Brain Arousal regulation in adult ADHD

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Background:
The Arousal-regulation model of affective disorders and ADHD interpret hyperactivity and impulsivity in ADHD as an autoregulatory attempt to stabilize vigilance by creating a stimulus incentive environment. Using an EEG-based algorithm (Vigilance Algorithm Leipzig, VIGALL) to assess the CNS arousal from high wakefulness to drowsiness until sleep onset, pediatric ADHD as well as manic patients showed an unstable CNS arousal with rapid declines to lower vigilance stages or sleep onset. We investigated whether the CNS arousal in adult patients with ADHD is less stable than that of healthy controls by exploring the frequency of EEG-vigilance regulation patterns.

Methods:
Resting EEG recordings of 15 min under quiet rest with eyes closed of 34 unmedicated adult ADHD patients and 24 healthy controls were performed. Two parameters were determined: Mean EEG-arousal level and of Arousal regulation. Group differences (ADHS vs. healthy controls) were tested with Mann-Whitney U test for independent samples. Results/conclusions: Patients with ADHD showed lower EEG arousal level (mean vigilance p = 0.024) and less stable arousal regulation (arousal stability score p = 0.019) compared to the healthy controls.

Conclusion:
The confirmed arousal regulation model in ADHD could establish new insights into the neurophysiology of ADHD in adulthood and should be the subject of further investigations.