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Research Article

Use of wide bore bougie (36fr) and small distance of staple line from pylorus (≤ 4cm)as predictor of success of laparoscopic sleeve gastrectomy

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ABSTRACT

Objective: To evaluate effect of 36fr bougie size and a distance of staple line of ≤ 4cm from pylorus as predictor of success of LSG.

Material and method: This is a descriptive study and done by going through the records of patients undergoing sleeve gastrectomy from January 2012 to December 2017. Multivariate analysis was performed.

Results: 150 patients were included in the study. Mean age of patients was 42 years and Male to female ratio was 4:11. BMI before operation was 56 kg/m^2.Operative time was 102 ± 13.24 minutes. Postoperative leak was seen in 2 (1.6%) cases with total 7 patients developing complication with 1 (0.6%) mortality. Percentage ofweight loss calculated 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 remittance of 75%, 90%, 58%, 40% and 82% cases respectively. No revisional surgery was performed. Mean follow up was 34.21±13.68 (range: 4-60) months. Using a bougie size of 36F calibre and a distance of <4cm of pylorus from staple line seemed to beeffective in governing weight loss results.

Conclusion:LSG as a definite bariatric surgery is not only safe in expert hands but also effective and durable. There is no additional advantage of staple line reinforcement. %WL is mainly dependent upon bougies of 36F 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. An individual is considered morbidly obese if he/ she is 20% over his/ her ideal body weight, has a BMI of 40 or more, or 35 or more experiencing obesity related health conditions such as high blood pressure, diabetes or joint problems.[1] Laparoscopic sleeve gastrectomy (LSG) was doneinitially as first stage of two staged bariatric surgery for morbid obese patients.[2,3]It is a restrictive procedure in which about 70% of stomach is cutalong its vertical axis and stomach is converted in a tube such that vagi and pylorus is preserved.[4]Outcomes for nutritional deficiency and morbidity/mortality are almost negligible for this simple procedures.[5]

The data available in Pakistan is scanty. 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 loss[4], no local study is

available to standardize these choices for successful outcome of LSG.

OBJECTIVE

These audits of oractice is conducted at FMH with use of bougie size of 36 fr. and a distance of staple line from pylorus of ≤ 4cm and observe its impact on outcome of LSG.

MATERIAL & METHOD

This is an audit of practice done by going through database of morbidly obese patients presenting to Fatima Memorial Hospital, Lahore who underwent LSG from January 2012 to December 2017 retrospectively. Patients with morbid obesity with acknowledge of LSG, details of operation and its effect on patient`s quality of life were included in this study. Patients excluded from study were patients who have alcohol or anxiolytic or antidepressant medicines addiction, patients with psychiatric and other neurological diseases, previous bariatric procedures and previous upper GI surgery.

Patient`s preoperative protocol

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, electrocardiogram, blood cytology, thyroid profile, coagulation profile, electrolytes, blood urea nitrogen (BUN), creatinine and evaluation of liver function and fasting lipid profile. Clinical adviceof 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 4th generation antibiotic was given at induction. Deep vein thrombosis was avoided using elastic stockings preoperatively.

Details of operation

The greater curvature of stomach was devascularized using Ligasure device going up to the angle of His. Distance formally from pylorus to the 1st staple firing was measured using length of a suture. A conduit of stomach was tailored over a 36Fr. calibration tube and using EndoGIA staplers starting with 1-2 green cartridges at the antrum and 2-4 blue ones at the body and the fundus. Closure of staple line was ensured by checking it intraoperatively using methylene blue dye and then calibration tube was removed. The resected part of stomach was retrieved through 15mm port and a 36F wide bore drain was placed in left hypochondriac space. All 10mm port sites were stitched with vicryl rapid suture 3/0. Rupivacane was used to infiltrate woundonce skin was closed. All operations were done by same operative team with level 5 bariatric surgeon (lead) trained at FMH. All operations were accomplished laparoscopically. No cholecystectomy was performed concomitantly. Umbilical hernia was seen in 20 cases and was not dealt with simultaneously.

Postoperative and follow up protocol

ERAS protocol was followed in postoperative recovery phase. On 1st post-operative day, leakage of fluid from staple line was checked by observing drain for 24-36 hours. Then patients were allowed to take oral sips, oral liquids for one week, semisolid diet for further 3 weeks andsolid food after one month to allow time for the new stomach or pouch to heal. Anticoagulation was not required as all patients mobilised on 1st postoperative day. Patients were discharged when they feel fit and have resumed liquid intake without any problem.

The first visit for follow up course was ten days after discharge to examine the wounds and to check other problem. Future follow up visits were plannedafter six months for the first year and yearly thereafter.

Patient`s clinical information was gathered into a purposefully developed sheet for statistical calculationsincluding demographic, clinical, radiological, biochemical, operative, post-operative and follow up data.

At each visit in the follow up period, 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 disease was if required medicines are not used.

Statistical analysis

We used SPSS version 21 for data analysis in our study. Regarding continuous variables, descriptive statistics were computed and described as mean ± SD. Categorical variables were stated using frequency distributions.Paired samples were subjected to t-test to report differences in the means of numerical variables and Chi-square test was applied for qualitative variables. *P* value of <0.05 was taken as significant.

RESULTS

A total of 160 patients underwent LSG at our institute (Fig. 1). The demographic data of the patients included in the series were summarized in table 1. 150 patients were included for our study as 10 patients were exclude because of loss to follow up. Mean follow up duration was 34.21 ±13.68 (range: 6→ 60) months.

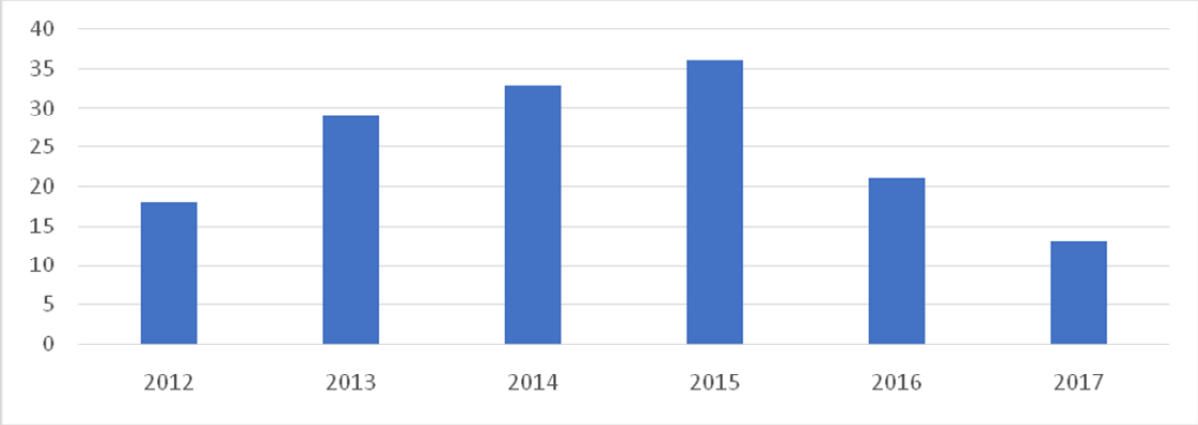


Fig 1. 150 patients from January 2012 through December 2017

Table 1: Descriptive statistics of the patients

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

Table 2: Descriptive statistics of the patient 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)
Preoperative Weight (kg)	129.76±21.8 (range:90-200)	121.15±17.6 (range:92-155)
Preoperative BMI (kg/m^2)	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)
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)

At 5 years, DM, HTN, OSAS, DJD and HLP showed remittance of 75%, 90%, 58%, 40% and 82% cases respectively.

Table 3: Comorbid factors and remission after LSG prevalence according to gender

Comorbid conditions	Women (N=110)	Remission observed	Men (40)	Remission observed
Diabetes Mellitus	95 (77%)	90(95%)	30 (73%)	27 (90%)
Hypertension	99 (90%)	89(90%)	36 (90%)	31 (88%)
OSAS	63 (69%)	53 (85%)	18 (47%)	16 (90%)
Hyperlipidaemia	93 (85%)	92 (99%)	31 (79%)	29 (95%)
DJD	49 (53%)	39 (80%)	10 (25%)	8 (80%)

Table 4: Intraoperative complications

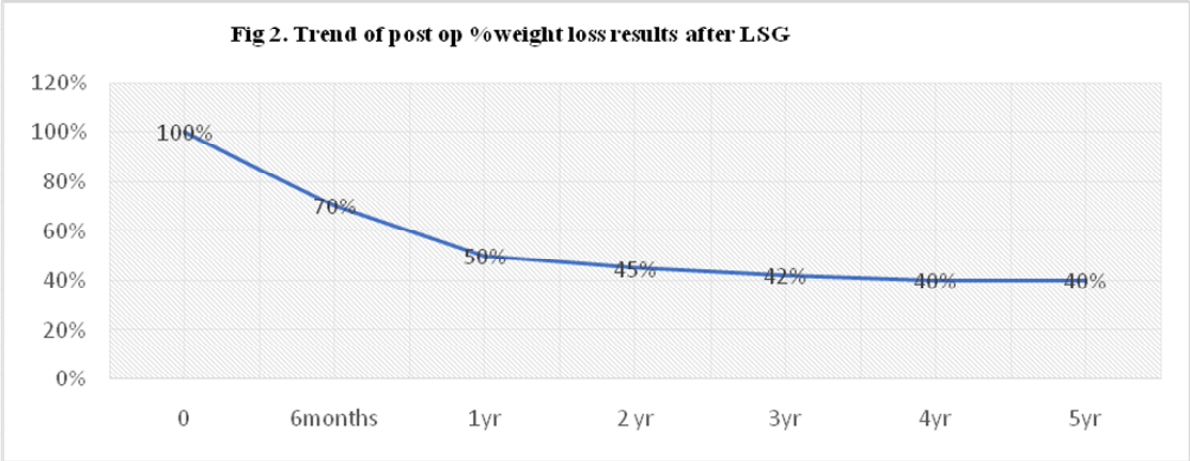
Complications	N=150
Splenic injury	0
Bleeding from short gastric vessels	10 (0.7%)
Staple line bleeding	10 (0.7)
Staple line leakage	0

Table 5: Post op complications

Complications	N=150
Staple line leakage	2 (1.3%)
Staple line bleeding	2 (1.3%)
Dyspepsia	35 (23.3%)
Pulmonary embolism	0
Port site hernia	0
Port site infection	0
Death	2 (1.3%)

Table 6: Weight loss results

Variable	Postop BMI(kg/m^2)	%WL
6 months	35.24±5.31	30%
1 year	27.24±2.81	50%
2 years	24.30±2.54	55%
3 years	22.26±1.90	58%
4 years	21.59±1.28	60%
5 years	21.19±0.71	60%



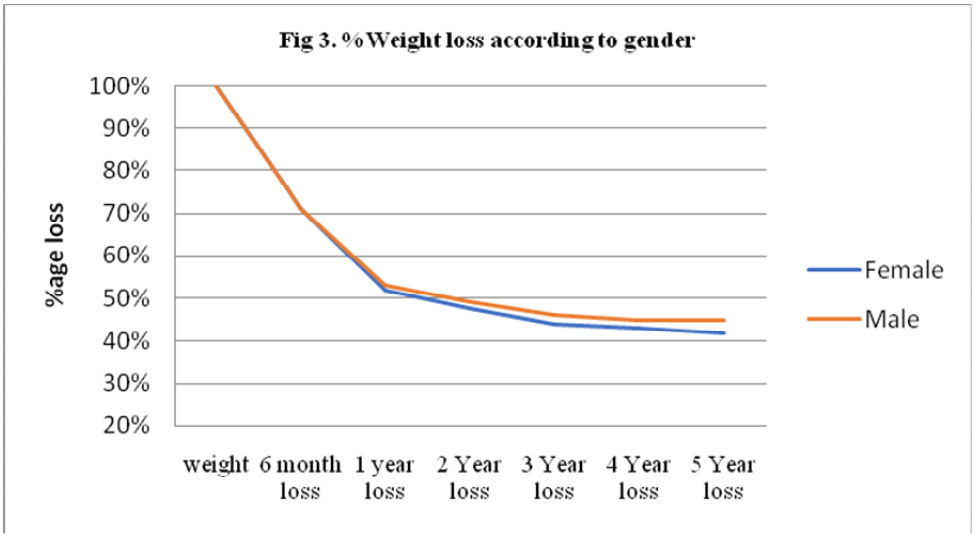


Table 7: Value of calibre of the bougie + distance of pylorus from staple line

Variable	Bougie calibre size 36Fr. + <4cm distance of pylorus from staple line
Weight loss % at 6 months	28.94 + 2.30
Weight loss % at 1 year	52.68 + 4.14
Weight loss % at 2 years	48.10 ± 5.79
Weight loss % at 3 years	45.34 ± 6.73
Weight loss % at 4 years	38.58 ± 2.31
Weight loss % at 5 years	37.15+ 3.22

Table 8: Value of suture line reinforcement

Variable	With 10 (6%)	Without 140 (94%)	p value
Time to complete operation	136.8 ± 8.6 min.	99.55 ± 9.48 min.	0.0001
Postoperative morbidity			
Leak	2 (20%)	3 (2.1%)	0.284
Luminal haemorrhage	1 (10%)	1 (7%)	0.129
Suture line haemorrhage	0	0	0
	1 (10%)	1 (0.7%)	0.129

Revisional 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 improved by better equipment and expertise. It is now considered as a definitive bariatric procedure because it has low morbidity with better weight loss results and almost nil mortality[4].

Our study also showed a female to male preponderance of four to one signifying morbid obesity a major problem of women in our society (Table 1). Our study showed mean age of patients is 42 years signifying morbid obesity is common in middle age groups. Mean preoperative weight is 127kg in our study as patients still hesitate to consult surgeon for obesity problem and negligent behaviour towards their health. Mean hospital stay of 2 days shows early return to activity and reduced hospital stay is possible after major laparoscopic surgery which ultimately affects positively on economic status of patient and family. Remission of comorbid conditions of the patients signifies effective ness of LSG as a definitive bariatric procedure(Table 3).

Our study showed a 50% weight loss after one year of LSG in both male and female patients in 18-65years aged patients (Fig 2). This falling trend of weight loss is significant for 2 years but then it seems to become static and then it is maintained at around 40% after 2 years of LSG. This trend in postoperative weight loss is present in both males and females. (Fig 3)

A standard tool of 36 fr.bougie size and a distance of ≤ 4cm of staple line from pylorus were used. Need to convert from LSG to additional restrictive gastric surgery like bypass was reported by Crooksfor complete relief of complaints in patients with refractory symptoms of dyspepsia[8]. No case in our study needed any convertingsurgery.

Leakage is a commonly reported complication of LSG and its incidence reported in the literature is between 0 to 5.7%[11]. Some studies like Stroh et al. showed leakage rate of 7%, complication rate of 14% and mortality rate of 1.6%. In their conclusion, LSG is not a safe procedure[13]. In our study, leakage from staple line was 0.06% which is acceptable as reported in literature. Several studies in this regards have supportive and contradictory views. Ser et al. strongly implied that staple line reinforcement is mandatory to decrease complication[10]. We found that reinforcement is not needed to prevent staple line bleeding (Table 8).

The sites 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 minimise the leak[4]. Preventing physiological constriction at incisura angularis and applying staples very close to the oesophagus at the area of the cardiac end of oesophagus are vital steps in LSG[11]. We found that prolonged pressure on stomach wall with stapling device does not play additional beneficial role but can cause ischemia and can lead to leakage from newly formed gastric sleeve[4].

Second stage operation was not required in any of our cases as results of LSG were satisfactory regarding loss of weight and resolution of obesity related comorbid conditions. 2 (1.3 %) patients presented with B12 deficiency confirmed by checking B12 levels and for which 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. This is in contrast to other studies like AbdEl latif et al. reported 2% and Prasad et al. also recorded 2.7% patients having vitamin B12 deficiency after LSG[4,15].

None of our patients required second stage operation. This is in contrast to other reports[10-16]. Some technical points are noteworthy. Close application of staple line to the pylorus seemed to be significantly related to long-term weight loss with lesser complications[4].

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 contradictory to it[4]. This reflects learning curve problem and once expertise achieved and procedure modified to perfection, it can be avoided as all our mortalities are in first two years at start of LSG in our institution. Complication rate is 7.5% which is lower than the overall published complication rate (10 to 20%)[17,19].

CONCLUSION

LSG is not only safe but also effective bariatric operation. It has lower complications rates and nil mortality in expert hands. Staple line reinforcement plays no beneficial role in preventing staple line bleeding or leakage. Dietary regimens after sleeve gastrectomy should be followed otherwise weight loss goals 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 databank and other options to compare are required to verify our findings.

Author contribution

Prof.Asim Malik, Dr.Junaid Khan, Dr.Saba Tahir Bokhari,Dr.Ossama Athar and Dr.HishamAhmed performed the research. Dr.Hisham and Dr.Saba collected the data. Prof.Asim Malik and Dr.Junaid analysed the data. Dr.Junaidis the principal writer of this study.

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Conflict of interest

Prof Asim Malik, Dr.Junaid Khan Lodhi, Dr.Saba Tahir BOkhari, Dr Ossama Athar and DR. Hisham Ahmad have no conflict of interest or financial ties to disclose and

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