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P4.4: INHIBITION OF ARTERIAL CALCIFICATION BY MATRIX GLA PROTEIN AS DETERMINANT OF RENAL FUNCTION IN THE GENERAL POPULATION

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We examined cross-sectional associations of self-reported PA intensities with arterial stiffness in elderly Caucasians of the Swiss Cohort Study on Air Pollution and Lung and Heart Diseases in Adults (SAPALDIA). Mixed central and peripheral arterial stiffness was measured oscillometrically by the cardio-ankle vascular index (CAVI) and brachial-ankle pulse wave velocity (baPWV). The self-reported International Physical Activity Questionnaire (IPAQ) long version was administered to classify each subject's PA level. We used univariable and multivariable mixed linear and logistic regression models for analyses in 1908 persons aged 50 years and older. After adjustment for several confounders moderate, vigorous and total PA were inversely associated with CAVI ($p=0.02-0.03$). BaPWV showed negative and marginally significant associations with vigorous and moderate PA (each $p=0.06$), but not with total PA ($p=0.28$). Increased arterial stiffness (CAVI ≥ 9 , upper tertile) was inversely and significantly associated with vigorous PA (Odds Ratio (OR)=0.65, 95% Confidence Interval (CI): 0.48-0.88), and marginally significantly with total PA (OR=0.76, 95% CI: 0.57-1.02) and moderate PA (OR=0.75, 95% CI: 0.56-1.01). The odds ratio for baPWV ≥ 14.4 was 0.67 (95% CI: 0.48-0.93) across the vigorous PA levels, and was non-significant across the total (OR=0.91, 95% CI: 0.66-1.23) and moderate PA levels (OR=0.94, 95% CI: 0.69-1.28). In this general Caucasian population of older adults higher levels especially of vigorous PA were associated with lower arterial stiffness. These data support the importance of PA for improving cardiovascular health in elderly people.

P4.4

INHIBITION OF ARTERIAL CALCIFICATION BY MATRIX GLA PROTEIN AS DETERMINANT OF RENAL FUNCTION IN THE GENERAL POPULATION

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Background: Carboxylation of matrix Gla protein (MGP), a vitamin K dependent process, activates the protein to a powerful inhibitor of arterial calcification. Circulating dephosphorylated and uncarboxylated MGP (dp-ucMGP) and total uncarboxylated MGP (t-ucMGP) are associated with macrovascular disease. The association with microcirculatory disease remains unknown.

Methods: In 1174 randomly recruited Flemish (51.4% women; mean age, 38.2 years), we studied the estimated glomerular filtration rate (eGFR) and microalbuminuria, as prototypes of microcirculatory traits, in relation to dp-ucMGP and t-ucMGP. In multivariable linear and logistic regressions, we expressed effect sizes for a doubling of the biomarkers, while accounted for anthropometric characteristics, lifestyle, risk factors and use of medications.

Results: Among all participants, geometric means of dp-ucMGP and t-ucMGP were 3.68 mg/L and 45.2 mg/L, respectively. In relation to dp-ucMGP (figure), eGFR decreased by 1.57 mL/min/1.73 m² ($p=0.015$), while the risk of renal dysfunction (eGFR <60 mL/min/1.73 m²) increased by 19% ($p=0.022$) with a 43% trend in the same direction ($p=0.069$) for microalbuminuria (albumin-to-creatinine ratio ≥ 3.5 mg/mmol in women and ≥ 2.5 mg/mmol in men). In relation to t-ucMGP (figure), eGFR increased by 1.89 mL/min/1.73 m² ($p=0.041$) with no changes in the risks of renal dysfunction or microalbuminuria ($p\geq 0.12$).

Conclusion: In the general population, eGFR is inversely correlated with dp-ucMGP, a marker of vitamin K deficiency, whereas the opposite is the case for t-ucMGP, a marker of prevalent arterial calcification.

P4.5

VASCULAR HEALTH ASSESSMENT OF THE HYPERTENSIVE PATIENTS (VASOTENS) REGISTRY: RATIONALE, DESIGN AND METHODS OF AN INTERNATIONAL REGISTRY FOR AMBULATORY BLOOD PRESSURE AND ARTERIAL STIFFNESS TELEMONITORING

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Background: Ambulatory (A) blood pressure (BP), central BP and pulse wave velocity (PWV) are parameters recommended by hypertension guidelines for estimating BP control and vascular impairment. Recent advances in technology made available devices allowing combined non-invasive estimation of these parameters over the 24-h during ABPM. However, at present, there is limited evidence on the usefulness of such an approach for routine hypertension management.

Objective: We recently launched an investigator-initiated, international, multicenter, observational, prospective study aiming at: i) evaluating non-invasive 24-h ABP and arterial stiffness estimates (through 24-h pulse wave analysis, PWA) in hypertensive subjects; ii) assessing the changes in estimates following treatment; iii) weighing the impact of 24-h PWA on target organ damage and cardiovascular prognosis; iv) assessing the relationship between arterial stiffness, BP absolute level and variability, and prognosis.

Methods: Approximately 2000 subjects, referred to 20 hypertension clinics for routine diagnostic evaluation and follow-up of hypertension, will be recruited. Data collection will include ABPM, performed with a device allowing simultaneous non-invasive assessment of BP and arterial stiffness (BPLab), and clinical data (including cardiovascular outcomes). A web-based telemedicine platform will be used for data collection. Subjects will visit the centers at 6-12 month intervals. First follow-up results are expected to be available in the next 2-years.

Conclusions: The results of the VASOTENS Registry will help defining the normalcy thresholds for current and future indices derived from 24-h PWA, according to outcome data. They will also provide supporting evidence for the inclusion of such evaluation in recommendations on hypertension management.

P4.6

GREATER CAROTID CIRCUMFERENTIAL WALL STRESS IS ASSOCIATED WITH INCIDENT CARDIOVASCULAR DISEASE IN INDIVIDUALS WITH TYPE 2 DIABETES – THE HOORN STUDY

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Introduction: Arterial remodeling is an adaptive phenomenon aimed at maintaining circumferential wall stress (CWS) within operating limits. It is characterized by widening of the inter-adventitial diameter (IAD) and increases in intima-media thickness (IMT). This process is maladaptive when CWS increases despite remodeling. Type 2 Diabetes (T2D) is associated with increased carotid CWS, but its association with cardiovascular disease (CVD) is unknown.

Methods: The cohort consisted of 277 individuals with normal glucose metabolism (NGM), 162 with impaired glucose metabolism (IGM) and 131 with T2D (age 69.6 ± 6.4 , 51.0% women, systolic pressure 141.9 ± 20.6 mmHg, bmi 26.9 ± 3.5 kg/m², prior CVD 50.1%). Carotid arterial properties (IAD, IMT, lumen diameter (LD)) were quantified by ultrasonography. CWS was calculated as PP-LD/(2IMT), where PP is the brachial pulse pressure. A morbidity and mortality register was kept on all individuals.