

## [ LETTERS TO THE EDITOR ]

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

**Key words:** COVID-19, neurology, post-COVID-19 syndrome, infectious diseases, intensive and critical care

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**The Authors Reply** We thank Drs. Finsterer and Scorza for their comments on our article (1) and have submitted our responses to the comments, shown below.

We agree that we should have provided a clearer definition of “acute” and “subacute” neurological presentation and our rationale for these terms. Although the definition of “acute”/“within two weeks” was intended to be “within two weeks and six days,” it should have been clearly described. As the duration of viral shedding from the onset was two to three weeks, corresponding to the clinical course of COVID-19 (2), we therefore believe that categorizing the neurological findings in this timeline was reasonable.

The details regarding who investigated the neurological findings have been mentioned. “Acute neurological presentations” were evaluated by medical professionals in the isolation ward, including physicians other than neurologists, in order to prevent nosocomial infection. By contrast, “subacute neurological presentations” and “neurological sequelae” were evaluated by two trained neurologists after the quarantine release. Objective findings in “acute neurological presentation” included impaired consciousness and limb weakness, which were evaluated using the Glasgow coma scale (a simplified scale that can be evaluated by other than neurologists) and manual muscle testing (MMT), respectively. As the authors noted, MMT should assess more than just a weakness of  $\leq 4$ ; however, we defined limb weakness simplistically as MMT  $\leq 4$ , as it was evaluated by a multi-disciplinary team, and this fact is considered to be one limitation associated with our study. MMT investigated by neurologists were evaluated in detail, such as 5-/4+; however,

the definition of limb weakness was described in a unified manner to avoid complexity.

The authors also pointed out that deceased patients should not have been excluded. We included these patients only in the evaluation of “acute neurological presentations,” as they died before their release.

We should have discussed the cause of subsequent limb weakness in severe COVID-19 (Table 5, case 1-3, 5-7). Nerve conduction studies (NCSs) in the subacute phase showed a reduced amplitude of compound muscle and sensory nerve action potential, demonstrating neuropathy. However, the limb weakness in these patients was too severe (MMT 0-2) to be explained by the findings of the NCS, indicating concurrent central muscle weakness. At the follow-up, all of these patients except case 6 showed improved weakness (MMT 4) commensurate with the NCS findings, indicating neuropathy as the main cause. Case 6 showed subsequent impaired consciousness, which can be a major cause of weakness.

Finally, the authors pointed out the lack of clarity regarding the term “neurological complications.” We have now clarified this definition in “*Neurological manifestations*” in the Methods section, using this term to describe not neurological symptoms or findings but the disease category determined during the hospitalization.

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

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### **References**

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