Arch Bronconeumol. 2021;57(S1):7–8

Sociedad Española de Neumología y Cirugía Torácica SEPAR

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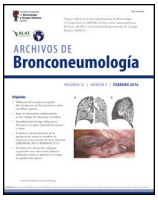

Editorial

Functional Limitations Post-COVID-19: A Comprehensive Assessment Strategy

Limitaciones funcionales post COVID-19: Una estrategia de evaluación integral

In late 2019, the new SARS-CoV-2 coronavirus began to spread rapidly, causing respiratory diseases of different severity.[1] Approximately 80% of cases are asymptomatic or mild, and about 20% cause severe respiratory compromises that need hospital management, eventually requiring invasive mechanical ventilation and life support,[2] which can lead to permanent sequelae and even death.[1]

Muscle weakness is one of the most frequent problems in the Intensive Care Unit (ICU) and is often generated because of critical conditions that pose a vital risk. Intensive care unit-acquired weakness (ICUAW) is one factor related to muscle weakness and its prevalence, in people who survive a critical illness, is close to 40%.[3] Critical illness survivors experience marked disability and deficiencies in physical and cognitive function that may even persist for years after their initial ICU stay.[4] Post-ICU-acquired disability is associated with rising health costs and the use of more medical care, reduced health-related quality of life, and prolonged unemployment.[5]

Surviving older adults have limited activities of daily life (ADLs), reaching more significant limitations in basic ADLs such as walking, bathing, or dressing.[6] Disability in ADLs is associated with increased risk of institutionalization, more significant health care expenditures, more hospitalizations, and higher mortality rates.[4] Furthermore, post-critical illness patients present cognitive impairments and mental problems such as anxiety or depression that make returning to normal life more difficult.[7]

Recent SARS-CoV-2 experience has revealed the need for a multidisciplinary rehabilitation approach, especially for those patients with advanced age, obesity, comorbidities, and organ failure.[8] Although the evaluation of patients with post-COVID-19 sequelae must include an exhaustive and complete medical evaluation, we consider that a specific assessment focused on functional rehabilitation must contemplate at least these five dimensions: (1) ADLs; (2) cognitive function; (3) physical function; (4) respiratory function; and (5) quality of life.

The dimension of ADLs and physical capacity must be assessed due to the consequences of extended bed rest and/or mechanical ventilation and, in some cases, the use of sedatives. The importance of ADLs lies in the fact that they allow patients to be easily stratified by level of dependency and/or activity limitations and to guide rehabilitation strategies by groups with similar needs.[4] The ADLs and physical capacity evaluation are also a widely used recommendation for assessing the health status of people in the ageing process (those most severely affected by COVID-19). There are tools to assess ADLs, such as the Barthel index or the Functional Independence Measure (FIM),[9,10] as well as tests to assess physical fitness such as the six-minute walk test (6MWT) or the sit-to-stand test (STST) which have already been used in patients with COVID-19.[10,11]

The cognitive dimension must be evaluated by the consequences due to the use of medicaments and/or presence of delirium. Hypoglycemia, hyperglycemia, delirium, and in-hospital acute stress symptoms have been identified as prognostic factors of persistent cognitive impairment after critical illness.[7] Additionally, there is strong evidence that patients with delirium in the ICU are at a higher risk of long-term outcomes of cognitive dysfunction.[3] The Mini-Mental State Examination (MMSE) and the Montreal Cognitive Assessment (MoCA) are some tools commonly used that also has the advantage of being able to be used through telemedicine platforms.[12]

The respiratory dimension must be evaluated due to the damage provoked by mechanical ventilation and the pathophysiological response to the virus. People who had received intensive care and had abnormal pulmonary function tests showed a restrictive pattern of pulmonary impairments at six months.[4] On the other hand, there is a risk of ventilator-induced lung injury and subsequent lung fibrosis in persons that had received mechanical ventilation.[4] The spirometry and the diffusion capacity of the lungs for carbon monoxide (DL_{CO}) determination have been used to assess the respiratory function in patients with COVID-19. Particularly, DL_{CO} has been shown to be diminished in about half of the patients.[13]

The quality of life dimension is necessary to assess because represent the perceptions, comfort, and feelings experienced during and after COVID-19 by the individual. We must not forget that one of the most crucial purposes of rehabilitation is to improve the quality of life by maintaining, improving, and reacquiring activities of daily living.[7] There are some quality of life questionnaires, such as the Short Form-36 (SF-36) or the European Quality of Life-5 Dimensions (E5-QD) that have been used in this type of patient.[10,14]

Another critical point in the assessment of post-COVID-19 patients is to consider the muscle function (peripheral/respiratory) that involves at least three dimensions. The peripheral muscles are crucial for carrying out the ADLs, for the physical capacity, and

https://doi.org/10.1016/j.arbres.2020.07.025

the respiratory muscles are important for the respiratory pump function. Their evaluation has been included in rehabilitation programmes in the current context.[9,10]

Additionally, other factors would be to influence the functional rehabilitation of post-COVID-19 patients and may affect performance during therapeutic interventions; for example, pain, sleep quality, nutritional status, mood, and necessity of returning to work, among other factors. These must be assessed according to the needs of each person.

The proposed model contemplates four different levels of severity: minimal, mild, moderate and severe functional limitations, which allow for adjusting the intervention according to the functional limitations present in each one. It is essential to classify the people into these groups because not all people will have the same impairments, mainly because the limitations to perform physical, cognitive, or functional tasks depend not only on the magnitude of the post-COVID 19 damage but also on the previous state of health, age, and comorbidities. We believe that in this way, the objectives can be better customized to the needs of each person.

Although there are other compromised systems, we think that these dimensions are the minimum to evaluate in a rehabilitation programme. However, if the patient requires it, other important aspects that influence rehabilitation must be evaluated, such as nutritional support, psychosocial support, swallowing, or referral to other medical specialities.

Finally, we call on the professionals involved in rehabilitation to evaluate at least these five dimensions so that we can carry out interventions adjusted to the reality of each patient and thus improve their quality of life.

Funding

Rodrigo Torres-Castro is funded by a grant from the National Agency for Research and Development (ANID) / Scholarship Program / DOCTORADO BECAS CHILE / 2018 – 72190117.

Conflict of interests

The authors declare no conflicts of interests.

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