

Effects of Small Sized Versus Medium Sized Bougies on Excess Weight Loss & Complication Rate for Laparoscopic Sleeve Gastrectomy

Junaid Khan Lodhi,¹ Asim Malik,² Saba Tahir Bukhari,³ Saima Amjad,⁴ Tasadduq Hussain⁵

Abstract

Objective: To assess excess weight loss results and complication rate with medium sized (36 Fr) & small sized (32 Fr) bougie.

Method: This study was conducted at Fatima Memorial hospital from Dec 2012 to Dec 2017. A total of 50 patients were segregated into two groups of 25 each. Group 1 had LSG using 36 Fr. sized bougie while group 2 had 32 Fr. bougie for neogastric sleeve formation. Patients were followed up for excess weight loss and BMI at 6months, 1 year, 2 years, 3 years and 4-year interval.

Results: EWL in group 1 & 2 was 39.2± 6.77kg & 41.9± 4.35kg at 6 months, 73.64± 6.49kg & 71.06± 7.77kg at 1 year, 65.52± 5.53kg & 63.92± 7.07kg at 2 years, 58.16± 4.97kg & 57.28± 5.75kg at 3 years and 55.48± 3.39kg & 55.36± 3.72kg for 4 years, not significant statistically. BMI in group 1 & 2 were 39.47± 5.11 & 35.88± 4.40 at 6 months, 29.22± 2.68 & 29.12± 2.00 at 1 year, 25.44± 1.96 & 24.73± 2.86 at 2 years, 22.84± 1.79 & 22.40± 2.20 at 3 years and 21.66± 1.32, 21.67± 1.62 at 4 years and found statistically insignificant.

Conclusion: With regards to extra weight loss, medium and small sized bougies have identical effects but the former has lowest complication. Medium sized bougies are best choice to ensure safety in LSG.

Key words: Morbid obesity, laparoscopic sleeve gastrectomy, bougie size, suture line leak

How to cite: Lodhi JK, Malik A, Bukhari ST, Amjad S, Hussain T. Effects of Small Sized Versus Medium Sized Bougies on Excess Weight Loss & Complication Rate for Laparoscopic Sleeve Gastrectomy. *Esculapio - JSIMS* 2022;18(03):253-256

DOI: <https://doi.org/10.51273/esc22.251832>

Introduction

Morbid obesity is a serious health condition. An individual is considered morbidly obese if he or she is 20 % over his /her idea body weight, has a BMI of 40 or more, or 35 or more experiencing obesity related health conditions such as high BP, Diabetes or joint problems.¹ Laparoscopic sleeve gastrectomy (LSG) was done initially as a first stage of two staged bariatric surgeries for morbid obese patients.^{2,3} It is a restrictive procedure in which about 70% stomach is cut along

its vertical axis and stomach is converted in a tube preserving vagi and pylorus.⁴ Outcomes for nutritional deficiency and morbidity/mortality are almost negligible for this simple procedure.⁵ The data available in Pakistan is scanty. Multiple techniques have been described internationally with choice of size of bougies. Yet the standard size of bougie for LSG is not established. While most surgeons use 36 Fr bougie size, some surgeons prefer 32 Fr or smaller bougie size to form a neogastric sleeve. However, no consensus has been made yet.⁶

Material & Methods

This is a retrospective study carried out at surgical unit 1 of Fatima Memorial Hospital from Dec 2012 to Dec 2017. All the patients with morbid obesity aged 20 to 60years old who has undergone LSG were included in the study. An individual was considered morbidly obese if he or she was 20 % over his /her idea body weight, had a BMI of 40 or more, or 35 or more experiencing

1. Associate Professor, Department of Surgery, FMH CM&D Lahore
2. Professor/HOD, Department of Surgery, FMH CM&D Lahore
3. Assistant Professor, Department of Surgery, FMH CM&D Lahore
4. Senior Registrar, Department of Surgery, FMH CM&D Lahore
5. Medical Officer, Department of Surgery, FMH CM&D Lahore

Correspondence:

Dr. Junaid Khan Lodhi, Associate professor of Surgery, Surgical Unit 1, Fatima memorial Hospital, Lahore. E-mail: drjunaid@gmail.com

Submission Date: 21-04-2022
1st Revision Date: 23-08-2022
Acceptance Date: 04-09-2022

obesity related health conditions such as high BP, Diabetes or joint problems. Patients under 20 years of age with some other abdominal pathology, who have alcohol or antidepressant addiction and with psychiatric illness were excluded from the study. Patients were segregated in two groups; Group 1 had neogastric tube creation using 36 Fr. calibration tube while in Group2, 32 Fr. calibration tube was used for this purpose. ERAS protocol was followed in postoperative recovery phase. Staple line leakage and bleeding was checked for 24 to 36 hrs by monitoring drain output & checking its contents and then oral intake was started. Patients were discharged when they feel fit and have resumed liquid intake without any problem. The follow up visits were planned after 6 months for the 1st year and yearly thereafter. At each visit excess weight loss (EWL) and BMI was calculated and all the data was gathered into a purposefully developed sheets for statistical calculation. We used SPSS version 21 for data analysis in our study. Descriptive statistics were computed and described as mean \pm SD. Categorical variables were stated using frequency distribution. Paired samples were subjected to t test. P value of less than 0.001 was taken as significant.

Table 1: Showing demographic data

Variables	Group 1 (N = 25)	Group 2 (N=25)	P value
Age (years)	42.96 \pm 8.82	41.64 \pm 8.2	0.588
Sex (men: women)	1:4	1:1	1.000
Preoperative weight (kg)	144.84 \pm 13.24	142.16 \pm 15.5	0.515
Preoperative BMI (kg/m)	48.9 \pm 4.18	47.6 \pm 4.7	0.315
Operative time(minutes)	113.40 \pm 19.6	101.80 \pm 12.4	0.016
Oral intake (days)	1.40 \pm 0.57	1.17 \pm 0.35	0.038
Hospital stay (days)	2.75 \pm 0.92	2.24 \pm 0.66	0.027

Table 2: Weight loss and BMI on each visit in both groups and their statistical significance

Follow up time	Group	Excess Weight loss (kg)	p value	BMI (kg/m ²)	p value
6months	1	39.2 \pm 6.77	0.092	39.47 \pm 5.11	0.011
	2	41.9 \pm 4.35		35.88 \pm 4.40	
1 year	1	73.64 \pm 6.49	0.209	29.22 \pm 2.68	0.887
	2	71.06 \pm 7.77		29.12 \pm 2.00	
2 years	1	65.52 \pm 5.53	0.378	25.44 \pm 1.96	0.378
	2	63.92 \pm 7.07		24.73 \pm 2.86	
3 years	1	58.16 \pm 4.97	0.566	22.84 \pm 1.79	0.443
	2	57.28 \pm 5.75		22.40 \pm 2.20	
4 years	1	55.48 \pm 3.39	0.906	21.66 \pm 1.32	0.992
	2	55.36 \pm 3.72		21.67 \pm 1.62	

Results

A total of 50 patients were included in the study and categorized in two groups with 25 patients in each group. The demographic data of the patients included in the series along with their statistical significance is summarized in table 1.

Post-operative BMI and excess weight loss in each group after LSG measured in each follow up visit and its statistical significance is summarised in table 2.

Complications encountered in LSG peroperatively

Table 3: Showing complications encountered during LSG in both groups

Intraoperative complications (N=50)	Splenic injury	Group1	0
		Group 2	0
Bleeding from short gastric vessels	Staple line bleeding	Group 1	2 (4%)
		Group 2	10 (20%)
	Staple line leakage	Group 1	0
		Group 2	10 (20%)
	GERD	Group 1	0
		Group 2	2 (4%)
Pulmonary embolism	Group 1	0	
	Group 2	15 (30%)	
Port site infection	Group 1	0	
	Group 2	0	
Port site hernia	Group 1	0	
	Group 2	0	
Death	Group 1	0	
	Group 2	2 (4%)	

and postoperatively in both groups are summarised in table 3.

Based on data shown above, small & medium sized bougies both have equal EWL while lowest complication incidence is seen with latter group suggesting that medium sized bougies are favoured as the best choice to ensure effectiveness of LSG.

Discussion

LSG is a restrictive bariatric surgical operation which not only affects GI motility but also has impact on gut microbiota and hormonal regulations.^{7,8,9} Therefore, LSG is not only efficient in weight loss but also has impact

in improving morbidity associated comorbidities like diabetes mellitus type 2, hyperlipidaemia, obstructive sleep apnoea & hypertension.^{8,9,10} It is imperative to note that for neogastric tube formation, role of proper sized bougie is pivotal to achieve best weight loss results while avoiding complications. The best decision about bougie calibration is done intraoperatively by availability of different bougie sizes so as to aid bariatric surgeons in determining expected neogastric tube. Although much emphasis has been put on pivotal role of bougie size in formation of ideal gastric sleeve, ideal bougie size has not been decided yet. Yuval et al in 2013 reported that large sized bougies not only have similar effects on EWL as the small sized bougie but also has decreased incidence of staple line leak.¹¹ Many studies have been done in recent decades to compare bigger & thinner bougie calibration.^{4,12,13,14,15} Wang et al in 2013 reported more effective role of small sized bougie for weight loss with fewer complications.¹⁶ However, our results in this study favour the weight loss results but not in agreement with safety in view of complications that are demonstrated more with small sized bougie.

Some named complications associated with LSG are bleeding, SLL, nausea, wound infection and dyspepsia. The controversy still exists about merits and demerits of LSG for GERD. Some patients with mild GERD are reported to be benefited by LSG but morbidly obese patients after LSG experience severe reflux esophagitis leading to problem of persistent GERD.¹⁷ Some of the earlier studies have suggested that SLL risk can be decreased by use of large sized bougie.^{11,18} Surgeon's personal experience matter a lot in preventing this complication. In 2018, Demeusy et al postulated that it's the staple line reinforcement required intraoperatively to prevent SLL and bougie size has nothing to do with this complication.¹⁹ Our findings are not in agreement with this study as we found out that SLL risk is greater in small sized bougie as compared to medium sized bougie with nil complication rate at all.

Conclusion

With regards to extra weight loss, medium and small sized bougies have identical effects but the former has lowest complication incidence including SLL. Hence, use of medium sized bougie for intraoperative calibration is quintessential choice to ensure safety of LSG for morbidly obese patients.

Conflict of interest

None

Funding Source

None

References

1. Broli RE, Bariatric surgery & long term control of morbid obesity. *JAMA* 2002;(22): 2793-2796.
2. Sillechia G, Boru C, pecchia A Et al. Effectiveness of laparoscopic sleeve gastrectomy (first stage biliopancreatic diversion with duodenal switch) on co-morbidities in super obese high risk patients, *Obesity surgery*. 2006; 16(9); 1138-1144
3. Tucker ON, Szomstein S, Rosenthal RJ. Indications of sleeve gastrectomy for morbid obesity as a primary procedure for weight loss in the morbidly obese. *Journal of Gastrointestinal Surgery*. 2008 ;12(4): 662-667.
4. AbdEllatif ME, Abdallah E, Askar W et al. long term predictors of success after laparoscopic sleeve gastrectomy. *International Journal of Surgery*.2014;12:504-508.
5. Siddiq G, Aziz W, Pervez MB et al. early laparoscopic sleeve gastrectomy outcomes in terms of weight loss. *J Coll Physicians Surg Pak*. 2016;26(3): 169-172.
6. Chang PC, Chen KH, Chang TW, et al. Promising effects of 33 to 36 Fr. bougie calibration for laparoscopic sleeve gastrectomy: A systematic review and network meta-analysis. *Scientific Reports*.2021;11:15217.
7. Papailiou J. et al. Morbid Obesity and sleeve gastrectomy: How does it work? *Obes Surg*. 2010;20:1448-1455.
8. Miras AD. & le Roux CW. Mechanisms underlying weight loss after bariatric surgery. *Nat Rev Gastroenterol Hepatol*. 2013;10:575-584.
9. Benaiges D. et al. Laparoscopic sleeve gastrectomy: More than a restrictive bariatric surgery procedure? *World J Gastroenterol*. 2015;21:11804-11814.
10. Golomb I, Ben DM, Glass A, Kolitz T, Keidar A. Long Term metabolic effects of laparoscopic sleeve gastrectomy. *JAMA Surg*. 2015;150: 1051-1057.
11. Yuval JB, Mintz Y, Cohen MJ, Rivkind AI, Elazary R. the effects of bougie calibre on leaks and excess weight loss following laparoscopic sleeve gastrectomy. Is there an ideal bougie size? *Obes Surg*. 2013;23:1685-1691.
12. Braghetto I. et al. Laparoscopic sleeve gastrectomy: surgical technique, indications and clinical results. *Obes Surg*. 2007;17:1442-1450.
13. Weiner RA. Et al. Laparoscopic sleeve gastrectomy- influence of sleeve size and resected gastric volume. *Obes Surg*. 2007;17:1297-1305.
14. Spivak H. et al. Laparoscopic sleeve gastrectomy using 42 french versus 32 french bougie: first year outcome. *Obes Surg*. 2014;24:1090-1093.

15. Hawasli A. et al. early effects of bougie size on sleeve gastrectomy outcome. *Am J Surg.* 2015;209:473-477.
16. Wang Y. et al. The effectiveness and safety of laparoscopic sleeve gastrectomy with different sizes of bougie calibration: a systematic review and meta-analysis. *Int J Surg.* 2018;49:32-38.
17. Bou Daher H, Sharara AI. Gastroesophageal reflux disease, obesity and laparoscopic sleeve gastrectomy: the burning question. *World J Gastroenterol.* 2019; 25: 4805-4813.
18. Aurora AR, Khaitan L, Saber A. Sleeve gastrectomy and the risk of leak: a systematic analysis of 4888 patients. *Surg Endosc.* 2012;26:1509-1515.
19. Demeusy A, Still A, Averbach A. Current role of staple line reinforcement in 30 day outcomes of primary laparoscopic sleeve gastrectomy: an analysis of MBSAQIP data. *Surg Obes.* 2018;14:1454-1461.

Authors Contribution

AM: Conceptualization of Project

TH: Data Collection

STB: Literature Search

JKL: Statistical Analysis

SA: Drafting, Revision

JKL: Writing of Manuscript