



Acute Mesenteroaxial Gastric Volvulus with Eventration of the Diaphragm

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Abstract:

We report a 6 year old female child who presented with acute mesenteroaxial volvulus of the stomach associated with eventration of the left hemidiaphragm. Clinically the child presented with epigastric distension, unproductive retching and upper abdominal pain. The patient was diagnosed by upper gastrointestinal contrast study and was immediately operated with the successful outcome.

Key words: Diaphragmatic Eventration, Stomach Volvulus, Intestinal Volvulus, Abdominal Pain.

Introduction

Gastric volvulus is usually a disease occurring more commonly in adults. 10-12% of cases occur before age of 1 year, but cases have been reported in children up to 12 years of age. Gastric volvulus is an abnormal degree of rotation of one part of the stomach around another varying from 180 degree to 360 degrees [1]. According to the axis of rotation of the stomach, it is of three types: organoaxial, mesenteroaxial and combined type. Rotation of the stomach result in incomplete or complete obstruction at the inlet or outlet associated with vascular compromise. Early diagnosis and surgical intervention is required to prevent grave complications like ischemia, necrosis and perforation. Gastric volvulus may be primary or secondary, depending upon the absence or presence of associated anomalies. Among the associated anomalies diaphragmatic defect is

most common predisposing cause for volvulus in upto 60% of the cases [2]. We herein report a successful management of 6 year old female child who presented with acute mesenteroaxial gastric volvulus with eventration of the diaphragm.

Case Report

A 6 years old female child presented with sudden onset of non bilious vomiting, upper abdominal pain and epigastric distension for last 24 hours. Initially vomitus contained ingested food but later on she had unproductive retching. There was no history of hematemesis or any significant past history.

Examination revealed stable vitals with mild pallor, visible fullness seen in epigastric and umbilical region of abdomen. Abdomen was non tender with

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absence of guarding and rigidity and there was normal bowel sound pattern. In view of evident upper abdominal distention, nonbilious vomiting and acute abdomen, upper gastro intestinal obstruction was suspected. 1.5 liters of gastric contents were aspirated on placement of nasogastric tube. X-ray abdomen in erect position showed raised left hemidiaphragm with a large air-fluid level in the left hypochondrium, paucity of distal gas and right mediastinal shift [Fig.1]. In view of raised left hemidiaphragm with a large air-fluid level in left sub-phrenic space, eventration of diaphragm with gastric volvulus was suspected. Routine hematological and biochemical tests revealed anemia which was corrected with blood transfusion.

The diagnosis was confirmed by upper GI contrast study, which showed grossly distended spherical stomach, raised left dome of diaphragm with stomach extending into left thorax, the fundus of stomach lying at lower level and the antrum part at higher level suggestive of inversion of stomach. Dye did not extend beyond the pyloric region suggestive of obstruction [Fig.2].



Fig.1: Erect X-ray film showing raised left diaphragm with large air-fluid level in left hypochondrium, paucity of distal gas and right sided mediastinal shift.

After adequate resuscitation the child was taken up for surgery by left subcostal incision. Intraoperative findings revealed grossly distended stomach. The gastroesophageal junction and fundus of stomach were at a lower level and the antrum at high level leading to confirmation of mesenteroaxial volvulus [Fig.3]. Derotation was made. Spleen and colon were seen high up below the eventrated diaphragm. The plication of diaphragm was done [Fig.4] and then anterior gastropexy was performed with fixing the stomach at two points to the anterior abdominal wall and fundus with the plicated diaphragm. Post operatively, the child was kept nil per orally for 2 days and started oral feeding on 3rd day and was discharged uneventfully on day 7.

Discussion

Gastric volvulus is rare because the stomach is held securely in place by four attachments namely esophageal hiatus, gastro-phrenic ligament, gastro-splenic ligament and duodenum which prevent abnormal rotation of the stomach. A normal diaphragm is also responsible for prevention of abnormal displacement of abdominal viscera and gastric volvulus. Abnormalities of these



Fig.2: Upper GI contrast study depicting grossly distended stomach, raised left dome diaphragm, fundus at lower level and antrum at higher level, no flow of contrast beyond pyloric region.



Fig.3: Intra-operative photograph showing grossly distended stomach with fundus caudally and antrum at upper level.

suspensory ligaments of the stomach, or excessive mobility due to wide sub-diaphragmatic space as in eventration of the diaphragm leads to gastric volvulus. Gastric volvulus is of three types: organoaxial, mesenteroaxial and combined types. In organoaxial or upside-down stomach, rotation occurs along its long axis with greater curvature displaced superior to the lesser curvature. It is most common type in both children and adults and is usually associated with diaphragmatic defects and vascular compromise is more common in this type. In mesenteroaxial volvulus, stomach rotates along its short axis, passing from greater curvature to lesser curvature perpendicular to long axis, with antrum displaced at a higher level to the gastro-esophageal junction as seen in our case, and diaphragmatic defect is less commonly seen. It is more often seen in infants and children, but Cribbs *et al.* showed that organoaxial is also more common in this age group as well (54% vs. 41% mesenteroaxial and 5% combined) [3]. In combined form stomach rotates on both its long and short axis.

The incidence of gastric volvulus is slightly more common in males. The most common presentation



Fig.4: Intra-operative photograph showing plication of diaphragm being done.

is non-bilious vomiting, upper abdominal distension and pain, these symptoms depend on the degree and rapidity of twisting. The typical features include Borchardt's triad of epigastric pain, retching with no vomiting, and difficulty or failure to pass nasogastric tube associated with acute gastric volvulus [4]. Triad seen in 30% in adult and rarely in children but one or more of these criteria is present in 70% of children suffering from gastric volvulus. Eventration of diaphragm is the most commonly associated anomaly among the congenital or traumatic diaphragmatic hernia, paraesophageal hernia, Morgagni hernia, pyloric stenosis, intestinal malrotation, wandering spleen, and Asplenia-polysplenia syndrome.

Because of low incidence in children, diagnosis requires high degree of suspicion. Upper gastrointestinal contrast study is the procedure of choice to diagnose the condition as it will evaluate the anatomical changes of stomach more exactly as seen in our case. The diagnosis was confirmed by upper GI contrast study, which shows grossly distended spherical stomach, raised left dome of diaphragm with stomach extending into left thorax,

the fundus of stomach lying at lower level and the antrum part at higher level suggestive of inversion of stomach [5]. CT scan, and MRI are another imaging modalities which provide good anatomical details and confirm the diagnosis.

After adequate resuscitation the child was taken up for surgery by left subcostal incision, because it allows ready access to both diaphragm for plication and stomach for gastropexy, and allows abdominal exploration for associated gastrointestinal anomalies [6]. Reduction of acute gastric volvulus may be attempted with nasogastric decompression but it is often unsuccessful, so surgical repair in the form of anterior gastropexy, whether open or laparoscopic assisted is performed to fix the stomach in its anatomically correct position [7]. Most cases of acute and chronic gastric volvulus can now be approached laparoscopically. A combined laparoscopic and endoscopic approach has also been used to better assess the intra-luminal and intra-abdominal status of the stomach as well as its position before, during and after fixation. Surgical goals of treatment include reduction of the volvulus, prevention of recurrence and correction of predisposing factors. Emergent surgical intervention is indicated for acute gastric volvulus but majority of patients with chronic volvulus are managed non-operatively and surgery is performed to prevent complications. Early diagnosis and treatment ensure excellent prognosis. The overall mortality rates of acute gastric volvulus range from 15% to 20%, while those for chronic gastric volvulus range from 0% to 13% [8]. About more than 2/3rd of these deaths are due to delay in the management of volvulus leading to complications like gastric ischemia, necrosis, perforation, peritonitis, and mediastinitis, all associated with poor prognosis.

Conclusion

Acute gastric volvulus, although rare in the children, but it does require a heightened sense of

awareness to avoid delay in appropriate therapy and minimize the risk of complications which can lead to death. Gastric volvulus should always be kept in differential diagnosis in a patient with acute abdomen, epigastric distension and non-bilious vomiting so as to help in early diagnosis and prevention of grave complications.

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