

Transcranial Magnetic Stimulation for Neuropsychiatric Disorders: Clinical Effectiveness and Guidelines

Context

Post-traumatic stress disorder (PTSD) affects 12% of Canadians, generalized anxiety disorder (GAD) affects 2.6%, and depression affects 8%. These conditions can be treated with medications or counselling, but patients may still experience symptoms that interfere with daily life; up to two-thirds of patients with depression do not respond to conventional treatment. Brain stimulation techniques are one potential alternative.

Technology

Transcranial magnetic stimulation (TMS) is a non-invasive procedure that uses a magnetic field to stimulate nerve cells in the brain. To create the magnetic field, a large electromagnetic coil is placed on the scalp and a strong electric current is passed through it. The magnetic field passes through the scalp and bone, electrically stimulating the cortex. In repetitive TMS (rTMS), the treatment is repeated over a number of days, weeks, or months.

Issue

How TMS might work to treat PTSD, GAD, or depression isn't fully understood. Some studies have shown that TMS can improve the symptoms of depression, but evidence continues to emerge, and the overall benefits remain unclear. A review of the clinical effectiveness and current guidelines will help to inform clinical decisions on the use of TMS in patients with PTSD, GAD, or depression.

Methods

A limited literature search of key resources was conducted, and titles and abstracts of the retrieved publications were reviewed. Full-text publications were evaluated for final article selection according to predetermined selection criteria (population, intervention, comparator, outcomes, and study designs).

Key Messages

- For PTSD, there is early evidence that TMS may improve clinical outcomes.
- For GAD, no evidence was found.
- For depression, some studies may show a benefit, but four health technology assessments have been unable to make conclusions. Evidence is generally inconsistent and of low quality.
- Evidence-based guidelines for PTSD and depression are mixed, with some listing TMS as a potential first-line option, some giving criteria for second-line use, and some stating TMS should be used for research purposes only. No evidence-based guidelines were found for the use of TMS in GAD.

Results

The literature search produced 465 citations of which 116 were deemed potentially relevant. Five additional articles were identified from the grey literature. Of these 121 reports, 29 met the criteria for inclusion in this review — 4 health technology assessments, 14 systematic reviews, 6 randomized controlled trials, and 5 evidence-based guidelines.

DISCLAIMER: The information in this Report in Brief is intended to help health care decision-makers, patients, health care professionals, health systems leaders, and policy-makers make well-informed decisions and thereby improve the quality of health care services. The information in this Report in Brief should not be used as a substitute for the application of clinical judgment in respect of the care of a particular patient or other professional judgment in any decision-making process nor is it intended to replace professional medical advice. While CADTH has taken care in the preparation of the Report in Brief to ensure that its contents are accurate, complete, and up-to-date, CADTH does not make any guarantee to that effect. CADTH is not responsible for any errors or omissions or injury, loss, or damage arising from or as a result of the use (or misuse) of any information contained in or implied by the information in this Report in Brief.

CADTH takes sole responsibility for the final form and content of this Report in Brief. The statements, conclusions, and views expressed herein do not necessarily represent the view of Health Canada or any provincial or territorial government. Production of this Report in Brief is made possible through a financial contribution from Health Canada.