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Effect of APOE epsilon 4 allele on partial volume-corrected diffusion anisotropy in patients with Alzheimer's disease and mild cognitive impairment

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PURPOSE: To prospectively evaluate whether carriers of apolipoprotein E 4 (APOE4) were altered in brain diffusion anisotropy compared with noncarriers in subjects with Alzheimer disease (AD) or mild cognitive impairment (MCI) compared with cognitively normal (CN) subjects.
MATERIALS AND METHODS: 25 AD, 25 MCI, and 25 CN subjects underwent isotropic volumetric T1WI and DTI-MRI with being taken blood samples to determine APOE genotypes. Among the subjects, 14 AD, 5 MCI and 5 CN subjects were APOE4 carriers. A brain atrophy correction method was applied on FA and trace maps to test voxel-based comparisons between carriers and noncarriers for each subject groups.
RESULTS: GM volumes and FA values were significantly reduced and trace values were significantly increased in AD compared to MCI & CN subjects. HypoCBF values were observed in AD compared with MCI & CN subjects. Additionally, CBF values in MCI subjects were increased in left parahippocampal gyrus compared with CN subjects.
CONCLUSION: Multimodal investigations can demonstrate patterns of concordance or dissociation in imaging results in AD & MCI subject. Concordance areas were mainly in temporal and parietal lobes. APOE4 carrier status is associated with structural changes in white matter integrity in patients with AD. Therefore, multimodal approaches that include regional perfusion imaging are advantageous in the diagnosis of AD and MCI.