135

CLINICAL APPLICATION AND REPRODUCIBILITY OF CENTRAL PRESSURE AUGMENTATION USING RADIAL ARTERY PULSE WAVE ANALYSIS

D Kotecha,[1] J Pepper,[2] M D Flather[3] [1]*Oxford Heart Centre, John Radcliffe Hospital;* [2]*Royal Brompton Hospital;* [3]*University of East Anglia*

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Background The use of surrogate measures for central artery blood pressure (BP) is now commonplace, including radial artery pulse wave analysis (PWA). Prior studies have examined central augmentation index (cAI), defined as the systolic augmentation pressure (cAP)/pulse pressure. We sought to assess the validity, reproducibility and clinical utility of systolic and diastolic parameters.

Methods 346 patients attending elective coronary angiography were pre-assessed with conventional sphygmomanometry and radial PWA, with direct aortic BP taken during cardiac catheterisation.

Results PWA-derived central systolic BP was closer to measured pressure (2.70 mm Hg lower; SE=1.18) compared to conventional BP (8.03 mm Hg higher; SE=1.22). However for diastolic BP, conventional and PWA measurement were similar and higher than aortic pressures (9.93 and 10.99 mm Hg; SE for both 0.83). cAP was linearly associated with age (r=0.40, p<0.001), whereas pulse

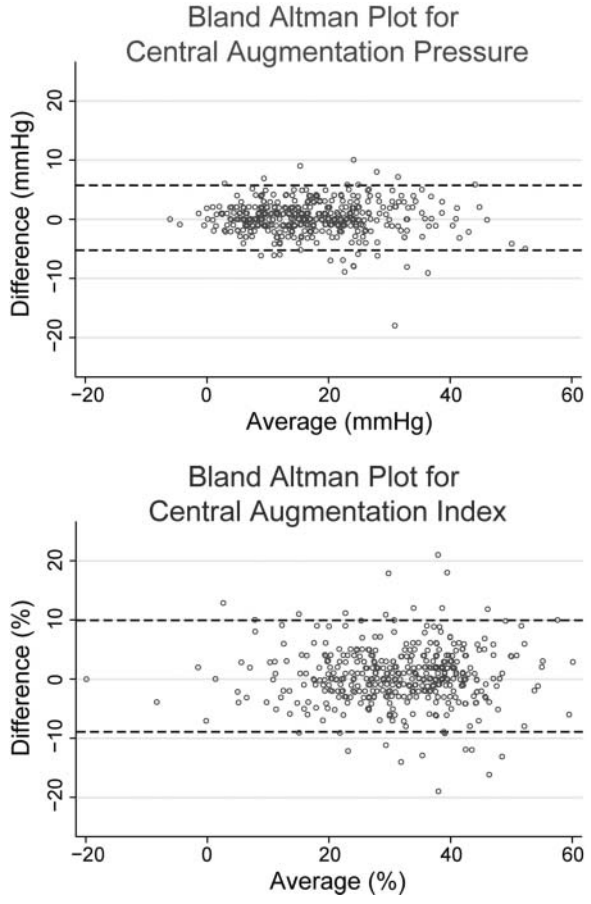

Figure 1

Table 1

Multivariate logistic model	cAP (per 10 mm Hg) OR (95% CI); p Value	cAI (per 10%) OR (95% CI); p Value
Extent of angiographic coronary disease; adjusted for age, gender, lipids, diabetes, SBP, 5-min heart rate and medications	1.39 (1.04 to 1.84); 0.024	1.17 (0.97 to 1.41); 0.109
Severity of coronary disease (weighted for coronary flow); also adjusted for pulse pressure, cholesterol and LV impairment	2.65 (1.15 to 6.12); 0.022	1.42 (0.90 to 2.24); 0.129

pressure and cAI had a curvilinear relationship, with the latter showing no relationship to the Framingham Risk Score. Reproducibility assessment identified broader limits of agreement for cAI than cAP (see figure) although similar coefficients of variation (10%). cAP, derived solely from systole, was significantly associated with both the extent and severity of angiographic coronary disease after adjusting for risk factors, unlike cAI (see table).

Conclusions Radial artery PWA is a valid and reproducible method of estimating central systolic BP parameters and central augmentation pressure is independently associated with coronary atherosclerosis. Variation in diastolic waveforms limits the use of augmentation index for risk stratification of patients with suspected coronary artery disease.