VOLUME-3, ISSUE-8

UDC 616.34-002.44-036.1:616-092:616-036.882

CLINICAL SCALES (APACHE II, SAPS II) AND IPORP IN PREDICTING COMPLICATED COURSE OF PERITONITIS

Rakhimov Oybek Umarovich *dr.oybek1984@gmail.com*
https://orcid.org/0000-0003-3569-6688
Tashkent State Medical University

Annotation. The inclusion of the IPORP clinical and immunological scale in practice has made it possible to more differentiatedly assess the degree of immunopathological risk, form personalized forecasts and, on this basis, build individualized immunoprophylaxis schemes.

Keywords: apache II, saps II, generalized peritonitis.

Relevance. Generalized peritonitis (GP) remains one of the most complex, life-threatening and urgent problems of abdominal surgery. Despite significant advances in modern surgical practice, the introduction of improved surgical techniques, intensive care, widespread use of the latest generation of antibacterial drugs and the development of resuscitation technologies, mortality rates for this disease remain high and range from 20 to 40% in different clinics (1,2,4,7,8,9,10). The key reason for unsatisfactory outcomes is considered to be not only the severity of the inflammatory process, but also the high probability of developing a complicated course. Therapeutic approaches, which in most cases are based primarily on the use of systemic antibacterial therapy, do not always allow achieving the expected clinical result. (3,11,12,13,14,15).

The use of complex programs helps to improve both immediate and remote treatment results, increases the effectiveness of recovery processes and reduces the risk of developing a protracted septic condition. All this is reflected in a reliable decrease in postoperative mortality rates and an improvement in the overall survival of patients in this severe category, which confirms the relevance of using such treatment strategies in modern abdominal surgery (3,5,6).

Generalized peritonitis is an extremely severe and potentially life-threatening disease, which in most cases develops acutely and requires the earliest possible diagnosis in combination with immediate initiation of intensive treatment.

In modern scientific literature, the importance of the body's immunological reactivity as one of the key factors determining outcomes in generalized peritonitis is increasingly being discussed. It has been established that a pronounced imbalance in the cellular and humoral immunity system not only intensifies the pathological

process, but also directly contributes to the progression of the systemic inflammatory response, which ultimately leads to the formation of a complicated course of the disease and a worsening prognosis. Despite numerous studies aimed at finding predictors of an unfavorable outcome, today in clinical practice there is still no single, universal and reliable method for stratifying the risk of complicated course in patients with widespread peritonitis, which determines the relevance of searching for new approaches in this area.

Objective: To develop a comprehensive approach to predicting complicated course of disseminated peritonitis based on the assessment of the body's immunological reactivity and the use of validated clinical scales, which will improve the effectiveness of treatment tactics and reduce mortality rates.

Materials and methods of the study. The study was conducted in 2021–2025 in a surgical department and was aimed at a comprehensive assessment of the capabilities of modern prognostic scales in the treatment of widespread peritonitis of various etiologies. The analysis included 118 patients who underwent emergency surgeries for peritonitis that developed as a complication of perforation of hollow organs, destructive forms of acute appendicitis, strangulated hernias, as well as cholelithiasis and other inflammatory and destructive processes in the abdominal cavity. In accordance with the objectives, the clinical observations were divided into two groups that differed in the principles of postoperative management. The control group consisted of 58 (49.15%) patients treated in 2021–2022, who received standard intensive care without the use of additional prognostic models and immunotropic interventions. The main group consisted of 60 (50.85%) patients operated in 2023–2025, in whom the developed IPORP clinical and immunological scale was integrated into the treatment and diagnostic algorithm.

In the main group, the use of IPORP allowed not only to carry out individualized prediction of the risk of complicated course, but also to make timely adjustments to intensive care, including targeted correction of identified immune disorders, optimization of antibacterial therapy, and prevention of septic complications. Such division of groups provided the possibility of an objective comparative analysis of the effectiveness of various approaches and provided grounds for subsequent statistical processing of the obtained results. All biological material was collected on the first day after surgery, strictly observing the "cold chain" principle, which excluded the degradation of protein structures and ensured high reproducibility of the obtained results.

Results of the study and their discussion. The most pronounced correlations were found for T-lymphocytes. The absolute number of CD4+ T-helpers showed the maximum inverse relationship ($r=-0.741$; $p<0.001$), and their percentage had

similar dynamics (r=-0.717; p<0.001). This confirms their key role in inflammation control. CD3+ in absolute values also strongly correlated with the severity of the condition (r=-0.692; p<0.001), while the percentage of CD3+ demonstrated a moderate but reliable relationship (r=-0.684; p<0.001), indicating suppression of the effector link of cellular immunity. The CD4+/CD8+ ratio turned out to be a prognostic indicator (r=-0.553; p<0.001), reflecting the imbalance of regulation. CD16+CD56+ (NK cells) decreased both in absolute (r=-0.624; p<0.001) and percentage values (r=-0.609; p<0.001), confirming their importance in preventing complications. The absolute number of CD8+ T-suppressors had a less pronounced but significant correlation (r=-0.391; p=0.017).

In general, cellular immunity parameters, especially CD4+, CD3+ and NK cells, have high prognostic significance and can be used for early stratification of the risk of complicated POP.

Thus, CD4+, CD3+ and NK cells have the greatest prognostic significance in RP.

Correlation analysis of the humoral component of immunity showed a significant decrease in the main classes of immunoglobulins with the worsening condition of patients with RP. The most pronounced dependence is for the IgA × IgM / IgG index (r = -0.651; p <0.001), reflecting the balance of primary and secondary antibodies. Its decrease is associated with a complicated and especially lethal course, when the levels of IgA and IgM decrease and their ratio with IgG is disrupted, which indicates the exhaustion of the humoral response.

IgM (r=-0.523; p=0.001) and IgA (r=-0.494; p=0.002) also showed reliable negative correlations, indicating a deficiency in the formation of the primary immune response in the early stages of POP. The IgG level decreased less significantly (r=-0.382; p=0.019), which may be associated with both a decrease in production and increased consumption during massive antigen stimulation.

The dynamics of CIC turned out to be interesting: their level increased proportionally to the severity of the clinical picture (r=0.584; p<0.001), which confirms the participation of immune complexes in the development of secondary inflammatory and vascular damage, including PON.

The levels of pro- and anti-inflammatory cytokines are closely related to the severity of POP. The main marker was IL-6 (r=0.712; p<0.001), confirming its role in systemic inflammation and SIRS progression. Its growth was accompanied by an increase in IL-10, which reflects compensatory inhibition of the immune response (r=0.655; p<0.001), consistent with R.S. Hotchkiss's hypothesis on the development of "immune paralysis" in the late phases of inflammation.

TNF-α is also a significant mediator (r=0.682; p<0.001), associated with severe forms of systemic destabilization, including SS. IFN-γ showed a moderate positive

correlation (r=0.489; p=0.003): its growth accompanied the worsening of the condition, but remained below the levels of IL-6 and TNF-α, indicating an imbalance of effector and regulatory links. In the course of the study, based on a set of identified immunological markers, clinical characteristics, as well as calculated logistic regression coefficients and ROC analysis data, an original clinical and immunological scale "IPORP" (Immunological Prediction of Risk in Peritonitis) was developed. This tool is designed to assess the likelihood of complicated course of widespread peritonitis and is built on a multi-level scoring system.

The scale structure included nine indicators, each of which was confirmed not only for statistical significance, but also for pathophysiological validity. The threshold values determined using ROC analysis allowed us to establish risk stratification intervals. For quantitative variables, including the level of CD4+ T-lymphocytes, NK cell activity, concentrations of interleukins IL-6 and IL-10, the level of IgM and circulating immune complexes (CIC), ranges corresponding to clinically significant boundaries were identified. Qualitative parameters, such as the stage of peritonitis, the nature of the exudate in the abdominal cavity and the presence of a prolonged systemic inflammatory response (SIRS), were assessed by fixed values.

The final scale is presented as a table containing 9 rows with a description of the variables and 4 columns corresponding to the risk levels. The maximum possible total score is 45, which creates a wide and convenient range for individual stratification of patients and predicting their outcomes. Based on the total number of points scored, patients were divided into three levels of risk of developing an unfavorable course. The first category included individuals with a low risk (≤9 points), which reflected only minimal deviations in immunological parameters without signs of systemic dysfunction. The second group included patients with a high risk (10–19 points), who had moderate manifestations of immunosuppression in combination with activation of the cytokine cascade. The most severe, critical category (≥20 points) was characterized by severe immunosuppression, hypercytokinemia, and clinical signs of the terminal stage of widespread peritonitis.

A comparative analysis showed that the use of the proposed IPORP model allowed us to correctly predict the complicated course of the disease in 47 patients, which amounted to 57.3%. At the same time, 7 false positive cases were recorded (14.3%), when patients with a favorable outcome were mistakenly included in the high-risk group. There were 11 true negative results (26.2%), and the number of false negatives reached 35 (42.7%). The latter fact indicates that in almost half of the patients who developed complications, signs of immunosuppression and cytokine destabilization were manifested only in a weak form or became obvious only at later stages of the disease.

Comparison of the obtained data with literary sources demonstrated that previously proposed universal prognostic scales (APACHE II, SAPS II) are significantly less informative in relation to complicated peritonitis. The main reason is that these scales are focused mainly on the general somatic condition of the patient and do not take into account his immunological status.

The inclusion of the IPORP clinical and immunological scale in practice allowed for a more differentiated assessment of the degree of immunopathological risk, the formation of personalized forecasts and, on this basis, the construction of individualized immunoprophylaxis schemes. This approach determines both the scientific novelty and the clinical significance of the study.

Based on the obtained results, it is advisable to recommend that all patients with widespread peritonitis undergo express immunological examination already on the first day after surgery. The use of this method in combination with traditional clinical scales (APACHE II, SAPS II) increases the accuracy of risk stratification, allows for the timely identification of patients with an unfavorable prognosis and provides the possibility of more targeted preventive and therapeutic measures.

CONCLUSIONS:

1. The inclusion of the IPORP clinical and immunological scale in practice has made it possible to more differentiatedly assess the degree of immunopathological risk, form personalized forecasts and, on this basis, build individualized immunoprophylaxis schemes.
2. Based on the results obtained, it is advisable to recommend that all patients with widespread peritonitis undergo express immunological examination already on the first day after surgery. The use of this method in combination with traditional clinical scales (APACHE II, SAPS II) increases the accuracy of risk stratification, allows timely identification of patients with an unfavorable prognosis and provides the possibility of more targeted preventive and therapeutic measures.

LIST OF REFERENCES

1. Rakhimov O., Tirkashev S., Rashidov Z. Features of the postoperative period after laparoscopic cholecystectomy // Science and innovation. - 2024. - Vol. 3. - No. D5. - P. 387-393.
2. Sh A. A. et al. Immunological Changes in Destructive Cholecystitis // International Congress on Biological, Physical And Chemical Studies (ITALY). - 2025. - Vol. 8. - P. 68-70.
3. Abdumazhidov A. Sh. et al. Treatment of patients with infected cystic liver lesions with decasan solution // New Day in Medicine. - 2020. - No. 2. - P. 285-289.

4. Altyev BK et al. Features of clinical manifestations of intra-abdominal complications after operations on the biliary tract (literature review) // Young scientist. - 2016. - No. 27. - P. 230-234.
5. Ismailov FM, Alimkhanov OO, Zuparov KF Clinical and Laboratory Aspects in Patients with Perforation of Hollow Organs // Research Journal of Trauma and Disability Studies. - 2024. - Vol. 3. - No. 10. - P. 230-233.
6. Rakhimov OU, Tursumetov AA Comparative analysis of clinical and economic efficiency of various methods of hemostasis after cholecystectomy // Innovative technologies in medicine: a young specialist's view. - 2022. - P. 42-44.
7.Khamdamova M.T., Akramova D. E. Genetic aspects of genital prolapse in women of reproductive age // New day in medicine. Bukhara, 2023. - No. 5 (55). - P. 638-643.
8. Khamdamova M.T., Teshaev Sh.Zh., Hikmatova M.F. Morphological changes of the thymus and spleen in renal failure in rats and correction with pomegranate seed oil // New day in medicine. Bukhara, 2024. - N. 3(65). - P. 167-187.
9. Khamdamova M.T., Khasanova M.T. Various mechanisms of pathogenesis of endometrial hyperplasia in postmenopausal women (literature review) // New day in medicine. Bukhara. 2023. - No. 8 (58). - P. 103-107.
10. Khamdamova M.T., Zhaloldinova M.M., Khamdamov I.B. The state of nitric oxide in blood serum in patients with cutaneous leishmaniasis // New day in medicine. Bukhara, 2023. - No. 5 (55). - P. 638-643.
11. Khamdamova M.T., Zhaloldinova M.M., Khamdamov I.B. The value of ceruloplasmin and copper in blood serum in women wearing copper-containing intrauterine device // New day in medicine. Bukhara, 2023. - No. 6 (56). - P. 2-7.
12. Khamdamova M.T., Akramova D. E. Immediate and long-term results of surgical treatment of genital prolapse in elderly women // New day in medicine. Bukhara, 2025. - N3 (77). - P. 201-206.
13. Khamdamova M. T., Khasanova M.T. Genetic mechanisms of development of endometrial hyperplastic processes in women in menopacteric age // New day in medicine. Bukhara, 2025. - N3 (77). - P. 207-211.
14. Khamdamova M. T., Umidova N. N. Genetic factors of genital endometriosis // New day in medicine. Bukhara, 2025. – N4 (78). - P. 82-87.
15. Efgan, M. G.; Akar, H.; Kanter, E.; Kirik, S.; Duman Shahan, T. Role of systemic immune inflammation index, systemic immune response index, neutrophil lymphocyte ratio, and platelet ratio in predicting peritoneal culture positivity and prognosis in patients with spontaneous bacterial peritonitis admitted to the emergency department. Medicina 2024 , 60 , 1335.