Increased rates of intermittent rhythmic delta and theta activity in the electroencephalographies of adult patients with attention-deficit hyperactivity disorder

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Abstract

Introduction
Adult attention-deficit hyperactivity disorder (ADHD) is a common neurodevelopmental disorder. In subgroups of patients with a (para)epileptic pathomechanism, this might be due to intermittent rhythmic delta or theta activity (IRDA/IRTA).

Participants and methods
Using a fully data-driven analysis, we compared the IRDA/IRTA rates in the resting electroencephalography (EEG) results of 97 adult patients with ADHD and 30 control subjects. The IRDA/IRTA rates before hyperventilation (HV) and for HV difference (difference between IRDA/IRTA rate after and before HV) were compared between groups using a linear model.

Results
We detected significantly increased rates of IRDA/IRTA before HV ($F = 4.209$, $p = 0.042$) in patients with ADHD but no significant difference between the groups for HV-difference ($F = 2.46$, $p = 0.119$).

Discussion
The increased IRDA/IRTA rates before HV in the group with ADHD might lead to (para)epileptic short-term effects (e.g., impulsivity) via local area network inhibition, and to long-term effects (e.g., cognitive deficits) via connectivistic brain restructuring.