Abdominal pain with a twist: a rare presentation of acute gastric volvulus

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ABSTRACT

Acute gastric volvulus is a life threatening condition requiring early diagnosis and aggressive management. Diagnosis of gastric volvulus remains a challenge for clinicians due to variable, non-specific clinical presentation, which requires a high level of suspicion. It should be considered in patients presenting with chest pain and/or epigastric pain, especially in the elderly population. Endoscopic de-rotation could be initially attempted as a therapeutic modality especially in patients who cannot undergo surgery. However, surgery remains the main stay of treatment. Delay in diagnosis can lead to complications like mucosal ischemia, necrosis or perforation, shock, which substantially increase the morbidity and mortality.

1. Introduction

The word volvulus originates from the Latin word ‘volvere’ which means to turn or roll, and hence gastric volvulus means twisting or rolling of stomach or part of stomach more than 180° causing a closed loop and obstruction. Gastric volvulus can present either as an acute or chronic presentation. The classical presentation is known as Borchardt’s triad which includes severe epigastric abdominal pain and distention, vomiting followed by non-productive retching, and inability to pass a nasogastric (NG) tube [1]. This triad has been reported to occur in 70% of cases and represents total gastric obstruction [2,3]. Acute gastric volvulus is a life threatening condition characterized by rotation of the stomach around its axis in variable degrees. It can lead to strangulation and even complete gastric obstruction which in turn can lead to ischemic necrosis and perforation with a mortality rate of 30–50% [4]. Due to its rarity, the exact incidence remains unknown. It was first described by Berti in 1866 in a 60-year-old man on autopsy and the first surgery for this condition was performed in 1897 by Berg [5–7]. Early recognition and treatment are essential as they may lead to reversal of symptoms and improved prognosis.

Here we report a case of acute gastric volvulus in an elderly female presenting with epigastric pain.

2. Case report

A 79-year-old Caucasian female with a known moderate size hiatal hernia presented to the Emergency Department with acute onset of chest pressure, accompanied by nausea and vomiting. She reported pain at the epigastric area with radiation to her mid-back. Pain was described as sharp, worse with lying flat, and better with sitting up. She denied any paraesthesia in her arms, dizziness, dyspnea, hematemesis, melena, or hematochezia. She further denied any recent use of nonsteroidal anti-inflammatory drugs (NSAIDs), alcohol, or ingestion of foreign objects.

Her past medical history was significant for hypertension, grade 1 diastolic dysfunction, moderate size hiatal hernia, gastroesophageal reflux disease, depression, and bipolar disorder. Her surgical history consisted of cholecystectomy, pelvic surgery for ramus fracture, and vertebroplasty for T7 compression fracture. Family history was non-contributory. She had a 15 pack-year smoking history.

Interestingly she was evaluated at our Emergency Department 2 weeks prior for altered mental status, chest pain associated with nausea and vomiting. Her workup at that time included a normal complete blood count (CBC), comprehensive metabolic profile (CMP), troponin test, and electrocardiogram (ECG). Chest X-ray showed moderate to large size hiatal hernia. She was diagnosed with a urinary tract infection based on urine analysis and was then discharged home with trimethoprim/sulfamethoxazole (TMP/SMX).

Physical examination on current admission revealed a soft, non-distended abdomen with epigastric tenderness, hypoactive bowel sounds, but no rebound tenderness, rigidity, or guarding. She had a leukocytosis of $17 \times 10^3$ mcL and normal hemoglobin on CBC. CMP showed potassium of 3.4 mmol/L, chloride of 109 mmol/L, bicarbonate of 16 mmol/L, anion gap of 13 mmol/L, BUN of 21 mg/dL, and Cr
was normal at 0.86 mg/dL. Lactic acid was elevated at 6.2 mmol/L. Her troponin was normal and ECG showed normal sinus rhythm without evidence of ischemia. She had multiple episodes of dark brown emesis and was later tested positive for occult blood. Her abdominal X-ray showed a significant increased in size of large hiatal hernia with minimal bowel gas (Figure 1). She was started on intravenous fluid for hydration, and intravenous proton pump inhibitor drip. Serial lactic acid and hemoglobin were obtained. Gastroenterology was consulted for upper endoscopy to evaluate for possible upper gastrointestinal bleed from Cameron lesions or Mallory-Weiss tears from underlying hiatal hernia.

Esophagastroduodenoscopy (EGD) showed a large hiatal hernia with gastric volvulus combined organoaxial and mesenteroaxial. About 70% of the gastric lumen was above the diaphragmatic pinch. The fundus and gastric body had ischemic appearance (Figure 2). An attempt was made to reduce the malrotation and was only partially successful. Subsequent computed tomography (CT) abdomen showed an organoaxial gastric volvulus with pneumatosis of the gastric wall (Figure 3). General surgery was then consulted for reduction and repair of the hiatal hernia. Intraoperatively, after complete reduction of the stomach, it was noted that there was ischemic/necrotic tissue along the posterior surface

![Figure 1](image1.png)

**Figure 1.** X-ray of the abdomen showed a large hiatal hernia with minimal bowel gas which can be seen with gastric volvulus.

![Figure 2](image2.png)

**Figure 2.** EGD showed a large hiatal hernia. Roughly 70% of the gastric lumen was above the diaphragmatic pinch. There is a large amount of old blood, food, and feculent material in the hernia sac with malrotation.
of the stomach. Due to concern for impending perforation, a partial gastrectomy was performed. This was followed by gastropexy to prevent recurrence of gastric volvulus.

3. Discussion

Gastric volvulus is an uncommon condition with a higher prevalence in those elderly more than 50 years of age, who comprise up to 80% of the cases [8]. The stomach is normally fixed to the abdominal wall via gastro-phrenic ligament, gastro-splenic ligament, gastro-colic ligament, and gastro-hepatic ligament along with being firmly held proximally at the cardia and distally at retroperitoneum fixation in duodenum [5,6]. Gastric volvulus can be either primary or secondary, with primary gastric volvulus occurring in 30% of patients when the ligaments are either lax, atrophic, or rupture. Secondary gastric volvulus occurs in rest of the patients with eventration of diaphragm, para-esophageal hernias, ulcers, or adhesions, carcinoma of stomach or pancreas, phrenic nerve crush, abdominal bands, or adhesions [6,9].

Von Haberer classified gastric volvulus mainly into 2 types, first is organoaxial where twisting occurs from pylorus to esophago-gastric junction along the long axis, this is the most common type. The second type is mesenteroaxial where twisting occurs along a transverse gastric axis. A combination of both is the rarest form [5,6]. Gastric volvulus can present either as an acute or chronic presentation, classical triad is present in 70% of the cases presenting as severe epigastric abdominal pain and distension, vomiting followed by non-productive retching, and inability to pass NG tube [1-3]. In a review looking at 21 patients, it was found that abdominal pain, vomiting and upper GI bleeding were the most common presenting symptoms [1]. The chronic presentation on the other hand could manifest with recurrent non-specific abdominal pain, abdominal fullness, chest pain, retching, acid reflux, and dysphagia [3]. The cause of chronic volvulus and incidence of conversion to acute cases remain unknown [3]. Paraesophageal hiatal hernia was found to be present in 16 of 21 patients in one review looking at different case reports [1].

Diagnosis of gastric volvulus remains a challenge for clinicians as it is a rare entity often with variable, non-specific clinical presentation, which requires a high level of suspicion. A diagnosis cannot be made with history and physical examination alone as it is usually not one of the top differential diagnoses one would expect as the cause of upper abdominal pain, nausea, and vomiting. It can also present as chest pain mimicking an acute cardiac event. Chest or abdominal X-rays are a good place to start and usually can show a retrocardiac air bubble or large air-fluid level in the epigastric area. However, abdominal CT can detect predisposing factors and other abnormalities associated with gastric volvulus such as gastric pneumatosis and pneumoperitoneum, which is suggestive of necrosis and perforation, respectively [10]. Furthermore, CT imaging can potentially detect other causes of abdominal pain in the absence of gastric volvulus. Barium studies have been reported to have the highest yield (81%) per one review paper looking at 21 cases [1].

Management should start with stabilizing the patient – fluid resuscitation, correction of electrolyte abnormalities, and immediate nasogastric tube insertion if able. Gastric decompression provides symptomatic relief, may result in spontaneous de-rotation, and decrease the risk for gastric ischemia. Surgical repair allows reduction and de-rotation of the
stomach, gastrectomy, repair of anatomic defects, and gastropexy. Upper endoscopy is a less invasive approach that can be used in patients with high surgical risk and acute presentation as in our patient. An EGD can be both diagnostic to evaluate the gastric mucosa or therapeutic to reduce the gastric volvulus. Endoscopic treatment allows de-rotation and gastric fixation, but without repair of the anatomic defects [11]. Endoscopic de-rotation can be especially important in cases where a palliative approach is being considered [12]. It has been reported more commonly for cases of chronic gastric volvulus. The techniques that have been suggested include the J-shape maneuver, extended J-shape maneuver, alpha-loop maneuver, and non-specific rotational maneuvers [13]. Alpha-loop maneuver was successfully reported to reduce 7 out of 8 cases of gastric volvulus by David et al. [13] All patients in this study presented with acute symptoms and 7 out of the 8 later underwent surgical repair, one patient continued to do well without surgery 1 year post procedure but died of other causes. Despite endoscopic resolution of acute gastric volvulus with symptomatic improvements patients who are suitable candidates for surgery need elective surgery to repair the underlying hernia [13]. Endoscopic de-rotation was initially attempted in our patient but could not be accomplished. She also had evidence of pneumatosis on CT scan, which is a contraindication for endoscopic reduction. Other contraindications include any evidence of gastric ischemia, necrosis or perforation. Such patients should be taken emergently for surgery as was done in our patient.

Disclosure statement
No potential conflict of interest was reported by the authors.

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References
[1] Gourgiotis S, Vougas V, Germanos S, et al. Acute gastric volvulus: diagnosis and management over 10 years. Dig Surg. 2006;23(3):169–172.
[2] Chau B, Dutel S. Gastric volvulus. Emerg Med J. 2007;24(6):446–447.
[3] Hsu Y-C, Perng C-L, Chen C-K, et al. Conservative management of chronic gastric volvulus: 44 cases over 5 years. World J Gastroenterol. 2010;16(33):4200–4205.
[4] Al-Faraj D, Al-Haddad M, Al-Hadeedi O, et al. A case of acute mesentero-axial gastric volvulus in a patient with a diaphragmatic hernia: experience with a laparoscopic approach. J Surg Case Rep. 2015;2015(9):rjv119.
[5] Rashid F, Thangarajah T, Mulvey D, et al. A review article on gastric volvulus: a challenge to diagnosis and management. Int J Surg. 2010;8(1):18–24.
[6] Smith RJ. Volvulus of the stomach. J Natl Med Assoc. 1983;75(4):393.
[7] Hladík P, Čáp R, Tomáš H. Acute stomach volvulus—case report. Biophysical Days. 2004;47(4):281–283.
[8] Patel JB, Akshintala D, Patel P, et al. Intermittent gastric volvulus mimicking acute coronary syndrome. Am J Med. 2017;130(2):e47–e49.
[9] Sevcik WE, Steiner IP. Acute gastric volvulus: case report and review of the literature. Cjem. 1999;1(03):200–203.
[10] Ahmed A. Acute mesenteroaxial gastric volvulus on computed tomography. S Afr J Rad. 2013;17:21–23.
[11] Bhasin DK, Nagi B, Kochhar R, et al. Endoscopic management of chronic organoaxial volvulus of the stomach. Am J Gastroenterol. 1990;85:1486–1488.
[12] Kılıncalp S, Akinci H, Çoban Ş. Successful treatment of acute gastric volvulus by emergency endoscopic reduction in a patient with cerebral palsy. Endoscopy. 2014;46(5):E375–E376.
[13] Tsang TK, Walker R, David JY. Endoscopic reduction of gastric volvulus: the alpha-loop maneuver. Gastrointest Endosc. 1995 Sep 30;42(3):244–248.