Abnormal white matter properties in adolescent girls with anorexia nervosa.

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Abstract:

Anorexia nervosa (AN) is a serious eating disorder that typically emerges during adolescence and occurs most frequently in females. To date, very few studies have investigated the possible impact of AN on white matter tissue properties during adolescence, when white matter is still developing. The present study evaluated white matter tissue properties in adolescent girls with AN using diffusion MRI with tractography and T1 relaxometry to measure R1 (1/T1), an index of myelin content. Fifteen adolescent girls with AN (mean age = 16.6 years ± 1.4) were compared to fifteen age-matched girls with normal weight and eating behaviors (mean age = 17.1 years ± 1.3). We identified and segmented 9 bilateral cerebral tracts (18) and 8 callosal fiber tracts in each participant's brain (26 total). Tract profiles were generated by computing measures for fractional anisotropy (FA) and R1 along the trajectory of each tract. Compared to controls, FA in the AN group was significantly decreased in 4 of 26 white matter tracts and significantly increased in 2 of 26 white matter tracts. R1 was significantly decreased in the AN group compared to controls in 11 of 26 white matter tracts. Reduced FA in combination with reduced R1 suggests that the observed white matter differences in AN are likely due to reductions in myelin content. For the majority of tracts, group differences in FA and R1 did not occur within the same tract. The present findings have important implications for understanding the neurobiological factors underlying white matter changes associated with AN and invite further investigations examining associations between white matter properties and specific physiological, cognitive, social, or emotional functions affected in AN.

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