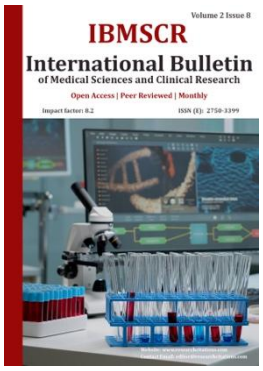

IMPACT OF CLINICAL AND PATHOMORPHOLOGICAL CRITERIA ON THE EFFECTIVENESS OF GASTRIC RESECTION

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Introduction

In recent decades, the global rise in obesity has reached epidemic proportions, posing a serious public health concern not only in developed countries but also in nations undergoing economic growth. Obesity is a major risk factor in the development of type 2 diabetes, cardiovascular diseases, respiratory disorders, and certain malignancies. As a result, implementing effective treatment strategies has become one of the key tasks for healthcare professionals.

Due to the limited efficacy of conservative approaches, bariatric surgery—particularly sleeve gastrectomy—has been widely adopted for obesity treatment. This method influences hormonal balance, enhances satiety, and stabilizes metabolism. However, the variability of clinical outcomes and the occurrence of postoperative complications or relapses in some patients highlight the need for individualized approaches.

From this perspective, identifying pathomorphological changes in gastric tissue and their correlation with clinical criteria for determining the extent of resection is of critical importance. This article analyzes the results of clinical and pathomorphological studies to emphasize the role of resection volume, hyperplasia, fibrosis, parietal cell status, and hormonal activity in the development of personalized surgical strategies.

Keywords: *obesity, sleeve gastrectomy, bariatric surgery, pathomorphology, gastric tissue, resection volume, parietal cells, fibrosis, individualized treatment*.

Relevance of the Problem

In recent decades, obesity has become one of the most pressing global health concerns, reaching epidemic proportions not only among adults but also among adolescents and children. This condition significantly increases the risk of cardiovascular, endocrine, hepatic, respiratory, and even certain oncological diseases [1–3].

Conservative treatments for obesity, such as dietary modifications, physical activity, and pharmacological approaches, often fail to produce long-term results. As a result, bariatric surgery—particularly sleeve gastrectomy and similar gastric resection techniques—has become a preferred method for effective weight reduction in patients with morbid obesity [4–6].

However, post-surgical outcomes can sometimes be unsatisfactory due to complications, insufficient metabolic correction, or weight regain. These limitations highlight the need for a personalized approach to selecting the appropriate type and volume of gastric resection, based on a comprehensive preoperative assessment that includes morphofunctional and pathomorphological indicators [7–9].

Pathomorphological analysis of gastric tissue allows for the evaluation of epithelial hyperplasia, glandular structure, fibrosis levels, and the distribution of endocrine cells—factors that can influence the success of surgical treatment. Recent international studies support the importance of such individualized approaches in achieving improved long-term outcomes [10–12].

Research Objective

The primary aim of this study is to evaluate the significance of clinical and pathomorphological criteria in optimizing the type and extent of gastric resection performed during bariatric surgery for obesity. The goal is to enhance surgical outcomes by developing an individualized approach based on morphofunctional parameters of the gastric tissue.

Materials and Methods

As the material for the study, resected stomach tissue samples and their corresponding pathomorphological data were obtained from 183 patients who underwent bariatric surgery (mainly sleeve gastrectomy) at the Republican Center of Pathological Anatomy during the period of 2022–2024. All materials were scientifically analyzed in conjunction with clinical data.

Clinical Methods: Clinical indicators of the patients - including age, sex, degree of obesity (BMI – Body Mass Index), comorbid conditions (such as diabetes, hypertension, metabolic syndrome, etc.), type of surgery, postoperative condition, and complications - were analyzed. In addition, the results of dynamic follow-up observations were reviewed to assess the effectiveness of gastric resection in clinical practice.

Pathomorphological Methods: The resected gastric tissues were fixed in formalin, embedded in standard paraffin blocks, and thin sections were prepared on slides. These were stained with hematoxylin and eosin (H&E) and examined under an optical microscope.

Results and Discussion

When the total of 183 patients included in the study were analyzed by gender, it was found that 22 patients (12.0%) were male, while 56 patients (67.5%) were female (see Figure 1).

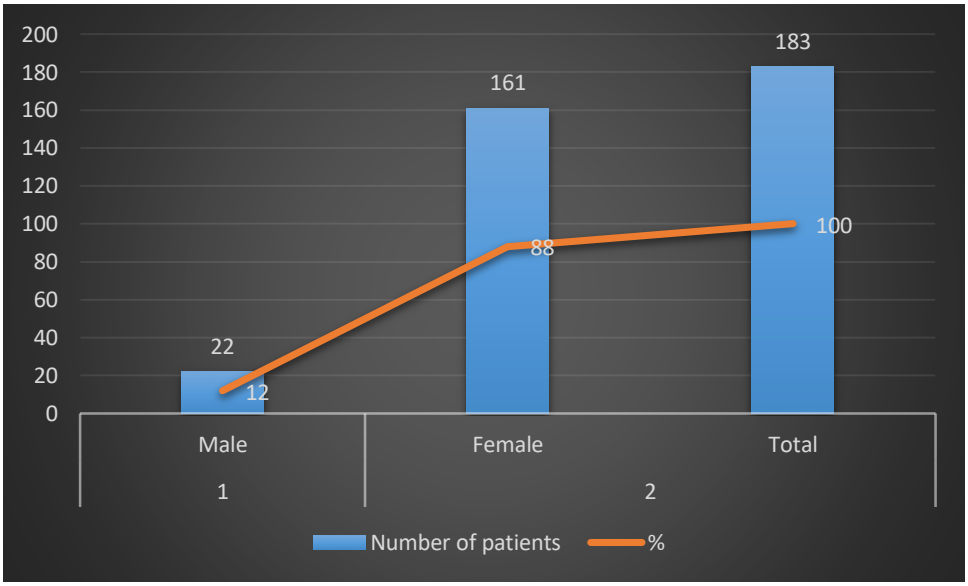

Figure- 1. Distribution of patients by gender (%)

In bariatric surgical procedures, the majority of patients - 88% - were women. This indicates that women are more active in seeking surgical intervention. In contrast, men made up only 12% of the patients, which may suggest either a lower incidence of the condition among men or a more passive approach to choosing surgical solutions. This observation also highlights the importance of considering gender as a significant factor in clinical research.

Based on the duration of hospitalization: All patients included in the study were hospitalized for a period ranging from more than 0–1 day up to more than 15 days. The smallest group consisted of patients hospitalized for 0–1 day, totaling 9 individuals, which accounted for 5.0% of the total. The next largest group comprised those who stayed 15 days or more. Patients hospitalized for 2–3 days and 8–14 days represented an average proportion. The highest number of patients were hospitalized for a duration of 4–7 days. (see figure 2).

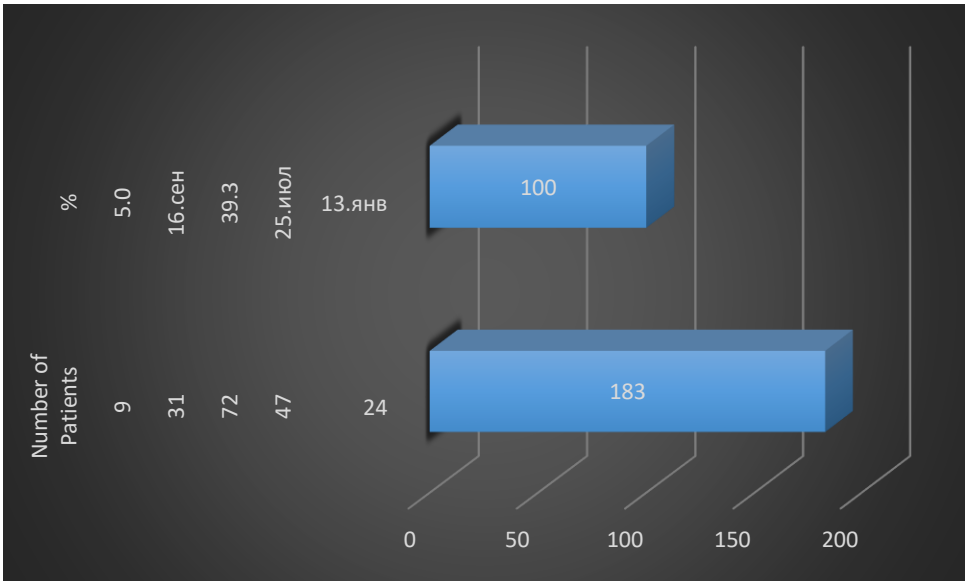

Figure-2. Distribution of patients by duration of hospitalization (%)

Thus, the majority of patients (39.3%) remained in the hospital for 4–7 days after bariatric surgery, indicating that this period represents the standard recovery time for this type of procedure.

The distribution of patients by age groups revealed a specific structure and observable trends. According to the obtained data, the majority of patients undergoing bariatric surgery were aged over 30 years. This suggests that obesity and its complications become more clinically significant in this age group (see figure-3).

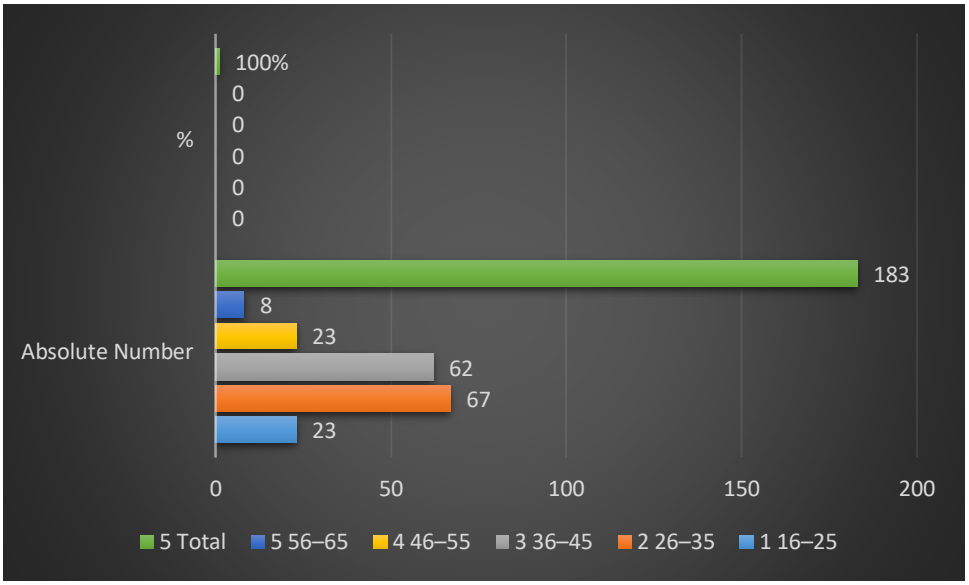

Figure 3. Age group distribution of patients who underwent bariatric surgery based on the clinical and pathomorphological foundations for optimizing gastric resection %.

Bariatric surgery was primarily performed on patients aged 26 to 45 years, accounting for 70.4% of all cases. This indicates that surgical treatment of obesity is most commonly applied within this age group. In contrast, the need for surgical intervention in older patients was relatively lower or approached with greater caution. The objective of this study was to identify the morphological and morphometric changes developing in the key morphofunctional zones of gastric tissue following bariatric surgery.

The analysis of the prevalence and complications of major gastric pathologies in bariatric surgery revealed the following: alimentary obesity was observed in 58 cases, metabolic syndrome in 38 cases, type 2 diabetes mellitus in 29 cases, fatty liver disease (steatosis, steatohepatitis) in 19 cases, gastroesophageal reflux disease (GERD) in 10 cases, hiatal hernia in 3 cases, and comorbid conditions such as chronic hypertension and dyslipidemia were noted in 26 cases (see Table-1).

№	Main Disease or Complication	Number of Cases	%
1	Alimentary (exogenous) obesity	58	31.7%
2	Metabolic syndrome (MS)	38	20.8%
3	Type 2 diabetes mellitus	29	15.8%
4	Fatty liver disease (steatosis, steatohepatitis)	19	10.4%
5	Gastroesophageal reflux disease (GERD)	10	5.5%
6	Hiatal hernia (of the thoracic diaphragm)	3	1.6%
7	Chronic hypertension, dyslipidemia (comorbid conditions)	26	14.2%
	Total	**183**	**100%**

Morphological Examination

Gastric tissue samples obtained during patient autopsies were fixed in 10% phosphate-buffered formalin for 48–72 hours. The samples were then dehydrated through a standard graded ethanol series (70–100%), cleared with chloroform and xylene, and embedded in paraffin. Sections of 4–5 µm thickness were prepared from the paraffin blocks, stained with

hematoxylin and eosin, and mounted. Histological preparations were examined under a ZEISS Primo Star light microscope at magnifications of 40×, 100×, and 400×, and microphotographs were taken.

Within the scope of the study, distinct morphological changes were identified in the gastric tissues obtained from autopsy samples of patients in the postoperative period following bariatric surgery. According to the histological analysis, the most common alterations observed in the gastric mucosa were as follows:

A reduction of glandular tissue and a decrease in secretory activity were noted in the majority of samples. A decreased number of gastric glands and, in some cases, structural deformities of the glands were observed on the mucosal surface. These findings indicate a diminished secretory function of the stomach.

In some cases, intestinal-type metaplasia of the epithelium was found in the area of the pyloric glands. This metaplasia is likely to develop as a response to the functional remodeling that often occurs after bariatric procedures. Moreover, signs of low-grade dysplasia were detected in 2 cases.

Fibrosis within the submucosal layer, characterized by an increase in fibrous tissue components, was identified. This likely reflects trophic disturbances and impaired microcirculation following surgery. Hemodynamic alterations, including dilation of synovial and capillary vessels and focal areas of stasis, were also recorded.

In most samples, lymphoplasmacytic infiltration was detected in both the mucosal and submucosal layers. This indicates the presence of a persistent inflammatory process within the gastric tissue (see figure-3).

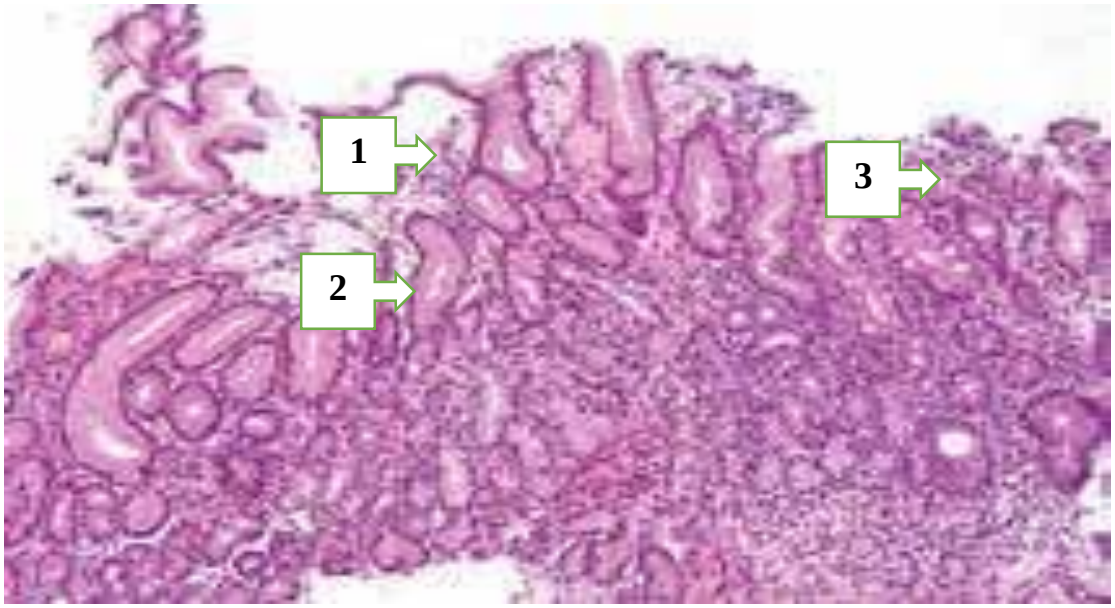

Figure-4. Pathomorphological changes of gastric tissue. Intestinal-type metaplasia of the epithelium (1). Vascular dilatation (2). Fibrosis within the tissues (3). Stain: H&E. Magnification: 10×40.

Conclusion

The results of this study confirm the importance of integrating both clinical and pathomorphological criteria when evaluating the effectiveness of gastric resection. In patients who underwent bariatric surgery, clinical manifestations such as alimentary obesity, metabolic

syndrome, type 2 diabetes mellitus, fatty hepatosis, and gastroesophageal reflux disease were among the most frequently observed conditions.

Pathomorphological analysis revealed structural alterations characterized by glandular tissue reduction, intestinal-type metaplasia, stromal fibrosis, and vascular dilation. These changes are associated with trophic disorders, adaptive remodeling, and persistent inflammatory processes in gastric tissues during the postoperative period, reflecting a complex reorganization of gastric function.

The findings suggest that selection of the type and volume of gastric resection should be tailored to each patient, taking into account age, comorbid conditions, and the state of gastric tissues. This individualized approach may enhance surgical outcomes, reduce the risk of complications, and improve long-term clinical prognosis following bariatric procedures.

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