Omentopexy in sleeve gastrectomy and its effect on postoperative complications

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Background
Sleeve gastrectomy is an effective and relatively safe procedure for morbid obesity. Diagnosis of leakage is mainly based on clinical suspicion rather than laboratory and radiological evidence.
Aim
To evaluate the benefit of omental reattachment with full-thickness stomach stitches during laparoscopic sleeve gastrectomy (LSG) in decreasing postoperative hemorrhage and/or leakage.
Patients and methods
A retrospective analysis was conducted on the collected data from 100 cases that were divided into two groups: group I included 50 cases that underwent LSG procedures with no omental reattachment, and group II included 50 cases that underwent LSG procedures with omental reattachment with full-thickness staple line of sleeved stomach stitches till the level of angle of His above and to the antrum below from April 2019 to April 2020 at Bariatric Surgery Unit of the General Surgery Department of Ain Shams University Hospitals.
Results
There was a statistically significant difference between the two groups regarding the operation time and drain content and amount. There was a decrease of postoperative bleeding between the two groups from 12% in group I to 0% in group II, with *P* value of 0.4, indicating slight significant difference. It also showed no difference in the percentage of postoperative leakage, as it was 1% in both groups.
Conclusion
A decrease in incidence of bleeding postoperatively can be achieved by omental fixation to the sleeved stomach by full gastric thickness stitches; it will decrease patient's morbidity and mortality, as it decreases hospital stay and possibility of blood transfusion.

Keywords:
omentopexy, postoperative leakage and bleeding, sleeve gastrectomy

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Introduction

Recent reports have described morbid obesity as a continuing epidemic. The failure of various diets to achieve a long-term weight loss has prompted a growing number of morbidly obese patients to seek surgical treatment [1].

For many bariatric surgeons around the world, laparoscopic sleeve gastrectomy (LSG) has become one of the most common bariatric procedures and the first choice. Factors that contribute to LSG's popularity include technological feasibility, preservation of normal intestinal anatomy and absorption capacity, no implantation of foreign bodies, and less chance of nutritional deficiencies [2].

LSG has been developed over the last 10 years to become more safe and efficient than other bariatric surgeries; many techniques have been discovered to minimize postoperative complications such as bleeding and/or leakage [3].

There are some common complications after LSG such as bleeding, with an incidence range from 0-–4.4%, and leakage, with an incidence of ~2.2% [2]. In most cases, these complications can be managed conservatively, with no need of revision surgery, although there may be need for surgical intervention in some serious cases, as to stop a serious bleeding or to close persistent leakage site after stent insertion [4].

Gastric leak is one of the most dreaded complications after bariatric surgery. Owing to their high rate of morbidity and mortality, patients who developed gastric leakage require multiple additional diagnostic tests, longer hospitalization, transfer to theICU, prolonged ventilator support, and many times a reoperation as a consequence of septic shock,

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multiorgan failure, intraabdominal abscesses, and fistulas [5].

LSG is a modern and successful method for surgical management of morbid obesity, and hence the number of LSG patients will increase for all practicing bariatric surgeons; therefore, basic knowledge of common complications and appropriate treatment options are important. Patient morbidity and mortality may be minimized by early diagnosis and treatment of those complications [6].

Aim

The aim of this study is to evaluate the benefit of omental reattachment with full gastric thickness stitches during LSG in decreasing postoperative hemorrhage and/or leakage.

Patients and methods

A retrospective analysis was conducted on the collected data from 100 cases after ethical approval and consent, which were divided into two groups: group I included 50 cases that underwent LSG procedures with no omental reattachment, and group II included 50 cases that underwent LSG procedures with omental reattachment with full-thickness staple line of sleeved stomach stitches from the level of angle of His above to the antrum below, from April 2019 to April 2020, at Bariatric Surgery Unit of the General Surgery Department of Ain Shams University Hospitals.

Study tools

Laparoscopic tools, stapler, and PDS 2-0 threads or vicryl 2–0 were used.

Study population

Inclusion criteria

According to American Society of Anesthesiologists classification system, physical status I and II [7]; age 18–55 years; and body mass index > 35+comorbidity or > 40 without comorbidities were the inclusion criteria.

Exclusion criteria

According to American Society of Anesthesiologists classification system, patients with physical status category III and category IV [7] were excluded.

Study procedures

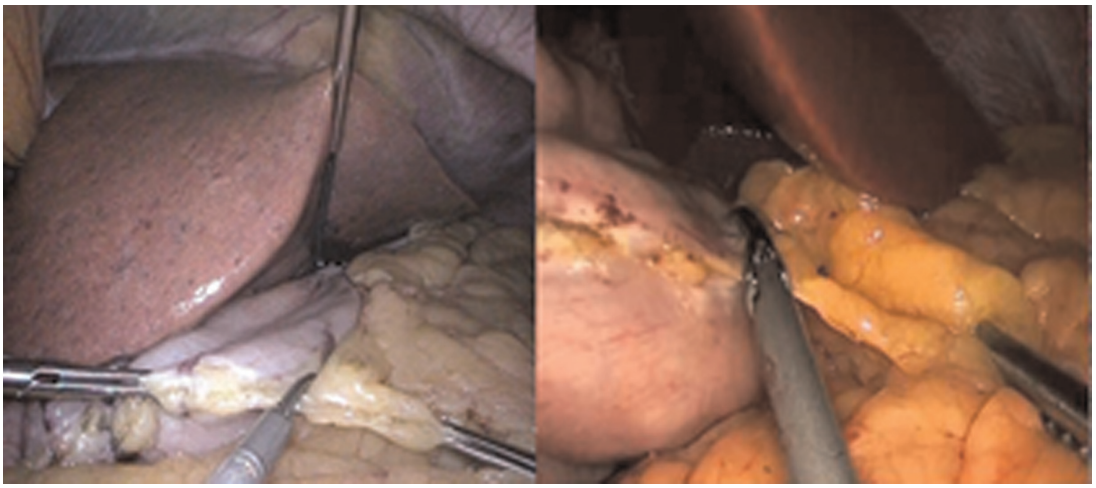
The procedure was performed under general anesthesia in a French position (supine with open legs).

Creation of pneumoperitoneum was done using a small stab at the umbilical scar allowing the introduction of the veress needle; insufflation was done to establish carbon dioxide pneumoperitoneum up to 14 mmHg and then insertion of four ports was done:

5-mm epigastric trocar (for liver retractor).
5-mm left hypochondrial (left working port).
12-mm right hypochondrial (right working port).
10-mm supraumbilical for the camera man.

Devascularization of the greater curvature from the greater omentum from 2 cm proximal to pylorus to angle of His was done using ultrasonic harmonic scalpel or ligasure (Fig. 1). Insertion of 36-Fr Bougie inside stomach through mouth was done. Johnson Stapler was introduction using at first green reload 60–4.8 mm, and then we used another green reload if needed, and stapling was continued using gold and blue reloads 60–3.8 mm and 3.5, respectively, till

Figure 1



Devascularization of greater curvature from the greater omentum.

the end. Methylene blue test is done to ensure sealed staple line and no intraoperative leakage (Fig. 2).

Group I

No omental fixation was done, but if bleeding occurs, we apply titanium clips to the site of bleeding (Fig. 2).

Group II

Omental fixation by full gastric thickness stitches using PDS 2–0 or vicryl 2–0 by simple continuous sutures till the antrum only was done (Figs 3 and 4).

Finally, insertion of an intraabdominal drain was done.

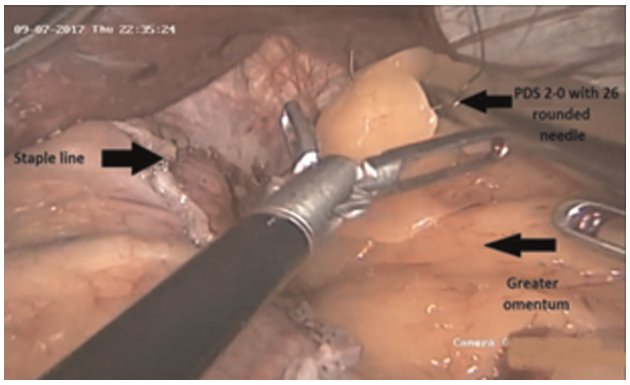
Results

Tables 1 and 2 shows highly statistically significant difference between groups according to operation time (min). Table 3 shows a statistically significant difference between groups according to drain, amount, and weight loss after 6 months.

Discussion

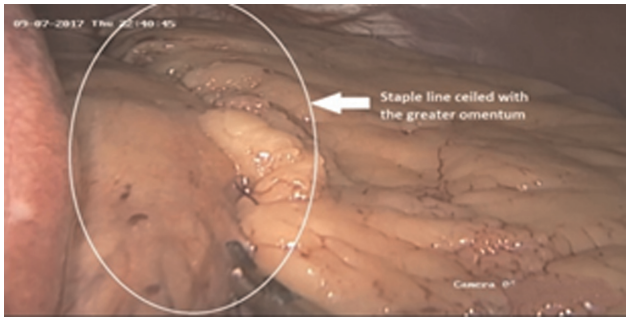
Between April 2019 and April 2020, 100 cases were operated for LSG. The cases were grouped into two groups: groups I and II. Group I included 50 cases operated without performing omental reattachment as a routine. It included 33 (66%) females and 17 (34%) males, with a mean age of 31.24±4.28 years, mean BMI of 45.36±4.42 kg/m2, and mean operative time of 45 ±7 min, with a range of 35–65 min. Group II included 50 cases operated with performing resected omentum reattachment to staple line. It included 30 (60%) females and 20 (40%) males, with mean age of 32.52±7.09 years, mean BMI of 44.64±5.32 kg/m2, mean operative time was of 60±15 min, with range of 55–80 min. Patients started oral feeding once they tolerated it and started ambulation within 2 h postoperatively.

Figure 3



Stitching the greater omentum to the staple line beginning at the highest point of the staple line.

Figure 4



Fixation took place till the antrum.

Figure 2

The sleeved stomach with methylene blue test.

Table 1 Comparison between group I: without omentopexy and group II: with omentopexy according to preoperative data

Preoperative data	Group I: without omentopexy (*N*=50)	Group B: with omentopexy (*N*=50)	*t*/χ2[a]	*P* value
Age (years)				
Mean±SD	31.24±4.28	32.52±7.09	1.359	0.157
Range	25–45	26–54		
Sex [*n* (%)]				
Female	33 (66.0)	30 (60.0)	0.386[a]	0.534
Male	17 (34.0)	20 (40.0)		
BMI				
Mean±SD	45.36±4.42	44.64±5.32	0.828	0.762
Range	41–58	36–56		

independent sample *t* test. aχ2, χ2 test. *P* value more than 0.05, nonsignificant.

Table 2 Comparison between group I: without omentopexy and group II: with omentopexy according to operative data

Operative data	Group I: without omentopexy (*N*=50)	Group II: with omentopexy (*N*=50)	Test	*P* value
Intraoperative leakage test [*n* (%)]				
Negative	49 (98)	49 (98)	0.000a	1.000
Positive	1 (2)	1 (2)		
Operation time (min)				
Range	40–90	90–140	35.594	<0.001**
Mean±SD	60.60±10.52	108.40±13.90		

χ2, χ2 test. *t*, independent sample *t* test. *P* value more than 0.05, nonsignificant. **P value less than 0.001, highly significant.

Table 3 Comparison between group I: without omentopexy and group II: with omentopexy according to postoperativedata

Postoperative data	Group I: without omentopexy (*N*=50)	Group II: with omentopexy (*N*=50)	*t* test	*P* value
Pulse				
Mean±SD	83.12±11.65	83.40±9.47	0.017	0.895
Range	66–130	65–120		
MBP				
Mean±SD	95.28±4.12	92.20±11.30	3.278	0.073
Range	85–110	70–120		
Temperature (°C)				
Mean±SD	37.01±0.24	37.03±0.21	0.198	0.657
Range	36.5–38.5	37–38.5		
Perigastric localized collection				
No	48 (96.0)	49 (98.0)	χ2=0.344	0.558
Yes	2 (4.0)	1 (2.0)		
Drain				
Bloody	6 (12.0)	0	χ2=8.028	0.037*
Gastric	1 (2.0)	1 (2.0)		
Serous	10 (20.0)	15 (30.0)		
Nil	33 (66.0)	34 (68.0)		
Amount				
Mean±SD	102.94±37.25	87.50±39.52	*t*=2.010	0.047*
Range	50–300	50–300		
Leakage				
No	49 (98.0)	49 (98.0)	χ2=0.000	1.000
Yes	1 (2.0)	1 (2.0)		
Weight loss after 6 months				
Mean±SD	16.64±3.37	17.90±2.79	*t*=4.155	0.044*
Range	12–25	10–25		

*Means significant *P* value.

In group I, six patients presented with postoperative bleeding detected by monitoring patients postoperatively for vital data, drain, follow-up serial complete blood count (CBC) (daily for 3 days), and imaging, for example, abdominal and pelvic ultrasound and computed tomography abdomen. One patient with bloody drain more than 300 ml in first 24 h needed to go back to the theater, and relaparoscopy was done to control bleeding. Five patients with bloody drain less than 300 ml in first 24 h needed only conservative

management with fluid therapy and blood transfusion. Only one case of leakage was detected at the fifth day clinically (tachycardia, low blood pressure, tachypnea, fever, rigid abdomen, and gastric content in the drain) through imagingby ultrasound and was managed with intraluminal stent insertion.

In group II, we did not have patients who presented with postoperative bleeding by monitoring patients postoperatively for vital data, drain, follow-up serial CBC, and imaging. Only one case of leakage was detected with intraluminal stent insertion, with more operative time than group I, but with no significant value according to possible leak risk and slight significant value according to possible bleeding risk.

However, a case in group I during intraoperative leakage test was positive for leakage. Omentopexy at the point of leakage was the chosen method for management of this complication, and on monitoring postoperatively, the patient was stable with respect to vital data, empty drain, follow-up CBC, and imaging. Therefore, we report the role of omentopexy in the management of intraoperative and postoperative complications rather than its prophylactic role.

So, the end point of our study shows the efficacy of full-thickness omentopexy to the sleeved stomach to decrease the postoperative bleeding between the two groups from 12% in group I to 0% in group II, with *P* value 0.4, with slight significant difference. It also showed no difference in the percentage of postoperative leakage, as it was 1% in both groups.

Chang *et al.* [8] used omentopexy to prevent sleeve axial distortion and maintaining the axis of the whole tube. The author suggested that gastric stenosis may predispose for gastric leakage. It increases the intragastric pressure with a relatively thinner gastric wall at the fundus which contributes to the aim of our study as the role of omentopexy in preventing leakage.

There are some common complications after LSG such as bleeding, leakage, and stricture. In most cases, these complications can be managed conservatively with no need of revision surgery, although there may be need for surgical intervention in some serious cases to stop a serious bleeding or to close persistent leakage site after stent insertion without closure (Figs 5 and 6). Our technique as shown before seems to reduce these complications, avoiding the burden of revision surgical intervention in a complicated patient [9].

Common sources for extraluminal bleeding include gastric staple line, spleen, liver, or abdominal wall at the sites of trocar entry. Studies suggest a second-look laparoscopy in any patient who presents with extraluminal bleeding with a sustained heart rate greater than 120 beats/ min, a drop in hemoglobin of more than 10 g/l postoperatively, and more than 300 ml blood in the drain in first 24 h [10].

Figure 5

Stent in place with drain in place, note clip at leak site.

Figure 6

Persistent leak after stent removal with drain in place.

Staple line reinforcement (SLR) is a routinely practiced technique today. Benefits of this has resulted in decreased bleeding and staple line leak postoperatively. Concerns with SLR are that they can increase rate of stricture, increase operative time, and increase costs for patients. Different techniques are used for SLR:

(1) Oversewing the staple line with running suture.
(2) Buttressing it with specific material such as bovine pericardium strips, synthetic polyester, glycoside and trim ethylene carbonate copolymer, and applying glue/hemostatic agents.
(3) Covering the staple line with omentum. Some surgeons report a reduction in bleeding by reinforcing the staple line by oversewing or by using buttressing material. However, caution should be used with oversewing as some studies have shown an increased risk of tearing and bleeding at the point of suture penetration when using this technique [11].

Different studies have used different techniques to decrease the possible bleeding after LSG such as the study by Himpens *et al.* [12], which depended on oversewing the stable line in 80 cases undergoing LSG, with 1.25% bleeding rate; Gandsas *et al.* [13], which depended on stable line reinforcement by bovine pericardium in 292 cases, with 0.6% bleeding rate; and our present study, which depends on omental reattachment to stable line in 50 cases, with 0% bleeding rate, indicating its efficacy.It is extremely important to closely inspect the entire staple line after withdrawal of the bougie. Following these steps should significantly decrease the incidence of bleeding from the staple line. If any minor bleeding is detected in this area postoperatively, it can be easily controlled with small clips. However, postoperative bleeding may also be from the resected area of the omentum, and the use of drains may aid in the detection of this intraabdominal bleeding [14].

Conclusion

A decrease in the incidence of bleeding postoperatively can be achieved by omental fixation to the sleeved stomach by full gastric thickness stitches. It will decrease patient's morbidity and mortality as it decreases hospital stay and possibility of blood transfusion.

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Nil.

Conflicts of interest
There are no conflicts of interest.

References

1 Mokdad AH, Bowman BA, Ford ES. The continuing epidemics of obesity and diabetes in the United States. JAMA 2010; 286:1195–1200.
2 Sakran N, Goitein D, Raziel A, Keidar A, Beglaibter N, Grinbaum R, *et al.* Gastric leaks after sleeve gastrectomy: a multicenter experience with 2, 834 patients. Surg Endosc 2013; 27:240–245.
3 Gibson SC, Le Page PA, Taylor CJ. Laparoscopic sleeve gastrectomy: review of 500 cases in single surgeon Australian practice. ANZ J Surg 2013; 85:273–277.
4 Abou Rached A, Basile M, El Masri H. Gastric leaks post sleeve gastrectomy: review of its prevention and management. World J Gastroenterol 2014; 20:13904–13910.
5 Kim J, Azagury D, Eisenberg D, DeMaria E, Campos GM, American Society of Metabolic and Bariatric Surgery Clinical Issues Committee. ASMBS position statement on prevention, detection, and treatment of gastrointestinal leakage after gastric bypass and sleeve gastrectomy, including the roles of imaging, surgical exploration, and non operative management on behalf of the American Society for Metabolic and Bariatric Surgery Clinical Issues Committee. Surg Obes Relat Dis 2015; 11:739–748.
6 Gumbs AA, Pomp A, Gagner M. Revisional bariatric surgery for inadequate weight loss. Obes Surg 2007; 17:1137–1145.
7 Sankar A, *et al.* Reliability of the American Society of Anesthesiologists physical status scale in clinical practice. Br J Anaesth 2014; 113.3:424–432.
8 Chang PC, Tai CM, Hsin MC, Hung CM, Huang IY, Huang CK. Surgical standardization to prevent gastric stenosis after laparoscopic sleeve gastrectomy: a case series. Surg Obes Relat Dis 2017; 13:385–390.
9 Walsh C, Karmali S. Endoscopic management of bariatric complications: a review and update. World J Gastrointest Endosc 2015; 7:518–523.
10 Dari G, Cadière GB, Himpens J. Reinforcing the staple line during laparoscopic sleeve gastrectomy: prospective randomized clinical study comparing three different techniques. Obes Surg 2010; 20:462–467.
11 Baker RS, Foote J, Kemmeter P, Brady R, Vroegop T, Serveld M. The science of stapling and leaks. Obes Surg 2004; 14:1290–1297.
12 Himpens J, Dapri G, Cadi'ere GB. A prospective randomized study between laparoscopic gastric banding and laparoscopic isolated sleeve gastrectomy: results after 1 and 3 years. Obes Surg 2006; 16:1450–1456.
13 Gandsas A, Li C, Tan M, Barbul A. Laparoscopic sleeve gastrectomy as a single stage procedure for morbid obesity: Initial outcomes of 293 consecutive patients. Bariatric Times 2010; 7:11–13.
14 Mittermair R, Sucher R, Perachoner A. Results and complications after laparoscopic sleeve gastrectomy. Surg Today 2014; 44:1307–1312.