

Complications of Mega Stent in Controlling the Leakage After Sleeve Gastrectomy

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Background: Sleeve gastrectomy has become a popular stand-alone bariatric procedure with comparable weight loss and resolution of co-morbidities to that of laparoscopic gastric bypass. One of the dreaded complications after LSG is a gastric leak which may reach up to 5% and is most commonly occurring at the upper staple line near the gastro-esophageal junction. The use of flexible stents has been recently proposed as an alternative for the treatment of the esophago-gastric enteric leaks. We present our experience in the treatment of gastric leaks with coated self-expandable mega stents.

Patients and methods: This study included 15 patients who had gastric leaks at the gastro-esophageal (GE) junction after SG. Stents were placed endoscopically in 9 patients and the other 6 patients were managed laparoscopically by drainage and closure of the leakage site with insertion of feeding jejunostomy.

Results: Mega stent insertion had successfully controlled the leakage only in 2 patients; showed migration of the stent in 3 patients, failure of leakage control in another 2 patients and associated with bleeding in 1 case and marked esophageal narrowing in another case. Leaks were completely sealed in the 6 patients who had been managed with laparoscopic exploration and after feeding through the jejunostomy tube for 2-3 weeks.

Conclusions: Mega stents are proposed as an alternative therapeutic option for the management of GE junction leaks in bariatric surgery, however the complications related to the stent insertion and after removal together with the incidence of its ineffectiveness of leakage control make us reconsider the conventional drainage with the closure of the leakage site (if possible) with insertion of feeding jejunostomy.

Key words: Gastric leaks, morbid obesity, bariatric surgery, sleeve gastrectomy, coated stents.

Introduction:

Laparoscopic sleeve gastrectomy (LSG), also known as longitudinal or vertical gastrectomy, is a relatively new and effective surgical option for the management of morbid obesity. It was initially introduced in 1990 as an alternative to distal gastrectomy with the duodenal switch procedure to reduce the rate of complications.¹

Sleeve gastrectomy was first performed laparoscopically by Ren and colleagues in 1999. At the time, LSG was considered a first-stage operation in high-risk patients before biliopancreatic diversion or Roux-en-Y gastric bypass.²⁻³

Laparoscopic sleeve gastrectomy was subsequently found to be effective as a single procedure for the treatment of morbid obesity. Although LSG functions as a restrictive procedure, it may also cause early satiety by removing the ghrelin-producing portion of the stomach.⁴

One of the dreaded complications after LSG is a gastric leak, most commonly occurring at the upper staple line near the gastro-esophageal junction.^{5,6} This complication if not identified and treated quickly and aggressively, may lead to abdominal sepsis, which might progress either to chronic gastric fistula or to multi-organ failure and patient

demise.⁷

The use of flexible stents has been recently proposed as an alternative for the treatment of enteric leaks after esophago-gastric surgery⁸ and also for leaks after bariatric surgery.⁹

Stent placement for exclusion of the leak from the gastrointestinal tract is the endoscopic technique supported by the most substantial body of evidence. Stent placement allows the leak to heal while enteral nutrition is resumed, potentially accelerating recovery and avoiding the need for parenteral nutrition. Peritoneal contamination is decreased, and improvement in abdominal pain may follow.¹⁰

Study design:

The aim of the current study is to present our experience on the self-expandable mega stents (TAEWOONGN Niti-S Mega Esophageal stent) for the management of gastric leakage after sleeve gastrectomy.

Patient and methods:

Between January 2011 and 2015, 390 patients benefitted from sleeve gastrectomy (SG) in 8B unit of Ain Shams university hospitals ,Elgolf International hospital and Dar Elhekma hospital .This study evaluated the outcome of 15 patients who developed leakage after laparoscopic sleeve gastrectomy, 6 patients of our departments and the other 9 patients were referred to our university hospitals.

Mega Stent was inserted endoscopically on 9 patients. The other 6 patients were managed by laparoscopic exploration and drainage at the leakage site with or without closure of the leakage site with creation of feeding jejunostomy.

2 patients who had laparoscopic sleeve gastrectomy showed leakage at the angle of His. One of them was a female patient 25 year old with BMI 41. The leakage was detected on the gastrograffin study on the 1st post operative day, while the other patient was a 36 year old male patient with BMI 46. He showed the signs of leakage 3 days later after discharge with normal gastrograffin study postoperatively. Ultrasound guided

aspiration of localized collections was done before the insertion of the covered mega stent.

The gastrograffin study done on the second day after insertion of the stent had showed control of the leakage. The two patients started oral feeding on the second day and were discharged, both patients complained of intermitted mild to moderate epigastric pain, chest pain and reflux symptoms that were controlled by analgesic and PPI. The stent was kept for 7 weeks and was removed endoscopically with smooth course.

3 of our patients had complained of stent migration down to the jejunum. Persistence of leakage was the main feature. 3-4 sessions were required for pulling up and repositioning the stent, which finally was effective in controlling the leak and was removed after 7 weeks.

Another 4 cases of leakage after sleeve gastrectomy were treated by mega stent insertion, however various complications had occurred.

A 25-year-old male with BMI 37 kg/m², with type 2 diabetes mellitus, after laparoscopic sleeve gastrectomy, leakage at the GE junction was detected. Mega stent was inserted, the leakage was markedly controlled but minor leakage persisted on the dye study. The patient was kept on total parental nutrition (TPN) with no oral feeding for 10 days but the dye study showed the persistence of that minor leakage.

TPN was extended to another 10 days with ultrasound guided aspiration of a localized collection at the leakage site and the pelvis, the stent was removed after 8 weeks, with the persistence of minor leakage that was finally controlled after 7 days of stent removal.

Another 42-year-old woman with BMI 41. Four days after sleeve gastrectomy, a gastric leak at the angle of His was detected. Mega stent was inserted and the leakage control was confirmed by the dye study. The patient had started oral feeding and discharged, however the patient was readmitted 7 days later with signs of septicemia.

Pelvi- abdominal ultrasound was done showed a moderate pelvic collection. Midline exploration and drainage of the collection at

the site of leakage was done and the edges were approximated by 2-0 Vicryl sutures. Wide drains were inserted and feeding jejenostomy was inserted.

The patient was kept on the jejenostomy feeding for 3 weeks after which the leakage site was healed as confirmed by the dye study.

A 24-year-old woman with BMI 43 underwent a LSG. Two days after the operation, signs of leakage were detected as fever and tachycardia that was confirmed by the dye study.

Mega stent was inserted and the patient started oral feeding, however 2 days later, the patient complained of recurrent attacks of hematemesis that required transfusions of 2 unit of fresh blood as the hemoglobin level dropped to 7.5 gm/d. Upper GIT endoscopy was done, revealed multiple erosions on the duodenal wall by the lower edge of the stent so the stent was pulled up with epinephrine injection at the erosion site. The bleeding was controlled, 7 weeks later the stent was removed with no signs of leakage.

A 38 -year-old woman with BMI 44 underwent a LSG. Two days later the signs of leakage and the dye study confirmed the prescience of leakage at the gastro-esophageal junction.

Mega stent was inserted and the patient started oral feeding, however she complained of severe epigastric pain hardly relieved by strong analgesics. The stent was removed 7 weeks later after the leakage site was healed. The removal was done with difficulty as the upper end of the stent had eroded the esophageal wall with marked narrowing of the esophagus not passable to the scope and she complained of marked dysphagia.

Esophageal dilation using savary dilators was done, however esophageal perforation had occurred, necessitated insertion of another esophageal stent and right sided intercostals tube for drainage.

The intercostal tube was kept for 10 days, 3 weeks later the stent was removed. The patient complained of moderate dysphagia that necessitated 3 session of esophageal dilation.

After we had experienced that

complications accompanied with the Mega stent insertion, we changed our policy toward any leakage after gastric sleeve through laparoscopic exploration and drainage of the leakage site with standard creation of the feeding jejenostomy. Such policy was done for 6 patients presented to us later with leakage after sleeve gastrectomy.

3 patients had showed the signs of leakage on the third day and were operated upon laparoscopically. It was not possible to approximate the edges of the leakage site because of the friability of the tissues, however good drainage and feeding jejenostomy was done.

The other 3 patients showed the signs of leakage on the second day postoperatively. We had approximated the edges with 2 stitches 2-0 vicryl with good drainage and the feeding jejenostomy was done laparscopically.

The patients were discharged to their home on the fourth day postoperatively and they were kept on feeding through the jejenostomy tube for 2 weeks. Healing of the leakage site was confirmed by the dye study, the tube was removed 1 week later for establishment of a well formed track.

The post operative period was smooth, however one of our explored patients suffered from DVT and attacks of pulmonary embolism that was controlled by medical treatment.

Results:

We had used mega stent for nine patients to treat leaks after LSG. The mega stent was inserted endoscopically and it extended from the middle of the esophagus to the first part of the duodenum. In all cases the site of leakage was the gastro- esophageal junction. The patients had poor tolerance to the stent with mild to moderate, recurrent nausea and retrosternal discomfort.

However the leakage was not well controlled in 2 patients. One of them required urgent midline exploration and drainage of the pelvic collection with insertion of a jejeunostomy tube, while the other was kept on TPN for 7 days after the retrieval of the stent.

3 of our patients had complained of stent migration down to the jejunum. Persistence of leakage was the main feature. 3-4 sessions were required for pulling up and repositioning the stent.

Another patient complained of marked duodenal erosion at the lower end of the stent, presented by recurrent attacks of hematemesis which was controlled by endoscopic epinephrine.

The leakage site was controlled in 2 patients with no complications related to the stent other than epigastric chest pain with intermittent dysphagia.

We adopted the policy of exploration and drainage of the leakage collections laparoscopically with standard creation of the feeding jejunostomy, such policy was done with 6 patients.

We could approximate the edges with 2-0 vicryl in 3 patients, however the tissues were friable on the other 3 patients, so we only ensured good drainage and insertion of the feeding tube.

The post operative period was smooth, however one patient had complained of DVT and pulmonary embolism.

Discussion:

Complication rates after primary bariatric operations are today within acceptable limits, although in the hands of the most experienced surgeons, both morbidity and mortality are inevitable.¹¹

Gastric leak is one of the most serious and dreaded complication of LSG. It occurs in up to 5% of patients following LSG.¹²

Leaks after bariatric operations are usually life threatening complications, traditionally treated with surgery, distal enteral feeding or total parenteral nutrition (TPN). The use of flexible stents has been recently proposed as an alternative for the treatment of enteric leaks after esophago-gastric surgery¹³ and also for leaks after bariatric surgery.¹⁴

We routinely test the incidence of possible leaks intra-operatively with methylene blue, the 1st postoperative day with upper GI Gastrografin® studies. In our study, the detected cases of leakage were managed by

insertion of the endoscopic mega stent.

The placement of the stent can temporarily bypass the site of leakage and allow the patients to maintain the enteral nutrition until complete closure of the leak. Stents must be tested with oral Gastrografin® after the implantation and also immediately after removal. Almost all authors have reported that the optimal time for removal of the stent is around 6-8 weeks.

Removal of the stent is not always easy. The prostheses are silicone-coated, but intense adherence of the stent is frequent, and mucosal laceration and bleeding are frequent after removal. Migration is another concern with the use of stents. The incidence of migration has been reported to be as high as one third of cases.¹⁵

We had maintained the stents for 7-8 weeks, in some cases leaks had persisted, so we kept the patients on TPN for another 1 week till the leakage site was healed.

However we experienced some complications related to the stent insertion as bleeding, esophageal stricture, stent migration and the persistence of the leakage site after the stent removal.

Himpens J et al, had mentioned that 29 patients who developed a leak at the angle of His. All patients were treated under general anesthesia by the placement of a covered stent. Stent treatment was immediately successful in 19 patients, as documented by barium swallow performed the day after ablation of the stent. Ten patients, however, had positive barium swallow and/or methylene blue test and required insertion of a new stent for another six weeks.¹⁶

Renca c et al, had mentioned that fifteen patients presented with a leak after LSG, 6 of these patients required stenting as a secondary treatment. Although leaks from 3 patients resolved with stenting, the other 3 required re-stenting and 2 eventually underwent conversion to gastric bypass.¹⁷

Moszkowicz D, et al stated that the endoscopic stent was tried in nine patients but failed in 84.6 % of cases within 20 days. Seven patients necessitated total gastrectomy within 217 days of conservative treatment



Figure (1): TAEWOONGN Niti-S Mega Esophageal stent - South Korea 415-873 T (28 mm diameters and 23 cm length).

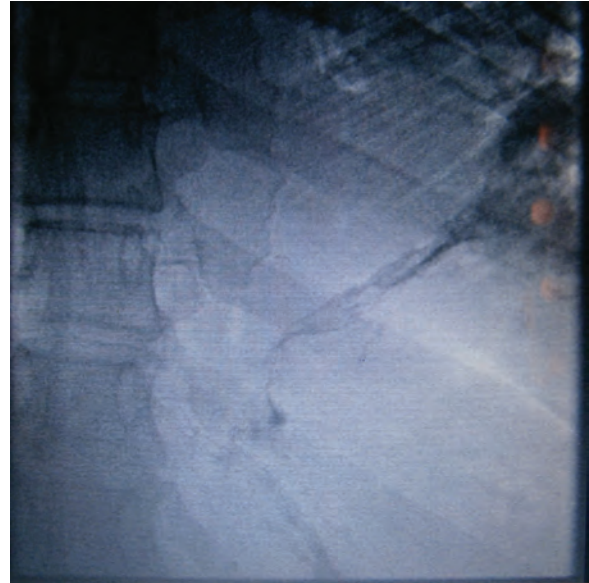


Figure (1): Leakage at the angle of His.

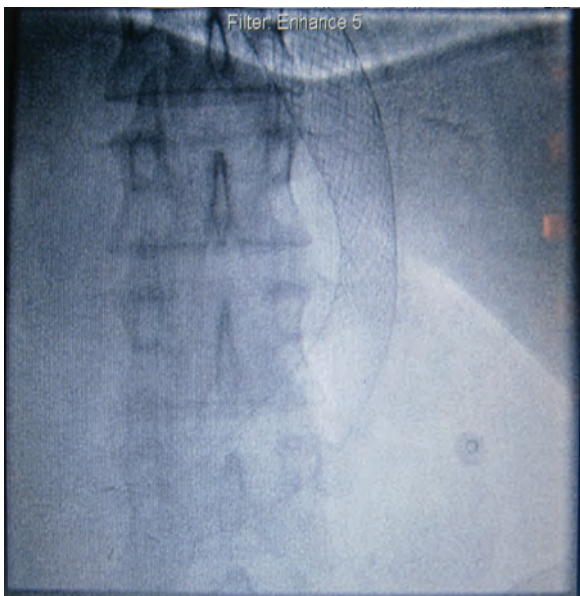


Figure (3): Inserted mega stent.



Figure (4): Persistence of leakage after the stent insertion.

Table (1)

Intervention	Number of patients	Hospital stay	Complications	Failure
Stent insertion	9	33 (3-63 days)	4 patients	3 patient
Laparoscopic intervention	6	8 days (3-13)	1 patient	0

failure. Endoscopic stents entail high failure rate, total gastrectomy is required in one third of the cases.¹⁸

Therefore, we suggest an exploratory laparoscopy for diagnosis in patients who show signs of leakage in the early

postoperative period. In the presence of a leak, an abdominal washout with surgical repair of the leak (if technically feasible) and establishment of an enteral feeding route should be performed. As the stomach is limited in size, the preferred choice for enteral feeding is typically a feeding jejunostomy for 3 weeks after which the tube was removed.

This policy had succeeded with patients and limit their complaints and suffering after sleeve gastrectomy to 3 weeks as compared to the stent insertion that if complicated, may extend up to 10 weeks.

Conclusion:

Although the endoscopic mega stents are minimally invasive, complications related to the stent insertion and after removal increase the incidence of its ineffectiveness on leakage control as compared to the conventional drainage with the closure of the leakage site (if possible) with insertion of feeding jejunostomy. Further studies are needed to find better materials for the endoscopic stent insertion to make this approach even more effective.

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