

## High Blood Pressure in Young Men and Long-Term Mortality

Miura K, Daviglius ML, Dyer AR, et al. Relationship of blood pressure to 25-year mortality due to coronary heart disease, cardiovascular diseases, and all causes in young adult men: the Chicago Heart Association Detection Project in Industry. *Arch Intern Med* 2001;161:1501-8.

### Study Overview

**Objective.** To assess the relationship of blood pressure (BP) measured in young adult men to long-term mortality due to coronary heart disease (CHD), cardiovascular diseases (CVD), and all causes.

**Design.** Observational, prospective cohort study with 1 initial screening visit and average follow-up of 25 years.

**Setting and participants.** This study uses data from the Chicago Heart Association Detection Project in Industry, in which a screening evaluation of 39,573 men and women volunteer employees of 84 Chicago-area companies and organizations took place from November 1967 through January 1973. The current report is based on 10,874 men aged 18 to 39 years at baseline not receiving antihypertensive drugs and without CHD or diabetes. Missing data was grounds for exclusion. 45.7% of the participants had hypertension (stage 1, 36.4%; stage 2, 7.8%; and stage 3, 1.5%).

**Main outcome measures.** BP was a single casual supine measurement in the field by trained staff using a standard mercury sphygmomanometer. Vital status was established during 1995 using several methods: direct mail, telephone call, contact with employer, Social Security Administration files, and National Death Index records. Cause of death was determined by the underlying cause of death stated on the death certificates.

**Main results.** Age-adjusted association of systolic blood pressure (SBP) to CHD mortality was continuous and graded. Multivariate-adjusted CHD hazard ratios for 1 SD-higher SBP (15 mm Hg) and diastolic blood pressure (DBP) (10 mm Hg) were 1.26 (95% confidence interval [CI], 1.11 to 1.44) and 1.17 (95% CI, 1.01 to 1.35), respectively. Compared with the Sixth Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure stratum with normal BP (and lowest mortality rates) [1], the 2 large strata with high-normal BP and stage 1 hypertension had 25-year absolute risks for death of

63 and 72 per 1000, respectively; had absolute excess risks of 10 and 20 per 1000, respectively; accounted for 59.8% of all excess CHD, CVD, and all-cause mortality; and were estimated to have their life expectancy shortened by 2.2 and 4.1 years, respectively.

**Conclusion.** In young adult men, BP above normal was significantly related to increased long-term mortality due to CHD, CVD, and all causes.

### Commentary

The relationship between elevated blood pressure and mortality, especially those related to CHD and CVD, is well established. However, the evidence supporting this association is scarce when the target population is young adults. The sample size and the length of follow-up needed to achieve enough power are the major obstacles. This study uses data that partly overcome these 2 obstacles but has other limitations. The risk factor was assessed only once, and very limited clinical data were available, including the evaluation of the cause of death. In consequence, important comorbidity is not considered in the multivariate analysis. Nevertheless, this report provides important evidence with respect to the research question. It is important to note that participants with optimal BP (SBP < 120 mm Hg and DBP < 80 mm Hg) did not have better outcomes than those with normal BP, probably because participants with abnormally low BP were included in this group and the limited clinical data do not allow for their identification.

### Applications for Clinical Practice

The effective management of patients with elevated BP has always been a challenge. It is especially difficult to effectively manage the young adult who feels healthy and in whom treatment for hypertension interferes with his or her lifestyle. Early detection of borderline BP and other hidden risk factors for CAD in the young adult and comprehensive patient education are needed to positively impact the long-term survival in this population. The use of nonpharmacologic interventions is clearly indicated. On the other hand, the recommendation of

the use of medication is still empirical and based on data from other age-groups. Long-term safety, compliance, and effectiveness of antihypertensive medications in young adults need to be better tested in randomized controlled trials.

– *Review by Pedro J. Caraballo, MD*

### References

1. The sixth report of the Joint National Committee on prevention, detection, evaluation, and treatment of high blood pressure [published erratum appears in Arch Intern Med 1998; 158:573]. Arch Intern Med 1997;157:2413–46.

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