P41: INCREASED STIFFNESS IN THE DIGITAL ARTERIES OF ESSENTIAL HYPERTENSIVE WOMEN: THE FUCHSIA STUDY

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Results: Central pressures and Alx were different between normotensive and hypertensive men after the two AE bouts as shown in table 1.

Conclusion: Although both AE were able to reduce pulse wave reflection in hypertensive men, only the major volume has attenuated the increase in central aortic BP observed in the control session.

References

Methods: Brachial BP was measured using a Pulsecor device in 1,112 participants in the Southall and Brent Revisited study (68.8 ± 6.1 y; 78.2% male; 47.4% White-European; 38.3% South-Asian; 14.3% African-Caribbean). Form factors (FFosc and FFwave) were calculated as (MAP-diastolic BP)/(systolic BP-diastolic BP) by oscillometry (MAPosc) or from the BP waveform (MAPwave). However, blood pressure (BP) measurement errors will affect FF, its correlations with exposures, and introduce errors into MAP estimated from the BP waveform.

Results: FFosc and FFwave differed (0.28 (SD = 0.02) vs. 0.36 (SD = 0.04); p < 0.001) and were negligibly correlated (r = 0.07). Neither FFosc nor FFwave were associated with ethnicity, prevalent cardiovascular disease or current smoking status, and neither showed significant correlations with age, total- or HDL-cholesterol, or physical activity. Both FFosc and FFwave were lower in men (difference (Δ) = -0.005 (95% CI = -0.007, -0.002) vs. -0.015 (95% CI = -0.020, 0.009) respectively) and were negatively correlated with height (r = -0.14) but only FFwave correlated with body mass index (r = 0.02 vs r = 0.10) and heart rate (r = -0.06 vs r = 0.20). MAPosc-MAPwave Correlated with age (r = 0.10), height (r = 0.15) and heart rate (0.17) and was greater in women (0.95% CI = 0.5, 1.3 mmHg).

Conclusions: FFwave agrees poorly with FFosc probably due to measurement errors. This creates spurious associations between exposures and FF and causes systematic errors in estimated MAPwave. These errors have the potential to confound associations in epidemiological studies.

Rationale and Aim: Essential hypertension is characterized by extensive alterations of arterial geometry and mechanical properties: increased stiffness, dilation and wall of large arteries, increased thickness in muscular arteries, small artery remodeling. This study is aimed at exploring function and structure of the digital arteries of the hand, muscular arteries with an internal diameter of 500-1000 mm, easily accessible by ultrahigh frequency ultrasound.

Methods: 24 hypertensive women (HT) and 37 healthy controls (C) were recruited. 5’-videoclips of left palmar digital arteries were obtained by YevMoD (FUJIFILM, VisualSonics, Toronto, Canada), by means of a 70 MHz probe (axial-lateral resolution 30-65 μm). An automatic system (Cvsuite, Quipu srl, Pisa, Italy) was used to measure intima-media thickness (IMT) and diameter. Densitability and stiffness were then calculated using left brachial pulse pressure (PP - oscillometric).

Results: HT and C had similar age (57 ± 11 vs 53 ± 11 years, p = 0.02), BMI (24.9 ± 4.6 vs 24.5 ± 4.2 vs kg/m², p = 0.80) and mean blood pressure (BP, 95 ± 12 vs 91 ± 12 mmHg, p = 0.24); HT showed slightly higher PP (54 ± 14 vs 47 ± 10, p = 0.07). Palmar digital lumen tended to be higher in HT (804 ± 201 vs 696 ± 191 mm, p = 0.10), while IMT was similar (120 ± 23 vs 125 ± 36 mm, p = 0.81). Densitability was reduced (21.4 ± 18.2 vs 29.0 ± 18.8 kPa⁻¹, p < 0.05), while stiffness was increased (7.95 ± 2.22 vs 6.72 ± 2.11 m/s, p < 0.005).

Conclusions: This is the first report of the presence of altered mechanical properties (i.e. increased stiffness) in muscular arteries with lumen <1000 mm of essential hypertensive women. These findings suggest that increased hemodynamic load characterizing hypertension lead to a different vascular phenotype in each arterial segment.