Obesity-Related Hypertension? 
Weighing the Evidence

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Overweight and obesity are established risk factors for hypertension, and hypertension is approximately twice as prevalent in the obese than in the nonobese. The prevalence of overweight and obesity has been increasing in the United States for at least the past 2 decades. These increases have occurred in children, adolescents, and adults, as well as in both genders and in all racial/ethnic groups.1,2

Based on an analysis of data from 2 National Health and Nutrition Examination Surveys (NHANESs) approximately a decade apart, the article by Cutler et al3 in the current issue of Hypertension reports that the age-standardized prevalence of hypertension increased from 24.4% to 28.9% between 1988–1994 and 1999–2004. The increase was greater for women than men and occurred in all racial/ethnic groups. The analysis further suggests that an increase in body mass index (BMI) accounted for nearly all of the increased hypertension prevalence in men and for a portion of the increased prevalence in women. Furthermore, between the 2 NHANESs, mean systolic blood pressures increased in nonhypertensive individuals and in untreated hypertensive subjects. This upward shift of blood pressures resulted in a decreased percentage of subjects with normal blood pressure and an increased percentage with prehypertension.

Given the extensive evidence supporting a relationship between obesity and hypertension, the hypothesis that an increased BMI contributes to the increased prevalence of hypertension is plausible. Nevertheless, the relationship between overweight or obesity and hypertension is complex. Hypertension is not an invariable consequence of obesity. In addition, recent evidence suggests that blood pressures are correlated with various measures of adiposity in normotensive but not in hypertensive individuals.4 In the analysis of Cutler et al,3 although the prevalence of hypertension increased in all of the BMI strata, the upward shift of systolic blood pressures across the overall blood pressure distribution was observed only in individuals with a BMI <25 kg/m². Taken together, these observations suggest that a potential impact of adiposity on blood pressure is attenuated in obese, hypertensive individuals. Because the NHANESs are cross-sectional rather than longitudinal, it is not possible to directly evaluate the impact of weight gain on blood pressure at different blood pressure levels and different levels of adiposity.

In contrast to the report by Cutler et al3 of an upward shift of systolic blood pressure in the general US population, the World Health Organization Multinational Monitoring of Trends and Determinants in Cardiovascular Disease project reported a decrease of blood pressure across 38 populations, including the United States, between the mid-1980s and the mid-1990s.5 These reported decreases, based on cross-sectional, population-based surveys, occurred despite increasing obesity rates and could not be accounted for by the use of antihypertensive drugs. In addition to differences of study design, this apparent discrepancy may be related to the fact that the analysis of Cutler et al describes blood pressure changes over a more recent time period than the Multinational Monitoring of Trends and Determinants in Cardiovascular Disease report. Continued tracking of population-based blood pressure trends, and factors contributing to changes of blood pressure over time, would be of considerable interest.

On a positive note, hypertension awareness and control rates have consistently improved over time since 1960. Between the 2 NHANESs in the report by Cutler et al,3 there were increases in the rates of hypertension awareness (68.5% to 71.8%), treatment (53.1% to 61.4%), and control (26.1% to 35.1%). These favorable trends reflect an increasing awareness of the risks of hypertension and the benefits of antihypertensive therapy, the increasing availability of effective antihypertensive agents, and the efforts of health providers. The National High Blood Pressure Education Program has been instrumental in improving blood pressure control through its promotion of programs of professional, patient, and public education. Although heart disease, stroke, and cancer remain the leading causes of death in the United States, the death rates for heart disease and stroke continue to decrease over time, whereas the overall cancer death rate has remained relatively stable (Figure). It seems reasonable to suggest that improved rates of hypertension treatment and control have contributed to these favorable trends. Nevertheless, heart disease and stroke remain among the leading causes of death in the United States, and recent increases in the prevalence of obesity and hypertension threaten continuation of these trends. Indeed, the World Health Organization estimates that 54% of strokes and ≈47% of the ischemic heart disease burden on a worldwide basis are attributable to above normal blood pressures.6

In the report by Cutler et al,3 despite improvement, the most recent hypertension control rate, based on blood pressure <140/90 mm Hg, remains disappointingly low. Based on recommended control blood pressure <130/80 mm Hg for
patients with diabetes and chronic kidney disease, the control rate would be even lower, and, in the future, depending on results of clinical trials currently in progress, more stringent target blood pressure levels for control may be recommended for the majority of hypertensive patients. Control rates vary by gender, race/ethnicity, and age. Lowest control rates were observed in young (18 to 49 years) Mexican American men (16.3%), in young non-Hispanic black men (20.3%), and in older (≥70 years) Mexican American women (19.0%). Potential explanations for the gap between recommended treatment guidelines and clinical practice may include the complexity or difficulty of achieving the recommended blood pressure goals, patient or physician behaviors, and/or deficiencies in the system of health care. Effective, culturally sensitive strategies will have to be developed to achieve the Healthy People 2010 target goal of a hypertension control rate of 50%, and this will require a better understanding of the barriers.

From both population and patient care perspectives, the analysis of Cutler et al provides added impetus for preventing obesity and encouraging weight loss for the overweight as strategies for hypertension prevention. This is particularly relevant because the prevalence of childhood obesity has increased several fold in the past decade. In 2003–2006, 16.3% of children and adolescents were at or above the 95th percentile of BMI for age, based on the 2000 Centers for Disease Control and Prevention growth charts. Although weight loss trials clearly document a decrease of blood pressure among overweight hypertensive individuals, most of the reported trials are short term. Less information is available about the long-term effects of sustained weight loss on blood pressure. Nevertheless, for those who are overweight, weight loss is a prudent strategy for decreasing overall cardiovascular disease risk.

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**References**
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