

**RISK OF RECURRENCE OF ANTERIOR ABDOMINAL WALL
HERNIAS IN ELDERLY AND SENILE PATIENTS**

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Abstract. Logistic analysis enabled us to reliably identify the most significant independent risk factors that must be considered when developing a prognostic model and stratification algorithm for selecting the optimal laparoscopic approach. Based on the data obtained from the multivariate logistic analysis, a patient stratification system was developed based on the risk of hernia recurrence after laparoscopic surgery.

Keywords: anterior abdominal wall hernia, recurrence, complications, risk

Relevance. Despite the advancement of laparoscopic hernia repair technologies and the introduction of modern implants, the problem of optimizing surgical outcomes in patients with recurrent laparoscopic hernias (RHS) remains relevant and requires further resolution based on a comprehensive analysis of risk factors, disease progression characteristics, and modification of surgical tactics [1, 4, 6]. Overall, an abdominal wall hernia occurs in one in three to five people worldwide. More than 20 million surgical procedures are performed annually worldwide, of which 10-15% are hernias [1, 2,5, 6]. Among surgical procedures, hernia repair ranks third after appendectomy and cholecystectomy [2, 8]. However, inguinal hernias constitute the majority of all hernia patients. The main unresolved problem with this pathology is the recurrence rate, which reaches 10% for direct inguinal hernias, and the recurrence rate for postoperative and inguinal hernia repair can reach 40% [3, 9]. The recurrence rate of indirect inguinal hernias ranges from 5 to 12%, and in cases of significant destruction of the posterior wall of the inguinal canal, it reaches 25-30% of cases [3, 10, 11]. Recurrence of inguinal hernias is a pressing issue in surgery and herniology, as they present significant difficulties in both treatment and prevention. A particularly high rate of recurrence of inguinal hernias is observed in the elderly. According to various data, recurrence 3 years or more after the initial surgery in elderly and senile individuals accounts for 80.5% [3, 13]. According to other data, recurrence in patients 50 years and older accounts for 67.6% [1,12].

Current developments in Russian medicine include numerous measures aimed at improving treatment outcomes for patients, including those with recurrent hernias in the elderly and senile population (ESP).

The aim of the study was to identify clinical, anatomical, functional, and technical parameters that increase the risk of complications and recurrence, with the goal of incorporating them into a personalized surgical treatment strategy.

Materials and Methods: Two subgroups were identified for the analysis: patients whose postoperative course was complicated by one or more adverse events (n=37) and patients with a satisfactory postoperative course without complications (n=52).

Results and discussion. The key anatomical risk factor was the size of the hernia defect. The average diameter in the complication group was 8.1 ± 3.0 cm versus 6.4 ± 2.6 cm ($p < 0.01$), and the average defect area was 57.8 cm² versus 42.7 cm². These parameters are directly related to the technical complexity of the repair and the need to use non-standard implants.

According to the analysis, the following parameters had the greatest prognostic significance: patient age, diameter and area of the hernia defect, the presence of posterior hernia and aponeurosis thinning, the severity of the adhesion process, a high Charlson comorbidity index, and the absence of an implant in previous procedures. These parameters showed high odds ratios (OR), and their p-levels of significance ranged from < 0.01 to 0.02 , with the exception of the ASA indicator, which demonstrated only a trend toward significance. Based on an integrated assessment of anatomical, morphological, functional, and operative-technical characteristics, a practice-oriented risk stratification model was constructed, comprising three risk levels: low, moderate, and high. For each of these categories, substantiated tactical recommendations were proposed, reflecting the required extent of intervention, approach to access selection, implant type, and fixation method.

The presented scoring risk stratification model is based on an integrated assessment of the most significant clinical, anatomical, and functional parameters identified during multivariate analysis. Each indicator was assigned a quantitative severity scale (1, 3, or 5 points), reflecting its individual contribution to the development of hernia recurrence. The combined score, obtained by summing all criteria, allows for the assignment of a patient to one of three risk categories (low, moderate, or high) and, based on this, the development of personalized laparoscopic surgical strategies. This scoring system ensures ease of use, clinical clarity, and prognostic validity.

To evaluate the effectiveness and verify the accuracy of the developed predictive model and assess its clinical applicability, a ROC analysis was performed

to determine the discriminatory characteristics of the scoring scale for stratifying the risk of hernia recurrence in patients with PFS after laparoscopic surgery. The established fact of recurrence was used as a dependent variable, and the total score calculated on the basis of nine integral clinical, anatomical and functional criteria obtained as a result of multivariate analysis was used as a predictor. The area under the ROC curve (AUC) was 0.842 (95% CI: 0.756–0.910; $p < 0.001$), indicating a high discriminatory ability of the model. The most informative threshold value was ≥ 18 points, which achieved an optimal balance between sensitivity (81.2%) and specificity (76.9%). This means that the proposed model allows for the high reliability of identifying patients at risk of recurrence, while minimizing the number of false positive predictions. The scale's high sensitivity is particularly valuable in patients with increased surgical risk in older age groups, where underestimation of adverse factors can lead to critical postoperative consequences.

Thus, the obtained ROC analysis results confirm the clinical efficacy of the proposed risk stratification method and justify its use in tactical planning. Based on these data, an electronic implementation of the model was developed as a software product designed for the rapid stratification of patients with recurrent posterior hernias. The developed software allows for the input of individual patient parameters, automatically calculates a total score, assigns the patient to the appropriate risk category, and generates personalized recommendations for the selection of the scope and technique of laparoscopic intervention. Thanks to its simple interface, clinical clarity, and adaptability to various patient profiles, the program can be effectively used in surgical practice as a tool for supporting physician decision-making and individualizing surgical tactics.

CONCLUSIONS:

1. The developed software allows for the input of individual patient parameters, automatically calculates a total score, assigns the patient to the appropriate risk category, and generates personalized recommendations for the selection of the scope and technique of laparoscopic intervention.
2. The algorithm is implemented as a complete program. Thanks to its simple interface, clinical clarity, and adaptability to various patient profiles, the program can be effectively used in surgical practice as a tool for supporting physician decision-making and individualizing surgical tactics.

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