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Clinical effects of sensorimotor anodal transcranial direct current stimulation in patients with early-onset Parkinson's disease: a pilot study

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Introduction: Transcranial direct current stimulation (tDCS) is a non-invasive brain stimulation increasingly used for therapeutic modulation of central nervous system excitability in various neurological diseases [1], including Parkinson's disease (PD) [2]. Early-onset PD (EOPD) is a PD subtype with severe impact on patients' quality of life. tDCS has never been specifically applied to EOPD patients, although it could represent a valid integrative therapeutic option.

Objective: To evaluate the clinical effects of an anodal tDCS treatment in a group of EOPD patients.

Methods: We recruited 12 idiopathic EOPD patients. tDCS was administered with the anode placed over the left sensorimotor area and the cathode over the contralateral supraorbital ridge. The protocol included 10 sessions of stimulation (2mA intensity) of 20 minutes each, over two weeks. Participants were assessed at baseline and at the end of the protocol with MDS-UPDRS part III, Non-motor symptoms scale (NMSS), PD-cognitive rating scale (PD-CRS), and PD Quality of Life Questionnaire-39 (PDQ-39). Paired T-test was used to compare changes in clinical scores.

Results: Significant changes occurred in NMSS score (M 32,36±29,07 vs 17,45±20,92, p=0.001) and PD-CRS (M 100,82±13,95 vs 106,55±13,97, p=0. 040). Total MDS-UPDRSIII score did not change; conversely the rigidity items score significantly reduced (M 0,67±0,78 vs 0,42±0,70, p=0.05). PDQ-39 score was unmodified. No relevant side effects were recorded. The treatment was well tolerated by all participants.

Conclusions: This pilot study showed that a 10 session-long protocol of anodal sensorimotor tDCS might exert beneficial clinical effects in EOPD patients. Most relevant improvements occurred in non-motor symptoms and cognitive performances, consistently with a direct effect of the stimulation on cortical cognitive network. Motor disturbances did not significantly change, albeit some amelioration was notice for rigidity. Further confirmation in larger samples, with sham-controlled subjects, is now needed. However, tDCS emerges as a safe, well-tolerated, promising therapeutic option for EOPD.

References:

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