



P110 Impact of Cardiac Pre-load on Arterial Stiffness in Patient with Essential Hypertension

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ABSTRACT

Background: Effects of afterload and blood pressure (BP) on pulse wave velocity (PWV) have been investigated using vasoactive drugs but effects of cardiac pre-load have not previously been studied.

Methods: Transient mechanical reduction of cardiac pre-load (lower limb venous occlusion, LVO) and expansion of cardiac pre-load (intravenous infusion of 2 litres of saline solution, SST) were performed in patients with hypertension. BP, carotid-femoral PWV (Sphygmocor, AtCor Medical, Australia), cardiac stroke volume (SV) and total peripheral resistance (TPR) derived by transthoracic echocardiography were recorded during LVO and SST. Peak flow velocity in superior vena cava (SVCx) was used to assess change in pre-load.

Results: 35 subjects were studied. SVCx decreased during LVO ($n = 20$) by mean (95% confidence-intervals) 7.6 (2.8–11.6) cm/s and increased during SST ($n = 15$) by 7.1 (–0.3–14.6) cm/s. LVO produced a small but significant reduction in mean arterial BP (MAP) of 1.5 (0.0–3.1) mmHg and SV of 6.7 (2.2–11.3) mL; while TPR and PWV increased by 236.9 (51.7–422.1) dynes-sec/cm⁵ and 0.7 (0.3–1.1) m/s respectively. SST produced a decrease of MAP of 4.3 (0.4–8.0) mmHg while SV increased by 4.8 (0.7–9.1) mL. TPR and PWV were reduced by 255.7 (15.4–490.5) dynes-sec/cm⁵ and 0.7 (0.1–1.0) m/s, respectively. All $p < 0.05$.

Conclusion: Modulation of cardiac pre-load affects PWV beyond the effects on afterload and BP. The reciprocal changes of BP, PWV, SV and TPR could be explained by a role of the autonomic nervous system in the regulation of vascular tone in response to change of pre-load.

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