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# Primary Repair of Gastrobronchial Fistula Presenting 12 Years Post Uncomplicated Laparoscopic Sleeve Gastrectomy

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## ABSTRACT

**Background:** Obesity is an alarmingly increasing global public health issue. Laparoscopic sleeve gastrectomy (LSG) is the most common bariatric surgery owing to its simplicity, effectiveness, and low complication rates. The complications can be classified as early or late, with fistula formation being one of the most severe complications. Here, we report a rare gastrobronchial fistula (GBF) that presented 12 years post LSG.

**Case Presentation:** A 34-year-old woman who underwent LSG in 2011 was referred to our institution. The patient complained of recurrent upper respiratory tract infections, nausea, and vomiting. Abdominal computed tomography (CT) with oral contrast showed abnormal fistulous communication between the fundus and left lung. Conservative management was initiated but failed multiple times. After counseling the patient on the surgical options, she underwent fistula removal and primary

repair of the fundus with a healthy omental wrap and an omental diaphragmatic flap. She tolerated the procedure well, recovered uneventfully, and was discharged on postoperative day 7.

**Conclusion:** GBF diagnosis is challenging. Imaging studies, such as CT and radiography with contrast and endoluminal diagnosis with esophagogastroduodenoscopy (EGD), bronchoscopy, and bronchial secretion analysis, aid in the diagnosis. GBF management requires a multidisciplinary team. Patients should be initially offered conservative management with the understanding that reoperation would be the only option if failure is seen for 3 months.

**Key Words:** Bariatric surgery, Gastrobronchial fistula, GBF, Sleeve gastrectomy.

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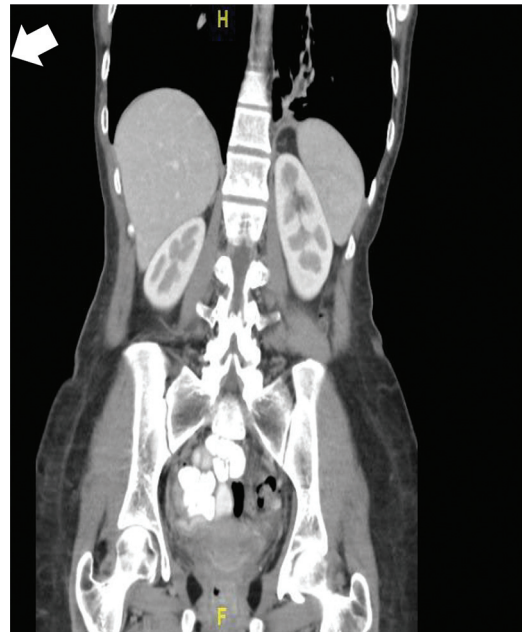
## INTRODUCTION

Obesity is a major health problem that is becoming increasingly prevalent worldwide. It can lead to several severe comorbidities, including cardiovascular disease, stroke, type 2 diabetes, and cancer.<sup>1</sup> Bariatric surgery is widely used to manage morbid obesity and its comorbidities.<sup>2</sup> The most common types of bariatric surgery include gastric bypass, adjustable gastric banding, and laparoscopic sleeve gastrectomy (LSG). Among these procedures, LSG has emerged as the preferred option for many surgeons because of its simplicity, effectiveness, and low complication rates, as it does not require gastrointestinal anastomosis.<sup>3</sup> However, like any surgical procedure, there are potential complications associated with LSG, which can be classified as early and late. Early complications include bleeding, staple line leak, and collection.<sup>4</sup> Late complications include stricture, gastroesophageal reflux disease (GERD), and nutritional deficiency. One of the most dreaded complications of bariatric surgery is fistula formation.<sup>5</sup> Fistulas are abnormal connections between two organs or tissues that do not normally communicate with each other. Risk factors for fistula formation include

smoking, foreign bodies, abscesses, hemorrhages, ischemia, and leaks. Leak is a common complication following LSG and can be classified as class I (subclinical type), typified by leak without early septic complications, and class II (clinical type), typified by leak with early septic complications.<sup>6</sup> Leak can also be classified according to its location along the staple line. The most common leak site is at the gastroesophageal junction (GEJ), followed by the mid stomach and distal stomach.<sup>7</sup> Factors associated with a higher risk of having post-LSG leak include diabetes, hypertension, infection, smoking, body mass index (BMI) greater than 50 kg/m<sup>2</sup>, obstructive sleep apnea, and revisional surgery.<sup>8</sup> Prolonged anastomotic leak may evolve into a chronic fistula, especially if coupled with extraluminal fluid spillage and abscess.<sup>9</sup> The incidence of fistula formation post bariatric surgery is relatively rare, with an overall rate of 0.9–2.6%, reaching up to 10% in revision operations.<sup>10</sup> Fistulas can present with various symptoms depending on their location and severity, including fever, abdominal pain, dyspnea, nausea, and vomiting. Fistulas can occur between the stomach and pleural cavity (gastropleural fistula), skin (gastrocutaneous fistula), the stomach itself (gastrogastric fistula), or, in very rare cases, the bronchus gastrobronchial fistula (GBF).<sup>11</sup> Most GBF reported cases were preceded by a gastric leak, with a mean period of diagnosis of 7.2 months. The most commonly reported symptoms were productive cough and subphrenic abscess.<sup>12</sup> Management options of GBF include conservative, endoscopic, and surgical management.<sup>13</sup> In this case report, we present a rare case of a 34-year-old woman with GBF presenting 12 years post uncomplicated LSG in accordance with the Surgical Case Report guidelines.<sup>14</sup>

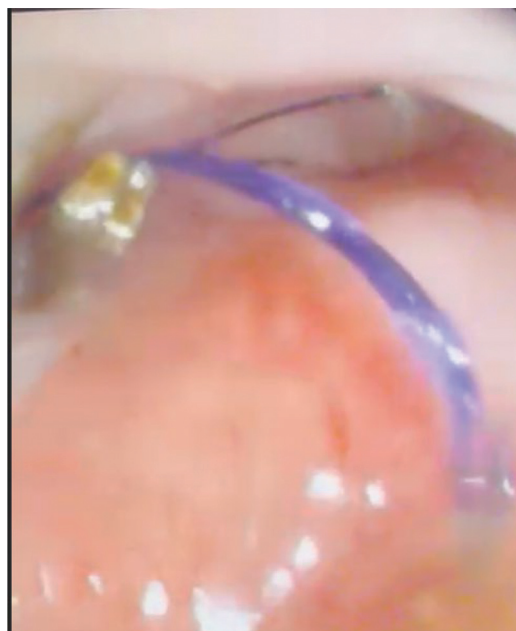
## CASE REPORT

A 34-year-old married woman with asthma who underwent LSG in 2011 and was on medication was referred to our institution. The patient complained of recurrent upper respiratory tract infections, nausea, and vomiting. On physical examination, she appeared cachectic. The abdomen was neither distended nor rigid, with mild epigastric tenderness. Laboratory investigations revealed a normal white blood cell count, platelet count, and hemoglobin level of 110 g/dL (12–16 g/dL). Electrolytes, including (Na, K, Mg, and Ph) were all within the normal ranges. Her serum albumin level was 33.80 g/L. CT of the abdomen with oral contrast showed abnormal fistulous communication between the fundus and left lung (Figure 1). Conservative management was initiated for the patient beginning with keeping her on total parenteral nutrition (TPN) and



**Figure 1.** Coronal view computed tomography of the abdomen and lower chest shows an air-fluid level associated with mild thickening of the diaphragmatic crus, abnormal fistulous communication between the fundus and left lung, and adjacent lung consolidation.

antibiotics. Upper endoscopy was performed as part of the management (Figure 2), and the first trial of endoscopic stenting was offered to the patient but failed due to slippage (Figure 3). The patient was taken again for stenting retrieval using a larger Mega stent; she tolerated the procedure well and was observed for 48 hrs. She tolerated the oral diet and was discharged with a follow-up at our clinic. Five days later, she returned to the hospital with the same complaint. Radiography of the chest and abdomen revealed a second slipped stent (Figure 4). Owing to the two failed stenting trials, she was counseled on surgical options, including gastric bypass, total gastrectomy, fistulojejunostomy, fistula takedown, and primary repair. All options were offered in addition to the primary repair of the diaphragm. The patient was informed of all options, and she left the decision with the primary surgeon, who decided intraoperatively based on the findings. Intraoperative diagnostic laparoscopy revealed a large retained fundus attached to the left diaphragm. Dissection was performed along the fundus. Dense fibrotic adhesions between the fundus and diaphragm were observed. The fistula was identified and excised after removing the fundus from the diaphragm. Anesthesia ensured that there were no changes in the respiratory parameter (CO<sub>2</sub>) levels, after which the diagnosis of the gastropleural fistula was clear. The attached fundus

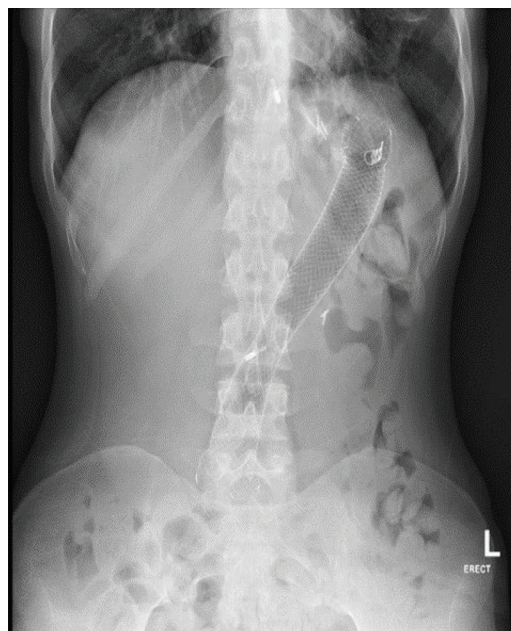


**Figure 2.** Upper endoscopy shows a retaining prolene suture from previous surgery, clips, and two patent tracks going to the pleura.

containing the fistula showed surgical prolene sutures and clips retained from the previous surgery. The stomach fundus was opened longitudinally and proximally until a healthy area was reached. Subsequently, surgical sutures



**Figure 3.** X-ray fluoroscopy of gastrograffin shows that part of the contrast passed through a fistula into the bronchial tree of the left lower lung lobe.



**Figure 4.** X-ray of chest and abdomen shows stent migration of its original place; based on the images and the recurrence of symptoms (cough, nausea, and vomiting), slippage was confirmed.

and clips were extracted and removed. The edges of the fundus were refreshed, and primary repair using 3.0 vicryl sutures over bogie was performed. The left diaphragmatic opening of the fistula was 1 cm in diameter, and a trial of suture was tried but only one stitch was successfully done, but due to the dense fiber tissue, coagulation using monopolar hook and fibrin glue were used to induce fibrosis to the tissue, and ensure closure of the fistula. We wrapped a healthy omentum around the stomach to repair the diaphragm, but this was unsuccessful because of fibrotic edges. Fibrin glue was used for the diaphragmatic defect, and an omental flap was wrapped around the stomach to separate it from the diaphragm and prevent recurrence of the fistula. Therefore, the primary surgeon removed the fistula and repaired it with a healthy omental wrap and an omental diaphragmatic flap. The patient tolerated the procedure well and was monitored. TPN was tapered down as the oral liquid diet was started, and she did not have any aspiration symptoms and tolerated the liquid diet. A post-operative UGI contrast study was obtained prior to discharge and revealed no evidence of leak, definite fistula tract, or contrast leak (**Figure 5**). The patient was discharged on postoperative day 7. The patient was followed in the clinic over 3 months with no clinical evidence of recurrence, and she was satisfied with the outcome of the surgery.





**Figure 5.** X-ray fluoroscopy of gastrograffin shows that contrast passes smoothly through the esophagus, gastroesophageal junction, and down to the remaining part of the stomach to proximal jejunal loops without obstruction.

## DISCUSSION

Bariatric surgery has become more common in recent years because of the increasing prevalence of obesity worldwide. It is now considered the first-line management option for individuals with a BMI greater than 35 kg/m<sup>2</sup> or those with a BMI of 30 kg/m<sup>2</sup> with comorbidities.<sup>1</sup> Although bariatric surgery is generally considered safe and effective, potential complications can occur postoperatively. The most common complications include bleeding, anastomotic leak, stricture, obstruction, and pulmonary embolism.<sup>15</sup> LSG is one of the most commonly performed bariatric procedures because of its simplicity and effectiveness in achieving weight loss goals. However, it has been associated with specific complications, such as staple line leaks or bleeding from the staple line, fistulas, and tube stricture. These complications can lead to sepsis, multiorgan failure, and even death if not managed promptly.<sup>16</sup> GBF is a rare condition, and its incidence remains unclear. Rebibo et al included 750 patients who underwent LSG in a retrospective study. They found that 18 (2.4%) of 750 cases were complicated with gastric fistula, and 11% of these fistulas were attributed to GBF.<sup>17</sup> Vrande et al reported a 3.9% (n = 812) leak rate following LSG. Their study divided the patients into primary and corrective LSG groups (n = 728 and n = 84, respectively). The incidence of GBF was higher among the

corrective LSG group, with a rate of 16.7% compared to 7.7% in primary LSG, corresponding to a total rate of 0.37% of their total population and 9.4% of leak patients.<sup>18</sup> In 1985, Moeller and Carpenter first classified GBF according to the etiology into five categories: (1) neoplasm, (2) prior esophageal or gastric surgery, (3) trauma, (4) gastric ulcer, and (5) subphrenic abscess.<sup>10</sup> The presentation of GBF can vary depending on the severity of the condition. Patients may experience coughing, chest pain, dyspnea, hemoptysis, and gastrointestinal symptoms, such as nausea, vomiting, and abdominal pain.<sup>19</sup> A GBF should also be suspected when a lower lobe lung abscess fails to resolve with treatment or when there is recurrent or persistent pneumonia, as with our patient.<sup>20</sup> Diagnosis of GBF can be challenging due to its rarity and nonspecific symptoms. Imaging studies, such as computed tomography (CT) scans with oral contrast, can be used to look for drainable collections, which will aid in diagnosing GBF, as exhibited in our case report. Additional tests, such as esophagogastroduodenoscopy (EGD) to locate the fistula orifice, X-ray with oral contrast to look for an opacified connection between the stomach and the lung, bronchoscopy with methylene blue staining, which shows the fistulous tract, and bronchial secretion analysis, may also be required to confirm the diagnosis.<sup>20</sup> There is no consensus on the best way to manage GBFs, as each case should be managed individually according to the presentation and severity. The approach to fistulas is multidisciplinary.<sup>21</sup> Patients should be offered conservative management with antibiotics in the presence of lung infection, TPN if unable to tolerate oral and malnutrition, adequate drainage of the collection if present.<sup>22,23</sup> Endoluminal therapy is another option, which include: SEMS, endo-clip closure, internal drainage, argon plasma ablation, endo-vac and glue injection.<sup>8,12</sup> Despite the improvements in endoscopic techniques, up to 69% of patients with GBF require surgical treatment.<sup>8</sup> A repair would be the only solution if conservative management fails for 3 months.<sup>24</sup> The surgical options discussed with our patient included gastric bypass, total gastrectomy, fistulojejunostomy, takedown of the fistula, primary repair, and interposition tissue.

In summary, GBF is a rare complication after bariatric surgery, which carries a high mortality rate. Key presenting symptoms should be recognized by the surgeon in order not to delay the diagnosis and treatment. There is no standardized treatment for GBF, therefore it is challenging and requires a multidisciplinary team to treat. Patients should be initially offered conservative management with the understanding that reoperation would be the only option if failure is seen after 3 months, as supported by the guidelines from The ASMBS Textbook of Bariatric Surgery,

which recommends offering conservative management to patients with GBF for up to 3 months before considering a step-up approach with endoscopic and surgical options.<sup>25</sup> Our case is unique as the patient presented 12 years after an uneventful LSG while the mean time for presentation of GBF described in the literature is 7.2 months,<sup>12</sup> and it is one of the few reported cases of a GBF that underwent a successful laparoscopic primary repair.

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