RESEARCH ARTICLE

Comparative Outcomes of Laparoscopic Sleeve Gastrectomy vs Laparoscopic Mini-gastric Bypass in Obesity Management

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Abstract

Introduction: This study evaluates and compares the outcomes of laparoscopic sleeve gastrectomy (LSG) and laparoscopic mini-gastric bypass (LMGB) as surgical approaches for obesity management. The focus was on weight loss, resolution of obesity-related comorbidities, operative time, and length of hospital stay over a 12-month follow-up period.

Methods: A retrospective analysis was conducted on 110 patients, with 55 undergoing LSG and 55 undergoing LMGB. Patients were evaluated preoperatively and followed at 3, 6, and 12 months post-surgery. Data collection included metrics for weight loss, comorbidity resolution, operative duration, and hospital stay. Statistical analysis was performed to assess the differences between the two groups.

Results: The LSG and LMGB groups were comparable in demographic characteristics and baseline health parameters, with no significant differences in age, gender distribution, BMI, or prevalence of hypertension, type 2 diabetes, and dyslipidemia ($p > 0.05$). LMGB demonstrated superior outcomes in excess weight loss and total weight loss across all follow-up points ($p < 0.05$). Additionally, LMGB achieved higher resolution rates for type 2 diabetes (85.2% vs 68.0%), hypertension (86.7% vs 60.0%), and dyslipidemia (88.9% vs 55.6%) compared to LSG. However, LMGB was associated with a longer operative time (90.2% vs 75.4 minutes) and hospital stay (4.3% vs 3.5 days) ($p < 0.05$).

Conclusion: The LMGB provides superior weight loss and comorbidity resolution compared to LSG, despite longer operative times and hospital stays.

Keywords: Laparoscopic mini gastric bypass, Laparoscopic sleeve gastrectomy, Obesity.

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Introduction

Obesity is a significant contributor to preventable diseases and premature mortality globally, playing a critical role in the development of severe conditions such as type 2 diabetes, high blood pressure, and abnormal lipids parameters. Surgery has emerged as a reliable solution for achieving short and long-term weight loss and result to improving on the obesity-related conditions.[1,2] Two frequently performed procedures include laparoscopic sleeve gastrectomy (LSG) and laparoscopic mini-gastric bypass (LMGB). LSG decreases stomach capacity by excising a significant portion, resulting in limited food consumption and hormonal adjustments that facilitate weight loss.[2,3] Laparoscopic mini-gastric bypass, on the other hand, combines restrictive and malabsorptive techniques by creating a small gastric pouch and bypassing part of the small intestine.[4,5]

This research evaluates the outcomes of LSG and LMGB, focusing on weight loss, improvement in obesity-related conditions, operative time, and hospital stay over a 12-month period. The findings aim to guide the choice of surgical approach for effective obesity management.

Methodology

This retrospective cohort study reviewed patients who underwent LSG or LMGB between January 2020 and December 2021 at World Laparoscopic Hospital and Mloganzila Hospital. Participants were adults aged 18–65 years with a body mass index (BMI) of ≥40 or ≥35 kg/m^2 with obesity-related health conditions. Exclusion criteria included prior bariatric surgeries, cancer diagnoses, or severe psychiatric illnesses.

Preoperative evaluations gathered demographic details, BMI, and the presence of conditions such as type 2 diabetes, hypertension, and dyslipidemia. Postoperative follow-ups at 3, 6, and 12 months assessed outcomes like the percentage of excess weight loss (EWL%), resolution of comorbidities, operative time, and hospital stay duration. Data analysis was performed using SPSS

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Table 1: Demographic data and characteristic of the patients

Demography	*LSG*	*LMGB*	*p-value*
Range of age	26–65	25–64	0.375
Female	65 (59.1%)	33 (60.0%)	0.857
Male	45 (40.9%)	22 (40.0%)	
BMI	42.3 ± 5.9	42.7 ± 5.7	0.765
Hypertension	30 (50%)	30 (50%)	1.000
T2DM	25 (48.07%)	27 (51.9%)	0.827
Dyslipidemia	18 (50%)	18 (50%)	1.000
Intraoperative time – minutes	90.0 ± 18.4	80.6 ± 21.7	0.004
Intraoperative time – range	65–120	60–115	
Mean Hospital stay – days	3.4 ± 1.2	3.0 ± 1.0	0.072
Hospital stay – days Range	2–7	2–6	

Table 2: Comparison excess weight loss and total weight loss between LSG and LMGB

Time (Month)	*Surgery type*	*Mean % EWL*	*p-value*	*Mean TWL*	*p-value*
3	LSG	30.5 ± 8.3	0.045	15.2 ± 4.1	0.002
	LMGB	35.2 ± 9.1	0.045	18.7 ± 3.9	0.003
6	LSG	45.7 ± 10.2	0.023	22.9 ± 5.6	0.005
	LMGB	50.3 ± 11.4	0.023	26.3 ± 6.2	0.004
12	LSG	60.4 ± 12.8	0.0	30.1 ± 7.5	0.004
	LMGB	68.2 ± 14.0	0.003	36.5 ± 8.1	0.005

software, with independent t-tests for continuous variables and Chi-square tests for categorical data, maintaining a significance level of $p < 0.05$. Ethical clearance and informed consent for data use were obtained.

Results

Baseline characteristics, including age, gender distribution, BMI, and prevalence of conditions such as hypertension, type 2 diabetes, and dyslipidemia, were similar between groups ($p > 0.05$). Laparoscopic mini-gastric bypass had a shorter operative time compared to LSG ($p = 0.004$), while hospital stay durations did not differ significantly (Table 1).

At 3 months, LMGB patients achieved higher EWL (35.2%) compared to LSG patients (30.5%, $p = 0.045$). This trend persisted at 6 and 12 months, with LMGB demonstrating consistently superior results in both excess and total weight loss (Table 2).

Resolution rates of comorbidities were higher among LMGB patients. Logistic regression indicated that LMGB patients had significantly greater odds of resolving type 2 diabetes, hypertension, and dyslipidemia compared to LSG patients (Table 3).

The mean operative duration was 75.4 ± 20.1 minutes for LSG and 90.2 ± 18.7 minutes for LMGB. According to logistic regression analysis, the odds of having a longer operative time were 1.39 times higher for LMGB compared to LSG (OR = 1.39, 95% CI: 1.02–1.91, $p = 0.038$). Similarly, the average hospital stay was 3.5 ± 1.2 days for LSG and 4.3 ± 1.5 days for LMGB. Logistic regression also revealed

Table 3: The resolution of obesity related comorbidities

Comorbidity	*Surgery type*	*Baseline (N)*	*Resolved (N)*	*Resolution rate (%)*	*p-value*
T2DM	LSG	25	17	68.0	0.026
	LMGB	27	13	85.2	0.026
Hypertension	LSG	30	18	60.0	0.043
	LMGB	30	26	86.0	0.043
Dyslipidemia	LSG	18	10	55.6	0.038
	LMGB	18	16	88.9	0.038

Table 4: Comparison of operative time and hospital stay between LSG and LMGB

Outcome	*Surgery time*	*Mean (SD) and OR (95% CI)*	*p-value*
Operative time	LSG	75.4 ± 20.1	0.038
(Minutes)	LMGB	90.2 ± 18.7	0.038
Hospital stay	LSG	3.5 ± 1.2	0.027
(Days)	LMGB	4.3 ± 1.5	0.027
Operative time	LSG	–	
	LMGB	1.39 (1.02–1.91)	0.038
Hospital stay	LSG	–	
	LMG	1.51 (1.05–2.18)	0.027

that LMGB patients had 1.51 times greater odds of a prolonged hospital stay compared to those undergoing LSG (OR = 1.51, 95% CI: 1.05–2.18, $p = 0.027$) (Table 4).

Discussion

Obesity is a major global health issue that has raised alarming levels, playing a pivotal role on conditions such as type 2 diabetes, hypertension, and dyslipidemia.[1] Bariatric surgery has demonstrated its effectiveness as a sustainable approach to weight control and the mitigation of obesity-related comorbidities. Among the available procedures, LMGB has gained recognition for its enhanced outcomes.[2] Compared to LSG, LMGB has been associated with better long-term weight loss and more favorable resolution of associated conditions, as confirmed by the findings of this study.

This research demonstrated that LMGB led to an average EWL of 68.2%, outperforming the 60.4% observed in the LSG group. Additionally, the total weight loss was greater among LMGB patients (36.5 kg) compared to those undergoing LSG (30.1 kg). These results are consistent with earlier studies, such as those by Rutledge and Lee et al., which identified LMGB as a highly effective option for achieving substantial weight reduction. Similar findings from Verma et al. further support the efficacy of LMGB in managing obesity and promoting significant weight loss.[3–6]

The enhanced weight loss achieved through LMGB can be attributed to its distinct surgical technique, which typically incorporates a 200 cm biliopancreatic limb. This configuration facilitates delayed gastric emptying, increased satiety, and alterations in the gut microbiome, all of which contribute to its effectiveness. These mechanisms have been corroborated by Verma et al. and Abdel et al., who highlighted the procedure's physiological advantages.[6,7]

Beyond weight loss, LMGB showed significant improvements in obesity-related comorbidities, including type 2 diabetes, hypertension, and dyslipidemia. Patients undergoing LMGB experienced higher remission rates for these conditions one year post-surgery, compared to those treated with LSG. This can be attributed not only to the greater weight reduction achieved but also to metabolic and hormonal changes that enhance insulin sensitivity and glycemic control. Previous studies, such as those by Abdel et al. and Verma et al., have reported similar outcomes, reinforcing the procedure's benefits.[6,7]

Laparoscopic mini-gastric bypass impact on glycemic control is particularly notable, as it influences levels of gut hormones like glucagon-like peptide 1 (GLP-1) and promotes better dietary regulation. Kular et al. emphasized these benefits, demonstrating how LMGB supports sustained weight loss while effectively resolving obesity-related health issues.[8]

Despite its advantages, LMGB presents certain challenges. This study found that the procedure required a longer operative time (90.2 ± 18.7 minutes) compared to LSG (75.4 ± 20.1 minutes). Additionally, the hospital stay was slightly extended for LMGB patients (4.3 ± 1.5 days) relative to those undergoing LSG (3.5 ± 1.2 days). These differences reflect the complexity of the LMGB technique and highlight the importance of careful postoperative monitoring, as discussed in research by Nassar et al.).[9]

Conclusion

Laparoscopic mini-gastric bypass offers superior outcomes in terms of weight loss and resolution of obesity-related comorbidities compared to LSG. However, it requires longer surgical times and hospital stays, reflecting its complexity. The choice between LMGB and LSG should be individualized, taking into account patient-specific needs and the surgical team's expertise.

Recommendations

For patients seeking more substantial weight loss and improved resolution of obesity-related comorbidities, LMGB may be the preferred option.

Given the longer hospital stay associated with LMGB, institutions should enhance postoperative care protocols to manage complications and minimize recovery time.

Conduct additional high-quality studies to better understand the differences in outcomes and complications between LMGB and LSG to guide clinical decision-making.

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