SUPERIORITY OF PULSE WAVE VELOCITY FOR CARDIOVASCULAR RISK ASSESSMENT AMONG NON-INVASIVE ARTERIAL STIFFNESS PARAMETERS IN THE GENERAL POPULATION

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Background: Several recent studies have suggested that arterial stiffness parameters such as peripheral pulse pressure (PPP), central blood pressure (CBP), and pulse wave velocity (PWV) are more accurate markers than brachial blood pressure for prediction of cardiovascular (CV) events. However, it remains unknown which arterial stiffness parameter is the most useful for predicting CV risk in the general population.

Methods: Participants in the present study were randomly selected from the 40 to 79 year age group in the general population (n = 973; mean age = 59). PPP was determined in the upper arm with an oscillometric device. CBP was estimated noninvasively by radial pulsatile analysis, and brachial-ankle PWV was measured using a validated automatic device. A follow-up survey assessing incidence of CV events including CV death was carried out after the baseline study.

Results: The mean follow-up duration was 7.8 years. Subjects were divided into quartiles according to PPP, CBP, or PWV. Event free rates among the PWV quartiles were clearly divergent (p < 0.001); however, the rates among quartiles for the other parameters were not significant. In a multivariate Cox regression model, both the 90th percentile level of PWV (HR = 2.51, 95% CI; 1.21 - 5.22: p = 0.014) and the increase in PWV per one standard deviation (HR = 1.42, 95% CI; 1.06 -1.90: p = 0.019) were significantly associated with risk of CV events. The area under the curves of the receiver-operating-characteristics analysis for CV event prediction were 0.71 (95% CI, 0.68 to 0.73) for PWV, 0.60 (95% CI, 0.57 to 0.63) for PPP, and 0.61 (95% CI, 0.58 to 0.64) for systolic CBP. Although all of these predictive abilities for CV events were suboptimal, the AUC of PWV was significantly larger than the others (p = 0.002 for PWV vs PPP; p = 0.043 for PWV vs CBP).

Conclusions: The measurement of brachial-ankle PWV is more useful than determination of PPP or CBP for identifying subjects at high risk of CV events within the general population.