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A Rare Complication of Laparoscopic Nissen Fundoplication: Gastric Volvulus

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Abstract

Background: Gastric volvulus is defined as a rotation of the stomach greater than 180 degrees, and can be classified based on its etiology as primary/idiopathic, which represents 10-30% of cases and it is associated with adhesions and abnormalities of the gastric ligaments. Secondary volvulus is associated with defects of the diaphragmatic anatomy, mostly due to paraesophageal hernias, tumors, after fundoplications, and gastric banding. It can also be classified based on the rotation of its axis.

Type I is organo-axial, in which rotation occurs along the axis connecting the pylorus and the esophageal-gastric junction, occurring in 59% of cases. Type II is mesenteric-axial, in which rotation occurs connecting the lesser and greater curvatures, occurring in 29% of cases.

A third type has been reported, consisting of a combination of both, occurring in approximately 2% of cases.
In adults, secondary gastric volvulus is most commonly associated with paraesophageal hernias and traumatic diaphragmatic injury.

Symptoms are nonspecific; however, the most common are postprandial epigastric or chest pain, early fullness, dysphagia, nausea, and vomiting. Diagnosis is usually made by endoscopy and contrast-enhanced radiological studies.

Treatment is surgical, with the goals of reducing the volvulus, resection of the hernial sac, repair of the diaphragmatic defect, and fundoplication if the patient requires it.

Clinical Case: A 24-year-old male with no chronic diseases, an active smoker with a consumption of one cigarette per day, with occasional alcohol consumption, a surgical history of septoplasty performed 13 years earlier and laparoscopic Nissen fundoplication in 2019. The patient began with exertional precordial pain of 1 day duration, unresponsive to analgesics, in addition to diaphoresis, intolerance to oral intake, and sialorrhea, for which he came to the Emergency Department in February 2021. Initially, an endoscopy was performed, evidencing changes after an intact complete fundoplication, acute erosive gastritis in the fundus, ecchymotic changes suggestive of gastric volvulus with ischemia. He was managed with intravenous fluid resuscitation and analgesia. Emergency laparoscopic surgery was performed for gastric detorsion and reduction of the volvulus. Hiatal plasty was performed using poly 4-hydroxybutyrate (P4HB) mesh, followed by a Nissen fundoplication; no gastropexy was performed.

Intraoperative video panendoscopy was performed after laparoscopic fundoplication, which revealed postoperative changes, an intact fundoplication without overriding phenomena, erosive gastritis in the fundus, and a negative pneumatic test. The surgical time was 1 hour and 15 minutes, with intraoperative blood loss of 200 cc, without complications, and a hospital stay of 2 days.

Conclusions: Gastric volvulus as a complication of laparoscopic fundoplication is quite rare; it should be highly suspected in patients with symptoms of gastric obstruction. Surgical treatment should be focused on correcting the underlying cause and restoring anatomy.

Keywords: Gastric volvulus; Laparoscopic fundoplication; Nissen refundoplication

INTRODUCTION

Gastric volvulus was first described by Ambroise Paré in 1579, later described during an autopsy by Berti in 1866, and Berg was the first to successfully treat a gastric volvulus surgically in 1897 [1,2].

In adults, secondary gastric volvulus is mostly associated with paraesophageal hernias and traumatic diaphragmatic injury. In patients with a history of fundoplication and symptoms suggestive of gastric obstruction, this diagnosis should be considered [1].

The word volvulus comes from the Latin volvere, meaning "to twist" [2]. It is defined as the rotation of the stomach of more than 180 degrees and can be classified based on its etiology as primary/idiopathic, representing 10-30% of cases and associated with adhesions and abnormalities of the gastric ligaments; Secondary volvulus is associated with defects in diaphragmatic anatomy, mostly commonly due to paraesophageal hernias, tumors, after fundoplications, placement of gastric bands [2].

CLINICAL CASE

A 24-year-old male with no chronic diseases, a smoker of 1 cigarette per day, occasional alcohol consumption, and a surgical history of septoplasty 13 years ago and laparoscopic Nissen fundoplication in 2019. He began experiencing symptoms in February 2021, presenting with abdominal and retrosternal pain associated with exertion and lasting 24 hours. The pain was acute, progressively worsening, intense, and continuous, accompanied by abdominal distension, an inability to tolerate oral intake, sialorrhea, and was unresponsive to analgesics. He also presented with diaphoresis and a marked deterioration of his general condition, prompting him to visit the Emergency Department. Upon evaluation, his vital signs were: 130/80 mmHg, 110 bpm, 22 RR, temperature 36 C, and oxygen saturation of 95% with nasal cannula at 2 L/min. At initial assessment, the patient was conscious, oriented, agitated, with a pained expression, diaphoretic, and hemodynamically stable. Thoracic examination revealed a symmetric chest with slightly decreased expansion and no use of accessory muscles. Pulmonary auscultation revealed preserved vesicular breath sounds, with a slight decrease at the bases, and no crackles or wheezes. Heart sounds were rhythmic and of adequate intensity. Abdominal examination revealed a distended abdomen with decreased bowel sounds, tenderness to palpation in the epigastrium and upper quadrants, and slight rigidity. No masses or organomegaly were palpable, and there were no clear signs of peritoneal irritation. Percussion revealed a predominantly tympanic sound. The following paraclinical findings were present upon admission **(Table 1)**.

Table 1. Summary of laboratory results.

Hematological parameters			
Parameter	Result	Units	Reference interpretation
Erythrocytes	3.15	$\times 10^6/\mu L$	Low
Hemoglobin	5.6	g/dL	Very low
Hematocrit	26	%	Low
Mean corpuscular volume (MCV)	81	fL	Borderline low
Leukocytes	20.1	$\times 10^3/\mu L$	High
Neutrophils	90	%	High

Lymphocytes	6	%	Low
Platelets	250	$\times 10^3/\mu L$	Normal

Biochemical parameters			
Parameter	Result	Units	Reference interpretation
Glucose	96	mg/dL	Normal
Urea	28.9	mg/dL	Normal
Creatinine	0.74	mg/dL	Normal
Uric acid	6.7	mg/dL	Borderline high
Total cholesterol	118	mg/dL	Normal
Triglycerides	51	mg/dL	Normal
HDL cholesterol	49	mg/dL	Normal
LDL cholesterol	75	mg/dL	Normal

Liver function tests			
Parameter	Result	Units	Reference interpretation
AST (SGOT)	38	U/L	Upper limit
ALT (SGPT)	35	U/L	Normal
GGT	50	U/L	High

Coagulation Tests			
Test	Result	Units	Reference Range
Prothrombin Time (PT)	13.4	sec	12.0 – 15.3
Activity	100	%	70 – 100
INR	1.03	Index	0.80 – 1.20
Activated Partial Thromboplastin Time (aPTT)	25.4	sec	24.8 – 34.4
Control aPTT	30.1	Sec	

A contrast-enhanced computed tomography scan of the chest and abdomen revealed organ-axial gastric volvulus with gastric distension and inversion of the greater and lesser curvatures. There was no evidence of ischemia, perforation, or contrast extravasation. Thoracic findings included elevation of the left hemidiaphragm with mild compression of the ipsilateral lung base. Initially, a panendoscopy was performed, revealing changes following complete and intact fundoplication, including underlying acute erosive gastritis and ecchymotic changes suggestive of gastric volvulus with ischemia **(Figure 1)**. Endoscopy was performed to confirm the clinical suspicion based on the patient's history and the CT findings, as well as to decompress the gastric volume. The patient was managed with fluid resuscitation and analgesia. He underwent emergency laparoscopic surgery for gastric detorsion and reduction. A hiatal hernia repair was performed with poly-4-hydroxybutyrate (P4HB) mesh reinforcement, and a Nissen fundoplication was made. Gastropexy was not performed. Intraoperative videopanendoscopy of the laparoscopic fundoplication revealed complete and intact post-fundoplication changes without overriding, erosive gastritis of the fundus, and a negative pneumatic gas test. The surgical time was 1 hour and 15 minutes, with intraoperative blood loss of 200 cc, no complications, and a 2-day hospital stay. He was monitored in the hospital with analgesics, gastric mucosal protectant, respiratory physiotherapy based on incentive spirometry exercises, and intravenous hydration. He progressed to a liquid diet 24 hours after surgery and was discharged home two days later. The patient returned for follow-up appointments 10 days and 1 month post-surgery, showing good progress and no gastrointestinal symptoms.

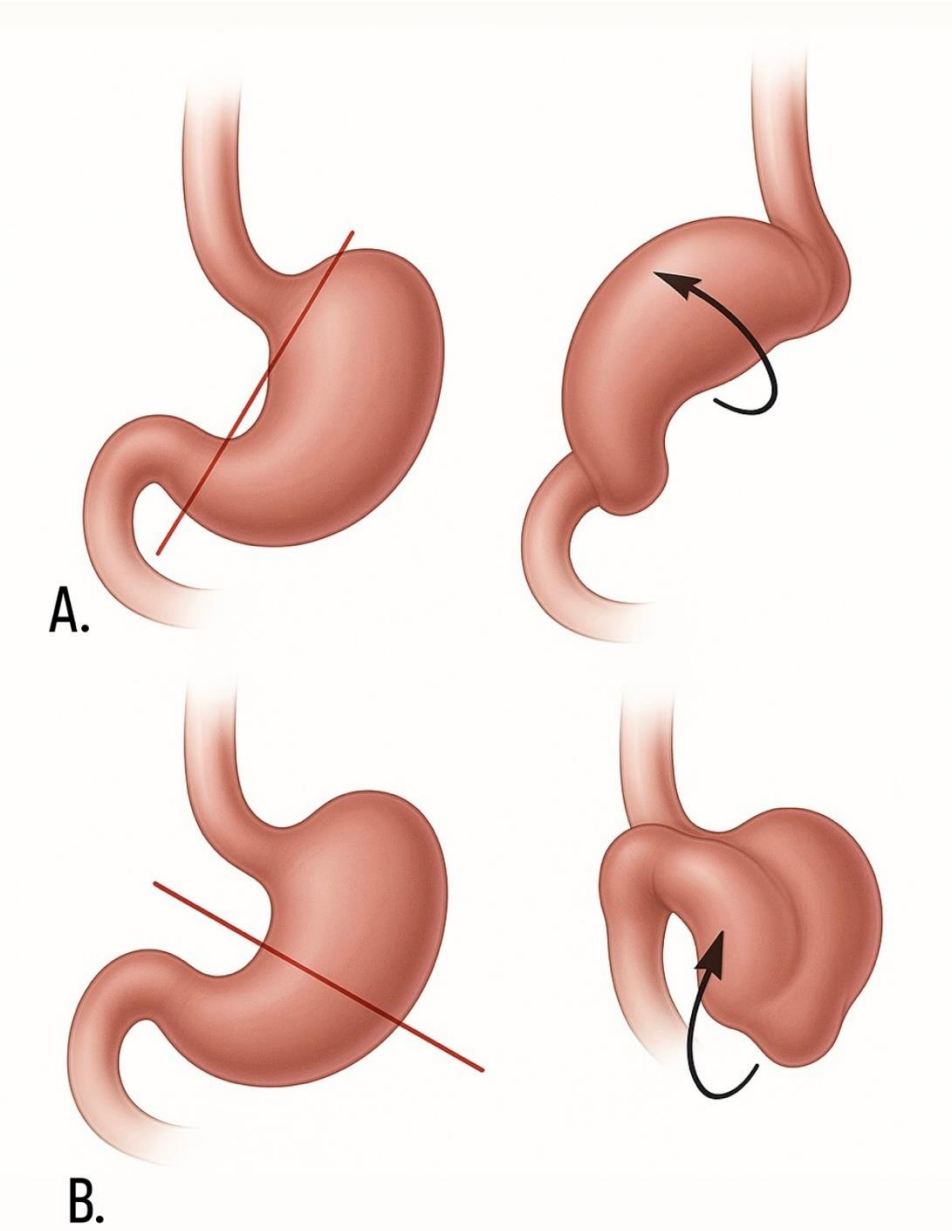


Figure 1. A. Schematic drawing illustrating organoaxial gastric volvulus, B. Schematic drawing illustrating mesenteroaxial gastric volvulus. (From Timpone VM, Lattin Jr GE, Lewis RB. Abdominal twists and turns: Part 1, gastrointestinal tract torsions with pathologic correlation. AJR Am J Roentgenol. 2011;197(1):86–89. Reprinted with permission from American Journal of Roentgenology.

He denied dysphagia but presented with signs suggestive of delayed gastric emptying, such as nausea, vomiting, early satiety, and epigastric pain. In our case, no further studies such as a barium swallow and/or contrast radiography were ordered due to the absence of recurrence of symptoms or alarming signs.

DISCUSSION

Gastric volvulus can be classified based on the rotation of its axis.
Type I is organoaxial, in which rotation occurs along the long axis connecting the pylorus and the esophagogastric junction, accounting for 59% of cases.

Type II is mesenteric-axial, where the rotation occurs connecting the lesser and greater curvatures, occurring in 29% of cases **(Figure 1)**.

A third type, a combination of both, has been reported, occurring in 2% of cases [2]. Acute presentation is more frequent with organoaxial volvulus, and a high index of suspicion should be maintained in patients with gastric obstruction, especially after the first year following antireflux surgery. There are few reports of gastric volvulus as a complication of antireflux surgery; among these, three occurred in pediatric patients and eleven in adults [3].
In 1904, Borchardt described the clinical presentation of acute gastric volvulus, later termed "Borchardt's Triad," characterized by acute epigastric abdominal pain, inability to pass a nasogastric tube, and retching. However, this presentation is only present in 50% of cases [4]. Diagnosis usually relies on clinical suspicion in addition to endoscopic and contrast-enhanced radiological studies [5]. A barium swallow is considered the gold standard due to its high sensitivity and specificity; however, abdominal computed tomography is an important diagnostic tool that can assess complications, reach a definitive diagnosis, and aid in surgical planning. Early endoscopy is also recommended to assess for ischemia or necrosis of the gastric wall [6]. In most cases, the gastric antrum rotates anteriorly and superiorly, and the fundus rotates posteroinferiorly, resulting in rotation along the greater curvature [7].
The most comprehensive classification of gastric volvulus is attributed to Dr. Arthur Singleton, who, based on previously reported autopsy and surgical findings, classified gastric volvulus as follows.

1. By type of rotation.
    a. Organo-axial: with rotation of the stomach upwards around the long axis of the stomach.
    b. Mesentero-axial: rotation of the stomach from right to left or vice versa around the axis of the gastrohepatic omentum.
2. Extent:
    a. Total: cases in which the entire stomach undergoes torsion, except for its diaphragmatic junction.
    b. Partial: the rotation is limited to a gastric segment.
3. Direction:
    a. Anterior: cases in which the volvulated portion passes forward.
    b. Posterior.
4. Etiology:
    a. Secondary to a disease of the stomach or adjacent organs.
    b. Idiopathic.
5. Severity:
    a. Acute: presenting with acute abdomen.
    b. Chronic: moderate, recurrent symptoms [8].

The reported case involves gastric volvulus secondary to laparoscopic Nissen fundoplication, a very unusual complication. The incidence of paraesophageal hernia following Nissen fundoplication is low (0.8%). One proposed mechanism is extensive mobilization of the gastric fundus, causing herniation through the esophageal hiatus [9].
There are three defined alterations in the context of structural complications of fundoplication **(Figure 2)**: migration of the fundoplication due to hyperlaxity of the repair, obstruction due to gastric torsion, or stenosis due to a very tight fundoplication [10].

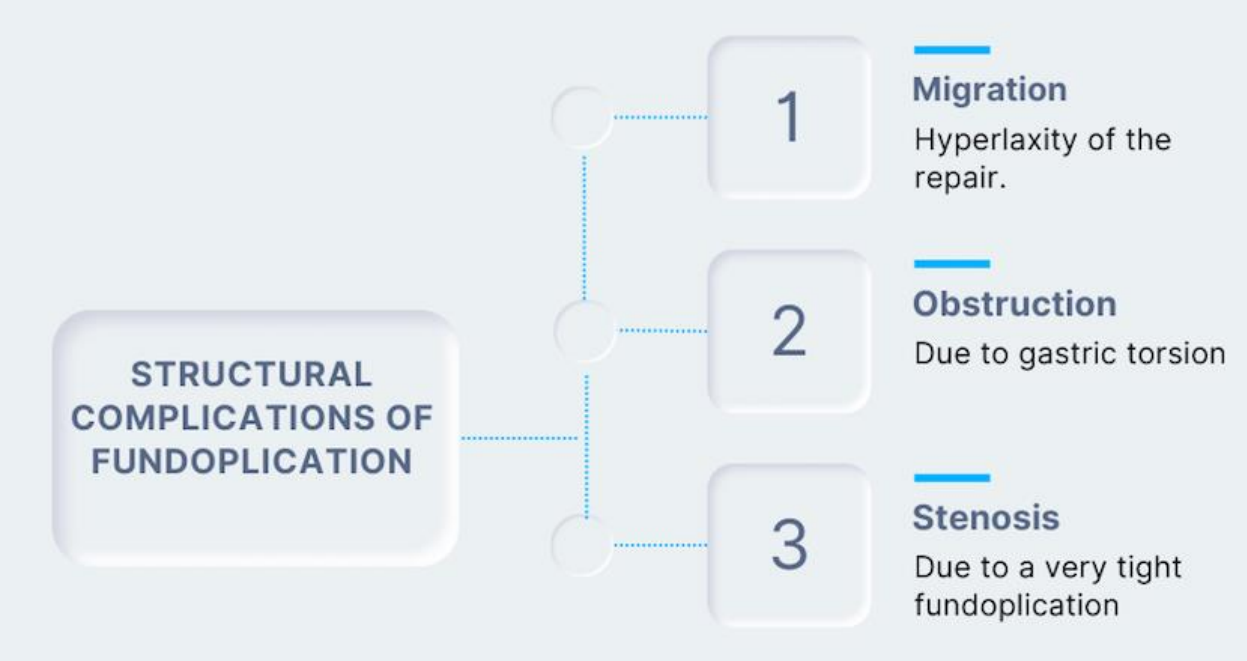
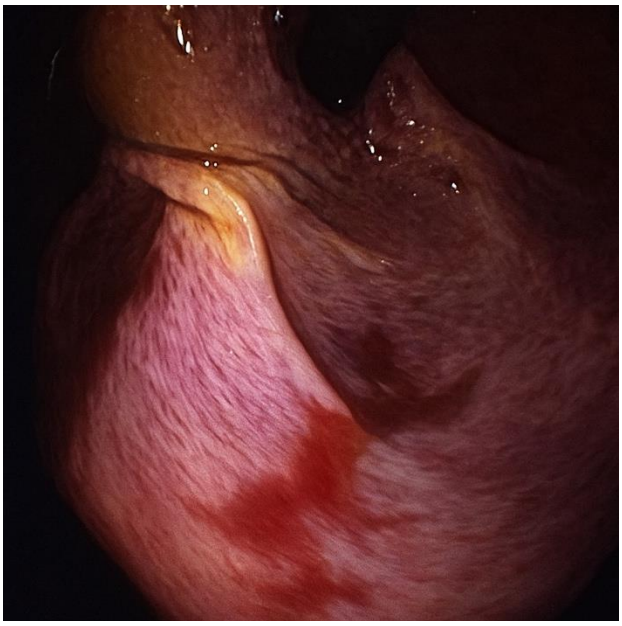
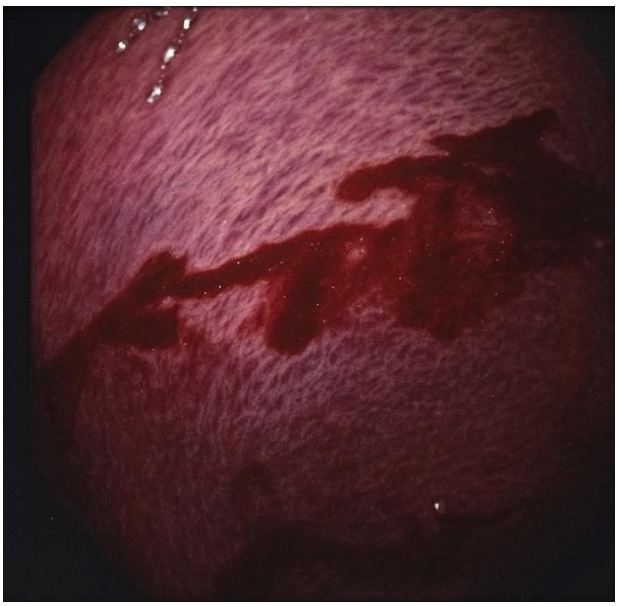


Figure 2. Structural mechanisms after fundoplication associated with gastric volvulus.





1. Pre-operative endoscopic images obtained showing a complete and intact fundoplication, with acute erosive gastritis and ecchymotic changes consistent with gastric volvulus and ischemic compromise

In most literature reports, the predisposing factor in 80% of gastric volvulus cases is a paraesophageal hernia. Therefore, treatment should focus on correcting the underlying cause with resection of the hernial sac, adequate closure of the diaphragmatic crura (with or without mesh), and fundoplication [11].
Gastropexy has been suggested by various authors; however, it is not always necessary, especially when the triggering cause of the torsion is corrected. Some series have even documented a high recurrence rate of torsion when gastropexy is used as the sole surgical treatment for gastric volvulus [12].

Endoscopic attempts at gastric detorsion are frequently ineffective, requiring surgical intervention [13]. Endoscopic reduction of chronic organoaxial gastric volvulus has been previously described by Bhasin et al. (14). Successful correction was achieved in 6 cases of primary volvulus and 3 cases of secondary volvulus [14]. The insertion of percutaneous endoscopic gastrostomy tubes has been described as primary management, ensuring 3 fixation points at the level of the hiatus, body and gastric antrum with subsequent removal of the tubes, with adequate evolution [15].

Traditionally, definitive management has been described as surgical reduction of the hernia, detorsion, and an antireflux technique combined with hiatal hernia repair [16].

In laparoscopic Nissen fundoplication, there are preoperative considerations to take into account: Esophagogastroduodenoscopy, pH monitoring, and esophageal motility studies should be performed. Other etiologies of the symptoms, such as peptic ulcer disease, achalasia, esophageal dysmotility, and neoplasms, should be ruled out. In patients with grade III obesity (>40 kg/m²), bariatric surgery should be considered [17].
To ensure safe laparoscopic Nissen fundoplication, the surgical steps to follow are:

- Proper port placement and operating room setup, preferably using the Lloyd-Davis position. The first assistant is positioned to the surgeon's right, and the second assistant and scrub nurse to the left. With the laparoscopy and endoscopy tower at the patient's bedside.
- Begin dissecting the right diaphragmatic crus.
- Systematically section the short gastric vessels to then dissect the left diaphragmatic crus.
- Create a retroesophageal window and place a Penrose drain around the gastroesophageal junction.
- Mediastinal mobilization and esophageal lengthening are performed, taking care to identify and preserve the vagus nerves during dissection.
- Close the diaphragmatic crura, paying particular attention to avoid tearing them during hiatal dissection.

- Calibration with a bougie is suggested. Before constructing the fundoplication, confirm the availability of adequate gastric fundus.
- The fundoplication is constructed by suturing from the posterior wall of the gastric fundus to the anterior wall of the esophagus and then to the other posterior wall of the gastric fundus. Typically, three separate sutures are placed in a 2-cm fundoplication.

Placement of a suture in the posterosuperior portion of the fundoplication at the base of the diaphragmatic crus as an intra-abdominal fixation point is considered a good surgical practice.

Key points in this procedure are avoiding initiating the dissection at the phrenoesophageal ligament and incidentally injuring the esophagus; adequate sectioning of the short gastric vessels to achieve a sufficient retroesophageal window is essential to obtain an adequate length of intra-abdominal esophagus [17]. This case was distinguished by early diagnostic suspicion, which led to the timely identification of the correct diagnosis based on clinical, tomographic, and endoscopic correlation.

The minimally invasive approach allowed for a favorable postoperative course with a short hospital stay. This case highlights the importance of maintaining a high index of diagnostic suspicion in patients with a history of previous antireflux surgery.

CONCLUSION

Gastric volvulus following fundoplication is an abnormal rotation of the stomach that occurs after an antireflux surgical procedure.

It should be suspected, particularly in patients with a history of such a procedure who present with signs of gastric obstruction. It is a rare but potentially life-threatening complication.

The pathophysiology involves the creation of fixed points in the stomach due to surgical manipulation. Early diagnosis and timely therapeutic intervention prevent serious complications.

REFERENCES

1. Zamorano R. Manejo laparoscópico del volvulo gástrico secundario. Reporte de 3 casos y revisión de la literatura. Cirujano General, 2014;36(2):96–102.
2. Akhtar A, Siddiqui FS, Sheikh AAE, Sheikh AB, Perisetti A. Gastric Volvulus: A Rare Entity Case Report and Literature Review. Cureus. 2018.
3. Jes Reyes-Zamorano. Vólvulo gástrico agudo: una complicación tardía de la funduplicatura Nissen. Reporte de dos casos y análisis de la bibliografía. Ciruga Y Cirujanos, 2020;82(5):541–550.
4. Nitinkumar Bhajandas Borkar, Pant N, Aggarwal SK. Chronic Mesenteroaxial Gastric Volvulus and Congenital Diaphragmatic Hernia: Successful Laparoscopic Repair. World Journal of Laparoscopic Surgery with DVD, 2012;5:102–104.

5. Jabbour G, Afifi I, Ellabib M, El-Menyar A, Al-Thani H. Spontaneous Acute Mesenteroaxial Gastric Volvulus Diagnosed by Computed Tomography Scan in a Young Man. American Journal of Case Reports, 2016;17:283–288.
6. Akiki L, Abed AlRaouf Kawtharani, Rached AA, Semaan A, Geagea AS, Abboud AA. Endoscopic Management of Gastric Volvulus in an Elderly Patient With Multiple Comorbidities: A Case Report. Cureus. 2024.
7. Gourgiotis S, Vougas V, Germanos S, Baratsis S. Acute Gastric Volvulus: Diagnosis and Management over 10 Years. Digestive Surgery, 2006;23(3): 169–172.
8. Yeo CJ, Mcfadden DW, Pemberton JH, Peters JH, Matthews JB. Shackelford's Surgery of the Alimentary Tract E-Book. Saunders. 2019.
9. Singleton AC. Chronic Gastric Volvulus. Radiology, 1940;34(1):53–61.
10. Seelig M. Paraesophageal herniation as a complication following laparascopic antireflux surgery. Journal of Gastrointestinal Surgery, 1999;3(1): 95–99.
11. Sobrino-Cossío S, Soto-Pérez JC, Coss-Adame E, Mateos-Pérez G, et al. Post-fundoplication symptoms and complications: Diagnostic approach and treatment. Revista de Gastroenterología de México (English Edition), 2017;82(3): 234–247.
12. Carlson MA, Condon RE, Ludwig KA, Schulte WJ. Management of Intrathoracic Stomach with Polypropylene Mesh Prosthesis Reinforced Transabdominal Hiatus Hernia Repair. Journal of the American College of Surgeons, 198;187(3): 227–230.
13. Baty V, Rocca P, Fontaumard E. Acute gastric volvulus related to adhesions after laparoscopic fundoplication. Surgical Endoscopy, 2002;16(3): 538.
14. Bhasin DK, Nagi B, Kochhar R, Singh K, Gupta NM, Mehta SK. Endoscopic management of chronic organoaxial volvulus of the stomach. The American Journal of Gastroenterology, 1990;85(11):1486–1488.
15. Baudet JS, Armengol-Miró JR, Medina C, Accarino AM, Vilaseca J, Malagelada JR. Percutaneous endoscopic gastrostomy as a treatment for chronic gastric volvulus. Endoscopy, 1997;29(2): 147–148.

16. Romera Martínez JL, Ruano Campos A, Sánchez Pernaute A. The role of percutaneous endoscopic gastrostomy in the treatment of acute gastric volvulus. Revista Espanola de Enfermedades Digestivas, 2020;112(8): 662–663.

17. Rosen MJ, Ponsky, JR. Atlas de técnicas quirúrgicas del tracto digestivo superior y del intestino delgado. Elsevier. 2012.