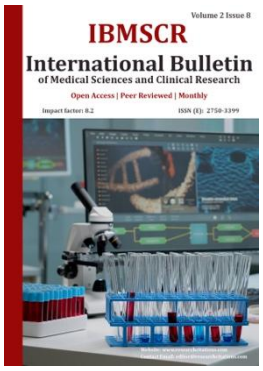

CLINICAL AND IMMUNOLOGICAL PREDICTORS OF THE SEVERE CURRENT ACUTE OF ACUTE ADHESIVE INJECT INTESTINAL CONTRACTION

Eshchanov Alisher Atabayevich
Khamdamov Bakhtiyor Zarifovich
Bukhara State Medical Institute, Bukhara, Uzbekistan
https://doi.org/10.5281/zenodo.17934579

Annotation. Acute adhesive small intestinal obstruction (AICOB) remains one of the most complex forms of emergency abdominal pathology, characterized by a high frequency of complications, relapses, and mortality. The purpose of the study was to assess the prognostic significance of clinical and immunological indicators as factors of stratification of disease severity and the risk of adverse outcomes. 115 patients with the established diagnosis of PCOS were examined, who were divided into groups depending on the clinical form and severity of the condition. It was established that a pronounced decrease in CD4+ and HLA-DR+, a disbalance of CD4/CD8, an increase in the levels of IL-6, TNF-α, and circulating immune complexes (CIC) are reliably associated with a complicated course of the disease and the need for emergency surgical intervention. ROC analysis showed high diagnostic accuracy of IL-6 and HLA-DR+ (AUC > 0.90). The obtained data confirm the possibility of using immunological indicators as reliable prognostic markers for OCTK.

Keywords: acute adhesive small intestinal obstruction, immunity, CD4, HLA-DR, interleukin-6, TNF-α, prognosis.

Problem relevance. Acute adhesive intestinal obstruction is the leading form of mechanical intestinal obstruction and accounts for up to 60-75% of all cases of impaired intestinal passage. Despite the improvement of surgical technologies and anesthesiological support, the mortality rate in complicated forms of PCOS, according to various authors, reaches 20-30%, and the frequency of postoperative complications remains consistently high (3.7, 9).

Traditionally, the severity of OCTK is assessed primarily based on clinical and instrumental criteria, such as the severity of pain syndrome, duration of the disease, visualization data, and signs of intestinal wall ischemia. However, these approaches do not always allow for reliable prediction of the course of the disease and the risk of adverse outcomes in the early stages of hospitalization (2,5, 8).

Modern understanding of the pathogenesis of UTIL indicates the key role of a systemic inflammatory response and secondary immune dysfunction, which develops against the background of intestinal wall ischemia, endogenous intoxication, and translocation of bacterial components. Hyperproduction of pro-inflammatory cytokines (IL-6, TNF-α), suppression of the antigen-presenting function of monocytes (HLA-DR+), imbalance of T-lymphocyte subpopulations lead to the depletion of the immune reserve and an increased risk of complications (1, 4, 6).

In this regard, the search for clinical and immunological markers that have prognostic value in OCTK is a pressing task of modern emergency surgery.

Research objective. Assess the prognostic significance of clinical and immunological indicators in patients with acute adhesive small intestinal obstruction and determine their diagnostic accuracy in predicting the severe course of the disease.

Materials and methods of research. The study was conducted at the emergency surgery clinic and included 115 patients with a verified diagnosis of acute adhesive intestinal obstruction. The average age of the patients was 56.4±11.2 years. Based on the clinical form and severity of the course, patients were divided into three groups:

Group I (n=38) - uncomplicated course, effectiveness of conservative therapy;

II group (n=41) - complicated course without signs of intestinal necrosis;

Group III (n=36) - severe course with ischemia, necrosis, and the need for extended surgical intervention.

Immunological examination included the determination of lymphocyte subpopulations (CD3+, CD4+, CD8+, CD16+), HLA-DR+ expression by flow cytofluorimetry, IL-6, TNF-α concentrations, and CIC by ELISA. Additionally, the clinical and laboratory indicators of inflammation were assessed.

Statistical processing was carried out using Student's t-test, ANOVA, Pearson's correlation analysis. Diagnostic accuracy was assessed using the ROC analysis method. Differences were considered significant at $p<0.05$.

Research Results: during the study, a comprehensive assessment of cellular and humoral immune response parameters was performed in patients with acute adhesive intestinal obstruction. The obtained data demonstrate a clear pattern: as the clinical course of OSTKN worsens, progressive immune dysfunction forms, combining signs of a systemic hyperinflammatory reaction (increase in IL-6, TNF-α, CIC) and simultaneous decrease in functional immune reserve (suppression of CD4+ and HLA-DR+ antigen presentation).

Analysis of the subpopulation composition of lymphocytes and HLA-DR+ expression revealed statistically significant intergroup differences reflecting an increase in immunoregulatory imbalance and a decrease in immunocompetence in patients with a complicated and severe course of the disease (Table. 1).

Table 1.

Cellular immunity indicators (M±m)

Note: * $p<0.01$; ** $p<0.001$

As can be seen from Table 1, during the transition from group I to group III, a progressive decrease in the proportion of CD4+ T-lymphocytes was observed, indicating a weakening of the coordinating (helper) link of the immune response. At the same time, an increase in CD8+ with an increase in the severity of the condition was noted, which reflects the shift of the immune profile towards the cytotoxic component and the formation of regulatory imbalance. The most integral expression of this trend is the decrease in the CD4/CD8 index: from 1.75±0.21 in group I to 0.82±0.14 in group III ($p<0.001$), which corresponds to immunoregulatory insufficiency and is considered an unfavorable immunological background in acute abdominal pathology.

The HLA-DR+ indicator, which reflects antigen-presenting activity and the functional readiness of the immune system to control infectious-inflammatory complications, is of particular importance. A marked decrease in HLA-DR+ from 64.2±6.1% (I group) to 39.8±4.9%

(III group; p<0.001) was established. This dynamic indicates the development of immune exhaustion/"immune paralysis," characteristic of severe abdominal surgical diseases, and may be one of the key mechanisms of high risk of complications in patients of group III.

Thus, already at the cellular level, a model of "immune stress" is recorded: weakening of CD4+-mediated regulation + decrease in HLA-DR+ with a relative predominance of CD8+, which clinically and pathogenetically corresponds to the severe course of PCOS.

In parallel with changes in the cellular link in patients with a more severe course of PCOS, a pronounced activation of the systemic inflammatory response was noted (Table. 2).

Thus, the level of IL-6 increased more than 4 times compared to the I and III groups (18.4±4.1 versus 78.9±9.5 pg/ml; p<0.001). This dynamic indicates a significant contribution of IL-6 to the formation of systemic inflammation and endotoxicosis in the progression of obstruction, ischemia, and intoxication. Similarly, TNF-α increased from 12.6±2.9 to 49.2±6.7 pg/ml (p<0.001), which confirms the activation of key pro-inflammatory cascades associated with intestinal wall damage and the body's systemic reaction.

Table 2.

Cytokine profile and CIC

TNF-α (pg/ml)			

Note: * p<0.01; ** p<0.001

An additional marker of immune tension was the increase in circulating immune complexes (CICs), reflecting the overload of the humoral link and increased antigenic stimulation. The CIC level increased from 82±11 units in group I to 181±22 units in group III (p<0.001), which corresponds to the model of a pronounced systemic immuno-inflammatory process in severe forms of PCOS.

The obtained data are confirmed by correlation analysis: a significant negative correlation was found between IL-6 and HLA-DR+ (r = -0.61; p<0.01), which reflects a typical phenomenon for severe surgical conditions: the higher the pro-inflammatory activation, the deeper the suppression of antigen presentation and immune function. In addition, a positive correlation was established between IL-6 and the clinical severity of the disease (r = +0.68; p<0.001), which allows us to consider IL-6 not only as a marker of inflammatory activity, but also as a marker of the overall risk of complicated course.

To assess the diagnostic and prognostic value of key immunological indicators, a ROC analysis was conducted (Table. 3).

The highest prognostic effectiveness was demonstrated by HLA-DR+ (AUC=0.93) and IL-6 (AUC=0.91), which corresponds to "high" and "very high" diagnostic accuracy. The CD4/CD8 index (AUC=0.88) also showed significant prognostic value, confirming that immunoregulatory imbalance is a significant factor in the severe course of PCOS.

Table 3.

ROC analysis of prognostic significance

IBMSCR | Volume 5, Issue 12, December

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In summary, the results indicate that the combination of IL-6 (inflammation activity) + HLA-DR+ (antigen presentation/immunity reserve preservation) + CD4/CD8 (immunoregulatory balance) markers forms a highly informative basis for early risk stratification in patients with PCOS and justification of individualized treatment tactics.

Conclusions:

The severe course of acute adhesive intestinal obstruction is accompanied by a pronounced immune dysfunction characterized by a decrease in CD4+, HLA-DR+, and a disbalance of CD4/CD8.

An increase in the levels of IL-6, TNF-α, and CIC reliably correlates with the clinical severity of the disease and the risk of complications.

The highest prognostic value was demonstrated by IL-6 and HLA-DR+ (AUC > 0.90).

The use of clinical and immunological indicators allows for improving early risk stratification and justifying the choice of treatment tactics in patients with PCOS.

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