

Long-term outcomes after laparoscopic sleeve gastrectomy in Kuwait

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BACKGROUND: Laparoscopic sleeve gastrectomy (LSG) has been established as an effective means of weight loss. Multiple studies report LSG as a cost-effective procedure with few perioperative complications.

OBJECTIVES: Report long-term weight changes after LSG in a single center in Kuwait.

DESIGN: Retrospective analysis of data collected 5-8 years after surgery.

SETTING: A single medical center.

PATIENTS AND METHODS: All patients that had undergone LSG between December 2008 and December 2011.

MAIN OUTCOME MEASURES: Weight changes, short-term complications following surgery (within one month).

SAMPLE SIZE: 187.

RESULTS: The mean age at the time of the surgery was 36.5 (10.3) years. Females composed 71.6% of this study population. Two patients (1.1%) presented with a leak within 30 days of the surgery. Twenty-one (11.2%) patients underwent revisional bariatric surgery after LSG. Mean (SD) BMI decreased from 47.1 (8.3) kg/m² before surgery to 34.3 (7) kg/m² 5-8 years after surgery. Mean (SD) body weight decreased from 126.3 (25.3) kg to 91.6 (19.9) kg 5-8 years following LSG. The mean excess body weight loss was 58.8% (29.2%).

CONCLUSION: LSG is a bariatric procedure with low complications and mortality in relation to other forms of bariatric surgery. It is associated with a significant improvement in weight loss in the long term.

LIMITATIONS: Recall bias due to the nature of collecting the data, small sample size.

CONFLICT OF INTEREST: None.

Obesity and its associated metabolic disorders are reaching pandemic proportions worldwide.¹ It is considered a chronic disease that has a negative impact on the health of many individuals. Kuwait is considered one of the top 10 countries in the world in terms of obesity, with 42.8% of its population affected.² Obesity is also a risk factor for the development of multiple comorbidities including type 2 diabetes mellitus, hypertension, dyslipidemia, and heart failure.³ Thus, discovery of effective weight loss methods is of global interest. Laparoscopic sleeve gastrectomy (LSG) has been established as an effective and safe method of weight loss for obese patients, as well as treatment for the metabolic disorders associated with obesity.⁴ Multiple studies report LSG as a cost-effective procedure with lower perioperative complications compared to bypass,^{5,6} but data on the use of surgery in Kuwait are lacking. We report long-term outcomes after several years as well as the immediate results 30 days after surgery.

PATIENTS AND METHODS

Beginning in June 2016, we collected patients who were morbidly obese and treated with LSG as a primary bariatric surgery between December 2008 and December 2011 at a single center (Al-Amiri), a governmental tertiary hospital in Kuwait. Patients had previously followed up once with their surgeon one month after surgery. We conducted another follow-up 5-8 years after LSG.

Inclusion criteria for the LSG were BMI ≥ 40 kg/m² without associated comorbid conditions or BMI >35 kg/m² with at least one comorbidity and unsuccessful attempts at medical treatment.⁷ Exclusion criteria were psychiatric illness or substance abuse.

All patients signed informed consent forms after a detailed explanation of the procedure, follow-up, advantages, and complications. Ethical approval was obtained from the medical research ethics committee. The data was collected from the hospital registry and patient files. Eligible patients were contacted by telephone. Patients who declined to participate or could not be reached by phone were excluded. Preoperative characteristics included age, gender, height, weight (WT), and body mass index (BMI). The mean excess body weight loss was calculated as $(WT \text{ before} - WT \text{ after}) \times 100 / (WT \text{ before} - \text{ideal body WT})$. Ideal body WT = BMI of 25 kg/m². The EBWL percentage was calculated using the formula: $(WT \text{ before} - WT \text{ after}) \div 100 / (WT \text{ before} - \text{ideal body WT})$. Ideal body WT = WT corresponding to a BMI of 25 kg/m². The 5-8 year follow-up data were collected via telephone interview.

Laparoscopic sleeve gastrectomy technique

A standard split-leg French position was utilized for performing the LSG procedure using the placement of the standard five laparoscopic ports. Devascularization of the greater curvature of the stomach was started from 4-6 cm from the pylorus up to the angle of His. A 36-Fr calibrating bougie was then passed through the stomach to the duodenum and a linear laparoscopic stapler was used to perform the sleeve. Finally, an assessment for leakage was done by pulling the bougie proximally and injecting 100 mL of methylene blue. No intra-abdominal drains were placed. A semi-solid diet was permitted after 2 weeks and then the diet was gradually converted to normal diet over a 4-week period.

The policy at Amiri Hospital for bariatric patients with a BMI of less than 50 includes 40 mg enoxaparin twice daily for 2 weeks, which is then reduced to 40 mg once daily for another week. If the BMI is more than 50, 60 mg enoxaparin is started twice daily for two weeks, followed by 60 mg once daily for another week. Appropriate antibiotic therapy was given to patients preoperatively. Patients were followed up postoperatively at 2 weeks, 3 months, 6 months, 12 months, 18 months, and yearly afterward by bariatric surgeons. Nutritional status was assessed by routine laboratory tests and anthropometric measurements at each follow-up visit.

RESULTS

The 187 patients who underwent LSG included 134 females (71.6%) and 53 males (28.4%). The time of follow up for this study ranged from 5 years for 66 patients to 8 years for 4 patients. The mean age of the patients at the time of the surgery was 36.5 (10.3) years, ranging from 13 to 62 years. Mean (SD) BMI decreased from 47.1 (8.3) kg/m² before surgery to 34.3(7) kg/m² 5-8 years after surgery (**Figure 1**). Mean (SD) body weight decreased from 126.3 (25.3) kg to 91.6 (19.9) kg 5-8 years following LSG. The mean excess body weight loss was 58.8% (29.2%). The mean excess body weight loss (EBWL) was 58.8% (29.2%). There were neither intra-operative complications nor postoperative mortalities. The only acute complication within 30 days of surgery was leakage (1.1%) in 2 patients. No bleeding or obstruction was reported during these 30 days. Long-term complications included gastroesophageal reflux disease (n=78), gallstones (n=36), musculoskeletal pain (n=32), depression (n=4), and deep vein thrombosis (n=3).

DISCUSSION

Bariatric surgery has become a popular procedure for

those with morbid obesity. There are several bariatric surgical procedures. LSG is a restrictive technique in which the size of the stomach is reduced by removing up to 3/4 of it. This effectively restricts the stomach capacity without affecting its function, so that the amount of food that can be consumed in one sitting is restricted.⁸⁻¹⁰

As LSG and other types of bariatric surgery are more widely practiced, the surgical techniques for performing them are improving significantly, leading to lower rates of complications. Previous studies have reported leak rates ranging from 1.5% to 5.4%.¹¹⁻¹³ Eng-Hong et al reported 14 leaks in 667 patients (2.1%).¹⁴ In comparison, our study showed a 1.1% leak rate, consistent with rates lower than those previously reported in the long term. In addition, there was no bleeding, obstruction or mortality within the 30-day post-op period.

In our study, 21 patients (11.2%) underwent revisional bariatric surgery post LSG. In Seki et al.'s study, revisional surgeries were required in 6 patients (3.4 %).¹⁵ Eng-Hong et al reported a revision rate for LSG in 18 patients (2.2%).¹⁴ The rate of revisional bariatric surgery was higher in our study compared to other studies. This could be due to multiple factors.

A higher commitment with patients to follow-up and stressing the importance of concurrent diet and exercise in preventing weight regain and increasing weight loss might be useful to achieve the most out of LSG. After following up our patients for 5-8 years, their mean BMI was decreased to 34.3 kg. In Eng-Hong et al.'s study, the mean BMI at the 5-year postoperative follow-up was 26.2 kg.¹⁴ Seki et al reported a decline in the mean BMI to 32.7 at 5 years or more.¹⁵ The mean excess body weight loss in our study was 58.8%. Aridi et al, in comparison, reported a mean total weight loss of 69.8% at 5 years.¹⁶ Our results and other data available illustrate the role of LSG in sustained, long-term weight loss.

A possible limitation of this study is that recent patient data was collected via telephone and therefore may contain some form of recall bias in addition to the small sample size. Possible future approaches might

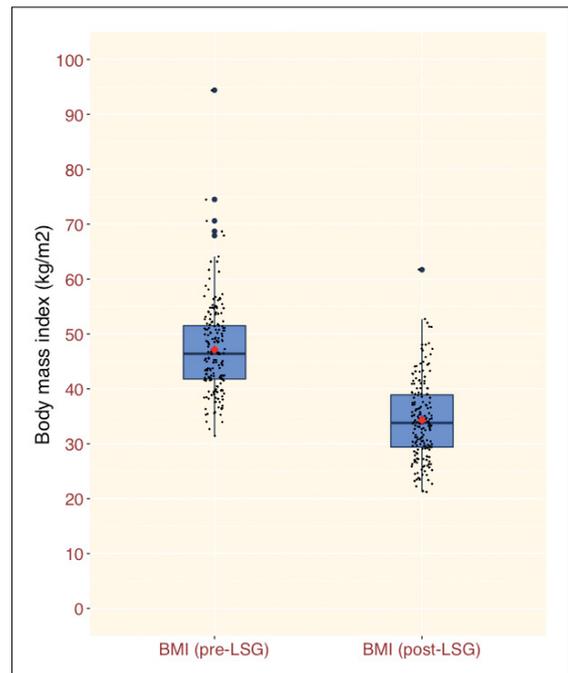


Figure 1. Body mass index before and 5-8 years after laparoscopic sleeve gastrectomy (median, 25th and 75th percentile, red dot=mean) ($P<.001$).

be to conduct studies that include a larger sample size over a longer period of time, and to follow up patients in the outpatient department with proper investigations to evaluate the after-effects of LSG. In conclusion, this study shows that LSG is an effective type of bariatric procedure with a low complication rate and mortality relative to other forms of bariatric surgery that achieves sustained weight loss.

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Availability of data and materials: The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

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