Gastric Leak after Laparoscopic Sleeve Gastrectomy

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Background: Laparoscopic sleeve gastrectomy (LSG) has increased in popularity as a definitive bariatric operation. LSG had significant morbidity like stenosis, leak along the staple line, and bleeding. Gastric leak after LSG is serious and life threating complication. It requires high index of suspicion for early diagnosis and proper management.

Patients and methods: From September 2012 till October 2015, 120 morbidly obese patients with a mean BMI of 49±9 underwent laparoscopic sleeve gastrectomy (LSG) at Ain Shams University hospitals. LSG was discussed in details with the patients with emphasis on the benefits and more importantly the potential complications and side effects of LSG and written consent was taken.

Results: 120 patients underwent LSG at Ain Shams University hospitals from them 4 patients (3.3%) developed a gastric leak. Of these 4 patients, 3 (75%) were women and 1 (25%) man. The patients had a mean age of 42.5 years and a body mass index (BMI) of 48.4 kg/m^2. Leaks were diagnosed at a median of 7 days. All cases of leakage were managed conservative by antibiotics, proton pump inhibitor (PPI), total parenteral nutrition and a self-expanding stent was placed under fluoroscopic and endoscopic control (coated metallic stents). Mean healing time was 45 days (range 21–60), mean hospital stay was 10 days. No patient required reoperation and there was no mortality.

Conclusion: Gastric leak after LSG is low but serious and life threating complication. It required early diagnosis and proper management. Conservative treatments are effective but require long hospital stay.

Key words: Gastric leak, laparoscopic sleeve gastrectomy, morbid obesity, morbidity.

Introduction

Laparoscopic sleeve gastrectomy (LSG) represents a valid option for morbidly obese patients, either as a primary or as a staged bariatric procedure. Initially, LSG was conceived as a restrictive component of the biliopancreatic diversion and duodenal switch. Later on, LSG has been proposed as a step procedure in high-risk patients, followed by a second step Roux-en-Y gastric bypass or biliopancreatic diversion and duodenal switch.[1]

Recently, LSG has been proposed as a standalone bariatric procedure. Excess weight loss and remission of comorbidities have been reported to take place in a frequency comparable with other well-established procedure.[2]

LSG had significant morbidity like stenosis, leak along the staple line, and bleeding.

The aim of this study was to determine the rate, early diagnosis, and treatment of gastric leak after LSG in a consecutive group of obese patients.

Patients and methods

Patients

From September 2012 till October 2015, 120 morbidly obese patients with a mean BMI of 49±9 underwent laparoscopic sleeve gastrectomy (LSG) at Ain Shams University hospitals. LSG was discussed in details with the patients with emphasis on the benefits and more importantly the potential complications and side effects of LSG and written consent was taken.

Inclusion criteria

All cases were chosen according to the following criteria:

- BMI more than 40 or more than 35 with an obesity associated co- morbidity
- Age between 18 - 60 years
- No endocrinal causes for obesity
- Psychologically stable
- Motivation & acceptance of surgical risks

Exclusion criteria:

- Younger than 18 years or older than 60 years
- Pregnant or breast feeding
- Suffer from any severe psychiatric illness
- Significant longstanding heart/lung disease or other severe systemic disease
- Sweet eaters
- Patients with significant history of reflux esophagitis
- Previous bariatric surgery

Operative techniques

Preoperative preparation

For prophylaxis against thromboembolic complications, all patients were given low molecular weight heparin, pneumatic intermittent pressure stocking was used intraoperatively and

continued postoperatively till the patient was fully ambulant.

Surgical technique

The patient was put in supine, reverse Trendlenburg head up position by 30 degree with legs apart. The surgeon stood between patients' legs with the assistant to patient's left and camera man on patient's right. Five ports were used: one 10 mm to the left of the umbilicus for camera, one epigastric 5mm for self-retaining laparoscopic liver retractor, two working 12/15 mm at both midclavicluar line for gastrolysis, and stapling, and one 5 mm at left anterior axillary line for the assistant.

Gastrolysis was started from a point 4 cm from the pylorus up to the angle of His using either ultrasonic shears or a bipolar sealing device (Ligasure). The left crus was completely exposed up to the medial border. A sleeve was created over a 36F gastric calibration tube with sequential firings of different color reloads according to stomach thickness excluding all gastric fundus as shown in **Figures 1-4.**

Methylene blue test was done at the end without over sewing the staple line with a drain left at the gastric bed.

Fig 1: Gastrolysis using Ligasure.

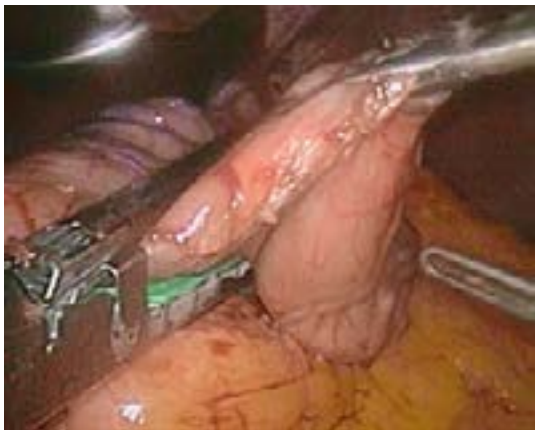

Fig 2: First reload firing.

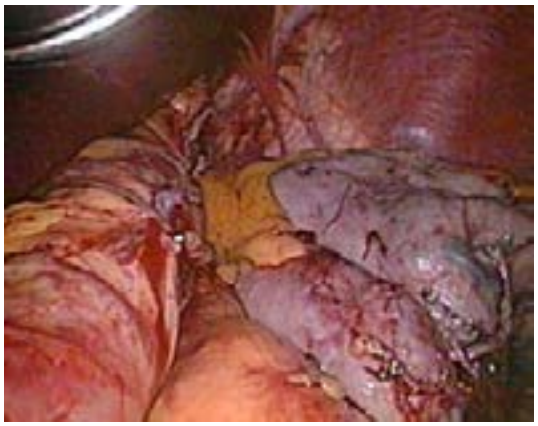

Fig 3: Firing last reload with complete exclusion of the fundus.

Fig 4: Postoperative specimen for resected stomach.

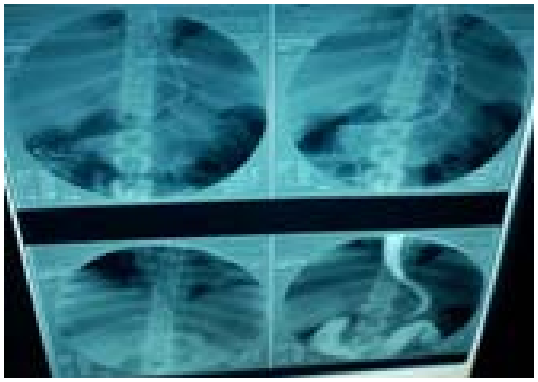

Fig: 5 Stent insertion.

Statistical analysis

Required data were collected tabulated and then statistically analyzed. Analysis of data was done using IBM SPSS software (statistical program for social science version 21). Data analysis was performed by the usual methods of descriptive statistics; frequencies and percentages for discrete variables, average, median, and standard

deviations for continuous variables. The results were significant (S) with P<0.05 & highly significant (HS) with P<0.01. P≥0.05 was regarded non-significant (NS).

Results

Enrolled patients

From September 2012 till October 2015, 120 morbidly obese patients with a mean BMI of 49±9 underwent laparoscopic sleeve gastrectomy (LSG) at Ain Shams University hospitals. There were ninety women and thirty men with a mean age of 39 (18–60). Female: male ratio was 75:25, BMI was 49±9 (range: 40-58) kg/m^2, with mean body weight 135 (105-165) kg **(Table 1).**

Table 1: Patient demographics

No. of patients	120
Age (year)	39 (range 18-60)
Sex	
Female	90 (75%)
Male	30 (25%)
Preoperative BMI (kg/m^2)	49±9 (40-58)
Preoperative Weight (kg)	135 (105-165)

120 patients underwent LSG at Ain Shams University hospitals from them 4 patients (3.3%) developed a gastric leak. Of these 4 patients, 3 (75%) were women and 1 (25%) man. The patients had a mean age of 42.5 years and a body mass index (BMI) of 48.4 kg/m^2. The 116 patients who underwent LSG without a leak served as a control group.

Methylene blue test was done routinely at the end of surgery without over sewing the staple line. All patients except one showed no intraoperative leakage. This leak was identified and sutured, with a consequent negative intraoperative dye test. Unfortunately, the patient leaked postoperatively **(Table 2).**

	Leak	Control	P Value
No. of patients	4 (3.3%)	116 (96.7%)	0.7

Patients with gastric leak presented with abdominal pain, fever, tachycardia, tachypnea, and increased white blood cell (WBC) and C-reactive protein (CRP) levels. A leak was clinically suspected and later confirmed by imaging.

Leaks were diagnosed at a median of 7 days (range, 1–30 days) postoperatively: 1 (25%) early (within 3 days), 2 (50%) intermediately (from 7–14 days), and 1 (25%) late (>14 days).

In all cases the leak site was in the gastro esophageal junction area.

All cases of leakage were managed conservative by antibiotics, proton pump inhibitor (PPI), total parenteral nutrition, drainage of any collection by intervention radiology and a self-expanding stent was placed under fluoroscopic and endoscopic control (coated metallic stents) (**Figure 5)**. Radiological controls were performed weekly in order to check the correct stent position. In one patient the X-ray control showed a stent migration and the persistence of the fistula. The migrated stent was removed endoscopically and a new stent was positioned. Stents were left in place for a mean time of 45 days (range 30–60 days) with healing of the leaks in all patients. Mean healing time was 45 days (range 21–60).

Mean hospital stay was 10 days. Weekly x-ray was done at patients follow up. No patient required re-operation and there was no mortality.

Discussion

LSG is well accepted as a definitive bariatric procedure with low morbidities and acceptable weight loss results. The LSG is a straightforward procedure that can be generally completed laparoscopically, even in the case of an extremely obese patient. It does not involve any digestive anastomosis; no mesenteric defects are created eliminating the risk of internal hernia.[3]

The American Society for Metabolic and Bariatric Surgery (ASMBS) Clinical Issues Committee statement quotes an overall complication rate for LSG of 0–24% and a mortality rate of 0.39%.[4]

Leakage after LSG is a serious and life threatening complication, it required high index of suspicion for early diagnosis and proper management. Many studies reported its occurrence rate ranges between 0.5% and 5% of patients.[1,4-7]

In this study the leakage rate was 3.3% which is comparable with other studies.

Clinical presentations of leaks vary from mild symptoms, to symptoms of sepsis characterized by peritonitis, septic shock, and multi-organic failure.[5,8]

In this study all cases were mild and diagnosed early by persistent discharge from the drains and late by symptoms and signs and confirmed by radiology.

Routine methylene blue test have been used by some authors to detect intraoperative leakage.[2,9,10] The idea of this methylene blue test is to detect intraoperative leakage and to repair

it at the time when tissues are viable and fresh. A negative methylene blue test does not eliminate the possibility of a leak.[11]

In this study methylene blue test was done routinely in all patients at the end of surgery and was positive only in one patient. The leak was identified and sutured, with a consequent negative intraoperative dye test. Unfortunately, the patient leaked postoperatively.

Also postoperative contrast studies have been advised by several authors, whereas others said that over testing is unnecessary and that good clinical judgment is the key for diagnosis.[2,9,12,13]

In this study, postoperative contrast study was positive only in one patient while in another two patients contrast study was negative till two weeks postoperative. The most sensitive method for diagnosis of leakage is clinical with a high index of suspicion. This is consistent with similar observations in numerous reports.[12,14]

Some studies said that contrast-swallow studies are notorious for showing "normal" results in the presence of leaks.[13,14]

In this study gastric leakage was located near gastro esophageal junction same as other studies.[11,15,16] This may be due to presence of gastric-wall heat ischemia near the staple line or surgical fault in the surgical technique causing devascularization of the gastro esophageal junction. Classic ischemic leaks have been reported to occur 5 to 7 days after surgery when wound healing is between the inflammatory and fibrosis phases.[17,18] Extraluminal gastric leak can result in cutaneous fistula, peritonitis, abscess, sepsis, organ failure, and death.[19]

Dietel M et al,[2] in the First International Consensus Summit for Sleeve Gastrectomy, reported treatment of leak included early over sewing, drainage (CT or open), endoscopic clipping, and persisting fistulas requiring fibrin glue, stents, Roux loop, and even total gastrectomy. In this study the patients were managed conservatively by keeping the drain in place. Total parenteral nutrition, high-dose proton pump inhibitors, broad spectrum antibiotics, drainage of any collection by intervention radiology and a self-expanding stent was placed under fluoroscopic and endoscopic control (coated metallic stents).

Enteral nutrition should be started as soon as possible during treatment since appropriate nutrition is needed to support defect closure.[11,20]

Radiological controls were performed weekly in order to check the correct stent position. In one patient the X-ray control showed a stent migration and the persistence of the fistula. The migrated stent was removed endoscopically and a new stent was positioned. Stents were left in place for a mean time of 45 days (range 30–60 days) with healing of the leaks in all patients. Mean healing time was 45 days (range 21–60).

In this study mean hospital stay LOS was 10 days. Others studies have reported a mean hospital stay LOS between 3.2 and 6 days.[21,22]

Conclusion

Gastric leak after LSG is low but serious and is a life threating complication. It required early diagnosis and proper management. Conservative treatments are effective but require long hospital stay.

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