Upper gastrointestinal endoscopy performed before sleeve gastrectomy in patients with morbid obesity: retrospective analysis of 460 patients

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SUMMARY

This study aimed to evaluate the results of preoperative upper gastrointestinal endoscopy (UGE) performed on patients with morbid obesity before laparoscopic sleeve gastrectomy (LSG).

A total of 460 patients with morbid obesity who underwent UGE before LSG at the General Surgery Endoscopy Unit of Keçiören Training and Research Hospital were included. Their age, body mass index, additional diseases, and endoscopic findings were evaluated. Among endoscopic findings, antral gastritis, lower esophageal sphincter (LES) laxity, pyloric dysfunction, esophagitis, hiatal hernia, pancreatitis, and body mass index were evaluated using univariate analysis and comparative logistic method.

UGE was performed in 460 patients scheduled for LSG; 293 (64%) patients had antral gastritis, 46 (10%) had pangastritis, 30 (6.6%) had esophagitis, 163 (35.6) had LES laxity, 58 (12.7%) had a hiatal hernia, 25 (5.5%) had pyloric dysfunction, and 18 (3.9%) had additional comorbidities. A statistically significant relationship existed between antral gastritis and LES laxity and age (P = 0.002, 0.003, respectively); between pancreatitis and hiatal hernia, pyloric dysfunction, and LES laxity (P = 0.007, 0.004, and 0.002, respectively); and between esophagitis and hiatal hernia (P = 0.001). In the multivariate analysis, hiatal hernia increased the risk of pancreatitis 2.5 times while LES laxity increased the risk of pangastritis 0.42 times. Pyloric dysfunction increased the risk of pangastritis by 5.6-fold. Age and LES laxity increased the risk of antral gastritis by 1.04-fold and 2.07-fold, respectively.

An upper gastrointestinal system endoscopy performed before obesity surgery is important in selecting a surgical method.

Key words: Endoscopy, morbid obesity, sleeve gastrectomy

INTRODUCTION

Upper gastrointestinal system (GIS) endoscopy is a safe method widely used in diagnosing and treating esophagus, stomach, and proximal duodenal diseases worldwide. The biggest advantage of this method is that it shows the internal surface of the organ directly, allowing sampling for pathological examination from the lesions, and is used in the treatment where necessary (1). Epigastric pain, dysphagia, retrosternal burning, upper gastrointestinal bleeding, dyspepsia, nausea, and vomiting are common symptoms of upper GIS diseases. These upper GIS symptoms may be indicative of both benign and malignant diseases (2). This study aimed to retrospectively evaluate the results of preoperative upper gastrointestinal endoscopies performed on patients with morbid obesity who were recommended laparoscopic surgery at the endoscopy unit of Keçiören Training and Research Hospital.

MATERIAL AND METHOD

The study included 460 patients with a body mass index (BMI) >40 who underwent upper gastrointestinal endoscopy (UGE) before sleeve gastrectomy between 2016 and 2017 in the General Surgery Endoscopy Unit of Keçiören Training and Research Hospital. Informed consent of the patients was obtained for the procedure. Endoscopy was performed after administering

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topical pharynx anesthesia (xylocaine, 10 μg/dose). Patients' age; BMI; gender; and endoscopic findings, such as antral gastritis, lower esophageal sphincter (LES) laxity, pangastritis, hiatal hernia, pyloric dysfunction, and comorbid diseases, were evaluated. In endoscopy, a distance of more than 5 cm between the Z line and gastric entrance was considered a hiatal hernia.

For descriptive analyses, continuous variables were reported as the mean and standard deviation, while the categorical nominal variables were expressed as a percentage of total population. Normal distribution fitness was assessed using the Kolmogorov–Smirov test. Independent variables showed a normal distribution in the patients evaluated. For comparison of independent univariate subgroups in the same patient groups, the chi-square and Fischer tests were used for categorical variables and the Student t test for continuous variables. If other factors affected the results, the effects of these factors were presented statistically with logistic regression.

RESULTS

UGE was performed in 460 patients scheduled for LSG. Of these, 95 (20.6%) patients were male and 365 (80.3%) female. The average age was 38.9 years for males and 37.3 years for females. The average BMI was 46.7 for males and 44.4 for females (Table 1).

Of the patients enrolled, 293 (64%) had antral gastritis, 46 (10%) had pangastritis, 30 (6.6%) had esophagitis, 163 (35.6) had LES laxity, 58 (12.7%) had a hiatal hernia, 25 (5.5%) had pyloric dysfunction, and 18 (3.9%) had different comorbidities (Table 2).

Upper gastrointestinal endoscopy findings are more common in women than men (Table 3). A statistically significant relationship existed between antral gastritis and LES laxity and age ($P = 0.002$ and 0.003, respectively) (Table 4), between pangastritis and hiatal hernia, pyloric dysfunction, and LES laxity ($P = 0.007$, 0.004, and 0.002, respectively) (Table 5); and between esophagitis and hiatal hernia ($P = 0.001$) (Table 6).

TABLE 1: General demographic characteristics.

	Male	Female	Total
Gender	20, 65% (95)	80, 35% (365)	460 (n)
Average age (year)	38.97 ± 12.11	37.38 ± 10.81	37.72 ± 11.02
BMI (kg/m²)	46.78 ± 4.16	44.44 ± 10	44.93 ± 3.48

TABLE 2: Upper gastrointestinal endoscopic findings.

	Positive	Negative	Total (n)
Antral gastritis	293 (64%)	165 (36%)	
Pangastritis	46 (10%)	412 (90%)	
Esophagitis	30 (6.6%)	428 (93.4%)	
LES laxity	163 (35.6)	295 (64.4%))	458
Hiatal hernia	58 (12.7%)	400 (87.3%)	
Pyloric dysfunction	25 (5.5%)	433 (94.5%)	
Comorbidity	18 (3.9%)	440 (96.1%)	

TABLE 3: Gender distribution of upper gastrointestinal endoscopic findings.

	Male (119)	Female (334)	Total
Antral gastritis (+)	n = 78	n = 215	293
Pangastritis (+)	n = 16	n = 30	46
Esophagitis (+)	n = 6	n = 24	30
LES laxity (+)	n = 43	n = 120	163
Hernia (+)	n = 19	n = 39	58
Pyloric dysfunction (+)	n = 6	n = 19	25

In the multivariate analysis, the presence of hiatal hernia and LES laxity increased the risk of pancreatitis 2.5 times and 0.42 times, respectively. Pyloric dysfunction increased the risk of pangastritis 5.6 times. The most effective risk factor for pancreatitis was pyloric dysfunction, followed by a hiatal hernia and, finally, LES laxity (Table 8).

Age and LES laxity increased the risk of antral gastritis 1.04 and 2.07 times, respectively (Table 9). Again, hernia increased the risk of esophagitis 10.65 times (Table 10).

DISCUSSION

Obesity is the most common preventable epidemic disease worldwide after smoking. It can lead to many GIS pathologies such as gastritis, esophagitis, LES laxity, and morbidity with various chronic diseases (cancer, cardiovascular disease, type 2 diabetes, and so on). It may also lead to serious psychosocial problems and cause serious financial burdens (3). Surgical procedures are now the mainstay of morbid obesity treatment because medical treatment is generally inadequate in weight loss. For this purpose, Roux-en-Y gastric bypass, sleeve gastrectomy, adjustable gastric band, and biliopancreatic diversion are commonly applied procedures worldwide. All of these procedures may be performed endoscopically or robotically, leading to decreased eating due to the reduction in stomach volume. Also, disrupted absorption by bypass leads to more weight loss (4).

Endoscopy is a highly effective and reliable technique widely used in diagnosing and treating GIS diseases all over the world; it has a few complications. It not only helps in detecting the GIS symptoms but also is useful in interventional procedures, such as bleeding control in esophagus variceal bleeding, polyp excision, percutaneous endoscopic gastrostomy, stent placement in esophageal stenosis, and foreign body removal from the stomach (5). In a study conducted by Günay et al., gastric cancer was diagnosed in 0.6%−7.9% patients even when only dyspepsia was present. Even dyspepsia, which is seen as the most common and simple symptom in the upper GIS, is important in endoscopy (7). Oxygen saturation (pulse oximetry) and ECG monitoring was used as recommended. In the present study, the endoscopic procedure was delayed in 23 patients who experienced panic attacks; these patients were excluded from the study.

All the patients had a BMI >40. In accordance with previous studies, 80.3% patients were female. The most common endoscopic finding was antral gastritis (64%), and the least frequent endoscopic finding was pyloric dysfunction. It was

TABLE 4: Univariate analysis of the relationship between antral gastritis and LES laxity, hiatal hernia, and pyloric dysfunction.

	Antral gastritis (+)	Antral gastritis (-)	Total	P value
LES laxity	119 (73%)	44 (27%)	163 (100%)	0.003
Hiatal hernia	38 (65.5%)	20 (35.5%)	58 (100%)	0.8
Pyloric dysfunction	12 (48%)	13 (52%)	25	12.09
BMI > 40 kg/m^2	274 (64%)	155 (36%)	429	0.99

TABLE 5: Univariate analysis of the relationship between pancreatitis and LES laxity, hiatal hernia, and pyloric dysfunction.

	Pangastritis (+)	Pangastritis (-)	Total	P value
LES laxity	8 (4.9%)	155 (95.1%)	163 (100%)	0.007
Hernia	12 (20.7%)	46 (79.3%)	58 (100%)	0.004
Pyloric dysfunction	17 (68%)	8 (32%)	25 (100%)	0.002
BMI > 40 kg/m^2	41 (9.6%)	387 (90.4%)	428 (100%)	0.297

TABLE 6: Univariate analysis of the relationship between esophagitis and LES laxity, hiatal hernia, and pyloric dysfunction.

	Esophagitis	Esophagitis (-)	Total	P value
LES laxity	7 (%)	156 (%)	163 (100%)	0.147
Hernia (+)	16 (27.6%)	42 (72.4%)	58 (100%)	0.001
Pyloric dysfunction (+) (used Fischer)	25 (100%)	0 (0%)	25 (100%)	0.395
BMI > 40 kg/m^2	28 (6.5%)	400 (93.5%)	(428 100%)	0.677

inferred that the obesity-related upper GIS was mainly due to nutritional habits and diseases associated with obesity. A statistically significant relationship existed between antral gastritis and age and LES laxity, but pangastritis and pyloric dysfunction were closely related. A close relationship existed between esophagitis and hiatal hernia in accordance with previous studies. The most effective factor in pangastritis formation was pyloric dysfunction (which increases the risk 5.6 times). LES laxity increased the risk of antral gastritis 2.07 times, and hiatal hernia increased the risk of esophagitis 10.6 times. No polyp and/or stomach cancer was detected in any of the patients. Despite the absence of a mass in the stomach lumen, dyspeptic complaints and high rates of gastritis were reported mainly due to dietary habits. Günay et al., in a study comprising 1475 cases, reported that gastric cancer might occur with various symptoms, varying from simple complaints such as dyspepsia to serious symptoms such as epigastric pain, anemia, and weight loss (6).

This study was limited due to its retrospective nature and relatively small sample size.

CONCLUSIONS

Obesity can lead to various GIS pathologies. LSG is an effective treatment protocol used all over the world in surgically treating morbid obesity. UGE should be performed to exclude GIS pathologies before LSG operation for morbid obesity diagnosis. An upper GIS endoscopy performed before obesity surgery might have an important role in selecting a surgical method.

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TABLE 7: Relationship of age with antral gastritis, esophagitis, and pancreatitis.

	Average age	*P* value
Antral gastritis (+)	37.75 ± 1063	0.002
Antral gastritis (-)	34.44 ± 10.69	
Pangastritis (+)	37.23 ± 10.87	0.653
Pangastritis (-)	36.48 ± 10.75	
Esophagitis (+)	36.46 ± 10.00	0.96
Esophagitis (-)	36.56 ± 10.82	

TABLE 8: Relationship of hiatal hernia, pyloric dysfunction, and LES laxity with pancreatitis (logistic regression results).

	Pangastritis exp (B)	95.0% Confidence interval	*P* value
Hiatal hernia	2.475	(1.148–5.334)	0.021
LES laxity	419	(0.184–0.952)	0.038
Pyloric dysfunction	5.642	(2.189–14.542)	000

TABLE 9: Relationship of LES laxity and age with antral gastritis (logistic regression results).

	Antral gastritis exp (B)	95.0% Confidence interval	*P* value
Age	1.035	(1.015–1.055)	0.001
LES laxity	2.070	(1.349–3.177)	0.001

TABLE 10: Effect of hernia on esophagitis.

Hernia	Esophagitis exp (B)	95.0% Confidence interval	*P* value
	10.648	(4.851–23.375)	000