

Neurological manifestations and COVID19

Manifestações neurológicas e COVID19

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"In a few weeks, our world has become a very different place. Those things that we took for granted have been severely disrupted, and, suddenly, we all fear for our own mortality and health of our loved ones."
 Stoessl J, Bhatia KP, Merello M¹

On December 30, 2019, the Chinese ophthalmologist Li Wenliang alerted a group of fellow doctors about the possibility of facing a new Severe Acute Respiratory Syndrome (SARS), probably from an infectious cause. This occurred in the province of Wuhan, in the People's Republic of China, where the COVID19 index case is suspected to have arisen². In February 2020, in order not to use of xenophobic and prejudiced terms, WHO coined the acronym COVID 19, which means Corona Virus Disease, 19 being a reference to the year 2019, date of the description of the first cases of the disease³. Since the first descriptions, much has been written about the SARS COV-2 virus (Severe acute respiratory syndrome coronavirus 2). Unfortunately, as well as the first health authorities in Wuhan, who later recanted themselves, allowing the control of the epidemic in China, some world leaders in the face of the calamity we experienced, disdain the impact of this nefarious disease, for initially, the decreasing public health expenses and more

recently persisted with the incentive to break social isolation^{4,5}.

In few months, we witnessed the transformation of a disease of regional location, at first characterized by a feverish and respiratory condition occurring in the elderly, into a pandemic, a disease that affects various tracts and systems of the human body of people in many age groups. Thereby, the central and peripheral nervous systems are affected.

Currently, it is theorized about the possibility of contamination of the nervous system by two routes. In one of them, there would be participation of the cranial nerve and in another the dissemination would be hematological⁶. A study has shown, in SARS-COV 1 infection, therefore, another coronavirus, in a transgenic rat for human angiotensin-converting enzyme receptor 2, that the olfactory nerve has a fundamental role in this neuroinvasion⁷. In humans, this route has also been proposed for other viruses that affect the respiratory system. Thus, a case series study, analysis of cerebrospinal fluid, as well as necropsies, suggest, by analogy with other biological agents, that the SARS COV2 is neurotropic^{8,9}.

The prevalence of neurological manifestations seems to be around 36%, with the central nervous system being affected in 2/3 of the cases. Headache has been reported in 13 to 15% of symptomatic patients. There are several possibilities for its cause, including exacerbation of previously manifested migraine, meningitis symptom, encephalitis, among others. Generally, in milder cases the headache is mild and may last for a few days. About 15% may have myalgia, sometimes localized and sometimes diffuse, mild to intense and which can reach, very rarely, rhabdomyolysis. Anorexia is not uncommon. Loss of smell or anosmia and loss of taste are symptoms / signs whose frequency is somewhat confused. They may or may not coexist with flu-like signs as coryza. They are one of the first manifestations of COVID19 and are of sudden appearance. The appearance of one of the two, even in the absence of cough or fever, sometimes, even exclusively, at the present time, should be considered as very suggestive of COVID19. Syncope (fainting) due to hypoxia can also appear in the intermediate or more advanced stages of the disease (after the seventh or tenth day). In the most severe intermediate states, in some cases, encephalopathy (usually secondary to metabolic changes, hypoxia and drugs) appears. Epileptic seizures and other mental disorders such as mental confusion (disorientation, delirium) and stupor occur as a result. These manifestations and behavioral changes sometimes indicate encephalitis caused by COVID 19. Brain's inflammation occurs among the most serious cases or under intensive care^{10,11}.

Cerebrovascular diseases initially found in vulnerable people with overlapping risk events, such as severe systemic arterial hypertension (SAH), diabetes mellitus and dyslipidemia, combined with decompensations in blood volume and other disorders due to the critical state of COVID infection¹⁹. However, more and more reports have been published of cases of younger patients manifesting stroke. A few days ago, an American article described the onset of stroke in four people whose ages ranged from 31 to 47 years old. Two of them were healthy and in one the stroke was the first manifestation of COVID19¹². Thus, countless changes in motricity and tone result from these situations. In about 1/3 of the cases, the peripheral nervous system has also been affected. Guillain Barre Syndrome, neuropathy of critically ill patients and others have been reported¹³.

In the context of rehabilitation, physiotherapy has been present since the first moments. The handling of non-invasive and invasive ventilation, as well as the practice of pronation, on the occasion of the most dramatic syndrome of COVID19, the respiratory failure, has had an essential activity in the physiotherapist. More recently, neurological rehabilitation, given the above, is gaining importance¹⁴.

References

1. Stoessel AJ, Bhatia KP, Merello M. Movement Disorders in the World of COVID-19. This article has been copublished in Movement Disorders and Movement Disorders Clinical Practice. Movement Disorders Clinical Practice. 2020;7(4):355-356. doi: [10.1002/mdc3.12952](https://doi.org/10.1002/mdc3.12952)
2. Green A, Li Wenliang. Lancet. 2020;395(10225):682. doi: 10.1016/S0140-6736(20)30382-2
3. Fundação Osvaldo Cruz. Covid-19 / Perguntas e respostas. [Internet]. 2020. Disponível em: <https://portal.fiocruz.br/pergunta/por-que-doenca-causada-pelo-novo-virus-recebeu-o-nome-de-covid-19>
4. Burki T. COVID-19 in Latin America. Lancet Infect Dis 2020. 2020;20(5):547-548. doi: [10.1016/S1473-3099\(20\)30303-0](https://doi.org/10.1016/S1473-3099(20)30303-0)
5. Garrett L. COVID-19: the medium is the message. Lancet. 2020;395(10228):942-943. doi: [10.1016/S0140-6736\(20\)30600-0](https://doi.org/10.1016/S0140-6736(20)30600-0)
6. Felice FG, Tovar-Moll F, Moll J, Munoz DP, Ferreira ST. Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) and the Central Nervous System. Trends Neurosci. 2020;pii:S0166-2236(20):30091-6. doi: [10.1016/j.tins.2020.04.004](https://doi.org/10.1016/j.tins.2020.04.004)
7. Netland J, Meyerholz DK, Moore S, Cassell M, Perlman S. Severe acute respiratory syndrome coronavirus infection causes neuronal death in the absence of encephalitis in mice transgenic for human ACE2. J Virol. 2008;82(15):7264-75. doi: [10.1128/JVI.00737-08](https://doi.org/10.1128/JVI.00737-08)
8. Zhou L, Zhang M, Wan J, Gao J. Sars-Cov-2: Underestimated damage to nervous system. Travel Med Infect Dis. 2020;24:101642. doi: [10.1016/j.tmaid.2020.101642](https://doi.org/10.1016/j.tmaid.2020.101642)
9. Xu Z, Shi L, Wang Y, Zhang J, Huang L, Zhang C et al. Pathological findings of COVID-19 associated with acute respiratory distress syndrome. Lancet Respir Med. 2020;8(4):420-422. doi: [10.1016/S2213-2600\(20\)30076-X](https://doi.org/10.1016/S2213-2600(20)30076-X)
10. Mao L, Wang M, Chen S, He Q, Chang J, Hong C et al. Neurological Manifestations of Hospitalized Patients with COVID-19 in Wuhan, China: a Retrospective Case Series Study. MedRxiv. 2020. doi: [10.1101/2020.02.22.20026500](https://doi.org/10.1101/2020.02.22.20026500)

11. Li Y, Wang M, Zhou Y, Chang J. Acute Cerebrovascular Disease Following COVID-19: A Single Center, Retrospective, Observational Study. SSRN Electronic Journal. 2020. doi: [10.2139/ssrn.3550025](https://doi.org/10.2139/ssrn.3550025)
12. Oxley TJ, Mocco J, Majidi S, Kellner CP, Shoirah H, Singh IP et al. Large-Vessel Stroke as a Presenting Feature of Covid-19 in the Young. N Engl J Med. 2020; 382:e60. doi: [10.1056/NEJMc2009787](https://doi.org/10.1056/NEJMc2009787)
13. Padroni M, Mastrangelo V, Asioli GM, Pavolucci L, Abu-Rumeileh S, Piscaglia MG et al. Guillain-Barré syndrome following COVID-19: new infection, old complication? J Neurol. 2020:1-3. doi: [10.1007/s00415-020-09849-6](https://doi.org/10.1007/s00415-020-09849-6)
14. Thomas P, Baldwin C, Bissett B, Boden I, Gosselink R, Granger CL et al. Physiotherapy management for COVID-19 in the acute hospital setting: clinical practice recommendations. J Physiother. 2020;66(2):73-82. doi: [10.1016/j.jphys.2020.03.011](https://doi.org/10.1016/j.jphys.2020.03.011)