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The State of Adaptive Immunity in Patients with Acute Polymorphic Psychotic Disorders

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Abstract The article examines disorders in the activity of the immune system caused by acute polymorphic psychotic disorders. The results of immunological researches and measures to enhance the response of the immune system as a result of the use of immunocorrectors in the treatment of psychosis are described. The resistance of the immune system to the effects of antipsychotic drugs is being studied in terms of preventing possible complications.

Keywords Acute psychotic disorders, Treatment with antipsychotics, Immunocorrectors, T-cell link of immunity

1. Introduction

Today, acute polymorphic psychotic disorder is one of the most pressing problems in the field of psychiatry. This is due to the fact that the prevalence of this disease throughout the world is increasing over the years more and more, namely among the middle-aged population. [5,6,12]

This, in turn, is a threat to the disability of the patient, the loss of his significance in the family and in society. Currently, the nomenclature for "Acute polymorphic psychotic disorder" (APSD) is included in the ICD-10, which is characterized by symptoms with acute, spontaneous manifestation of psychotic symptoms such as delusions, hallucinations and paranoids. [1,3,9,14]

The peculiarity of this type of psychotic disorder is that if the patient is provided with comprehensive and timely treatment, then in this case, patients with such symptoms are completely cured. [11,23]

Thus far, data have been accumulated on the participation of psychoneuro-immune disorders in the pathogenesis of acute psychosis. There is also a hypothesis that long-term use of antipsychotic drugs leads to suppression of the body's immune functions. These disorders can be associated with a change in the regulatory influence of the central nervous system on the immune system [7,17,18]

As a result of acute psychosis, in an altered state of consciousness, the limbic-diencephalic system of the brain is damaged [20,21]. This leads to functional disorders of the brain that regulate the immune system. An in-depth study of the role of the immune mechanism in this disease proves the role of the immune system in the patient's recovery and quality remission. A number of authors note that in the study of immunological parameters in patients with psychotic disorders, there is a manifestation of secondary immune deficiency - VIN. [13,15,11]

The data given by different researchers are ambiguous. We see that some authors in their studies note an increase in the concentration of lymphocytes of the CD3 + and CD4 + groups in the blood, a decrease in the number of CD8 + cytotoxic T-lymphocytes, a decrease in the number of lymphocytes with Fas receptors and readiness for apoptosis (CD95 +). [2,17]

Other authors note the opposite, that is, a decrease in the concentration of lymphocytes of the CD3 +, CD4 + groups, an increase in the number of CD8 + cytotoxic T-lymphocytes. [10,19]

The deviation of immunological parameters in patients with acute psychosis in one way or another proves the susceptibility of the immune system to this type of disease. [14,22]

The importance of neuroimmune regulation disorders in the mechanisms of mental maladjustment determines the need for further development of complex rehabilitation programs with the inclusion of methods of immunocorrection.

Based on the foregoing, the use of immunomodulators for the complex treatment of acute psychoses is aimed at improving the quality of immune indicators and improving the somatic health of patients. Therefore, by preventing the onset of tolerance to antipsychotic drugs, the body's sensitivity to these drugs can be increased. [8,24,16]

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2. Research Objectives

The study of the role of the immune system in the clinic of acute polymorphic psychotic disorders and the development of complex treatment with the use of immunocorrectors can increase the effectiveness of their treatment and allow achieving long-term remission.

The following main tasks were set:

1) To study the presence of psychopathological (positive and negative) symptoms in patients with AKI according to the PANSS scale;
2) To investigate the immunological parameters of blood (CD4 +, CD3 +, CD8 +, CD95 +) in patients with AKI before the start of treatment;
3) Upon completion of treatment, compare the immunological parameters of the blood by re-collecting a blood test;
4) To improve the state of the immune status, include immunocorrectors in the treatment algorithm;
5) After complex treatment with immunomodulators, assess the residual psychopathological symptoms on the PANSS scale.

3. Research Materials and Methods

Patients were selected with a diagnosis of acute polymorphic psychotic disorder who were not yet fully treated with psychotropic drugs.

Clinical-psychological and clinical-immunological methods were selected.

The study involved 59 patients aged 18–45 years (hospitalized for inpatient treatment at the Republican Clinical Psychiatric Hospital in Tashkent) with a diagnosis of ARC (F23), without a diagnosis of schizophrenia- (F23.0) and with a diagnosis of schizophrenia - (F23.1).

Patients were selected based on the following criteria:

The presence of delusional ideas, with symptoms of persecution (delirium) and pseudo-hallucinations, profound affective disorders, psychomotor excitability, a sense of suspicion, loss of abstract thinking, autism, lack of critical assessment of one's condition.

With the absence of organic cerebral disorders, without signs of intoxication under the influence of alcohol or any psychoactive substances.

The presence of clinical signs characteristic of depressive or manic disorders was determined by (ICD-10).

Pregnant or lactating women, patients with severe somatic or neurological disorders, patients with psychoorganic diseases were considered inappropriate for the study.

4. Results

The research was carried out in **three** stages:

At the *first* stage, based on clinical and psychopathological research methods and the results of the PANSS scale, all patients with hallucinatory-paranoid symptoms were diagnosed with acute polymorphic psychotic disorder. For the purposes of clinical and immunological studies, blood was taken from all the subjects to study the state of immunological blood parameters.

At the *second* stage, the patients of the research group were included in the treatment with immunocorrectors.

At the *third* stage of the study, all the data obtained were analyzed, evaluated and statistically processed.

We conditionally divided patients into **three** groups:

Group I (30 people), we marked it as a research group, in addition to antipsychotic drugs to treatment in this group, we added an immunocorrector (Derinat solution 1.5%, 5.0 ml, once a day, i / m, No. 5).

II-Group (29 patients), was named a study group with a traditional treatment algorithm. In this group, immunocorrective therapy was not performed.

III-Group, we designated - the control group. Nursing staff of the RCHP were invited to this group. In this group, at the time of blood collection for immunological parameters, all the subjects were healthy.

All patients and their legal representatives signed the Informed Consent Form prior to inclusion in the study.

Patient information collected during the study is strictly confidential.

The results of immunological blood tests from patients were taken five days after the last injection.

5. Noted

1. Significant suppression of CD3 + expression on T-lymphocytes, which is characteristic of T-cell immunodeficiency ($p < 0.05$).
2. Decreased expression of CD3 + is the result of the depressive effect of neurohumoral factors on immunity.
3. Decrease in the total pool of T-lymphocytes (CD3 +) mainly due to suppression of the expression of CD4 +.
4. When studying the expression of CD4 + on T-lymphocytes, which are the main regulatory cells of the immune system, their lowest values were noted in the group of patients with mental disorders ($p < 0.05$).

Studies have shown that the expression of CD8 + on T-lymphocytes was significantly increased in comparison with the data of healthy individuals ($p < 0.05$).

Such activation of T-cytotoxic lymphocytes, which are very sensitive to various external influences, is due to the influence of neurohumoral changes.

The analysis showed that in the group of people with psychotic disorders, there is an increased expression of CD95 +. This again indicates the formation of a T-cell immunodeficiency state. (Table 1.)

Table 1

	Blood counts before immunocorrector therapy	Blood counts after immunocorrector therapy	Blood counts after conventional therapy	Blood counts of the control group
Leukocytes	5800	5100	5300	4300
Lymphocytes	32,5	43,5	36,6	46,2
CD3+	41,6	48,2	45,2	54,5
CD4+	21,4	29,9	23,9	30,5
CD8+	32,3	24,2	29,8	25,2
CD95+	30,5	21,8	27,6	19,2

Thus, the analysis of the results obtained made it possible to reveal pronounced changes in the cellular link of immunity, which are manifested by suppression of the expression of CD3 +, CD4 + and an increase in the expression of CD8 +.

Obviously, in this pathology, the T-cell immune response is significantly weaker, which suggests clonal depletion of T-lymphocytes.

Determination of cellular immunity, as well as identification of activation markers of lymphocytes was carried out by flow cytometry on Accuri C6 (USA) using MCAt.

The results were evaluated by calculating the percentage of dead cells and their absolute values. Content of CD4 + (T-helpers / inducers), CD8 + (cytotoxic T-lymphocytes) and CD95 + (cells with Fas-receptors ready for apoptosis).

6. Discussion

The correlations we identified between the types of reduction of psychopathological disorders and the characteristics of changes in the immune status are evidence that the responses of immunological indicators can be used to assess the effectiveness of **therapies** and the quality of remission, as well as the validity of the correct selection of the prescription of maintenance therapy with long-acting neuroleptics.

The results of our research allowed us to say that the leading role in the development of auto-inflammatory immune disorders belongs to the T-system of immunity. At the same time, the most important role in maintaining the immunological homeostasis of the body is attached to the subpopulation of T-suppressor cells.

Analyzes prove that T-suppressors inhibit the differentiation of B-lymphocytes into plasma cells, ensuring the development of tolerance to autoantigens, suppress the synthesis of nonspecific antibodies, deficiency and / or a decrease in the functional activity of suppressor T-cells, disrupting homeostasis, can lead to the occurrence of autoimmune reactions in the body ...

The immunological parameters obtained by us can provide information, and the data can be used as markers in predicting the course and progression of polymorphic psychotic disorder.

The results of immunological parameters in patients with the first diagnosed acute psychosis showed the ambiguity of their changes depending on the duration of the disease.

Acute polymorphic psychotic disorder with a rapid onset of psychotic symptoms is associated with a tendency to the progression and development of immune disorders, belonging to the T-system of immunity, as well as a decrease in the number of circulating immune complexes (CIC).

7. Conclusions

Considering the above described changes in immunological parameters in our patients with acute polymorphic psychotic disorders and their dynamics during treatment, we can assume that the data obtained are most logically described in our hypothesis (put forward in the relevance section) of the involvement of immune mechanisms in the development of this disease.

Alignment of immunological parameters and improvement of the mental state in the examined patients with psychotic relapses, and in the period of remission after a 5-day course with immunocorrectors, makes it possible to recommend the use of immunocorrectors in the complex therapy of acute polymorphic psychotic disorders.

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Glossary

OPPR- Acute polymorphic psychotic disorder

10-ICD - International Classification of Diseases, Tenth Revision

CNS - central nervous system

VIN- Secondary immune deficiency

CD3 + - T-lymphocytes

CD4 + - T-helpers / inducers

CD8 + - T-cytotoxic lymphocytes

CD95 + _ one of the apoptosis receptors

PANSS - Positive and Negative Syndrome Scale - a scale of positive and negative syndromes

CIC - circulating immune complex

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