Postoperative leaks in esophagectomy and sleeve gastrectomy for obesity*

Rifat Latifi MD, FACS, FICS[1] ; Agron Dogjani MD, PhD, FACS[2]

Received: 12 April 2018 / Accepted: 24 May 2018 / Published online: 20 July 2018
*Presented at the European Trauma and Emergency Surgery Congress, Bucharest, Romania, 2017
https://doi.org/10.32391/ajtes.v2i2.1

Abstract

Postsurgical gastro-intestinal or intestinal-intestinal anastomotic leaks while not frequent, are the most feared complications for any anastomoses performed in the gastrointestinal tract (GIT) by general surgeons. This is particularly important in the upper GIT, such as gastro esophageal anastomosis, where leaks can lead to severe sepsis and septic shock, need for re-operation, or stent placement. For this short review we will address post-operative leaks following esophagectomy and sleeve gastrectomy as the most frequent bariatric procedure today. The factors and causes responsible for Upper Gastro-Intestinal Anastomosis, as they relate to patient, surgeon or technique will be reviewed. Moreover, the diagnosis and current management will be examined.
Keywords: Esophago-gastro-intestinal leaks, management of leaks, esphagectomy

Corresponding author: Rifat Latifi
rifat.latifi@wmchealth.org

[1]*Director, Department of Surgery, Chief, Trauma and General Surgery Divisions*
Director, Surgical Critical Care Fellowship, Westchester Medical Center
Professor of Surgery, NYMC, Valhalla, NY, USA

[2]*General Surgeon, Department of Trauma and General Surgery.*
Associate Professor of Surgery
University Hospital of Trauma. Tirana Albania.

Anastomotic leaks following esophagectomy

Anastomotic leaks following esophagectomy are serious complications, but most recent developments in surgical techniques and management of such leaks has been substantial. The incidence of leak following esophagectomy ranges from 0%-35%. The main risk factors are cervical and hiatal location of the anastomosis, positive margins for malignancy, local ischemia and technical errors. Other important factors for anastomotic leak are higher American Society of Anesthesiologists (ASA) score, malnutrition, Diabetes Mellitus (DM), renal failure, steroids, obesity and smoking. In a series of 390 patients undergoing esophagectomies were performed (median age 65 (range 32-81) years), in which 96·7 per cent of patients this was a two-stage subtotal esophagectomy, 31 patients (7·9 per cent) developed a leak. Of these, only four (13 per cent) required immediate thoracotomy. The median length of stay for patients with a leak was 41·5 (range 15-159) days; none of these patients died (1). Surgeon's experience and the frequency that the operation is performed by individual surgeon as well as institutional overall experience are another important factor.

Moreover, whether the anastomosis is performed hand sewn or stapler influences the frequency of leaks. Recent evidence favors use of stapling in preventing anastomotic leak. The meta-analysis by Liu et al (2) of 15 RCTs (n=2,337) comparing stapling vs hand-sewn anastomosis use of stapler reduced the risk of leak by 34%. In another recent study by Ryan et al (3) of 21 RCT combining prospective/retrospective cohort studies (n=7167) comparing transthoracic vs trans-hiatal approaches (TTE) vs THE) there were no difference between TTE and THE. However, in a cohort studies leak risk there was significant (44%) reduction in risk of leak favoring TTE. One has to note though that this meta-analysis reported mixed results. Use of of omentoplasty to reduce the leak rate was reported as favorable by Schaheen et al (4). Interestingly, Zhou et al (5) reported no differences in leak if esophagectomy is done minimally invasive or open. Clinical presentation of the leak varies by the location of the anastomosis and other factors (preoperative status, co-morbid conditions, nutritional status), and it may present as sepsis from mediastinitis or peritonitis to large drainage from the site into the pleural space. Moreover, arrhythmias, upper abdominal or chest pain, bronchopneumonia, hypoxia, confusion and agitation to full respiratory failure, increased WBC, and deterioration of end-point resuscitation and finally the need for mechanical ventilation and tube thoracostomy. The diagnosis is usually made clinically, change in drainage character or amount, contrast esophagogram or flexible endoscopy, or probably most commonly by CT scan.

The management depends on clinical presentation and location of the anastomosis and extent of anastomotic disruption, i.e., grading of the leak that may be without clinical signs (Grade 1) to major leak (Grade 3) or Grade 4, with entire gastric conduit necrosis. Nonoperative, conservative management for occult (Grade I) leaks such as delayed initiation of oral feeding may suffice and antibiotics. However, general principles of management include systemic antibiotics, close or occlude the defect as soon as possible which could be done by stents or surgically. Drain associated fluid collections, prevent distal obstruction and ensure minimizing factors such as keeping perforation open (e.g., tumor, foreign body, persistent infection). In more serious situation, esophageal diversion or resection, if sepsis is poorly controlled with more conservative measures, should be done. In recent years, laser-assisted fluorescent-

dye angiography (LAA) has been used to assess perfusion in the gastric graft and to correlate perfusion with subsequent anastomotic leak. In a study of 150 patents undergoing esophagectomy with planned gastric pull-up (GPU reconstruction a leak was found in 24 patients (16.7%) and were significantly less likely when the anastomosis was placed in an area of good perfusion compared with when the anastomosis was placed in an area of less robust perfusion by LAA (2% vs 45%, P < 0.0001) (6). While management of leaks in this situation may be complex, the use of stents has been recently reported in 267 patients by van Boeckel et al (7) with success rate 81-94%. Placement of self-expanding metal stents (SEMS) or self-expanding plastic stents (SEPS) has emerged as a minimally invasive treatment option for benign esophageal ruptures and leaks, although the most common complication was stent migration, which occurred more often with SEPS [n = 47 (31%)]. Recent data suggest conservative management of esophageal leaks is associated with excellent outcomes without using esophageal stents and do not support the widespread adoption of endoscopic stenting (1). Yet, we suggest that both esophagectomy and management of complications should be performed by surgeons and in institutions with large experience in esophagectomy and with ability to deploy a multidisciplinary approach.

Leaks following laparoscopic sleeve gastrectomy (LSG) for morbid obesity

Morbid obesity has risen to true world-wide epidemic proportion. To this end, bariatric surgery has become a common procedure, particularly in the western world. While over the years a number of bariatric procedures evolved including gastroplasty, vertical banding gastroplasty (VBG), gastric banding, gastric bypass (Roux-en Y), partial biliopancreatic diversion and duodenal switch operations, with advances in stapler technology, laparoscopic and robotically assisted sleeve gastrectomy has become most common bariatric procedure world-wide. While, life saving for many obese and super obese patients, bariatric surgery may be associated with significant complications.. However, although post-operative complications are not common in all these procedures, they must be recognized and addressed promptly in order to minimize possible mortality and significant morbidity. Large published case series of open and laparoscopic cases the leak rate varies between 0.1% and 8.3% after gastric bypass (8), while the Laparoscopic Sleeve Gastrectomy (LSG) has become the procedure of choice in bariatric surgery, and leaks have been reported to be much lower, however. For example, data from 12799 LSGS, the International Sleeve Gastrectomy Expert Panel Consensus Statement 2011, the leak rate was 1.06% (9). Yet, as this procedure is becoming the most common bariatric procedure performed, even a small percentage of leak as suggested from this panel discussion, may be very significant and should be understood by those who perform it.
The etiology of the leaks is multiple but generally falls into mechanical/tissue causes or ischemic causes, both of which involve intraluminal pressure that exceeds the strength of the tissue and/or staple line [10]. Identifying the best technique with lowest complication such as reinforcement of the stapler resection of the stomach has been studied extensively. In a systematic review by Gagner and Buchwald (11) of 88 RCTs, retrospective/prospective studies (n=8,920), laparoscopic sleeve gastrectomy (LSG) was compared with 4 staple-line reinforcement methods. The study compared LSG staple-line leak rates of 4 prevalent surgical options: no reinforcement, over sewing, non-absorbable bovine pericardial strips (BPS), and absorbable

polymer membrane (APM). There were 191 leaks in 8,920 patients; overall leak rate 2.1%. Leak rates ranged from 1.09% (APM) to 3.3% (BPS); APM leak rate was significantly lower than other groups (p= 0.05). The percentage of leak was the lowest with absorbable membrane 1.09 (N/A); Over sewing 2.04 (p=0.02); No reinforcement 2.60 (p=0.001); while the highest leak rate was using bovine pericardium 3.30 (p=0.0006). Moreover, a meta-analysis by Parikh et al (11) of 112 studies (n=9,991), LSG, use of Bougie ≥40 Fr OR 0.53 (0.37, 0.77), significantly (47%) reduced odds of leak while there were no significant effects for distance to pylorus, use of buttressing.

The clinical presentation and the management of leaks post LSG depends entirely on the size of the leak and may involve conservative management such as nil per mouth, intravenous fluids, provision of enteral nutrition support distally to the leak (proximal small bowel most commonly) broad spectrum antibiotics to re-exploration (preferentially laparoscopically in the early days post op). In more severe cases of leaks conversion of what was LSG, should be converted into more complex procedure such conversion to Roux- Y gastro-jejunostomy.

In one study, 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.

Summary

Recognizing the leak early be it post esophagectomy or gastric sleeve resection and addressing it promptly must be done in a timely fashion, if complications and serious morbidity are to be minimized. Traditionally, any leak from the gastric pull-up anastomosis or any form of bariatric surgery would have been re-operating, wide draining or a combination off. The definitive management of these leaks depends on the location, patient's condition, and the ability to provide nutrition support enterally. Proper drainage, use of the stent, and provision of enteral nutrition support offer the highest chances that the leak will close. Recently the American Society for Metabolic and Bariatric Surgery issued position statement and recommendation on prevention, detection, and treatment of gastrointestinal leak after gastric bypass and sleeve gastrectomy, including the roles of imaging, surgical exploration, and non-operative management (7). While meticulous tissue handling, use of proper tissue thickness, and avoidance of inadvertent narrowing, undue tension, and twisting or kinking of the mesentery and tissues are most important, other elements in this statement should be examined by every surgeon doing GI anastomosis.

References

1.Dent B, Griffin SM, Jones R, Wahed S, Immanuel A, Hayes N.

Management and outcomes of anastomotic leaks after oesophagectomy. Br J Surg. 2016 Jul;103(8):1033-8. doi: 10.1002/bjs.10175. Epub 2016 May 5.

2.Liu QX, Min JX, Deng XF, Dai JG. Is hand sewing comparable with stapling for anastomotic leakage after esophagectomy? A meta-analysis. World J Gastroenterol 2014; 20(45): 17218-17226

3.Ryan CE, Paniccia A, Meguid RA et al. Transthoracic Anastomotic Leak After Esophagectomy: CurrentTrends. Ann Surg Oncol (2017) 24:281–290

4.Schaheen L, Blackmon Sh, Nason KS. Optimal approach to the management ofintrathoracic esophageal leak following esophagectomy: a systematic review.

5.Zhou C, Ma G Li X et al. Is minimally invasive esophagectomy effective for preventing anastomotic leakages after esophagectomy for cancer? A systematic review and meta-analysis. The American Journal of Surgery (2014) 208, 536-543

6.Zehetner J, DeMeester SR, Alicuben ET, et al. Intraoperative Assessment of Perfusion of the Gastric Graft and Correlation With Anastomotic Leaks After Esophagectomy. Ann Surg. 2015 Jul;262(1):74-8.

7.Van Boeckel A, Sijbring A, Vleggar FP and Siersema PD. Systematic review: temporary stent placement for benign rupture or anastomotic leak of the oesophagusAliment Pharmacol Ther 2011;33(12):1292

8.Kim J, Azagury D, Eisenberg, D et al. on behalf of the American Society for Metabolic and Bariatric Surgery Clinical Issues Committee. Surgery for Obesity and Related Diseases11(2015)739–748.

9.Rosenthal RJ, Diaz AA, Arvidsson D, Baker RS, Basso N, Bellanger D, Boza C, El Mourad H, France M, Gagner M. International Sleeve Gastrectomy Expert Panel Consensus Statement: best practice guidelines based on experience of > 12,000 cases. Surg Obes Relat Dis. 2012;8:8-19).

10.Baker RS, Foote J,Kemmeter P,Brady R et al. The science of stapling and leaks. ObesSurg2004;14(10):1290–8.

11.Gagner M, Buchwald JN. Comparison of laparoscopic sleeve gastrectomy leak rates in four staple-line reinforcement options: a systematic review. Surg Obes Relat Dis 2014;10(4):7

12.Parikh M, Issa R, McCrillis A et al.Surgical Strategies that May decrease Leak after laparoscopic Sleeve Gastrectomy. Systematic Review and Analysis if 9991 cases. Ann Surg 2013;257(2):231

13.Moon RC, Shah N, Teixeira AF, Jawad MA. Management of staple line leaks following sleeve gastrectomy. Surg Obes Relat Dis. 2015 Jan-Feb;11(1):54-9. doi: 10.1016/j.soard.2014.07.005. Epub 2014 Jul 10.