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Selective reduction of central blood pressure by reducing cardiac pre-load

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Objective: Selective actions of antihypertensive drugs on central blood pressure (BP) components may influence target organ damage and cardiac events independent of peripheral BP. We examined whether selective actions of nitrates to reduce central rather than peripheral BP might be explained in part by reduction in pre-load in hypertensive patients.

Design and methods: 70 hypertensive patients (age 44.7±14.3 years) had brachial BP measurements (OMRON-705IT, Omron Corporation, Kyoto, Japan), central BP, augmentation pressure (AP) and augmentation index (AIx) recorded by radial pulse wave analysis (SphygmoCor AtCor Medical, Sydney, Australia), and measures of pre-load by trans-thoracic echocardiography (TTE). Measurements were repeated after 5 minutes of supra-diastolic, sub-systolic pressure inflation of thigh cuffs in order to decrease venous return from the lower limbs.

Results: Leg cuff-inflation significantly decreased TTE indices of cardiac pre-load reducing inferior vena cava diameter from 1.48±0.49 to 1.19±0.34 cm ($p<0.01$). Systolic BP was marginally reduced by the intervention (by 1.9±0.9 mmHg, mean±SE, $P=0.04$) while diastolic BP and heart rate did not change significantly. By contrast effects on central haemodynamics were greater with central systolic BP, augmentation pressure and augmentation index reduced by 4.5±1.3 mmHg, 3.2±0.6 mmHg, and 6.2±1.4%, respectively, each $P<0.001$, $P<0.05$ for central vs. peripheral BP).

Conclusions: Acute reduction of cardiac pre-load influences central haemodynamics; chronic reduction in pre-load might contribute to beneficial effects of diuretics to reduce heart failure events.

Disclosure: None declared.