

Organo-Axial Volvulus of the Stomach with Diaphragmatic Eventration

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Gastric volvulus occurs when the stomach rotates about its longitudinal axis (organo-axial volvulus), or about an axis joining the lesser and greater curvatures (mesentero-axial volvulus). Primary gastric volvulus, making up one third of cases, occurs when the stabilizing ligaments are too lax as a result of congenital or acquired causes. Secondary gastric volvulus, making up the remainder of cases, occurs in association with a paraesophageal hernia or other congenital or acquired diaphragmatic defects. While gastric volvulus may occur acutely, especially in children, it may not be clinically apparent and discovered incidentally. The authors present a case of chronic organo-axial volvulus of the stomach secondary to left hemidiaphragmatic eventration with a review of the relevant literature.

Key Words : *Organo-axial volvulus of stomach; Diaphragmatic eventration*

INTRODUCTION

Gastric volvulus, an entity seen in both pediatric and adult patients, occurs when the stomach twists upon itself. This event may be transient, producing few if any symptoms, or may lead to obstruction or even ischemia and necrosis. Pare described the first case of gastric volvulus in 1579 in a patient with diaphragmatic injury from a sword wound¹⁾. Since then, several other reports have appeared in the literature. In Korea, acute gastric volvulus in pediatric and adult patients has been reported²⁻⁴⁾ but chronic organo-axial gastric volvulus with diaphragmatic eventration has not been reported. This report describes a rare case of gastric volvulus with a review of the literature.

CASE

A 41-year-old man visited our hospital for evaluation of upper abdominal discomfort. He had a feeling of fullness and discomfort in the upper abdomen for 2 months. These attacks lasted about 2 hours and were not usually severe. There was no dyspepsia nor was the pain related to any other precipitating factor. Twenty years ago, he was told that his chest radiography, performed due to routine survey for military service, was abnormal. But he had received no specific measures since then and he had been relatively healthy. He denied any history of antecedent trauma or surgery. A thorough review of symptoms was performed but did not disclose any respiratory or cardiovascular symptoms. On clinical examination, he appeared not acutely ill looking and his body temperature was 36 °C, blood pressure 120/70 mmHg, respiratory rate 24/min. Auscultation of the chest showed diminished breathing sound at the left lung base and heart sound was normal. The abdomen was soft and bowel sounds were normal. No abnormalities were observed in CBC, liver chemistry, serum amylase and

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stool examination.

The chest radiograph showed the left hemidiaphragm to be located at an unusually high intercostal space with large air-fluid level (Figure 1). Upper gastrointestinal series demonstrated the typical appearance of an organo-axial volvulus of the stomach (Figure 2). The barium-filled stomach was twisted on an axis from the pylorus to the esophagus. The greater curvature was uppermost and formed a continuous convex curve to the duodenum. Fluoroscopy of the diaphragm demonstrated no movement of the left hemidiaphragm according to respiration. The patient refused surgical or endoscopic correction of the volvulus and has been followed in the outpatient clinic for more than 6 months without symptom aggravation.

DISCUSSION

The stomach is relatively fixed at the esophageal hiatus and the pylorus by the four gastric ligaments. The gastrophrenic ligament and the retroperitoneal attachment of the second part of the duodenum provide the superior and inferior fixation. The gastrohepatic ligament tethers the lesser curve, the gastrocolic ligament connects the stomach to the transverse colon, and the gastrosplenic ligament tethers the greater curve. The absence or stretching of these ligaments can cause a volvulus³.

The clinical symptoms depend upon the extent or degree of rotation, obstruction and associated defect. Borchard's triad of pain, violent retching and inability to pass a nasogastric tube⁶ should lead to a strong clinical suspicion of acute gastric volvulus. An acute volvulus is an emergency situation, with either obstruction or strangulation of the stomach and requires expeditious surgery. In comparison, the clinical features of chronic volvulus are nonspecific as in our patient. This explains why the diagnosis is often delayed in the elderly or after complication has occurred⁷. The most common complications of chronic volvulus are gastro-esophageal reflux and gastric ulceration. Gastro-esophageal reflux may give rise to epigastric pain, which is intermittent during the periods of engorgement or gastric emptying⁷. Iron deficiency anemia or upper gastrointestinal hemorrhage may occur due to esophagitis following reflux. Gastric ulceration is caused by localized ischemia and acidity within the herniated stomach or mucosal congestion due to venous obstruction of the herniated stomach³. Angina-like pain and electrocardiographic abnormalities may

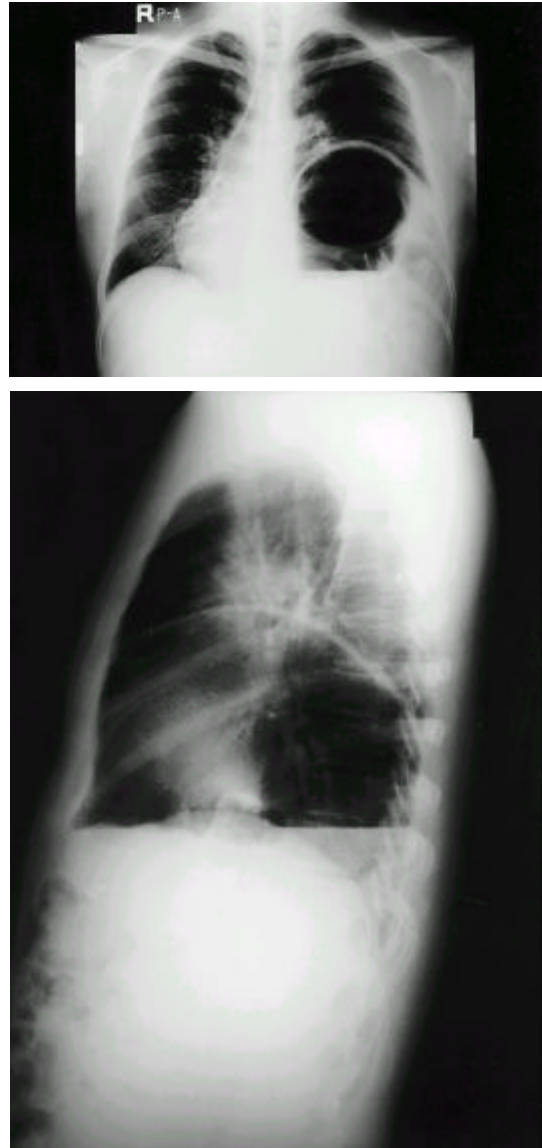


Figure 1. Chest PA (Figure 1A) and left lateral view (Figure 1B) of the case. A large gas filled structure with air-fluid level is noted in the left subphrenic space on lower thoracic cavity. The heart is displaced to the right side.

make the differential diagnosis difficult in the elderly⁹. Our patient had no evidence of gastrointestinal hemorrhage and denied reflux or cardiovascular symptoms.

The diagnosis is confirmed by the presence of a large, unusual gas-filled viscus in the chest or abdomen on plain radiographs. If necessary, a barium swallow study can define the anatomic changes more exactly. On

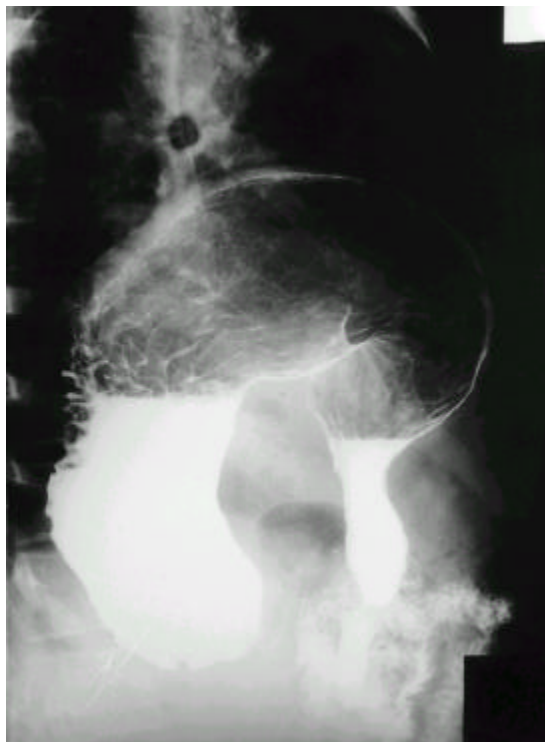


Figure 2. Upper gastrointestinal series showing organo-axial type of volvulus. It shows reversal of the greater and lesser curvatures with two air-fluid levels, typical features of organo-axial volvulus.

barium examination, the characteristic findings are 1) esophagogastric junction lying lower than normal, 2) reversal of the greater and lesser curvatures, 3) pylorus pointing downward, 4) greater curvature crossing the esophagus, 5) two air-fluid levels and lowering of the gastric fundus¹⁰. Our case showed the typical upper gastrointestinal series findings of organo-axial volvulus. Secondary gastric volvulus is more frequent than idiopathic volvulus, therefore the diagnosis of gastric volvulus can be made after a thorough search for possible causative factors¹¹. The most common association is with congenital or acquired defects of the diaphragm. These conditions have been reported as follows; para-esophageal hernia, traumatic rupture of the diaphragm, eventration of the diaphragm and phrenic nerve injury¹². In infants and children, 15 (33%) among 46 patients with gastric volvulus had diaphragmatic eventration^{2,13}. Interestingly, all of these cases were mesentero-axial gastric volvulus. Organo-axial volvulus is commonly associated with diaphragmatic hernia and usually man-

ifests as an acute event.

Diaphragmatic eventration is suggested when a part or all of the hemidiaphragm is located at an unusually high level in the thorax. It does not refer to a defect or hole in the diaphragm with discrete edges, but rather to a diffuse or localized bulging of the diaphragm itself². The condition may be congenital or acquired. Acquired lesions are usually related to phrenic nerve injury, which may be diverse in origin. Radiological investigation combined with fluoroscopy of the diaphragm should be diagnostic. Our patient showed no diaphragmatic movement during respiration, so he had complete left hemidiaphragmatic eventration.

Acute gastric volvulus and symptomatic chronic gastric volvulus require operative treatment. If the volvulus is secondary, definitive treatment must include correction of the associated abnormalities. Some acute and chronic cases have been treated with endoscopic reduction of the volvulus¹⁴. This is done by advancing the endoscope just past the point of torsion, turning and locking the tip of the instrument, and rotating it 180 degrees.

With rapid diagnosis and modern treatment, the rate of mortality from acute gastric volvulus is now about 15% to 20%¹⁵. If the stomach is strangulated, the mortality rate of emergency surgery is 40-60%¹⁶. In recognized cases of chronic gastric volvulus, the mortality rate has been reported to vary from 0% to 13%¹¹.

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