

Editorial

Optimal Blood Pressure Goals in Patients with Hypertension

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INTRODUCTION

In the absence of randomized control data, the seventh report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure recommended that patients with diabetes mellitus or with chronic kidney disease should have their blood pressure decreased to less than 130/80 mm Hg [1]. In the absence of randomized control data, the American Diabetes Association recommended that diabetics with hypertension should have their blood pressure decreased to less than 130/80 mm Hg [2]. In the absence of randomized control data, the National Kidney Foundation Kidney Disease Outcome Quality Initiative guidelines recommended that patients with chronic kidney disease and hypertension should have their blood pressure decreased to less than 130/80 mm Hg [3]. In the absence of randomized control data, the American Heart Association 2007 guidelines recommended that patients with hypertension at high risk for coronary events such as those with coronary artery disease, a coronary artery risk equivalent, diabetes mellitus, chronic kidney disease, or a 10-year Framingham risk score $\geq 10\%$ should have their blood pressure decreased to less than 130/80 mm Hg [4]. These guidelines also recommended that patients with hypertension and left ventricular dysfunction should have their blood pressure reduced to less than 120/80 mm Hg [4].

The American College of Cardiology Foundation/American Heart Association 2011 expert consensus document on hypertension in the elderly recommended that the blood pressure should be reduced to less than 140/90 mm Hg in adults younger than 80 years at high risk for cardiovascular events [5]. On the basis of data from the Hypertension in the Very Elderly trial, [6] these guidelines recommended that the systolic blood pressure should be reduced to 140 to 145 mm Hg if tolerated in adults aged 80 years and older. I concur with these guidelines [5,7]. The following studies discuss the reasons for my recommendations.

At 24-month mean follow-up of 4,162 patients with an acute coronary syndrome (acute myocardial infarction with or without ST-segment elevation or high-risk unstable angina pectoris), the lowest cardiovascular events rates occurred with a systolic blood pressure between 130 to 140 mm Hg and a diastolic blood pressure between 80 to 90 mm Hg with a nadir of 136/85 mm Hg [8]. The optimal systolic blood pressure for all-cause mortality at long-term follow-up of 6,400 diabetics with coronary artery disease was 130 to 139 mm Hg [9]. A target systolic blood pressure less than 140 mm Hg was the optimal systolic blood pressure of 4,733 patients with type 2 diabetes at 4.7-year follow-up [10]. The lowest incidence of death from cardiovascular causes at 4.6-

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year follow-up in 9,603 diabetics at high risk for cardiovascular events occurred with a systolic blood pressure of 135.6 mm Hg (range 130.6 to 140.5 mm Hg) [11]. The lowest incidence of death from cardiovascular causes at 4.6-year follow-up in 15,081 nondiabetics at high risk for cardiovascular events occurred with a systolic blood pressure of 133.1 mm Hg (range 128.8 to 137.4 mm Hg) [11].

A meta-analysis of 2,272 patients with hypertensive chronic kidney disease without diabetes mellitus showed that a blood pressure of less than 125/75 to 130/80 mm Hg did not improve clinical outcomes more than a target blood pressure of less than 140/90 mm Hg [12]. Whether a blood pressure of less than 130/80 mm Hg benefits patients with proteinuria greater than 300 to 1,000 mg per day requires further study [12]. The optimal systolic blood pressure in 20,330 patients with a recent non-cardioembolic ischemic stroke at 2.5-year follow-up for first recurrence of stroke of any type or for a composite of stroke, myocardial infarction, or death from vascular causes was 130 to 139 mm Hg [13].

We investigated in 7,785 patients with mild to moderate chronic systolic and diastolic congestive heart failure in the Digitalis Investigation Group trial the impact of baseline systolic blood pressure on outcomes using a propensity-matched design [14]. Mean follow-up was 5 years. Compared to a baseline systolic blood pressure greater than 120 mm Hg, a systolic blood pressure of ≤ 120 mm Hg was associated with an increase in cardiovascular mortality, an increase in heart failure mortality, an increase in cardiovascular hospitalization, an increase in all-cause hospitalization, and an increase in heart failure hospitalization [14].

The American Diabetes Society 2013 guidelines recommend that diabetics with hypertension should have their systolic blood pressure decreased to less than 140 mm Hg [15]. A systolic blood pressure of less than 130 mm Hg may be considered in younger patients with long life expectancy if achieved with few drugs and without side effects. The 2012 International Society of Nephrology guidelines for treatment of blood pressure in patients with non-dialysis-dependent chronic kidney disease recommend that adults with chronic kidney disease without diabetes mellitus [16] or with diabetes mellitus [17] with hypertension and albuminuria less than 30 mg per 24 hours should have their blood pressure lowered to $\leq 140/\leq 90$ mm Hg with a class I B indication. If albuminuria greater than 30 mg per

24 hours is present, lowering of the blood pressure to $\leq 130/\leq 80$ mm Hg has a class II D indication [16,17].

The European Society of Hypertension/European Society of Cardiology 2013 guidelines for the treatment of hypertension recommend lowering the systolic blood pressure to less than 140 mm Hg in patients at low to moderate cardiovascular risk (class I indication), in patients with diabetes mellitus (class I indication), in patients with a prior stroke or transient ischemic attack (class IIa indication), in patients with coronary heart disease (class IIa indication), and in patients with diabetic or non-diabetic chronic kidney disease (class IIa indication) [18]. In elderly patients with a systolic blood pressure of 160 mm Hg or higher, the systolic blood pressure should be lowered to 140-150 mm Hg (class I indication). A diastolic blood pressure target of less than 90 mm Hg is recommended except in diabetics in whom a level less than 85 mm Hg is recommended (class I indication) [18].

The Reasons for Geographic and Racial Differences in Stroke (REGARDS) study is an observational study of risk factors for stroke [19]. This study included 4,181 persons aged 55-64 years, 3,767 persons aged 65-74 years, and 1,839 persons aged 75 years and older. Median follow-up was 4.5 years for first occurrence of a coronary heart disease or stroke event, 4.5 years for nonfatal myocardial infarction or coronary heart disease death, 5.7 years for stroke, and 6.0 years for all-cause mortality. The results from this study generated a hypothesis that for all patients older than 55 years, the recommended level of systolic blood pressure should be less than 140 mm Hg [19].

In conclusion, on the basis of the available data, I recommend that the blood pressure should be reduced to less than 140/90 mm Hg in adults younger than 80 years at high risk for cardiovascular events and that the systolic blood pressure should be reduced to 140 to 145 mm Hg if tolerated in adults aged 80 years and older [5].

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