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THE EFFECTS OF LONG ACTING METHYLPHENIDATE IN ADULTS WITH ADHD: A STUDY WITH PAIRED PULSE TRANSCRANIAL MAGNETIC STIMULATION

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Background: Recent investigations into motor cortex excitability with paired pulse transcranial magnetic stimulation technique (ppTMS), have shown inhibition deficits in ADHD which correlate with the clinical symptomatology. Methylphenidate effects on cortical excitability in adults with ADHD are contradictory. Therefore, we use long-acting methylphenidate (LA-Mph) to consider cortical excitability effects under stable medication conditions.

Objectives: Systematic evaluation of the effects of LA-Mph on motor cortex excitability in adult patients with ADHD with the ppTMS technique.

Aims: Investigation of the putative influence of LA-Mph on motor inhibition and facilitation in adults with ADHD.

Methods: Thirteen drug naïve adult ADHD patients were included in this ppTMS study. Measurements took place before and under treatment with LA-Mph (30-54mg daily dose). Statistical analyses were performed to investigate treatment effects and correlations with clinical symptomatology.

Results: LA-Mph significantly decreased the relative short intracortical motor inhibition (SICI) magnetically evoked potential (MEP) amplitude at 3ms interstimulus interval (conditioned/ unconditioned MEP amplitude: 0.84 ± 0.76 drug-free vs. 0.29 ± 0.19 with LA-Mph; $p=0.020$). The relative intracortical facilitation (ICF) MEP amplitude at 11ms interstimulus interval (conditioned/ unconditioned MEP amplitude: 1.51 ± 0.92 drug-free vs. 1.79 ± 0.95 with LA-Mph) was not significantly increased. The decrease of the relative SICI MEP amplitude with LA-Mph correlated significantly with the improvement of the psychopathological ADHD self-rating total scores ($p=0.034$) and hyperactivity/impulsivity subscores ($p=0.029$). These results show that in adult patients with ADHD, LA-Mph significantly improves motor disinhibition without influencing motor facilitation.

Conclusion: LA-Mph might have differential stabilizing effects on motor hyperexcitability in adults with ADHD and correlates with the clinical improvements.