In vivo imaging of amyloid beta deposition with radioligand ^{18}F-AV-45 (Flobetapir) - preliminary studies-

H.Yonezawa, S.Takahashi, J. Takahashi, M. Kudo, H. Shibata, S. Obara, Y. Terayama, T. Sasaki[1], K. Terasaki[1] and K. Sera[1]

Department of Neurology and Gerontology Iwate Medical University
19-1 Uchimaru,Morioka,Iwate020-8505, Japan

[1]Cyclotron Research Center, Iwate Medical University
348-58 Tomegamori, Takizawa, Iwate 020-0173, Japan

Abstract

[Purpose] In vivo imaging of beta-amyloid (Aβ) plaques may improve both early detection of Alzheimer disease (AD) and efficacy assessment of new treatments for AD. Recently, the radioligand ^{18}F-AV-45 (Florbetapir) was shown to have high binding affinity to Aβ aggregates in AD patients. Here, we present the results of a clinical trial involving in vivo imaging of beta amyloid deposition by using ^{18}F-AV-45.

[Methods] The study population comprised 6 subjects, that is, 4 patients with AD (men 2, women 2; mean MMSE score 22 points), and 2 old healthy control (OHC) (men 2; mean age 80 y) subjects. Dynamic PET was performed over approximately 90 min after injecting the tracer (370 MBq). Subsequently, we constructed time-activity curves. Standardized uptake values and cortical-to-cerebellum standardized uptake value ratios (SUVRs) were calculated.

[Results] PET data were obtained for all the subjects. In the patients with AD, ^{18}F-AV-45 accumulated in cortical regions expected to show high amyloid deposition, and in the OHCs, low accumulation of the tracer was seen in the cortical regions. The SUVRs calculated using the cortical-to-cerebellar ratio in patients with AD plateaued within 50 min after ^{18}F-AV-45 administration. The 10-min period extending from 50 to 60 min after tracer administration was used as a representative sample for further analysis. The average cortical SUVR for this period was 1.44 ±0.08 for the patients with AD versus 0.82 ± 0.11 for the OHCs. In the cortical regions, the SUVRs for the patients with AD were greater than those for the OHCs.

[Conclusion] ^{18}F-AV-45 PET can significantly discriminate between patients with AD and OHCs, by using a simplified SUVR calculated for 10 min of scanning, i.e., during 50–60 min after ^{18}F-AV-45 administration.