



## Case Report

## Acute gastric volvulus: A rare case report and literature review



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## ARTICLE INFO

## Keywords:

Acute gastric volvulus  
Organoaxial volvulus  
Borchart's triad  
Gastric gangrene  
Case report

## ABSTRACT

**Introduction and importance:** Gastric volvulus is the abnormal gastric rotation upon itself. It carries a considerable risk for gastric strangulation which may lead to gangrene and perforation, which can be fatal. It commonly presents with non-specific and vague abdominal symptoms making prompt diagnosis and management imperative. This is a case report describing a case of acute organo-axial gastric volvulus.

**Case presentation:** A 74-year-old female, with no comorbidities, presented to our department with non-specific abdominal symptoms. Gastric outlet obstruction was suspected. The patient was reviewed by the gastroenterologist and was offered an urgent upper endoscopy. The upper endoscopy findings described a gastric volvulus, and a Computed Tomography (CT) scan was done to confirm the diagnosis. The patient underwent exploratory/diagnostic laparoscopy and successful reduction and fixation followed. There was no evidence of tissue compromise or ischemia. The patient was discharged on post-operative day 4 following an unremarkable postoperative course.

**Clinical discussion:** Acute gastric volvulus is a surgical emergency which can be associated with a high morbidity and mortality, if complications occur. The most important factor in diagnosing acute volvulus of the stomach is a high index of suspicion of the clinical symptoms and should be confirmed by imaging. Contrast enhanced computed tomography (CT) scan is the preferred imaging modality. Urgent surgical intervention is needed to prevent potentially fatal complications.

**Conclusion:** Acute Gastric Volvulus is rare and carries the risk of significant morbidity and mortality. Prompt recognition and treatment is required to prevent complications.

## 1. Introduction and Importance

Gastric volvulus is a rare, yet life-threatening condition first described by Berti in 1866 as an autopsy finding. The surgical management of a gastric volvulus was first described and successfully executed by Berg in 1978 [1]. Gastric volvulus can be defined as an abnormal gastric rotation upon itself of more than 180°; this can be either around its long or short axis resulting in gastric inlet and outlet obstruction of variable degrees. Gastric volvulus can be classified depending on its chronicity, acute versus chronic, and the axis of rotation, organo-axial (Fig. 1- A) or mesentero-axial (Fig. 1- B) or a combination of both [2].

Foregut obstruction is a complication of gastric volvulus. This can

lead to strangulation and necrosis which can result in perforation. This can be fatal. Therefore, it is imperative to obtain an early diagnosis and to commence treatment promptly [2,3].

Acute and chronic gastric volvulus vary in presentation. In approximately 70% of acute presentations, patients typically present with Borchart's triad; with the sudden onset of intense epigastric pain, retching with no emesis and failure to advance a nasogastric tube [2,5]. In contrast, chronic gastric volvulus may be asymptomatic, or may present with vague non-specific symptoms including epigastric discomfort or fullness, heartburn, dysphagia, and bloating most commonly after the ingestion of food [2,5]. The mortality rate from acute and chronic gastric volvulus has decreased from 15% - 20% to 0% - 13%, which can be attributed to prompt diagnosis and management [6].

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<https://doi.org/10.1016/j.amsu.2021.102857>

Received 21 August 2021; Received in revised form 9 September 2021; Accepted 10 September 2021

Available online 13 September 2021

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## 2. Case Presentation

A 74-year-old woman presented with a five-day history of epigastric pain, generalized abdominal discomfort, nausea and vomiting. The pain, along with nausea and retching worsened in the 24 hours prior to her presentation to the hospital. The patient is not known to have any chronic medical conditions and is not on any medications, with an insignificant past surgical history, and she is not known to have any drug allergies. She has no significant family history. With regards to her social history, she is a homemaker, a non-smoker, she does not consume alcohol and is not a recreational drug user.

On physical examination, the patient was alert and oriented and her vital signs were normal with a blood pressure (BP) of 110/70 mm Hg, heart rate of 90 bpm, a temperature of 37.4 °C and oxygen saturation on pulse oximetry of 96% on room air. Abdominal examination revealed a non-distended abdomen, with mild tenderness at the epigastric region and no signs of peritonitis. With regards to her laboratory investigations, they were unremarkable apart from a slightly elevated lactic acid of 2.34 mmol/L (normal range; 0.5–2.2 mmol/L).

The gastroenterology service was consulted, and an urgent upper endoscopy was recommended and performed. The procedure showed evidence of an acute gastric volvulus and a paraesophageal hernia (Fig. 2).

Computed tomography (CT) scan of the abdomen was then conducted and confirmed the diagnosis of an incarcerated and obstructed organo-axial gastric volvulus, within a large paraesophageal hiatus hernia measuring about 8 cm. The contents of the hernia included a twisted gastric antrum and the distal body dividing the stomach into three parts (Fig. 3):

- 1 The first part included the fundus and proximal body which were seen under the diaphragm, containing residual food particles and it communicated with the second part through a narrow connection, 5 mm in width, through the oesophageal hiatus hernia.
- 2 The second part contained the distal body, which was twisted. The antrum was both above the diaphragm and within the paraesophageal hernia. Partial filling post oral contrast administration was demonstrated, with no food residue.
- 3 The third part contained the gastric pyloric canal and distal antrum, which was seen under the diaphragm. It displayed partial filling with fluid and traces of the administered oral contrast. The connection between the second and third parts was completely obstructed within the oesophageal hiatus hernia and exhibited mucosal buckling.

Furthermore, the gastric mucosa revealed adequate enhancement with no gastric lesions or filling defects. However, no contrast was able to pass into the duodenum.

A plain abdominal x-ray was also performed, showing a part of the stomach above the diaphragm containing oral contrast.

The patient was kept nil by mouth and a diagnostic laparoscopy was performed by the general surgeons on-call. The paraesophageal hernia of the stomach with gastric volvulus was evident, with no evidence of ischemia or necrosis of the stomach. The stomach was reduced back into the abdominal cavity, and the hernial sac was excised. The esophagus was then mobilized to an adequate abdominal length (5 cm) with the preservation of the both vagus nerves. The diaphragmatic hiatus was repaired by performing a posterior cruroplasty using permanent braided sutures. A floppy Nissen fundoplication was then performed over a 36F bougie. The stomach was also fixed to the abdominal wall with tacking sutures and a gastrostomy tube was also placed for further fixation.

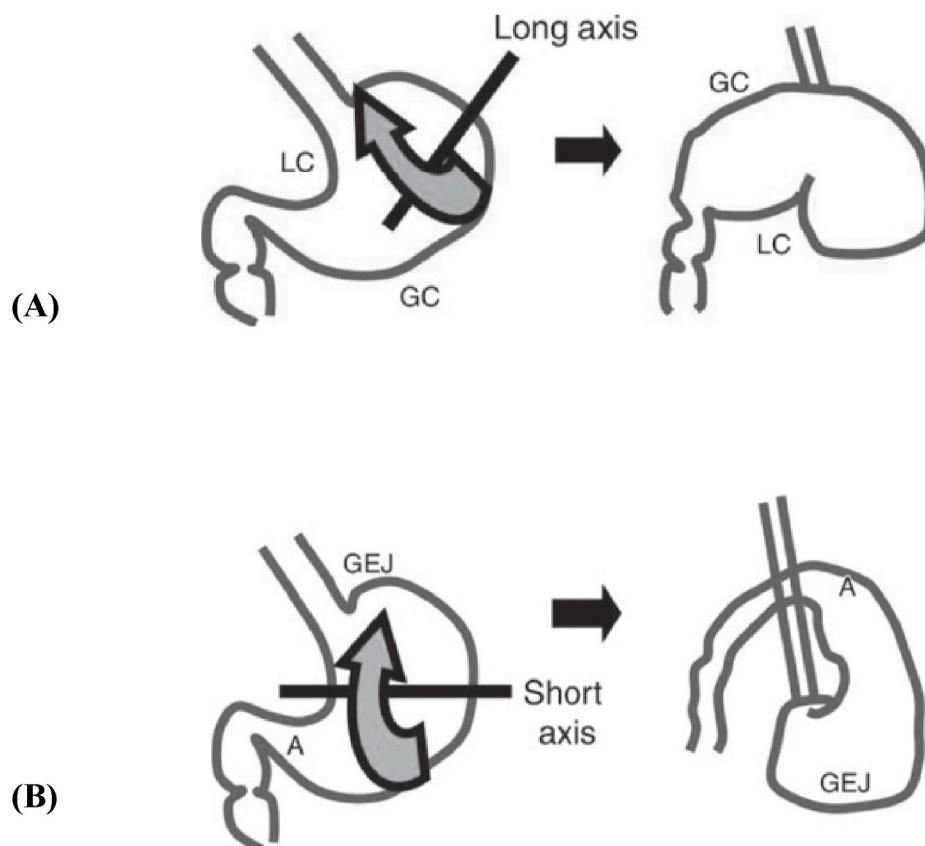
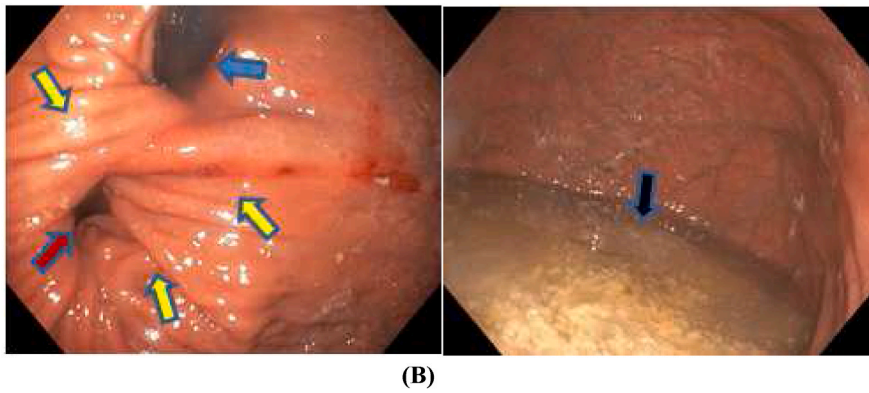


Fig. 1. (A) Organo-axial volvulus. Diagram shows the rotation of the stomach along its long axis. GC = greater curvature, LC = lesser curvature [4]

(B) Mesentero-axial volvulus. Diagram shows the stomach twisting along its short axis.

A = gastric antrum, GEJ = gastroesophageal junction [4].



**Fig. 2.** (A) Blue arrow: Upper gastrointestinal endoscopy revealing the gastro-oesophageal junction with an endoscope passing through. Red arrow: The narrow connection orifice to the twisted gastric body within the para-oesophageal hiatus hernia. Yellow arrow: The twisted mucosal folds around the hernia. (B) Black arrow: Upper GI endoscopic image showing food residue within the gastric fundus. (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

The patient's postoperative course was uneventful. A contrast swallow study was done on postoperative day two and it revealed normal intra-abdominal position of the stomach with free flow of contrast through the esophagus to the stomach, and normal emptying of contrast into duodenum. No abnormalities were noted.

The patient was discharged home on postoperative day 4 and was instructed to continue on a soft diet for 2 weeks. Two weeks post-operatively, she presented to the surgical outpatient department for a follow up. She reported complete resolution of her presenting symptoms and had no further complaints. The patient tolerated the procedure well and was compliant to the post-operative instructions.

This case report has been reported in line with the SCARE Criteria [7].

### 2.1. Clinical Discussion

Gastric volvulus is a rare yet life threatening medical condition. It can be described as the pathological rotation of the stomach, of more than 180° upon itself. The condition was first noted by Berti in 1866 in an autopsy done post-mortem. Gastric volvulus can occur in both adults and children, with the highest prevalence being in those who are in their fifth decade and has an equal distribution between both genders [2,8].

Gastric volvulus can be classified by cause, axis of rotation or chronicity. Firstly, primary gastric volvulus can be a result from gastric adhesions, tumors or due to gastric ligaments failure. While secondary gastric volvulus occurs as a consequence of anatomical or functional abnormalities of the stomach or the nearby organs [2,9,10]. Next, the rotation axis can be categorized as either organo-axial, mesentero-axial or a combination of both. Organo-axial volvulus – longitudinal – is portrayed by the rotation of the stomach around the axis connecting the gastro-oesophageal junction and the pylorus, giving the stomach an inverted appearance with the greater curvature appearing superior to the lesser curvature. This is the most common type of gastric volvulus, occurring in 60% of the cases [10].

Mesentero-axial volvulus is commonly associated with diaphragmatic anomalies, characterized by the stomach rotation around the perpendicular axis to its longitudinal axis, resulting in a vertical positioning of the stomach where its antrum and pylorus lie antero-superior to the gastroesophageal junction [3,5]. This is more prevalent in children and young adults. It typically presents with vague, non-specific symptoms, making the condition challenging to diagnose by clinical history and examination alone. Imaging modalities are used to confirm the diagnosis, these include plain radiographs, fluoroscopy and computed tomography scans. The findings usually support or raise a suspicion of gastric volvulus as a diagnosis. For example, in plain abdominal and chest x-rays, a retrocardiac structure can be seen containing air or a distended shadow showing two air-fluid levels within the fundus and antrum can be detected. These findings indicate a twisted or rotated stomach. Another finding on plain radiographs can be a single

air bubble with scarce gases within the distal bowel. However, fluoroscopy and CT scans are the imaging modalities of choice in confirming abnormal gastric rotations. Multiple studies recommend the use of CT scan as the 'gold-standard' diagnostic imaging modality, as it is able to confirm gastric rotation, obstruction and locate the transitional point, which can aid with surgical planning [5,11–13].

In our case report, the gastric volvulus can be described as an acute organo-axial gastric volvulus secondary to the paraesophageal hernia which was confirmed by CT imaging.

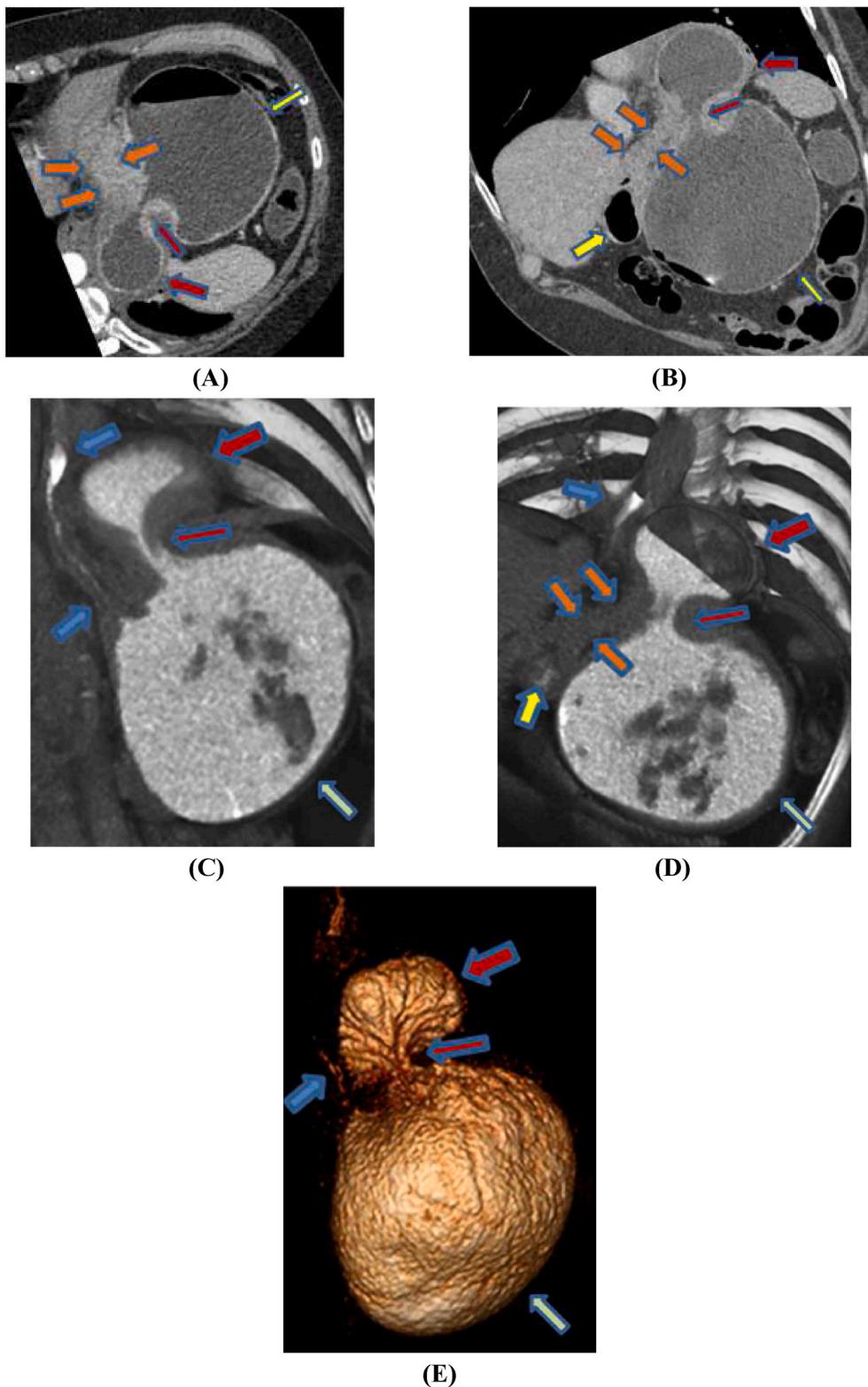
Management of gastric volvulus is tailored to the patient's presentation. In acute situations, the patient might require resuscitative measures prior to surgical intervention. Whereas, in chronic presentations it can be managed as an elective case. This will allow for pre-operative optimization prior to surgery. Surgical management is aimed at ensuring gastric viability, if there is any evidence of ischemia or necrosis, the affected tissue should be excised. Henceforth, total or partial gastrectomy are performed depending on the extent of tissue ischemia. However, if there is no evidence of vascular compromise, reduction and de-rotation of the twisted stomach with gastropexy is recommended. Moreover, in cases where gastric volvulus is due to a secondary cause, the cause should be addressed and treated appropriately. If the cause was a hiatal hernia, Nissen's fundoplication should be performed [3,9,14,15]. A laparoscopic approach is preferred due to its benefits of smaller and more cosmetically appealing wounds, better pain management, lower complication rates and shorter recovery and overall hospital stay. Lastly, in patients where surgery is contraindicated, conservative management options include laparoscopic-assisted percutaneous endoscopic gastrostomy (LAPEG) insertion or endoscopic reduction [8].

### 3. Conclusion

Acute gastric volvulus is a surgical emergency. Prompt diagnosis and treatment is required to reduce the morbidity and mortality of condition. A high index of suspicion regarding the constellation of clinical symptoms is required. Contrast enhanced CT is done to confirm the diagnosis of gastric volvulus. The volvulus is surgically corrected, preferably by the laparoscopic approach as it yields more favorable results when compared to a laparotomy. The following paper documents a rare pathology that presents with vague symptoms. It can be associated with a high morbidity and mortality as a result of its complications. Therefore, it is imperative for surgeons and emergency physicians to have a high index of suspicion when encountering a patient with a constellation of non-specific symptoms.

### Ethical approval

Exempt, written consent obtained from the patient.



**Fig. 3.** (A & B) Post contrast reformatted axial and coronal oblique CT images with a water filled stomach.

(C & D) *Blue arrows:* Reformatted coronal oblique CT MIP (Maximum intensity projection) enterography images in the delayed phase after oral contrast ingestion, showing the distal esophagus containing contrast traces. *Red arrows:* The paraesophageal hernia containing the twisted distal body and proximal antrum. *Narrow red arrows:* The narrow connection between the twisted herniated part and the proximal gastric fundus located under the diaphragm (*narrow yellow arrows*) and the completely collapsed distal antrum and pyloric canal within the oesophageal hiatus and under diaphragm (*orange arrows*). *Yellow arrows:* Buckled mucosa can be seen, and some gases in the post contrast early phase scan and traces of the given oral contrast in the delayed scan.

(E) *Blue arrows:* a 3 dimensional volumetric image of the delayed phase scan after oral contrast ingestion showing contrast filled parts of the stomach and distal esophagus. *Yellow arrows:* The proximal gastric fundus located under the diaphragm. *Red arrow:* the herniated part within the *para-oesophageal hiatus hernia* and the *narrow red arrow* indicating the narrow connection between the twisted herniated part and the proximal gastric fundus located under the diaphragm. (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

**Sources of funding**

None.

**Author contribution**

Dr Alsafraan has full access to the data used in the study and takes full

responsibility for the integrity and accuracy of the data. *Concept and design* Salman Alsafraan and Khalifah Alyatama. *Drafting of the manuscript* Dalia Albloushi and Danah Quttaineh. *Imaging analysis* Amgad Abdel-Rahman. *Critical revision of the manuscript for important intellectual content* all authors. *Supervision* Salman Alsafraan.

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## Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of consent is available for review by the editor in chief of this journal upon request from the corresponding author.

## Provenance and peer review

Not commissioned, externally peer reviewed.

## Declaration of competing interest

All authors declare no conflict of interest.

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