Characterization Of Cytokines in HIV-Infected People Children With Acute Rhinosinusitis

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ABSTRACT

Currently, cytokines have been identified as a new independent system of regulation of the main functions of the body, associated, first of all, with maintaining homeostasis during the introduction of pathogens and disruption of tissue integrity. It is known that cytokines are a group of polypeptide mediators involved in the formation and regulation of the body's defense reactions

Keywords: HIV-infected, , cytokines

Despite the improvement in the methods of diagnosis, treatment and prevention of acute rhinosinusitis (ARS), the incidence in childhood ranges from 60 to 75%, and the mortality rate is 0.01-0.2% of cases. This is due to general intoxication, a decrease in the specific and non-specific defenses of the body, which lead to the development of secondary complications from the internal organs.One of the serious complications of ARS in HIV-infected infants is brain damage. This sharply increases the risk of developing meningoencephalopathic complications leading to an unfavorable outcome of the underlying disease [1,3,5].

ARS is a common condition in children with normal immune systems. From 5 to 10% of all acute respiratory viral infections (ARVI) in children are complicated by bacterial sinusitis. According to a number of authors, ARS is more common in HIV-infected children than in children with a normal immune system [2,4,6].

Currently, cytokines have been identified as a new independent system of regulation of the main functions of the body, associated, first of all, with maintaining homeostasis during the introduction of pathogens and disruption of tissue integrity. It is known that cytokines are a group of polypeptide mediators involved in the formation and regulation of the body's defense reactions [7,8,9].

The study of cytokine levels allows obtaining information about the functional activity of various types of immunocompetent cells; the severity of the inflammatory process, its transition to the systemic level; about the ratio of activation processes of T-helper types 1 and 2. The assessment of cytokine levels, in particular, using enzyme immunoassay diagnostic test systems, makes it possible to take a new approach to studying the state of the body's immune system in clinical practice. It is known that the system of pro- and anti-inflammatory cytokines controls the processes of inflammation, the presence of complications, and also affects the outcomes of the disease [10,11,12,13,14].

The aim of the study was to study cytokines in HIV-infected children with ARS.

Material and methods

25 children under 3 years of age with ARS were under observation. Boys made up 56.6%, girls - 43.4%. Unilateral lesion of the sinuses was observed in 57.8%, bilateral - in 42.2%. In addition to signs of inflammation, general anxiety, poor sleep, refusal to breastfeed, and headaches were noted. In addition to the traditional examination (general blood count, urinalysis, bacteriological and biochemical

studies), all patients underwent an ENT examination, according to indications, sinus probing (26.5%), radiography of the paranasal sinuses (9.6%) .

In the main group there were 13 HIV-infected patients with ARS, and in the control group there were 12 children with ARS who were not infected with HIV infection. Children received antiretroviral therapy, antibacterial, anti-inflammatory and local therapy in a hospital setting. The level of cytokines (IFN-γ, IL-10) in peripheral blood serum was studied by enzyme immunoassay using a test system from Vector-Best (Russia).

Results And Its Discussion

The results of studying the level of pro-inflammatory cytokines in the peripheral blood serum of HIV-infected children with ARS are presented in the table 1.

Table 1.
The content of pro- and anti-inflammatory cytokines in HIV-infected children in combination with ARS in the dynamics of treatment.

Indicator	**Control group**	**Main group**
ИФН-γ, пг/мл	23,70 ± 5,38	82,80 ± 25,07
		21,93 ± 5,28
ИЛ-10, пг/мл	10,95 ± 3,65	86,08 ± 25,72
		52,04 ± 15,06

*Note: in the numerator data before treatment, in the denominator - after treatment; * - P<0.05 compared with the control group*

Analysis of the obtained results revealed the presence of significant differences between the values of the main group with the control group. So, for example, if in healthy children the level of IFN-γ was 23.70 ± 5.38 pg / ml, then in HIV-infected children with ARS the same parameter was 3.5 times higher and was at the level of 82.80 ± 25.07 g/ml (table). Thus, a high level of IFN-γ in HIV-infected children with ARS indicated the severity of the degree of the inflammatory reaction.

It is known that activated T-lymphocytes and natural killers serve as a source of IFN-γ. Among T-lymphocytes, IFN-γ producers are both cytotoxic CD8+ and helper CD4+ cells, however, when the latter differentiate into Th1 and Th2, only Th1 cells retain the ability to produce IFN-γ. The most important function of IFN-γ is its participation in mediating the relationship between lymphocytes and macrophages, as well as in regulating the ratio of the cellular and humoral components of the immune response. Being the main product of Th1 cells, IFN-γ reduces the secretory activity of Th2 cells. Thus, IFN-γ enhances the development of cellular immunity and suppresses the manifestations of humoral immunity. Therefore, IFN-γ plays an important role in immunoregulation, being a key cytokine of the cellular immune response and an inhibitor of the humoral immune response.

The level of IL-10 in the group of HIV-infected children with ARS was approximately 8 times higher than those of the control group. IL-10 is known to be described as a B-lymphocyte stimulating factor because it causes B-cell proliferation. The main producers of IL-10 are Th2 cells. IL-10 suppresses the functions of macrophages and their secretion of IL-1, TNF and IL-6, while providing an anti-inflammatory effect.IL-10 determines the proliferation and differentiation of B- and T-lymphocytes, affects the development of hematopoietic cells, macrophages, natural killers, basophils, being a functional antagonist of cytokines produced by Th1 cells. IL-10 contributes to the development of allergic reactions, has a pronounced anti-inflammatory effect.

Comparative analysis showed that the ratio of IFN-γ / IL-10 (pro-inflammatory / anti-inflammatory cytokines or Tx1 / Tx2) in healthy children was 2.2. In the presence of a pronounced inflammatory process, that is, in children of the main group, this indicator was 0.96. A pronounced imbalance in the functioning of the main regulatory cytokines was revealed, which was expressed by a sharp rise in the level of anti-inflammatory cytokines

and suppression of pro-inflammatory cytokines, which are the main regulators of acute inflammatory conditions.

Thus, during ARS there is a pronounced stimulation of the production of both pro-inflammatory and anti-inflammatory cytokines. Such processes may be a necessary condition for protection against an infectious agent and systemic damaging effects of high concentrations of pro-inflammatory cytokines.

After treatment in the group of HIV-infected children with ARS, the level of IFN-γ approached the control values, and the level of IL-10 in the dynamics of treatment, if it decreased, but still remained at a high level, 5.5 higher than those in children of the control group. groups.

The ratio of IFN-γ/IL-10 in the main group tended to decrease even more, amounting to 0.42.

Thus, under the influence of the treatment, there was a noticeable improvement in the clinical condition of the children of the main group, which, along with the suppression of the pro-inflammatory cytokine IFN-γ, was accompanied by the disappearance of clinical symptoms of ARS. But it should be emphasized that the revealed change in the level of IL-10 and the violation of the quantitative ratio of pro- and anti-inflammatory cytokines indicates the presence of a pre-existing immunodeficiency state, which, apparently, manifested itself in the form of complications against the background of HIV infection.

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