

Is Staple Line Reinforcement Essential to Prevent Post-Operative Staple Line Leak and Haemorrhage after Laparoscopic Sleeve Gastrectomy

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ABSTRACT

Background: Staple line haemorrhage and leak are considered to be common complications of laparoscopic sleeve gastrectomy. Some strongly recommend staple line reinforcement to deal with these complications while some consider it non beneficial.

Aim: To analyze if staple line reinforcement is essential to prevent staple line haemorrhage and leaks.

Methods: This retrospective study was conducted in Surgical unit 1 Fatima Memorial Hospital. A total of 100 patients were selected and divided into two groups of 50 each. Group 1 had staple line reinforced while group 2 had no reinforcement at all. All patients were observed for 24-48 hours for post-operative bleeding and leak.

Results: Staple line leakage was found to be 4% in patients with staple line reinforcement whereas it was 6% in patients without staple line reinforcement with a p value of 0.284 which was not significant. Likewise, staple line bleeding in both groups were 2% and 6% with p value of 0.129 which was also insignificant.

Conclusion: There is no added benefit to reinforce the staple line to prevent postoperative leak or bleeding but reinforcement only prolongs the operation time.

Keywords: Laparoscopic sleeve gastrectomy, leak, post-operative bleeding, staple line reinforcement

INTRODUCTION

Body mass index (BMI) is calculated by weight in kilograms divided by height in metres square and a person having BMI of 40 kg/m² or more is categorised as a patient of morbid obesity¹. Morbid obesity has become a global problem now, affecting more than 300 million adult populations worldwide, hence now termed as globesity². Earlier it was thought to be a health problem in the west, now it has established a foot hold in Asia. Pakistan is also a victim of this problem because of increased population of overweight and obese patients.³ Since the advent of laparoscopic sleeve gastrectomy (LSG), bariatric surgery has been revolutionised as it is being accepted as sole bariatric procedure^{4,5}. Like any other procedure, LSG is also associated with certain postoperative complications. Early complications include staple line haemorrhage, staple line leak and abscess formation. Late complications include strictures, nutritional deficiencies and gastroesophageal reflux disease.⁶ The documented staple line bleeding incidence is up to 3%⁷. It causes not only prolonged hospital stay but also additional cost on treatment⁸. Staple line over sewing or applying clips along the staple line are some strategies to reinforce the staple line to prevent the complications of leaks and bleeding. However, no data is available to document the effectiveness of these techniques^{9,10}.

There is a controversy regarding efficacy of staple line reinforcement despite of the fact that several studies have been conducted for its impact on the safety of laparoscopic sleeve gastrectomy. Some authorities strongly advocate staple line reinforcement while some suggest it only prolongs operation time without any additional benefit. Moreover, data in Pakistan in this context is scanty. The objective of this study is to analyze if staple line reinforcement is essential to prevent staple line haemorrhage and leaks.

METHOD

This study was conducted at Surgical unit 1, Fatima Memorial Hospital (FMH) after permission of Institutional Review Board (IRB). A retrospective analysis of data of all the patients who

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underwent Laparoscopic Sleeve Gastrectomy (LSG) at FMH from July 2012 to December 2020 was done. Patients at extreme of ages (age <20years and >70years) were excluded from the study. Patients were segregated into two groups, group 1 patients had no staple line reinforcement while patients in group 2 had staple line reinforced with metallic clips or suture over-sewing. The primary outcome variable was post-operative bleeding (POB). The criterion set for POB was requirement to transfuse blood 24-48 hours after surgery or need to re-explore. Among other outcome variables, length of stay, resume to start oral intake, operative time of surgery and mortality were included. SPSS version 21 was used for data analysis in our study. Regarding continuous variables, descriptive statistics were computed and described as mean \pm SD. Categorical variables were stated using frequency distributions. Paired samples were subjected to t-test to report differences in the means of numerical variables. P value of <0.001 was taken to be significant. The demographic data of the two groups is shown in table 1. The primary and secondary outcomes data is as follows for both groups.

RESULTS

A total of 100 patients were included in the study. These were divided in two groups; Group 1 had staple line reinforced using metallic clips along resected border of the stomach while Group 2 patients had no reinforcement at all.

Table 1: Descriptive statistics of the patients (n=100)

Variables	Group 1	Group 2
Age (years)	42.15 \pm 8.5	41.3 \pm 7.3
Sex (Men:Women)	17:33	21:29
Preoperative Weight (kg)	127.46 \pm 21.1	130.15.6
Preoperative BMI (kg/m ²)	46.49 \pm 21.1	45.5 \pm 15.8

Table 2. Comparative variable evaluation of two groups (n=100)

Variables	Group 1	Group 2	P value
Operation time(min)	136 \pm 8.6	99.55 \pm 9.48	0.0001
Leak	2 (4%)	3 (6%)	0.284
Luminal bleeding	0	0	0
Suture line bleeding	1(2%)	3(6%)	0.129
Length of stay (days)	2.3 \pm 0.85	2.1 \pm 0.5	0.143
Time to resume oral intake (days)	1.2 \pm 0.45	1.08 \pm 0.24	0.083
Mortality	0	0	0

DISCUSSION

Since the advent of laparoscopy, LSG has now become gold standard definitive procedure for morbid obesity producing better weight loss results and nil mortality¹¹. In our study, both groups showed a preponderance for females signifying morbid obesity more prevalent in female population of our society. Mean age of patients in both groups indicate that morbid obesity is common in middle age groups. Mean hospital stay in both groups is 2.3 and 2.1 shows that early return to activity and reduced hospital stay has nothing to do with the two techniques. It ultimately affects positively on economic status of patient and family.

Leakage and bleeding are commonly reported complications of LSG and its incidence reported in the literature is 0 to 5.7%¹². Some studies like Stroh et al. showed a leakage rate of 5.7% and a mortality rate of 1.6%. In their conclusion, LSG is not a safe operation¹³. In our study, staple line leakage was found to be 4% in patients with staple line reinforcement whereas it was 6% in patients without staple line reinforcement with a p value of 0.284 which was not significant. Likewise, staple line bleeding in both groups were 2% and 6% with p value of 0.129 which was also insignificant. We found that reinforcement is not needed to prevent staple line bleeding or leak as shown in Table 2. Ser et al has contradictory view as compared to our study as his study strongly implies mandatory role of staple line reinforcement to stop staple line complications¹⁴. Zafar et al. also emphasized addressing staple line to prevent post-operative bleeding¹⁵. The overall reported mortality for LSG is 0.5-1.1%¹¹. However, we found that LSG is one of the safest procedures with nil mortality. We attribute this accomplishment to expertise achieved and procedure performed to its perfection using advanced modern equipment. A significant finding noted was in operation time difference between two groups. Group 1 had an operation mean time of 136 minutes while group 2 had mean operation time of 99 minutes with a p value of 0.0001 which was significant. It meant that staple line reinforcement prolongs the operation time and also prolongs anaesthesia time that can lead to increased postoperative respiratory problems like basal atelectasis and pneumonia. So in this case, staple line reinforcement is found to be less beneficial than no reinforcement at all.

CONCLUSION

There is no added benefit to reinforce the staple line to prevent postoperative leak or bleeding but reinforcement only prolongs the operation time. However, strict post-operative monitoring is

required to identify and treat complication. A bigger sample size and further research is needed for performing SLR in selected patients only.

Conflict of interest: None to declare

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