

Endothelial function in patients after severe or critical acute phase of COVID-19 one year after the disease onset

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Conflict of interest: none

BACKGROUND. The SARS-CoV-2 virus not only causes respiratory diseases but also significantly impacts endothelial function, which may be one of the mechanisms for developing long-term consequences of coronavirus disease (COVID-19).

OBJECTIVE. To determine the levels of endothelial function markers (endothelin-1, thrombomodulin) in the peripheral blood of individuals who experienced non-hospital pneumonia on the background of COVID-19, in the early post-acute phase and one year after the onset of the disease, and to analyze the changes in individual levels of these markers.

MATERIALS AND METHODS. The main group consisted of 16 individuals (age – 57.5 (43.8; 64.5) years, 8 (50.0 %) men, 7 (50.0 %) women), who were examined twice: at visit 1 – on day 60.0 (56.3; 62.5) from the onset of the disease; at visit 2 – on day 312.5 (300.0; 365.0) from the onset of the disease. The control group consisted of 10 individuals (age – 58.5 (39.5; 67.8) years, 4 (40.0 %) men, 6 (60.0 %) women). General clinical and laboratory methods were used, as well as an assessment of lung diffusion capacity (DLco).

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ОРИГІНАЛЬНЕ ДОСЛІДЖЕННЯ

RESULTS. At visit 1, the clinical status of 16 (100.0 %) individuals in the main group was impaired. At visit 2, the clinical status of 12 (75.0 %) individuals normalized, while 4 (25.0 %) individuals showed improvement; the severity of dyspnea according to the mMRC scale and heart rate decreased, and SpO₂ and DLco levels increased ($p < 0.01$, $p < 0.01$, $p < 0.01$, and $p = 0.03$, respectively). The level of endothelin-1 in the control group was 14.6 (11.7; 17.0) pg/ml, and the thrombomodulin level was 451.7 (403.9; 652.4) pg/ml. The level of endothelin-1 at visit 1 in the main group was 11.1 (6.8; 15.9) pg/ml, and at visit 2 – 14.4 (11.2; 20.0) pg/ml ($p = 0.02$), not differing from the control group ($p = 0.48$ and $p = 0.61$, respectively). The level of thrombomodulin at visit 1 in the main group was 723.1 (689.1; 1012.2) pg/ml, and at visit 2 – 811.5 (713.3; 911.7) pg/ml ($p = 0.40$), which was higher than in the control group ($p = 0.01$ and $p = 0.01$, respectively).

CONCLUSIONS. One year after COVID-19, most individuals show normalization of clinical status and improvement in lung diffusion capacity; however, elevated thrombomodulin levels persist, which requires further investigation. In some patients, the level of endothelin-1 also increases, which is why they should be monitored not only by a family doctor or a pulmonologist but also by a cardiologist.

KEY WORDS: coronavirus disease (COVID-19), community-acquired pneumonia, post-acute period, endothelin-1, thrombomodulin, endothelial function, lung diffusion capacity (DLco).