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CHARACTERISTICS OF PERIPHERAL BLOOD MONOCYTES IN CONGETITAL CLEFT IN YOUNG CHILDREN

Aliev A.L., Akmalova N.A.

Department of Pediatrics, Tashkent Pediatric Medical Institute

Objective: The aim of the study is the analysis of clinical and biochemical characteristics of the course of severe pneumonia in young children with congenital cleft.

Materials and methods: Medical history, clinical observations, radiological, biochemical studies.

Results: Clinical and biochemical characteristics of the course of severe pneumonia in young children were identified. Cytochemical changes were revealed.

Keywords:young children, pneumonia, congenital cleft, biochemistry

Relevance: Acute pneumonia in young children remains a significant cause of morbidity and mortality despite the implementation of highly effective broad-spectrum antimicrobial drugs, the presence of comprehensive supportive treatment regimens, and the availability of advanced therapeutic approaches(2,3,4,5).

Energy deficiency, anemia, dysbiosis, atopic dermatitis, and other conditions further exacerbate the situation(1).

Children with congenital anomalies of the tissues and organs of the maxillofacial region occupy a special place. Great interest lies in assessing the clinical course of acute pneumonia in such premature children. However, despite this, there is a scarcity of literature or any theoretical or practical data that could be of significant importance for treating this group of patients. Treatment is associated with particular difficulties, requiring the participation of highly qualified specialists, proper sequencing, and a comprehensive approach(6,7,8).

We consider myeloperoxidase (MP), acid phosphatase (AP), and succinate dehydrogenase (SDH) to be important indicators. Therefore, it was of interest to study the activity of SDH, MP, and AP depending on the stage of the disease.

Materials and Methods

A total of 60 children aged 3 months to 3 years were examined. This included 30 children with ordinary pneumonia, 30 with congenital cleft, and 20 with purulent-destructive pneumonia as a complication of AP. The control group consisted of 22 healthy children of the same age.

In all patients, in addition to general clinical and radiological studies, the activity of MP, AP, and SDH in peripheral blood monocytes was determined at admission, during the acute phase of the disease, during improvement in the general condition, and upon recovery.

MP activity was determined using the methods of Goloberg and Barka, followed by the calculation of the average cytochemical index (ACI). SDH activity was assessed using a quantitative cytochemical method developed by R.P. Narcissov. The diagnosis of pneumonia was made according to the ICD-10 classification (2010).

Results and Discussion

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Parents of the sick children mainly reported fever, restlessness, catarrhal symptoms, cough, severe weakness, shortness of breath, sleep disturbances, reduced appetite, and dyspeptic symptoms.

The semiotics of respiratory organ involvement primarily manifested as mixed dyspnea in all patients, as well as increased resistance in the airways during exhalation in 12 children. Among them, 16 patients exhibited particularly difficult and prolonged exhalation, indicating a pronounced obstructive syndrome.

Impairments in external respiratory function were evidenced by nasal flaring in 30 patients and retraction of compliant areas of the chest in 41 patients.

The frequency of various toxic and exacerbating syndromes associated with pneumonia in the primary group was as follows:

- Obstructive syndrome: 22 cases (0.24).
- Cardiorespiratory syndrome: 5 cases (0.05).
- Dyscirculatory syndrome: 8 cases (0.1).
- Disseminated intravascular coagulation (DIC) syndrome: 2 cases (0.02).
- Exicosis (severe dehydration): 1 case (0.01).

In the comparison group, the frequency of these syndromes differed:

- Obstructive syndrome: 16 cases (0.23).
- Cardiorespiratory syndrome: 23 cases (0.32).
- Neurotoxic syndrome: 17 cases (0.03).
- Circulatory syndrome: 6 cases (0.084).
- DIC syndrome: 2 cases (0.03).

Bronchial obstruction syndrome was clinically manifested by expiratory dyspnea…

…during the course of the disease, and by the time of recovery, it exceeded the age norm by 1.5 times ($P<0.001$). The observed changes in MP levels can be explained by the concentration of components of the myeloperoxidase system in the cells involved in phagocytosis.

When analyzing the data, the highest increase in AP activity was also noted in children with rapidly progressing, destructive pneumonia. The maximum increase, compared to the control group, was recorded during the acute phase of the disease ($P<0.001$). The decrease in enzyme activity paralleled the clinical improvement, but even at the point of recovery, it remained higher than the control values.

The assessment of SDH levels in purulent-destructive pneumonia as a complication of congenital cleft showed a pronounced depression during the acute phase ($P<0.001$). There was a more rapid increase in enzyme activity during the pathological process compared to other forms.

Discussion

The results of our research demonstrated that acute pneumonia developing as a complication is characterized by a severe course. Cytochemical changes in peripheral blood monocytes indicate an intense inflammatory process with acute severity. These changes highlight the impact on the organism at multiple levels: systemic, tissue, organ, and cellular.

Based on these observations, cytochemical studies of the enzyme spectrum in blood cells, particularly monocytes, can be used to assess the depth of metabolic disturbances and the state of the organism's reactivity at the cellular level.

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This provides a foundation for further studies of patients with acute atypical pneumonia and the development of new therapeutic approaches, as well as a logical management algorithm for such patients.

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The evaluation of SDH levels in purulent-destructive pneumonia as a complication of congenital cleft revealed significant depression during the acute phase ($P<0.001$). The enzyme activity showed a more rapid increase in the dynamics of the pathological process compared to other forms.

The results of our studies have shown that acute pneumonia, developing as a complication, is characterized by a severe course. Cytochemical changes in peripheral blood monocytes indicate an inflammatory process of high intensity and acute severity, causing alterations at the organism, tissue, organ, and cellular levels.

Based on these premises, cytochemical studies of the enzyme spectrum in blood cells, particularly monocytes, can be used to evaluate the depth of metabolic disturbances and the reactivity of the organism at the cellular level.

This provides a basis for further study of patients with acute atypical pneumonia, the development of new treatment methods, and a logical approach (algorithm) for managing these patients.

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