

Gastric Volvulus, Diagnostic Approach Through Special Studies

Vólvulo gástrico: aproximación diagnóstica mediante estudios especiales

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Summary

Background: Gastric volvulus is when the stomach turns on one of its axes. **Objective:** To make a diagnostic approach through special studies, describing the different types and their characteristics. **Materials and methods:** We conducted a search in the institutional PACS (Picture Archiving and Communication System) (2017 to 2019), selecting the most representative studies, with gastric volvulus diagnosis; subsequently, we built schemes to facilitate the understanding of the findings. **Results and Conclusions:** This information will allow the radiologist and, even more, the radiology resident, to address this clinical dilemma and recognize through this excellent tool the radiological findings of the two subtypes (organoaxial and mesenteroaxial), highlighting the importance of nominating the position, considering those patients with no emergency surgical indication.

Resumen

Introducción: El vólvulo gástrico es el giro del estómago sobre alguno de sus ejes. **Objetivo:** Realizar una aproximación diagnóstica mediante estudios especiales, describir los diferentes tipos y sus características. **Materiales y métodos:** Se realizó una búsqueda en el sistema PACS (por las iniciales en inglés de *picture archiving and communication system*) institucional (2017 a 2019), seleccionando los estudios más representativos con diagnóstico de vólvulo gástrico; posteriormente, se construyeron esquemas para facilitar la comprensión de los hallazgos. **Resultados y conclusiones:** Esta información le permitirá al radiólogo y, más aún, al residente, abordar este dilema clínico y reconocer por medio de esta excelente herramienta los hallazgos de los dos subtipos (organoaxial y mesenteroaxial), resaltando la importancia de nominarlo adecuadamente, considerando aquellos pacientes sin indicación quirúrgica de emergencia.

Introduction

The gastric volvulus consists of the stomach turning on one of its axes -horizontal or vertical-, even being in its normal anatomical location (figure 1). Although relatively rare, it is a cause of non-specific abdominal pain and, therefore, the radiologist must be familiar with your symptoms. Some patients manifest the characteristic triad de Borchardt (epigastralgia, untreatable gagging and disability to pass a nasogastric tube) (1-7) and others, a non-specific clinic, so the images are of vital importance for a diagnosis assertive in both scenarios (1-7).

Identification of the pathology

The exact incidence is unknown, but the literature suggests that gastric volvulus affects children under

one year old or adults in the 5th decade of life (1,3,4); there are few cases described in patients over 70 years old (5,6). Gastric volvulus is divided into two main subtypes: organoaxial and mesenteroaxial.

The organoaxial volvulus is more common than the mesenteroaxial and accounts for approximately two-thirds of cases. Each has specific radiological characteristics and constitutes surgical emergencies, requiring timely diagnosis and treatment (7). The organoaxial volvulus occurs when the stomach turns on its long axis, with the major curvature displaced upwards and the minor curvature located more caudally (Figure 2) (2), so that the stomach is seen upside down, with the upper antrum and pylorus at the bottom and the body Proximal. You can also say that the stomach turns along the cardiopiloric line, which is drawn between the heart and the pylorus (7,8).

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Figure 1. Anatomy of the stomach and duodenum. The stomach is composed of a vertical portion: 1, cardia (located on the left of T10), 2, fundus and 3, vertical body; and a horizontal portion: 4, pylorus (9th costal cartilage), 5, antrum (in which the angularis incisor is located), 6 and 7, horizontal body.

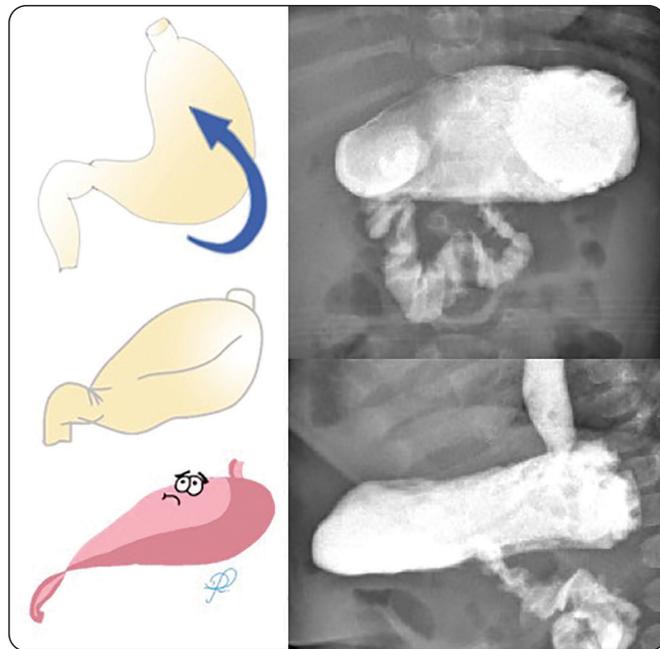


Figure 2. Organo-axial volvulus. In the picture and the diagram: the stomach rotates on its long axis, moves in a cephalic sense with the curvature and the minor curvature located at the same height in the abdomen.
Author of the drawing: Alejandro Piñeros Nieto.

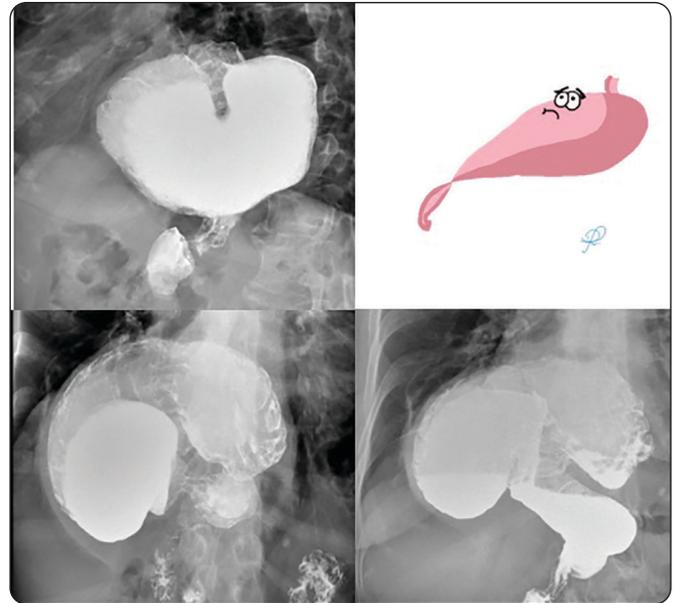


Figure 3. Organo-axial volvulus. Diagram and images: displaced stomach in the cephalic sense and located in the thorax, the major localized curvature slightly above the minor curvature, the contrast material ingested can pass through the stomach into the duodenum.

Author of the drawing: Alejandro Piñeros Nieto.

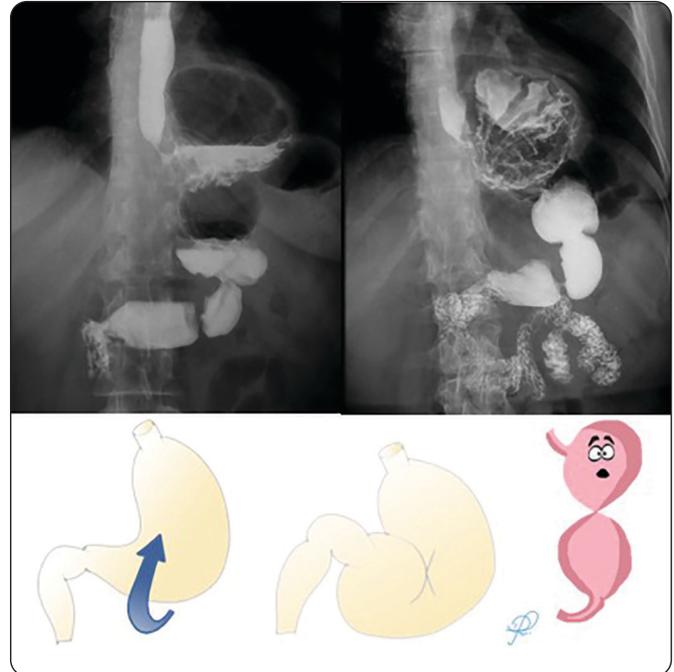


Figure 4. Mesenteroaxial volvulus. Images and diagrams: displacement of the stomach in the upper direction and rotation around the short axis of the same from the minor to the major curvature, building a morphology in 8 and with level between air and liquid contrast in the two bubbles formed.
Author of the drawing: Alejandro Piñeros Nieto.

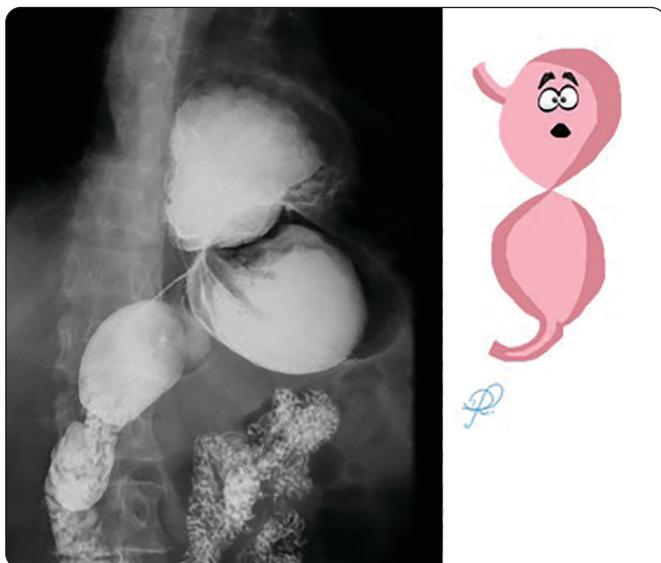


Figure 5. Mesenteroaxial volvulus. Image and diagram of another patient, showing the displacement of the stomach in an upper direction towards the thorax and rotation around the short axis from the minor to the major curvature, with displacement of the antrum above the gastroesophageal junction and passage of the contrast medium through the duodenum towards the small intestine.

Author of the drawing: Alejandro Piñeros Nieto.

In adults, organoaxial volvulus usually occurs in the context of a post-traumatic or paraesophageal hernia that predisposes the stomach to abnormal movement along its long axis (9). If the volvulus is severe or complete (torsion greater than 180°), there is obstruction in the outlet of the stomach, dilation and increased liquid content. If oral contrast material is administered, it is retained in the stomach (7).

On the other hand, many patients have a less severe incomplete or partial volvulus, with a rotation of less than 180° . In these cases, the ingested contrast material can pass through the stomach, into the duodenum, which is more common in patients with para-esophageal hernia (7). These patients usually lack symptoms and radiological signs of obstruction, and in such cases, it is more accurate to describe the stomach as having an organoaxial position rather than an organoaxial volvulus (Figure 3). Although an organoaxial position of the stomach predisposes to a future volvulus, it is not clear whether asymptomatic patients should be treated or followed clinically. In general, the acuity and severity of symptoms dictate management (7).

Mesenteroaxial volvulus is rare, occurring when the stomach rotates along its short axis, with displacement of the antrum above the gastroesophageal junction (2). Radiographic findings include: rotation around the short axis from minor to major curvature, i.e. perpendicular to the cardiopyloric line, displacing the antrum over the gastro-oesophageal junction (Figures 4 and 5) (7,8) The rotation is usually partial (less than 180°) and not associated with a defect underlying diaphragmatic. On the other hand, some patients may course with complex gastric volvulus with organoaxial components and mesenteroaxial (7).

In both mesenteroaxial and organoaxial presentation, the most common and highly suggestive findings of gastric volvulus include distended stomach, a hernia of much of the stomach above the diaphragm often with double levels of air and fluid, and collapsed small intestine (10). Fluoroscopy (upper gastrointestinal series) may be performed to

evaluate the rotation of the stomach, as well as, to detect the passage of ingested oral contrast material into the duodenum. Computed tomography (CT) may help confirm the rotation of the herniated stomach and the transition point (7).

The diagnosis of gastric volvulus is challenging because of its clinical non-specific and low frequency (11,12). Fluoroscopy is the standard for the diagnosis of gastric volvulus, CT scans are often performed in the context of an acute abdomen and can be useful in the evaluation of gastric rotation; however, more commonly for the detection of other associated anomalies, such as gastric ischemia and hiatal hernia (12,13).

As soon as the diagnosis is obtained, an urgent reduction of the volvulus should be done to avoid acute gastric ischemia and perforation. A nasogastric tube is inserted to decrease intragastric pressure (1,14), avoiding endoscopic reduction if the risk of perforation is high, especially in patients with ischemic changes of the mucosa (1). In patients with multiple comorbidities, laparoscopic repair may be attempted (15,16); however, emergency laparotomy remains the most common surgical option for patients with gastric volvulus (12). Surgical reduction with or without gastropexy is the most common procedure (3).

Results and conclusions

In gastric volvulus, the clinical condition of the patient is determined by the degree of rotation of the stomach on its axis, which also defines the entity as acute or chronic. In the latter, patients may be asymptomatic with incidental identification during a digestive tract study, in which case it is called organoaxial position.

X-ray and fluoroscopy studies are essential for the diagnostic approach in gastric volvulus, since they usually do not have a clear clinical presentation and may sometimes be asymptomatic; in addition, timely diagnosis is critical to avoid life-threatening complications, such as intestinal ischemia and heart attack.

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