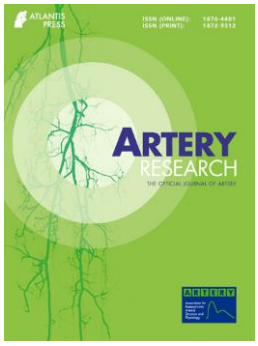

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P5.3: INFLUENCE OF DIABETES MELLITUS ON ARTERIAL STIFFNESS PARAMETERS, RESPECTIVELY ON CENTRAL SYSTOLIC BLOOD PRESSURE - A MATTER OF SEX?

A. Sitar-Taut, A. Cozma, M. Cebanu, D. Zdrenghea, D. Pop

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Changes in the arterial amounts of small proteoglycans, known to be involved in collagen fibrillogenesis, are associated with arterial stiffness. In addition, several proteins related to function of the human arterial smooth muscle are changed as well.

P5.2
QUANTITATIVE PROTEOMICS REVEAL INCREASED CONTENT OF BASEMENT MEMBRANE PROTEINS IN ARTERIES FROM PATIENTS WITH TYPE 2 DIABETES, BUT REDUCED AMOUNTS AMONG METFORMIN USERS

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We hypothesized that metformin intake influence the molecular composition of arterial tissue from patients with type 2 diabetes.
We analyzed non-atherosclerotic, internal mammary arteries, gathered at coronary by-pass operations from 30 patients with type 2 diabetes (16 treated with metformin, 14 without), as well as from 30 age- and gender-matched non-diabetic individuals. Quantitative proteome analysis was done by iTRAQ-labelling and LC-MS/MS analysis on individual trypsinized extracts of formalin fixed, paraffin embedded tissue. Sections were also analyzed by histology and immunohistochemistry.
We were able to quantitate 129 proteins. The amounts of the basement membrane (BM) component, alpha-1-type IV collagen were increased in patients with diabetes (0.96 +/- 0.05 (non-DM, n=30) vs 1.35 +/- 0.09 (T2DM, n=30), t-test: p= 0.00015, Benjamini-Hochberg correction: p=0.02), as was other BM-components, i.e. laminins and nidogen. The expression of type IV collagen, laminin and other altered proteins were significantly lower among metformin users, compared to patients not treated with metformin (alpha-1-type IV collagen: 1.63 +/- 0.1 (no metformin treatment, n=14)) vs 1.17 +/- 0.10 (metformin treated, n=16) (arb.units)), p=0.013). Patients treated with or without metformin had similar levels of HbA1c, cholesterol and blood pressure.
Accumulation of basement membrane proteins as part of the arteriopathy of type 2 diabetes link the diabetic macro- and micro-angiopathy and provides a molecular substrate for altered functions of the arteries in diabetes, as for example dysfunctional remodeling. Reduced amounts of basement membrane components in metformin treated individuals, despite similar glycemic control, are compatible with the hypothesis that metformin influence the vasculature.

P5.3
INFLUENCE OF DIABETES MELLITUS ON ARTERIAL STIFFNESS PARAMETERS, RESPECTIVELY ON CENTRAL SYSTOLIC BLOOD PRESSURE - A MATTER OF SEX?

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Diabetes represents an important cardiovascular risk factor, arterial stiffness being responsible, partially at least, for cardiovascular disease initiation. Objective to evaluate the arterial stiffness changes in diabetic patients, identifying differences between two sexes. Design and method The study included 285 patients, (67% women), with a mean age of 59.27±11.05 years. 69 (42 women) patients (24.2%) were diabetics. All patients underwent biochemical and arterial determinations. Arterial parameters (brachial augmentation index -Aixb-, aortic augmentation index -AixAo-, pulse wave velocity -PWVao-, central systolic blood pressure -SBPAo-, aortic pulse pressure-PPAo-) were determined using the TensioMed™Arteriograph.Results Significant differences were found between diabetic patients vs non diabetic patients regarding PPAo (125.6±44.1 mm Hg vs 97.93±55.3 mm Hg, p=0.017), SBPAo (140.01± 46.05 mm Hg vs 107.37±60.48 mm Hg, p=0.003), but no significant differences were registered regarding Aixb, AixAo, PWVao. In women, significant differences between diabetic vs non-diabetic patients were registered regarding SBPAo (142.1 ± 50.2 mm Hg vs 107.1 ± 61.8 mm Hg, p=0.034) and PWVAo (10.45±1.72 vs 10.07±2.57 m/s , p=0.043). Diabetic men presented significantly greater values for PPAo (121.17±35.67 mm Hg, p= 0.035), SBPao (136.27±38.62 mm Hg vs 107.83±57.74 mm Hg, p= 0.034), but not for aortic and brachial augumentation index, nor for PWVao. Conclusion Despite the fact that all parameters quantify aortic and brachial stiffness, the diabetes seems to affect differently men and women, further studies being necessary to elucidate all the involved mechanism. Paper published under the frame of European Social Found, Human Resources Development Operational Programme 2007-2013, project no. POSDRU/159/1.5/S/138776

P5.4
IDENTIFICATION OF FACTORS THAT INFLUENCE AORTIC AND BRACHIAL STIFFNESS

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Knowing the predictive value of arterial stiffness for cardiovascular events, it is mandatory to identify the factors responsible for the increase in arterial stiffness.
Objective: Identification of factors that influence arterial stiffness, i.e. brachial and aortic augmentation index (AixAo), pulse wave velocity (PWVao), respectively central systolic blood pressure (SBPAo).
Design and method: The study included 285 patients with a mean age of 59.27±11.05 years. All patients underwent anthropometric measurements, biochemical and arterial determinations. Arterial parameters were determined using the TensioMed™Arteriograph.
Results: 74% of patients were hypertensive, 24.2% diabetics, 40% obese, 16.8% smokers, 68.1% with dyslipidaemia, 70.9% with metabolic syndrome, 37.8% with cardiovascular diseases. A significant correlation ($p<0.05$) was found between brachial augmentation index and age (r=0.375), weight (r= - 0.427), abdominal circumference (r= - 0.286), systolic blood pressure (r=0.359), HDL-cholesterol (r=0.352). In addition aortic augmentation index correlated with diastolic blood pressure (r=0.173). Pulse wave velocity significantly correlated with age (r=0.266), systolic blood pressure (r=0.376), diastolic blood pressure (r=0.168), triglycerides (r=0.192). A relationship was found between SBPAo and age (r=0.155), systolic blood pressure (r=0.423), diastolic blood pressure (r=0.390), glycemia (r=0.155). All arterial stiffness parameters correlated with SBPAo (for AixAo r=0.405, for Aixb r=0.291, for PWVao r=0.214).
Conclusion: Despite the fact that all parameters quantify aortic and brachial stiffness, they seems to be different influence by anthropometric and biochemical parameters.
This paper was published under the frame of European Social Found, Human Resources Development Operational Programme 2007-2013, project no. POSDRU/159/1.5/S/138776

P5.5
IN VIVO ASSESSMENT OF REGULATORY MECHANISM OF THE SYSTEMIC ARTERIAL AND VENOUS SYSTEM FOR THE PREVENTION OF ORTHOSTATIC INTOLERANCE

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To reduce the risk of post-flight orthostatic intolerance for astronauts, a better understanding of the response of the cardiovascular system to changes in hydrostatic pressure is essential. The objective of this study is to assess the regulatory mechanisms of the arterial and venous system in response to acute changes in hydrostatic pressure.
The experimental protocol applied to twelve volunteers consisted of: 3x3min 70-degree head-up tilt (HUT) and 3x3min 45-mmHg Lower Body Negative Pressure (LBNP). Blood Pressure, 4-segment electrical impedance (thorax, splanchnic, upper leg, and lower leg-Z_{leg}) and Femoral artery blood flow (FABF) was assessed.
FABF responses were characterized by a half-time decay constant, τ, of 6.10±0.34s and a volume increase of 27.2±3.4mL. Z_{leg} after tilting and LBNP onset decreases faster with HUT (τ=6.9±0.7s LBNP and 2.7±0.7s HUT, $p<.0001$), whereas upon tilting-back and removal of LBNP no differences were obtained (τ=3.3±0.7s LBNP and 2.1±0.7s HUT).
We can assume that the extra FABF volume and dynamics is mainly related to a vasoconstriction sympathetic reaction independent of the stress conditions. The faster decrease in Z_{leg} for HUT indicates a faster fluid shift in the lower leg than with LBNP, whereas the similar time course upon tilt-back and removal of LBNP may mainly be related to the compliance of the tissues in the lower limb, and thus independent of the stress conditions. With this study, we have shown that LBNP onset induces a delayed blood fluid shift compared to HUT whereas fluid emptying on removal coincided with lower limb tissue properties.