

Voxel-based morphometric difference in metabolic activity of 50 to 73 years old healthy adult brain: A PET/CT study

ABSTRACT

Healthy adult exhibits variants of ¹⁸F-FDG distribution of cerebral glucose metabolism associated with age. This study was conducted to investigate the hypometabolism and hypermetabolism as a function of gender in healthy adults unrelated to dementia. The subjects consisted of 21 males aged 51 to 66 (mean + SD = 57.81 + 4.792) and 15 females aged 50 to 73 (mean + SD = 62.8 + 5.906). Six data of equal gender were randomly chosen from the subjects to investigate the difference in metabolic activity. The result showed that hypometabolism was detected at cerebrum, cerebellum, parahippocampalgyrus, superior frontal gyrus, superior temporal gyrus, frontal lobe and posterior lobe that were not exclusively showing dementia-related diseases but only a sign of mild cognitive decline with increased age. In healthy elderly, hypometabolism was also seen in the anterior regions of the brain that related to executive function and performance of attention. Preserved glucose consumption was seen as both hypo- and hypermetabolized in the cerebrum and cerebellum region. This finding was supported by previous studies that a normal daily function of an AD patient was preserved even with evidence of cognitive decline. Nevertheless, there were gender effect differences in metabolic activity between male and female healthy adults. Hypometabolism was significant in right cerebrum, right cerebellum and left cerebellum for male but hypermetabolic in female at left cerebrum region. On the other hand, only female subject showed a hypometabolic area in thalamus and parahippocampalgyrus due to effect of estrogen where older female aged 50 and above were in menopausal condition unless HRT were taken.

Keyword: Voxel-based morphometry; Healthy adult; Hypometabolism; Hypermetabolism; Gender effect