

Hiatal Hernia as a Total Gastrectomy Complication

Bruna do Nascimento Santos^a Marcos Belotto de Oliveira^{b–e}
Renata D’Alpino Peixoto^d

^aFaculdade de Ciências Médicas da Santa Casa de São Paulo, ^bSurgery Department of Irmandade da Santa Casa de Misericórdia de São Paulo, ^cOncologic Surgery Department of ^dCentro Oncológico Antônio Ermírio de Moraes, and ^eSurgery Department of Hospital Israelita Albert Einstein, São Paulo, Brazil

Key Words

Hiatal hernia following gastrectomy · Total gastrectomy · Gastric cancer

Abstract

Introduction: According to the Brazilian National Institute of Cancer, gastric cancer is the third leading cause of death among men and the fifth among women in Brazil. Surgical resection is the only potentially curative treatment. The most serious complications associated with surgery are fistulas and dehiscence of the jejunal-esophageal anastomosis. Hiatal hernia refers to herniation of elements of the abdominal cavity through the esophageal hiatus of the diaphragm, though this occurrence is rarely reported as a complication in gastrectomy.

Case Report: A 76-year-old man was diagnosed with intestinal-type gastric adenocarcinoma. He underwent a total laparoscopic-assisted gastrectomy and D2 lymphadenectomy on May 19, 2015. The pathology revealed a pT4pN3 gastric adenocarcinoma. The patient became clinically stable and was discharged 10 days after surgery. He was subsequently started on adjuvant FOLFOX chemotherapy; however, 9 days after the second cycle, he was brought to the emergency room with nausea and severe epigastric pain. A CT scan revealed a hiatal hernia with signs of strangulation. The patient underwent emergent repair of the hernia and suffered no postoperative complications. He was discharged from the hospital 9 days after surgery. **Conclusion:** Hiatal hernia is not well documented, and its occurrence in the context of gastrectomy is an infrequent complication.

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Introduction

Gastric cancer affects more than 20,000 Brazilians per year [1]. According to the Brazilian National Institute of Cancer (INCA), gastric cancer is currently the fifth leading cause of death among women and the third among men in Brazil [1]. Surgical resection is the only potentially curative treatment. In order to achieve a successful R0 resection, a total gastrectomy is necessary in 60–70% of the cases [2, 3]. The decision regarding the most appropriate operative technique takes into account the location of the lesion and its lymph node dissemination [4, 5]. Roux-en-Y anastomosis is performed in about 86% of cases [6]. Gastrectomies with lymphadenectomy are primarily recommended to patients suffering from gastric cancer located in the body and fundus of the stomach as well as in the cardia [7].

The complications are associated with the chosen technique and, in the literature, range from 10 to 47% [8], with an average incidence of 30%. These complications can be divided into three groups: immediate postoperative complications, which occur up to 30 days after surgery; early postoperative complications, which occur up to 6 months after surgery, and late complications, which occur 6 months after surgery [6, 9–11]. The most frequent complications are listed in the tables below (table 1: immediate surgical complications; table 2: immediate nonsurgical complications [2, 4, 6, 9, 11–14]; table 3: early and late surgical complications, and table 4: early and late nonsurgical complications [13, 15–19]).

Hiatal hernias as complications after total gastrectomy have been rarely documented in the medical literature and can be classified as an early or late postoperative complication.

Case Report

A 76-year-old male presented with a 2-month history of nausea and vomiting associated with weight loss of more than 15 kg. A CT scan without contrast was performed on May 5, 2015, which revealed concentric parietal thickening of the gastric antrum associated with an increase in the size and number of locoregional lymph nodes. On May 7, 2015, the patient underwent an upper digestive endoscopy where an ulcerated lesion was observed in the angular incisure, which was infiltrating the small curvature and antrum, was friable, and there was a large quantity of necrotic material. There was no hiatal hernia, the pylorus was partially stenotic, and it was not possible to pass by the lesion. Due to symptoms of partial gastric obstruction, the patient underwent a laparoscopic-assisted total gastrectomy with Roux-en-Y anastomosis and D2 lymphadenectomy on May 19, 2015, with a total duration of 4 h and intraabdominal pressure of 12 mm Hg. There were no intraoperative complications, the hiatus was not opened wide during surgery, and the diaphragmatic pillars were not sutured as this is not a standard of care in our service. Histopathological analysis revealed a moderately differentiated intestinal-type gastric adenocarcinoma, infiltrating the gastric wall to the serous layer and adipose tissue of the large and small curvatures, measuring 72 × 40 × 24 mm and located in the corpus and antrum. Lymphovascular invasion and the presence of perineural infiltration were additionally identified. The circumferential margins of the large and small omentum were cancer free. Carcinoma metastases were identified in 27 of 47 lymph nodes. Pathologic staging (TNM staging, AJCC 7th edition, 2010) was consistent with a pT4a pN3b gastric adenocarcinoma. The postoperative course was uneventful, and the patient was discharged 10 days after surgery with no evidence of anastomotic fistula or any other type of surgical complication.

On June 22, 2015, the patient began adjuvant chemotherapy with 5-fluorouracil and oxaliplatin (FOLFOX). Nine days after the second cycle, the patient was admitted to the emer-

gency room with emetic symptoms and intense epigastric pain. Electrocardiogram showed no abnormalities. A CT scan was performed and revealed small intestinal herniation through the diaphragm to the left hemithorax without distention of the aforementioned intestines, causing compressive atelectasis of the adjacent parenchymal lung (fig. 1). Liquid distention of the duodenojejunal portion was observed with abrupt tapering in the left thoracoabdominal transition. Given these findings, an emergency exploratory laparoscopy was performed, which took place 60 days after the total gastrectomy. The intraoperative findings revealed that 140 cm of the small intestine were herniated into the thorax. It was initially not possible to pass the small intestine through the iatrogenic orifice; therefore, a small incision was made in the left diaphragm. It was then found that 30 cm of the intestinal tissue was ischemic. Therefore, a portion of it was resected, and a primary anastomosis was performed. After the herniation correction and intestinal resection, the diaphragm was sutured with Prolene. The only minor postoperative complication was an acute high-ventricular-response atrial fibrillation which was treated with amiodarone. The patient was discharged home 9 days after surgery.

Discussion

Complications requiring reoperation after gastrectomy for gastric cancer are relatively infrequent. In a Korean study, 6,131 patients underwent gastrectomy for stomach cancer, 129 (2.1%) of which required surgical reintervention due to postoperative complications. The most frequent complications included dehiscence ($n = 40$, 0.65%), bleeding ($n = 31$, 0.5%), mechanical ileus ($n = 27$, 0.44%), and perforation ($n = 8$, 0.13%). In that study, there were only 5 patients who exhibited internal abdominal herniation [20].

Internal hernias as complications of total gastrectomy are extremely rare [21]. In a retrospective Japanese study, of 8,938 patients that underwent a gastrectomy for gastric cancer, only 13 were diagnosed with an internal hernia (0.19%) and only 1 case was considered a hiatal hernia (0.01%) [21]. The main internal hernias were jejunal mesenteric defects, Peterson hernias (caused by the herniation of the small intestine through the defect between the mesentery of the small intestine, the transverse mesocolon, and the retroperitoneum), mesentery hernias of the transverse colon, and hiatal hernias which may happen by sliding or rolling.

Hiatal hernias are rare diaphragmatic postoperative complications and are most often reported after esophagectomy [22, 23], occurring in approximately 0.69% of the cases [24]. There are 2 reported cases of a hiatal hernia as a complication of a total gastrectomy. In the first case, a 44-year-old Japanese man diagnosed with advanced gastric cancer underwent a total gastrectomy, low esophagectomy, and splenectomy by the Roux-en-Y technique. On the second day after surgery, the patient showed signs of dyspnea and chest pain, which were revealed to be due to a hiatal hernia. This was later corrected by a laparotomy [25]. In the other case, a 47-year-old American woman diagnosed with gastric adenocarcinoma underwent a gastrectomy with D2 lymphadenectomy. Three months after surgery, she was hospitalized due to emetic symptoms which were unresponsive to antiemetic medications. A CT scan was subsequently performed and revealed the presence of a hiatal hernia, which was later corrected by a laparotomy [8]. In the previous cases, the hernial sac was composed of portions of the colon, while our patient's sack was only composed of the small intestine. This has never been reported before.

In esophagectomy, the main causes of hiatal hernia are the extensive blunt dissection of the hiatus during surgery and iatrogenic enlargement of the hiatus [26, 27], which may also

occur in gastrectomy. An incision of the hiatus is not performed during gastrectomy, making its closure unnecessary. The Roux-en-Y reconstruction technique was utilized in the 2 previously reported cases, similar to the presented case. In the previously mentioned multicentric Japanese study regarding the occurrence of postgastrectomy internal hernias, there was a greater tendency for the occurrence of this complication when using the Roux-en-Y and Billroth II techniques, presumably because of the greater size of the iatrogenically created openings compared with other techniques such as Billroth I [21]. Furthermore, the occurrence of internal hernias was higher in laparoscopic gastrectomy compared to open gastrectomy (0.53 vs. 0.15%, $p = 0.03$) and in patients with substantial weight loss after gastrectomy. Our patient underwent a videolaparoscopic gastrectomy, but no weight loss occurred after the initial surgery. However, it is possible that the loss of more than 20% of body weight before surgery may have contributed to the development of the hiatal hernia.

As seen in the previously described cases, surgery is required for both the correction as well as the reduction of the hernia defect. When diagnosed early, surgery solely consists of the correction of the hernia defect, with lower morbidity and mortality. However, when the diagnosis is delayed, rupture of the small intestine may occur, leading to mediastinitis, which may be fatal. Therefore, although rare, whenever a patient who underwent gastrectomy develops shortness of breath, chest pain, or an intestinal subocclusion postoperatively, hiatal hernia should be considered as a differential diagnosis.

Statement of Ethics

The authors have no ethical conflicts to disclose.

Disclosure Statement

The authors declare that there are no conflicts of interest regarding the publication of this article.

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Table 1. Immediate postoperative surgical complications

	Incidence	Variation
Anastomotic esophageal-jejunal fistula	16%	12–22%
Evisceration	4%	–
Duodenal, jejunum-jejunal and pancreatic fistula	3.50%	2–5%
Abscesses and wall infections	3%	–
Subphrenic abscess	1%	–
Acute pancreatitis	1%	–

Table 2. Immediate postoperative nonsurgical complications

	Incidence	Variation
Pulmonary atelectasis	16%	12–20%
Pneumonia	9%	–
Respiratory failure	3%	–
Deep vein thrombosis	2%	–
Pulmonary thromboembolism	0.05%	–

Table 3. Early and late postoperative surgical complications

	Incidence	Variation
Esophageal-jejunal anastomotic stenosis	3%	0.05–6%
Dumping	5%	2–8%

Table 4. Early and late postoperative nonsurgical complications

	Incidence	Variation
Diarrhea and malabsorption	7.5%	3–10%



Fig. 1. CT scan of the abdomen revealing small-intestine herniation through the diaphragm to the left hemithorax.