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WHITE MATTER MICROSTRUCTURAL ABNORMALITIES IN ANTISOCIAL PERSONALITY DISORDER: A PILOT DIFFUSION TENSOR IMAGING STUDY

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Introduction: Antisocial personality disorder (ASPD) and psychopathy involve significant interpersonal and behavioural impairments. However, little is known about white matter (WM) abnormalities in tracts linking grey matter regions. A previous diffusion tensor imaging (DT-MRI) tractography study in ASPD and psychopathy revealed abnormalities in the right uncinata fasciculus, indicating fronto-limbic disconnectivity.

Objectives: It is not clear whether WM abnormalities are restricted to only this tract or are more widespread. Therefore, we planned to use whole brain DT-MRI voxel-based analyses.

Aims: To clarify if WM abnormalities extend beyond the frontal lobe.

Methods: We used whole brain DT-MRI to compare WM fractional anisotropy (FA) of 15 adults with ASPD and healthy age, handedness and IQ-matched controls. Also, within ASPD subjects, we related differences in FA to severity of psychopathy measures.

Results: Significant WM FA reductions were found in ASPD subjects relative to controls.

These were found bilaterally in the anterior corpus callosum. Right hemisphere FA reduction was found in the anterior corona radiata, uncinata fasciculus, inferior fronto-occipital fasciculus and internal capsule. Left hemisphere, FA deficits encompassed the inferior longitudinal fasciculus, inferior fronto-occipital fasciculus and internal capsule. There was a significant negative correlation between WM FA in the right uncinata fasciculus and corpus callosum and measures of psychopathy.

Conclusions: We report FA reduction in the uncinata fasciculus and anterior corpus callosum which may be associated with frontal and inter-hemispheric disconnectivity in ASPD, in addition to abnormalities in other tracts which directly or indirectly connect to prefrontal regions.