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Original article

Midterm outcomes of laparoscopic sleeve gastrectomy as a stand-alone procedure in super-obese patients

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Abstract

Background: Laparoscopic sleeve gastrectomy (LSG) has been gaining popularity as a safe and effective bariatric procedure for patients with morbid obesity. However, the long-term outcomes of LSG alone in patients with body mass index over 50 kg/m^2, or super obesity, have not been analyzed in comparison to those of other bariatric procedures.

Objectives: This study aimed to compare midterm results of LSG and laparoscopic Roux-en-Y gastric bypass (RYGB) and to evaluate the efficacy of LSG as a stand-alone bariatric procedure for patients with super obesity.

Setting: Tertiary medical center.

Methods: The 3-year outcomes of 607 super-obese patients who underwent either LSG or RYGB at an academic institution between December 2003 and February 2012 were retrospectively reviewed. Patient records at 6, 12, 18, 24, and 36 months of follow-up were analyzed.

Results: The average percent excess weight loss and change in body mass index of the LSG versus RYGB group showed no significant difference at any follow-up period. The rate of resolution of type 2 diabetes and the mean hemoglobin A1C level in both groups were also comparable. The dramatic loss of patient data beginning at the 12-month follow-up (220/607, 36.24%) was also analyzed. The surgery type was associated with the duration of follow-up at .133, with a *P* value of .001.

Conclusions: We concluded that LSG is a comparably effective stand-alone procedure for patients with super obesity as RYGB. Our study is the first to suggest that compared with RYGB, LSG is associated with a shorter duration of postoperative follow-up. (Surg Obes Relat Dis 2017;▮:00–00.)

Keywords: XXX; XXX; XXX

In recent years, laparoscopic sleeve gastrectomy (LSG) has gained recognition and popularity as a treatment for obesity and obesity-related diseases. Numerous studies have proven the short- and long-term effectiveness of LSG with regard to weight reduction, resolution of co-morbidities, and postoperative complications [1–4]. It has also been proven that LSG provides surgical benefits and safety comparable to those provided by laparoscopic Roux-en-Y gastric bypass

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(RYGB) or other measures for patients with morbid obesity (body mass index [BMI] <50 kg/m^2) [5]. However, the long-term effectiveness of LSG is yet to be established in patients with super obesity (BMI ≥ 50 kg/m^2).

Bariatric operations in patients with super obesity are often faced with more technical difficulties than those in patients with lower BMI [6–8]. This led to the development of LSG originally as the initial procedure of a 2-stage bariatric operation for patients with BMI ≥ 50 kg/m^2 [9]. Although LSG alone provided considerable weight reduction in super-obese patients, a subsequent malabsorptive procedure, such as RYGB, was almost always mandated in previous studies [10,11]. However, the technical simplicity of LSG and its surgical outcomes that are comparable to those of more complex surgeries have suggested its efficiency as a stand-alone procedure for patients with BMI <50 kg/m^2 [12,13]. In addition, patients who underwent LSG have reported fewer postoperative complications than patients who underwent RYGB [14–16], further supporting the efficacy of LSG as a stand-alone procedure for patients with morbid obesity.

With the increasing recognition of LSG as a sole treatment for obesity, the outcomes of LSG in the super-obese population should be reevaluated and directly compared with those of other surgeries. Furthermore, to the best of our knowledge, no study has compared the results of LSG and RYGB in a large pool of super-obese patients. Our study explored the 3-year outcomes supporting the effectiveness of LSG as a stand-alone bariatric procedure for patients with BMI ≥ 50 kg/m^2.

Methods

Study sample

We retrospectively reviewed the records of patients who underwent bariatric surgery at Cleveland Clinic Florida from December 2003 to February 2012. A total of 607 patients with preoperative BMI ≥ 50 kg/m^2 were identified and divided into 2 groups based on the type of surgery they underwent: the RYGB group included 501 patients, and the LSG group included 106 patients.

Operative methods

All procedures were performed by 2 surgeons at Cleveland Clinic Florida, using a 7-trocar approach. For LSG, the short gastric vessels on the greater curvature were taken down up to the gastroesophageal junction, 6 cm proximal to the pylorus. The stomach was vertically transected using multiple applications of a linear stapler over a 38-French orogastric bougie. The estimated capacity of the created gastric sleeve was 150 mL.

For RYGB, the stomach was transected below the left gastric artery to maintain an optimal blood supply to the pouch and anastomosis. Gastrojejunostomy was performed with a linear stapler and was closed using the hand-sewn approach. Jejunojejunostomy was entirely performed using the stapler technique. The enteric limb was positioned in an antecolic and antegastric manner.

Outcome measures

Records of patients' weights measured at 6, 12, 18, 24, and 36 months after surgery were selected for analysis and compared between the 2 patient groups. Percent of excess weight loss (%EWL) was assessed as 100 × (weight loss/baseline excess weight). Weight was measured at every visit, and hemoglobin (HbA1C) level was checked as necessary. Preoperative co-morbidities, including hypertension, type 2 diabetes (T2D), gastroesophageal reflux disease, hypercholesterolemia, and obstructive sleep apnea, were identified based on electronic records data. Diabetes was diagnosed according to the criteria of the American Diabetes Association [17]. Of the patients whose records indicated preoperative T2D, those with baseline HbA1C level of $\geq 6.5\%$ were selected for the analysis of HbA1C level at 6, 12, 18, and 24 months after surgery. The consensus statement of the American Diabetes Association was selectively adopted in defining diabetes remission in this study owing to the lack of data on the fasting glucose levels of the patients [18]. Patients whose HbA1C level dropped $<6\%$ were defined as resolved from diabetes [3], and those whose HbA1C level decreased from their preoperative HbA1C level were defined as improved. The average follow-up duration of all patients was calculated in months and compared between the groups by sex, surgery type, and the presence of preoperative co-morbidities.

Statistical analysis

Continuous data including %EWL, BMI, and duration of follow-up by months was analyzed using the independent sample t test or analysis of variance and are presented as means and standard deviations. Categoric data, such as sex and preoperative co-morbidity, were analyzed using χ^2 tests and are presented as percentages. For analysis of the duration of follow-up, patients were grouped according to different variables, such as sex, preoperative co-morbidity, and surgery type. After the initial t test of each variable in the groups, univariate analysis of variance and partial correlations analysis were performed, with sex and surgery type as the independent variables and the maximum follow-up period as the dependent variable. A P value $< .05$ was considered statistically significant. All analyses were performed using IBM SPSS software version 23 (IBM, Armonk, NY).