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## Total gastrectomy in a case of complicated gastric volvulus: Case report and review of literature

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### ABSTRACT

**INTRODUCCIÓN:** Gastric volvulus is characterized by a rotation, in its long or short axis, generating various degrees of obstruction, which can occur acutely or chronically.

**CASE:** A 45-year-old female. Refers to the performance of laparoscopic Nissen fundoplication 4 years ago. In December 2018, she presented a recurrence of the symptoms associated with reflux, for which a new laparoscopic fundoplication was performed (outside our medical unit) without eventualities or apparent complications. Six months later, he was admitted to our medical unit due to intolerance to the oral route. Thoraco-abdomino-pelvic tomography reports images suggestive of gastric volvulus and mixed hiatal hernia with protrusion of colon, stomach, duodenum, jejunum and mesenteric vessels, with data suggestive of complication or ischemia of these structures. An emergency operating room was requested to perform an exploratory laparotomy. Gastric volvulus, ischemia and gastric necrosis were observed in the cavity, for which a total gastrectomy and restitution of the intestinal transit were carried out by means of an esophagus-jejunum end-to-side Roux-en-Y anastomosis.

**DISCUSSION:** There is no scientific evidence or algorithms described for the management of this condition, according to the management described in the literature, decision-making by our team surgical procedure matches current recommendations.

**CONCLUSION:** In accordance with what is described in the literature, we consider it important to carry out a retrospective study that describes the bases for standardizing the management of this complication, and assessing models for conducting prospective multicenter studies that allow the creation of an algorithm and clinical guideline.

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### 1. Introduction

The stomach achieves anatomical stability thanks to several ligaments, within them are the gastrocolic, gastrohepatic, gastrosplenic and gastrophrenic ligaments. These ligaments, together with the gastroesophageal junction and the pylorus, anchor the stomach and prevent its rotation [1].

With a rotation greater than 180° it conditions a complete intestinal obstruction, with less than 180° the obstruction is partial. A chronic rotation conditions venous congestion and increased cap-

illary pressure and decreased venous return, which increases the probability of gastric bleeding [2].

Gastric volvulus is characterized by a rotation, in its long or short axis, generating various degrees of obstruction, which can occur acutely or chronically. A rotation greater than or equal to 180° leads to a complete gastric obstruction; this strangulation can lead to ischemia, necrosis, perforation and, as a consequence, abdominal sepsis [3]. It causes high mortality if it is not recognized or treated early. It is a rare entity, the highest incidence peak (80–90% of all cases) is observed in the fifth decade of life [4].

Among the risk factors, diaphragmatic abnormalities are mentioned (esophageal hernia, hiatal hernia, diaphragmatic hernia, diaphragmatic eventration), phrenic nerve palsy, kyphoscoliosis, gastric and/or splenic anatomical abnormalities. Gastric volvulus is classified as primary (idiopathic) and secondary according to the etiology, axial or mesenteroaxial organ in relation to the axis of rotation and/or acute or chronic, depending on the clinical presentation [5].

Clinically, most of the patients who present this condition come for medical attention, due to acute or chronic abdominal and/or

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thoracic pain, due to its low incidence, this etiology is not considered initially. For this reason, it is important to question the risk factors to initiate suspicion of the condition [2]. Among the acute symptoms, patients report pain in the epigastrium or chest, accompanied by severe nausea and/or vomiting. The combination of pain, vomiting, and inability to place a nasogastric tube (Borchardt's triad) occurs in up to 70% of acutely ill patients [6]. Also, hematemesis and distention can be seen. Chronically, symptoms are usually sporadic and nonspecific, such as upper abdominal pain, dysphagia, bloating, early satiety, heartburn, melena, etc [7].

The imaging study of choice is computed abdominal tomography; however, simple or contrast abdominal radiographs and/or abdominal ultrasound can be used initially [8].

Within the initial management, stabilization and hydroelectrolytic correction of the patient is suggested, as well as immediate pneumatic decompression, through the placement of NGT [7]. In some cases, it is possible to devolvulate the stomach by gastric decompression, despite this, definitive surgical correction is necessary. In the event of failure in the placement of the NGT, endoscopically guided and devolvular placement will be attempted using this same technique [9].

After endoscopic treatment (if successful), it is suggested to place a gastrostomy tube in hemodynamically unstable patients temporarily until general conditions improve for a definitive surgical procedure or in patients who are not candidates for surgery [10].

The definitive treatment is surgical, which can be carried out laparoscopically or openly, being the devolvular and gastropexy, partial or total gastrectomy, with or without Second Look, according to the intraoperative findings [11].

## 2. Presentation of case

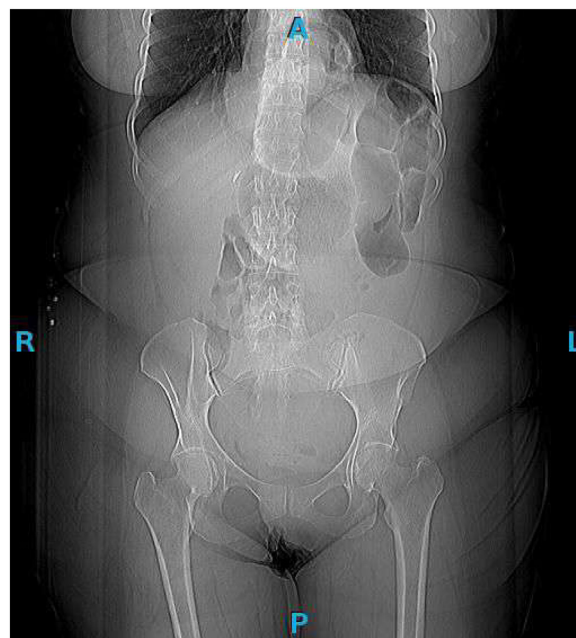
It is a 45-year-old female, with no significant chronic degenerative history for the current condition. Laparoscopic cholecystectomy, umbilical plasty 6 and 5 years before, respectively, both without apparent complications. He refers to the performance of laparoscopic Nissen fundoplication 4 years ago, due to a diagnosis of gastroesophageal reflux disease with the need for reoperation in the immediate postoperative period due to intolerance to the oral route. In December 2018, she presented a recurrence of the symptoms associated with reflux, for which a new laparoscopic fundoplication was performed, being discharged 72 h after surgery (outside our medical unit) without eventualities or apparent complications. Six months later, he was admitted to our medical unit due to intolerance to the oral route, dysphagia to liquids and solids, pain in the epigastrium, PS 8/10, with up to 12 vomits in the last 48 h, in poor general condition, no data of hemodynamic instability.

On physical examination, a Glasgow score of 15 was calculated, pallor ++ / +++ and dehydration ++ / +++, rhythmic heart sounds without added phenomena, ventilatory mechanics present and without alterations, vesicular murmur present, abdomen, globular, painful on medium and deep palpation, peristaltic noises decreased in intensity and frequency, tympanic on percussion, with data of peritoneal irritation, the rest of the physical examination within normal parameters.

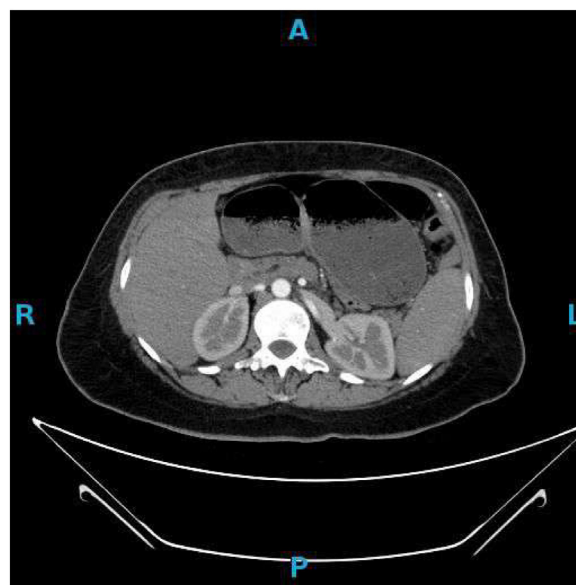
Laboratory studies report:

Leukocytes 13.6, neutrophils 90.1, hemoglobin 9.2, Platelet 264, Ph 7.2, PaO<sub>2</sub> 91 mm Hg, PaCO<sub>2</sub> 42 mm Hg, SO<sub>2</sub> 97.7%, HCO<sub>3</sub> 14 meq/l, Lactate 4.1, rest within normal parameters.

Report of thoraco-abdomino-pelvic tomography with IV and oral contrast medium: images suggestive of gastric volvulus and mixed hiatal hernia with protrusion of colon, stomach, duodenum, jejunum and mesenteric vessels, with data suggestive of complication or ischemia of these structures (Pictures 1 and 2).

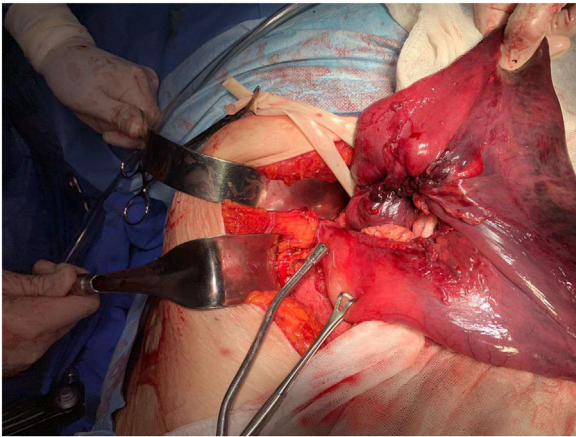


Picture 1. Topogram.

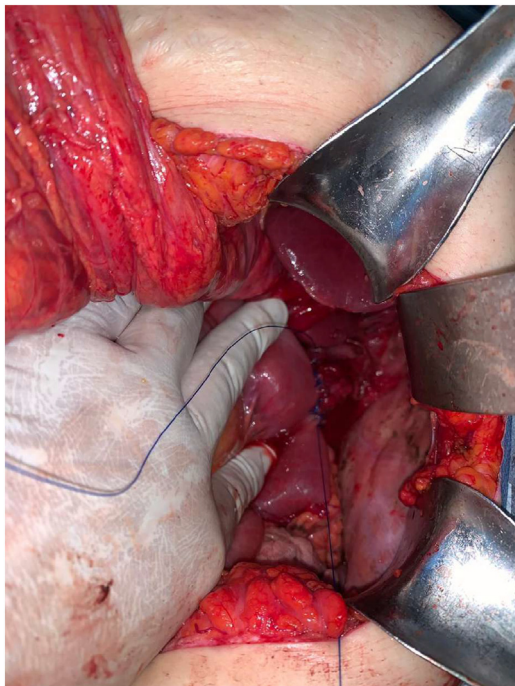


Picture 2. Axial computed tomography.

Medical management was initiated to correct uncompensated metabolic acidosis and hydration, and an emergency operating room was requested to perform an exploratory laparotomy. Gastric volvulus, ischemia and gastric necrosis were observed in the cavity, as well as abundant reaction fluid, other abdominal structures (Picture 3) without apparent alterations, for which a total gastrectomy and restitution of the intestinal transit were carried out by means of an esophagus-jejunum end-to-side Roux-en-Y anastomosis, manual, with simple stitches with prolene 00 with external knots, as well as jejunum-jejunum anastomosis in two planes, the first with suture continues with 00 chromic catgut and second plane with 00 Lembert stitches silk, the same technique for the dysfunctional jejunum loop (Picture 4). A hiatus plasty is also performed with five-point placement after resection of the hernial sac with prolene 00, the abdominal cavity is aspirated and washed, subdiaphragmatic drains are placed, and the pelvic cavity is closed and



**Picture 3.** Gastric ischemia.



**Picture 4.** Esophagojejunal anastomosis.

the procedure is terminated (procedure realized between a general surgeon with more than 20 years of experience and a 3rd year general surgery resident).

Postoperative course with parenteral nutrition and fasting, with control laboratories within normal parameters, esophagus-jejunal series, esophagogram and CT scan with oral and IV contrast were performed, with no report of anastomosis leak on the 5th postoperative day, therefore we decided to start the oral route progressively without complications and hospital discharge on the 7th day, continuing to be monitored by the outpatient clinic. Patient refer that the procedure realized in our institution disappear all symptoms related to reflux disease and improve her quality of life instead of the dietary changes required.

Histopathological study of the specimen reports: extensive submucosal infarction secondary to gastric ischemia in greater curvature, gastric esophagus junction, gastroduodenal junction and greater omentum.

At 18 months of follow-up by the outpatient clinic, he is showing adequate evolution and tolerance to the oral route.

### 3. Discussion

As it is a pathology of low incidence worldwide, there is no scientific evidence or algorithms described for the management of this condition [12], however, and according to the management described in the literature, decision-making by our team surgical procedure matches current recommendations [1,5]. We do not consider it necessary as part of the protocol to carry out an endoscopic procedure, due to what is observed by computed tomography, the clinical picture and the lactate present in blood gases suggestive of anaerobic metabolism, the main suspicion being ischemia of the stomach. With the patient's surgical history, it was decided to perform open surgery, due to the high probability of adhesions (4 previous abdominal surgeries) [13].

Although currently there is no comparative study between both types of procedures.

Traditionally, an open procedure is performed, however, the trend toward laparoscopic resolution continues to increase [9,14]. Among the surgical techniques is the development of the stomach and reduction (in case of intrathoracic and/or hernial sac). Subsequently, it is suggested to assess the perfusion and characteristics of the tissue for a period of 10–15 min [6]. If the ischemia persists, a total or partial gastrectomy will be evaluated in the same event or in a second surgical time according to the affected tissue [15]. There is sufficient evidence that in cases where there are no areas of necrosis and ischemia persisted 15 min after the first review, when performing a second review (Second Look), there was tissue recovery and fewer cases of partial or total gastrectomy [11,15].

As part of the procedure, once the need for gastrectomy has been unwrapped and the need for gastrectomy has been assessed, it is suggested to proceed to plasty the defect at the level of the hiatus (if any) with or without mesh placement and with the technique best mastered by the surgeon [16].

Finally, gastropexy may or may not be performed with a non-absorbable suture from the anterior wall of the stomach, towards the abdominal wall (not performed if the hernial defect was repaired at the same time) [11].

### 4. Conclusion

In accordance with what is described in the literature, we consider it important to carry out a retrospective study that describes the bases for standardizing the management of this complication, and assessing models for conducting prospective multicenter studies that allow the creation of an algorithm and clinical guide for its handling. However, currently the prompt attention of this complication, starting with hydroelectrolytic correction, hemodynamic stability, thoracoabdominal tomography with oral and IV contrast, and according to the results obtained from said studies, assess the performance of endoscopy and/or the performance of the procedure surgery, where it is essential to devolvulate and perform the pertinent tests in order to preserve the greatest amount of gastric tissue, and according to the tissue response obtained after this maneuver in the intraoperative, assess the performance of a Second Look [16]. If a total or partial gastrectomy is required, a Roux-Y is suggested, obtaining the best results compared to other reconstruction techniques [11].

As part of the postoperative protocol, it is essential to carry out studies that rule out dehiscence or stenosis of the anastomosis, so the performance of esophagography, gastroduodenal esophagus series or jejunal esophagus series and tomography with oral and IV contrast, are important for the evaluation of results and decision at hospital discharge [16].

Finally, it is suggested as part of the medium and long-term surveillance, the performance of control panendoscopies, thoracoabdominal tomography in a period of no less than 3–6 months



and no longer than 12 months, as well as support from Clinical Nutriology. This case report has been arranged in line with SCARE guidelines [17].

#### Declaration of Competing Interest

None.

#### Funding

None.

#### Ethical approval

This case report is exempt from ethical approval in our country.

#### 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's contribution

Study concept or design: Julian Vargas Flores.

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#### Registration of research studies

Not applicable.

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