Association of low systolic blood pressure with postmortem amyloid-β and tau

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Objective: Vascular mechanisms may contribute to the accumulation of Alzheimer's disease (AD) pathology. We examined whether the burden of vascular risk factors proximate to death is associated with amyloid-β and tau levels (AD pathology indices) or modified their known association.

Methods: We examined the brains of 1585 participants from two longitudinal community-based studies of older adults, the Religious Orders Study and the Rush Memory and Aging Project. Amyloid-β and tau were quantified by postmortem examination. The burden of vascular risk factors was summarized by calculating the Framingham general cardiovascular risk score (FRS) proximate to death. Using linear regressions, we examined the association of the FRS with the amyloid-β and tau levels and examined if the FRS modified the association of the amyloid-β with tau.

Results: On average, participants were nearly 90 years old and two-thirds were women. The FRS was not associated with amyloid-β (Spearman r = -0.00, p = 0.918), or tau (r = 0.01, p = 0.701). However, the FRS as a whole (estimate = -0.022, SE = 0.008, p = 0.009), and specifically the systolic blood pressure (SBP) component (estimate = -0.033, SE = 0.012, p = 0.009), modified the association of the amyloid-β with tau. Further analysis showed that the association between amyloid-β and tau was stronger at lower levels of SBP.

Conclusion: Late-life vascular risk scores were not related to postmortem levels of amyloid-β or tau. However, lower levels of vascular risk scores and SBP were associated with a stronger association between amyloid-β and tau. These data suggest that vascular risk factors may modify the relation of AD pathology markers to one another.