

Original article

Metabolic Activity Value in the Posterior Cingulate Cortex Using F-18 Fluorodeoxyglucose Positron Emission Tomography Brain to Predict the Severity of Alzheimer's

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Abstract

Alzheimer's disease (AD) is a type of dementia which is known as one of a major problem in elderly. Clinicians commonly use mini-mental state examination (MMSE) score to determine the severity of cognitive decline, but MMSE has some limitations such as more subjective, influenced by age, educational degree, and local culture. F-18 fluorodeoxyglucose positron emission tomography (F-18 FDG PET) can be used to assess the process of glucose metabolism in posterior cingulate cortex (PCC) area which endures a central role in supporting cognitive function directly. The purpose of this study is to observe a correlation between metabolic activity value of PCC and MMSE score in predicting the severity of AD. A cross-sectional study was done to 30 subjects suspect AD disease with aged 60 years and older. Characteristic data including gender, age, and education, MMSE scoring by psychiatrist, and imaging of F-18 FDG PET were established. The results of correlation test between the value of FDG metabolic activity and MMSE score shows that the value of metabolic activity in the PCC area tends to increase along with the increase of MMSE score ($r_s = 0.411$, $P = 0.024$). While from the results of multiple regression test with predictor variable consisting of F-18 FDG metabolic activity in the PCC, gender, age, education level, and the interaction between the metabolic activity of F-18 FDG at PCC and gender, a regression model was obtained. There is a significant correlation observed between the captured of F-18 FDG radioactivity with MMSE score in PCC area which can be used as a tool to predict the severity of AD.

Keywords: Alzheimer's disease, F-18 fluorodeoxyglucose positron emission tomography, mini-mental state examination, posterior cingulate cortex

Introduction

Dementia is a group of clinical manifestation from several kinds of diseases. Clinical manifestation could

be loss of memory, mental disturbance, and other cognitive impairment, but without any consciousness disorder.^[1] Dementia becomes the main health problem in the elderly population, particularly in the age of 60 years or more. According to WHO report on 2001, it was estimated that 24.3 million people over the world

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