

— Vol. 65 No. 3, March 2008

— Original Article

## Treatment of Vascular Depression Using Repetitive Transcranial Magnetic Stimulation

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*Arch Gen Psychiatry.* 2008;65(3):268-276.

**Context** The term *vascular depression* (VD) has been used to describe late-life depressive disorders in patients with clinical evidence of cerebrovascular disease. Preliminary data on poststroke depression suggest that repetitive transcranial magnetic stimulation (rTMS) might also be effective among patients with VD.

**Objective** To examine the efficacy and safety of rTMS to treat VD.

**Design** Prospective, randomized, sham-controlled study.

**Setting** University hospital.

**Methods** After discontinuation of antidepressant therapy, 92 patients with clinically defined VD were randomly assigned to receive active or sham rTMS of the left dorsolateral prefrontal cortex. Approximately half of the patients met criteria for magnetic resonance imaging–defined VD. In experiment 1, we administered a total cumulative dose (TCD) of 12 000 pulses (TCD-12K); in experiment 2, 18 000 pulses (TCD-18K). Sham stimulation was performed using a sham coil.

**Results** In experiment 1, the sham group showed a 13.6% decrease in the 17-item Hamilton Depression Rating Scale (HAM-D-17) scores compared with a 33.1% decrease in the TCD-12K group ( $P = .04$ ). Response rates were 6.7% in the sham group and 33.3% in the active-stimulation group ( $P = .08$ ); remission rates were 6.7% and 13.3%, respectively ( $P = .50$ ). In experiment 2, the sham group showed a 17.5% decrease in the 17-item Hamilton Depression Rating Scale scores compared with a 42.4% decrease observed in the TCD-18K group ( $P < .001$ ). Response rates were 6.9% in the sham group and 39.4% in the active-stimulation group ( $P = .003$ ); remission rates were 3.5% and 27.3%, respectively ( $P = .01$ ). Response rates to rTMS were negatively correlated with age and positively correlated with higher frontal gray matter volumes.

**Conclusions** To our knowledge, this is the first controlled trial that demonstrates the efficacy of rTMS among geriatric patients with VD. Older age and smaller frontal gray matter volumes were associated with a poorer response to rTMS.

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