

Additional biological therapies for attention-deficit hyperactivity disorder: repetitive transcranial magnetic stimulation of 1 Hz helps to reduce methylphenidate

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Abstract

Excessive hyperactivity, impulsiveness and attentional difficulties characterize attention-deficit hyperactivity disorder (ADHD). The aim of this case report is to signal the possible therapeutic effectiveness of the repetitive transcranial magnetic stimulation (rTMS). Low frequency (1Hz, 1200 stim/die for five days) was applied on the impending scalp in the motor additional area of a patient suffering from combined type ADHD who received methylphenidate (MPH). We saw a significant improvement, especially according to criteria associated with hyperactivity. The improvement lasted for at least three weeks and suggested the final reduction in dosage of MPH to 10 mg.

Introduction

Attention-deficit hyperactivity disorder (ADHD) is characterized by the progressive development of excessive hyperactivity, impulsiveness and attentional difficulties, which also influences interpersonal relationships. The little specific research carried out so far has used diagnostic criteria, which have not considered specific biological markers. Some researchers have underlined the presence of a direct correlation of the severity of symptomatology and psychometric markers and ADHD. They also investigated the mechanisms of intracortical inhibition by transcranial mag-

netic stimulation (TMS) to coupled stimuli and found that TMS-evoked short interval intracortical inhibition (SICI) which correlated inversely with ADHD scores¹ and which also seems to be modified by the assumption of methylphenidate (MPH).² Our observation suggested that rTMS as monotherapy might improve ADHD core symptoms.³ This encouraged us to check rTMS as an add-on therapy to MPH. The aim of our study is to signal the possible therapeutic effectiveness of the contemporary use of rTMS together with ongoing MPH medication in a subject affected by ADHD.

Case Report

We observed the therapeutic effectiveness of rTMS in a 42-year-old female affected by ADHD (hyperactive type). The patient, who did not suffer from any comorbidity, had received MPH 20mg daily for 16 years. We applied daily low frequency rTMS (1Hz, 1200 stim/die, lasting one hour, for 21 days) on the right scalp above the motoric area with a Cool-B65 Coil in the morning and evaluated symptomatology by Conner's Self-Rating Scale for adults (20 items, 10 for inattention, 10 for hyperactivity, scale 0=never to 3=always) before and after the 21-day treatment with rTMS. Because of the clinical improvement of ADHD symptomatology after the first five days, we reduced MPH to 10mg. After the reduction, symptoms were re-evaluated by the Conner-Scales. EEG and blood parameters (RBC, WBC, liver transaminases) were within the normal range before and after treatment. The patient did not complain of headache and hearing problems. She felt generally well. The 10 hyperactivity-associated items of the Conner scale improved from an initial 25 to 17 after one week of treatment, rose to 18 after two weeks, fell again to 16 after three weeks, and rose finally to 17 after four weeks, whereas the attention items did not show any benefit from this treatment.

Conclusions

rTMS might be a safe method to improve ADHD symptomatology when used in addition

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to pre-existing specific medications such as MPH. Some of the specific medication could be replaced by rTMS. We suggest conducting larger placebo controlled studies to prove this interesting observation.

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