Therapeutic efficacy of right prefrontal slow transcranial magnetic stimulation in major depression
A double-blind controlled study


Background: Transcranial magnetic stimulation (TMS) is a new procedure that shows promise in treating some psychiatric conditions (see related references for more Background). TMS involves placing an electromagnetic coil on the scalp, then a high intensity current is passed through the coil and turned on and off rapidly, much like is done with a MRI scan. A magnetic field is generated, and if of sufficient intensity then depolarization occurs in the area of the brain under the coils. The TMS decreases logarithmically over distance, thus the effects of the procedure are limited to structures in the brain within 2 cm of the surface. Unlike electroconvulsive therapy (ECT), TMS is primarily an outpatient procedure that requires no anesthesia. It produces discomfort at the scalp site of stimulation and occasionally a mild headache. Though studied in different psychiatric conditions, it shows the greatest promise in the treatment of depression.

Aim: To test the efficacy of TMS in patients with major depression.

Methods: Seventy patients were randomly assigned to receive slow repetitive TMS in the right prefrontal area or sham TMS in a double blind design. The treatment was daily for a total of 10 treatments in 2 weeks. Outcomes measured included several depression specific tools (Hamilton Depression Rating Scale-HDRS and the Montgomery-Asberg Depression Rating Scale-MADRS).

Main Findings: A difference between the two treatments began to appear within a week and by study end a significant difference was evident in a group x time interaction for both the HDRS and MADRS (P<0.03). Adverse effects were limited to discomfort due to facial muscle contractions (14%) and mild headache (9%).

Conclusions: Low frequency, repetitive transcranial stimulation over the right prefrontal area of the brain has short-term beneficial effects in patients with major depression.

Limitations: Caution is warranted in interpreting these results. The published studies differ substantially in design and stimulus parameters. In this study a
low-frequency impulse was used as opposed to a higher frequency impulse. Higher frequency impulses delivery more energy and provide depolarization to a deeper and larger area, but are associated with a greater seizure risk. In this study a figure 8 coil was used instead of a circular coil. In short, TMS is not ready for regular usage.

Impact on Internal Medicine: New medicines and procedures (e.g. TMS, VNS) are being developed at a rapid pace. With direct marketing and intensive media coverage, new developments often reach our patients before they reach our publications. In the case of transcranial magnetic stimulation, the studies to date show promise for this procedure, but its efficacy, safety, and optimal techniques remain to be established. It is an experimental, not standard, treatment.

Related Articles:
Trancranial Magnetic Stimulation. Applications in Neuropsychiatry
George MS, et al. Arch Gen Psych 1999;56:300-311