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## Case Report

# Acute gastric volvulus in adults: A rare case report and a comprehensive review<sup>☆,☆☆</sup>

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## ABSTRACT

Acute gastric volvulus, a rare and life-threatening condition, often presents diagnostic challenges due to atypical symptoms. We report a unique case of nonincarcerated organo-axial gastric volvulus within a para-esophageal hiatus hernia in a 38-year-old male. Diagnosis relied on imaging, emphasizing the crucial role of CT scans. Successful open surgical intervention addressed the complexity, highlighting the evolving understanding and tailored approaches in managing this uncommon condition, essential for improved outcomes and reduced morbidity and mortality.

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## Introduction

Acute gastric volvulus is a rare but potentially life-threatening condition characterized by the abnormal rotation of the stomach around its axis exceeding even 180 degrees [1,2]. Borchartd's triad involving intense epigastric pain, retching, and the inability to pass a nasogastric tube, seen in 70% of cases,

signals acute gastric volvulus, with potential complications including ischemia, gangrene, perforation, pancreatic necrosis, omental avulsion, and rare splenic rupture presenting as a surgical emergency [3,4].

Most cases arise in the fifth decade, and 10%-20% affect children under 1 year. Despite insights from existing literature on clinical aspects, diagnostics, and management, understanding is limited due to infrequent reporting. Given its rarity

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and atypical presentation, the clinical suspicion index is consistently low [5].

The deficiency in the literature on acute gastric volvulus stems from the scarcity of reported cases in adults and the absence of consensus on the best diagnostic and therapeutic approaches. Insufficient data hinders the creation of standardized management guidelines, forcing clinicians to depend on anecdotal evidence and extrapolations. Consequently, mortality rates for acute volvulus range from 30% to 50%, underscoring the critical need for early diagnosis and treatment [5,6].

This case report contributes to the existing literature by presenting a unique case of nonincarcerated and organo-axial gastric volvulus within a para esophageal hiatus hernia in an adult patient. The rarity of such cases, coupled with the successful surgical intervention, underscores the need to document and analyze adult presentations of this condition. By highlighting the distinctive features of this case, including the imaging findings and the surgical approach chosen, this report aims to bridge the existing knowledge gap and emphasize the significance of considering acute gastric volvulus in the differential diagnosis of adults presenting with acute abdominal symptoms.

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## Case presentation

### Presentations

A 38-year-old male arrived at the emergency department reporting a 1-week history of intermittent epigastric pain. The pain had intensified over the past 24 hours, accompanied by multiple episodes of vomiting, nausea, and loose stools. Vomiting included food and water, without any evident blood or bile. The patient, with no known history of chronic illness, surgical interventions, or drug allergies, occasionally consumed alcohol but did not smoke. Physical examination revealed mild distress, alertness, and orientation to time, place, and person. Vital signs were within normal ranges, with a blood pressure of 130/80, heart rate of 90 bpm, temperature of 97 F, respiratory rate of 18 breaths per minute, and oxygen saturation of 96% in room air on pulse oximetry.

### Diagnosis

Abdominal examination unveiled a nondistended abdomen with mild tenderness at the epigastric region, and signs of peritonitis were absent. Laboratory investigations, including acid-base levels, returned normal results. Ultrasonography (USG) of the abdomen revealed no obvious significant findings. A computed tomography (CT) scan of the abdomen was recommended due to persistent pain. Laboratory parameters were within normal limits. CT scan of the abdomen/pelvis showed distended stomach with air-fluid levels consistent with gastric outlet obstruction. Herniation of stomach was noted via the esophageal hiatus with opening measuring 5mm. Greater curvatures comes to lie antero-superiorly and lesser curvature lying posteroinferiorly. Distal part of gastric antrum and pyloric canal were noted in the thoracic cavity above the diaphragm. No air foci were noted in the gastric

wall. There was no obstructing mass or stone noted on the CT scan. A plain abdominal x-ray was done which showed the gastric gas shadow in left lower thoracic cavity. The patient was made NPO, and 2 attempts at nasogastric tube placement failed. The CT scan confirmed a diagnosis of nonincarcerated and organo-axial gastric volvulus within a para esophageal hiatus hernia (as suggested by Figs. 1-3).

### Management

Gastric decompression could not be performed. So, a decision was made to approach with surgical exploration. The patient was placed on nil per oral. Considering patient preference, an open surgical approach was chosen after explaining all the pros and cons of the open surgical approach. No ischemic areas were observed during surgery, and successful de-rotation of the stomach was achieved. The hernia sac was completely dissected and removed. The esophagus was mobilized to the level of the inferior pulmonary veins to ensure the return of the esophagogastric junction into the abdomen. Closure of the crura of the diaphragm inferiorly and posteriorly to the esophagus was performed. A complete Nissen-type fundoplication and anterior gastropexy with sutures were conducted without encountering any complications during the procedure.

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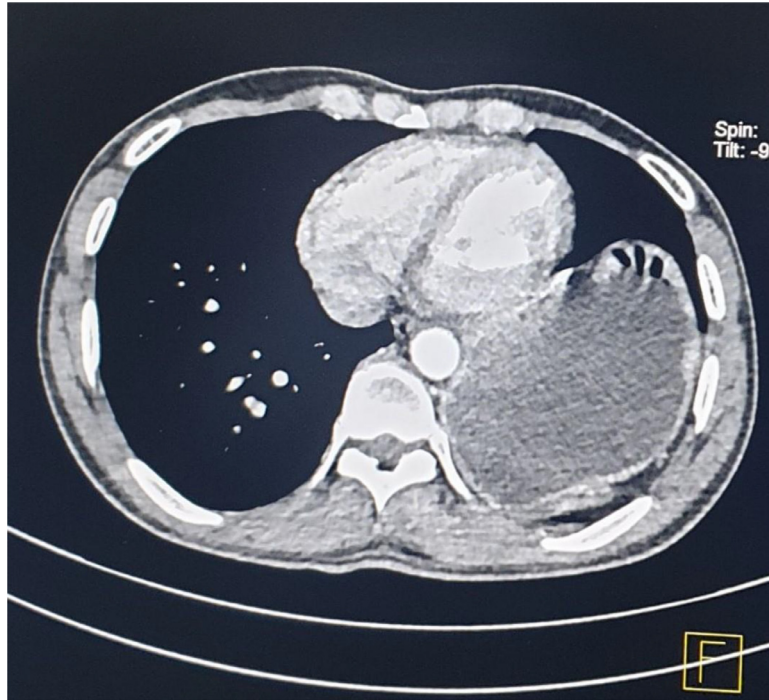
## Discussion

### Understanding the complexity of gastric volvulus

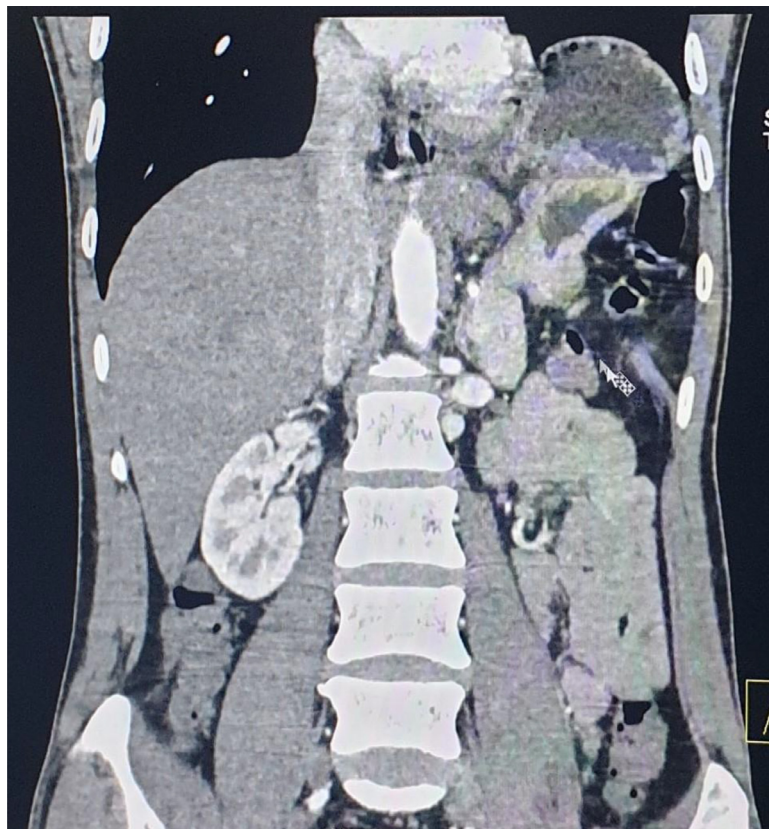
Gastric volvulus, though infrequent, represents a potentially life-threatening ailment marked by the abnormal rotation of the stomach, typically surpassing 180 degrees and commonly manifesting in the fifth decade of life. The acute form of gastric volvulus has been associated with the development of gangrene in a significant proportion of patients, ranging from 5% to 28% [2,3]. The intricacies of this ailment are underscored by classifications based on etiology, rotation axis, and chronicity [6]. This comprehensive discussion synthesizes insights from distinctive clinical cases, shedding light on the diverse clinical presentations, diagnostic challenges, and evolving management strategies associated with gastric volvulus.

### Classification and etiology: Decoding the origins

The presented case exemplifies a secondary form of gastric volvulus within a para-esophageal hiatus hernia, shedding light on anatomical abnormalities as contributing factors. The broad classification of gastric volvulus into primary or secondary categories reveals that approximately 70% of cases are secondary to anatomical or functional abnormalities [7]. Causes span from para esophageal hernias and diaphragmatic trauma to congenital hernias and diaphragmatic eventration [8]. On the other hand, primary volvulus may be instigated by malignancy, adhesions, or the failure of gastric ligaments. Further classification based on the axis of rotation categorizes volvuli into organo-axial, mesentero-axial, or a combination, with the organo-axial type prevailing as the most common [6,7]. These classifications provide a structured



**Fig. 1 – Contrast-enhanced axial CT image showing the herniated stomach lying in the left posterior aspect of the thoracic cavity.**



**Fig. 2 – Contrast-enhanced Coronal CT image showing the herniation of the stomach into the left thoracic cavity in the left paracardiac region. No obvious gas in the wall was seen.**



**Fig. 3 – Contrast-enhanced sagittal CT image showing the herniated stomach with greater curvature (white arrow) lying anterosuperiorly and lesser curvature (black arrow) in posteroinferior location.**

framework for understanding the diverse pathophysiological mechanisms contributing to gastric volvulus. In our case a nonincarcerated and organo-axial gastric volvulus within a para esophageal hiatus hernia representing a primary type with a diaphragmatic defect as illustrated in Fig. 1. Association of gastric volvulus with paraesophageal hiatus hernia in adults is relatively commonly reported [5]. Roughly 20% of instances of gastric volvulus are observed in infants aged less than 1 year, frequently arising as a consequence of congenital diaphragmatic defects [9].

#### **Clinical presentations: Navigating the spectrum of symptoms**

Clinical manifestations of gastric volvulus present a diverse spectrum, challenging timely diagnosis as present in the above case. In the presented case severe abdominal pain, nausea, and vomiting were the predominant clinical features with 2 failed attempts with nasogastric tube insertion revealing Borchardt's triad in the absence of any prior co-morbidities. While Borchardt's triad, indicative of intense epigastric pain, retching, and the inability to pass a nasogastric tube, serves as a diagnostic marker in some cases, it is not universally present [9,10]. A retrospective study on common presentations unveils that dysphagia, epigastric pain, and chest pain collectively occur in 29% of cases. Acute presentations often lead

to the manifestation of Borchardt's triad, while chronic forms may present with vague symptoms such as dysphagia and intermittent pain after meals [6,11,12]. The overlap of symptoms with other gastrointestinal conditions complicates clinical diagnosis, necessitating a reliance on imaging modalities for confirmation [13].

#### **Diagnostic challenges and imaging modalities: Unraveling the complexity**

Gastric volvulus is a rare condition often overlooked initially in patients with abdominal or chest pain, nausea, and vomiting. Diagnosis is challenging and typically relies on radiological imaging, such as chest and abdominal X-rays. These may reveal a retrocardiac air-filled mass and increased soft-tissue density in the upper abdomen indicative of a distended fluid-filled stomach [1]. However, these features may be absent in cases of intermittent obstruction, necessitating further imaging like upper gastrointestinal barium studies or computer tomography for confirmation [5]. Computed tomography can confirm the diagnosis and identify the transition point, with some experts recommending it as the first-line investigation [3]. Upper gastrointestinal endoscopy is less diagnostically significant but can help identify potential causes such as hiatal hernia and assess the gastric mucosa. However, it

is contraindicated in the presence of signs of gastric necrosis or perforation, and the exploration is often incomplete due to gastric torsion [4,9].

Barium studies are reliable, diagnosing 14 out of 25 observed cases according to Teague et al. [14].

In the presented case the abdominal ultrasound showed inflammatory changes in the omentum and lymph nodes, while in CT scan herniation of stomach was noted via the esophageal hiatus with opening measuring 5 mm. Greater curvatures lying anterosuperiorly and lesser curvature lying posteroinferiorly. Distal part of gastric antrum and pyloric canal were noted in the thoracic cavity above the diaphragm. No air foci were noted in the gastric wall. There was no obstructing mass or stone noted on the CT scan.

### **Clinical management strategies: Tailoring approaches**

Gastric volvulus, a rare and challenging condition, requires a multifaceted approach for effective management. The initial steps involve nasogastric decompression and prone positioning, followed by immediate surgical consultation, especially in acute cases with high mortality risks. Various operative interventions, ranging from diaphragmatic hernia repair to gastropexy, are considered, with open surgical reduction being a commonly performed procedure [3,5]. Laparotomy remains the primary surgical choice, although laparoscopic interventions offer an alternative [13]. The treatment strategy is tailored to the clinical presentation, emphasizing surgical emergencies for acute cases to prevent severe complications. Notably, the decision-making process involves assessing gastric viability, resecting gangrenous portions, and addressing underlying causes [1,3]. While gastropexy is often employed, its necessity may vary, and coelioscopic methods present viable alternatives, albeit with conversion considerations [15]. If the cause was a hiatal hernia, Nissen's fundoplication should be performed as presented in the above case. Reduction and derotation of the twisted stomach with gastropexy are recommended in the absence of vascular compromise [6]. The mortality associated with acute gastric volvulus underscores the significance of addressing complications such as electrolyte imbalance, severe anemia, and acute malnutrition in ensuring optimal patient outcomes [15].

In the presented case gastric decompression was initiated, and nil per oral status was imposed. Opting for an open surgical approach based on patient preference, the procedure successfully derotated the stomach, dissected and removed the hernia sac, mobilized the esophagus to the inferior pulmonary veins and closed the diaphragmatic crura. A complication-free completion included a Nissen-type fundoplication and anterior gastropexy.

### **Role of laparoscopic interventions**

Laparoscopic interventions have rightfully gained prominence in managing gastric volvulus, offering advantages over traditional open surgery. The literature consistently highlights the benefits of laparoscopic approaches, emphasizing their role in optimizing patient outcomes through smaller incisions, improved cosmetic outcomes, reduced pain, lower com-

plication rates, and shorter hospital stays. This aligns with the broader trend in minimally invasive surgery [6,14].

Advancements in diagnostic approaches, particularly the increasing reliance on CT scans, signify a paradigm shift in understanding and diagnosing gastric volvulus [13]. The case discussed consistently underscores the diagnostic accuracy and comprehensive insights provided by CT scans, making them the preferred imaging modality. The ongoing evolution of diagnostic techniques reflects the concerted efforts to refine diagnostic criteria for gastric volvulus, enhancing clinicians' ability to make timely and accurate diagnoses.

Despite the insights gained from the literature, the rarity of gastric volvulus and its varied presentations necessitate continued research and heightened clinical awareness. This discussion accentuates the critical role of documenting and analyzing cases to refine diagnostic criteria, optimize management strategies, and enhance overall understanding. The call for increased awareness among clinicians to facilitate early recognition and intervention resonates throughout the discussion, emphasizing its potential impact on reducing morbidity and mortality associated with this condition [11,15].

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## **Conclusion**

In conclusion, this rare case of acute gastric volvulus in a paraesophageal hiatus hernia highlights diagnostic and management complexities. The review emphasizes diverse presentations and evolving treatment strategies, emphasizing tailored surgical approaches and the role of laparoscopy. Ongoing advancements in diagnostic techniques, notably CT scans, are crucial. The rarity of gastric volvulus necessitates ongoing research and heightened clinical awareness for refined diagnostics, optimized management, and improved patient outcomes, reducing morbidity and mortality.

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## **Ethical approval**

The study is exempt from ethical approval in our institution.

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## **Provenance and peer review**

Not commissioned, externally peer-reviewed.

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## **Role of generative AI**

None.

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## **Patient consent**

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A

copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

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