



TREADMILL EXERCISE TEST AND DEVELOPMENT OF HYPERTENSION

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ABSTRACT

Objective: Guidelines promote screening people with high normal BP for the presence of end-organ damage because their presence is associated with a 2- to 3-fold increase in the risk of CVD.

Design and Method: 100 consecutive subjects with high normal BP [systolic BP=130-139mmHg and/or diastolic BP=85-89mmHg] were examined for early signs of hypertension-mediated organ damage (HMOD). They underwent an echocardiographic study, a negative for ischemia treadmill exercise test (Bruce protocol) where the index $\frac{SBP}{MET-slope} = \frac{[(peakSBP - restingSBP)]}{(peakMET - 1)}$ was used. Arterial stiffness was evaluated based on carotid-femoral pulse wave velocity (PWV). The sympathetic drive was assessed by MSNA. Follow-up was scheduled every 6 months for 3 consecutive years, where BP measurements were assessed in the office and with ambulatory BP monitoring (ABPM). All participants offered lifestyle advice to lower their BP. The endpoint was the development of HTN either with Office BP or ABPM.

Results: Of 100 subjects (54±8 years, 42 males, baseline office BP: 132/82 mmHg, 24-hour BP: 122/76 mmHg) 40 developed HTN in 3 years. 34 subjects developed Hypertensive Response to Exercise (HRE) (BP >210mmHg in men and >190mmHg in women) and all of them developed HTN. The SBP/MET-slope in those who developed HTN demonstrate a sharper increase in all stages till peak exercise independently of sex type (stage1: 6.7vs4.9 p=0.049, stage2: 8.4vs4.8 p=0.001, peak: 6.7vs4.9, p=0.001). Their exercise capacity was reduced (10vs11.3METs, p=0.002) as

well as their maximal predicted exercise heart rate (156vs164, p=<0.0001).

Those with HRE had higher 24hour ABPM SBP (124vs121mmHg, p=0.009), Night SBP (117vs111mmHg, p<0.001), Day SBP (127vs124mmHg, p=0.012) Office PP (51vs47mmHg, p=0.01), while did not differ regarding their metabolic profile at the follow-up. Additionally, they had increased PWV (8.3vs7.5m/sec, p=<0.0001), MSNA levels (36vs28 bursts, p=<0.0001), LVMI (38vs34 gr/m^{2.7}, p=0.02), and statistically significant deterioration of renal function 2021 CKD-EPI eGFR (90 vs 97 mL/min/1.73 m², p=0.02).

Conclusion: Detecting exaggerated blood pressure response is associated with increased systemic vascular resistance and early subclinical HMOD which may upgrade an individual's cardiovascular disease (CVD) risk as they progress to HTN indicating a need for instituting a BP-lowering strategy.

BIOGRAPHY

Theodoros Kalos is a board-certified cardiologist and PHD candidate at the age of 37 years from Hippokration General Hospital of Athens, Greece. He is occupied in the outpatient clinic of cardiac imaging and heart failure unit of Hippokration General Hospital. His publication h-index is 9.

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