DIFFUSION TENSOR CHANGES ACCORDING TO AGE-AT-ONSET AND
APOLIPOPROTEIN E GENOTYPE IN ALZHEIMER’S DISEASE

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Introduction: Age-at-onset is one of the most important factors that affect clinical
course of Alzheimer’s disease (AD), and apolipoprotein E (apoE) genotype may
also play important parts in determining the clinical phenotype. We aimed to
investigate the change of white matter integrity according to age-at-onset and
apoE genotype in AD using diffusion tensor imaging (DTI).

Methods: DTI was obtained in 72 patients with AD and 66 subjects with normal
cognition (NC), and apoE genotype was available in 48 patients with AD. Multiple
regression analysis was conducted including the interaction of age-at-onset (or
current age in the NC group) and group difference as one of the independent
variables, and fractional anisotropy (FA) and mean diffusivity (MD) values as the
dependent variables in all subjects. In order to assess the effect of apoE, 48 AD
patients whose apoE genotypes were available were divided into two groups
according to e4 allele positivity, and each group was analyzed with the NC group
using the similar method as above.

Results: Without consideration of apoE genotype, younger age-at-onset was
associated with lower FA and higher MD in the cingulum and fraction-temporo-
parietal association fibers. When the data were analyzed individually in e4
carriers and non-carriers, the carriers showed correlation between younger age-at-onset and both of the cingulum and association fibers while the non-carriers
showed correlation with only association fibers.

Conclusion: Our results suggest that characteristic topographical distribution of
pathological changes in patients with AD is determined by not only age-at-onset
but also by apoE genotype.