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ABSTRACT

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Case Series: This paper reports a series of five cases in which endoluminal stents migrated antegrade into unfavorable positions. One of the cases resulted in the stent migrating into the jejunum where it resulted in a jejunal perforation requiring surgery and bowel resection. After endoscopic repositioning of the stents, endoluminal suture fixation resulted in stabilization of the stents, prevented further migration, and facilitated clinical resolution of gastric fistula. No complications of the endoluminal suture fixation to the esophageal wall occurred, and all patients recovered fully.

Conclusion: This paper presents five cases of migrated gastroesophageal stents that were successfully secured with endoluminal sutures without complications. Endoluminal suturing may be a technically straightforward and useful solution to the migration of gastroesophageal stents.

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Introduction: Microperforation of the stomach following bariatric surgical procedures is often treated with endoluminal stent placement. Endoluminal stents migrate out of the desired position in a high frequency of cases. Case Series: This paper reports a series of five cases in which endoluminal stents migrated antegrade into unfavorable positions. One of the cases resulted in the stent migrating into the jejunum where it resulted in a jejunal perforation requiring surgery and bowel resection. After endoscopic repositioning of the stents, endoluminal suture fixation resulted in stabilization of the stents, prevented further migration, and facilitated clinical resolution of gastric fistula. No complications of the endoluminal suture fixation to the esophageal wall occurred, and all patients recovered fully. Conclusion: This paper presents five cases of migrated gastroesophageal stents that were successfully secured with endoluminal sutures without complications. Endoluminal suturing may be a technically straightforward and useful solution to the migration of gastroesophageal stents.

Keywords: Minimally invasive surgery, Microleak, Stent migration, Sleeve gastrectomy

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INTRODUCTION

Gastric microperforation following bariatric surgical procedures is often treated with endoluminal esophagogastric stent placement [1–4]. Stent migration is a common occurrence, reportedly occurring in 30–50% of stent placements following sleeve gastrectomy micro leaks [2, 5, 6]. In most cases, antegrade stent migration is treated with repeat endoscopy and repositioning of the stent [5]. In rare cases, however, stent migration may result in intestinal injury or perforation and require surgery. Methods of stent fixation within the lumen have been proposed and include use of clips and the use of endoluminal suturing devices [7–10]. We present five cases of stent migration including one resulting in jejunal perforation, and we report our experience with the use of endoluminal suturing to secure endoluminal stents and prevent migration.

CASE SERIES

Case 1

A 56-year-old male with morbid obesity who underwent a laparoscopic sleeve gastrectomy in Mexico

two weeks prior to presentation at our center with sepsis due to a leak at the proximal staple line. He underwent a laparoscopic washout and drainage procedure followed by endoscopic placement of a fully covered endoluminal esophagogastric stent (fully-covered 150x23 mm WallFlex, Boston Scientific). His sepsis resolved, and improved clinically, tolerating clear liquids orally while being primarily nourished with total parenteral nutrition. After 15 days after of stent placement he developed abdominal pain and vomiting. Computed tomography scan demonstrated the stent had migrated beyond the pylorus to the jejunum (Figure 1). He developed increased pain and fever and underwent laparotomy at which time he was found to have a perforation of the jejunum due to the migrated stent. He underwent a resection of a segment of jejunum as well as removal of the stent. An attempt at suture closure and omental patching of the proximal gastric fistula was performed.

In the days following his recovery from laparotomy, the gastric fistula was evident from the drain output. He underwent repeat endoscopy and placement of a new endoluminal stent (fully-covered 150x23 mm WallFlex, Boston Scientific), this time secured to the esophageal wall with two endoluminal sutures through the proximal stent flange and the esophageal wall (absorbable suture Apollo Overstitch). For the next 12 weeks, the stent remained in position with the patient tolerating oral liquids and nourished with TPN. Repeat endoscopy was then performed and the stent was removed. The patient was able to advance to a regular diet, and no further gastric fistula recurred.

Case 2

A 46-year-old female with a history of morbid obesity and diabetes who underwent a laparoscopic sleeve gastrectomy procedure complicated by a delayed microperforation from the proximal gastric staple line and a subdiaphragmatic abscess. She underwent laparoscopic drainage and endoscopic stent placement (fully-covered 150x23 mm WallFlex, Boston Scientific). The stent resulted in the elimination of gastric fistula, but three times in the ensuing six weeks, the stent migrated antegrade to the pylorus, producing pain and vomiting (Figure 2). In each case, the stent was endoscopically repositioned. The final procedure included endoluminal fixation of the stent by suturing it to the esophageal wall with two sutures to the proximal stent flange (Apollo OverStitch). After the endoluminal suture fixation, the stent remained in position and was removed 10 weeks later, resulting in successful resolution of the gastric leak.

Case 3

A 38-year-old female with morbid obesity and hypertension who underwent a laparoscopic sleeve gastrectomy procedure and presented three weeks later with fever and left sided chest pain. She was found to have a gastric microperforation with fluid above and below the diaphragm. At surgery, a laparoscopic washout and drain placement were performed with tube thoracostomy and endoscopic placement of a fully covered stent (150 x 20 mm Evolution, Cook Medical). She quickly improved clinically and went home with a drain and stent in position, on TPN only to return three weeks postop with epigastric pain and retching due to migration of the stent. The perigastric drain turned cloudy and purulent and increased in volume, indicating a return of the gastric fistula. Repeat endoscopy was performed to reposition the stent, and it was secured with endoluminal sutures to the esophageal wall (Figure 3). No further migration occurred. The stent was removed after 12 weeks and the leak resolved.

Case 4

A 44-year-old female developed a leak from the proximal stomach 4 weeks after undergoing sleeve gastrectomy. She was treated with laparoscopic washout and drain placement followed by endoscopic stent placement. The stent migrated antegrade within two weeks and was replaced by two stents positioned in tandem (150x23 mm and 120x23 mm WallFlex, Boston Scientific). Three weeks later ,the stents migrated and were replaced by a single stent, secured with two endoluminal sutures to the esophageal wall (Figure 4). The stent remained in place until it was removed 12 weeks later.

Case 5 is that of a 49-year-old female with a history of gastric banding and recurrent obesity. She underwent concomitant removal of the band and conversion to sleeve gastrectomy. Two weeks postoperatively, she presented with sepsis and evidence of a leak from the proximal staple line. Open surgical washout and drain placement was performed, and attempted primary closure of the fistula was unsuccessful. Endoscopic stent placement was performed (fully-covered 150x23 mm Wallflex, Boston Scientific), resulting in resolution of the gastric fistula, and the patient improved clinically. After three weeks the stent migrated distally and required repeat endoscopic positioning, this time secured with endoluminal suturing using two absorbable sutures through the proximal stent wall and the esophageal wall (Apollo OverStitch). No further stent migration occurred, and the patient eventually fully recovered.

DISCUSSION

Endoluminal stenting has proven to be an effective mode of treatment for esophageal and gastric leaks, perforations, structures, and fistulae [1–4]. With the growth of sleeve gastrectomy, there has been a parallel growth in delayed microperforation, the most serious and frequent complication of sleeve gastrectomy. Endoluminal stent migration, while normally fairly innocuous does cause vomiting and epigastric pain for the patient. It also requires an additional procedure for repositioning of the

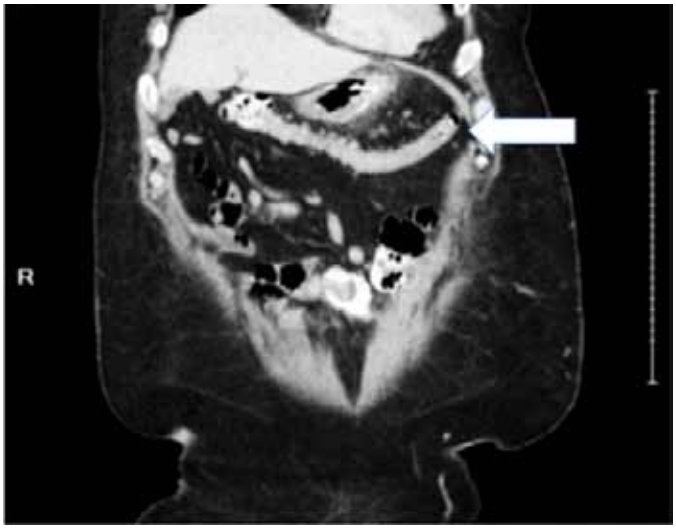

Figure 1: Computed tomography scan demonstrating migration of stent to the jejunum.

Figure 2: Computed tomography demonstrating migration of stent to the distal stomach and pylorus.

stent. However, as this first case presented here points out, it is a potentially very serious and life-threatening complication.

In this paper, we report five cases in which antegrade migration of endoluminal esophagogastric stents occurred at least once following stent placement for sleeve gastrectomy leaks. One of these cases resulted in a severe complication of jejunal perforation. In each case, repeat endoscopy was performed to reposition the stent and secure the stent in position with an endoluminal suturing technique. In each of those cases of stent fixation utilizing endoluminal sutures to the esophageal wall, no stent migration occurred. No complications of the suture fixation technique occurred.

Figure 3: Plain abdominal film demonstrating successfully repositioned stent secured with endoluminal suture. The perigastric drain may be seen in the left upper quadrant.

Figure 4: Plain abdominal film showing stent successfully repositioned and secured with endoluminal suture. Sutures are placed at the most proximal/superior portion of the stent.

Migration of endoluminal stents has been a reported and vexing complication occurring in a significant number of cases [2, 5, 6]. Reports that emphasize use of clips, tandem stenting, or other fixation techniques have suggested that the techniques may provide greater security, although that has not been well demonstrated. In case one reported above, the patient experienced a serious complication of jejunal perforation following stent

migration. In an effort to prevent such complications, our practice turned to a procedure of suture fixation utilizing an endoluminal suture device technique (Apollo Overstitch).

Other authors have reported use of endoscopic clip placement, utilization of tandem stents, and the use of partially covered stents in order to reduce stent migration [3, 5]. In our experience, the endoluminal suturing technique has proven successful, potentially more robust than clipping, and easy to perform.

CONCLUSION

Endoluminal suturing is technically straightforward and successful in preventing endoluminal stent migration. After some practice, it adds only a short amount of additional time to the procedure, normally less than 15 minutes. At this point, given our experience resolving a devastating complication of stent migration, and after multiple repeat endoscopies to reposition migrated stents, endoluminal suture fixation has become standard approach to any endoluminal stent placement. Potential risks of routine suture fixation of endoluminal stents include bleeding or perforation from the esophageal wall suture placement, something we have not seen in clinical practice, and we are unaware of its having been reported to date. Concerns of esophageal wall suture placement must be balanced against the frequency and the risks of stent migration.

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Author Contributions

Kent C. Sasse – Substantial contributions to conception and design, Acquisition of data, Analysis and interpretation of data, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published
David L. Warner – Analysis and interpretation of data, Revising it critically for important intellectual content, Final approval of the version to be published
Jared Brandt – Analysis and interpretation of data, Revising it critically for important intellectual content, Final approval of the version to be published
Ellen Ackerman – Analysis and interpretation of data, Revising it critically for important intellectual content, Final approval of the version to be published

Guarantor

The corresponding author is the guarantor of submission.

Conflict of Interest

Authors declare no conflict of interest.

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