MEMORY ENHANCEMENT IN ALZHEIMER DISEASE AFTER DAILY TRANSCRANIAL DIRECT CURRENT STIMULATION

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Introduction: Previous studies assessed the acute effects of transcranial direct current stimulation (tDCS) on memory in patients with Parkinsons Disease (PD) and Alzheimer Disease (AD), these studies showed that PD and AD patients improve their memory performance. These results prompt the development of experimental protocols for investigating the effects of prolonged treatment with tDCS.

Aims: To assess whether daily tDCS can induce prolonged cognitive improvement in patients with AD.

Methods: The cognitive functions were evaluated in fifteen patients, before and after tDCS, using four tasks: Mini-Mental State Examination (MMSE), Alzheimer’s Disease Assessment Scale-cognitive sub scale (ADAS-cog), Visual-Recognition Task (VRT) and Visual-Attention Task.

tDCS was delivered bilaterally by a direct constant-current electrical stimulator connected to a pair of sponge electrodes: two scalp electrodes placed over the temporal regions and the stimulation reference electrode placed over the right deltoid muscle. The stimulating current was anodal DC at 2 mA intensity, delivered for 30 minutes for five consecutive days.

Results: Anodal tDCS induced significant changes in the accuracy of VRT by about 9% (p=0.04) as compared to baseline, that persists for at least four weeks after the end of tDCS sessions.

tDCS failed to change ADAS-cog, MMSE, and the visual-attention task.

Conclusions: Our results showed an enhancement of visual-recognition memory that persists for at least four weeks. This long-lasting effect could reflect the impact of this technique on long-term potentiation (LTP) even in a progressive, degenerative disease and could be relevant also for memory in PD.