Reduced prefrontal cortex activation in children with attention-deficit/hyperactivity disorder during go/no-go task: A functional near-infrared spectroscopy study

shuo miao1 xia j. han, yue gu, xin wang, hong w. song, qing d. li, zhao liu, jian yang, Xiaoli Li


Abstract:

Objective:
Attention-deficit/hyperactivity disorder (ADHD) is one of the most common neuropsychiatric disorders in children and affects 3% to 5% of school-aged children. This study is to demonstrate whether functional near-infrared spectroscopy (fNIRS) can detect the changes in the concentration of oxygenated hemoglobin (oxy-HB) in children with ADHD and typically developing children (TD children).

Method:
In this study, 14 children with ADHD and 15 TD children were studied. Metabolic signals of functional blood oxygen were recorded by using fNIRS during go/no-go task. A statistic method is used to compare the fNIRS between the ADHD children and controls.

Results:
A significant oxy-HB increase in the left frontopolar cortex (FPC) in control subjects but not in children with ADHD during inhibitory tasks. Moreover, ADHD children showed reduced activation in left FPC relative to TD children.

Conclusion:
Functional brain imaging using fNIRS showed reduced activation in the left prefrontal cortex (PFC) of children with ADHD during the inhibition task. The fNIRS could be a promising tool for differentiating children with ADHD and TD children.