

Correspondence

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ECT and rTMS for depression

Schulze-Rauschenbach *et al* (2005) report an interesting study comparing electroconvulsive therapy (ECT) with repetitive transcranial magnetic stimulation (rTMS) for the treatment of major depression. They conclude that both are equally efficacious, but rTMS is associated with fewer cognitive side-effects.

Ultimately, a therapeutic plan that optimally helps a given individual cope with disability and recover can only be devised when the physician transcends the traditionally proven, generic insights about pathological anatomy, physiopathology and aetiology of disease, and identifies the unique characteristics of a specific patient. Therefore, therapeutic decisions should always consider the risk–benefit ratio of each treatment option for the specific patient and circumstances. The focus on differences in side-effect profile of rTMS and ECT in major depression by Schulze-Rauschenbach *et al* is thus most valuable.

In 2003 we conducted a similar study of which the authors appear to be unaware (O'Connor *et al*, 2003). We compared 14 patients with medication-refractory depression who underwent ECT with 14 who underwent rTMS. ECT had a significantly greater positive effect on mood than a 2-week trial of rTMS. The reason for this difference between our results and other published trials comparing rTMS with ECT (Janicak *et al*, 2002; Grunhaus *et al*, 2003; Schulze-Rauschenbach *et al*, 2005) is unclear. In our study, as in that of Schulze-Rauschenbach *et al*, ECT was applied unilaterally approximately three times per week for 2–4 weeks. We applied rTMS in sessions of 1600 stimuli at 10 Hz and 90% of motor threshold intensity to the left dorsolateral prefrontal cortex daily (Monday through Friday) for 2 consecutive weeks. Thus we employed 'stronger' parameters of rTMS than Schulze-Rauschenbach *et al*, who applied shorter

trains and also limited stimulation to only 2 weeks. Nevertheless, in both studies ECT and rTMS may have been used at insufficient doses, since progression to bilateral ECT (UK ECT Review Group, 2003) or extension of daily rTMS to 3–4 weeks (Gershon *et al*, 2003; Rumi *et al*, 2005) were not considered.

In our study ECT exerted a deleterious but transient effect on various components of memory that was no longer detected 2 weeks after the end of treatment. However, there was evidence of persistent retrograde amnesia after ECT. Patients undergoing rTMS experienced only a modest reduction in the severity of depression but there was no evidence of anterograde or retrograde memory deficits and there was a remarkable suggestion of cognitive improvement even in those patients with no antidepressant benefits. These findings, as those of Schulze-Rauschenbach *et al*, suggest that the cognitive effects of rTMS might not be the consequence of the mood effects. The suggestion of independent effects of rTMS on mood and cognition also seems to be supported by a previous study of rTMS in major depression (Moser *et al*, 2002) and studies in patients with cerebrovascular (Rektorova *et al*, 2005) and Parkinson's disease (Boggio *et al*, 2005). Boggio *et al* (2005) showed that 10 days of rTMS treatment (15 Hz, left dorsolateral prefrontal cortex) improved cognition and depression in patients with Parkinson's disease, but this cognitive improvement was not correlated with mood change. Furthermore, there was no correlation between cognitive and motor function improvement. Thus, it appears that left prefrontal rTMS exerts differential effects on cognition, mood and motor function. Even in individuals without psychiatric illness, we have recently shown that suppression of the right hemisphere by slow rTMS can enhance verbal memory, while left-sided slow rTMS disrupts it (Kahn *et al*, 2005). Therefore, cognitive and antidepressant effects

of rTMS may be the consequence of modulation of dissociable neural networks.

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Authors' reply: We are glad that Fregni *et al* share our interest in side-effect profiles of rTMS and ECT in major depression and thank them for their positive judgement of our work. They draw attention to their