The Incidence of Leak Following Laparoscopic Sleeve Gastrectomy with Pyloric Balloon Dilatation

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Abstract

Background: Laparoscopic sleeve gastrectomy is rapidly increasing in popularity, its rapid rise in popularity coupled with good initial results suggest that it will be a major component of patient care for the treatment of morbid obesity and its comorbid medical problems for years to come in the future. Staple-line disruption is the most life-threatening complication after LSG many hypotheses and solutions were suggested to overcome this problem, however no significant effect.

Methods: Pyloric balloon dilatation was done to 20 morbidly obese patients undergoing sleeve gastrectomy and the results were compared to another group of 20 LSG patients in which no pyloromyotomy was done.

Results: We had intra-operative complications in the form of staple line bleeding in 8 patients (20%) and serosal tear in 2 patients (5%) for whom buttressing was done and staple line disruption in only one patient (2.5%) which was over-sewn by hand. Regarding post-operative complications we had 2 cases (10%) of proximal staple line leak in the pyloromyotomy group in the early post-operative period for which gastric stents were inserted. We had one case of mortality after leak.

Conclusion: Pyloromyotomy has reduced the gastric pressure to an extent that was adequate to relieve heart burn and other symptoms of GERD but only in the immediate post operative period, was not sustained for a long period and also it was not enough to prevent staple line leak although this leak was not primarily due to high intra-gastric pressure but definitely this high pressure played a role in the progress of leak.

Key Words: Laparoscopy – Sleeve gastrectomy – Leak – Pyloromyotomy.

Introduction

LSG is a new option being used in the treatment of morbid obesity. Benefits of LSG include low rate of complications, avoidance of foreign material, maintenance of normal gastrointestinal continuity, absence of malabsorption, and ability to perform it concomitantly with other procedures. The two most common surgical complications after bariatric operations are staple-line bleeding and anastomotic leak.

The incidence of anastomotic leak after sleeve gastrectomy ranges from 0-20% [1-3]. Most leaks appear in the proximal third of the stomach, close to the gastro-esophageal junction. Burgos et al., [1] reported 85.7% leaks in the proximal third and only 14.3% in the distal third. Stroh et al., [4] reported that 7% of the fistulas in their series occurred at the gastro-esophageal junction.

The surgical technique used is of vital importance to reduce the risk of post operative complications, among which are leaks. Relevant steps include careful tissue management, optimal use of endostaplers, prevention of distal stenosis, and good hemostasis without damaging tissues when using electrocautery equipment or ligaSure system [1].

Baltasar et al., protect the staple line with a continuous sero-serous suture (from the angle of Hiss to the half-way point, and a 2 nd continuous suture from this point to the end) that inverts the staples, controls bleeding and reduces the number of leaks without increasing the cost of the procedure [5].

Another fistula preventing technique involves using fibrin sealants (Tissucol, Vivostat) along the staple line [8,9].

Patients and Methods

In this prospective comparative study, forty morbidly obese patients are selected in Kasr Al-Ainy Hospital between 2012 and 2014 for LSG after failure of conservative therapy.
The Incidence of Leak Following Laparoscopic Sleeve Gastrectomy

All the participants’ age range between 16-60 years, and their Body Mass Index (BMI) > 40kg/m² or 35-40kg/m² with co-morbidity in which surgically induced weight loss is expected to improve the disorder.

Candidates with previous gastric surgery and known cases of sliding hiatus hernia are excluded from this study. Also Barrett’s esophagus cases are excluded for fear of theoretical risk of malignant transformation after LSG. Patients with ASA (American Society of Anesthesiologists) score 4 or higher are excluded.

Medical records are analyzed for Patients’ demographics including: Age, gender, BMI, the ASA score [10] (anaesthesiological risk according to the classification of the American Society of Anesthesiologists) as described in (Table 1).

Table (1): ASA physical classification system.

<table>
<thead>
<tr>
<th>ASA class</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Normal healthy patient</td>
</tr>
<tr>
<td>2</td>
<td>Patient with mild systemic disease</td>
</tr>
<tr>
<td>3</td>
<td>Patient with severe systemic disease</td>
</tr>
<tr>
<td>4</td>
<td>Patient with severe systemic disease that is a constant threat to life</td>
</tr>
<tr>
<td>5</td>
<td>Moribund patient not expected to survive without operation</td>
</tr>
</tbody>
</table>

Data from cuvillon et al., [10].

In the current study two groups of sleeve gastrectomy were studied, in the first group pyloromyotomy was added to 20 cases of sleeve gastrectomy and compared to the other group in which no pyloromyotomy was done.

Operative technique:

The operation starts by mobilization of the greater omentum attachment to the greater curvature medial to the gastroepiploic arch using the harmonic ultrasonic shears (Harmonic Ace (R) Curved Shears, Ethicon Endosurgery, USA) reaching the first part duodenum downwards and upwards opening angle of His, exposing the left crus to free the fundal bare area and control the posterior gastric artery if encountered and opening the gastro-phrenic ligament.

A 36 F bougie is orally advanced into the stomach and the pylorus along the lesser curvature of the stomach, till it reaches the first part duodenum Fig. (1).

After reaching the duodenum, assuring the presence of the balloon in the pylorus, the balloon was inflated until blanching of the pyloric wall is noted by the laparoscope, then the inflated balloon is withdrawn back across the pyloric ring to ensure dilatation.

Then a reticulating linear stapler (Echelon Flextm Endopath (R), Ethicon Endosurgery, USA) is used to create the gastric sleeve around the bougie starting just proximal to the pyloric ring.

The first stapling cartridge is green (4.1mm) for the thicker tissue at the antrum, followed by gold (3.8mm) till reaching the angle of His. A methylene blue test is applied after stapling to check the integrity of the staple line. One drain is inserted along the staple line for fear of reactionary hemorrhage or leaks, which is removed the second post operative day after a contrast study of the created sleeve.

Post-operative care:

Patients are encouraged to move out of bed few hours after surgery, as no anticoagulation medications are used. We start administration of IV PPI and anti emetics from first post-operative day, which is continued orally after patients start oral feeding for the first 2 weeks only.

Patients start oral fluid intake on the second post-operative day, after a gastrografin study showing intact suture line.

Follow-up:

All patients will be followed-up for early signs of leak and other post-operative complications like bleeding and infections.

Results

During the study period, 40 LSG for morbid obesity were performed in Kasr Al-Aliny Hospital, Cairo University.
We had intra-operative complications in the form of staple line bleeding in 8 patients (20%) and serosal tear in 2 patients (5%) for whom buttressing was done and staple line disruption in only one patient (2.5%) which was over-sewn by hand.

Regarding post-operative complications we had 2 cases (10%) of proximal staple line leak in the pyloromyotomy group in the early post-operative period for which gastric stents were inserted.

We had one case of mortality after leak.

Table (2): Showing complications among patients.

<table>
<thead>
<tr>
<th>Frequency (n=40)</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Intra-operative complications:</strong></td>
<td></td>
</tr>
<tr>
<td>Bleeding</td>
<td>4</td>
</tr>
<tr>
<td>Serosal tear</td>
<td>2</td>
</tr>
<tr>
<td>Staple line disruption</td>
<td>1</td>
</tr>
<tr>
<td><strong>Early post-operative complications</strong></td>
<td>2</td>
</tr>
<tr>
<td>Mortality</td>
<td>1</td>
</tr>
</tbody>
</table>

Data from cuvillon et al., [10].

Dapri et al., [12] showed, through a prospective randomized trial, with 3 treatment arms (non-reinforced, suture reinforced, and stapler-load buttressing), a difference in intraoperative blood loss parameters, but no difference for leak rate, after staple-line reinforcement.

Baltasar et al., [5] concluded that EGJ leaks—which have occurred uncommonly-have been at the upper corner of the staple line. High intraluminal pressure and low compliance of the gastric tube may be the principle causes of the leak at this level. In spite of routine using of Lembert type of continuous Prolene 2-0 suture to cover the staple line and prevent bleeding and leaks, they experienced nine cases of leak after LSG at the proximal staple line, as no sepsis was present, they started conservative management including antibiotics, percutaneous drainage of any collections, enteral nutrition with a silicone tube (guided by the interventional radiologist) distal to the duodenum (safer and cheaper than total parenteral nutrition), frequent computed tomography scans, and daily clinical evaluation until the leak is considered healed by negative findings on the leak tests. Re-suturing of the leak will most likely result in failure.

CSESs (coated self expanding stents) [11] were used in 8 patients, and in 6 of them, the fistula closed. Some patients have required total gastrectomy with good results.

In our study we had two cases of leak at the proximal staple line, once diagnosed laparoscopic exploration and drainage collections was done, followed by insertion of CSESs, frequent computed tomography scans, and daily clinical evaluation. The fistula closed in one case, but deterioration in general condition due to sepsis supervened in the other case ending in mortality.

Despite pyloric balloon dilatation and at least theoretical-reduction in intra-luminal pressure in gastric sleeve leak had occurred at the proximal staple line which is according to Yehoshua et al., [7], Baltasar et al., [8] and others-due to high intra-luminal pressure.

**Conclusion:**

In the current study we have tried to reduce the high pressure in the gastric tube after sleeve gastrectomy by this technique of pyloric dilatation.

In conclusion we found that pyloromyotomy has reduced the gastric pressure to an extent that was adequate to relieve heart burn and other symptoms of GERD but only in the immediate post-
operative period, was not sustained for a long period and also it was not enough to prevent staple line leak although this leak was not primarily due to high intra-gastric pressure but definitely this high pressure played a role in the progress of leak.

References


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