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The Relative Potency of ECT and TMS

To the Editor:

A group that assessed the relative effectiveness of electroconvulsive therapy (ECT) and repetitive transcranial magnetic stimulation (rTMS) to be unclear aimed to clarify matters by investigating the outcomes of ECT and TMS treatment of depression in patients who had received both interventions.¹

They accessed Sweden's National Quality Register for ECT that contains details of the management and outcome of all patients who receive ECT or TMS (unless patients opt out). They described their work as “observational crossover;” “register-based;” “retrospective, naturalistic study design;” and “using a prospectively collected register.” The authors identified and gathered the responses of patients who had received both forms of treatment at some point. However, as information was “lacking,” it was not possible to determine whether the 2 treatments were applied to separate episodes or the same episode of depression. Two hundred sixty-eight patients were eligible for inclusion, but relevant data were missing in for one half.

Montgomery-Åsberg Depression Rating Scale–Self-report scores were reduced by 15 after ECT and only 5.6 after TMS ($P = 0.0001$)—supporting the view that “ECT is more effective than TMS” in those who had received both treatments. Much is made of the point that these patients had received both treatments, but this is of little importance as the study is disordered.

One hundred thirty-eight patients' histories were explored. In 111 cases, ECT was provided first, and in 27 cases, TMS was provided first. This indicates departure from random choice of treatment. Also, it is important as the authors were unable to determine whether the 2 treatments applied to an individual were applied during the same or separate episodes of depression.

It has been well demonstrated that the likelihood of an agent to induce remission decreases with each treatment failure. This is because some episodes of depression are highly resistant to treatment, and the failure of early treatments means the case in hand likely possesses greater resistance.² In the described study, ECT was provided first in 80% of cases providing it with a distinct statistical advantage.

Unless the authors can overcome the difficulty to identifying whether both treat-

ments were applied in separate or the same episodes of depression and explain how providing ECT first in 80% and TMS first in 20% of cases would not have distorted the results, this study will not be used as an indicator of the relative potency of ECT and TMS.

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Electroconvulsive Therapy Versus Repetitive Transcranial Magnetic Stimulation in Patients With a Depressive Episode *A Register-Based Study*

To the Editor:

Thank you for the opportunity to respond to the valuable comments on the study on relative effectiveness of electroconvulsive therapy (ECT) and repetitive transcranial magnetic stimulation (rTMS).¹ Indeed, it is important to be reminded that this study, with its observational design, cannot, with certainty, answer the question about the superiority of ECT or rTMS, as randomized studies can.²

In order to respond to the comments, the still expanding registers were revisited, and further analyses were made that could shed more light on the relative effectiveness of ECT and rTMS. As noticed in the Letter to the Editor, the current study had a risk of being biased toward a higher chance for ECT to show positive effects in patients with depression because the majority of patients received ECT as the first treatment. Thus, we extracted a new dataset with a population of patients who received both rTMS and ECT and who were treated with rTMS first. All patients were assessed with the Montgomery-Åsberg Depression Rating Scale–Self-assessment (MADRS-S) before and after both treatments. In total, 128 patients were identified. Patients were treated between 2018 and 2023 (data extraction was done on the 15th of December 2023). The mean of the MADRS-S score before rTMS was 33.6 (SD, 7.4) and 28.3 (SD, 10.3) after rTMS. The mean of the MADRS-S score before ECT was 34.7 (SD, 7.7) and 20.8 (SD, 11.1) after ECT. A linear mixed model was used to analyze the significance of differences between MADRS-S change after rTMS and ECT while accounting for the intraindividual variability. The best-fitting model included a random intercept and a random slope. The interaction term between MADRS-S change and ECT versus MADRS-S change and rTMS was significant ($P < 0.0001$), meaning that patients improved significantly more after ECT compared with after rTMS. The new result of the new analysis suggests that the published study was not significantly biased because the majority of patients received ECT first. These results should also be seen in the broader context of the evidence based on randomized studies supporting the idea of the superiority of ECT over rTMS in treating major depression.^{3,4} However, more randomized studies are needed to compare the effects of these 2 treatment modalities in different subpopulations with depression. Considerations should include costs and patient preferences after balancing antidepressive effects with adverse effects.

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