CASE REPORT

Bilious Vomiting: Three Different Diagnosis

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Abstract

Vomiting is a frequent but non-specific complaint, that could be caused by a surgical pathology such as intestinal obstruction / occlusion. Case 1, a 16-year-old girl with abdominal pain, constipation, and bilious and fecal vomiting. Imaging exams were compatible with intestinal obstruction, and exploratory laparotomy revealed a volvulus associated with a mesenteric lymphatic malformation. Case 2, a 4-year-old girl with bilious vomiting and abdominal pain, due to intestinal obstruction by trichobezoar in the jejunum, that was associated with trichotillomania and trichophagia. Case 3, a 15-year-old girl with uncontrollable bilious vomiting and abdominal pain, with computed tomography suggestive of intestinal obstruction by superior mesenteric artery syndrome. Surgical procedure was performed due to lack of response to conservative treatment. The causes of intestinal obstruction in pediatric age are varied and represent a diagnostic challenge. Persistent bilious and/or fecal vomiting should evoke a surgical etiology.

Keywords: Adolescent; Bezoars; Child; Intestinal Obstruction; Mesentery/abnormalities; Superior Mesenteric Artery Syndrome; Vomiting/etiology

Introduction

Vomiting is a frequent but unspecific pediatric complaint, with various causes and different severity degrees.
In the vomiting etiology the following can be considered[1]:
- Organic causes, like infectious situations, increased intracranial pressure, inherited metabolic diseases, surgical causes, among others;
- Non-organic causes, like eating disorders, cyclic vomiting, among others.

Intestinal obstruction is an uncommon entity in pediatric age and the etiology is different in the various age groups.

Congenital malformations, such as intestinal atresia, intestinal malrotation and Hirschsprung's disease, often manifest in the neonatal period or during the first two years of life.[2] From 3 months to 6 years, the most frequent causes are intestinal invagination and incarcerated inguinal hernia. In older children the causes are more varied and may include congenital or acquired conditions such as intestinal invagination, incarcerated hernia, postoperative adhesions, inflammatory bowel disease and foreign body ingestion.[3]
The mechanical intestinal obstruction, in addition to the inherent stopping of gas and stool emission, is usually associated with vomiting, abdominal pain and abdominal distension of variable intensity, depending on the level of obstruction. In patient evaluation, imaging tests are usually required to confirm the diagnosis, location and extent or even the cause of obstruction.[3,4]
The following cases reflect the diagnosis challenge in evaluating a child or adolescent with bilious vomiting, demonstrating the variety of differential diagnosis that should be evoked.

Case Report 1

A 16-year-old girl was referred to the emergency department for vomiting, colicky abdominal pain, localized in the upper quadrants, and absence of dejections in the last three days. The vomitus initially contained undigested food and later became biliary, also increasing in frequency. She had no fever and there was no infectious context in cohabitants.
She was previously medicated by the attending physician, with an oral rehydration solution, metoclopramide and butylscopolamine bromide, without clinical improvement.
Personal antecedents were irrelevant, without any previous surgeries.
At admission to the emergency department, the adolescent had a thin, dry mucous appearance, heart rate (HR) of 105 bpm, blood pressure (BP) of 130/68

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mmHg and had no fever. The abdomen was soft, depressive, painful to palpation on the epigastric, right upper and lower quadrants, without defense and with increased and metallic bowel sounds. There was no abdominal distension.

Urinalysis revealed urine density 1030 and 4+ ketone bodies. Blood analysis with hemoglobin 14.1 g/dL, leukocytes 6900 cells/µL, platelets 271 000 cells/µL, C-reactive protein 0.8 mg/L, amylase 49 U/L, lipase 19 U/L, sodium 136 mmol/L, potassium 3.9 mmol/L, chlorine 97 mmol/L, magnesium 0.93 mmol/L, calcium 2.51 mmol/L, phosphate 1.14 mmol/L, urea 6.2 mmol/L, creatinine 50 µmol/L, alanine aminotransferase 9 U/L and aspartate aminotransferase 18 U/L.

She was hospitalized for surveillance and started intravenous hydration, analgesia and ondansetron. However, she maintained frequent bilious vomiting and subsequently had a vomit with fecal content.

Abdominal radiography demonstrated hydro-aerial levels and abdominal ultrasonography revealed no abnormalities. To clarify the clinical presentation, abdominal-pelvic computed tomography (CT) with intravenous contrast was performed and showed evidence of mechanical occlusion in the small intestine. Although it was not possible to identify the cause, it was admitted a possible internal hernia.

An exploratory laparotomy was done, and a volvulus was observed at the level of the small intestine conditioned by saccular mass with 6.5 cm at the mesentery (Fig. 1). Mass excision and ileo-ileal anastomosis were performed. The anatomopathological study was compatible with congenital lymphatic malformation of the mesentery. The postoperative period was uneventful.

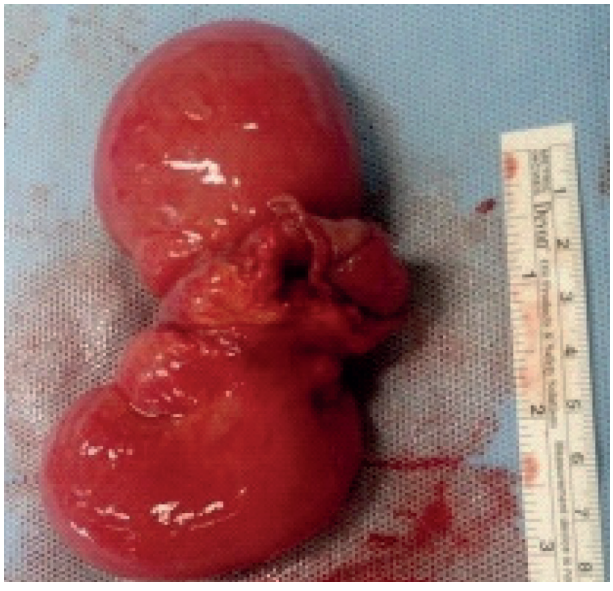


Figure 1. Surgical piece of the mesenteric congenital lymphatic malformation.

Case Report 2

A 4-year-old girl with a history of congenital asymmetric crying facies syndrome was brought to the emergency department with abdominal pain and persistent bilious vomiting with 24 hours of duration. There was no fever, altered intestinal transit, as well as no context of gastroenteritis in cohabitants. Due to the persistence of the vomiting, she was medicated with intravenous ondansetron. However, the bilious vomiting persisted, so it was decided to start intravenous fluid therapy. A summary analysis of urine revealed 4+ ketonuria, and abdominal radiography demonstrated hydro-aerial levels in the upper abdomen.

Due to the suspicion of intestinal occlusion, abdominal ultrasound was performed, which demonstrated marked distension of several intestinal loops, although no obstacle to intestinal transit was observed. Due the suspicion of intestinal obstruction, she was transferred to a level III hospital. At admission, pain mass was palpated at the epigastric / periumbilical level. An exploratory laparotomy with enterotomy was undertaken and a trichobezoar was observed in the proximal jejunum, which was then removed (Fig. 2). The postoperative period was uneventful.

Reviewing the patient background, the parents said that the girl has always had the habit of handling and pulling her hair as well as her mother hair. There were no changes in psychomotor development, nor behaviors compatible with pica. She was referred to pedopsychiatry consultation for tricholomania and trichophagia.

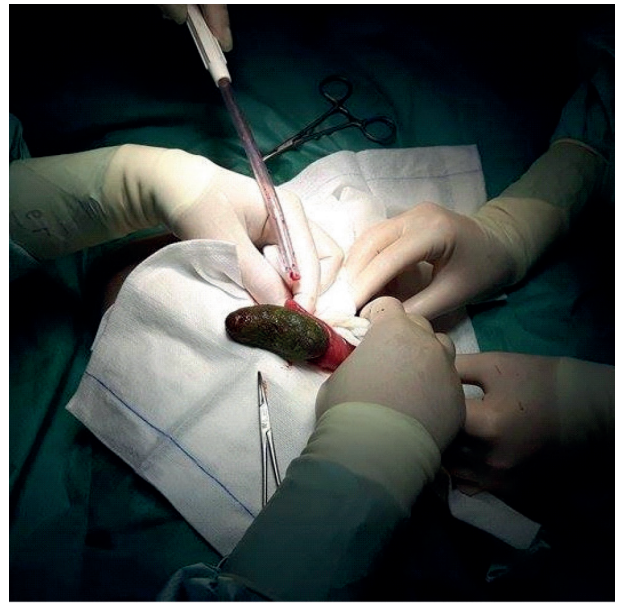


Figure 2. Trichobezoar removed from the jejunum.

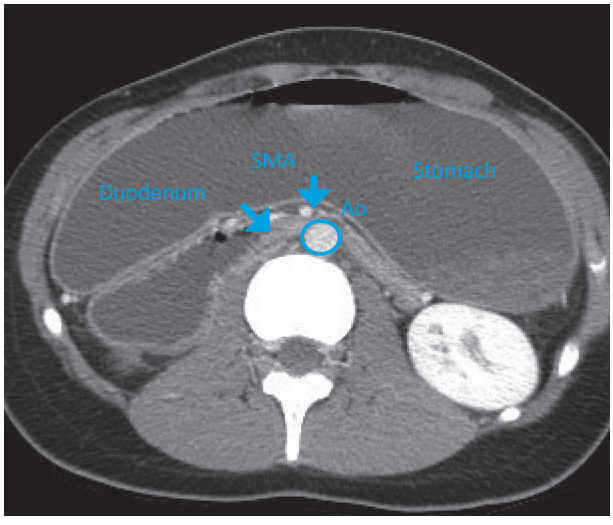
Case Report 3

A 15-year-old girl was brought to the emergency department due to uncontrollable bilious vomiting and colicky abdominal pain with less than 24 hours of evolution. No fever, no change in bowel habits and no urinary complaints. Infectious context in cohabitants was denied.

In the observation she was afebrile, with BP 129/77 mmHg and HR 81 bpm. She had a thin appearance, skin paleness, dry mucous membranes, soft abdomen, painful palpation in the lower quadrants, no defense, no palpable masses, and normal bowel noises.

The patient had no medical or surgical history of significance, and she denied recent weight loss. She was medicated with ondansetron and intravenous hydration, without any improvement. An analytical evaluation was performed with hemoglobin 12.6 g/dL, leukocytes 12 800 cells/µL (neutrophils 11 800 cells/µL), platelets 220 000 cells/µL, C-reactive protein 0.4 mg/L, glucose 7.4 mmol/L, amylase 149 U/L (normal - 100 U/L), lipase 16 U/L, urea 5.5 mmol/L, creatinine 59 mmol/L, alanine aminotransferase 14U/L, aspartate aminotransferase 26 U/L, sodium 134 mmol/L, potassium 3.5 mmol/L.

The patient underwent abdominal radiography, which revealed hydro-aerial levels, and to clarify the situation, the patient underwent abdomen CT, which was suggestive of intestinal obstruction, caused by superior mesenteric artery clamp or eventual rotation of the duodenal descending (D2) - distal horizontal (D3) transition (Fig. 3). A high digestive endoscopy was performed, and it was possible to progress to D2, showing no mucosal changes.



Ao - aorta; SMA - superior mesenteric artery.

Figure 3. Abdominal and pelvic computed tomography. Gastric and proximal duodenal distension and compression of the third duodenal portion by the decreased distance between the aorta and the superior mesenteric artery.

She was transferred to a level III hospital with a presumptive diagnosis of superior mesenteric artery syndrome. The patient was submitted to conservative treatment (nasogastric tube placement in free drainage for decompression, food pause and parenteral nutrition) for 10 days. Due to the persistence of symptoms, with abundant biliary drainage, she underwent exploratory laparotomy and performed duodenojejunostomy, with good postoperative evolution.

Discussion

The causes of intestinal obstruction in pediatric age are varied, and a detailed clinical history and physical examination are important to make the differential diagnosis.

In the three cases described, persistent bilious vomiting was the sign that led to the clinical suspicion of an intestinal obstruction.

Depending on the location of the obstruction, the characteristics of the vomit are different. They are usually biliary when the obstruction is distal to the Vater *ampulla* and are fecaloid when the obstruction is in the distal ileum.[2]

In the first case, the diagnosis cause was a congenital lymphatic malformation of the mesentery, that caused an intestinal volvulus. This consists of twisting a hollow organ around itself or around a fixed point, resulting in obstruction and severe systemic disorders due to total circulatory compromise.[5] Depending on its etiology, we can divide volvulus into primary or secondary. The primary volvulus occurs in the absence of anatomical defects. Secondary volvulus is associated with predisposing, congenital or acquired lesions, including intestinal malrotation, redundant sigmoid, Meckel's diverticulum, Hirschsprung's disease, neoplasms, mesentery malformations, congenital and acquired adhesions.[6-8]

Volvulus with or without underlying intestinal malrotation, are a rare condition, with manifestation in the first year of life 75% of cases.[9] In cases of late presentation, the most common manifestations are intermittent complaints of intestinal obstruction, bouts of vomiting, recurrent abdominal pain, malabsorption with diarrhea, poor weight progression, constipation, bloody diarrhea.[7,9]

When complete twisting of the intestinal loops occurs, the progression to intestinal necrosis and consequent hypovolemic shock can be fast. Thus, in the case of abdominal pain, vomiting and hypotension, these complications must be evoked with emerging surgical

intervention.[9] However, the clinical presentation is varied and the absence of late signs of volvulus can be falsely reassuring. The initial clinical presentation may be indolent, maintaining a normal abdominal examination and hemodynamic stability until a stage in which intestinal ischemia is marked.[10] In the case presented, the diagnosis of volvulus in the small intestine was only made during the surgical intervention. The indolent clinic and the nonspecific findings of the imaging tests made the diagnosis difficult. Surgical intervention before the onset of late signs of volvulus was a decisive factor in the good evolution after surgical intervention.

The other two cases report acquired conditions that led to intestinal obstruction. Both bezoar and mesenteric artery syndrome are rare causes of intestinal obstruction. Bezoars are foreign bodies that result from the accumulation of undigested material at the level of the stomach or intestine.[11,12] They are classified according to their composition, and tricobezoar (composed of hair) is the most common in pediatric age.[11] It results from the compulsion to pull hair (trichotillomania) and swallow it (trichophagia), as was evident in the case reported. In more extreme situations, trichobezoar can extend from the stomach through the intestine, this being called Rapunzel syndrome.[13] The trichobezoars can give symptoms such as abdominal pain, halitosis, anorexia, nausea / vomiting, weight loss, obstruction and peritonitis.[12,13]

In case 2 an epigastric mass was detected, which is one of the alterations of the objective examination that can be found. However, unlike other cases described, there were no obvious alopecia areas.

Bezoars can be removed by endoscopy or by surgery, depending on their size and consistency. In addition to the removal of bezoar, the child or adolescent should have psychology / pedopsychiatry consultation follow-up, to avoid recurrences.

The superior mesenteric artery syndrome is characterized by obstruction of the third portion of the duodenum by compression between the superior mesenteric artery and the aorta.[14] It usually occurs in young adults, with an incidence of 0.013% to 0.3%.[15] The most common cause is rapid weight loss, which leads to a reduction of mesenteric and retroperitoneal fat tissue. Other predisposing factors, such as spinal cord injury, spinal deformities, burns, major surgical interventions and nervous anorexia have been described.[16] In the case presented, no congenital anatomical changes were identified (neither in the imaging tests nor during surgery), and although the adolescent presented a slim appearance, there was no history of weight loss, which is a frequent cause.

The most common symptoms of superior mesenteric artery syndrome are abdominal pain (epigastralgia), and vomiting. It may also manifest as an acute episode of intestinal obstruction, as evidenced in case 3.[16] Superior mesenteric artery syndrome is a diagnosis of exclusion in these situations, requiring a high index of suspicion.

The treatment can be done through conservative measures, but in the absence of response to these measures or when the superior mesenteric artery syndrome is associated with a previous surgery, the surgical treatment (duodenojejunostomy) is recommended.[17] In case 3, a conservative treatment was applied (gastric decompression and parenteral nutrition), which was not effective, and it was necessary to resort to the surgical approach.

These clinical cases emphasize the need for early recognition of intestinal obstruction, regardless of its etiology. In this context, persistent bilious vomiting and/or fecaloid vomiting is an alarm signal that should be carefully evaluated.

In the clinical suspicion of an intestinal occlusion, the first line investigation is the radiography of the abdomen standing or with tangential rays, which can then be complemented with echography or abdominal CT. When there is a clinical or imaging suspicion of intestinal occlusion, some measures should be initiated, like hydration and correction of hydroelectrolytic disorders, digestive decompression (food pause, nasogastric tube placement, rectal stimulation), hemodynamic monitoring and search of sepsis signs. Due to the persistence or worsening of the clinical state, surgery is indicated. In some situations, only the surgical intervention with exploratory laparotomy and examination of the operative piece allow to identify the cause of the obstruction, as happened in these cases.

WHAT THIS CASE REPORT ADDS

- Bilious and/or fecaloid vomiting is a warning sign, which should evoke a possible surgical cause.
- The causes of intestinal obstruction in children and adolescents are varied, constituting a diagnostic challenge, which implies a careful and serial clinical evaluation, to identify situations with potential urgent and emergent surgical indication (*eg* intestinal volvulus).
- Intestinal obstruction has various causes in pediatric age and the congenital malformations are not exclusive of the neonatal period.

Conflicts of Interest

The authors declare that there were no conflicts of interest in conducting this work.

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Vómitos Biliares: Três Diagnósticos Diferentes

Resumo:
Os vómitos são uma queixa frequente, mas inespecífica, podendo estar na sua origem uma patologia do foro cirúrgico que condicione obstrução ou oclusão intestinal. Caso 1, adolescente de 16 anos com vómitos biliares e posteriormente fecaloides, dor abdominal e ausência de dejeções. Exames imagiológicos compatíveis com obstrução intestinal, identificando-se na laparotomia exploradora um volvo associado a uma malformação linfática do mesentério. Caso 2, menina de 4 anos com vómitos biliares e dor abdominal, decorrentes de obstrução intestinal por tricobezoar no jejuno, associado a tricolomania e tricofagia. Caso 3, rapariga de 15 anos com vómitos biliares e dor abdominal, com tomografia computorizada sugestiva de obstrução intestinal por pinça da artéria mesentérica. Realizou-se intervenção cirúrgica por ausência de resposta ao tratamento conservador. As causas de obstrução intestinal em pediatria são variadas e representam um desafio diagnóstico. Vómitos persistentes biliosos e/ou fecaloides devem evocar uma etiologia cirúrgica.

Palavras-Chave: Adolescente; Bezoares; Criança; Mesentério/anomalias congénitas; Obstrução Intestinal; Síndrome da Artéria Mesentérica Superior; Vómito/etiologia