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Original article

Management of staple line leaks following sleeve gastrectomy

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Abstract

Background: Leaks after laparoscopic sleeve gastrectomy (LSG) are not very frequent but are a difficult complication that can become chronic. Various treatment options have been suggested but no definitive treatment regimen has been established. The aim of our study is to report leak complications after LSG, their management, and outcomes.

Methods: Between June 2008 and October 2013, a total of 539 patients underwent laparoscopic and robot-assisted laparoscopic sleeve gastrectomy at our institution. A retrospective review of a prospectively collected database was performed for all LSG patients, noting the outcomes and complications of the procedure.

Results: Fifteen (2.8%) patients presented with a leak after LSG. The diagnosis was made at a mean of 27.2 ± 29.9 days (range, 1–102) after LSG. Eight (53.3%) patients underwent conservative treatment initially and 6 (75.0%) of these patients required stenting as secondary treatment. Although leaks from 3 patients resolved with stenting, the other 3 required restenting and 2 eventually underwent conversion to gastric bypass. Five (33.3%) patients underwent endoscopic intervention, closing the leak with fibrin glue (n = 3) or hemoclips (n = 2). Two (13.3%) patients who were diagnosed with a leak immediately after LSG before discharge had their leak oversewn laparoscopically with an omental patch. Leaks in 9 (60.0%) patients did not heal after the first intervention, and the mean number of intervention required was 2.3 ± 1.7 times (range, 1–7) for the treatment of this condition.

Conclusion: Management of leaks after LSG can be challenging. Early diagnosis and treatment is important in the management of a leak. However, it can be treated safely via various management options depending on the time of diagnosis and size of the leak. (Surg Obes Relat Dis 2014;▮:00–00.)

Keywords: Staple line leak; Fistula; Complications; Sleeve gastrectomy; Reoperation; Stent; Fibrin glue; Hemoclip

Laparoscopic sleeve gastrectomy (LSG) was initially introduced as a first-step procedure followed by biliopancreatic diversion or duodenal switch in high-risk morbidly obese patients. However, early findings of LSG showed excellent weight loss as well as co-morbidity resolution, and LSG gained popularity as a primary restrictive bariatric procedure [1–3]. A recent report showed similar excess weight loss for Roux-en-Y gastric bypass (RYGB) and LSG at 12 months after adjusting for age and body mass index (BMI) [4].

Furthermore, LSG has drawn attention because of its technical simplicity and lower long-term complication rate compared with those of RYGB [1]. Overall complication rate after LSG was lower than that of adjustable gastric banding as well, ranging between 2–15% [5,6]. Major

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complications after LSG include leakage, bleeding, and stricture [7]. The incidence of significant staple line bleeding rate is reported to be 2% in average [3]. Staple line leaks are still of great concern and perhaps the most feared complication after LSG [5,8,9].

Leak rates are reported to be 1–7% in LSG patients and some surgeons have attempted to decrease this rate by oversewing the staple line or using a reinforcement material [10–14]. However, true effect of staple line reinforcement on leaks after LSG remains unclear at the moment [12,15,16]. Leaks have been reported to be related to the bougie size, narrower bougies resulting in higher incidences of leaks [3,17]. Chronic leaks are even more challenging to treat, as many have been persistent and recurrent [14,18]. The aim of our study is to report management and outcomes of staple line leaks after LSG at our institution.

Methods

After Institutional Review Board approval and the Health Insurance Portability and Accountability Act guidelines, the authors performed a retrospective chart review of a prospectively maintained database of 539 patients who underwent primary laparoscopic and robot-assisted LSG from June 4, 2008 to October 30, 2013. Patients who underwent LSG as a conversion, and patients with a previous bariatric procedure were not included in the present study. All procedures were performed by 2 surgeons according to the National Institutes of Health criteria for management of obesity.

Patients were included if they were diagnosed with a staple line leak after LSG. When patients complained of pain, nausea, or fever, either upper gastrointestinal imaging (UGI) or computed tomography (CT) scan of the chest, abdomen, and/or pelvis with contrast was performed.

Data points collected included demographic information, time to presentation from the original surgery, chief presenting symptoms, treatment method, and any readmissions for recurrence. All data for age and BMI are demonstrated as mean ± standard deviation, unless otherwise noted.

Surgical technique

Sleeve gastrectomy

A standard technique was used to perform sleeve gastrectomy. Using a harmonic scalpel, the greater omentum was detached from the greater curvature of the stomach about 3 cm from the pylorus all the way to the angle of His. The fundus of the stomach was separated from the retroperitoneum until the left crura was exposed. A 34 French bougie-sized Edlich tube (Covidien, Mansfield, MA) was inserted into the stomach along the lesser curvature to help calibrate the size of the sleeve. Multiple fires of an Echelon Endopath 45 and 60 (Ethicon Endo-surgery, Somerville, NJ) were then used to transect the stomach. The staple line was then oversewn using a 2-0 Polysorb stitch. The staple line was tested with air and methylene blue. A drain was placed, and the gastrectomy specimen was removed through the umbilical incision. The drain was typically left for 1–2 days and removed at discharge.

Out of 539 laparoscopic cases, 125 (23.2%) were done as robot-assisted laparoscopic procedures. Same harmonic scalpels were used as the energy source in robot-assisted cases by attaching them to the robot. Same laparoscopic linear staplers were used in the robotic cases as well. There were no technique differences between laparoscopic and robotic cases. Robotic cases were selected randomly, and no selection bias was present to patients with robotic approach. No robotic cases were converted to laparoscopic, and no procedure was converted to open.

Placement of stents

Stents were endoscopically placed. After identifying the leak site, a guide wire was placed under direct visualization and distal site of the leak was marked. One 23 × 100 mm and one 23 × 150 mm sized esophageal stents were anchored at the distal mark and deployed. Complete coverage was confirmed with the endoscope. Stents were typically left in place for 4 weeks unless migrated or were intolerable to the patient.

Conversion to Roux-en-Y gastric bypass

A 15–30 cc gastric pouch was created, resecting the leak site with a linear stapler. The staple line was oversewn with running and/or interrupted 2-0 Polysorb sutures. The ligament of Treitz was identified, the jejunum was transected with a linear stapler at 40 cm, and the mesentery was left intact. The efferent limb was followed for 75 cm, and jejunojejunostomy was performed using the linear stapler. The Roux limb was brought in as antecolic, antegastric fashion. After creating the gastrojejunostomy with the linear stapler, the staple lines were oversewn on the pouch.

Results

Out of 539 patients, 3 (0.6%) patients were lost to follow-up and thus excluded from the analysis. A total of 15 (2.8%) patients were identified to have a leak complication after LSG. Mean age was 39.5 ± 9.9 years (range, 22–55) and mean BMI was 48.5 ± 10.5 kg/m^2 (range, 37.6–77.2) at the time of LSG in these patients. Demographic characteristics of these patients are listed in Table 1. Of these, 5 patients were from the robotic-assisted group (n = 125) and 10 patients were from the laparoscopic group (n = 411). The leakage rate was 4.0% in the robot-assisted group and 2.4% in the laparoscopic group. All leaks were proximal and identified at the gastroesophageal junction.