

The Outcome of Staple-Line Oversewing Using V-Loc Suture During Laparoscopic Sleeve Gastrectomy

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ABSTRACT

Background: Laparoscopic sleeve gastrectomy (LSG) is a simple procedure; however, postprocedural hemorrhage and/or leak remain the most troublesome outcomes. To prevent these serious complications, some surgeons have recommended the necessity to support the staple-line (SL). The target of the existing work was to estimate the occurrence rate of SL leak or hemorrhage after LSG with using and without using V-Loc running sutures to support the SL.

Patients and methods: This work was carried out in the General Surgery Department, Al-Hussein Hospital, Faculty of Medicine, Al-Azhar University between January 2017 and January 2020. A sum of forty cases suffering from morbid obesity prepared for LSG. Patients were separated randomly into 2 groups; Group-I; 20 cases; prepared for LSG without suturing of SL, and Group-II; 20 cases; prepared for LSG with suturing of the SL by v-lock suture.

Results: The average procedure duration in Group-I was 75 min and in Group-II was 92 min. The duration of hospital admission was around 3 days in group-I and 2 in group-II. Postoperative hemorrhage was more in Group-I; 4 patients (20%) versus one patient (5%) in Group-II. The postoperative leak was more in Group-I; 2 patients (10%) while in Group-II; no patients (0%) had it.

Conclusion: Strengthening the SL is a simple technique to prevent postoperative hemorrhage and/or leak. Although sewing the complete SL is time-consuming together with additional cost, but it decreases the procedure complications rate.

Keywords Laparoscopy; Sleeve Gastrectomy; Staple-line oversewing.

INTRODUCTION

Gastric sleeve was first described in 1993, by Marceau as a step of the biliopancreatic diversion. Then, at the start of the 2000s, it became a separate procedure done by many bariatric surgeons. After that, LSG has settled to be the standard restrictive bariatric surgery [1-3]. This procedure gained its success because of its simple technique, short procedure time, lack of intestinal anastomosis, and low complications rate [4,5].

SL leakage and/or bleeding are the furthestmost troublesome postoperative complications. The occurrence rate of hemorrhage varies from 1.1 to 8.7%, and it may need reoperation [6]. Leakage through the SL is less common than bleeding but more life-threatening, and its incidence rate is from 0.5 to 2.7% [7]. Although, the various approaches to make the procedure safer, no agreement has settled on which approach is best [8]. Several studies have indicated that SL strengthening reduces the possibility of leakage and hemorrhage, but its efficacy is still being debated.

Our study's target was to weigh the outcome between non reinforced and reinforced SL using V-Loc suture during LSG regarding postoperative hemorrhage and/or leak.

PATIENTS AND METHODS

This study was carried out in General Surgery Department, Al-Hussein Hospital, Faculty of Medicine, Al-Azhar University between January 2017 and January

2020 on 40 patients between January 2017 and January 2020. Participants were allocated randomly by using the simple random allocation method, where 40 cards were prepared by the investigator and were put in closed envelopes and mixed. Patients were separated into 2 groups; group-I; 20 cases; prepared for LSG without strengthening of SL. and group-II; 20 cases; prepared for LSG with supporting of the SL by v-lock suture.

Inclusion criteria: Morbidly obese individuals with, BMI >40 kg/m² or BMI >35 kg/m² with one or more comorbidities.

Exclusion criteria

Patients unfit for general anesthesia

BMI < 35 kg/m²

Revision of bariatric surgery

Age < 18 or >55 years

Preoperative assessment:

All patients underwent clinical assessment; history and physical examination including height and weight and were investigated by routine blood tests, chest X-ray, ECG, thyroid, and growth hormone levels, and pulmonary function tests.

Operative procedure: Operations were achieved by the laparoscopic method under general anesthesia by one team.



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Surgical technique

Group-I (Non-reinforced SL):

All cases were given enoxaparin (Clexane) 40 IU night of the procedure, the patient was fixed on the operating table in the supine position with the operating surgeon between the patient legs. Insufflation of peritoneal cavity using Veres needle to 15-mmHg CO₂. Optical entry was the preferred method of entry to the peritoneal cavity with a 12-mm trocar loaded with the 10-mm 0-degree scope, which was then replaced by a 45-degree scope.

Then, four trocars 12-mm were passed obliquely through the abdominal wall, including right and left upper quadrant trocars, epigastric, and supraumbilical trocars just to the left of the midline. While a 5th 5-mm trocar was inserted in the left lumbar region at the anterior axillary

line. A window was created at the gastric greater curvature around 10 cm far away from the pyloric ring (Fig.1A). Sealing of the gastroepiploic, short gastric, and posterior fundic vessels was done starting at 4 cm away from the pyloric ring to the GE angle using the bipolar LigaSure electrocautery (Fig. 1B).

After completion of devascularization, a 36 Fr bougie was introduced orally until it reached the stomach. The surgeon then guided it along the gastric lesser curvature and into the pyloric channel and duodenal bulb. Gastric stapling started 4-7 cm away from the pyloric ring by 60-mm, green cartilage. Consecutive firings of the stapler complete the gastric division until the left crus (Fig. 2 A,B). After completing the transaction, the entire SL was examined carefully to make sure that the staples were well fitted.

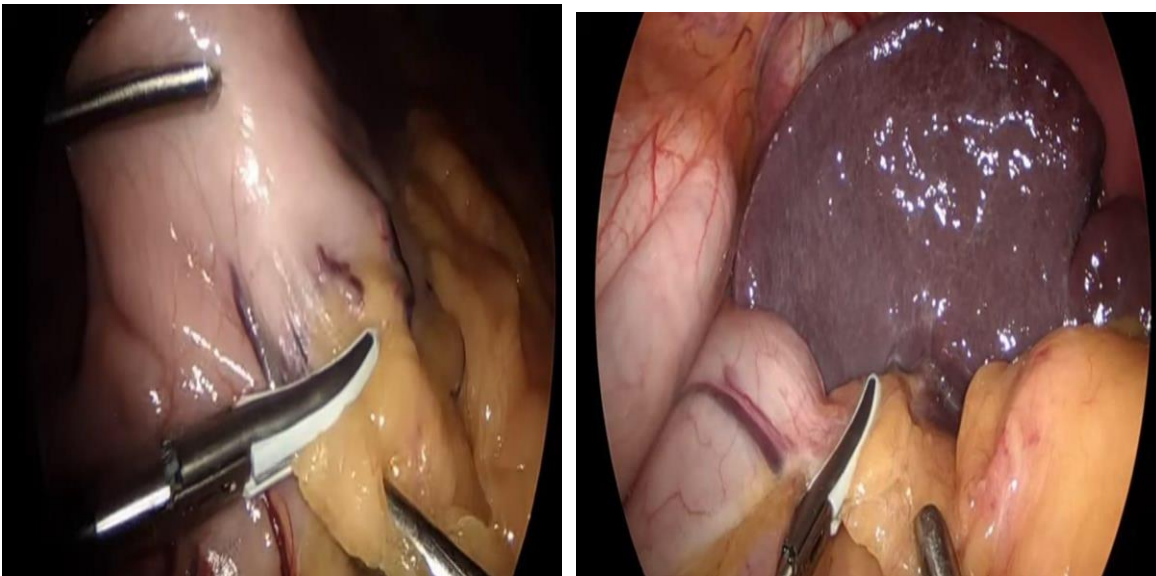


Figure 1: (A), Devascularization of the greater curvature using LigaSure
(B), Devascularization completed until GE junction

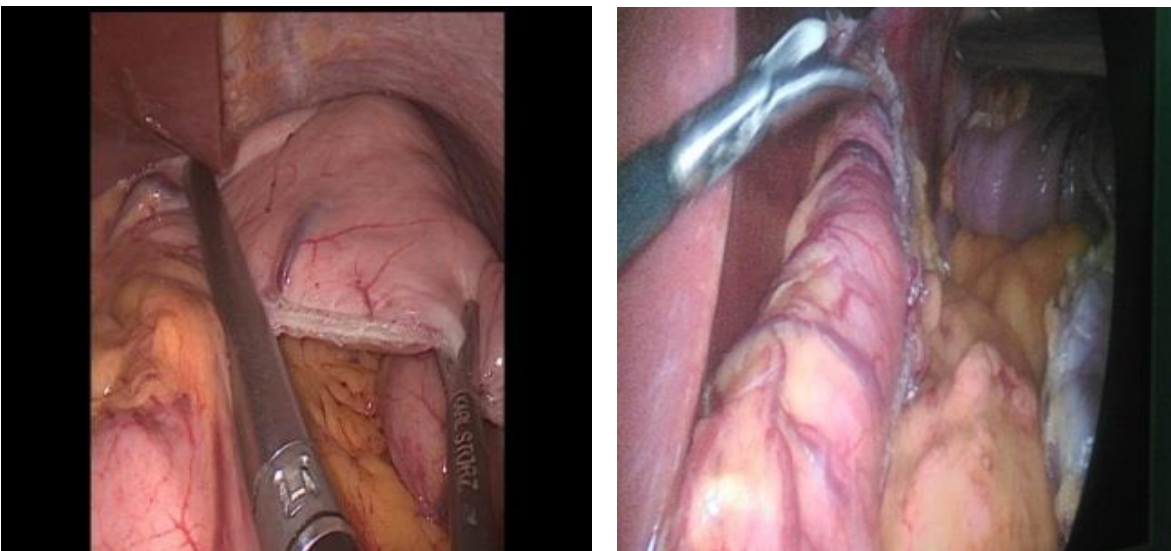


Figure 2: (A), Gastric stapling with consecutive firing
(B), Complete gastric transection

The transected stomach (Fig. 3) then was retrieved from the 12-mm port site. Methylene blue was injected (via the bougie) into the stomach with the pylorus compressed by a surgical grasper and the SL was inspected carefully to detect macroscopic leaks. The dye was then removed from the transected stomach, together with the bougie. An 18Fr nelaton drain was inserted. All port sites were closed with 2/0 Vicryl sutures.



Group-II (Reinforced SL):

All cases in this group underwent LSG by similar steps, but the SL was reinforced by running seromuscular stitches using absorbable v-lock 2/0 sutures starting from the upper angle down to the pylorus invaginating the SL completely (Fig. 4).

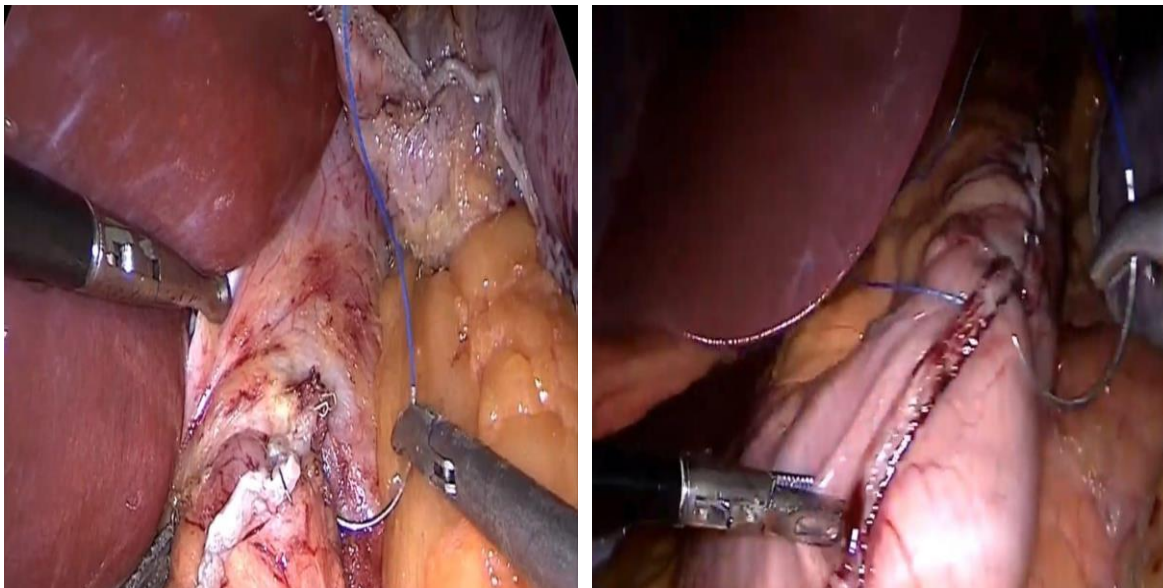


Figure 4: (A), Beginning of SL over-sewing from GE angle
(B), Completion of SL reinforcement

Postoperative Follow-up:

All cases were closely observed for the postoperative leak, and/or hemorrhage. Complications follow up and concomitant medications or procedures were recorded. Subject weight was obtained.

Nutritional assessment/counseling was performed. The incidence of adverse events was carefully monitored throughout the entire study period and recorded as applicable on the 1st postoperative day, after 1 week, and monthly to the 3rd month postoperatively.

Ethical Considerations:

This study was approved by the Ethics Board of Al-Azhar University and an informed written consent was taken from each participant.

This work has been achieved in according to The Code of Ethics of the World Medical Association (Declaration of Helsinki) for studies involving humans.

Statistical analysis

Quantitative data were calculated as mean ± standard deviation (SD) and qualitative data were presented as numbers and percentages. A p<0.05 was considered statistically significant. All statistical tests were performed using IBM SPSS Statistics for Windows, Armonk, NY: IBM Corp, Version 20.

RESULTS

Preoperative data are shown in table (1).

Table 1. Showing preoperative data (gender, age, and BMI)

	Group-I		Group-II	
Gender	n	%	n	%
Male	7	35%	6	30%
Female	13	65%	14	70%
Age (Years)				
Range	22–53		27–55	
Mean ± SD	33.13±8.34		37.21±9.32	
BMI (kg/m ²)				
Mean ± SD	45.74 ± 5.02		45.71 ± 5.06	

The surgery time was significantly shorter in group 1 (Table 2).

Table (2) Duration of surgery and hospitalization

	Group-I	Group-II	P-value
Time of surgery (minutes)	75 ± 5	92 ± 9	<0.001
Hospital stay (days)	3 ± 1	2 ± 0	0.015

In the existing study; bleeding frequency was more in Group-I; 4 patients (20%) than in Group-II; one patient (5%) and showed significant variance. Moreover, this complication was managed conservatively in Group-II, but for patients of Group-I; 2 cases needed re-exploration (one by laparoscopy and one need laparotomy).

The leakage frequency was more in Group-I; 2 patients (10%) while in Group-II; no patients (0%) had a leakage and showed statistical significance. The two complicated cases in Group-I were managed as follows; one of them needed re-exploration due to concomitant leakage and hemorrhage, and the 2nd patient was managed endoscopically by a mega stent (Table 3).

Table (3) Postoperative outcomes

	Group-I	Group-II	P-value
Bleeding	4 (20%)	1 (5%)	0.008
Leakage	2 (10%)	0 (0%)	0.012

DISCUSSION

LSG procedure success is dependent on the efficiency and quality of the utilized staplers. All of the commercially approved stapler devices are considered provided that the cartridge has been loaded correctly and is used on the proper tissue thickness [9]. Staple-line strengthening has been applied with optimistic results in animals and in special cases that subjected to other bypass surgery to minimize leakage, and reduce staple-site bleeding [10]. Indications of bariatric surgery include BMI of 40 kg/m² or higher or a BMI between 35 and 40 kg/m² with two obesity-related comorbidities, depending on NIH guidelines [11]. The mean BMI of the individuals who participated in this work was around 45 with mean ± SD; 45.74 ± 5.02 in group-I and 45.71 ± 5.06 in group-II without significant variance. Upon review the surgery time; group-II was done in longer time with mean ± SD; 92 ± 9 but group-I was done in shorter time mean ± SD; 75 ± 5 with considerable statistical variance. The duration of our procedure was longer than mentioned by **Taha et al.**; the average procedure time was shorter in the cases without reinforcing of the SL (44.3 ± 5.5 min in group-I versus 51.3 ± 4.3 min in 2) [12].

In the existing work; the duration of hospital admission was around 3 days with mean ± SD; 2 ± 0 in group-II and 3 ± 1 in group-I and without significant statistical difference. These outcomes were matching with the results obtained from **Hany and Ibrahim**; who mentioned that the mean hospitalization period (days) was 1.97 ± 0.42 in group-A and 1.92 ± 0.33 in group-B [13].

Various co-morbidities are accompanying LSG such as staple-line disruption with consequent leakage, hemorrhage, and gastric stenosis [14,15]. In the existing study; bleeding frequency was more in group-I; 4 patients (20%) than in group-II; one patient (5%). These results were similar to a study achieved by **Hany and Ibrahim**; who reported that hemorrhage in 7 individuals (1.5%) of group-A and 2 individuals (0.4%) in group-B [12].

Staple-line leakage is another dangerous comorbidity with a reported incidence of 2-5% [16,17]. Leakage after LSG has been known as a risk factor related to perioperative mortality [18]. We had no reported leak cases in group-II but we had a leak in 2 individuals in group-I (10%). These outcomes were compatible with **Hany and Ibrahim** who reported; Leakage was zero in group-B and eight patients (1.7%) in group-A [13]. There are numerous causes of such leak; probably due to the massive dissection which results in tissues ischemia. The gastro-esophageal junction has been mentioned as the usual site of leakage after LSG [19,20]. In the existing study; using V-Loc 2/0 continuous suture markedly minimized the postprocedural bleeding and leak and similar results were mentioned by **Nemecek et al.** [21]

CONCLUSION

LSG is a simple, minimally invasive, and easy operative procedure. Invagination/support of the total SL is a simple method to decrease the occurrence rate of postprocedural leak and hemorrhage to a great extent. Financial cost due to invaginating the entire SL may be compensated by the lessening in the hospitalization period.

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