

# Twist and Turn: A Rare Case of Eventration of Diaphragm, Mesentero-axial Volvulus and Gastric Outlet Obstruction

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## ABSTRACT

Acute gastric volvulus is a rare entity which is a surgical emergency, demands early recognition and appropriate treatment to avoid life threatening complications. The author hereby, report a case of 18-year-old girl who presented with epigastric pain with previous history of laparoscopic repair of diaphragmatic hernia. Cross-sectional imaging revealed concurrent occurrence of eventration of left hemi diaphragm, mesentero-axial volvulus with complication of gastric outlet obstruction, which is very uncommon.

**Keywords:** Gastropexy, Herniation, Meso-gastrium, Plication, Stomach

## CASE REPORT

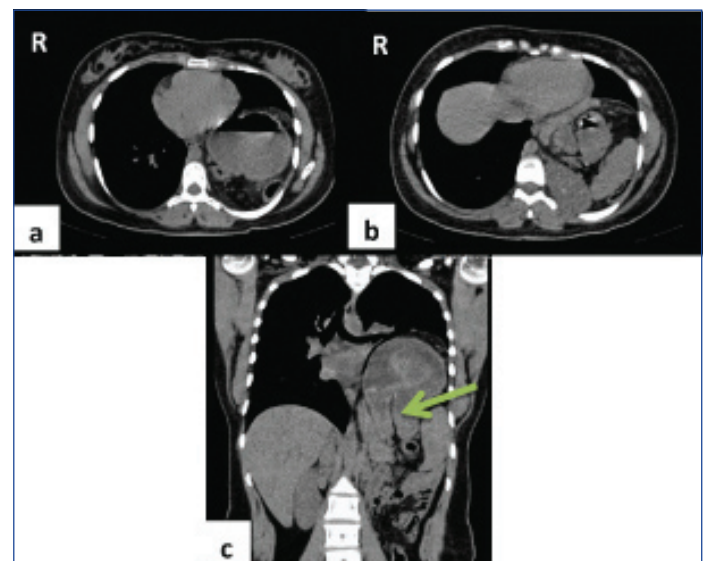
An 18-year-old female presented to Department of Surgery with complaints of abdominal pain, vomiting and intolerance to solid and liquid foods since three days. She had similar complaints three months back and was diagnosed to have herniation of the left hemi-diaphragm with left kidney, stomach, spleen and omentum in the thorax. The patient underwent laparoscopic diaphragmatic repair of left hemi-diaphragm and plication of the defect was performed in the same institution.

On examination, vitals were stable with epigastric tenderness. Laboratory investigations were within normal limits. For further evaluation of the patient presenting complaints, she was referred to Department of Radio-diagnosis. Plain radiograph of abdomen and contrast enhanced computed tomography was done. Elevated left dome of diaphragm with a gas-filled viscous in the lower chest on left side was seen and there was no evidence of free air under the domes of the diaphragm [Table/Fig-1]. Non-contrast and contrast enhanced CT of thorax and abdomen (oral and intravenous contrast) was done in arterial and venous phases demonstrated eventration of the left dome of diaphragm. The body and pylorus of the stomach, splenic flexure, body and tail of pancreas, upper pole of left kidney and left gastric artery were in the thorax. Pyloric end of the stomach was seen superiorly and fundus was seen inferiorly indicating mesentero-axial volvulus of stomach. No passage of oral contrast beyond the pylorus was noted on delayed images suggestive of gastric outlet

obstruction. There was no mass or any other significant abnormality [Tables/Fig-2,3]. Insertion of naso-gastric tube was done for decompression of stomach prior to surgery. The patient underwent thoracotomy with double breasting of the diaphragm and mesh reinforcement was done [Table/Fig-4]. Intraoperative findings were eventration of the left dome of diaphragm, volvulus of stomach along the meso-gastrium and spleen, tail of pancreas, left kidney seen in the thorax. Left lung was well developed. Post-operatively recovery was uneventful [Table/Fig-5].



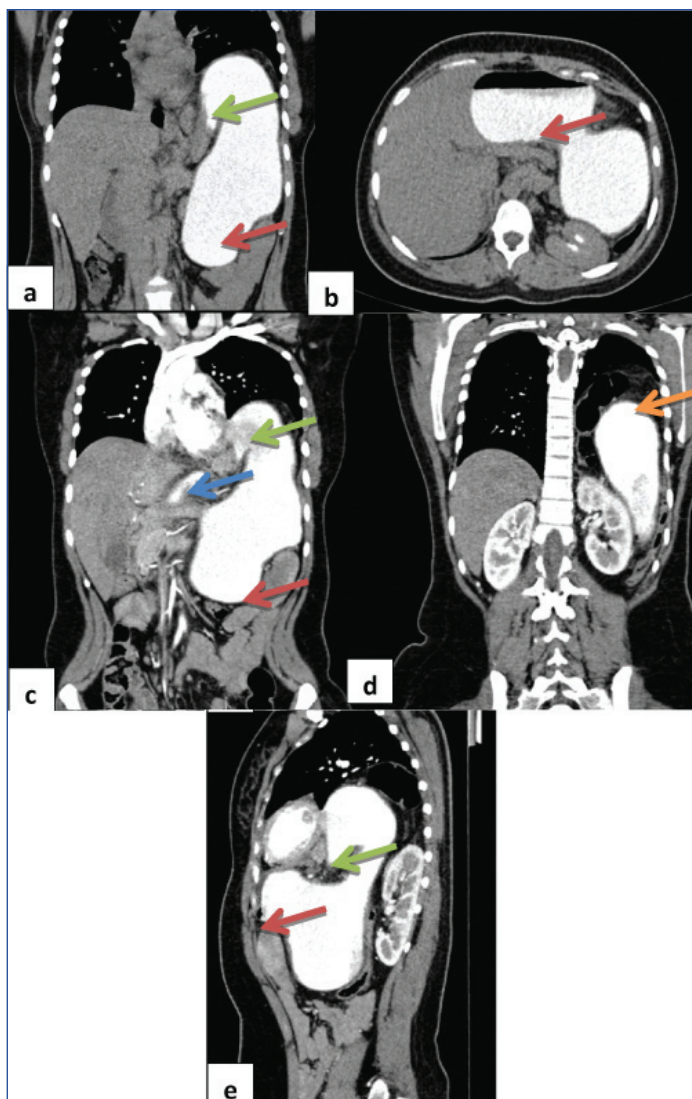
**[Table/Fig-1]:** Erect radiograph of abdomen - elevation of the left hemi-diaphragm with lucency in the lower chest (arrow). No free air under the dome of the diaphragm. Ground glass appearance of the abdomen.



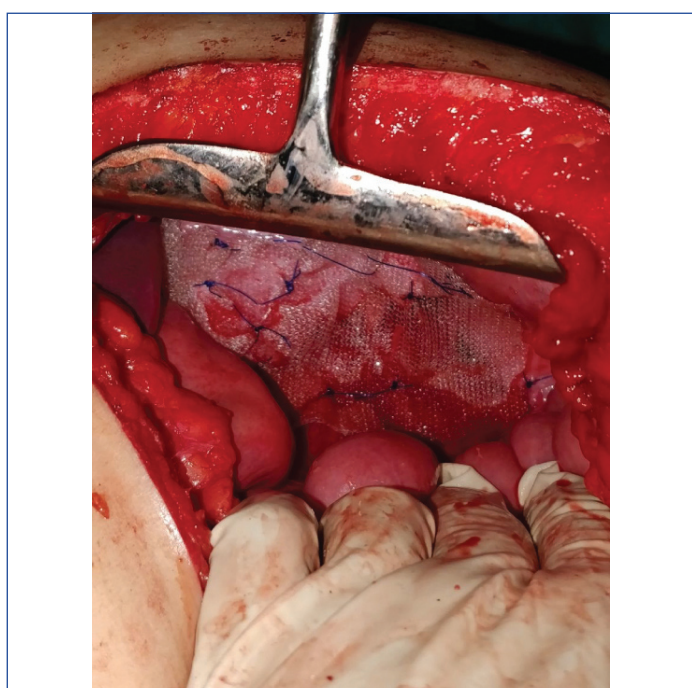
**[Table/Fig-2 (a-c)]:** Non-contrast enhanced computed tomography (Axial and Coronal Planes) shows eventration of left hemidiaphragm with twisting of the stomach (arrow).

## DISCUSSION

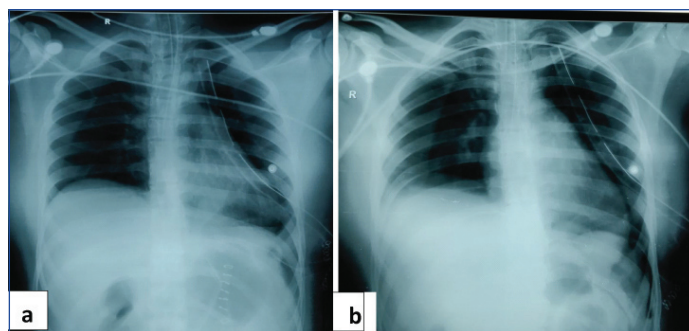
Gastric volvulus is rare surgical emergency and is defined as 180 degree twisting of the stomach on mesogastrium. First it was described in 1866 by Berti in an autopsy study [1-3]. Sub-classified based on the cause (primary/idiopathic and secondary), axis of rotation (organo-axial, mesentero-axial and combined type) (and on clinical presentation (acute and chronic) [Table/Fig-6] [3,4]. Gastric volvulus involves a stomach that is partially or totally intrathoracic and that rotates between the normally positioned gastric ligaments. Salient features of mesentero-axial volvulus are shown in [Table/Fig-7] [3,4]. The risk factors are phrenic nerve palsy, eventration of the diaphragm, traumatic diaphragmatic hernia, gastric distension and abnormalities of the spleen. Complications of gastric volvulus



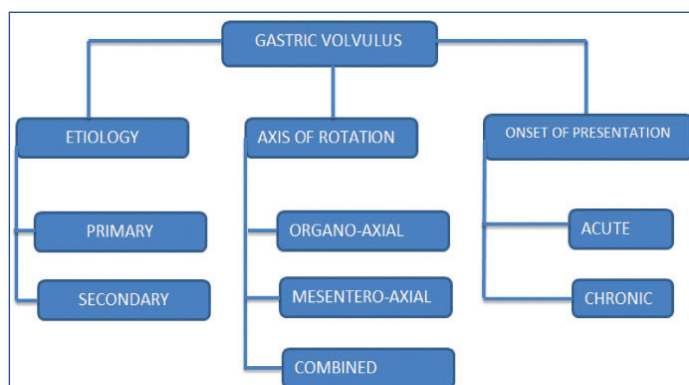
**[Table/Fig-3 (a-e)]:** Contrast enhanced computed tomography (oral and intravenous) shows eventration of the left dome of diaphragm. Body and pylorus of the stomach, distal one-third of transverse colon, body and tail of pancreas, upper pole of left kidney and left gastric artery in the thorax (orange arrow); Pyloric end of the stomach (green arrow) was seen superiorly and fundus (red arrow) was seen inferiorly - mesentero-axial volvulus of stomach; gastroesophageal junction (Blue Arrow); No Passage of oral contrast beyond the pylorus was noted on delayed images - gastric outlet obstruction.



**[Table/Fig-4]:** Intraoperative image after double breasting of left hemi-diaphragm and mesh reinforcement.



**[Table/Fig-5 (a & b)]:** Postoperative radiograph of chest (Day 1 and Day 3) shows normal position of both the hemi-diaphragms. Nasogastric and Intercostal Drainage Tube Insitu.



**[Table/Fig-6]:** Classification of gastric volvulus [3,4].

1. Less common than organoaxial gastric volvulus (29%)
2. Stomach rotates around its transgastric or short axis
3. Antrum and pylorus moves above the gastro-esophageal junction, twisting its vascular supply leading to ischemia
4. Reversal of pylorus and gastroesophageal junction

**[Table/Fig-7]:** Salient features of mesentero-axial volvulus [3,4].

includes gastric outlet obstruction, strangulation, perforation and serious cardio-respiratory compromise. Imaging is key for early recognition of this clinical entity along with its complications [2,3,5].

This is an unusual case of acute secondary mesentero-axial volvulus with eventration of diaphragm. Gastric volvulus usually occurs in the fifth decade of life but in present case, the patient was of young age. Predisposing factors for gastric volvulus in adults are paraoesophageal herniation, diaphragmatic surgery or trauma, and left lung resection [3,6].

The primary symptoms include Borchardt's triad consisting of severe epigastric pain and distension, vomiting, and difficulty in placing the nasogastric tube. These symptoms suggest pyloric and cardiac obstruction and posterior gastric distention [3]. Present case patient presented with two components of the Borchardt's triad which was epigastric pain and vomiting.

In addition to Borchardt's triad, there are three important characteristics of gastric volvulus has been described which includes: (a) Minimum abdominal findings when the stomach is in the thorax; (b) A gas-filled viscous in the lower chest or upper abdomen in chest radiography, which was present in index case; (c) Obstruction at the site of the volvulus shown by emergency upper gastrointestinal series [3].

Most common type of gastric volvulus is organo-axial, usually seen in adults and is associated with paraesophageal hernia and diaphragmatic defects and eventration. Jabbour G et al., reported a case of spontaneous mesentero-axial gastric volvulus with gastric outlet obstruction in a 23-year-old male who was treated by laparotomy with resection of ischemic stomach [2]. Sinwar PD reported a case in paediatric male child with partial eventration of left hemi-diaphragm and mesentero-axial gastric volvulus who was

treated with anterior gastropexy [5]. Singham S and Sounness B reported a case of elderly female with para-oesophageal hernia and acute mesentero-axial volvulus [7]. Fansur M and Atiq S reported an isolated case of mesentero-axial volvulus with Morgagni hernia in 80-year-old elderly female [8]. Porcaro F et al., reported a case of chronic organo-axial volvulus with delayed emptying in paediatric child [9]. Gupta V et al., reported a case of middle aged man with eventration with chronic gastric volvulus complicated with perforation and strangulation [10]. Martis JS et al., reported a similar case in an elderly male [11].

Association of eventration of diaphragm and mesentero-axial type of gastric volvulus is uncommon in a young adult, less than 10 cases have been reported in the literature till date [2,5,7,8,10,11]. Exact incidence of acute volvulus is not known. Most common complication of gastric volvulus is gastric outlet obstruction which can be acute or recurrent or intermittent or chronic. Acute gastric volvulus is associated with 30-50% mortality [3,5-8].

Abdominal radiograph is the initial investigation of choice. Gas filled viscus can be seen in the lower chest. Obstruction at the site of the volvulus can be demonstrated on emergency upper gastrointestinal series [3]. Multi-Detector Computed Tomography (MDCT) is the investigation of choice and is useful in diagnosis of diaphragmatic defect, gastric volvulus and its associated complication, to determine axis of rotation of the stomach, position of greater and lesser curvature, pylorus and gastro-oesophageal junction position [4].

Treatment includes both non-surgical and surgical methods. Non-surgical management includes gastric decompression with naso-gastric tube. Most commonly preferred surgical method for treatment of gastric volvulus is open/laparoscopic reduction of the volvulus with or without gastropexy to prevent recurrence [3,4,9-11].

## CONCLUSION(S)

Present case is of a young adult female who had undergone previous laparoscopic hernia repair, who presented with epigastric tenderness and intolerance for food. MDCT aided in early diagnosis which in turn helped in proper management of the patient to reduce the associated morbidity and mortality.

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