Guidelines for the Management of Hypertension

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KEYWORDS

• Hypertension • Antihypertensive therapy • SPRINT study • Blood pressure goals
• Management of hypertension

KEY POINTS

- This article summarizes pertinent data from clinical trials on the effects of antihypertensive therapy on cardiovascular complications.
- Prior definitions of hypertension and blood pressure goals of therapy are discussed, and differences between national and international guidelines on such goals are summarized.
- The results of the SPRINT study are summarized, and the impact of this study on future goals of treatment is discussed.
- New recommendations are provided on blood pressure goals, and the effects such goals might have on clinical practice are discussed.

INTRODUCTION

Actuarial data indicated almost a century ago that elevated blood pressure (BP) shortened life expectancy,[1] but it was not until many years later that much attention was given to lowering BP because of fear of compromising perfusion to vital organs.[2] However, a few pioneers, such as Walter Kempner, who used extreme dietary measures; Reginald Smithwick, who used surgical lumbodorsal sympathectomy; and my mentor, Robert Wilkins, using drug therapy, began to study the effects of BP lowering in persons with marked elevations and demonstrated that reducing BP was in fact well-tolerated by most.[3–5] Such observations led to a rapid expansion of efforts by the pharmaceutical industry to develop new therapies for hypertension. The advances made since then have been truly remarkable. Several effective and well-tolerated antihypertensive drugs were introduced (**Box 1**), and clinical trials were performed to study their effects in hypertensive persons. Initially, "proof of principle" studies were carried out in persons with malignant hypertension (whose life expectancy if untreated averages 6–12 months) and showed major benefits in preventing congestive heart failure, renal failure, and hemorrhagic strokes, and in prolonging life.[6] The landmark Veterans Administration

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Box 1
Advances in the treatment of hypertension

Decade and Therapy

1940s
- Potassium thiocyanate
- Kempner diet
- Surgical sympathectomy

1950s
- Rauwolfia serpentina
- Ganglionic blockers
- Veratrum alkaloids
- Hydralazine
- Guanethidine
- Thiazide diuretics

1960s
- Alpha-2 adrenergic receptor agonists
- Spironolactone
- Beta adrenergic receptor antagonists

1970s
- Alpha-1 receptor antagonists
- Angiotensin-converting enzyme inhibitors

1980s
- Calcium channel blocking drugs

1990s
- Angiotensin receptor antagonists

2000s
- Renin inhibitors
- Renal sympathetic denervation (experimental)

Adapted from Chobanian AV. The Shattuck Lecture. The hypertension paradox–more uncontrolled disease despite improved therapy. N Engl J Med 2009;361:878–87; with permission.

Cooperative Trials then demonstrated benefits of treatment in those with diastolic BP (DBP) in the 115 to 129 mm Hg range and subsequently in the 90 to 114 range.[7,8]

After epidemiologic data demonstrated that systolic BP (SBP) was a more important cardiovascular disease (CVD) risk factor than DBP after age 50, placebo-controlled trials were performed to investigate the benefits of decreasing SBP in older persons with isolated systolic hypertension. Notable in this regard were the Systolic Hypertension in the Elderly Program (SHEP) in which reducing SBP to lower than 160 mm Hg with chlorthalidone-based therapy was associated with reductions in incidences of stroke and cardiac diseases,[9] and also the Systolic Hypertension in Europe Trial (Syst-Eur), which showed broadly similar benefits but with nitrendipine-based treatment.[10] These and various other studies demonstrated that BP reduction in persons with hypertension can reduce the incidence of stroke, coronary heart disease (CHD), congestive heart failure (CHF), and chronic renal disease, and that such benefits can be obtained independent of age, gender, race, ethnicity, socioeconomic status, severity of hypertension, or the presence or absence of target organ damage.[11]

DEFINITION OF HYPERTENSION

The definition of hypertension has changed over the past several years. BP on a population-wide basis is a continuous variable with a Gaussian distribution and