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## Case Report & Review of Literature

# Gastrobronchial Fistula After Re-Sleeve Gastrectomy: Case Report and Review of Literature

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### ABSTRACT

**Introduction:** Gastro-bronchial fistula (GBF) is a rare and challenging complication of sleeve gastrectomy as it is the result of a chronic gastric leak and subsequent long-standing sub-phrenic abscess. In this article we report the first case of GBF after a re-sleeve gastrectomy.

**Case Presentation:** a 42-years-old patient was admitted to our Unit because of the arise of sepsis, hypotension and cough with expectoration of enteral nutrition. The patient had a history of sleeve (2010) and re-sleeve gastrectomy (2017) for weight regain. On admission radiological signs of consolidation of the left pulmonary lobe and, after the swallowing of oral contrast, a little backward trans-diaphragmatic opacification of the main bronchus was described. An open total gastrectomy with a trans-abdominal atypical lower pulmonary lobe resection were performed. A post-operative ERAS protocol was adopted, and the patient was discharged in POD 9 in good conditions, after an uneventful recovery and feeding per os.

**Conclusions:** To our knowledge this is the first case of a GBF after a re-sleeve gastrectomy, more evidences are needed before routinely advice a re-sleeve gastrectomy after a failed sleeve gastrectomy. Indeed, given that in revisional bariatric surgery the risk of gastric leak may be higher due to a greater tension applied on the staple line, the incidence of rare but serious complications such GBF may consequently increase.

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### Introduction

Laparoscopic Sleeve Gastrectomy (LSG) is quickly becoming the most common bariatric procedure for surgical treatment of morbid obesity. LSG carries several advantages, mainly the avoidance of gastrointestinal anastomosis, the rarity of malabsorptive problems and dumping syndrome, the possibility to easily explore endoscopically the upper GI and biliopancreatic systems. It is also very effective as first stage operation for super-obese patients (BMI > 55 kg/m<sup>2</sup>) [1]. Nevertheless, weight regain is a well recognised but poorly reported problem. Besides hormonal issues, lifestyle behaviors, and lack of follow-up, some technical factors (bougie size, leaving fundal remnant, size of antral remnant) as well as post-operative sleeve dilatation may be a cause of weight regain [2].

In these cases, a redo surgery may be an option, with the possibility to convert LSG into a more malabsorptive procedure like RYGB or duodenal switch. A third surgical option may be re-sleeve gastrectomy, aiming at the resume of weight loss without losing the advantages of LSG. First described in 2006 by Baltasar et al., re-sleeve gastrectomy maintains also the same complications of LSG, mainly the risk of gastric leak [1]. This case report is written according to the 2018 SCARE guidelines.

### Case Report

In March 2019 a 42-years-old male patient was admitted to our Unit because of the arise of sepsis with fever up to 40°C, SIRS and cough with the expectoration of enteral nutrition and hypotension. His past

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surgical history included a LSG in 2010 and a laparoscopic re-sleeve gastrectomy in 2017 for weight regain, which resulted in a proximal staple line leak. Many unsuccessful endoscopic attempts to manage the leak were tried, including self-expanding plastic stent, fibrin sealant and endoscopic clip placement. On admission enteral nutrition through nasojejunal tube and antibiotic therapy were already ongoing; blood tests revealed a CRP protein of 120 mg/L, albumin 24 g/L, with leukocyte and procalcitonine within normal range, gas exchange was within limits. A CT-scan showed an already known peri-gastric fluid collection (11.5 x 5 cm), extended to the splenic and subdiaphragmatic space. However, two new findings were noticed: consolidation signs of the lower left pulmonary lobe (6 x 8.5 cm) with left pleural effusion, and, after the swallowing of oral contrast, a little backward trans-diaphragmatic opacification up to the main ipsi-lateral and contra-lateral bronchi.



**Figure 1:**

An open total gastrectomy with a mechanic end-to-side esophagojejunostomy on Roux-en-Y reconstruction was subsequently performed by two experienced upper GI surgeons. During surgery, excision of left diaphragmatic tissue and trans-abdominal atypical lower pulmonary lobe resection was needed. Pulmonary resection was accomplished by endo-GIA stapler; the diaphragmatic defect was closed by direct suture. A feeding jejunostomy was finally placed, along with two chest tubes and two abdominal drains. After two days in ICU the patient moved to our Unit and a standard ERAS protocol was adopted, which could be summarized in a quick removal of nasogastric tube, urinary catheter, abdominal and thoracic drains, avoidance of water overload, non-opioid oral analgesia, early mobilization, respiratory physiotherapy, stimulation of gut mobility, nutritional support through jejunostomy, dietitian evaluation and quick resuming of oral feeding with gradually increasing consistency. The patient was discharged in POD 9 in good conditions, after an uneventful recovery. At 5 months of follow up the patient is in good conditions, BMI 22, he does feed per os without using the jejunostomy.

## Discussion

Gastrobronchial fistula (GBF) is a rare and challenging surgical complication, previously described following esophago-gastric, splenic and antireflux surgery. The true incidence of GBF after LSG is still unknown but seems to be around the 0.2%, with a probably underestimated mortality rate of 6% [3, 4]. The specific kind of gastric

leak after LSG and re-sleeve gastrectomy is particularly prone to evolve in a GBF, because the leak site is usually at the top of the staple line, near the cardia at the level of the angle of His, with a subsequent long-standing subphrenic abscess which, in the presence of distal stenosis of the gastric pouch, is continuously supplied by foods and acid gastric secretions [5]. Also, an ischemia of the gastric wall next to the staple line has been advocated to result in a gastric leak that, if un-noticed or not adequately treated, could directly erode the diaphragm, causing a lung abscess that eventually drains into a bronchus. In the meantime, bacteria could also spread through the lymphatic flow [6].

Just like the gastric leak, a GBF may develop very slowly, becoming clinically evident even after more than one year from the diagnosis of leak. In a systematic review the mean time for diagnosis from the symptom's onset was 7.2 months (range 1-30 months) [7]. For this reason, respiratory symptoms not responding to the common antibiotic therapy must not be overlooked in this kind of patient. Productive cough, fever, thoracic pain, recurrent pneumonia, vomiting, hemoptysis, dyspnea, wheezing, respiratory failure, vomica and expectoration of food residues/surgical clips have been associated with GBF and require prompt imaging evaluation, by the means of a contrast study of the upper GI tract. Other methods include bronchoscopy after methylene blue ingestion and measurement of the pH of the bronchial secretion [7]. The therapeutic approach is tailored on the clinical conditions of the patient. In the absence of sepsis, a more conservative approach may be attempted [8].

Therapy should aim at the healing of the underlying gastric leak by removal of the sleeve stenosis through endoscopic balloon dilatation, self-expanding plastic stent, clips and OVESCO, fibrin-glue, stricturotomy or septoplasty [9]. Utmost importance is reserved to the prevention of sepsis with the use of wide-spectrum antibiotics, eventually associated with a careful percutaneous drainage of the subphrenic abscess, given the risk to create a iatrogenic fistula by accidentally puncturing the inflamed diaphragm or leaving for several days a drainage catheter. Nutritional status should be pre-operatively optimized through TPN, nasojejunal tube or jejunostomy [8]. Surgical treatment should be aggressive and include a management of gastric leak through a partial or total gastrectomy, a pulmonary resection and a diaphragmatic reconstruction.

As in our case, a midline laparotomy and a total gastrectomy with an esophagojejunostomy and a variable-length alimentary limb is usually performed, considering that also a conversion to RYGB is an available option. [3] In septic patient, clinical conditions may hinder the possibility to create a primary reconstruction and a two-step abdominal surgery may be preferred, leaving the esophageal and duodenal stump closed until sepsis improvement allows to perform a safe anastomosis. Splenectomy may be mandatory in order to approach the left subphrenic space; distal pancreatectomy has also been described [3]. The thoracic step involves a left inferior lobectomy or a segmental lung resection, generally through a left posterolateral thoracotomy, albeit trans-diaphragmatic approaches have been described, as in our case. Different materials have been employed for the reconstruction of the diaphragmatic surface after fistulectomy and complete debridement of the eroded tissue: simple suture, omental patch, biologic prosthesis or autologous tissue such as latissimus dorsi flap and serratus anterior flap

[8]. Whenever possible, the totally abdominal transdiaphragmatic approach allows the surgeon to correctly deal with the fistula and the inferior pulmonary lobe and, at the same time, to avoid the postoperative morbidity connected with thoracotomy incision.

Our tendency to strictly follow ERAS items for gastric cancer surgery lead the patient to resume oral feeding with a liquid diet on POD 4 and a solid diet on POD 6, without complications higher than Clavien-Dindo grade II (transfusion of 2 RBCs for mild anemia), a LOS in ICU of 2 days and an overall postoperative LOS of just 9 days. This data are remarkably different if compared to the Rebibo one's, with a median LOS in the ICU of 10 days (range 9-16 days), a median overall LOS of 14 days (range 13-25 days), a 33.3% Clavien Dindo IIIb complications rate and a median time to oral refeeding of 10 days (range 8-65 days) [3]. Since no specific risk factors for GBF have been identified, the prevention of this challenging complication matches with the prevention of gastric leak [3]. As such, the correct patient selection for sleeve and re-sleeve gastrectomy is of utmost importance. Current evidence about surgical indications for re-sleeve gastrectomy are insufficient EWL ( $\leq$  50%) or weight regain, associated with a high residual gastric volume ( $>$  250 mL) as assessed by gastric computed tomography volumetry. The aim is to correct potential technical mistakes of primary surgery such as incomplete removal of gastric fundus or antrum, or a large gastric sleeve calibrated over too big orogastric boogie, considering that also a physiological dilatation of remnant stomach has been postulated.

On the other hand, when residual gastric volume is less than 350 mL, re-sleeve gastrectomy could be associated with a higher risk of leaks because of the greater tension applied on the staple line. Also the type of gastric remnant dilatation (primary vs secondary), the type and thickness of stapler and cartridges employed on the fibrotic gastric tissue (Universal endo-GIA vs Tri-Staple) and the application of staple line reinforcement (none vs suture or patch) have been associated with different risk of leaks after re-sleeve gastrectomy [10]. Of note an extremely heterogeneous rate of staple line leak for this kind of operation, ranging from 0% to a peak of 13.3% and 14.2% after re-sleeve gastrectomy has been reported [11-14].

## Conclusion

To the best of our efforts, this is the first report of a gastrobronchial fistula after a re-sleeve gastrectomy. Based on our experience, more evidences are needed before routinely advice a re-sleeve gastrectomy after a failed SG. Indeed, given that in revisional bariatric surgery the risk of gastric leak may be higher, the incidence of rare but serious complications such GBF may consequently arise. The very impressive incidence of gastric leak showed in some series may be due to a not careful selection of patients [13, 14]. A high index of suspicion is essential in order to achieve an early diagnosis, being aware that the first respiratory symptoms may appear several months after SG and for this reason they should not be overlooked. When needed, surgical treatment

should be aggressive, especially in septic patients, where a two-step total gastrectomy with a delayed reconstruction may be the solution.

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