



## Gastric Volvulus: A Challenge to Diagnosis and Management

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### Abstract

**Introduction:** Gastric Volvulus (GV) is a rare disease. The exact incidence of GV is unknown and patients with a chronic presentation may never be diagnosed. The peak age group of incidence is in the fifth decade. The volvulus can be classified as organoaxial and mesenteroaxial. The clinical presentation of gastric volvulus depends on the degree of rotation and the rapidity of onset.

**Case Presentation:** An 86-year-old man came to the emergency department presenting with abdominal pain of 48-h progression with dyspnea, nausea with no vomiting. Nasogastric tube placement was unsuccessful. An abdominal computed tomography scan was revealed a volvulus gastric with pneumoperitoneum. Emergency surgery was indicated and a typical gastrectomy was performed.

**Conclusion:** Acute GV usually presents with Borchardt's triad. With the advent of CT and laparoscopic surgery, the gold standards for diagnosing and treating this disease are ever evolving. Surgical treatment should be performed according to aetiology and to patient's characteristics.

**Keywords:** Gastric volvulus; Management of gastric volvulus; CT

### Abbreviation

GV: Gastric Volvulus; CT: Computed Tomography

### Introduction

Acute gastric volvulus is rare clinical condition and is considered a medical emergency and defined as the pathological rotation of the stomach by more than 180° [1-2]. It was first described in 1866 by Berti based on the autopsy of a 61-year old woman [3]. The peak age group of incidence is in the fifth decade with children less than one year old making up 10% to 20% of cases. No association with either sex or race has been reported [4,5]. In 30% of cases the volvulus occurs as a primary event, but it is more commonly secondary to another cause [4,6]. Clinical presentation may vary from occasional non-specific symptoms to life-threatening situations [7]. The main consequence of the disorder is foregut obstruction that may be acute, recurrent, intermittent or chronic [5,8,9]. Furthermore, there is a risk of strangulation which may result in necrosis, perforation and hypovolemic shock. As such, the mortality rates for acute volvulus range from 30% to 50% highlighting the importance of early diagnosis and treatment [4,6,9,10].

### Case Presentation

An 86-year-old man came to the emergency department presenting with abdominal pain of 48-h progression that initially was epigastric and then became generalized. Her other symptoms were epigastric pain with dyspnea, nausea with no vomiting, and a progressively deteriorating general health status; as the hours progressed, the level of consciousness began to diminish. Upon arrival he presented with hypotension (blood pressure 75/40 mmHg), tachycardia (130 bpm), tachypnea (28 rpm), and desaturation (SaO<sub>2</sub>: 85%). The first examination revealed a distended and tympanic abdomen with diffuse pain upon palpation and obvious signs of generalized peritoneal irritation. Nasogastric tube placement was unsuccessful. Blood analysis showed elevated levels of C-reactive protein and procalcitonin – 110 mg/l and 282 ng/ml, respectively -, leukopenia (1,200 l/ml), acute renal failure (urea of 69 mg/dl and creatinine of 1.68 mg/dl), and hypoxemia with compensated metabolic acidosis. Electrocardiogram results showed no signs of acute myocardial ischemia.

Crystalloid and colloid resuscitation was begun due to the symptoms of shock, and once the hemodynamic parameters improved, an abdominal computed tomography scan was carried

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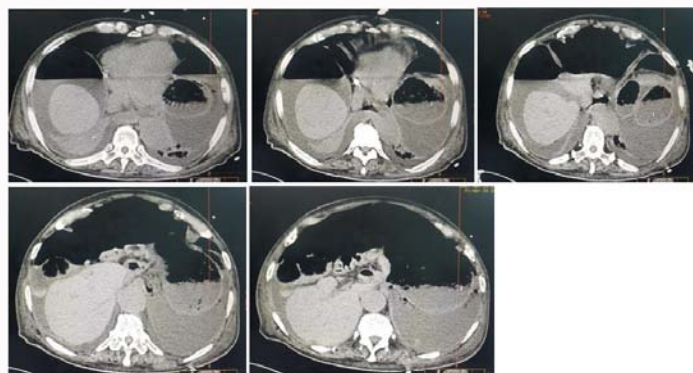
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**Figure 1:** The gastric volvulus and pneumoperitoneum.



**Figure 2:** Necrosis gastric and perforation.

out; it revealed with abundant free fluid with organoaxial volvulus gastric; it also showed signs of ischemia in the gastric wall and pneumoperitoneum (Figure 1).

Emergency surgery was indicated and the patient underwent laparotomy through a midline incision that revealed diffuse peritonitis with abundant free fluid and organoaxial gastric volvulus that presented with signs of ischemia, as well as a perforation in the fundic (Figure 2). Given the patient's situation (48-h symptom progression, the need for vasoactive drug perfusion from the start of the procedure), the entire cavity was thoroughly washed, and atypical gastrectomy was performed, extirpating practically the entire necrotic area with Gastropexy. The patient was placed in the intensive care unit. She showed slight improvement and then within the first 24 h presented with hemodynamic deterioration that was refractory to catecholamines. Her previous respiratory and renal failure worsened, progressing to multiorgan failure and consequent death.

## Discussion

GV is defined as an abnormal rotation of the stomach by more than 180 degrees, which can create a closed-loop obstruction, resulting in strangulation [2,11].

The exact incidence of GV is unknown and patients with a chronic presentation may never be diagnosed [12]. Approximately 80% of GV cases occur in adults [13,14,11]. The peak age group of incidence is in the fifth decade, with equal frequencies between the sexes and across all races. Acute gastric volvuli carry a mortality rate of 42% to 56%, secondary to gastric ischemia, perforation or necrosis [15].

The Risk factors for gastric volvulus include patient age over 50, gastric ligament laxity, pyloric stenosis, gastroduodenal tumors, diaphragmatic injury and eventration, left lung resection, or pleural adhesions [16,17]. The volvulus can be classified as organoaxial, where the stomach rotates around an axis that connects the gastroesophageal junction and the pylorus; mesenteroaxial, where the rotation occurs around an axis that bisects both the lesser and

greater curve; or mixed. Mesenteroaxial volvulus is more likely found in the pediatric population and is rarely described in adult individuals [16]. Strangulation is less likely to occur in mesenteroaxial volvulus, where spontaneous detorsions with recurrent acute episodes may occur [18].

Gastric volvulus divided into two: Primary GV (25% to 30%) has been associated with the absence or laxity of the gastrocolic or gastrosplenic ligaments [19,7,13]. Secondary GV (70% to 75%) is always associated with an underlying condition such as paraesophageal and diaphragmatic hernias, connective tissue disorders, adhesions and anterior abdominal wall defects [2,13,20].

The clinical presentation of GV depends on the degree of rotation and the rapidity of onset [1,14,20]. Acute GV usually presents with Borchardt's triad of vomiting, epigastric pain and an inability to pass an NGT should trigger one to think of gastric volvulus as the primary diagnosis. Borchardt's triad has been reported to occur in 70% of cases [21]. However, a retrospective study on the common presentations of chronic gastric volvulus over a 5-year period has shown that dysphagia, epigastric pain and chest pain occur 29% of the time individually [22]. Chronic volvulus presents with broad-spectrum symptoms, which may include non-bilious vomiting, epigastric pain or distension, early satiety, retching and gastro-oesophageal reflux [7].

The diagnosis is frequently made by an abdominal radiograph and an upper gastrointestinal series, which is considered the diagnostic tool of choice, although the results may be normal during the asymptomatic period [7]. CT scan provides more accurate diagnosis with specific details of the anatomical abnormalities: Diaphragmatic eventration, paraesophageal hernia and wandering spleen can be seen associated with gastric volvulus [19,12]. Gastric volvulus can sometimes be diagnosed through upper endoscopy and a tortuous appearance of the stomach; difficulty or inability for the endoscope to reach the pylorus can be encountered.

Acute GV is an abdominal emergency and early surgery is mandatory. Delayed diagnosis may result in strangulation, ischemia and necrosis with perforation, leading to shock [2,20].

Conservative management consists of endoscopic reduction or percutaneous endoscopic gastrostomy. The risk of gastric perforation is significant in conservative treatment. Therefore, patients should be considered carefully for conservative treatment. The gold standard is open laparotomy with detorsion and prevention with anterior gastropexy. Nissen fundoplication decreases future occurrences in patients with a hiatal hernia [23]. Nonviable or gangrenous areas may demand subtotal or total gastrectomy.

As for treatment of chronic GV, while surgery is the preferred treatment for most authors, others claim that it can be managed conservatively with prokinetic agents and anti-secretory therapy. It is important for clinicians to take patients age, comorbidity, physical performance, life expectancy and willingness into consideration [12].

## Conclusion

In summary, unless it stays in the back of the diagnostician's mind, gastric volvulus can be an easily missed diagnosis, which is associated with significant morbidity and mortality. It is an unusual entity, often not recognized at an early stage, which can become a surgical emergency. Primary gastric volvulus is not associated to any underlying condition and presents more frequently with intermittent symptoms. With the advent of CT and laparoscopic surgery, the gold standards for diagnosing and treating this disease are ever evolving. Surgical treatment should be performed according to aetiology and to patient's characteristics.

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