Reduction in Obsessive-Compulsive and Depressive Symptoms Following Bilateral Repetitive Transcranial Magnetic Stimulation (rTMS): Case Series

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Introduction

Obsessive-Compulsive Disorder (OCD) is associated with complex psychiatric comorbidity, with 81% of patients suffering from a mood disorder [1]. Many patients with OCD and depression are medicated resistant and seek alternative forms of treatment as an augmentation to medication and therapy. One promising option is rTMS, which produces an electromagnetic field to stimulate cortical neurons [2]. High frequency rTMS to the left dorsolateral prefrontal cortex (DLPFC) has demonstrated efficacy and is FDA approved for depression [3]. These findings have been supported both in RCTs (efficacy) and real world effectiveness studies [4,5]. Low frequency rTMS to the right DLPFC has antidepressant activity in a subset of patients, and is immediately anxiolytic though this effect has not been shown to be sustainable. A meta-analysis of randomized and sham-controlled trials found a medium size difference in outcome favoring active rTMS, and that low frequency protocols targeting non-DLFC regions may be ideal for treating OCD symptoms [6]. Results from this analysis found no significant change in depressive symptoms. A recent double-blind study on patients with OCD found that alpha electroencephalogram guided TMS over DLFC bilaterally yielded significant reduction in scores for the Yale-Brown Obsessive Compulsive Scale and the Hamilton Rating Scale for Anxiety relative to a sham group [7]. More research is needed to determine the optimal rTMS protocol for the treatment of OCD with comorbid depression.

Objectives

Our primary goal was to use rTMS to reduce obsessive-compulsive symptoms and depression in outpatients with comorbid OCD and MDD who had not responded to medication. We hypothesized that high frequency rTMS to the left DLPCF with low frequency rTMS to the right DLPCF would produce this effect. Our secondary goal was to determine how many treatments our patients would need to show improvement in obsessive-compulsive and depressive symptoms.

Participants

N = 12
Race = Caucasian
Gender = 4 Males, 8 Females
Age Range = 17-65
Mean Age = 45
All patients continued their medication

Methods

Yale-Brown Obsessive Compulsive Scale (Y-BOCS) [8]
Beck Depression Inventory – II (BDI-II) [9]

Patients completed outcome measures at:
• Baseline
• Completion of 10 treatments
• Completion of 20 treatments

MEASURES

Y-BOCS scores decreased from baseline (mean=20.8, SD=8.9), to 10 treatments (mean=17.6, SD=6.9), and to 20 treatments (mean=11.1, SD=7.6). No significant difference occurred between baseline and 10 treatments (t(12)=1.3, p=0.01), but significant differences emerged between baseline and 20 treatments (t(10)=3.5, p=0.004). Patients also experienced a decline in BDI-II scores from baseline (mean=30.0, SD=11.7), to 10 treatments (mean=17.0, SD=14.7), and to 20 treatments (mean=10.8, SD=13.5). Scores were significantly reduced on the BDI-II between baseline and 10 treatments (BDI-II t(12)=4.6, p<0.001), as well as between baseline and 20 treatments (BDI-II t(10)=8.4, p<0.001).

Table 1. Treatment Parameters

<table>
<thead>
<tr>
<th>Location</th>
<th>Motor Threshold Level</th>
<th>Stimulation</th>
<th>Total Pulses</th>
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<tbody>
<tr>
<td>LDLPFC</td>
<td>120%</td>
<td>10 or 20 Hz</td>
<td>3000</td>
</tr>
<tr>
<td>OCD</td>
<td>RDLPCF</td>
<td>80%</td>
<td>1Hz</td>
</tr>
</tbody>
</table>

Results

Many patients with severe OCD with comorbid depression do not respond to medication or cognitive behavioral therapy. Safe alternative treatments need to be developed to alleviate symptoms in this difficult to treat population. Results from our research suggest that high frequency rTMS to the left DLPCF with low frequency rTMS to the right DLPCF significantly reduce obsessive-compulsive and depressive symptoms.

Our findings suggest that there is a differential rate of improvement in anxious and depressive symptoms. Our patients showed only a small and insignificant improvement in the reduction of obsessive-compulsive symptoms after 10 treatments. Improvement following 20 treatments was robust and statistically significant. Four patients went into complete remission from OCD and 20 treatments. Future research is needed to determine whether the obsessive compulsive symptoms would continue to reduce after 30 or 40 treatments.

From this study indicate significant reduction in depressive symptoms in as little as 10 treatments, with half (6) of our patients going into remission at that time. After 20 treatments, an additional 2 patients were in full remission.

These results demonstrate how patients respond to rTMS in a private practice setting and support the effectiveness of bilateral treatment. Our patients were able to continue their medication, representing a medication and rTMS treatment paradigm reflective of real world outpatient care. Large scale studies offering 30-40 rTMS treatments are needed to determine whether symptoms would continue to decline with additional bilateral rTMS. Durability research on TMS for depression suggests that patients who go into remission following a long course of treatment experience a slow relapse rate [10]. Longitudinal research is necessary to determine whether bilateral treatment gains for the treatment of OCD and depression are maintained over time.

Discussion and Conclusion

Key Messages

- High frequency TMS to the left DLPCF with low frequency rTMS to the right DLPCF is an effective treatment for patients with comorbid depression and OCD as an augmentation to medication.

References


Discussion and Conclusion

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