REGIONAL AMYLOID PLAQUE DEPOSITION IN MCI AND ALZHEIMER DISEASE EVALUATED BY F-18 FLORBETAPIR (AV-45) PET SCANS

C.-C. Huang¹, K.-J. Lin²,³, I.-T. Hsiao²,³, C.-J. Hsieh², H.-C. Kang², Y.-C. Hsieh¹, S.-P. Wey³, M.-P. Kung²,⁴, D. Skovronsky⁵, T.-C. Yen²

¹Neurology, Chang Gung Memorial Hospital and Chang Gung University, ²Molecular Imaging Center and Nuclear Medicine, Chang Gung Memorial Hospital, ³Medical Imaging and Radiological Sciences, Chang Gung University, Taoyuan, Taiwan R.O.C., ⁴Radiology, University of Pennsylvania, ⁵Avid Radiopharmaceuticals Inc, Philadelphia, PA, USA

Introduction: Alzheimer’s disease (AD) is characterized by the anatomical appearance of beta-amyloid plaques and neurofibrillary tangles. The neurofibrillary tangle exhibited a characteristic distribution pattern permitting the differentiation of six stages (Braak stage). In contrast, the regional distribution of amyloid plaque deposition showed limited significance for differentiation of neuropathological stages.

Aims: To investigate the distribution pattern of amyloid deposition in elderly control (n=6), mild cognitive impairment (MCI, n=11) and AD (n=9) subjects, F-18 Florbetapir (AV-45) PET scans were performed.

Methods: AV-45 PET scans were performed at 50 min after tracer injection in all subjects. AV-45 parametric images were computed by calculating the region-to-cerebellum ratio in each voxel. Comparison between these three groups was evaluated by statistical parametric mapping (SPM) after spatially normalized to a MRI template. Automatic region-of-interest (ROI) analysis was also performed.

Results: ROI analysis of AV-45 parametric image showed a higher AV-45 uptake in the frontal, lateral temporal, and occipital region in both MCI and AD groups as compare to controls. A higher AV-45 uptake at parietal lobes was noted in AD groups as compare to MCI subjects. On SPM analysis, significant differences between the control and MCI groups were similarly found in the abovementioned regions. Interestingly, AD subjects showed higher uptake of AV-45 at parietal, precuneus, and postcentral gyrus as compare to MCI group.

Conclusion: Our data suggest that frontal, lateral temporal, and occipital amyloid deposition occur relatively early in MCI subjects. Additional amyloid deposition can be found at parietal, precuneus, and postcentral gyrus during disease progression.