ACCELERATED HIPPOCAMPAL ATROPHY IN SUBJECTS WITH MATERNAL HISTORY OF ALZHEIMER'S DISEASE

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Background: Alzheimer's disease (AD) invariably results in hippocampal atrophy. Family history of dementia increases one's risk for developing AD. Subjects with maternal (MH+) but not paternal (PH+) dementia history were recently reported to show reduced PET glucose uptake in AD-vulnerable brain regions.

Objective: To investigate whether MH+ associates with greater hippocampal atrophy compared to PH+ and no parental history of dementia (H-).

Methods: We applied a robust automated hippocampal segmentation technique based on adaptive boosting followed by the 3D radial distance hippocampal mapping technique to the baseline and 1-year follow-up AD Neuroimaging Initiative (ADNI) 1.5 T MRI data of 245 subjects with mild cognitive impairment (MCI), 97 with AD and 150 cognitively normal (CN). 68 were PH+, 171 MH+ and 268 H-. Baseline and 1-year follow-up hippocampal volumes and 3D hippocampal radial distance maps were extracted for statistical comparisons. We used multiple regression models to investigate the effects of MH+ and PH+ on hippocampal volume and radial distance in follow-up while controlling for baseline volume. The 3D statistical maps were further corrected for multiple comparisons correction by applying permutation correction with a threshold of $p<0.05$

Results: Subjects with MH+ were significantly younger (74.2 vs. 76.0 y, p=.003) and more educated (16.2 vs. 15.6 y, p=.025) relative to H-. There were no education and age differences between PH+ and H-. There were no differences in MMSE scores, gender, race or diagnostic breakdown between the three groups. All multiple regression models were corrected for age and education. MH+ was a significant predictor of hippocampal atrophy in the full sample (right hippocampus p=.006, left p=.042) and in MCI on the right (p=.004). MH+ showed trend-level significant association with hippocampal atrophy on the left in CN (p=.06). PH+ showed no statistically significant associations with hippocampal volume. History of dementia in either parent was a significant predictor of follow-up hippocampal volume on the right in the full sample (p=.014) and in MCI (p=.035).

Conclusions: As hypothesized, MH+ but not PH+ associates with significantly smaller hippocampal volume in subjects with normal cognition or those at risk for dementia of the Alzheimer's type.

*** Either poster or platform presentation**

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