

## C A S E R E P O R T

# Mesentero-axial gastric volvulus in an old woman: a case report of a diagnostic challenge

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**Abstract.** Gastric volvulus is a rare condition defined as an abnormal rotation of the stomach around itself. Acute gastric volvulus is a surgical emergency because it is a life-threatening condition, but its non-specific symptoms make diagnosis difficult. There are two types of gastric volvulus: organoaxial and mesentero-axial. The treatment is surgical intervention. Computed tomography allows to identify and classify gastric volvulus and rule out complications so that to guide surgery management. We report a case of a mesentero-axial gastric volvulus in an old woman with abdominal pain, who underwent surgery in laparoscopy. ([www.actabiomedica.it](http://www.actabiomedica.it))

**Key words:** Gastric volvulus, Mesentero-axial, Computed tomography, Laparoscopic fundoplication

## Introduction

Gastric volvulus is an abnormal rotation of the stomach around its short or long axis leading to variable degrees of gastric obstruction and consequently to the presence of obstructive symptoms such as vomiting and abdominal pain (1).

A rotation of more than 180 degrees can cause strangulation, necrosis, and perforation; for this reason, it is a rare surgical emergency condition that should be diagnosed promptly and treated urgently (2).

Acute mesentero-axial volvulus is more common in children and young adults, but it is a rare entity in the elderly (3).

We present a case of mesentero-axial volvulus in an old woman with abdominal pain.

## Case presentation

A 75-year-old woman with a history of hiatal hernia presented to the emergency room with an acute

onset of severe epigastric pain associated with nausea. There was no history of fever or systemic disturbances. She denied the use of non-steroidal anti-inflammatory drugs and alcohol.

Abdominal examination revealed abdominal distension with epigastric tenderness but with normal bowel sounds. No peritoneal signs were detected.

Vital signs of heart rate, blood pressure, respiratory rate were normal. The laboratory findings were irrelevant.

The patient underwent computed tomography (CT) of the chest and abdomen before and after intravenous administration of contrast medium.

The CT investigation documented herniation of the gastroesophageal junction, the gastric antrum, and part of the transverse colon through the diaphragm into the chest (Figure 1). Marked distension of the stomach was associated with intraluminal hydro-aero level and hyperemia of the walls (Figure 2). The findings supported the diagnosis of a mesentero-axial gastric volvulus. No free air in the abdomen. There was

no mass or pathological finding to suggest the cause of the volvulus.

The patient underwent laparoscopic surgery by an experienced gastrointestinal surgeon in conjunction with the endoscopist. The stomach retained in the mediastinum was repositioned in the abdomen (Figure 3). A hiatoplasty and Dor fundoplication was performed (Figure 4).

No complications were reported after surgery.



**Figure 1.** Axial CT scan, portal phase. Organs in the anterior mediastinum are dislocated anteriorly and compressed by the stomach.

## Discussion

Based on etiology of the rotation, gastric volvulus may be both primary and secondary (4).

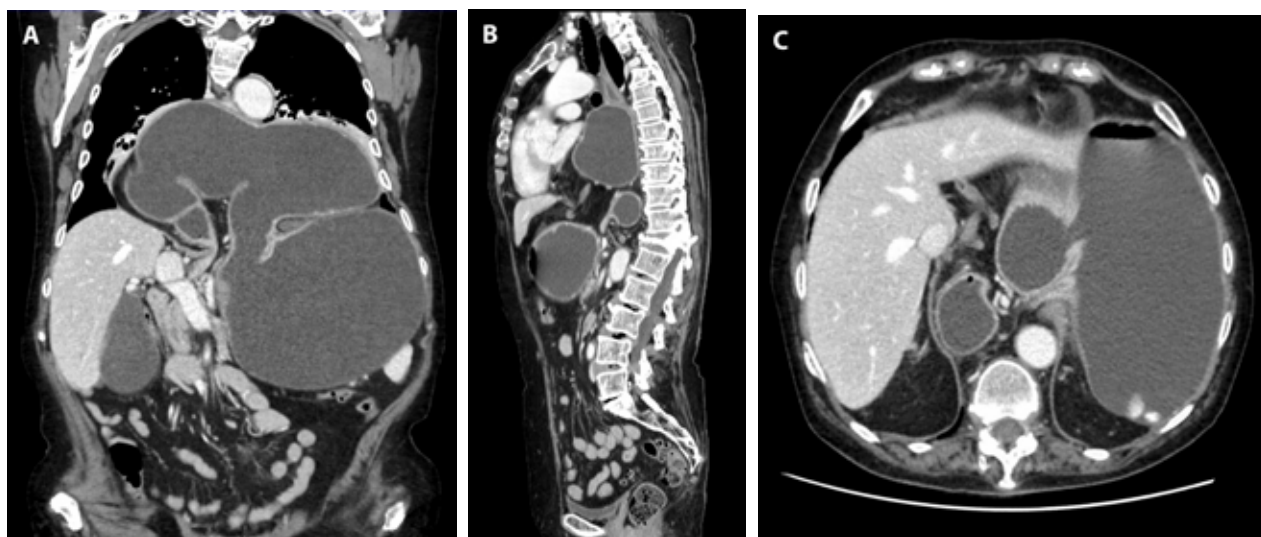
The primary volvulus occurs as a result of adhesions or an abnormality in the attachment of the stomach, in particular the laxity of the ligaments which anchors the stomach in place within the abdominal cavity. In 30% of gastric volvuli, there is a primary cause (5).

Secondary gastric volvuli have different causes, including congenital or traumatic diaphragmatic hernias, hiatal paraesophageal hernias, diaphragmatic eventration, phrenic nerve paralysis and intra-abdominal adhesions (6, 7) and stomach obstruction caused by extrinsic pressure from adjacent masses (2).

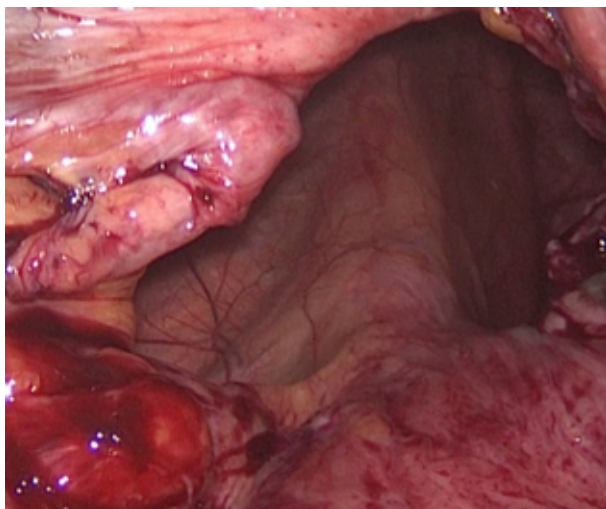
According to the axis of the abnormal rotation, there are 3 types of volvulus: organo-axial, mesentero-axial, or a combination of both (8).

Organo-axial volvulus is the most common, occurring in 59% of cases (8).

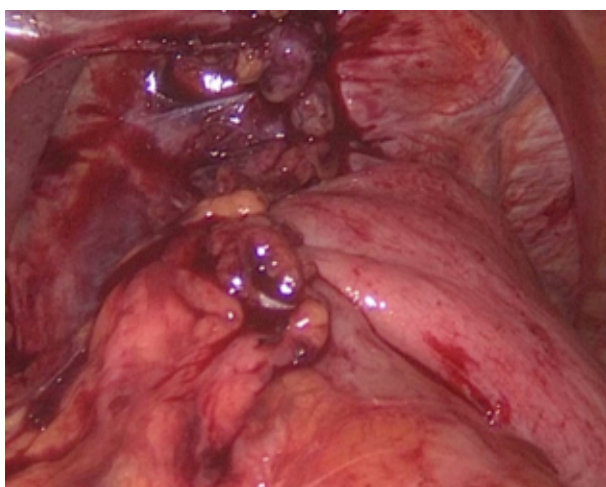
This type of volvulus is associated with diaphragmatic defects, such as para-esophageal hernias and diaphragmatic eventration. It results from the rotation of the stomach around the long axis of the stomach (4). This occurs due to anterior rotation of the greater



**Figure 2.** CT scan, portal phase. Coronal (A) and sagittal (B) MPR reconstruction. Gastric antrum and pylorus are displaced above the gastro-esophageal junction. Axial scan (C) shows a para-esophageal hernia and gastric fluid distension.



**Figure 3.** Endoscopic visualization of herniation of the gastroesophageal junction and the gastric antrum through the diaphragm into the chest.



**Figure 4.** Surgery imaging of hiatoplasty and Dor fundoplication.

curvature, as the duodenum and gastro-esophageal junction are fixed, therefore the greater curvature of the stomach rests superior to the lesser curvature, resulting in an 'inverted' stomach (6, 7). This causes obstruction of the gastro-esophageal junction, of the pylorus, or both and consequently may produce strangulation and necrosis (2).

The second type of gastric volvulus is mesentero-axial, occurring in 29% of cases. It results when torsion occurs around the short stomach axis (4). In this

position, the stomach lies in the vertical plane with the antrum and pylorus rotated anterior and superior to the gastroesophageal junction (8). The suggested predisposing factor for mesentero-axial volvulus is the laxity of the gastro-splenic ligament. This type of volvulus is not usually associated with diaphragmatic defects (2).

The majority of chronic volvulus cases are related to mesentero-axial rotation, with sudden detorsions and recurrent acute episodes may without evidence of complete obstruction or strangulation (2).

The remaining and rarest form of gastric volvulus (12% of cases) is when the stomach rotates simultaneously about both the organo-axial and mesentero-axial axes resulting in a mixture of both (4). It is typically observed in patients with chronic volvulus (9).

The clinical presentation of patients with gastric volvulus depends upon the speed of onset, the type of volvulus and the degree of obstruction. The acute form presents with pain in the upper abdomen or lower chest associated with severe retching (6,10). These, in conjunction with the inability to pass a nasogastric tube, formulate Borchardt's triad, that occurs in as many as 70% of cases (4,11).

In contrast, patients who have a chronic gastric volvulus may present with nonspecific symptoms, which may go unnoticed. These include mild upper abdominal pain, dysphagia, bloating, and pyrosis. Such features may be chronic and may be often misattributed to other upper gastrointestinal disorders such as peptic ulcer disease (6,12).

Reported complications of a gastric volvulus include ulceration, perforation, hemorrhage and necrosis (13,14).

The peak of organo-axial volvulus incidence is in the fifth decade, with equal frequencies between the sexes and across all races, with a high mortality rate of 42–56%, secondary to gastric ischemia, perforation or necrosis (4).

Mesentero-axial volvulus have been reported more common in neonates, infants, and young children (15) with equal frequency in both men and women (16). Few cases of acute mesentero-axial gastric volvulus have been reported in adults (17).

Our case is rare because it's a mesentero-axial volvulus in an elderly woman. Her symptoms were nonspecific, in particular epigastric pain and nausea.

Because clinical symptoms are non-specific, the diagnosis of gastric volvulus is difficult and it is based on clinical suspicion and radiographic investigations. Abdominal radiographs provide a clue to suspect gastric volvulus. The upright films usually reveal double air fluid level, one inferior and left, with normally located fundus, and the other with superior and right, showing the displaced antrum (18).

Chest radiographs demonstrate a retro-cardiac and massive, air-filled mass or large air-fluid level in the chest on either side of the midline (15). The gold standard to confirm the diagnosis is a barium swallow, which has a very high sensitivity and specificity for diagnosing a gastric volvulus (4).

A CT scans provide a more accurate diagnosis with specific anatomical details (2). In mesentero-axial volvulus, CT may show gastric herniation of the antrum and distal body in the left hemithorax, with inferior location of the oesophagogastric junction below the diaphragm (19).

In our case, the patient was directly subjected to a CT scan, which documented an abnormal rotation of the stomach along its short axis with herniation of the gastric antrum and part of the transverse colon through the diaphragm into the chest. Also in our case, we have documented a gastrectasis with associated intraluminal hydro-aero level.

Because its non-specific symptoms, the differential diagnosis for gastric volvulus is hard. They include gastroesophageal reflux disease, peptic ulcer disease, esophageal motility disorders, esophageal diverticulum, gastroparesis, esophageal cancer and gastric cancer (20,21).

Acute mesenteroaxial gastric volvulus is rare in adults. A missed or delayed diagnosis may result in serious complications due to obstruction, which includes strangulation, perforation, hemorrhage, ischemia, and severe necrosis with a higher rate of mortality (30–60%) (22).

Treatment can be either surgical or medical in nature. Conservative management can be performed in clinically stable patients (4).

Endoscopic treatment allows volvulus decompression and reduction, which has been successfully used to treat patients with high surgical risk and acute presentation (2). It allows safe reduction, placement of

a gastrostomy tube, and treatment of underlying diseases like hiatal hernia (22). In most cases, endoscopic management is considered to treat chronic gastric volvulus. The risk of gastric perforation is significant in conservative treatment.

The gold standard is surgical intervention with laparoscopy to repair the volvulus and limit the chance of recurrence through stomach fixation and management of diaphragmatic hernia (23).

In a cohort of 30 patients with intrathoracic stomach including 14 gastric volvulus, laparoscopic treatment showed to be effective and safe. In the latter study, only one case recurred, with a 30-day complication rate of 11%, and no death at a mean follow-up of 11 months (24). Thus, the choice between open and laparoscopic approach relies on the patient previous intervention, the presence of hemodynamic instability, abdominal contamination, and surgeon experience (23).

The surgical intervention consists with detorsion and prevention of hiatal hernia avoiding gastroesophageal reflux disease, through fundoplication. However, if gastric necrosis has occurred, partial or total gastrectomy is preferred, depending on the extent of ischemia (5,8).

Several operative strategies can be employed. As described by Tanner these include diaphragmatic hernia repair, simple gastropexy, gastropexy with division of the gastrocolic omentum (Tanner's operation), partial gastrectomy, fundo-antral gastrogastrostomy (Opolzer's operation) and repair of eventration of the diaphragm (25).

Less invasive techniques (laparoscopic surgery) entail fewer complications and a shorter hospital staying and they are the most used for gastric volvulus nowadays (25).

## Conclusion

Gastric volvulus is a rare, high morbidity and mortality condition with non-specific symptoms and therefore represents a diagnostic challenge.

The role of the radiologist is fundamental to allow the gastric volvulus to be identified in a short time in order to allow the patient to be treated and possible emergency surgical intervention, avoiding the onset of complications like necrosis and perforation.



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**Conflict of Interest:** Each author declares that he or she has no commercial associations (e.g. consultancies, stock ownership, equity interest, patent/licensing arrangement etc.) that might pose a conflict of interest in connection with the submitted article.

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