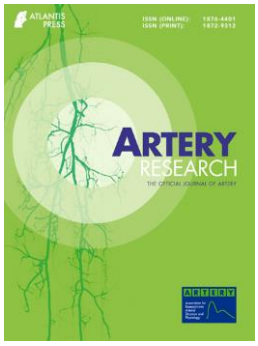

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P8.08: HEMODYNAMICS AND LARGE ARTERY STIFFNESS IN YOUNG PREHYPERTENSIVE MEDICAL STUDENTS

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Objective: Which are aortic pulse wave velocity determinants in a diabetic population?
Methods: We studied 132 diabetic patients. They entered the day hospital to have a cardiovascular checkup. We measured brachial and central blood pressure, augmentation index, and pulse wave velocity (PWV). They also had extended biochemical tests.
Results: Among those 132 patients, 8% had type 1 diabetes and 92% had type 2 diabetes. Mean period of diabetes was 13 years. Treatments combined insulin (47%), biguanids (54%), acarbose (10%), sulfamids (31%), thiazolidinediones (11%), with 25 patients (19%) having both insulin and oral drugs. We compared patients with and without insulin, measured their PWV, and adjusted it to standard factors (age, gender, MAP, sex), but also to 3 time-related diabetes criteria (short term : plasma glucose; middle term : HbA1c; long term : insulin treatment).
Antihypertensive drugs such as ACEI also contribute to the model (-1.02; $p = 0.0398$).
Conclusion: Insulin treatment is the most powerful diabetes-related parameter accepted in this PWV model.
Oral hypoglycemiant drugs, HbA1C, plasma glucose do not contribute to the PWV model.
RAAS blockade drugs contribute to the PWV model.
Diabetes control quality over the time when coming to the point of having insulin as a treatment is an independent factor of arterial wall rigidification.

P8.06
REFERENCE VALUES FOR ARTERIAL STIFFNESS MEASURED WITH ARTERIOGRAPH

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Elevated aortic pulse wave velocity (aoPWV) is an independent predictor of cardiovascular morbidity and mortality. There are, however, no widely accepted normal or reference values for aoPWV. The aim of this work was to define these values.
Patients and methods: AoPWV was assessed in several patient populations using oscillometric device (TensioMed Arteriograph) by a numerous investigators and data were collected into a large database of 17173 subjects aged 2-92 years. AoPWV was studied in a group of 11024 normotensive individuals without antihypertensive medication which was divided into age decades in order to determine the age-specific reference values for aoPWV.
Results: Mean age was $39{,}5 \pm 20{,}12$ and $43{,}6 \pm 17{,}82$ ys in males and females, respectively ($p < 0{,}001$). Mean aoPWV differed significantly between genders ($7{,}9 \pm 2{,}3$ vs $8{,}9 \pm 2{,}7$; $p < 0{,}001$). Median aoPWV values in the age subgroups by decades were determined (5.44, 6.08, 6.69, 7.29, 8.38, 9.81, 10.15, 10.41, 11.02 m/s from the age under 10 to 80-90, respectively). The 75th and 95th percentiles of the samples were used to determine the upper limit of aoPWV reference values.
Conclusions: The value above 12 m/s suggested as a threshold for elevated aoPWV by ESH'07 can be questioned as PWV depends on the method used to calculate the travel distance. Our results derived from a huge healthy general population including wide range of age suggest that aoPWV values are highly dependent on age and gender. Therefore, these results might serve as age and gender specific reference values for aoPWV.

P8.07
AN OLD DOG WITH NEW TRICKS: URIC ACID LEVELS ARE ASSOCIATED WITH AORTIC STIFFNESS AND WAVE REFLECTIONS IN NEWLY DIAGNOSED, NEVER-TREATED HYPERTENSION

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Background: Serum uric acid (UA) plays a key role in the development and progression of hypertension. We investigated the association of UA levels and indices of arterial function in a cohort of newly diagnosed, never treated hypertensive subjects.
Methods: 1225 patients with a new diagnosis of mild to moderate arterial hypertension for which they had never received treatment were enrolled in the study (mean age 53 years, 728 men). Serum UA, carotid-femoral pulse wave velocity (cfPWV), an index of elastic-type, aortic stiffness and augmentation index (AIx), a composite marker of wave reflections and arterial stiffness were measured.
Results: In univariable analysis, UA levels correlated with cfPWV ($r = 0.199$, $P < 0.001$) and AIx ($r = -0.263$, $P < 0.001$). In stepwise multivariable linear regression analysis, an independent positive association of cfPWV with UA levels was observed after adjusting for confounders (standardized regression coefficient $\beta = 0.135$, $P < 0.001$, adjusted $R^2 = 0.405$), indicating an increase in aortic stiffness with higher values of UA. In contrast, an independent negative association of AIx with UA levels was observed after adjusting for confounders (standardized regression coefficient $\beta = -0.059$, $P = 0.022$, adjusted $R^2 = 0.507$), indicating a decrease in wave reflections with higher values of UA.
Conclusion: Serum UA levels are independently associated with aortic stiffening and wave reflections in never treated hypertensives. This finding extends the theoretical underpinnings regarding the cardiovascular functions of UA, as it advocates a putative role in the development of hypertension via mechanisms regulating arterial function.

P8.08
HEMODYNAMICS AND LARGE ARTERY STIFFNESS IN YOUNG PREHYPERTENSIVE MEDICAL STUDENTS

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Background: Prehypertensive subjects have a markedly increased risk of developing hypertension compared to normotensive subjects. Prehypertension is therefore an excellent model to study hemodynamics and arterial stiffness in the development of hypertension.
Methods: We assessed hemodynamics and arterial stiffness in normotensive (NT, blood pressure <120/80 mmHg) and prehypertensive (PHT, blood pressure (120-139/80-89 mmHg) medical students. Blood pressure (BP) was measured with a validated oscillometric device on two separate visits. On a third visit cardiac output, cardiac index (cardiac output corrected for body surface area), stroke volume and heart rate were measured using the Nexfin monitor for continuous non-invasive finger BP monitoring. Carotid-femoral pulse wave velocity (cfPWV) was measured using the Sphygmocor system.
Results: We studied 15 prehypertensive subjects (BP $127 \pm 8/69 \pm 6$ mmHg, 13 males, age 21.5 ± 2 years) and 25 normotensive subjects (BP $112 \pm 7/64 \pm 6$ mmHg, 8 males, age $21.1 \pm$years). Nexfin data were available for 31 subjects (22 NT and 9 PHT). Cardiac output and cardiac index were 7.0 ± 1.2 and 3.6 ± 0.7 L/min respectively in prehypertensive compared to 5.7 ± 0.9 and 3.1 ± 0.4 L/min in normotensive subjects ($p = 0.002$, $p = 0.02$). Stroke volume was 111 vs 101 ml ($p = 0.13$) and heart rate was 65 vs. 57 bpm ($p = 0.06$). cfPWV was higher in the prehypertensive group (5.5 ± 0.5 vs. 5.2 ± 0.5 m/s $p < 0.03$). Linear regression analysis showed that age ($R^2 = 0.13$, $\beta = 0.39$, $p = 0.02$) and SBP ($R^2 = 0.28$, $\beta = 0.53$, $p = 0.001$) are independent determinants of cfPWV.
Conclusion: Young prehypertensive medical students have higher cardiac output and cardiac index than normotensive students. The increased cfPWV in the prehypertensive subjects is partially determined by higher blood pressures.

P8.09
C-REACTIVE PROTEIN IS ASSOCIATED WITH ENDOTHELIUM-DEPENDENT ALTERATIONS OF MICROCIRCULATION IN PATIENTS WITH METABOLIC SYNDROME

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Objective: Inflammation and early arterial damage are the possible mechanisms responsible for increased cardiovascular risk (CVR) in patients with metabolic syndrome (MetS). The aim of this study was to investigate the relationship between C-reactive protein (CRP) and arterial parameters of macro- and microcirculation in MetS patients.
Methods: Subjects with MetS but without overt cardiovascular disease ($n = 100$; age 52.9 ± 6.4; 40% male) underwent detailed assessment of CVR factors. Measurements of local, regional and systemic arterial stiffness (AS) and endothelial function (EF) in brachial artery, finger and skin were performed.