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Reply to Esquinas *et al.*

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To the Editor:

We read with interest the comments of Esquinas and colleagues on our work highlighting the high prevalence of cognitive impairment in patients with chronic respiratory failure referred for long-term noninvasive ventilation (NIV) (1).

We acknowledge that the Montreal Cognitive Assessment (MoCA) has several limitations. We used a cutoff score of 26 of 30 to define mild cognitive impairment, but some authors have suggested 24 as a cutoff value (2). Even with this lower cutoff score, the prevalence of mild cognitive impairment remained high in our cohort, with 46 patients (47%) having a MoCA score lower than 24. Another limitation raised in regard to the use of the MoCA is the fact that it does not fully capture cognitive function. Indeed, MoCA was designed to screen for dementia (3) and does not replace a comprehensive cognitive assessment. However, aside from the fact that it has been used in patients who require overnight respiratory support (4, 5), it allows a multidimensional assessment of cognitive function, unlike other cognitive tests like the Trail Making Test. To illustrate this, we performed a domain-by-domain analysis of MoCA results before and after the initiation of home NIV. As shown in Figure 1, the visuospatial, attention, naming, abstraction, and delayed recall components of the MoCA score improved significantly after NIV initiation, whereas this was not the case for the language and orientation components (Wilcoxon matched-pairs signed rank).

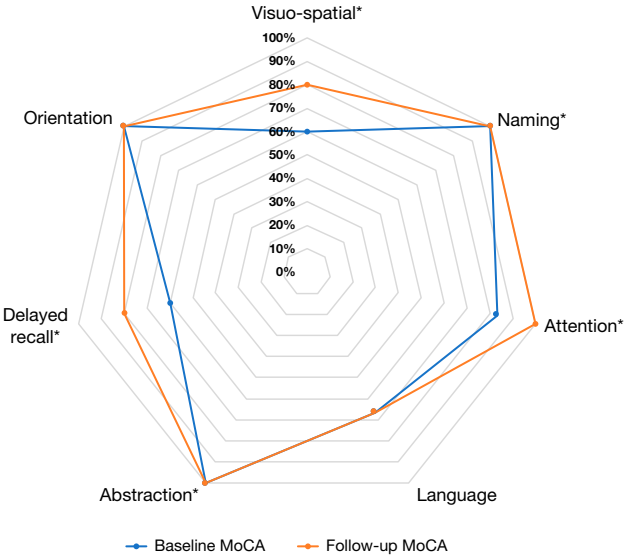

Figure 1. Change in MoCA score according to subdomain and expressed as the percentage of the maximum score achievable for each subdomain. The dotted line indicates the time period before noninvasive ventilation setup; the solid line indicates the first follow-up. *$P < 0.05$. MoCA = Montreal Cognitive Assessment.

The clinical implications of our findings remain to be assessed. However, this may be particularly challenging given the heterogeneity of our study population. Regarding daily functioning, we assessed at baseline and follow-up the instrumental activity of daily living that did not change significantly ($P = 0.756$). Such a lack of change may be more related to the underlying disease itself than the impact of long-term NIV, which, as an example, is unlikely to change the ability of a patient with amyotrophic lateral sclerosis to cook by themselves. We agree that our study lacked an evaluation of health-related quality of life, which is an important metric for patients in whom long-term NIV has been established, considering their poor survival rates (6). However, improvement in health-related quality of life is not systematically present at first follow-up evaluation (7, 8). Moreover, to our knowledge, improvement in cognitive function does not necessarily correlate with improvement in health-related quality of life: "Blessed are the poor in spirit, for theirs is the kingdom of heaven" (*Matthew 5:3*).

We agree that the lack of rigorous sleep evaluation is a major limitation of our study given the importance of sleep for the cognitive process. It is indeed plausible that restored sleep drove the improvement in cognition, bearing in mind that most patients

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treated with long-term NIV report poor sleep quality (9) and NIV improves sleep architecture (10), but we believe these data are explanatory and would not change the significance of the message our study conveys.

Finally, we agree with Esquinas and colleagues that more studies are needed in the field of chronic respiratory failure and cognition. We hope our preliminary findings will stimulate ambitious and well-structured research. ■

Author disclosures are available with the text of this letter at www.atsjournals.org.

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