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CHOICE OF SURGICAL TREATMENT TACTICS FOR HIAPHEAL HERNIAS

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Abstract. The use of a developed algorithm for selecting surgical treatment tactics for esophageal hiatal hernias has reduced the incidence of postoperative complications and mortality.
Keywords: hernia, esophageal hiatus, surgical treatment

Relevance. The problem of hiatal hernia (HH) has been studied for over a century, beginning with the first morphological and radiographic observations in the first half of the 20th century. Despite the extensive study of HH and the significant accumulated clinical experience, the transition from a universal to an individualized surgical approach remains unrealized (2). This creates a justified need for a systematic study aimed at developing and implementing a stratified approach to the surgical treatment of various forms of HH with a clinical and morphological justification for the choice of surgical technique (1, 3, 4, 5).

Gastroesophageal reflux disease (GERD) is currently the leading cause of gastrointestinal disease in industrialized countries. GERD affects 30% of people in the United States, and 20-40% of people in Western Europe. In Russia, this disease, according to various estimates, occurs in 10-60% of residents (17). Moreover, 45-80% of these patients are diagnosed with esophagitis (16). GERD is rare in Asians (1,6). According to R.B. Beretar (2020), GERD is detected in more than 6-12% of the population who have undergone endoscopic examination. The National Clinical Guidelines of the Russian Society of Surgeons (2017) define a hiatal hernia (HH) as follows: It is a condition associated with the displacement of the abdominal esophagus, cardia, upper stomach, and sometimes strands of omentum and loops of the small and large intestine through the esophageal opening of the diaphragm into the chest cavity. In this case, the esophageal opening of the diaphragm becomes a hernial orifice. (2,7,8,9,10).

Currently, HH rivals duodenal ulcer (DU), chronic cholecystitis, and pancreatitis in its prevalence. HH is diagnosed in 5-15% of patients undergoing radiographic

examinations for various gastrointestinal diseases (1,11). With increasing age, HH is diagnosed more frequently (2,12). Sneezing, straining, coughing, and any physical activity suddenly increase intra-abdominal pressure, which sooner or later
leads to dilation of the esophageal hiatus of the diaphragm and "squeezing" the cardia into the posterior mediastinum. HH develops, disrupting the function of the obturator mechanisms, and as a result, reflux esophagitis (RE) develops. This explains the frequent occurrence of hiatal hernia in patients with various chronic non-specific lung diseases and in professional athletes (3,13).

Hiatal hernia is diagnosed in 50% of patients with chronic obstructive pulmonary disease, as persistent coughing leads to a persistent increase in intra-abdominal pressure (1,14). Some diseases of the stomach and duodenum (pylorospasm, pyloric stenosis, celiac axis compression, etc.), as well as overeating and excessive carbonated beverage consumption, lead to increased pressure in the stomach. When gastric pressure at a certain point exceeds esophageal pressure, the compensatory barrier of the cardiac sphincter is disrupted, and gastric contents reflux into the esophagus (1). In the lower third of the esophagus, the mucosa ensures adequate closure of the cardia. Inflammation or atrophy of the mucosa disrupts the congruence of the esophageal lumen (2).

The angle of His plays a significant role in the formation of the closure function of the cardia. It has been proven that the more pronounced the angle, the more reliable the closure function of the cardia. Surgeons take this into account when performing operations (3). Decreased esophageal contractility also increases the likelihood of reflux of gastric contents into the esophageal lumen and weakens esophageal clearance, ultimately leading to the development of ER (17).

It should be noted that at the current stage of medical development, authors vary in their assessment of the priority role of various mechanisms involved in the development of GERD (1).

In 2014, L.N. Bisenkov drew attention to the five most important pathogenetic factors that can lead to the development of GERD: decreased esophageal peristalsis, decreased esophageal clearance, decreased esophageal wall contractility, decreased pressure in the lower esophageal sphincter, and delayed gastric emptying. The influence of these factors can occur either independently or in combination.

According to N.U. Chamsutdinov (2020), the damaging effect of the reflux agent, the structural features of the esophageal mucosa, and increased intra-abdominal pressure are of great importance. Thus, the diversity of classifications of GERD and the various systematization features incorporated into them for understanding the pathogenesis of

GERD are additional evidence that a unified system of views on the pathogenesis, and therefore on the choice of treatment method for such patients, has not yet been formed.
Study objective: Develop an algorithm for selecting a surgical approach for HH.
Materials and methods. The analysis was conducted at the clinical site of the Bukhara Regional Multidisciplinary Clinic and covers the period 2015-2025. The total sample consisted of 128 patients with HH who underwent laparoscopic surgery. The study design was retrospective and prospective.
Results and discussion. To objectively develop an algorithm for selecting a surgical approach, a statistical analysis of clinical, morphological, and functional parameters was conducted, allowing for the identification of signs associated with unsatisfactory treatment outcomes**.**
The analysis included the following variables: hernia type (Barrett/HPE classification), degree of gastric migration, antireflux valve status (Hill classification), presence of esophageal motility disorders (esophagomanometry data), severity of pathological reflux (daily pH measurement), and other diagnostically significant parameters. The incidence of adverse outcomes was determined in each subgroup, and odds ratios (OR) and 95% confidence intervals were calculated.
Esophageal motility impairment demonstrated the strongest association with an unfavorable prognosis: in patients with dyskinesia, an unsatisfactory outcome was recorded in 60% of cases, while in those with normal motility, it was only 8.9% (odds ratio, OR = 9.00; 95% CI: 2.40-33.80; p = 0.001), emphasizing the key role of motor function assessment in planning surgical tactics, especially in choosing the fundoplication option and the feasibility of combining it with other stages of the intervention.
The state of the antireflux valve mechanism according to the Hill classification also proved to be a significant predictor: with grades III-IV impairment, an unsatisfactory outcome was observed in 48% of patients, versus 8.6% in the group with grades I-II (OR = 5.75; p = 0.006). This sign reflects functional failure of the esophageal stenosis, requiring at least stabilization measures (e.g., gastropexy), and in some cases, also diaphragmatic ring reinforcement.
According to the data obtained, the most significant independent prognostic factor was a sign of esophageal motility disorder, in particular the presence of dyskinesia (OR=7.85; 95% CI: 2.10-29.35; p=0.002), which highlights the inconsistency of esophageal peristaltic activity, significantly reducing the effectiveness of standard interventions and requiring modification of surgical tactics.

The Hill valve mechanism score was the second most influential: at grades III-IV, impaired esophageal-to-stomach transition was accompanied by an almost fivefold increase in the risk of an unsatisfactory outcome compared to grades I-II (OR=4.95; p=0.008).

A high degree of gastric migration (grade 3-4) demonstrated an OR of 3.80 (95% CI: 1.20-12.00; p=0.025), indicating the need for stabilization of the cardia with fixation or additional reinforcement in cases of significant gastric displacement into the thoracic cavity.

Finally, the hernia type according to the Barrett/HPE classification (III-IV) retained independent prognostic significance even after adjustment for other variables (OR=2.95; p=0.041), allowing the inclusion of the morphological type of hiatal hernia in the risk scale, particularly when assessing the volume of the hernia sac and the deformation of the pancreatic hernia.

Based on the results of multivariate logistic analysis, an integrated prognostic scale was developed to stratify patients according to the degree of risk of developing an unsatisfactory outcome of surgical treatment of hiatal hernia. The scale included only those features that retained independent prognostic significance in multivariate regression: Barrett/HPE hernia type, degree of gastric migration, valve mechanism status according to Hill, and the presence of esophageal motility disorders. Each feature was assigned a weight (point) proportional to its impact on the risk of outcome, assessed using the odds ratio (OR).

The most significant factor was esophageal motility disorder, which was assigned 2 points. The remaining features (hernia type III-IV, Hill III-IV, degree of gastric migration ≥ 3) were assigned 1 point each, reflecting their clinical significance but a lesser impact on prognosis compared to dyskinesia.

Thus, the presented scale not only formalizes the approach to choosing a surgical strategy but also improves the reproducibility of clinical decisions, minimizing the risk of subjective assessment during intervention planning. The use of this model makes it possible to personalize the scope of the operation and avoid both under- and over-surgical aggression.

Overall, the developed risk stratification scale and algorithm for selecting surgical treatment tactics for hiatal hernias represent a logically formalized system based on a quantitative assessment of clinical and instrumental parameters, which provides the basis for their digital implementation in the form of specialized software.

Given the clearly structured input data (hernia type, degree of gastric migration, valve mechanism parameters, manometry data) and their diagnostic reproducibility, this algorithm can be integrated into a digital platform with artificial intelligence elements, providing automated interpretation of significant parameters and predicting the likelihood of an unsatisfactory outcome. The use of artificial intelligence will allow for real-time recommendations for the optimal surgical intervention for a specific patient, improve the accuracy of clinical decisions, eliminate the variability of human interpretation, and thereby standardize a personalized approach to hiatal hernia surgery.
Based on the overall assessment, the following stratification is proposed:
0-1 point: patients with minimal anatomical and functional impairments. They are recommended to undergo a modified cruroraphy, typically without additional stages.
2-3 points: intermediate risk zone, in which modified cruroraphy can be supplemented with functional gastropexy to stabilize the cardia and prevent axial displacement.
≥ 4 points: high risk of unsatisfactory results with the traditional approach. Patients in this category are recommended to undergo a full modified technique, including cruroraphy with subalarcosis sutures, gastropexy, and placement of a semi-encompassing "saddle" mesh implant.
The algorithm we developed for choosing a surgical treatment strategy for hiatal hernia reflects a shift from an empirical approach to a formalized model based on a logistic analysis of objective clinical and instrumental data. The developed risk scale includes predictors that have proven their independent prognostic value: hernia type, degree of gastric migration, valve mechanism assessment, and esophageal motility. All these parameters allow us to stratify patients based on their risk of developing unsatisfactory outcomes and, accordingly, determine the necessary intervention, ranging from basic cruroraphy to a fully modified technique with gastric fixation and mesh placement.
Use of this algorithm ensures clinical validity, reproducibility, and individualization of surgical approaches for hiatal hernia. The model's application in real-life practice has been validated in clinical cases and helps reduce the risk of recurrence, functional impairment, and unnecessary extension of surgical intervention.

CONCLUSIONS:

1. The developed modified technique includes three functionally interconnected stages: cruroraphy with subalgal sutures, gastric fixation, and placement of a semi-loop mesh implant. Each of these modifications is aimed at correcting a specific aspect of the anatomical and functional imbalance. Unlike standard approaches, the proposed technique is not universal, but is applied differentially, based on objective diagnostic criteria.

2. The proposed algorithm for choosing surgical tactics allows us to minimize the risks of relapse and functional failure and increase the reproducibility of surgical decisions.

BIBLIOGRAPHY

1. Ablaev E. E., Belyalova A. R., Ibragimova D. N. Nissen fundoplication – the "gold standard" of surgical treatment of hiatal hernia // Scientific news. - 2022. - No. 28. - P. 88-90.
2. Ishchenko R. V., Sovpel I. V., Grintsov A. G., Sovpel O. V. Efficiency of using mesh implants in laparoscopic GERD repair // Surgical practice. – 2020. – No. 1(41). – P. 33–44.
3. Starkov Yu. G., Khizrieva I. N., Zamolodchikov R. D., Dzhantukhanova S. V. Experience with using Collis-Nissen esophagogastroplasty for GERD and short esophagus // Diagnostic and interventional radiology. – 2024. – Vol. 18, No. 5. – P. 30–37.
4. Khamdamova M.T., Zhaloldinova M.M., Khamdamov I.B. The state of nitric oxide in the blood serum of patients with cutaneous leishmaniasis // New Den Medicine. - Bukhara, 2023. - № 5 (55). - P. 638-643.
5. Khamdamova M.T., Zhaloldinova M.M., Khamdamov I.B. The value of ceruloplasmin and copper in the blood serum of women wearing copper-containing intrauterine devices // New Den Medicine. - Bukhara,2023. - № 6 (56). - P. 2-7.
6. Khamdamova M.T., Khasanova M.T. Various mechanisms of pathogenesis of endometrial hyperplasia in postmenopausal women (literature review)// New Den Medicine. - Bukhara, 2023. - № 8 (58). - P. 103-107.
7. Khamdamova M.T., Akramova D.E. Genetic aspects of genital prolapse in women of reproductive age // New Den Medicine. - Bukhara, 2024. - № 2 (64). - P.420-426.
8. Khamdamova M.T., Akramova D.E. Immediate and long-term results of surgical treatment of genital prolapse in elderly women // New Den Medicine. - Bukhara, 2025. - № 3 (77). - P. 201-207.
9. Khamdamova M.T., Akramova D.E. Efficiency of various methods of treatment of women with genital prolapse // News of dermatovenerology and reproductive health. - Tashkent, 2025. - № 2 (109). - P.30-33.
10. Khamdamova M.T., Khasanova M.T. genetic mechanisms of development of endometrial hyperplastic processes in women in menopacteric age)// New Den Medicine. - Bukhara, 2025. - № 3 (77). - P. 207-211.

11. Khamdamova M.T., Khasanova M.T. Морфологические изменения эндометрия при гиперплазии // Новости дерматовенерологии и репродуктивного здоровья.-Ташкент.-2025.- № 2 (109). - P. 12-14.
12. Khamdamova M.T., Umidova N.N. Генитальный эндометриоз – болезнь активных и деловых женщин // Новости дерматовенерологии и репродуктивного здоровья.-Ташкент.-2025.- № 2 (109). - P. 33-14.
13. Khamdamova M.T., Akramova D.E. Генетические аспекты генитального пролапса у женщин репродуктивного возраста) // New Den Medicine. - Bukhara, 2024. - № 2 (64). - P. 420-426.
14. Barratt O. A., Badenoch T., Findlay J. M. A systematic review of hiatus hernia classifications // Diseases of the Esophagus. – 2025. – Vol. 38, No. 3. – Article doaf044.
15. Jaruvongvanich V. K., Matar R., Reisenauer J., et al. Hiatal hernia repair with transoral incisionless fundoplication versus Nissen fundoplication for gastroesophageal reflux disease: A retrospective study // Endoscopy International Open. – 2023. – Vol. 11, No. 1. – P. E11–E18.
16. Ishchenko R. V., Sovpel I. V., Grintsov A. G., Sovpel O. V. Efficiency of using mesh implants in laparoscopic GERD repair // Surgical practice. – 2020. – No. 1(41). – P. 33–44.
17. Starkov Yu. G., Khizrieva I. N., Zamolodchikov R. D., Dzhantukhanova S. V. Experience with using Collis-Nissen esophagogastroplasty for GERD and short esophagus // Diagnostic and interventional radiology. – 2024. – Vol. 18, No. 5. – P. 30–37.