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The Use of Biomarkers in the Diagnostics of Infections Complications in Children with Oncological and Hematological Diseases

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ABSTRACT

Background and Purpose: Patients with hematological malignancies are at risk of fungal infections and require quick diagnostics infection complications. The following study aimed to evaluate the effectiveness and relevance of the use of biomarkers of procalcitonin (PCT), C-reactive protein (CRP), galactomannan (GM), and bis(methylthio) gliotoxin (BMGT) in the diagnosis of fungal and bacterial infections in patients with oncological and hematological diseases.

Materials and Methods: The prospective study was conducted at the Belarusian Research Center for Pediatric Oncology, Hematology, and Immunology from April 2015 to January 2020. The study included 66 children with malignant hematological diseases aged 1 to 17 years. Clinical, microbiological, and statistical methods were used in the study.

Results: In the case of fungemia in children with oncological and hematological diseases, the PCT level during the infectious episode was significantly lower than with bacterial infections of the bloodstream (p = 0,0063); and the CRP level fungal and bacterial infections did not differ significantly (p = 0,1719). Diagnostic study of GM in bronchoalveolar lavage had a high predictive value of a negative result (91,7%). The method's sensitivity was higher than in the study of GM in serum (50% versus 0%). There was no correlation between serum BMGT levels as measured by HPLC and the presence of invasive aspergillosis in children.

Conclusion: An increase in CRP levels with normal PCT levels in immune compromised children with clinical signs of bloodstream infection is indicative of a fungal etiology of the disease. Determination of the optical density index of galactomannan in the bronchoalveolar fluid is a sensitive marker for diagnosing invasive pulmonary aspergillosis in children. We cannot recommend BMGT for the diagnostics of invasive aspergillosis in children.

Keywords: Biomarkers, Infectious diseases, Oncohematological diseases

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