Original Article

Global Pediatric Health
January-December 2014: 1–4

DOI: 10.1177/2333794X14553624
gph.sagepub.com
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Infantile Feeding Difficulties: It Is Not Always Reflux

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Abstract

Background. Gastric volvulus refers to a torsion of all or part of the stomach that may cause an obstruction of the foregut. The clinical symptoms of gastric volvulus range from asymptomatic to life-threatening and thus must be rapidly diagnosed. However, the presenting symptoms of gastric volvulus vary widely, which may cause diagnosis to be delayed or missed. *Objective*. Describe varying presentations of gastric volvulus (including a case report of a rare presentation), pathophysiology of the entity, and how to diagnose/treat the phenomenon. *Design/Method*. Article review and case presentation. *Results*. Our patient was taken to the operating room for a gastropexy and G-tube placement. During surgery, the stomach was redundant and large, but not currently torsed, consistent with intermittent organoaxial volvulus. There are several approaches to classifying gastric volvulus as well as different theories on how to treat the volvulus based on type and degree of rotation that this article aims to detail more thoroughly. *Conclusion*. There are a growing number of case reports describing gastric volvulus, which had historically been viewed as a rare finding. The presenting symptoms of gastric volvulus commonly mimic other, more benign newborn diagnoses, and thus can be difficult to diagnose. We present our patient as well as an article review of other cases to highlight the diverse presentations of gastric volvulus so this potentially devastating disease can be diagnosed quickly with prompt treatment initiation.

Keywords

critical care, gastroenterology, general pediatrics, emergency medicine, neonatology

Case Report

A 2-month-old male born at 35 weeks gestation, with a history of gastroesophageal reflux disease (GERD) needing Prevacid and thickened formula, presented with an increased frequency in "choking episodes" and vomiting. These choking episodes followed feeds and consisted of mucoid emesis, described by the mom as "transparent string cheese," and subsequent "gasping for air." His clinical course was further complicated by an acute viral illness with nasal congestion, decreased oral intake, and mild volume depletion.

Initial physical exam, including abdominal exam, was largely unremarkable except for signs of upper respiratory infection. Weight gain during this period was appropriate, and other vital signs were within normal limits. His initial lab workup revealed normal results. He was observed on an apnea monitor overnight and no acute events were recorded.

Due to the chronicity of symptoms and frequent episodes of vomiting, an upper gastrointestinal (GI) series was obtained. This revealed abnormal positioning of the stomach, which had a horizontal lie, with a relative caudad position of the duodenal bulb in relation to the gastric antrum (Figure 1), suggestive of an organoaxial volvulus.

Final Diagnosis

Chronic, intermittent organoaxial gastric volvulus.

Hospital Course

The patient was taken to the operating room for a laparascopic gastropexy and G-tube placement. During surgery, the stomach was found to be redundant and large,

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Figure 1. Upper GI study of our patient diagnosing organoaxial gastric volvulus. Antrum of the stomach is superior to the duodenal bulb (should be lower than or even with the duodenum).

but not currently torsed, consistent with chronic, intermittent organoaxial volvulus.

Postoperative course was uneventful, and the patient was discharged home the following day. By 4 months of age, he was on regular formula and was gaining weight appropriately with resolution of his symptoms. His G-tube was removed 2 months after surgery, and by 6 months of age, he continued to thrive well tolerating regular formula and age-appropriate baby foods.

Discussion

Introduction

The word volvulus means "twisting of a viscus upon itself."[1] Thus, a gastric volvulus refers to a torsion of all or part of the stomach that may cause an obstruction of the foregut.[2] There are a growing number of case reports describing gastric volvulus, which had historically been viewed as a rare finding. The clinical presentation of volvulus varies widely, which may cause diagnosis to be delayed or missed.

Anatomy of the Stomach

The stomach is anchored to the abdominal cavity by 4 ligaments (gastrohepatic, gastrophrenic, gastrocolic, and gastrosplenic) that allow the stomach to inflate and contract yet keep enough tension to prevent torsion along its long or short axis[3] (Figure 2A). Failure of these normal attachments, due to laxity, congenital absence, disruption, or abnormal gastric distention, can predispose one to gastric volvulus.[3]

Classification

There are several approaches to classify a gastric volvulus, which we have broken up into 3 categories.

Acute Versus Chronic. Acute presentation typically suggests severe, sometimes life-threatening symptoms with sudden onset. Chronic presentation suggests more insidious onset of less-severe symptoms.

Primary Versus Secondary. Primary volvulus is defined as a failure of the stomach's normal attachments to the abdominal cavity due to laxity, congenital absence, or disruption of the anchoring ligaments.[3] In addition, any condition that predisposes the stomach to abnormal distention (fluid secondary to pyloric stenosis, aerophagia, etc) makes the stomach more inclined to twist on itself, especially in neonates/infants with lax or immature ligaments.

Secondary gastric volvulus suggests that the volvulus coexists with an anomaly of an adjacent organ. The most common anomalies are diaphragmatic defects such as eventration or hiatal hernias,[4] though other predisposing factors including asplenia or wandering spleen (a mobile spleen is thought to draw the gastric fundus downward via the gastrosplenic ligament that can promote twisting of the stomach) have been noted.[1]

Organoaxial Versus Mesenteroaxial. There are 2 axes on which the stomach can rotate, and this axis differentiates the 2 types of gastric volvulus. The short axis of the stomach joins the greater and lesser curvatures of the stomach (Figure 2C); rotation around this line suggests a mesenteroaxial volvulus (MA; Figure 2E).[1,5]

An organoaxial volvulus (OA) results from rotation around the long axis (Figure 2D), or the axis extending from the gastroesophageal junction to the pylorus (Figure 2B).[1,2,5]

Presentation

The clinical symptoms of gastric volvulus range from asymptomatic to life-threatening, depending on the type and degree of rotation. MA volvulus usually presents acutely, while OA might be more chronic.[3] Additionally, MA is more often associated with diaphragm abnormalities, making it associated with secondary causes of volvulus.[3] Thus, secondary volvulus is usually more severe by the time of presentation and can even be life-threatening. There is a clinical triad of symptoms used to describe an acute gastric volvulus: acute localized epigastric distention, unproductive vomiting, and the inability to advance a nasogastric tube.[1] These features

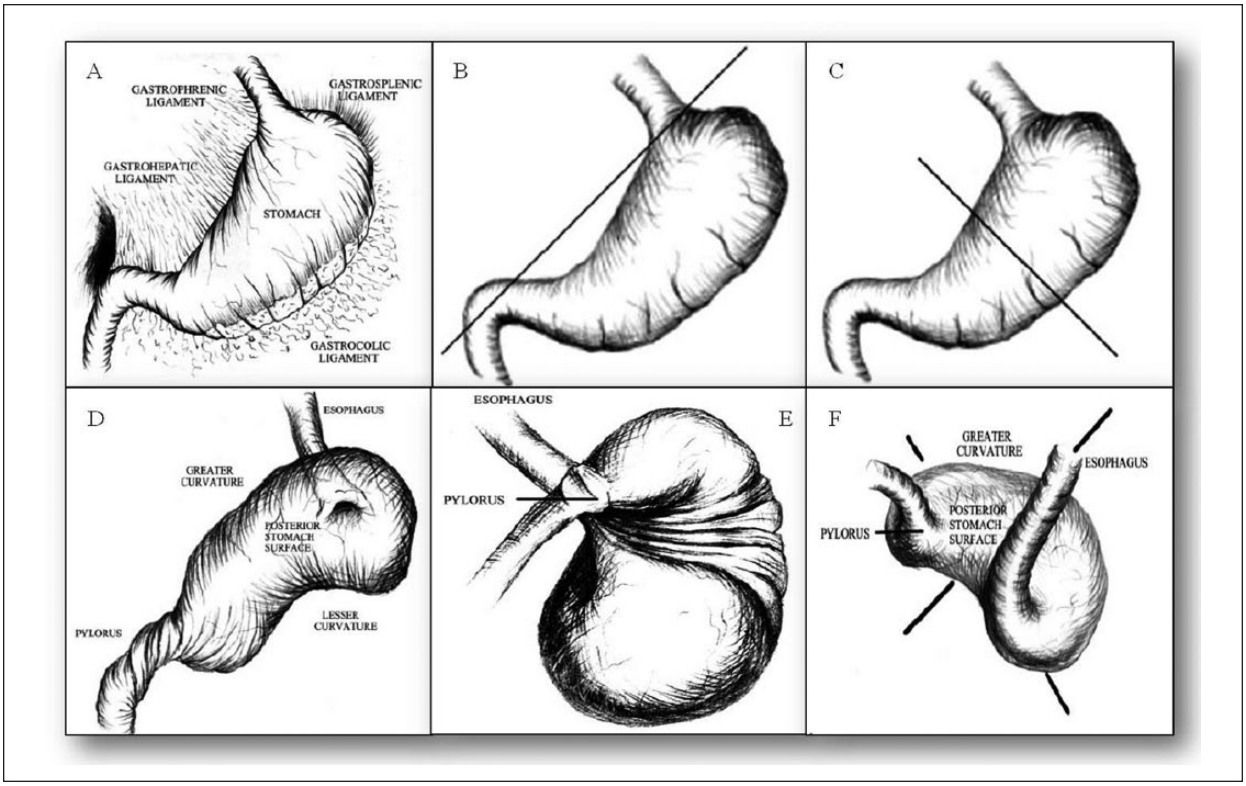

Figure 2. The 4 ligaments of the stomach normally function to prevent twisting or turning about 2 anchor points: the gastroesophageal junction and the pylorus (A). The organoaxial axis of the stomach extends from the gastroesophageal junction to the pylorus (B). The mesenteroaxial axis extends from the greater to the lesser curvature of the stomach (C). Organoaxial volvulus, or "upside down stomach" (D). Mesenteroaxial gastric volvulus, demonstrating complete obstruction of the distal esophagus (E). Combined gastric volvulus, with rotation about the organoaxial and mesenteroaxial axes (F). Adapted with permission from Cribbs et al.[2]

may be difficult to assess in a child; thus, we usually diagnose based on a high index of suspicion and characteristic radiographic findings, as explained below.

A chronic gastric volvulus is probably more common than the acute presentation and is more commonly due to OA volvulus. Symptoms, which may include early satiety, intermittent dysphagia, failure to thrive, recurrent projectile vomiting, abdominal distention, GERD, colic, and sleep problems,[1,2,5-7] are harder to distinguish because they are similar to more typical conditions such as pyloric stenosis and reflux,[7] as was the case with our patient.

Diagnosis

The definitive diagnosis of gastric volvulus is made via surgical exploration[1,4] and/or upper GI studies. However, plain films can also give a high index of suspicion for a volvulus, as evidenced by gastric dilatation and scarcity of gas in the remainder of the GI tract. An upper GI study, which is considered the gold standard of imaging for diagnosis, may be normal (if volvulus is intermittent) or may show abnormal orientation of stomach based on which type of volvulus is present.

Treatment Options

Conservative. Historically, conservative treatment alone has been found to be effective in patients with chronic or intermittent volvulus.[1] Conservative treatment consists of small amounts of thickened feeds and sitting in a right recumbent position with the head raised 30° to 45° for at least an hour after feeding.[1,6] This position prevents folding of the gastric fundus and favors rapid gastric emptying. However, with this method, it still may take up to 6 months before symptoms resolve. As the baby grows, the right side of the stomach develops and the ligamental attachments strengthen, preventing rotation of the stomach in the future.[5]

Surgical. The acute form of volvulus, and cases of chronic volvulus that are not amenable to conservative methods, require surgical intervention. Surgery can be

divided into 3 steps: decompression of dilated stomach, resection/correction of any associated defects, and prevention of recurrence with gastrostomy and/or anterior gastropexy.[1,5] Gastrostomy serves for both fixation of the stomach and postoperative decompression and can safely be removed within 2 to 3 weeks.

Conclusion

Gastric volvulus can present with a variety of symptoms, and it is often difficult to diagnose clinically, especially in the case of chronic, intermittent volvulus. While treatment for acute presentation is obvious (surgical intervention), management of chronic, intermittent volvulus remains less clear. Our patient, who was already on smaller, thickened feeds, continued to have persistent symptoms, so it was decided that surgical intervention was his best option. He underwent gastropexy with temporary gastrostomy. He continued to thrive and at 6 months of age was on regular formula and age-appropriate baby food.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

References

1. Mayo A, Erez I, Lazar L, Rathaus V, Konen O, Freud E. Volvulus of the stomach in childhood: the spectrum of the disease. *Pediatr Emerg Care*. 2001;17:344-348.
2. Cribbs RK, Gow KW, Wulkan ML. Gastric volvulus in infants and children. *Pediatrics*. 2008;122:e752-e762.
3. Oh SK, Han BK, Levin TL, Murphy R, Blitman NM, Ramos C. Gastric volvulus in children: the twists and turns of an unusual entity. *Pediatr Radiol*. 2008;38:297-304.
4. Chattopadhyay A. Neonatal gastric volvulus: another cause of "mucousy baby" with gasless abdomen. *Indian J Pediatr*. 2010;77:691-692.
5. Anagnostara A, Koumanidou C, Vakaki M, Manoli E, Kakavakis K. Chronic gastric volvulus and hypertrophic pyloric stenosis in an infant. *J Clin Ultrasound*. 2003;31:383-386.
6. Bautista-Casasnovas A, Varela-Cives R, Fernandez-Bustillo JM, et al. Chronic gastric volvulus: is it so rare? *Eur J Pediatr Surg*. 2002;12:111-115.
7. Singal AK, Patel R, Jain S, Gavhane J, Kadam NN. Laparoscopic management of neonatal gastric volvulus: a case report and review of the literature. *Eur J Pediatr Surg*. 2009;19:191-193.