

Retrospective Cohort Study

Laparoscopic gastric bypass vs sleeve gastrectomy in obese Korean patients

Ji Yeon Park, Yong Jin Kim

Ji Yeon Park, Yong Jin Kim, Department of Surgery, Soonchunhyang University Seoul Hospital, Seoul 140-743, South Korea

Ji Yeon Park, Department of Surgery, National Cancer Center, Goyang-si, Gyeonggi-do 410-769, South Korea

Author contributions: Kim YJ designed and performed the research; Park JY analyzed the data and wrote the paper.

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Correspondence to: Yong Jin Kim, MD, PhD, Department of Surgery, Soonchunhyang University Seoul Hospital, 59, Daesagwan-ro, Yongsan-gu, Seoul 140-743, South Korea. yjgs1997@gmail.com
Telephone: +82-2-7099479
Fax: +82-2-7951687

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Abstract

AIM: To compare the mid-term outcomes of lapa-

roscopic sleeve gastrectomy (LSG) and laparoscopic Roux-en-Y gastric bypass (LRYGB) in obese Korean patients.

METHODS: All consecutive patients who underwent either LSG or LRYGB with primary to treat morbid obesity between January 2011 and December 2012 were retrospectively reviewed. Patients with a body mass index (BMI) ≥ 30 kg/m² with inadequately controlled obesity-related comorbidities (*e.g.*, diabetes, obstructive sleep apnea, hypertension, or obesity-related arthropathy) or BMI ≥ 35 kg/m² were considered for bariatric surgery according to the International Federation for the Surgery of Obesity-Asia Pacific Chapter Consensus statements in 2011. The decision regarding the procedure type was made on an individual basis following extensive discussion with the patient about the specific risks associated with each procedure. All operative procedures were performed laparoscopically by a single surgeon experienced in upper gastrointestinal surgeries. Baseline demographics, perioperative surgical outcomes, and postoperative anthropometric data from a prospectively established database were thoroughly reviewed and compared between the two surgical approaches.

RESULTS: One hundred four patients underwent LSG, and 236 underwent LRYGB. Preoperative BMI in the LSG group was significantly higher than that of the LRYGB group (38.6 kg/m² vs 37.2 kg/m², $P = 0.024$). Patients with diabetes were more prevalent in the LRYGB group (18.3% vs 35.6%, $P = 0.001$). Operating time and hospital stay were significantly shorter in the LSG group compared with the LRYGB group (100 min vs 130 min, $P < 0.001$; 1 d vs 2 d, $P = 0.003$), but the incidence of perioperative complications was similar between the groups ($P = 0.351$). The mean percentage of excess weight loss (%EWL) was 71.2% for LRYGB, while it was 63.5% for LSG, at mean follow-up periods of 18.0 and 21.0 mo, respectively ($P = 0.073$). The %EWL at 1, 3, 6, 12, 18, 24, and 36 mo was equivalent

between the groups. Four patients required surgical revision after LSG (4.8%), while revision was only required in one case following LRYGB (0.4%; $P = 0.011$).

CONCLUSION: Both LSG and LRYGB are effective procedures that induce comparable weight loss in the mid-term and similar surgical risks, except for the higher revision rate after LSG.

Key words: Morbid obesity; Bariatric surgery; Roux-en-Y gastric bypass; Sleeve gastrectomy; Weight loss

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Core tip: Both laparoscopic sleeve gastrectomy (LSG) and laparoscopic Roux-en-Y gastric bypass (LRYGB) are effective procedures that result in comparable weight loss in the mid-term with similar surgical risks in obese Korean patients. However, a larger number of patients required revisional surgery following LSG than LRYGB. The long-term complications encountered after each procedure differed significantly, and these complications were not negligible. Surgeons should provide a tailored surgical option for each patient that takes into consideration the possible risks, as the long-term complications may have a significant influence on the quality of life following the surgery.

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INTRODUCTION

Obesity is one of the most concerning health problems in the world today, imposing a considerable financial burden on society^[1]. Consistent effort has been made to enable individuals to achieve weight loss and, concomitantly, to manage a variety of obesity-related comorbidities. However, none of the currently available conservative measures has succeeded in realizing these goals, and at the present time, bariatric surgery has proven to be the most effective method for achieving sustained weight loss^[2].

Among the various available options for bariatric surgery, Roux-en-Y gastric bypass has been considered the gold standard for several decades. This procedure has a relatively long history compared to the other available procedures, qualified with sufficient data involving satisfactory long-term outcomes in terms of durable weight loss and resolution of comorbidities^[3]. Recently, however, laparoscopic sleeve gastrectomy (LSG) has been rapidly gaining popularity as a stand-

alone treatment for morbid obesity^[4]. It is thought to be technically less demanding and to offer a potential benefit of reduced risk of long-term complications compared to laparoscopic Roux-en-Y gastric bypass (LRYGB). The trend of exponential increase in LSG is even noticeable in Asian countries where bariatric surgery has only recently been introduced^[4], although results regarding the long-term efficacy of LSG are still lacking.

The present study aimed to evaluate the mid-term efficacy of LSG and LRYGB and to compare the results between the two procedures in obese Korean patients at a single center.

MATERIALS AND METHODS

All patients who were operated on at Soonchunhyang University Seoul Hospital, a tertiary referral medical center, between January 2011 and December 2012 were retrospectively reviewed. Of those, the patients who underwent either LRYGB or LSG with primary intent to treat morbid obesity were enrolled in the present study. Baseline, operative, and follow-up data from a prospectively established database were thoroughly reviewed and summarized. Approval for this review of hospital records was obtained from the Institutional Review Board (SCHUH 2014-12-006); the need for patient informed consent was waived.

Bariatric surgery candidates were selected according to the International Federation for the Surgery of Obesity-Asia Pacific Chapter Consensus statements in 2011^[5]. As such, patients with a body mass index (BMI) ≥ 30 kg/m² with inadequately controlled obesity-related comorbidities (*e.g.*, diabetes, obstructive sleep apnea, hypertension, or obesity-related arthropathy) or with a BMI ≥ 35 kg/m² were considered for bariatric surgery. The decision regarding the procedure type was made on an individual basis following extensive discussion with the patient about the specific risks associated with each procedure. Patients received interdisciplinary education about potential surgical and nonsurgical options, possible outcomes, possible complications, and necessary postoperative lifestyle changes and nutritional supplementation.

Surgical procedures

All operative procedures were performed laparoscopically by a single surgeon experienced in upper gastrointestinal surgeries. Six trocars were used both in LSG and LRYGB; one 11-mm port for a scope at the umbilicus, two 12-mm ports, and three additional 5-mm ports. A 34 Fr bougie dilator was used for guidance during gastric resection in LSG. The lengths of the alimentary and biliopancreatic limbs were estimated at about 70-100 cm and 50 cm, respectively, and a 15-20 mm sized linear stapled gastrojejunostomy was established in LRYGB. Detailed surgical procedures were well described in our previously published study^[6].

Table 1 Preoperative demographics and clinical characteristics of the enrolled patients

	LSG (<i>n</i> = 104)	LRYGB (<i>n</i> = 236)	<i>P</i> value ¹
Age (yr)	31 (25-38)	38 (29-46)	< 0.001
Sex			
Male	41 (39.4)	37 (15.7)	< 0.001
Female	63 (60.6)	199 (84.3)	
Body weight (kg)	107.0 (95.0-130.8)	100.0 (87.0-116.8)	< 0.001
BMI (kg/m ²)	38.6 (34.8-43.8)	37.2 (33.6-41.7)	0.024
Excess weight (kg) ²	43.1 (33.5-62.6)	38.4 (28.1-52.6)	0.003
Comorbidities			
Diabetes	19 (18.3)	84 (35.6)	0.001
Hypertension	28 (26.9)	88 (37.3)	0.082
Dyslipidemia	64 (67.4)	116 (68.2)	0.892
OSA			
Confirmed	10 (10.5)	24 (14.1)	0.514
Suspicious	4 (4.2)	11 (6.5)	
Arthropathy	12 (12.6)	31 (18.2)	0.298
GERD	14 (13.5)	19 (8.1)	0.163
PCOS ³	12 (19.0)	30 (15.1)	0.554
No. of comorbidities	1.5 (1-2)	2 (1-3)	0.031

Data are presented as *n* (%) or median (interquartile range). ¹Mann-Whitney *U* test for continuous variables and Pearson's χ^2 test or Fisher's exact test for categorical variables were applied; ²The excess weight was calculated from the ideal weight using a BMI of 23 kg/m² as the upper limit of normal according to the World Health Organization recommended definition of obesity for Asians; ³The incidence among female patients. LSG: Laparoscopic sleeve gastrectomy; LRYGB: Laparoscopic Roux-en-Y gastric bypass; BMI: Body mass index; OSA: Obstructive sleep apnea; GERD: Gastro-esophageal reflux disease; PCOS: Polycystic ovarian syndrome.

Postoperative data collection and follow-up data analysis

Patients returned to the outpatient clinic 2 wk after surgery and then every 3 mo for the first postoperative year to monitor weight loss, dysphagia or food intolerance, eating behavior, comorbidity status, and the presence of any complications. Follow-up frequency was then increased to every 12 mo after the first year. Telephone interviews were also used to monitor patients who were unable to visit the outpatient clinic.

The degree of weight loss was expressed as the percentage of total weight loss (%TWL) and the percentage of excess weight loss (%EWL), with the calculation of ideal body weight as that equivalent to a BMI of 23 kg/m² according to the World Health Organization (WHO)-recommended definition of obesity for Asians^[7].

Statistical analysis

Statistical analysis was performed using SPSS version 18 for Windows (SPSS Inc., Chicago, IL, United States). Medians with interquartile ranges of the variables were calculated and compared between the two different procedures. The χ^2 test or Fisher's exact test was applied to analyze categorical variables, while Mann-Whitney *U* test was used for continuous variables. All tests were two-tailed and *P* values < 0.05 were considered significant.

Table 2 Surgical outcomes according to the surgical procedures

	LSG (<i>n</i> = 104)	LRYGB (<i>n</i> = 236)	<i>P</i> value ¹
Combined operation	5 (4.8)	19 (8.1)	0.282
Operating time (min)	100 (90-115)	130 (110-150)	< 0.001
Intraoperative blood loss	100 (50-150)	100 (50-200)	0.010
Length of hospital stay (d)	1 (1-2)	2 (1-2)	0.003
Intraoperative complication	1 (1.0)	4 (1.7)	> 0.999
Postoperative complication ²			
No	95 (91.3)	202 (85.6)	0.351
Yes			
Mild	7 (6.7)	25 (10.6)	
Moderate	0 (0)	5 (2.1)	
Severe	2 (1.9)	4 (1.7)	
Re-admission	3 (2.9)	8 (3.4)	> 0.999

Data are presented as *n* (%) or median (interquartile range). ¹Mann-Whitney *U* test for continuous variables, and Pearson's χ^2 test or Fisher's exact test for categorical variables were applied; ²The severity of postoperative complications were classified according to the Accordion Severity Grading System. LSG: Laparoscopic sleeve gastrectomy; LRYGB: Laparoscopic Roux-en-Y gastric bypass.

RESULTS

A total of 340 consecutive patients underwent either LSG or LRYGB for morbid obesity during the study period and were included in the study. One hundred four patients (30.6%) underwent LSG, while 236 patients (69.4%) underwent LRYGB. The demographic characteristics are shown in detail in Table 1. In the LSG group, the patients were younger, and the proportion of males was greater (*P* < 0.001 for both factors) than the LRYGB group. Preoperative BMI was 38.6 kg/m² [interquartile range (IQR), 34.8-43.8] in the LSG group, which was significantly higher than the BMI of 37.2 kg/m² (IQR, 33.6-41.7) for the LRYGB group (*P* = 0.024). Patients with diabetes were more prevalent in the LRYGB group (35.6% vs 18.3%, *P* = 0.001), while the incidence of other obesity-related comorbidities was similar between the two groups.

The mean operating time and the length of hospital stay were significantly shorter in the LSG group than in the LRYGB group (100 min vs 130 min, *P* < 0.001; 1 d vs 2 d, *P* = 0.003; Table 2). There was one patient in whom the scheduled LRYGB was converted to LSG because of severe adhesions between small bowel loops associated with a previous history of panperitonitis. The left gastroepiploic vessels were injured during LSG in one patient, but there was no further evidence of ischemia. Technical failure of gastrojejunostomy reconstruction was encountered for four patients in the LRYGB group; successful laparoscopic revision was accomplished for all during the surgery. The incidence and severity of postoperative complications did not statistically differ between the groups (*P* = 0.351). Most complications in the LSG group were minor, involving operative wound or dietary problems; two severe complications were

Table 3 Anthropometric outcomes at last follow-up

	LSG (<i>n</i> = 104)	LRYGB (<i>n</i> = 236)	<i>P</i> value ¹
Mean follow-up period (mo)	21.0 (14.5-28.0)	18.0 (12.0-24.0)	0.012
At last follow up			
Body weight (kg)	81.5 (64.0-98.5)	72.0 (63.0-85.0)	< 0.001
BMI (kg/m ²)	28.5 (24.5-34.2)	27.3 (24.1-30.2)	0.014
%EWL (%) ²	63.5 (44.8-88.0)	71.2 (53.7-91.1)	0.073
%TWL (%)	25.0 (19.4-32.9)	26.7 (20.0-32.4)	0.394
EWL < 50% at 1 year	18 (21.2)	23 (13.6)	0.148
Revision	5 (4.8)	1 (0.4)	0.011

Data are presented as *n* (%) or median (interquartile range). ¹Mann-Whitney *U* test for continuous variables and Pearson's χ^2 test or Fisher's exact test for categorical variables were applied; ²A BMI of 23 kg/m² was adopted as the upper limit of normal to calculate %EWL according to the World Health Organization recommended definition of obesity for Asians. LSG: Laparoscopic sleeve gastrectomy; LRYGB: Laparoscopic Roux-en-Y gastric bypass; BMI: Body mass index; EWL: Excess weight loss; TWL: Total weight loss.

related to intra-abdominal bleeding in the immediate postoperative period that required reoperation to achieve hemostasis. Meanwhile, more than half of the complications (18/34, 52.9%) were associated with postoperative bleeding in the LRYGB group; 12 of these were mild, four were moderate, and two were severe complications. The overall incidence of postoperative bleeding was 7.6%, where two-thirds of the cases presented as luminal bleeding and one-third presented as intra-abdominal bleeding. Clinically significant hemorrhage requiring transfusion or invasive intervention occurred in 10 patients (4.2%) undergoing LRYGB. Other severe complications included one case of gastric pouch leakage and one intestinal obstruction; both of these required surgical intervention.

Patients were followed up for an average of approximately 21.0 mo and 18.0 mo in the LSG and LRYGB groups, respectively (Table 3). Although the postoperative BMI was significantly higher in the LSG group than in the LRYGB group (28.5 kg/m² vs 27.3 kg/m², *P* = 0.014) at the last follow-up, the %EWL and %TWL were similar between the groups (63.5% vs 71.2%, *P* = 0.073; 25.0% vs 26.7%, *P* = 0.394). The proportion of patients who had failed to achieve 50% of EWL 1 year postoperatively was larger in the LSG group (21.2%) than in the LRYGB group (13.6%), but the difference was not statistically significant (*P* = 0.148). Five patients in the LSG group (4.8%) required revisional surgery following the initial procedure because of intolerable *de novo* reflux disease (*n* = 2) and insufficient weight loss (*n* = 3). On the other hand, only one patient (0.4%) who had undergone LRYGB requested revision, RYGB reversal, due to malnutrition, and the rate of revision was significantly lower than in the LSG group (*P* = 0.011).

The chronological changes in anthropometric data during the follow-up period are shown in Figure 1. The body weight and BMI of the LSG group were generally

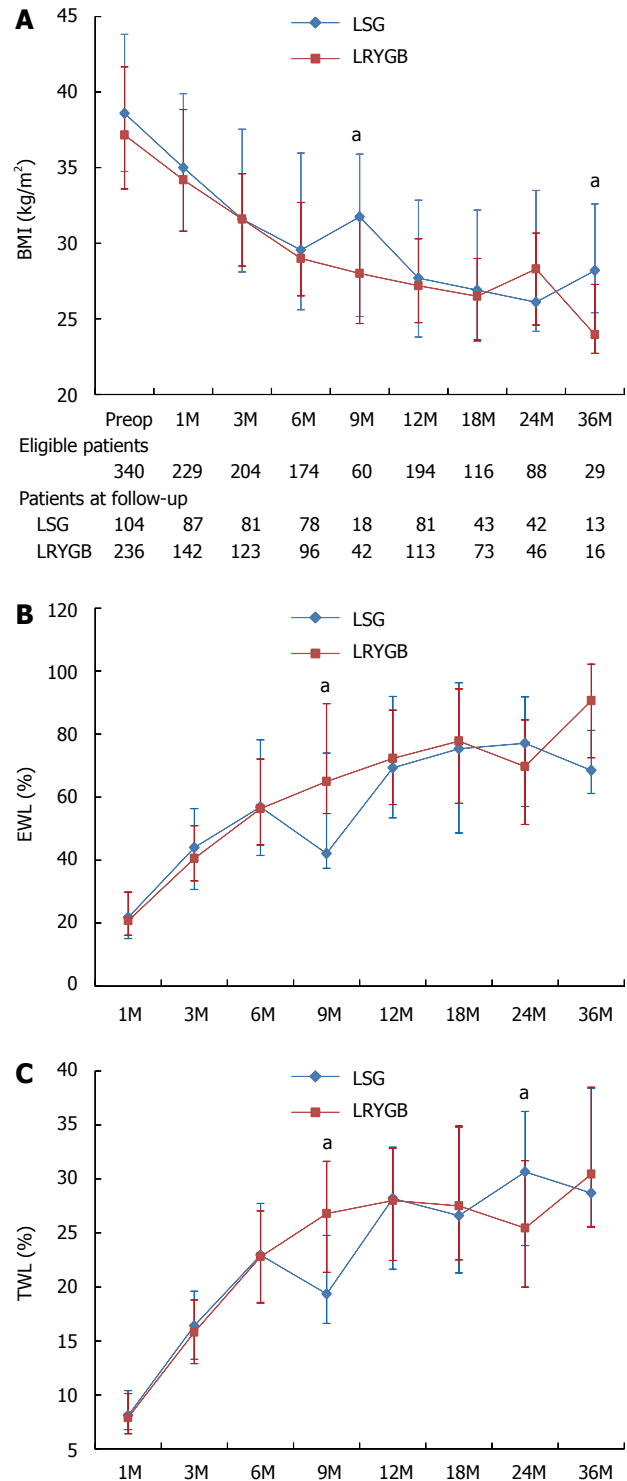


Figure 1 Chronological changes in anthropometric outcomes. A: Body mass index; B: Percentage of excess weight loss; C: Percentage of total weight loss. Medians are used to depict the values, and error bars indicate the interquartile range. ^a*P* < 0.05 between groups. LSG: Laparoscopic sleeve gastrectomy; LRYGB: Laparoscopic Roux-en-Y gastric bypass; BMI: Body mass index; EWL: Excess weight loss; TWL: Total weight loss.

higher than those of the LRYGB group throughout the study period. However, there were no significant differences between the LSG and LRYGB groups in %EWL and %TWL, which plateaued at around 80% and 30%, respectively, in both groups.

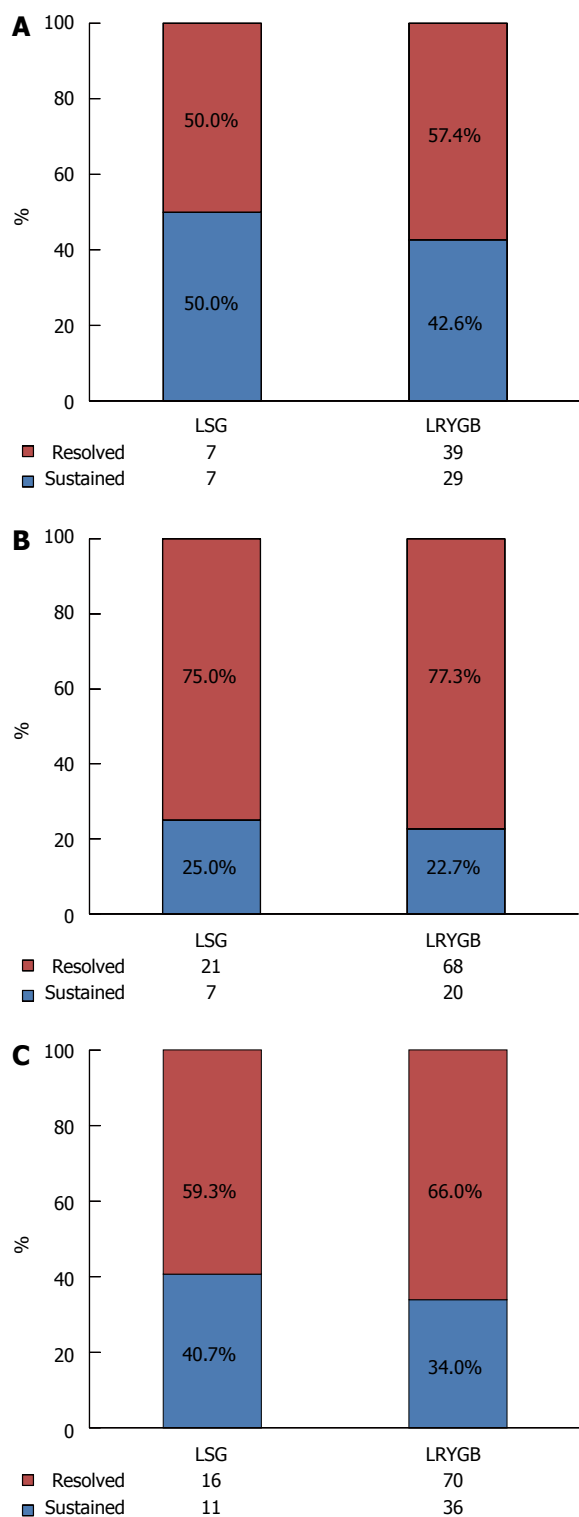


Figure 2 Resolution of comorbidities. A: Diabetes; B: Hypertension; C: Dyslipidemia. $P = 0.769, 0.801, \text{ and } 0.653$, respectively.

The obesity-related comorbidities were resolved in a considerable number of patients in both groups. The overall resolution rates of the obesity-related comorbidities were 56.1% for type 2 diabetes, 76.7% for hypertension, and 64.7% for dyslipidemia in the entire study population. No difference was observed between the LSG and LRYGB groups regarding

Table 4 Long-term complications (> 30 d) n (%)

LSG (n = 104)		LRYGB (n = 236)	
GERD	28 (26.9)	Marginal ulcer	64 (27.1)
Anemia	4 (3.8)	Confirmed by endoscopy	15 (6.4)
		Clinically suspicious	49 (20.8)
		Anemia	53 (22.5)
		GERD	11 (4.7)
		Peterson hernia	3 (1.3)
		Ventral hernia	3 (1.3)

LSG: Laparoscopic sleeve gastrectomy; LRYGB: Laparoscopic Roux-en-Y gastric bypass; GERD: Gastro-esophageal reflux disease.

comorbidity resolution (Figure 2).

Differences were observed between the groups in the types of long-term complications experienced (Table 4). Twenty-eight patients (26.9%) presented with gastroesophageal reflux symptoms following LSG; 24 of these suffered from *de novo* reflux symptoms after the surgery, and four showed aggravation of pre-existing gastroesophageal reflux disease (GERD). The most frequently encountered long-term complication following LRYGB was marginal ulcers. The clinical symptom-based incidence reached 27.1%, but only one-fourth of the cases were confirmed with endoscopic evaluation. Most of the symptoms associated with both reflux esophagitis and marginal ulcers were well managed with proton pump inhibitors (PPIs). However, two patients in the LSG group were converted to LRYGB due to intolerable reflux symptoms, and one patient in the LRYGB group developed panperitonitis owing to marginal ulcer perforation and required emergent laparotomic exploration to redo the gastrojejunostomy.

DISCUSSION

In the present study, both LSG and LRYGB were found to be effective bariatric procedures with similar surgical risks leading to equivalent weight loss outcomes and comorbidity resolution during the medium-term follow-up. To the best of our knowledge, this is the first report comparing LSG vs LRYGB in obese Korean patients, and we believe that this study will provide valuable information to better guide clinical decisions for individual obese patients in Korea.

Bariatric surgery is relatively new in East Asian countries, including Korea. There is a marked tendency in the region to prefer technically less demanding procedures, including laparoscopic adjustable gastric banding or LSG, over more complicated procedures such as LRYGB or biliopancreatic diversion^[4]. This might be attributable to the surgeons' lack of experience as well as to the sufficient weight loss outcomes achieved by these relatively simple restrictive procedures. The surgeon in the current study first began to perform the technically less demanding LSG in 2008, and then, starting in 2011, gradually began to adopt the more

complicated LRYGB, after experience with 100 cases of LSG. In the present study, we enrolled patients who underwent surgery when the two surgical options were evenly offered to prospective candidates. The selection of the procedure type largely depended on the patient's decision after thorough discussion regarding the outcomes and potential risks of each procedure based on the historical data. However, LSG was prioritized in super obese patients with BMI over 50 kg/m² to reduce surgical risks with further staged operation in mind. This tendency has been reflected in the higher preoperative BMI of the LSG group compared to that of the LRYGB group.

LSG has been advocated for its technical simplicity and reduced surgical risks compared to LRYGB^[8,9]. According to a recent meta-analysis by Zhang *et al.*^[10], LSG was shown to have statistically fewer major complications than LRYGB. The perioperative surgical outcomes in our series also suggested that LSG was technically less demanding than LRYGB, with a shorter operating time and hospital stay. Although the incidence of overall and severe complications did not statistically differ between LSG and LRYGB, the incidence of both did trend higher for LRYGB, and clinically significant bleeding requiring transfusion or reoperation developed more frequently following LRYGB. Given the disparity in surgical experience with LSG and LRYGB in our series, however, there is a chance that the complication rate of LRYGB can be further lowered with sufficient experience on the part of surgeons, and the trend toward higher complications may presumably recede.

In the present study, both procedures achieved a maximal %EWL of approximately 80% at between 12 and 18 mo postoperatively; this subsequently leveled off. These results are in line with the recently published literature reporting that the %EWL following LSG and LRYGB ranged from 60.0%-76.5% and 69.0%-76.6%, respectively, 1 year postoperatively, figures that were maintained as 60.0%-75.4% and 70.0%-73.0%, respectively, 2 years postoperatively^[8,9,11,12]. The slightly higher %EWL in our study might be explained by the lower preoperative BMI of our study cohort, since %EWL is significantly influenced by initial BMI level^[13]. The recent meta-analysis by Zhang *et al.* found that the excess weight loss was similar between LSG and LRYGB in the early postoperative period, for up to 2 years^[10]. The present study also revealed that LSG and LRYGB demonstrated almost equal efficacy in terms of %EWL during the study's 3 years of postoperative follow-up. Some studies with longer follow-up periods have suggested that weight regain is more prevalent in patients who have undergone LSG^[11,14], but the number of patients who were followed up in the present study became too small after 2 years to allow a definite conclusion. Longer follow-up with a larger number of patients is necessary to determine whether the reduced weight would be maintained thereafter. Interestingly, the attrition rate

was higher in the LRYGB group than in the LSG group throughout the follow-up period, with the exception of the third year. This finding might be attributable to the fact that the surgeon traced the patients undergoing LSG more rigorously in order to evaluate whether or not they required secondary operations.

A recent meta-analysis suggested that LSG and LRYGB showed equivalent efficacy in regard to resolution of most of the obesity-related comorbidities, except for diabetic control where LRYGB was superior to LSG^[10]. The current study showed similar resolution rates of hypertension, dyslipidemia, and diabetes following both procedures. As shown by the preoperative clinical characteristics, the patients with diabetes in our study initially inclined toward LRYGB, expecting an additional metabolic effect from bypass. Therefore, there could be a selection bias from the beginning. In addition, the number of patients with diabetes in the LSG group was too small to allow a comprehensive comparison of the efficacy of the two procedures in diabetic control. Nonetheless, the resolution rate of diabetes in the current study was estimated to be less than 60% even following LRYGB, a figure which is much lower than the diabetes remission rate of 92%-95% reported in a recently published meta-analysis^[15]. Ethnic differences in the characteristics of type 2 diabetes, such as early β -cell dysfunction, could be the reason for the decrease in effective diabetic control, despite equivalent %EWL, relative to the Western population-based studies^[16].

The potential long-term complications can be an important issue when determining the type of surgical procedure for a given obese patient. The present study showed that patients undergoing LSG and LRYGB encountered different kinds of long-term complications following the surgery. LSG led to far less frequent nutritional problems, such as anemia, than LRYGB; but new onset GERD developed in about 23% of the patients. Although the majority of patients with pre-existing GERD (71.4% in the LSG group vs 94.7% in the LRYGB group) experienced symptom improvement along with weight loss following both procedures, the resolution rate was considerably lower in the LSG group, and some patients experienced endoscopically proven disease aggravation following LSG, similar to the results from a previous randomized trial^[8]. On the other hand, marginal ulcer was one of the representative complications following LRYGB. The reported incidence varies significantly in the literature, ranging from 3.5% to 12.3%, depending on the definition and evaluation method^[17-20]. The incidence of endoscopically confirmed marginal ulcers was 6.4% in the present study, which is consistent with previous reports. However, the actual incidence is expected to be higher, considering that only about half of the symptomatic patients were evaluated with endoscopy while the rest were managed with PPIs based on their symptoms. The incidence of marginal ulcer is reported to be as high as 27%-36% among

symptomatic patients^[21,22]. Currently, plausible risk factors for marginal ulcer following LRYGB include technical factors, such as a long gastric pouch or non-absorbable suture materials, smoking, non-steroidal anti-inflammatory drugs, diabetes mellitus, and possibly *Helicobacter pylori* infection^[19]. Although both post-LSG GERD and post-LRYGB marginal ulcers responded well to the PPI treatment, two LSG patients eventually required revisional surgery, and one LRYGB patient underwent emergent operation due to marginal ulcer perforation in our series. It is difficult to say which complications would be easier to manage. Nonetheless, surgeons should provide a tailored surgical option for each patient that takes into consideration the possible risks, as the long-term complications may have a significant influence on the quality of life following the surgery. We believe that LRYGB would be a better choice for the patients with symptomatic GERD preoperatively, while LSG would be recommended for those with poor compliance or for substance abusers, including heavy smokers.

There are several limitations to the present study. Above all, this study is a retrospective study based on prospectively collected data, and there could be a selection bias for each group, as shown in the preoperative demographics. Well-designed randomized trials are necessary to truly elucidate the differences between LSG and LRYGB. The attrition rate in our series was also quite high, a finding that seems to be a universal challenge among other institutions. Since bariatric surgery and its related examinations are not reimbursed at all in South Korea, the costs for the follow-up examinations must come directly from the patients. Patients are reluctant to cover all of the expenses for regular surveillance unless they feel that something is wrong, a situation which renders our follow-up data less reliable.

In conclusion, both LSG and LRYGB are effective procedures that yield comparable weight loss in the mid-term with similar surgical risks. However, a larger number of patients required revisional surgery following LSG. The long-term complications encountered after each procedure differ significantly, and these complications are not negligible. Longer follow-up periods are necessary to compare the long-term differences in weight loss and complications between LSG and LRYGB.

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COMMENTS

Background

Bariatric surgery is relatively new in East Asian countries, including South Korea. There is a marked tendency in the region to prefer technically less demanding and purely restrictive procedures, including laparoscopic sleeve

gastrectomy (LSG), over more complicated procedures such as laparoscopic Roux-en-Y gastric bypass (LRYGB). Therefore, comparisons between LRYGB and LSG are still lacking from Asian countries to demonstrate of the efficacy of each procedure.

Research frontiers

The present study evaluated the mid-term efficacy of LSG and LRYGB and compared the results between the two procedures in obese Korean patients at a single center.

Innovations and breakthroughs

Both LSG and LRYGB were found to be effective bariatric procedures with similar surgical risks leading to equivalent weight loss outcomes and comorbidity resolution during the mid-term follow-up. To the best of our knowledge, this is the first report comparing LSG vs LRYGB in obese Korean patients.

Applications

This study will provide valuable information to guide clinical decisions for individual obese patients in Asian countries. LRYGB would be a better choice for the patients with symptomatic GERD preoperatively, while LSG would be recommended for those with poor compliance or for substance abusers, including heavy smokers.

Peer-review

The authors present a head-to-head comparison of laparoscopic sleeve gastrectomy and laparoscopic Roux-en-Y gastric bypass procedure as performed at a single Korean center. They performed a retrospective analysis of prospectively collected data. Overall the manuscript is well organized and very well written. The authors are to be commended for their work.

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