

Health Quality Ontario

Repetitive Transcranial Magnetic Stimulation for Treatment-Resistant Depression: OHTAC Recommendation

ONTARIO HEALTH TECHNOLOGY ADVISORY COMMITTEE RECOMMENDATIONS

- OHTAC recognizes that electroconvulsive therapy (ECT) is the most effective treatment for non-psychotic, treatment-resistant depression. OHTAC therefore recommends that repetitive transcranial magnetic stimulation be publicly funded for patients with non-psychotic, treatment-resistant depression only when ECT is not an option.

BACKGROUND

Major depression is a severe and disabling health condition that can dramatically affect a person's quality of life. Although depression can often be effectively treated with antidepressant medications, psychotherapy, or both in combination, many patients do not improve with these treatments. Several treatments have been introduced into clinical practice to improve outcomes for "treatment-resistant" patients. Repetitive transcranial magnetic stimulation (rTMS) is considered a noninvasive technique that delivers intense magnetic pulses, circulating within a coil resting on the scalp, into the brain. The induced magnetic pulses reach the brain cortex and activate the neurons. The aim is to stimulate the area of the brain that is associated with mood regulation.

Repetitive transcranial magnetic stimulation has been used as an alternative to electroconvulsive therapy for treatment of depression. Unlike electroconvulsive therapy, repetitive transcranial magnetic stimulation does not require anesthesia and does not cause seizures if used properly and in compliance with safety guidelines. Repetitive transcranial magnetic stimulation can be applied to conscious patients and can be used for outpatients or inpatients.

SUMMARY OF FINDINGS

Health Quality Ontario conducted a review to determine the clinical effectiveness of rTMS compared to either electroconvulsive therapy or sham treatment.¹ In addition, Health Quality Ontario worked with the Programs for Assessment of Technology in Health (PATH) Research Institute to evaluate cost-effectiveness and one-year budgetary impact of the technology.²

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Our key findings were that:

- Electroconvulsive therapy is more effective than rTMS. Repetitive transcranial magnetic stimulation is more effective than sham treatment, although the difference in effectiveness is small, and there is limited evidence regarding the length of time that the benefit persists.
- Repetitive transcranial magnetic stimulation is cost-effective compared with sham treatment when willingness-to-pay is greater than \$98,242 per quality-adjusted life-year.
- The one-year budgetary impact of funding rTMS for treatment-resistant depression would depend on how widely it was implemented, but might range between \$2 million and \$25 million per year.

OHTAC DELIBERATIONS

OHTAC accepted the findings of the evidence review and the economic evaluation. OHTAC agreed that the evidence in support of rTMS compared to sham therapy was of low or moderate quality. OHTAC also recognized that many patients refuse to be treated with ECT, and that many physicians do not offer this treatment. Given that rTMS is cheaper than ECT, OHTAC believed that rTMS should be publicly funded for patients in whom ECT is contraindicated.

Decision Determinants for High-Frequency Repetitive Transcranial Magnetic Stimulation for Treatment-Resistant Depression

Decision Criteria	Subcriteria	Decision Determinants Considerations
Overall clinical benefit How likely is the health technology/intervention to result in high, moderate, or low overall benefit?	Effectiveness	ECT was found to be superior to high-frequency DLPFC rTMS for treatment-resistant unipolar depression. It reduces depressive symptoms more effectively than rTMS (about 6 points) and results in higher rate of remission. Sham trials showed a small difference in treatment effect between rTMS and sham (about 2 points). rTMS resulted in about 10% benefit increase in remission or response rate.
	Safety	The most frequently reported short-term adverse events were headache, scalp discomfort, pain in the eye, muscle twitching, and insomnia.
	Burden of illness	About 160,837 persons 15 years or older in Ontario have depression resistant to two courses of antidepressant medications.
	Need	ECT has well-defined indications and established standards for practice. With present-day techniques, many previously significant medical complications of ECT have been eliminated. Nevertheless, many physicians do not offer ECT, many patients refuse the treatment when it is offered, and access remains limited.
Consistency with expected societal and ethical values How likely is adoption of the health technology/intervention to be congruent with societal and ethical values?	Societal values	Evidence suggests that ECT is more effective than rTMS. However, some patients may be unwilling to receive it because of fear or because of the stigma that surrounds ECT (expert consultation).
	Ethical values	
Value for money How efficient is the health technology likely to be?	Economic evaluation	rTMS is cost-effective compared with sham rTMS when willingness to pay is greater than \$98,242 per QALY. ECT is cost-effective compared with rTMS when willingness to pay is greater than \$37,640 per QALY.
Feasibility of adoption into health system How feasible is it to adopt the health technology/intervention into the Ontario health care system?	Economic feasibility	Providing access to rTMS for all patients with treatment-resistant depression would be challenging. Several possible scenarios were examined to look at current access to ECT as the foundation for infrastructure development for rTMS in the province.
	Organizational feasibility	ECT has been in use for decades and has established standards for practice. Use of rTMS is currently restricted to a few centres in Ontario.

Abbreviations: DLPFC, dorsolateral prefrontal cortex; ECT, electroconvulsive therapy; QALY, quality-adjusted life years; rTMS, repetitive transcranial magnetic stimulation.

REFERENCES

- (1) Health Quality Ontario. Repetitive transcranial magnetic stimulation for treatment-resistant depression: a systematic review and meta-analysis of randomized controlled trials. Ont Health Technol Assess Ser [Internet]. 2016 March;16(5):1-66. Available from: <http://www.hqontario.ca/evidence/publications-and-ohtac-recommendations/ontario-health-technology-assessment-series/sys-rev-rtms>.
- (2) Health Quality Ontario. Repetitive transcranial magnetic stimulation for treatment-resistant depression: an economic analysis. Ont Health Technol Assess Ser [Internet]. 2016 March;16(6):1-51. Available from: <http://www.hqontario.ca/evidence/publications-and-ohtac-recommendations/ontario-health-technology-assessment-series/econ-rtms>

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