P.060: AGE-RELATED ARTERIAL STIFFNESS IN PATIENTS WITH WHITE COAT OR ESSENTIAL HYPERTENSION


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The configuration of intracoronary pressure waveforms is significantly affected by the status of coronary microcirculation. Therefore, their analysis may facilitate assessment of microvascular disease.

P.058
LEFT VENTRICULAR FUNCTION IN RELATION TO ARTERIAL STIFFNESS IN HYPERTENSION. THE PROGNOSTIC IMPORTANCE OF PULSE PRESSURE IN LV REMODELLING - PRELIMINARY REPORT
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Background. Increased arterial stiffness has been reported to affect LV diastolic function in hypertension. Pulse pressure (PP) is independently related to cardiovascular and all-cause mortality. Strain and strain rate deformation parameters can detect subtle changes of the left ventricular (LV) function.

Aim. To investigate the role of arterial stiffness in Systolic LV function and the effect of Pulse pressure in hypertension.

Methods. We studied 55 consecutive hypertensive patients and 25 controls, matched for age (49.7±5.7 yrs. vs. 45.1±4.1 yrs), with normal EF (66±2.5 vs. 64±3.3%, NS). All subjects had 2D and colour doppler myocardial imaging of basal and mid LV segments (12) in the longitudinal axis. Mean longitudinal strain (S) and strain rate (SR) were averaged from each of the 12 segments assessed. Pulse wave velocity (PWV) carotid-femoral was used for estimation of arterial compliance in 20 of the hypertensive patients.

Results. The hypertensive group had higher pulse pressure (59.5±16.6 vs. 41.4±7.2mmHg, P<0.001), and lower mean longitudinal S and SR (S: 16.6±2.2 vs. 20.5±2.0% P<0.05 and SR: 1.34±0.16 vs. 1.54±0.13/s P<0.05) compared to control. The patients with hypertrophy or diastolic dysfunction (DD) had higher PP than those without hypertrophy (65±15 vs. 46±11mmHg, P<0.001) or DD (63±16 vs. 44±12mmHg, P<0.001).

Pulse pressure was correlated with LVM (r = 0.51, P<0.001), WT (r = 0.61, P<0.001), RWT (r = 0.52, P<0.001), mean SR (r = 0.58, P<0.001), mean S (r = 0.51, P<0.001), DTR (r = 0.36, P<0.05), A (r = 0.45, P<0.05) and E/A (r = 0.54, P<0.01). PWV was correlated with mean S and SR (r = 0.58, P<0.05 and r = 0.49, P<0.05) and PP (r = 0.47, P<0.05).

Conclusion. Pulse pressure is related with functional (S, SR) and structural (WT, LVM, RWT) components of the left ventricle and the arterial stiffness. Arterial stiffness seems to affect not only the diastolic, but also the longitudinal systolic function of the left ventricle.

P.059
SEGMENTAL LEFT VENTRICULAR FUNCTION ESTIMATED BY STRAIN ECHOCARDIOGRAPHY IN RELATION TO ARTERIAL STIFFNESS IN HYPERTENSIVES. MRI FINDINGS IN RESPECT TO MYOCARDIAL FIBROSIS - PRELIMINARY REPORT
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Background: Left Ventricular (LV) diastolic function has been reported to be related with the presence of increased arterial stiffness in hypertension. Myocardial fibrosis is one of the main causes of diastolic dysfunction (DD).

Aim: To investigate the role of arterial stiffness in segmental LV systolic function and the presence of fibrosis with Delayed Enhancement (DE) MRI in hypertension.

Methods: We studied 20 consecutive hypertensive patients with mean age 51.6±6.1 years and normal EF 66.3±4.1%, with no history of coronary artery disease. All subjects had MRI with (DE) and 2D and colour doppler myocardial imaging of basal and mid LV segments (12) in the longitudinal axis. Mean longitudinal strain (S), strain rate (SR) and pulse pressure (PP) were averaged from each of the 12 segments assessed. Pulse wave velocity (PWV) carotid-femoral was measured.

Diastolic dysfunction was diagnosed based on published criteria regarding DT, IVRT, E/A and TDEa.

Results: The mean duration of hypertension was 10.4±5.7 yrs. Diastolic dysfunction was evident in 16 out of the 20 patients. PWV was increased in patients with diastolic dysfunction (12.6±12.3 vs. 10.6±1.4 m/s) compared to those without DD. Septal basal and mid segment had the lowest systolic strain (basal: 15±2.7%, mid: 19.5±3.1%) and strain rate value (basal: 1.1±0.2/s, mid: 1.4±0.3/s) in comparison to the other segments. PWV was correlated with septal mid SR (r = 0.60, P<0.05) and septal basal and mid S (r = 0.67, P<0.05 and r = -0.69, P<0.05), PWV was also correlated with mean S and SR (r = 0.58, P<0.05 and r = -0.49, P<0.05) and PP (r = 0.47, P<0.05).MRI with DE detected 2 patients (10%) having replacement fibrosis, but did not detect interstitial or perivascular fibrosis.

Conclusion: Septal wall is the region mainly affected by the presence of hypertension in comparison to other segments. Arterial stiffness is related to global and regional systolic function. MRI can exclude replacement but not subtle interstitial or perivascular fibrosis in hypertensive patients.

P.060
AGE-RELATED ARTERIAL STIFFNESS IN PATIENTS WITH WHITE COAT OR ESSENTIAL HYPERTENSION
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Background: It is well documented that arterial stiffness is age-related. The purpose of the present study was to evaluate to what extent age affects
arterial stiffness in patients with essential or white coat hypertension (WCH) and the previous antihypertensive medication.

**Methods:** We studied 850 patients, untreated or after a 15 days wash-out period, in our outpatient clinic. All patients underwent 24h ambulatory blood pressure monitoring (ABPM) and full biochemical assay. Large-artery stiffness and arterial wave reflections were evaluated by measuring carotid-femoral pulse wave velocity (PWVc-f) and augmentation index (AIx) respectively.

**Results:** Patients were classified in four groups, according to the ABPM results: 294 never treated patients with essential hypertension (group 1), 322 patients with essential hypertension after the wash-out period (group 2), 112 never-treated patients with WCH (group 3) and 322 patients with WCH after the wash-out period (group 4). Univariate analysis showed a significant correlation of age with PWVc-f in groups 1, 2 and 3 (r = 0.43, 0.46 and 0.38 respectively, p < 0.001) and with diastolic blood pressure in group 2 (r = 0.37, p < 0.0001).

**Conclusion:** Age affects arterial stiffness differentiating in PWVc-f or AIx. In patients with essential hypertension as well as in patients with WCH, the age effect is of similar magnitude whereas the effect of previous medication use is minimal.

**P.061 RELATIONSHIP BETWEEN FIBRINOGEN AND ARTERIAL STIFFNESS IN PATIENTS WITH ESSENTIAL HYPERTENSION**

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**Introduction:** Increased levels of prothrombotic markers such as fibrinogen and plasminogen activator-inhibitor-1 have been related to target organ damage and cardiovascular outcomes in hypertensive population. Arterial stiffness is an important determinant of cardiovascular performance and a predictor of the corresponding risk. The association of fibrinogen and PAI-1 with arterial stiffness in hypertensive patients has not been defined.

**Methods:** 296 consecutive hypertensive patients with a wide range of lipids, glycemia, body mass index and smoking were measured as indices of elastic-type, large-artery (aortic) stiffness and wave reflections, respectively. Serum PAI-1 and plasma fibrinogen were measured in all participants.

**Results:** Across the tertiles of fibrinogen, we found a significant increase in PWVc-f (7.76 ± 7.52 vs 8.17 m/s at tertiles 1 to 3, p = 0.001) but not in PWVc-r as well (8.73 vs 8.70 vs 8.68 m/s, p = NS). Across the tertiles of logPAI-1 was also a gradual increase in PWVc-f (7.43 ± 7.73 vs 7.93 ± 7.00, p = 0.02) but no significant difference was observed in PWVc-r levels (8.57 ± 8.82 vs 8.74 m/s, p = NS). In multivariate analysis, the association of fibrinogen with PWVc-f remained significant (β = 0.11, p < 0.05) after adjustment for age, gender, systolic blood pressure, smoking, body mass index, HbA1c and serum cholesterol. However, the associations of PAI-1 with PWVc-f disappeared once the above confounding factors were taken into account.

**Conclusion:** The present study shows that in hypertensive subjects increased aortic stiffness is related to increased plasma levels of fibrinogen. This finding may have important implications for hypertensive patients.

**P.062 WHITE BLOOD CELL COUNT PREDICTS WAVE REFLECTIONS IN PATIENTS WITH ESSENTIAL HYPERTENSION**

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**Background:** Arterial stiffness and wave reflections are independent markers and predictors for cardiovascular events in patients with hypertension. White blood cell (WBC) count has been associated with high incidence of cardiovascular events. The aim of the present study was to assess the relationship between WBC count and augmentation index (AIx), a composite measure of arterial stiffness and wave reflections, in patients with essential hypertension.

**Methods:** We studied 235 consecutive patients with uncomplicated, never treated essential hypertension (mean age 51 years, 63% males). WBC was evaluated with a validated system (Sphymocor) using application tonometry of the radial artery and pulse wave analysis. AIx was then adjusted for a steady heart rate of 75 beats/min (AIxcrf). WBC, high sensitivity C-reactive protein (hsCRP) and serum amyloid A (SAA) were measured in all subjects.

**Results:** In univariate analysis, AIxcrf was correlated with both log-hsCRP (r = 0.13, p = 0.04) and log-SAA (r = 0.19, p = 0.002). In stepwise regression analysis, AIxcrf was independently associated with log-hsCRP (β = 12.41, p = 0.02, 95% CI: 1.48-23.34) but not with log-hsCRP (P=NS) and log-SAA (P = 0.07).

**Conclusions:** WBC count, but not hsCRP, predicts wave reflections in patients with essential hypertension. Considering that WBC count is an inexpensive, readily available laboratory assay, it might be used as a first line inflammatory marker for arterial function and cardiovascular risk assessment.

**P.063 INSULIN LEVELS ARE ASSOCIATED WITH THE ANKLE-BRACHIAL INDEX IN HYPERTENSIVE PATIENTS WITH METABOLIC SYNDROME**

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**Introduction:** Metabolic syndrome (MS) is a composition of several cardiovascular risk factors with hyperinsulinemia being the main underlying pathophysiological abnormality. Ankle-Brachial Index (ABI) is a non invasive measure of peripheral artery disease and has been associated with cardiovascular risk. The purpose of this study was to evaluate the relationship between insulin levels and ABI in hypertensive patients with and without metabolic syndrome.

**Methods:** We studied 88 consecutive, non diabetic patients, mean aged 50 years, with newly diagnosed, uncomplicated essential hypertension. The patients were divided in two groups according to the presence of MS (38 patients with MS, 50 patients without MS), as defined by the criteria of the Adult Treatment Panel III. Fasting insulin levels and Hba1c were measured and HOMA index was calculated. ABI was assessed in all patients.

**Results:** The mean ABI values were higher in hypertensives with MS (1.20 ± 1.15 vs 0.77 ± 0.75, p = 0.04) as were insulin (12.4 ± 9.1 vs 13.8 ± 8.6, p = 0.005) and HOMA index was calculated. ABI was assessed in all patients.

**Conclusion:** Insulin independently predicts ABI in patients with hypertension and metabolic syndrome. This finding provides further information for the pathophysiology of the relationship between metabolic syndrome and the risk for peripheral artery disease.

**P.064 SERUM BILIRUBIN LEVELS ARE INVERSELY RELATED TO ARTERIAL STIFFNESS IN PATIENTS WITH ARTERIAL HYPERTENSION**

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**Introduction:** Bilirubin has antioxidant effects and may protect against atherosclerosis. Arterial stiffness in an independent cardiovascular risk factor for patients with hypertension. The purpose of this study was to investigate the association between bilirubin levels and arterial stiffness in hypertensive subjects.

**Methods:** We studied 293 consecutive patients with uncomplicated, never treated essential hypertension. Bilirubin concentrations were measured in all subjects who were then divided according to tertiles of bilirubin levels (113 patients with bilirubin concentrations <0.7 mg/dl, 82 patients with bilirubin concentrations between 0.7 and 1.02 mg/dl and 98 patients with bilirubin concentrations >1.02 mg/dl). Arterial stiffness was evaluated by the measurement of carotid-femoral Pulse Wave Velocity (PWVc-f) and Augmentation Index (AIx).

**Results:** Using the ANOVA statistical analysis, AIx was significantly reduced with increasing bilirubin level tertiles (28.48 ± 11.45, 27.26 ± 12.11 and 23.98 ± 13.60% respectively, P = 0.02). There was also a gradual reduction of PWV-c-f from the lower to the higher tertiles (8.02 ± 1.66, 7.83 ± 1.36, and 7.55 ± 1.77 m/s respectively, P = 0.06). Having AIx as a dependent variable, after adjustment for potential confounders, no independent association between bilirubin levels and AIx was observed.

**Conclusion:** Hyperinsulinemic patients with elevated bilirubin concentrations revealed increased values of arterial stiffness. Although an independent association was not observed, because bilirubin might act favorably through other determinants of arterial stiffness, the present finding reinforces the notion of a protective effect of bilirubin.