Unique regional patterns of amyloid burden predict progression to prodromal and clinical stages of Alzheimer's disease

Julia Pfeil, Merle C. Hoenig, Elena Doering, Thilo van Eimeren, Alexander Drzezga, Gérard N. Bischof, and for the Alzheimer's Disease Neuroimaging Initiative

Abstract:
Although beta-amyloid (Aβ) positivity has shown to be associated with higher risk of progression to Alzheimer's disease (AD) in mild cognitive impairment (MCI), information on the time to conversion to manifest dementia cannot be readily deduced from this binary classification. Here, we assessed if regional patterns of Aβ deposition measured with 18F-florbetapir may serve as biomarker for progression risk in Aβ-positive cognitively normal (CN) and MCI patients, including clinical follow-up data and cerebrospinal fluid (CSF) biomarkers. Voxel-wise group comparisons between age and sex-matched Aβ-positive groups (i.e., CN-stables [n = 38] vs. CN-to-MCI/AD progressors [n = 38], MCI-stables [n = 104] versus MCI-to-AD progressors [n = 104]) revealed higher Aβ burden in precuneus, subcortical, and parietal regions in CN-to-MCI/AD progressors and cingulate, temporal, and frontal regions in MCI-to-AD progressors. Importantly, these regional patterns predicted progression to advanced stages on the AD spectrum in the short and the long-term beyond global Aβ burden and CSF biomarkers. These results suggest that distinct regional patterns of Aβ burden are a valuable biomarker for risk of disease progression in CN and MCI.

Published: October 2021

Neurobiology of Aging

https://doi.org/10.1016/j.neurobiolaging.2021.06.014