THE EFFECT OF GENETIC BURDEN TO CONNECTIVITY AND VOLUME LOSS IN DEMENTIA;
CROSS-SECTIONAL AND LONGITUDINAL STUDY

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Background: The ApoE is well established as a risk factor for late-onset Alzheimer disease (AD) according to allele type. MTHFR is also known to vascular pathology in dementia related with hyperhomocysteinemia.

Objectives: To evaluate the effect of apo E and MTHFR gene variation to brain connectivity and cortical volume, as indirect markers of myelin breakdown in brain and cognitive decline rate in dementia.

Methods: Forty-six patients with AD did brain MRI and apo E and MTHFR genotype test at the Hanyang medical center. All subjects were performed laboratory test including vitamin B12 and folate. Brain MRIs and neuropsychological tests were obtained to 25 subjects as same acquisition methods after 1 year. Voxel Based Morphometry and 22 regions of interest in DTI were measured to evaluate gray and white matter disruption according to genetic burden.

Results: Patient with apo ε4 demonstrated wide cortical atrophic changes in parietal and temporal regions compared to apo ε2 and ε3. FA values presented any specific differences of decline rate in 22 ROIs according to MTHFR type. Apo ε4 presented fast slope in decrease of MMSE score (ΔMMSE = -0.26) compared to ε2 allele groups (ΔMMSE = -0.18). MTHFR gene showed white matter disruption within subcortecs, not ApoE.

Conclusions: These results suggest that apo E genotype may affect the neuronal change restrictively in corteces not in the subcortical structures adjusted by age, MMSE and CDR scores. MTHFR gene also influences connectivity within white matter in dementia. It is certain that apo E and MTHFR genotype is important modulator of cognitive symptoms in dementia progression.