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Does vermal TMS decrease the negative symptoms of schizophrenia? A case study

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Abstract

While psychopharmacological interventions for schizophrenia (SCH) have demonstrated efficacy for positive symptoms, there are virtually no treatment interventions for the negative symptoms of SCH. The negative symptoms of SCH, which includes social withdrawal, affective flattening, poor motivation, and apathy, point to the subcortical structures of the Papez circuit as potential targets of intervention. However, these structures are difficult to selectively modulate by pharmacological treatment, and are situated too deeply to target by non-invasive stimulation. We hypothesized, because of its superficial location the cerebellum may provide a potential access point for TMS to modulate the ventrolateral thalamus through the cerebello-thalamic pathway and may affect the negative symptoms of SCH.

Subject: The subject was a 38 year old Caucasian male, who had been referred through his primary psychiatrist. At the time of intervention, the subject was free of positive symptoms.

Method: The subject's cognitive abilities were measured prior to intervention using a wide variety of neuropsychological measures. The subject was then randomly assigned to either an active intervention or sham intervention. Both the raters and the subject were blinded. Using a double circular 90 mm coil, connected to a Magstim Rapid 2 stimulator 1000 rTMS stimuli were delivered at 10 Hz with an intensity of 120% of resting motor threshold to Lobule VII of the cerebellar vermis. Treatment was composed of 4 weeks of biweekly intervention, followed by 4 weeks of observation and measurement. The subject was then reassigned to 1000 TMS pulses delivered at 1 Hz.

Results: Cognitive measures were obscured by ceiling effects. During the active phase of intervention, the subject demonstrated a 7% impairment during the inhibitory treatment phase and a 11% improvement during the excitatory treatment phase on SANS scales. Interestingly, the subject reported lowered libido during the inhibitory treatment phases, which complicated measurement of improvement. Using a modified scale, which excluded measurements of libido, the subject had greater than a 20% improvement. Studies continue to determine if the cerebellum can modulate the symptoms of refractory schizophrenia.

Biography

Robert J. Buchanan completed his residencies at the University of California San Diego (UCSD) School of Medicine in the Department of Psychiatry and the Department of Surgery/Neurosurgery. His fellowships include Yale University School of Medicine, Department of Neurosurgery, in Epilepsy Surgery and Functional Neurosurgery; UCSD Department of Psychiatry and the National Institute of Health (NIH) Psychobiology and Psychopharmacology as well as The Salk Institute for Biological Studies, Post-Doctoral Fellow with the Lab of Genetics. Dr. Buchanan is an associate Professor in the Department of Psychology and The Institute for Neuroscience at The University of Texas at Austin and The University of Texas Southwestern Medical School. He has an Image Guided Transcranial Laboratory at UT where he studies Brain Function and is exploring treatments for epilepsy, psychiatric disease, and movement disorders. Dr. Buchanan is a Board Certified Diplomate of both the American Board of Neurological Surgery and the American Board of Psychiatry and Neurology.

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