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An Unexpected Twist: Gastric Volvulus As A Cause of Acute Abdomen

Abstract – Acute gastric volvulus is a rare but life-threatening condition that can cause gastric outlet obstruction, vascular compromise, strangulation, and potential perforation if not promptly diagnosed and managed. We describe a case involving a 75-year-old female with a history of laparoscopic paraesophageal hernia repair who presented with 2 to 3 days of worsening abdominal pain and recurrent vomiting. On physical examination, she had diffuse abdominal tenderness and a vague central abdominal mass. Laboratory tests showed elevated white blood cell count and metabolic acidosis, raising suspicion of septic shock, initially thought to be due to a strangulated incisional hernia. However, contrast-enhanced computed tomography of the abdomen revealed features consistent with organo-axial gastric volvulus, including abnormal rotation of the stomach with the greater and lesser curvatures switched, along with twisting at the pylorus. This diagnosis was later confirmed during surgery. Gastric volvulus can be challenging to diagnose due to its nonspecific symptoms. This case highlights the vital role of computed tomography in detecting gastric volvulus, particularly when the clinical presentation is unclear, enabling timely surgical management to prevent serious complications.

Keywords*: Gastric volvulus, abdominal pain, computed tomography, Strangulation*

1 INTRODUCTION

Gastric volvulus refers to an abnormal twisting of the stomach that exceeds 180 degrees (1). The precise incidence of this condition is not well established, as many chronic instances go unrecognized or unreported. The clinical manifestations can range from an acute abdomen requiring immediate surgical intervention to chronic and nonspecific abdominal discomfort. We present a case of gastric volvulus that was admitted to our facility, initially complaining of abdominal pain and vomiting.

2. CASE REPORT

A 75-year-old lady with underlying bronchial asthma was brought to the emergency department complaining of worsening left-sided abdominal pain for the past 3 days and recurrent vomiting for 2 days. She had no diarrhoea or fever. On further questioning, she had a previous history of type II paraesophageal hernia and subsequently underwent laparoscopic paraesophageal hernia repair in November 2022.

On physical examination, she was alert, afebrile, and her vital signs were stable. There were signs of dehydration (cold peripheries, coated tongue, and mucous membrane as well as low pulse volume). Abdominal examination revealed a well-healed laparoscopic scar. There was generalized guarding and tenderness with a vague mass palpable at the central abdomen. Bowel sounds were absent.

Her laboratory investigation results showed leukocytosis with a total white cell count of 14.6 x 109/L. Venous blood gas showed decompensated metabolic acidosis with pH 7.1, PCO2 58.4mmHg, HCO3 17.7mmol/L. Serum lactate was elevated with a reading of 8mmol/L. Renal profile showed signs of acute kidney injury with serum creatinine of 134mmol/L. Her capillary blood sugar was 13mmol/L. Serum ketone is not elevated (0.3mmol/L). Both chest and abdominal radiographs showed no signs of pneumoperitoneum or ileus. At this point, a provisional diagnosis of septic shock with likely strangulated incisional hernia was made.

Subsequently, a contrast-enhanced computed tomography (CT) of the abdomen and pelvis was done on the same day. The stomach is grossly

distended with reversal of location of the lesser and greater curvatures (mirror image of normal stomach position) [Figure 1]. The pylorus appears to be on the left side [Figure 1]. Abrupt narrowing at the pylorus with twisting of this segment noted [Figure 3]. The wall of the stomach is thinned out in some areas of poor gastric wall enhancement [Figure 2]. The gastroesophageal junction is seen at its normal location. Nasogastric tube seen with its tip in the body of the stomach. Thus a diagnosis of organo-axial gastric volvulus with possible developing gastric wall necrosis were made.

She underwent surgery (total gastrectomy with Roux-en-Y reconstruction) on the same day. Intraoperatively, there was posterior organo-axial gastric volvulus. The proximal stomach was ischemic, whereas the distal stomach (antrum and pylorus) was still healthy-looking. The previous Nissen repair was intact. Slough was also seen in the abdomen. Gastric wall tissue histopathological examination revealed ischemic gastritis and transmural necrosis, features in keeping with the clinical history of gastric volvulus. She was discharged well with a scheduled follow-up visit at day 15 post-operation.

Figure 1. Grossly distended stomach with reversal location of the greater (thick arrow) and lesser gastric curvature (arrowhead). Pylorus is at the left side of the abdomen (thin arrow).

Figure 2. Thinning of gastric wall with areas of poor enhancement suspicious of ischemia (arrows).

Figure 3. Axial view illustrating left sided location of pylorus with abrupt narrowing at this segment (arrow) and appeared twisted.

3. DISCUSSION

Gastric volvulus is characterized by the abnormal rotation of the stomach around its short or long axis by more than 180 degrees. It becomes a surgical emergency if this rotation results in gastric outlet obstruction or jeopardizes the blood supply to the stomach, which can lead to rapid strangulation, incarceration, and perforation of the stomach (2). Although gastric volvulus is relatively rare, its exact prevalence is unclear. There is no evident predisposition based on sex or race, and it

can manifest in both acute and chronic forms. The first documented case was reported by Berti in 1866, with the initial surgical procedure performed by Berg in 1895.

Gastric volvulus can be categorized into primary or secondary types based on the underlying cause. Primary gastric volvulus arises from neoplasia, adhesions, or abnormalities in the ligamentous attachments. The ligaments (gastrocolic, gastrosplenic, gastrophrenic, and gastrohepatic) along with the pylorus and gastroesophageal junction anchor the stomach, preventing malrotation and volvulus. Conditions that lead to agenesis or disruption of these ligaments result in inadequate gastric support, increasing the risk of malrotation or volvulus. More frequently, gastric volvulus occurs as a secondary effect of anatomical or functional disorders of the stomach or adjacent structures, such as the spleen and diaphragm. In adults, the most common association is with a paraesophageal hernia, but it may also be triggered by traumatic defects, diaphragmatic eventration, or phrenic nerve palsy (4).

Three distinct types of gastric volvulus have been identified based on the rotation axis: organoaxial, mesenteroaxial, and combined. The organoaxial volvulus, which constitutes about 60% of cases, involves rotation around the pylorus-cardia axis, resulting in the greater curvature positioned above the lesser curvature, creating an 'inverted' stomach. This positioning can lead to obstructions at the gastroesophageal junction or pylorus, potentially causing strangulation and vascular compromise (1). Conversely, mesenteroaxial volvulus occurs when the stomach rotates around an axis perpendicular to its longitudinal axis, positioning the stomach vertically, with the antrum and pylorus located anteriorly and superiorly to the gastroesophageal junction. Diaphragmatic defects are less common in this type, and the primary risk factor is laxity of the gastrosplenic ligament (1). Patients with mesenteroaxial volvulus often experience prolonged symptoms (3). The combined type is the least common.

Adults experiencing acute gastric volvulus typically present with severe epigastric pain, abdominal distension, vomiting, followed by intense non-productive retching and difficulty or inability to insert a nasogastric tube. This symptom cluster is known as Borchardt's triad (6). Approximately 75% of affected patients may exhibit this classic triad, while the remaining 25% may not (2). The mortality rate for acute gastric volvulus ranges from 42% to 56%, primarily due to gastric ischemia, perforation, or necrosis (3). Diagnosing this condition remains challenging due to its rarity, and there are currently no specific clinical or laboratory indicators; often, the diagnosis is established intraoperatively. Given the nature of the condition, early surgical intervention is essential to avert further complications.

A chest radiograph may reveal a retrocardiac air-filled mass, indicative of an intrathoracic stomach herniating through the diaphragm. Abdominal radiographs might show a significant gas shadow with limited distal bowel gas, consistent with a distended, fluid-filled stomach. For patients suspected of having chronic gastric volvulus, particularly in conjunction with a paraesophageal hernia, a barium study is considered the gold standard imaging technique (3). However, these findings were not present in our patient. Currently, abdominal CT is preferred for diagnosing gastric volvulus due to its high sensitivity and specificity, surpassing that of barium studies, endoscopy, and other imaging modalities (8). The combination of two CT signs—the gastropyloric transition zone and abnormal positioning of the antrum at or above the fundus—enables a confident diagnosis of acute gastric volvulus with high specificity and sensitivity (7). Some case reports have also noted a reversed position of the greater and lesser gastric curvatures, similar to what was observed in our patient. Additionally, an abdominal CT scan can assist in identifying any anatomical defects necessary for surgical planning and evaluating potential perforation. According to Singham et al., CT of the abdomen should be the initial investigational approach (3).

Surgical intervention is the primary treatment for acute gastric volvulus, particularly when complications like perforation, bleeding, or gastric outlet obstruction arise, or when a nasogastric tube cannot be inserted (9). In stable cases without severe complications, conservative management options such as gastric decompression via nasogastric tube or endoscopic reduction may be pursued. However, surgery remains necessary if conservative measures are ineffective or if the volvulus recurs. The main objectives of surgery include untwisting the stomach and securing it to prevent recurrence. If complications such as necrosis, perforation, or bleeding occur, these must also be addressed, and repairing underlying

factors like a hiatal hernia may be required. Traditionally, open surgery (laparotomy) has been utilized, but laparoscopic techniques are increasingly preferred for stable patients due to quicker recovery times and reduced complications. Percutaneous endoscopic gastrostomy gastropexy was once employed as a less invasive alternative but is now less frequently used due to concerns about recurrence and cosmetic issues.

4 CONCLUSION

Acute gastric volvulus is a rare condition associated with a high mortality rate if left undiagnosed. Timely diagnosis and prompt surgical intervention are vital for managing such cases. This condition should be considered in patients presenting with acute abdominal symptoms, and CT scans have proven to be beneficial in the diagnostic process.

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AUTHOR CONTRIBUTIONS

MFTL: Investigation, writing–original draft;
NKAK: conceptualization, supervision, writing–review and editing.
SAA, PSDS: Conceptualization, investigation.

AUTHORSHIP CLARIFICATION

All authors meet the ICMJE criteria for authorship and approved the final manuscript.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Ethics approval was not required for this case report. Written informed consent was obtained from the patient.

CONSENT FOR PUBLICATION

Not applicable

CONFLICTS OF INTEREST

The authors declare that they have no competing interests.

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