

Clinical Report of Stem Cell Therapy in Iranian Neurologic Patients - Bita Shalbafan - Labbafinejad Hospital, Shahid Beheshti Medical Science University, Tehran, Iran

Bita Shalbafan

Abstract

The severe acute respiratory syndrome coronavirus 2 has led to the worldwide pandemic named coronavirus disease 2019 (COVID-19). It has caused a significant increase in the number of cases and mortalities since its first diagnosis in December 2019. Although COVID-19 primarily affects the respiratory system, neurological involvement of the central and peripheral nervous system has been also reported. Herein, the higher risk of neurodegenerative diseases in COVID-19 patients in future is also imaginable. Neurological complications of COVID-19 infection are more commonly seen in severely ill individuals; but, earlier diagnosis and treatment can lead to better long-lasting results. In this respect, stem cell biotechnologies with considerable self-renewal and differentiation capacities have experienced great progress in the field of neurological disorders whether in finding out their underlying processes or proving them promising therapeutic approaches. Herein, many neurological disorders have been found to benefit from stem cell medicine strategies. Accordingly, in the present review, the authors are trying to discuss stem cell-based biotechnologies as promising therapeutic options for neurological disorders secondary to COVID-19 infection through reviewing neurological manifestations of COVID-19 and current stem cell-based biotechnologies for neurological disorders. Stem Cell Therapy is a chance to treat several non-treatable diseases like Neurologic diseases. There are many ambiguous questions in this regard that need to be examined in clinical trials in different diseases and different stem cells. 1-Is the use of pure and cultured mesenchymal cells more effective or fresh mesenchymal cells with progenitor cells (Stromal Vascular Fraction)? 2-Which kind of source is suitable for which kind of disease, Allogeneic or Autologous? 3- Is Adipose tissue-derived cell more effective than hematopoietic ones, in myopathic patients? 4- How long does the stem cell therapy benefit? Is it dependent on cell dose or cell type? And the unknown more and more questions need to know the exact reports of exact clinical trials. In this panel, we will review Iranian stem cell therapy clinical trials in neurological diseases like Cerebral Palsy, Friedrich Ataxia, CADASIL, Multiple Sclerosis. Due to the substantial burden of neurological disorders in the health, economic, and social system of society, the emergence of neurological manifestations following COVID-19 (as a life-threatening pandemic) creates the need to use efficient and modern methods of treatment.

Since stem cell-based methods have been efficient for a large number of neurological diseases, it seems that the use of mentioned methods is also effective in the process of improving neurological disorders caused by COVID-19. Hereupon, the current review aims to address stem cell-based approaches as treatments showing promise to neurological disorders related to COVID-19. Nowadays, there is a current global outbreak of coronavirus disease 2019 (COVID-19) resulting from severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) or a novel type known member of β coronaviruses. Until now, the most common early manifestations of COVID-19 appear to occur in the respiratory system. But there are ample shreds of evidence that it can be spread to other major organs, including the central and peripheral nervous systems (CNS and PNS). In this context, based on the variation in the severity of symptoms in the affected area, the subsequent destructive health, economic, and social burdens are also different. Hence, in many cases in addition to the need for costly treatments, it can lead to irreversible complications and death. Since finding effective treatment options to reduce the destructive consequences of the disease is always an important goal of health systems, this is also very important for the reduction of COVID-19 manifestations in various organs, especially the nervous system. Herein, cell therapy and regenerative medicine investigations as a pivotal part of clinical investigations promise powerful developments in medical science. In this respect, the emphasis of many studies is related to the safety and efficacy of the stem cell therapies for treating neurological disorders. Mentioned therapies rely on various factors, including the form and seriousness of the disorders, medical comorbidities, and other specific dilemmas. Overall, given the issues raised, the purpose of writing the present review is to consider studies on the impacts of stem cells to improve neurological manifestations following COVID-19. COVID-19 infection caused by SARS-CoV-2 is a recent public health challenge spread around the world. SARS-CoV-2 originated from bats, transmitted to humans by the means of intermediate animals, and thus affecting the global medical, economic, and public health. The incubation period of the disease ranges from 2 to 14 days, and respiratory droplets, direct contacts, and contaminated surfaces are mentioned to be the three ways of transmission.

Bita Shalbafan

Labbafinejad Hospital, Shahid Beheshti Medical Science University, Tehran, Iran E-mail: shalbafan.b@gmail.com

The disease can be diagnosed by computed tomography scan (CT scan), real-time-polymerase-chain-reaction (RT-PCR), antibody detection (with lower sensitivity), and viral culture (a more time-consuming method). COVID-19 typically results in respiratory and

enteric infection. However, age, hypertension, diabetes mellitus, and chronic lung disease are some factors that can lead to worse outcomes.

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