THE EFFECT OF TRANSCRANIAL DIRECT CURRENT STIMULATION (TDCS) ASSOCIATED WITH HYPOCALORIC DIET IN SUBJECTS WITH DIFFERENT DEGREES OF GLUCOSE TOLERANCE

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Background

• Non-adherence to lifestyle modification is an important determinant of failure to treat obesity.
• The dorsolateral prefrontal cortex (DLPFC) plays an important role in appetite and food intake regulation and may be a target for electric brain stimulation.

Aims

To test the effect of active tDCS over the right DLPFC associated with a hypocaloric diet on weight loss in overweight or obese adults.

Methods

• Randomized, placebo-controlled, double-blind pilot study.

• ClinicalTrials.org NCT 02683902, approved at UFRGS IRB 150119. Consent term was applied in all subjects.

Results

Question 1. How was the baseline and follow-up characteristics of the population at study according to the intervention?

<table>
<thead>
<tr>
<th></th>
<th>Active (n=4)</th>
<th>Sham (n=6)</th>
<th>p valuea</th>
<th>GEE p valuea</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, years</td>
<td>38.2 ± 7</td>
<td>38.0 ± 2</td>
<td>0.940</td>
<td></td>
</tr>
<tr>
<td>Female sex, %</td>
<td>3 / 1 (75)</td>
<td>3 (50)</td>
<td>0.571</td>
<td></td>
</tr>
<tr>
<td>Weight, kg</td>
<td>90.9 [81.4, 97.7]</td>
<td>92.7 [82.0, 101.4]</td>
<td>0.091</td>
<td></td>
</tr>
<tr>
<td>Physical activity, steps/day</td>
<td>3357.0 [2327.3, 5000.4]</td>
<td>3349.5 [2485.5, 5327.0]</td>
<td>0.849</td>
<td></td>
</tr>
<tr>
<td>Glucose, mg/dL</td>
<td>91.8 [88.2, 95.4]</td>
<td>91.8 [82.8, 97.2]</td>
<td>0.509</td>
<td></td>
</tr>
<tr>
<td>2h glucose, mg/dL</td>
<td>104.4 [73.8, 135]</td>
<td>108 [109.4, 113.4]</td>
<td>0.683</td>
<td></td>
</tr>
<tr>
<td>A1c, %</td>
<td>5.8 [5.1, 6.3]</td>
<td>5.7 [5.2, 6.2]</td>
<td>0.379</td>
<td></td>
</tr>
</tbody>
</table>

Table 1. Data are expressed as absolute number (%), mean ± SD, or mean [95% CIs]; *p value was tested by Fisher’s exact χ² test for or Student’s t test; #p value for interaction (TDCS by time) was tested by generalized estimation equation (GEE).

Figure 1. Data are means [95% CI]. p value for interaction (tDCS by time) was tested by GEE.

*Significant difference between Active and Sham tDCS at a specific moment in the study. A, B and C indicates Bonferroni post- hoc analysis, means without a common capital letter differ in time, p<0.001.

Question 3. How was the adherence to the prescription diet of participants between groups?

Figure 2. Data are means [95% CI]. p value for interaction (tDCS by time) was tested by GEE.

Question 4. How was the effect of tDCS over the glycemic-insulinemic status?

Figure 3. Data are means [95% CI]. * p value for interaction (tDCS by time) was tested by GEE.

Question 5. How was the effect of tDCS over depression and anxiety?

Table 2. Data are expressed as means [95% CI]. * p value for interaction was tested by GEE. Means without common capital letter differ in time, p<0.05

Conclusions

This preliminary analysis suggests that repetitive active a-tDCS may be a potential non-invasive and adjunctive treatment in addition to lifestyle modification for obesity management.

Funding: