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White matter changes in mild cognitive impairment

H. Cho¹, J.-H. Kwan², S.-H. Choi³, S.-Y. Kim³

¹Neurology, ²Ulsan University Hospital, ³Dong-gang Hospital, Ulsan, South Korea

Introduction: Mild cognitive impairment (MCI) is a syndrome, distinct from dementia, with a high heterogeneity in terms of etiology, clinical manifestations and prognosis. Recent studies suggest that one possible etiology is small vessel cerebrovascular disease (CVD). It is associated with small subcortical infarcts and white matter abnormalities. These white matter changes appear on Magnetic resonance imaging (MRI) as white matter hyper-intensities (WMH).

Objective: In this study, we examined the white matter changes of different MCI subtypes to evaluate their correlation to neuropsychological characteristics, demographic information, prevalence of vascular risk factors and MCI subtypes.

Methods: We examined a group of individuals who were clinically diagnosed with MCI and used WMH on MRI to identify two subgroups of subjects: those with WMH (MCI-WMH), and those without WMH (MCI-NL).

We investigated the association of different white matter changes with the neuropsychological characteristics, demographic information, prevalence of vascular risk factors and MCI subtypes, based mainly on the neuropsychological profile.

Results: The study included 56 subjects with MCI-NL and 24 with MCI-WMH. WMH were significantly associated with the neuropsychological characteristics in MCI patients, in particular with the frontal/executive dysfunctions. And they were correlated well with age, education level, and vascular risk factors independent of gender and MCI subtypes.

Conclusions: The white matter changes could produce the syndrome of MCI by disrupting frontal/executive systems. Further studies, using functional and structural neuroimaging techniques, will be necessary to more conclusively link small vessel CVD to frontal/executive dysfunction in MCI.

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Case report on the efficacy and safety of repetitive transcranial magnetic coil stimulation (rTMS) in aphasia in Alzheimer's disease

G. Devi^{1,2,3}, E. Shin¹, J. Halper^{1,3}, S. Lowe^{1,3}, M. Glodowski¹

¹Neurology and Psychiatry, The New York Memory and Healthy Aging Services, ²Neurology, ³Psychiatry, New York University School of Medicine, New York, NY, USA

Objective: To determine the efficacy and tolerability of repetitive transcranial magnetic stimulation (rTMS) on language performance in Alzheimer's disease (AD) patients with aphasia.

Background: AD patients often develop aphasia which progresses along with the disease. Currently approved agents for slowing progression of AD do not specifically target this symptom. By modulating cortical excitability, rTMS is a non-invasive technique that uses electrical current to stimulate the brain. Studies have demonstrated the beneficial effects of rTMS in improving cognition and language deficits in healthy subjects and in patients with neurological disorders. rTMS may be a potential therapeutic tool to help improve expressive language functioning in aphasic AD patients.

Design and methods: A 75-year-old man with a NINCDS-ADRDA diagnosis of probable AD underwent rTMS stimulation twice a week for 2 weeks. He underwent an fMRI study and an abbreviated cognitive battery at baseline, after the 2 weeks of stimulation and 4 weeks after the final stimulation.

Results: After the rTMS sessions the patient demonstrated improvement on the abbreviated cognitive battery, along with concomitant functional improvement. His fMRI studies showed increased bilateral activation for certain language and motor tasks, seen after 2 weeks of stimulation and sustained 4 weeks after completion of stimulation. The patient tolerated the stimulation without adverse effects.

Conclusions and relevance: rTMS may have a role in ameliorating the language deficits experienced by AD patients. Further research with larger numbers of patients and sham stimulation is needed.