



P9 Repeatability and Predictors of a Potentially Blood Pressure-Independent Parameter of Arterial Stiffness

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ABSTRACT

Background: Arterial stiffness (e.g., as measured by carotid-femoral pulse wave velocity (cfPWV)) changes acutely with blood pressure (BP). High cfPWV at high BP could be due to structural arterial changes or acute BP effects. Various parameters have been proposed as BP-independent parameters of arterial stiffness. These rely on assumptions to simplify theoretical calculations. This study evaluates a parameter quantifying BP dependency of cfPWV through BP manipulation, avoiding assumptions and mathematical derivations.

Methods: Brachial BP and cfPWV (SphygmoCor XCEL, AtCor Medical, Australia) were assessed in seated and supine position. The postural change invokes a systemic and hydrostatic BP change, thus changing cfPWV. $\Delta\text{cfPWV}/\Delta\text{BP}$ was calculated. Repeatability was assessed in 25 participants (28 ± 11 years (mean \pm SD), 52% female) across two visits on separate days. Cross-sectional correlation with age, gender, height, weight, seated BP, and supine cfPWV was assessed by stepwise linear regression across 135 participants (49 ± 23 years, 48% female).

Results: Mean $\Delta\text{cfPWV}/\Delta\text{BP}$ was 0.061 ± 0.025 m/s/mmHg. Repeatability showed a between-measurement difference of 0.005 ± 0.028 m/s/mmHg (8.2% error on mean). $\Delta\text{cfPWV}/\Delta\text{BP}$ was cross-sectionally correlated with seated diastolic BP (standardised $\beta = -0.506$, $p < 0.001$), systolic BP ($\beta = 0.503$, $p < 0.001$), weight ($\beta = -0.220$, $p = 0.006$), and heart rate ($\beta = 0.178$, $p = 0.039$) (model $p < 0.05$, $r^2 = 0.264$).

Conclusion: $\Delta\text{cfPWV}/\Delta\text{BP}$ showed fair repeatability. Notwithstanding accounting for BP, it correlated with typical long-term modifiers of arterial stiffness such as chronic elevated BP and weight. Further studies are required to validate if dividing ΔcfPWV by ΔBP , following acute intervention, creates an acceptable BP-independent arterial stiffness variable before the parameter is investigated for cardiovascular risk prediction to evaluate its clinical utility.

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