Abstract: P5466

Exaggerated exercise blood pressure response is accompanied by increased sympathetic activity and arterial stiffness in subjects with high normal blood pressure

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Background/Introduction: The clinical importance of a hypertensive response to exercise (HRE) in subjects with high normal blood pressure (BP) is not fully elucidated, while sympathetic overactivity and arterial stiffening are linked with adverse cardiovascular prognosis.

Purpose: The aim of this study was to assess the relation of HRE with sympathetic drive as assessed by muscle sympathetic nerve activity (MSNA) and arterial stiffness in subjects with high normal BP.

Methods: 42 subjects with high normal office BP [defined as office systolic BP=130-139 mmHg and office diastolic BP=85-89 mmHg (age: 53±9 years, 29 males, office BP: 134/84 mmHg, 24-hour BP: 114/72 mmHg)] with a negative treadmill exercise test (Bruce protocol) were divided into those with HRE (n=12) (peak exercise systolic BP ≥210mmHg in men and ≥190 mmHg in women) and those without HRE (n=30). Arterial stiffness was evaluated on the basis of carotid to femoral pulse wave velocity (PWV) values. In all participants sympathetic drive was assessed by MSNA estimations based on established methodology (microneurography).

Results: Subjects with a HRE compared to those without exhibited higher waist circumference (108.2±5.3 vs 94.7±9.2 cm, p=0.001) and were characterized by greater levels of carotid to femoral PWV (8.5±0.8 vs 7.0±0.9 m/sec, p<0.001) and sympathetic nerve traffic as reflected by MSNA levels (41.1±1.5 vs 32.1±1.9 bursts per 100 heart beats, p<0.001), while did not differ regarding metabolic profile and left ventricular mass index (p=NS). In the total population, peak exercise systolic BP was related to 24-h systolic BP (r=0.229, p<0.05), PWV (r=0.218, p=0.002), and MSNA (r=0.214, p<0.05). Moreover, MSNA was related to waist circumference (r=0.33, p=0.004) and office systolic BP levels (r=0.31, p<0.05) but there was no association with PWV values (p=NS).

Conclusion: In subjects with high normal BP, a HRE identifies a state of arterial stiffening and sympathetic overdrive, as reflected by increased PWV and MSNA levels respectively. These findings suggest that exercise testing provides additional clinical information regarding the vascular status and modulation of sympathetic tone in this setting.