Reduction of tics after CBIT is not associated with change in EEG alpha coherence during a Go/No-Go task in children with Tourette syndrome

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INTRODUCTION

• Comprehensive Behavioral Intervention for Tics (CBIT) is a first-line treatment for Tourette syndrome (TS). However, the brain mechanisms involved in successful reduction in tic symptoms following CBIT are poorly understood.

• Enhanced EEG coherence in the alpha frequency band (8-13 Hz) over frontomesial electrodes during a response inhibition task has been suggested as a mechanism by which adults with TS may gain control over their tics (Serrien et al., 2005).

OBJECTIVES AND HYPOTHESES

• In this study, we tested whether alpha coherence during a Go/NoGo task represented a possible mechanism of tic reduction after CBIT.

• We hypothesized that alpha coherence would increase from baseline to endpoint in children undergoing CBIT relative to a Treatment-as-Usual (TAU) control condition. We also hypothesized that children with larger baseline alpha coherence would be those showing larger decreases in tic severity after CBIT.

METHODS

• Randomized controlled trial of CBIT vs TAU.

• 16 children assigned to CBIT; 16 assigned to TAU.

• Outcomes measures: YGTSS & CGI-I.

• Task: Cued Go/NoGo with 3s foreperiod between cue and target. 120 Go & 40 NoGo trials.

• EEG recorded with 128 electrode geodesic sensor nets.

• EEG alpha (8-13 Hz) coherence assessed between 4 channel pairs (F3-C3, FCz-C3, F4-C4 & FCz-C4). Computed during NoGo trials as a percentage score [(post-target – pre-cue) / pre-cue], indicating coherence increase from pre-cue to post-target.

• Effect sizes were computed by subtracting the baseline-to-endpoint change in the TAU group from that of the CBIT group and dividing by the pooled SD at baseline.

RESULTS

• Table 1. Characteristics at baseline

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>CBIT (n = 16)</th>
<th>TAU (n = 16)</th>
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<tbody>
<tr>
<td>Age in years, mean (SD)</td>
<td>11.4 (1.8)</td>
<td>11.3 (1.5)</td>
</tr>
<tr>
<td>Sex (% male)</td>
<td>87.5</td>
<td>81.3</td>
</tr>
<tr>
<td>Handedness (% right-handed)</td>
<td>81.3</td>
<td>87.5</td>
</tr>
<tr>
<td>YGTSS total tic score</td>
<td>23.8 (6.0)</td>
<td>24.4 (5.1)</td>
</tr>
<tr>
<td>Comorbid diagnoses, number (%)</td>
<td>12.5 (82.5)</td>
<td>11.8 (86.8)</td>
</tr>
<tr>
<td>Concomitant medications, number (%)</td>
<td>3 (18.8)</td>
<td>3 (18.8)</td>
</tr>
</tbody>
</table>

• Tic severity decreased from 23.8 ± 6.0 at baseline to 16.9 ± 4.9 at endpoint in the CBIT group and it increased from 24.4 ± 5.0 to 24.9 ± 5.0 in the TAU group (Time X Treatment interaction: F(1,30) = 41.08, p < .001, d = 1.34).

• Ten children (62.5%, red lines in Figure 3) in the CBIT group and none in the TAU group were rated as responders on the CGI-I (Fisher’s exact test: p < .001).

• Consistent with previous findings (Piacentini et al, 2010), CBIT resulted in significant reduction of tics in children with TS.

• However, contrary to our hypothesis, there was no effect of CBIT on EEG alpha coherence related to response inhibition.

CONCLUSIONS

• Also, baseline EEG alpha coherence did not predict CBIT outcome in children with TS.

REFERENCES


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