

THE RELATIONSHIPS BETWEEN PET AMYLOID BURDEN AND CLINICAL SYMPTOMS IN ALZHEIMER'S DISEASE

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Background

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Amyloid- β ($A\beta$) deposition in the brain is a key pathogenesis Alzheimer's disease (AD), but the $A\beta$ burden in the brain did not relate with clinical severity. However, the relationships between clinical symptoms and regional $A\beta$ burden in lobar areas measured by PET had not been determined.

Methods

Methods: This cross-sectional observational study included 79 patients with AD. All participants underwent $A\beta$ -PET scans, and global $A\beta$ burden was measured using Centiloid values, while regional $A\beta$ burden in lobar areas was quantified using SUVmean. Clinical Dementia Rating-Sum of Boxes (CDR-SB), Minimal-Mental State Examination (MMSE), and Montreal Cognitive Assessment (MoCA) were used to evaluate global cognition and core domains such as memory, naming, attention, and calculation. Pearson correlation analysis and multiple linear regression models were employed to explore the associations between cerebral $A\beta$ burden and clinical symptoms.

Results

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After adjusting for confounding factors (age, sex, APOE $\epsilon 4$ genotype, education level), multiple linear regression analysis revealed that global $A\beta$ burden did not associate with the severity of global cognitive impairment (MMSE, CDR-SB) (all $p > 0.05$). However, $A\beta$ deposition in the parahippocampal gyrus was significantly negatively correlated with memory function ($\beta = -2.162$, $p < 0.05$). $A\beta$ deposition in the precuneus and isthmus cingulate was associated with decline in naming ability (precuneus $\beta = -4.557$, isthmus cingulate $\beta = -2.559$; all $p < 0.05$). $A\beta$ deposition in the frontal pole, occipital lobe, and cingulate gyrus was significantly negatively correlated with attention and calculation abilities (frontal pole $\beta = -2.217$, occipital lobe $\beta = -7.635$, cingulate gyrus $\beta = -4.670$; all $p < 0.05$).

Conclusion

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The global $A\beta$ burden does not parallel the severity of clinical symptoms, whereas $A\beta$ deposition in specific regions is associated with distinct clinical symptoms. This suggests that the specific clinical symptoms may reflect specific spatial distribution of $A\beta$ pathology.