The Value of Mega stents in the management of leak after sleeve gastrectomy

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Received 19 November, 2016; Accepted 30 November, 2016

Leak after laparoscopic sleeve gastrectomy (LSG) is not very frequent but are difficult complication that can become chronic. The aim of our study is to report leak after LSG, their management, outcomes and effect of stenting. Between January 2016 and September 2016, 9 patients who underwent laparoscopic sleeve gastrectomy in Azhar university hospitals had postoperative leak. Prospective review was performed for patients, noting the outcomes and complications of stenting. 9 patients presented with a leak after LSG. The diagnosis was made at mean of 25-29 days after LSG. 3 patients underwent conservative treatment initially and 6 patients required stenting as secondary treatment. Although a leak from 3 patients was resolved with stenting, the other 3 required resenting due to stent migration. Management of leaks after LSG can be challenging. But covered stent has good and safe option especially in late and chronic leak combined by gastric stenosis or fistula more than 3cm.

Keywords: Staple line leak, Fistula, Sleeve gastrectomy, Megastent bariatric surgery.

INTRODUCTION

Endoscopic techniques for the diagnosis and therapy for gastrointestinal disease are rapidly developing. Fistulae are abnormal communications originating in a visceral structure. Postoperative leaks are 1 type of fistula, defined as discontinuity of tissue apposition in the immediate postoperative period. Conventional surgical therapy for postsurgical leaks and fistulae is associated with significant morbidity and mortality, and new endoscopic options offer significant benefits. Patients who underwent Laparoscopic Sleeve Gastrectomy (LSG) as a conversion, and patients with a previous bariatric procedure were not included in the present study.

The global epidemic of obesity has resulted in a marked increase in demand for bariatric surgery (Rosenthal, 2012; Zackary et al., 2008). Currently, Roux-en-Y gastric bypass (RYGB) and, more recently sleeve gastrectomy (SG), alone or in combination with a biliopancreatic diversion with or without duodenal switch (BPD/DS) are the most commonly performed procedures (Ganger et al., 2013). With the increasing number of bariatric procedures being performed, postoperative complications, such as anastomotic and staple line leaks and strictures, have become more prevalent (Yaghoubian et al., 2012; Labor et al., 2008).

SG has become very popular and is currently the surgical procedure most commonly performed for treatment of morbid obesity in France (Breather et al., 2009; Trustfully et al., 2013). It is a relatively short procedure with a mean operating time of 100 minutes (Wittgrove and Clark, 2000; CarraquillaC et al., 2004). Nevertheless, the complexity of sleeve gastrectomy is probably underestimated and it is wrongly considered to be an easy bariatric surgical technique. Gastric leak (GL) rate after SG is 2.2%. According to the literature, most of these patients (85%–90%) are cured by an endoscopic procedure (Aurora et al., 2012; Siebel et al., 2014; Eubanks et al., 2008).
**Patient and methods**

**Inclusion criteria**

Patients were included if they were diagnosed with a staple line leak after LSG. The presentation, time to onset and staple line site of gastric leakage were classified according to the modified UK Surgical Infection Study Group definitions (Sarkozy et al., 2013; Carlucci et al., 2008). The patient’s clinical presentation was further described in terms of systemic signs of inflammation (tachycardia (>100 bpm) and hyperthermia (>38°C)), peritonitis (diffuse abdominal tenderness), pulmonary symptoms (cough and expectoration) and intra-abdominal abscess (local abdominal tenderness). The time to onset after SG was used to differentiate between acute gastric leakage (from postoperative day (POD) 1 to POD 7) and other types of leakage (>POD 8) according to Rosenthal’s classification (Wittgrove and Clark, 2000). Oral contrast-enhanced abdominal computed tomography (CT) was used to distinguish between leakage from the upper third of the staple line and leakage from the lower third, large GL was defined as a fistula orifice greater than 3 cm in diameter allowing passage of the endoscope through the leak orifice (as measured during endoscopy).

**Exclusion criteria**

Patients who underwent LSG as a conversion and patients with a previous bariatric procedure were not included in the present study and patient improved with conservative management.

**Definition of GL closure**

GL closure was defined as oral refeeding in the absence of (i) surgical drainage or endoscopic stents, (ii) flow via a previous surgical drainage pathway (gastrocutaneous fistula) and (iii) collection on an abdominal CT scan (with or without oral contrast agent) close to the GL site.

**Surgical technique and placement of stent**

All procedures were performed by 2 surgeons. Stents were endoscopic ally placed. After identifying the leak site, 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.

A total of 9 patients met the criteria for a staple line leak after LSG. Patient demographic characteristics include age, body mass index, ethnicity, and gender (Table 1). Creation and initial placement of the mega stent is performed under general anesthesia; as it is essential to protect the patient’s airway with endotracheal intubation. Preoperative anti-biotic were indicated.

Before placement of the stent, the endoscope is used to locate and explore the perforation; the cavity is then irrigated and debrided as much as possible. Once in the esophagus, the stent is carried down to the perforation in the stomach. The scope should be driven into the cavity to get the tip of the NGT and the stent extraluminally. The stent can be pushed, from its proximal portion, into the fistula cavity with the rat tooth forceps and then should be left in place endoscopically a UGI is also performed to confirm closure of the leak as shown in figure (1).

**Follow up**

Patients are then allowed to take oral medication, advanced on a diet as tolerated, followed clinically, and reevaluated as necessary.

**RESULTS**

From 200 patients underwent LSG. A total of 6 from 9 patients were identified who underwent endoscopic SEMS placement for treatment of anastomotic or staple line leaks the other 3 patient cure under conservative treatment (AB and parenteral nutrition and follow up by upper GIT imaging and CT scan because leakage done in first weak) Staple line leak is one of complications which can be chronic recurrent and require multiple intervention leaks mostly occur at GE junction and vary in size from 1 to 3 cm and according to Roseental the leakage may be acute within 7d (or early within 6wk or chronic after 6wk and the chronic one ideal for mega stent as in our study of the cohort included 7 women and 2 men with a mean age of 51 years(range36–61 yr.). In 6 patients with leaks the stents allowed oral enteral nutritional resuscitation rather than an enteric tube or total parenteral nutrition. In several other patients, an attempt at endoscopic dilation with post dilation placement of assets was decided on with the thought at that time that the SEMS might prevent restructuring. Stents were placed under endoscopic and fluoroscopic guidance using moderate sedation or anesthesia support (Table 1).

There were no immediate adverse events after stent placement, specifically no perforations or hemorrhage. Stents remained in place for a mean of 60 days (range21-100 d). This range of SEMS duration varied with patient request, referring physician request, need for nutritional resuscitation, and difficulties with the distance patients needed to travel for further therapy.
Table 1. Demographic characteristics

<table>
<thead>
<tr>
<th>Patient</th>
<th>Age</th>
<th>Gender</th>
<th>BMI</th>
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<tbody>
<tr>
<td>1</td>
<td>29</td>
<td>Female</td>
<td>34</td>
</tr>
<tr>
<td>2</td>
<td>39</td>
<td>Female</td>
<td>61.5</td>
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<tr>
<td>3</td>
<td>73</td>
<td>Male</td>
<td>44.5</td>
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<td>70</td>
<td>Male</td>
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<td>6</td>
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<td>51.9</td>
</tr>
<tr>
<td>9</td>
<td>54</td>
<td>Female</td>
<td>39</td>
</tr>
</tbody>
</table>

Figure 1. (A) Post sleeve gastrectomy leak (B) Megastent insertion (C) 3 weeks after stent removal

Table 2. Characteristics of patients who developed leak complication after sleeve gastrectomy as regards comorbidities

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Co-morbidities*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypertension</td>
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<tr>
<td>Diabetes mellitus</td>
<td>4</td>
</tr>
<tr>
<td>Hyperlipidemia</td>
<td>5</td>
</tr>
<tr>
<td>Sleep apnea</td>
<td>3</td>
</tr>
<tr>
<td>Length of hospital stay (d)</td>
<td>(7d)</td>
</tr>
</tbody>
</table>

Endoscopic stent removal, repositioning, and replacement were required in 3 patients; 2 patients required placement of second stent in an attempt to fully cover or control the fistula. Distal stent migration occurred in 1 patient.

DISCUSSION

Endoscopic ally placed SEMS offer potential and real advantages for treatment of staple line complications that can simplify the surgical management of postoperative leaks. A stent may prevent or greatly diminish further peritoneal contamination by excluding the leak site from esophago-gastroenteric secretions. This lack of ongoing chemical and bacterial contamination is thought to promote and accelerate healing of the leak. Stent placement may also result in a rapid improvement in abdominal pain because of decreased peritoneal contamination. Shielding of the leak site often permits nutrition to be given orally, thereby allowing oral nutritional resuscitation/maintenance and avoiding the need for parenteral nutrition or downstream enteral feeding. Perioperative care with nutritional support, appropriate use of antifungal medications in some cases of GL presenting risk factors for yeast infection and systematic use of somatostatin following the discovery of the GL (Beget et al., 2011; Thompson et al., 2004; Nguyen et al., 2010). We totally agree with Csendes et al. 2005, who reported that leak size and...
gastric stenosis associated with GL were very important factors in the management of postoperative GL and can be associated with a higher endoscopic treatment failure rate when treatment is not adapted to the type of GL. We also agree with the letter by Bruce et al. 2001, commenting the report of Rebibo et al. 2013, that leak size is very important and can explain some failures of endoscopic treatment. Although large GL can be suspected on oral contrast-enhanced abdominal CT or during reoperation for GL, most cases of large GL are diagnosed during endoscopy for stent placement. Similarly, upper GI endoscopy plays an important role in the diagnosis and management of gastric stenosis associated with GL. Our endoscopic procedure for the management of GL has now been standardized by systematically looking for GS during endoscopy and measuring the length of the GL orifice. In the light of our results, we propose CS placement as first-line endoscopic treatment for large GL (greater than 2 cm) and/or stenosis associated with GL.

CONCLUSION

Postoperative leaks are significant complications resulting in considerable morbidity and increased rate of mortality. Patients with these complications are likely already afflicted by infection, organ failure, and nutritional deficiency, and they are poor candidates for surgical revision. Our endoscopic procedure for the management of GL has now been standardized by systematically looking for GS during endoscopy and measuring the length of the GL orifice. In the light of our results, we propose CS placement as first-line endoscopic treatment for large GL (greater than 3 cm) and/or stenosis associated with GL.

REFERENCES


