Brain Metabolic Correlates of Cerebrospinal Fluid Beta-Amyloid 42 and Tau in Alzheimer's Disease

Abstract:
Background: The cerebrospinal fluid (CSF) proteins β-amyloid 42 (Aβ42) and Tau are believed to indirectly reflect some core pathological features of Alzheimer's disease (AD). Their topographic origin and their association with synaptic dysfunction are still not well understood. Aim: The present study aimed to explore possible associations between cerebral glucose metabolism and CSF Aβ42 as well as Tau protein levels in AD. Methods: CSF analyses and 18F-FDG PET scans were conducted on 32 patients with mild-to-moderate AD. Voxel-based statistical parametric correlations were computed for CSF protein levels and cerebral glucose metabolism. Results: After correction for multiple comparisons, a strong positive association between CSF Aβ42 levels and glucose metabolism was identified for 2 extensive clusters located in the right temporal, prefrontal and anterior cingulate cortices. For CSF Tau protein, no association was observed for any brain region. Conclusions: These findings point to a significant association between synaptic dysfunction as measured with 18F-FDG PET and CSF Aβ42 levels, but do not suggest a correlation between synaptic function and CSF Tau levels.

Keywords: Alzheimer's disease; Dementia; 18F-FDG