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Extended Research Article

Connectivity guided intermittent theta burst stimulation versus repetitive transcranial magnetic stimulation in moderately severe treatment resistant depression: the BRIGhTMIND RCT

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Plain language summary

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Plain language summary

Transcranial magnetic stimulation delivers magnetic bursts of energy to the skull. It is recommended for use in the National Health Service in the United Kingdom by the National Institute for Health and Care Excellence as a treatment for treatment-resistant depression. Treatment-resistant depression is depression that has not improved with at least two different courses of treatment.

In this trial, we randomly allocated (like a toss of a coin) 255 individuals with treatment-resistant depression to either the usual repetitive transcranial magnetic stimulation delivered to a standard brain region, or to an alternative patterned form of transcranial magnetic stimulation delivered to an individually personalised site called connectivity-guided intermittent theta burst stimulation. We used the participants' magnetic resonance brain imaging scans to choose the site. All participants in the trial received 20 transcranial magnetic stimulation sessions over 4–6 weeks.

We measured depression, anxiety, functioning, thinking, memory, acceptability, side effects, quality of life, and costs of both treatments at baseline and at 8, 16 and 26 weeks after they were randomised. We used brain imaging techniques before and 16 weeks after they were randomised to measure brain connectivity (how parts of the brain interact with each other) and chemical changes in the brain that may change with depression symptoms.

Contrary to what we predicted, connectivity-guided intermittent theta burst stimulation was not more effective than repetitive transcranial magnetic stimulation on any of the outcomes except it might have cost a little less and slightly improved quality of life. About 20% of both groups showed a response lasting 26 weeks. Both treatment protocols were safe but often produced mild temporary side effects. Both treatments were acceptable. There were some associations between chemicals in the brain and improvement with treatments. There were similar changes in the way some parts of the brain interacted with each other when depression symptoms improved with transcranial magnetic stimulation.

We concluded that both transcranial magnetic stimulation treatments produce lasting improvements for some people with treatment-resistant depression. However, there were reasons other than transcranial magnetic stimulation why some of these people might have improved.

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