Diagnostic difficulty in mesenteroaxial gastric volvulus—A rare cause of acute abdomen in a child

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ABSTRACT
Gastric volvulus as a cause of acute abdomen is uncommon, especially in children. This increases the likelihood of missed or delayed diagnosis leading to increased morbidity and mortality. Acute gastric volvulus is a potentially life-threatening condition and timely diagnosis and management significantly reduces the chances of complications. We report a case of an adolescent male child, who presented to the casualty with acute abdominal pain in the epigastric region, associated with vomiting and epigastric belching and was being managed with a clinical diagnosis of acute pancreatitis. Eventration of left hemi-diaphragm was missed and gastric volvulus was not suspected in the initial differential diagnosis leading to delay in the diagnosis and management. The child was diagnosed using upper gastrointestinal barium study and was immediately operated upon with favourable outcome.

Keywords: Acute abdomen, Borchardt’s triad, eventration, gastric volvulus, mesenteroaxial.

INTRODUCTION
The stomach is a relatively uncommon site of volvulus and mesenteroaxial is even rarer of the two types of gastric volvulus. Gastric volvulus occurs frequently in infants and older age group and is quite rare in adolescents. A 12-year-old male child presented to the casualty with acute abdominal pain in the epigastric region and was managed as acute pancreatitis. However, radiological evaluation later revealed an acute gastric volvulus and was immediately operated upon with favourable outcome. Acute gastric volvulus, although rare, should always be kept in the differential diagnosis of acute abdomen in children presenting with epigastric distension, pain, and non-bilious vomiting so as to help in early diagnosis and surgical management.

CASE REPORT
A 12-year-old male child presented to the casualty department with complains of abdominal pain, vomiting and epigastric belching since past 12 hours. The pain was gradually increasing in intensity, radiating to the back in the retrocardiac area and was relieved on bending forward. His previous medical history was not significant except for a history of fall from bicycle few days back.

On physical examination, the patient was alert and oriented. His vitals were normal except for tachycardia. There was mild fullness noted in epigastrium; however, there was no guarding or rigidity. Bowel sounds were normal. A working clinical diagnosis of acute pancreatitis was made and patient management was started. After IV fluid administration, routine investigations (Hb%, TLC, DLC, ESR) were ordered which were within normal range. An
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Ultrasound abdomen was advised which showed no evidence of pancreatitis, nor any evidence of fluid collection. Also, bowel loops showed normal peristalsis with no evidence of fluid filled distended bowel. X-ray abdomen (erect and supine) also showed no evidence of fluid level or gas under diaphragm. Levels of serum lipase and amylase turned out to be normal, which raised query over the working diagnosis. The patients’ clinical condition remained stable, however pain was still persisting.

Next morning, following detailed discussion with the radiologists, review of the abdominal X-ray revealed an elevated left hemidiaphragm with distended hollow viscus under the diaphragm. An upper GI barium study was preferred over CT to look for the distended hollow viscus and the elevated hemidiaphragm. The upper GI Barium study showed widely distended stomach lying in vertical plane with the gastroesophageal junction at a lower level than pylorus. The antrum was displaced and was seen at a higher level. These findings were consistent with mesenteroaxial type of gastric volvulus with eventration of left hemi-diaphragm [Figure 1]. The patient was immediately taken up for surgery. A subcostal incision was used to access both the diaphragm and for gastropexy. After anterior gastric fixation, diaphragmatic plication and search for any associated gastrointestinal anomaly, abdomen was closed. The postoperative period was uneventful and the patient was discharged on 7th post operative day. The patient was last seen at 1 year follow up and has progressed well.

**Discussion**

The stomach has traditionally been considered as an uncommon site of volvulus. Gastric volvulus is of two types: organoaxial type and mesenteroaxial type with organoaxial accounting for 2/3rd of the cases and frequently associated with paraoesophageal hernias in adults.[1,2] The stomach rotates along its long axis in organoaxial volvulus with greater curvature displaced superior to the lesser curvature. In mesenteroaxial volvulus, stomach rotates along its short axis with antrum displaced at a higher level to the gastroesophageal junction as seen in our case.[1,3] In infants and children, gastric volvulus is a relatively rare entity. Traditionally, mesenteroaxial volvulus was considered more common in infants and children, but Cribbs et al. in his review of acute gastric volvulus showed that organoaxial (54% vs. 41% mesenteroaxial and 5% combined volvulus) is also more common in this age group as well.[3]

The stomach is normally anchored to the abdominal wall at oesophageal hiatus and pylorus by four ligaments. Idiopathic or primary gastric volvulus results when there is failure of these ligaments. Secondary gastric volvulus occurs as a result of disorder of normal gastric anatomy or adjacent organ abnormality, namely spleen, diaphragm as seen in our case where it was secondary to eventration of hemi-diaphragm.[3,4]

The incidence is slightly more common in males, with 58% cases of acute gastric volvulus presenting in first year of life. The most common presentation is non-bilious vomiting followed by epigastric distension and abdominal pain.[11] An inability to pass nasogastric tube into the stomach associated with acute epigastric pain and vomiting constitutes an important clinical “Borchardt” triad associated with acute gastric volvulus.[12] Diaphragmatic eventration is the most commonly associated anomaly followed by congenital diaphragmatic hernia, intestinal malrotation, and wandering spleen among others.[3,4,6]

The diagnosis requires high degree of suspicion because of its low incidence in children. Upper gastrointestinal barium study is the procedure of choice to diagnose the condition,[11] because it will evaluate the rotation of stomach as well as passage of contrast into the duodenum as seen in our case. CT scan, with coronal reformatted images, is

**Figure 1.** AP upper GI barium (a, b) shows passage of contrast through the gastroesophageal junction with eventration of left hemidiaphragm with distended hollow viscus below it (a) The gastroesophageal junction and fundus of stomach are at a lower level with distended stomach lying in vertical plane with rotation of stomach along its short axis (b) Oblique upper GI barium. (c, d) Displacement of gastric antrum above the gastroesophageal junction consistent with mesenteroaxial volvulus.
another imaging modality which gives good information regarding rotation of stomach, its relationship with diaphragm, and its extension into the thoracic cavity.[1]

Surgical repair in the form of gastropexy, whether open or laparoscopic is the most common treatment modality in acute gastric volvulus.[5–7] Treatment of the associated anomaly is important to prevent recurrence. In patients presenting with chronic volvulus, a majority are managed nonoperatively.[3] Timely surgical management ensures excellent prognosis. The mortality rate in children presenting with acute gastric volvulus is twice that of chronic gastric volvulus. However, more than 2/3rd of these deaths are due to delay in diagnosis and proper surgical intervention.[3] Delay may result in gastric ischemia leading to necrosis, perforation, peritonitis, and mediastinitis, all associated with poor prognosis.[1]

CONCLUSION

Acute gastric volvulus, although rare, should always be kept in differential diagnosis of acute abdomen in adolescent children presenting with epigastric distension, pain, and non–bilious vomiting so as to help in early diagnosis and prevention of grave complications.

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REFERENCES