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EXAGGERATED EXERCISE BLOOD PRESSURE RESPONSE IS ACCOMPANIED BY A STATE OF ARTERIAL STIFFENING, AUGMENTED ASYMMETRIC DIMETHYLARGININE AND OSTEOPROTEGERIN LEVELS IN ESSENTIAL HYPERTENSIVE SUBJECTS

ACC Poster Contributions

Ernest N. Morial Convention Center, Hall F

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Session Title: Physiology of Cardiopulmonary Testing

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Background: A hypertensive response to exercise (HRE) is associated with high cardiovascular risk, while elevated levels of asymmetric dimethylarginine (ADMA) and osteoprotegerin (OPG) are related to atherosclerosis progression. In this study we sought to determine the relationships of HRE with ADMA, OPG and arterial stiffness in essential hypertension.

Methods: 240 newly diagnosed never treated non-diabetics with stage I to II essential hypertension [155 men, mean age=51 years, office blood pressure (BP)=150/96 mmHg] with a negative treadmill exercise test (Bruce protocol) were divided into those with HRE (n=70) (peak exercise systolic BP \geq 210mmHg in men and \geq 190 mmHg in women) and those without HRE (n=170). In all subjects arterial stiffness was evaluated on the basis of carotid to femoral pulse wave velocity (PWV) values, by means of a computerized method (Complior SP).

Results: Patients with HRE compared to those without HRE had greater 24-h systolic BP (143 \pm 9 vs 131 \pm 8 mmHg, $p<0.05$), while did not differ regarding metabolic profile and left ventricular mass index ($p=NS$). Patients with HRE as compared to those without HRE exhibited greater levels of ADMA (0.63 \pm 0.04 vs 0.52 \pm 0.05 μ mol/l, $p<0.0001$), OPG (5.4 \pm 0.1 vs 4.1 \pm 0.5 pmol/l, $p<0.0001$) and PWV (8.9 \pm 1.7 vs 7.5 \pm 0.9 m/sec, $p<0.0001$), independently of confounders. In the total population, peak exercise systolic BP was related to 24-h systolic BP ($r=0.249$, $p<0.05$), PWV ($r=0.278$, $p=0.003$), ADMA ($r=0.260$, $p=0.007$) and OPG ($r=0.214$, $p<0.05$). Regarding OPG, it was associated with 24-h systolic BP ($r=0.285$, $p<0.0001$), ADMA ($r=0.284$, $p<0.05$) and PWV ($r=0.424$, $p<0.0001$). Multiple regression analysis showed that 24-h systolic BP ($b=0.216$, $p=0.003$), ADMA ($b=0.225$, $p=0.006$) and OPG ($b=0.188$, $p<0.05$) were independent predictors of peak exercise systolic BP.

Conclusion: In essential hypertension, a HRE is accompanied by a state of increased arterial stiffening, endothelial dysregulation and progressive atherosclerosis, as reflected by PWV, ADMA and OPG values. The interrelationships of ADMA and OPG with exercise BP response and stiffness, further support that diffuse vascular dysfunction contributes to HRE-related risk in hypertension.