Abstract

Background

Borderline personality disorder (BPD) involves several psychopathological dimensions related to prefrontal cortex impairments. These impairments consecutively alter fronto-limbic network functionality. Impulsivity is one of the main dimensions of BPD and is considered a good predictor of likelihood of severity, regression, and responsiveness to treatment. Anodal transcranial direct current stimulation (tDCS) targeting the right DLPFC positively influences cognitive functions related to impulsivity in healthy individuals.

Methods

This pilot study was designed to assess feasibility and to investigate the influence of anodal and cathodal stimulation on right and left DLPFC, respectively, in BPD. We hypothesize that right anodal tDCS stimulation lowers BPD severity by decreasing impulsivity.

Ten patients were recruited to Institut Universitaire en Santé Mentale de Montréal, IUSMM, in Quebec to receive active tDCS sessions at 2 mA, in one 20-minute session a day for 10 days, followed by short term psychotherapy. Impulsivity and depression were assessed before and immediately afterward, and then 3 months after the neuromodulation sessions.

Results

Bilateral tDCS (Anode-cathode) on right and left DLPFC respectively seemed to alleviate depressive symptoms in BPD patients. The mean score of MADRS significantly decreased from 13.7 to 9.2 (SD). Conversely, impulsivity scores increased with tDCS stimulation on UPPS-IBS from 99.1 to 107 (SD). On risk taking, BART did not significantly change.

However, impulsivity and BPD overall severity improved when tDCS stimulation was conjugated with short- term psychotherapy. The mean BPDSI overall score significantly decreased from 26.3 to 18.7 (SD).

Conclusion:

Conjugation of right anodal/left cathodal DLPFC tDCS stimulation with psychotherapy may improve borderline overall severity as well as impulsivity. Depressive symptoms in BPD patients may improve with solo tDCS. However, tDCS stimulation, alone, deteriorated impulsive behavior with no significant effect on risk taking. Yet, combining neuromodulation and psychological treatments appears a promising therapeutic for borderline patient with high impulsivity. Nevertheless, careful assessment and protocols are warranted for the future trials.