

Case Series

Variability in presentation and management of gastric volvulus: report of 3 cases

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ABSTRACT

Gastric volvulus is a pathology of acute or subacute presentation. Depending on the type, a gastric volvulus can present as an emergency if there is vascular compromise with necrosis and high risk of perforation and its surgical resolution is mandatory. Subacute gastric volvulus does not compromise the organ or organism urgently but is associated with high morbidity and should be resolved when the patient is in optimal conditions to offer definitive treatment. Depending on the torsion axis, it is classified as axial or mesenteroaxial organ, both merit reduction according to their presentation and the clinical context of the patient.

Keywords: Gastric volvulus, Abdominal pain, Acute abdomen

INTRODUCTION

Gastric volvulus is the twist or rotation of more than 180° of the stomach or a segment of it around an axis, causing total or partial obstruction of the outflow tract and may occur with or without vascular compromise.¹⁻³ It is more common in patients over 50 years old and can occur acutely or subacutely. The mortality rate of acute gastric volvulus is up to 56%, and management invariably involves surgery, but the urgency of surgery depends on its presentation.⁴ The aim of this work is to clearly present the most important aspects of the pathology in the context of three clinical cases that illustrate the diagnostic and therapeutic possibilities.

CASE SERIES

Case 1

A 71-year-old female patient reported a three-year history of symptoms that began with burning and stabbing pain located in the epigastrium. The pain was insidious,

progressive, rated 9/10 in intensity, and radiated to the chest. It was accompanied by dyspnea with minimal exertion and non-productive morning-dominant cough. She sought evaluation for gastroesophageal reflux disease at the Upper Digestive Tract Clinic at Hospital General de México (HGM).

Panendoscopy revealed a type III hiatal hernia and mesenteroaxial gastric volvulus. Esophageal manometry reported a type III esophagogastric junction, normal esophageal motility, hypotonic lower esophageal sphincter, normal pharyngoesophageal coordination, and hiatal hernia. On 31 February 2022, a laparoscopic procedure was performed, identifying a type III hiatal hernia.

The hernia content was reduced, the hernia sac was dissected, a 4 cm hiatal defect was identified, the pillars were closed, and a 2.5 cm geometric Nissen fundoplication was performed. Follow-up outpatient visits reported adequate tolerance to oral intake, without pain, dyspnea, or cough (Figure 1).

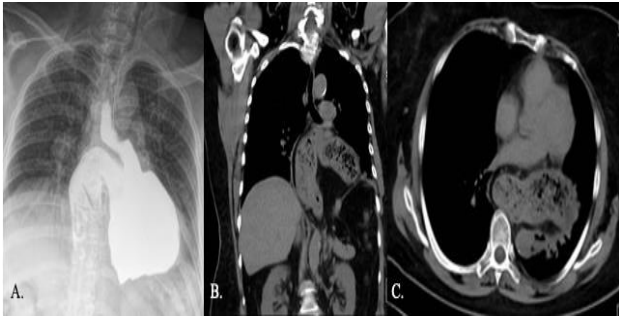


Figure 1: Diagnostic images of primary mesenteroaxial gastric volvulus in case 1 (A) esophagogram; (B) coronal cut in tomography; and (C) axial cut in tomography.

Case 2

A 58-year-old male with no significant medical history reported the onset of symptoms in 2019, including solid dysphagia progressing to liquids, associated with chest pain and an approximate weight loss of 30 Kg. He was diagnosed with achalasia by the Upper Digestive Tract Clinic at HGM, managed with Heller myotomy with partial fundoplication on 26 June 2021 without complications. Two months post-surgery, he presented to the emergency department with intestinal obstruction, resolved with medical management. Follow-up revealed an esophagogram on 09 May 2022 showing an esophagogastric junction above the diaphragm, the stomach displaced cephalad and to the right, indicating a type II achalasia associated with organoaxial gastric volvulus and type I hiatal hernia. Laparoscopy on 30 September 2022 identified a giant hiatal hernia containing the stomach, transverse colon, and omentum. Hernia content was released until complete reduction was achieved, and the diaphragmatic pillars were closed without tension. Follow-up reported the patient asymptomatic (Figure 2).

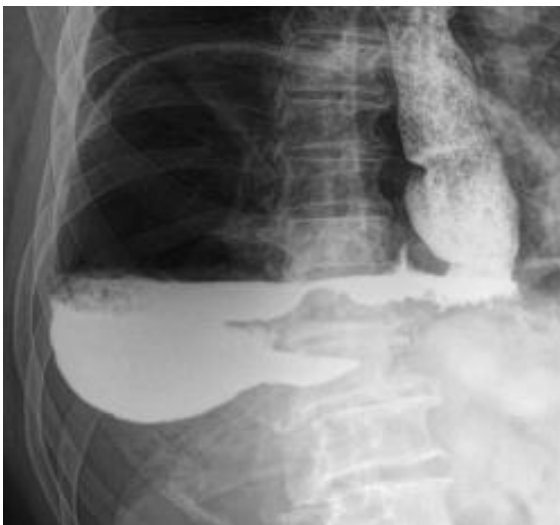


Figure 2: Diagnostic images of secondary organoaxial gastric volvulus in case 2.

Case 3

A 78-year-old patient began experiencing abdominal pain in November 2022, rated 5/10, accompanied by distension and postprandial fullness. Upon initial assessment in the HGM Emergency Department, a patient with a distended abdomen, tenderness, and a 6x6 cm ventral hernia with a reducible sac was found. Abdominal X-rays revealed hydroaerial levels in the upper hemiabdomen, absence of distal air, leading to admission for intestinal obstruction. A contrast-enhanced chest and abdominal CT scan showed an unspecified aetiology stenosis at the antropyloric junction, causing retrograde dilation of the stomach with the antropyloric junction located to the left. Endoscopy reported organoaxial gastric volvulus, and attempts at reduction were unsuccessful. An esophagogastric series demonstrated a loss of the axis with cephalad and leftward direction, along with delayed gastric emptying, suggesting organoaxial gastric volvulus. Endoscopy successfully reduced the volvulus on the second attempt, and a gastrostomy tube was placed to prevent recurrence. Postoperatively, the patient developed intestinal obstruction, underwent surgery to dismantle the percutaneous gastrostomy, close the gastric wall in two planes, reduce the gastric volvulus, and perform anterior gastric wall gastropexy. Despite an initially smooth recovery, the patient was admitted to the ICU due to acute respiratory failure secondary to pneumonia associated with healthcare, and she passed away 31 January 2023 (Figure 3).



Figure 3: Diagnostic images of secondary mixed gastric volvulus in case 3 (A) standing abdominal X-ray with multiple air-fluid levels; (B) esophagogastric series; (C) axial cut in tomography showing the transition from pylorus to duodenum; and (D) sagittal cut in tomography depicting the torsion zone.

DISCUSSION

Volvulus derives from the Latin word ‘volvere’, meaning ‘to roll or twist.’^{1,2} The torsion of a segment of the gastrointestinal tract was first described around 1500 B.C. in the Ebers Papyrus, and it was first documented in medical literature by Berti in 1866.^{2,3} Gastric volvulus is the twist or rotation of more than 180° of the stomach or a segment of it around an axis, causing total or partial obstruction of the outflow tract and may occur with or

without vascular compromise.¹⁻³ Gastric torsion refers to the rotation of the stomach of less than 180 degrees, causing partial obstruction of the upper digestive tract.²

It primarily occurs in patients over 50 years old, with no specific predilection for gender or race.^{3,4} Acute presentation occurs in 43% of cases, with 69% being secondary to another pathology, most commonly associated with diaphragmatic herniation (25%).² Acute gastric volvulus has a mortality rate of 42 to 56%, secondary to gastric ischemia, perforation, or necrosis.⁴ The reported mortality for chronic gastric volvulus is 15%.³

Classification by etiology and risk factors. Gastric volvulus is primary or idiopathic if it occurs due to intrinsic abnormalities in the fixation elements such as absence, abnormal insertion, or elongation of ligaments.^{2,3} There are no diaphragmatic defects or intra-abdominal abnormalities causing volvulus, representing 30% of cases.⁴

Gastric volvulus is secondary if it occurs as a consequence of other pathologies of function, gastric anatomy, or abnormalities in adjacent organs altering anatomy, such as congenital diaphragmatic hernias, traumatic hernias, hiatal hernias, diaphragmatic eventrations, or adhesion-related diseases.²⁻⁴ It occurs in two-thirds of patients, with the most common pathology being hiatal hernia, and it presents in adults.⁴

Classification according to the axis of rotation. For this anatomical definition, two anatomical axes are described: a long axis from the gastroesophageal junction to the pylorus and a short axis from the lesser to the greater curvature.

Organoaxial volvulus

Rotation occurs along the major axis, with the antrum rotating anterosuperiorly and the fundus posteroinferiorly, resulting in the greater curvature ending over the lesser curvature.³ It is attributed to laxity in the gastrosplenic and gastrocolic ligaments.⁵ It occurs in 60% of cases and is more common as a secondary volvulus, 5-30% involve vascular compromise and are usually associated with paraesophageal diaphragmatic hernias.^{3,4}

Mesoaxial or mesenteroaxial volvulus

Rotation occurs along the minor axis, typically in a vertical plane, with the antrum displacing over the gastroesophageal junction.^{2,3} It is attributed to laxity of the gastrosplenic ligament. The reported frequency is 29%, and it more frequently presents as a primary volvulus.^{4,5}

Mixed or combined volvulus

It occurs in 12% of cases.²⁻⁴ Intra-abdominal adhesions can act as rotation axes for the stomach.⁵

Classification according to presentation. Clinical presentation depends on vascular compromise, the degree of outflow tract obstruction, and the irreversibility of the condition as described

Acute gastric volvulus

Occurs when there is vascular compromise and ischemia of the wall, which, without timely management and after prolonged time, leads to necrosis and a high risk of perforation. Clinical manifestations in 29% of patients include dysphagia, epigastric pain, and chest pain.⁴ Additionally, oral intolerance may progress to nausea and vomiting. If the volvulus is primary, the pain tends to localize in the epigastrium; if secondary, it is in the chest. In 70% of patients, Borchardt's triad (1904) is present: intense pain localized in the epigastrium, vomiting followed by unproductive retching, and the inability to pass a nasogastric tube.⁴ Hematemesis or coffee-ground vomiting may indicate gastric mucosa breakdown due to ischemia or lacerations during retching.² Laboratory findings may show signs of organ distress, such as hyperlactatemia, leukocytosis, elevated LDH, and amylase.

Chronic gastric volvulus

No vascular compromise is present, and there is variable and intermittent outflow tract obstruction. Patients may manifest nonspecific symptoms such as gastrointestinal discomfort, early satiety, heartburn, and hiccups.^{3,4}

Diagnosis

Initial diagnostic suspicion is clinical and supported by radiography. In an acute case, an approach to a patient with an acute abdomen is warranted, with complete laboratory workup and chest and abdomen X-rays in two positions. Plain chest and abdomen X-rays: in organoaxial volvulus, a single bubble located in the upper abdomen with a hydroaerial level is visualized, and the stomach is positioned horizontally.^{2,5} In mesenteroaxial volvulus, the stomach appears spherical in supine X-rays but with two hydroaerial levels in standing X-rays, with the gastric fundus located inferior to the diaphragm and to the left, and the antrum located superior to the fundus and to the right.⁵ Computed tomography (CT): It has a sensitivity and specificity of 100% to identify the transition point. Swirl signs can be observed, and signs of gastric necrosis, such as pneumatosis in the wall, free air or fluid, or contrast medium leakage, can be investigated. Esophagogastric series: highly sensitive for diagnosing gastric volvulus, it allows defining gastric anatomy to determine whether it is an organoaxial or mesenteroaxial volvulus and is considered the gold standard.⁴

Management

The treatment goal for gastric volvulus is the same for acute or subacute presentations and varies according to its etiology: to reduce the volvulus and prevent recurrence.³

Initial management

The resolution of the condition and the definitive treatment modality depend on the speed of presentation and the patient's clinical status. In a patient with acute gastric volvulus, presenting with an acute abdomen, a nasogastric tube should be inserted, and fluid resuscitation and electrolyte replacement should be prioritized. In patients with gastric volvulus without signs of peritonitis or oral intolerance, the patient can undergo further diagnostic evaluation and a treatment plan can be devised.

Emergency surgery

Indicated when gastric perforation is documented or when there are signs of hemodynamic instability secondary to an abdominal septic focus or the inability to decompress the stomach by endoscopy. Exploratory laparotomy is considered the gold standard, involving distortion and prevention of recurrence with anterior gastropexy.⁴ Proposed modalities in the literature include simple gastropexy (fixation of the anterior gastric wall to the posterior abdominal wall), repair of the diaphragmatic hernia, gastropexy with division of the gastrocolic omentum, partial gastrectomy, gastrostomy (in high-risk surgical patients), or repair of the diaphragmatic eventration (Nissen fundoplication prevents recurrence).^{4,6} There are reports of laparoscopic reduction of gastric volvulus with low morbidity.⁷ Endoscopic reduction of gastric volvulus was first reported in 1977 and is considered a treatment option in stable patients without anatomical abnormalities that do not require emergency surgery.⁸

CONCLUSION

Gastric volvulus can occur either as a primary or idiopathic condition or secondary to intrinsic abnormalities of the anatomical structure, accounting for 30% of cases and typically rotating in a mesoaxial direction. Regarding its presentation, in the acute form, it manifests as an acute abdomen with predominant symptoms in the upper abdomen, presents the Borchardt triad in 70% of cases, and requires urgent surgical treatment. Chronic gastric volvulus presents with nonspecific symptoms and tends to be an incidental finding during the investigation of concurrent pathologies. The gold standard diagnostic method is the esophagogastric series. Management

depends on the mode of presentation and associated pathology.

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