PECULIARITIES OF IMMUNE REACTIVITY IN CONVALESCENTS AFTER COVID-19

N. V. Vantiukh, O. I. Lemko, D. V. Reshetar
Government Institution "The Scientific-Practical Medical Centre "Rehabilitation" Health Ministry of Ukraine", Uzhhorod, Ukraine

Abstract. Recent pandemic caused by the SARS-CoV-2 virus has united researchers from all over the world. However, despite their efforts, many questions remain unsolved: how the immune system is effective against this viral infection, how long the immunity persists in convalescents, what are the consequences of the disease. The inflammatory process, which is based on multicomponent immunological disorders, is one of the leading pathogenetic links of the disease caused by the SARS-Cov-2 virus. In this regard, a precise study of the immune status peculiarities in patients — convalescents after COVID-19 and their possible role in the further development of chronic pathology are relevant.

The aim of the work is to investigate peculiarities of immune disorders in convalescents after acute respiratory disease COVID-19 in relation to the severity of the disease and the timing of the examination after the acute period.

Methods. We examined 91 convalescents after COVID-19, aged 21-67 years, treated as inpatients during the acute period of the disease. After the acute period these patients received a course of rehabilitation treatment in the Government Institution "The Scientific-Practical Medical Centre "Rehabilitation"". For comparison, a group of 45 patients with bacterial community-acquired pneumonia of medium severity were examined. As a control for laboratory indices, 24 practically healthy persons were examined. Cytokine status was studied by determining the levels of pro- and anti-inflammatory cytokines using immunoenzymatic method. Non-specific resistance was investigated on the base of phagocytic activity and phagocytic number of monocytes. Indicators of cellular immunity were evaluated using an indirect immunofluorescence reaction using monoclonal antibodies ($CD3^+$, $CD22^+$, $CD4^+$, $CD8^+$, $CD16^+$) and on this basis index values were calculated that characterize the relationships of the studied subpopulations. When analyzing these data, the severity of the COVID-19 and the time of examination after the acute period of the disease were taken into account.

Results. At the beginning of the course of recovery treatment, a pronounced imbalance in the ratio of pro- and anti-inflammatory cytokines with a significant predominance of the first one, was revealed. These changes can contribute to the persistence of the inflammatory process with further formation of the chronic pathology. This imbalance did not depend significantly on the severity of COVID-19, persisted for a long time and was 1.9 times more pronounced than in bacterial community-acquired pneumonia. In the period of convalescence, suppression of the monocytes' phagocytic activity and significant changes in the T-cells link of immunity were also revealed. It should be noted that disorders of cellular immunity depended on the severity of COVID-19 and were most pronounced in patients with its severe course. These changes persisted for a long time (examinations were carried out 2-3 weeks and 2-3 months after the acute period), which determines the need for recovery treatment during the convalescence period.

Conclusions. 1. In convalescents after acute respiratory disease caused by the SARS-CoV-2 virus, certain disturbances of the immune status remain, which significantly affect the functional state of the organism as a whole and may be the basis for a persistent inflammatory process and the development of chronic pathology in the future.

2. Immune defense of convalescents after COVID-19 is characterized by a significant decrease in non-specific protection indices and the cellular link of immunity with manifestations of cytokine imbalance and these changes persist for a long time, which can contribute to the formation of post-COVID syndrome.

3. The obtained data serve as a pathogenetic basis for carrying out complex immunorehabilitation measures in convalescents after COVID-19 in order to recover the normal functioning of immune system, correcting protective reserves of the organism and preventing the development of chronic pathology.

Key words: COVID-19, cytokine status, non-specific defense, cellular immunity.