Effect of Transcranial pulse stimulation for the treatment of Alzheimer's Disease – The Spanish Experience with a control group study

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Introduction

Brain stimulation techniques based on the delivery of transcranial shockwaves are currently being studied for their increasing popularity as an approach to modulate the human brain in a focal and targeted manner. It is an innovative method that is gathering more and more scientific evidence in its favor, being an excellent therapeutic option to treat patients with Alzheimer's Disease (AD). Here we present the results from a medium / long-term follow-up of subjects treated with transcranial pulse stimulation by analyzing the scoring on neurological evaluations 3 months post-treatment, compared with a control group (12 month results are pending).

Materials and Methods

The results belong to 41 patients (16 treated, 25 control), 50% female, aged from 66 to 91 years with mild or moderate AD.

The treatment protocol includes an initial evaluation with a neurologist and a neuropsychologist. If diagnosed as mild to moderate AD, an MRI scan is conducted to discard other pathologies. The tests performed includes the following tests: mini mental test evaluation (MMSE), Montreal Cognitive Assessment (MoCA), Consortium to Establish a Registry for Alzheimer's Disease (CERAD), Clinical Dementia Rating (CDR), Geriatric Depression Scale (GDS), Apathy Motivation Index Questionnaire and other domain specific cognitive tests.

The treatment consisted on 6000 pulses/session: 800 pulses in both frontal areas, 400 pulses on each parietal area and 600 pulses on the precunean area before repeating the same sequence once. Short pulses of 3 microseconds, 5Hz and 0.2-0.3 mJ/mm^2 were applied. The session duration is 25 minutes. Subjects received 6 sessions delivered over 2 weeks on alternate days, and a reinforcement session was administrated 10 weeks after the initiation of the treatment. The protocol includes the evaluation with a cognitive evaluation of the patients after 3, 6 and 12 month post-treatment.

Results

Results from 41 patients were collected (16 treated, 25 control), with the 3 months follow-up completed for all. All patients experienced a sustained improvement in MMSE, MoCA, CDR and CERAD scores, compared with the control group where deterioration was observed.

Conclusion

Patients presented good tolerability and no side effects. This method shows promising results to slow down the progression of the disease and improve certain areas on the cognitive behavior. This study is yet to be concluded after collecting the results 12 month follow-up results.

Treatment with TPS produces significant improvements in overall cognition, temporal orientation and immediate recall, MMSE, CDR, MoCA and CERAD scores. We can conclude that TPS is an excellent and safe therapeutic option for AD that accompanies currently available treatments and complements them, helping to maintain greater stability of the disease and slowing its progression.