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Intrathoracic Hernia after Total Gastrectomy

Yoshihiko Tashiro Masahiko Murakami Koji Otsuka Kazuhiko Saito
Akira Saito Kentaro Motegi Hiromi Date Takeshi Yamashita
Tomotake Ariyoshi Satoru Goto Kimiyasu Yamazaki Akira Fujimori
Makoto Watanabe Takeshi Aoki

Department of General and Gastroenterological Surgery, Showa University School of Medicine, Tokyo, Japan

Keywords

Intrathoracic hernia · Gastrectomy · Laparoscopic surgery · Liver cirrhosis

Abstract

Intrathoracic hernias after total gastrectomy are rare. We report the case of a 78-year-old man who underwent total gastrectomy with antecolic Roux-Y reconstruction for residual gastric cancer. He had alcoholic liver cirrhosis and received radical laparoscopic proximal gastrectomy for gastric cancer 3 years ago. Early gastric cancer in the remnant stomach was found by routine upper gastrointestinal endoscopy. We initially performed endoscopic submucosal dissection, but the vertical margin was positive in a pathological result. We performed total gastrectomy with antecolic Roux-Y reconstruction by laparotomy. For adhesion of the esophageal hiatus, the left chest was connected with the abdominal cavity. A pleural defect was not repaired. Two days after the operation, the patient was suspected of having intrathoracic hernia by chest X-rays. Computed tomography showed that the transverse colon and Roux limb were incarcerated in the left thoracic cavity. He was diagnosed with intrathoracic hernia, and emergency reduction and repair were performed. Operative findings showed that the Roux limb and transverse colon were incarcerated in the thoracic cavity. After reduction, the orifice of the hernia was closed by suturing the crus of the diaphragm with the ligament of the jejunum and omentum. After the second operation, he experienced anastomotic leakage and left pyothorax. Anastomotic leakage was improved with conservative therapy and he was discharged 76 days after the second operation.

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Introduction

There are no reports on intrathoracic hernias after total gastrectomy. Of the various postoperative complications that are related with gastrectomy, internal hernia occurs in one of them. Internal hernia is the risk of intestine necrosis with the consequence, it is a serious complication that requires emergency surgery. Internal hernias are reported to occur in 1–5% of patients after open gastrectomy with Roux-Y reconstruction [1]. The incidence rate of internal hernia increases to 5–9% [2–4] after the laparoscopic approach. This increase is thought to be decreased by adhesion formation after laparoscopic surgery. In general, internal hernia often occurs after Roux-Y reconstruction and Billroth II reconstruction, because of the iatrogenically created structures compared to the lower incident after other reconstructions [5]. Most sites of internal hernias in Roux-Y reconstruction after total gastrectomy include a transverse mesocolon defect, Petersen's space, and a jejunojejunostomy defect [6]. To close these defects after laparoscopic Roux-Y reconstruction is now recommended, and evidence suggests that closure of these defects decrease the risk of internal hernia [4].

A hiatal hernia is a type of internal hernia, with an incidence rate of <1% in esophagectomy [7] and only 0.01% in total gastrectomy [5]. Moreover, with regard to intrathoracic hernias, there is only one report on esophagectomy [8], but no reports on gastrectomy. In the era of laparoscopic surgery, we should pay more attention to postoperative internal hernia including intrathoracic hernia. We report here a rare case of intrathoracic hernia after total gastrectomy.

Case Presentation

The patient was a 78-year-old man who had alcoholic liver cirrhosis (Child-Pugh grade A) and radical laparoscopic proximal gastrectomy for gastric cancer. On routine upper gastrointestinal endoscopy, a 15-mm gastric cancer in the remnant stomach was discovered after 3 years. We performed endoscopic submucosal dissection at the first therapy. However, the vertical margin was positive in a pathological result. Contrast-enhanced computed tomography (CT) showed no metastasis in other organs.

We performed total gastrectomy with Roux-Y reconstruction and D1 lymph node dissection with laparotomy. Operative findings showed an atrophic liver with liver cirrhosis. When we performed blunt dissection around the gastroesophageal junction, the left pleura was damaged because of severe adhesion around the gastroesophageal junction after laparoscopic proximal gastrectomy. As a result, the left chest cavity was connected through the abdominal cavity. Moreover, we knew that the previous anastomotic site was located in the posterior mediastinum by preoperative diagnosis. Therefore, we dissected the crus of the diaphragm for pulling out the anastomotic site and the esophagus. We did not repair the pleural defect because the orifice of the hernia was small and it was difficult to confirm a defect of the pleura. Two days after the operation, the patient was suspected of having an intrathoracic hernia by chest X-rays (fig. 1). CT showed incarceration of the transverse colon and Roux limb in the left thoracic space (fig. 2a, b). We diagnosed intrathoracic hernia and emergently performed repair of the hernia. Operative findings showed that the Roux limb and transverse colon were incarcerated in the thoracic cavity (fig. 3a). Additionally, the esophageal hiatus was not covered because of atrophy of the left lateral segment by liver cirrhosis. The incarcerated intestine was placed back into the abdominal cavity. There was no ischemic change. After replacement, the orifice of the hernia was found as a defect be-

tween the Roux-Y limb and the left crus of the diaphragm (fig. 3b). The orifice of the hernia was closed by suturing the crus of the diaphragm to the ligament of the jejunum and omentum. Unfortunately, he was complicated by anastomotic leakage and pyothorax on the left side on the 4th postoperative day after the emergency operation. We performed multimodal treatment and he was finally discharged on the 76th postoperative day after the second operation.

Discussion

Internal hernias after abdominal operations are a well-known complication, but intrathoracic hernias are rare. Three studies have been published in which the authors describe the incidence of internal hernias after gastrectomy as ranging from <1 to 7% [5, 9, 10]. However, most sites of internal hernias in Roux-Y reconstruction after total gastrectomy include a transverse mesocolon defect, such as Petersen's space and a jejunojejunostomy defect [6]. With regard to case reports of intrathoracic hernia, there are a few reports after a procedure for esophageal cancer [8, 11], but there are no reports after total gastrectomy.

Laparoscopic gastrectomy for gastric cancer has gradually increased. Randomized trials for laparoscopic surgery versus open surgery against gastric cancer have shown a difference in rate of internal hernias [1, 12]. The incident rate of internal hernia by laparoscopic surgery was higher than that by open surgery. This finding suggests that laparoscopic surgery induces reduction of postoperative adhesions.

In our case, the following causes of intrathoracic hernia are proposed. The first cause could have been negative intrathoracic pressure. The intestine may have been pulled into the thoracic cavity by opening the pleura. We did not repair the defect because the orifice of the hernia was small. The second cause of intrathoracic hernia could have been resection of the diaphragmatic crus. Adhesion between the crus of the diaphragm and the anastomotic site was firm by previous proximal gastrectomy. Moreover, the anastomotic site was located in the posterior mediastinum. Therefore, we had to dissect the crus of the diaphragm for pulling out the anastomotic site and the esophagus into the abdominal cavity. We did not repair the crus for drainage of anastomotic leakage and prevention of intestinal ischemia. The third cause of intrathoracic hernia could have been previous laparoscopic surgery. Some reports showed a higher incidence of internal hernias after laparoscopic surgery than after open surgery, suggesting a reduction in intra-abdominal adhesion [1, 12]. Another cause of intrathoracic hernia could have been liver cirrhosis. Esophageal hiatus is commonly covered by the left lateral segment of the liver. However, the lateral segment of the liver in our case was atrophic by liver cirrhosis. A hiatal hernia in the left side may frequently occur after esophagectomy because adhesions between the liver and crus of the diaphragm are likely to be a predisposing factor for left-sided predominance. In brief, adhesions between the liver and crus of the diaphragm are important for preventing hiatus hernia. Therefore, if an esophageal hiatus on the left side is covered by a normal liver, this might prevent a hernia.

We speculate that intrathoracic hernia was caused by negative intrathoracic pressure, dissection of the crus of the diaphragm, reduction of intra-abdominal adhesion, and liver cirrhosis.

Conclusions

We reported a rare case of intrathoracic hernia after total gastrectomy. We conclude that a damaged pleura or crus of the diaphragm should be repaired for prevention of intrathoracic hernia as much as possible. When pleural tears occur in an operation of total gastrectomy with Roux-Y reconstruction, we recommend suturing the crus of the diaphragm for prevention of intrathoracic hernia with attention to anastomotic ischemia.

Statement of Ethics

The authors have no ethical conflicts to declare.

Disclosure Statement

The authors have no conflicts of interest or financial ties to disclose.

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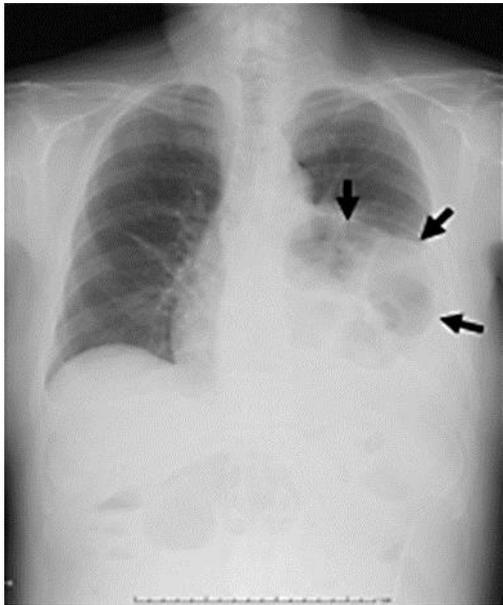


Fig. 1. Chest X-ray showing the intestine in the left lung field (black arrows).

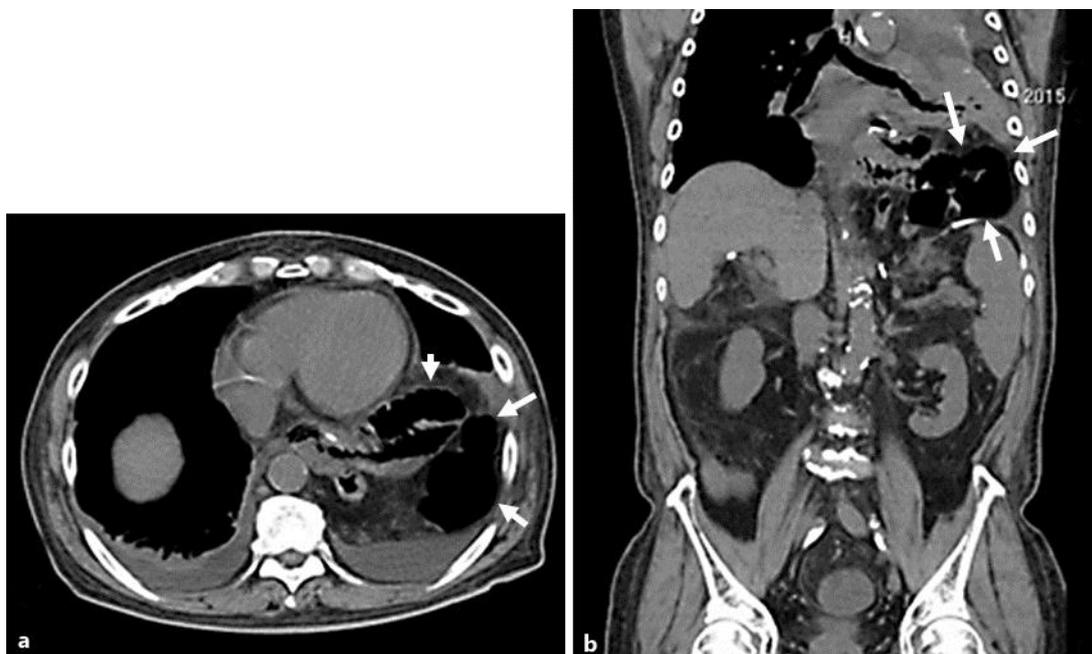


Fig. 2. Thoracoabdominal CT shows a dilated small intestine and the transverse colon (white arrow) in the left thoracic cavity (a, axial; b, coronal).

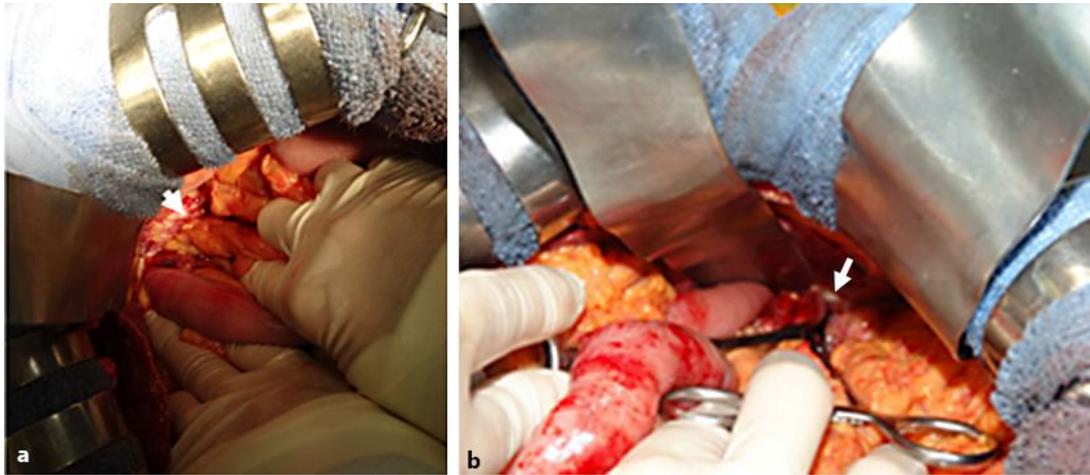


Fig. 3. Intraoperative findings showing that the transverse colon and small intestine have herniated into the left thoracic cavity (**a**, arrow). After reduction, the orifice of the hernia was found as a defect between the esophageal hiatus and Roux limb (**b**, arrow).