

Contribution of 24-h Blood Pressure Variability to Dementia-Related Disorders in Hispanics

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Contribution of 24-h Blood Pressure Variability to Dementia-Related Disorders in Hispanics

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Introduction: As the number of people living with dementia is increasing at alarming rates worldwide, there is an urgent need to understand the physiopathology of dementia syndromes. Among the most important preventable risk factors, treatment of vascular risk factors such as high blood pressure (BP) decreases the risk of Alzheimer's disease and related dementias (ADRD). Recent evidence suggests that examining BP variability provides additional physiopathological and predictive information above the mean BP level. However, studies examining the relationship between 24-h BP variability and ADRD are limited, and evidence of the association with dementia has not been documented yet. Therefore, we aimed in this study to assess the association of 24-h ambulatory BP variability with brain imaging and cognitive markers of ADRD.

Methods: A cross-sectional observational study was conducted using a subset of 420 individuals from the Maracaibo Aging Study aged ≥ 40 years. Study participants underwent brain MRI scanning and 24-h ambulatory BP monitoring assessments. Markers of ADRD included 1) cerebral small vessel disease (CSVD, defined as white matter hyperintensities, presence of lacunes, cerebral microbleeds, and enlarged perivascular spaces, and hippocampal volume), 2) cognitive functioning addressed with the mini-mental state exam (EMEMS), and 3) diagnose of dementia at baseline. 24-h ambulatory BP variability was studied as the average real variability index. Adjusted linear and logistic regression models were used to analyze the association between 24-h BP and ADRD and accounted for age, sex, education level, body mass index (BMI), current smoking, alcohol intake, hypertension treatment, diabetes mellitus, serum total cholesterol, previous cardiovascular diseases, and cephalic circumference and 24-h mean BP level.

Results: The mean age was 57.1 ± 11.8 years old and 73.2% were women (n=303). In adjusted analysis, each unit increase in the 24-h systolic BP variability was significantly associated with

lower hippocampus volume (β , -0.036; 95% confidence interval [CI], -0.064, -0.008, $P=0.011$), greater white matter hyper intensities volume (β , 0.026; 95% CI, 0.008, 0.044; $P=0.006$), lower cognitive scores (β , -0.370; 95% CI, -0.729, -0.011; $P=0.044$), greater presence of lacunes (Odds ratios [OR], 1.38; 95% CI, 1.10, 1.71; $P=0.004$), enlarged perivascular spaces (OR, 1.34; 95% CI, 1.08, 1.67; $P=0.007$), and dementia prevalence (OR, 1.41; 95% CI, 1.07, 1.85; $P=0.014$). 24-hour diastolic blood pressure variability was only significantly associated with lacunes (OR, 1.42; 95% CI, 1.06, 1.90; $P=0.017$). In exploratory analysis, we found that neither daytime nor nighttime variability in BP significantly relate with ADRD.

Conclusions: Excessive 24-h BP variability associates with ADRD independently of the mean BP level. Understanding the physiological mechanisms explaining the relationship between excessive 24-h BP variability and ADRD may be clinically relevant in the prevention of ADRDs.