Laparoscopic sleeve gastrectomy with preservation of preexisting fundoplication wrap

Basem H. Abd-elAziz ELShayeb, Rabbah A. Khaled, Mohammed A. Hammoda

Bariatric Division, Department of General Surgery, Faculty of Medicine, Ain Shams University, Cairo, Egypt

Correspondence to Basem H. Abd-elAziz ELShayeb, MD, Bariatric Division, Department of General Surgery, Faculty of Medicine, Ain Shams University, Cairo, 11 Hassan Assem Street, Zamalek, Cairo 11211, Egypt
Fax: +0227372663;
e-mail: mabasem@yahoo.com

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Introduction
Gastroesophageal reflux disease (GERD) is one of the most frequent gastrointestinal disorders with significant prevalence in obese patients. Bariatric surgery for weight reduction is proven to improve the quality of life in obese GERD patients with gastric bypass as the first choice. Laparoscopic sleeve gastrectomy (LSG) is a safer and less complicated bariatric procedure. However, evidence exists that it induces GERD. There is not enough evidence on the outcome of LSG on patients with controlled GERD symptoms following antireflux surgery.
Aim
Our study aims at evaluating LSG as a surgical option for obese patients who have already undergone previous antireflux fundoplication.
Patients and methods
In all, six patients (three men, three women) with previous history of laparoscopic Nissen fundoplication for GERD underwent LSG for morbid obesity in this interventional clinical study. Patients included in the study had a BMI more than 40 kg/m^2 or more than 35 kg/m^2 with concomitant comorbidities. Patients with poor GERD-Health-Related Quality of Life score and patients dependent on proton-pump inhibitors were excluded. Freeing the stomach was done along its greater curve 4 cm from the pylorus until the left crus with preservation of any vascular adhesions around the old wrap. Standard sequential gastric stapling was done starting 4 cm from the pylorus and ending 1 cm lateral to the old wrap. Patients were followed up over a course of 6 months.
Results
Mean operative time was 40 + 5 min with no conversion to open surgery; no bleeding or leak was recorded. All patients were sent home on the second postoperative day, and there was no reoperation. At 6 months follow-up, the mean BMI dropped to 34 + 5 kg/m^2 (P<0.009), the mean total GERD-Health-Related Quality of Life score remained unchanged in four patients, and improved slightly in two patients.
Conclusion
LSG could present a safe, feasible, and effective bariatric alternative to gastric bypass in obese patients with preexisting fundoplication and controlled GERD symptoms.

Keywords:
bariatric, fundoplication, gastrectomy, gastroesophageal reflux, Nissen-sleeve, obesity

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Introduction

Gastroesophageal reflux disease (GERD) is one of the most frequent gastrointestinal disorders with a prevalence reaching up to 27.8% in North America, 25.9% in Europe, 7.8% in East Asia, 33.1% in the Middle East, 11.6% in Australia, and 23.0% in South America [1]. This prevalence is correlated with the increasing prevalence of obesity [2].

Obesity is a significant independent risk factor for GERD and hiatal hernia (HH); obesity and HH go hand in hand as siblings [3]. The incidence of HH increases with BMI [4].

Management of GERD is attempted by lifestyle modification and symptomatic treatment with acid-suppressive and prokinetic medications [5]. Refractory GERD is managed by surgical interventions [6]. The most popular and effective of which is laparoscopic Nissen fundoplication [7].

Weight reduction achieved by bariatric procedures has a positive outcome on the quality of life of patients with GERD [8]. Weight reduction surgery achieves significant weight loss and improves comorbidities in severely obese patients. Reflux symptoms are supposed to improve with weight loss and decrease in acid production [9].

Bariatric surgery is dominated by laparoscopic sleeve gastrectomy (LSG) and gastric bypass [10]. The former is currently the most performed bariatric procedure representing 50–60% of all bariatric surgeries [11]. This can be explained by its easy technique, effectiveness in treating morbid obesity, and lower incidence of comorbidities compared with laparoscopic gastric bypass [12].

However, LSG may induce an alteration of gastroesophageal junction, increases intragastric pressure, and divides gastric sling fibers, hence inducing GERD or worsening preexisting GERD [13].

Although technically more difficult, with higher incidence of complications, laparoscopic Roux-en-Y gastric bypass is an effective surgical treatment for morbid obesity and is known to effectively control symptoms of GERD [3]. Gastric bypass is a safe and effective option for controlling gastroesophageal reflux in obese patients previously submitted to anti-reflux surgery, with the added benefit of excess weight loss [14].

Modifications to LSG were attempted to decrease the risk of GERD including hiatus hernia repair with SG [15] and the recently introduced Nissen-SG, which consists of SGD with Nissen fundoplication, shows promising preliminary results [16].

This study aims primarily at determining the technical feasibility of LSG as a surgical option for obese patients, who has already benefited from previous Nissen fundoplication. It also aims at assessing the efficacy of this procedure in weight loss and its safety regarding complications like wrap necrosis and recurrence of reflux symptoms.

Patients and methods

Six patients (three men, three women) with previous history of laparoscopic Nissen fundoplication for GERD underwent LSG for morbid obesity. The cases were operated on between January 2016 and January 2020.

Patients included in the study had a BMI more than 40 kg/m^2 or more than 35 kg/m^2 with concomitant comorbidities. All patients had previous surgical history of LNF for GERD.

All patients underwent subjective assessment of GERD symptoms using the GERD-Health-Related Quality of Life (GERD-HRQL) score before and after surgery. Patients with poor GERD-HRQL score or who were dependent on proton-pump inhibitors (PPI) were not included. Operative and postoperative outcomes, change in GERD-HRQL score, and change in BMI were analyzed.

Preoperatively, blood picture, renal and hepatic functions, fasting blood sugar, plasma cortisol, and TSH level were assessed plus glycated hemoglobin for diabetic patients.

Ethical considerations

This study was approved by the Ain Shams Ethics Committee. An informed consent was obtained from the patients after full explanation of the procedure and its possible complications.

Surgical technique

After prophylaxis against thromboembolism, pneumatic intermittent pressure stocking in place, and the patient is in supine, reverse Trendelenburg position by 30° with legs apart, we started by optical peritoneal access 15 cm below the xiphisternum. Stomach was dissected from undersurface of the liver when needed; freeing the stomach was done as usual along its greater curve 4 cm from the pylorus until the left crus, which was not extensively dissected keeping in mind to preserve any vascular adhesions around the old wrap (Fig. 1).

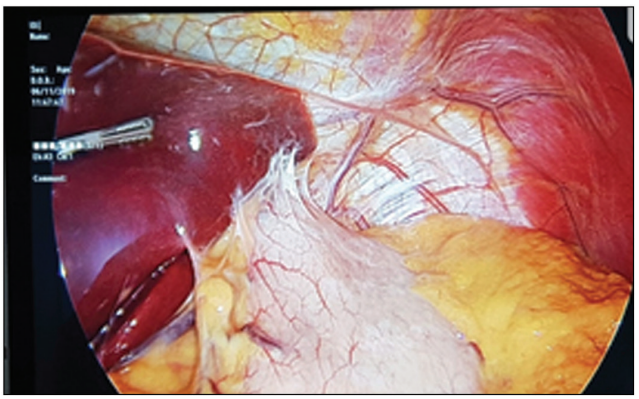
Partial dehiscence of the old wrap was encountered in one case (Fig. 2), which was kept as it was since the patient had satisfactory result with it.

Standard sequential gastric stapling is done starting 4 cm from the pylorus and ending 1 cm lateral to the old wrap (Fig. 3).

Data collection and statistics

All data were prospectively collected using a standardized protocol. Fisher's exact test and *t* test

Figure 1



Adhesions around the old wrap kept in place.

were applied. For all statistical tests, a *P* value less than 0.05 was considered significant. For quantification of weight loss, percentage of excessive BMI loss was used.

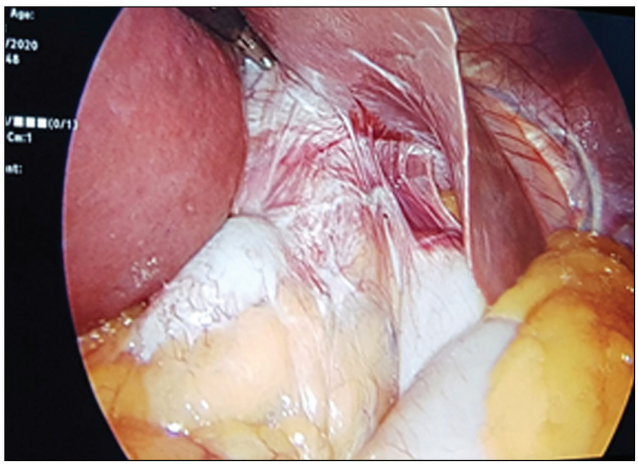
Results

The operation was technically feasible with a mean operative time of 40 + 5 min and no conversion to open surgery, no bleeding nor leak was recorded. All patients were sent home on the second postoperative day, and there was no reoperation. No cases of postoperative wrap necrosis were recorded.

The mean age of the patients was 42 .5 years (32–51 years). The mean BMI before surgery was 44.6 kg/m^2 (36.8–51.3 kg/m^2).

Regarding the efficacy of the procedure in weight loss, at 6 months follow-up, the mean BMI dropped to 34 + 5 kg/m^2 (P<0.009).

Figure 2



Partial dehiscence of the old wrap.

The mean total GERD-HRQL score before surgery was 13.16. No patient was dependent on PPI. The mean total GERD-HRQL score remained unchanged in four patients and improved slightly in two patients. PPI was given routinely for 6 weeks and then was stopped in all patients.

Discussion

This study suggests using LSG as a safe and effective option for weight management following Nissen fundoplication.

Our results showed a reduction in BMI of the patients 6 months following the procedure with no worsening in GERD symptoms (and improvement in two cases) and with cessation of antireflux medications. No postoperative complications were encountered.

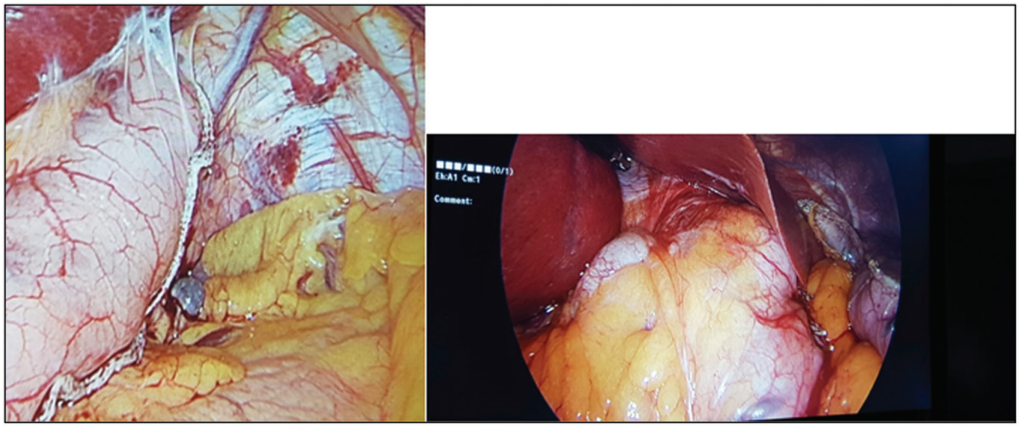
Obesity is frequently associated with GERD due to an increase in abdominal pressure with consequent hypotonia of the lower esophageal sphincter, and increase in the frequency of its spontaneous relaxation [17,18]. GERD with or without HH is now recognized as an obesity-related comorbidity [19].

Roux-en-Y gastric bypass has been proved to be the most effective initial bariatric procedure for the treatment of morbidly obese patients with GERD and/or HH [15]. In contrast, the indication for LSG in these patients is still debated [20].

This study included almost a similar targeted patient (bariatric patients with GERD), but with a crucial difference – that had encouraged us to do LSG – in having prior satisfactory GERD control.

Many authors have already reported the poor outcome of the anti-reflux operation in obese patients, with

Figure 3



Completed sleeve gastrectomy preserving the old wrap.

valve migration or rupture in most cases [21,22]. These types of patients were excluded from that study, as we believe that RYGB is the best option for them.

The technique adopted in that study is simple and greatly reproducible, avoiding the unneeded total revision into RYGB, which is technically more difficult, with higher incidence of complications [23].

Several techniques were suggested to combine LSG with different fundoplication methods [24].

Nissen-sleeve is a new procedure, technically more challenging than the standard LSG. It seems to show similar outcomes in terms of weight loss, effects on comorbidities, and lower rate of leak and GERD [25].

However, there are studies implying that a single step LSG and gastric fundoplication could increase the risk of severe postoperative complications with the most commonly repeated complication as gastric ischemic perforation [26].

In the current study, the same principle was almost adopted just as a staged operation. This approach can limit the operation time in a single stage Nissen LSG, which was postulated to increase the risk of postoperative complications [27]. In our study, there were no reported causes of staple line leakage, which concurs with the hypotheses of the protective effect of wrap on the vulnerable area of the gastroesophageal junction [24].

Similar results were also demonstrated by another study termed Nissen-preserving SG for surgical weight loss in patients with existing Nissen fundoplication [28]. Although both studies are early, and include a small sample of patients, the results are promising.

The GERD-HRQL questionnaire was developed and validated to measure changes of typical GERD symptoms such as heartburn and regurgitation in response to surgical or medical treatment [29]. We found it as an easy subjective score that can reflect accurately the degree of patient satisfaction following anti-reflux surgery.

Limitations of the study

The number of patients in this study was limited as gastric bypass is generally the first choice in patients with a history of reflux.

Conclusion

LSG is a technically feasible bariatric option in obese patients with preexisting fundoplication. It is effective in weight loss and safe regarding postoperative complications and recurrence of reflux symptoms.

Implications for future research

Future prospective clinical randomized trials involving a larger number of patients are needed to validate the benefit of this new procedure. Comparative studies with bypass are recommended.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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