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P3: THE EXTENT OF ENDOTHELIAL DYSFUNCTION IN THE FEMORAL ARTERY IS SIMILAR IN THE JUVENILE MALE AND FEMALE SPONTANEOUSLY HYPERTENSIVE RATS

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ARTERY 17 Poster Presentation abstracts

Poster Session 1 – Basic

P2

LOCAL ABDOMINAL VERSUS THORACIC AORTA STIFFENING IN HYPERTENSIVE RATS UNDER EITHER NO RESTRICTION OR SALTED DIET

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Background: Hypertensive humans exhibit reduced nitric oxide bioavailability and increased salt sensitivity, both of which are related to central artery stiffening. We studied the effect of 5 week NO restriction via L-NAME treatment in spontaneously hypertensive rats (SHR) and 5% salted diet in salt-sensitive SHR (SHRSP), on the thoracic (TA) and abdominal (AA) aorta.

Methods: Ultrasonic recording of the pulsatile aortic diameter together with blood pressure allowed the measurement of diameter distension and β -stiffness index. SHRLN and SHRSP salt were compared to their respective control normotensive rats WKY and two measurements were performed in each rat for TA and AA: at operating basal pressure and at reduced WKY matched pressure, $n = 6-8$. Aortic structure was then characterized by immunohistochemical analysis.

Results: At basal blood pressure, stiffness was greatly increased (range 263–330%) and distension decreased at both TA and AA in both models. At WKY-matched blood pressure and pulse pressure, AA parameters remained significantly altered whereas TA recovered to values not significantly different from WKY values.

Immunohistochemistry evaluation showed similar increases of markers of fibrosis and remodeling for AA and TA in the two models (fibronectin and its integrin $\alpha 5$ - $\beta 1$ receptor, Focal Adhesion Kinase).

Conclusions: This study confirms the potency of ultrasonic derived stiffness measurements and that aortic remodeling is non-uniform along the aortic trunk. The thoracic aorta, which has an important role in dampening cardiac output appears less sensitive to salt loading and NO reduction induced stiffening. Surprisingly, fibrosis does not appear to account for these dynamic differences.

P3

THE EXTENT OF ENDOTHELIAL DYSFUNCTION IN THE FEMORAL ARTERY IS SIMILAR IN THE JUVENILE MALE AND FEMALE SPONTANEOUSLY HYPERTENSIVE RATS

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Objectives: Endothelial dysfunction (ED) plays an important role in the pathogenesis of hypertension. In this work, we studied sex differences in the endothelium-dependent relaxation (EDR) of the femoral artery (FA) and its nitric oxide (NO)-dependent and NO-independent components in peri-pubertal (7-week-old) spontaneously hypertensive male and female rats (SHR). Age-matched Wistar-Kyoto (WKY) rats served as the control groups.

Method: Systolic blood pressure (sBP) was measured non-invasively by tail-cuff. Vascular studies were conducted using the wire myograph at isometric conditions. EDR was determined using acetylcholine test. Biochemical parameters (lipid profile, uric acid) were determined in plasma.

Results: We found a significant increase in sBP of SHR vs. WKY, however, there were no sex-dependent differences in sBP. Significantly reduced EDR was found in both male and female SHR and the extent of ED was similar in males and females. ED in SHR of both sexes was associated with a reduced NO-independent component, while NO-dependent component was reduced only in females. Concentrations of high-density lipoproteins were significantly increased in females vs. males in both WKY and SHR. Uric acid concentration was decreased only in male SHR vs. male WKY.

Conclusion: In conclusion, we did not find differences in sBP and overall endothelial function between juvenile SHR males and females. ED in both young SHR males and females was NO-independent. In addition, results suggested the association between low serum uric acid concentrations and ED in male SHRs. Supported by the grants VEGA No. 2/0190/17, APVV-16-0263 and Slovak Society of Cardiology.

P4

SOCIAL STRESS-INDUCED BLOOD PRESSURE INCREASE IN BORDERLINE HYPERTENSIVE RATS IS ASSOCIATED WITH ENDOTHELIAL DYSFUNCTION IN THE RESISTANT ARTERIES

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Objectives: Several studies have observed that altered endothelial function is involved in the development of stress-induced hypertension. The aim of this study was to investigate the effects of chronic social stress (crowding) on endothelium-dependent relaxation (EDR) of the superior mesenteric artery (SMA) and of small resistant mesenteric arteries (MA) as well as on neurogenic contractions of SMA in adult borderline hypertensive rats (BHR). **Methods:** Twelve-week-old BHR (offspring of spontaneously hypertensive dams and Wistar-Kyoto sires) males were exposed to crowding (living space: 200 cm²/rat) for eight weeks. Control BHR were kept in the groups of four rats per cage (living space: 480 cm²/rat). Systolic blood pressure (sBP) was determined by the tail-cuff method.

Vascular function was investigated in the isolated arteries at isometric conditions. EDR was assessed using acetylcholine test.

Results: Crowding significantly increased sBP of BHR to the hypertensive values. Results showed that stress did not affect total acetylcholine-induced relaxation and its nitric oxide (NO)-dependent and NO-independent components in the SMA. In the resistant MA, stress reduced total acetylcholine-induced relaxation by reducing NO-independent component, without the alterations of its NO-dependent component.