

Intrathoracic gastric perforation secondary to laparoscopic fundoplication: an unusual complication. Report of a case

Perforación gástrica intratorácica secundaria a funduplicatura laparoscópica: una complicación inusual. Reporte de un caso

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Laparoscopic fundoplication, gastric perforation, acute mediastinitis.

Palabras clave:

Funduplicatura laparoscópica, perforación gástrica, mediastinitis aguda.

ABSTRACT

Introduction: Laparoscopic fundoplication has become the surgical treatment of choice for gastroesophageal reflux disease due to minimal complications, one of which is esophageal or gastric perforation, this last one has the lowest incidence, but is the one with the worst prognosis. Most gastric perforations are detected and treated intraoperatively and those detected in the postoperative period require reoperation and present a high morbidity and mortality due in some cases to the presence of acute mediastinitis, of which the reports in the literature are limited. In addition, there are few reported cases of perforation with simultaneous herniation. **Method:** A clinical case of a patient who underwent intrathoracic gastric perforation is presented as the complication of a laparoscopic fundoplication, presenting acute mediastinitis. It describes its management and evolution as well as a review of the subject. This case was managed with surgical reoperation, drainage and placement of pleural and pericardial drains. **Results:** The patient died despite adequate treatment. **Conclusions:** Postoperative gastric perforation by laparoscopic fundoplication may be complicated by acute mediastinitis, the most lethal chest infection. It is a rare complication, with a difficult diagnosis due to its non-specific presentation and its late diagnosis increases its mortality.

RESUMEN

Introducción: La funduplicatura laparoscópica se ha convertido en el tratamiento quirúrgico de elección para la enfermedad por reflujo gastroesofágico por tener mínimas complicaciones, una de ellas es la perforación esofágica o gástrica; esta última es la de menor incidencia, pero la que tiene peor pronóstico. La mayoría de las perforaciones gástricas son detectadas y tratadas intraoperatoriamente y las que son detectadas en el periodo postquirúrgico son las que requieren reintervención y tienen una elevada morbimortalidad por presentar en algunos casos mediastinitis aguda; los reportes en la literatura son limitados. Además, hay pocos casos descritos de perforación con herniación simultánea. **Método:** Se presenta un caso clínico de una paciente que sufrió perforación gástrica intratorácica como complicación de una funduplicatura laparoscópica, mostrando además mediastinitis aguda. Se describe su manejo y evolución y se realiza una revisión del tema. Este caso fue manejado con reintervención quirúrgica, drenaje y colocación de sondas pleurales y pericárdicas. **Resultados:** La paciente falleció a pesar del tratamiento adecuado. **Conclusiones:** La perforación gástrica postquirúrgica por funduplicatura laparoscópica puede complicarse con mediastinitis aguda, la infección del tórax más letal. Se trata de una complicación poco frecuente, con un diagnóstico difícil por su presentación inespecífica y su diagnóstico tardío eleva su mortalidad.

INTRODUCTION

Laparoscopic fundoplication has become the most common surgical treatment for gastroesophageal reflux disease (GERD). It is the treatment of choice because it involves a short hospital stay, better aesthetic results and fewer complications. These include intraoperative

bleeding, nausea, vomiting, infection, port site hernia, and wrap migration or ischemia;^{1,2} they have a 30-day mortality rate lower than 1%.² Reported complications with a high mortality rate are hemorrhage, gastric or esophageal perforation, pulmonary embolism, and cardiac or respiratory disorders.² Literature on the risk of gastric or esophageal perforation during

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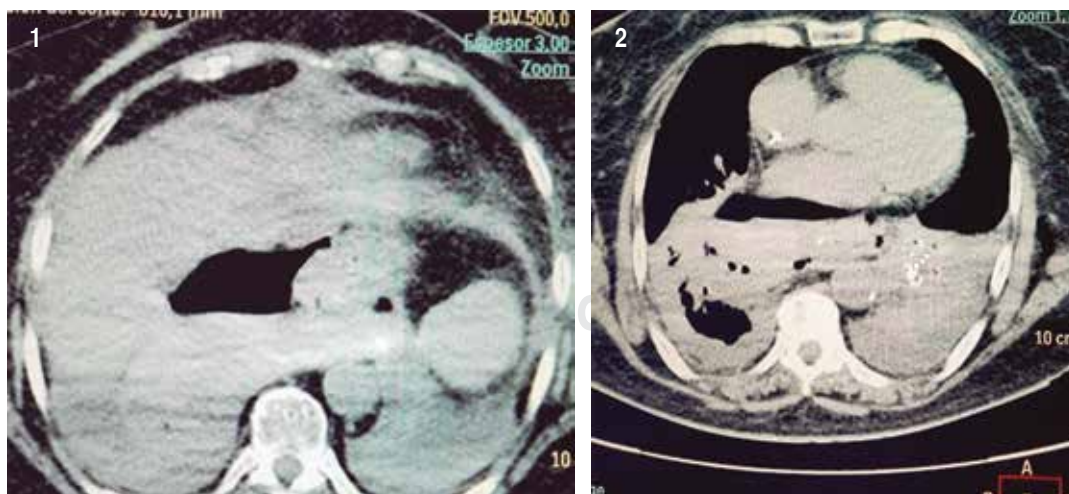
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fundoplication is limited, but it is known to have the worst prognosis.³ An incidence from 0% to 4% has been reported in literature,^{2,3} and it has been associated with the use of a bougie during adhesion dissection, with a 7- to 14-fold higher incidence in redo fundoplication, in these cases due to difficult dissection.^{2,3} Lately, it has been related to the placement of sutures in 75% of cases, to traction during repair of hiatal hernia in 43%, and to Heller myotomy in 72%.³ Most gastric perforations are discovered and treated intraoperatively; those diagnosed in the postoperative period require reoperation and have high morbidity and mortality rates, in some cases due to acute mediastinitis, the most lethal chest infection.³ We present a case of acute mediastinitis due to an intrathoracic gastric perforation—a complication of laparoscopic fundoplication—the first case of this kind reported in Mexico.

CASE REPORT

This was a 76-year-old female with grade II gastroesophageal reflux disease (GERD), type III hiatal hernia and sliding of the stomach fundus and body through the esophageal hiatus. She was admitted to undergo an elective laparoscopic fundoplication. During surgery, a giant hiatal hernia was found; the stomach fundus dissected the mediastinum and there was a 20 × 20 cm hernial sac,

with two thirds of the stomach located inside the mediastinal cavity. A 360-degree Nissen-Rossetti fundoplication was performed without complications. The day after surgery, the patient suffered from dyspnea and had a 77 percent oxygen saturation, with clinical and X-ray signs of atelectasis; consequently, oxygen therapy was given and saturation improved. Feeding by mouth was started with liquids, after which the patient experienced nausea, retching and dyspnea, together with tachycardia, tachypnea, somnolence and diminished breathing murmurs in the lung bases. Laboratory results included leukocytosis with bandemia, mixed acidosis and hyperlactacidemia. Respiratory function deteriorated rapidly, requiring assisted mechanical ventilation. The patient was transferred to the intensive care unit. A thoracoabdominal CT scan was performed that showed air densities in the soft tissues of the anterior thorax, bilateral parapharyngeal space and retropharyngeal space (*Figures 1 and 2*), as well as air densities in the mediastinum and a fluid collection arising from the stomach at the level of the fundoplication, with an estimated volume of 831 cm³. Emergency drainage of the collection was undertaken through a median sternotomy, with methodical cavity lavage. Hematobiliary collections were found inside the thorax, as well as the stomach fundus, which showed a lineal tear approximately 2 mm in length. Pericardial and pleural



Figures 1 and 2: Thoracoabdominal CT scans showing air densities and an intraabdominal collection.

drainages were left in place, with a system of mediastinal infusion. The patient returned to the intensive care unit, where respiratory function improved. For the next 72 hours, the patient received sympathomimetics. She suffered from respiratory failure and continued under mechanical ventilation with high parameters. Hypotension ensued despite the use of sympathomimetics, and fluid overload required renal replacement therapy. Cardiorespiratory arrest occurred, and the patient died of septic shock six days after surgery.

DISCUSSION

Diagnosing a perforation secondary to laparoscopic fundoplication is difficult, since the first signs are unspecific, such as tachycardia and pain, resulting in delayed treatment.¹ When perforation is recognized and treated intraoperatively, or else diagnosed in the postoperative period and treated immediately, the outcome is excellent;^{1,2} however, repairing perforations in redo fundoplication is technically harder and involves a higher intraoperative risk.³ In this patient, an intrathoracic postsurgical gastric perforation was found, secondary to migration of the stomach into the thorax due to the rupture of a suture in the fundoplication; this was probably caused by an increase in intraabdominal pressure during postsurgical vomiting. A case of intrathoracic gastric perforation two days after a laparoscopic fundoplication was reported in a patient with postsurgical nausea and vomiting, ascribed to the increased intraabdominal pressure during retching. No comorbidities are mentioned in the report, and the patient had a favorable outcome after repairing the perforation and reconstructing the hiatus.⁴ The cause in 19% of cases of mediastinitis is gastric or esophageal perforation, but not all perforations lead to mediastinitis;^{5,6} it depends on the extent of the lesion, the leaking of material, and the bacterial load. Minor or punctiform injuries may heal spontaneously; larger injuries require surgical treatment.⁷ There are few cases similar to ours, in which perforation and concurrent herniation have been reported. One case of intrathoracic gastric perforation was secondary to chronic use of analgesics plus a hiatal hernia

attributed to increased intraabdominal pressure during vaginal childbirth; the perforation was diagnosed on the basis of severe epigastric pain, dyspnea, hypoxia and fever. No mediastinitis occurred, and the case was treated with primary closure of the perforation and closure of the diaphragmatic defect, with a favorable postoperative outcome.⁵

Acute mediastinitis is the most lethal thoracic infection, with a 31.82% mortality rate; prognosis has been related to the number of preoperative comorbidities and, most of all, to a delay longer than 24 hours in surgical treatment.⁸ Mortality ranges approximately from 10% to 25% within the first 24 hours, and increases to between 40% and 60% if treatment is provided after 24 hours.⁹ Several studies have reported mediastinitis secondary to gastric or esophageal perforation;⁹⁻¹¹ the clinical picture includes dyspnea and epigastric pain, decreased oxygen saturation, respiratory failure, and signs of hydropneumothorax in imaging studies.¹⁰ Surgical treatment of our patient was consistent with that recommended in literature, including thoracotomy and placement of endopleural and mediastinal drains; patients in those other studies were admitted to the intensive care unit and treated with mechanical ventilation and sympathomimetic amines, as well as antibiotics. The most outstanding feature is the high morbidity and mortality rate in these patients due to septic shock, as happened to our patient.¹¹ Mortality is associated with delayed treatment of mediastinitis;⁹ therefore, it is advisable that, in case of suspected mediastinitis, a CT scan is taken immediately. Since mortality is related to the time elapsed, it is recommended to start immediate, aggressive treatment with thorough mediastinal debridement, together with removal of necrotic tissue and placement of multiple drains in the mediastinum, the pleural cavity and, if necessary, the neck.⁹

CONCLUSIONS

One of the most fearsome but least common complications of laparoscopic fundoplication is gastric perforation. In most cases, it is recognized intraoperatively and treated uneventfully. However, in some cases it

appears postoperatively and leads in its turn to fatal complications, one of which, acute mediastinitis, is the most lethal chest infection. Not all perforations cause mediastinitis. In our patient, acute mediastinitis secondary to a postsurgical intrathoracic gastric perforation was due to two injury mechanisms, i.e., migration of the stomach fundus into the thorax and the occurrence of a perforation, both perhaps secondary to an increase in intraabdominal pressure caused by the retching and vomiting experienced by the patient. It is a rare complication, and diagnosis is difficult because of its unspecific presentation; therefore, it is advisable to start with a thoracoabdominal CT scan so as not to delay diagnosis and treatment, which results in a high mortality rate.

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