Case Report

Right-sided Transcranial Direct Current Stimulation and Attentional Salience of Auditory Hallucinations in Schizophrenia

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ABSTRACT

Transcranial direct current stimulation (tDCS) is a safe, noninvasive technique demonstrated to reduce persistent auditory hallucinations in patients with schizophrenia. Here, we report the differential effect of tDCS on auditory hallucinations against other positive symptoms and also the use of right-sided tDCS in patients with increased attentional salience toward auditory hallucinations.

Key words: *Auditory hallucinations, positive symptoms, salience, transcranial direct current stimulation*

INTRODUCTION

Transcranial direct current stimulation (tDCS) is a safe, reemergent, noninvasive brain stimulation technique demonstrated to reduce persistent auditory verbal hallucinations (AVHs).[1,2] tDCS is also used to facilitate improvement in cognitive deficits[3] and negative symptoms domain.[4] There is a paucity of literature on the effect of tDCS on other positive symptoms such as delusions, thought alienation, and formal thought disorder. In addition, there is a recent report on clinical utility of attentional salience of AVHs to influence the laterality specific response to tDCS.[5]

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CASE REPORT

Mrs. K is a 28-year-old marriedfemale, diagnosed with schizophrenia (Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition) for 12 years characterized by thought alienation, 2nd and 3rd person auditory hallucinations, olfactory hallucinations, bizarre delusions, and formal thought disorder. She was admitted with exacerbation of above symptoms over the past 3 months despite being regular on treatment with 6-mg/day of risperidone. In the past, she had been treated with olanzapine (30-mg for 8 months)

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and flupenthixol (40-mg fortnightly for 6 months) with poor response. Her baseline psychopathology ratings were as follows: Brief Psychiatric Rating Scale version 4.0 (BPRS) score was 54. Auditory hallucinations score was 39 on Psychotic Symptom Rating Scale - hallucinations dimension (PSYRATS).[6] She had marked salience toward her hallucinations, paying full attention to voices altering her thought, speech and behavior with a score of 7 in the attention salience component of Auditory Hallucinations Rating Scale (AHRS).[7] In view of significant attention salience toward hallucinations, it was decided to stimulate right dorsolateral prefrontal cortex activity with anode and inhibit right temporoparietal junction with cathode through add-on tDCS along with continuation of stable antipsychotic dosage.

Twice daily, 20 min sessions using 2 mA current (sessions separated by at least 3 h) with electrode placement as mentioned above were tried for 5 consecutive days (10 sessions in total) with stringent safety measures and detailed recording of any adverse events after each session using a standard protocol.[8] She tolerated these sessions well except for mild burning sensation under anode during initiating stimulation for about 10–20 s.

She reported a significant reduction in auditory hallucinations following tDCS. In her own words "I heard them speaking about me throughout the day but now I hear occasionally around 5 min once in every 2–3 h. They are not disturbing me anymore. I am able to concentrate on work at hand." PSYRATS hallucination score reduced to 27 from 39 (more than 30% reduction). AHRS salience score (item 6) reduced to 2 (distracting occasionally) from 7. However, BPRS score showed minimal change (54–53).

DISCUSSION

In this case, we attempted to evaluate the possible effects of tDCS on various symptoms of schizophrenia other than auditory hallucinations such as delusions, thought alienation, and formal thought disorder. As demonstrated before,[1,2] there was a clinically significant reduction of auditory hallucinations but not in other symptom domains. This points to the differential effect of tDCS on AVHs against other positive symptoms. In addition, we successfully used right-sided stimulation instead of the usual left[1,2] based on literature on functional imaging, magnetic, and DCS.[5,9,10] This adds to the existing observation of clinical utility of "attentional salience" in individualizing neuromodulation.

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Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Brunelin J, Mondino M, Gassab L, Haesebaert F, Gaha L, Suaud-Chagny MF, *et al*. Examining transcranial direct-current stimulation (tDCS) as a treatment for hallucinations in schizophrenia. Am J Psychiatry 2012;169:719-24.
2. Bose A, Shivakumar V, Narayanaswamy JC, Nawani H, Subramaniam A, Agarwal SM, *et al*. Insight facilitation with add-on tDCS in schizophrenia. Schizophr Res 2014;156:63-5.
3. Hoy KE, Bailey NW, Arnold SL, Fitzgerald PB. The effect of transcranial direct current stimulation on gamma activity and working memory in schizophrenia. Psychiatry Res 2015;228:191-6.
4. Narayanaswamy JC, Shivakumar V, Bose A, Agarwal SM, Venkatasubramanian G, Gangadhar BN. Sustained improvement of negative symptoms in schizophrenia with add-on tDCS: A case report. Clin Schizophr Relat Psychoses 2014;8:135-6.
5. Bose A, Sowmya S, Shenoy S, Agarwal SM, Chhabra H, Narayanaswamy JC, *et al*. Clinical utility of attentional salience in treatment of auditory verbal hallucinations in schizophrenia using transcranial direct current stimulation (tDCS). Schizophr Res 2015;164:279-80.
6. Haddock G, McCarron J, Tarrier N, Faragher EB. Scales to measure dimensions of hallucinations and delusions: The psychotic symptom rating scales (PSYRATS). Psychol Med 1999;29:879-89.
7. Hoffman RE, Hawkins KA, Gueorguieva R, Boutros NN, Rachid F, Carroll K, *et al*. Transcranial magnetic stimulation of left temporoparietal cortex and medication-resistant auditory hallucinations. Arch Gen Psychiatry 2003;60:49-56.
8. Brunoni AR, Amadera J, Berbel B, Volz MS, Rizzerio BG, Fregni F. A systematic review on reporting and assessment of adverse effects associated with transcranial direct current stimulation. Int J Neuropsychopharmacol 2011;14:1133-45.
9. Hoffman RE, Anderson AW, Varanko M, Gore JC, Hampson M. Time course of regional brain activation associated with onset of auditory/verbal hallucinations. Br J Psychiatry 2008;193:424-5.
10. Hoffman RE, Wu K, Pittman B, Cahill JD, Hawkins KA, Fernandez T, *et al*. Transcranial magnetic stimulation of Wernicke's and right homologous sites to curtail "voices": A randomized trial. Biol Psychiatry 2013;73:1008-14.