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Is macroscopic evaluation sufficient in sleeve gastrectomy specimens?

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ABSTRACT

Introduction: The incidence of bariatric procedures is on the rise, primarily driven by the escalating prevalence of obesity. Among these procedures, laparoscopic sleeve gastrectomy (LSG) has gained significant popularity. However, ongoing debates persist regarding the necessity of microscopic examination of postoperative pathology specimens for certain benign conditions, including those related to bariatric surgery, due to financial concerns. In our retrospective study, we aimed to investigate the adequacy of macroscopic evaluation of pathology specimens obtained from patients who underwent bariatric surgery and to identify any unforeseen pathologies that may be detected through microscopic evaluation.

Materials and Methods: Demographic and pathological data of patients who underwent surgical intervention for morbid obesity at our clinic from May 2017 to December 2021 were retrieved from the patient database. Following the macroscopic assessment of LSG specimens, the surgeon identified suspicious lesions, prompting further microscopic evaluation by pathologists. A p-value of less than 0.05 was considered statistically significant.

Results: A total of 225 patients and corresponding specimens were included in the study. The majority of patients were female (82.2%). The median age of the patients was 36 (range: 19–61) years, and the mean preoperative body mass index (BMI) was 42.6±4.21 kg/m². Macroscopic examinations revealed pathological suspicions in 21 cases (9.3%), and subsequent microscopic evaluations confirmed pathology in 20 of these cases ($p<0.001$). Notably, microscopic evaluation of all specimens identified pathology in 175 patients (77.8%).

Conclusion: Based on our findings, we conclude that relying solely on macroscopic examination of LSG specimens is inadequate for detecting lesions. Therefore, we strongly advocate for the inclusion of microscopic evaluation, particularly due to its importance in detecting premalignant lesions. We recommend that microscopic assessment be routinely performed to ensure comprehensive pathological evaluation in LSG specimens.

Keywords: Bariatric surgery, Histopathology, Obesity

Introduction

The global prevalence of obesity is trending upwards, with a notable increase observed particularly in the United States.[1,2] Obesity contributes to the development of numerous illnesses, such as hypertension, Type 2 diabetes mellitus, coronary artery disease, dyslipidemia, and obesity-related malignancies, resulting in increased healthcare costs for countries.[3] Recently, bariatric surgeries have emerged as the most successful and cost-effective long-term treatment

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modalities for obesity.[4] Currently, laparoscopic Roux-en-Y gastric bypass (LRYGB) and laparoscopic sleeve gastrectomy (LSG) are the two most frequently performed bariatric procedures in North America.[5] When considering postoperative complications and the need for reoperations, LSG has demonstrated considerable advantages.[6]

LSG, a restrictive procedure involving the resection of approximately three-quarters of the stomach, differs from LRYGB in terms of the amount of stomach tissue sent for pathological examination. While no portion of the stomach is typically submitted to pathology in LRYGB, a significant portion of the stomach is sent for pathological evaluation in LSG. Existing literature indicates that abnormal histological findings are observed in 31% to 96% of specimens examined after LSG.[7,8] Among the benign cases, gastritis represents the majority. The incidence of premalignant lesions is around 2%, while malignant lesions occur at a rate of 0.4%.[9,10]

A retrospective study was designed to assess whether macroscopic evaluation alone would be sufficient in identifying premalignant and malignant lesions, and to determine if pathological conditions could be detected solely through macroscopic examination, given the predominantly benign nature of LSG specimens.

Materials and Methods

Patient Selection and Study Design

The data of a total of 247 patients who underwent obesity surgery at the General Surgery Clinic of Malatya Education and Research Hospital between May 2017 and December 2021 were analyzed for the study. The study protocol received ethics approval from the Malatya Turgut Özal University Rectorate Non-Interventional Clinical Research Ethics Committee on June 15th, with the reference number E-30785963-020-160996. Patient data, including demographic information such as age, sex, and body mass index (BMI), as well as postoperative pathology specimen results (specifically Helicobacter pylori [Hp] status and histopathology), were extracted from the hospital's patient database.

All patients who underwent LSG were included in the study. The pathological specimens obtained from these patients were evaluated both macroscopically and microscopically in the postoperative period. Patients who underwent LRYGB (seven patients) and those for whom perioperative macroscopic evaluation data were unavailable (fifteen patients) were excluded from the study (Fig. 1).

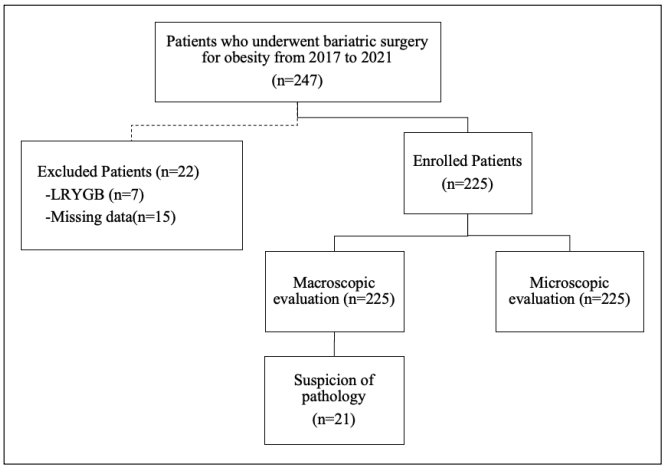

Figure 1. Flow chart of the study.

After the exclusions, a total of 225 patients were included in the study.

The macroscopic pathological evaluation of the specimens was performed by the surgeon through palpation and visual inspection. Suspicious areas were marked and evaluated microscopically by two different pathologists. Additionally, all other specimens were evaluated macroscopically and microscopically by pathologists.

Statistical Analysis

Statistical analyses were performed using SPSS Statistics for Windows, version 23 (SPSS Inc., Chicago, IL, USA). The normality of distribution was tested using the Kolmogorov-Smirnov test. All continuous variables were expressed as medians with minimum and maximum values. Categorical variables were analyzed using the chi-square test. The frequency and percentage values of these variables were presented. Statistical significance was set at $p<0.05$.

Results

Among the 225 patients included in the study, 185 (82.2%) were female and 40 (17.8%) were male, with a median age of 36 years (range: 19–61). The mean BMI was 42.6±4.21 kg/m² (Table 1). Upon macroscopic examination of the specimens, 21 cases were identified as potentially having

Table 1. Patients Characteristics

Age, years (min-max)	36 (19-61)
BMI, kg/m²	42.6±4.21
Sex, Female	185 (82.2%)

BMI: Body Mass Index.

a pathology, and of these marked areas, 20 (95.2%) exhibited pathology upon microscopic evaluation. Among all specimens, 50 (22.2%) patients were classified as normal, while pathology was detected in 175 (77.8%) patients. The majority of these cases (152; 67.7%) presented with chronic gastritis (Table 2). Premalignant lesions were observed in 11 (4.9%) patients, with intestinal metaplasia accounting for 3.1% and atrophic gastritis for 1.8% of cases. Furthermore, pathology evaluations revealed that 65 patients were positive for Hp.

As confirmed by microscopic examination, macroscopic examination demonstrated statistical significance in detecting pathology ($p<0.001$). The sensitivity of macroscopic examination was 40.0%, with a specificity of 99.4%, a positive predictive value of 95.2%, and a negative predictive value of 14.7%. Among the 21 pathologically suspicious areas identified macroscopically, eight were determined to be fundic gland polyps, seven were diagnosed as chronic gastritis, three as atrophic gastritis, two as intestinal metaplasia, and one as benign. Notably, only 45.5% of premalignant lesions exhibited macroscopic suspicion for pathological focus (Table 3).

Table 2. Pathological Evaluation

Macroscopic evaluation		p
Suspicion of pathology	21 (9.3%)	<0.001
Microscopic evaluation		
Benign	50 (22.2%)	
Gastritis	152 (67.7%)	
Fundic gland polyps	8 (3.6%)	
Lymphoid aggregates	4 (1.8%)	
Premalignant Lesion		
Intestinal metaplasia	7 (3.1%)	
Atrophic gastritis	4 (1.8%)	

p<0.05 was considered statistically significant.

Table 3. Results of suspicious foci in macroscopic evaluation

Microscopic evaluation	
Benign	1 (4.8%)
Gastritis	7 (33.3%)
Fundic gland polyps	8 (38.1%)
Premalignant Lesion	
Intestinal metaplasia	2 (9.5%)
Atrophic gastritis	3 (14.3%)

Discussion

Currently, the global prevalence of obesity is increasing, leading to a rise in the number of bariatric surgeries performed. Among these procedures, LSG has gained significant popularity worldwide. Despite being primarily performed for benign indications, LSG highlights the importance of both macroscopic and microscopic evaluation of pathological samples. In our study, we found that macroscopic examination of LSG samples yielded statistically significant results in detecting pathological conditions, as demonstrated and confirmed by microscopic examination. However, the sensitivity of macroscopic evaluation was notably low. Macroscopic evaluations identified only 20 out of 175 pathological conditions and only 45.5% of premalignant lesions.

Financial efficiency has become a major concern for healthcare providers, prompting the questioning of the necessity of histological examination for every resected tissue sample. Particularly in cases where surgery is performed for benign conditions, there is a debate regarding the need for microscopic examination if malignancy is not suspected following macroscopic examination. A related study aimed to evaluate the requirement for histological examination of resected appendix, gallbladder, or hemorrhoids that appeared macroscopically unchanged.[11]

Hansen et al.[12] highlighted in their study that the complete pathological evaluation of gastric specimens from various institutions incurred significant costs ranging from $500 to $1500 per sample. Their findings indicated that this extensive evaluation may not be necessary. Among a population of 351 patients, none of the samples revealed pathological malignancies requiring immediate treatment or urgent follow-up beyond standard post-surgical obesity monitoring. The authors argued that, particularly in an era of escalating healthcare expenses, performing a comprehensive pathological assessment of the gastric remnant following LSG is unnecessary, especially when no apparent abnormalities are observed during the surgical procedure.

AbdullGaffar et al.[13], in a study including 546 patients, reported that 54% of the gastric specimens were normal, while premalignant lesions were identified in 1.8% of cases. They suggested that macroscopic evaluation and palpation by the surgeon should initially be performed on the specimens, with subsequent microscopic analysis conducted only in the presence of positive findings.

Walędziak et al.[14], in a study analyzing a total of 1,252 cases, emphasized the importance of conducting surgical macroscopic evaluations of specimens following LSG as a standard practice. They recommended that pathological examination should be carried out if any doubts arise during the macroscopic evaluation.

Yardimci et al.[15], in their study of 755 cases, identified neoplasms in four cases, representing a prevalence rate of 0.5%. Canil et al.[16], in a study conducted over a period of five years with a total of 925 cases, detected gastrointestinal stromal tumors (GISTs) at a rate of 0.3%. In the study conducted by Almazeedi et al.[17], where the histopathological results of 656 patients were examined, GISTs were observed in 12 patients (1.8%) with atrophic gastritis, a premalignant lesion. In our study, premalignant lesions were observed in 11 cases, accounting for a prevalence rate of 4.9%.

Obesity has been established as a significant risk factor for the development of malignancies. While increased production of estrogen contributes to a higher frequency of genital malignancies in obese individuals, there is also a notable incidence of GISTs in this population.[18] Timely diagnosis of GISTs is crucial, as they can have poor outcomes if left undetected. Even after undergoing radical oncological resection, 40–50% of patients may experience relapse.[19] In our study, no cases of GISTs or other malignant lesions were detected.

Limitations

One of the significant limitations of this study is its retrospective nature and the relatively limited patient population. Additionally, despite the fact that the majority of the stomach is examined in the pathology specimens, there is a possibility of undetected premalignant or benign conditions in the remnant gastric tissue that may require treatment. Therefore, it is imperative for patients to undergo preoperative and postoperative gastroscopy to ensure comprehensive evaluation and management.

Conclusion

Microscopic evaluations of LSG specimens predominantly reveal gastritis. However, our study, along with others, has identified the presence of premalignant lesions. Although the surgeon's macroscopic evaluation can detect polypoid and ulcerated lesions, only half of the premalignant lesions are identifiable through this method. Therefore, we strongly recommend that LSG specimens undergo both macroscopic and microscopic examinations to ensure comprehensive pathological assessment.

Disclosures

Ethics Committee Approval: Malatya Turgut Özal University Rectorate Non-Interventional Clinical Research Ethics Committee on June 15th, with the reference number E-30785963-020-160996.

Peer-review: Externally peer-reviewed.

Conflict of Interest: None declared.

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