



Exclude Alternative Causes before Attributing Exacerbation of Myasthenia to COVID-19

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Abstract: Myasthenia gravis (MG) may not only exacerbate by the infection but also by application of new drugs, which could worsen MG, it is crucial to know if any of the included patients received drugs known to deteriorate MG. Drugs commonly given to COVID-19 patients include chloroquine, remdesivir/lopinavir, azithromycin, steroids, tocilizumab, or muscle relaxants and opiates if intubated.

Keywords: Myasthenia, muscle weakness, acetyl-choline receptor.

LETTER TO THE EDITOR

With interest we read the article by Muppidi *et al.*, (2020) about the projected generation of a registry of which preliminary results about 91 patients with myasthenia gravis (MG) who experienced COVID-19 were reported (Muppidi, S. *et al.*, 2020). We have the following comments and concerns.

The finding that 40% of the MG patients with COVID-19 experience exacerbation of MG or a myasthenic crisis is not new (Muppidi, S. *et al.*, 2020). In a recent review about 16 MG patients with COVID-19, 50% experienced deterioration, whereas the other half remained stable (Finsterer, J. *et al.*, 2020).

Since MG may not only exacerbate by the infection but also by application of new drugs, which could worsen MG, it is crucial to know if any of the included patients received drugs known to deteriorate MG. Drugs commonly given to COVID-19 patients include chloroquine, remdesivir/lopinavir, azithromycin, steroids, tocilizumab, or muscle relaxants and opiates if intubated. From steroids it is well-known that they exacerbate MG, particularly during the first 2-3 weeks and if started with a high dosage. Concerning chloroquine, there is one report of a COVID-19 patient who developed a myasthenic syndrome triggered by chloroquine (Koc, G. *et al.*, 2020). From azithromycin it is known that it triggers

myasthenic crises (Pradhan, S. *et al.*, 2009). Remdesivir, lopinavir, and ritonavir have not been reported to exacerbate MG. Since patients with severe COVID-19 occasionally require artificial ventilation and thus the application of muscle relaxants, and since muscle relaxants can deteriorate MG, it is crucial to know if the 40% in whom deterioration was observed were under artificial ventilation.

Concerning the notion that MG patients under immune-suppression or immune-modulation are prone to experience exacerbation of MG, there is one report about an immuno-suppressed MG patient who did not get infected from her infected relatives (husband, son) who both had developed mild COVID-19 (Rzepiński, Ł. *et al.*, 2020).

Since the causes of death in MG patients with COVID-19 may be highly, variable we should be told which causes of death were identified in the 22 patients who deceased.

In conclusion, before attributing exacerbation of MG to an infection with SARS-CoV-2, all other possible causes, including newly administered drugs, need to be excluded as potential triggers of the exacerbation.

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