



Comparative Study between Laparoscopic Roux En Y Gastric Bypass and Sleeve Gastrectomy in the Management of Gastroesophageal Reflux Disease

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Abstract: Background: Gastroesophageal reflux disease (GERD) is considered to be one of the most prevalent diseases of the gastrointestinal system all over the world. one of the major risk factors of GERD is morbid obesity. during the last decade, the prevalence of obesity has increased significantly around the world. Many studies have suggested the association between obesity and GERD symptoms. The effect of weight loss on the incidence and severity of GERD symptoms was found to be significant, and weight loss is considered to be one of the lines important lines in managing GERD symptoms. **Aim:** We aim to compare between the different techniques of bariatric surgery, and study the use of laparoscopic mini-gastric bypass and Roux-en-Y gastric bypass in the management and treatment of Gastroesophageal reflux disease (GERD) and decide which approach is associated with the best short and long term effects on the prevalence and symptoms of Gastroesophageal reflux disease (GERD). **Methods:** The current study is a retrospective study, conducted in Ain Shams University Surgery Hospital in Cairo During the period between March 2014 and July 2018, a total number of 110 patients have been enrolled in our study, we collected the patients from Ain Shams University Surgery Hospital, Cairo, Egypt. We included patients with Gastroesophageal reflux disease (GERD) who fulfilled the inclusion criteria to underwent bariatric surgery in our hospital including a body mass index of more than 35 kg/m², aged between 18 and 65, with one or more comorbidity and with failure of conservative treatment of obesity over a period of more than 2 years. We excluded patients with general contraindications to underwent abdominal surgery. In addition to sever cases of Gastroesophageal reflux disease (GERD), patients with Hiatal hernias, patients with history of previous major abdominal operations and patient of inflammatory bowel disease. **Results:** Both groups were similar regarding the terms of age, sex, weight and average BMI. The rates of other comorbidities such as diabetes, hypertension and dyslipidemia were almost identical in both groups. The changes in GERD score were significantly higher in the LRYGB patients (56.5%). While it was (41%) in the LSG group. a small number of patients experienced worsening of the GERD symptoms and were mostly in the LSG group. **Conclusion:** Both the most common bariatric surgery procedures were associated with improved GERD symptoms. We consider the Roux- en-Y gastric bypass to be the superior operation technique in improving GERD symptoms. Sleeve gastrectomy was associated with more de-novo GERD symptoms development. Some recent guidelines consider having a preoperative GERD symptom to be a contraindication to performing sleeve gastrectomy.

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1. Introduction

Gastroesophageal reflux disease (GERD) is considered to be one of the most prevalent diseases of the gastrointestinal system all over the world, in the united states alone, more than 30% of the adult population suffer from GERD symptoms such as acid reflux and heartburn.¹ one of the major risk factors of GERD is morbid obesity, more than 50% of morbidly obese patients in the united states are presented with one or more symptom of GERD.² during the last decade, the prevalence of obesity has increased

significantly around the world. in the united states, the CDC reported that 35% of the American adults are considered morbidly obese and having a body mass index of more than 30 kg/m², which was accompanied with an exponential increase in incidence of many obesity-related diseases such as hypertension, dyslipidemia, type 2 diabetes, and many other health problems.³

Many studies have suggested the association between obesity and GERD symptoms where obesity was associated with increased risk of GERD, and GERD the severity of GERD symptoms was related to the degree of obesity. Furthermore, obesity was found to be a major and important risk factor for GERD, the prevalence of GERD and GERD-like symptoms was reported to be 26% higher than normal populations⁴. The effect of weight loss on the incidence and severity of GERD symptoms was found to be significant, and weight loss is considered to be one of the most important lines in managing GERD symptoms.⁵

The treatment of Gastroesophageal reflux disease usually involves many aspects including changes in the dietary habit, lifestyle modifications, and pharmacological anti-reflux procedures⁶. In the lately published literature, many authors and surgeons believe that the best and only long-term effective way to manage and treat GERD is through bariatric surgery.⁷⁻⁹ Many studies have investigated the effect various of bariatric surgeries on the incidence and symptoms of GERD in morbidly obese patients. The effect of different types of bariatric surgeries on the incidence and severity of GERD symptoms have been studied including Roux-en-Y gastric bypass (RYGB) and sleeve gastrectomy¹⁰⁻¹³.

Since sleeve gastrectomy technique was introduced more than 15 years ago, it has been the preferred bariatric surgery technique among large number of surgeons worldwide as it is considered to be a simple operation with no need of ant intestinal bypass or anastomosis, thus less complications and side effects.¹⁴ On the other hand, the Roux-en-Y gastric bypass technique was recently found to be associated with better long term results, and less diabetes remission.^{15,16}

In our study, we aim to compare between the different techniques of bariatric surgery, and study the use of laparoscopic mini-gastric bypass and Roux-en-Y gastric bypass in the management and treatment of Gastroesophageal reflux disease (GERD) and decide which approach is associated with the best short and long term effects on the prevalence and symptoms of Gastroesophageal reflux disease (GERD).

2. Methods

The current study is a retrospective study, conducted in Ain Shams University Surgery Hospital in Cairo During the period between March 2014 and July 2018, a total number of 110 patients have been enrolled in our study, we collected the patients from Ain Shams University Surgery Hospital, Cairo, Egypt. We included patients with Gastroesophageal reflux disease (GERD) who fulfilled the inclusion criteria to underwent bariatric surgery in our hospital including a body mass index of more than 35 kg/m², aged between

18 and 65, with one or more comorbidity and with failure of conservative treatment of obesity over a period of more than 2 years. We excluded patients with general contraindications to underwent abdominal surgery. In addition to severe cases of Gastroesophageal reflux disease (GERD), patients with Hiatal hernias, patients with history of previous major abdominal operations and patient of inflammatory bowel disease.

All the patients included in our study underwent a complete physical evaluation before the operation including upper endoscopy, esophageal manometry, and abdominal ultrasound.

Pre-operative preparation of the patients included history taking focusing on age, sex, weight, BMI, dietary habits, history of previous operations. All the patients underwent full general examination, full abdominal examination checking for scars of previous operations or abdominal wall hernias.

General pre-operative laboratory investigations for all the patients included full blood count, prothrombin and thromboplastin time, liver function tests, albumin, liver AST, ALT, serum urea, serum creatinine, sodium and potassium, free T3, T4, TSH, Fasting blood sugar and HBA1C.

Pre-operative investigations were ECG, CXR. Patients with cardiovascular troubles had ECHO. Patients with respiratory troubles as sleep apnea underwent respiratory function test and arterial blood gases. A pre-operative pelvic abdominal ultrasound was done to all patients to see any intra-abdominal and pelvic organ pathologies.

Operation Techniques

Standard operation techniques followed in Ain Shams university hospital were followed. For LSG, we used a 35-Fr bougie along the lesser curvature for calibration of the gastric tube; the longitudinal resection of the stomach was done from approximately 3 to 6 cm orally of the pylorus to the angle of His. The staple line was routinely over sewn with an absorbable running suture. Hiatal hernias were explored and repaired with posterior closure of the crura. LRYGB was performed with a 150-cm antecolic Roux-limb with either a linear stapled or circular stapled (25-mm) gastrojejunostomy according to the preference of the bariatric center. A 50-cm long biliopancreatic limb was chosen.

The medical records of the patients were inspected to record data regarding operation time, hospital stay duration, 90 days readmission rate, and postoperative complications; including leakage, postoperative hemorrhage, infections, anastomotic stricture, marginal ulcers, and port site herniation.

Statistical Analysis

Statistical analysis was performed using SPSS 23.0. The continuous variables were presented as mean \pm SD, Descriptive statistics were used for demographic variables such as age, weight, and BMI. The Student *t* and Fisher exact 2-sided tests were used where appropriate. A comparison between the variables was done using the one-sample test. postoperative was considered statistically significant if its value was less than 0.05.

The assessment of GERD symptoms was measured according to a grading system where the absence of GERD symptoms was given a score of 0, Intermittent or variable symptoms was associated with a score of 1, Intermittent medication was given 2, the use of H2 blockers or low dose PPI was associated with the score of 3, the use of High dose PPI was given a score of 4 and patients who met the criteria for anti-reflux surgery, were given the score of 5.

grade	Symptoms
0	No symptoms of GERD
1	Intermittent or variable symptoms, no medication
2	Intermittent medication
3	H2 blockers or low dose PPI
4	High dose PPI
5	Meet criteria for anti-reflux surgery, or prior surgery for GERD

3. Results

Patient Characteristics

After applying the including/excluding criteria, a total number of 110 patients, with a BMI of more than 35 kg/m² were enrolled in the study. The LSG group was 50 patients, and the LRYGB group was 60 patients. The follow-up rate after a period of 1 year

was 94%.

Both groups were similar regarding the terms of age, sex, weight and average BMI. The rates of other comorbidities such as diabetes, hypertension and dyslipidemia were almost identical in both groups. Table 1.

Table 1: Patient Characteristics

	LSG (N=50)	LRYGB (N=60)	P
Age, mean \pm SD, Yr	34.0 \pm 11.1	42.1 \pm 11.2	NS
Female, n (%)	36 (72)	43 (71.6)	NS
Weight, mean \pm SD, Kg	123.5 \pm 19.4	124.8 \pm 19.8	NS
BMI, mean \pm SD, kg/m ²	43.6 \pm 5.3	44.2 \pm 5.3	NS
Hypertension (%)	63	59	NS
Diabetes (%)	24	26	NS
Dyslipidemia (%)	67	51	NS
GERD (%)	44	46	NS

The changes in GERD score were significantly higher in the LRYGB patients (56.5%). While it was (41%) in the LSG group (P < .05).

A small number of patients experienced worsening of the GERD symptoms and were mostly in the LSG group (4.6%), while it was (0.02%) in the LRYGB group. The rest of the sample showed no difference in their GERD status. Figure 1

The changes in the GERD score reveals that the patients underwent Laparoscopic Roux-en-Y gastric bypass procedure were associated with better results comparing to those underwent Laparoscopic sleeve

gastrectomy (P < .0001).

Postoperatively, and after follow up, both groups were associated with improved comorbidities. Regarding type 2 diabetes, 57.7% of patients in the LSG group, and 67.9 % of patients in the LRYGB were no taking any diabetes medication after one year after the operation.

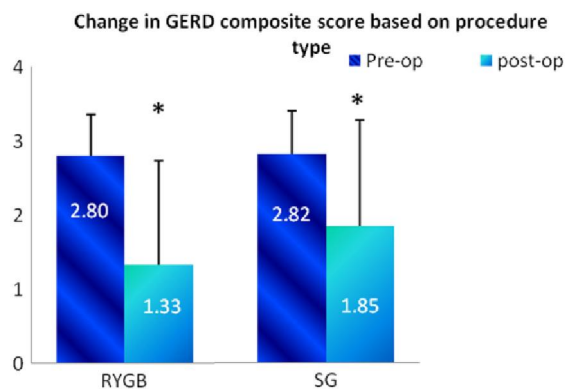


Figure 1: changes in GERD symptom score according to the type of the procedure

Regarding the remission of GERD symptoms, patients in the LSG were associated with higher rates of remission GERD symptoms comparing to the patients in the LRYGB group (12.5% vs 4%; $P = 0.12$), while the rates of improvement in patients who experienced GERD previously to the operation were higher in the LSG group (50% vs 75%; $P = 0.008$).

4. Discussion:

In our study, patients undergoing both types of bariatric operations experienced significant improvement in their GERD symptoms.

Our results suggest a slight worsening in addition to notable worsening in the pre-existing GERD symptoms, as well as the onset of new GERD symptoms in patients who never had any symptoms of reflux before the operation. Supporting to our results, Howard et al. reported similar results, where he reported an overall worsening of 82% of GERD symptoms in patients who underwent sleeve gastrectomy operations¹⁷. Similarly, Tai et al. reported a significant increase in the symptoms of GERD after sleeve gastrectomy in 66 patients after one year of the operation.¹⁸ On the other hand, Daes et al. reported a 48% decrease of GERD incidence of GERD symptoms after one year of performing sleeve gastrectomy, after excluding the surgical error and any other comorbidities such as the existence of a previous hiatal hernia.¹⁹ similar, Soricelli et al. reported in a previously published study that the remission of the GERD symptoms were associated with patients who had preoperative GERD symptoms and underwent a combined hiatal hernia repair during the SG operation.²⁰

in 2011, Karmali et al. in a review of literature performed on 11 studies reported a decrease prevalence of GERD symptoms in a total of 7 studies, while the other 4 studies reported an increase in the

incidence of GERD symptoms after performing a sleeve gastrectomy.¹² another study published in 2013 reported 41% improvement of preexisting GERD symptoms, while worsening the GERD symptoms were reported in 4.6% of the patients and 9.2% of the patients reported developing GERD symptoms after undergoing LSG.²¹

According to our results, LRYGB was found to be the superior bariatric procedure when it comes to patients with GERD. Our results showed an improvement of the GERD symptoms in 56.5% of the patients. Our findings were similar to previously published results in the available literature. Murr et al reported a 94% improvement of typical GERD symptoms after performing LRYGB on morbidly obese patients, with only 4% of them showing symptoms of worsening.¹¹

accordingly, Schauer et al. reported similar significant results where GERD symptoms were decreased from 87% to 22% after performing LRYGB on morbidly obese patients with a BMI more than 35 kg/m².²²

The superiority of the Roux-en-Y gastric bypass operation can be explained due to the nature of the operation, which include creating a low-pressure gastric pouch connected to the duodenum directly. this results in reduced acid exposure and less acid and bile reflux. Thus, leading to maximum and optimal results in reducing the incidence of GERD symptoms.²³

When we compared the data of the patients who show no changes in their weight after the operation within a period of 6 months, they were associated with significantly improved GERD symptoms, and were mainly from the LRYGB group. A possible explanation of such results may be due to LRYGB creating a pouch and minimizing the exposure to acid and bile secretions.

Our study has a few limitations, the retrospective nature of the study, and the relatively small sample may make our results hard to be generalized on a huge sample. The system used to measure the weight loss may be a little subjective and the GERD symptoms grading system can be a little confusing In cases of multiple drugs usage.

Conclusion

Both the most common bariatric surgery procedures were associated with improved GERD symptoms. We consider the Roux- en-Y gastric bypass to be the superior operation technique in improving GERD symptoms. Sleeve gastrectomy was associated with more de-novo GERD symptoms development. Some recent guidelines consider having a preoperative GERD symptom to be a contraindication to performing sleeve gastrectomy.

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