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A Thoracoabdominal Approach for Gastrobronchial Fistula Repair Post Complicated Laparoscopic Sleeve Gastrectomy (LSG)

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Abstract

Laparoscopic sleeve gastrectomy (LSG) is a restrictive procedure without the malabsorptive component present in other bariatric procedures. It involves resection of two-thirds of the stomach to provide increased satiety and decreased appetite. During the laparoscopic sleeve gastrectomy (LSG), about 75% of the stomach is removed leaving a narrow gastric “tube” or “sleeve”. No intestines are removed or bypassed during the sleeve gastrectomy. The LSG takes one to two hours to complete. A sleeve gastrectomy is a purely restrictive procedure.

Here, we report the case of a 36-year-old woman who underwent a LSG procedure, complicated by a GBF that was managed through a thoracoabdominal approach.

Keywords: Laparoscopic sleeve gastrectomy (LSG); Symptomatology; Diaphragm; Gastrobronchial fistula

Introduction

Laparoscopic sleeve gastrectomy (LSG) has become a popular validated bariatric procedure. The most common complication is gastric leak along the staple line in approximately 2 percent of LSG procedures [1]. Leaks can evolve into gastro-bronchial fistulas (GBF). With the increase in number of patients undergoing bariatric surgeries, physicians must be aware of complications. There is no consensus on the management of GBFs, which is further complicated by lack of sufficient literature [2]. Herein, we report the case of a 36-year-old woman who underwent a LSG procedure, complicated by a GBF that was managed through a thoracoabdominal approach. Moreover, we provide a brief literature review on the etiology, symptomatology, imaging and management of GBF.

Case Presentation

A 36-year-old woman presented to our clinic with 1-month history of fever, productive cough, green sputum and left-sided chest pain. Past surgical history was remarkable for a history of LSG procedure 15 months ago, complicated by wound dehiscence and gastric leak 4 days postoperatively, and managed with lower esophageal stenting and drainage.

Physical examination was unremarkable except for mild crackles on the left lower lateral chest.

Contrast-enhanced CT scan confirmed a GBF with thickening of visceral and parietal pleura as well as cavitation of left lower lobe of lung **(Figure 1).** A contrast swallow study showed a gross leak from the fundus of the stomach to the left subdiaphragmatic area. From this collection, a fistula is seen through the posterior part of the diaphragm directly to the left lung with contrast filling seen of bronchi in the left lower lobe **(Figure 2).**

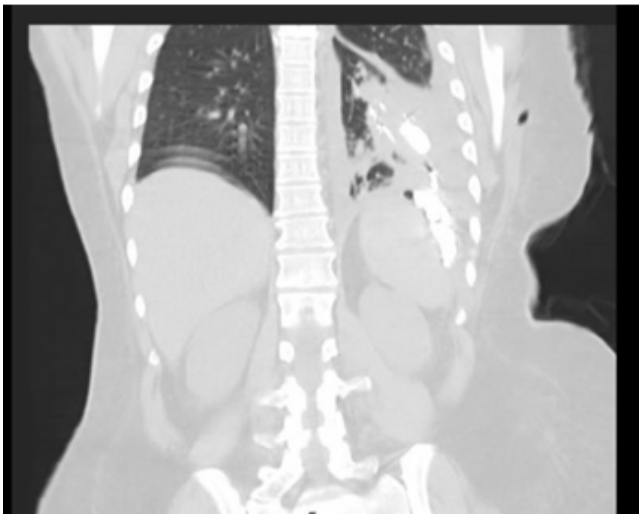

Figure 1 CT chest fistulous tract connecting subphrenic space to stomach and subphrenic space to left lung lower lobe.

Figure 2 Preoperative contrast swallow showing leak from the fundus to the left sub-diaphragmatic area. A fistula through the posterior diaphragm is also shown directly to the left lung with contrast filling of bronchi in the left lower lobe.

Using upper GI Endoscopy, multiple clips were placed over the fistula site, which failed to resolve the issue.

Based on the imaging findings, a surgical repair was planned. Patient underwent a left postero-lateral thoracotomy via the 7th intercostal space. The GBF passing through the posterior basal segment of left lung was visualized. A pus cavity containing food particles was identified between the posterior basal segment of left lung and the diaphragm. The cavity was irrigated multiple times with saline. Then, the small bronchi were closed using a prolene 3-0 followed by debridement of the eroded diaphragm. In the same setting of left postero-lateral thoracotomy, the abdominal cavity was accessed via medial diaphragmatic incision. The procedure necessitated splenectomy. A 2 cm opening was visualized at the fundus with opened staple line. After refashioning of the edges, the opening was closed with polydioxanone 3-0 sutures and overruled by silk sutures, then the jejunum was brought to the site of fistula and the opening was covered with clean serosa. Approximately 60 cm distal to the patch, an entero-enteric anastomosis was done. This was considered the simplest and safest approach.

Postoperatively, the patient was transferred to the ICU and intubated for 24 hours. Patient had an uneventful recovery following surgery, and was discharged home on day 16 postoperatively, at 18 months follow up, the patient is doing well, asymptomatic, with normal chest X-ray **(Figure 3).**

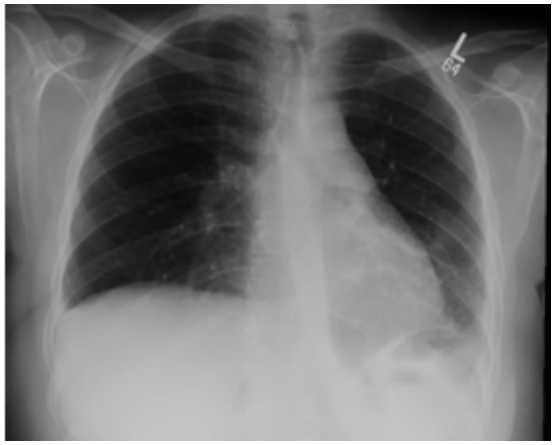

Figure 3 Post-operative CXR (18 months).

Discussion

There is a surge in bariatric surgeries, the most common ones being Roux-en-Y gastric bypass and LSG procedures [2]. The most prevalent acute complications are gastric fistulas and hemorrhage, whereas the most prevalent long-term complications are gastric strictures and gastroesophageal reflux disease [2].

The frequency of leak at the staple line is between 1.4 and 2.8% [3]. Mechanical fistulas are usually discovered within the first 2 days whereas classic ischemic fistulas appear 5-6 days after surgery [4]. GBF may occur early or late. If early it arises from extensive dissection, vessel manipulation or ischemia. If late: non-healing ulcers in the gastric conduit, anastomotic leaks, infection, inflammation or iatrogenic trauma [4]. Our patient presented 4-days post operatively with gastric leak; therefore it can be assumed to be an ischemic leak.

GBF was classified by Moeller and Carpenter in 1985 [2]. Its relation to bariatric surgery was established in 2006 [3]. The exact incidence has not been established but some studies show a range between 0.2% [2] and 0.37% [3].

Most GBF cases may present with productive cough, fever, thoracoabdominal pain, recurrent pneumonia, vomiting, dyspnea, wheezing, mild hypoxemia and expectoration of food [2]. Our patient presented with productive cough, fever, abdominal pain, dysphagia and food particles in sputum.

Imaging plays a crucial role in the diagnosis of GBFs. Such imaging modalities include: CT, X-ray, upper endoscopy and bronchoscopy [2]. X-ray is not diagnostic but an initial x-ray guides us towards definitive tests. CT with intravenous and oral contrast is a key to diagnosis and has been indicated in all cases; it helps in abscess identification and drainage [3]. Endoscopy can identify the internal opening and aids in various therapeutic procedures [3]. Bronchoscopy may suggest fistulation via methylene blue; however, it is largely proven ineffective due to distal location [3].

Nutritional status is of interest and importance in the line of management. In previous reported cases, most patients were malnourished and needed nutritional support prior to intervention [4]. In our case, the patient was started on total parental nutrition (TPN) 14 days prior to the surgical procedure.

Proper management of GBFs involves a comprehensive evaluation of the clinical condition. In the absence of red flags, an initial conservative management should be undertaken [2,3]. Antibiotic administration is essential [2,3]. Whenever deemed necessary, CT-guided aspiration and drainage can be attempted [3]. Endoscopic balloon dilatation, self-expanding plastic stent, stricturotomy or septoplasty, are some minimally invasive techniques that can be implicated in resolving gastric stenosis — a leading cause of perpetuation of fistula [2,3]. One study included the use of one-way endobronchial valve placement for the management of GBF [3].

In our study, endoscopy was performed during the initial management, with a failed attempt of clip placement to control the fistula. In a recently published systematic review [2], 18 out of 20 GBFs resolved via endoscopic approach. In one previous multicenter study including 15 patients, it led to 93.3% success rate in GBF closure with no recurrence [3] which may be attributed to systematic repetitive dilatations and stricturotomy [3]. Some studies were unfavorable, and endoscopy did not resolve the fistula [3].

When conservative management fails, surgery is the route towards definitive treatment. The surgical approach may be conservative or aggressive. Conservative surgical treatment consists of drainage along with supportive treatment of TPN, antibiotics, and somatostatin analogs [2]. Aggressive surgical treatment is numerous [2] and summarized in **Table 1**. The choice of aggressive surgical approach depends on patient condition, age and agreement. Based on Clavien classification of surgical complications, Silva et al. [2] classified GBFs from grade I to V; grade III being surgical, endoscopic or radiological intervention.

Table 1 Aggressive surgical treatments (Systematic review by Silva et al. [2]).

1.	Exploratory laparoscopy + open pouch resection + Roux en- Y esophagojejunostomy with long alimentary limb + drainage + omental patch on diaphragmatic defect (no thoracotomy)
2.	Total gastrectomy + gastrojejunal anastomosis + splenectomy (all) + distal pancreatectomy + segmental lung resection/LLL + diaphragm flap/suture/ prosthesis
3.	Thoracoabdominal approach: left lower lobe resection + debridement of eroded diaphragm + completion gastrectomy + Roux-en-Y esophagojejunostomy
4.	Laparoscopic conversion to RYGB
5.	Total gastrectomy + intrathoracic esophagojejunostomy + left inferior lobectomy + diaphragm reconstruction with latissimus flap
6.	Thoracotomy + rib resection + left lower lobe/hemi diaphragm resection + total gastrectomy + intrathoracic esophagojejunostomy + diaphragm reconstruction w/ latissimus dorsi + chest/abdominal drainage

Conclusion

Gastrobronchial fistula is a relatively new complication with an expected rise in the years, parallel to an increase in bariatric surgeries. There is need for research in management, diagnosis and to increase awareness due to its presentation under the facade of common symptoms.

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