

## Procalcitonin is a Predictor of Bacterial Inflammation in Severe Pneumonia In Children

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**Annotation**. Severe pneumonia is pneumonia characterized by severe respiratory failure, signs of sepsis and multiple organ dysfunction. Today, the problem of severe pneumonia is relevant, due to the high mortality of the disease, the presence of a wide range of poly and multi-resistant strains of microorganisms. Thus, at present, the issues of studying severe pneumonia in children have not been sufficiently addressed, and the issue of using modern methods of preventing infection remains insufficiently addressed. Issues related to establishing the degree of influence of modifiable and non-modifiable factors on the development and course of severe pneumonia in children the course and outcome, develop and implement new methods of treating and preventing the disease. In this connection, determining the level of procalcitonin in the blood today is very indicative for diagnosing severe forms of pneumonia.

Key words: children, diagnosis, severe pneumonia, procalcitonin.

**Relevance**. Pathologies of the respiratory system in children occupy first place, both in terms of overall morbidity and mortality. Research shows that various bacterial and viral agents, bacterial and viral agents have been identified among the etiological factors of pneumonia. The significance of which is not fully understood, but these cases are characterized by mixed results, lack of complete data and insufficient coverage in the literature. Severe pneumonia is pneumonia characterized by severe respiratory failure (RF) or signs of sepsis and multiple organ dysfunction. Today, the problem of severe pneumonia is relevant due to the high mortality of the disease and the presence of a wide range of poly- and multi-resistant strains of microorganisms. Thus, at present, the study of severe pneumonia in children has not been sufficiently studied, and the issue of using modern methods of preventing infection remains insufficiently addressed.

The purpose of the scientific work: to determine the prognostic value of procalcitonin in hospitalized children with severe pneumonia.

**Materials and methods of research.** We observed 26 patients with severe pneumonia aged 1 month to 5 years who were admitted to the Republican Research Center for Emergency Medicine. 14 (53.8%) children were hospitalized from districts and regional centers, 12 (46.2%) from the regional center. All patients underwent standard clinical, laboratory and instrumental studies, determination of plasma procalcitonin concentration, with a detection limit of 0.5 ng/ml.

Results of the study: When analyzing the clinical features of pneumonia, it was revealed that in 18 (69.2%) children the disease began with signs of a viral infection and severe catarrhal syndrome, in 8 (30.8%) children with an unproductive cough, an increase in body temperature was noted in 24 (92.3%) patients. The condition of 16 (61.5%) patients upon admission was assessed as severe due to symptoms of intoxication and signs of respiratory failure, which developed against the background of broncho-obstructive syndrome in 9 patients (34.6%), and in 3 (11.5%) children due to widespread inflammatory process in the lungs, complicated by exudative pleurisy or destruction of lung tissue. At the same time, inflammatory changes in the clinical blood test (leukocytosis more than 10.0, ESR more than 12 mm/h were detected in only 15 patients (57.7%). All patients were tested to determine procalcitonin in the blood. Positive results were noted in 10 (38.5%) patients. During the studies, only 7 children with elevated procalcitonin levels had a high ESR, 7 had leukocytosis, leukopenia (with a significantly high ESR) was found in 1 child, 5 patients had an increase in CRP of more than 15 mg/l, seromucoid values did not exceed 0.6 units, with the exception of one case with destructive pneumonia. Among 10 patients with elevated procalcitonin levels, only 5 had a severe condition upon admission. All patients with positive blood test results for procalcitonin were divided into 3 groups. Group 1 6 (23.1%) children with plasma procalcitonin levels > 0.5 ng/ml but < 2 ng/ml Group 2 - 2 (7.7%) children with procalcitonin levels > 2 ng/ml but < 10 ng/ml.

**The discussion of the results.** In group 1, 5 children had a short period of outpatient treatment (1-2 days), an early start of adequate antibacterial therapy, and the educational process in the lungs was focal in nature. One patient admitted on the 5th day from the onset of the disease was diagnosed with left-sided lower lobe focal pneumonia with damage to several segments of the lung, absence of leukocytosis, positive procalcitonin levels > 0.5 ng/ml but < 2 ng/ml; the analysis was carried out on the 5th day from the start of antibacterial therapy. In patients of group 2, in one case, a widespread focal-confluent process was noted in the upper and middle lobe of the right lung, an average severity of the disease, leukocytosis of 16.0 \* 10/1, and in the second case, focal pneumonia, complicated by left-sided otitis media, was diagnosed. Procalcitonin levels of more than 10 ng/ml (group 3) were found in two patients with a destructive process in the lungs, the development of systemic inflammatory response syndrome, signs of generalization of the process with late hospitalization on the 6-7th day of illness and the absence of timely antibacterial therapy. A patient with severe sepsis with multiple purulent foci (focal confluent pneumonia, purulent pleurisy, purulent pericarditis) was also observed. All patients were discharged from the hospital with recovery.

**Conclusions**. An analysis with procalcitonin (a predictor of bacterial inflammation) is most informative in the development of sepsis, as well as in widespread inflammatory processes in the lungs, complicated pneumonia and severe forms of the disease. It is advisable to determine the level of procalcitonin in the blood in the first days of hospitalization of a patient with severe clinical manifestations of community-acquired pneumonia and with late admission to the hospital. When procalcitonin levels are more than 2ng/ml, a search for bacterial complications is necessary;

procalcitonin levels of more than 10ng/ml indicate the presence of pulmonary destruction or the formation of a septic, generalized process, including with multiple purulent-inflammatory foci. A complex of laboratory examination of patients with radiologically confirmed pneumonia should include a clinical blood test, biochemical studies, including quantitative indicators of C-reactive protein and determination of the level of procalcitonin in the blood serum.

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