Poster

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Poster 33

[P-33-04] Neurodevelopmental Correlates of ADHD Remission: Evidence from Longitudinal White Matter Analysis

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Objective: Attention-deficit/hyperactivity disorder (ADHD) is associated with heterogeneous structural brain anomalies. Approximately half of childhood ADHD cases remit by adulthood. This study aimed to investigate longitudinal changes in white matter microstructure in individuals with ADHD compared to typically developing controls (TDC), and to explore differences between remitted and persistent ADHD trajectories.**Methods:** Diffusion spectrum imaging (DSI) was conducted at two timepoints in a cohort of 57 participants, including 26 individuals with ADHD and 31 TDCs. Participants were first scanned at a mean age of 13 years (range: 7–18), with a follow-up scan approximately five years later. In adulthood, a clinical reassessment categorized the ADHD group into remitted (n=13) and persistent (n=13) subgroups. Microstructural integrity of 45 white matter tracts was quantified using generalized fractional anisotropy (GFA), standardized into Z-scores (Z-GFA) based on a normative dataset (n=626). A mixed-effects model examined time-by-group interactions in Z-GFA, adjusting for follow-up interval and head motion.**Results:** Significant time-by-group interactions were observed between the remitted ADHD and TDC groups, with 17 white matter tracts exhibiting FDR-corrected differences. These tracts encompassed key projection and association fibers involving the prefrontal and sensorimotor cortices, as well as interhemispheric pathways within the corpus callosum. In contrast, no significant longitudinal changes were detected between the persistent ADHD group and either the remitted or TDC groups. Importantly, the remitted ADHD group displayed accelerated white matter maturation compared to TDCs. Furthermore, greater microstructural development in the right arcuate fasciculus and left fronto-striatal tract was associated with more pronounced improvement in hyperactivity and impulsivity symptoms over time.**Conclusions:** This longitudinal study provides evidence that distinct trajectories of white matter maturation are associated with differential clinical outcomes in individuals with ADHD. These findings support the deviant brain development hypothesis and highlight white matter microstructure as a candidate predictive biomarker for ADHD prognosis.