Case Report

Safety of Transcranial Direct Current Stimulation in Alcohol-Induced Psychotic Disorder with Comorbid Psoriasis

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ABSTRACT

Transcranial Direct Current Stimulation (tDCS) involves application of weak direct electric currents (up to 2mA) using scalp electrodes with resultant neuroplasticity modulation by altering the cortical excitability. Though the side effect profile of tDCS is benign and less severe, the utility and safety of tDCS in dermatological conditions remains a concern. In this context, we report the safe administration of tDCS in a subject with substance induced psychosis and co-morbid psoriasis.

Key words: *Alcohol induced psychotic disorder, auditory hallucinations, psoriasis, tDCS*

INTRODUCTION

The reintroduction of transcranial direct current stimulation (tDCS) has kindled great enthusiasm in the field of neurosciences. tDCS involves application of weak direct electric currents (up to 2mA) using scalp electrodes (usually cathode and anodal electrodes in bipolar stimulation). It is proposed to cause neuromodulation and neuroplasticity changes by altering the cortical excitability.[1,2] Apart from research in neurophysiology, it has also shown promising results as a novel therapeutic intervention of various neuropsychiatric disorders.[3] The ease of administration and lesser side effects have made tDCS a popular intervention.[4]

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Though the side effect profile is benign and less severe, few authors have reported skin burns beneath the electrode site in multiple sessions tDCS[5,6] and the utility and safety of tDCS in dermatological conditions remains a concern. While one report contradicts use of tDCS in subjects with skin lesions,[7] another report has demonstrated safe administration of multiple sessions tDCS in a schizophrenia patient with vitiligo, demonstrating the safety of the procedure even in fragile skin.[8] In this context, weighing benefits of tDCS over its adverse effects, we report the safe administration of tDCSin a subject with substance-induced psychosis and co-morbid psoriasis, a chronic inflammatory skin disease.[9]

CASE REPORT

Mr. V., a 48-year-old right-handed man diagnosed to have alcohol dependence syndrome with alcohol-induced

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psychotic disorder presented to us in October 2013 with persistent auditory verbal hallucinations for nearly 3 years with only partial improvement with adequate trial of multiple antipsychotics. He was diagnosed with psoriasis by a dermatologist elsewhere and was on topical treatment since 15 years. Plaque type psoriatic lesions were present on the scalp, especially in the left temporo-parietal region. Patient's psychopathology was assessed using auditory hallucinations subscale (AHS) of Psychotic Symptom Rating Scales (PSYRATS)[10] and the score was 35. In view of persistent auditory hallucinations and considering the risk benefit ratio, the option of tDCS as an add-on treatment along with antipsychotics was considered.

The patient as well as his primary caregiver was provided with adequate information regarding the procedure, and a video of the tDCS procedure was also shown. tDCS procedures were done using a standard equipment (Neuroconn DC Stimulator Plus, http://www.neuroconn.de/dc-stimulator_plus_en/) as per established guidelines with stringent safety measures.[11,12] The anode was placed with the middle of the electrode over a point midway between F3 and FP1 (left dorsolateral prefrontal cortex) and the cathode located over a point midway between T3 and P3 (left temporo-parietal junction). The stimulation level was set at 2 mA for 20 minutes. The sessions were conducted twice a day (separated by at least 3 hours) on 5 consecutive days.[11] At the end of each session, a structured questionnaire was used to assess for any potential adverse effects.[4] In addition to this, the skin under the electrodes was examined for any lesion after each session.

After second day, patient started reporting improvement in symptoms. He appreciated a significant decrease in duration and frequency of auditory hallucinations. Repeat AHS score on day 5, at the end of 10th session was 25. Subjectively, the patient reported significant improvement in the distress due to hallucinations. Assessment of adverse effect revealed only tingling sensation (restricted to the time of electrode application) which was rated as mild and tolerable by the patient. There was no erythema or burns at the electrode site.

DISCUSSION

In this case report, the safety of multiple session tDCS applied over psoriatic skin lesion is demonstrated. The sponge pads holding the electrodes were soaked adequately in 10 millimolar saline to reduce the impedance at the tDCS application site and the pads were washed after each session to avoid accumulation of toxic substances that might account for skin lesions.[6] Palm and colleagues[6] also report that tDCS at higher intensities (2 mA) for longer periods can cause skin burns. They attribute this to the change in the dermal equilibrium by DC iontophoresis or due to drying of the electrode, resulting in more focused current to small area causing burns. However, the exact mechanism behind this is yet to be established. In this single case description, we observed that multiple session tDCS was well-tolerated without any significant dermatological side-effect in this patient with psoriasis. Our observation suggests that tDCS can be safety administered in psychiatric disorders with co-morbid psoriasis.

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