P8.05: DIABETES CONTROL QUALITY IS AN INDEPENDENT FACTOR OF ARTERIAL WALL RIGIDIFICATION

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P8.02
IMPACT OF TRIGLYCERIDES AND INSULIN LEVELS ON WHOLE AND SURFACE CAROTID PLAQUE COMPOSITION IN PATIENTS WITH METABOLIC SYNDROME
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Introduction: Metabolic syndrome (MetS) is a cluster of metabolic abnormalities strongly associated with atherosclerosis and increased risk of CV events. Atherosclerotic plaques (AP) and its echolucency (ECL) can be detected using ultrasound (US) and evaluated by grey scale median analysis (GSM). ECL is associated with a higher plaque lipid content and vulnerability to rupture.
Aim: To assess the association between carotid plaques ECL and plasma markers of vascular inflammation, and disarray of lipid and glucose metabolism in patients (p.) with MetS.
Methods: After evaluating plasma lipids, glucose and insulin levels, blood pressure, and waist circumference in 700 p., 390 (56%) presented MetS (ATP III). Carotid US evaluation revealed AP in 185 (47%) of them (age 54.2 ± 11.1, 33.3% females). AP were evaluated by GSM analysis, and divided in tertiles of ECL of the whole AP (whole plaque GSM, WSGM) and for the luminal first millimeter of the plaque (surface GSM, SGSM). The relation between tertiles of WSGM and SGSM and plasma lipids, glucose, insulin, CRP, and HOMA, and HOME were evaluated by multivariate regression analysis.
Results: Plasma triglycerides, insulin and HOME were negatively related with WSGM and SGSM tertiles meaning a higher plaque lipid content and vulnerability. In multivariate analysis, triglycerides were significantly associated to low WSGM (p < 0.003) and SGSM (p < 0.018), whereas insulin only to low SGSM (p < 0.012).
Conclusion: The elevation in plasmatic triglycerides and insulin levels in patients with MetS are directly related with carotid plaques ECL, lipid content and vulnerability.

P8.03
INCREASED ARTERIAL STIFFNESS IN WOMEN WITH RHEUMATOID ARTHRITIS AND SYSTEMIC LUPUS ERYTHEMATOSUS IS NOT ASSOCIATED WITH LEVEL OF C-REACTIVE PROTEIN
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Introduction: The elevated level of C reactive protein (CRP) is associated with increased arterial stiffness in general population. However, it is uncertain whether CRP is related to arterial stiffness in rheumatoid arthritis (RA) and systemic lupus erythematosus (SLE).
Methods: We studied 63 RA women (aged 41.48 ± 10.77 years) with disease activity (DAS28) 5.43 ± 0.93, 31 SLE (aged 37.23 ± 9.09 years), disease activity index (SLEDAI) 18.40 ± 8.17, organ damage index (SLICC) 1.0 (IQR 2.0) and 72 controls (aged 37.42 ± 9.15). Blood tests included serum lipid profile, glucose and high-sensitivity CRP (hsCRP) measurement. The augmentation index (Alx), the measure of systemic arterial stiffness, was assessed by applanation tonometry (Sphygmocor v.7.01, AtCor Medical).
Results: In RA patients CRP (mg/l) was significantly higher as compared to SLE and controls (31.89 ± 40.44 vs. 5.80 ± 5.56 vs. 1.64 ± 3.18; p < 0.001), but it was not related to Alx. Alx was 24.71 ± 11.52% in RA vs. 20.81 ± 12.29% in SLE and 13.24 ± 10.44% in controls; p < 0.001. Significant influence of mean blood pressure (MBP) on arterial stiffness (Alx) was observed in RA patients (r(2a) = -0.365; p < 0.001). In SLE patients MBP, SLICC and age were significant predictors of Alx (r(2a) = -0.508; p < 0.001).
Conclusion: Elevated CRP is present in RA and SLE, but it is not related to increased systemic arterial stiffness. Significant influence of MBP on arterial stiffness (Alx) was observed in RA patients. In SLE patients MBP, SLICC and age were related to increased Alx.

P8.04
ARTERIAL FUNCTION AND INSULIN SENSITIVITY: THEIR INTERPLAY IN EUGLYCAEMIC, NEVER-TREATED HYPERTENSIVES
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Background: Insulin resistance is a feature of essential hypertension. The interrelationships of indices of insulin resistance and arterial function in euglycaemic, never-treated hypertensives has not been addressed. To this end, we investigated the correlations of two insulin resistance indices (HOMA: homeostasis model assessment index; QUICKI: quantitative insulin sensitivity check index) and two arterial function indices (cfPWV: carotid-femoral pulse wave velocity; Alx: augmentation index) in a cohort of non-diabetic, never-treated hypertensives.
Methods: 998 patients with a new diagnosis of essential hypertension for which they had never received treatment were enrolled in the study (mean age 53 years, 600 men). HOMA and QUICKI were calculated from fasting glucose and insulin values. cfPWV and Alx were measured using validated devices.
Results: In univariable analysis, only cfPWV correlated with insulin resistance indices (r = -0.245, P < 0.01 for HOMA; r = -0.245, P = 0.01 for QUICKI). No statistically significant correlation was observed for Alx (r = 0.015, P = NS for HOMA; r = -0.015, P = NS for QUICKI). QUICKI is directly proportional to 1/logHOMA, thus explaining its negative correlation with cfPWV.
Conclusion: Aortic stiffness, as estimated by cfPWV correlates with insulin sensitivity in non-diabetic, newly diagnosed, never-treated hypertensives. A choice of an antihypertensive drug which improves arterial elasticity and insulin sensitivity could be of benefit in this setting.

P8.05
DIABETES CONTROL QUALITY IS AN INDEPENDENT FACTOR OF ARTERIAL WALL RIGIDIFICATION
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Introduction: Arterial tree alteration is the cornerstone of diabetes complications and its mechanical parameters are impaired.
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 their cardiovascular group measured brachial and central blood pressure, augmentation index, and pulse wave velocity (PWV). They also had extended biochemical tests.

Results: Among these 132 patients, 8% had type 1 diabetes and 92% had type 2 diabetes. Mean period of diabetes was 13 years. Treatments combined insulin (47%), biguanid (54%), acarbose (10%), sulfonyl (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; \(p < 0.001\)).

Conclusion: Insulin treatment is the most powerful diabetes-related parameter accepted in this PWV model.

Oral hypoglycemic 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 coming to the point of having insulin as a treatment is an independent factor of arterial wall rigidity.

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 ± 8/69 ± 6 mmHg, 13 males, age 21.5 ± 2 years) and 25 normotensive subjects (BP 112 ± 7/64 ± 6 mmHg, 8 males, age 21.1 ± 1 year). 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, \(p < 0.05\)). Stroke volume was 111 vs 101 ml (p = 0.13) and heart rate was 65 vs. 75 bpm (p = 0.06). cfPWV was higher in the prehypertensive group (5.5 ± 0.5 vs. 5.2 ± 0.5 m/s, p < 0.05). Linear regression showed that age (R² = 0.13, \(p = 0.39\), p = 0.02) and SBP (R² = 0.28, \(p = 0.53\), 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 ENDOTHELIAL-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.