Laparoscopic sleeve gastrectomy with Sydney patch: a cohort study

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Introduction
Prevalence of obesity nearly tripled between 1975 and 2016 globally, with more than 1.9 billion adults aged 18 years and older being overweight. Bariatric surgery, including laparoscopic sleeve gastrectomy, has been shown to be effective in treating obese patients by reducing BMI and treating comorbidities of obesity. However, the most severe consequence is staple line leakage at the most proximal part of the staple line, increasing morbidity, mortality, and hospital stay. Therefore, our stud5y's aim is to evaluate Sydney patch (SP) technique, a maneuver that reinforces proximal area of staple line using the gastric fat pad and omentum.
Patients and methods
From January 2020 to December 2020, we reviewed medical records of patients undergoing laparoscopic sleeve gastrectomy (LSG) with SP in the Bariatric Surgery Department at Ain Shams University Hospital. We included patients above 18 years old and excluded those who were young than 18 years or older than 60 years and had previous bariatric or Gastro-intestinal (GI) surgery.
Results
A total of 30 patients underwent LSG with SP between January and December 2020. Only two (6.7%) patients developed postoperative gastroesophageal reflux disease (GERD), whereas no patients had postoperative leakage or hemorrhage or gastric remnant rotation (gastric twist).
Conclusion
This study shows promising results that LSG with SP can potentially protect against gastric leakage and hemorrhage. The authors believe that SP can be potentially efficient and a cost-effective method compared with synthetic staple line reinforcement, but large randomized controlled trials (RCTs) are needed to further evaluate the effectiveness of SP in reducing morbidity and mortality after LSG.

Keywords:
laparoscopic sleeve gastrectomy, leakage, Sydney patch, twist

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Introduction

According to the WHO, the prevalence of obesity nearly tripled between 1975 and 2016 globally. More than 1.9 billion adults aged 18 years and older were overweight, of whom 650 million adults were obese [1].

Bariatric surgery has been shown to be effective in treating obese patients by reducing BMI and treating comorbidities of obesity. Several bariatric surgeries emerged, including laparoscopic sleeve gastrectomy (LSG), minigastric bypass, and Roux-en-Y gastric bypass (LRYGB). Popularity of each procedure has changed over time [2,3].

Nguyen *et al.* [4] examined the popularity of procedures done in academic centers of USA between 2008 and 2012 and reported that by the end of 2012, the rate of gastric banding operation decreased from 23.8% to only 4.8% of all bariatric operations performed in USA over a course of 4 years, whereas the rate of LSG rose from 0.9% to 36.3%. LRYGB is the most popular procedure performed nowadays (56.4%). Although LSG is continuing to increase globally, several complications arise, forcing surgeons to find a solution or an alternative.

Commonest complications of LSG include postoperative bleeding, postoperative gastroesophageal reflux disease (GERD), sleeve strictures, mesenteric vein thrombosis, surgical site hernia, and staple line leakage. The most severe consequence is staple line leakage at the most proximal part of the staple line, occurring in 1–5% of procedures. Staple line leakage not only increases morbidity, mortality, and hospital stay but also requires interventions such as stent insertion or drainage of collection [5].

Therefore, our study aim is to evaluate Sydney patch (SP) technique presented by Rahman and colleagues. This method aims to reduce postoperative leakage from the staple line at the proximal area of staple line using the gastric fat pad and omentum. SP also reduces the fluid collection space next to the gastric cardia.

Patients and methods

From January 2020 to December 2020, we reviewed medical records of patients undergoing lLSG with SP in the Bariatric Surgery Department at Ain Shams University Hospital. We included patients older than 18 years. Scientific committee approval is acquired to access patient's data. We excluded those who were younger than 18 years or older than 60 years and those who had previous bariatric or Gastro-intestinal (GI) surgery.

Preoperatively, a multidisciplinary team evaluated the candidates based on medical, nutritional, endocrinological, and psychiatric workup. Preoperative assessment included blood examinations, cardiology evaluation, and chest radiography. Psychiatric counseling was conducted to evaluate mental health contraindications to surgery.

Patients were then followed postoperatively for leakage or hemorrhage or gastric twist and then later for symptoms of GERD. Missing patients were called by phone and asked to attend the next day for follow-up.

After dissection of the greater curvature till well visualization of the left crus of diaphragm, resection begins 4–5 cm from the pylorus along a 36-Fr calibration tube, using violet linear tri-staplers (GIA-Roticulators; Covidien, Dublin, Ireland). A gastric sleeve with a capacity of 100 ml in volume remains.

As done in Rahman *et al.* [6], an omentopexy is made with a 3/0 Monocryl V-lock suture, which is placed from the loose part of the gastrosplenic omentum to the left diaphragmatic pillar, close to the esophagus. Then, by the same suture, we did a through-and-through stitch from the omentum to the edge of the staple line at the level of lower margin of the mobilized fat pad. The fat pad is then pushed along the suture loop and placed on the upper border of the staple line and anchored omentum. The suture loop is then pulled compressing the upper part of the gastric staple line between the anchored momentum and the fat pad, forming the SP (Figs 1–3).

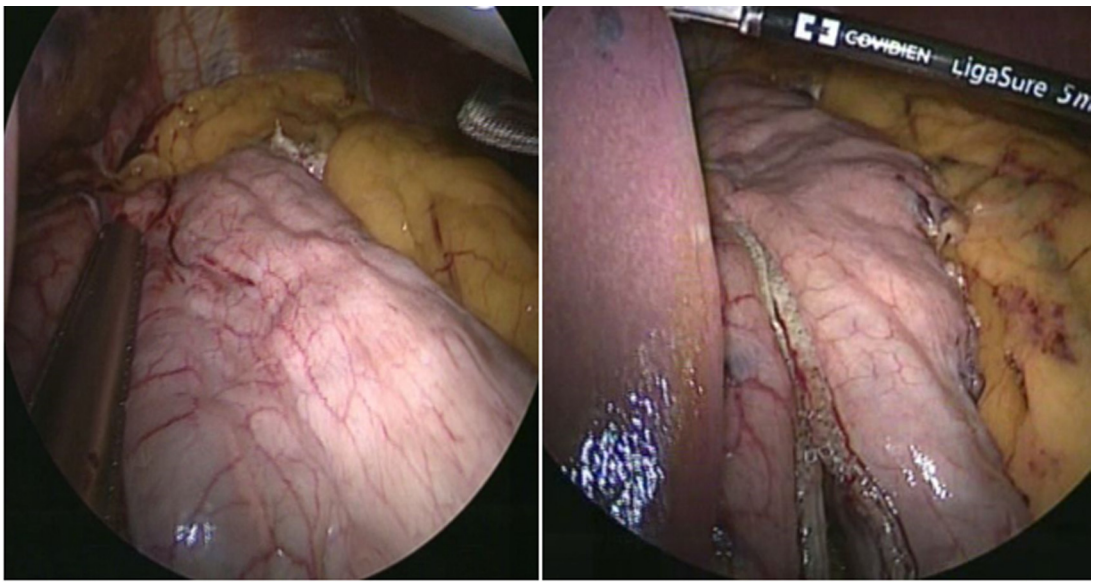
Careful dissection of the SP and avoiding too much stitches in order not to compromise the vascularity must be taken in consideration.

Statistical analysis was done through SPSS version 16.0, IBM SPSS Statistics, Chicago, USA. To ensure our data had normal distribution, we performed Kolmogorov–Smirnov test and Shapiro–Wilk test. We used one-sample Student's *t*-test for noncategorical variables. *P* value less than 0.05 was considered statistically significant.

Results

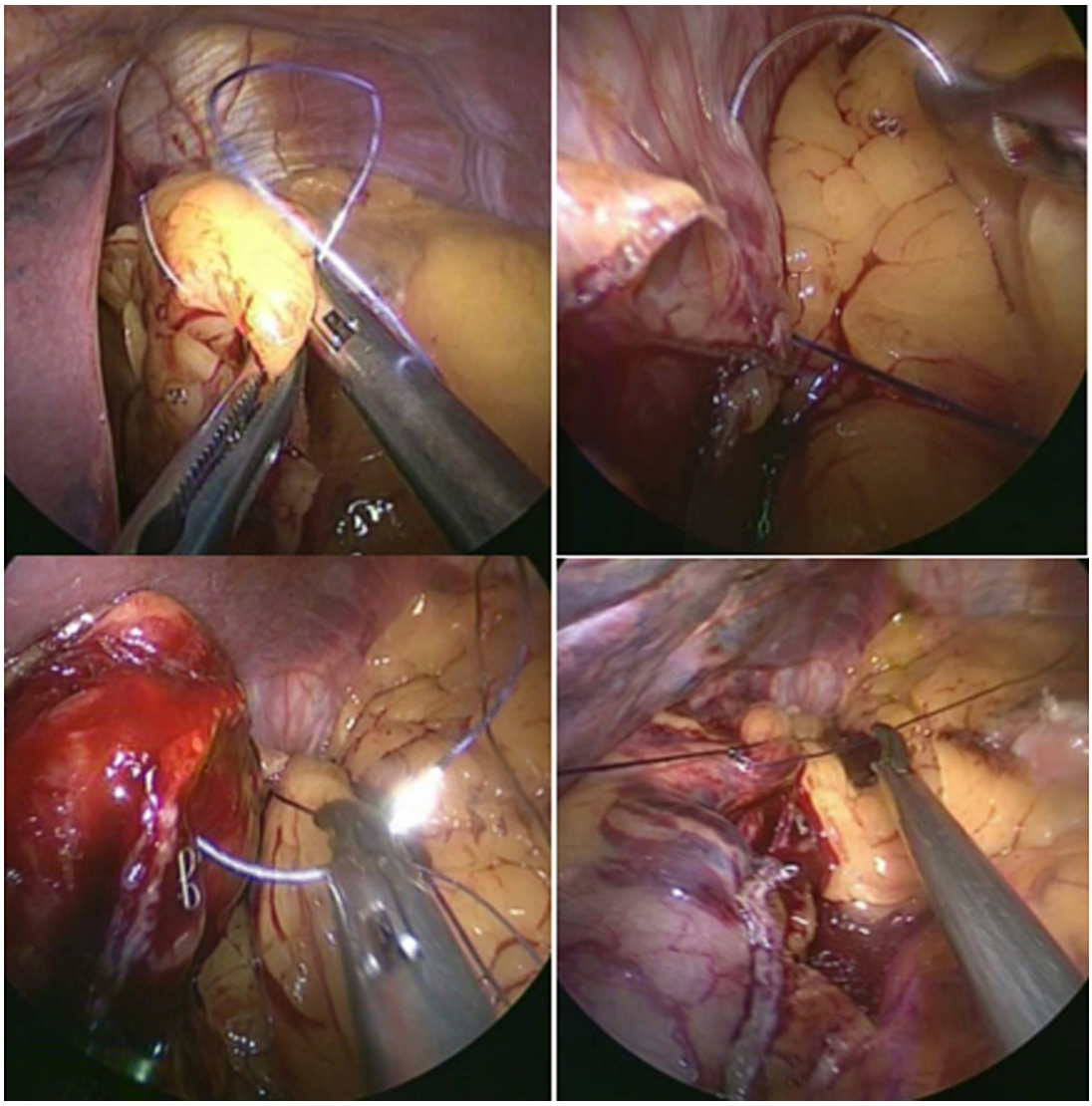
A total of 30 patients underwent LSG with SP between January and December 2020. Table 1 shows patients'

Figure 1



Removal of a part of stomach along the greater curvature.

Figure 2



Steps of anchoring the pad of fat to the crus of diaphragm then along staple line of the remaining stomach.

demographics. None of the participants had postoperative leakage, hemorrhage, gastric twist, or mortality. Two (6.7%) out of 30 patients developed postoperative GERD.

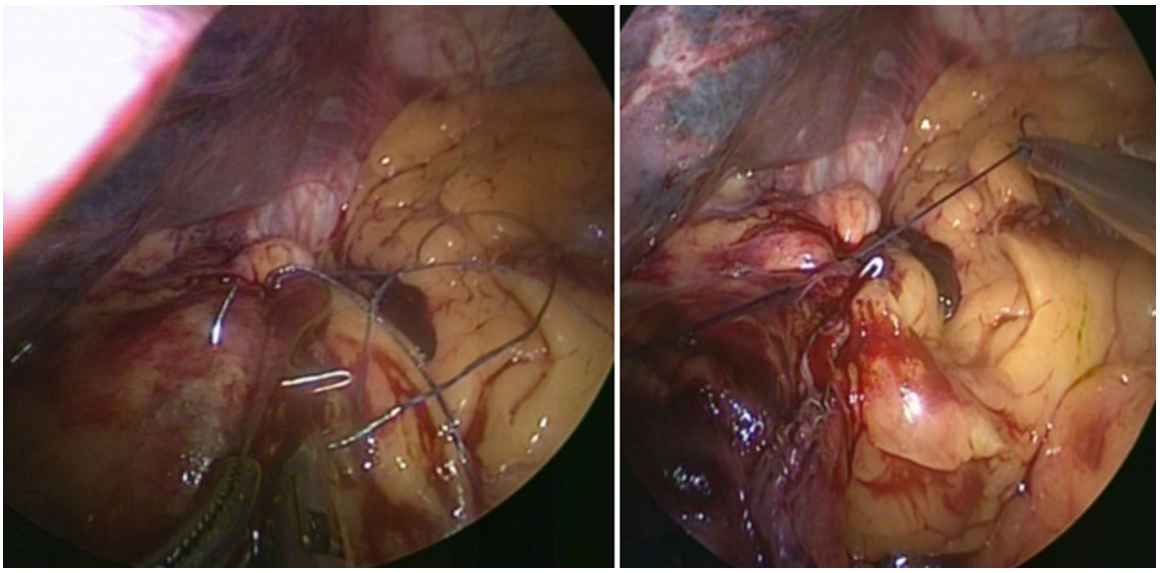
Performing SP along with LSG had significantly high mean operative time (46.20±5.2 SD) using one-sample *t*-test (P=0.0005) (Table 2).

Discussion

Staple line leakage not only increases morbidity, mortality, and hospital stay but also requires interventions to manage such cases. Wang and colleagues reported incidence of postoperative hemorrhage and gastric leak of ~13.7 and 4.5%, respectively [7]. However, Parikh *et al.* [8] mentioned a leak rate of 2.2% and a leak-related mortality of 0.11% in LSG. Several intraoperative techniques are done to prevent such complication.

To address this complication, Paikah and colleagues studied in their meta-analysis the relationship between leak rate and bougie size, distance from the pylorus, and the use of buttressing material on the staple line. They suggested Bougie size greater than or to 40 Fr may decrease leak incidence, unlike use of buttressing or distance from the pylorus [8]. Ganger *et al.* [9] in their systematic review of 40,653 patients studied oversewing nonabsorbable bovine pericardial strips, tissue sealant or fibrin glue, or absorbable polymer membrane to decrease incidence of gastric leaks. They reported that absorbable polymer membrane had the least leak rate of 0.7% compared with other techniques. In another study, Ganger *et al.* [10] also found that absorbable polymer membrane had the least gastric leak rate (1.09%).Although several techniques

Figure 3



A through-and-through stitch from the omentum to the edge of the staple line at the level of lower margin of the mobilized fat pad and then staple line is compressed between pad of fat and omentum.

Table 1 Patients' characteristics

Age (mean±SD)	36.60±9.70
Sex [*n* (%)]	
Male	12 (40)
Female	18 (60)
Preoperative BMI (mean±SD)	43.90±2.42
Operative time (mean±SD)	46.2±5.28
Postoperative leak [*n* (%)]	0
Postoperative hemorrhage [*n* (%)]	0
Postoperative GERD [*n* (%)]	2 (6.7)
Postoperative gastric twist [*n* (%)]	0
Mortality [*n* (%)]	0

GERD, gastroesophageal reflux disease.

Table 2 Mean difference in operative time using one-sample *t*-test

t	df	*P* value	Mean difference	95% CI
5.393	29	0.0005	5.20	3.22–7.17

CI, confidence interval.

had clearly decreased the incidence of postoperative gastric leak, desirable results are not met yet.

To our knowledge, our study is one of the early studies after Rahman *et al.* [6] studying the LSG with SP. In Rahman and colleagues, 546 patients underwent LSG between January 2014 and August 2017. Of them, 462 underwent LSG with SP. They reported that patients with SP had a short hospital stay and no staple line leakage.

In our study, we evaluated postoperative leak, hemorrhage, gastric twist, and GERD in patients with SP. We studied 30 patients between January 2020 and December 2020. Only two patients had postoperative GERD. There was no reported postoperative leak or hemorrhage or twist.

This simple maneuver shows reduction in postoperative leaks in both Rahman and colleagues and our study. In Rahman and colleagues, the authors predicted that postoperative leaks will be contained owing to reduced dead space at gastroesophageal junction by the SP. Moreover, SP, done by omentum and pad of fat, is an affordable technique that helps prevent a severe postoperative complication of LSG.

Larger sample sized studies are needed to evaluate effectiveness of SP compared with other techniques done to minimize postoperative leak.

Our study had limitations. First, we had a small sample size owing to COVID-19 pandemic; thus, few elective surgeries were done. Second, our study might have some bias owing to a single-arm cohort design.

Conclusion

Our study shows promising results that LSG with SP can potentially protect against gastric leakage and hemorrhage. We believe that SP can be potentially efficient and a cost-effective method compared with synthetic staple line reinforcement, but large randomized controlled trials (RCTs) are needed to

further evaluate effectiveness of SP in reducing morbidity and mortality after LSG.

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Nil.

Conflicts of interest
There are no conflicts of interest.

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