

Voxel-wise analysis of 18F-fluorodeoxyglucose metabolism in correlation with variations in the presentation of Alzheimer's disease: a clinician's guide

ABSTRACT

Diagnostic imaging can be applied in the management of Alzheimer's disease as it provides structural and functional information to exclude possible secondary causes and offers additional information, especially in atypical cases of Alzheimer's disease. The utility of positron emission tomography/computed tomography (PET/CT) can help in the noninvasive diagnosis of Alzheimer's disease by voxel-wise quantification of cerebral 18F-fluorodeoxyglucose (FDG) metabolism. **Methods:** This prospective study was conducted among 10 subjects with Alzheimer's disease and 10 healthy control subjects who underwent neuropsychological testing and 18F-FDG PET/CT scans. Images of the brain were postprocessed using voxel-wise analysis and segmented into 20 regions of interest. The standardized uptake value (SUV) max/SUVmean/standard deviation of SUVmean results were analyzed accordingly and correlated with the subjects' Montreal cognitive assessment (MoCA) results that were adjusted for age and education level. **Results:** Hypometabolism at the right parietal lobe significantly correlated with increasing age and lower MoCA scores. Global hypometabolism was observed in subjects who had advanced Alzheimer's disease but preserved primary somatosensory cortices (S1) region metabolism. Predominance of frontal lobe hypometabolism was a feature of subjects with Alzheimer's disease having associated depressive symptoms. **Conclusions:** 18F-FDG PET/CT voxel-wise analysis can be used for quantitative assessment and can assist clinicians in the diagnosis of Alzheimer's disease and other variations of the disease spectrum.

Keyword: Dementia; Geriatrics; Molecular imaging; Neurocognitive disorder; Neurology; Positron emission tomography