NEUROLOGICAL MANIFESTATIONS OF COVID-19

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The relevance of the topic is due to the extensive spread of coronavirus infection (COVID-19) as a pandemic disease around the world. Although SARS-CoV-2 mainly manifests with respiratory symptoms, it has already been found out and reported of the virus' effects systemically, including that of the nervous system. This thesis is intended to provide a comprehensive overview of the neurological manifestations of COVID-19 and to discuss potential pathogenic mechanisms of damage to the central nervous system (CNS). Clinicians and, in particular, therapists, neurologists and infectious disease specialists should be aware of these symptoms and be able to identify them at an early stage.

The aim of the study is related to a retrospective analysis of the main neurological manifestations of coronavirus infection in humans.

The materials and methods of the study included a systematic review of clinical studies of cases of neurological manifestations, complications and disorders associated with COVID-19 throughout the entire period of the pandemic. Data search was carried out in electronic databases PubMed, Scopus, Embase and LILACS. As the new epidemic is still ongoing, there is insufficient documentation of the neurological manifestations of SARS-CoV-2. Patients with COVID-19 may initially present with nonspecific neurological symptoms, including headache and dizziness. Others may develop more specific symptoms such as seizures and cardiovascular disease. There is also evidence that the more severe the infection, the greater is the likelihood of developing neurological symptoms, especially cardiovascular diseases and changes in the patient's mental status. Human coronaviruses are already recognized as neuroinvasive and neurotropic ones. In particular, SARS-CoV is proved to cause various neurological diseases such as polyneuropathy, encephalitis, and ischemic aortic stroke. In addition, its RNA was detected in the cerebrospinal fluid of a patient with severe acute respiratory syndrome (SARS), while autopsy samples from eight SARS patients revealed the presence of SARS-CoV in brain samples using immunohistochemistry, electron microscopy, and real life studies. The new coronavirus can potentially enter the central nervous system using the same pathophysiological mechanisms as other coronaviruses. In spite of the fact that the exact pathophysiological mechanisms are not fully researched, two possible theories have been proposed so far: hematogenous spread and retrograde neuronal spread. The olfactory nerves and the olfactory bulb in the nasal cavity can act as a connecting channel between the nasal cavity and the central nervous system. The latter scenario is further supported by the fact that many COVID-19 patients experience anosmia or hyposmia. Moreover, removal of the olfactory bulb in mice resulted in limited penetration of CoV into the central nervous system. As a result of data analysis and literature review, the conclusion is made that COVID-19 is a common pathology able to affect various organs, including the central and peripheral nervous system. The neurological symptoms caused by CoV are similar and can occur in any age group. Continuous documentation of neurological symptoms, complications and disorders, timely testing of cerebrospinal fluid, EEG and autopsy in surviving COVID-19 patients can help us in better understanding of the new coronavirus neurological manifestations, as well as the pathophysiological mechanisms of CNS damage.