Functional MRI Reveals Different Response Inhibition Between Adults and Children With ADHD.

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Abstract
OBJECTIVE: Attention-deficit hyperactivity disorder (ADHD) has been recognized as a disorder of executive function, and a number of functional MRI (fMRI) studies have been conducted to investigate the altered brain activation patterns between ADHD patients and healthy controls. However, the findings across different studies have been inconsistent, and the different neural mechanisms between adults and children with ADHD remain unclear. The aim of this study was to perform a meta-analysis of fMRI studies to further investigate and compare the abnormalities in adults and children with ADHD during motor response inhibition.

METHOD: Activation likelihood estimation (ALE) was used to investigate brain activation differences between ADHD patients and controls, and a subtraction meta-analysis was performed to compare adult and child patients.

RESULTS: Twenty-three studies met the inclusion criteria. Meta-analysis using ALE detected significantly decreased activation during response inhibition in ADHD in the supplementary motor area, insula, caudate, and precentral gyrus, as well as increased activation in the postcentral gyrus, inferior frontal gyrus, and precuneus. The activation decreases in the right caudate were greater in child ADHD patients than adult ADHD patients.

CONCLUSIONS: This meta-analysis identified dysfunction in several areas of the motor inhibition network that may play a role in the abnormal neural mechanisms of response inhibition in ADHD. The comparison of child and adult subgroups raises the possibility that the persistence of functional abnormalities of the caudate may be an important factor in whether ADHD persists.