

Impact of Cardiovascular Burden on the Relationship Between Tau Biomarkers and Cognitive Function in Alzheimer's Disease

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Background: Alzheimer's disease (AD) is marked by cognitive decline, with Tau protein as a key biomarker. Abnormal Tau phosphorylation disrupts neurons and correlates with cognitive impairment. Cardiovascular diseases (CVD), such as hypertension, are linked to cognitive decline and may worsen Tau-related neurodegeneration. We hypothesize that greater CVD burden strengthens the association between Tau and cognitive function. These findings could inform preventive strategies targeting cardiovascular health to mitigate AD-related decline.

Methods: This cross-sectional study enrolled on persons with one or more CVD. We administered a comprehensive cognitive battery assessing multiple domains, including global executive function, memory, and processing speed. Sociodemographic information and medical history were collected through self-report. Serum total (t) tau and phosphorylated (p) tau217 protein levels were quantified using ELISA assays according to the manufacturer's protocol.

Results: This study included 40 participants (55% female, 38% Black) with a mean age of 65.8 ± 7.97 years. Average systolic and diastolic blood pressure were 123.59 ± 19.43 mmHg and 84.93 ± 11.46 mmHg, respectively. Mean p-tau217 concentration was 0.492 ± 0.262 ng/ml and t-tau were 85.86 ± 26.63 pg/ml. Mean CVD burden was 2.49 ± 0.72 factors. T-tau ($r=.586$, $p<.001$) and p-tau217 ($r=.590$, $p<.001$) were positively associated with CVD burden. T-tau ($r=.379$, $p=.016$) was positively associated with diastolic blood pressure. T-tau ($p=.008$) and p-tau217 ($p=.032$) levels were lower in Black participants compared to whites.

Conclusions: We found that higher CVD burden was associated with higher tau levels and lower cognitive function in attention and processing speed and executive function. Despite the higher risk for Alzheimer's disease, p-tau217 was lower in Black adults compared to white adults. This study is ongoing.

Figure. Study Procedures and Collected Data

