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Original article

Long-term outcomes of laparoscopic sleeve gastrectomy: a Lebanese center experience

Hanaa Dakour Aridi, M.D., Ramzi Alami, M.D., F.A.C.S., Hani Tamim, Ph.D.,
Ghassan Shamseddine, M.D., Tarek Fouani, M.P.H., Bassem Safadi, M.D., F.A.C.S.*

Department of Surgery, American University of Beirut Medical Center, Beirut, Lebanon

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Abstract

Q4 Background: ■■

Objectives: The aim of this study was to assess the efficacy and safety of laparoscopic sleeve gastrectomy (LSG) at 5 years and beyond.

Setting: Tertiary referral hospital between April 2007 and March 2015.

Methods: A retrospective review of 76 patients who underwent LSG at the authors' institution between April 2007 and March 2010.

Results: Mean preoperative body mass index (BMI) was 42.8 ± 7.1 kg/m². Follow-up rates were 90.4%, 86.3%, and 77.8% at 5, 6, and 7 years, respectively. Percentage of excess weight loss (% EWL) was $69.8\% \pm 28.7\%$ at 5 years, $70.6\% \pm 32.7\%$ at 6 years, and $76.6\% \pm 21.2\%$ at 7 years, respectively. Mean total weight loss was $26.5\% \pm 8.7\%$, $24.9\% \pm 8.8\%$, and $26.6\% \pm 6.0\%$ at 5, 6, and 7 years, respectively. %EWL at 5-years was significantly higher for patients with a pre-operative BMI <45 kg/m² (83.1% versus 46.3% , $P < .0001$). LSG improved or resolved diabetes, hypertension, and asthma in 87.5%, 68%, and 81.7% of patients, respectively. New onset gastro-esophageal acid reflux disease developed in 21.2% of patients. Long-term complications included hiatal hernias necessitating repair (1.4%), incisional hernias (2.7%), and symptomatic gallstones (9.6%), as well as depression necessitating admission (4.1%).

Conclusion: In the present patient population, LSG resulted in satisfactory %EWL and co-morbidity resolution after 5 years. The results were excellent for patients with a BMI <45 kg/m². De novo acid reflux symptoms developed in 1 of 5 patients. Cholelithiasis necessitating cholecystectomy was the most common long-term complication. (Surg Obes Relat Dis 2015;■:00–00.)

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Keywords:

Obesity; Weight loss; Bariatric surgery; Laparoscopic sleeve gastrectomy

The prevalence of obesity is increasing worldwide. According to the World Health Organization, > 1.9 billion adults aged 18 years and older were overweight with a body mass index (BMI) ≥ 25 kg/m² in 2014. Of these, > 600 million were obese (BMI ≥ 30 kg/m²) [1]. Laparoscopic

sleeve gastrectomy (LSG) is an increasingly popular bariatric intervention for the treatment of morbid obesity and its associated co-morbidities, including type 2 diabetes (T2D), hypertension, dyslipidemia, premature joint disease, sleep apnea, polycystic ovary syndrome, and nonalcoholic fatty liver disease [2]. Many studies have shown that LSG can be a single, safe, and effective treatment for patients with morbid obesity due to satisfactory weight loss results and co-morbidity resolution on short- and mid-term follow-up [3–8]. However, data on the long-term efficacy of this

*Correspondence: Bassem Y. Safadi, M.D., F.A.C.S., American University of Beirut Medical Center, PO Box: 11-0236, Riad El Solh, Beirut 1107 2020, Beirut, Lebanon.

E-mail: bs21@aub.edu.lb

procedure are still scarce [2,6], especially in the Middle East. A recent study from Kuwait with an average post-operative follow-up time of 3.3 years (range, 1–5 yr) found a mean percentage excess weight loss (%EWL) of $55.7\% \pm 23.0\%$ and resolution of nonalcoholic fatty liver disease in more than half of the obese patient [9]. This study aims to assess the efficacy and safety of LSG at 5 years and beyond. This study was approved by the Institutional Review Board at the American University of Beirut. For this type of study, formal consent is not required.

Materials and methods

Patients

After receiving institutional review board approval, a prospectively collected database of 76 patients who underwent LSG at the American University of Beirut Medical Center and affiliate hospitals was retrospectively reviewed by the senior author (B.Y.S.) between April 2007 and March 2010. Patients were followed up by clinic visit and, when not available, by telephone contact or e-mail until March 2015 (providing, at least, a 5-year follow-up and, at most, a 7-year follow-up).

Data

Data collected included patients' demographic characteristics, anthropomorphic information (weight, height, and BMI), presence of medical co-morbidities, and postoperative complications. Weight loss was expressed as change in BMI, percentage of total weight loss (%TWL), and %EWL. Presence of T2D was defined as a glycosylated hemoglobin (HbA1C) level $\geq 6.5\%$ or fasting blood glucose ≥ 126 mg/dL. Remission was defined as an HbA1C $< 6\%$ or fasting blood glucose (FBG) < 100 mg/dL in the absence of antidiabetic medications, and partial remission was defined as an HbA1C 6–6.4% or FBG 100–125 mg/dL in the absence of antidiabetic medication. Improvement was defined as a statistically significant reduction in HbA1C and FBG that did not meet the criteria for remission or as a decrease in antidiabetic medications requirement (discontinuing insulin or 1 oral agent or 1/2 reduction in dose). Presence of hypertension included both stage 1 (blood pressure: 120–159/90–99 mm Hg) and Stage 2 ($> 160/> 100$). Improvement was defined as a decrease in dosage or number of antihypertensive medication; partial remission as prehypertension values (120–140/80–89) when off medication and complete remission as normal blood pressure ($< 120/80$) when off antihypertensive medication as reported by the patient. Because many follow-ups were done via phone calls or e-mails, values were based solely on patients' self-reports. Initial diagnosis of dyslipidemia was based on high levels of low-density lipoprotein (> 130 mg/dL), total cholesterol (> 200 mg/dL), or triglycerides (> 150 mg/dL)

on initial assessment. Because laboratory testing of lipid profile was lacking on most follow-ups, dyslipidemia outcomes are not reported.

For gastroesophageal reflux disease (GERD), improvement was subjective and based on improvement in symptoms severity or frequency or on decreased medication use. Complete resolution meant absence of symptoms and no medication use. Similarly, for asthma and depression, remission and improvement were based on symptoms and medication use.

Surgical procedure

The procedure was performed under general anesthesia in the supine position. The number of laparoscopic ports ranged from 3 to 5 with a Nathanson liver blade to retract the left lateral segment of the liver. The vessels along the greater curvature were sealed and divided with the LigaSure Atlas (Covidien, Boulder, CO) all the way to the angle of His and to 3–5 cm proximal to the pylorus. All the retrogastric adhesions were released so that the stomach was quite floppy. A 36 French orogastric tube was placed and oriented toward the antrum, and starting at approximately 4 cm proximal to the pylorus, the stomach was stapled and divided along the 36 French orogastric tube with an endoscopic stapler. The staple line was then sutured with 2-0 PDS sutures serosa to serosa, and then the orogastric tube was removed. The ports were removed under direct vision, and the stomach was retrieved through the umbilical incision. The fascia at the umbilicus was closed with PDS, and the skin was closed with absorbable sutures.

Measure

%EWL was calculated using the formula:

$$\frac{100\% \times (\text{initial}_{\text{weight}} - \text{Follow-up}_{\text{weight}})}{(\text{Initial}_{\text{weight}} - \text{IBW})}$$

where ideal weight (IW) was considered as the weight needed to achieve a BMI of 25 kg/m^2 [10]. Analysis was conducted using SPSS (Statistical Package for Social Sciences), version 22. Comparison of means from continuous variables was performed using paired 2-tailed Student's *t* test whereas comparison of co-morbidities at baseline and after LSG used McNemar's test. Results were represented as mean \pm standard deviation and 95% confidence interval. Moreover, multivariate linear regression analyses were carried out to identify the variables associated with %EWL at 5 years, whereby factors found to be significant at the univariate level or those of clinical significance were included. The level of statistical significance was set at a *P* value $< .05$. Reinhold criteria were used to assess if weight loss results were satisfactory. This criteria distinguishes between excellent, good, fair, and poor

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