Neurosurgical Forum LETTERS TO THE EDITOR

Magnetic resonance–guided focused ultrasound and essential tremor

TO THE EDITOR: We read with interest the article by Mohammed et al.¹⁰ (Mohammed N, Patra D, Nanda A: A meta-analysis of outcomes and complications of magnetic resonance–guided focused ultrasound in the treatment of essential tremor. *Neurosurg Focus* 44(2):E4, February 2018).

The history of the neurosurgical treatment of essential tremor dates back to the late 1960s, with the application of the then standard technique of radiofrequency. The majority of experience was focused on motor thalamotomies centered in the nucleus ventralis lateralis pars posterior (or ventralis intermedius). In the late 1960s, however, the Canadian functional neurosurgical school¹¹ chose a target just below this nucleus in the subthalamus and described the fact that the simple presence of the radiofrequency electrode in it, before any thermocoagulation was applied, was enough to produce tremor arrest in a significant percentage of cases. Results in terms of tremor control were similar for both types of targets. Since deep brain stimulation (DBS) has established itself as a new standard in our field, the large majority of experience has again been collected for DBS interventions at the thalamic level, although a few groups^{1,2,7–9,12} have favored, until today, targets in the subthalamic area below the motor thalamus. As exact anatomical knowledge of the fiber tracts coursing below the thalamus was lacking, and in view of the confusion in naming the structure(s) suspected to be responsible for tremor control, we undertook and published a stereotactic study of this area.⁵ In this work we identified, thanks to anatomico-surgical correlations, the cerebellothalamic tract (CTT) as the tremor-suppressing target, thus allowing us to consider the other target names of the posterior subthalamic area or prelemniscal radiation as not precise enough. The zona incerta as a target description should also be abandoned because of a lack of solid evidence for the relevance of this structure in tremor relief. The clarification provided by our study seems to have been recently accepted by some authors^{3,13} treating essential tremor with the new focused ultrasound technology.

In the review paper on the treatment of essential tremor by focused ultrasound, Mohammed et al. assert that “Schreglmann et al. was the *only* study that targeted the CTT [*italics added*].” Schreglmann and colleagues’ study

appeared in 2017 and addressed the treatment of 6 patients.¹³ Our study “Incisionless transcranial MR-guided focused ultrasound in essential tremor: cerebellothalamic tractotomy,”⁶ conducted on a group of 21 patients and published in 2016, was the second largest series ever published in the field of focused ultrasound treatment for essential tremor, after the paper by Elias et al.⁴ It was the first in the neurosurgical literature to propose the CTT denomination, and it brought the first evidence of the feasibility of bilateral tremor control with this target.

Accordingly, we would greatly appreciate a correction of this misleading statement.

Marc Gallay, MD
Daniel Jeanmonod, MD

Sonimodul Center for Ultrasound Functional Neurosurgery,
Solothurn, Switzerland

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Disclosures

The authors report no conflict of interest.

Response

We welcome the comments of Drs. Gallay and Jeanmonod regarding our article.

The study by Gallay et al.¹ evaluated 21 patients with therapy-resistant essential tremor treated with MR-guided focused ultrasound. They used the Essential Tremor Rating Scale (Fahn-Tolosa-Marin TRS scale) for evaluation

of the treatment response. However, we only considered studies that used the Clinical Rating Scale for Tremor (CRST) for assessment of the treatment response as an inclusion criterion. Hence, their study was excluded from our analysis. Meta-analysis requires the data from studies to have a similar scale for evaluation. Our study evaluated the percentage improvement in the CRST from the baseline value and compared it with the values in other studies. This comparison would not be possible if studies utilizing different scales were included in the study. The study by Schreglmann et al.² was the only study included in our analysis that targeted the CTT. We acknowledge the series by Gallay et al.¹ in the treatment of essential tremor using the CTT as the target and thank them for their interest in our article.

Nasser Mohammed, MD, MCh
Devi Patra, MD, MCh
Anil Nanda, MD, MPH

Louisiana State University Health Sciences Center, Shreveport, LA

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