Global and local grey matter reductions in boys with ADHD combined type and ADHD inattentive type

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Abstract

Attention-deficit/hyperactivity disorder (ADHD) has reliably been associated with global grey matter reductions but local alterations are largely inconsistent with perhaps the exception of the caudate nucleus. The aim of this study was to examine local and global brain volume differences between typically developing children (TD) and children with a diagnosis of ADHD. We also addressed whether these parameters would differ between children with the ADHD-combined type (ADHD-C) and those with the ADHD-inattentive type (ADHD-I). Using an ROI approach caudate volume differences were also examined. 79 boys between the ages of 8 and 17 participated in the study. Of those 33 met diagnostic criteria for the ADHD-C and 15 for the ADHD-I subtype. 31 boys were included in the TD group. Structural magnetic resonance imaging data were analysed using voxel-based morphometry. The ADHD group had significantly lower global and local grey matter volumes within clusters in the bilateral frontal, right parietal and right temporal regions compared to TD. A significant group by age interaction was found for right caudate nucleus volume. No differences between the ADHD-C and ADHD-I groups were found. Right caudate nucleus volume and age are more strongly related in ADHD than in TD consistent with previous research.