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STATE OF CELLULAR IMMUNE IN CHILDREN WITH INFECTIOUS MONONUCLEOSIS

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ABSTRACT

The main feature of infectious mononucleosis in children is the defeat of the immune system, primarily the T-cell link. Undoubtedly, a low number of CD4+-lymphocytes is associated with reduced resistance to secondary infections. This requires an inadequate immunological response and leads to a chronic infection.

Key words: *infectious mononucleosis, immune systems, T-cell link.*

АННОТАЦИЯ

Основной особенностью инфекционного мононуклеоза у детей является поражение иммунной системы, прежде всего Т-клеточного звена. Несомненно, низкое количество CD4+-лимфоцитов связано со сниженной резистентностью к вторичным инфекциям. Это требует неадекватного иммунологического ответа и приводит к хронической инфекции.

Ключевые слова: *инфекционный мононуклеоз, иммунные системы, Т-клеточное звено.*

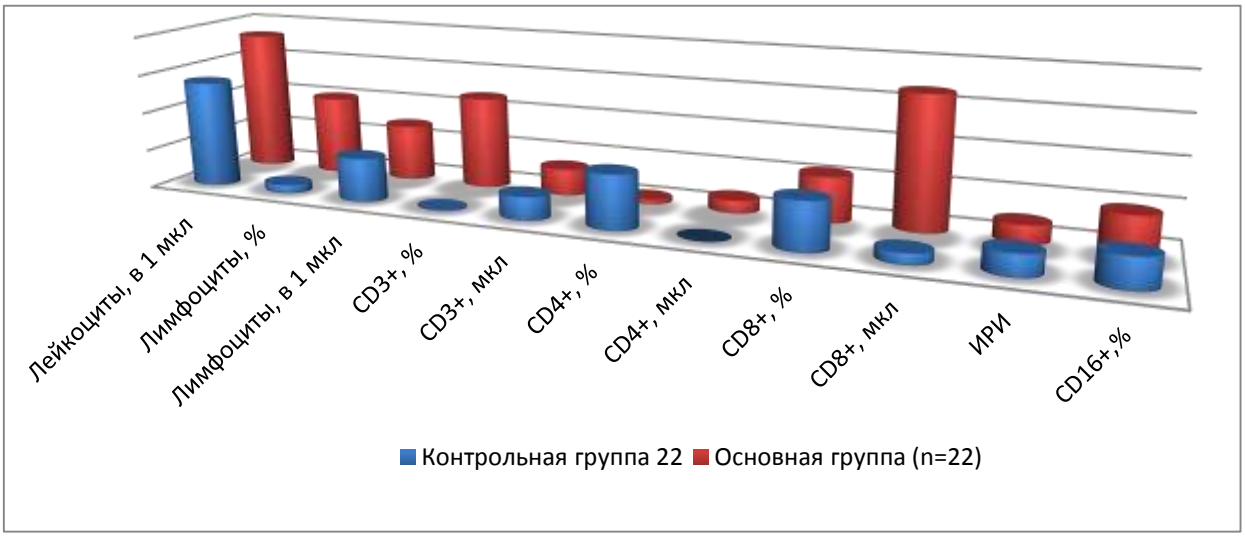
INTRODUCTION

Infectious mononucleosis is an acute anthroponotic viral infectious disease characterized by fever, generalized lymphadenopathy, tonsillitis, damage to the liver and spleen with changes in the immune status [1,3]. Infectious mononucleosis is recorded mainly in children and young people, more often in males. The disease occurs worldwide in the form of sporadic cases. Epidemics are very rare. The maximum incidence occurs in the cold season [4,6]. A special place among herpesviruses is occupied by an infection caused by the Epstein-Barr virus (EBV) infection, which is one of the most relevant and common diseases in modern pediatrics and pediatric infectology, as well as among the adult population [5,9]. One of the most common forms of EBV infection is infectious mononucleosis (IM) [8,11,2]. Immune disorders in infectious mononucleosis are complex in nature, they concern both the cellular and humoral levels, entail a aggravation of the course, an increase in the complications of the disease, which reflects the essence of infectious mononucleosis as a disease of the immune system [10,12]. An analysis of the state of

the immune status in relation to changes in the cytokine spectrum in children with infectious mononucleosis has not yet been carried out in the literature available to us, which served as the basis for setting the goal of the study.[13,14]

The aim of the study: the state of cellular immunity in children with infectious mononucleosis.

Materials and research methods. We have studied the immune system in 22 children with infectious mononucleosis, which made up the main group. At the same time, 22 children in the control group underwent an immunological examination during the period of exacerbation of the disease and in remission. The indicators of cellular immunity in all children with infectious mononucleosis were compared with those of the control group of sick children. The average age of the examined children was 7.5±0.45. All examined children received generally accepted medical measures.



Rice. The mean number of T-cell rings in children with infectious mononucleosis.

The results of the study of the average parameters of T-cell rings infected with infectious mononucleosis are presented in the diagram.

In the peripheral blood, the structural percentage of lymphocytes decreased without a shift, which, in turn, did not differ from the normative indicators. Thus, in children infected with infectious mononucleosis, there was an increase in the number of leukocytes due to inflammation in the peripheral blood, the absolute number of lymphocytes increased statistically compared to the control group (P<0.001).

The results of the analysis of the T-cell link of immunity showed that the number of CD3+-lymphocytes in children of the main group was lower than in the control group. In the control group, the number of DM3+ was 55.83±0.97%, and in the main group this indicator averaged 49.8±2.3% during the exacerbation period and 48.3±4.6% during the remission period (R< 0.05).

Analysis of subpopulation parameters of T-cells of the immune system, the inclusion of regulatory CD4+ and CD8+ lymphocytes showed a 1.6-fold decrease in T-helpers/inducers (CD4+) in the peripheral blood of children infected with infectious mononucleosis. The reason for the increase in the total number of leukocytes, the amount of T-lymphocytes went in parallel with the increase in absolute indicators. It is likely that inducer/helper T-lymphocytes exhibited an immune control function with a parallel decrease. Thus, the relative number of T-helpers/inducers in the children of the main group in the study was significantly lower than in the children of the control group ($R<0.05$).

When analyzing the subpopulation composition of the immune T-cell link, it was found that the number of T-helpers/inducers (DM4+) in the main group of children decreased by 1.6 times. Judging by the high values of leukocytes, the absolute number of T-lymphocytes tended to increase. The CD4+/CD8+ ratio (immunoregulatory index - IRI) showed an incredible decrease ($R>0.05$) compared with the control group and the comparison group. In children of the main group, the range of individual IRI values ranged from 0.45 to 0.97, but in most patients IRI was below 0.80.

The change in IRI in this case was observed as a result of a decrease in CD4+-lymphocytes and an insignificant increase in CD8+-lymphocytes. For our part, it was found that the number of CD8+-lymphocytes did not significantly differ from those in the control group. It can be seen that the presence of an immunodeficiency state in children depends on the presence of an infectious process and the deficiency of an inadequate immune response to the pathogen.

The deficiency of the T-lymphocyte population in children of the main group in this case is mainly due to a decrease in the CD4+ helper/inducer, which is a necessary link in the regulation of adequate inflammatory processes and the regulation of the formation of killer cells that directly destroy infectious agents. Analysis of the data obtained revealed the presence of reliable results between the indicators of children in the control and main groups.

Thus, the state of T-cell immunotoxicity, expressed in children of the main group, was expressed by immunoregulatory immunodeficiency of T-lymphocyte subpopulations, a pronounced CD4+ T-immunodeficiency of cells and CD8+T-cytotoxic lymphocytes with an increase in the number in the peripheral blood.

A comparative analysis of the expression of CD16+ lymphocytes revealed the uncertainty of a significant increase in the comparative analysis of the indicators of children in the control group and the main group ($P>0.05$). Thus, the number of DM16+ in children of the main group during the period of exacerbation of infectious

mononucleosis was 17.2±0.84% versus 18.4±0.38% and 18.09±1.03%, which is 1.3 times higher than in the control group. The results of the analysis of B-lymphocytes showed a trend towards a decrease in CD20+-lymphocytes and their markers in children of the main group, but no significant difference was found. The fact is that this is due to the fact that DM20+ is a marker of B-lymphocytes, during the inflammatory process, especially in children, there is a violation of the production of lymphocytes, therefore, immunocompetent cells lose their property of maturation and function.

Analysis of the relative number of DM25+ in children of the main group showed a significant difference compared to the control group. Interestingly, this decrease in the expression of CD25+-lymphocytes is associated with the effect of interleukin-2 deficiency on the immaturity of immunocompetent blood cells, which in turn indicates the presence of an immunodeficiency state in children with infectious mononucleosis.

Analysis of the number of CD38+ in children of the main group showed a significant difference compared to the values in the control group, and such a decrease in the expression of CD38+ lymphocytes is associated with the effect of interleukin-2 on the immaturity of immunocompetent blood cells, which in turn leads to immunodeficiency in children with infectious mononucleosis.

Analysis of markers of late activation of CD95+ in children of the main group showed that children with infectious mononucleosis showed a significant difference between the analysis of children in the control group, since the relative and absolute number of CD95+ lymphocytes significantly increased compared to the control group.

CONCLUSION

Thus, the cellular immune response was characterized by a highly developed state of T-cell immunodeficiency in children of the main group, characterized by a decrease in the relative number of CD3+ lymphocytes, an increase in CD4+ T-helpers/inducers due to SD8+ T-cytotoxic lymphocytes, and a decrease in the immunoregulatory index. Changes in markers activation of lymphocytes revealed a relative decrease in CD25+ and a relative increase in CD95+. Qualitative and quantitative changes in the expression of CD25+ and CD95+ lymphocytes indicate a clear inflammatory process in children with infectious mononucleosis.

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