April 30, 2014

OAK BROOK, Ill -- April 30, 2014 -- A study published in the online edition of the journal *Radiology* has found that children and adolescents with attention-deficit/hyperactivity disorder (ADHD) have disrupted connections between different areas of the brain that are evident on resting-state functional magnetic resonance imaging (rfMRI).

The findings point to the potential of rfMRI to help provide objectively accurate, early diagnosis of a disorder that affects approximately 5% of children and adolescents worldwide.

For the study, researchers used rfMRI, a relatively new technique that assesses neural function when the brain is not focused on a specific task, in 33 boys aged 6 to 16 years with ADHD and in 32 similarly aged, healthy controls. The researchers correlated the MRI findings with results from tests of executive function.

The results showed that the patients with ADHD had altered structure and function located in areas of the brain like the orbitofrontal cortex, which is primarily involved in the cognitive processing of strategic planning, and the globus pallidus, which is involved in executive inhibitory control.

“Our study suggests that the structural and functional abnormalities in these brain regions might cause the inattention and hyperactivity of the patients with ADHD, and we are doing further analysis on their correlation with the clinical symptoms,” said Qiyong Gong, MD, Department of Radiology, West China Hospital of Sichuan University, Sichuan, China. “Our preliminary results show the association between imaging findings and symptoms.”

The researchers also found abnormalities in the connections between resting-state brain networks associated with executive dysfunction. These abnormalities indicate more widespread brain alterations in ADHD than previously had been shown, said Dr. Gong.

“Our results suggest the potential clinical utility of the rfMRI changes as a useful marker, which may help in diagnosis and in monitoring disease progression and, consequently, may inform timely clinical intervention in the future,” he said.

He indicated that larger studies are needed to validate the results. The researchers also plan to study changes in connectivity over time in ADHD patients and explore the potential differences of functional connectivity between the clinical subtypes of ADHD, such as inattentiveness and hyperactivity.

SOURCE: Radiological Society of North America