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Simultaneous Deep Brain Stimulation/Motor Cortex Stimulation Trial for Neuropathic Pain: Fishing with Dynamite?

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We read with great interest the publication by Son et al. [1] entitled 'Simultaneous trial of deep brain and motor cortex stimulation in chronic intractable neuropathic pain', published in *Stereotactic and Functional Neurosurgery*. The authors report a series of 9 patients who underwent a simultaneous implantation of thalamic ventralis caudalis (Vc) deep brain stimulation (DBS) and motor cortex stimulation (MCS) trial electrodes. One patient had no response, and the device was explanted. Of the other 8 patients, 2 and 6 patients responded to the Vc DBS and MCS trials, respectively, and generators were placed for long-term therapy. This work raises numerous questions and calls for a comment.

The authors write that the choice between DBS and MCS for the treatment of chronic neuropathic pain 'is still considered empirical, and there is no consensus on which method is better'. There are important nuances that need to be addressed. Although, to our knowledge, there are no studies showing a superiority of one technique over the other, several publications have shown that the efficacy of MCS can be reliably predicted using repetitive transcranial magnetic stimulation (rTMS) [2–5]. Today, it has been established that a positive response to rTMS can predict a satisfactory therapeutic response with MCS. In the present case, this tool may have helped identify a subset of the 8 patients who were MCS responders, thus avoiding a simultaneous DBS placement, which is more invasive than MCS and associated with a greater risk of complications. It would be interesting to know the reasons why the authors did not use rTMS as part of the patient selection process.

Both MCS and DBS offer the advantage of being able to carry out double-blinded studies, as the patients usually cannot tell if the stimulator is in the 'on' or 'off' mode. From a methodological point of view, this point is important as it eliminates any placebo effect that may be responsible for symptom improvement. It is well known that, when dealing with pain, it is important to control for this placebo effect. It would also be interesting to better understand the reasons why the authors carried out an open-label study instead of a double-blinded study. The authors' argument 'the reason we undertook a simultaneous stimulation trial is that thalamic Vc DBS and MCS seem to have a common mechanism of analgesia' does not quite explain why an open-label study was favored. In the absence of a double-blinded study, a control group would have been interesting in this small group of 9 patients.

At the end of their discussion, the authors write: 'Considering the risks associated with the complicated implantation of intracranial electrodes in thalamic DBS and the inherently less invasive nature of epidural MCS, together with the more successful initial stimulation results from our study, we think that trial stimulation with MCS would be a more reasonable approach in the planning of surgical treatment for intractable central pain syndromes.' However, all the patients had a trial electrode implanted into the Vc nucleus of the thalamus, exposing them to the risks of this invasive procedure. To this effect we wish to know why a more prudent approach was not taken for this study. This approach would have consisted of first implanting the MCS device in patients selected by rTMS and determining their pain improvement. If the results were disappointing, DBS could have then been discussed as an option following a failed MCS. In the present case, this strategy would have helped avoid 8 DBS interventions and the inherent risk and cost associated with this technique.

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