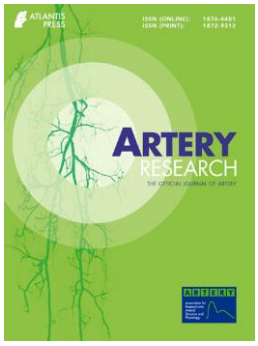

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P1.2: NANOMECHANICAL ALTERATIONS IN THE ADVENTITIAL LAYER OF THE INTERNAL MAMMARY ARTERY OF PATIENTS WITH HIGH PWV

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ARTERY 2015: Poster presentation abstracts

P1.1
PHYSICAL ACTIVITY IS ASSOCIATED WITH FLOW-MEDIATED DILATATION IN FEMALES

Ulrika Ferberg *, Katya Matusevich, Gabriella Eliason, Maria Fernstom, Anita Hurtig-Wennlof
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Impairment of vascular endothelial function is an early sign of atherosclerosis. An active lifestyle is suggested to be positively associated with favorable endothelial function as opposed to a sedentary lifestyle.
The aim of this ongoing study (*Lifestyle, Biomarkers and Atherosclerosis Study*) is to investigate associations between vascular endothelial function and physical activity level in 1000 non-smokers without know disease aged 18-25 years. Preliminary data from the 317 first subjects with complete data will be reported here.
Flow-mediated dilation was assessed in *a. brachialis* by high-resolution ultrasound (Vivid e9) before and after 5-minutes occlusion, and time spent active (at moderate or vigorous intensity level) or sedentary was assessed by accelerometry (ActiGraph wGT3X-BT).
Females
n=226
Males
n=91
Gender differences
(*P*-value)
Age
BMI
Body fat (%)
Time spent active (min/day)
Time spent sedentary (min/day)
Flow Mediated Dilatation measures
Diameter, pre-stas (mm)
Increase, post-stas (mm)
Increase, post-stas (%)
21,8
22,4
27,8
45
514
3,16
0,28
8,9
21,8
22,9
15,0
45
524
3,74
0,28
7,5
1,00
0,14
<0,001
0,99
0,32
<0,001
0,96
<0,001
Multiple regression analyses show that time spent active is statistically associated with diameter increase (mm) and percentage increase (adjusted for pre-stas diameter) in females (beta coefficient = 0,144; p=0,032 and beta-coefficient=0,135; p= 0,041, respectively) but not in males. Time spent sedentary did not show any associations with the flow-mediated dilatation variables in neither females nor males.
In conclusion, already in young adulthood, an active lifestyle is associated with higher flow-mediated dilatation as a measure of endothelial function.

P1.2
NANOMECHANICAL ALTERATIONS IN THE ADVENTITIAL LAYER OF THE INTERNAL MAMMARY ARTERY OF PATIENTS WITH HIGH PWV

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Aim: Arterial stiffening occurs as part of the natural ageing process, and is thought to be related to the accumulation of collagen and degradation of elastin. However, little is known about how regional variations in arterial structure and mechanical properties contribute to arterial stiffening. This study compared localised differences in the nano-structure and mechanical properties in the internal mammary arteries (IMA) from patients with high and low PWV.
Methods: 6 IMAs were collected from coronary bypass operations and the patients were grouped according to their carotid-femoral PWV; high (14.6 ± 1.4 m/s) and low (8.7 ± 0.5 m/s). The nano-topography and elastic modulus were determined by atomic force microscopy (AFM) using 5 μm cryosections. Data are presented as means ± SEMs.
Results: Overall, IMAs in the high PWV group were significantly stiffer than in the low PWV group (High; 2234.7 ± 72.3 MPa, Low; 2015.3 ± 58.4 MPa), ($p < 0.0001$). Although no significant difference was found in the intimal or medial layers, the adventitia was stiffer in the high PWV group (High; 2597.6 ± 135.7 MPa, Low;2215.6 ± 110.2 MPa), ($p < 0.001$). Furthermore, the collagen fibrils in the adventitia of the high PWV group were found to have a smaller diameter (High; 118.44 ± 1.1 nm, Low; 123.81 ± 1.3 nm), ($p < 0.01$)).
Conclusion: Overall, the nanomechanical data associates with PWV data. The high PWV group exhibited higher nanomechanical stiffness alongside morphological alterations within the adventitial layer.

P1.3
A NEW DYNAMIC ORGAN BATH SETUP TO ASSESS ISOBARIC STIFFNESS PARAMETERS OF PERIODICALLY STRETCHED ISOLATED MOUSE AORTIC SEGMENTS

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Cyclic stretch is a major contributor of vascular function. However, isolated mouse aortas are frequently studied at low stretch frequency or even