Cardiovascular markers as predictors of cognitive decline in elderly hypertensive patients

Authors:
A Noriega De La Colina¹, L Desjardins-Creapeau², R Wu³, M Lamarre-Cliche³, P Larochelle⁴, L Bherer⁵, H Girouard¹, ¹University of Montreal, Centre de Recherche de l'Institut universitaire de géériatrie de Montréal (CRIUGM) - Montreal - Canada, ²Université de Québec à Montréal (UQAM), Department of Psychology - Montreal - Canada, ³Université de Montréal, Institut de recherches cliniques de Montréal (IRCM) - Montréal - Canada, ⁴Université de Montréal, Centre hospitalier de l'Université de Montréal (CHUM) - Montréal - Canada, ⁵Concordia University, PERFORM Centre - Montréal - Canada,

On behalf: Laboratoire Girouard & LESCA

Topic(s): Aging

Citation: Cardiovascular Research Supplements (2016) 111 (S1), S71

Introduction: Normal aging is associated with structural and functional brain alterations. Recent studies in animal models of hypertension and hypertensive patients indicate that hypertension could accelerate brain aging by increasing the pressure on the cerebral arteries. To date, there is no convincing evidence that lowering blood pressure prevents cognitive impairment, and there are conflicting data as to which antihypertensive drugs should be used to prevent cognitive impairment. These facts underscore the urgency to better understand the acceleration mechanisms of brain aging underlying hypertensive patients to develop better strategies for prevention and improving the quality of life of elderly people.

Purpose: The objective was to determine the cardiovascular factors that are markers of cognitive decline in hypertensive patients. By drawing correlations between blood pressure and changes in brain structure and function, with hypertension-related parameters, this study should help elucidate the relationship between blood pressure and cognitive performance.

Methods: The 48 recruited subjects were divided in two groups: "Normotensive" (n=26) and "Hypertensive" (n=22). Subjects were aged between 65 and 85 years old. "Hypertensive": Treated hypertension; controlled hypertension.

The subjects were assessed for:

a) systolic blood pressure (SBP) and diastolic blood pressure (DBP)

b) ambulatory blood pressure monitoring (24 hours)

c) Blood analysis (Na+, K+, Ca++, blood creatinine, glucose, triglycerides, thyroid function)

Participants completed a battery of neuropsychological tests: Digit Span, 15 words of Rey, MOCA and Folstein MMSE, Trail Making Test parts A and B (TMTA & TMTB), D-KEFS examining Stroop Colour-Word Test (SCWT) with four conditions.

Results: The largest difference between the groups was in the performance on the SCWT, specially when switching conditions. Significant positive correlations (p<0.05) were found between day values of hypertension over 135 mmHg and the "cost of switching" condition from the SCWT. In switching conditions, hypertensive subjects performed worse than normotensive subjects. There were also correlations between SCWT "cost of switching" and the "Trail making Test part B (TMTB)". The importance of the "cost of switching" and the
"TMTB", is that those parts of the task require the use of executive functions controlled by the prefrontal lobe which is highly sensitive to sustained high blood pressure levels. Incidentally, these conditions have been reported as good predictors of cognitive decline and dementia in older adults.

Conclusion: There is a strong correlation between the "percentage of systolic blood pressure greater than 135 mm Hg during the day" and switching conditions like TMTB and SCWT, reinforcing the hypothesis that performance in switching conditions of neuropsychological tests like the Stroop task could be a predictive factor of decline cognitive and dementia in elderly hypertensive subjects.