



Indicators of Neutrophil-Lymphocytic Ratio in Patients with Critical Condition with Acute Ischemic Cerebral Circulation Disorders

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Abstract: The objects of the study were 32 patients with acute ischemic cerebral circulatory disorders, aged 52 to 65 years (the average age was 58.3 ± 2 years), in whom clinical (systemic hemodynamic and respiratory indicators, neurological status), instrumental (ECG, chest X-ray, MSCT examination of the brain) were analyzed) and laboratory data (leucoformula, ISNL). Comparison of clinical and laboratory parameters was carried out in three stages: the first stage - upon admission, the second stage: – the 3rd day, the third stage - the 7th day of intensive care. It has been established that a high rate of ISNL is a reliable indicator of clinical deterioration of patients and a predictor of an unfavorable outcome of critical conditions caused by ONMC.

It is known that in patients with ONMC, the systemic immune response has features and is characterized by leukocytosis in combination with relative lymphopenia, deficiency of the T-cell link of the immune system [5,9] and activation of the humoral immune response with an increase in the blood content of B lymphocytes (SB19+, SB20+), A, M, b and CEC [2,5]. This fact suggests that the nature of changes in the immune status in acute disorders of cerebral circulation (ONMC) has the same vector of orientation, therefore, individual indicators of the immune status can be used in assessing the prognosis of the course and functional outcome of the disease.

The normal functioning of the immune system is one of the determining conditions for the adequate state of physiological systems the body. A decrease in the immunological reactivity of the population determines the features of formation. the course and prognosis of diseases. including neurosurgical ones [8,12]. A decrease in the number of lymphocytes leads to a decrease in the body's resistance to pathogenic microorganisms and is an important manifestation of immunodeficiency in critical patients [1]. Immunological monitoring will make it possible to distinguish the rapidly changing phases of progressive inflammation and severe immunosuppression, which will help improve the results of differentiated correction [4].

To date, clinical laboratory medicine has a huge number of methods for early and accurate diagnosis of a large number of diseases, dynamic control of the pathological process. Quantitative analysis of the leukocyte formula is an important research method that has diagnostic value in critical conditions. A thorough analysis of the leukoformula allows us to judge the course of the disease, the occurrence and severity of inflammatory manifestations and the effectiveness of the therapy [3]. Along with modern neuroimaging methods such as MSCT and MRI, successful therapy of patients with critical condition in severe forms of acute cerebral circulatory disorders (ONMC) is based on laboratory indicators. Due to a number of features of immune disorders in patients in critical conditions, the problem of objective and timely diagnosis of immune disorders has not yet been

solved [7]. In order to objectify the evaluation of these results, a number of indices are currently proposed that allow us to judge the course of the pathological process in the body, including the severity of inflammatory manifestations and the effectiveness of therapy. At the same time, the assessment of the immune status in patients in critical conditions should be as fast as possible and include objective, accessible, reproducible indicators in extreme conditions of emergency conditions, ensuring timely selection of intensive care tactics and monitoring of its effectiveness [11]. According to a number of authors, one of such indicators is the index of the ratio of neutrophils to lymphocytes (ISNL) of blood [6.10].

Based on all these data, it can be argued that autoimmune inflammation in acute brain injuries is one of the key factors determining the further development and influencing the outcome of the disease. But, despite numerous studies focused in this field of medicine, to date there is no consensus and recommendations on the correction of the immune status in patients with acute brain injuries. In this regard, this uncertainty determined the purpose of our study.

The purpose of the study: to determine the prognostic significance of ISNL in predicting the outcome of critical conditions caused by ONMC.

The study was conducted in the Department of neuro-resuscitation of the Bukhara branch of the RNCEMP. The objects of the study were 32 patients with acute cerebral circulatory disorders, of ischemic type, whose age ranged from 52 to 65 years (the average age was 58.3 ± 2 years), in whom clinical and laboratory data were studied. There were 18 males (56.3%) and 14 females (43.7%). The total mortality rate was 4 (12.5%). The primary diagnosis was carried out on the basis of clinical and neurological data and the results of multispiral computed tomography (MSCT). When assessing neurostatus on the Glasgow coma scale (SCG), the average score upon admission to the hospital was 9.3 ± 2.1 . Ischemic foci were diagnosed in the pool: medial artery 15 (46.9%), anterior cerebral artery 5 (15.6%), posterior cerebral artery 5 (15.6%), as well as vertebrobasillary pool 7 (21.9%).

All patients received conservative treatment, including antibacterial, decongestant, membrane stabilizing, hemorheological, cerebroprotective and symptomatic therapy. If necessary (comatose state and with signs of dislocation of median structures on MSCT), patients were transferred to an extended ventilator (9 patients). Ventilation modes and parameters were selected individually according to the severity of the somatic status and anthropometric parameters. Clinical (systemic indicators of hemodynamics and respiration, neurological status), instrumental (ECG, chest X-ray, MSCT examination of the brain) and laboratory data (leukoformula, ISNL) were analyzed. Comparison of clinical and laboratory parameters was carried out in three stages: the first stage - upon admission, the second stage: – the 3rd day, the third stage - the 7th day of intensive care.

Results and their discussions

When analyzing the obtained neurological status data, it was revealed that at admission in all examined patients, the level of consciousness according to SHG was from 8 to 12 points $n=12$, 9 points $n=10$, 10 points $n=3$, 11 points $n=4$, 12 points $n=3$. Analysis of the leukoformula parameters of these patients showed that the average ISNL was equal to 2.2 ± 0.64 . At the 2nd stage of the study, there was an increase in the number of patients with a deeper violation of neurostatus (according to the SHG: 8 points $n=14$, 9 points $n=12$, 10 points $n=5$, 11 points $n=1$). This deterioration of the neurological status was most likely connected with the increase in cerebral edema. These changes were confirmed by neuroimaging, where the smoothness of the furrows, narrowing of the basal cisterns and ventricles of the brain testified to the increase in brain edema. In these patients, clinical data on the progression of brain edema appeared as arterial hypotension, a tendency to bradycardia, tachypnea and anxiety. In this regard, 14 patients were transferred to a ventilator. In this category of patients, when analyzing the leukoformula, there was an increase in the number of segmented neutrophils and a decrease in the number of lymphocytes, respectively, an increase in their ratio index (more than 3.8).

Clinical improvement was noted in dynamics against the background of intensive therapy in 28 patients, which was confirmed by the obtained data of the neurostatus of the 3rd stage of the study (according to the SHG: 8 points $n=6$, 9 points $n=12$, 10 points $n=8$, 11 points $n=4$, 12 points $n=2$

During MSCT The study noted a regression of the previous pattern of brain edema: smoothness of the furrows, narrowing of the basal cisterns and ventricles of the brain were absent. Patients who were on a ventilator easily adapted to respirators and respiratory support stopped earlier periods of intensive care. In these patients, there was a gradual decrease in the ISNL index below 2.1.

Of all the examined patients, a fatal outcome was observed in 4 (12.5%). When analyzing the data obtained, a reliable correlation was revealed between the indicators of the leukoformula and overall mortality among patients with both nosologies. In these patients, there was a progressive increase in the average ISNL index compared with the indicator of the first stage ($2,36\pm 0,52$, $4,35\pm 0,34$, $5,64\pm 0,42$,) ($p<0.05$).

Conclusions:

A higher ISNL index is a reliable indicator of the clinical deterioration of patients with ischemic stroke and a predictor of an unfavorable outcome. According to the results of the study, it can be assumed that careful observation of changes in the leukoformula makes it possible to predict the course and outcome of ONMC. The voluntary response to changes in the ISNL makes it possible to correct the ongoing therapy and can prevent possible deterioration of the condition of patients.

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