STATUS OF PARAMETERS OF SOME CYTOKINES IN SICK CHILDREN WITH PSORIASIS

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Abstract. *Psoriasis is a chronic immune-associated disease of a multifactorial nature with a dominant role in the development of genetic factors, characterized by hyperproliferation of keratinocytes, impaired differentiation, immune reactions in the dermis and synovial membranes, an imbalance between pro-inflammatory and anti-inflammatory cytokines, chemokines; frequent pathological changes in the musculoskeletal system.*
Keywords: *musculoskeletal system, anti-inflammatory cytokines, chemokines.*

INTRODUCTION

Psoriasis is a chronic immune-associated disease of a multifactorial nature with a dominant role in the development of genetic factors, characterized by hyperproliferation of keratinocytes, impaired differentiation, immune reactions in the dermis and synovial membranes, an imbalance between pro-inflammatory and anti-inflammatory cytokines, chemokines; frequent pathological changes in the musculoskeletal system (Bakulev A.L. et al., 2018).

Numerous studies available which indicating the pathogenetic significance of immune disorders in patients with psoriasis (Khairutdinov V.R., 2012; Evdokimov E.Yu. et al., 2021; Zhang M. et al., 2018; Dickel H. et al., 2019).

Despite the studies studying the molecular mechanisms psoriasis development, the accumulated knowledge about the role of various cell populations in this process and the effects of mediators produced by them, nowadays there is no holistic understanding of the immune pathogenesis of psoriasis (Khairutdinov V.R. et al., 2016).

TNF-α - is a key cytokine in the response of innate immunity; its concentration increases with the development of psoriasis. The protein has many effects - from inflammation to apoptosis, in addition, it stimulates the synthesis of pro-inflammatory molecules (interleukin (IL) -1, -6, -8, nuclear factor kappa bi (NF-κB)), adhesion molecules (cell adhesion molecules: ICAM-1, P-selectin, E-selectin) (Sobolev V.V. et al., 2022; Fantuzzi F. Et al., 2008).

Certain difficulties in studying the immunopathogenesis of psoriasis are due to the fact that the key cytokines produced during inflammation have numerous effects and regulate a wide variety of processes. Most of these mediators do not have a strict affiliation to one cell type and a clear nosological specificity; many of these peptides are involved in the development of various inflammatory diseases, and different cell populations can secrete them. Different combinations of these cytokines, determined genetically, determine the polymorphism of clinical manifestations of psoriasis (Lowes M.A. et al., 2014; Kim J., Krueger J.G., 2015).

Despite numerous studies of the etiopathogenesis of psoriasis, studies of the state of immunity in children with psoriasis in the aspect of assessing the cytokine status have not been conducted so far.

In this regard, we set a goal to study the state of indicators of some cytokines and the features of the cytokine status in children with psoriasis.

MATERIALS AND METHODS

Under our observation were 72 sick children with various clinical forms of psoriasis aged from 3 to 18 years.

Of these, 11 sick children were diagnosed with a limited form and 61 with a common form of psoriasis. The control group consisted of data from 15 practically healthy children.

The assessment of the state of the cytokine status was carried out by determining interleukins in the blood serum by enzyme immunoassay (ELISA) (Aripova T.U. et al., 2005). To determine interleukins, we used ELISA test systems manufactured by CJSC Vector-best (Novosibirsk, Russia).

The data obtained during the study were subjected to statistical processing on a Pentium-IV personal computer using the Microsoft Office Excel-2010 software package, including the use of built-in statistical processing functions. The methods of variational parametric and nonparametric statistics were used with the calculation of the arithmetic mean of the studied indicator (M), standard deviation (σ), standard error of the average numbers (m), relative values (frequency, %), the statistical significance of the measurements obtained when comparing the average values was determined by the criterion Student (t) with the calculation of the probability of error (p) when checking the normality of the distribution (according to the kurtosis criterion) and the equality of general variances (F - Fisher's criterion).

RESULTS AND DISCUSSION

To evaluate the state of cytokine numbers in children with psoriasis, we studied the numbers of the pro-inflammatory cytokine TNF-α and the anti-inflammatory cytokine IL-4. Since in this pathology especially these cytokines that undergo more changes than other cytokines, and the quantitative determination of their level has great importance in assessing the state of the body's immune system.

Table 1

Indicators of some cytokines in children with psoriasis (M±m)

Cytokine indicators	Control Group n=15	Sick children with psoriasis n=72
IL-4 (pg/ml)	1,74 ± 0,15	1,50 ± 0,07*
TNF-α (pg/ml)	14,96 ± 0,47	35,28 ± 1,37**

Note: p - Reliability of data in relation to control.

* - p<0,05; ** - p<0,001

Study results revealed (table 1) that in the blood serum of patients of the general group of children with psoriasis before the start of treatment a significant increase in the content of TNF-α compared with the control group (p<0.001).

On the contrary, in sick children of this group, a significant decrease in the concentration of the anti-inflammatory cytokine IL-4 was noted in relation to the control group (p<0.05). In further studies, we studied the parameters of cytokines in children with psoriasis, depending on the clinical form of the disease.

Table 2

Some indicators of cytokines in sick children with a limited form of psoriasis (M±m)

Cytokine indicators	Control group n=15	Sick children with limited form of psoriasis n=11
IL-4 (pg/ml)	1,74 ± 0,15	1,70 ± 0,18
TNF-α (pg/ml)	14,96 ± 0,47	24,29 ± 1,10*

Note: p - Reliability of data in relation to control.

* - p<0,05

The data obtained showed (Table 2) that in the blood serum of sick children with a limited form of psoriasis before the start of treatment, a significant increase in the concentration of the cytokine TNF-α (p<0.05) was detected compared to the control group. Along with this, in patients of this group, there was a tendency to reduce the level of the cytokine IL-4 compared with the data of the control group (p>0,05).

The results of the study indicate that in sick children with a limited form of psoriasis in the blood serum, there is a violation of cytokine parameters, expressed by an increase in the level of TNF-α and a tendency to a decrease in the concentration of IL-4.

Table 3

Some indicators of cytokines in sick children with a common form of psoriasis (M±m)

Cytokine indicators	Control group n=15	Sick children with a common form of psoriasis n=61
IL-4 (pg/ml)	1,74 ± 0,15	1,46 ± 0,07*
TNF-α (pg/ml)	14,96 ± 0,47	37,26 ± 1,47*

Note: p - Reliability of data in relation to control.

* - p<0,001

In subsequent studies, we studied the state of cytokine indicators in sick children with a common form of psoriasis.

When studying the parameters of cytokines in sick children with a common form of psoriasis, it was revealed (Table 3) that in patients of this group in the blood serum, the concentration of the cytokine TNF-α (p<0.001) significantly increased, and the content of the cytokine IL-4 decreased (p<0.001) in relation to the data of the control group.

It should be noted that the revealed changes in cytokine levels in sick children of this group were more pronounced than in sick children with a limited form of psoriasis.

Thus, the studies have shown that in psoriasis in children, changes in the content of cytokines are detected, which is expressed by a deficiency in the blood serum of the concentration of the anti-inflammatory cytokine IL-4 and an increase in the content of the pro-inflammatory cytokine TNF-α, which are directly dependent on the clinical form of the disease. That is, in mild forms (limited form) of the disease, the content of the studied cytokines changes less, and in severe forms (common form) of psoriasis, more.

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