

Use of wide bore bougie (36Fr) and small distance of staple line from Pylorus (≤ 4 cm) as predictor of success of Laparoscopic Sleeve Gastrectomy

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ABSTRACT

Background: Laparoscopic sleeve gastrectomy is now a gold standard treatment for morbid obesity but no local data is available to standardize size of bougie and distance of staple line from pylorus and its effect on weight loss.

Aim: To evaluate effect of 36 Fr bougie size and a distance of staple line of ≤ 4 cm from pylorus and its impact on outcome of LSG.

Method: This is retrospective study done by going through data base of morbidly obese patients from Jan 2012 to Dec 2020.

Results: 150 patients were included in the study. Mean age of patients was 42 years old and male to female ratio was 4:11. Preoperative BMI was 56 kg/m². Operative time was 102 \pm 13.24 minutes. Postoperative leak was seen in 2 (1.6%) cases with total 7 patients developing complication with 1(0.6%) mortality. Mean follow up was 34.21 \pm 13.68 months. Percentage of weight loss observed was 30%,50%,55%,58%,60% and 60% at 6 months,1 year and then yearly after till 5 years. At 5 years, DM, HTN, OSAS, DJD and HLP showed remission of 75%,90%, 58%, 40% and 82% cases respectively. No revisional surgery was performed.

Conclusion: LSG is a definitive bariatric procedure not only safe in expert hands but also effective and durable %WL is mainly dependant on bougies of 36 Fr size and a distance of ≤ 4 cm of staple line from pylorus.

Keywords: Morbid obesity, Laparoscopic sleeve gastrectomy, weight loss

INTRODUCTION

Morbid obesity is a serious health condition. It is defined as 20% over patient's ideal body weight, A BMI of 40 or more or 35 or more experiencing health problems due to obesity like hypertension, diabetes mellitus or joint problems¹. Laparoscopic sleeve gastrectomy (LSG) was done initially as first stage of two staged bariatric surgery procedure for morbidly obese patients^{2,3}.

It is a restrictive procedure in which about 70% of stomach is cut along its vertical axis and stomach is converted in a tube such that vagi and pylorus is preserved⁴. Outcomes for nutritional deficiency and morbidity/mortality are almost negligible for this simple procedure⁵. The data available in Pakistan is scanty in this context. While internationally multiple techniques have been described with choice of size of bougies and distance of staple line from pylorus and its effect on weight loss⁴. No local study is available to standardize these choices for successful outcome of LSG.

The objective of the study was to evaluate effect of 36 Fr bougie size and a distance of staple line of ≤ 4 cm from pylorus and its impact on outcome of LSG.

MATERIAL & METHOD

After permission from IRB, this retrospective study was conducted by going through data base of morbidly obese patients presenting to surgical unit 1 of Fatima Memorial Hospital Lahore, who underwent LSG from Jan 2012 to Dec 2020. Patients with morbid obesity with acknowledgement of LSG, details of operation and its effect on quality of life were included in the study. Patients excluded in the study were patients who have alcohol or anxiolytic or antidepressant's medicine addiction, Patients with psychiatric or any other neurological disease, previous bariatric procedures and previous upper GI surgery. Upon admission, after complete history and thorough physical examination and comorbidities evaluation, each patient underwent complete diagnostic workup which

included abdominal ultrasonography, chest x ray, ECG, blood cytology, thyroid profile, coagulation profile, serum electrolytes, blood urea nitrogen (BUN), creatinine and evaluation of liver function and fasting lipid profile. Clinical advice of relevant specialities like cardiologist, pulmonologist, gastroenterologist and anaesthetist was sought. This preoperative evaluation was done to assess and minimize operative risk and ensure safety of patient during and after the procedure. One preoperative dose of fourth generation antibiotic was given at induction. Deep vein thrombosis was avoided using elastic stockings per operatively.

Details of Operation: The greater curvature of stomach was devascularized going up to the angle of His using ligasure device. Distance from pylorus to the first staple firing point was measured using length of a suture. A conduit of stomach was tailored over a 36 Fr calibration tube and using endo GIA staplers at antrum body and fundus of stomach. Closure of staple line was ensured by checking it per operatively using methylene blue dye and then calibration tube was removed. A 36 Fr wide bore drain was placed in left sub phrenic space. All port sites were stitched with vicryl rapid suture 3/0. All operations were done by same operative team in the lead of level 5 bariatric surgeon. All operations were accomplished laparoscopically. No cholecystectomy was performed concomitantly.

Postoperative and follow up protocol: ERAS protocol was followed in postoperative recovery phase. On 1st postoperative day, leakage of fluid from staple line was checked by observing drain for 24 hours. Then patients were allowed to start oral sips and then oral fluid intake was continued to allow time for the neogastric sleeve to heal. No anticoagulation was needed as all patients were ambulatory on 1st postoperative day. Patients were discharged when they feel fit and have resumed oral liquid intake without any problem. The 1st postop visit was done after 10 days to assess wound and stitches were removed. Further visits were planned after six months for the first year and then yearly thereafter. At each visit, comorbidities were assessed and reported to be improved if medication dose is reduced or fewer drugs were required for disease control. Criteria for resolution of comorbid condition were if required medicines were not needed. Patient's

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clinical information was gathered in a purposefully developed data sheet for statistical calculations.

Data analysis: We used SPSS version 21.0 in this study. Regarding continuous variables, descriptive statistics were computed and expressed as mean±SD. Categorical variables were stated using frequency distributions.

RESULTS

A total of 150 patients underwent LSG at our institute from 2012 to 2020. The demographic data of the patients included in the series is summarised in table 1 and table 2. Weight loss results and resultant decrease in BMI over 5 years is summarised in table 3. Intraoperative and postoperative complications are summarised in table 5.

Table 1: Descriptive statistics of the patients (n=50)

Variables	
Age (years)	42.15±8.58 (range: 25-62)
Gender (Men: Women)	4:11
Preoperative BMI (kg/m ²)	46.49±5.88 (range: 33.8-69.20)
Preoperative weight (kg)	127.46±21.11 (range: 90-200)
Operative time (minutes)	102±13.24 (range: 81-150)
Time to resume oral intake (days)	1.19±0.41 (range: 0.75-3)
Hospital stay (days)	2.26±0.78 (range: 2-7)
Follow up (months)	34.21±13.68 (range: 4-60)

Table 2: Descriptive statistics of the patients according to gender

Variables	Women (n=110)	Men (n=40)
Age (years)	41.84±8.2 (range: 27-62)	43.03±9.5 (range: 25-59)
Preop BMI (kg/m ²)	129.76±21.8 (range: 90-200)	121.15±17.6 (range: 92-155)
Preoperative weight (kg)	48.9±19.4 (range: 35-41)	44.6±4.9 (range: 33.8-53.1)
Operative time (minutes)	103.2±13.7 (range: 81-150)	98.8±11.3 (range: 83-145)
Time to resume oral intake (days)	1.2±0.45 (range: 0.5-3)	1.08-0.24 (range: 1-2.25)
Hospital stay (days)	2.3±0.85 (range: 2-7)	2.1±0.5 (range: 2-5)

Table 3: Follow up period with weight loss, percent weight loss and BMI

Variable	Weight loss (kg)	%weight loss	Postop BMI (kg/m ²)
6 months	28.94±2.30	30%	35.24±5.31
1 year	52.68±4.14	50%	27.24±2.81
2 years	48.10±5.79	55%	24.30±2.54
3 years	45.34±6.73	58%	22.26±1.9
4 years	38.58±2.31	60%	21.5±1.28
5 years	37.15±3.22	60%	21.19±0.71

Table 4: Remission of comorbid factors after five years after LSG according to gender

Comorbid conditions	Women (n=110)	Remission observed	Men (n=40)	Remission observed
DM	95(77%)	90 (95%)	30 (75%)	27 (90%)
HTN	99(90%)	89 (90%)	36 (90%)	31 (88%)
OSAS	11(10%)	5 (45%)	10 (25%)	6 (60%)
Hyperlipidaemia	93(85%)	92 (99%)	31 (76%)	29 (95%)
DJD	49(53%)	39 (80%)	10 (25%)	8 (80%)

Table 5: Complications observed with LSG

Intraoperative complications (n=150)	
Splenic injury	0
Bleeding from short gastric vessels	10 (0.7%)
Staple line bleeding	10 (0.7%)
Staple line leakage	0
Staple line leakage	2 (1.3%)
Postoperative complications (n=150)	
Staple line bleeding	2 (1.3%)
Dyspepsia	35 (23.3%)
Pulmonary embolism	0
Port site infection	0
Port site hernia	0
Death	2 (1.3%)

Revisonal surgery was not done in any of our patients. Histology of the resected specimens was not done.

DISCUSSION

LSG was first performed in 1999 in patients with morbid obesity. Since then there had been a conflict regarding its efficacy. At present, LSG has been remarkably improve by better equipment and expertise. It is now considered a definitive bariatric procedure because of its excellent weight loss results, low morbidity and 100% safe with nil mortality⁴. Our study showed that majority of patients were 42 years or more. It signifies the fact that morbid obesity is more prevailing in middle aged groups (Table 1).

Our study also showed that majority of the patients were females which signifies incidence of morbid obesity is more in women in our society (Table 2). Mean preoperative weight is 127kg. This is because patients still hesitate to consult surgeon for obesity problem and negligent behaviour towards their health. Mean hospital stay was two days insuring early return to work and less duration of hospital stay. This fact avoids compromise on economic status of patients.

Our study showed 50% weight loss after one year of LSG in patients of both genders. This falling trend of weight loss is significant for two years but then it seems to become static and then it is maintained at around 40% after two years of LSG (Table 3). Remission of comorbid condition of the patients signifies effectiveness of LSG as a definitive bariatric procedure (Table 4). A standard tool of 36Fr bougie size and a distance of ≥4cm of staple line from pylorus were used. Need to convert from LSG to additional restrictive gestational surgery like bypass was reported by Crooks for complete relief of complaints in patients with refractory symptoms of dyspepsia⁸. No case in our study needed any converting surgery. Leakage is a known complication of LSG occurring between 0 to 5.7 % of procedures¹¹. Stroh et al reported 7% leakage rate, 14% complication rate and 1.6% mortality rate. They concluded against the safety of LSG procedure¹³.

We found a leakage rate of 0.06% in our study. The sights commonly reported for leakage after sleeve gastrectomy is gastroesophageal junction and antrum. The former is related to increased intraluminal pressure due to fundus removal. The latter is related to compromised full closure of the staples due to increased gastric wall thickness at antrum. Several strategies have been suggested to minimize the leak⁴. Preventing physiological constriction at incisura angularis and applying staples very close to the oesophagus at the area of its cardiac end are vital steps in LSG¹¹. We found that prolonged pressure on stomach wall with stapling device does not play additional beneficial role but can cause ischemia leading to leakage from neogastric sleeve⁴. Second stage operation was not required in any of our cases because of excellent weight loss result and resolution of obesity related comorbid conditions after LSG. Vitamin B12 deficiency was found in 2(1.3%) patients confirmed by checking B12 levels and correction was needed by injections for supplementation. This was supposed to be caused by inadequate hydrochloric acid in stomach required to release bound vitamin B12 from diet. AbdEllatif et al and Prasad et al concurred with our findings as they reported 2% and 2.7% respectively of the patients having vitamin B12 deficiency after LSG^{4,15}. Second stage operation is suggested in some reports^{10,16}. We found that second stage operation is not required. Some technical points are noteworthy. Close application of the staple line to the pylorus seemed to be significantly related to long term weight loss with lesser complications⁴. The mortality rate of 1.3% was recorded in our study.

The accepted published death rate to laparoscopic gastric bypass (LRYBG) of 0.5% or bilio-pancreatic diversion (BPD) of 1.1% is slightly lower than our mortality rate⁴. This reflects learning curve problem and once expertise achieved and procedure modified to perfection, it can be avoided as all our mortalities are in 1st two years at start of LSG at our institution. Complication rate is 0.7-1.3% which is lower than the overall published complication rate (10 to 20%)^{17,19}.

CONCLUSION

LSG is not only safe but also definitive bariatric operation. It has lower complication rates and nil mortality in expert hands. Dietary regimes after sleeve gastrectomy should be followed otherwise weight loss results cannot be achieved. Close application of staple line to the pylorus and wide bore bougie size seems to be an effective factor in causing weight loss but further prospective studies with larger patient data bank and other options to compare are required to validate our findings.

Conflict of interest: Nil

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