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Comment on “Transcranial direct-current stimulation as a strategy to manage COVID-19 pain and fatigue”

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Em um momento em que há uma emergência mundial de saúde pública, é fundamental que o conhecimento científico gerado durante a pandemia chegue rapidamente à classe médica classe médica.

Dentro desta dinâmica a Revista da Associação Médica Brasileira (Ramb) está adotando uma série de medidas a fim de acelerar o processo editorial para publicação de artigos sobre a Covid-19. A partir de hoje (14/04/2020), a AMB publicará o Boletim Ramb Covid-19, que antecipará os artigos científicos selecionados pelos editores da Ramb sobre o tema.

“Os artigos foram escritos por especialistas e selecionados dentro dos critérios da Ramb para esclarecer temas fisiopatológicos, assim como oferecer orientações de prevenção e tratamento da doença. Dessa forma, esperamos colaborar com os médicos para o melhor atendimento aos seus pacientes, com a disponibilidade mais ágil desses artigos, antes de sua publicação na Ramb”, comenta Carlos Serrano Jr., editor-chefe da Ramb.

Para o diretor científico da AMB, Antonio Carlos Palandri Chagas, “neste momento ímpar vivido no mundo por conta da pandemia de Covid-19, a AMB cumpre seu papel de estar levando à comunidade científica brasileira os recentes artigos sobre os mecanismos fisiopatológicos e aspectos clínicos relevantes dessa situação que assola a saúde pública”.



Carlos Serrano Jr.



Antonio Carlos Palandri Chagas

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Comment on “Transcranial direct-current stimulation as a strategy to manage COVID-19 pain and fatigue”

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INTRODUCTION

Muscular pain and fatigue have been observed in about 36% of the patients infected by the novel coronavirus disease (COVID-19).¹ The cause of these symptoms is still poorly understood; however, treatment strategies aiming to decrease pain and fatigue symptomology must be discussed to quickly offer the best treatment approach to decrease the suffering of those infected. Several pharmacological methods have been proposed to reduce pain, such as opioids, which can lead to endocrine alterations and suppress the immune system,² and

steroids, which have been related to bone mineral density and muscular dysfunctions as collateral effects.³ Nonpharmacological methods to decrease pain⁴ and fatigue⁵ have been studied and showed some efficacy without side effects. Non-invasive brain stimulation might help some people infected by COVID-19 through the application of a current over the scalp for some minutes.

Transcranial direct-current stimulation (tDCS) emerges as a non-invasive and nonpharmacological alternative to treat pain through the

neuromodulation of pain-related areas. Considering the effects of COVID-19 to the central nervous system⁶, the use of electric currents to modulate some brain areas could be important to decrease symptoms and provide more comfort to patients. Cortical areas, such as the primary motor cortex, which is part of the pain neuromatrix region, have been widely investigated as a site that controls the pain threshold and perception. It is emphasized that tDCS over the primary motor cortex has shown the potential to decrease pain caused by

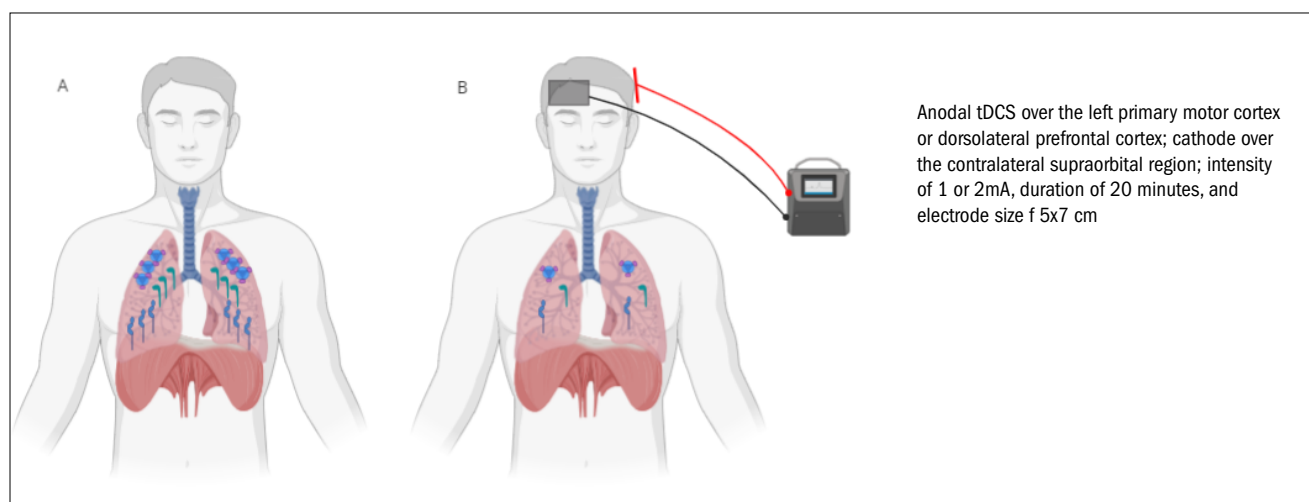


FIGURE 1. (A) COVID-19 INFECTION IN THE LUNG WITH THE PRESENCE OF INFLAMMATORY CELLS. (B) AN EXPECTED REDUCTION OF THE INFLAMMATORY RESPONSE AFTER TRANSCRANIAL DIRECT-CURRENT STIMULATION. IN THE BOX, THERE IS A SUGGESTION ABOUT TDCS PARAMETERS FOR COVID-19 BASED ON STUDIES RELATED TO CHRONIC PAIN AND FATIGUE. CREATED WITH BIORENDER.

several diseases.⁷ Moreover, fatigue has been associated with changes in the neural excitability of cortical areas, such as the primary motor cortex.⁸ In this sense, as tDCS has been implicated in improving neural function, the modulation of the primary motor cortex in people infected by COVID-19 could provide an improvement in both pain and fatigue.

Beyond the cortical region chosen to be neuromodulated, the parameters used to promote changes in brain function through direct current must be contemplated. Most of the studies have shown similar protocols, an intensity of 1 or 2mA, anodal polarity as the active electrode, electrode size of 5x7 cm, and a frequency of 5 times a week are frequently found in the literature.⁷ The definition of a parameter model pattern could facilitate the use of tDCS in hospitals and clinics by medical teams.

Furthermore, the alterations generated by COVID-19 in the immune system through the release of a cytokine storm and interleukin activity have affected and damaged mainly

the respiratory tract.⁹ tDCS over the dorsolateral prefrontal cortex could also interfere with the function of these inflammatory cells, improving their response or avoiding exacerbations.¹⁰ Thus, the use of tDCS as a cheap and nonpharmacological tool for people infected by COVID-19 could neuromodulate the function of the immune system and decrease the damage to the central nervous system and peripheric organs. Figure 1 represents the human lungs and the exacerbation of the inflammatory cells (cytokines, interleukins, and tumor necrosis factor) in the immune system generated by COVID-19, and what would be expected after the use of the tDCS.

CONCLUSION

Nonpharmacological approaches must be encouraged to provide improvements in the muscular pain and fatigue generated by COVID-19. At this moment, there is no gold standard medication to fight off the virus or vaccine to prevent infection. So, a simple, easy-to-use and cheap

tool such as tDCS could emerge as an alternative to be used in infirmaries and centers to treat COVID-19. It is important to consider the use of tDCS after recovery because frequently the presence of sequels has been reported in people who presented moderate and severe symptoms. Thus, tDCS could act by decreasing the time of recovery and physical limitations. We expect that future clinical trials are developed to test its efficacy in people presenting different symptomatology intensities generated by COVID-19.

Author's Contribution

ESF and JAA: study design. ESF, JAA, SM, ACS, and MSBS: wrote the manuscript, revised and approved the final version. ■

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