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Effectiveness of Rational Antibiotic Therapy for Community-Acquired Pneumonia in Children

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Abstract: Pneumonia is one of the most common and serious lung diseases in children. The highest level of morbidity and mortality is observed in newborns and children of the first years of life. A favorable prognosis for pneumonia in children is largely determined by early diagnosis, as well as timely and adequate prescription of antibacterial agents.

Keywords: community-acquired pneumonia, morbidity in children, effective antibacterial drug morbidity in children, empirical antibiotics.

Relevance. Community-acquired pneumonia is defined as pneumonia acquired outside of a hospital. Pneumonia is an acute infectious inflammation of the pulmonary parenchyma, diagnosed on the basis of characteristic clinical and radiographic signs.

Community-acquired pneumonia is spoken of in cases where the infection and illness of a child is not associated with his stay in a medical institution. This emphasizes that the development of pneumonia occurred in a normal microbial environment. This makes it possible to suggest with a high degree of probability the etiology of the disease, since it was found that the main causative agent of pneumonia in this case is Streptococcus (Str.) pneumoniae . Less commonly, community-acquired pneumonia is caused by Haemophilus (H.) influenzae, Mycoplasmae (M.) pneumonia, chlamydia (Chlamydia (C.) trachomatis - in children in the first months of life and C. pneumonia - in subsequent age periods) and respiratory viruses.

Pneumonia is one of the most common and serious lung diseases in children. The highest level of morbidity and mortality is observed in newborns and children of the first years of life. A favorable prognosis for pneumonia in children is largely determined by early diagnosis, as well as timely and adequate prescription of antibacterial agents.

Complaints include malaise, chills, chills, fever, cough, shortness of breath and chest pain. The cough is usually productive in older children and dry in infants and young children. Shortness of breath is mild. Gastrointestinal symptoms (nausea, vomiting, diarrhea) are also common. Children under 1 year of age may experience nonspecific irritability and anxiety.

Purpose of the study. Select an effective antibacterial drug for the treatment of community-acquired pneumonia in children.

Materials and methods of research. Under observation were 37 children aged 1 to 12 years, patients with community-acquired pneumonia with moderate and severe course. The children were treated in the emergency pediatric department. A clinically substantiated diagnosis was established on the basis of anamnestic data, clinical examination and chest radiography. Localization of the pathological process was noted mainly in the middle and lower lobes on one side. All children underwent a hemogram, biochemical blood test, ultrasound of the liver and kidneys, and an ECG as indicated. The children were examined by an otolaryngologist.

Research results. The basis of treatment for community-acquired pneumonia is antibacterial therapy. Proper treatment involves immediate initiation of empirical antibiotics, preferably within 8 hours of illness onset. To reduce errors in antibacterial therapy for pneumonia in children, recommendations for the empirical selection of starting antibiotics have been developed in recent years.

For an adequate empirical choice of initial antibiotic therapy, in addition to epidemiological characteristics, a detailed analysis of the child's individual data (age, background conditions, concomitant pathology) and clinical features of the disease is necessary.

Because the causative agent is difficult to identify, the empiric antibiotic regimen is selected based on the suspected causative agent and the severity of the disease. For children undergoing hospital treatment, antibacterial therapy, as a rule, should have a wider spectrum of action.

The presence of symptoms such as fever, toxicosis, clear physical findings, as well as focal and/or confluent radiological changes in the lungs, allow us to more reliably assume a typical bacterial etiology of pneumonia. In these cases, treatment begins with broad-spectrum antibiotics, which, given the high risk of developing severe forms of the disease, should be administered parenterally. Aminopenicillins and cephalosporins are used as starting drugs, and in severe cases of pneumonia, their combination with aminoglycosides is used. This choice of antibiotics is explained by the need to target a range of gram-positive and gram-negative bacteria that can cause disease in children of this age.

Taking into account the high level of β-lactamase-producing strains among potential pathogens, preference should be given to inhibitor-protected aminopenicillins and II-III generation cephalosporins. The spectrum of antimicrobial action of inhibitor-protected aminopenicillins extends to gram-positive (streptococci, staphylococci) and gram-negative bacteria (Haemophilus influenzae, some strains of Klebsiella, Proteus), as well as anaerobes (bacteroides, etc.). The use of amoxicillin in combination with clavulanic acid (amoxicillin/clavulanate) allows maintaining the high microbiological and therapeutic effectiveness of the drug, even in cases where pneumonia is caused by β-lactamase-producing pathogens.

Amoxicillin/clavulanate is used intravenously at a dose (according to amoxicillin): 30–60 mg/kg/day. Considering that parenteral administration of amoxicillin/clavulanate is possible only in the form of intravenous administration, in case of mild pneumonia, preference is given to basic cephalosporins of the second (cefuroxime) or third generation (cefotaxime, ceftriaxone), which can be used not only intravenously, but also intramuscularly. It should be noted that third-generation cephalosporins are more active against bacteria that produce broad-spectrum β-lactamases.

If pneumonia develops in a child born to a woman with chlamydia, as well as in cases where the child has protracted conjunctivitis that does not respond to the use of β-lactam antibiotics, it is necessary to exclude an atypical etiology of the disease. At the same time, the presence of a dry cough with a gradual increase in intensity and frequency, the slow development of other symptoms of the disease and the predominance of interstitial changes on the radiograph make one think about the possible etiological role of C. trachomatis. Treatment of chlamydial pneumonia determines the need to prescribe modern macrolide antibiotics (Azitrocin, midecamycin, clarithromycin, roxithromycin, etc.), since the use of erythromycin is often accompanied by the development of side effects.

In cases where pneumonia develops in a child who has not previously received penicillin, amoxicillin is the drug of choice. Usually, it is prescribed at a dose of 10–20 mg/kg per dose with an interval of 8 hours (daily dose – 30–60 mg/kg/day).

Contraindications for prescribing aminopenicillins are anamnestic indications of an allergy to penicillin. In these cases, macrolides or cephalosporins of II and III generations are used.

When prescribing azithromycin, a 3-day course with a daily dose of 10 mg/kg/day or a 5-day course with the following dosage regimen is recommended: on the first day - 10 mg/kg/day, on days 2–5 - 5 mg/kg/day

If an atypical etiology of pneumonia is suspected (chlamydia, mycoplasma), therapy is carried out with modern macrolide antibiotics. For some viral pneumonias, antiviral therapy may be indicated.

The clinical effectiveness of the antibiotic was assessed comprehensively based on the elimination of clinical signs of the disease on days 3-7 of the disease. 90% of patients with bacterial pneumonia

showed improvement. The improvement was manifested by the child's active condition, his appetite and well-being improved, cough and shortness of breath decreased, temperature normalized, and chest pain decreased. All patients showed positive dynamics in peripheral blood parameters (decrease in the number of leukocytes, normalization of the leukocyte count and decrease in ESR). X-rays showed the disappearance of inflammatory infiltrative foci in the lungs.

If during this period there is no positive clinical dynamics or a worsening of the condition is noted, then the antibiotic should be changed.

The criterion for stopping antibiotic therapy in the treatment of mild and moderate forms of pneumonia is clinical recovery.

Conclusions. The use of antibiotics with a broad antimicrobial spectrum is promising in the treatment of children with community-acquired pneumonia.

BP is the prevention of primary forms of pneumococcal infection, including vaccination, as well as immunization against influenza and acute respiratory diseases.

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