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# Adult Patients Da Immunological Aspects of Diagnosed Chronic Kidney Disease

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**Abstract:** clinical immunology in various pathological conditions, as well as in patients diagnosed with chronic kidney disease (CKD), provides information about the state of the immune system , changes in the quantity and quality of immunocompetent cells , various endogenous and exogenous factors that lead to this [5, 6, 8, 11].

**Keywords:** related to the comparative study of specific and non-specific resistance factors of the immune system in SBK, and those that exist are scattered, more emphasis is placed on the clinical aspects of the issue, there are no prognostic immunological criteria that determine the transition of the disease to the stage of hemodialysis in clinical practice.

## Introduction.

The recommendation of diagnostic and prognostic criteria based on the laws related to changes in immunological indicators recommended by most researchers allows to determine the perspective of the end of various pathologies [4, 7] .

S BK is one of the leaders among many other diseases with its complications and death rates. Various clinical, instrumental and laboratory methods are used to determine the prognosis of the end of the disease in these patients [ 1, 2, 12 ] .

related to the comparative study of specific and non-specific resistance factors of the immune system in SBK, and those that exist are scattered, more emphasis is placed on the clinical aspects of the issue , there are no prognostic immunological criteria that determine the transition of the disease to the stage of hemodialysis in clinical practice. [ 9, 10 ]. For this reason, the research focused on the solution of this problem has not lost its relevance .

**The purpose of the study** was to study the immune status of patients diagnosed with SBK , to develop immunological diagnostic and prognostic criteria .

**Materials and methods of research.** 135 SBK patients between the ages of 19 and 60 were included in the research. 87 of them (64.44±4.12%) were men, and 48 (35.56±4 , 12%) were women. In men, this stone was placed 1.81 times more than in women (R<0.001 ). The majority of patients (71.85±3.87% , n=97) were patients aged 21 to 50 years.

Involving people in medical research was carried out in accordance with the Declaration of Helsinki adopted by the General Assembly of the World Medical Association (Helsinki 1964 , last updated in Forta Leza , Brazil , 2013 ) . Evidence-based medicine practices were followed in the organization and conduct of research .

They have cellular ( CD3+ -, CD 4+-, CD 8+-, CD 16+-, CD 20+-, CD 25+-, CD 95+- lymphocytes) and humoral immunity ( IgA, IgM, IgG ) , cytokine status (IL-4, IL-6) indicators were determined. All immunological studies were performed using conventional immunological

methods. All immunological studies were performed at the Institute of Immunology and Human Genomics of the Federal Republic of Uzbekistan and the Bukhara State Medical Institute .

was carried out on personal computers based on programs specially used for medical-biological research using traditional variational statistical methods .

**Results obtained and discussion.** Determining the immune status of adult patients with SCC begins with the interpretation and analysis of cellular immunity indicators . The obtained results showed that the amount of leukocytes in the blood of patients 5649±180 x 1 0 $^{9}$ / in the case of i, which is l the average amount of lymphocytes in the blood is 30.80±0.93% and their absolute amount is 1740±101 it reached m k l .

Although there was a significant difference in the amount of leukocytes in the blood , no significant difference was found in the relative amount of lymphocytes . The obtained results showed that in healthy individuals (control group, n=20) SD3+-lymphocytes were 62.35±0.89%, while in the studied patients they were on average 43.72±0.56%. was 1.43 times less than the indicators of healthy people ( R<0.05). A convincing decrease in the relative amount of SD3+-lymphocytes in patients pathologically developed in them explained by the situation .

Determination of SD4+-lymphocytes in the blood of patients diagnosed with SBK showed that , although this indicator was in a small percentage, it was reliably lower compared to the parameters of healthy individuals - 30.43±0.57% vs. 32.45±0.66% respectively (1.07 fold decrease, R<0.05). If we take into account that SD4+-lymphocytes are assistants in the three -cell cooperative system that transmit antigen information from macrophages to antibody-producing V-lymphocytes, we can be sure that a decrease in their percentage will have a negative effect on the immune system.

During the performance of the immune system, the synthesis of anti-antigen antibodies is sufficient , the antigens are eliminated from the body, and the increase of SD8+-lymphocytes, the cells suppressing the immune system , is a sign of the development of the pathological process. In the study, it was observed that the relative amount of SD8+-lymphocytes increased in patients compared to these parameters in healthy individuals . If this indicator in patients is on average 28.30±0 , 53% was 22.71±0.72% on average in healthy level (1.25 times reliable difference, R<0.05). It can be seen that the relative amount of SD8+-lymphocytes increased reliably in patients , which led to a decrease in the activity of the immune system in patients, and a decrease in SD 3+- and SD4 +- lymphocytes. This condition is a target of secondary immunodeficiency developed in patients.

The parameters of the immunoregulatory index (IRI) were given as a proof of the mentioned points . It is known that IRI is the ratio of SD4+-lymphocytes to SD8+-lymphocytes, and this index indicates the level of immune system activity . In our case , IRI was 1.08±0.02 units in patients diagnosed with SBK. h showed that it was significantly less than the parameters of healthy individuals (1.43±0.02 units ) by 1.32 times ( R<0.05). This parameter was explained by a decrease in SD4+ lymphocytes due to an increase in the relative amount of SD8+ lymphocytes.

The fact that such changes occurred against the background of no significant changes in the total number of lymphocytes showed that only changes related to immunocompetent cells occurred , which was expressed in the form of T-immunodeficiency. Therefore , secondary immunodeficiency was observed in the immune system of patients diagnosed with SBK , which was expressed by the formation of T-immunodeficiency . All data are fully represented in Figure 1.

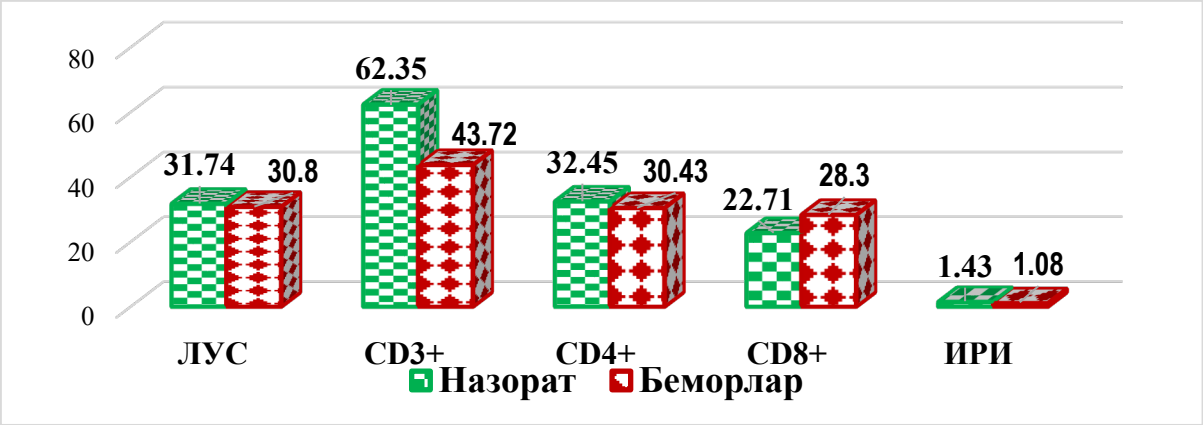


**Figure 1. Comparative parameters of immune system T-joint relative indicators in adult patients with chronic kidney disease, %** (total number of LUS-lymphocytes ).

the given picture 1 .

Along with the T-joint of the immune system, the V-joint, which is responsible for humoral immunity, has also been studied. In it, the relative amount of V-lymphocytes was determined and compared with the indicators of healthy people. It is known that V-lymphocytes are differentiated from lymphopoietic stem cells in the bone marrow, and when T-helpers convey information about the antigen, they are synthesized into plasma cells , synthesize antibodies suitable for this antigen and provide an immune response. SD20+ in our case marker-bearing V-lymphocytes (SD20+-lymphocytes) were 28.55±0.43% in patients h before, in the control group reached 23.98±0.93% , the difference between the numbers reached 1.19 times, statistically significantly higher in favor of patients ( R <0.05). In order to make it easier to evaluate the relative parameters of the immune system, the V-joint is compared with the T-joint indicators in Figure 2 .

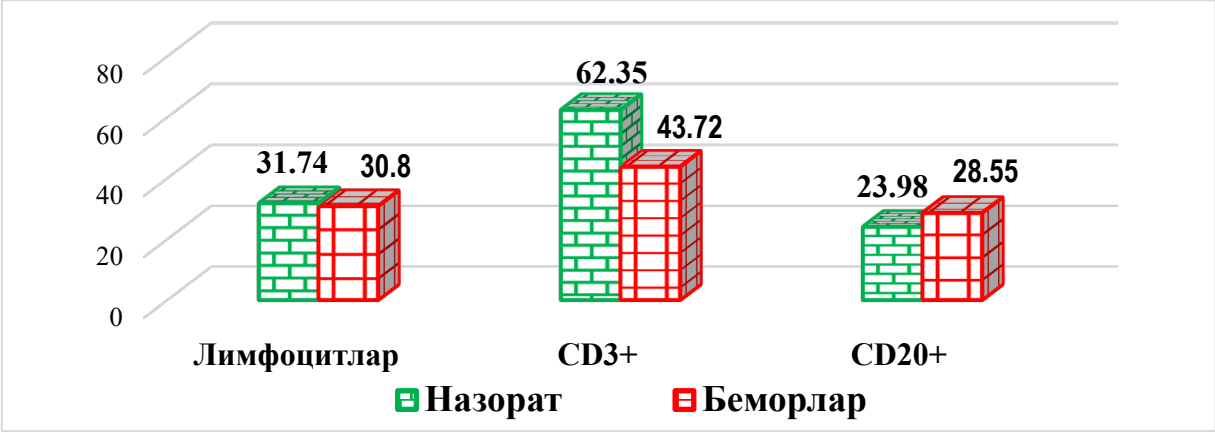


**Figure 2. Comparative parameters of relative indicators of the V-joint of the immune system in adult patients with chronic kidney disease, %.**

in Figure 2 , the immune system T- and the imbalance in the V-joints fell , that is, when there was a deficiency in the T-joint (T - immunodeficiency) , an increase in relative parameters was observed in the V-joint (V-hyperproduction). Such a situation academician R.V. It is explained on the basis of Petrov's " mobile principle", that is, the immune system is explained by the decrease of one joint and the increase of another joint , so that the immune system keeps its activity in balance. In this case, the deficiency of SD3+-lymphocytes caused the hyperproduction of SD20+-lymphocytes and provided the immune response, but this case still represents a strain on the immune system. It can be seen that the absolute numbers had a trend of changes in the same way as the indicators of the relative numbers (Figure 3). Although the intensity of the changes differed , the tendency of the changes was the same as the relative parameters.

At the next stage of the scientific work, the relative and absolute quantities of proliferating lymphocytes (SD25+-lymphocytes), which indicate the activation of immune system h cells, and apoptotic cells (SD95+-lymphocytes), which determine the apoptosis activity of immunocompetent h cells , were determined, the results were interpreted and analyzed .

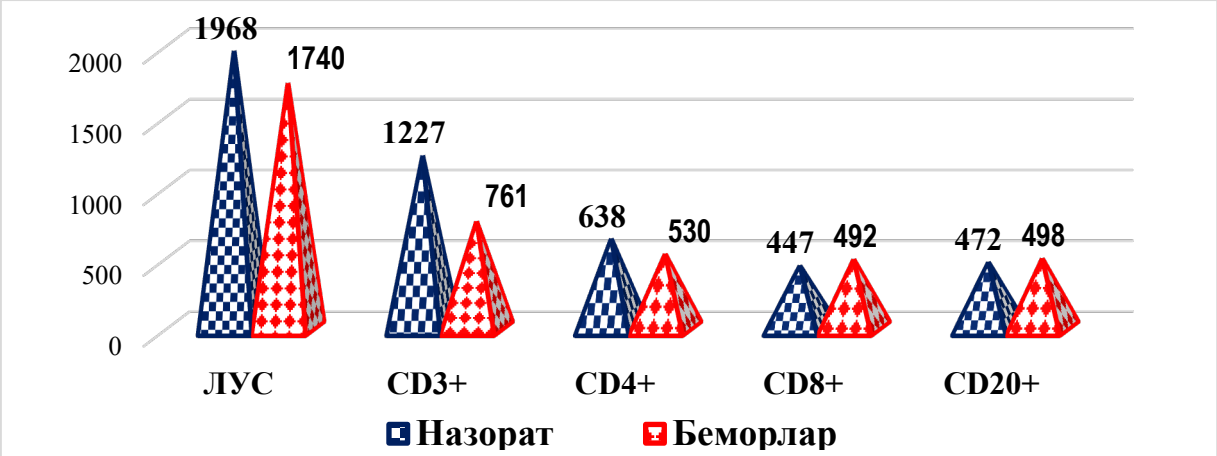


**Figure 3. Comparative indicators of absolute amounts of immune system cells in adult patients with chronic kidney disease , in absolute numbers**

received indicators were reliably high in patients . If we turn to the numbers , it turns out that the relative parameter of S D 25+-lymphocytes was reliably 1.80 times higher in patients compared to healthy people - 25.26±0.49%, respectively against 14.06±0.32% (R<0.001) . A similar trend was observed in the absolute amount of this lymphocyte - 440±9 µl, respectively vs. 277±6 µl (1.59-fold difference, R<0.001).

The increase of this cell in the peripheral blood of patients indicates that the activity of the immune system has increased, the number of proliferating h cells has increased, and the proliferation process has exceeded the norm. So, in order to ensure the functioning of the immune system, this system is strained, which means an increase in the number of proliferating (activated) lymphocytes.

A similar trend of changes was observed in S D 95+ lymphocytes. It is known that apoptosis is the programmed death of cells, which normally takes place at the same time, but as a result of different effects , it increases and accelerates the death of immunocompetent cells . This causes deficiency in the immune system ( secondary immunodeficiency). In this case, relative and absolute amounts of S D 95+ lymphocytes, as well as S D 25+-lymphocytes, showed a statistically significant increase in patients compared to healthy individuals - on average 21.60±0.59%, respectively. against 16.89±0.47% (1.28-fold difference, R<0.05) and 376±10 µl vs. 332±9 µl (1.13-fold difference, R<0.05). This situation testified that the immune system is working under strain, and it is also an attempt to restore the immune balance when immunocompetent cells compensate for their activity in the background of secondary immunodeficiency .

There was nothing special about it we found it permissible to dwell on the results of the detection of natural killers that capture the S D 16+ marker , which is one of the protective factors . These NK - cells (natural killers ) perform the task of identifying and destroying mutant or tumor cells that are generated in the body, regardless of the introduction of antigen into the body. As a result of the formation of SBK, the tendency to the formation of mutant cells increases under the influence of chronic inflammation. This can be proved by the increase in relative and absolute values of SD16+-lymphocytes detected in patients. These indicators were 27.21±0.48% and 473±8 µl in patients with SBK, respectively, and were reliably higher than the parameters of healthy subjects by an average of 2.36 and 2.08 times - 11.53±0.36%, respectively and 227±7 µl (P < 0.001). This situation indicated a sharp activation of SD16+-lymphocytes in the body (Fig. 4). This situation is a sign of activation of SD16+-lymphocytes in the body, which means an

increase of mutant cells being formed in the body. It has been proven that this condition is the result of negative changes in the body's immune system.

In addition to cellular (T- and V-cells of the immune system), non-specific protective factors (SD16+-lymphocytes), proliferative (SD25+-lymphocytes) and apoptosis cells (SD95+-lymphocytes), humoral immunity was studied in the body's immune system. In it, the concentration of immunoglobulins of the main class ( I g) in the blood serum of patients and healthy individuals was analyzed in a comparative manner. Clinically important immunoglobulins A, M, G ( I gA, I gM, I gG) were detected in it. Their concentrations in blood serum were determined by conventional methods using IFA.

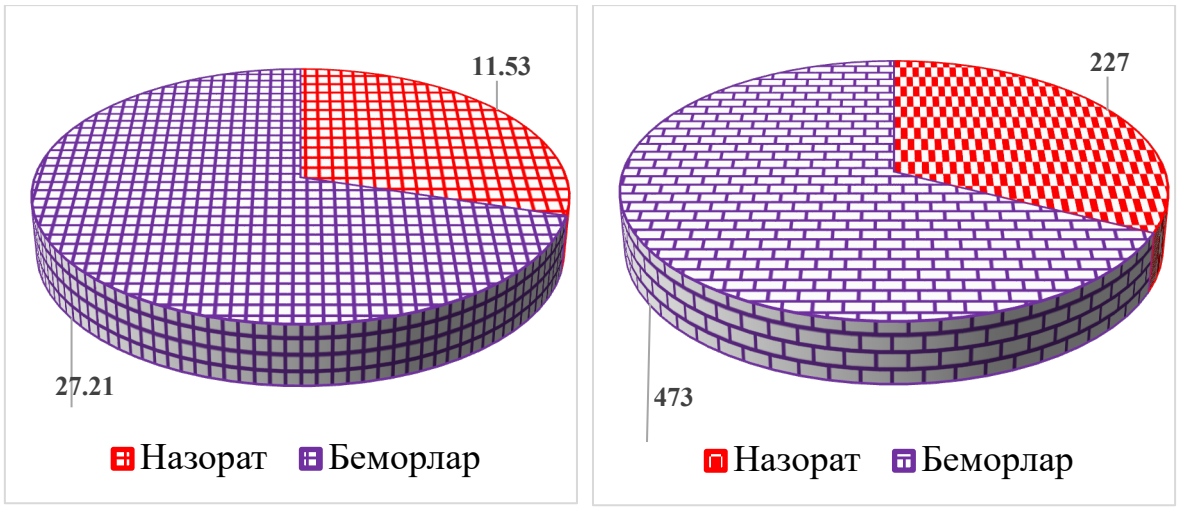


**Figure 4. Comparative indicators of relative** (A) **and absolute** (B) numbers **of SD16+ lymphocytes in the blood of patients with chronic kidney disease , in % and absolute numbers**

According to the results, the amount of immunoglobulins in healthy individuals was as follows: I gA - 1.26±0.15 g/l, I gM - 1.33±0.13 g/l, I gG - 13.53±0.89 g /l. In patients diagnosed with SBK, their concentrations in blood serum changed differently , and an imbalance in their amount was observed, which was considered a sign of the development of a pathological condition.

It is known that even if IgA is found in the blood serum, it passes through the tissues to the surfaces of the shill and q layers in the form of sIgA and provides local immunity. In this case , the amount of immunoglobulins in patients is 4.15 compared to healthy ones it was observed that it increased reliably up to -5.23± 0.3 8, respectively g/l against 1.26±0.15 g/l (R<0.001). This condition is specific for SBK, this immunoglobulin was not increased in other pathologies, which was explained by the specific aspects of the pathological condition in the kidney .

Correspondingly, but smaller changes were also observed for IgM (R<0.05). It is known that IgM is distinguished among the immunoglobulins in the blood serum by its molecular mass (900 daltons) , being the first to be synthesized when an antigen is encountered , not being able to pass through the placenta, and its structure being a pentamer. Also , this immunoglobulin is not synthesized in the secondary immune response, as it provides the primary immune response. In the studied pathology, it showed that its concentration remained reliably unchanged in patients compared to healthy ones - 1.60±0.20 g / l , respectively 1.33±0.15 against g/l (R>0.05).

Among the studied immunoglobulins, the most important is IgG, which accounts for 75% of all immunoglobulins in the blood serum. in the primary immune response, it begins to be synthesized 5-6 days after the antigen enters the body and reaches its maximum on the 28th day , while in the secondary immune response, it begins to be synthesized in large quantities from the first day. At the same time, unlike others, the molecular weight is small, so it can pass through the placenta. In other words , it is an immunoglobulin that performs the main function in inflammatory processes . The amount of this immunoglobulin in the studied SBK was

convincingly 1.93 times lower in patients than in the control group - 7.00±0.25, respectively 13.53±0.89 g / l against g/l (R<0.001).

This determined imbalance in the concentration of immunoglobulins in blood serum in SBK was explained by the specificity of the pathogenesis of the disease , the chronicity of the pathological process, and the fact that the tendency of the inflammatory process to decrease is not observed.

status of patients diagnosed with SBK , interpreting and analyzing the actual results, the following specific immunological features were identified:

*b* , all 20 indicators of immune status (except the relative amount of lymphocytes , IgM concentration) are at a reliable level (R<0.05 - R<0.001) was found to have changed, depending on the state of the immune system , their amount was lower or higher than the normal limits, the imbalance of immunocompetent cells was evaluated as a secondary immunodeficiency caused by a pathological condition in the body ;

*secondly , a deficit was observed in the relative and absolute* amounts of the T-joint of the immune system compared to the normal parameters, while the relative and absolute amounts of the V-joint were reliably increased . b such imbalance was explained by the "principle of mobiles" ;

*Moreover , it was found that the relative and absolute amounts* of proliferating active lymphocytes (SD 2 5+-lymphocytes) and apoptotic cells (SD95+-lymphocytes) in the patients were statistically significantly increased, which indicates that the immune system is stressed as a result of a chronic pathological process. explained by h ;

*fourthly* , the increase in the relative and absolute amounts of SD16+ lymphocytes in the blood of patients is a sign of the sudden activation of these h cells , the increase of mutant h cells produced in the body , which was interpreted as a consequence of negative changes in the immune system;

*Secondly* , there was an imbalance in the concentration of immunoglobulins in the patients' blood serum , while the IgM remained within the normal range, the amount of IgA increased dramatically, and the concentration of IgG reliably increased accordingly . decrease was noted, which was explained by the chronic course of the pathological condition and the negative impact of the formed secondary immunodeficiency on the development of the secondary immune response.

clearly visualize the changes in the immune system of the studied SBK patients , the ratio of all indicators to the indicators of healthy individuals was presented and formed as a table.

The level of changes in the immune system is clearly visible from the above table. These numbers given for each parameter of the immune system made it possible to adequately assess the immune system status of patients diagnosed with SBK.

**Table 4. with chronic kidney disease , the level of changes in the immune system compared to the norm, times**

| Indicators | The degree of changes compared to the norm, times |
|---|---|
| Leukocytes | 1.10 * ↓ |
| Lymphocytes | 1.03 ↔ |
| SD3 + lymphocytes | 1.43 * ↓ |
| SD4 + lymphocytes | 1.07 * ↓ |
| SD8 + lymphocytes | - 1.25 * ↑ |
| IRI | 1.32 * ↓ |
| SD20 + lymphocytes | - 1.19 * ↑ |
| SD25 + lymphocytes | - 1.80 * ↑ |
| SD95 + lymphocytes | - 1.28 * ↑ |
| SD16 + lymphocytes | - 2.36 * ↑ |

| | |
|---|---|
| IgA | - 4.15 * ↑ |
| IgM | 1.20 ↔ |
| IgG | 1.93 * ↓ |

Note: * - a sign of a convincing difference compared to the indicators of healthy individuals ; ↑, ↓ - directions of change; ↔ - no convincing difference exists; numbers with a negative sign are higher than those of healthy individuals.

Today, the immune system along with cellular and humoral links, describing its cytokine status is one of the main cases of evaluating the activity of this system. Assessment of cytokine status not only allows patients to assess the state of the immune system, but also to determine the trend and intensity of its changes. According to today's scientific sources, cytokines include: interferons, colony-stimulating factors, tumor necrosis factor, interleukins, growth factor group, chemokines. The tasks performed by these groups are different, and their study is determined depending on the pathological condition.

These endogenous mediators were determined because pro-inflammatory and anti-inflammatory interleukins are important in inflammatory processes. Pathogenically important anti-inflammatory interleukin-4 ( IL -4) and pro-inflammatory IL -6 were determined and the obtained results were evaluated. The concentrations of these cytokines were determined in the blood serum of patients using conventional enzyme immunoassay (IFA).

The obtained results showed that the serum concentration of IL -4 was 5.85±0.99 pg/ml, and the corresponding amount of IL -6 was 155.95±0.66 pg/ml in healthy individuals without SBK diagnosis.

If we logically derive from the activity of cytokines, it is natural that the amount of anti-inflammatory cytokines (for example, IL -4) is low in the absence of inflammation, and the amount of pro-inflammatory cytokines is higher than anti-inflammatory ones. If we take into account that anti-inflammatory cytokines suppress the transcription of their genes in pro-inflammatory cytokine-producing cells, induce the synthesis of interleukin receptor antagonists, increase the formation of soluble receptors, reduce the density of pro-inflammatory receptors on the surface of cells through down -regulation, then the compatible antagonistic activity of these cytokines is shown. will be In pathologies where various inflammatory processes are observed, the violation of this ratio ensures the strength and duration of this process [7].

IL -4 in the blood serum of patients with SBK was reliably increased by 11.84 times - 69.27±5.50 pg/ml versus 5.85±0.99 pg/ml, respectively (R<0.001). It should be noted that such a sharp increase of IL -4 as an anti-inflammatory cytokine indicates the development of the inflammatory process in patients with SBK and its persistence. If we take into account that IL -4 induces the differentiation of normal T-helpers ( Th 0-cells) into Th2- cells in the immune system, the mechanism of their action in this studied pathology becomes clear.

pro-inflammatory cytokine IL -6 increases during inflammatory processes, its clinical and immunological significance is known. However, it was found that the amount of this cytokine in the blood serum of patients with SBK was 106.67±11.58 pg/ml and was 1.46 times less than the parameters of healthy people (R<0.001). This situation was explained by the fact that the inflammatory process was observed for a long time in these patients, and the concentration of anti-inflammatory cytokines was high (Fig. 5).

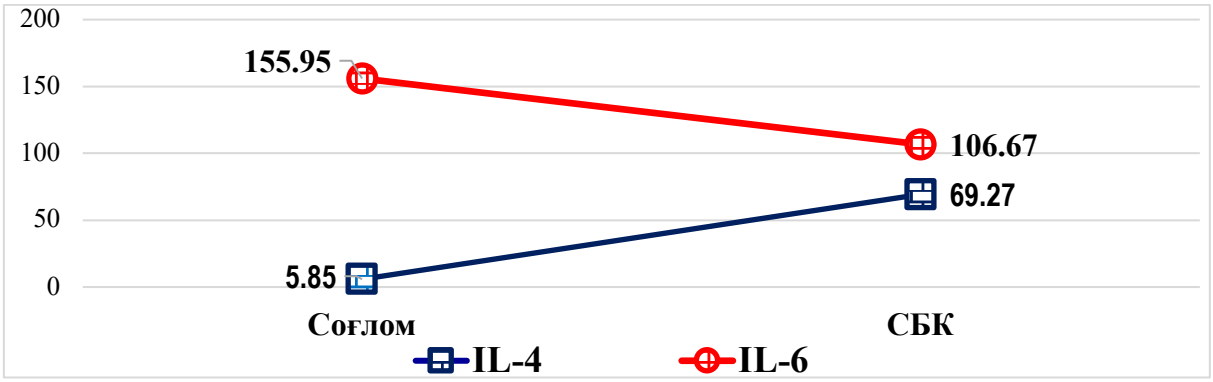


**Figure 5. Comparative parameters of IL -4 and IL -6 concentrations in blood serum of patients with SBK , pg/ml**

The differences of studied cytokines between patients and healthy people are clearly visible from the given figure 5. This situation indicates that there was no reduction in the inflammatory process in the patient's body.

In this case, it was shown that the inflammatory process developed in these patients, as a result of which the strength and intensity of the immune response was low. Due to the fact that cytokine changes can provide information about the pathogenesis of the disease and its outcome, the dynamic determination of IL -4 and IL -6 concentrations in blood serum was recommended as diagnostic and prognostic immunological criteria for patients diagnosed with SBK.

**Conclusion.**

1. It was found that there were significant changes in the immune system of adult patients with SBK , SD3+- and SD4+-lymphocytes were reliably reduced to 1.43 and 1.07 m, respectively, relative to the control parameters, SD8+-lymphocytes were reduced to 1.25 times a statistically significant increase was expressed by a convincing decrease of IRI by 1.32 times , which was expressed in the form of T-immunodeficiency . SD20+-lymphocytes were statistically significantly higher by 1.19 times in patients with SBK than in controls .

2. The amount of S D 25+ , S D 95+-lymphocytes in the blood of patients diagnosed with SBK was reliably higher compared to the indicators of healthy individuals , and the average of S D 25 +-lymphocytes was 1.80 and 1 , respectively. ,59 times , S D 95+-lymphocytes increased by an average of 1.28 and 1.13 times, respectively , which indicated a strained functioning of the immune system, which , in the background of secondary immunodeficiency, reduced their activity It was evaluated as an effort to restore the immune system in case of compensation .

3. It was found that the amount of SD16+-lymphocytes in the peripheral blood of patients with SBK increased reliably compared to the parameters of healthy individuals - this difference was 2.36 times in relative terms, and 2.08 times in terms of absolute numbers. This situation is a sign of sudden activation of SD16+-lymphocytes in the body, which is a sign of an increase in the mutant cells formed in the body, and it has been proven that the increase of natural killers is a consequence of negative changes in the body's immune system.

4. In patients diagnosed with SBK, there was an imbalance in the concentration of immunoglobulins in the blood serum, if the IgA parameter increased by 4.15 times compared to healthy individuals, the opposite was observed in the concentration of IgG - it was 1.93 times lower than the values of healthy people , the concentration of IgM did not differ reliably . Such an imbalance is explained by the specificity of the pathological condition ;

IL -4 in blood serum of patients with SBK increased by 11.84 times compared to the parameters of healthy individuals, while IL -6 significantly decreased by 1.46 times compared to the parameters of healthy individuals. Such a situation indicated that the inflammatory process had developed in these patients and that it was ongoing, as a result of which it was shown that the strength and intensity of the immune response was low. Due to the fact that such changes of IL -

4 and IL -6 can provide full information about the pathogenesis of the disease and its outcome, dynamic determination of their concentrations in blood serum was recommended as diagnostic and prognostic criteria for patients diagnosed with SBK.

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