Visual and auditory steady-state responses in attention-deficit/hyperactivity disorder

Khaleghi A, Zarafshan H, Mohammadi MR.


Abstract

We designed a study to investigate the patterns of the steady-state visual evoked potential (SSVEP) and auditory steady-state response (ASSR) in adolescents with attention-deficit/hyperactivity disorder (ADHD) when performing a motor response inhibition task. Thirty 12- to 18-year-old adolescents with ADHD and 30 healthy control adolescents underwent an electroencephalogram (EEG) examination during steady-state stimuli when performing a stop-signal task. Then, we calculated the amplitude and phase of the steady-state responses in both visual and auditory modalities. Results showed that adolescents with ADHD had a significantly poorer performance in the stop-signal task during both visual and auditory stimuli. The SSVEP amplitude of the ADHD group was larger than that of the healthy control group in most regions of the brain, whereas the ASSR amplitude of the ADHD group was smaller than that of the healthy control group in some brain regions (e.g., right hemisphere). In conclusion, poorer task performance (especially inattention) and neurophysiological results in ADHD demonstrate a possible impairment in the interconnection of the association cortices in the parietal and temporal lobes and the prefrontal cortex. Also, the motor control problems in ADHD may arise from neural deficits in the frontoparietal and occipitoparietal systems and other brain structures such as cerebellum.