

RESOLUTION OF Eurasian Teleconference «Clinical council. Specific features of progression and rehabilitation of patients with Long COVID»

20.01.2022

Almost 10 000 health care specialists from Ukraine, Uzbekistan, Tadjikistan, Kirghizia, Kazakhstan, Azerbaijan, Georgia, Moldova and other countries have registered to participate in the Teleconference “Clinical council. Specific features of progression and rehabilitation of patients with Long COVID” (Kyiv, Ukraine).

Interdisciplinary format of the Teleconference, which took place on January 20, 2022, was assured by speakers from different special fields: cardiologists, neurologists, anesthesiologists, pulmonary specialists.

10 main speeches were offered to the participants and they were dealing with the following issues:

- Main pathophysiological mechanisms and clinical manifestations of the Long COVID syndrome.
- Directions of drug-free and drug-induced rehabilitation in case of Post COVID syndrome.
- Long-term consequences of the COVID-19 infection and the ways for correction of neurological and cognitive disorders
- Potential interrelations of demyelinating diseases and Long COVID.
- The problem of hibernating myocardium.

Brief outlines of reports:

1. As defined by NICE (The British National Institute for Health and Care Excellence), Post COVID syndrome is a complex of symptoms that developed during or after COVID-19, last more than 12 weeks and cannot be explained by alternative diagnosis. According to the data of the British Medical Journal presence of persistent cough, hoarse voice, headache, meal omission and laboured breathing within the first week of COVID-19 increases the risk of development of post COVID symptoms in 2-3 times. Immediacy of the problem of Long COVID is proved by the fact that it is included into ICD-10 under two codes: U08.9 Personal history of COVID-19, unspecified and U09.9 Post COVID-19 condition.
2. Three pathophysiological syndromes launch development of post-COVID complications: endotheliitis, system background inflammation and a significant clinical syndrome – asthenia. In absence of causal treatment the patients with Long COVID require syndromic and pathogenic approach to rehabilitation. Endotheliitis is one of the leading syndromes during COVID-19 and of triggering mechanisms of the Long-COVID syndrome. Virus SARS-CoV-2 can infect endothelial cells directly penetrating through ACE-2 receptors and resulting in endothelium diffuse inflammation. Direct infection of endotheliocytes by the virus or indirect damaging by immune cells, cytokines and free radicals can cause pronounced endothelial dysfunction further resulting in microcirculation disorders, vasoconstriction, development of ischemia of organs, inflammation and tissue edema, pro-coagulation.

Application of fixed combination of L-arginine and L-carnitine helps to reduce intensity of endotheliitis and to protect cardiovascular system and to increase tolerance to physical activity.

3. As far as SARS-CoV-2 virus has affinity to cells of the central nervous system and may cause development of neurological symptoms in infected patients with Long COVID, it is recommended to consider treatment with edaravone that will encourage regression of neurological manifestations and decrease of the level of system inflammatory response at all stages of coronaviral infection progression, including patients with Long COVID. Prescription of edaravone during Long COVID let us reduce system background inflammation through depression of pro-inflammatory cytokines, neutralizes free radicals and reduces activation of microglia and astrocytes. Edaravone protects endothelium against damaging and activates eNOS, impedes iNOS and nNOS function, and amplifies the adhesive contacts of the endothelium.
4. The infusion solutions based on xylitol and electrolytes are used to decrease asthenia signs as far as they are sources of energy with insulin independent metabolism and provide efficient energetic support. Parenteral ethylmethylhydroxypyridine succinate, identical to the original in composition and instruction, 700 ml per day, helps to eliminate anxiety. Drug-free rehabilitation methods are also very important: electrophoresis, therapeutic massage, halotherapy.
5. Hibernating myocardium is the reverse pathological condition of the tissue resulting from a long-term and significant deficiency of perfusion, which manifests itself in a local decrease of the contraction function of the muscle. The early use of pharmacological means, namely the preparation of edaravone, the combination of L-carnitine and L-arginine, and the solution of electrolytes in combination with xylitol is necessary to prevent possible new cardiovascular events, to accelerate the processes of restoring of the normal functioning of the system, to improve rehabilitation measures and to reduce the probability of death.
6. Presence of SARS-CoV-2 in cerebrospinal fluid demonstrates its neuroinvasive properties and possible damaging of microstructural and functional integrity of brain in patients who recovered after COVID-19. Headache, tremor, poor attention and concentration; cognitive obtusion ("brain fog"), peripheral nerves dysfunction; and mental problems such as anxiety, depression and post-trauma stress disorder are often observed in people with Long COVID. Treatment of patients with Long COVID requires multidisciplinary approach, including assessment, syndromic and pathogenic treatment, physiotherapy and psychological support.
7. Special attention is paid to patients with demyelinating diseases. Attention is drawn to the fact that in patients with this pathology, the number and severity of attacks, their duration, and the severity of neurological symptoms increase in the context of the coronary infection suffered. All these changes can be a consequence of macro-organism immune responses to SARS-CoV-2, such as elevated C-reactive protein levels, IL-7, IL-6 and other inflammatory markers.
8. Accumulated experience in treatment of patients with COVID-19 indicates that pulmonitis is a triggering mechanism for pulmonary fibrosis: more than 50% of patients with Long COVID have respiratory function disorders, many of them have reduced vital capacity because of pulmonary fibrosis. Pathogenic processes are based on further damaging of respiratory endothelium and alveolar complex as a result of release of pro-inflammatory mediators and synthesis of free radicals. Parenteral

acetylcysteine is a powerful pneumoprotector and antioxidant that reduces the release of pro-inflammatory cytokines, neutralizes free radicals and reduces the apoptosis of alveolar cells.

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