World Bulletin of Public Health (WBPH)
Available Online at: https://www.scholarexpress.net
Volume-32, March 2024
ISSN: 2749-3644

MODERN VIEWS ON MORPHOLOGICAL CHANGES IN THE CEREBRAL CORTEX IN PATIENTS IN THE POSTCOVID PERIOD

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Article history:
Received: January 24th 2024
Accepted: March 20th 2024

Abstract:
Coronavirus infection (COVID-19) has spread worldwide since the coronavirus was detected in December 2019 and has caused the deaths of millions. The new coronavirus infection (COVID-19) poses a serious public health problem. As of April 2021, since the beginning of the pandemic, the World Health Organization has registered about 3 million deaths from a new coronavirus infection caused by the SARS-CoV-2 virus in humans [1].

Keywords: Cortex, brain, post-cortical period, morphology

The novel coronavirus disease (COVID-19) is a serious problem for health care. As of April 2021 since the start of the pandemic
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INTRODUCTION. Despite protective measures and vaccination programs, the ongoing COVID-19 pandemic poses various challenges for doctors. Timely diagnosis and hospitalization, risk stratification, effective use of intensive care services and the choice of appropriate treatment methods are of great importance for solving the problem of COVID-19 [2,13]. COVID-19 is not a localized respiratory tract infection, but a multisystem disease caused by a widespread systemic process involving the interaction of immunological, inflammatory and coagulation cascades [3, 4]. The clinical course of COVID-19 in children is lighter than in adults, possibly due to natural immunity, vaccination, frequent viral infections, better lung regeneration or the absence of concomitant diseases [5,12]. Answers to unresolved questions of COVID-19 pathogenesis may be related to cytokines and immunological mechanisms [5,7].Morphological studies of the internal organs of patients who died from COVID-19 reveal signs of circulatory disorders, lung damage characteristic of acute respiratory distress syndrome, as well as nonspecific damage to internal organs [2, 3]. Despite the predominance of respiratory symptoms in COVID-19, according to various studies, 3669% of patients with a new coronavirus infection have anosmia, headache, dizziness, convulsions, acute cerebral circulatory disorders, which implies the likelihood of involvement of the central nervous system in the pathogenesis of a new coronavirus infection [4,11].

The question of whether brain damage is a direct consequence of the cytopathic effects of the virus or is caused by hypoxia resulting from respiratory failure, coagulopathy complicating the course of COVID-19 remains open. Based on the studies conducted to date, it is impossible to exclude the possibility of direct brain damage due to the neurotropy of the virus. It is assumed that there are two ways for the virus to enter the central nervous system (CNS): 1) a retrograde

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axonal pathway from the central nervous system (CNS): 1) a retrograde axonal pathway from infected olfactory or vagus nerves; 2) a hematogenic pathway in which the virus spreads to the central nervous system through damaged endothelial cells of the blood-brain barrier (BBB) [6,15]. It is known that angiotensin converting enzyme type II (APF2), which is the main receptor for penetration into the SARS-CoV-2 cell, is present in endothelial cells of human cerebral vessels [7, 8]. According to a study by Paniz- Mondolfi et al., in the endothelial cells of cerebral vessels of a patient who died from COVID-19, Viral particles were detected using electron microscopy [9]. In the study by T.R. Buzhdygan et al. A microfluidic 3D model of the BBB demonstrated the ability of the S1 subunit of the Sars-CoV-2 coronavirus S-protein to disrupt the integrity of the BBB, as well as induce the expression of proinflammatory cytokine genes and matrix metalloproteinases in endothelial brain cells, which may also contribute to the study of the change in mice to coronavirus through the BBB. [10]

CONCLUSIONS: Infection with the SARS-CoV-2 virus in an unfavorable course of the disease with the development of a cytokine storm is morphologically manifested by pronounced paresis of microcirculatory vessels, stasis, arterial hyperemia with dilation of small arteries and edema in various organs and tissues of the body. The autopsy material was analyzed in order to study morphological changes in the brain.

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World Bulletin of Public Health (WBPH)
Available Online at: https://www.scholarexpress.net
Volume-32, March 2024
ISSN: 2749-3644

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