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Microstructural white matter changes in Alzheimer's disease

Pajavand A M¹, Hossein Hasooni¹, Tohid Emami Meybodi² and Reza Khosrowabadi¹¹Shahid Beheshti University, Iran²Iran University of Medical Sciences, Iran

Background: Alzheimer's disease is a neurodegenerative disorder characterized by cognitive decline. Current study used diffusion tensor imaging data from the Alzheimer's disease neuroimaging initiative 2 databases to examine microstructural white matter changes in individuals with Alzheimer's disease relative to healthy controls.

Methods: Participants data were collected from 23 individuals with Alzheimer's disease and 35 similarly aged controls. Diffusion weighted images were corrected for distortions related to eddy currents. Fractional anisotropy, radial and mean diffusivity maps were created using dtifit and input into tract-based spatial statistics. Individuals with Alzheimer's disease were compared to controls.

Results: Tract based spatial statistics revealed that individuals with Alzheimer's disease had reduced fractional anisotropy and increased mean and radial diffusivity in left corticospinal tract, right and left anterior thalamic radiation, minor and major forceps relative to controls. In the right corticospinal tract, we only saw reduced fractional anisotropy and increased radial diffusivity relative to controls.

Conclusions: Diffusion tensor imaging holds potential as an Alzheimer's disease biomarker given its sensitivity to detect microstructural white matter changes in the brain. Further diffusion tractography will be necessary to evaluate fibers integrity more accurate.

shahryar.bme@outlook.com