Letter to the Editor

Targeting negative symptoms in schizophrenia: Results from a proof-of-concept trial assessing prefrontal anodic tDCS protocol

Dear Editors,

To date, only one trial assessed transcranial direct current stimulation (tDCS) for the treatment of schizophrenia (Brunel et al., 2012). Thirty schizophrenic patients with persistent auditory hallucinations were randomized to receive either active stimulation or sham. tDCS was applied twice daily for 5 days. The authors showed an improvement were observed (t = 0.96; p = 0.844). We found no clinical or demographic variables to be confounders regarding main outcome (Table 1).

Neuroimaging studies have been pointed towards an association between schizophrenia and gray matter reductions in the prefrontal cortex (Fraguas et al., 2014) (Pasternak et al., 2015). In fact, even during rest hypoactivity of the prefrontal cortex is observed (Ellison-Wright and Bullmore, 2009). Same results highlighting prefrontal hypoactivity have arisen from transcranial magnetic stimulation (TMS) trials showing that high-frequency rTMS (excitatory) was effective in the treatment of negative symptoms (Prikryl et al., 2013).

In the present study anodic tDCS protocol was found to ameliorate negative symptoms in schizophrenia. The present results need to be taken as hypothesis-driven given the study design. Limitations to this study include its unblinded nature, small sample size, lack of a control group, and short length. Moreover, our results may be overestimated due to intrinsic characteristics such as the placebo effect and Hawthorne effect. However, the current “proof-of-concept” trial is aimed at evaluating preliminary effects of a new experimental tDCS protocol. We understand that the trends seen in the completers shall strongly justify a larger double-blind study with better estimation of sample size.

Role of funding source
Dr. Milton Kurimori reported no biomedical financial interests or potential conflicts of interest.
Dr. Pedro Shiozawa reported no biomedical financial interests or potential conflicts of interest.
Dr. Marom Bikson has equity in Soterix Medical Inc. and the City University of New York has patents on brain stimulation with MB as inventor.
Mohamed Aboelsera reported no biomedical financial interests or potential conflicts of interest.
Dr. Quirino Cordeiro reported no biomedical financial interests or potential conflicts of interest.

Contributors
Dr. Milton Kurimori participated in the present article with recruitment and assessment, his participation contributed significantly to the work.
Dr. Pedro Shiozawa participated in the present article with data analysis, his participation contributed significantly to the work.
Dr. Marom Bikson participated in the present article with data analysis, his participation contributed significantly to the work.

Table 1
Overview of main outcome and exploratory analysis for clinical data between baseline and after stimulation protocol.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean difference</th>
<th>Sd</th>
<th>p</th>
<th>t</th>
<th>df</th>
<th>95% IC</th>
</tr>
</thead>
<tbody>
<tr>
<td>PANSS</td>
<td>7.00</td>
<td>1.85</td>
<td>0.005</td>
<td>3.77</td>
<td>8</td>
<td>2.720</td>
</tr>
<tr>
<td>Positive dimension</td>
<td>0.33</td>
<td>1.32</td>
<td>0.471</td>
<td>0.75</td>
<td>8</td>
<td>−1.350</td>
</tr>
<tr>
<td>Negative dimension</td>
<td>6.77</td>
<td>2.48</td>
<td>&lt;0.0001</td>
<td>8.16</td>
<td>8</td>
<td>4.864</td>
</tr>
<tr>
<td>General dimension</td>
<td>1.66</td>
<td>6.16</td>
<td>0.440</td>
<td>0.81</td>
<td>8</td>
<td>−3.071</td>
</tr>
<tr>
<td>Baseline Calgary</td>
<td>0.11</td>
<td>2.47</td>
<td>0.844</td>
<td>0.96</td>
<td>8</td>
<td>−1.789</td>
</tr>
<tr>
<td>Baseline MoCA</td>
<td>2.44</td>
<td>1.85</td>
<td>0.222</td>
<td>1.32</td>
<td>8</td>
<td>−1.819</td>
</tr>
</tbody>
</table>

PANSS: Positive and Negative Symptoms Scale; Calgary: for depressive symptoms assessment; MoCA: Montreal Cognitive Assessment; Sd: standard deviation; t: t-test; df: degrees of freedom; IC: confidence interval.

☆ The present manuscript represents original material. It has not been published before, and is not under consideration for publication elsewhere. Every author approves the final version.
Mohamed Aboseria participated in the present article with data analysis, his participation contributed significantly to the work.

Dr. Quirino Cordeiro participated in the present article with data analysis, his participation contributed significantly to the work.

Conflict of interests
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Dr. Quirino Cordeiro reported no biomedical financial interests or potential conflicts of interest.

References

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