

Hypertension and arterial stiffness: The Atherosclerosis Risk in Communities Study

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Our objective was to describe the relationship of arterial stiffness and hypertension in a large, population-based sample of men and women. Hypertension-related increases in arterial stiffness may reflect the distending pressure and/or structural alterations in the artery. Included were 10,712 participants, ages 45 to 64 years, of the Atherosclerosis Risk Communities Study, free of prevalent cardiovascular disease. Hypertension was classified as systolic or diastolic blood pressure (BP) greater than or equal to 140/90 mm Hg, respectively, or the current use of antihypertensive medications. Common carotid arterial diameter change was measured using B-mode ultrasound and an electronic device that utilized radio frequency signals to track the motion of the arterial walls.

Using statistical models to control for diastolic BP and pulse pressure, arterial diameter change was calculated separately in normotensive nonmedicated and medicated hypertensives. Hypertension was associated with a smaller adjusted diameter change (ie, greater stiffness) in comparison to optimal blood pressure (BP less than 120/80 mm Hg): normotensive/nonmedicated men, 0.33 versus 0.43 mm (P less than 0.001); medicated men, 0.34 versus 0.42 mm (P less than 0.001); normotensive/nonmedicated women, 0.34 versus 0.40 mm (P less than 0.001). The relationship between pulse pressure and diameter change (ie, the slope of pulse pressure and diameter change) did not differ between hypertensives and normotensives.

These cross-sectional data suggest that hypertension is associated with carotid arterial stiffness; however, these differences in the calculated stiffness appear to be the effect of distending pressure rather than structural changes in the carotid artery.

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