

[ LETTERS TO THE EDITOR ]

**Adherence to Clear-cut Definitions Is Mandatory When Assessing Short- and Long-term Neurological Complications of COVID-19**

**Key words:** COVID-19, SARS-CoV-2, outcome, neurological involvement, critical illness

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*To the Editor* We read with interest the article by Ishiyama et al. concerning their retrospective study of 95 hospitalised patients with COVID-19 (mild COVID-19: n=60, group 1; severe COVID-19, n=35, group 2) and their acute (<14 days after COVID-19 onset) and subacute (>21 days after COVID-19 onset) neurological complications (1). It was concluded that neurological complications of COVID-19 are common and can be long-lasting (1). The study is appealing but raises concerns.

According to the method section, “acute” and “subacute” neurological complications were defined as those occurring <2 weeks and >3 weeks after the onset of COVID-19, respectively. Were patients with an onset of neurological complications >2 but <3 weeks after the COVID-19 onset excluded from the evaluation?

The rationale for the cut-off of 14 days for acute neurological manifestations is not comprehensible. There are a number of neurological manifestations with an onset >14 days, such as Guillain-Barre syndrome (GBS), venous sinus thrombosis (VST), ischemic stroke, acute disseminated encephalomyelitis (ADEM), and immune encephalitis, which are nonetheless classified as immediate sequelae of COVID-19 (2). Thus far, there have been no studies assessing whether the treatment or outcome differ if neurological complications start <14 days or >14 days after the COVID-19 onset.

It is stated in the methods that only “some patients” of group 2 were investigated by two trained neurologists (1).

Were the other patients of group 2 and all of group 1 seen by a single neurologist or by none at all? This point is crucial, as neurological complications of COVID-19 should be investigated by an experienced neurologist. Furthermore, manual muscle testing requires long-term experience and should assess not only weakness of  $\leq 4$  but also 5- or 4+ and should not be carried out by “intensivists”, “nurses”, or “therapists”.

It is not clear why, according to the methods section, patients in group 2 with severe COVID-19 and fatal outcome were excluded (1). It is important to include death as an outcome parameter, as it may have a neurological cause.

The cause of muscle weakness in 50% of those requiring ventilation at >2 months follow-up should also be mentioned.

We are unsure why neurological manifestations were classified as “acute neurological presentations, neurological complications, subacute neurological presentations, and neurological sequelae”. The category “neurological complications” should be explained.

Overall, this elegant study has some limitations which challenge the results and their interpretation.

**The authors state that they have no Conflict of Interest (COI).**

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**References**

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