References


Long-term response to cathodal transcranial direct current stimulation of temporoparietal junction in a patient with refractory auditory hallucinations of schizophrenia


Transcranial direct current stimulation (tDCS) is a non-invasive brain stimulation technique that alters the neuronal membrane resting potential by sending a continuous electric current between two electrodes (cathode and anode) placed over the scalp, leading to changes in motor-cortical excitability. Given the neuromodulatory effects of tDCS, the applicability of this technique has been tested for different clinical entities, such as ultra-treatment resistant hallucinations in schizophrenia.

The main mechanisms of tDCS modulation have been linked to the action of N-methyl-D-aspartate (NMDA) receptors, especially with regard to post-stimulation effects, which may also be influenced by neuromodulators such as serotonin, dopamine, adrenaline, GABA, and acetylcholine. Furthermore, it is believed that the NMDA receptor plays a central role in the induction of neuroplasticity, and that NMDA modulation by tDCS produces remission of long-term symptoms.

In our research, we search for a long-term effect of tDCS on auditory hallucinations, which if confirmed could suggest long-term modulation of NMDA receptors. Thus, the present case report describes the use of a stimulation protocol as adjuvant treatment for an ultra-treatment resistant schizophrenic patient.

A 28-year-old white man with a 22-year DSM-V diagnosis of schizophrenia was admitted to a psychiatric inpatient unit with auditory hallucinations, persecutory delusions, and severe psychomotor agitation. The initial prescription included haloperidol tapered up to 20 mg/day, and up to 6 mg/day of risperidone in multiple daily doses (twice in a day). Unfortunately, the use of both medications led to neuroleptic malignant syndrome. After recovery from this clinical condition, the patient was switched to clozapine up to 400 mg/day. Because the auditory hallucinations persisted, a course of 12 electroconvulsive sessions was indicated, with no response.

Because the residual symptoms of auditory hallucinations strongly impacted the patient’s overall functioning, he made the decision to try an off-label tDCS protocol. The protocol consisted of two 20-minute stimulation sessions per day for 15 consecutive days, with the aim of improving the patient's symptoms.

Figure 1 Clinical progress measured by BPRS-A and evaluation of overall functioning measured by GAF. Note the robust post-intervention response in both psychometric scales; the effect was maintained during the 15 months of follow-up. BPRS-A = Brief Psychiatric Rating Scale-Anchored; GAF = Global Assessment of Functioning.
sessions per day performed 1 hour apart, for 5 consecutive
times. A 2mA current was used, with the anode placed
on the left temporal-parietal junction and the cathode
on the left dorsolateral pre-frontal cortex. The choice for
this setup was based on a systematic review showing
this as the most usual montage in schizophrenia, because
it covers areas associated with both positive and negative
symptoms. In addition, the precise places being stimu-
lated can be mapped through computer modeling analysis
or a neuronavigation system.6

After signing an informed consent form, the patient
was started on the protocol. Clinical evaluations were
performed on eight occasions using the Brief Psychiatric
Rating Scale-Anchored (BPRS-A) and the Global Asses-
ment of Functioning (GAF) scales: before the stimulation
protocol, on the last day of the protocol and at months 1,
3, 6, 9, 12, and 15 after the end of stimulation. Also, medi-
cations remained stable along the 15 follow-up months.
Figure 1 shows a robust reduction in overall BPRS-A and
GAF scores during the 15 month-follow-up, during which
no new tDCS sessions were applied. The BPRS-A score
assessing auditory hallucinations had the highest reduc-
tion (ranging from 5 to 1). In the 9th month, the patient
resumed work and was able to be alone in public places.

The synergistic effect between tDCS and psychotropic
drugs has been recognized. According to the neuroplas-
ticity hypothesis of tDCS, this technique may induce the
release of neurotransmitters that increase the sensitivity
of postsynaptic receptors, inducing subsequent cortical reor-
ganization over time. This sustained effect over a prolonged
period is more frequent in patients with short duration of
disease, higher educational level, and absence of substance
abuse, as seen in this case report. It is postulated that
the associated mechanism of action involves the correc-
tion of inhibition deficit mediated by GABA receptors.6

Despite the limited level of evidence, the present case
does support the notion of a direct, positive tDCS impact,
as shown by 1) rapid response, which had not yet occu-
red with use of antipsychotics only; 2) clinical response
measured by BPRS-A, suggesting an impact of tDCS
over time (Figure 1). Given the characteristics of this
case, this approach requires further investigation before it
can be used in different mental disorders. For that, pro-
spective studies, different tDCS protocols and adequate
follow-up evaluations must be designed.

References

Systematic evaluation of the impact of stimulation intensity on neu-
roplastic after effects induced by transcranial direct current stimula-
2. Pondé PH, de Sena EP, Camprodon JA, de Araújo AN, Neto MF,
DiBlasi M, et al. Use of transcranial direct current stimulation for the
treatment of auditory hallucinations of schizophrenia – a systematic
3. Li H, Wang Y, Jiang J, Li W, Li C. Effects of transcranial direct current
stimulation (tDCS) for auditory hallucinations: a systematic review.
Dopaminergic modulation of long-lasting direct current induced cor-
Understanding tDCS effects in schizophrenia: a systematic review of
clinical data and an integrated computation modeling analysis. Expert

First psychotic episode in an adult with Becker muscular dystrophy

In the present report, I describe the case of a 50-year-old
male diagnosed with Becker muscular dystrophy (BMD)
six years earlier, prior heart transplant and progressive
motor impairment, treated with everolimus and mycope-
holate motefil, and no previous psychiatric history. The
patient was admitted to a psychiatric emergency room
with persecutory and prejudice delusions, as well as ideas
of reference; these symptoms had worsened over the
past months. Secondly, he developed depressive mood,
initial and intermediate insomnia, anorexia, passive death
wishes, and decreased cognitive performance. He denied
alcohol or recreational drug consumption. Both his brother
and cousin had BMD and similar psychiatric symptoms.

No relevant changes had been detected on previous brain
imaging. Laboratory and electrocardiographic evaluation

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