LESS

Original Article

Laparosc Endosc Surg Sci 2023;30(3):94-103
DOI: 10.14744/less.2023.26780

Factors affecting the treatment success of sleeve gastrectomy with concomitant hiatal hernia repair on gastroesophageal reflux disease in patients with obesity

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ABSTRACT

Introduction: This study aims to investigate the effects of concomitant laparoscopic sleeve gastrectomy (LSG) and hiatal hernia repair (HHR) on gastroesophageal reflux disease (GERD) and identify other factors that influence the success of the surgery in a patient with obesity.

Materials and Methods: A prospective study design was used to evaluate GERD symptoms in patients undergoing concomitant LSG+HHR, using the GERD symptom score (SS) questionnaire before and after the surgery. Logistic regression and receiver operating characteristic (ROC) analysis were employed to identify factors contributing to symptom improvement.

Results: A total of 112 patients underwent the surgery, with 94 (75.3%) of them being female. The mean age was 37.41±10.44, and the body mass index (BMI) was 44.37±6.788. Eleven (9.8%) patients underwent concomitant cholecystectomy. Esophagitis was present in 22 (19.64%) patients before the surgery. The mean pre-operative GERD SS was 12 (4–18), which significantly decreased to a mean post-operative GERD SS of 0 (0–18) (p<0.001). Logistic regression and ROC analysis were used to evaluate other factors influencing the improvement of GERD symptoms. The variables identified were as follows: 6th-month weight (odds: 4.010; p<0.001), 6th-month BMI (odds: 3.644; p<0.001), 6th month excess weight (EW) (odds: 2.743; p<0.01), 6th month EW loss% (odds: 2.699; p<0.001), and 6th month total weight loss % (odds: 2.361; p=0.003).

Conclusion: Concomitant LSG+HHR appears to be an effective treatment method for improving GERD symptoms. Post-operative weight loss of the patient was found to be another effective factor in the improvement of symptoms.

Keywords: Gastroesophageal reflux disease, Hiatal hernia repair, Receiver operating characteristic analysis, Sleeve gastrectomy

Introduction

The prevalence of gastroesophageal reflux disease (GERD) has significantly increased in patient with obesity compared to the normal population.[1] Numerous studies have demonstrated that obesity is an independent risk factor for both GERD and hiatal hernia (HH).[2-5] Mechanisms such as increased intra-abdominal pressure, lower esophageal sphincter dysfunction, and esophageal dysmotility con-

Received: 17.08.2023 **Revision:** 24.08.2023 **Accepted:** 31.08.2023
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tribute to the pathophysiology of obesity-related GERD.[6-10] The lower esophageal sphincter, comprising the distal 2 cm of the 4 cm average length, is a crucial component of the antireflux barrier.[3] Additional elements of this barrier include diaphragmatic crura, the angle of His, and the phrenoesophageal ligament.[11] In a study involving morbidly obese patients with body mass index (BMI 43±6 kg/m^2), the prevalence of HH and GERD was found to be 37% and 39%, respectively.[4] Shararaa et al. conducted a study on patients with a BMI of 40.4±5.3 and found GERD prevalence to be 64% and HH prevalence to be 15.7%. The study also identified HH as an independent risk factor for erosive esophagitis.[12] Laparoscopic Roux-en-Y gastric bypass (RYGB) has been recommended as an effective treatment option for GERD in morbidly obese patients based on short- and long-term studies.[13-16] Furthermore, the latest data from the American society for metabolic and bariatric surgery indicate that laparoscopic sleeve gastrectomy (LSG) accounts for 61.4% of all bariatric surgical procedures and is increasingly favored worldwide.[17] Although LSG yields significant weight loss and improvement in comorbidities, its impact on GERD remains controversial. Recent publications have suggested that LSG may induce or exacerbate GERD symptoms.[18,19] In a study involving 2149 patients with pre-operative reflux symptoms, it was observed that these symptoms persisted in 84.1% of patients after LSG, improved in 15.9%, and worsened in 9% of cases. The study also reported that 8.6% of patients developed de novo GERD.[20] Burgerhart et al. conducted a study assessing esophageal function tests (high-resolution manometry and 24-h pH/impedance monitoring) before and 3 months after LSG. While there was no significant change in GERD symptoms, esophageal acid exposure significantly increased after sleeve gastrectomy: Upright from 5.1±4.4 to 12.6±9.8% (p=0.003), supine from 1.4±2.4 to 11±15% (p=0.003), and total acid exposure from 4.1±3.5 to 12±10.4% (p=0.004).[21] Concomitant LSG and HH repair (HHR) is one of the most commonly utilized treatment methods for patients with obesity and GERD symptoms. However, the impact of this combined procedure on GERD remains controversial, and a specific consensus has not been reached.[22] In our study, we aim to investigate the effects of concomitant LSG and HHR on GERD and identify the factors that contribute to the treatment success of this combined approach in obese patients with symptomatic GERD and HH detected during endoscopy.

Materials and Methods

In this prospectively designed study, all patients underwent surgery at the same center and were operated on by the same bariatric surgeon. GERD symptoms were evaluated using the symptom score (SS) questionnaire before surgery and at least 6 months after the procedure (Table 1). The scores ranged from 0 to 18, with scores ≥4 indicating a positive diagnosis of GERD.[23-25] Only patients with a pre-operative GERD SS ≥4 and concurrent HH detected during upper gastrointestinal endoscopy were included in the study. Patients with SS s below 4, no HH detected during upper gastrointestinal endoscopy, or with Bar-

Table 1. GERD Symptom Score Questionnaire

Severity of symptoms of Heartburn and Regurgitation	
Grade 0	No symptoms
Grade 1	Mild symptoms with spontaneous remission. No interference with normal activity and sleep
Grade 2	Moderate symptoms with spontaneous but slow remission. Mild interference with normal activity and sleep
Grade 3	Severe symptoms without spontaneous remission. Marked interference with normal activity and sleep.
Frequency of symptoms of heartburn and regurgitation (days/week)	
Grade 0	Absent
Grade 1	Occasionally (<2 days in a week
Grade 2	Frequent (2–4 days in a week)
Grade 3	Very Frequent (>4 days in a week)

The final score for each symptom was obtained by multiplying the scores for severity and frequency. The total score was obtained by adding the final scores of individual symptoms. Thus the scores ranged from 0 to 18. Patients with symptom scores ≥4 were included in the study.

rett's metaplasia detected during upper gastrointestinal endoscopy were excluded from the study. A multidisciplinary team consisting of a bariatric surgeon, dietician, endocrinologist, cardiologist, anesthesiologist, and psychiatrist assessed the patients preoperatively. All patients underwent upper gastrointestinal endoscopy and abdominal ultrasonography before surgery.

The patients were evaluated for demographic data (age and sex), anthropometric measurements (weight, height, and BMI), comorbid diseases, biochemical parameters (lipid profile, HbA1c, and fasting blood sugar), as well as weight loss at 6 months and the percentages of excess weight loss (EWL), total weight loss (TWL), and complications.

BMI equivalent to 25 kg/m², calculated by dividing weight (kg) by height (m²), was considered the ideal body weight. The difference between the initial weight and the ideal weight was defined as EW.

The percentage of EWL% was calculated using the formula ([initial weight – current weight]/[initial weight – ideal weight]) × 100. The percentage of TWL% was calculated using the formula ([starting weight – current weight]/starting weight) × 100.[26]

Surgical Procedure

All patients received low molecular weight heparin prophylaxis both before and after surgery. The surgical procedure was conducted laparoscopically. The first trocar was inserted using a visiport, positioned between the umbilicus and xiphoid, approximately one-third of the distance from the umbilicus. A total of five trocars were used. The devascularization of the greater curvature of the stomach was performed. The ligasure® device (Medtronic Parkway, Minneapolis, MN, USA) was used to divide the short gastric vessels and gastrosplenic ligaments. The right diaphragmatic crus was completely exposed after the left diaphragmatic crus. If a hernia sac was present, it was dissected, and the gastroesophageal fat pad was removed. The esophagus was completely separated and pulled into the abdomen, while preserving both vagus nerves. Posterior repair of the right and left diaphragmatic crura was carried out using 2 or 3 non-absorbable sutures and a 38 Fr bougie. Cruroplasty, performed posteriorly in all patients, involved passing the bougie through the gastroesophageal junction before the procedure to prevent stenosis. The stomach was transected by starting 2–4 cm proximally from the pylorus until reaching the gastroesophageal junction. A 38 Fr bougie was used during this process. The initial stapler used was an endo GIA™ 60 mm black tri-stapler (Medtronic Parkway, Minneapolis, MN, USA), followed by subsequent staplers, which were endo GIA™ 60 mm purple tri-staplers. No suture reinforcement was applied to the stapler line. An intraoperative methylene blue stress leak test was routinely performed. A 10 mm Jackson-Pratt drain was routinely inserted along the suture line in all patients. Liquid nutrition was initiated for all patients at 24-h postoperatively.

Statistical Analysis

Mean and standard deviations were calculated for continuous variables. Binary logistic regression analysis and receiver operating characteristic (ROC) curve analysis were conducted. Binary logistic regression analysis was used to identify prognostic predictors of LSG+HHR in patients with GERD, and odds ratios were calculated using the logistic regression method. Logistic regression is a statistical model that is both predictive and explanatory.[27] The odds ratio is a commonly used measure of the strength of association between exposure and disease.[28]

All variables were included in the forward step-wise procedure. Areas under the ROC curves were determined for variables that were found to be significant using logistic regression analysis. Two-sided $p \leq 0.05$ was considered statistically significant. All statistical analyses were performed using R software/programming (version 3.6.2 (2019-12-12) – CRAN).

Sample size was determined based on previous literature,[29] which reported a 43.5% rate of adult patients meeting the inclusion criteria for reflux surgery. With an expected rate of 43.5%, it was calculated that a minimum of 95 patients should be included in the study to achieve a power of 90%, using the R software/programming (version 3.6.2 – CRAN).

Results

A total of 112 patients underwent LSG+HHR, with 94 (83.9%) of them being female. The mean age of the patients was 37.41±10.4, and the mean BMI was 44.37±6.788. Eleven (9.8%) patients underwent concomitant cholecystectomy. Esophagitis was detected in 22 (19.64%) patients during the pre-operative upper gastrointestinal endoscopy (Fig. 1). Out of the 5 (4.4%) patients, there were no changes in GERD SS. The SS of 6 (5.3%) patients decreased but remained ≥4. The post-operative SS of 101 (90.1%) patients was found to be less than 4. No mortality occurred after surgery, but complications were observed in 3 (2.67%) patients during the early post-operative period. One patient developed myocardial infarction within the first 24 h and underwent coronary artery stenting. Hypocalcemia was observed in one patient, and pneumonia was observed in another patient. In the late period, a total of 5 (4.46%) patients experienced com-

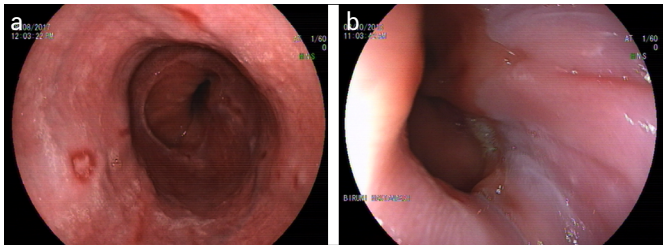

Figure 1. Upper gastrointestinal endoscopic images **(a)** LA Grade B esophagitis before surgery **(b)** Z line after 1-year LSG+ HHR.
LSG: Laparoscopic sleeve gastrectomy; HHR: Hiatal hernia repair; LA: Los Angeles classification.

plications. Among them, three patients developed stenosis at the hiatus level, which was relieved with endoscopic balloon dilatation therapy. One patient developed a drop foot, which improved with physical therapy, and another patient developed atypical psychosis (Table 2).

Table 3 presents the analyzed variables and their characteristics for patients with and without a SS of ≥4. According to the results in Table 3, there were statistically significant differences ($p<0.05$) in the mean difference of 6^{th} month weight, 6^{th} month BMI, 6^{th} month EW, 6^{th} month

Table 2. Patient characteristic

	n (%)		
Total Number of Patients	112 (100)		
Female	94 (75.36)		
Age	37.41±10.44		
Height	165.0±9.663		
Weight	121.0±22.68		
Esophagitis	22 (19.64)		
Surgery type			
LSG+HHR	101(90.2)		
LSG+HHR+Cholecystectomy	11 (9.8)		
Complication	8 (7.14)		
Length of Stay (median day)	3		
Hypertension	22 (19.64)		
Type 2 diabetes mellitus	21 (18.75)		
Cardiac disease	6 (5.35)		
OSAS	2 (1.78)		
Respiratory disease	6 (5.35)		
Psychological disorders	13 (11.60)		
	Before surgery	**6^{th} month after surgery**	**p**
Symptom score	12	0.00	p<0.001
≥4	112	11	
<4	-	101	
BMI	44.37±6.788	31.36±5.429	t=45.46; p<0.001
EW	52.66±19.15	17.23±14.46	t=38.67; p<0.001
EWL %		70.61±16.93	
TWL %		29.25±5.247	
HbA1c	5.553±0.778	5.150±0.462	t=5.221; p<0.001
-HbA1c (Diabetic Patients)	6.550±1.463	5.359±0.552	t=4.006; p=0.001
Glucose	105.22±18.74	89.14±9.702	t=8.215; p<0.001
Total cholesterol	202.3±41.30	174.9±81.23	t=3.753; p<0.001
LDL	134.1±33.07	133.8±37.83	t=0.079; p=937
Fe	76.47±32.71		
Vitamin D3	18.09±10.46		
Hemoglobin	13.73±1.53		

LSG: Laparoscopic sleeve gastrectomy; HHR: Hiatal hernia repair; OSAS: Obstructive sleep apnea syndrome; EW: Excess weight; EWL%: Excess weight loss %; TWL%: Total weight loss %.

Table 3. Significant differences according to have with and without a GERD SS of (≥4)

Variables	$\bar{X}$	SD	t	p
Age				
<4	37.18	10.39	0.682	0.497
≥4	39.45	11.22		
Weight				
<4	122.0	23.03	1.420	0.158
≥4	111.8	17.45		
Height				
<4	165.1	9.818	0.327	0.744
≥4	164.0	8.455		
BMI				
<4	44.67	6.780	1.426	0.157
≥4	41.61	6.521		
Pre-operative EW				
<4	53.56	19.28	1.522	0.131
≥4	44.36	16.45		
6th month weight				
<4	86.11	17.23	4.015	<0.001
≥4	64.91	8.491		
6th month EW				
<4	17.81	14.65	2.557	0.012
≥4	6.418	4.530		
6th month BMI				
<4	31.54	5.504	3.347	0.001
≥4	25.95	1.396		
6th month EWL%				
<4	69.77	≥46.83	2.764	0.007
≥4	55.54	8.104		
6th month TWL%				
<4	29.28	5.483	2.493	0.014
≥4	25.01	4.479		
Hemoglobin (Before Surgery)				
<4	13.77	1.498	0.741	0.461
≥4	13.40	1.846		
6th month Hyperlipidemia				
<4	0.365	0.484	1.115	0.268
≥4	0.556	0.527		
HbA1c (Before Surgery)				
<4	5.603	0.826	0.459	0.647
≥4	5.727	1.041		
Glucose (Before Surgery)				
<4	105.2	18.47	0.469	0.640
≥4	108.1	27.13		
HCT (Before Surgery)				
<4	41.69	5.637	0.471	0.638
≥4	40.86	4.611		

Table 3. Cont.

Variables	$\bar{X}$	SD	t	p
Iron (Before Surgery)				
<4	76.70	32.54	0.225	0.823
≥4	74.36	35.76		
Ferritin (Before Surgery)				
<4	84.69	94.88	0.793	0.430
≥4	57.68	45.30		
25OHVİTD3 (Before Surgery)				
<4	18.37	14.99	0.621	0.536
≥4	15.51	8.283		
Triglyceride (Before Surgery)				
<4	148.5	86.68	0.722	0.472
≥4	167.9	53.13		
HDL (Before Surgery)				
<4	50.33	14.45	1.527	0.130
≥4	43.00	14.49		
LDL(Before Surgery)				
<4	132.0	33.19	1.535	0.128
≥4	147.9	25.41		
VLDL (before surgery)				
<4	29.68	17.13	0.738	0.462
≥4	33.58	10.62		
Total cholesterol (before surgery)				
<4	200.3	41.91	1.509	0.134
≥4	220.0	31.43		
Total cholesterol (6th month)				
<4	199.5	45.07	1.891	0.062
≥4	229.1	40.50		
LDL 6^{th} month				
<4	132.5	38.58	1.415	0.188
≥4	147.1	26.64		
Triglyceride 6^{th} month				
<4	105.9	35.98	0.826	0.434
≥4	116.1	30.84		
HDL 6^{th} month				
<4	50.38	11.37	2.131	0.073
≥4	61.86	13.87		
Glucose 6^{th} month				
<4	89.49	9.935	1.537	0.150
≥4	85.77	6.514		
HbA1c 6^{th} month				
<4	5.145	0.467	0.356	0.729
≥4	5.200	0.435		

BMI: Body mass index; EW: Excess weight; EWL%: Excess weight loss %; TWL%: Total weight loss %; HbA1c: Glycated hemoglobin; Hct: Hematocrit.

EWL%, and 6th month TWL% between patients with and without a SS of ≥4.

Forward step-wise logistic regression analysis was conducted to select significant variables associated with patients with and without a SS of ≥4, indicating the effectiveness of the treatment. The results of forward stepwise logistic regression showed that five variables were highly influential in the treatment, as indicated by their odds coefficients. These variables are as follows: 6th month weight (odds: 4.010; p<0.001), 6th month BMI (odds: 3.644; p<0.001), 6th month EW (odds: 2.743; p<0.01), 6th month EWL% (odds: 2.699; p<0.001), and 6th month TWL% (odds: 2.361; p=0.003) (Table 4). Each entry of significant variables in the model provides P-value that varies depending on certain measures.

The logistic regression model achieved the highest proportion of correct classifications (97.5%) for the improvement of GERD in patients who underwent concomitant LSG+HHR.

ROC curves were generated for the variables found to be significant in the logistic regression analysis. The diagnostic accuracy for the improvement of GERD in patients who underwent concomitant LSG+HHR was assessed using the area under the curve in the ROC analysis (Fig. 2). The AUC values for 6th month weight, 6th month BMI, 6th month EW, 6th month EWL%, and 6th month TWL% differed significantly (p<0.05) (Table 5).

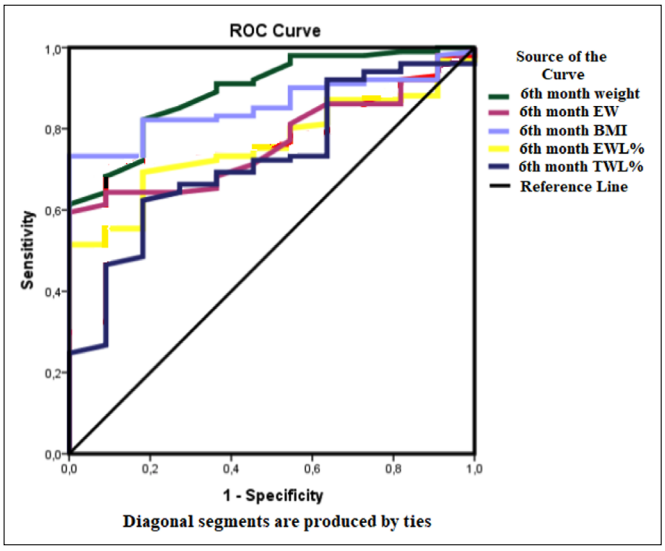

Figure 2. Receiver operating characteristic curve of those with and without a symptom score of (≥4).
BMI: Body mass index; EW: Excess weight; EWL%: Excess weight loss %; TWL%: Total weight loss %

Discussion

In recent years, LSG has become increasingly popular worldwide compared to other bariatric surgical procedures.[17] Obesity has been identified as an independent risk factor for HH and GERD in several studies.[2-5] Some studies have shown that LSG may increase the incidence of reflux.[18,19] Therefore, it is expected that GERD, which occurs after LSG, will be encountered more frequently. HHR is a commonly used surgical method in patients with GERD and HH detected during upper gastrointestinal endoscopy. A meta-analysis involving 937 patients and 18 studies investigated the effects of concomitant LSG and HHR on GERD disease and found that LSG+HHR significantly reduced GERD symptoms and improved esophagitis. The remission rate of GERD after LSG+HHR ranged from 21.3% to 95% in this meta-analysis.[30] In a study by Angrisani et al. with a 7-year follow-up, the GERD resolution rate was reported as 60% in patients with SG+HHR.[31] However, a study by Samakar

Table 4. Estimates of variables of logistic regression model for those with and without a GERD symptom score of (≥4)

	β*	SE.	Wald	P	OR	95% CI	
						Lower Bound	Upper Bound
Weight 6th month	1,389	0,434	10,24	<0.001	4,010	1.713	9.389
EW 6th month	1,009	0.359	7.899	<0.001	2.743	1.357	5.543
BMI 6th month	1,293	0.411	9.897	<0.001	3.644	1.628	8.153
EWL% 6th month	0.993	0.284	12.23	<0.001	2.699	1.547	4.710
TWL% 6th month	0.859	0.289	8.835	0.003	2.361	1.340	4.160
Constant	1.389	0.389	12.12	<0.001			

*Regression coefficient. Correct classification; 97.0%. SE: standard error. Wald: test statistics; OR: Odds ratio; CI: Confidence interval; BMI: Body mass index; EW: Excess weight; EWL%: Excess weight loss %; TWL%: Total weight loss %.

Table 5. AUC of those with and without a GERD symptom score of (≥4)

Test result variable(s)	Area	SE	p	95% CI	
				Lower bound	Upper bound
Weight (6th month)	0.893	0.041	<0.001	0.813	0.973
EW (6th month)	0.766	0.050	0.004	0.668	0.864
BMI (6th month)	0.857	0.037	<0.001	0.785	0.929
EWL% (6th month)	0.761	0.052	0.005	0.659	0.863
TWL% (6th month)	0.724	0.070	0.015	0.586	0.862

SE: Standard error; CI: Confidence interval; BMI: Body mass index; EW: Excess weight; EWL%: Excess weight loss %; TWL%: Total weight loss %; AUC: Area under the curve; GERD: Gastroesophageal reflux disease.

et al. found that concomitant LSG+HHR improved GERD symptoms in only 36.4% of patients.[32]

In the present study, all patients had a reflux SS of ≥4 pre-operatively, and HH was present based on upper gastrointestinal endoscopy. The GERD remission rate was found to be 90.2% in our study, with 73.21% of patients achieving a SS of "0" after concomitant LSG+HHR.

Another study by Navarini et al. identified LSG, pre-operative esophagitis, and age as independent risk factors for post-operative GERD in the multivariate analysis. In the same study, post-operative HH was 3.5 times more common in the LSG group than in the RYGB group.[33] Two main mechanisms contribute to the development of GERD after LSG. The first mechanism is decreased gastric compliance with increased intragastric pressure, and the second mechanism involves the disruption of the anatomical anti-reflux mechanism, including the dissection of the angle of His and potential damage to the sling fibers.[34] Vagus nerve damage can also contribute to reflux. The previous studies have shown that vagus nerve damage during anti-reflux surgery negatively impacts long-term reflux control.[35] When considering the factors influencing the improvement of GERD after LSG, reduced gastric volume, accelerated gastric emptying, decreased gastric acid production, and decreased intra-abdominal pressure due to weight loss have been indicated.[36,37] In our study, we examined the factors affecting the improvement of GERD symptoms after LSG+HHR, and we identified weight, BMI, EW, EWL%, and TWL% at the 6th month as significant variables.

This study aimed to investigate the relationship between different risk variables and concomitant LSG+HHR for patients with GERD using binary logistic regression analysis. It was observed that the identified risk factors varied across different studies conducted in different locations. In our study, logistic regression analysis identified five variables that significantly influenced the improvement of GERD in patients who underwent concomitant LSG+HHR (those with and without a SS of ≥4). These variables are 6th-month weight, 6th month BMI, 6th month EW, 6th month %EWL, and 6th month %TWL. These variables were selected based on the criterion of achieving a level of model significance ($p<0.01$). In conclusion, all five of these variables can affect the risk variables associated with the improvement of GERD in patients who underwent concomitant LSG+HHR (those with and without a SS of ≥4).

ROC curves generated through logistic regression were used to determine the differential value (AUC) for the improvement of GERD in patients who underwent LSG+HHR. The AUC values for 6th month weight (0.8936), 6th month EW (0.766), 6th month BMI (0.857), 6th month %EWL (0.761), and 6th month %TWL (0.724) were high and significant ($p<0.05$). The ROC curve area of these variables demonstrated a distinct performance in distinguishing between healing and non-healing cases. These findings suggest that 6th month weight, 6th month EW, 6th month BMI, 6th month %EWL, and 6th month %TWL may serve as valuable additional prognostic markers for the treatment success of concomitant LSG+HHR in GERD patients. To the best of our knowledge, this is the first study to explicitly determine risk variables with odds ratios in the improvement of GERD in patients who underwent concomitant LSG+HHR and calculate the AUC values using logistic regression and ROC analysis.

Regarding the effect of concomitant LSG+HHR on post-operative complications, a study by Shada et al. showed that concomitant hernia repair did not contribute to mortality and morbidity.[38] Similarly, a study that included 32,581

patients from the American College of Surgeons National Surgical Quality Improvement Program database, which evaluated 30-day mortality and complications, found no difference between the two groups undergoing LSG and LSG+HHR.[39] In our study, no mortality was observed in the post-operative period. The complication rate in the early post-operative period was 2.67%, and the overall complication rate was 7.33%.

One limitation of this study is that esophageal manometry, 24-h pH measurement, and post-operative endoscopic evaluations could not be performed in all patients. Evaluation was solely based on symptoms.

Conclusion

Although concomitant LSG+HHR does not guarantee complete resolution, it is considered an effective treatment method for patients with symptomatic GERD disease and HH detected on endoscopy. After 6-month post-surgery, weight, BMI, EW, EWL%, and TWL% were identified as important factors influencing symptom improvement. However, these findings should be supported by studies with long-term follow-up, prospective randomized trials, pre-operative and post-operative upper gastrointestinal endoscopy, and 24-h pH measurement.

Disclosures

Ethichs Committee Approval: This study was approved by Biruni University Ethics Committee (2021 / 51-39).

Peer-review: Externally peer-reviewed.

Conflict of Interest: None declared.

Authorship Contributions: Concept – A.O.; Design – A.O., Y.C.; Supervision – A.O.; Materials – A.O.; Data collection and/or processing – A.O.; Analysis and/ or interpretation – A.O., Y.C.; Literature search – A.O., Y.C.; Writing – A.O., Y.C.; Critical review – A.O.

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