

THE MOST SIGNIFICANT ETIOLOGICAL AGENTS OF COMMUNITY-ACQUIRED PNEUMONIA IN CHILDREN

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ANNOTATION

Pneumonia in children is one of the urgent problems of pediatrics, which is determined by the continuing high level of morbidity and the severity of the prognosis, especially in young children. The results of clinical, radiological, laboratory examination of children with community-acquired pneumonia living in the Samarkand region, its place in the structure of bronchopulmonary pathology in children according to hospitalization data are presented. Shown is the etiological structure of community-acquired pneumonia, the sensitivity of pneumotropic microflora to the main groups of antibiotics. The results obtained underline the age-related characteristics of the course of community-acquired pneumonia in children.

Key words: children, community-acquired pneumonia, etiology, chest x-ray, bacteriological examination of sputum.

Relevance. Pneumonia in children is one of the urgent problems of pediatrics, which is determined by the continuing high level of morbidity and the severity of the prognosis, especially in young children [2, 8, 10, 12, 13, 16]. Despite the clear clinical and instrumental criteria for the diagnosis of pneumonia existing in pediatric practice, the issues of hypo- and overdiagnosis of the disease remain relevant [2,8,10,15]. Pneumonia in children in most cases is community-acquired and has various clinical forms. Acute pneumonia of a seasonal nature is most often

recorded in children, although they occur throughout the year. The etiological approach is fundamentally important in the diagnosis of acute pneumonia [4,11,17].

Difficulties in the etiological diagnosis of pneumonia in children are due to its polyetiology. The causative agents of infection in pneumonia can be both typical bacterial agents (for example, *Streptococcus pneumoniae*, *Streptococcus pyogenes*, *Staphylococcus aureus*) and atypical pathogens (*Mycoplasma pneumoniae* and *Chlamydia pneumoniae* and respiratory viruses) [3-18]. The influence of each of the infectious agents on the etiology of community-acquired pneumonia depends on the age group of patients, and the cause of the development of the disease in children in most cases is mixed bacterial or viral-bacterial infections. However, in general, the rise in the incidence of community-acquired pneumonia in recent years is most often due to atypical pathogens [9,17,18]. Children are most at risk of developing pneumonia, especially after respiratory viral infections. The share of acute pneumonia in the general respiratory pathology is relatively small, however, the damage caused to the child's health, the risk of developing protracted and chronic forms of pathology in the form of carditis, as well as the economic costs associated with treatment are very significant [15].

The aim of this study was to study the etiological aspects of community-acquired pneumonia in children, depending on the clinical and radiological picture.

Research materials and methods. A comprehensive clinical and laboratory, X-ray examination of children with community-acquired pneumonia, hospitalized in the clinical departments of emergency pediatrics and the children's intensive care department of the Samarkand branch of the Republican Scientific Center for Emergency Medical Aid, was carried out in the period from 2019 to 2021. Children diagnosed with pneumonia accounted for 22.4% (534) of the total number (2378), which is almost a quarter of patients who applied to inpatient care. The group of children diagnosed with pneumonia was randomly selected and it amounted to 64 patients. Children of the first year of life accounted for 44.2%, from 1 to 3 years old - 36%, over 3 years old - 18.8%.

The material for the bacteriological study was sputum, which was collected using a device for collecting liquid for a single use from children who did not receive antibiotic therapy at the prehospital stage and before the start of antibiotic therapy at the hospital stage, subject to conditions that maximally exclude the possibility of microflora contamination. Sputum was examined by quantitative and semi-quantitative methods.

Research results. According to hospitalization data in the clinical department for the period from 2019 to 2021 in the structure of bronchopulmonary diseases, pneumonia was 22% 4. Of the total number of patients, boys predominated — 86.8%. Of these, 88.6% of children hospitalized with pneumonia are residents of the city. Most cases of community-acquired pneumonia, according to the generally accepted classification [5], were diagnosed as "complicated", while the proportion of "complicated" pneumonia prevails in children under 1 year of age. The age of children isolating gram-negative flora was predominantly early, from 1 to 6 months. The structure of the microbial composition when studying the nature of the growth of bacteria on nutrient media, we noted a significant number of associations of the isolated significant agents with other bacteria, but contained in amounts below the diagnostic threshold - mainly titers of such bacteria did not exceed 10¹-10³ CFU / ml in sputum. Among these microorganisms, we did not take into account the species belonging to the normal flora of the pharynx and oral cavity, but attributed them to the contaminating microflora (green streptococci, corynebacteria, Neisseria). However, such types of bacteria as *Escherichia coli*, *Klebsiella pneumoniae*, *S. aureus*, *Enterococcus* spp. and others, identified from unusual habitats, were regarded by us as indicators of a violation of the normal biocenosis of the upper respiratory tract. In the examined group, signs of a violation of the biocenosis of the upper respiratory tract were detected in 31.7% of children. Enterococci were found more often than other bacteria - in 14% of the examined children. This microorganism is conditionally pathogenic and its usual habitat is the intestine. There are two types - *Enterococcus faecalis* and *Enterococcus faecium*. We isolated both of these species

from sputum, although the former was more often found. Enterococci as pathogenic agents are often of clinical importance for purulent infections in a surgical practice and urology, while in respiratory diseases it is not considered a significant pathogen [2]. However, it is impossible to ignore its effect on the clinical course of pneumonia in children, since the disturbed microbiocenosis of the respiratory tract has a direct correlation with immunity, with a change in colonization resistance and, therefore, affects the nature of the course of the inflammatory process. In the examined group of children, 22% of cases required the appointment of a second course of antibiotic therapy, although the main pathogen had good sensitivity to the main antibiotics. The biocenosis of the upper respiratory tract with the participation of enterococci included such microorganisms as staphylococci, enterobacteria, and fungi of the genus *Candida*; in some cases, *Pseudomonas aeruginosa* and non-fermenting gram-negative bacteria were found, that is, species not typical for this biotope. In 8.7% of cases, there were associations of enterococcus with pneumopathogens - *S. pneumoniae*, *H. influenzae*, and more often with the second. Resistance to antibacterial drugs has been studied in the main etiologically significant strains of isolated bacteria. In these groups of patients, the severity of the patient's condition is determined by the cardiorespiratory syndrome, which was diagnosed in 18.1% of cases in children of the first 3 years of life. Syndromes most typical for pneumonia occupy a much smaller proportion (Fig. 1). In 26% of cases, focal pneumonia with significant cardiomegaly was radiographically documented in children, mainly older children. In the overwhelming majority of cases (74%), pneumonia had an acute onset, clinically manifested by a wet cough (80%), symptoms of intoxication (65%). The presence of febrile fever for the first time days of the disease was noted in 72% of cases. In 28% of cases, the disease proceeded with normothermia. In 37% of cases, the disease was preceded by ARVI. Most of the children were admitted in serious condition. An extremely serious condition was recorded in 3% of cases. Typical local physical changes in the lungs were detected only in 33% of cases. The rest of the children heard hard breathing, diffuse rales of various sizes. Tachypnea was noted in 32%,

tachycardia - in 47% of cases. In 17% of cases, limited cyanosis of the skin in the area of the nasolabial triangle was expressed even against the background of the disappearance of symptoms of intoxication, which indicates the presence of general circulatory disorders in these patients. In 9% of patients, a moderate structure of bronchopulmonary diseases was revealed according to hospitalization data, and etiological monitoring was carried out.

Structure of syndromes and complications of community-acquired pneumonia in children was with broncho-obstructive syndrome 46.6%, intoxication syndrome 22.22%, acute respiratory failure 6.6%, atelectasis-11.11% and toxicoinfectious cardiopathy -15.15% of cases respectively.

The hemogram in the first days of the disease was characterized by leukocytosis (above $12.0 \cdot 10^9$ g / l) and a shift in the blood count in 17% of cases. The most frequently documented change in ESR, an increase in which from 15 to 35 mm / h was noted in 40% of cases, over 33 mm / h in 17% of cases. In all children, pneumonia was confirmed by X-ray. In 85.8% of cases, changes in the lung tissue were focal, in the rest - bronchogenic. Right-sided localization of pneumonic changes was more often noted (68.7%). In 22.9% of cases, the process was bilateral in nature and was mainly observed in children of the first year of life. The majority of children had a burdened premorbid background (71.6%). Among the background conditions, secondary immunodeficiency states (13%), CNS pathology (26.9%), lymphatic-hypoplastic diathesis (18.2%), atopic dermatitis (7%) prevailed. The results of bacteriological examination of sputum in children with community-acquired pneumonia are presented in table. 1. The results of the conducted etiological monitoring made it possible to identify the most significant pneumotropic flora of community-acquired pneumonia, which in 51.6% of cases is represented by *Streptococcus pneumoniae*, highly sensitive to cephalosporins (94%), penicillin (87%), ampicillin (85%).

The discussion of the results. Most cases of community-acquired pneumonia, according to the generally accepted classification [5], were diagnosed as "complicated", while the proportion of "complicated" pneumonia prevails in children under 1 year of age. The age of children isolating gram-negative flora was predominantly early, from 1 to 4 months. The biocenosis of the upper respiratory tract with the participation of enterococci included such microorganisms as staphylococci, enterobacteria, and fungi of the genus *Candida*; in some cases, *Pseudomonas aeruginosa* and non-fermenting gram-negative bacteria were found, that is, species not typical for this biotope. In children, a violation of the microbiocenosis of the respiratory tract has a direct correlation with immunity, with a change in colonization resistance and, therefore, affects the nature of the course of the inflammatory process. As can be seen from the results of bacteriological examination, the pathogens with community-acquired pneumonia in more than half of the cases are *Streptococcus pneumoniae*, in second place pneumonia is a complication of *Haemophilus influenzae*. In 8.7% of cases, there were associations of enterococcus with pneumopathogens - *S. pneumoniae*, *H. influenzae*, and more often with the second. Resistance to antibacterial drugs has been studied in the main etiologically significant strains of isolated bacteria. In these groups of patients, the severity of the patient's condition is determined by the cardiorespiratory syndrome, which is diagnosed in one third of cases in children of the first 3 years of life. The syndromes most typical for pneumonia occupy a much smaller proportion. In children, mainly older children, radiographically documented focal pneumonia with significant cardiomegaly and in most cases (74%) pneumonia had an acute onset, clinically manifested by a wet cough (80%), symptoms of intoxication (65%). The presence of febrile fever for the first time days of the disease was noted in 72% of cases. In 28% of cases, the disease proceeded with normothermia. In 37% of cases, the disease was preceded by ARVI. Most of the children were admitted in serious condition. An extremely serious condition was recorded in 3% of cases. Typical local physical changes in the lungs were detected only in 33% of cases.

Results. Thus, when carrying out therapeutic and diagnostic measures in children with community-acquired pneumonia, it is necessary to take into account age characteristics, premorbid state, etiology and clinical course of the disease in children.

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