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MODERN METHODS OF IDENTIFYING THE CAUSATIVE AGENTS OF RESPIRATORY DISEASES IN CHILDREN

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Annotation: The article provides a general understanding of the shortcomings, inconveniences and modern methods of using classic old methods to identify the causative agents of respiratory diseases in children, as well as the advantages of modern diagnostic criteria and methods for identifying the causative agents of diseases.

Keywords: Pneumonia, atypical pneumonia, respiratory diseases, mycoplasma, chlamydia, IFA, IXLA, Immunoglobulin M, Immunoglobulin G.

Difficulties in diagnosing respiratory diseases in children sometimes lead to irrational empiric prescription of antibacterial drugs, formation of resistant flora, prolongation of treatment and development of complications [3].

Diseases of respiratory organs in children occupy a leading place in the nosological forms of all diseases [1]. One of the important tasks of children's pulmonology is to determine the etiological factors of respiratory pathology. It is important to determine the etiology of the pathogen for the correct etiological diagnosis of serious diseases such as pneumonia outside the hospital and for the correct selection of antibacterial therapy. In recent years, it has been noted that the exacerbation of the inflammatory process of the lung parenchyma with the mild manifestation of intoxication in respiratory diseases, the lack of physical data and the absence of inflammatory changes in the peripheral blood possible [1,2]. These cases require a modern approach to the diagnosis of the etiology of respiratory diseases in children.

As a minimally invasive diagnostic method, a number of authors suggest studying the quantitative composition of neutrophils that have migrated from the general blood stream to the oral cavity. The essence of the method is that the absolute number of neutrophils in the oral cavity was calculated using a fluorescent microscope. The method shows the increased emigration of neutrophil granulocytes to the oral cavity and allows to identify different clinical forms of acute pneumonia. The disadvantage of this method is the lack of possibility to check and identify the causative agent, which means that it cannot provide information for prescribing etiotropic treatment [4].

In addition to the quantitative calculation of the composition of oral neutrophils, some authors propose to determine the indicators of oral granulocyte damage when stimulated by various bacterial antigens. Determining the structural or functional activity of neutrophils during incubation with B. Gervasieva antigen. After staining,

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the number of damaged elements among 100 granulocytes using a fluorescent microscope, and then the calculation of the test index of neutrophil damage was conducted. Mycoplasma spp., Chlamydia spp. data on the activity of oral neutrophils against bacteria. That is, it can be assumed that various infectious diseases cause specific changes in the migration of neutrophils and their damage [5,6].

There is no doubt that the identification of the causative agent by bacterial inoculation of sputum is a traditional effective diagnostic method for diagnosis. However, this method is hampered by the lack of opportunity and difficulty of collecting sputum from children, the difficulty of obtaining a high-quality sample, and the duration of the research, which is on average 48 hours to 7 days. For this reason, this traditional method is not one of the less invasive, fast and time-consuming methods [3,4].

In recent studies, special attention has been paid to the study of oxidation status among the pathogenetic mechanisms of the initiation and kinetics of the inflammatory process in the lungs. This is due to an imbalance in the adaptive mechanism of homeostasis in response to inflammation: lipid peroxidation - antioxidant protection [5,6]. Excessive production of reactive oxygen species by neutrophil granulocytes, which damage phospholipids of cell structures and vascular endothelium, causes a cascade of inflammatory reactions. In this case, an oxidant-antioxidant imbalance occurs, which contributes to the development of oxidative stress [7]. Different pathogens may be able to change the parameters of the oxidation state to different degrees, which allows to use it to determine the etiology of pneumonia outside the hospital.

The ratio of pro- and anti-inflammatory cytokines in the blood plasma can be an indicator of the etiology of the pathogen. A balanced increase in pro-inflammatory interleukin-1 and anti-inflammatory interleukin-4 has been reported in community-acquired pneumonia caused by "typical" pathogens. In mycoplasma and chlamydia infections, there is a slight increase in the level of interleukin-1 and a high increase in the level of anti-inflammatory interleukin-4. These conditions should be taken into account not only when investigating the etiology of the pathogen, but also when explaining the fact that there is no clear inflammation of the lung parenchyma in atypical pneumonia and the disappearance of clinical symptoms [10].

There are also methods that allow you to predict the etiology of pneumonia outside the hospital with high probability. A number of works describe the relationship between the etiological factor and the characteristics of the morphological form of pneumonia outside the hospital. The work of some authors presented the results of a prospective study of more than six hundred children of preschool age who were treated in the hospital with a diagnosis of pneumonia outside the hospital. Accordingly, in children infected with mycoplasma or chlamydia, focal forms of damage to the lung

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parenchyma are recorded in most cases. At the same time, not a single case of the development of massive inflammation, such as segmental and lobar forms, was recorded. In pneumonias caused by staphylococci, pneumococci, and Haemophilus influenzae, focal and focal mixed forms, as well as segmental and lobar forms are often detected. Thus, the characteristics of the morphological form of pneumonia outside the hospital allow us to indirectly estimate the nature of the pathogen based on the results of X-ray imaging [8,9].

In the etiology of diseases, it is important to use the method of determining blood saturation in the differential diagnosis of triggers. A number of researchers have provided convincing evidence that a saturation average of 92% or less is typical for pneumonia caused by pneumococci and Haemophilus influenzae. Respiratory diseases caused by atypical pathogens are characterized by normal saturation or their slight decrease [4,5].

Clinical appearance is very important in the differential diagnostic criteria of the etiology of pneumonia outside the hospital. In pneumonia caused by atypical pathogens, broncho-obstructive syndrome, rhinitis and family transmission of the disease prevail. Pneumonia caused by typical pathogens is characterized by signs of respiratory failure and auscultation of soft breathing over the inflammation [6].

One of the modern methods for determining the etiological agents of respiratory tract diseases is the examination of specific immunoglobulins in relation to the agent from the blood of a sick child. Determination of specific immunoglobulins by IFA and IXLA methods allows for high accuracy and specific response. The essence of this method is determined by the antibody immune reaction produced in the body against the provoking antigen. Immunoglobulin M is produced early in relation to the pathogen. Immunoglobulin G, which is produced relatively late, means that the disease has been transmitted, and immunity to this disease has been formed in the body [5].

In conclusion, it can be said that the use of modern methods of diagnosing the etiology of respiratory diseases in children allows to get more comprehensive information about the causative agent and the course of the disease. In addition, the use of modern methods makes it possible to diagnose the disease early, choose the right treatment tactics in time, and prevent the general condition of the child from getting worse.

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