

Analysis of the Results of Immunological Examination in Infectious Mononucleosis in Children

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ABSTRACT

A comparative study of cytokines in clinically similar groups of patients requiring a differential diagnostic search revealed significant differences at the level of indicators. Since the virus is not eliminated from the body and has a tropism for lymphoid and reticular tissue, it is modeled by a kind of immunopathological process that affects all parts of the immune system. Infectious mononucleosis (MI) is an acute anthropoz viral infectious disease characterized by fever, generalized lymphadenopathy, tonsillitis, liver and spleen damage with changes in the immune status. In connection with the introduction of the virus into lymphoid cells, structural changes are formed that affect all parts of the immune system.

KEYWORDS: *infectious mononucleosis, T-lymphocytes, cytotoxic cells.*

Relevance. Infectious mononucleosis (MI) is an acute anthropologic viral infectious disease characterized by fever, generalized lymphadenopathy, tonsillitis, liver and spleen damage with changes in immune status. [1]. Due to the introduction of the virus into lymphoid cells, structural changes are formed affecting all parts of the immune system [2]. Infectious mononucleosis (MI) is an acute anthropologic viral infectious disease characterized by fever, generalized lymphadenopathy, tonsillitis, liver and spleen damage with changes in immune status [1,3]. Infectious mononucleosis is registered mainly in children and young people, more often male. The disease occurs everywhere in the form of sporadic cases. Epidemic outbreaks are very rare. The maximum incidence occurs during the cold season [4]. A special place among herpes viruses is occupied by an infection caused by the Epstein-Barr virus (EBV) - Epstein-Barr viral infection (EBV infection), refers to the most relevant and common diseases in modern pediatrics and pediatric infect ology, as well as among the adult population [5]. One of the most common forms of EBV infection is infectious mononucleosis (MI) [6]. Immune disorders in infectious mononucleosis are complex in nature, they concern both cellular and humoral links, entail a heavier course, more frequent complications of the disease, which reflects the essence of infectious mononucleosis as a disease of the immune system [7,6]. The analysis of the state of the immune status in relation to changes in the cytokine spectrum in children with infectious mononucleosis has not been carried out in the literature available to us so far, which served as the basis for setting the goal of the study.[6]

The aim of the study was to study the immunological features of infectious mononucleosis of Epstein-Barr-viral etiology in children.

Materials and methods of research. Comprehensive clinical studies were conducted in 50 children with infectious mononucleosis who were hospitalized in the Regional Infectious Diseases Hospital. Convalescents of acute EBV infection were observed in the offices of infectious diseases, in polyclinics of the city at the place of residence of children for up to 6 months. The diagnosis of infectious mononucleosis was made on the basis of characteristic clinical manifestations, typical

changes in the peripheral blood of patients and positive results of polymerase chain reaction (PCR). In addition to signs of inflammation, general anxiety, poor sleep, and refusal of food were noted. In addition to the traditional examination (general analysis of blood, urine, bacteriological and biochemical studies) all patients were subjected to ENT examination. The immunological examination included the study of the main indicators of cellular and humoral immunity. The leukocyte phenotype was evaluated by the presence of differentiated antigens on the cell surface by immunofluorescence using monoclonal antibodies (CD3+, CD4+, CD8+, CD16+, CD95+, CD20+, CD4+/CD8+ immunoregulatory index were determined).

Research results and their discussion The data obtained by us indicate that in modern conditions infectious mononucleosis develops mainly in preschool children (47.1%), more often in boys (62.9%) with a predominance of moderate forms of the infectious process (78.6%), which is consistent with the observations of S. A. Tsar ova (1987). An analysis of the anamnesis data of patients with infectious mononucleosis showed that 82.5% of them had a burdened premorbid background, the structure of which was dominated by changes from the central nervous system in the form of hypertension-hydrocephalus syndrome and perinatal lesions in 12 children (17.14%). According to our data, 10 children (14.29%) had a history of atopy. Four children had infectious mononucleosis against the background of hypochromic anemia; three had chronic somatic pathology from the gastrointestinal tract and kidneys. Among the hospitalized patients with infectious mononucleosis, 25.71% were from the group of frequently ill. In patients, foci of acute and chronic infection were detected in a significant percentage of cases. According to our data, among those with infectious mononucleosis, concomitant infection was observed in 30% in the form of acute bronchitis, catarrhal and purulent otitis, sinusitis, rhino pharyngitis. Chronic tonsillitis was detected in 17.1%, acute respiratory viral infections - in 7.1% of children.

The conducted clinical study showed that for modern infectious mononucleosis, the acute course of the disease is characterized by a predominance of moderate forms with a predominant lesion of lymphoid and reticular tissue. Regardless of the severity and age of the patients, the following symptoms were observed: febrile fever - in 75.7% of children, enlarged lymph nodes - in 94.3%, difficulty in nasal breathing - in 65.7%, snoring in sleep - in 31.4%, swelling of the palatine tonsils - in 52.9%, sore throat - in 62% hyperemia of the soft and hard palate was observed in 80% of children, hepatomegaly - in 91.4%, splenomegaly - in 55.7% of patients. In laboratory blood analysis in acute EBV infection, moderate leukocytosis was observed in 24.3%, lymphocytosis in 82%, monocytosis in 78%, and an increase in ESR in 91% of children. When examining peripheral blood smears of patients, atypical mononuclears were detected in 93.5% of cases. During the convalescence period, the majority of patients retained signs of asthenovegetative syndrome - in 12.3% of children, lymphoid tissue lesions in the form of an increase in submandibular lymph nodes - in 43.1%, posterior - in 26.2%, liver enlargement - in 10.8% and spleen - in 6.2% of children. In a laboratory study of peripheral blood of children, a period of convalescence was observed; moderate leukopenia in 6.2%, lymphocytosis in 2 convalescents, the presence of atypical mononuclears was not detected in any case. The analysis of cellular and humoral immunity indicators in patients with infectious mononucleosis, depending on age and gender, did not reveal their significant differences.

The immunological status of patients with infectious mononucleosis in the acute period of the disease had its own characteristics. The general pattern was an increase in the number of T-, B-lymphocytes in this disease, and an increase in the number of cytotoxic cells in subpopulations of T-lymphocytes, which makes it possible to regard infectious mononucleosis as a lymph proliferative process. With an increase in suppressor activity, inhibition of the maturation process of immune competent cells was noted, which led to the development of immunodeficiency. An increase in the level of T-lymphocytes with suppressive activity in the acute period of the disease is one of the main regulatory mechanisms for inhibiting the early stages of B-lymphocyte expression, both directly

affecting them and indirectly suppressing the activation of T-helpers. According to the results of our studies, there is an indirect inhibition of B-lymphocytes due to a decrease in the level of SE4+ (helper) lymphocytes. In turn, a decrease in the T helper index leads to blocking the induction of apoptosis. A specialized receptor for signals to induce apoptosis is CD95+(Fas-ag), the level of which tended to decrease compared to healthy children. Consequently, in infectious mononucleosis, the apoptosis of "spent" effector cells was slowed down and there was no obstacle to their participation in the immune response. Ultimately, in our opinion, with EBV infection, there is a possibility of auto reactive, as well as malignant cell clones. The mechanism directed against the persistence of clones of cells infected with the virus is the activation of natural killers. In our studies, the indicator of the level of CD16+ (natural killers) did not differ significantly from the similar indicator in the group of healthy children. Thus, we assume that low activation of CD16+ cells in patients with infectious mononucleosis contributes to the persistence of virus-infected cells in the patient's body for a long time. The data obtained by us indicate that in modern conditions infectious mononucleosis develops mainly in preschool children (47.1%), more often in boys (62.9%) with a predominance of moderate forms of the infectious process (78.6%), which is consistent with observations. An analysis of the anamnestic data of patients with infectious mononucleosis showed that 82.5% of them had a burdened premorbid background, in the structure of which changes from the central nervous system in the form of hypertension-hydrocephalus syndrome and perinatal lesions prevailed in 12 children (17.14%). According to our data, 10 children (14.29%) had a history of atopy. Four children had infectious mononucleosis against the background of hypochromic anemia; three had chronic somatic pathology from the gastrointestinal tract and kidneys. Among the hospitalized patients with infectious mononucleosis, 25.71% were from the group of frequently ill. In patients, foci of acute and chronic infection were detected in a significant percentage of cases. According to our data, among those with infectious mononucleosis, concomitant infection was observed in 30% in the form of acute bronchitis, catarrhal and purulent otitis, sinusitis, rhino pharyngitis. Chronic tonsillitis was detected in 17.1%, acute respiratory viral infections - in 7.1% of children.

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mechanisms for inhibiting the early stages of B-lymphocyte expression, both directly affecting them and indirectly suppressing the activation of T-helpers. According to the results of our studies, there is an indirect inhibition of B-lymphocytes due to a decrease in the level of SE4+ (helper) lymphocytes. In turn, a decrease in the T helper index leads to blocking the induction of apoptosis. A specialized receptor for signals to induce apoptosis is CD95+(Fas-ag), the level of which tended to decrease compared to healthy children. Consequently, in infectious mononucleosis, the apoptosis of "spent" effector cells was slowed down and there was no obstacle to their participation in the immune response. Ultimately, in our opinion, with EBV infection, there is a possibility of autoreactive, as well as malignant cell clones. The mechanism directed against the persistence of clones of cells infected with the virus is the activation of natural killers. In our studies, the indicator of the level of CD16+ (natural killers) did not differ significantly from the similar indicator in the group of healthy children. Thus, we assume that low activation of CD16+ cells in patients with infectious mononucleosis contributes to the persistence of virus-infected cells in the patient's body for a long time.

Our studies-observation of the state of the immune system in children 3 months after the acute period of infectious mononucleosis against the background of treatment with viferon justified the need for the use of this drug in acute EBV infection and confirmed the effectiveness of the appointment of viferon in infectious mononucleosis in pediatric practice

Conclusions. In patients with infectious mononucleosis, the Epstein-Barr virus causes a peculiar immunopathological process with immunocyte dysfunction, which makes EBV similar to the human immunodeficiency virus. In EBV infection, an imbalance of effector and suppressor cells develops, which is based on changes in the differentiation of CD8+ cells in the direction of effectors (cytotoxic cells) and cells with suppressor activity. Another form of imbalance of subpopulations of cells is a violation of the ratio of the activities of Th1 and Th2 helper types. Its reflection is the predominance among the humoral products of T-helper sets of cytokines, which contribute to the predominant development of the cellular form of the immune response.

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