Motor cortical inhibition in ADHD: modulation of the transcranial magnetic stimulation-evoked N100 in a response control task.

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Abstract

The N100 component, evoked by transcranial magnetic stimulation (TMS) and electroencephalography is associated with the activation of inhibitory cortical circuits and has recently been suggested as a potential marker of inhibition in attention-deficit/hyperactivity disorder (ADHD). The aim of the present ADHD study was to investigate the modulation of the TMS-N100 in go and nogo trials of a response control task considering stages of response preparation, activation, execution and inhibition. Eighteen children with ADHD and 19 typically developing children, aged 10-14 years, were assessed. TMS was delivered over the left motor cortex, the TMS-N100 was measured at electrode P3. The TMS-N100 was determined at rest and at different time points (50 ms before S2; 150, 300 and 500 ms after S2) in a cued go/nogo task (S1-S2 paradigm). Correlations between the TMS-N100 measures, MEP-related TMS measures (e.g., short-interval intracortical inhibition) and performance measures were calculated. At rest, the amplitude of TMS-N100 was not found to be significantly reduced in the ADHD group. During the go/nogo task, children with ADHD showed a smaller increase of TMS-N100 amplitude in go trials and a smaller decrease after inhibiting a response. In go trials, a lower TMS-N100 was associated with a smaller variability of reaction times. A smaller TMS-N100 modulation extends the picture of cortical inhibition deficits in ADHD. Findings suggest a functional involvement of the mechanisms underlying the TMS-N100 at the motor output stage.

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