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VARIANTS OF CLINICAL COURSE OF COMMUNITY-ACQUIRED PNEUMONIA IN CHILDREN OF DIFFERENT AGES

Sharipov I.L.
Samarkand State Medical University, Samarkand, Uzbekistan

Abstract: Pneumonia is a serious disease characterized by inflammation in the lungs. In children, this disease often runs especially hard due to the immaturity of the respiratory apparatus as well as the inability to fully expectorate sputum. Pathology requires mandatory prescription of antibiotics and symptomatic drugs, and in severe cases, hospitalization.

A retrospective analysis of 125 case histories of children treated for community-acquired pneumonia in the intensive care unit of Samarkand Regional Children's Multidisciplinary Medical Center was conducted. Among the hospitalized patients, infants accounted for 20%, young children 33%, preschool children 10%, primary school children 24%, and high school children 13%. Approximately half of the patients (49%) were admitted within the first three days of the disease. Complaints in the majority of children (76%) were a combination of symptoms of respiratory system damage and intoxication, without noticeable symptoms of upper respiratory tract catarrh. In addition, all children showed a lack of appetite, weakness, insomnia, fever, persistent cough with sputum, and signs of acute respiratory and cardiac failure. Local physical symptoms were observed in 53-79% of children. Radiological examination revealed a right-sided lesion in 68% of cases, with darkening of the lower lobe in 64% of cases. On bacteriologic examination of sputum, Streptococcus pneumoniae was isolated in 59% of cases. Community-acquired pneumonia was more frequently observed in children in the first 3 years of life among patients hospitalized in the intensive care unit.

Keywords: community-acquired pneumonia, children

Community-acquired pneumonia (CAP) is an urgent problem in pediatric practice. In recent years, there has been an increase in the incidence of CAP in children, and the mortality from this disease remains relatively high. In practice, especially in outpatient settings, serious problems include early diagnosis and rational therapy for pneumonia in children[1]. At the same time, there is constant growth in community-acquired pneumonia in children worldwide [1, 2]. According to statistics, respiratory diseases in children aged 0-17 years occupy the third place in the structure of causes of death, after external causes and malformations.

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Various bacteria and viruses, as well as fungi and parasites, can cause CAP in children [3, 4]. In addition, pneumococcal infections are a frequent cause of morbidity and mortality worldwide. According to the WHO, approximately one million children die annually from various forms of pneumococcal infections. Currently, mortality from diseases caused by pneumococcal infections can be prevented by vaccination [5].

However, as pneumococcal vaccines are utilized, the medical community faces a legitimate question about their continued efficacy due to the predominant serotypes of the microorganism among local target populations.

This study aimed to investigate the clinical manifestations and anatomo-morphologic forms of community-acquired pneumonia in children at the present stage.

Materials and methods. A retrospective study of 125 case histories of all children treated for community-acquired pneumonia in the ICU of the Samarkand Regional Children's Multidisciplinary Medical Center between 2020 and 2023 was conducted.

Results of the Study and Discussion. The studied group of children consisted of 66 (53%) boys and 59 (47%) girls. The patients were distributed by age as follows: infants, 46 (36.9%); early childhood, 40 (32%); preschool, 20 (16%); junior school age -13 (10.4%); and senior school, 6 (4.8%).

Children with pneumonia were admitted to the hospital on different dates from disease onset. Approximately half of the patients (n=67; 53.6%) were admitted in the first three days of the disease, slightly less than half (n=52; 41.6%) within four to seven days, and six (4.8%) patients were admitted after seven days.

Currently, the diagnosis of pneumonia is based on data from anamnesis, clinical picture, and radiologic examination. The main clinical symptoms characteristic of pneumonia and allowing the assumption of this disease in a child are respiratory failure (dyspnea without obstruction, participation of auxiliary muscles in the act of breathing, cyanosis), fever over 38.5 °C for more than 3 days, pronounced symptoms of intoxication (refusal to eat, significant weakness, lethargy, headache), cough with sputum discharge, and local physical findings (shortening of the percussion sound, weakened or bronchial breathing, fine bubbling or crepitating rales over the areas of lesions). Radiological confirmation of typical pneumonia is the presence of a homogeneous shadow with clear boundaries [1].

Local shortening of percussion sounds was observed in the clinical picture in the absolute majority of children ($p<0.001$), and fine bubbling moist rales at auscultation of the lungs were described in more than half of the patients ($p>0.05$).

Radiological examination was performed using a Shimadzu apparatus, Flexavision SF model (Manufactured in Japan). The radiological picture of the disease is diverse. Most hospitalized children (n=88; 70.4%, $p<0.001$) had right-sided lesions. More than half of the children with right-sided pneumonia (n=55 of 88; 62.5%,

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p<0.001), as well as children with left-sided pneumonia (n=19 of 31; 60%, p<0.05), had lower lobe involvement in the inflammatory process.

The peculiarities of the clinical and radiologic pictures of community-acquired pneumonia have been studied by other authors. In one study devoted to the peculiarities of the clinical course of pneumonia in children, the authors showed that fever in this disease was observed in 82% of cases, cough in 91% of cases, shortening of the percussion sound in 47% of cases, wheezing was heard in 62% of cases (mainly small bubbles), dyspnea of mixed type occurred in 80% of cases, and bronchoobstructive syndrome was observed in 18% of cases. Inflammation in 88% of cases was unilateral and localized predominantly (63%) on the right side and in the lower lobe (74%) [8].

A significant increase in blood levels of C-reactive protein (CRP) and other acute-phase proteins is characteristic of severe pneumonia of bacterial etiology, including pneumococcal pneumonia [5, 6]. In our study, elevated CRP levels were observed in 45 children (36 %).Asymptomatic transient colonization of the nasopharynx with opportunistic bacteria, such as Streptococcus pneumoniae and Staphylococcus aureus, is common in children in the first years of life; it decreases with age due to maturation of the immune system. According to epidemiological studies, Streptococcus pneumoniae carriage ranges from 20-65%. Nasopharyngeal colonization of Haemophilus influenzae can reach 90% in children under 5 years of age, whereas Staphylococcus aureus carriage occurs in 10-55% of children in this age group [4].

The etiologic diagnosis of community-acquired pneumonia is limited and is not performed in outpatient settings. Microbiologic analysis of sputum (bacterioscopic or bacteriologic examination) is recommended in all children with pneumonia in the presence of sputum in inpatient settings. The main method of etiologic diagnosis of pneumonia is classical bacteriological analysis of sputum, the sensitivity and specificity of which are approximately 50%. The disadvantage of this method is the late receipt of results [8].

Streptococcus pneumoniae was also isolated in more than half of the cases (n=21 out of 36; 58.4%, p<0.001) during bacteriological examination of the sputum. Literature also shows a significant role of pneumococcus in the etiology of community-acquired pneumonia in children under 17 years of age (24.14%) [5].

Antibiotic therapy in the hospital setting in most cases (n=77, 67%) was carried out with a single antibiotic, in one-third of cases (n=38, 33%), and more than one course of antibiotic therapy was used. Most children (n=81; 70.4%) were hospitalized for 1 to 2 weeks, 26 (22.6%) patients were hospitalized for less than 1 week and discharged for outpatient treatment, and 8 (7%) were hospitalized for more than 2 weeks.

Conclusion. Community-acquired pneumonia was more frequently observed in children in the first 3 years of life among patients hospitalized in the intensive care unit

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with the named pathology, which is consistent with literature data [6]. Children who were not immunized against pneumococcal infection were significantly more likely to be affected by pneumonia. In our study, recurrent pneumonia was 6 times more frequent in children who were not immunized against pneumococcal infection. During bacteriological examination of sputum, pneumococcal etiology of the disease was confirmed in more than half of the children, while studies conducted in other regions showed a much lower significance of pneumococcus in the etiology of community-acquired pneumonia in children. In the clinical picture, most patients had a combination of respiratory and intoxication syndromes and local shortening of the percussion sound.

Literature data indicate the importance of objective examination of the patient in the diagnosis of community-acquired pneumonia, allowing for 50-70% of cases to identify local symptoms indicative of the disease. The sensitivity of the combination of fever, tachypnea, local weakening of respiration, and fine bubbly moist rales in the diagnosis of this disease is approximately 94% [6]. The pathological process was more often localized to the lower lobe of the right lung. However, in the literature, one can find data on reliably more frequent detection of bilateral focal pneumonia in young children [7]. The practical significance of this study lies in the confirmation of the diagnostic criteria of community-acquired pneumonia, which is especially relevant for the diagnosis of bacterial pneumonia at present and the differential diagnosis of viral lung lesions. The role of pneumococcus in the etiology of the disease has also been shown, which is important for the choice of etiotropic therapy. Competent and clear compliance with the vaccine calendar and mass coverage of children in their first years of life with vaccination against pneumococcal infection will contribute to a reduction in the incidence of bacterial community-acquired pneumonia in children and adolescents.

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