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White Matter Hyperintensities and Hippocampal Atrophy in Relation to Cognition: The 90+ Study (S34.005)

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Abstract

Objective: To study the interactive effect of white matter hyperintensities (WMH) and hippocampal atrophy on cognition in the oldest-old.

Background: Cognitive functioning in individuals aged 90 years and older (the oldest-old) is determined by multiple factors. The association between cognitive impairment and individual pathologies seems to become weaker at older ages. It remains however unknown how these different pathologies interact in the oldest-old.

Design/Methods: Participants were 141 individuals (94 cognitively normal and 47 cognitively impaired). Each participant completed a brain MRI scan. Cognitive testing was performed every six months with a mean follow-up of 2.0 years and included the following tests: Mini-Mental State Examination (MMSE), modified MMSE (3MS), California Verbal Learning Test (CVLT) immediate recall over four trials and delayed recall, Digit Span Backward, Animal Fluency, Trail Making Test (TMT) A, B and C. One linear mixed model was used for each cognitive test to study the baseline and longitudinal association of WMH and hippocampal volume with cognition. Models were adjusted for age, gender and education.

Results: Mean age of the study sample was 94.3 (SD=3.2) years. At baseline, higher WMH volumes were associated with worse scores on the 3MS, CVLT immediate and delayed recall and TMT B. Lower hippocampal volumes were associated with worse baseline scores on all cognitive tests, except for the Digit Span Backward. Longitudinally, higher WMH and lower hippocampal volumes were associated with faster decline in the 3MS and MMSE and lower hippocampal volume was also associated with faster decline in the CVLT immediate recall. There was no association between WMH and hippocampal volume and no interaction between WMH and hippocampal volume in their association with baseline cognition or cognitive decline.

Conclusions: The research shows that WMH and hippocampal atrophy have an independent, and not synergistic, negative effect on cognition in the oldest-old.

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