STATE OF HUMORAL IMMUNITY IN PATIENTS WITH ATYPICAL PNEUMONIA IN FREQUENTLY ILL CHILDREN.

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https://doi.org/10.5281/zenodo.8436601

Abstract: Atypical pneumonia remains one of the most common and severe diseases of the respiratory system in children [8]. Understanding the pathogenetic role of immune status can contribute to a deeper understanding of the mechanisms of disease development in atypical pneumonia, to develop effective strategies for diagnosing and treating the disease in frequently ill children. Questions regarding the study of the role of immune mechanisms in children with pneumonia and in the formation of a group of frequently ill children are quite controversial and insufficiently reflected, further study of which seems relevant. Currently, convincing data have been accumulated on the important role of the immune system in the formation and development of pneumonia in children

In our country, large-scale activities are being carried out for early diagnosis and prevention of somatic diseases among children, especially bronchopulmonary pathology.

Keywords: atypical pneumonia, immunity, frequently ill children.

СОСТОЯНИЕ ГУМОРАЛЬНОГО ИММУНИТЕТА У БОЛЬНЫХ С АТИПИЧНОЙ ПНЕВМОНИЕЙ У ЧАСТО БОЛЕЮЩИХ ДЕТЕЙ.

Аннотация: Атипичные пневмонии остаются одной из распространённых и тяжело протекающих заболеваний дыхательной системы у детей [8]. Понимание патогенетической роли иммунного статуса могут способствовать более глубокому пониманию механизмов развития заболевания при атипичной пневмонии, для разработки эффективных стратегий диагностики и лечения заболевания у часто болеющих детей. вопросы по изучению роли иммунных механизмов у детей при пневмониях и в формировании группы часто болеющих детей достаточно противоречивы и отображены недостаточно, дальнейшее изучение которого представляются актуальным. В настоящее время накоплены убедительные данные о важной роли иммунной системы в формировании и развитии пневмонии у детей

В нашей стране выполняются широкомасштабные мероприятия по ранней диагностике и профилактике соматических заболеваний среди детей, особенно бронхолёгочной патологии.

Ключевые слова: атипичная пневмония, иммунитет, часто болеющие дети.

RELEVANCE

In pediatric practice, one of the modern diagnostic markers of the group of “frequently ill children” is the state of local and systemic immunity, but their role in the development of the formation of the pathological process is only indicative. [6,11]. It is known that frequent respiratory diseases in children 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 [1,3,9].

With frequent viral infections in children, the protective function of the respiratory tract decreases. A number of authors point out the importance of determining humoral and cellular immunity in patients with pneumonia, believing that a pronounced inflammatory process in the respiratory tract occurs due to its imbalance [2,4,10]. The study of the role of immunity in diseases still remains relevant today. In the majority of patients with chronic diseases, disorders of the cellular component of immunity are detected, which are determined by the pathology of the phagocytic function of blood cells. [5,7,12]. Blood macrophages actively absorb antigens by endocytosis and destroy them, while at the same time, interacting with leukocytes, they participate in the regulation of innate and adaptive immunity/

PURPOSE OF THE SCIENTIFIC RESEARCH

To study the state of humoral immunity in atypical pneumonia in frequently ill children.

MATERIAL AND RESEARCH METHODS

To establish the relationship with indicators of humoral immunity, a survey of 80 children with pneumonia was conducted, divided into 2 groups:

Group I - 40 patients with community-acquired pneumonia of typical etiology

Group II - 40 patients with atypical pneumonia from the group of “frequently ill children”

RESEARCH RESULTS

In atypical pneumonia, B cells are activated by viral or bacterial antigens present in the respiratory tract. Once activated, B cells differentiate into plasma cells, which produce and secrete specific antibodies known as immunoglobulins, which are the basis of humoral immunity. These antibodies, particularly IgA, IgM and IgG, play various roles in the immune response against pathogens and disease development.

In general, humoral immunity, through the production of antibodies, formation of immune complexes and activation of complement, plays a crucial role in the immune response in the pathogenesis of obstructive bronchitis. Understanding the mechanisms involved in humoral immunity may help treat the disease in children.

The study of immunological parameters upon admission in children revealed a number of features (Table 1.)

Table 1

Indicators of humoral immunity in patients with atypical pneumonia upon admission (M±m).

indicators	norm	Group I	Group II	P_1
Ig A, pg/ml	1,37±0,07	0,72±0,03	0,48±0,01	<0,001
Ig M, pg/ml	1,23±0,05	1,74±0,06	1,37±0,05	<0,001
Ig G, pg/ml	10,03±0,24	9,31±0,16	8,70±0,17	<0,02
Ig E, ME/ml	31,90±0,30	31,02±0,63	31,54±0,38	>0,2

Note: P1 – significance of differences between normative values and atypical pneumonia.

Multidirectional changes in the humoral part of the immune system during atypical pneumonia were revealed. During the development of the disease in patients with community-acquired pneumonia of typical etiology, significant differences were found in the form of a sharp decrease in the level of immunoglobulins IgA by 1.9 times (0.72±0.03 pg/ml), and moderate IgG by 1.1 times (9.31 ±0.16 pg/ml), pronounced hyperimmunoglobulinemia IgM 1.4 times (1.74±0.06 pg/ml) in relation to standard values (P<0.001, P<0.02), which indicated an imbalance humoral

type of immune response. The IgE content did not differ from those of practically healthy children (P>0.2). The level of CEC was 1.2 times (30.5±0.9 a.u.) higher than the normative values (P<0.001).

It is worth noting that the precise mechanisms and specific role of IgA in atypical pneumonia are still an active area of research, and understanding the mechanisms involved in IgA-mediated immune defense may help develop strategies to enhance mucosal immunity and prevent or treat pneumonia in children.

Class A and G immunoglobulins are important components of humoral immunity, responsible for protecting the body from infections and other pathogens. A decrease in the level of these immunoglobulins may indicate possible problems in the functioning of the immune system in children.

Studies indicate that increased IgM production in children with atypical pneumonia indicated an early immune response against viral or bacterial infections causing the disease, its role in recognizing and neutralizing pathogens and activating other components of the immune system.

The detected decrease in IgG indicates a deficiency of the most common type of antibodies involved in maintaining long-term immunity, which provide systemic protection by neutralizing pathogenic microorganisms, facilitating their elimination by phagocytes and activating the complement system.

The level of IgE, which is a marker for diagnosing allergic reactions, corresponded to standard values, which may mean the absence of severe allergic reactions in children.

Studies have shown that with atypical pneumonia in frequently ill children, the content of immunoglobulins A and G turned out to be significantly 2.9 times (P<0.001) and 1.2 times (P<0.02) lower than normal, respectively, the content of IgM in serum 1.2 times (P<0.05), higher than the normative values, the amount of IgE turned out to be almost identical to the norm (P>0.5). As in group I, the concentration of CEC in the blood was significantly higher by 1.3 times than in healthy children (P<0.001).

The revealed hypoglobulinemia A in atypical pneumonia in frequently ill children (0.48±0.01 pg/ml), both with normative indicators and in comparison with group I (P<0.001), is associated with an increased frequency of recurrent respiratory infections and long-term deficiency of IgA production caused by this pathology. Moreover, IgA limits the release of inflammatory mediators such as cytokines that interact with macrophages, neutrophils, regulating their functions and preventing excessive immune activation and tissue damage.

A slight increase in IgM in atypical pneumonia in frequently ill children (1.37±0.05 pg/ml), in comparison with data from group I (P<0.001), indicates the possibility of using it as an indicator of the severity and effectiveness of treatment of the disease in this group.

CONCLUSIONS

The study showed that the indicators of humoral immunity in patients with atypical pneumonia in frequently ill children were significantly higher than normal, indicating increased activity of the inflammatory process during development and can serve as a criterion for early immunodiagnosis of the disease.

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