Automated tractography of the cingulate bundle in Alzheimer's disease: a multicenter DTI study.

To evaluate the feasibility of multicenter tractography of the cingulate bundle (CB) in Alzheimer's disease (AD). Automated deterministic tractography of the CB was applied to scans of 45 patients with probable AD and 58 healthy controls (HC) acquired with Siemens Sonata (1.5T; 60 gradients), Trio (3T; 61 gradients), and Avanto (1.5T; 30 gradients). Diagnosis and center effects on the tracking indices fractional anisotropy (FA), mean diffusivity (MD), track density, and volume were estimated with analysis of variance. The multicenter coefficients of variance (CVs) in HC and AD patients were 7% and 7% for FA, 10% and 8% for MD, 18% and 20% for density, and 21% and 21% for volume. Multicenter and single-center CVs were within a similar range. Significant center effects declined in the order MD > FA > density > volume. After adjustment for center and age, the AD group showed significantly higher MD (P < 0.001) and lower FA (P < 0.05) as compared with the HC group. Despite strong center effects, we detected significantly altered microstructural integrity of the CB in AD patients. Diffusion-tensor imaging indices of the CB as obtained by automated tractography might qualify as a biologically sustained surrogate marker for diagnostic and monitoring purposes in multicenter AD trials.