

Changes in Arterial Stiffness and Blood Pressure during Various Vascular Reactivity Tests

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ABSTRACT

Increased arterial stiffness is an independent prognosis marker of elevated cardiovascular risks. However, some investigators have questioned the utility of arterial stiffness above and beyond the traditional blood pressure (BP) measurement as the change in arterial stiffness is often accompanied by the corresponding change in BP. Although the associations between chronic levels of arterial stiffness and BP have been fairly well studied, it is not clear if and how much arterial stiffness is influenced by acute changes in BP. **PURPOSE:** We determined magnitudes of BP-dependence of arterial stiffness during acute BP perturbations. **METHODS:** Thirty apparently healthy subjects (46±4 years; 17 males & 13 females) were studied. A variety of BP perturbations, including head-up tilt, head-down tilt, mental stress, isometric handgrip exercise, and cold pressor test were used in order to encompass blood pressure changes induced by physical, mental, and/or physiological stimuli. Arterial stiffness was measured with carotid-femoral pulse wave velocity (PWV). **RESULTS:** PWV was significantly associated with mean BP at rest ($r=0.42$). Mean BP was significantly changed during each of the BP perturbations, and changes in mean BP ranged from $\Delta 5\pm 4$ to $\Delta 22\pm 4$ mmHg. Changes in mean BP and PWV were significantly correlated during mental stress ($r=0.44$), handgrip exercise ($r=0.55$), and cold pressor test ($r=0.39$). But no such significant associations were found during head-up tilt and head-down tilt. **CONCLUSION:** This study demonstrated that changes in arterial stiffness as assessed by PWV were significantly associated with acute blood pressure changes during some blood pressure perturbations. But the blood pressure-dependence of arterial stiffness was not observed in all the perturbations.

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