Imaging brain amyloid using the radioligand ^{18}F-AV45 (Florbetapir F18)

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Abstract

【Purpose 】 To characterize quantitative ^{18}F-AV45 (Florbetapir) positron emission tomographic (PET) measurements of fibrillar β-amyloid (Aβ) burden of participants with probable Alzheimer disease (AD) , mild cognitive imaparment (MCI), healhy control (HC), cerebral amyloid angiopathy (CAA) and frontotemporal lober degeneration (FTLD).

【Methods】 ^{18}F-AV45 was performed on 9 patient with AD (men 5, women 4 ; HDS-R 18±5.8 points, mean age 72y), and 3 patients with MCI (men 2, woman 1 ; HDS-R 27±2.0 points, mean age 62y), and 3 healthy controls (men 2, woman 1 ; mean age 70y), 2 patients with CAA (man 1, woman 1), 4 patients with FTLD (man 1, women 3 ; HDS-R 25±4.3, mean age 72y). Dynamic PET was performed over approximately 90 min after injection the tracer (370 MBq). Subsequently, we constructed time-activity curves. Standardized uptake values and cortical-to-cerebellum standardized uptake value ratios (SUVRs) were calculated with region of interests (ROI) at cortical region (frontal, temporal, parietal, occipital lobe) and other regions (putarmen, thalamus, Pons) for all subjects.

【Results】 The standardized uptake value ratio (SUVR) calculated using the cortical-to-cerebellar ratio in patients with AD, MCI and HC was plateaued within 40 min after ^{18}F-AV-45 administration. The cortical SUVR for 10 minutes extending from 50 to 60 minutes after administration was 1.30-1.37 for the patients with AD, 1.12–1.29 for the patients with MCI, 1.03–1.26 for the HC. The SUVR for the patients with AD were greater than those for the HC. SUVR value for the MCI was middle average. The images among AD patients with SUVR value between 0.6 to 2.0 were visually discriminative from HC. SUVR of white matter were higher than that of gray matter for the HC while that of gray matter was higher for the patients of AD.

【Conclusion】 ^{18}F-AV-45 PET showed significant difference between AD patients and HC, utilizing simplified SUVR acquired by scanning of 50-60 minutes after ^{18}F-AV-45 administration.