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Review / Derleme

COVID-19 and Neurology

COVID-19 ve Nöroloji

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Abstract

Neurological diseases are the most common and important health burden over the world. Coronavirus disease-19 (COVID-19) pandemic is a new and important burden for the neurological area. Information related to the neurological involvement of Severe Acute Respiratory syndrome-Coronavirus-2 infection has been increased during the last several months. Frequency and mechanisms of neurological involvement of the disease may be explained more efficiently by neurologists who are included within the multidisciplinary COVID-19 teams. Other very important point is possibility of failure of follow up and treatment of chronic neurological disorders which needed frequent and regular control and also quick action for the acute treatment. The regulations are extremely important for the neurologists to perform their responsibilities with considering all these requirements.

Keywords: COVID-19, neurology, Turkey

Öz

Nörolojik hastalıklar bütün dünyada en fazla sağlık yükü oluşturan hastalık gruplarındandır. Çoğu kronik ve iyi takip edilmesi gereken risk faktörlerine bağlı olan nörolojik hastalık alanına yeni koronavirüs hastalığı-19 (COVID-19) pandemisi ile yeni ve ağır bir yük daha eklenmiştir. Nörolojik sisteme etkileri giderek daha fazla yayımlanmakta olan Severe Acute Respiratory syndrome-Coronavirus-2'nin nörolojik tutulum yapma sıklığı ve mekanizmaları multidisipliner ekip içinde nörologların da yer alması ile daha iyi anlaşılabilecektir. Diğer bir önemli durum ise, COVID-19 nedeniyle yapılan olağanüstü düzenlemelerin kronik gidişli, sık ve düzenli kontrol gerektiren, akut müdahale gerektiren hastaların izlem ve tedavilerini aksatabilme durumudur. Nöroloji uzmanlarının bu dengeleri koruyarak sahadaki sorumluluklarını yerine getirecek düzenlemeler yapılması hayati önemdedir.

Anahtar Kelimeler: COVID-19, nöroloji, Türkiye

Neurologic Diseases and COVID-19

Neurologic diseases are among the disease groups that pose the greatest health burden for patients, their relatives, and healthcare workers, and this situation is increasing with the aging world population. Neurologic diseases are the leading cause of years of life lost. They account for 10.2% of global loss in health worldwide, cause 16.8% of global deaths, and 9.4 million people in the world lose their lives every year because of neurologic diseases (1).

Now there is a new threat for this widespread and important group of diseasese: the COVID-19 pandemic. The pandemic, which was first reported in December 2019 from Wuhan in China, has become a very serious health problem throughout the world. While the unmodifiable and modifiable risk factors causing neurologic diseases are increasing rapidly throughout the world; reports from the COVID-19 [severe acute respiratory syndrome (SARS) CoV-2] outbreak, which has become a serious health problem and is considered a pandemic by the World Health Organization, have revealed that the disease causes SARS by affecting the respiratory tract, and affects neurologic systems in combination with the respiratory tract or alone (2,3,4).

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Neurologic Findings in Patients with COVID-19

It is known that in at least 30% patients with COVID-19, neurologic symptoms and signs have been detected (5,6). It is suggested that the effect of COVID-19 in neurologic systems occurs through different mechanisms. These mechanisms can be summarized as follows: (1) invasion of the virus into the neurologic system by a neurotropical effect; (2) the inflammatory response caused by the virus causes secondary damage in neurologic systems; (3) the effects on the respiratory and cardiac systems in particular may cause hypoxemia in the brain; (4) the virus infection and inflammation can cause effects on coagulation parameters, leading to cerebrovascular disease (7,8). The investigation and detection of neurologic symptoms and signs in these patients may be achieved with awareness of this condition. It is very likely that some of the symptoms and findings of these patients who are isolated and whose examination conditions have become difficult, will be overlooked. The most common symptoms reported in the current situation are headache, nausea and vomiting. Also, vertigo, sleep disorders, visual disturbances, myalgia, seizures, and changes in consciousness have been reported. Olfactory and taste disorders are the most common early neurologic findings. These have been tried to be explained through genetic expression changes besides the neurotrophic effects of the virus (9,10).

Acute stroke is also reported as a complication in 6% of patients with more severe disease, especially in elderly patients, with risk factors such as hypertension, diabetes, chronic lung disease, and obesity (11).

Nervous system involvement may cause an increase in respiratory failure. It is also suggested that the virus may affect the respiratory center, which may cause disturbances in coughing and gag reflex or may increase hypoxia thus leading to respiratory failure (12).

Diagnostic Difficulty in COVID-19's Neurologic Involvement

In addition to routine laboratory tests for the virus in the diagnosis of the disease, respiratory system tests are performed; chest X-ray and thorax tomography are the most important tools in the diagnosis. The diagnostic process generally does not allow cranial examinations of patients, and even if these patients have neurologic involvement, this condition cannot be revealed. Reports of cranial imaging showing neurologic involvement in patients are increasing (13). In the same way, cerebrospinal fluid examinations are not usually performed in these patients, which makes it difficult to detect encephalitis and meningeal involvement. Recently, publications on patients with encephalopathy and seizures have emerged. Peripheral nervous system involvement and movement disorders are also reported. SARS-CoV-2 reaches host cells via angiotensin-converting enzyme 2 receptors. This enzyme is most commonly found in lung type 2 alveoli, but is also expressed by glial cells and neurons in the the central nervous system. A hypothoesis of transneuronal transport of the virus through the olfactory nerve (bulb) has also been proposeded (14,15,16,17). Therefore, diagnostic parameters that will examine neurologic systems will also need to be included in algorithms.

Effect of Risk Factors of Neurologic Diseases on Prognosis in Patients with COVID-19

Age and cardiovascular risk factors are the most important factors in determining the prognosis of the disease (18). Prognostic findings revealed that the fight against the risk factors that play a crucial role in the prevention of cerebrovascular diseases was in fact the most important factor in the success of COVID-19 treatment. Very serious measures taken in our country are aimed at reducing the risk, especially for people age over 60 years. The importance of prevention and early treatment in these age groups becomes even more evident when one takes into account that cerebrovascular disease risk factors are quite common in individuals aged over 60 years. Social measures as well as individual measures and compliance with rules to prevent infection are vital in this period. Another very important point, as pointed out by health authorities all over the world, is that current chronic neurologic diseases and risk factors are kept under regular and painstaking control during these difficult health conditions.

Impact of COVID-19 Pandemic on Healthcare in Neurologic Diseases

The risks for neurologists who are under a major health service burden related to neurologic diseases during this pandemic are a separate issue. The protection and treatment of patients who require continuous treatment and whose immunity to infections is reduced, and ensuring that they are not affected by the current pandemic bring new responsibilities in addition to serious efforts and infrastructure. This extraordinary situation may create problems in monitoring chronic neurologic diseases (19). In addition to the general guidelines prepared by the Turkish Republic Ministry of Health, like other international neurology associations and organizations, the Turkish Neurological Society and its scientific study groups have prepared guides and informative documents in the field of neurology in this fight against th COVID-19 pandemic (20,21,22,23,24). While it is unpredictable as to how long the current situation will last, it is clear that approaches will change with the search for new methods in the areas of service, education and research, or with the development and dissemination of existing methods. Further efforts will be required to compensate for this period in which neurology specialization training is inevitably affected. Telemedicine applications, distance education systems, more effective use of digital facilities, and online organization and meetings will bring new habits to our field. It is inevitable that the infrastructure appropriate to the new situation will be provided to institutions as soon as possible.

Contribution of Neurology in Understanding and Managing COVID-19

It is necessary to provide accurate and effective information on COVID-19 and its neurologic signs and symptoms, such as cerebrovascular disease, to support the necessary organizations, to cooperate, to contribute to this difficult period through activities such as surveys, studies, projects, and forming databases to evaluate our own data and to pass the process, which maintains

its importance in our country, as soon as possible and with minimal damage. Accurate information is vital at all times and in all circumstances, most often in cases of confusion or absence of information. It is also our responsibility to provide and share accurate information in this new field. The success in combating the current COVID-19 outbreak and the risk factors of neurologic diseases that are always present constitute two close processes that actually affect each other very much, on which the effect of neurologists is undeniable, and should be regulated as soon as possible according to new developments.

Ethics

Peer-review: Externally peer-reviewed.

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