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Fully covered metallic mega stents use in management of post lapar oscopic sleeve gastrectomy staple- line leaks is it beneficial ?

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Abstract: Background: Laparoscopic sleeve gastrectomy is one of the mostly performed bariatric surgical procedules, LSG, has many advantages as no anastmosis, easily done and antrum preservation, but with some complications the most disquieting of them is the stable line leak, many surgical and endoscopic methods emerged for treatment of the stable line gastric leak, as partially covered and fully covered stent insertion and the endoluminal vacuum (E-Vac). **Method:** From January 2015 and February 2019 in zagazig university hospitals, eight patients diagnosed with post laparoscopic sleeve gastrectomy stable line leak were managed by endoscopic fully covered mega stent insertion to cover the leak defect,7 of them underwent rapid stent insertion and one delayed for management of peritonitis. **Results:** The stent managed to control leak in 7 patients successfully, with only one case needed reposition in a mean time (mean 31.8 ±SD7.1) days. Only one patient needed (RYGB). **Conclusion:** Endoscopic fully covered mega stent insertion is a safe effective method for treatment of post laparoscopic sleeve gastrectomy stable line leak.

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Keywords: mega stent, sleeve gastrectomy, leak

Background

Laparoscopic sleeve gastrectomy is one of the mostly performed bariatric surgical procedules, LSG, has many advantages as no anstmosis, easily done and antrum preservation, but with some complications the most disquieting of them is the stable line leak, many surgical and endoscopic methods emerged for treatment of the stable line gastric leak, as partially covered and fully covered stent insertion and the endoluminal vacuum (E-Vac).

Method

From January 2015 and February 2019 in zagazig university hospitals, eight patients diagnosed with post laparoscopic sleeve gastrectomy stable line leak were managed by endoscopic fully covered mega stent insertion to cover the leak defect,7 of them underwent rapid stent insertion and one delayed for management of peritonitis.

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mean time (mean 31.8 ±SD7.1) days. Only one patient needed (RYGB).

Conclusion

Endoscopic fully covered mega stent insertion is a safe effective method for treatment of post laparoscopic sleeve gastrectomy stable line leak Key points, mega stent, sleeve gastrectomy, leak.

INTRODUCTION

Laparoscopic sleeve gastrectomy (LSG) became one of the mostly performed bariatric operation worldwide for patients with different degrees of obesity.(1,2) LSG is an efficient technique to decrease excessive weight and develop survival against overweight -related morbidity and mortality (3). This technique has many advantages, it gives continuity of the gastrointestinal system and preserves the antrum, thus preventing dumping syndrome (4). It is technically simpler to perform without the need of an anastomosis (5). It has a lower morbidity and mortality rate, if compared with Roux-en-Y gastric bypass or bilio-pancreatic diversion with or without duodenal switch.(6), It can be done concurrently with other techniques.(7) However, the technique is not free from complications. It associated with significant complications, as staple line gastric leaks, which is the most dangerous, staple line gastric bleeding, and gastric stenosis (8). The ratio of gastric leaks varies between 1.5 – 5.3% of all patients who experience the LSG technique(2).

According to the best practice guidelines from the International Sleeve Gastrectomy Expert Panel Consensus, leaks were categorized according to their occurrence time from the operative procedure (acute: <7 days, early: within 1–6 weeks, late: 6–12 weeks, and chronic >12 weeks) (9) if the leak is not detected rapidly and managed appropriately, the patient may presented by peritonitis, abscesses, cutaneous or other fistulas, abdominal sepsis, organ failure or even death (2,8). We conducted this study to assess the effectiveness and outcome of mega stents use in management the leak after LSG.

Patient and methods

This study was done in Zagazig University Hospitals, department of general surgery, in the period between January 2015 and February 2019 on 8 patients with post laparoscopic sleeve gastrectomy stable line leaks, we implicated the endoscopic insertion of fully covered metallic mega stent for treatment of leak after proper laparoscopic drainage of Intraperitoneal collections.

Diagnosis of leak was done by postoperative abdominal pain referred to left shoulder, tachycardia and /or fever presence of gastric contents or pus in the drain. The main diagnostic investigation is computed tomography (CT) with oral contrast. Fig (1) endoscopic picture of the defect.

Once leak is diagnosed nothing per-oral is allowed, broad-spectrum antibiotics, metronidazole and total parental nutrition were started intravenously. Laparoscopic exploration, lavage and drainage was done for all patients then stent insertion done under general anesthesia.

Fig (1) staple line leakage

Fully covered mega stent insertion : fig (2,3,4)

Esophagogastroduodenoscopy was performed under general anesthesia, and stents were inserted under endoscopic and fluoroscopic guidance.

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Fully Covered Mega Esophageal stent with a length of 230 mm & flared ends of 36 mm were used. During endoscopic examination the site of staple line leak, gastric twist and or distal strictures are detected. Under fluoroscopic guidance, radiopaque markers were placed to outline the site of leak, cardia & pylorus to design the proximal and distal extent of the stent. The upper flare was deployed above the leak site by 5cm, and the lower flare was deployed across the narrowing area of the distal sleeve either in the antrum or the duodenal bulb. Savary metal stiff guide wire was placed into the duodenum. The endoscope then removed and the guide wire was left in place. The stent was deployed over the guide wire and positioned between the radiopaque markers.

Follow up

X-ray chest and abdomen was done immediately after the procedure and after 48 hour to confirm full stent deployment & also to detect early migration. Oral fluids are allowed 72 hour after stenting, during follow-up, if there were any symptoms of stent migration such as epigastric pain or vomiting, x-ray examination was used to check the location of the

stent. Endoscopic stent repositioning was performed under fluoroscopic guidance if stent migration was noted.

The stents were removed endoscopically after 4-6 weeks unless migrated or the patient cannot tolerate it.

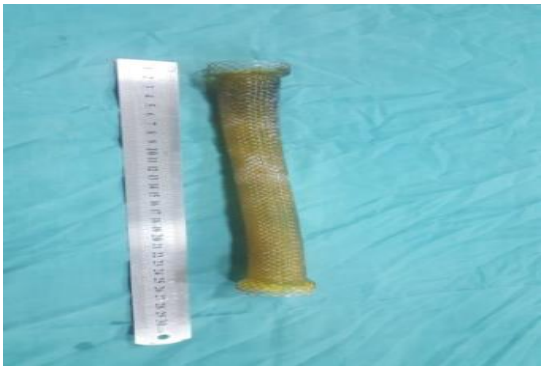

Fig (2) stent

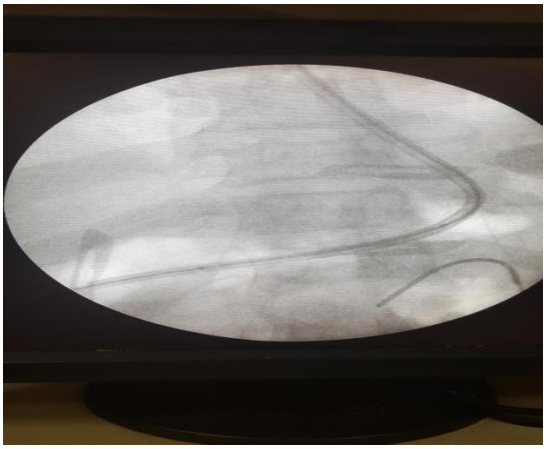

Fig (3) Stent deployment

Fig 4. Fully deployed stent fig (4)

Data collection Statistical Analysis:

Data collected included demographic data (age, sex, BMI), symptoms of leak, site size and timing of the leak, method of drainage of associated intraperitoneal collections, stent migration and stent migration-related complications, total stent treatment duration, and treatment outcome

Data were analyzed using percentage, mean, and standard deviation (SD).

RESULTS

In the period between January 2015 and February 2019 Through this period, 8 patients presented with staple –line gastric leaks (out of 105 sleeve) (7.6%). Three of them were males(37.5%) and five were females (62.5%) with the age range from 29 to 47 years old, with a mean age of 37.75 years ±SD 6.9. The main BMI of 39.3 kg/m2 ± (SD 1.02) (range 38 to 40.2 kg/m2).

A summary of their demographics is put in Table 1.

Table 1. A summary of their demographics

No	Gender	Age “years “	BMI
1	F=female	37	39
2	M=male	43	40.1
3	F	32	41
4	F	29	38
5	M	31	38.4
6	F	37	40.2
7	F	46	39.1
8	M	47	38.7

We put Mega stent to all patients suffering from leakage after LSG. Epigastric pain, vomiting and increase of temperature were the common symptoms of staple –line gastric leaks. Leaks were diagnosed at a median interval of 6.9 days±SD2.9 (range 4 to 12 days) 6 patients with acute leak and 2 patients with early leak after LSG operation. The leaks occurred in five patients, at the gastro-esophageal junction (62.5 %) and three patients had leak at middle of sleeve (37.5%). Small sized stable line defect (1cm) leak had appeared in five patients around 2 cm stable line defect in 2 patients one patient with 4 cm stable line defect, all patients underwent laparoscopic exploration, lavage and drainage of the intraperitoneal collection. Fully covered mega stent was immediately inserted in 7 patients, one patient had big size staple –line gastric defect about 4 cm, rapidly developed generalized peritonitis. patient underwent laparoscopic drainage and he received massive antibiotics, analgesic antipyretic and parenteral nutrition till improvement of the general conditions, Then the stent was placed after five days from the leakage discovery.

Patients were followed up, till leakage cessation, and stent removal, the time of stent therapy ranged between 26 and 45 days (mean 31.8 ±SD7.1) days. Stent reposition needed in one patient after stent migration, the use of mega stent managed to stop leakage in 7 patients (87.5%) one patient (12.5%) needed conversion to Roux-en-Y gastric bypass (RYGB). Where the patient had big size staple –line gastric leaks about 4 cm, no improvement of gastric leak detected after 45 days from mega stent placement, so patient underwent rough en Y gastric bypass (RYGB). The follow up data presented in table 2.

Table 2 follow up data

No	Time of leak diagnosis	Defect size "Cm"	Days of treatment	Reposition	Surgical intervention
1	4	1	27	no	no
2	5	2	32	no	no
3	4	1	26	no	no
4	7	1	37	no	no
5	6	2	35	no	no
6	12	4	45	yes	yes
7	7	1	23	no	no
8	10	1	29	no	no

Discussion

The incidence of laparoscopic sleeve gastrectomy as a single solution for treatment of morbid obesity is rapidly increasing, despite the improvement of results and decreased rate of complications, stable line leaks remain the most disabling complication.

Many techniques emerged for management of stable line leaks (10) the actual interval between the diagnosis of the leak and its surgical treatment hasn't been defined but The 2012 International Sleeve Gastrectomy Expert Panel Consensus (9) agreed on the importance of waiting at least 3 months before undergoing surgical management of the leak.

Surgical options as fistulo-jejunostomy or total gastrectomy with esophagojejunostomy, may be beneficial especially for chronic leaks that have failed endoscopic treatment (11-12).

Stents are the gold standard of the endoscopic treatment modalities in early postoperative periods, it was to be safe since 2007 when Serra et al (13), reported that self expanding stents controlled leak in 83% of cases, stent migration remain major complication as well as difficult stent removal especially for non covered stents.(14).

Nedelcu et al (15) used a fully covered stent with or without internal pig tail drain insertion, where complete control of the leaks achieved in a mean time of 3.4 months in the absence of axial twist, but stent migration remain the main concern about this study.
internal drainage/stricturotomy. Is another strategy that consists of a combination of stricturotomy of the septum between the perigastric cavity and the gastric sleeve, associated with 30 mm achalasia balloon dilatation in case of axial deviation at the incisura angularis. but, further studies need to confirm the results of this study(16).

The use of endoluminal vacuum (E-Vac) according to Smallwood et al, (17) showed good results as a therapy post foregut leaks, healing was achieved, after an average of 35.8 days and 7. different E-Vac changes Similarly.

Leeds et al, (18) presented very encouraging results in the treatment of SG where leak was controlled in 89% of cases. but the mandatory endo-sponge changes that are done every 3 to 5 days under general anesthesia. Remains the major draw back of this technique.

In our study ; we managed to control leaks in 7 of 8 patients (87.5%) in (mean 31.8 ±SD7.1) days Eubanks et al,(19 and Corona et al. (20) announced shorter control time 20 and 31 days respectively, while Southwell et al. (21) reported a longer time (75 days) with only one case failure mainly due to large sized defect and the bad general conditions of the patient where conversion to Roux-en-Y gastric bypass (RYGB) was needed, we needed to reposition the stent in one case, the repositioning was easy as the fully covered stent induces less adhesions, also the use of **Taewoong Niti-S** Fully Covered Mega Esophageal stent allows early oral feeding that adds to the early optimization of the patient conditions not like the use of the endoluminal vacuum (E-Vac)

Conclusion;

It is proved to us throughout the results of this study that the use of fully covered mega stent is safe and effective in the treatment of post sleeve gastrectomy stable line leaks.

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