Case study

Strangulated Paraesophageal Hernia Complicated by Intrathoracic Gastric Volvulus: A Case Report and Review of Literature

Abstract

Background:

A volvulus has been defined as rotation of a hollow organ more than 180 degrees around its axis leading to an obstruction of variable degrees, ischemia, perforation and necrosis. Gastric volvulus, in particular, is an uncommon entity, associated with high mortality ranging between 30-50%. Herein, we report a case of strangulated paraesophageal hernia complicated by intrathoracic gastric volvulus, along with summarizing pertinent literature.

Case presentation:

A 61-year-old, morbidly obese female, who is known to have diabetes mellitus (DM), hypertension (HTN) and glucose-6-phosphate dehydrogenase (G6PD) deficiency, presented with epigastric abdominal pain. The pain onset was associated with nausea, vomiting and heartburn. Computed tomography scans of the chest and abdomen confirmed the diagnosis of mesentro-axial gastric volvulus secondary to a strangulated paraesophageal hernia. the condition was managed as a surgical emergency where the herniating abdominal organs were placed back into the abdominal cavity and the hiatal defect was approximated with simple stitches.

Conclusion:

Gastric volvulus remains a diagnostic challenge due to the rarity and its unspecific symptomatology. The presence of Borchardt's triad should raise the suspicion of underlying gastric volvulus. Computed tomography scan is considered to be the gold standard diagnostic modality and endoscopic decompression is recommended prior to definitive surgical intervention.

Key words:

Gastric volvulus; Hiatal hernia; Strangulation

Abbreviation:

diabetes mellitus (DM), hypertension (HTN) and glucose-6-phosphate dehydrogenase (G6PD) computed tomography (CT), intravenous (IV), intensive care unit (ICU)

1. Introduction

Gastric volvulus is a pathological rotation of the stomach of more than 180 degrees (1). Gastric rotation could be either around its long or short axis leading to gastric inlet and outlet obstruction of variable degrees (2). The patient could present as a case of surgical emergency of chronic abdominal symptoms (1). Borchardt's triad, consisting of severe epigastric abdominal pain, vomiting and inability to pass the nasogastric tube presents in about 70% of cases and is

believed to be characteristic of gastric volvulus (1,3-5). Gastric volvulus is associated with complications such as ulceration, ischemia, gastric perforation, gangrene, and in few reported cases pancreatic necrosis (6) and omental avulsion (7) and even splenic rupture (8). Due to rarity and the difficulty of establishing the diagnosis, gastric volvulus has been associated with high mortality ranging between 30-50% (9). Herein, we report a case of strangulated paraesophageal hernia complicated by intrathoracic gastric volvulus, along with summarizing pertinent literature.

2. Case Presentation

A 61-year-old, morbidly obese female, who is known to have diabetes mellitus (DM), hypertension (HTN) and glucose-6-phosphate dehydrogenase (G6PD) deficiency, was referred to our facility as a case of strangulated para-esophageal hiatal hernia with intrathoracic gastric volvulus. Upon presentation, she was complaining of a sudden epigastric abdominal pain, for one-day duration. According to her, it was severe, colicky in nature, not even responding to analgesia. Significantly, two weeks prior to the attack of abdominal pain, she had several episodes of vomiting that became more frequent after the pain onset. It was also associated with nausea and heartburn, however, there was no change in bowel habit, fever or recent weight change. On examination, the patient was conscious, alert and oriented to time, place and person. She was moderately dehydrated but vitally within normal range except for tachycardia with a pulse reaching up to 122 beats per minute. Upon local examination of the abdomen, it was found to be slightly distended with moderate epigastric tenderness. Examination of the chest revealed a decreased vesicular breath sound over the left hemithorax with unequal air entry bilaterally.

All elements of complete blood count were normal. Renal function parameters, on the other hand, demonstrated evidence of acute kidney injury, with creatinine exceeding 500 umol/L and urea of more than 20 mmol/L. As the patient was having several episodes of vomiting, an expected picture of venous blood gasses demonstrated metabolic alkalosis, with bicarbonate of 32 mmol/L. Subsequently, hypokalemia with potassium of less than 3 was also observed. Radiological modalities were utilized to confirm the diagnosis. Initially an abdominal x-ray was obtained and a portion of the stomach was found herniating into the left hemithorax as illustrated in **figure 1**. The contrast shown was given by the primary team before referral and can be seen accumulating in the stomach, not passing beyond the pyloric sphincter. Endoscopy was also done and clearly demonstrated the presence of paraesophageal hiatal hernia with gastric volvulus. Additionally, computed tomography (CT) scans of the chest and abdomen did not only confirm the diagnosis of gastric volvulus secondary to hiatal hernia but also were able to identify the exact type of the volvulus. As shown in **figure 2**, the fundus of the stomach, along with part of the gastric body, present within the thoracic cavity. The antropyloric segment can also be seen located superior to the stomach fundus, clearly suggesting a gastric volvulus, mesentro-axial in type.

After establishing the diagnosis, the patient was resuscitated in terms of intravenous (IV) fluids, and analgesia. Intraoperatively, the stomach along with the omentum were found herniating

into the thoracic cavity through the diaphragm. A diaphragmatic defect at the site of the hiatus opening, measuring around 5x3 cm, was also evident upon exploration. Herniating organs were placed back into the abdominal cavity, and the stomach was de-torted. The diaphragmatic esophageal hiatus was approximated using Prolene sutures. **Figure 3** demonstrates the herniated abdominal structures after being repositioned back into the abdominal cavity Postoperatively, the patient was shifted to intensive care unit (ICU) where inotropic support was required for a couple of days. Thereafter, she demonstrated a significant clinical improvement in terms of tolerance to oral feeding and reduction in previously experienced symptoms. Renal parameters returned to normal levels also as the causative factor has been treated. Day six postoperative, the patient was discharged in a satisfactory condition. She was seen in the clinic one week after and reported complete resolution of symptoms.

3. Discussion

A volvulus has been defined as rotation of a hollow organ more than 180 degrees around its long or short axis leading to an inlet and outlet obstruction of variable degrees leading to ischemia, perforation and necrosis. [1,2] Gastric volvulus is considered a rare entity that can occur in children and adults, with higher rates of prevalence among people in the 5th decade of life [2,4,10] with no reported gender preference. [11] It is known that the most common organ that undergoes volvulus in adults is sigmoid colon and followed by caecum. Gastric volvulus has been firstly described in the literature by Berti et al. in 1866 as a finding of autopsy. Later in 1897 Berg et al. reported first successful surgical management of gastric volvulus. [1]

Gastric volvulus can be classified depending on the cause, axis of its rotation and the chronicity. First, primary gastric volvulus might result from adhesions, tumors or failure of gastric ligaments. On the contrary, secondary gastric volvulus which happens in 70% of the cases could be a consequence of functional or anatomical abnormalities of the stomach or its surrounding organs. [2,9, 10] The axis of rotation can be divided as either organo-axial, mesentero-axial or a combination of both. Organo-axial volvulus is a longitudinal rotation of the stomach around the axis connecting the gastro-esophepgeal junction of the pylorus, showing the greater curvature superior to the lesser curvature. This is the most common type which presents in 60% of the cases. [2,12] While mesentero-axial volvulus is associated with diaphragmatic hernia, where the stomach rotate in perpendicular axis to its longitudinal axis, showing the stomach in vertical position, making its antrum and pylorus laying antero-superior to the gastro-esophageal junction. [13,14] This type of rotation is usually partial, less than 180 degrees, and present with vague symptoms making the diagnosis more challenging. A combined gastric volvulus in which the stomach rotates in mesenterio-axially and organo-axially is rare and has been reported in patient with chronic gastric volvulus. [4,15]

Gastric volvulus could be acute or chronic, acute volvulus patients typically present with Borchardt's triad, as seen in 70% of the cases. [7-9] This presentation should raise the suspicion of gastric volvulus as an etiological factor. While chronic volvulus patients might be asymptomatic, or have vague non-specific symptoms like epigastric fullness, heartburn or dysphagia. Those symptoms might resemble those of gastritis, cholecystitis or peptic ulcer

disease leading to delay diagnosis. [16] In our case the patient presented with acute gastric volvulus secondary to para-esophageal hernia and showed mesentero-axial volvulus.

Due to rarity of the disease, clinical diagnosis uncommon, chest radiograph may show retrocardiac air filled mass suggestive of an intrathoracic stomach herniating through the diaphragm or an abdominal radiograph may show single large gas shadow with paucity of distal bowel gasses, consistent with a distended fluid filled stomach. Those findings indicate a rotated stomach. [4,14] According to Singham et al. CT scans should be the first line of investigation and is considered as the gold standard radiologic modality to establish the diagnosis. CT scan can identify the type of gastric rotation and locate the transitional point, aiding in planning the surgical management. [17]

No optimal treatment strategy of gastric volvulus has been developed due to the variation of clinical course between cases. In acute gastric volvulus the patient might require resuscitation and correction or electrolytes abnormalities prior to definitive management. [18] In few studies, endoscopy and decompression have been recommended to facilitate identifying ischemia and refiling patient symptoms. [19] Surgery aimed to ensure gastric viability, define and address the cause of volvulus in case of paraesophageal hernia as presented in our patient. During surgery when there is evidence of ischemia or necrosis partial or total gastrectomy are performed as needed. [4,13] When there is no vascular compromise, de-rotation of stomach and gastropexy is recommended. In addition, when gastric volvulus is due to secondary cause the underlying condition, should be addressed and treated. [20] Laparoscopic approach is preferred due to lower rate of complication, reduced hospital stay and faster patient recovery. In chronic volvulus, a non-operative approach is recommended with percutaneous endoscopic gastropexy, especially for elderly patients who might not tolerate a surgical intervention. [10]

4. Conclusion

Acute gastric volvulus is a rare condition that represents a diagnostic challenge. Among patients presenting with a triad of epigastric pain, vomiting and inability to insert naso-gastric tube, gastric volvulus should be highly suspected. CT scan with contrast is considered the gold standard diagnostic modality. Even after endoscopic decompression, surgical intervention remains the definitive treatment to ensure stomach viability and treat the underlying cause.

Figure 1 X-Ray image of left hemithorax

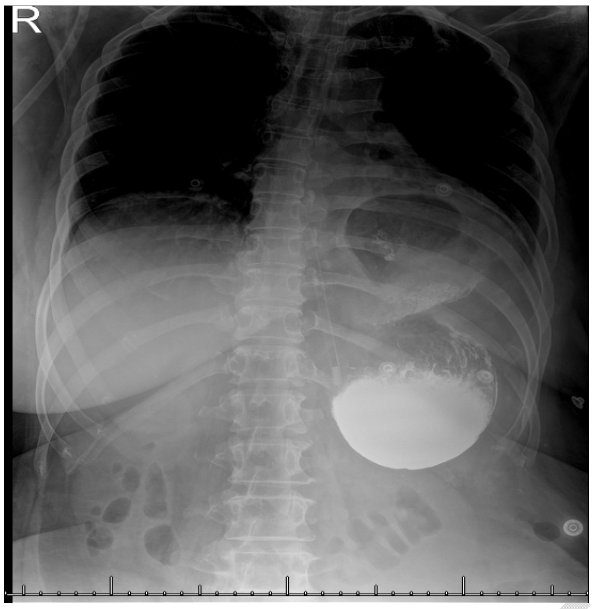


Figure 2 (A and B) Computed Tomography (CT) scans of the chest and abdomen

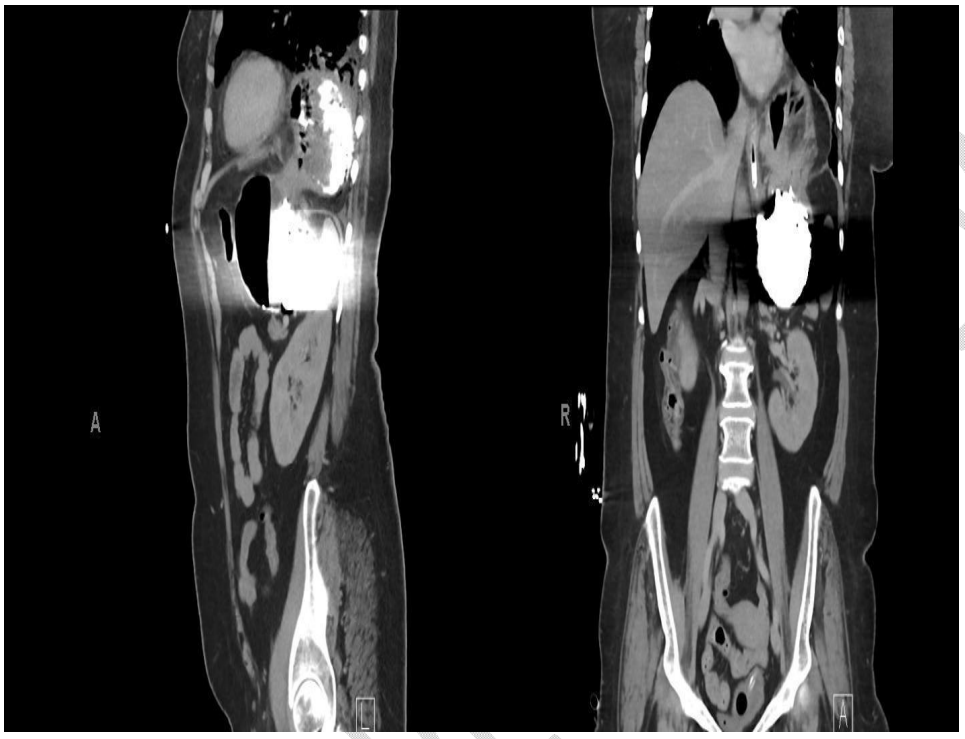
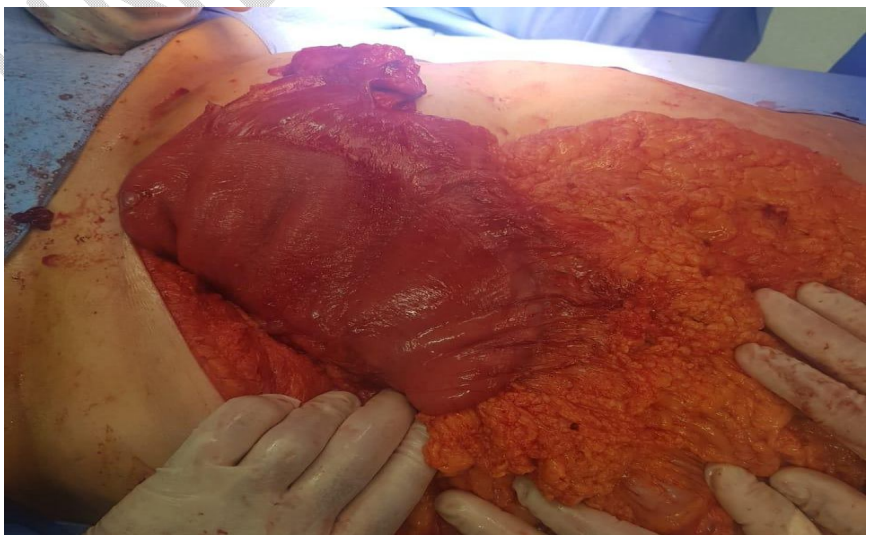


Figure 3 Herniated abdominal structures after being repositioned back into the abdominal cavity



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