Association of Variability and Hypertensive Peaks in 24-h Blood Pressure with Cardiovascular Risk and Mortality

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Abstract

BACKGROUND: Blood pressure (BP) variability relates to cardiovascular (CV) diseases and one unexplored mechanism may involve hypertensive peaks caused by high BP variability.
OBJECTIVES: To test this hypothesis, we studied the association of cumulative hypertensive peaks (CHP) in 24-h systolic BP with CV risk.
METHODS: A total of 1212 participants from the Maracaibo Aging Study (mean age, 66; women, 67.2%) underwent 24-h ambulatory BP monitoring and were followed between 1998 and 2010. BP variability was the 24-h average real variability (ARV). CHP in systolic BP (expressed as %) was the number of systolic BP measures ≥125 mmHg (based on the ACC/AHA threshold) each participant experienced over 24-h divided by the number of recordings. The primary endpoint was a composite of fatal and nonfatal coronary, heart failure, and stroke events, while secondary endpoints were total and CV mortality, and fatal and nonfatal coronary and stroke endpoints. Statistics included adjusted Cox proportional models adjusted.
RESULTS: During a median follow-up of 8 years, 242 participants developed a composite of any CV endpoint, and 353 died (210 cardiovascular deaths), 129 had coronary and 57 stroke endpoints. An increment of +2 mmHg in 24-h ARV (HR [hazard ratio], 1.18; 95% confidence interval [CI], 1.05-1.33) or +5% in CHP (HR, 1.05; 95% CI, 1.02-1.07) increased CV risk. The inclusion of both indexes in the same Cox proportional models resulted in CHP, but not ARV (P=0.075), associated with the primary endpoints (P=0.004). For secondary endpoints, the association of ARV attenuated while CHP was similar.
CONCLUSIONS: In this population-based cohort study, CHP in 24-h systolic BP explains the association of high 24-h BP variability and CV risk. Clinical management of high 24-h BP variability is challenging but recognizing that an increased variability results in CHP seems a feasible alternative to address in CV prevention.