

Transcranial Direct Current Stimulation in Schizophrenia

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Objective

Our objective was to examine whether transcranial Direct current Stimulation (tDCS) applied over the left temporoparietal junction (assumed 'inhibitory' - cathode) and the left prefrontal cortex (assumed 'excitatory' - anode) can impact clinical symptoms and functional connectivity of targeted regions in patients with schizophrenia presenting treatment-resistant auditory verbal hallucinations.

Method

In a double blind sham-controlled randomized clinical trial, thirty patients with schizophrenia and treatment-resistant auditory verbal hallucinations were randomly allocated to receive either 20 minutes of active 2mA tDCS or sham stimulation twice a day during 5 consecutive working days. The anode was placed over the left prefrontal cortex according to 10/20 EEG international system (PFC/F3FP1) and the cathode over the left temporoparietal junction (TPJ/T3P3). Seed-based functional connectivity maps were compared before and after stimulation sessions (5 minutes resting state fMRI). Seed were placed in regards of the electrode locations. Analyses were done using Brain Voyager QX on resting state fMRI maps.

Results

Clinical impact of tDCS was investigated in the initial sample of 30 patients. tDCS resulted in an improvement of global symptoms (-12%) and auditory hallucination (-31%) for at least 3 months.

The impact of tDCS on seed-based functional connectivity was investigated in a subsample of 21 patients. We reported a significant decrease of functional connectivity in fronto-temporal network (language-related brain areas including left TPJ, dorso-lateral PFC, Broca's area and their right homologues) after active tDCS compared to sham treatment.

Conclusion

tDCS seems to be a promising tool to modulate brain networks underlying clinical symptoms in schizophrenia.