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Treatment of Acute Complicated Pneumonia in Children

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Abstract: Pneumonia is an acute infectious disease of the lung parenchyma, pneumonia can be caused by viruses, bacteria and fungi. Pneumonia can be prevented through immunization, adequate nutrition, and elimination of environmental factors. Pneumonia caused by bacteria can be treated with antibiotics, but only about 30% of children with pneumonia receive the antibiotic they need. Among respiratory diseases, pneumonia is the single most important cause of death in children worldwide. It kills an estimated 1.1 million children under the age of five each year. It is the cause of all deaths of children under five years of age worldwide. Pneumonia is ubiquitous; pneumonia can be prevented with simple measures; it can be treated with simple, inexpensive drugs with proper care and with early detection and timely hospitalization of sick children.

Keywords: pneumonia, atypical pneumonia, children, diagnostics, antibiotics.

Pneumonia is an acute infectious disease of the pulmonary parenchyma, diagnosed by the syndrome of respiratory disorders or physical findings in the presence of focal or infiltrative changes on the radiograph. The presence of these radiological signs of the "gold standard", according to WHO, with a high degree of probability indicates a bacterial etiology of the process and allows to exclude from the range of diseases defined as pneumonia, most of the lesions of the lower respiratory tract: bronchitis, including obstructive, caused by respiratory viruses and not in need of antibacterial treatment. The widespread occurrence of acute pneumonia poses a great danger to children. Pneumonia is the single largest cause of death in children worldwide. It kills an estimated 1.1 million children under the age of five each year. It is the cause of all deaths of children under five years of age worldwide. Timely correct diagnosis of acute pneumonia in children, assessment of the severity of the disease taking into account concomitant diseases, the correct choice of antibiotic therapy allows children to fully recover from pneumonia, reduce complications and mortality from pneumonia.

Pneumonia is divided into outside and nosocomial. Community-acquired pneumonia occurs in a child under normal conditions, nosocomial after 72 hours of hospital stay or within 72 hours after discharge from there. There are also pneumonia of newborns.

Problem: Community-acquired pneumonia remains a major medical problem due to its prevalence and high mortality. Streptococcus pneumoniae is the most common causative agent of community-acquired pneumonia. Along with this, atypical pathogens of pneumonia (Mycoplasma pneumoniae, Legionella sp., Chlamydia pneumonia) play a significant role, which together are responsible for the occurrence of about 40% of cases of community-acquired pneumonia, as the main or co-pathogens, while mortality can increase and reach 25% ... Laboratory methods for detecting atypical flora cannot be called routine and generally available, pathogens are not detected by Gram staining, the cultivation of these microbes by conventional microbiological methods is difficult. There are no significant differences in clinical and radiographic manifestations of infections caused by typical and

atypical flora. Therefore, empirical therapy for community-acquired pneumonia should be selected taking into account the need to suppress both typical and atypical flora.

It is important to distinguish between "typical" forms with a clear, homogeneous appearance, focus or infiltration on the roentgenogram, and "atypical" with inhomogeneous, no clear boundaries changes. The severity of pneumonia is due to pulmonary heart failure, toxicosis and the presence of complications (pleurisy, pulmonary destruction, infectious toxic shock). With adequate treatment, most uncomplicated pneumonias resolve in 2-4 weeks, complicated in 1-2 months, a protracted course is diagnosed in the absence of reverse dynamics in a period of 1.5 to 6 months. Are subject to hospitalization: The child's age is less than 2 months, regardless of the severity and prevalence of the process, age up to 3 years with a lobar nature of lung damage, age up to 5 years with damage to more than one lobe of the lung, Leukopenia <6 thousand, leukocytosis> 20 thousand , atelectasis, children with severe encephalopathy of any genesis, children of the first year of life with intrauterine infections, children with congenital malformations, especially of the heart, children with concomitant bronchial asthma, diabetes mellitus, CVS, kidney diseases, hematology oncology, children from poor social conditions , lack of guaranteed implementation of therapeutic measures at home.

Pneumonia is diagnosed by auscultation and percussion. Signs of pneumonia: fever, shortness of breath, cough, wheezing in the lungs. Temperature above 38.0 ° C for more than 3 days, shortness of breath in the absence of signs of bronchial obstruction (> 60 / min in children under 2 months,> 50 at the age of 2-12 months, and> 40 in children 1-5 years), asymmetry of wet wheezing ... Hemograms for the diagnosis of pneumonia are not as significant as it is commonly believed, clinical signs have a higher diagnostic efficiency. Leukocytosis below 15x109 / l is observed in the first days of the disease in 40% of patients with coccal and 96% of atypical pneumonia, in fact, as often as in bronchitis. And only numbers higher than 15x109 / l make it possible to exclude a viral etiology of lower respiratory tract damage with a moderate probability, since such figures are possible even with bronchitis (RS-viral in children aged 2-3 months). CRP levels> 30 mg / L and PCT> 2 ng / ml are more reliable for the diagnosis of pneumonia. Levels of leukocytosis above 15x109 / l and procalcitonin (PCT) above 2 ng / ml exclude SARS, however, at lower levels, the differences are almost completely smoothed out. Atypical pneumonia differs little from ARVI and bronchitis in the level of markers. With pneumonia in children of the first half of the year caused by C. trachomatis, very high leukocytosis (30-40 * 109 / l) and eosinophilia of more than 5% are often found. At the age of 1-6 months, atypical forms caused by Chlamidia trachomatis are often observed. In more than half of the patients, typical pneumonia is associated with food aspiration, cystic fibrosis, primary immunodeficiency, their causative agents are gram-negative intestinal flora, staphylococci. Atypical pneumonia with an identified pathogen occurs in 7–20% of community-acquired pneumonia. Taking into account patients without clear clinical symptoms and in the absence of identification of the pathogen, this percentage may be higher. Often among SARS, mycoplasma pneumonia is found. Pneumonia in children is caused by pathogens that usually circulate in the respiratory tract; detection of these pathogens in sputum does not indicate their etiological role. The detection by any method of viruses, mycoplasmas, chlamydia, fungi, pneumocystis in the absence of a clinical picture of the corresponding pneumonia is not evidence of their etiological role, as well as the presence of pneumonia itself. The detection of IgM antibodies to chlamydia and mycoplasma is of diagnostic value, but during the first week after the onset of pneumonia caused by mycoplasma, they are often absent. Often, mycoplasma infection is asymptomatic and is detected only when seroconversion is detected. With the development of a lesion of the respiratory tract, the patient's complaints often do not correspond to the scanty objective data. The onset is gradual, with headaches, malaise, fever, not reaching a high degree of severity. Respiratory tract symptoms: Cough from dry, tearful to productive cough with light sputum. Cough is the most common symptom of respiratory tract involvement. In patients with mycoplasma infection, cough is always present, but among those who cough, only 3-10% of patients with pneumonia. Dyspnea is a rather rare symptom, if it occurs, it is mild. Fever, a characteristic symptom of mycoplasma infection, does not reach a high degree of severity. Basically there is no correspondence between fever and X-ray picture and blood tests. Pharyngitis symptoms in 6-59%. Rhinorrhea in 2-35%. Ear pain (myringitis) in 5%. Asymptomatic sinusitis.A physical examination reveals unexpressed wheezing (dry or moist fine bubbling),

percussion most often does not detect changes. Extrapulmonary manifestations of mycoplasma infection: Hemolysis, accompanied by increased titers of cold agglutinins, catarrhal pancreatitis, catarrhal meningitis, meningoencephalitis, neuropathy, cerebral ataxia, maculopapular skin lesions (described as a connection with the syndrome, Stevens-Johnson) often), myalgia, arthralgia (without a picture of true arthritis).

Objective examination methods: X-ray examination most often reveals an increase in the pulmonary pattern, characteristic of peribronchial infiltration, but there may be focal infiltrates, disc-shaped atelectasis, enlargement of the lymph nodes of the lung root, pleurisy. Laboratory data: hemolytic anemia with increased titers of cold reticulutinins and an increase in the titers of cold agglutinins and reticultocytosis. Leukocytosis is not observed. Thrombocytosis is possible as a response to anemia. Immunological diagnosis: determination of titers of anti-mycoplasma antibodies (IgM, IgG). Positive result: initial increase in antibody titers> = 1: 32 or 4-fold increase over time. The appearance of antibodies is noted by 7-9 days, and the maximum - by 3-4 weeks of the disease. Determination of antigens (the most reliable results within one week from the onset of the disease). The polymerase chain reaction is based on the determination of the specific DNA of mycoplasma pneumonia. The sensitivity of the method is 93%, the specificity is 98%. Pneumonias caused by pneumococci and Haemophilus influenzae type b occur in 10% of children; usually these are children who have become ill as a result of contact with a patient with acute respiratory infections. In children 6 months - 6 years old, the most common causative agent of pneumonia is pneumococcus, at the age of 7-15 years, the main bacterial causative agent of typical pneumonia is pneumococcus.

The selection of antibiotics for the treatment of pneumonia is optimal when decoding its etiology, however, express methods are not always reliable and available. An acceptable alternative is to determine the most likely causative agent, taking into account the obvious symptoms, as well as the age of the sick child, the time and place of the disease. The choice of an antibacterial agent for pneumonia is carried out empirically, taking into account different pathogens at different ages, the severity of the process and the likelihood of resistance of the pathogen. If there is uncertainty about the etiology, a drug or a combination of two drugs with a broader spectrum can be used. The indications for replacing the drug are the absence of a clinical effect within 36-48 hours for mild pneumonia and 72 hours for severe pneumonia, as well as the development of side effects. In complicated pneumonia, treatment begins with parenteral drugs, replacing them with oral drugs when the effect occurs (stepwise method).

In SARS, macrolides and azithromycin are the drugs of choice. Since they also act on the coccal flora, these agents can be used in persons allergic to b-lactams, but their widespread use is undesirable due to their stimulation of the drug resistance of the flora.

Evaluation of the effectiveness of treatment is carried out after 24, 36 and 48 hours of treatment. The full effect is recorded when the temperature drops below 38.0 ° C (without antipyretics) and the general condition improves, the appearance of appetite, while the X-ray picture may improve or remain the same. This indicates the sensitivity of the pathogen to the drug, therefore, treatment with this drug should be continued. A partial effect is recorded with an improvement in the general condition and appetite, as well as the absence of negative dynamics in the focus, but while maintaining a febrile temperature, this picture is observed with a purulent focus (destruction) or an immunopathological process (metapneumonic pleurisy). In this case, the antibiotic is not changed, the full effect occurs later - when the abscess is emptied or anti-inflammatory drugs are prescribed. If the patient maintains a febrile temperature, increases infiltration in the lungs or general disorders, it is considered that there is no effect, in these cases an immediate change of the antibiotic is required.

The duration of treatment for non-severe pneumonia is 5-7 days, for complicated forms of 10-14 days (2-3 days after the drop in temperature). In case of nosocomial pneumonia, the replacement of the drug is carried out according to bacteriological data or empirically already after 24-36 hours, at the first signs of ineffectiveness. In children over 12 years of age and in extremely severe cases in younger patients with resistance to enterobacillary, Pseudomonas aeruginosa and atypical flora, fluoroquinolones are used. For anaerobic processes, metronidazole is used, for processes of fungal etiology, fluconazole, ketoconazole. Mild pneumonia can be treated at home under good conditions,

and when antibiotics respond quickly, no other therapies are needed. Antipyretics are not prescribed for pneumonia, as this can make it difficult to assess the effectiveness of treatment. Ventilation of the room is required. Before the onset of the effect, bed rest, with a rapid reverse dynamics, the child is transferred to semi-bed rest, and from the 6-10th day to the general regimen. Hardening can be resumed after 10-14 days, but heavy physical activity (sports) is permissible after 6 weeks, with mild pneumonia and 12 weeks after complicated pneumonia. During this time, pulmonary blood flow is restored. Appetite is quickly restored in the first days, which makes the appointment unnecessary. vitamins. Physiotherapy procedures on the chest (iontophoresis, microwave, etc.), including during the period of reparation, are ineffective.

Conclusions: With early detection and timely hospitalization of sick children with acute pneumonia in pediatric areas by pediatricians, it reduces the lethal outcome and the appointment of adequate therapy.

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