MEETING ABSTRACTS

BUTYRYLCHOLINESTERASE GENETIC POLYMORPHISM AND NEUROIMAGING BIOMARKERS IN ALZHEIMER’S DISEASE

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Objective: The influence of butyrylcholinesterase (BChE) genetic polymorphism in Alzheimer’s (AD) remains controversial. BCHE-K and BCHE-A genetic variants cause reduction of BChE, an enzyme implicated in AD. Some studies have reported a protective effect of BCHE-K, others suggest increased AD risk, particularly when associated with APOE4. We utilized a candidate gene-driven analyses to determine the effects of BCHE-K and BCHE-A on AD biomarkers using ADNI data (http://adni.loni.ucla.edu/).

Methods: Participants were genotyped for BCHE-K (615) and BCHE-A (785), each stratified into control (C), MCI or AD groups. MRI, 18F-FDG and amyloid-PET were assessed. ANCOVA compared main effects of diagnosis, BCHE-K, BCHE-A and APOE4 status on each biomarker with age, education and sex as covariates.

Results: The allelic frequency was 20.8%, 4.6% and 26.5% for BCHE-K, BCHE-A and APOE4. For MRI, main effects for diagnosis were significant (p<0.0001), with reduction in whole-brain and selected regional volumes (7-27%, p≤6x10^{-6}) in AD vs. C. For 18FDG-PET, the main effect for diagnosis was significant (p=5x10^{-9}), with 14% decrease in metabolism in AD vs. C (p=7x10^{-10}). For amyloid-PET, the main effects for diagnosis and APOE4 status were significant (p=0.034; p=3x10^{-8}), with 12% increase in retention in AD vs. C (p=0.023) and 16% increase among carriers of at least one APOE4 allele vs. non-carriers (p=8x10^{-4}). No significant effects of these biomarkers were observed due to BCHE-K or BCHE-A status (p≥0.209).

Conclusions: These data suggest BCHE-K or BCHE-A may not significantly effect structural, metabolic or molecular AD biomarkers. Further ROI/voxel-wise analyses are warranted to uncover potential regional changes among AD BCHE variants.

Keywords: Alzheimer’s disease; butyrylcholinesterase genetic variants; neuroimaging; amyloid-PET; FDG-PET