Altered structural connectivity is related to attention deficit/hyperactivity subtypes: A DTI study

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Abstract

This study aimed to provide novel insights into the white matter (WM) microstructural properties of Attention Deficit/Hyperactivity Disorder (ADHD) subtypes by recruiting a relatively large sample of stimulant-naive children and adolescents who had no comorbidity other than Oppositional Defiant Disorder and were homogenous according to the DAT1 gene polymorphism. A sample of 72 ADHD subjects and 24 controls aged 8 to15 years were enrolled in the study. We applied tract-based spatial statistics to the DTI measures for obtaining fractional anisotropy (FA) and axial, radial diffusivity (AD, RD) measures to explore ADHD type-related differences in WM for the whole brain. Comparing ADHD-Combined group (ADHD-C) with the ADHD predominantly inattentive group (ADHD-I) we detected increased RD in several bilateral brain area and increased AD mostly in left side of the brain, including the body and splenium of the corpus callosum; the anterior and posteriors limbs of the internal capsule; the superior, anterior and posterior corona radiata; the posterior thalamic radiation; and the superior longitudinal fasciculus. Likewise, mostly in the overlapping brain areas, the ADHD-C group presented increased AD values than ADHD-RI. Significant differences among ADHD types could be a preliminary evidence that they have distinct microstructural properties. There were no significant differences in diffusivity between controls and both the ADHD group as whole or any ADHD subgroups.