

How Covid 19 has changed Neurorehabilitation in Italy: a critical appraisal

Rocco Salvatore Calabrò, MD, PhD; Alfredo Manuli, MSc; Antonino Naro, MD, PhD and Giuseppe Rao, MD

¹IRCCS Centro Neurolesi Bonino-Pulejo, Messina, Italy.

Dear Editor,

As of December 2019, severe cases of pneumonia of unknown aetiology were reported in Wuhan city, in China. The pneumonia was related to the severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2), and the disease was termed coronavirus disease-2019 (COVID-19).¹ At the end of January 2020, the infection spread all over the world, including Italy, mainly involving the Northern regions, where higher rates of pollution are present.²

The clinical presentation following human infection ranges from a mild upper respiratory tract infection, commonly accompanied by fever (82%) and cough (81%), to severe acute respiratory distress syndrome and sepsis with death. In the acute phase of COVID-19, there is a high incidence of medical complications, including hepatic, renal, haematological and gastrointestinal, but it is unclear how many of these complications will remain prevalent in the intermediate and chronic phases, also considering that such medical complications are associated with high rates of morbidity and mortality.^{1,3}

A growing number of reports have been describing pathologies of both central and peripheral nervous systems associated with SARS-CoV-2 infection, as well as other neurovascular conditions, including stroke.⁴ The high prevalence of non-specific symptoms, such as altered mental status, headache, or dizziness seems to be related to a systemic inflammatory state (or “cytokine storm”), to multiorgan damage and/or to hypercoagulability. Dysimmune mechanisms may be instead implied in Guillain-Barré syndrome

or encephalitis cases complicating COVID-19. Therefore, Covid-19 survivors often require long-term care and rehabilitation.⁴

Rehabilitation is patient-centred and tailored to individual patient needs, as any rehabilitation program should take into account comorbidities that may affect a patient’s progress or ability to partake in a program. Education and counselling play a key part in any successful rehabilitation plan.

As COVID-19 is a novel disease, education around the implications of the disease and potential consequences, with regard to neurological ones, should be discussed with patients and caregivers.

Physiatrists have provided practical guidelines to treat patients with COVID-19 long-term consequences.⁵ Indeed, a significant number of such patients requiring rehabilitation have spent much time on Intensive Care Units, presenting with symptoms (including dyspnoea, anxiety, depression, prolonged pain, impaired physical and cognitive function and poor quality of life) belonging to the post intensive care syndrome. Thus, a holistic approach to managing cardio-pulmonary, neurological and psychiatric sequelae should be considered.⁶

However, the situation for neurological patients not affected by COVID-19 and requiring rehabilitation has been even worse during the pandemic and the consequent lockdown.⁷

To face the pandemic, the Italian healthcare system has totally and rapidly changed its organization: many wards dedicated to chronic diseases and/or rehabilitation have been converted into acute ones, in order to manage medical and neurological complications of

COVID-19.⁸ To prepare the overall reorganization of services, early discharge from rehabilitation units of negative patients was performed, with shortening of their rehabilitation plan (when medical conditions and proper aids permitted this). In the case of COVID-19 positivity, most of the patients were transferred to Covid-Hospitals waiting for remission, or to specific nursing homes or long term care wards.

Despite the preventive measures, many nursing homes and some rehabilitation unit became actual outbreaks with high rate of mortality, especially among older people.

New admissions to neurorehabilitation have been suspended or temporarily reduced, then applying a scrupulous in place pre-admission screening to test for COVID-19, also differentiating the pathways of negative patients.⁸

Social distancing and quarantine abruptly interrupted access to routine medical care (especially for frail and vulnerable people), and outpatient services, including neurorehabilitation, have been suspended everywhere. Patients with neurological diseases are among such frail patients, because of advanced age, comorbidities or immunosuppression due to treatments.⁹ Therefore, telemedicine approaches to achieve non-face-to-face consultations and rehabilitation have been proposed and applied to many fields.^{10,11}

Lack of physical activities during lockdown may lead to worsening of various motor and

non-motor symptoms in patients with neurological disorders. Cognitive rehabilitation, as well as psychological support to both patients and their carers, is fundamental during periods of social isolation due to pandemics.^{10,12}

Therefore, to reduce the spread of the virus and guarantee the continuity of care, digital

rehabilitation strategies, namely Telerehabilitation, have been adopted as an alternative mode to deliver rehabilitation services at community level. Telerehabilitation offers a fair opportunity of access to rehabilitation services for people who live in remote areas or cannot reach the care centres due to physical impairments. In fact, it can guarantee the continuity of care over time (after discharge), and in space (from hospital to patient's home), substantial cost savings (due to the reduction of specialized human resources),

an improvement in comfort and patient lifestyle, and increased frequency and adherence to therapy.¹¹ This tool should be (and in some cases has been) particularly important in the COVID-19 era, because of the lockdown and the reorganization of the healthcare system. As many beds dedicated to neurorehabilitation have been converted or suppressed, and outpatients are still not treated in many regions, a consistent part of neurological patients lack proper management. What is more, some centers will not be able to provide the previous performance levels, due to economic loss and reduction in funding, potentially resulting in the business failure of small/private rehabilitation centers.

Finally, extensive measures to reduce person-to-person transmission of COVID-19, especially during the hospitalization of susceptible populations such as children and elderly people, are required to reduce the risk of future outbreaks.

This is the reason why, in our opinion, telerehabilitation may overcome, at least in part, these issues. However, more studies are needed to assess the real efficacy of telerehabilitation in the different neurological diseases, taking into account the cost/effectiveness ratio.

The authors declare no conflict of interests

References

1. <https://www.who.int/emergencies/diseases/novel-coronavirus-2019>. accessed on July,7, 2020.
2. Raciti L, Calabrò RS. Can volcanic trace elements facilitate Covid-19 diffusion? A hypothesis stemming from the Mount Etna area, Sicily. *Med Hypotheses* 2020; doi:10.1016/j.mehy.2020.110058.
3. Jiang Y, Chen J, Cen F, et al. Importance of respiratory airway management as well as psychological and rehabilitative treatments to COVID-19 patients. *Am J Emerg Med.* 2020;S0735-6757(20)30284-9. doi:10.1016/j.ajem.2020.04.055
4. Ellul MA, Benjamin L, Singh B, et al. Neurological associations of COVID-19. *Lancet Neurol.* 2020;S1474-4422(20)30221-0. doi:10.1016/S1474-4422(20)30221-0
5. Barker-Davies RM, O'Sullivan O, Senaratne KPP, et al. The Stanford Hall consensus statement for post-COVID-19 rehabilitation. *Br J Sports Med.* 2020;bjsports-2020-102596. doi:10.1136/bjsports-2020-102596

6. Bij de Vaate E, Gerrits KHL, Goossens PH. Personalized recovery of severe COVID19: Rehabilitation from the perspective of patient needs. *Eur J Clin Invest.* 2020;e13325. doi:10.1111/eci.13325
7. Iaccarino MA, Tenforde AS, Zafonte RD, Silver JK, Hefner J, Paganoni S. Neurological Manifestation of COVID-19 and the Enhanced Role of Physiatrists. *Am J Phys Med Rehabil.* 2020;10.1097/PHM.0000000000001502. doi:10.1097/PHM.0000000000001502
8. Boldrini P, Kiekens C, Bargellesi S, et al. First impact on services and their preparation. "Instant paper from the field" on rehabilitation answers to the Covid-19 emergency. *Eur J Phys Rehabil Med.* 2020;10.23736/S1973-9087.20.06303-0. doi:10.23736/S1973-9087.20.06303-0
9. Carda S, Invernizzi M, Bavikatte G, et al. The role of physical and rehabilitation medicine in the COVID-19 pandemic: The clinician's view. *Ann Phys Rehabil Med.* 2020;S1877-0657(20)30076-2. doi:10.1016/j.rehab.2020.04.001
10. Maggio MG, De Luca R, Manuli A, Calabrò RS. The five 'W' of cognitive telerehabilitation in the Covid-19 era. *Expert Rev Med Devices.* 2020;17(6):473-475. doi:10.1080/17434440.2020.1776607.
11. Calabrò RS, Bramanti A, Garzon M, et al. Telerehabilitation in individuals with severe acquired brain injury: Rationale, study design, and methodology. *Medicine (Baltimore).* 2018;97(50):e13292. doi:10.1097/MD.00000000000013292.
12. De Luca R, Calabrò RS. How Covid-19 pandemic is changing mental health disease management: The growing need of a telecounseling in Italy! *Innov Clin Neurosci.* 2020;17(4-6):

Received: 08 July 2020

Accepted: 26 July 2020

Correspondence:

Rocco Salvatore Calabrò

IRCCS Centro Neurolesi "Bonino-Pulejo"

S.S. 113, Contrada Casazza 98124 Messina, Italy

Phone: +39-090-60128840

Fax: +39-090-60128950

E-mail: salbro77@tiscali.it