



Correspondence

Response to the letter to the editor, “cerebellar repetitive transcranial magnetic stimulation for patients with essential tremor”


Dear Editor,

We welcome the opportunity to respond to the letter by Gupta et al. titled “Cerebellar repetitive transcranial magnetic stimulation for patients with essential tremor [1].”

We thank Gupta et al. for their interest in our paper and for suggestions on methodological and statistical aspects of our study. The study aimed to determine whether there are benefits of cerebellar repetitive transcranial stimulation (rTMS) for patients with essential tremor (ET). The results of the study were negative. The statistical analysis did not reject the null hypothesis because there was no Time \times Group interaction. In other words, low-frequency cerebellar rTMS did not improve tremor symptoms in ET patients. The improvement in tremor scales appears to be a placebo effect.

Gupta et al. described three major concerns in the methodological and statistical sections in detail. First, with regard to randomization, we used block randomization as Gupta et al. suggested. The randomization was performed for every four patients who were included in one block. As this was a pilot study, the number of participants is typically not defined using a power analysis in the beginning of the study. Therefore, the randomization was performed every four patients until the end of the protocol. If two more participants were enrolled in this study, the size of both groups would be the same.

Second, the authors had a concern regarding the statistical analysis. As the authors suggested, we used the Shapiro–Wilk test for normality of data, and subsequently, compared the baseline values using the Mann–Whitney U test, as the Shapiro–Wilk test did not confirm normal distribution of the data. Finally, null hypotheses were not rejected in all parameters with the Mann–Whitney U test ($P > 0.05$). As the authors suggested, presentation of the data as median (interquartile range) might well have been helpful to show the baseline similarity between the groups.

Third, the mean motor-evoked potential (MEP) before the rTMS intervention was indeed 0.80 ± 0.42 mV [1]. In terms of the difference in the baseline tremor scales, as we already discussed in the article, the

Fahn–Tolosa–Martin scale seemed different between the groups at the baseline; however, the statistics showed that they were comparable. Notably, the sham group was slightly worse at baseline, and the percent improvement was numerically greater in the real-rTMS group. These differences might have been significant in a larger study. However, as many researchers might agree, large studies are difficult to conduct if the protocol includes multiple sessions of rTMS, especially in a pilot study, which has strict clinical inclusion criteria, similar to our study. As Gupta et al. noticed, this study could have enrolled patients with medication intractable ET. However, we all agree that larger studies are needed to come to a firm conclusion.

Acknowledgements

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Reference

- [1] H.W. Shin, M. Hallett, Y.H. Sohn, Cerebellar repetitive transcranial magnetic stimulation for patients with essential tremor, *Park. Relat. Disord.* (2019) 1–4 In press.

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