

Endoscopic Stenting for Treatment of Leaks Following Sleeve Gastrectomy

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ABSTRACT

Background: Sleeve gastrectomy has become a valuable and effective option in the treatment of morbid obesity. Although a safe procedure overall, the operation does have a significant potential complication in the form of staple line leak. One of the strategies described to treat this complication is the placement of esophageal stents. We describe our experience with the placement of covered esophageal stents as a first-line treatment of staple line leakage after sleeve gastrectomy.

Methods: A retrospective review of all patients undergoing sleeve gastrectomy at our institution from 28th June 2004 to 31st Oct 2011 was performed. Patients presenting with staple line leak were identified. Also included were patients transferred from outside institutions with this diagnosis. In all cases, the leak was treated with esophageal stent placement. Outcomes of interest included rate of resolution, body mass index (BMI) and time at presentation.

Results: Four patients were identified with a diagnosis of staple line leak after laparoscopic sleeve gastrectomy. Time at presentation was 35 ± 47.7 weeks postoperatively. BMI was 45 ± 2.25 . In all cases, the leak was successfully managed with endoscopic placement of covered esophageal stent. In two cases, the patients required multiple stent placements.

Conclusion: Staple line leaks after sleeve gastrectomy can be successfully and safely managed with endoscopic placement of covered metal stents. Stenting should be considered as first-line treatment of these complications. Optimal duration of stent therapy is 6 to 8 weeks although repeat stent placement may be required.

Keywords: Laparoscopic, Bariatric, Endoscopic, Sleeve gastrectomy.

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INTRODUCTION

The sleeve gastrectomy was initially described as part of the duodenal switch procedure in 1988.¹ This procedure was first performed laparoscopically by Gagner et al in 1999.² The technique was later described as a first step in a staged bariatric procedure for the superobese in 2003.³ Since then, the laparoscopic sleeve gastrectomy has become an important stand-alone option in the treatment of morbid obesity and its subsequent comorbidities. The number of sleeve gastrectomies performed in the United States has steadily increased. Potential advantages of this procedure

include good weight loss results, no mesenteric defects, no required adjustments, fewer nutritional deficiencies and the elimination of dumping as the pylorus remains intact. While sleeve gastrectomy has been established as a safe procedure, it does have its share of complications. One of the more troublesome complications is staple line leak. The complication occurs from 1 to 3%.⁴ Management of a staple line leak can vary considerably and includes reoperation with closure of the defect, drainage (either laparoscopically or percutaneously), parenteral nutrition, stenting, biological glues or some combination of these options. Individual management of the complication should depend on the overall clinical state of the patient and should take into account length of time the leak has been present, presence of abscess and the development of peritonitis. The aim of our study was to determine the safety and efficacy of endoscopic stenting of staple line leaks after laparoscopic sleeve gastrectomy in the hemodynamically stable patient.

METHODS

Four patients who underwent laparoscopic sleeve gastrectomy with a diagnosis of staple line leak were identified at our institution. Of these three patients had their procedures performed at an outside institution. Their charts were reviewed for patient characteristics, postoperative time at presentation and outcomes. This retrospective chart review was approved by the Institutional Review Board of Ohio State University Medical Center.

Stent Placement Technique

An upper endoscopy was performed in each case to evaluate the site and extent of the leak. Once the leak was found, a radiopaque marker was placed at the site. A guidewire was then placed through the scope into the pylorus. Its placement was confirmed under fluoroscopy. The scope was then withdrawn, leaving the guidewire in place. A 23×155 mm covered esophageal stent (Wallflex[®], Boston Scientific Corporation, Natick, MA) was advanced to cover the defect using fluoroscopic guidance. The stent was then deployed and a completion endoscopy was performed. The day after stent placement an upper gastrointestinal contrast study was performed. If the study was negative for leak, the patients were started on clear liquid diet.

RESULTS

The patient characteristics and outcomes are summarized in Table 1. The mean age of the patients was 44 ± 9.3 years. The mean preoperative BMI was 45 ± 2.25 . The mean time to presentation was 35 ± 47.7 weeks. This was highly variable as the patients were presented between 2 and 104 weeks postoperatively. The patients consisted of four women. Of the four patients, three had sleeve gastrectomy performed at an outside hospital. Presenting symptoms included abdominal pain, nausea and vomiting. Leukocytosis was present in two patients. The leaks were diagnosed with upper GI studies as well as abdominal CT scans. One of the patients was presented with a gastropleural fistula and required decortication of the left lung. Two of the patients had initial stent therapy failures requiring additional stent placement (Figs 1 and 2). One patient had stent migration requiring replacement. Treatment for staple line leaks consisted of covered stent placement and laparoscopic drain placement with abscess evacuation if present. In two patients, a drain was already in place, however, the remaining cases required laparoscopic drain placement.

DISCUSSION

Laparoscopic sleeve gastrectomy has become a valuable tool in the treatment of morbid obesity. While the procedure has been proven to be safe and well-tolerated as well as effective at achieving long-term weight loss, it does have

its share of potential complications. One of the more notoriously difficult complications to manage is that of staple line leak. Typically, the area of the staple line leak is inflamed and the surrounding tissue is friable making placement of primary sutures difficult and the risk of recurrence substantial. Many techniques have been attempted for control of these complications, including placement of esophageal stents at the leak site, biological glue injection, percutaneous and laparoscopically placed drains, primary closure of the defect or some combination of these methods.

The use of endoscopically placed esophageal stents to manage staple line leaks after laparoscopic sleeve gastrectomy has been described by several authors in small case series with varying results. Their results have been summarized in Table 2.⁵⁻¹⁰ In an attempt to add to the body of knowledge regarding this technique, we present our experience. In our practice, we have managed four patients with staple line leaks. One of the initial surgeries was performed at our institution. The other four were transferred from outside facilities for definitive treatment, including one surgery performed in Mexico. All of the leaks were located adjacent to the gastroesophageal junction. The time of presentation of symptoms from the initial surgery in our patient group varied tremendously. One of the patient's presented 2 weeks postoperatively, whereas another one presented over 2 years postoperatively. In all cases, an attempt was made at management of the staple line leaks



Fig. 1: Patient no. 1 after placement of stent with laparoscopic drain placement (note clip at leak site)



Fig. 2: Patient no. 1 after stent removal with persistent leak

Table 1: Patient characteristics

Patient number	Age	Gender	Time at presentation	Treatment
1	37	F	2 weeks	Stent with laparoscopic abscess evacuation and drain
2	51	F	4 weeks	Stent with laparoscopic drain
3	35	F	7.5 months	Stent x 2, percutaneous drain
4	53	F	25 months	Stent x 2, laparoscopic drain

Table 2: Use of esophageal stents for sleeve gastrectomy leaks

Study	No. of leaks	Leak rate (%)	No. of patient receiving stents	Resolution
Oshira (2009)	2	-	2	2/2
Casella (2009)	6/200	3.0	3	3/3
Tan (2009)	8		8	4/8
Nguyen (2010)	3		3	3/3
Jurowich (2010)	4		3	3/3
deAretxabala (2011)	8		4	4/4
Own data (2011)	5		5	5/5*

*Two patients requiring two stent interventions

with placement of endoscopic covered stent. However, we found that, in two cases, multiple placements of stents were required as the first attempt failed. These leaks were discovered on UGI studies performed immediately after stent removal. In all cases, drainage was utilized either by preexisting drain or by laparoscopic placement. Using the combination of these two techniques, we were able to achieve resolution in all patients.

The primary method of diagnosis for our patients was abdominal CT scan (Fig. 3). Patients presented with nausea and abdominal pain. Upper GI studies were used after stents were placed to evaluate for resolution of leak. These were performed 2 to 4 weeks after stent placement. Stents were withdrawn after 6 to 8 weeks.

Stent migration was a notable problem in one patient. The stent was noted to have migrated distally toward the gastric antrum on follow-up X-ray. The stent was removed and replaced. In general, we noted that the esophageal stents can be uncomfortable but tolerable for patients producing substernal chest pain, nausea and reflux symptoms.

All the patients in our series were clinically stable at presentation. The endoscopic placement of a covered esophageal stent or other minimally invasive techniques for the complication of staple line leak should only be performed

in hemodynamically stable patients. In patients with hemodynamic instability or peritonitis surgical reexploration is mandatory.

CONCLUSION

Any patient who, after laparoscopic sleeve gastrectomy, presents with abdominal pain, leukocytosis, nausea or vomiting should be immediately evaluated for staple line leak regardless of how far out from surgery they are. Abdominal CT scan and upper GI studies are essential for proper diagnosis of this complication. Patients who are hemodynamically unstable or display signs of peritonitis should be taken immediately to the operating room for exploration. However, in stable patients, a minimally invasive technique should be considered. The endoscopic placement of covered esophageal stents has been demonstrated to have acceptable success rates in managing this complication. The addition of laparoscopic or percutaneous drain placement may be required. Complications, such as stent migration and failure of the leak to resolve may require repeated endoscopy with removal and replacement of the stent. Nevertheless, the endoscopically placed covered esophageal stent represents an invaluable tool for the management of staple line leaks after laparoscopic sleeve gastrectomy.

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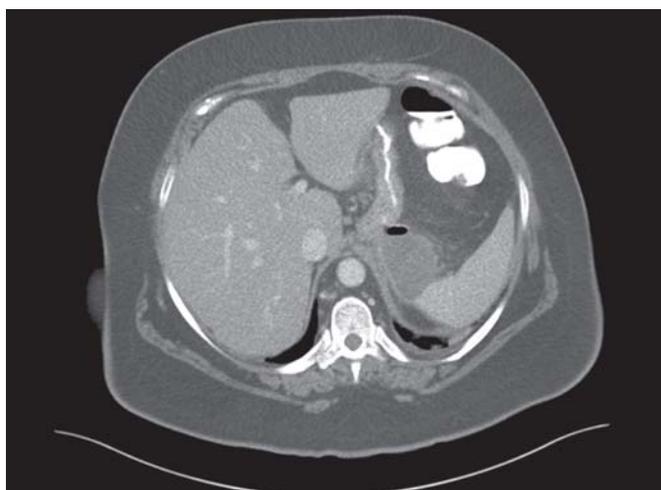


Fig. 3: Patient no. 2 with postoperative air-fluid collection adjacent to GE junction consistent with staple line leak

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