REVIEW

Annals of Nuclear Medicine Vol. 16, No. 8, 515–525, 2002

Clinical application of positron emission tomography for diagnosis of dementia

Kazunari ISHII

Department of Radiology and Nuclear Medicine, Hyogo Brain and Heart Center
(former: Hyogo Institute for Aging Brain and Cognitive Disorders [HI-ABCD])

Clinical applications of PET studies for dementia are reviewed in this paper. At the mild and moderate stages of Alzheimer's disease (AD), glucose metabolism is reduced not only in the parietotemporal region but also in the posterior cingulate and precuneus. At the advanced stage of AD, there is also a metabolic reduction in the frontal region. In AD patients, glucose metabolism is relatively preserved in the pons, sensorimotor cortices, primary visual cortices, basal ganglia, thalamus and cerebellum. In patients with dementia with Lewy bodies, glucose metabolism in the primary visual cortices is reduced, and this reduction appears to be associated with the reduction pattern in AD patients. In patients with frontotemporal dementia, reduced metabolism in the frontotemporal region is the main feature of this disease, but reduced metabolism in the basal ganglia, and/or parietal metabolic reduction can be associated with the frontotemporal reduction. When corticobasal degeneration is associated with dementia, the reduction pattern of dementia is similar to the reduction pattern in AD and the hallmarks of diagnosing corticobasal degeneration associated with dementia are a reduced metabolism in the primary sensorimotor region and/or basal ganglia and an asymmetric reduction in the two hemispheres. FDG-PET is a very useful tool for the diagnosis of early AD and for the differential diagnosis of dementia. I also describe clinical applications of PET for the diagnosis of dementia in Japan.

Key words: positron emission tomography (PET), F-18 fluorodeoxyglucose (FDG), dementia, Alzheimer disease, glucose metabolism