Associations between the mismatch-negativity component and symptom severity in children and adolescents with attention deficit/hyperactivity disorder.

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Abstract

AIM:
Cognitive impairment is an important predictor of functional outcome in patients with attention deficit/hyperactivity disorder (ADHD). However, the neurophysiology of ADHD-related cognitive impairments remains unclear. Event-related potentials (ERPs) represent the noninvasive measurement of neural correlates of cognitive function. Mismatch negativity (MMN) is an ERP component that is presumed to index the preattentive monitoring of changes in the auditory environment.

MATERIALS AND METHODS:
Previous studies have shown altered MMN amplitude and latency in patients with ADHD. However, little is known about the relationship between MMN and ADHD-symptom severity. To address this, we measured the amplitude and latency of MMN in ERPs and assessed correlations with the clinical severity of ADHD, as measured by the ADHD Rating Scale IV - Japanese version. Participants were 51 treatment-naïve children and adolescents with ADHD (mean age 10.42±3.35 years) and 15 normally developing age- and sex-matched children (mean age 11.8±3.36 years).

RESULTS:
In the ADHD group, MMN amplitudes were attenuated at the central electrode and MMN latencies prolonged at the parietal electrode (Pz) relative to those in the control group. Furthermore, MMN amplitudes at Pz were negatively correlated with ADHD full-scale and hyperactivity-impulsivity and inattention subscale scores, and MMN latency at Pz was positively correlated with ADHD hyperactivity-impulsivity subscale scores.

CONCLUSION:
Our data suggest that MMN reflects the severity of ADHD symptoms in children and adolescents, and provides support for the use of ERPs in evaluating ADHD symptoms in patients.