

Gastric volvulus and hiatal hernia. A case report

Katia Monserrat Rasura Armas M.D.
Alba Gibely Santos Valencia M.D.
Cristopher Rosales Vázquez M.D.
Samuel Rodrigo Gómez Arenas M.D.
Yamir Ahmed Nacud Bezies M.D.

Monterrey, Mexico

Case Report

General Surgery



Background:

Introduction: Gastric volvulus (GV) is the abnormal rotation of the stomach on its axial axis. It is a condition that can develop as a consequence of an underlying anatomical defect, such as a hiatal hernia. GV is a rare entity that can present acutely or chronically, being in most cases a diagnosis of exclusion, often being diagnosed intraoperatively. A late diagnosis can lead to complications such as strangulation and gastric necrosis, with mortality rates of up to 50%.

Case report: We report a female patient in the ninth decade of life who consulted for a 1-year history of abdominal pain and oral intolerance that affected her nutritional status. A laparoscopic surgical exploration was performed, finding a segment of the gastric antrum volvulated along its mesenteric-axial axis, a hiatal plasty with posterior partial fundoplication was performed.

Conclusions: The treatment of gastric volvulus is eminently surgical; it requires an early definitive approach and treatment since a delay in treatment entails high morbidity and mortality. Therefore, it is crucial to maintain a high index of suspicion in patients with evidence of gastric outlet obstruction, associated with anatomical anomalies, such as a hiatal hernia.

Keywords: hiatal hernia, gastric volvulus, stomach, paraesophageal hernia.

According to classic characteristics, hiatal hernias are identified according to the arrangement of the gastroesophageal junction (UG) as type 1: sliding hernia only migration of the UG; type 2: the gastric fundus is herniated, maintaining the intra-abdominal position of the UG; and type 3 involving both the gastric fundus and UG in the thoracic cavity. Only 5%–10% of all hiatal hernias involve more than a third of the stomach in the chest and usually have silent manifestations and a long evolution,¹ similar to those found in gastroesophageal reflux disease.² It is not unusual for patients older than 80 years to present with functional symptoms and an increased risk of life-threatening acute complications, which may occur in 1 to 2% of patients per year.³

VG was initially described by Berti in 1866. Berg performed the first successful operation in 1896. VG is a rare condition defined as an abnormal rotation of the stomach on one of its axes - horizontal or vertical - more than 180 degrees³. On the other hand, there are patients with incomplete or partial rotations, with a rotation of less than 180 degrees⁴. Some patients manifest the characteristic Borchardt triad, which is characterized by epigastralgia or severe distention in the epigastrium, intractable

retching, and inability to pass a nasogastric tube,⁴ typically present in the acute form while the chronic presentation can be asymptomatic or present with vague epigastric pain that radiates to the back and upper extremities, increasing in intensity in the postprandial period, and is accompanied by a sensation of fullness and vomiting, causing hyporexia and weight loss, with deterioration of nutritional status. Despite identifying GV as an acute or chronic complication, it has not been clarified which of these is more common due to the low global incidence.⁵

It is difficult to establish the diagnosis of GV by integrating only clinical manifestations since they are clearly nonspecific, which is why radiology studies are very useful. Computed tomography (CT) is positioned as the study of choice, reaching sensitivity of 80% and specificity of up to 100%, detailing anatomical characteristics, signs of ischemia and visceral perforation.⁶

The mortality of the chronic stage is approximately 0.13% and the acute stage is around 25%, being directly associated with delay in diagnosis and treatment and can rise up to 30-50%.⁷

From the department of General Surgery, University of Monterrey; High Specialty Medical Unit No. 25, Mexican Social Security Institute, Monterrey, Nuevo León. Received on June 9, 2024. Accepted on June 13, 2024. Published on June 16, 2024.



Figure 1. Computed tomography **A and B.** Hiatal hernia with intrathoracic stomach. **C.** Oral contrast image.

Case report

An 80-year-old female was admitted from the state of San Luis Potosí and a resident of Monterrey, Nuevo León. During her anamnesis, it was found that she had type 2 diabetes mellitus, systemic arterial hypertension and peripheral venous insufficiency. Surgical history of umbilical plasty and laparoscopic cholecystectomy. She was referred from a second level hospital unit due to abdominal pain and oral intolerance of 1 year's duration, associated with vomiting of gastrointestinal content, reflux and hematemesis on one occasion. On physical examination, he had a temperature of 38 degrees Celsius. Vital signs: blood pressure 100/60 mmHg, heart rate 71 beats per minute, respiratory rate 16 breaths per minute, temperature 36°C, maintaining saturations of 98% without requiring supplemental O₂, with weight 45 kg and height 1.58 m. On auscultation with hypoventilated left lung field, abdomen with peristalsis decreased in frequency with adequate intensity, on palpation with pain predominantly in the epigastrium, without evidence of peritoneal irritation. Biochemically with leukocytes of 4,000 cells/ μ l, hemoglobin 12.0 g/dl, platelets 145,400 u/ μ l. A CT scan shows displacement of the antrum above the gastroesophageal junction, in addition to a type 2 hiatal hernia (Figure 1. A and B). (Figure 1. C) (Table 1). Given clinical and radiological findings, a suspicion of hiatal hernia complicated with gastric volvulus was suspected, so surgical management

using a laparoscopic approach was decided. Among the intraoperative findings, a paraesophageal hernia with gastric antrum content was observed, which was volvulated on its mesenteric axis (Figure 2. D), hernial sac of 10 x 15 cm, hernial ring of 6 x 8 cm (Figure 3. F), and intra-abdominal esophagus of 3 cm. Reduction of the contents of the hernia sac was performed (Figure 2. E), subsequently the diaphragmatic pillars and esophagus were dissected until the anterior and posterior face was completed; Diaphragmatic pillar plasty was performed with separated stitches, a two-layer H-shaped mesh was placed on pillars and fixed with tackers (Figure 3. G). The gastric fundus was mobilized and a posterior partial fundoplication was performed, to place Penrose drainage in the esophageal hiatus and pneumoperitoneum was removed, the procedure was completed without complications. The patient received antibiotic treatment with second generation cephalosporin. The day after your procedure, an esophagram with water-soluble contrast is performed, which confirms adequate passage of fluid through the esophagus without retention. A liquid diet and frappe-type ice was started, which was tolerated adequately. He was discharged on the third postoperative day without complications. GV has not recurred at the time of follow-up 6 months after treatment.

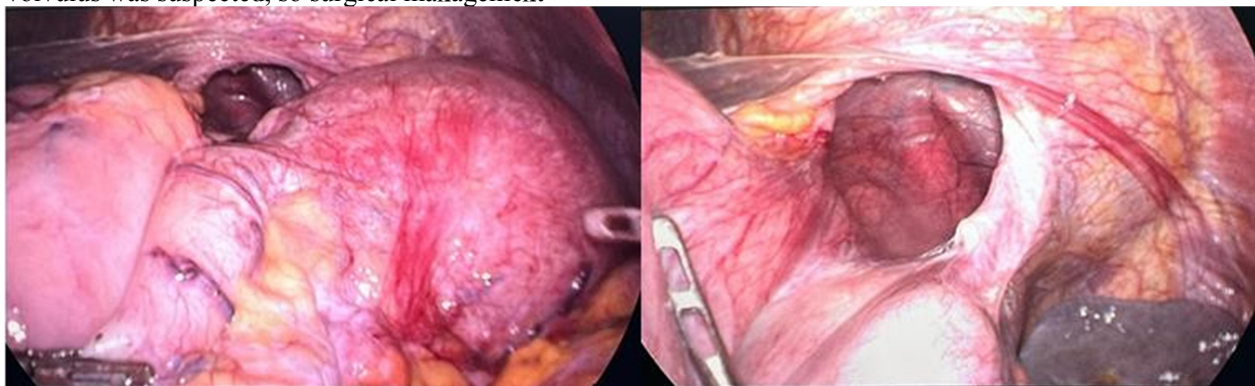


Figure 2. D) Adhesions of the volvulated gastric antrum on the mesenteric axis **E)** Reduction of the hernia sac with exposure of the defect in the diaphragmatic crura

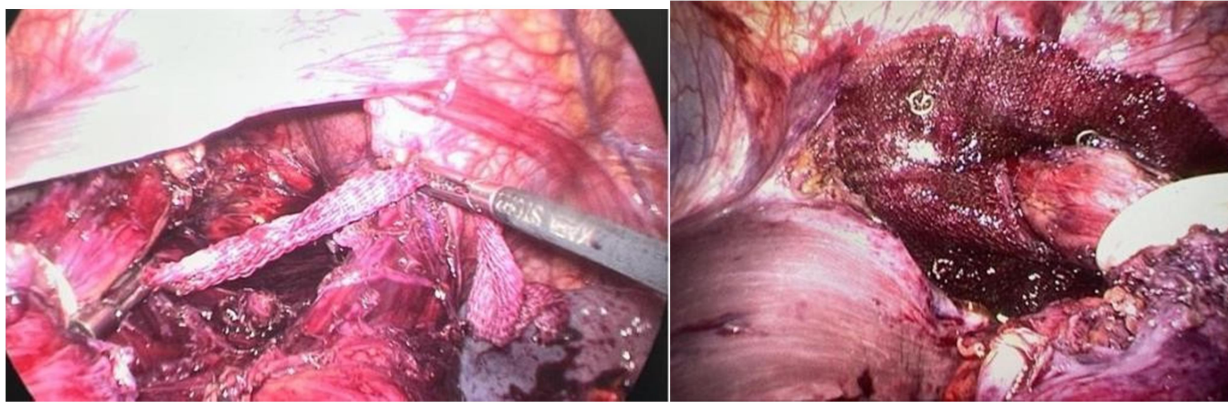


Figure 3. Assessment of the hernia defect, dimension 6 x 8 cm, placement and fixation of mesh layer is performed.

Discussion

Gastric volvulus is characterized by rotation of the stomach along its short or long axis leading to a variable degree of gastric inlet and outlet obstruction. Rotation more than 180 degrees can cause strangulation, necrosis, and eventually perforation. Therefore, it is a surgical emergency.

Gastric volvulus has been classified based on both the etiology (primary or secondary) and the axis of rotation, but the most accepted classification of volvulus is according to the latter as proposed by Singleton (Table 1).⁵

Depending on the etiology, primary and secondary forms of gastric volvulus have been recognized. The primary (idiopathic) subtype occurs as a result of neoplasia, adhesions, or an abnormality at the junction of the stomach. Alternatively, secondary gastric volvulus may arise due to disorders of gastric anatomy or gastric function or abnormalities of adjacent organs such as the diaphragm or spleen. In adults, the most common association is with a paraesophageal hernia, as well as with traumatic defects, diaphragmatic eventration, and phrenic nerve palsy.⁸

Symptoms can range from incidental radiographic findings to life-threatening emergencies, depending on the speed and progression of onset, the type of volvulus, and the extent of gastric rotation and obstruction.⁹ Mesentero-axial volvulus is rare, occurring in 30% of cases when the stomach rotates along its short axis, with displacement of the antrum above the gastroesophageal junction. but more so with an associated morbidity that conditions its appearance, such as the case of paraesophageal hernia.^{9,10}

The combination of barium esophagram, abdominal CT, and upper gastrointestinal endoscopy (EGIA) has been previously reported as a commonly combined diagnostic approach when evaluating patients with suspected GV.¹¹ Reports propose that CT should be the initial approach to

identify GV, but also to detail anatomical abnormalities.¹²

EGIA remains a common diagnostic test in patients presenting with suspected GV. The performance of EGIA in identifying VG has previously been reported to range between 27 and 73%.¹² CT is a better alternative, reaching sensitivity of 80% and specificity of up to 100% by itself by demonstrating the anatomical components and signs of organic compromise on the EGIA.^{6,13} The objectives of surgical treatment are reduction, decompression, debridement of non-viable portions and prevention of recurrence.¹¹ Minimally invasive techniques offer less morbidity and shorter recovery periods (postoperative discharge 3-6 days via laparoscopic vs 8 days in uncomplicated open surgery)¹⁴ which is why they are widely suggested for the treatment of this entity in elderly patients.

advanced.⁸ The chronic form is the most common and is associated with type II and III hiatal hernias.⁹ Only to establish the diagnosis is surgical intervention indicated as the preferred method⁸ and since the majority of cases like the one presented, have unfavorable clinical states that should consider the inclusion of the techniques used to reduce morbidity.¹⁰

In our case, it was a patient with a chronic course and notable deterioration in functional status with depletion of physiological reserve. Within the imaging findings, the complication is evident, justifying surgical exploration. In which the defect is reduced and the stomach repositioned in addition to repairing the hiatal defect. Some authors consider the use of techniques such as endoscopic devolvulation with ineffective results, even adding the installation of a percutaneous gastrostomy.¹⁵ Despite the poor clinical conditions and being an elderly patient, the minimally invasive approach proved to be effective in conjunction with an antireflux procedure since 18% of the patients treated

with simple surgical correction continued with symptoms of gastroesophageal reflux, adding a reduction in recurrence by having a fixative function.¹⁵

Conclusion

Acute gastric volvulus is a rare but life-threatening complication of hiatal hernias. In elderly patients with vague abdominal symptoms, the optimal treatment strategy for patients with gastric volvulus has not been established, because the cause and clinical course in these patients have different patterns. When the diagnosis is suspected or determined, an early referral for a surgical procedure to an experienced specialist surgeon should be made to prevent complications such as strangulation, which can lead to necrosis, perforation, shock and death.

A constellation of symptoms that can normally be overlooked in the setting of chronic evolution, together with radiological studies, helps to make an accurate diagnosis in order to establish definitive treatment at an opportune stage individualized by surgical risk due to the probability of recurrence and greater complications.

Conflicts of interests

There was no conflict of interest during the study, and it was no funded by any organization.

Acknowledgements

To Dr. Nacud and Gómez for being a guide for these young researchers on the path of surgery.

References

1. Paumgartner G, Sauerbruch T. Gallstones: pathogenesis. *Lancet*. 1991;338:1117–21.
2. Kimura Y, Takada T, Strasberg SM, Pitt HA, Gouma DJ, Garden OJ, et al. TG13 current terminology, etiology, and epidemiology of acute cholangitis and cholecystitis. *J Hepatobiliary Pancreat Sci* [Internet]. 2013;20(1):8–23. Disponible en: <http://dx.doi.org/10.1007/s00534-012-0564-0>
3. Orellana Soto P. Presentación, diagnóstico y terapéutica de la colangitis aguda. *Medicina Legal de Costa Rica*. 2014;31(1):84–93.
4. McNicoll CF, Pastorino A, Farooq U, Froehlich MJ, St Hill CR. *Choledocholithiasis*. StatPearls Publishing; 2023.
5. Leppert BC, Kelly CR. *Netter's Integrated Review of Medicine: Pathogenesis to Treatment*. Elsevier Health Sciences; 2020.
6. Miura F, Okamoto K, Takada T, Strasberg SM, Asbun HJ, Pitt HA, et al. Tokyo Guidelines 2018: initial management of acute biliary infection and flowchart for acute cholangitis. *J Hepatobiliary Pancreat Sci* [Internet]. 2018;25(1):31–40. Disponible en: <http://dx.doi.org/10.1002/jhbp.509>

7. Gomi H, Solomkin JS, Schlossberg D, Okamoto K, Takada T, Strasberg SM, et al. Tokyo Guidelines 2018: antimicrobial therapy for acute cholangitis and cholecystitis. *J Hepatobiliary Pancreat Sci* [Internet]. 2018;25(1):3–16. Disponible en: <http://dx.doi.org/10.1002/jhbp.518>
8. Mazuski JE, Tessier JM, May AK, Sawyer RG, Nadler EP, Rosengart MR, et al. The Surgical Infection Society revised guidelines on the management of intra-abdominal infection. *Surg Infect (Larchmt)* [Internet]. 2017;18(1):1–76. Disponible en: <http://dx.doi.org/10.1089/sur.2016.261>
9. Solomkin JS, Mazuski JE, Bradley JS, Rodvold KA, Goldstein EJC, Baron EJ, et al. Diagnosis and management of complicated intra-abdominal infection in adults and children: guidelines by the Surgical Infection Society and the Infectious Diseases Society of America. *Surg Infect (Larchmt)* [Internet]. 2010;11(1):79–109. Disponible en: <http://dx.doi.org/10.1089/sur.2009.9930>
10. Lardièrre-Deguelte S, Ragot E, Amroun K, Piardi T, Dokmak S, Bruno O, et al. Hepatic abscess: Diagnosis and management. *J Visc Surg* [Internet]. 2015;152(4):231–43. Disponible en: <http://dx.doi.org/10.1016/j.jvisc.2015.01.013>
11. Sand J, Airo I, Hiltunen KM, Mattila J, Nordback I. Changes in biliary bacteria after endoscopic cholangiography and sphincterotomy. *Am Surg*. 1992;58(5):324–8.
12. Mohsen AH. Liver abscess in adults: ten years experience in a UK centre. *QJM* [Internet]. 2002;95(12):797–802. Disponible en: <http://dx.doi.org/10.1093/qjmed/95.12.797>
13. Pang TCY. Pyogenic liver abscess: An audit of 10 years' experience. *World J Gastroenterol* [Internet]. 2011;17(12):1622. Disponible en: <http://dx.doi.org/10.3748/wjg.v17.i12.1622>

Katia Monserrat Rasura Armas
University of Monterrey
High Specialty Medical Unit No. 25
Mexican Social Security Institute
Monterrey, Nuevo León.