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Outcomes following laparoscopic sleeve gastrectomy versus Roux-en-Y gastric bypass in morbidly obese patients: A comparative study

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***Abstract*---Background:** Laparoscopic sleeve gastrectomy (LSG) and laparoscopic Roux-en-Y gastric bypass (LRYGB) are the two most common bariatric surgery methods performed worldwide. We aimed to contrast the LSG versus LRYGB effect in morbidly obese patients on obesity associated comorbidities and weight loss. **Methods:** This retrospective comparative research was performed through the period from 2019 to 2023 on 100 morbidly obese cases. Patients were designed into LSG group (50 patients underwent LSG) or LRYGB group (50 patients underwent LRYGB). **Results:** Excess weight loss (EWL) at one year follow up was insignificantly different between LSG and LRYGB groups while it was significantly improved in LRYGB group than LSG group at two years follow up (P value =0.027). The changes in hypertension, hypothyroidism, diabetes mellitus, obstructive sleep apnea syndrome, and gastro-oesophageal reflux disease (GERD) after surgery were insignificantly different between LRYGB and LSG groups. The number of oral hypoglycemic drugs, number of anti-hypertensive drugs, and thyroxine dosage after surgery were insignificantly different between LSG and LRYGB groups. Regarding postoperative complications, 3 (6%) cases progressd new-onset GERD in LSG group while 4 (8%) patients developed internal hernia, and 1 (2%) patient developed ulcer at gastrojejunal anastomosis in LRYGB group with insignificant difference between the two groups. **Conclusions:** LSG and LRYGB are efficient bariatric methods with similar enhancements in comorbidities and weight loss and similar medication requirements and postoperative complication

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profiles. However, LRYGB may have a slight advantage regarding greater EWL and a lower surgical failure rate at 2 years of follow-up.

***Keywords*---**Bariatric surgery, Obesity, Weight loss, Laparoscopic Sleeve Gastrectomy, Laparoscopic Roux-en-Y gastric Bypass.

Introduction

Bariatric surgery has demonstrated its dominance over a conventional medical treatments' variety regarding its efficacy in excess weight reduction and reduction in overall mortality [1]. At present, both most frequently conducted bariatric surgery methods worldwide are laparoscopic sleeve gastrectomy (LSG) and laparoscopic Roux-en-Y gastric bypass (LRYGB) [2].

RYGBP has been demonstrated to induce significant weight loss in clinically severe obesity cases. The researches majority have reported a weight loss of 60% to 70% of excess body weight. Numerous researchers have documented that weight loss can persist for up to ten years or more. For these reasons, numerous surgeons maintain that RYGBP is the optimal bariatric method for the majority of clinically severe obesity patients [3].

Gastric bypass is a more complex operation than SG, and the results are not as favorable in the short term. SG is technically simpler to do, has fewer early perioperative complications, and does not expose the cases to the internal hernias risk due to the small bowel rearrangement absence, which also allows for access to an intact intestinal passage [4]. The most significant drawbacks of SG are its irreversibility and the potential for gastro-esophageal reflux disease (GERD), which could lead to Barrett's esophagus [5]. We aimed to assess the LSG versus LRYGB effect in morbidly obese cases on obesity associated weight loss and comorbidities.

Patients and Methods

This retrospective comparative research was performed through the period from 2019 to 2023 on 100 morbidly obese cases aged from 19 to 65 years old, both sexes, and met the National Institute Health criteria for bariatric surgery. The patient provided written consent that was informed. The investigation was done with the approval of the Ethical Committee Ali bn Ali Hospital. Exclusion criteria were patients underwent revision surgery or patients underwent two stage method.

The patients were advised on the advantages and drawbacks of both LSG and LRYGB, which are bariatric procedures. Patients were designed into LSG group (50 patients underwent LSG) or LRYGB group (50 patients underwent LRYGB). The surgeon who performed all of the methods adhered to the standard surgical protocol. Before surgery, the cases were maintained on a Very Low-Calorie Diet (approximately 800 kcal, 60-70 g protein) for a period of couple of weeks.

LSG:

The procedure was conducted in the Reverse Trendelenburg position under general anesthesia. The typical procedure was followed to perform the sleeve. All four apertures were utilized: three 12 mm and one 5 mm. In the epigastrium, a 5-mm incision was made to introduce a self-retaining liver retractor. Utilizing either bipolar sealing device or ultrasonic shears, the greater omentum was severed from a point 4 cm from the pylorus and extended up to the His angle. The left crus were entirely revealed, reaching the medial border. Using a three-row stapler, a sleeve was constructed over a 36F gastric calibration tube through sequential firings. Using methylene blue, an intraoperative leak test was conducted to verify the staple line integrity. One of the port sites was utilized to retrieve the remnant stomach, and the port was subsequently closed. As required, a suction receptacle was installed.

LRYGB:

An antigastric and antecolic RYGB was performed, with an nourishing limb measuring 100-150 cm and a bilio-pancreatic limb measuring 70 cm, as determined by the duodeno-jejunal flexure. The method was conducted in the Reverse Trendelenburg position under general anesthesia. A vertical gastric chamber with a capacity of 30 to 50 cc was developed. Three-row staplers were employed to perform side-to-side jejuno-jejunostomy and end-to-side gastro-jejunostomy. In all instances, Mesentric defects were repaired through suturing. To verify the staple line integrity, an intraoperative leak test was conducted using methylene blue. A suction vent was installed as required.

Postoperative assessment:

The weight of the patients was recorded during the preoperative period and at the annual follow-up for a period of two years. The Deitel et [6]. method was used to indicate the yearly absolute excess weight loss (EWL) and weight loss percentage. According to Reinhold's criteria [7]. surgery failure was identified as a EWL percentage that was < 50%.

Diabetes mellitus (DM) remission was indicated as a FBG < 100 mg/dL level in the anti-diabetic medications' absence, while DM enhancement was indicated as a reduction in the anti-diabetic medications use to maintain a normal FBG. Hypertension (HTN) remission was identified as normal blood pressure (< 120/80 mmHg) in the absence of antihypertensive medications while HTN improvement was obtained if the antihypertensive medications dosage or quantity was reduced to preserve a healthy blood pressure.

Resolution in obstructive sleep apnea syndrome (OSAS), GERD, and hypothyroidism was indicated as symptoms absence with patients ceased to receive continuous positive airway pressure (CPAP) in OSAS cases and thyroxine in hypothyroidism patients and proton pump inhibitors (PPI) in GERD patients. Improvement in OSAS, hypothyroidism, and GERD was indicated as reduction in the symptoms with no longer medications need.

Statistical analysis

SPSS v28 (IBM Inc., Armonk, NY, USA) was done to perform the statistical analysis. The data distribution normality was indicated utilizing the Shapiro-Wilks test and histograms. The unpaired student t-test was performed to analyze the quantitative data, which were expressed as mean and standard deviation (SD). Qualitative data were analyzed utilizing the Fisher's exact or Chi-square test when applicable and were presented as frequency and percentage (%). Statistical significance was indicated as a two-tailed P value that was < or = to 0.05.

Results

Sex, age, body mass index (BMI), weight, DM, patients on insulin, HTN, number of anti-hypertensive drugs, OSAS, hypothyroidism, thyroxine dosage, and GERD were insignificantly different between LSG and LRYGB groups. The oral hypoglycemic drugs number was significantly increased in LRYGB group than LSG group (P value =0.017). **Table 1**

Table 1: Patients' data of the studied groups

		LSG (n=50)	LRYGB (n=50)	P value
Age (years)		42.8 ± 12.26	43.92 ± 12.56	0.653
Sex	**Male**	14 (28%)	17 (34%)	0.517
	Female	36 (72%)	33 (66%)	
Weight (Kg)		112.86 ± 14.64	109.54 ± 14.89	0.264
BMI (kg/m^2)		42.35 ± 8.09	40.88 ± 8.52	0.377
DM		26 (52%)	30 (60%)	0.420
Patients on insulin		5 (19.23%)	7 (23.33%)	0.709
Number of oral hypoglycemic drugs		2.08 ± 0.27	2.4 ± 0.62	0.017*
HTN		28 (56%)	27 (54%)	0.841
Number of anti-hypertensive drugs		2.14 ± 0.36	2.11 ± 0.32	0.730
OSAS		7 (14%)	4 (8%)	0.525
Hypothyroidism		8 (16%)	11 (22%)	0.444
Thyroxine dosage (µg/d)		90.5 ± 38.91	84.45 ± 31.5	0.713
GERD		7 (14%)	10 (20%)	0.425

Data are presented as mean ± SD or frequency (%). LSG: Laparoscopic sleeve gastrectomy, LRYGB: Laparoscopic Roux-en-Y gastric bypass, BMI: Body mass index, DM: diabetes mellitus, HTN: hypertension, OSAS: obstructive sleep apnea syndrome, GERD: gastroesophageal reflux disease, *: significant as P value ≤ 0.05
BMI at one and two years follow up was insignificantly different between LRYGB and LSG groups. EWL at one year follow up was insignificantly different between LRYGB and LSG groups while it was significantly improved in LRYGB group than LSG group at two years follow up (P= 0.027). **Table 2**

Table 2: EWL and BMI changes over 2 years follow up of the studied groups

		LSG (n=50)	LRYGB (n=50)	P value
BMI (kg/m^2)	**1 year**	32.23 ± 8.32	30.9 ± 8.73	0.437
	2 years	30.74 ± 8.39	29.5 ± 8.74	0.472
EWL (%)	**1 year**	68.16 ± 15.17	70.12 ± 15.18	0.520
	2 years	70.22 ± 15.18	76.68 ± 15.37	0.037*

Data are presented as mean ± SD. LSG: Laparoscopic sleeve gastrectomy, LRYGB: Laparoscopic Roux-en-Y gastric bypass, BMI: Body mass index, EWL: excess weight loss, *: significant as P value ≤ 0.05

The changes in DM, HTN, OSAS, hypothyroidism, and GERD after surgery were non-significantly different between LRYGB and LSG groups. **Table 3**

Table 3: The surgery effect on obesity associated comorbidities at follow up

		LSG (n=50)	LRYGB (n=50)	P value
DM	**Resolved**	19 (73.08%)	18 (60%)	0.303
	Improved	7 (26.92%)	12 (40%)	
HTN	**Resolved**	9 (32.14%)	11 (40.74%)	0.639
	Improved	16 (57.14%)	12 (44.44%)	
OSAS	**Resolved**	7 (100%)	4 (100%)	---
	Improved	0 (0%)	0 (0%)	
Hypothyroidism	**Resolved**	1 (12.5%)	3 (27.27%)	0.325
	Improved	3 (37.5%)	6 (54.55%)	
GERD	**Resolved**	3 (42.86%)	8 (80%)	0.115
	Improved	4 (57.14%)	2 (20%)	

Data are presented as frequency (%). LSG: Laparoscopic sleeve gastrectomy, LRYGB: Laparoscopic Roux-en-Y gastric bypass, DM: diabetes mellitus, HTN: hypertension, OSAS: obstructive sleep apnea syndrome, GERD: gastroesophageal reflux disease. The oral hypoglycemic drugs number, anti-hypertensive drugs number, and thyroxine dosage after surgery were insignificantly different between LSG and LRYGB groups. **Table 4**

Table 4: The surgery effect on medications at follow up

	LSG (n=50)	LRYGB (n=50)	P value
Number of oral hypoglycemic drugs	0.35 ± 0.63	0.43 ± 0.57	0.588
Number of anti-hypertensive drugs	0.86 ± 0.71	0.78 ± 0.75	0.688
Thyroxine dosage (µg/d)	61.63 ± 49.05	46.45 ± 39.21	0.464

Data are presented as mean ± SD. LSG: Laparoscopic sleeve gastrectomy, LRYGB: Laparoscopic Roux-en-Y gastric bypass.

Regarding postoperative complications, 3 (6%) patients progressed new-onset GERD in LSG group while 4 (8%) patients developed internal hernia, and 1 (2%) patient developed ulcer at gastrojejunal anastomosis in LRYGB group with insignificant difference between the two groups. **Table 5**
Contrasted to the LRYGB group, which had 7 (14%) failures two years after the surgery, the LSG group had 12 (24%) failures according to Reinhold's criteria for surgical failure.

Table 5: Complications of the studied groups

	LSG (n=50)	**LRYGB (n=50)**	**P value**
New-onset GERD	3 (6%)	0 (0%)	0.242
Internal hernia	0 (0%)	4 (8%)	0.118
Ulcer at gastrojejunal anastomosis	0 (0%)	1 (2%)	1.000

Data are presented as frequency (%). LSG: Laparoscopic sleeve gastrectomy, LRYGB: Laparoscopic Roux-en-Y gastric bypass, GERD: gastroesophageal reflux disease.

Discussion

Morbid obesity is a significant international issue that was considered to be the numerous comorbidities cause, involving type 2 diabetes, infertility, metabolic syndrome, cardiovascular disease, and specific cancer types, which resulted in an elevated mortality rate [8]. In terms of the sort of surgery, bariatric surgical treatment is the most effective method of managing severe obesity. This effect always occurs prior to the commencement of weight dissipation, as a result of the patient's diet and hormonal fluctuations [9]. The most effective method of managing morbidly obese cases is through bariatric surgery. Until recently, the gold standard bariatric operation was RYGB. Nevertheless, SG has been utilized at an increasing rate in recent years, despite the fact that its long-term efficacy is inadequate. In contrast to RYGB, the LSG procedure is potentially more secure, quicker, and more convenient. Nevertheless, there are numerous additional references available on the RYGB technique that pertain to the long-term metabolic and clinical studies outcomes [10].

The auspicious short-term LSG outcomes have undergone a slight transformation from a two-step method to an independent bariatric procedure. In comparison to LRYGB, LSG is lower technically simpler, invasive, and operationally more convenient. The intact gastrointestinal tract, an internal hernias absence, and the malabsorption absence necessitating life time dietary status observation are among the long-term benefits of LSG [11]. The objective of the present investigation was to indicate the LSG and LRYGB impact on obesity-associated comorbidities morbidly obese and weight loss in cases.

In the present study, it was found that age, sex, weight, BMI, DM, patients on insulin, HTN, number of anti-hypertensive drugs, OSAS, hypothyroidism, thyroxine dosage, and GERD were insignificantly different between LSG and

LRYGB groups. The oral hypoglycemic drugs number was significantly increased in LRYGB group than LSG group (P value =0.017).

Regarding the inclusion criteria, 200 cases were examined in the Baheeg study during this period. Of the 200 cases, 100 had RYGB and 100 were treated by SG. The mean cases age with RYGB was 41.30 ± 12.831, while the mean cases age without RYGB was 42.60 ± 13.018 years. The gender of the patients was a significant factor, with over half of the RYGB group being female (65%) and 52 (52%) in the SG group. The RYGB group had an mean BMI of 39.66 ± 3.770 kg/m2, while the control group had an mean of 39.38 ± 3.648 kg/m2. Significant differences were not indicated in relation to height, weight, or comorbidity [12]. In contrast to Sherif's study, which was performed on 434 cases, the patients' BMI ranged from 35 to 60 kg/m2, and the mean age was 42 ± 4.8 years. Additionally, 73% of the patients were women. Cases were analyzed at 3, 6, 9, 12, and 24 months. The study groups were randomly divided into two categories: the LSG group (214 cases) and the LRYGB group (220 cases). Insignificant difference was observed between the study groups regarding BMI, sex, age, and associated comorbidities [13]. Wölnerhanssen et al. reported that both groups did not exhibit any significant differences regarding BMI, sex, age, weight and the comorbidities prevalence (HTN, DM, dyslipidemia, and OSAS). Mean baseline BMI (47.9 kg/m2 Vs 43.9 kg/m2) and mean age (48.4 Vs 42.5 years) were statistically significant differences between the trials [14]. Nevertheless, Yang et al. conducted an additional study that found that the mean patients age in the RYGB group was 40.4 ± 9.4 years, whereas the mean cases age in the SG group was 41.4 ± 9.3 years. The mean BMI of the RYGB group was 32.3 ± 2.4 kg/m2, while the mean BMI of the SG group was 31.8 ± 3.0 kg/m2. Both groups had a similar anthropometric baseline, which included BMI, DM, sex, age, waist perimeter, weight, and medication utilization [15].

In the present study, it was found that BMI at one and two years follow up was insignificantly different between LSG and LRYGB groups. EWL at one year follow up was insignificantly different between LSG and LRYGB groups while it was significantly improved in LRYGB group than LSG group at two years follow up (P value =0.027).

Peterli et al. demonstrated that the mean BMI of both groups reduced markedly from baseline to five years after the operation. At the five-year follow-up, insignificant difference was indicated in BMI between the interventions. At 5 years, insignificant difference was indicated in the mean weight reduction between the groups. The weight loss nadir was achieved in both groups between one and two years following the surgery. The mean weight loss in the SG group was less than that in the RYGB group at 5 years, as stated as the original weight loss percentage. In the SG group, the cases percentage with a percentage excess BMI loss (EBMIL) more than 50% at 5 years was 68.3%, while in the RYGB group, it was 76%. A percentage EBMIL of over 75% was indicated in 31.7% and 40.4% of the cases, respectively. 9.9% of SG cases and 3.8% of RYGB cases exhibited a percentage EBMIL of less than 25% [10]. Biter et al. reported that the mean percentage EBMIL at 5 years was 58.8% after LSG and 67.1% after LRYGB, while TWL% was 22.5% after LSG and 26.0% after RYGB. LSG and RYGB had mean BMIs of 33.6 kg/m2 and 32.1 kg/m2, respectively, at the age of 5 years [5].

Wlnerhanssen et al. emphasized that the mean (SD) % EBMIL was 62.7 (24.2) % after LRYGB and 55.5 (25.9) % after LSG at 5 years. The main operation effect was a significant difference between the procedures, and this difference remained unchanged during the follow-up period from 1 to 5 years after the surgery (operation time interaction). The LRYGB group exhibited a 7.0% superior model-based mean%EBMIL estimate compared to the LSG group. The percentage of EBMIL was at its highest at one year and then started to reject (time principal effect). After LSG, the mean (SD) %TWL at 5 years was 23.9 (10.8) %, while after LRYGB, it was 27.8 (10.3) %. The weight discrepancy was 4.4 kilograms. The %TWL was significantly higher in the LRYGB group than in the LSG group after LSG (difference in model-based means 3.2%); however, the difference did not differ significantly through follow-up. The %TWL was significantly highest at one year and subsequently began to decline [14]. The weight loss long-term impacts from bariatric surgery have been the subject of numerous randomized controlled studies [4, 16]. After LRYGB and LSG, the mean %EWL at 5 years was 59.1% and 69.3%, respectively, according to the meta-analysis study's findings [16]. The outcome was consistent with that of Golzarand et al., who determined that the mean %EWL at ≥5 years was 62.5% and 53.2% after LRYGB and LSG, respectively [17]. Kowalewski et al. detected that isolated LSG supplied an mean of 51.1% in a long-term follow-up, with a median follow-up period of 8.0 years (ranging from 7.1 to 10.7) [18]. Nevertheless, the Swiss Multicenter Bypass or Sleeve Study, as informed by Peterli et al., randomly detailed 217 cases (mean BMI, 43.9, 72% women; mean age, 45.5 years) to have RYGB or SG. At five years, there was no discernible distinction in the percentage EBMIL between LRYGB and LSG [10]. The Finish Sleeve Vs Bypass study, a recent randomized trial done by Salminen et al., explained that the LSG use did not meet the criteria for equivalence regarding %EWL at 5 years (−9% to +9% EWL, equivalence margin) [4]. Grönroos et al. discovered that the estimated mean %EWL in the LSG group was 47% at 7 years, while the LRYGB group had a value of 55%. Compared to LSG, the model-based estimate of mean %EWL was 8.7 % higher after LRYGB. The two groups were not comparable at 7 years, as the entire confidence interval was not within the predefined equivalence margins (-9 to 9). Despite the fact that weight loss following LRYGB was statistically more than that following LSG, the disparity was not clinically significant [19].

In the present study, it was found that the changes in DM, HTN, OSAS, hypothyroidism, and GERD after surgery were insignificantly different between LSG and LRYGB groups.

Bariatric surgery was primarily employed to treat morbid obese cases. However, it was discovered that the type 2 DM cases weight lowered significantly after the surgery, and blood sugar levels revisited to normal quickly. Additionally, other metabolic indicators enhanced considerably [20]. In comparison to medical therapy, bariatric surgery has been shown to have obesity-related diseases superior control, including non-alcoholic and dyslipidemia steatohepatitis, and a reduction in overall mortality and cardiovascular events. Subsequently, numerous studies have demonstrated these benefits. The term "metabolic surgery" has been introduced in light of these discoveries [21]. Nevertheless, the meta-analysis did not reveal any distinction between LRYGB and LSG regarding their improvements in dyslipidemia and type 2 diabetes. These findings indicate that the LSG impact

on DM is comparable to that of LRYGB. Given this, it is logical for cases who are well-informed to select LSG as a treatment for dyslipidemia and DM. Furthermore, this meta-analysis determined that LRYGB was more efficient than LSG in alleviating symptoms of GERD [16], a finding that is in accordance with an increasing body of literature [22]. Surgeons should meticulously evaluate patients for contraindications to the LSG that are associated with GERD in light of these discoveries. As a result, it is imperative that all patients who are contemplating LSG are notified of the potential GERD events risks or their GERD symptoms deterioration. Biter et al. reported that the change in DM2, FBG (Fasting Blood Glucose), dyslipidemia, arthritis, and HTN between the LRYGB and LSG groups was not statistically significant after a two-year follow-up [5]. Sherif indicated the HTN, dyslipidemia, type 2 DM, joint pain, OSAS, and GERD recuperation rate and development in accordance with the obesity-related comorbidities. The two groups experienced a significant increase in comorbidities one year following the surgery. The remission of GERD was the only statistically significant difference between the LRYGB group and the LSG group regarding comorbidities or development rate [13]. Maggard et al. reported similar results on the same subject, even with a less BMI group, particularly the quick enhancement in DM2 after the two operations, which is consistent with our findings [23]. Insignificant difference was found between both groups regarding the change in total recovery of DM, dyslipidemia, GERD symptoms, OSAS, and joint pain at 5 years postoperative, as indicated by Peterli et al. [10]. Wölnerhanssen et al. discovered insignificant difference between the two groups regarding the change in total recovery of DM, dyslipidemia, symptoms, and OSAS [14].

In the present study, it was found that the oral hypoglycemic drugs number, anti-hypertensive drugs number, and thyroxine dosage after surgery were insignificantly different between LRYGB and LSG groups. In this study, 3 (6%) patients progressed to new-onset GERD in LSG group while 4 (8%) patients developed internal hernia, and 1 (2%) patient developed ulcer at gastrojejunal anastomosis in LRYGB group with no significant difference between both groups.
eight LSG group cases underwent histopathology examinations by Baheeg et al. Three of the cases exhibited normal (unremarkable) gastric features, while five of the cases exhibited chronic gastritis. In all of the specimens that were evaluated, no malignancy was identified. Clinical suspicion of aberrant mucosal lesions was demonstrated in all of the cases that were received [24]. The total complication rate for LSG was 3.24% (1/31) and for LRYGB was 15.62% (5/31) in accordance with the findings of Zhang et al. ($P > 0.05$) [25]. These results agreed with the research conducted by Peterli et al., which found insignificance in complications necessitating endoscopic or surgical review within the initial five years [10]. Gastric bypass is associated with a greater weight loss than SG in a five-year clinical trial, as per Salminen et al. [4]. Nevertheless, this weight loss was not significant. Furthermore, gastric bypass is linked to superior HTN management compared to SG; however, these findings were contingent upon the specific antihypertensive medication utilized. Lakdawala et al. [26]. found that LSG was associated with greater weight loss and superior metabolic outcomes in the Asian than Caucasian population over one-year intervals, in contrast to Salminen et al., [4]. Minor short-term complications were observed in 5 (1.6%) cases following SG and in 15 (4.7%) cases following RYGB, as reported by Biter et al. Vomiting, dysphagia, or discomfort comprised the majority of minor complications. Hemorrhage,

obstructed anastomosis, anastomotic leakage, and acute incisional hernia were the most significant complications [5]. The CCI score was more than 0 in 46 of 204 cases (22.5%) and 77 of 207 cases (37.2%), according to Wölnerhanssen et al. The number of complications following LSG was significantly less than that of LRYGB. A significant difference was indicated in the total CCI score between the LRYGB and LSG groups for cases with complications. Between baseline and the 5-year follow-up, 18.4% of cases reported a Clavien–Dindo grade IIIb or higher complication. In the LSG group, all-cause mortality was 2 of 228 cases (0.9%), while in the LRYGB group, it was 4 of 229 cases (1.7%). No significant difference was indicated between both groups. With no significant difference between the two groups, method-related mortality was 1 of 229 (0.4%) in the LRYGB group and 0 of 228 (0%) in the LSG group [14].

Contrasted to the LRYGB group, which had 7 (14%) failures two years after the surgery, the LSG group had 12 (24%) failures regarding Reinhold's criteria for surgical failure. Garg et al. compare the LSG and LRYGB efficacy on obesity-related comorbidities and weight loss over a two-year follow-up using a case-control investigation design. In the LRYGB group, the failure rate was 12.5%, as per Reinhold's criteria for surgical failure, while the LSG group experienced a 20% failure rate couple of years after the surgery [27]. The failure rate in the LSG group was 20%, as per Reinhold's criteria, while it was 12.5% in the LRYGB group. This implies that LRYGB had a superior weight loss outcome over a two-year period in comparison to LSG [7]. Other studies reported comparable outcomes. Lakdawala et al. indicated that 100 cases who had LRYGB and LSG experienced equivalent weight loss at the one-year follow-up [26]. Over a two-year follow-up period, El Chaar et al. discovered a %EWL of 75% with LRYGB and 60% with LSG [28]. Boza et al. indicated a significantly more %EWL with LRYGB (94% vs 84%) over a two-year follow-up in 786 cases had LRYGB and 811 cases had LSG. The reduced initial 38 kg/m2 BMI in their study participants could account for the higher %EWL. However, the LSG group exhibited a lower percentage of EWL [29]. In a meta-analysis that included 196 cases had LRYGB and 200 cases had LSG, Li et al. [30]. discovered that LRYGB resulted in a significantly higher weight loss. The early findings of the Swiss Multicentre Sleeve or Bypass research, a prospective randomized controlled trial that involved 107 cases undergoing LSG and 110 cases undergoing LRYGB, were published. The study reported a 77% and 73% EBMIL at one year follow-up and a 73% and 63% EBMIL at three years follow-up after LSG and LRYGB, respectively (P = 0.02) [28]. In contrast, there are only a handful of studies that have reported a superior outcome in LSG weight loss at a one-year follow-up. Karamanakos et al.observed a %EWL of 69.7% in the LSG group and 60.5% in the LRYGB group. They attributed this difference to the reduced ghrelin levels, which inhibited appetite during the first postoperative period [29]. Boza et al. also indicated a failure rate of 10% and 5.4% for LSG and LRYGB at a two-year follow-up. In comparison to our investigation, the lower failure rates may be attributed to the fewer obese cases contribution in their study, with a mean 38 kg/m2 BMI [29].

Limitations: single center study with small sample size, and hence, providing larger sample size with multicenter cooperation is recommended to validate our results.

Conclusions

LRYGB and LSG are efficient bariatric methods with similar improvements in comorbidities and weight loss and similar medication requirements and postoperative complication profiles. However, LRYGB may have a slight advantage regarding greater EWL and a lower surgical failure rate at 2 years of follow-up. The choice between LRYGB and LSG may depend on patient-specific factors and surgeon preference.

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