Int Surg 2019;**104:**480–484
DOI: 10.9738/INTSURG-D-15-00092.1

Case Report

Esophageal Perforation After Laparoscopic Sleeve Gastrectomy and Paraesophageal Hernia Repair Managed by Transhiatal Drainage

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Laparoscopic sleeve gastrectomy (SG) was first established as a 2-stage procedure in high-risk patients undergoing gastric bypass or biliary pancreatic diversion with duodenal switch. It has since become increasingly used as a primary bariatric procedure. The 2 significant postoperative complications after this procedure are anastomotic staple line leakage or bleeding. True esophageal leaks after sleeve gastrectomy are extremely uncommon. We present a case of contained esophageal perforation after a laparoscopic sleeve gastrectomy and paraesophageal hernia repair managed successfully with laparoscopic-assisted transhiatal drainage. We review the literature on the management of this uncommon but highly morbid complication in patients undergoing bariatric surgery.

Key words: Sleeve gastrectomy – Esophageal perforation – Bariatric surgery – Hiatal hernia

Laparoscopic sleeve gastrectomy (SG) was first established as part of a 2-stage procedure in high-risk patients undergoing gastric bypass or biliopancreatic diversion with duodenal switch. It has since become increasingly used as a primary bariatric procedure.[1] The effectiveness of SG as a primary procedure for weight loss has been documented in individual case series and in the review of a multi-institutional bariatric surgery database.[2,3] The 2 significant postoperative complications of the procedure are staple line leakage and bleeding.[4] The mean incidence of anastomotic staple line leakage is reported at 2.7%.[4] In the review of data from the Bariatric Surgery Center Network Database, SG has a higher incidence of anastomotic leaks compared with laparoscopic adjustable gastric banding (LAGB). However, when SG is compared with laparoscopic Roux-en-Y gastric bypass (LRYGB),

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the rates of bariatric procedure-specific complications are similar.[2] A recent single institution European study reporting short- and long-term outcomes after SG noted the incidence of intra-abdominal bleeding and staple line leakage at 2.6% and 2.3%, respectively.[3]

The prevalence of hiatal hernia of 37% has been reported in the morbidly obese in a series of 181 bariatric patients who underwent a routine upper gastrointestinal (GI) contrast study.[5] Combined repair of paraesophageal hernia with either SG or LRYGB has been reported in individual case series.[6,7]

True esophageal leaks after SG are uncommon. Leaks after SG characteristically occur along the staple line. The patho-physiology of leaks after this procedure is unclear, but suggested factors include a compromised blood supply particularly at the angle of His, stapler device failure, and high intragastric pressures in the residual remnant.[1] It has also been suggested that narrowing the sleeve excessively at the incisura may contribute to leaks at the gastro-esophageal junction.[1]

In this report, we describe a case of a delayed esophageal perforation noted after the combined performance of a laparoscopic sleeve gastrectomy and repair of a large type 3 paraesophageal hernia. This uncommon and potentially highly morbid complication was successfully managed with trans-hiatal closed suction drainage.

Case Report

A 55-year-old man, with a body mass index (BMI) of 36 kg/m^2, was evaluated for a laparoscopic sleeve gastrectomy. His medical history was significant for hypertension, obstructive sleep apnoea (OSA) managed with nighttime continuous positive airway pressure therapy (CPAP), a previous episode of lower extremity venous thrombosis, and long-standing gastro-esophageal reflux disease adequately controlled with an oral proton pump inhibitor (PPI). He has had no prior upper GI contrast study or esophago-gastroduodenoscopy (EGD).

At operation, he is noted to have a large type 3 paraesophageal hiatal hernia with at least 50% of the body of the stomach within the intrathoracic hernial sac. Dissection to reduce and excise the redundant sac was performed. The stomach was reduced to the abdominal cavity, and some mobilization of the lower esophagus was performed through the hiatus. A vertical sleeve gastrectomy was performed. Circumferential mobilization of the intra-abdominal esophagus was then performed, and the hiatus was narrowed with interrupted sutures both posteriorly and anteriorly. The hiatal repair was then reinforced with a prosthetic mesh (Gore BIO-A, WL Gore & Associates Inc, Flagstaff, Arizona). The mesh was brought behind the esophagus and was laid flat against the posterior hiatus, and the tails were brought together anteriorly and sutured. The procedure was completed laparoscopically.

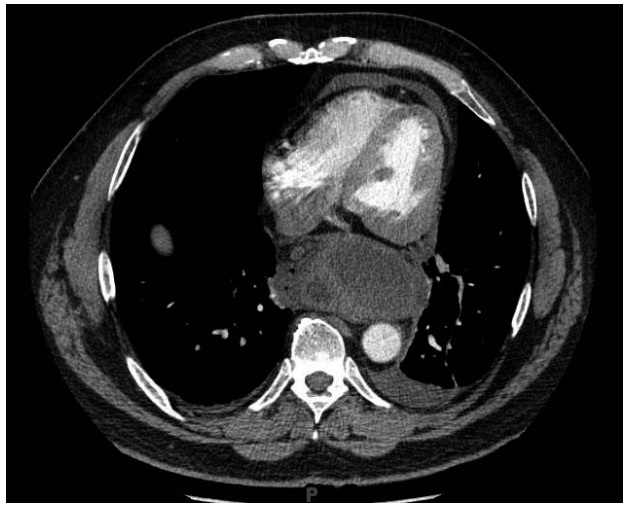

Fig. 1 A CT scan of the chest on POD 8.

In the early postoperative period, the patient was noted to have persistent hiccups. He did not complain of nausea or vomiting, however, and was able to tolerate liquids. A postoperative day (POD) 1 upper GI contrast study showed a large amount of contrast within the distal esophagus, no contrast extravasation, and some perioesphageal air attributed hiatal dissection. He was discharged from hospital shortly thereafter.

On POD 8, the patient was readmitted with vomiting, dehydration, and chest pain. A computed tomography (CT) scan of the chest revealed a large amount of retained luminal esophageal contrast and a periesophageal fluid collection (Fig. 1). No evidence of contrast extravasation was noted on the upper GI contrast study performed shortly thereafter.

On POD 9, the patient returned to the operating room. The hiatus and intra-abdominal esophagus was examined at laparoscopic re-exploration. At this time, an inflammatory reaction had set in, with omental and fibrinous adhesions noted along the gastric staple line and at the esophageal hiatus. Tentative dissection was then performed along the anterior aspect of the hiatus. Sutures in this area

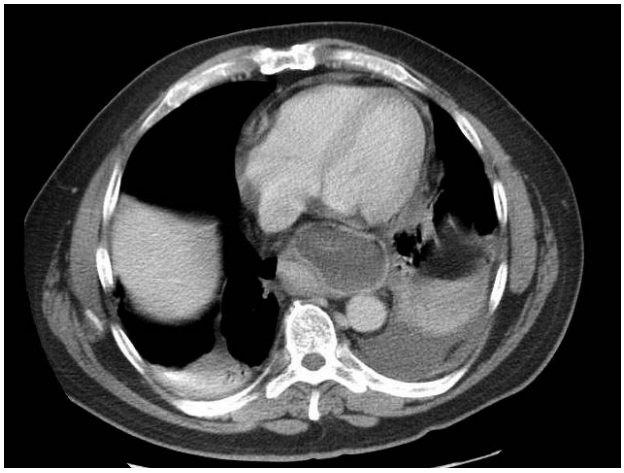

Fig. 2 CT scans of the abdomen and pelvis on POD 15.

were removed, and the mediastinal collection was drained. A closed suction drain was left in the posterior mediastinum and brought out through the anterior abdominal wall at the left upper quadrant 5-mm port site. An intraoperative EGD was performed at the time, with passage of the flexible endoscope through the gastro-esophageal junction to the stomach. No evidence of a perforation was noted.

The patient was readmitted on POD 15 with recurrent symptoms and poor drainage from the closed suction drain. Reaccumulation of the fluid collection and fat stranding at the hiatus were noted on CT imaging, and the patient was returned to the operating room (Fig. 2). The mediastinal fluid collection was drained, and irrigation of this area was performed. A leak test performed at this time after passage of an orogastric tube was positive. Transhiatal drainage of the posterior mediastinum was again instituted, this time with a larger caliber drain brought out again through the same left upper quadrant 5-mm port site. A left pleural effusion noted on CT imaging was drained under ultrasound guidance 24 hours later.

Postoperative analysis of the drain fluid revealed a high amylase content, and an upper GI contrast study confirmed extravasation of oral contrast at the distal esophagus (Fig. 3). The patient's symptoms promptly resolved. He was started on total parenteral nutrition. Intravenous antibiotics were restarted. He remained afebrile with no leukocytosis. He was discharged 7 days after this procedure on total parenteral nutrition and intravenous antibiotic therapy. He was reviewed in the office periodically, and at 6 weeks after his last hospital admission, the

Fig. 3 An upper GI contrast study on POD 15.

patient was restarted on oral intake after a negative upper GI contrast study, and the closed suction drain was subsequently removed.

Discussion

The conservative management of small, contained esophageal perforations in stable, afebrile, nontoxic patients has been well described. In a series of 34 patients with thoracic and cervical esophageal perforations managed conservatively with aggressive drainage of pleural and mediastinal collections, no mortality was noted.[8] No perforations were associated with bariatric surgical procedures in this series. In a pooled analysis of 75 studies, the mortality rate of an esophageal perforation from all causes was 11.9%. The mortality associated with a greater than 24-hour delay in initiating treatment for the perforation was 20.3% in this systematic review.[9]

The nonoperative treatment of esophageal perforations using covered stents has been successfully

described in individual case series. In a retrospective review, 23 patients with esophageal or gastric perforations or leaks were treated primarily with a covered self-expandable metal esophageal stent. Ten of these patients had staple line or anastomotic leaks after Roux-en-Y gastric bypass or sleeve gastrectomy. Successful resolution of the leak with this treatment modality was reported in all 10 patients.[10] In a more recently reported large series of 76 patients with esophageal perforations treated primarily with a removable covered esophageal stents, only 1 death was reported, and there were no conversions to open repair or esophagectomy. None of the perforations in this series were related to a bariatric surgical procedure.[11]

Esophageal perforations after bariatric surgery are uncommon. In this review, 2 reports of a distal esophageal perforation after LAGB were noted. Both cases were managed nonoperatively with drainage of mediastinal collections and parenteral nutrition.[12,13] In another single report of a distal esophageal perforation diagnosed 5 days after LRYGB, operation was required with mediastinal drainage and primary repair of the esophageal perforation and diverting cervical esophagostomy.[14] A small case series reported on the results of 2 patients who sustained esophageal leaks complicating reoperative bariatric surgery treated with removable covered esophageal stents. Although in both patients, control of the leaks was obtained early, surgery for nonhealing was ultimately required in both after 3 weeks of conservative management.[15]

Our case illustrates some important points in the management of this unusual complication. The presence of a large paraesophageal hernia adds significantly to the difficulty and length of a bariatric surgery procedure and increases the potential for complications. The incidence of unclassified hiatal hernia as stated in a report cited earlier in this paper is high. It is unclear, however, whether the incidence of large type 2 or 3 hiatal hernias is significantly higher in the morbidly obese. The only indication in our patient of this potential problem was the history of medically controlled gastro-esophageal reflux disease.

The diagnosis of the perforation can be difficult. Although a periesophageal fluid collection was seen on early imaging, the confirmation of the leak by noting extravasation of oral contrast was only made on the esophagram performed on POD 16.

During this period, however, this patient did not demonstrate any evidence of clinical deterioration. This illustrates the final important point in this case. The management of esophageal perforations following bariatric surgery is only reported in individual cases or small case series in the literature. Indeed, we were unable to find a report of a distal esophageal perforation with mediastinal leakage following SG. Operative intervention and direct repair carries a significant morbidity in this patient group. Endoscopic stenting has been reported in case series as an effective modality in the management of anastomotic or staple line leaks and in the treatment of iatrogenic esophageal perforations. Although it seems reasonable to extend the use of stenting to the management of this problem, reports of the use of this technique for esophageal perforations in the post-bariatric surgery patient are few. Conservative management with adequate drainage and parenteral nutrition is successful in the stable patient, and as this case illustrates, drainage of low, contained mediastinal collections at laparoscopic reexploration through the esophageal hiatus can be achieved.

Conclusions

Esophageal perforations after bariatric surgery are uncommon. Reoperation for this complication in this patient population carries a significant morbidity. The conservative management of small contained iatrogenic perforations in a healthy esophagus was well described and is successful in carefully selected patients. The use of removable esophageal stents for the management of iatrogenic and spontaneous esophageal perforations was reported in individual series. The successful use of removable self-expanding stents in the management of anastomotic and staple line leaks after bariatric surgery was described. Although the use of self-expanding esophageal stents for the treatment of esophageal perforations after bariatric surgery was reported, it has only been in single case reports or very small series.

In the absence of clear guidelines for an uncommon clinical problem, significant clinical judgment is required to avoid either unnecessary or inadequate intervention.

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