

Repetitive Transcranial Magnetic Stimulation for Neuropsychiatric Disorders: Clinical and Cost-Effectiveness, and Safety

Context

Deep brain stimulation uses implanted electrodes in the brain to deliver electrical impulses, and is used to treat movement disorders and obsessive compulsive disorder — usually when medication is not working to control symptoms. Another type of brain stimulation called repetitive transcranial magnetic stimulation (rTMS) is now being used in an attempt to treat a variety of neuropsychiatric disorders including depression, auditory hallucinations, anxiety disorders, and substance use disorders.

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 rTMS, the treatment is repeated over the course of a number of days, weeks, or months.

Issue

How rTMS might work to treat depression, auditory hallucinations, anxiety disorders, and substance use disorders isn't fully understood. The decision to use rTMS is usually reserved for patients not responding well to or not tolerating medication therapy for their conditions. A review of the clinical effectiveness and tolerability of rTMS in patients with these conditions will help to inform clinical decisions on its use. A review of the cost-effectiveness of rTMS in patients with depression will also contribute information to the decision-making process.

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 Message

Clinical Effectiveness of rTMS :

(> 2 weeks or > 10 sessions)

- rTMS treatment is effective in the treatment of depression compared to sham (placebo) treatment.
- rTMS treatment is not effective for the treatment of auditory hallucinations or obsessive compulsive disorder (OCD) compared to sham treatment.
- There is no evidence for substance use disorders.

Tolerability:

- rTMS is generally well-tolerated, with mild side effects.

Cost-Effectiveness:

- The cost-effectiveness of rTMS is uncertain.

Results

The literature search produced 270 citations of which 52 were deemed potentially relevant. No additional articles were identified from the grey literature. Of these 52 reports, 11 met the criteria for inclusion in this review: 4 systematic reviews and 7 randomized controlled trials.

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.