Functional Imaging and Neurocognitive Correlates of Targeted High Frequency Repetitive Transcranial Magnetic Stimulation in Patients with Alzheimer's Disease (P04.190)

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Objective: To assess whether 1) repetitive transcranial magnetic stimulation (rTMS) can ameliorate aphasia in Alzheimer's disease (AD) patients and 2) whether there are changes in activation patterns in relevant cortical areas using functional brain imaging subsequent to rTMS.

Background: Among the earliest manifestations of AD are deficits in language that significantly impair patients' quality of life. Currently approved agents for slowing progression of AD do not target aphasia. Studies have demonstrated beneficial effects of rTMS in improving cognition and language deficits in patients with neurological disorders. rTMS may be a potential therapeutic tool to help improve aphasia in AD patients.

Design/Methods: Eleven AD patients with aphasia underwent 4 sessions of rTMS applied to the dorsolateral prefrontal cortex at a frequency of 10-15 Hz over two weeks. They underwent standardized cognitive tests at baseline, immediately after completing the course of rTMS, and 4-weeks after the last rTMS treatment. All patients underwent concomitant functional MRI (fMRI) scans at the time of the tests while performing cognitive paradigms in the scanner.

Results: All patients completed the cognitive portions of the study. Three patients could not tolerate imaging and therefore did not complete the imaging portion of the study. There was improvement in verbal and non-verbal agility on testing that was seen 4-weeks post-treatment relative to baseline (p<0.05). In two of the three patients where the TMS coil placement was guided by structural MRI in addition to localization relative to motor cortex, the word generation paradigm on the fMRI revealed increased activation of Broca's area.

Conclusions: These preliminary results suggest that rTMS may serve as an effective adjunctive treatment for aphasia found in AD patients. Further research using control stimulation is needed.

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