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Conservative Management: Best Option For the Treatment of Gastric Leak Following Laparoscopic Sleeve Gastrectomy: Three Case Series

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Abstract

Laparoscopic sleeve gastrectomy (LSG) is the most commonly used bariatric procedure and has similar outcomes in weight loss and metabolic syndrome improvement compared to other procedures. Although, LSG is considered as a simple and safe procedure, it does have some complications. Among various complications, the gastric leak is the most feared and dreadful complication following LSG. In this article, we have discussed the successful recovery of three patients having a post-LSG gastric leak. The suspicion for its diagnosis included patients having symptoms of tachycardia and high fever along with left shoulder pain. The diagnosis was confirmed using contrast X-ray and CT scans. All the three cases had common leak site at the gastroesophageal junction. The gastric leak is usually about the minute size; it does not need any aggressive management of undergoing surgery and can be effectively managed with conservative treatment. The main treatment principles for gastric leak after LSG should be effective drainage, decompression, enteral nutrition and medications with fewer intervention procedures.

Keywords

Bariatric surgery
Gastric leak
Laparoscopic sleeve
gastrectomy
Morbid obesity

How to Cite

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Introduction

Laparoscopic sleeve gastrectomy (LSG) is the first step of a 2-staged procedure of biliopancreatic diversion (BPD) and duodenal switch (DS) used to reduce operative morbidity and mortality in high-risk super-obese patients, which is now widely being used as a single-stage procedure [1]. It has become a standalone procedure in bariatric surgery for the treatment of morbid obesity and has shown similar outcomes on weight loss and metabolic syndrome improvement as compared to Roux-en-Y gastric bypass (RYGB), biliopancreatic diversion (BPD) or gastric binding (GB) procedures with less morbidity and mortality rates [2]. A systemic review of 123 articles has shown that the mean percentage of excess weight loss (EWL) after LSG was about 60% after one year and 65% after two years of surgery [3]. A 5-year survey has shown the weight loss efficacy of LSG along with the improvement of morbidities is similar or greater than that of RYGB [2]. The reason for LSG being more preferable over other bariatric procedures is due to its technical efficiency, less operation time, excellent weight loss outcomes with least postoperative complications. This procedure does not require any foreign body implantation, no anastomosis or bypass, thus there is no risk of internal herniation and normal intestinal absorption with pylorus conservation preventing dumping syndrome [2-4].

Although LSG is considered as a simple and safe procedure, it does have some complications. According to The American Society for Metabolic and Bariatric Surgery Statement, a review done on 755 sleeve gastrectomy, the overall complication rate ranged from 0% to 20% and the mortality rate was 0.39% [5]. Major complications include gastric leak, bleeding, and stricture. Among these, the gastric leak is the most feared and dreadful complication. The postoperative leakage rate ranges from 0.7%-7% and varies according to different clinical centers and surgeons expertise. A meta-analysis performed by Aurora et al. [6] suggested 2.4% chances of the incidence of gastric leak. Sakran et al. [7] reported a leakage rate of 1.5% in their study; whereas, International Sleeve Gastrectomy Expert Panel Consensus Statement showed the leak rate of 1.06%

[4]. Though, the occurrence of postoperative gastric leak seems to be in very small percentage but once it occurs it is difficult to treat. Delay in diagnosis and treatment of gastric leak can result in abdominal sepsis, multiple organ failure and death. We here report the successful management of three cases series of gastric leakage following LSG. A written consent was obtained from all the three patients for this study.

Case Reports

Case-1

A 21 years female with a BMI of 40.6 kg/m² underwent LSG for morbid obesity. During the operation, 36 French (Fr) bougie was introduced along the lesser curvature of the stomach to calibrate the size of the sleeve. After creating the sleeve, intraoperative "leak test" was done by injecting methylene blue through nasogastric tube and was negative. The abdominal drain tube was kept near the newly created sleeve. The surgery was uneventful except for the difficulty in placement of orogastric tube which was then inserted with the help of gastroscopy. The patient was discharged on the 7th postoperative day. Three days after the discharge, she came with the complaint of fever and left shoulder pain. CT scan with the oral liquid contrast (gastrograffin) was done which showed an intraperitoneal fluid collection, surrounding tissue edema and pleural effusion along with extravasations of contrast at the gastroesophageal junction. X-ray with contrast showed leakage through the gastroesophageal junction (Fig. 1). As per the treatment plan, the patient was kept nil-per-oral, nasogastric tube inserted for gastric decompression, and fluid replacement, and antibiotics, enteral nutritional therapy, proton pump inhibitors and somatostatin were given. Ultrasound-guided percutaneous catheter drainage was tried, but failed. The covert esophageal stent was placed at the leakage site with the help of an endoscope and the symptoms gradually eased. However, five days later, she again had a fever and left shoulder pain. Repeat X-ray series was again done which showed displacement of the stent. The stent was removed and clipping was done. The patient symptoms were relieved for a few

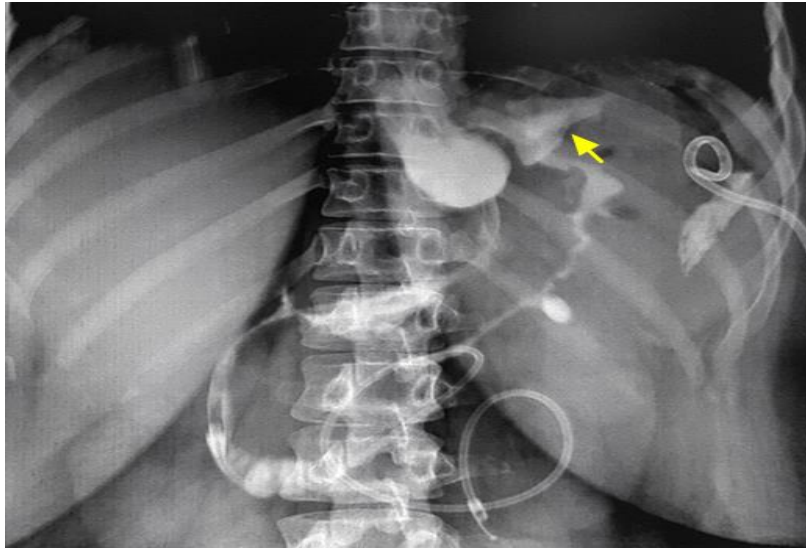


Fig. 1 Postoperative contrast X-ray of case-1. The arrow showing the site of extravasations of contrast through a leakage point.

days, but the symptoms reappeared. The endoscopy showed the leak clip clipping off and thus was removed. Later, the patient was continued on conservative management and after a few days the symptoms gradually subsided and the patient was discharged on the 50th day of re-admission.

Case-2

A 36 years male with a BMI of 35.5 kg/m² underwent the similar LSG procedure as case-1. He had difficulty in placement of orogastric tube and was inserted with the help of gastroscope. The patient had an uneventful immediate postoperative course and was discharged on the 7th postoperative day. After seven days of discharge, the patient came to the emergency department with the complaint of fever (>38.5°C), left shoulder pain, back pain and abdominal discomfort. Contrast CT showed an intraperitoneal fluid collection, edema of the tissue surrounding the sleeve, and pleural effusion along with extravasations of contrast. Oral contrast X-ray showed a small leakage point at the gastroesophageal junction indicating a gastric leak (Fig. 2A). The patient was treated with intravenous antibiotics, fluid replacement, proton pump inhibitors and somatostatin. However, no gastric decompression was done as leaking was in very less amount. Three weeks later, an upper X-ray series with gastrograffin confirmed the disappearance of the contrast

extravasations (Fig. 2B). The patient was discharged on the 14th day of re-admission.

Case-3

A 24 years woman with a BMI of 46.3 kg/m² underwent uneventful LSG. On the 2nd postoperative day, she took solid diet and then developed abdominal pain, fever (>38.5°C) and tachycardia. Her white blood cell count was 17.3×10⁹/L with 84.7% neutrophils. Contrast CT showed inflammatory exudates near the remnant stomach, extravasations of contrast at the gastroesophageal junction, and pulmonary edema with pleural effusion. Ultrasound showed B/L pleural effusion with fluid in the abdominal cavity. Contrast X-ray showed leakage at the gastroesophageal junction (Fig. 3A). She was kept nil-per-oral with intravenous antibiotics, PPI, somatostatin, and fluids. A nasogastric tube was inserted for gastric decompression. The abdominal drain which was kept during surgery contained 200-600 ml of purulent fluid per day. On the 11th postoperative day, no abdominal fluid was seen in the drainage tube. X-ray showed the tip of the tube being shifted to the pelvis. With the help of ultrasound, the tip of the drainage tube was successfully kept near the leakage site. The drain was continued and abdominal lavage was done twice a day with metronidazole through the tube. The patient condition stabilized gradually with improvement in fever and abdominal pain. Gastrograffin contrast X-ray done on

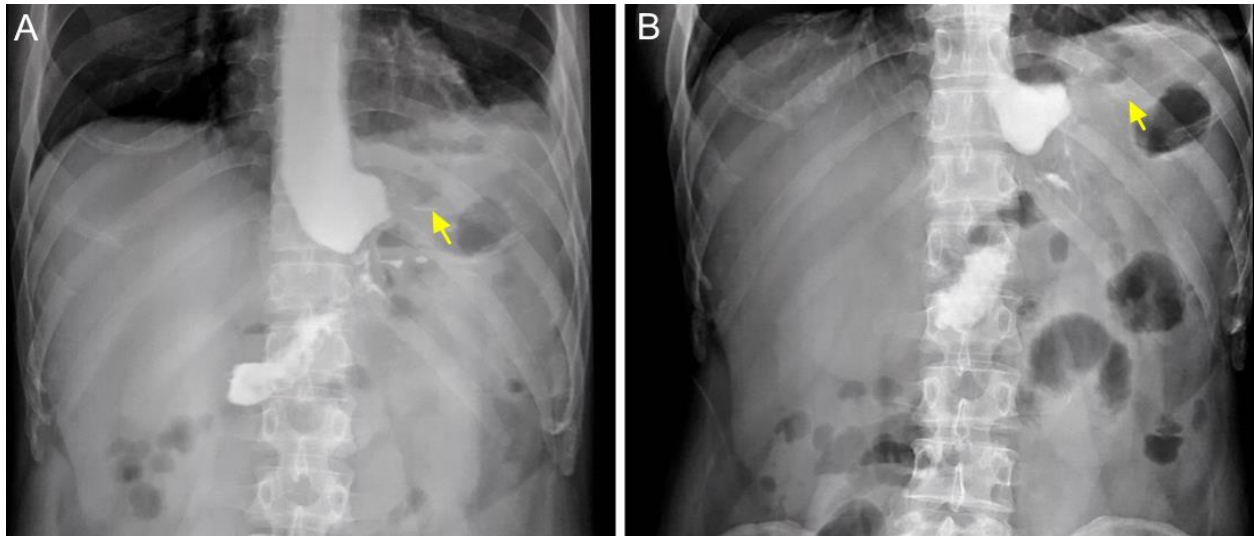


Fig. 2 Postoperative contrast X-rays of case-2. (A) The arrow showing the leakage and (B) the arrow showing no leakage at the same area after treatment.

the 35th day showed no further leak (Fig. 3B). On the 37th postoperative day, nasogastric tube was removed. The patient was discharged on the 42nd postoperative day after removing the abdominal drain tube.

Discussion

All the three cases in our series had common leak site, the gastroesophageal junction. This site has the highest percentage of leakage following LSG than any other site; however, the reason for this predominance is still unclear [6, 7]. Baker et al. [8] suggested that staple line leaks at this site may be secondary to an impaired healing process which may have multiple risk factors such as impaired suture-line healing, poor blood flow, infection or ischemic cause. Also, this region being thinner than other parts of the stomach, the increased intraluminal pressure exceeds the strength of the staple line making leakage more prominent at this region [6]. Intraoperative methylene blue dye test was performed in all cases and was negative but still, there was leakage which showed the negative methylene blue test does not rule out the possibility of a leak. This negative finding might be due to an inflammatory component around the leak. Some surgeons routinely over-sew or use reinforcement material over the staple line to decrease the leak rate; however, studies have shown that strengthening staple line by over-sewing or use of reinforcing materials may reduce bleeding [4], but

do not reduce the leak rate or clinical significant leak [9] and instead just prolong the operative time [6].

Early diagnosis of the leakage is essential to decrease the complication of the patient. All the three patients with a gastric leak in our series have common symptoms of tachycardia, high fever along with left shoulder pain. Together with these, other features could be chills, nausea, vomiting, shallow breathing, abdomen pain and so on along with features of sepsis. In all our cases, tachycardia appeared first, followed by fever and left shoulder pain. The reason for the left shoulder pain could be stimulation of the diaphragm due to fluid accumulation in the left inferior phrenic area. Sometimes the diagnosis of the leak becomes very difficult as the symptoms may not be obvious and are easily overlooked. A typical presentation could be unexplained fever or tachycardia, like in our 1st and 2nd cases, which were presented with fever after 10 days and 14 days of surgery, respectively, but had no major symptoms of sepsis or abdomen pain. All three patients had tachycardia, which may be the most important sign as reported [10]. Other less specific findings could be leukocytosis or higher C-reactive protein [7]. Therefore, once there is suspicion of the gastric leak, the radiological examination should be performed as early as possible to confirm the diagnosis. CT in all our cases showed positive findings of intraperitoneal fluid collection, tissue

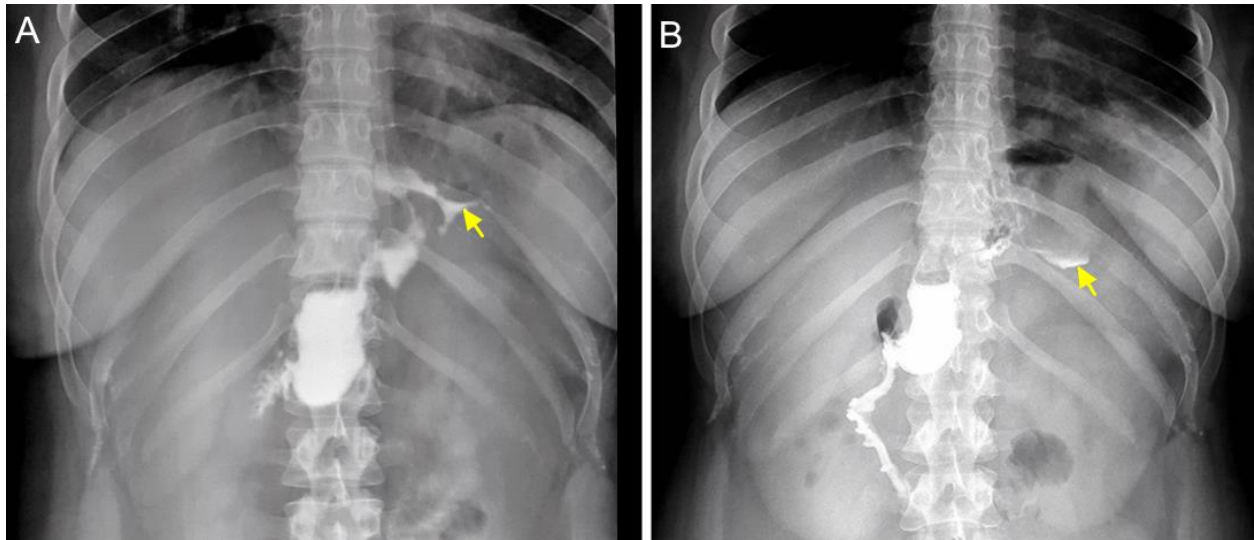


Fig. 3 Postoperative contrast X-rays of case-3. (A) The arrow showing the site of extravasations of contrast through a small leakage point and (B) the arrow showing no leakage after treatment.

edema around the newly created sleeve, pneumonia, pleural effusion, extravasations of contrast through leak site and can be considered the best non-invasive investigation for the detection and confirmation of gastric leak as also mentioned in other studies [6, 7, 11, 12]. In addition to contrast CT, serial contrast X-ray is equally important to quantify the magnitude and the level of leakage [12].

The size of the gastric leak is usually minute and can be managed conservatively. In our cases, the mainstay of management was conservative, which included nil-per-oral with adequate intravenous fluid, gastric decompression, enteral nutrition support, percutaneous drainage, somatostatin, and proton pump inhibitors along with intravenous broad-spectrum antibiotics. Regular and effective gastric and abdominal lavage is also important. Gastric lavage helps to remove the gastric juices while abdominal lavage helps to remove abdominal collections and prevents the spreading of infection in the abdominal cavity. If the displacement of drainage tube found, then could be repositioned with the help of ultrasound as done in case-3. As the patient condition improves, enteral nutrition can be started which helps in the early healing of the wound. Enteral nutrition must be given in a slow and uniform amount to prevent reflux into the stomach and escaping to the abdominal cavity through the leak causing peritoneal irritation, which can make the

condition worse. Some studies suggested that it is preferable to use an endoscopic treatment such as esophageal stent placement, endoscopic clip, fibrin glue, and fistula plug [13]. Esophageal stent implantation helps to mask the leak and prevent extravasations of the gastric content through the leak preventing bacteria and gastric juices to leak into the abdominal cavity and allow oral nutrition to the patient [13, 14]. However, Bège et al. [14] showed stent migration in 16.9%-59% of cases requiring premature removal due to complication derived from it. In case-1, stent placed initially had migrated and needed to be removed. Data about the use of endoscopic clip and fibrin glue for leakage treatment after LSG are not enough. Some studies have reported poor success with endoscopic clip placement in leak that did not heal after several weeks [7].

In hemodynamically unstable patients, surgical treatment should be considered. Surgical options range from the peritoneal toilet to placement of gastrostomy tubes through the leak site, serous suture repair, high gastric bypass, Roux limb and total gastrectomy [11]. During the operational management, local factors such as edema, inflammation, and the presence of infection around the defect should be considered as they can easily cause suture repair failure. In addition, reoperative surgery increases the technical difficulty and risk of complication due to extensive adhesion and

inflammation. Also, during the attempt to repair the defect, there are higher chances of the stenosis of the repaired area. The post-LSG leak is usually smaller and with timely and proper management, it can be treated conservatively without giving much trauma and pain to the patient. The conservative treatment includes nil-per-oral, gastrointestinal decompression, fluid replacement, nutritional support, antibiotics, proton pump inhibitors and somatostatin. Placement of abdominal tube and abdominal lavage are also very useful for the removal of leakage content from the abdomen. In the 2nd case, the contrast leak was very small so we did not put the abdominal drainage tube. We continued the above principle and the patient was recovered thus reducing the suffering of the patient due to the tube.

Conclusions

As the post-LSG gastric leak is usually of minute size, it doesn't need any aggressive management of undergoing surgery in cases the patient condition is stable and can be effectively managed conservatively. Thus, we suggest the gastric leak following LSG can be safely and successfully managed by conservative treatment and should be considered as the first line of treatment.

Conflict of Interest

The authors declare that there is no conflict of interest.

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