Magnetic vs Electric Seizure Induction for the Treatment of Mania—Similar, But Not Yet the Same

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In this issue of JAMA Network Open, Chen et al report the first comparison between magnetic seizure therapy (MST) and electroconvulsive therapy (ECT) for mania. The small randomized study with 48 participants is very welcome because of the severity of the condition and high risk of recurrence and because treatment options are few. Moreover, mania, by its nature, implies poor insight; thus, it is challenging to conduct randomized studies that require written consent. As expected, the study does not show any major differences in clinical effects between ECT and MST, but due to the sample size, clinically important differences cannot be excluded. Nevertheless, the study is important as the first randomized trial to investigate the effectiveness of MST in patients with mania. One of the strengths of this study is that bilateral ECT was used as a comparison, as suboptimal ECT stimulations are a valid criticism of many of the comparisons between ECT and MST for depressive episodes.

Induced seizures are an old, established, and effective treatment for both phases of bipolar disorder. Different pharmacologic agents have been used in the past for seizure induction, and the outcomes and adverse effects are shown to be similar regardless of the method for seizure induction. The reason ECT replaced pharmacologically induced seizures decades ago was because it is a more practical method.

Since its introduction, ECT has been refined to preserve its effectiveness and improve tolerance. A few of these developments have gained wide acceptance, such as unilateral electrode placement and brief-pulse stimuli. But most often there is a trade-off, where more intensive stimuli result in more intense seizures, stronger clinical effects, and more cognitive adverse effects, whereas less intensive stimuli result in less intense seizures, weaker clinical effects, and fewer cognitive adverse effects. In some conditions, including the treatment of severe mania, stronger clinical effects are generally prioritized. Bilateral electrode placement is therefore often used for the treatment of mania with very good outcomes, especially among patients with severe symptoms.

Magnetic seizure therapy has been introduced as a more tolerable form of convulsive therapy. It has been claimed that the cognitive adverse effects may be reduced compared with standard ECT, while the clinical effects are similar. If this is true, MST may be an improvement over ECT. However, so far, there are not enough data to support the claim, and the field has been mistaken before. The same claim was once made for ultrabrief pulse stimulus ECT on the basis of small studies. Unfortunately, it is now shown to simply be a weaker form of ECT. Scientifically, the challenge is that very large studies are required to exclude small but relevant differences in response, but in order to show slight transient cognitive advantages, smaller patient samples may be sufficient.

In the comparison by Chen et al between ECT and MST, most patients treated in the MST arm had short seizures (mean duration, 10 seconds). In contrast, patients treated in the bilateral ECT arm had more adequate seizure durations (mean duration, 37 seconds). This difference may explain the tendency toward superior clinical results of ECT compared with MST (response rates, 95.0% and 86.4%, respectively), although this difference in response rate was not statistically significant in this small study. The shorter and presumably less intensive seizures could also explain the subtle difference in one of the cognitive measures that was observed.

The concern that MST, as currently performed, could be a less effective form of convulsive therapy than ECT is further reinforced by the results of a recently published study on MST for...
depression. In the clinical trial, a mean of 9.0 sessions of MST was required to achieve similar results as 6.7 unilateral electrode placement ultra-brief pulse ECT sessions.7

In summary, the results of the study by Chen et al,1 along with other studies of MST, are promising and support the idea of MST as an alternative method for inducing seizures. It may be especially valuable in many countries where convulsive therapy needs a revival and the increased use of ECT is hindered by prejudice and stigma. It is important to stress that the evidence on the effectiveness and safety profile of MST is still limited. The number of patients included in this study, as well as the number of patients included in studies on depressive episodes, is low. More research is required to optimize the treatment protocols of MST to produce seizures that can match those of standard ECT, which may require the development of machines that are capable of producing stronger stimuli. If it becomes less complicated to produce adequate seizures using MST in the future, it may come to be regarded as an alternative and equivalent form of convulsive therapy to ECT. Then, we can worry less about whether the electromagnetic field is produced by electrodes or coils and put more emphasis on the quality of the seizure.

ARTICLE INFORMATION
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REFERENCES

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