

ERRORS IN EARLY DIAGNOSIS AND TREATMENT OF PNEUMONIA IN AN OUTPATIENT SETTING

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<https://doi.org/10.5281/zenodo.10581824>

Abstract

Pneumonia is one of the most common and life-threatening diseases in children. Pneumonia that develops at home or in the first 72 hours after hospitalization is assessed as community-acquired (home or outpatient) pneumonia (CAP). Despite the latest advances in medical science, due to high rates of morbidity and mortality from pneumonia, chronic pulmonary disease continues to be a pressing problem for pediatric pulmonologists. Although diagnostic and therapeutic criteria for pneumonia have long been developed and widely interpreted, there are still serious challenges in clinical practice, especially towards early diagnosis and rational treatment of pneumonia in outpatient settings. This article interprets some modern information about the diagnostic and therapeutic criteria for chronic disease in children, as well as prevention, as well as the results of an analysis carried out to identify errors in the diagnosis and treatment of pneumonia in children in outpatient settings.

Keywords: children, community-acquired pneumonia, clinical-diagnostic criteria, rational therapy.

Introduction. Pneumonia, as one of the serious and life-threatening diseases that often occur in children, is always in the focus of pediatricians' attention. Despite numerous scientific studies on community-acquired pneumonia (OCP), many aspects of it are interpreted differently in different sources, creating some difficulties and affecting the effectiveness of clinical practice. lowers [3-5]. Thus, in recent decades, the approach to the concept of "pneumonia" in various recommendations of the professional community of different countries on the diagnosis and treatment of pneumonia differs significantly from each other [5-8]. In clinical practice, some diagnostic confusion caused by ignoring these differences eventually leads to under- and overdiagnosis of the disease. Thus, an incomplete assessment of the general changes characteristic of pneumonia, and sometimes the absence of wheezing during auscultation, can be the main reason for underdiagnostic cases. In such cases, despite persistent febrile fever, the patient is diagnosed with ARVI and antipyretic drugs are prescribed. On the other hand, exaggeration of the results of a medical examination by doctors and incorrect interpretation of radiographs lead to overdiagnosis of the disease [2-4]. Correct assessment of the clinical signs of pneumonia and the effectiveness of antibacterial therapy can sometimes play an important role in determining the etiology of the disease, even without laboratory tests. For example, persistent fever without toxicosis, conjunctivitis against the background of a rare catarrhal syndrome, asymmetrical multiple wheezing in the chest, etc. such clinical symptoms give reason to suspect an atypical etiology of the disease. Currently, the lack of effect against β -lactamase-resistant antibiotics taken for 1-2 days is an important indicator confirming the atypical etiology of the disease. In suspicious cases, specific laboratory tests can play a decisive role in elucidating the etiology. Thus, at the 2-3rd week of pneumonia, an increase in the titer of specific antibodies against mycoplasma in

the patient's blood is considered as a reliable laboratory sign confirming the mycoplasma etiology of the disease (specific antibodies are not detected at the initial stage). The polymer chain reaction (PCR) method is considered less informative in 17-20% of cases due to the determination of mycoplasma DNA in sputum in children without respiratory symptoms [3-9]. For these reasons, all recommendations presented by various pediatric societies recommend the use of macrolides only in cases where symptoms of atypical pneumonia are noted; In other cases, if an atypical etiology of the disease is suspected, the use of macrolides is recommended only if there is no effect within 24-48 hours from the prescribed penicillin group drugs. In cases where dynamic monitoring of the disease is not possible, initial use of both groups of drugs is possible. At this time, given that pneumococci predominate among the bacterial causes of pneumonia in children under 5 years of age, after 5-6 years in 50-60% of cases only pneumococci, and in other cases - atypical pathogens (mainly *Mycoplasma pneumoniae*, rarely *Chlamydia pneumoniae*). It is necessary to analyze sensitivity to antibiotics[7]. According to recommendations published by the Pediatric Infectious Diseases Society of America and the Infectious Diseases Society and the International Consensus Documents on Current Diagnostic Criteria for Pneumonia, diagnostic criteria for CAP in children older than 3 months are defined as "recording of signs and symptoms." pneumonia in a previously healthy child" [5]. Most pneumonias diagnosed in this way are of viral etiology. This approach to the issue is explained by the fact that in the USA bronchiolitis is traditionally considered as viral pneumonia, and those patients who do not find X-ray confirmation of the diagnosis are involved in outpatient treatment. According to another point mentioned in the recommendations of USA regulatory structures, it is important to correlate the signs and symptoms of the disease with radiological or mi-

crobiological confirmation of the diagnosis for antibiotic therapy and hospitalization of the patient for pneumonia. Unlike the United States, pneumonia in Russia is defined as “a syndrome of respiratory distress against the background of infiltrative or focal changes in the lung parenchyma according to X-ray data, or an acute infectious disease accompanied by physical changes” [2-3]. In Russia, as in other European countries, bronchiolitis is not considered a viral pneumonia. In WHO recommendations, the main signs and symptoms that distinguish bacterial pneumonia from bronchiolitis and other viral lesions of the respiratory tract, highly correlated with radiological criteria, are: cough + shortness of breath/tachypnea, pulling in the lower respiratory tract. chest during breathing [9]. According to WHO recommendations, X-ray examination is considered the “gold standard” in the diagnosis of bacterial pneumonia, that is, in differentiating it from bronchitis, bronchiolitis and other viral lesions, which in most cases are considered. “Pneumonia” of the lower respiratory tract is considered an important method of examination, but does not necessarily require antibacterial treatment. The WHO diagnostic criteria for pneumonia, including persistent febrile fever and other clinical signs, are accepted by the Thoracic Society of Great Britain, as well as pediatric societies in many European countries, and indicate that the diagnosis of bacterial pneumonia should be confirmed. by the presence of infiltrates on an x-ray. According to the recommendations of the WHO expert group, typical bacterial pneumonia is usually characterized by compaction (consolidation) of lung tissue caused by alveolar infiltration [8]. At this time, the bronchovascular pattern is not clearly visible against the background of infiltrative shading, in which the basal (and often intersegmental) boundaries are clearly visible on the radiograph, the edge of the heart and diaphragm rests on the infiltrate and is poorly contoured, and an “air bronchogram” is often observed. Despite the fact that the diagnostic criteria for pneumonia are different in different countries, the treatment plan for pneumonia of the same etiology is almost the same and partially coincides in all countries. Thus, in all countries, amoxicillin is preferred for respiratory tract infections caused by *Streptococcus pyogenes*, *S. pneumoniae* and *H. influenzae*. WHO recommendations for mild and moderate pneumonia recommend taking amoxicillin at a dose of 40 mg/kg twice a day for a 5-day course [4-6]. For severe pneumonia, it is recommended to begin treatment with *ampicillin* (50 mg/kg) or *benzylpenicillin* (50,000 units/kg), administered intramuscularly or intravenously every 6 hours for at least 5 days. After the temperature decreases and intoxication decreases, treatment is continued by taking the drug twice a day at a dose of 40 mg/kg. Due to the fact that vaccination against *Haemophilus influenzae* is included in the National Vaccination Schedule, there is no need for treatment with β -lactam-resistant *amoxicillin/clavunic* acid in young children [1-9]. The American Society of Pediatrics Infectious Diseases guidelines do not necessarily recommend treating all CAP with antibiotics, given that bronchiolitis is considered a viral pneumonia [5]. *Amoxicillin* (90 mg/kg) is prescribed to

patients with moderate pneumonia twice a day. In severe cases of pneumonia, the drug is administered parenterally; the drug of first choice is *ampicillin* (every 6 hours at a daily dose of 150-200 mg/kg) or *penicillin* (200,000-250,000 units/kg every 4-6 hours). In the recommendations of the Russian Pediatric Societies, amoxicillin (at a dose of 50 mg/kg per day) in children over 6 years of age, and amoxicillin/clavuanate (70-100 mg/day) are used for antibacterial treatment of uncomplicated typical CR. kg per day) in children under 5 years of age attending preschool institutions and who have previously received antibiotics) is considered appropriate for use [2-3]. In all recommendations presented, macrolides are recommended only for patients with symptoms of atypical pneumonia or in cases where *amoxicillin* does not have an effect within 24-48 hours. In cases where dynamic monitoring of the patient is impossible, the use of both drugs is allowed[7].

Goal of the work to analyze mistakes made during the early diagnosis and treatment of patients hospitalized with a diagnosis of pneumonia.

Material and methods. The study was conducted on 68 patients hospitalized with a diagnosis of pneumonia in 2018-2020. Diagnosis of the disease was carried out on the basis of diagnostic and therapeutic criteria adopted by WHO, taking into account the recommendations proposed by pediatric societies in different countries. The study did not include children with other chronic diseases of the bronchopulmonary system, which may be complicated by pneumonia. During the work, the results of clinical laboratory tests (complete blood count, determination of C-reactive protein and procalcitonin) and X-ray studies carried out in all patients on an outpatient basis were analyzed, and the adequacy of therapeutic tactics was investigated.

Results. As a result of our research, it was established that the maximum incidence of typical pneumonia occurs at the age of 1-5 years (61.8%), atypical pneumonia (mainly mycoplasma) - at the age of 6-10 years (64.7%). Although the diagnosis of “atypical pneumonia” was not indicated in any of the referrals for hospitalization at the clinic, the diagnosis of “atypical pneumonia” was identified in 47% of patients admitted to the clinic (32 patients). When analyzing the duration of hospitalization, it was found that about 38.2% of patients (26 patients) were admitted to the clinic on the 5th day of illness or later, which is likely due to underdiagnosis allowed at the outpatient stage. This underdiagnosis is associated with the fact that patients are admitted to the clinic in critical condition with obvious signs of intoxication (high fever, refusal to eat, general weakness, drowsiness, etc.) and severe respiratory failure. In addition to cases of underdiagnosis, overdiagnosis of the disease often occurs at the outpatient stage. Thus, some local pediatricians regard any wheezing heard during a physical examination of the patient as inflammation of the lung tissue and, accordingly, an increase in the bronchovascular pattern visible on the radiograph, expansion of the shadow of the root of the lung, peribronchial thickening, areas of hyperventilation, etc. such changes are regarded as a sign of pneumonia, which is considered one of the main reasons for

overdiagnosis. We determined that only 25% (17 children) of outpatient radiographs met the criteria recommended by WHO. Confirmation of the diagnosis of pneumonia in only 17-20% of hospitalized patients once again indicates the fact of overdiagnosis. It should be remembered that in 45-53% of cases of pneumonia, especially dangerous pneumococcal pneumonia, it is not possible to detect the main symptoms of the disease, such as local wheezing and breathing problems. For this reason, the results of separately conducted percussion-auscultation studies are not enough to diagnose the disease [3-9]. In such cases, it is necessary to take into account all the symptoms that aggravate the patient's condition and are usually not reflected when referring to hospitalization (persistent fever $>38^{\circ}\text{C}$, wet cough, refusal to eat, vomiting, drowsiness or wakefulness, etc.), as well as the results of a radiological examination. As a "golden standard" they should be properly assessed and their compliance with WHO diagnostic criteria ensured. In another study we conducted, a number of errors were discovered in the choice of the type and dose of the drug in the antibacterial treatment of pneumonia on an outpatient basis. It has been established that 30-35% of patients with pneumonia in the outpatient period are prescribed *amoxicillin/clavunate*, but only slightly more than 10% are prescribed *amoxicillin*. Effective use of *amoxicillin/clavunate* in young children who have not received a vaccine against hemophilus infection has already been proven [9]. However, it is already known that this drug has no advantage over amoxicillin in older children (due to the rare occurrence of pneumonias of hemophilic bacilli and other Gram (-) etiology). It was revealed that the majority of local pediatricians do not follow the recommendations of the WHO and advanced clinics and still allow the use of antibacterial drugs in ineffective doses (20-30 mg/kg per day) according to old recommendations for the outpatient treatment of pneumonia, which often leads to unjustified replacement of the drug. In our personal experience, treatment with amoxicillin/clavunate at a dose of 20-30 mg/kg at home does not produce an effect, and therefore a significant effect from increasing the dose of the drug in hospitalized patients has already been confirmed. Children without the risk of pneumococcal persistence with community-acquired pneumonia are prescribed amoxicillin and amoxicillin/clavunate at a dose of 50-60 mg/kg per day, and patients with a risk of persistence are prescribed at a dose of 80 mg/kg according to WHO recommendations. and 90 mg/kg, used in the experience of leading USA clinics, provide a significant effect. One of the other reasons we have identified for the ineffectiveness of outpatient treatment and hospitalization of patients with pneumonia is the preference by local doctors of oral cephalosporins of the third generation as the drug of first choice (the instructions for their use contain information about the unjustifiedness of their prescription). use in the treatment of pneumonia is clearly indicated), or in the case of typical pneumonia, initial therapy was started with macrolides instead of amoxicillin (in our study - 41% (28 patients).

Conclusion. Our research shows that there are still significant deficiencies in the diagnosis and treatment of pneumonia in the outpatient stage, which is the modern diagnostic method recommended by the WHO and pediatric societies of developed countries for the diagnosis of pneumonia (typical and especially atypical) by field pediatricians. - gives reason to think that he is unaware of therapeutic criteria, or that his knowledge is at a low level.

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