

Prognostic value

Prognostic value of aortic pulse wave velocity as index of arterial stiffness in the general population.

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BACKGROUND: Few population studies addressed the prognostic significance of aortic pulse wave velocity (APWV) above and beyond other cardiovascular risk factors.

METHODS AND RESULTS: We studied a sex- and age-stratified random sample of 1678 Danes aged 40 to 70 years. We used Cox regression to investigate the prognostic value of APWV, office pulse pressure (PP), and 24-hour ambulatory PP while adjusting for mean arterial pressure (MAP) and other covariates. Over a median follow-up of 9.4 years, the incidence of fatal and nonfatal cardiovascular end points, cardiovascular mortality, and fatal and nonfatal coronary heart disease amounted to 154, 62, and 101 cases, respectively. We adjusted for sex, age, body mass index, MAP measured in the office (conventional PP and APWV) or by ambulatory monitoring (24-hour PP), smoking, and alcohol intake. With these adjustments, APWV maintained its prognostic significance in relation to each end point ($P < 0.05$), whereas office and 24-hour PP lost their predictive value ($P > 0.19$), except for office PP in relation to coronary heart disease ($P = 0.02$). For each 1-SD increment in APWV (3.4 m/s), the risk of an event increased by 16% to 20%. In sensitivity analyses, APWV still predicted all cardiovascular events after standardization to a heart rate of 60 beats per minute, after adjustment for 24-hour MAP instead of office MAP, and/or after additional adjustment for the ratio of total to HDL serum cholesterol and diabetes mellitus at baseline.

CONCLUSIONS: In a general Danish population, APWV predicted a composite of cardiovascular outcomes above and beyond traditional cardiovascular risk factors, including 24-hour MAP.

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Aortic stiffness measured by a novel oscillometric method independently predicts cardiovascular morbidity and mortality: a study of 4146 subjects.

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OBJECTIVE: Carotid-femoral pulse wave velocity (cfPWV) assessed by applanation tonometry evaluates aortic stiffness and predicts cardiovascular morbidity and mortality independently of classical CV risk factors. We studied the prognostic information provided by a novel and simpler oscillometric method, measuring aortic pulse wave velocity (PWVao) from a sole arm cuff.

DESIGN AND METHOD: We studied 4,146 subjects (51% women) aged 35-75 years, who attended voluntary health screening in Hungary. Oscillometric PWVao (Arteriograph, TensioMed Ltd, Budapest, Hungary) measurement was performed in addition to a medical history, physical examination, and laboratory tests. All events (all cause mortality, non-fatal myocardial infarction,

and non-fatal stroke according to ICD codes) were provided by the Hungarian National Health Insurance Fund, which performed an independent statistical analysis. Cox regression analyses were used to identify predictive factors for a composite endpoint, combining above events.

RESULTS: Mean age was 53 years, brachial blood pressure 136/82 mm Hg, and total cholesterol 5.2 mM. There were 16% smokers, 48% patients on cardiovascular medications and 8% on antidiabetic drugs; 10% had a previous cardiovascular hospitalization. There were 241 events (100 deaths, 56 non-fatal myocardial infarctions, and 86 non-fatal strokes) during a mean follow-up of 5.5 years. In univariate analysis, a 1.0 m/s increase in PWVao was associated with HR 1.49 [1.34–1.65], $P < 0.001$, for the composite endpoint. PWVao independently predicted the composite outcome in the final model of multivariate analysis (HR = 1.14 [1.01-1.30]) adjusted for pulse pressure, ejection duration, male gender, age, concomitant cardiovascular disease and treatment with thrombocyte inhibitors (all $P < 0.05$); body mass index, smoking, heart rate, blood pressure, augmentation index, diabetes, and cardiovascular drug therapy were all accounted for.

CONCLUSIONS: Aortic pulse wave velocity assessed by a simple oscillometric method using an arm cuff only independently predicted all cause mortality and major CV events in a large cohort of subjects attending health screening. Using a simpler oscillometric cuff method for assessing aortic stiffness may facilitate risk assessment in routine clinical practice.

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