



7-1-2024

Section: General Surgery

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### How to Cite This Article

Abd Elrhman, Ahmed El Said; Hassan, Ahmed Mohammed; Ahmed, Saad Mohamed Ali; and Mehanny, Ahmed Fouad (2024) "Effect of Routine Stapler Line Omentopexy on the Outcome of Early Postoperative Complication of Laparoscopic Sleeve Gastrectomy," *Al-Azhar International Medical Journal*: Vol. 5: Iss. 6, Article 3.

DOI: <https://doi.org/10.58675/2682-339X.2463>

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# Effect of Routine Stapler Line Omentopexy on the Outcome of Early Postoperative Complication of Laparoscopic Sleeve Gastrectomy

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## Abstract

**Background:** Sleeve gastrectomy is a highly effective and generally low-risk surgical treatment for treating severe obesity. Surgeons must possess knowledge of the complications linked to laparoscopic sleeve gastrectomy (LSG) and a strategy for managing them. Immediate postoperative problems that require prompt identification after undergoing LSG include hemorrhage and staple line leakage.

**Objective:** To assess the efficacy of omental repair with full-thickness sutures throughout laparoscopic sleeve gastrectomy in reducing the occurrence of postoperative bleeding and leaking.

**Methods:** A prospective study conducted by the general surgery department of Azhar Assiut University Hospital from October 2020 to October 2022 involved 100 cases total, split into two groups of 50 cases each (LSG).

**Results:** The two studied groups showed no significant difference in terms of sex, age, BMI, and operative time. Presentation postoperative with perigastric localized collection, when comparing the two groups, there was no statistically significant difference in leakage or drain color.

**Conclusion:** Our research revealed a slight drop in bleeding after surgery, accomplished by omental fixation to the sleeved stomach using full-thickness stitches. This will reduce patient morbidity and mortality and the likelihood of a hospital stay and blood transfusion. Still, there will be no discernible improvement in lowering the risk of leakage.

**Keywords:** Laparoscopic sleeve gastrectomy; Stapler line omentopexy

## 1. Introduction

Globally, the prevalence of obesity is rising at a startling rate. In 2009, the global population of overweight surpassed that of undernourished individuals.<sup>1</sup> increased rates of non-alcoholic steatohepatitis, arthritis, sleep apnea syndrome, dyslipidemia, cardiovascular illnesses, type II diabetes mellitus, and numerous malignancies are linked to being overweight or obese.<sup>2</sup>

Currently, LSG stands as one of the most widely used bariatric operations; LSG is becoming increasingly popular due to its technical viability, ability to preserve normal intestinal structure and absorption capacity,

and lower risk of nutritional deficiencies.<sup>3</sup>

Two primary mechanisms underlie LSG's therapeutic effect on weight loss: mechanical and hormonal. According to the mechanical principle, sleeve gastrectomy reduces stomach capacity and causes an early sense of satiety, which reduces meal sizes.<sup>4</sup>

According to the hormonal explanation, ghrelin is the primary hormone that stimulates hunger, which is released in smaller amounts when the gastric fundus is removed.<sup>5</sup>

Our study aimed to assess the effectiveness of omental fixation with full-thickness stitches during LSG in reducing hemorrhage and leakage following surgery.

Accepted 21 June 2024.  
Available online 31 June 2024

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<https://doi.org/10.58675/2682-339X.2463>

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## 2. Patients and methods

A prospective study conducted by the general surgery department of Azhar Assuit University Hospital from October 2020 to October 2022 involved 100 cases total, split into two groups on a randomized basis by closed envelope technique of 50 cases each (LSG). Individuals between the ages of 18 and 55 who had a body mass index (BMI) of more than 35 kg/m<sup>2</sup> with comorbidity or more than 40 kg/m<sup>2</sup> without comorbidities, as well as physical status I and II, according to the American Society of Anesthesiologists (ASA) categorization system, were included in the study. Patients classified as Category III or IV in the ASA physical status categorization system and those with GERD symptoms and any other illnesses impairing coagulation or healing were not allowed to participate in the study.

One hundred cases were split into two groups: Group I consisted of 50 instances that underwent LSG procedures without omental fixing, and Group II consisted of 50 cases that underwent LSG procedures with omental fixation using full-thickness stitches up to the antrum and the angle of his above. got approval from the General Surgery Department's Ethical Committee at Al-Azhar University's Faculty of Medicine. Each patient gave written informed consent for the study of their de-identified information.

All patients underwent preoperative testing, including CBC, PT, PTT, INR, bleeding time, clotting time, serum, creatinine, AST, ALT, HBsAg, HCVAb, T3, T4 TSH, serum albumin, and, if they had diabetes, fasting insulin level, fasting C-peptide, fasting blood glucose, fasting HbA1c, and pulmonary function test. Additionally, echocardiograms, electrocardiograms, and radiological pelviabdominal ultrasounds were performed. Using laparoscopic instruments, a stapler, and PDS 2-0 threads.

Operative: General anesthesia, low molecular weight heparin, and a single dosage of an antibiotic (Cephalosporin 1gm) at the time of induction.

Position: Posing in the Trendelenburg position with the legs spread wide (Figure 1a), creating the pneumoperitoneum along with trocars insertions (a tiny incision at the umbilical scar allowed the veress needle to be inserted), and insufflation to create a carbon dioxide pneumoperitoneum of up to 14 mmHg.

Five ports technique (Figure 1b): A 5 mm trocar is used for liver retraction through the subxiphoid region. A 5 mm trocar is placed in the left hypochondrial region for the left working port. A 12 mm trocar is used in the right hypochondrial region for the right working port. A 10 mm trocar is placed supraumbilically for the camera operator. Lastly, a 5 mm trocar is placed in the left anterior axillary line subcostally for the

assistant. The larger curvature of the greater omentum was devascularized using an ultrasonic harmonic scalpel (Figure 1c). Placement of a 36 French catheter. Pretentious. First, begin by using a green reload measuring 60 mm-4.8 mm. If necessary, another green reload may be used. Proceed with stapling using gold and blue reloads measuring 60 mm-3.8 mm and 3.5 mm until the task is completed.

The methylene violet test was performed to confirm the sealed staple line's integrity and ensure there was no leaking throughout the surgery (Figure 1d). Group I: Omental fixation is not performed. However, titanium clips are applied to the staple line in case of hemorrhage. Group II: Omental fixation was performed by suturing the complete thickness of the tissue to the stapling line using PDS 2-0 (as shown in Figure 1 e-g), extending until the antrum to prevent the development of stricture. Before concluding, the criterion for hemostasis involves raising the mean blood pressure (MBP) above 90 mmHg. Ultimately, the intra-abdominal drain is inserted, but it is not necessary in every instance.

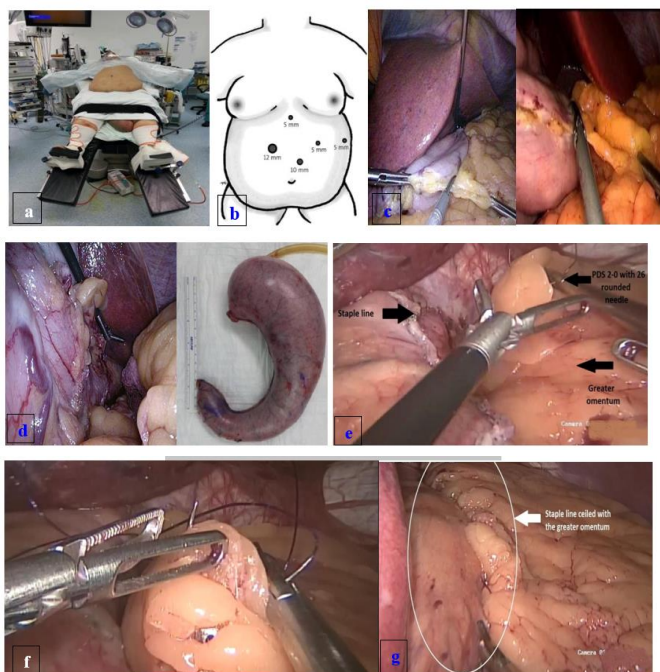


Figure 1. a) Showing the patient position during surgery. b) Positions and sizes of ports. c) larger curvature from the larger omentum is devascularized. d) The sleeved stomach with methylene blue test. e) attaching the larger omentum to the line of staples starting at the staple line's highest point. f) The larger omentum is sewn to the stapling line using PDS 2-0, 26 round needle stitching. g) Fixation took place till the antrum, completing.

Post-operative follow up:

Activation Within the second day post-operatively, we performed the Gastrografine meal contest study, initiated oral sips, and discharged

the patient after the drain, if present, was removed. A computed tomography (CT) scan of the abdomen with intravenous and oral water soluble contrast was considered as part of the diagnostic workup of patients with suspected leak. After two hours, during the hospital stay period, that we accompanied up the individuals by vital data suspecting leakage with fever 38.5 C degrees and tachycardia with heart rate exceeding 120 beats per minute and the drain, if present.

### 3. Results

*Table 1. Group I (50 cases) underwent Sleeve gastrectomy without omental fixation.*

		GROUP I NO. = 100
SEX	Female	30 (60.0%)
	Male	20 (40.0%)
AGE (YEARS)	Mean ± SD	32.10 ± 8.45
	Range	20 – 47
BMI (KG/M2)	Mean ± SD	38.40 ± 3.02
	Range	35 – 46
MBP (MMHG)	Mean ± SD	90.90 ± 18.24
	Range	60 – 120
PULSE	Mean ± SD	98.90 ± 17.30
	Range	78 – 130
TEMP (C)	Mean ± SD	37.15 ± 0.45
	Range	37 – 38.5
PER GASTRIC LOCALIZED COLLECTION	Negative	47 (94.0%)
	Positive	3 (6.0%)
DRAIN	Nil	46 (92.0%)
	Bloody	3 (6.0%)
LEAKAGE	Gastric	1 (2.0%)
	Negative	49 (98.0%)
RE-OPERATION	Positive	1 (2.0%)
	No	47 (94.0%)
TYPE OF RE-OPERATION	Yes	3 (6.0%)
	Laparoscopic control bleeding	2 (50.0%)
DRAIN	Stent with laparoscopic feeding jejunostomy	1(25.0%)
	Only resuscitation	1 (25.0%)
DRAIN	Less than 300 cc in the drain	2 (66.7%)
	MORE THAN 300 CC IN THE DRAIN	1 (33.3%)

Group I composited of 50 patients underwent routine LSG they include 30 females and 20 males their mean age was 32 yrs old ranged from (35-46) mean BMI 38 kg/m<sup>2</sup> ranged from (35-46) kg/m<sup>2</sup>. In group I three patients out of 50 patients developed abdominal pain associated with tachycardia above 100 beat per minute and

one patient of them developed Fever 38.5 c, Pelviabdominal CT with oral and IV contrast was done revealed perigastric collection.

In group I three patients out of 50 patients had bloody drains with drop of HB at the serial CBC. Two drains were more than 300 cc these patients needed to be reoperated to control bleeding and one drain was less than 300 cc these patients had been treated conservatively fluid therapy and blood transfusion and one patient presented with drain with gastric content and the patient presented with signs and symptoms of leakage.

In group I one patient presented with leakage the patient was tachycardic more than 100 bpm, feverish 38.5 with abdominal pain and tachypnea and leakage had been confirmed with abdominal CT with oral and IV contrast. In group I three patients out of 50 patients needed to be reoperated, two patients underwent relaproscopy to control bleeding and one patient underwent upper Endoscopy with laparoscopic feeding jejunostomy.

*Table 2. Group II (50 cases) Underwent Sleeve Gastrectomy with full thickness omental fixation of the stapling line.*

		GROUP II NO. = 100
SEX	Female	35 (70.0%)
	Male	15 (30.0%)
AGE (YEARS)	Mean ± SD	33.70 ± 11.70
	Range	20 – 55
BMI (KG/M2)	Mean ± SD	45.50 ± 7.32
	Range	36 – 59
MBP (MMHG)	Mean ± SD	85.50 ± 9.65
	Range	70 – 100
PULSE	Mean ± SD	94.50 ± 16.19
	Range	69 – 125
TEMP (C)	Mean ± SD	37.15 ± 0.45
	Range	37 – 38.5
PER GASTRIC LOCALIZED COLLECTION	Negative	48 (96.0%)
	Positive	2 (4.0%)
DRAIN	Nil	47 (94.0%)
	Bloody	2 (4.0%)
LEAKAGE	Gastric	1 (2.0%)
	Negative	49 (98.0%)
RE-OPERATION	Positive	1 (1.0%)
	No	48 (96.0%)
TYPE OF RE-OPERATION	Yes	2 (4.0%)
	Laparoscopic control bleeding	1 (33.3%)
DRAIN	Stent with laparoscopic feeding jejunostomy	1 (33.3%)
	Only resuscitation	1 (33.3%)

DRAIN	Less than 300 cc in the drain	1 (50.0%)
	MORE THAN 300 CC IN THE DRAIN	1 (50.0%)

The second group of 50 patients, comprising 35 females and 15 males, had LSG with full thickness omental fixation of the stapling line. The patients' mean age ranged from 20 to 47 years, and their mean body mass index (BMI) varied from (35–46) kg/m<sup>2</sup>. In group II two patients out of 50 patients developed abdominal pain associated with tachycardia above 100 beat per minute and one patient of them developed Fever 38.5 c, Pelviabdominal CT with oral and IV contrast was done revealed perigastric collection.

In group II two patients out of 50 patients had bloody drains with drop of HB at the serial CBC. one drain were more than 300 cc these patients needed to be reoperated to control bleeding and the other drain was less than 300 cc these patients had been treated conservatively fluid therapy and blood transfusion and one patient presented with drain with gastric content and the patient presented with signs and symptoms of leakage (Table 2). In group II one patient presented with leakage the patient was tachycardic more than 100 bpm, feverish 38.5 with abdominal pain and tachypnea and leakage had been confirmed with abdominal CT with oral and IV contrast. In group II two patients out of 50

patients needed to be reoperated, one patient underwent relaproscopy to control bleeding and one patient underwent upper Endoscopy with laparoscopic feeding jejunostomy.

Table 3. comparing the patients in two groups based on their age, gender, and BMI.

		GROUP		TEST VALUE*	P-VALUE	SIG.
		I	II			
SEX	Female	No.=100 30	No.=100 35	2.198	0.138	NS
	Male	(60.0%) 20(40.0%)	(60.0%) 20(40.0%)			
AGE (YEARS)	Mean ± SD	32.10 ± 8.45	33.70 ± 11.70	-1.108	0.269	NS
	Range	20-47	20-55			
	BMI (KG/M2)	Mean ± SD	38.40 ± 3.02			
	Range	35-46	36-59			
OPERATIVE TIME	MEAN ± SD	45± 7	60± 15	-2.108	-0.09	NS
	RANGE	35-65	55-80			

P-value >0.05: Non significant (NS); P-value <0.05: Significant (S); P-value < 0.01: highly significant (HS); \*: Independent t-test.

No significant difference between the two groups according to Sex and Age and BMI and operative time. It's showing that in group II the mean of the operative time was 60± 15 minutes ranged from 55 to 80 minutes with was longer than the mean operative time of Group I that was 45± 7 minutes ranged from 35-65 minutes.

Table 4. Showing comparison between the Two Groups according to the patients post-operative presented with Per gastric localized collections, leakage and color of the Drain.

		GROUP I		GROUP II		TEST VALUE*	P-VALUE	SIG.
		No.	%	No.	%			
PER GASTRIC LOCALIZED COLLECTION	Negative	47	94.0%	48	96.0%	0.421	0.516	NS
	Positive	3	6.0%	2	4.0%			
DRAIN	Nil	46	92.0%	47	94.0%	0.521	0.771	NS
	Bloody	3	6.0%	2	4.0%			
	Gastric	1	2.0%	1	1.0%			
LEAKAGE	Negative	49	98.0%	49	98.0%	0.000	1.000	NS
	POSITIVE	1	2.0%	1	2.0%			

P-value >0.05: Non significant (NS); P-value <0.05: Significant (S); P-value < 0.01: highly significant (HS)

\*:Chi-square test

Table 4 showing non-significant difference between the two groups according to presentation postoperative with per gastric localized collection, leakage and color of drain.

Table (5): Showing comparisons between the two groups according to the patients needed to be reoperated, the type of reoperation and amount of bloody Drain.

		GROUP I		GROUP II		TEST VALUE*	P-VALUE	SIG.
		No.	%	No.	%			
RE- OPERATION	No	47	94.0%	48	96.0%	0.205	0.651	NS
	Yes	3	6.0%	2	4.0%			
TYPE OF RE- OPERATION	Laparoscopic control	2	50.0%	1	33.3%	0.139	0.933	NS
	bleeding	1	25.7%	1	33.3%			
	Stent with laparoscopic feeding jejunostomy	1	25.0%	1	33.3%			
DRAIN	LESS THAN 300 CC IN THE DRAIN	1	40.0%	1	50.0%	0.036	0.850	NS
	MORE THAN 300 CC IN THE DRAIN	2	60.0%	1	50.0%			

P-value >0.05: Non significant (NS); P-value <0.05: Significant (S); P-value < 0.01: highly significant (HS) \*:Chi-square test

No significant difference between the two groups according to the patients needed to be reoperated, the type of reoperation and amount of bloody Drain.

#### 4. Discussion

Nowadays, LSG stands as one of the most widely used bariatric operations, and many bariatric surgeons worldwide choose it over other options. LSG is becoming increasingly popular because of its technological viability, ability to preserve natural anatomy and the intestine's absorptive capacity, lack of implanting foreign bodies, and decreased risk of nutritional shortages.<sup>3</sup>

Gibson et al. have developed their staple line reinforcement technique. Initially, they used Seamguard to buttress the most proximal staple firing, and they discovered one proximal staple line leak (0.2%) versus zero and three postoperative bleeding (0.6%) versus 8 (0.8%). First, they stapled the omentum to the proximal 10 cm of the staple line. Next, they used the partially mobilized fat pad or omentum to cover the angle of His.<sup>6</sup>

One of the most feared consequences of SG is a stomach leak, which usually happens at the upper staple line close to the gastroesophageal junction. Abdominal sepsis from this condition may lead to a persistent gastric fistula or multi-organ failure and the passing of the patient.<sup>7</sup>

Dissection of the stomach's larger curve may result in bleeding from the stomach's blood vessels. The majority of SG-related bleeding issues stem in the staple line during stomach transection.<sup>7</sup>

Over the last ten years, LSG has evolved to become safer and more effective. Several techniques have been developed to minimize postoperative complications, such as bleeding and leakage, which account for the majority of postoperative complications. Our study describes the technique of omental fixation with full-thickness stitches and how it affects patients' postoperative course. The results demonstrate the technique's increased efficacy in reducing post-operative bleeding, which went from 6% of cases in group I to 4% in group II, with no effect on lowering the risk of post-operative leakage.

One of the most dangerous side effects of LSG is bleeding. The rate of staple line bleeding varies from 0 to 4.5%; in group II of our study, it was found to be 4%. The incidence of leakage was reported to be Nothing changes.

A total of 100 individuals had laparoscopic sleeve gastrectomy (LSG) between October 2020 and October 2020; the cases were divided into two groups, A and B. Within the first group of 50 cases, which underwent surgery without routine omental fixation, there were 20 males (40%) and 30 females (60%) with a mean age of  $32.1 \pm 8.45$ , ranging from 35 to 46, and a mean BMI of  $38 \pm 3$  kg/m<sup>2</sup>, ranging from 35 to 46 kg/m<sup>2</sup>. The mean operative time was  $45 \pm 7$  minutes, ranging from

35 to 65 minutes. Fifty instances in Group II were operated with full thickness. Thirty-five females (70%) and 15 males (30%) with a mean age of  $33.7 \pm 11.7$  range (20-47) and a mean BMI of  $45.5 \pm 7.3$  kg/m<sup>2</sup> range (36-59) kg/m<sup>2</sup> and an average operative time of  $60 \pm 15$  minutes range (55-80) minutes are among those undergoing omental fixation of staple lines. Patients began walking two hours after surgery and began oral feeding when they could tolerate it.

During Group I, three patients experienced post-operative bleeding. We monitored these patients after their surgeries to collect vital data, remove excess fluids, and conduct follow-up tests such as complete blood count (CBC) and imaging. Two patients experiencing hemorrhaging from their drainage tubes, exceeding 300 ccs, required a return to the operating room for a procedure called laparoscopy to manage the bleeding. Another patient, with hemorrhaging from their drainage tube, but less than 300 cc, was successfully managed through conservative treatment involving fluid therapy and blood transfusion. Additionally, one case of leakage was identified, which was addressed by inserting an intraluminal stent and performing laparoscopic feeding. Jejunostomy.

In Group II, we encountered two patients who experienced post-operative bleeding. We diligently monitored these patients for vital signs and drainage and closely followed up with serial complete blood count (CBC) tests and imaging. One patient had a drain that contained more than 300 ccs of blood, necessitating a return to the operating theater for a laparoscopy procedure to control the bleeding. The other patient, on the other hand, only required conservative management involving fluid therapy and blood transfusion. Additionally, we detected one case of leakage, which was addressed by inserting an intraluminal stent and performing a laparoscopic feeding jejunostomy. Although this procedure took longer than those in Group I, it yielded no statistically significant results.

The final outcome of our study demonstrates that performing full-thickness omentopexy on the sleeved stomach effectively reduces post-operative bleeding. The incidence of bleeding decreased from 6% in the first group to 4% in Group II, with a p-value of 0.8, indicating no significant difference between the two groups. The study also showed no disparity in the incidence of post-operative leakage, as it was 2% in both cohorts.

Moy et al. The surgeons employed an endo-GIA stapler with a bioabsorbable buttress material called Seamguard. They hypothesized that using this buttressing material in the suture line would reduce bleeding and leakage. The average duration of the operation was 134 minutes. Out of the 135 cases of laparoscopic sleeve

gastrectomy (LSG) performed between 2003 and 2006, they encountered three instances of leakage, whereas our study only had one case.<sup>8</sup>

Chang et al. The author proposed using omentopexy to prevent sleeve axial distortion and maintain the alignment of the entire tube. Additionally, the author suggested that gastric stenosis, which increases intra-gastric pressure and results in a thinner gastric wall at the fundus, may predispose individuals to gastric leaks. This finding aligns with the objective of our study, which aims to investigate the role of omentopexy in preventing leakage.<sup>9</sup>

#### 4. Conclusion

Our study demonstrated a modest reduction in postoperative bleeding rates through full-thickness stitches to fix the omentum to the sleeved stomach. This intervention could decrease patient morbidity and mortality by reducing hospital stays, the need for blood transfusions, and the stress experienced by surgeons when dealing with complex cases. Despite efforts to mitigate the possibility of leakage, no discernible impact has been observed.

#### Disclosure

The authors have no financial interest to declare in relation to the content of this article.

#### Authorship

All authors have a substantial contribution to the article

#### Funding

No Funds : Yes

#### Conflicts of interest

There are no conflicts of interest.

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