

NeuroNews

Repetitive TMS demonstrates ability to reduce suicidal thoughts and behaviours

1 April 2021



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The use of transcranial magnetic stimulation (TMS) has a modest yet promising history in suicide reduction, according to the authors of a study published in *Neuromodulation*.

In this seed-based functional connectivity analysis, Jennifer Barredo *et al* evaluated whether changes in frontostriatal functional connectivity would accompany suicidality reductions following TMS, with the aim of optimising future treatment. This study was a secondary analysis of an open-label trial of 5Hz TMS of the left dorsolateral prefrontal cortex (DLPFC) in patients with post-traumatic stress disorder (PTSD) and major depressive disorder (MDD).

A total of 25 participants were included in this secondary study. For inclusion in the parent study, participants were required to meet criteria from the Diagnostic and Statistical Manual of Mental Disorders, fifth edition (DSM-V) for both PTSD and MDD. Patients' overall illness severity rating were at least "moderately ill" on the clinical global impressions-severity scale for each diagnosis. However, actively suicidal intent and suicidal planning were exclusionary.

Patients received eight weeks of 5Hz TMS on the left DLPFC. Clinical symptoms were measured on the Inventory of Depressive Symptomatology-Self Report (IDS-SR) and the PTSD checklist from the DSM-V (PCL-5). Investigators derived their definition of suicidality from IDS-SR item 18, which is a thoughts-of-suicide item. Possible responses to item 18 include: (0) "no thoughts of death or suicide", (1) "feeling that life is empty or wondering if it is worth living", (2) "thinking of suicide or death several times a week for several minutes", or (3) "thinking of suicide or death in detail multiple times each day, having a specific suicide plan, or having made an attempt".

Functional magnetic resonance imaging (fMRI) was collected before TMS, and at the treatment endpoint. Researchers entered these data into analyses of covariance, evaluating the effect of suicidality change across treatment on striatal and thalamic functional connectivity. Changes in other PTSD and depression symptoms were included as covariates, and results were corrected for multiple comparisons.

Suicidal ideation of "any severity" was reported by 68% of participants at study baseline, with 10 participants reporting a score of one, five participants reporting a score of two, and two participants reporting a score of three. Researchers found that after TMS, suicidality decreased by a minimum of one point in 65% of participants. However, they did also see an increase of suicidality in 12% of patients, including on one participant who did not endorse suicidality at baseline. Across participants, the mean change in overall PCL-5 and IDS-SR scores was 41.8% and 42.6%, respectively, in this subset of the original study cohort. In the parent sample, the average decrease in PCL-5 was 35.5% and IDS-SR was 37.6%.

In their conclusion, the study's authors commented: "Collectively, findings argue that the precise targeting of frontopolar circuits via diffusion-guided individualised targeting may enhance neuromodulation delivery precision to our highest-risk patients. Combing these methodologies with innovations in 5Hz TMS delivery, such as pulse energy optimisation, may further improve its efficacy as an antisuicidal treatment."

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