



STATE OF THE CYTOKINE PROFILE IN PNEUMONIA IN FREQUENTLY ILL CHILDREN

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Annotation

Pneumonia remains the most common and severe disease of the respiratory system in children. Understanding the pathogenetic role of the immune status and cytokines can contribute to a deeper understanding of the mechanisms of disease development in pneumonia, to develop effective strategies for diagnosing and treating the disease in frequently ill children. The purpose of the scientific research is to study the state of cytokines in atypical pneumonia in frequently ill children. Material and methods of research: to establish the relationship with cytokine profile indicators, 60 patients with community-acquired pneumonia were examined, divided into 2 groups: Group I - 30 frequently ill children with a typical etiology of pneumonia, Group II - 30 frequently ill children with an atypical etiology of pneumonia. The study showed that cytokines are one of the key mediators of pathogenesis, regulating the recruitment and activation of immune cells and inflammatory processes in the respiratory tract.

Key words

cytokine profile, pneumonia, frequently ill children.

Relevance. In pediatric practice, one of the modern diagnostic markers of the group of frequently ill children is the state of pro-inflammatory and anti-inflammatory cytokines, however, their role in the development of the formation of the pathological process is only indicative [8,11,14,15]. Cytokines are small secreted proteins that are key modulators of inflammation. They are produced in response to invading pathogens by stimulating, recruiting and proliferating immune cells. Cytokines regulate intercellular and intersystem interactions, stimulate or suppress cell growth, differentiation, functional activity and survival, and apoptosis. They also ensure the coordination of the actions of the immune, endocrine and nervous systems under normal conditions and in response to pathological influences. Cytokines include interleukins (IL), chemokines, interferons, and tumor necrosis factors (TNF). Cytokines are divided depending on the nature of the immune response and the source of their production. There are both pro-inflammatory and anti-inflammatory cytokines. Proinflammatory cytokines are secreted by CD4+ T cells, macrophages, and dendritic cells. Key proinflammatory cytokines are IL-1, IL-6 and TNF- α . Proinflammatory cytokines typically regulate the growth, activation and differentiation of immune cells, as well as the targeting of immune cells to sites of infection to control and eliminate intracellular pathogens, including viruses [1,15,16]. Despite ongoing research aimed at improving the treatment and prevention of pneumonia, the incidence of these diseases remains high and the approaches are insufficiently effective [5,9]. This indicates the need for further research aimed at improving diagnostics. It is known that frequent respiratory diseases in children, including pneumonia, lead to a breakdown of compensatory-adaptive mechanisms, to defects in the cellular and humoral components of the immune status with the development of chronic recurrent infections [3, 6,17]. The main direction of scientific research is to study the mechanisms of development, establish the characteristics of the clinical course, assess the role of cytokines in frequently ill children with pneumonia, to develop pathogenetic methods of treatment and preventive measures.

A number of authors point out the importance of determining the cytokine profile in patients with

pneumonia, believing that a pronounced inflammatory process in the respiratory tract occurs due to an imbalance of cytokines [2,4,10]. The study of the role of cytokines in diseases remains relevant today [7]. As is known, interleukins play a key role in various biological processes, including the activation, differentiation and proliferation of immune cells, as well as the regulation of adaptive and innate immunity and inflammatory processes in the body.

The purpose of the scientific research: to study the state of cytokines in community-acquired pneumonia in frequently ill children.

Material and research methods: to establish the relationship with cytokine profile indicators, 60 patients with community-acquired pneumonia were examined, divided into 2 groups: Group I - 30 frequently ill children with typical etiology of pneumonia, Group II - 30 frequently ill children with pneumonia of atypical etiology.

Research results. When studying cytokine indicators in patients of groups I and II, a significant difference was revealed in almost all studied indicators in relation to healthy children.

Frequently ill children with atypical pneumonia experience significant increases in the endogenous production of both anti-inflammatory and pro-inflammatory cytokines in comparison with normative values. An increase in cytokines is a consequence of the influence of infectious factors that cause the development of pneumonia, the balance of which determines the characteristics of the course and prognosis of the disease. In the group of frequently ill children with the development of atypical pneumonia, increased levels of cytokines were observed in the blood, and the concentration of IL-4 was determined to be 2.2 times higher, IL-6 to be 1.3 times higher, IL-8 to be 2.4 times higher, IL-10 by 3.2 times and TNF- α by 1.3 times in relation to standard values and a decrease in IL-4 by 0.7 times, an increase in IL-6 by 1.4 times, IL-8 by 1.8 times, IL-10 by 1.7 times and TNF- α by 1.2 times in relation to patients with pneumonia of typical etiology, allows us to assume that this imbalance is a feature of the manifestation of lung damage in diseases in this group of patients.

The decrease in IL-4 levels in children of group II, in comparison with patients of group I, indicates less pronounced allergic processes. An increase in the level of IL-6 to 22.96 pg/ml, with atypical pneumonia in frequently ill children, indicates the tension of the reserve capabilities of the immune response, which helps stimulate the production of other anti- and pro-inflammatory cytokines, including IL-10, TNF- α and may contribute to the regulation of inflammatory processes in disease.

An increased level of IL-8 in frequently ill children with atypical etiology (23.36 \pm 0.38 pg/ml), both in relation to the norm and in patients with pneumonia of typical etiology, attracting neutrophils to the site of inflammation, is part of systemic protective immunological reactions, may causing tissue damage and exacerbating the disease. High levels of IL-10, along with positive anti-inflammatory effects, may be involved in suppressing the activation of immune cells, with subsequent negative consequences leading to a complicated and prolonged course of the disease.

Studies have shown that interleukins play an important role in the pathogenesis of atypical pneumonia in children, the level of which can serve as a marker of the severity of the disease. Studying the dynamics of interleukins is necessary for the development of new diagnostic methods for frequently ill children with atypical pneumonia in children.

Conclusions. It was revealed that immunological markers of atypical pneumonia can be high values of the studied interleukins of the anti-inflammatory and pro-inflammatory classes, in comparison with standard indicators, which indicates their significance in the pathogenetic mechanisms of the inflammatory process.

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