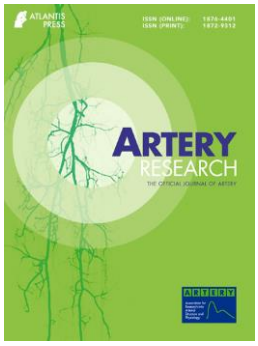

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3.3: AN EASY AND INTUITIVE WEB INTERFACE FOR THE ASSESSMENT OF MEASUREMENTS OF CAROTID-FEMORAL PULSE WAVE VELOCITY AND LOCAL ARTERIAL STIFFNESS RELATIVE TO THE REFERENCE VALUES DATABASE

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be generated by elastic recoil of large arteries independent of pressure wave reflection and this effect dominates in human physiology.

3.3
AN EASY AND INTUITIVE WEB INTERFACE FOR THE ASSESSMENT OF MEASUREMENTS OF CAROTID-FEMORAL PULSE WAVE VELOCITY AND LOCAL ARTERIAL STIFFNESS RELATIVE TO THE REFERENCE VALUES DATABASE

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Objective: The use of different devices and methods still hampers the widespread clinical use of the reference values for arterial stiffness. The aim of this work was therefore to create a web-based application that allows easy assessment - for different methodological approaches - of a given measured value of arterial stiffness, with the application providing the percentile reference associated with that specific value.
Methods: Reference values of carotid-femoral pulse wave velocity (cf-PWV) (11,092 individuals; age range: 15—97 years, 49.8% men) and local carotid (22,708 individuals; age range 15—99 years; 54% men) and femoral (5,069 individuals; age range: 15—87 years; 49.5% men) arterial stiffness were obtained from The Reference Values for Arterial Stiffness' Collaboration 2010 and the database of The Reference Values for Arterial Stiffness' Collaboration. Data from healthy subpopulations were used to establish equations for percentiles of cf-PWV and sex-specific percentiles of carotid and femoral distensibility coefficient (DC) across age. Using these established equations, an application was created (in JavaScript) to provide the percentile reference value from routine parameters obtained in clinical practice.
Results: The tool can be found at: http://bit.do/referencevalues. The user selects the parameter to be determined (or standardized): carotid DC, femoral DC or cf-PWV. Subsequently, a number of inputs are required to calculate the selected parameter, the percentile and, when relevant, additional information. The tool also allows conversion of cf-PWV following different methods.
Conclusions: An easy and intuitive interface was created to assess a given measurement of arterial stiffness relative to know reference values.

3.4
EVALUATION OF THE MUTUAL RELATIONSHIPS AMONG THE DEVELOPMENT OF HYPERTENSION, ARTERIAL STIFFENING AND RENAL FUNCTION DECLINE BASED ON REPEATED LONGITUDINAL MEASUREMENTS

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Background: The mechanisms underlying the development of hypertension have not yet been fully clarified. The mutual relationships among the development of hypertension and the longitudinal changes of arterial stiffness and renal function, and also the effect of maintenance of a normal body weight on these relationships were evaluated by a linear mixed-effects regression model analysis (LMM).
Methods and Results: In 3932 middle-aged Japanese subjects without hypertension (41 ± 9 years old), an 11-year prospective observational study was conducted by repeated annual measurements of the blood pressure (BP), brachial-ankle pulse wave velocity (baPWV), and serum creatinine-derived estimated glomerular filtration rate (eGFR). The mean number of measurements per patient was 6.5. The LMM analysis revealed that higher values of the baPWV were associated with annual elevation of the SBP, and higher values of the SBP were associated with annual increase of the baPWV (estimate = 0.2103, $p < 0.001$). These associations were also significant in the subjects in whom the body mass index was maintained at <25.0 at the end of observation period (n = 2815). However, no significant relationships were observed between the eGFR/proteinuria and the annual change of the baPWV/BP.
Conclusions: The results of LMM analysis in this study revealed that, while a vicious cycle may exist between the development of hypertension and the progression of arterial stiffening, mild renal dysfunction as reflected by eGFR decline and/or proteinuria may not affect this vicious cycle. Furthermore, maintenance of a normal body weight may not be effective for interrupting this vicious cycle.

3.5
ASSOCIATION OF VASCULAR RISK FACTORS WITH BRAIN STRUCTURE AND FUNCTION

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Background: Vascular risk factors have been associated with brain aging. We aimed to determine the associations between blood pressure (BP), atherosclerosis, arterial stiffness and microvascular damage with both structural and functional measures of the brain.
Methods: A community-based sample of 1287 individuals (69 ± 6 yrs) underwent cognitive function testing and MRI to measure hippocampal brain volumes. Brachial and central systolic BP (SBP, cSBP) and pulse pressure (PP, cPP), diastolic BP (DBP), arterial stiffness (cfPWV), atherosclerosis (cIMT) and microvascular disease (composite from retinopathy, ACR and eGFR measures) were measured.
Results: After adjusting for age, sex and ethnicity hippocampal volume was significantly associated with SBP ($\beta \pm SE$: -0.004 ± 0.002; $p = 0.01$), PP ($\beta \pm SE$: -0.008 ± 0.002; $p < 0.0001$), cPP($\beta \pm SE$: -0.01 ± 0.003; $p < 0.0001$) and cfPWV ($\beta \pm SE$: -0.02 ± 0.01; $p = 0.04$). Cognitive function (z-score) was significantly associated with PP ($\beta \pm SE$: -0.004 ± 0.002; $p = 0.003$) and cPP ($\beta \pm SE$: -0.005 ± 0.002; $p = 0.02$). After further adjustment for concomitant risk factors (heart-rate, diabetes, hypertension, previous stroke, coronary artery disease, waist-to-hip ratio, years of education and smoking) only the associations with PP (Hippocampal volume $\beta \pm SE$: -0.005 ± 0.002; $p = 0.02$, cognitive function $\beta \pm SE$: -0.004 ± 0.001; $p = 0.01$) and cPP (Hippocampal volume $\beta \pm SE$: -0.008 ± 0.003; $p = 0.004$, cognitive function $\beta \pm SE$: -0.004 ± 0.002; $p = 0.048$) remained significant.
Conclusion: In this community based sample brachial and central PP were significantly associated with measures of brain structure and function, not explained by concomitant risk factors.

3.6
AORTIC STIFFNESS IS RELATED TO CEREBRAL LESION GROWTH IN PATIENTS WITH ACUTE ISCHEMIC STROKE

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Objective: Cerebral lesion growth in acute ischemic stroke leads to secondary neurological deterioration and poor outcome. Whether cSBP and arterial stiffness are related to the early brain infarct growth in patients after ischemic stroke is unknown.
Design and Methods: We enrolled 65 patients (43 males, age 62.9 ± 12.2 years, mean ± SD) with acute ischemic stroke (NIHSS at admission 6.0 ± 4.6 points). Carotid-femoral pulse wave velocity (CF-PWV), central systolic blood pressure (cSBP) and central augmentation index (cAIx) were measured (Sphygmocor®) within few (5 ± 2) days after stroke onset. Serial brain MRI were analysed. Cerebral lesion growth was assessed on diffusion-weighted imaging (DWI) by comparing baseline and follow-up scans. Marked cerebral lesion growth was determined as the highest tertile in a standardized measure of DWI lesion volume increase, and compared with the lowest tertile used as the reference group. Data were analysed with multivariate logistic regression.
Results: CF-PWV was higher in patients with marked cerebral lesion growth than that in patients of the reference group (10.9 ± 3.1 vs. 9.1 ± 1.9 m/s,