



Outcome of COVID-19 in Patients with Myasthenia May Not Only Depend on the Immunologic Disease

Article History
Received: 25.09.2020 Accepted: 22.10.2020 Revision: 28.10.2020 Published: 30.10.2020 DOI: 10.47310/iarjmsr.2020.V01i02.04
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How to Cite the Article:
Josef Finsterer, Carla A. Scorza, Fulvio A. Scorza, and Ana C Fiorini (2020); Outcome of COVID-19 in Patients with Myasthenia May Not Only Depend on the Immunologic Disease. <i>IAR J. Med & Surg Res.</i> 1(2) 55-56.
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Abstract: With interest we read the article by Camelo-Filho *et al.*, (2020) about 15 patients with myasthenia gravis (MG) admitted to four hospitals in Sao Paolo because of an infection with SARS-CoV-2 (COVID-19). The authors found that most MG patients developed a severe course of COVID-19, such that 87% of the MG patients required transfer to the intensive care unit (ICU), that 73% required artificial ventilation, and that 30% of these patients died. We have the following comments and concerns.

Keywords: myasthenia, COVID-19, SARS-CoV-2, neuromuscular transmission.

LETTER TO THE EDITOR

With interest we read the article by Camelo-Filho *et al.*, (2020) about 15 patients with myasthenia gravis (MG) admitted to four hospitals in Sao Paolo because of an infection with SARS-CoV-2 (COVID-19) (Camelo-Filho, A. E. *et al.*, 2020). The authors found that most MG patients developed a severe course of COVID-19, such that 87% of the MG patients required transfer to the intensive care unit (ICU), that 73% required artificial ventilation, and that 30% of these patients died (Camelo-Filho, A. E. *et al.*, 2020). (Camelo-Filho, A. E. *et al.*, 2020) We have the following comments and concerns.

We do not agree with the statement in the introduction that only 7 patients with MG and COVID-19 have been reported so far (Camelo-Filho, A. E. *et al.*, 2020). In a recent review about SARS-CoV-2 infected MG patients (Finsterer, J. *et al.*, 2020), 16 patients with previously diagnosed MG who experienced a SARS-CoV-2 infection have been reported (Finsterer, J. *et al.*, 2020). Additionally, three patients had been reported who developed a newly diagnosed MG shortly after onset of a SARS-CoV-2 infection (Restivo, D. A. *et al.*, 2020).

Since seronegative MG patients frequently in fact have a congenital myasthenic syndrome (CMS) or a mitochondrial disorder (MID), the 4 seronegative patients of the presented study should be excluded from the evaluation. They should be re-evaluated for muscle disease, in particular metabolic myopathy and CMS. In this respect we

should know how many of the five patients with only ocular manifestations had in fact progressive external ophthalmoplegia (PEO). Of particular interest is the family history in the 4 patients with seronegative MG. We should know if any of the first degree relatives was also affected by a neuromuscular disorder (NMD).

Missing is a definition of "exacerbation of MG". Do the authors mean that pre-existing myasthenic symptoms worsened or do they mean that previously absent MG manifestations newly occurred? Furthermore, we should know how exacerbation was quantified. Did the authors apply any MG score or did they assess worsening clinically? We should know if serum titres of acetyl-choline receptor antibodies increased during hospitalisation, if repetitive stimulation, or single fiber-EMG were carried out to quantify deterioration of MG during the infection.

A further shortcoming is that the anti-myasthenic medication the patients took on admission and the drugs they additionally received during hospitalisation were not reported. There are a number of drugs that may worsen myasthenia (Pradhan, S. *et al.*, 2009) or may even trigger myasthenic syndrome (Koc, G. *et al.*, 2020). Is it conceivable that some of the included patients had exacerbation rather due to overdose of cholinergic drugs? How many of the patients experienced a cholinergic and how many a myasthenic crisis?

Overall, the interesting observational study by Comelo-Filho *et al.*, has some shortcomings, which should be addressed before drawing conclusions. More MG patients than reported had experienced COVID-19 than anticipated. The outcome is fair in the majority of MG patients with COVID-19. It is crucial to confirm and quantify exacerbation of MG for discriminating between COVID-19 manifestations and worsening of myasthenia. It is crucial to know the entire medication the included patients took on admission. Before attributing deterioration of a COVID-19 patients to myasthenia, exacerbation of myasthenia needs to be documented.

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