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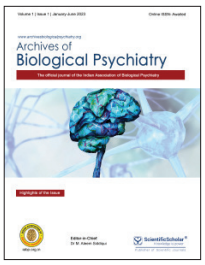

Letter to Editor *Psychiatry*

Self-limiting intense mood swings following transcranial direct current stimulation: A case study

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Dear Editor,

Transcranial direct current stimulation (tDCS) is a non-invasive neuromodulation technique used to treat various neuropsychiatric disorders. It uses weak electric current to modulate the firing of neurons of the underlying superficial cortex, where an anodal stimulation produces excitation and cathodal stimulation produces underlying cortical inhibition.[1-3] It is commonly used in the treatment of depression, schizophrenia, obsessive-compulsive disorder, substance use disorders, and neurocognitive disorders.[1] Existing evidence suggests that there is no serious or life-threatening side effect of tDCS; however, some patients report some minor side effects like – burning sensation, headache, redness, tingling sensation, and itching sensation.[1] It has been seen that tDCS may induce manic or hypomanic symptoms in patients with depression, though it is an extremely rare phenomenon, and evidence is limited to case studies only.[1] The side effects of tDCS are mostly transient, but sometimes, they may be long-lasting.[4] We report here the case of an adult female with a depressive episode who reported intense mood swings following initial sessions of tDCS, which resolved spontaneously.

A 35-year-old female presented with complaints of persistent, pervasive low mood, loss of interest in previously pleasurable activities, decreased attention and concentration, and disturbed sleep for 2 months. No precipitating factor was present. There is a history of one depressive episode 3 years back. There is a history of depression in her father. Premorbid personality and general physical examination were within normal limits. A mental status examination revealed low self-esteem, hopelessness, worthlessness, and passive death wishes. A diagnosis of recurrent depressive disorder, current episode moderate, was made as per the International Classification of Diseases, 10th Revision criteria. The symptoms were causing significant impairment in her personal and occupational life. Hence, with prior consent, a multimodal approach involving pharmacotherapy (Tab. Escitalopram 10 mg/day and Tab. Clonazepam 0.5 mg/day) and brain stimulation using tDCS was opted for.

Baseline assessment revealed a Hamilton Depression Rating Scale (HAM-D) score of 15, Beck's Depression Inventory (BDI) score of 23, and a Hamilton Anxiety Rating Scale (HAM-A) score of 19. The anode was placed over the left dorsolateral prefrontal cortex (DLPFC), and the cathode was placed over the right DLPFC. A total of ten sessions of tDCS with a current intensity of 2 mA and a ramp time of 10 s were delivered over 20 min. The patient was monitored for after-effects of tDCS after each session.

During the first two sessions, the patient reported transient euphoria. However, this was followed by a period of intense dysphoria, severe mood changes, crying spells, and difficulty in concentration

lasting for a day, which resolved spontaneously over the next 2–3 days. No other side effects were reported. This rare adverse reaction was reported to the Indian Pharmacopoeia Commission. After the patient's consent, the tDCS sessions were continued for ten sessions. The patient reported improvement in her depressive and anxiety symptoms. No side effects were observed or reported in the subsequent sessions. Post-tDCS sessions, the HAM-D, BDI, and HAM-A scores were 10, 18, and 11, respectively. After 2 weeks of follow-up, the patient was maintained well with a HAM-D score of 6, a BDI score of 13, and a HAM-A score of 6.

In this case, tDCS is used as an early augmentation strategy. Emerging evidence reports the beneficial role of the use of neuromodulation techniques like tDCS early in the course of the management of depression as an augmentation strategy.[5,6] The unique feature in our case is the development of euphoria following the very first session following tDCS. A recent systematic review evaluated the effect of single-session tDCS or repetitive transcranial magnetic stimulation on the mood of healthy individuals, and it was found that the impact of single-session neuromodulation on mood state is insignificant.[7] However, the impact of tDCS on patients with depression may be different. Our patient had a depressive episode, and the patient was on antidepressant escitalopram. Brunoni *et al.* reported a patient receiving antidepressant sertraline and tDCS (cathode over right DLPFC and anode over left DLPFC) for major depression in a 62-year-old woman who developed mania with psychosis following 5 days of administration of tDCS.[8] Few more such incidences are reported subsequently in the literature.[1] However, none of the published reports mention such diversity in mood changes following tDCS administration, which spontaneously resolved despite the continuation of tDCS sessions, and finally, at the end of ten sessions, the patient reported a 33% reduction of HAM-D score from the baseline severity. The mood changes in our patients following tDCS administration showed an initial euphoric effect followed by dysphoric (irritability, low mood, crying spells, and worsening of anxiety from the baseline severity) mood. The sessions of tDCS were continued with the same frequency without any change in protocol or site, which resulted in a reduction in depression severity. This case gives a message that tDCS may produce emotional turbulence in the initial phase of treatment, which may resolve spontaneously, and reassurance may be the best way to deal with it. Although antidepressant-induced mood changes are reported in literature, the mood changes associated with antidepressants are typically shift of the mood from a depressed state to euthymic affect, hypomania, or mania. Our patient showed an initial euphoric experience followed by intense turbulence in the mood, which might be mediated through tDCS. The intense mood changes were short-lasting. This case gives the message that despite emotional turbulence following tDCS, it can be safely continued with periodic monitoring of the mood and other associated symptoms.

Ethical approval

The Institutional Review Board approval is not required.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

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Conflicts of interest

There are no conflicts of interest.

Use of artificial intelligence (AI)-assisted technology for manuscript preparation

The authors confirm that there was no use of artificial intelligence (AI)-assisted technology for assisting in the writing or editing of the manuscript and no images were manipulated using AI.

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