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Research Article

INFLUENCE OF PREMORBID FACTORS ON THE CLINICAL COURSE OF COMMUNITY-AQUIRED PNEUMONIA IN CHILDREN

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ABSTRACT

Pulmonary pleural complications in children with pneumonia occur at different stages of the disease, which does not dictate the need to analyze predisposing and premorbid factors that influence the risk of developing complications in pneumonia in children.

KEYWORDS

Pneumonia; children; complication; premorbid factors.

INTRODUCTION

Pneumonia in childhood is classified as extensive diseases with various clinical features, a high risk of complications [1] and unfavorable outcome [1,3], which largely determines the structure of mortality at different ages [2, 4].

Pulmonary pleural complications in children with pneumonia occur at different stages of the disease, which dictates the need to analyze predisposing and premorbid factors affecting risk development of complications in pneumonia in children [9,10].

The purpose of the study is to identify and analyze predisposing and premorbid factors in children with complicated and uncomplicated pneumonia, and also to evaluate their effect on the severity of the inflammatory process.

MATERIALS AND METHODS

We observed 162 children aged 1 to 17 years diagnosed with community-acquired pneumonia (86 boys and 76 girls). All patients were undergoing inpatient treatment at the children's clinic of the Tashkent Medical Academy.

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Based on the results of the study, two groups of patients were formed. The first group included children diagnosed with uncomplicated pneumonia (n = 62), which accounted for 38% of the number of patients examined.

In the second group we included 100 patients whose pneumonia occurred with pulmonary pleural complications, which amounted to 62% of the total examined patients. In the group of patients with uncomplicated pneumonia, the average age was 3.3 ± 0.32 years. Of these, 46% were boys, girls - 54%. Distribution by age groups: from 1 year to 3 years – 44 patients (72%), from 4 to 6 years – 10 (17%), from 7 to 17 years – 7 patients (11%). In a group of children with complicated pneumonia the average age of the patients was 4.94 ± 0.54 years. Of these, 57% were boys, 43% were girls. Age distribution: from 1 year to 3 years – 54 children (54%), from 4 to 6 years – 16 (16%), from 7 to 17 years – 30 patients (30%).

When analyzing the data obtained, it was noted that in the general group of patients, right-sided pneumonia predominated, which occurred in 62% of patients. Left-sided pneumonia was diagnosed in 27% of cases. Bilateral lung damage was detected in 11% of cases, which corresponds to literature data [9].

All patients underwent: 1) collection of complaints, medical history (morbi, vitae, all mothers had collection of gynecological, obstetric anamnesis, data on the course of pregnancy and childbirth); 2) objective examination; 3) clinical blood test (leukocyte level, blood count, ESR, hemoglobin amount, color index, platelet level); 4) biochemical blood test (total protein, bilirubin (fractions), ALT, AST, glucose, urea creatinine); 5) radiography of the chest organs in a straight line, if necessary in a lateral projection. Statistical data processing was carried out using the application software package (APP) StatSoft Statistica 5.0 [11]. The international classification of diseases, tenth revision (1992) was used in the work [12, 13].

RESULTS AND DISCUSSION

When analyzing the anamnesis data of children with complicated and uncomplicated pneumonia, we identified the following social factors. In the group of patients with uncomplicated pneumonia, urban residents predominated (92%), while in the group of children with complicated pneumonia, the majority of patients were rural residents (74%), the share of the urban population was only 26%.

According to the obstetric and gynecological history of mothers of children with uncomplicated pneumonia Pregnancy pathology (toxicosis, threatened miscarriage, intrauterine infections and bacterial infections during pregnancy, anemia) occurred in 26% of cases, and in the second group of patients this pathology was detected in 80% of mothers ($p < 0.05$).

An assessment of the nature of feeding in the first year of life in children of the first group showed that, on average, children were breastfed for 6.8 ± 1.15 months. In children of the second group, natural feeding lasted an average of 3.4 ± 0.7 months, which was significantly different from the duration of breastfeeding of children of the first group ($p < 0.01$). Significant differences were established by

the presence of food and/or drug allergies in children of the study groups ($p < 0.01$). Allergies on medications and/or food products in children of the first group was noted in 17% of cases, and in patients with complicated pneumonia allergies

installed in 55% of cases.

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We carried out a comparative analysis of the course complicated and uncomplicated pneumonia in children.

It was found that more than 2/3 of those surveyed children (88%) with uncomplicated pneumonia were admitted to the hospital with suspected acute respiratory infection (ARI). The onset of the disease was accompanied by symptoms of acute respiratory infection; 98% of patients from this group had pneumonia and it was was diagnosed in the first three days of hospitalization; in the remaining 2% of patients, pneumonia was diagnosed later.

The main clinical symptom of uncomplicated pneumonia in 100% of patients in the first group was intoxication syndrome, which manifested itself as lethargy, drowsiness, and loss of appetite; an unproductive cough was also noted in all patients. Fever accompanied the course of the disease in 87% of children, while febrile temperature was recorded in 30% of children, high febrile temperature in 21% of patients, and an increase in body temperature to subfebrile levels was noted in 21% of those examined.

This correlates with data from other authors [1, 2, 5].

During an objective examination, shortening of the percussion sound and weakening of breathing were observed in 72% of children with uncomplicated pneumonia, and harsh breathing was observed in 94% of those examined. The presence of moist fine-bubble rales was noted in 44% of children, medium-bubble rales – in 22% of patients, crepitus – in 17% of patients. A combination of local percussion and auscultation symptoms was recorded in 70% of those examined, without significant differences between age groups.

According to X-ray examination, focal pneumonia was detected in 56% of patients, focal-confluent – in 31% of patients, segmental – in 2% of patients, polysegmental infiltration was diagnosed in 11% of those examined. According to localization, in 89% of cases the unilateral nature of the process was noted, the right lung was affected in 79% of children ($p < 0.01$), a bilateral process was diagnosed in 11% of cases. Bilateral localization of the process was more often observed in young children ($p < 0.01$). The results obtained correlated with the data of other authors [6, 9, 13].

In the hemogram in the first three days of uncomplicated pneumonia, leukocytosis was recorded in 34% cases, neutrophilia – in 51% of children, leukopenia –in 18% of children, lymphocytosis – in 5% of those examined.

An increase in ESR was detected in 66% of those examined Hypochromia occurred in 43 cases (70%), mild anemia was detected in 15% of patients and was observed more often in young children than in school children.

Thus, the course of uncomplicated pneumonia in the patients we examined was accompanied by catarrhal symptoms, fever and symptoms of intoxication. Local physical changes in the lungs were observed in only 70% of patients. [12, 14].

According to chest radiography, inflammatory infiltration was predominantly

focal nature (56% of cases), with right-sided localization – in 79% of those examined. Inflammatory changes in the hemogram and increased ESR were detected in 66% of patients with uncomplicated pneumonia.

Characteristics of children with complicated pneumonia. More than 2/3 of the children were admitted by the local pediatrician (or transferred from the central district hospital) to specialized departments on the 5-7th day from the onset of the

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disease. At the onset of the disease in 67% of children catarrhal symptoms were noted. Pneumonia was diagnosed in the first three days only in 38 patients (38%). In the remaining patients, the diagnosis of pneumonia was made later. The reason for the untimely diagnosis of the disease was a late visit to the doctor (rural residents predominated in this group of patients).

The main clinical symptom of complicated pneumonia in children was intoxication syndrome (100%) with the same frequency in all age groups, which manifested itself as lethargy, drowsiness, decreased appetite, and cough.

Fever was observed in 96% of patients without significant differences by age group, while low febrile temperature was recorded in 31% of children, high febrile temperature was detected in 43% of those examined, and an increase in body temperature to subfebrile levels was observed in 22% of patients.

The disease was accompanied by shortness of breath in 91% of patients; shortness of breath was significantly more common in young children compared to preschoolers and school-age children.

During an objective examination, all patients with complicated pneumonia showed a shortening of the percussion sound and weakened breathing In most cases, right-sided complicated pneumonia was recorded (in 71% of those examined).

On auscultation, moist fine bubbling rales were heard in 51% of children, scattered moist medium bubbling rales – in 30% of patients, crepitus – in 24% of patients, and dry rales in 27% of cases. The combination of local percussion and auscultation symptoms was recorded in 100% of those examined, without significant differences between age groups.

By localization, right-sided complications were more common than left-sided or bilateral ones. In the structure of pulmonary complications, pleurisy was in first place, which was detected in 46% of cases, lung destruction was noted in 30% of patients, pneumothorax was diagnosed in 10% of cases, pyothorax was detected in 14% of patients. [2, 5].

In the hemogram upon admission, all patients with complicated pneumonia had inflammatory changes in the blood in the form of leukocytosis, neutrophilia, and accelerated ESR.

Leukocytosis was recorded in 64% of patients, neutrophilia – in 100% of cases, leukopenia – in 3% of those examined. In 87 children with complicated pneumonia, an acceleration of ESR was noted, which is typical for the course of bacterial pneumonia [1].

Hypochromia was detected in 92% of patients, in 86% of young children and in 100% of school-aged subjects. Mild anemia was diagnosed in 57% of patients, moderate anemia in 20%, severe anemia in 6% of patients. Thus, in 96% of those examined the course complicated pneumonia was characterized by fever, symptoms of intoxication in the form of weakness and loss of appetite, in 98% of the examined patients - signs of respiratory failure and characteristic physical findings.

It was further noted that pregnancy of mothers of children in the second group occurred significantly more often ($p < 0.01$) against the background of various pathologies: bacterial infections, anemia, the development of toxicosis and the threat of miscarriage. At the same time, the presence of extragenital pathology and pathology of pregnancy in mothers of children of the first group was noted significantly ($p < 0.01$) less often.

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Breastfeeding in the first year of life in children of the first group lasted an average of 6.8 months, which is significantly ($p < 0.01$) longer than in children of the second group (3.4 months). The presence of a burdened allergic history in children of the second group occurred in 55% of cases, in children of the first group - in 17% ($p < 0.01$). [4].

Thus, it can be assumed that pulmonary pleural complications are more likely to develop in children with pneumonia under the influence of the following predisposing and premorbid factors: 1) late visit to the doctor (mainly children from the regions of the region) ($p < 0.01$); 2) pathology of pregnancy in the mother; 3) the presence of extragenital pathology in the mother during pregnancy; 4) the nature of feeding in the first year of life; 5) the presence of atopy in the child; 6) signs of iron deficiency and the presence of anemia. All of the above in combination and each individually has an impact on the severity of the inflammatory process in the lung.

CONCLUSIONS

Children may be included in the risk group for developing pulmonary pleural complications of pneumonia in the presence of such predisposing and premorbid factors as: late visit to the doctor, the presence of (perinatal pathology) pregnancy pathology in the mother, extragenital pathology, early transition to artificial feeding, the presence of underlying diseases in the child, atopy, signs of iron deficiency.

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