose to 7.4 mmol/L and mechanical ventilation was started for acute respiratory distress syndrome. By day 10 she had anuric acute kidney injury requiring continuous renal replacement therapy, with the SOFA score rising to 14. She died on postoperative day 12 from refractory septic shock and multiorgan failure despite maximal intensive care **(Table 1)**.

Table 1: Comparative summary of the three cases.

Parameter	Case 1	Case 2	Case 3
Age (years)	17	15	23
Rapunzel syndrome	Yes (jejunal)	No	Yes (jejuno-ileal)
Presentation	Obstruction + metabolic	Stable, chronic	Septic shock
Severe hyponatremia	Yes (110 mmol/L)	No	No (129 mmol/L)
Acute kidney injury	KDIGO 2	No	KDIGO 3
SOFA on admission	6	Not applicable	8
Bezoar length	34 cm	28 cm	36 cm
Surgery	Gastrotomy + enterotomy	Gastrotomy	Gastrotomy + double enterotomy
Septic shock	No	No	Yes (refractory)
ICU stay	3 days	2 days	12 days
Outcome	Recovery	Recovery	Death

SOFA: Sequential Organ Failure Assessment; KDIGO: Kidney Disease: Improving Global Outcomes; ICU: intensive care unit.

Discussion

Delayed diagnosis in young females

All three patients were young females with trichophagia, in keeping with the well-described epidemiology in which the overwhelming majority of trichobezoars occur in females under 30 years with an underlying psychiatric disorder[2,4]. Diagnosis is characteristically delayed: symptoms (epigastric pain, postprandial vomiting, early satiety, weight loss) are non-specific and trichophagia is concealed[2,4]. In our series only one patient had received prior psychiatric evaluation and the diagnosis was reached only once complications were established. This diagnostic latency allows the bezoar to reach a giant size and to extend into the small bowel, converting an indolent disorder into a surgical and critical-care emergency.

Severe metabolic derangement and the priority of cautious correction

High intestinal obstruction with chronic vomiting produces a combined loss of water, sodium, chloride and potassium, leading to the hypovolemic, hyponatremic, hypokalemic and hypochloremic picture seen in Case 1 (sodium 110 mmol/L, potassium 2.8 mmol/L, chloride 70 mmol/L) together with prerenal acute kidney injury. The intensivist's first challenge is to correct these derangements without precipitating osmotic demyelination. The correction strategy aimed to keep the rise in serum sodium below 8 mmol/L per 24 h; given the severe malnutrition and the chronicity of the hyponatremia, an even more conservative target of 4-6 mmol/L per 24 h could also be considered in line with current expert recommendations, since malnutrition, hypokalemia and a sodium below 115 mmol/L are all recognized risk factors for osmotic demyelination[7]. Slow correction, potassium repletion (itself a contributor to overcorrection if uncontrolled) and close neurological monitoring were therefore central to her management.

Indications for ICU admission and timing of surgery

Not every trichobezoar requires intensive care, but obstruction with severe metabolic failure (Case 1) or septic shock (Case 3) clearly does. A recurring dilemma is the timing of surgery: extraction is necessary but is not an emergency in the absence of perforation or ischemia, whereas operating on a profoundly hyponatremic, hypovolemic patient carries substantial perioperative risk. In Case 1, deferring surgery by 24 hours for metabolic optimization was associated with an uneventful recovery, illustrating that controlled preoperative resuscitation, rather than immediate operation, is often the safer strategy when there is no sign of perforation. Conversely, in Case 3 the established septic state on admission left little physiological reserve before an unavoidable operation.

Failure of endoscopic extraction

Endoscopic removal was attempted and failed in Case 2, consistent with the literature: endoscopy is generally ineffective for large, dense or compacted trichobezoars and is not feasible once the mass extends into the small bowel. Open surgery through a laparotomy with anterior gastrotomy - extended by enterotomy when a small-bowel tail is present - remains the treatment of choice for giant and complicated bezoars because of its high success rate and low recurrence, with laparoscopy reserved for selected smaller masses[1,5]. All three of our patients ultimately required laparotomy and the two with Rapunzel extension required additional enterotomy.

Septic complications and mechanisms of mortality

The fatal case underscores that mortality in complicated trichobezoar is driven predominantly by septic complications rather than by the mass itself. Reported deaths most often follow gastrointestinal ulceration, perforation, peritonitis or postoperative leak progressing to septic shock and multiorgan failure[5,6,8]. In our patient a postoperative gastric fistula seeded diffuse peritonitis and an unusual cascade of metastatic infection - parotitis and then meningitis - culminating in refractory septic shock, acute respiratory distress syndrome, anuric kidney injury and a terminal SOFA of 14. Preoperative malnutrition (albumin 22 g/L) and the already-septic presentation almost certainly impaired healing of the gastrotomy and predisposed to fistula formation, highlighting the prognostic weight of nutritional and septic status at admission and the importance of early postoperative nutritional rehabilitation with surveillance for refeeding syndrome. Microbiological documentation of the peritoneal, fistula and cerebrospinal fluid samples - frequently polymicrobial digestive flora, with Enterococcus, Candida or nosocomial organisms in this setting - is decisive for tailoring antimicrobial therapy and warrants systematic sampling whenever a postoperative leak is suspected.

Psychiatric management and prevention of recurrence

Because trichobezoar is the somatic expression of an underlying psychiatric disorder, surgical extraction without psychiatric treatment exposes the patient to recurrence. Early specialized follow-up - addressing trichotillomania and any associated anxiety disorder, as confirmed in Case 2 - with habit-reversal training, cognitive-behavioral therapy and long-term surveillance is therefore an integral part of management[2,4]. In our series, psychiatric follow-up was initiated for both survivors before discharge.

Limitations

This is a small, single-center, retrospective series without a control group and causal inferences must be cautious. Nevertheless, the contrast between the three trajectories - controlled metabolic resuscitation with recovery, uncomplicated elective extraction and a fulminant septic course - offers a coherent illustration of the critical-care determinants of outcome.

Key clinical messages

- Complicated giant gastric trichobezoar is a genuine critical-care emergency, not merely a surgical curiosity.
- In severe hyponatremia from obstruction, prioritize controlled correction (≤8 mmol/L/24 h or 4–6 mmol/L/24 h in high-risk patients) and defer non-urgent surgery until the patient is optimized.
- Endoscopy fails for giant or extending bezoars; laparotomy with gastrotomy (plus enterotomy for Rapunzel extension) is the definitive treatment.
- Mortality is driven by septic complications - anticipate and aggressively treat postoperative leak, fistula and sepsis, with systematic microbiological sampling to guide antimicrobial therapy.
- These patients are malnourished: plan early nutritional rehabilitation and watch for refeeding-related electrolyte disturbances, as nutritional status influences anastomotic and gastrotomy healing.
- Mandatory early psychiatric care prevents recurrence; management must be multidisciplinary (intensivist, surgeon, psychiatrist).

Conclusion

Complicated giant gastric trichobezoar is a true critical-care emergency whose prognosis depends on the precocity and quality of perioperative intensive-care management. Early, rigorous correction of metabolic and hemodynamic failures and prompt recognition and control of postoperative sepsis are the main determinants of survival, as illustrated by the divergent outcomes of our three patients. A coordinated multidisciplinary approach - intensivist, surgical and psychiatric - is essential both to reduce immediate morbidity and mortality and to prevent recurrence over the long term.

Declarations

Ethical considerations

This educational case series was prepared for academic and teaching purposes only. All clinical information was anonymized to protect patient confidentiality. Written informed consent for the use of anonymized clinical data and imaging was obtained from the surviving patients and from the family of the deceased patient. The study was conducted in accordance with the principles of the Declaration of Helsinki. Given the descriptive and educational nature of this work, formal institutional review board approval was not required according to local institutional policies.

Consent for publication

Written informed consent for publication of anonymized clinical data and images was obtained from the surviving patients and from the family of the deceased patient.

Availability of data

The data supporting this report are available from the corresponding author on reasonable request.

Competing interests

The authors declare no competing interests.

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