5.3: CAROTID ARTERY STIFFNESS INCREASES THE RISK OF INCIDENT DEPRESSIVE SYMPTOMS: THE PARIS PROSPECTIVE STUDY 3

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5.2 DIFFERENTIAL CHARACTERISTICS BETWEEN AORTIC PRESSURE AUGMENTATION AND CAROTID FLOW AUGMENTATION: CLINICAL IMPLICATIONS FOR CEREBRAL WHITE MATTER HYPERINTENSITIES

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Background: Aortic stiffness and pressure wave reflection have been found to be associated with age-related cerebral microvascular disease, but the underlying mechanism remains obscure. We hypothesized that cerebral (carotid) flow augmentation potentially mediates these associations.

Methods: Doppler waveforms were recorded in 286 patients with hypertension to measure the carotid flow augmentation index (FaIX) as the late/early systolic velocity amplitude ratio. Tonometric waveforms were recorded to estimate the aortic pressure augmentation index (PaIX), aortic compliance, and carotid-femoral and carotid-radial pulse wave velocities (PWVs). Additionally, white matter hyperintensities (WMHs) on brain MRI were evaluated using the Fazekas scale.

Results: With increasing age, the carotid late-systolic velocity increased whereas the early-systolic velocity decreased, although the aortic augmented pressure increased in parallel with the incident wave height (P<0.001). Both FaIX and PaIX increased with age, but the age-dependent curves were upwardly concave and convex, respectively. FaIX increased exponentially with increasing PaIX (r = 0.71). Compared to PaIX, FaIX was more closely (P < 0.001) correlated with the aortic PWV, aortic compliance, and aortic/ peripheral PWV ratio. FaIX was associated with WMH scores independently of confounders including age, gender, diabetes, hypercholesterolemia and aortic PWV (P = 0.02), and was more predictive of WMH presence than PaIX.

Conclusions: Carotid FaIX had closer associations with age, aortic stiffness and cerebral WMH than did aortic PaIX. These results indicate that carotid flow augmentation (enhanced by aortic stiffening and pressure wave reflection from the lower body) causes microcerebrovascular injury potentially through increasing cerebral flow pulsations, but this detrimental effect is even greater than that estimated from PaIX.

5.3 CAROTID ARTERY STIFFNESS INCREASES THE RISK OF INCIDENT DEPRESSIVE SYMPTOMS: THE PARIS PROSPECTIVE STUDY 3

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Background: Late-life depression is related to poor quality of life and increased risk of mortality and cardiovascular disease. Effective interventions for prevention and treatment of late-life depression need to be developed, which requires a better understanding of late-life depression risk factors. Arterial stiffness may contribute to late-life depression via cerebrovascular damage, but evidence is scarce.

Aim: To investigate the association between carotid artery stiffness and incident depressive symptoms in a large community-based cohort study.

Methods: This longitudinal study included 7,013 participants (60 (SD 6) years; 36% women) free of depressive symptoms at baseline. Carotid stiffness (high-resolution echotracking) was determined at baseline. Presence of depressive symptoms was determined at baseline and at 4 and 6 years of follow-up and was defined as a score >7 on a validated 13-item questionnaire (Q2DA) and/or new use of antidepressants. Logistic regression and generalized estimating equations (GEE) were used.
Results: In total, 6.9% (n = 484) of the participants had incident depressive symptoms at 4 or 6 years of follow-up. Greater carotid stiffness was associated with a higher incidence of depressive symptoms (Figure). Results were qualitatively similar when GEE was used instead of logistic regression. 

Conclusions: Greater carotid artery stiffness is associated with a higher incidence of depressive symptoms. This study supports the hypothesis that carotid artery stiffness contributes to the development of late-life depression.

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