Visual versus semi-quantitative analysis of 18F-FDG-PET in amnestic MCI: an European Alzheimer’s Disease Consortium (EADC) project.

We aimed to investigate the accuracy of FDG-PET to detect the Alzheimer’s disease (AD) brain glucose hypometabolic pattern in 142 patients with amnestic mild cognitive impairment (aMCI) and 109 healthy controls. aMCI patients were followed for at least two years or until conversion to dementia. Images were evaluated by means of visual read by either moderately-skilled or expert readers, and by means of a summary metric of AD-like hypometabolism (PALZ score). Seventy-seven patients converted to AD-dementia after 28.6 ± 19.3 months of follow-up. Expert reading was the most accurate tool to detect these MCI converters from healthy controls (sensitivity 89.6%, specificity 89.0%, accuracy 89.2%) while two moderately-skilled readers were less (p< 0.05) specific (sensitivity 85.7%, specificity 79.8%, accuracy 82.3%) and PALZ score was less (p< 0.001) sensitive (sensitivity 62.3%, specificity 91.7%, accuracy 79.6%). Among the remaining 67 aMCI patients, 50 were confirmed as aMCI after an average of 42.3 months, 12 developed other dementia, and 3 reverted to normalcy. In 30/50 persistent MCI patients, the expert...
recognized the AD hypometabolic pattern. In 13/50 aMCI, both the expert and PALZ score were negative while in 7/50, only the PALZ score was positive due to sparse hypometabolic clusters mainly in frontal lobes. Visual FDG-PET reads by an expert is the most accurate method but an automated, validated system may be particularly helpful to moderately-skilled readers because of high specificity, and should be mandatory when even a moderately-skilled reader is unavailable.