THE SYSTOLIC RATE CONSTANT (KS) IS PREDICTIVE OF CARDIOVASCULAR OUTCOMES IN THE ANBP2 AORTIC MECHANICS STUDY

Poster Contributions
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Background: Morphological parameters based on the central aortic pressure waveform are proposed to aid cardiovascular risk prediction, yet no study has definitively demonstrated the incremental value of any waveform parameter in elderly, hypertensive patients. The utility of the pressure-rate constants derived from reservoir-wave analysis of the central aortic pressure waveform in this population is unknown.

Methods: Carotid blood pressure waveforms were measured pre-randomisation, in a subset of 871 patients in the Second Australian National Blood Pressure study (ANBP2). We performed reservoir-wave analysis to define indices of arterial function, including the systolic and diastolic rate constants ks (inversely related to arterial compliance and characteristic impedance) and kd (inversely related to arterial compliance and systemic resistance). Survival analyses were performed to determine if reservoir-wave parameters independently predicted fatal and non-fatal MI and stroke and a composite endpoint including all cardiovascular events when added to currently accepted biomarkers. The incremental benefit of reservoir-wave parameters in addition to the Framingham Risk Score (FRS) was assessed.

Results: The pre-randomization value of the systolic rate constant (ks), independently predicted clinical outcome with greater values associated with a significantly reduced incidence of the primary and combined CVD endpoints (HR=0.42 95% CI 0.18-0.99 P = 0.049 and HR=0.41 95% CI 0.22-0.77 P=0.006 respectively). Addition of ks to the FRS conferred incremental prognostic benefit as assessed by the Integrated Discrimination Improvement and Net Reclassification indices (IDI=0.015, P=0.001 and NRI=0.27 P=0.02 ).

Conclusion: This analysis demonstrates that the systolic rate constant ks is independently predictive of clinical outcome in a large cohort of elderly patients with hypertension and addition of this rate constant to the FRS improves prognostic accuracy for cardiovascular events. These findings suggest that reservoir-wave analysis may provide clinically useful biomarkers for the estimation of cardiovascular risk in elderly hypertensive patients.