Cost-effectiveness of transcranial magnetic stimulation vs. electroconvulsive therapy for severe depression: a multi-centre randomised controlled trial


Record Status
This is a critical abstract of an economic evaluation that meets the criteria for inclusion on NHS EED. Each abstract contains a brief summary of the methods, the results and conclusions followed by a detailed critical assessment on the reliability of the study and the conclusions drawn.

CRD summary
The aim was to evaluate the cost-effectiveness of repetitive transcranial magnetic stimulation (rTMS) for patients with severe depression, compared with electroconvulsive therapy (ECT). The authors concluded that rTMS was not cost-effective compared with ECT. Overall, the methodology was presented clearly and valid sources of data were used, which enhances the reliability of the authors' conclusions. However, the limitations they outlined should be considered when interpreting these results.

Type of economic evaluation
Cost-effectiveness analysis, cost-utility analysis

Study objective
This objective was to evaluate the cost-effectiveness of repetitive transcranial magnetic stimulation (rTMS) for patients with severe depression, compared with electroconvulsive therapy (ECT).

Interventions
The rTMS was given once daily on consecutive weekdays for a maximum of 15 sessions, while the ECT was administered twice a week for a maximum of five weeks. In the ECT therapy, Methohexitone (0.75 to 1.0mg per kg) was used as an anaesthetic and suxamethonium (0.5 to 1.0mg per kg) was used as a muscle relaxant. Seizure thresholds were established in the first ECT session to ensure that the patient was given the minimum effectiveness stimulus.

Location/setting
UK/secondary care.

Methods
Analytical approach:
This economic evaluation was based on a single clinical trial. The time horizon of the analysis was 29 weeks. The authors stated that a health and personal social services system perspective and a societal perspective were adopted in the study.

Effectiveness data:
The clinical evidence came from a multi-centre (three sites) randomised controlled trial (RCT), which enrolled 46 patients (22 in the ECT group and 24 in the rTMS group). The period of follow up was six months after the end of the treatment. The two groups were comparable at baseline in terms of their demographic and clinical characteristics. Both the inclusion and exclusion criteria were reported. The main clinical outcome was reported to be the 17-item Hamilton Rating Scale for Depression (HRSD).

Monetary benefit and utility valuations:
Quality of life valuations were derived from patients enrolled in the RCT using the Short Form (SF-36) questionnaire. The data generated from the SF-36 were revised into a six-dimensional health state classification (SF-6D) to derive the utilities and societal weights for the quality-adjusted life-years (QALYs).

Measure of benefit:
The two main health benefit measures were the HRSD and QALYs.
Cost data:
The main cost categories were the capital costs of machines, staffing costs and in-patient and out-patient care costs. The costs for community-based services and social services were also considered. The cost data came from various sources, including the annual Personal Social Services Research Unit compendium, the National Health Service reference costs, and machine suppliers. The resource use data were derived from the sample of patients in the RCT. The price year was 2003/2004 and the costs were in UK pounds sterling (£).

Analysis of uncertainty:
The uncertainty surrounding the incremental cost-effectiveness estimates was investigated using a bootstrap analysis. The results were presented by means of a cost-effectiveness acceptability curve (CEAC). A regression analysis was used to compare the costs at six-month follow-up.

Results
At end of treatment, HRSD scores were significantly lower for the ECT group than for the rTMS group with 59% of the ECT group meeting the criteria for remission compared with only 17% of the rTMS group.

At the end of the six-month follow-up period, there was no significant difference between the groups in terms of their HRSD scores (p=0.93).

The total costs during the treatment and follow-up were £6,303 (standard deviation, SD: 3,513) for ECT patients and £10,632 (SD: 7,234) for rTMS patients.

The mean QALY gain for rTMS patients was 0.0300 (SD: 0.053) and for ECT patients it was 0.0297 (SD: 0.056) with an incremental QALY gain of 0.0003 (p=0.987).

At values of willingness-to-pay up to £30,000 per additional QALY, the probability of rTMS being cost-effective was less than 20%, which indicated that rTMS had a very low probability of being a cost-effective alternative to ECT.

Authors' conclusions
The authors concluded that rTMS was not cost-effective compared with ECT in the treatment of severe depression.

CRD commentary
Interventions:
The two comparators were outlined and selected appropriately. One was a recently introduced technology, which was compared with the standard treatment in the UK health care system.

Effectiveness/benefits:
The use of a RCT was appropriate and should have ensured the validity of the clinical analysis. The details of the inclusion and exclusion criteria, randomisation procedures, and follow-up were reported. The baseline comparability of the groups strengthened the validity of the clinical comparison. Overall, the clinical analysis appeared to have been carried out in a credible and transparent fashion.

Costs:
The reporting of the cost analysis was extensive and transparent. The health care utilisation was reported in detail. The resource use reflected the real consumption of services in the sample of patients enrolled in the clinical analysis. The authors provided the unit costs for most items and the sources of all unit costs appropriate to the analysis were reported. Statistical analyses were performed to assess the significance of cost differences. Other details of the analysis, such as the price year and the sources of cost data, were reported.

Analysis and results:
A synthesis of the costs and benefits was conducted and the results were reported transparently. The issue of uncertainty was satisfactorily addressed in the sensitivity analysis. The findings were clearly reported and discussed. The authors highlighted a number of limitations to their study, all of which were outlined and discussed in detail.
Concluding remarks:
Overall, the study methodology was presented clearly and valid sources of data were used. This enhances the reliability of the authors’ conclusions. However, the limitations they outlined should be considered when interpreting these results.

**Funding**
Funding received from the HTA.

**Bibliographic details**

**PubMedID**
18262655

**DOI**
10.1016/j.jad.2008.01.001

**Other publications of related interest**


**Indexing Status**
Subject indexing assigned by NLM

**MeSH**
Aged; Cost-Benefit Analysis; Depressive Disorder, Major /diagnosis /economics /therapy; Electroconvulsive Therapy /economics; Female; Humans; Male; Middle Aged; Retrospective Studies; Severity of Illness Index; Surveys and Questionnaires; Transcranial Magnetic Stimulation /economics

**AccessionNumber**
22008101452

**Date bibliographic record published**
02/03/2009

**Date abstract record published**
03/06/2009