



## Diagnostic and Therapeutic Methods of Atypical Pneumonia in Children

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### ABSTRACT

Diagnosis and treatment of atypical community-acquired pneumonia in children is a topical issue in pediatric practice. Pneumonia today is one of the most common diseases of childhood, which occupies one of the main places of morbidity and mortality. Among the primary causes of poor outcome of pneumonia in children is late diagnosis and inadequate therapy. To optimize treatment, in order to differentiate typical or atypical etiology of community-acquired pneumonia, we performed polymerase chain reaction (PCR), express methods for determining the level of procalcitonin and C-reactive protein in blood plasma in children. And thanks to the responses, they were treated with antibacterial and antiviral drugs. We have treated 80 patients aged 2 to 14 years who were divided into 2 groups. The patients were hospitalized in the departments of emergency pediatrics and the pediatric intensive care unit of the Samarkand branch of the Republican Scientific Center for Emergency Medical Care. 40 patients underwent complex therapy, which included an antibacterial drug, antiviral drugs at an age dosage for 10 days. Clinical manifestations of group I stopped almost 1.5 times faster than in patients from group II. The complex treatment of community-acquired pneumonia with atypical etiology with an antibiotic and an antiviral drug showed that they are the most effective, preventing and reducing the severity of the disease.

### Keywords:

diagnosis, treatment, atypical pneumonia, children.

**Relevance.** Infectious diseases of the respiratory system occupy a dominant place in the structure of pathology in children, and the highest incidence of community-acquired pneumonia with atypical etiology is observed among young children, which annually claims the lives of millions of children [2,6]. There are also risk factors for death from pneumonia, which include: an unfavorable premorbid background, age under 5 years, late seeking help and admission to a hospital. Pneumonia is an infectious and inflammatory disease of the

lung tissue associated with the penetration of microorganisms into the respiratory tract, in which the inflammatory response depends on the virulence of microorganisms, the state of the body's defense mechanisms and the respiratory tract [3,7]. In the etiology of the disease, various microorganisms play a role (these are bacteria, mainly cocci), fungi, viruses, and protozoa. Among the "atypical" pathogens are *Mycoplasma pneumoniae* and *Chlamydia pneumoniae* [1,5]. Clinically, pneumonia is manifested by fever, cough,

malaise, respiratory failure. The auscultatory picture of typical pneumonia is manifested by a local change in percussion sound and breathing, the presence of fine bubbling rales. For atypical pneumonia, the presence of a bronchitis auscultatory picture is characteristic. In this case, the diagnosis helps to make a persistent febrile temperature characteristic of this infection without a pronounced manifestation of toxicosis, scanty catarrhal manifestations with conjunctival hyperemia, as well as asymmetry of wheezing. Radiologically, the shadow of the infiltrate is weak and indistinct [6]. There is also an increase in the concentration of serum cytokines - IL-1, IL-4, IL-6. The severity of inflammation depends on their level. They determine the production of acute phase proteins - C-reactive protein, the level of leukocytosis, fibrinogen and sedimentation rate of erythrocytes. All these immunological indicators are pathogenetically significant in pneumonia, which determine the severe course of the disease and higher mortality. Given the diversity of clinical signs at different stages of the disease, the inability to etiologically differentiate between typical and atypical pneumonia, even if there is a picture, the right choice of treatment, laboratory indicators are of great help in diagnosis. In recent years, for the purpose of differential diagnosis of pneumonia and determining the severity of the condition, the determination of the serum level of C-reactive protein and procalcitonin has become increasingly important [4,8,11,12]. Combined treatment with an antibiotic and an antiviral drug form the basis of the etiotropic treatment of pneumonia with atypical etiology. The course and outcome of community-acquired pneumonia depends on the definition of the microorganism and the correct choice of antibacterial drug at the onset of the disease. In pediatric practice, oral antibiotics are preferred. When conducting antibiotic therapy for atypical pneumonia in children, mainly macrolides are used [9,10]. Antimicrobials of this group have been used in clinical practice for more than 50 years and during this time have proven to be highly effective and safest antibiotics.

**The purpose of the work:** To improve diagnostic and therapeutic methods for community-acquired pneumonia with atypical etiology in children.

**Materials and research methods.** To achieve this goal, we also conducted research in the departments of emergency pediatrics and the pediatric intensive care unit of the Samarkand branch of the Republican Scientific Center for Emergency Medical Care. The study groups included 80 patients with community-acquired pneumonia aged 1 to 14 years. Of these: **group I** - 40 patients with community-acquired pneumonia with identified atypical microflora (*M.pneumoniae*, *C.pneumoniae*), who received combined treatment. **Group II** - 40 patients with community-acquired pneumonia with identified typical microflora, who received traditional treatment. The control group consisted of 20 practically healthy children. Patients from both groups will be collected anamnestic data, examination by conventional clinical, laboratory and instrumental, as well as special methods. To clarify the atypical etiology of community-acquired pneumonia, PCR methods were used to determine the level of procalcitonin and C-reactive protein, which is characterized by high diagnostic accuracy for the detection of atypical bacteria (*M.pneumoniae*, *C.pneumoniae*) and respiratory viruses. Swabs from mucous membranes, sputum, and blood were taken for analysis. Simultaneous determination of mycoplasmal and chlamydial infections based on a positive PCR result, as well as determination of the level of procalcitonin and C-reactive protein, increases the reliability of the diagnosis of atypical infectious agents. Clarithromycin was administered to children 7.5 mg/kg 2 times a day, the duration of treatment was 7-10 days. The antiviral drug Galovit was prescribed one suppository daily for 5 days, then 1 suppository every other day for 10 days. Course 15 suppositories. Evaluation of the effectiveness of therapy was carried out on the basis of a study of the dynamics of the general condition of the child, clinical symptoms, such as cough, shortness of breath, physical changes in the lungs, radiological data.

**Results of work:** Pneumonia in 45% of patients developed at 3.1-1.1 days from the onset of symptoms of acute respiratory infection. The results of the studies before treatment showed that 32 (80%) patients of the 1st group and 35 (87.5%) patients of the second group showed signs of intoxication. Wet cough was observed in 36 (90%) and 33 (75%) patients of the 1st and 2nd groups. In 10 (25%) and 12 (30%) patients, symptoms of respiratory failure were observed. By 3-4 days from the start of treatment, 28 (70%) children of the 1st group and 23 (57.5%) of the 2nd group showed a positive clinical dynamics of the disease: the body temperature decreased. In 26 (65%) children of the 1st group and in 22 (55%) children of the 2nd group, cough decreased, appetite increased, antibiotic therapy was continued.

On the 5-6th day of treatment, 35 (87.5%) children of the 1st group and 31 (77.5%) of the 2nd group had the disappearance of cough, wheezing in the lungs.

On the 10-12th day of therapy, normalization was noted on the x-ray in 37 (92.5%) sick children of the 1st group and in 33 (82.5%) of the 2nd group.

Ultimately, the use of drugs led to a significant decrease in the duration of inpatient treatment, so patients of group I were in the clinic on average 1.1 bed-days less compared to patients of group II ( $P < 0.01$ ).

The study showed that in 92% of cases of typical pneumonia, the level of Procalcitonin (PCT) was 0.5 ng / ml, C reactive protein up to 30 mg / l. In atypical pneumonia, the concentration of C-reactive protein did not exceed 30 mg/l in 78% of cases, and in the remaining 22%, the indicator ranged from 31 to 90 mg/l.

The PCT level in these patients did not exceed 0.5 ng/ml in 100% of cases. Thus, a low level of markers helps in the diagnosis of atypical pneumonia at the initial stages of the disease, even before the appearance of specific antibodies in the blood serum.

As can be seen from the results of the examination and treatment of pneumonia with atypical etiology in children, the combined treatment of an antibacterial and antiviral drug

was accompanied by rapid positive dynamics. The children tolerated the combined treatment well, no adverse reactions were noted.

**Conclusions.** The use of a test to determine the content of procalcitonin and C-reactive protein helps to etiologically differentiate between typical and atypical pneumonia and the choice of the correct treatment.

Thus, the use of an antibacterial and antiviral drug is effective in the treatment of pneumonia with atypical etiology in children. Convenient to use, the presence of drinking and rectal forms of preparations, higher efficiency, and the absence of adverse events allow us to recommend this treatment for its widespread use in pediatric practice.

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