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Acute Organoaxial gastric volvulus: A massive problem with a twist-case report



Fadi Al Daoud*, Gul Sachwani Daswani., Vinu Perinjelil, Tina Nigam

1 Hurlley Plaza, 7 B Trauma services Flint, Michigan, 48503, USA

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ABSTRACT

INTRODUCTION: Gastric volvulus (GV) is a rare and life threatening condition if not treated promptly or wrongly diagnosed. The main complication of gastric volvulus is foregut obstruction. The extreme rotation can cut off blood supply to the stomach and even distal organs, which can lead to ischemia and necrosis of the affected area.

PRESENTATION OF CASE: We report a case of a 41yo female that complained of severe abdominal pain, nausea and vomiting for approximately 3 days after eating a large meal. The patient didn't have any flatus or bowel movements in the last 24 h. CT of the abdomen and pelvis showed a dilatation of the stomach and esophageal hernia. Laparotomy confirmed an organoaxial volvulus at the level of the antrum and body of the stomach. Gastropepy was implemented and the stomach fixed to the posterior abdominal wall to prevent recurrence.

DISCUSSION: GV may have a significant related morbidity and mortality rate. It can be missed easily on diagnosis. The presence of vomiting not responding to initial antiemetic treatment, as well as, the presence of a hiatal hernia on the imaging studies should trigger our thinking of gastric volvulus, regardless of the stable appearance of the patient.

CONCLUSION: Chronic GV can manifests as atypical chest, abdomen and gastro intestinal symptoms. We recommend that everyone with these atypical symptoms seek medical attention to rule out GV. Early diagnosis and treatment will reduce the risk of developing chronic gastric volvulus to acute gastric volvulus.

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1. Introduction

Gastric Volvulus (GV) is an uncommon medical condition that sometimes is not easy to diagnose and treat [1]. It occurs when the stomach rotates on its axis more than 180°. If not diagnosed and treated early, gastric volvulus may lead to severe complications including gastric ischemia and necrosis, perforation of the stomach, omental avulsion, pancreatic gangrene, and in a few cases splenic rupture [2]. This medical condition's high mortality rate (30%–50%) indicates an emergent accurate diagnosis followed by appropriate intervention to avoid aforementioned complications [2]. This work has been reported in line with the SCARE criteria [3].

Abbreviations: GV, gastric volvulus; GJ, gastrojejunal; UGI, upper gastrointestinal; POD, post-operative day.

* Corresponding author.

E-mail addresses: Fadi.da@hotmail.com,

FAldau1@hurleymc.com (F. Al Daoud), GSachwa1@hurleymc.com (G.S. Daswani.), VPerinj1@hurleymc.com (V. Perinjelil), tnigam2@gmail.com (T. Nigam).

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2. Presentation of case

A 41-year-old female, presented to our ED complaining of severe abdominal pain, nausea and vomiting. The patient had nausea and vomiting for approximately 3 days after eating a large meal. Patient states that she had been having intermittent gastric issues such as dyspepsia and stomach pain for the last few weeks without seeking medical treatment. The patient denied any flatus or bowel movements in the last 24 h. The patient had no prior health issues other than low vitamin D, for which she takes supplements. Her previous surgeries were a C-section and a tubal ligation in 2014. She has been a smoker for the past 20 years, smoking 1–2 cigarettes daily. Her last menstrual period was 3 weeks ago,

Patient's vital signs were as follows: Blood pressure 157/103, pulse 74, temperature 37.1 °C, respiratory rate 18, height 165.1 cm, weight 77.1 kg, SpO2 100%.

On physical exam patient was noted to have a distended abdomen with diffuse tenderness to palpation, extending from the upper to the lower abdominal region. There were no obvious signs of peritonitis. There was an absence of bowel sounds on abdominal auscultation. The patient had a CT of the abdomen and pelvis which revealed a diffusely dilated stomach with herniation of the gas-

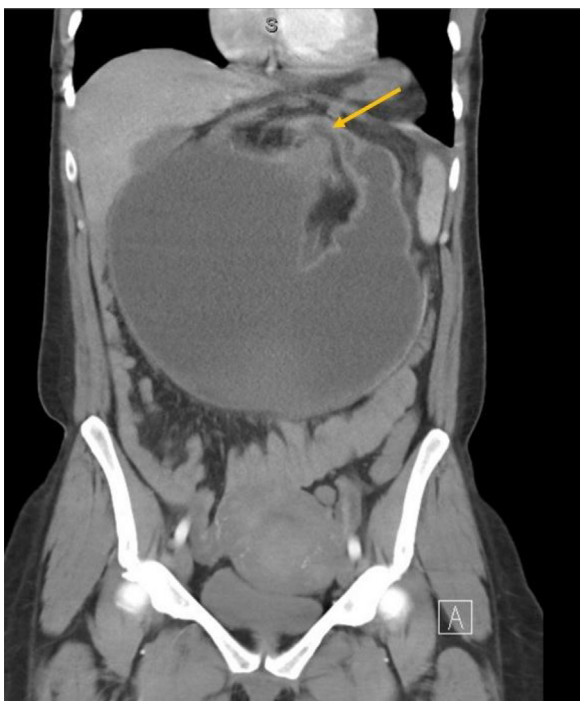


Fig. 1. Coronal view showing massively dilated stomach with torsion of the stomach at the level of the gastric body.

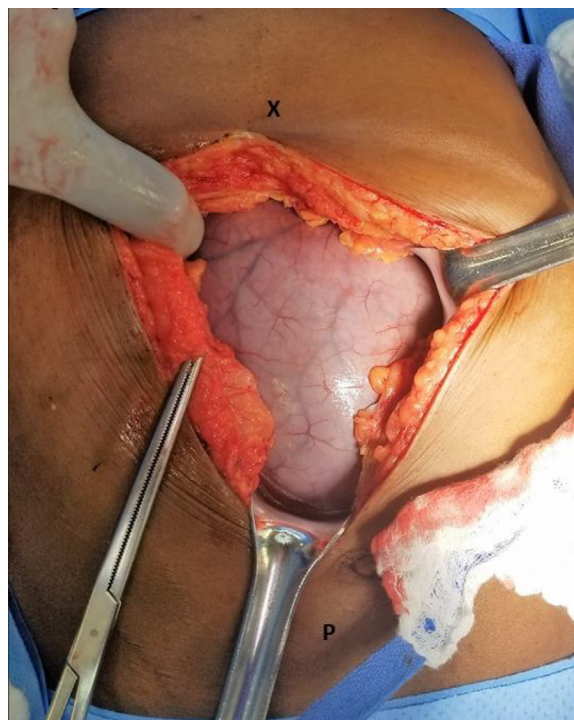


Fig. 3. A massive dilated stomach noted from xiphoid (X) to supra-pubic region (P).

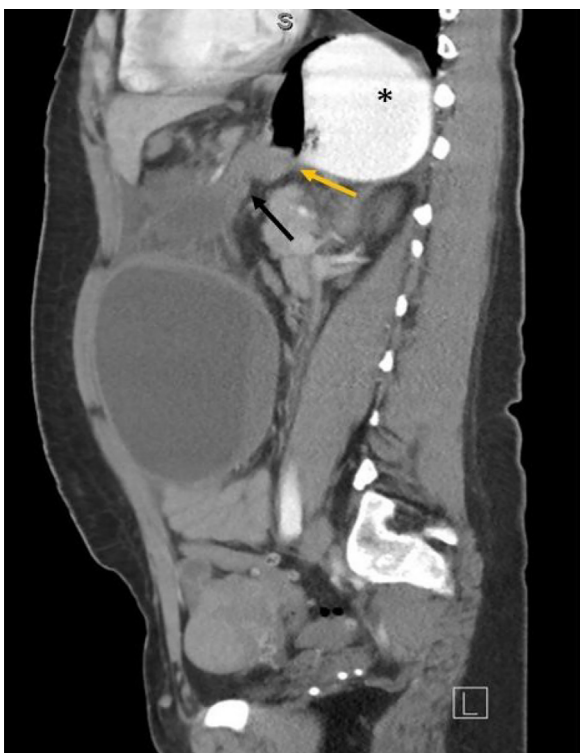


Fig. 2. Sagittal view demonstrating hiatal hernia (yellow arrow), herniated gastric cardia into chest (asterisk), and volvulus noted at the level of the gastric body (black arrow). (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)



Fig. 4. Post-volvulus reduction image showing massive gastric distention.

tric cardia and twisting of the gastric body concerning of volvulus. (Figs. 1 and 2)

Basic blood work revealed WBC 8.4, hemoglobin 11.7 with normal electrolytes, renal and liver function tests. After adequate resuscitation and given patients symptoms and worsening pain it

was decided to proceed with surgical intervention. Intra-operative findings revealed an extremely dilated stomach occupying the entire surgical field, all the way from the xiphoid region down towards the pubis. (Figs. 3 and 4)

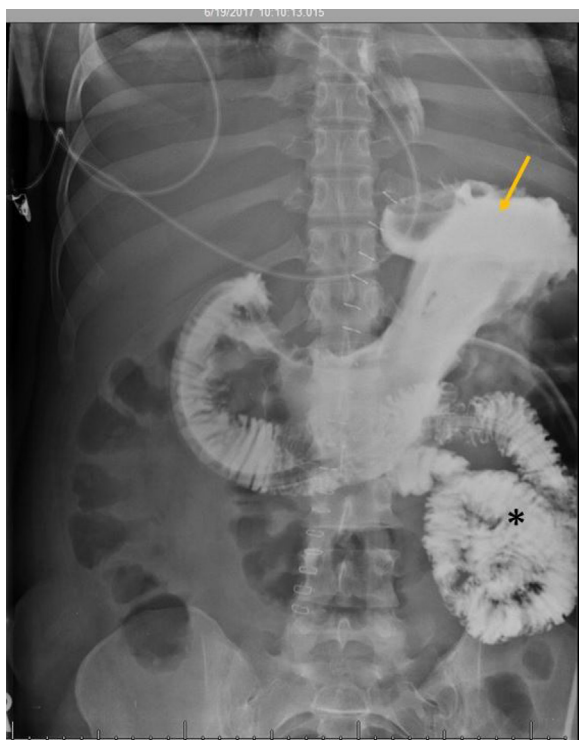


Fig. 5. Post-operative day 3 UGI series revealing adequate transit of contrast (black asterisk demonstrating contrast in small bowel) with no signs of gastric outlet obstruction, adequate position of stomach and gastroesophageal junction post-fundoplication (yellow arrow). (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

After adequate exposure it was obvious that there was an organoaxial volvulus at the level of the antrum and body of the stomach. There was an inflammatory reaction noted on the anterior gastric wall at the level of the volvulus. After tedious dissection from the inflammatory tissue around the volvulus site, the stomach was rotated counterclockwise to release the torsion until the stomach was back in anatomical position. The hiatal hernia identified on imaging and subsequently intra-operatively was repaired primarily with posterior hiatus crural closure and reinforced with biosynthetic mesh. A 270° fundoplication was created by rotating the fundus of the stomach posteriorly and then securing it to the medial portion of the esophagus. A gastrojejunal (GJ) feeding tube was placed and the anterior abdominal wall was pexied to anterior abdominal wall.

Post-operatively patient had no complications. On post-operative day (POD) 2 tube feeds were began via the feeding tube. On POD 3 patient had an UGI series which revealed adequate transit time of contrast into the bowels, and adequate location of fundoplication (Fig. 5). Diet was advanced as tolerated and was discharged on POD 5 after achieving adequate pain control and an optimal nutritional status. During her follow up clinic visits the GJ tube was removed and patient continued to progress adequately with no post-operative complications.

3. Discussion

GV is a rare, serious condition, and may prove lethal if not treated properly and in a timely manner [4]. It was originally described by Berti in 1866. The main ramification of gastric volvulus is foregut obstruction, which may fall under acute, chronic, recurrent, or intermittent category. Children younger than one year make up about 10% to 20% of all cases [5].

GV can be categorized as primary or secondary [6]. A defect in the gastric anchoring ligaments are the main reasons for the occurrence of the primary form [7]. The stomach is anchored by the gastrohepatic, gastrosplenic, gastrophrenic, and gastrocolic ligaments [7]. Disruption, agenesis, or elongation of the ligaments may lead to the failure of these ligaments to support the stomach, which would lead to primary gastric volvulus [2,4,7].

The secondary form is attributed to a defect in the gastric anatomy as well as gastric dysfunction, it can be also a result of disorders of adjacent organs such as the spleen and the diaphragm [7], or other intra-abdominal factors such as left diaphragmatic eventration, adhesions, gastric ulceration as well as gastric or duodenal cancers [4]. Para-esophageal hernia is the most common association with gastric volvulus in adults, however other associations have been reported such as phrenic nerve paralysis and traumatic defects [2,7].

The symptoms of GV can vary from incidental radiographic findings to life-threatening emergencies, depending on the speed and the progression of onset, the volvulus type and the extent of gastric rotation and obstruction [8]. The symptoms may mimic that of gastritis, cholecystitis, peptic ulcer disease, or even angina pectoris [6]. A chronic GV can manifest as atypical chest pain with a negative cardiac workup, anemia (most likely due to Cameron erosions), weight loss, and nonspecific symptoms including dyspnea, reflux, bloating [4], dyspepsia [2], intermittent abdominal pain after eating [2,7] and dysphagia which will go unnoticed usually [2]. These symptoms may diminish spontaneously that may cause a delay in diagnosis and treatment [2]. Patients with acute GV may present with Borchardt's triad, which is found in 70% of the cases. This triad manifests as pain in the lower chest and upper abdomen with severe retching as well as to the inability to pass the nasogastric tube [9].

In our case, the patient had similar nonspecific gastric symptoms for a couple of weeks which went un-noticed, and the patient didn't seek any medical treatment. We suspect that these symptoms were a result of chronic volvulus which progressed to an acute condition that required laparotomy to reduce this organoaxial volvulus, and to repair the hiatal hernia.

The diagnosis is suspected when erect chest and upper abdomen radiograph images show a high air-fluid level in the chest, and an increase in the soft tissue density in the upper abdomen. This is consistent with a fluid-filled distended stomach [7]. However these findings may not present in some intermittent obstruction. To confirm the diagnosis, we need to order extra imaging studies such as CT scan, upper GI endoscopy, or barium contrast study [7]. Usually, even if a CT scan or upper GI endoscopy is done, a barium contrast is crucial in confirming the diagnosis [7,9]. Barium contrast studies accounted as the most reliable diagnostic tool [7].

Gastric volvulus primarily presents in patients in their 40s [2,4,7]. There are three types of gastric volvulus: organoaxial, mesenteroaxial, and a combination of those two [2,4,9]. Organoaxial is the most common, seen in 60% of volvulus cases, and involves the esophagus and diaphragm most often [4,7]. Mesenteroaxial is about 30% and the rest is a combination of both which is very rare [4].

Paraesophageal hernias are a common presentation; these show up as an "inverted stomach". The pylorus revolves around the gastroesophageal junction and the greater curvature of the stomach ends up superior to the lesser curvature, giving the "inverted" descriptor [7].

The main surgical interventions to treat gastric volvulus include decompression of the stomach with reduction of the volvulus, gastropexy and correction of intra-abdominal factors that cause volvulus [4]. As reported by Llana and Salt, using a nasogastric tube can sometimes decompress the stomach and a reduction of the volvulus may occur [4]. Gastric volvulus can also be reduced by

performing endoscopy or by gentle traction on the stomach during surgery [4].

Most of the time, surgery is performed as laparotomy or laparoscopy to bring the stomach back into its normal position and fix it to the abdominal wall for prevention of secondary or future volvulus recurrence [4,7]. Definitive procedures include gastropexy with colonic displacement (Tanner's procedure), fundoantral gastrotomy (Oozler's operation), gastrojejunostomy and gastrocolic disconnection [4]. However, Channer and his medical team advocate for laparoscopy as minimal invasive surgery to treat gastric volvulus, because of the minimal complications of this surgery, it also reduces the amount of blood loss during surgery as well as it shortens the hospital stay [4]. A gastrotomy tube reinforces a lack of recurrence after the herniated sac with the involved organ is excised [4,7]. Fundoplication is done to prevent reflux. Gastric resection would only be needed if there is a full-thickness necrosis [4].

4. Conclusion

The morbidity and mortality rate of acute GV is very high and can reach 30%-50% of the acute cases. It is a surgical emergency with a high index of suspicion which is the key factor in diagnosis and treatment. Constellation of clinical symptoms combined with imaging studies help in making the diagnosis. Early diagnosis of GV will prevent complications of this surgical emergency like gangrene and perforation.

Conflict of interest statement

None. This work has been reported in line with the SCARE criteria.

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Ethical approval

Ethical approval is not required by our institution.

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".

Author contribution

Fadi Al Daoud. MD. MPH: First author. Coordinated the design of this study, performed literature reviews, contributed in data

collection from the preoperative, intraoperative and postoperative periods. Helped in writing the manuscript and provided proofreading of the report and gave its final form for submission.

Gul Sachwani Daswani DO: Co-author, is the chief operating surgeon in this case. Provided feedback and proofreading for this case, and he approved it for submission.

Vinu Perinjilil MD: Co-Author. She did literature reviews and contributed in collection of data from the preoperative, intraoperative and postoperative periods.

Tina Nigam- MSU medical: Co-author. Did literature reviews and contributed in collection of data from the preoperative, intraoperative and postoperative periods.

All the authors had read and approved the final report.

Registration of research studies

This is a case report not a research or study, so Registration of Research Studies is not required.

Guarantor

Dr. Gul Sachwani Daswani.

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