RELEVANCE OF BLOOD PRESSURE VARIABILITY AMONG THE ELDERLY: FINDINGS FROM THE MARACAIBO AGING STUDY

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Background: Blood pressure variability (BPV) is influenced by both internal cardiovascular mechanisms and external emotional stimuli, such as stress, anxiety and physical activity. The average real variability index (ARV) was proposed to provide a more precise assessment of the clinical value of BPV. The ARV attempts to correct the limitations of the commonly used standard deviation (SD), which accounts only for the dispersion of values around the mean, and not for the order of the blood pressure readings (BPR) obtained during the ambulatory BP monitoring (ABPM) period. Thus, the ARV provides new opportunities for investigating BPV and its prognostic relevance. Recent ABPM studies using the ARV have reported significant relationships between high BPV and cardiovascular outcomes. Most of these studies evaluated adults in general very few among elderly.

Objective: As prevalence of cardiovascular diseases among elderly subjects residing in Latin America is increasing rapidly, the relevance of the BPV -using the ARV index- was explored in community dwelling elderly subjects in Maracaibo Venezuela.

Methods: Randomly selected participants of the Maracaibo Aging Study (MAS) underwent extensive clinical examination, laboratory exams and ABPM. BPRs were obtained during daytime at 15 minute intervals from 6:00 AM to 10:59 PM, and corresponding nighttime from 11:00 PM, to 5:59AM at 30 minute intervals. ARV was calculated as the weighted total sum of differences (as absolute values) between a given BPR at time, t, and the previous BPR at time, t-1. The continuous Cox model was used to compute standardized hazard ratios (HR) for cardiovascular mortality, adjusted for sex, age, smoking status, treatment with antihypertensive drugs, body mass index (BMI), serum total cholesterol, 24-hour heart rate, and BP levels. Reduction in the -2 likelihood statistic of the continuous Cox was used to assess risk for a composite fatal cardiovascular event associated with 24-hour BP or ARV\textsubscript{24}.

Results: 619 subjects were included 31.3% were men. Mean age (±SD) was 66.0±10.4 years. 12.6% had a history of cardiovascular disease, while 30.2% were undergoing antihypertensive treatment, and 17.8% had a history of diabetes. The average total cholesterol level was 5.3±1.1 mmol/l and BMI averaged 27.3±3.9 kg/m\textsuperscript{2}. Mean 24-hour BP was 130.9±16.0 mmHg for systolic BP, 74.7±9.8 mmHg for diastolic BP. Average heart rate was 75.0±9.7 bpm. The median follow-up period was 6.69 years. 73 (11.8%) subjects experienced a fatal cardiovascular endpoint during this period (1.7 per 100 person-years). Cardiovascular mortality included 49 myocardial infarcts and 24 heart failures. Using continuous Cox model, adjusted for sex, age, smoking and drinking status, BMI, serum cholesterol, treatment with antihypertensive drugs, 24-hour heart rate, and systolic BP 24h, the HR for cardiovascular fatal events for the ARV of systolic and diastolic BP in 24h was 1.193 (95% CI 1.041-1.36; p=0.011).

Conclusion: ARV is an important and independent predictor of cardiovascular mortality in elderly subjects.