

**Purpose:** The investigation of gray matter (GM) structural changes in MCI the integrity of white matter (WM) has been assessed by diffusion tensor imaging (DTI) which is focused on fractional anisotropy (FA) or mean diffusivity indexes (MD). The purpose of this study was to evaluate the FA values of WM tracts using region of interest (ROI) with the aim of differentiating a control from MCI or AD.

**Methods:** Sixty individuals (20 controls, 20 MCI and 20 AD) with age-matched underwent DTI and three-dimensional (3D) were included. FA and ADC measurements were obtained for the whole brain and specific areas using ROIs. 3D MRI was helpful in validating ROIs in the proper anatomic regions. WM tract-based analysis of MD and FA was performed by manual placement of ROIs on the color-coded FA maps and measured for hippocampal formations, superior longitudinal fascicles, and posterior cingulate gyri, splenium of the corpus callosum, and inferior longitudinal, superior longitudinal, uncinate fasciculus.

**Results:** Relative to AD patients showed significant FA decreases and MD increases (Control/MCI/AD=mean FA:0.48 SD: 0.02/FA:0.46 SD: 0.03/ FA:0.45 SD: 0.03, on whole brain). In the left uncinate fasciculus was clearly compromised as they were left inferior fronto-occipital. The FA values in the splenium of the corpus callosum (Control/MCI/AD=mean FA:0.73/FA:0.66/FA:0.66), bilateral posterior cingulated gyri (Control/MCI/AD=mean FA:0.67/FA:0.61/FA:0.59), and bilateral superior longitudinal fascicles (Control/MCI/AD=mean FA:0.65/FA:0.57/FA:0.55), of patients with MCI and AD were significantly lower than those of controls.

**Conclusions:** We found compromise of the uncinate fasciculus among AD but not in MCI patients and DTI is a good for the evaluation of patients with probable from MCI to AD. The limitations of this study cannot exclude some degree of partial volume effect on the measurements, although the ROIs were carefully positioned, magnetic field heterogeneity and susceptibility artifacts might have impaired study.