

Royal Australian and New Zealand College of Psychiatrists

Position Statement #40

Transcranial Magnetic Stimulation

(Revised June 2003)

1. Repetitive transcranial magnetic stimulation (rTMS) is a potential new treatment for certain psychiatric disorders which is being studied in many countries throughout the world, including Australia. It involves the focal application of magnetic energy to the cerebral cortex, thus inducing small electrical currents. This has the effect of influencing brain function. Reports have generated positive views about its likely efficacy and usefulness in the treatment of Major Depression and its use is being explored in other conditions[1]. Subconvulsive rTMS does not involve loss of consciousness, loss of memory, or seizure, so that its potential benefits are available without incurring the main side effects of ECT.
2. rTMS presents the RANZCP with a unique situation. The Therapeutic Goods Administration (TGA) in Australia and Medsafe in New Zealand assess new medications with respect to both safety and efficacy before they are accepted for use in the community. However, TMS machines are classified as 'listable' electromedical devices and, under current legislation, these bodies would not assess their efficacy. It is therefore important that the RANZCP accepts the responsibility for making recommendations concerning the use of rTMS in clinical psychiatry and for monitoring such use.
3. Many controlled trials, including sham controlled trials, have been conducted worldwide to assess the antidepressant activity of rTMS. Research has been restricted by the limited availability of funding and subject numbers have tended to be small, particularly in comparison with industry sponsored medication trials. Research and treatment protocols have differed, often markedly, with respect to stimulus parameters and site of stimulation, making the comparison of results across studies difficult. The majority of controlled and uncontrolled studies, but not all, have demonstrated a positive effect in depression. One randomised sham controlled study of a group of depressed patients [2], one sham controlled study of a depressed elderly group [3], one sham controlled study of a group of bipolar depressed patients[4] and two sham controlled studies of rTMS as an 'add-on' treatment to antidepressants failed to demonstrate a benefit for rTMS.
4. Four published meta-analyses[5] [6-8] of the efficacy of rTMS in depression have indicated a positive benefit. McNamara et al [8] reported in their meta-analysis of five randomised sham controlled studies a number needed to treat of 2.3, while Kozel and George[7] reported an effect size 0.53 in 10 studies involving 230 subjects, both results suggesting clinically relevant efficacy. The meta analysis by Burt et al. [5] found an effect size across 16 controlled studies of 0.67, indicating a moderate to large effect. However the authors also noted that the average reduction in HDRS or MADRS scores was only 24% for active treatment (compared to 7% for sham treatment) and questioned whether this represented a clinically meaningful antidepressant effect, particularly when compared to the authors' estimate of a 70% (approx.) reduction in scores for high dose unilateral or bilateral ECT. It should be noted that many studies of TMS in depression have

been limited to two weeks duration and it has been suggested [9] that treatment of longer duration may be more effective.

5. There have been four randomised comparisons of rTMS versus ECT [10-13] which failed to find a statistically significant difference in efficacy in a depressed, non-psychotic population. A fifth study involving naturalistic follow-up [14] showed that patients who responded to either rTMS or ECT had similar relapse rates at three and six months follow-up.
6. A Cochrane Systematic Review[15] of fourteen randomised controlled trials of rTMS in depression found no difference between rTMS and sham treatment, except after two weeks of treatment with left dorsolateral prefrontal cortex and high frequency, and also for right dorsolateral prefrontal cortex and low frequency. The review also found that there was no difference in efficacy between rTMS (left dorsolateral prefrontal cortex) and ECT except for psychotic patients when ECT was superior. The review concluded that there is “no strong evidence for benefit from using TMS to treat depression, although the small sample sizes do not exclude the possibility of benefit”.
7. The safety and side effects of rTMS have been extensively studied. Seizures can occur with high intensity, high frequency rTMS and convulsive rTMS administered under general anaesthesia for depression is being studied. Inadvertent seizures have been reported among research subjects, but none have been reported since 1996[5]. Guidelines for safety have been published[16]. Provided that these safety parameters are observed, seizures are considered a rare adverse event though it is noted that some of the earlier reported seizures occurred despite using parameters which were within the later published guidelines [16]. Caution therefore continues to be necessary. The only common side effects are local discomfort at the site of coil application and mild headache. There is no evidence at this stage of any adverse effects on memory or other cognitive functions, or brain structure. Temporary hearing loss is a potential side effect which can usually be prevented by the use of earplugs. There have been reports of the induction of mania in bipolar patients. TMS is viewed favourably by recipients of the treatment[17]
8. On the basis of currently available data it is reasonable to conclude that rTMS has antidepressant efficacy which may be clinically significant in at least a subgroup of depressed patients. Further studies are required to explore the question of the robustness of the clinical response and to identify those patients who are likely to respond and to determine the most appropriate treatment parameters and site of application. Given its favourable safety profile it is reasonable therefore to recommend that rTMS should be available to certain patients in the clinical setting, outside of research, subject to the conditions outlined below (9-16).
9. Patients for whom rTMS might be offered outside a research protocol include:
 - a) those suffering from Major Depression (DSM IV) who have failed or who are intolerant of other suitable treatments.
 - b) previous responders to rTMS who have relapsed and are not eligible for an existing research protocol.
 - c) patients whose clinical presentation suggests that ECT is indicated, but who prefer to try rTMS before ECT, or for whom ECT might present an unusually high risk.
10. Patients with a history of epilepsy or with surgically implanted metal in the head or neck should not have rTMS.

11. In view of the absence of efficacy and safety data in pregnancy, pregnant women should not have rTMS outside of a properly conducted and ethically approved clinical trial.
12. In view of the paucity of information relating to the use of TMS in patients under the age of 18, TMS should only be used outside of an ethically approved clinical trial after careful evaluation of the individual situation by an appropriate child and adolescent service.
13. Until further data are available, for psychiatric illnesses other than depression rTMS should only be used within an approved research protocol.
14. Patients having rTMS in the clinical setting should sign an appropriate consent form for the treatment. The consent form should detail the possible side effects and adverse events, including the possibility of seizures and the induction of mania. The consent form should inform the patient that the potential benefits of rTMS in depression may be limited, that it may not work for a particular individual, and that the most efficacious manner of administering rTMS has not yet been established.
15. It is recommended that rTMS should not be an office based procedure, but should only be performed in a hospital setting such as an academic unit or tertiary referral unit or in other hospital based units, such as in a private psychiatric hospital, provided that a protocol for the use of rTMS outside research has been developed by an interested and properly trained psychiatrist or group of psychiatrists who undertake to supervise and regulate the administration of rTMS in that hospital or clinic. Such a protocol should be approved by an appropriate local body such as the Medical Advisory Committee or Ethics Committee or similar. Medical staff and resuscitation equipment such as oxygen and a simple ventilation apparatus should be at hand in the event of a seizure.
16. rTMS is considered to be a medical procedure and should only be administered by a medical practitioner or by trained nursing staff who are under the supervision of a medical practitioner. Personnel administering rTMS should be adequately trained in first aid and resuscitation to deal with an unexpected seizure.
17. Psychiatrists who are intending to administer rTMS, either in the clinical or research setting, should be properly trained in the theory and technique of the treatment and the safe operation of TMS devices.
18. Although it is reasonable for certain patients to have access to rTMS outside of research for the treatment of depression, it is recognised that as a treatment in psychiatry rTMS is in the early stage of development and that much research is required to establish its place in the management of psychiatric illness. For this reason it is envisaged that for the most part, rTMS in Australia and New Zealand should continue to be done within a research protocol. In any event, it is important that clinical information about the usefulness and safety of rTMS is collected. Centres who wish to use rTMS should register their interest with the RANZCP, through the Committee for Psychotropic Drugs and Other Physical Treatments. Basic efficacy and safety data should be collected by each centre, regardless of whether patients are being treated clinically or in a research trial. These data should then be forwarded to the Committee, at least annually, to enable a form of centralised monitoring of rTMS practice and outcomes in Australia and New Zealand. It is particularly important that any adverse events, such as seizure or the induction of mania, is reported to the Committee without delay.

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This statement will be due for review in June 2005.

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