

## Psychopharmacology for the Clinician Psychopharmacologie pratique

To submit questions for this regular feature, please send them to the Journal of Psychiatry & Neuroscience / Revue de psychiatrie & de neuroscience, Canadian Medical Association, 1867 Alta Vista Dr., Ottawa ON K1G 3Y6, Canada; fax 613 729-9545; [jpn.office@sympatico.ca](mailto:jpn.office@sympatico.ca). Please include details of any relevant case and your name, address, telephone and fax numbers as well as your email address.

### **A 56-year-old woman with recurrent major depressive disorder refractory to medication had a good response to an acute course of right unilateral electroconvulsive therapy (ECT) but experienced significant cognitive effects and refused maintenance ECT. Is she a good candidate for repetitive transcranial magnetic stimulation?**

Repetitive transcranial magnetic stimulation (rTMS) involves the application of a rapid train of magnetic pulses directly to the head of a patient, inducing electrical activity in underlying cortical neurons, which, depending on the stimulation frequency, results in transient activation or inhibition of targeted brain regions. rTMS offers the promise of a new, non-invasive, non-pharmacologic intervention for psychiatric illness.

For depressed patients, rTMS involving both high frequency stimulation of the left prefrontal cortex and low frequency stimulation of the right prefrontal cortex, has been evaluated for clinical effectiveness, but the results of numerous open studies and controlled comparisons with sham rTMS, medication and ECT have been mixed. Both positive and negative results have been reported (Aarre et al, *Nord J Psychiatry* 2003;57(3):227-32, and Wassermann

and Lisanby, *Clin Neurophysiol* 2001; 112(8):1367-77), and a recent meta-analysis of selected studies found only minimal evidence of efficacy (Martin et al, *Br J Psychiatry* 2003;182:480-91). Factors that may have contributed to these inconsistent results include small samples and other design shortcomings in most studies, the inclusion of subjects with refractory depression, varying stimulus parameters and uncertainty about the precise cortical areas to be targeted. Clearly, much more work must be done to establish rTMS as a routine treatment for depression, but it is one option for patients with refractory depression.

The comparison of rTMS to ECT is intriguing because both involve the induction of electrical activity in the brain, and rTMS may also produce behavioural and gene expression effects similar to ECT in animals (Hasey, *Can J Psychiatry* 2001;46:720-7). Although several groups have reported comparable efficacy between rTMS and ECT, these reports have involved small samples, no placebo/sham-treated arm and low statistical power to detect differences. One group found ECT superior to rTMS in patients with psychotic depression (Grunhaus et al, *Biol Psychiatry* 2000;47:314-24.), and another found ECT superior on 1 of 2 out-

come measures (Pridmore et al, *Int J Neuropsychopharm* 2000;3:129-34).

The effects of rTMS on cognition appear to be slight (Wassermann, *Depress Anxiety* 2000;12:124-9) and can include mild and transient improvements as well as impairments in specific areas of cognition. In a recent study directly comparing ECT with rTMS, ECT was more effective in alleviating depression but produced more obvious (albeit mostly short-lived) deficiencies in various components of memory (O'Connor et al, *Cogn Behav Neurol* 2003;16(2):118-27). rTMS also avoids the risks and expenses involved in managing the grand mal seizures induced by ECT.

Thus, although the efficacy of rTMS is still not firmly established, it offers potential advantages over ECT in the areas of safety and side-effects and may be worth pursuing in individual cases. Legal status and availability of rTMS may vary among jurisdictions, and clinicians should comply with regulations and guidelines appropriate to their location.

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**Competing interests:** None declared.

**The information in this column is not intended as a definitive treatment strategy but as a suggested approach for clinicians treating patients with similar histories. Individual cases may vary and should be evaluated carefully before treatment is provided.**