

2015 Guidelines on Treatment of Hypertension in Patients With Coronary Artery Disease

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ABSTRACT

Patients with coronary artery disease should have intensive treatment of modifiable coronary risk factors. Dietary sodium should be decreased. Hypertension should be treated with beta blockers and angiotensin-converting enzyme inhibitors or angiotensin receptor blockers. Long-acting nitrates are effective antianginal and antiischemic medications. Calcium channel blockers may be added if angina pectoris persists despite beta blockers and long-acting nitrates. The American Heart Association/American Society of Cardiology 2015 guidelines recommend a target blood pressure below 140/90 mm Hg in patients with coronary artery disease and with an acute coronary syndrome if they are aged 80 years and younger but below 150 mm Hg if they are \geq 80 years of age. Octogenarians should be checked for orthostatic changes with standing, and a systolic blood pressure below 130 mm Hg and a diastolic blood pressure below 65 mm Hg must be avoided. Caution is advised in lowering the diastolic blood pressure below 60 mm Hg in diabetics or in patients older than 60 years of age. In addition to the beta blockers carvedilol, metoprolol CR/XL, and bisoprolol, patients with hypertension and heart failure should be treated with diuretics and angiotensin-

converting enzyme inhibitors or angiotensin receptor blockers, and patients with persistent severe symptoms with aldosterone antagonists if not contraindicated.

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Key words: Coronary artery disease; Hypertension; Beta blockers; Angiotensin-converting enzyme inhibitors; Angiotensin receptor blocker; Aldosterone antagonists; Calcium channel blockers; Nitrates

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INTRODUCTION

Hypertension is a major risk factor for coronary artery disease^[1-7]. Hypertension is present in approximately 69% of patients with a first myocardial infarction^[8]. Hypertension is also a major risk factor for angina pectoris and for sudden cardiac death^[1-7].

The blood pressure should be reduced to less than 140/90 mm Hg in patients younger than age 80 years and to less than 150/90 mm Hg in patients aged 80 years and older if tolerated^[1-7]. This editorial will discuss the 2015 American Heart Association/American College of Cardiology/American Society of Hypertension guidelines on treatment of hypertension in patients with coronary artery disease^[7].

In 4,162 patients with an 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^[9].

In 8,354 patients aged 60 years and older with coronary artery disease in the International VERapamil SR Trandolapril (INVEST)

study, a baseline systolic blood pressure of 150 mm Hg and higher, and 22,308 patient years of follow-up, the primary outcome of all-cause mortality, nonfatal myocardial infarction, or nonfatal stroke occurred in 9.36% of adults with a systolic blood pressure below 140 mm Hg, in 12.71% of adults with a systolic blood pressure of 140-149 mm Hg, and in 21.3% of adults with a systolic blood pressure of 150 mm Hg and higher ($P<0.0001$)^[10]. Using propensity score analyses, compared with a systolic blood pressure below 140 mm Hg, a systolic blood pressure of 140 to 149 mm Hg increased cardiovascular mortality by 34% ($P=0.04$), total stroke by 89% ($P=0.002$), and nonfatal stroke by 70% ($P=0.03$)^[10]. Compared with a systolic blood pressure below 140 mm Hg, a systolic blood pressure of 150 mm Hg and higher increased the primary outcome by 82% ($P<0.0001$), all-cause mortality by 60% ($P<0.0001$), cardiovascular mortality by 218% ($P<0.0001$), and total stroke by 283% ($P<0.0001$)^[10].

A meta-analysis of 147 randomized trials of 464,000 persons with hypertension reported an extra protective effect of beta blockers given after myocardial infarction^[11]. If beta blockers are used to treat persons with hypertension, atenolol should not be used^[12-14].

BLOOD PRESSURE GOAL

The American Heart Association/American Society of Cardiology/American Society of Hypertension 2015 guidelines recommend that the target blood pressure should be below 140/90 mm Hg in patients with coronary artery disease and with an acute coronary syndrome if they are aged 80 years and younger and the systolic blood pressure below 150 mm Hg if they are older than 80 years of age^[7]. Consideration can be given to lower the blood pressure to below 130/80 mm Hg with a class IIb C indication^[7]. Octogenarians should be checked for orthostatic changes with standing, and a systolic blood pressure below 130 mm Hg and a diastolic blood pressure below 65 mm Hg should be avoided^[7]. Caution is advised in reducing a diastolic blood pressure below 60 mm Hg in patients with diabetes mellitus or in persons older than 60 years of age^[7].

ANTIHYPERTENSIVE THERAPY

Coronary Artery Disease

Coronary risk factors should be treated including cessation of smoking and treatment of hypertension, dyslipidemia, diabetes mellitus, obesity, and physical inactivity^[7]. Dietary sodium should be reduced.

Beta blockers are the initial antihypertensive drugs to use in patients with coronary artery disease who have angina pectoris, who have had a myocardial infarction, and in those who have left ventricular systolic dysfunction unless contraindicated^[7]. Persons with prior myocardial infarction and hypertension should be treated with beta blockers and angiotensin-converting enzyme inhibitors^[1-4,6,7,11,14-26]. Atenolol should not be administered^[12-14]. If a third drug is needed, aldosterone antagonists may be administered^[27]. Patients treated with aldosterone antagonists should not have significant renal dysfunction or hyperkalemia.

In addition to the beta blockers carvedilol, metoprolol CR/XL, and bisoprolol^[7,28-32], patients with hypertension, coronary artery disease, and congestive heart failure should be treated with diuretics and angiotensin-converting enzyme inhibitors or angiotensin receptor blockers^[7,28,33-40], and patients with persistent severe symptoms with aldosterone antagonists^[7,27,28,41]. Hydralazine plus isosorbide dinitrate should be added to African-American patients with New York Heart Association class III or IV heart failure with a reduced left ventricular ejection fraction already receiving diuretics, beta blockers, and an

angiotensin-converting enzyme inhibitor or angiotensin receptor blocker^[7,28,42]. Drugs to avoid in patients with hypertension and heart failure with a reduced left ventricular ejection fraction include verapamil, diltiazem, doxazosin, clonidine, moxonidine, hydralazine without a nitrate, and nonsteroidal anti-inflammatory drugs^[7].

In patients with hypertension, coronary artery disease, and heart failure with a preserved left ventricular ejection fraction, class I therapeutic indications include control of systolic and diastolic hypertension, control of the ventricular rate in patients with atrial fibrillation, and treatment of pulmonary congestion and peripheral edema with diuretics^[7,28]. Class IIb therapeutic indications include use of beta blockers, angiotensin-converting enzyme inhibitors or angiotensin receptor blockers, or calcium channel blockers^[7,28].

Stable Angina Pectoris

Patients with hypertension and chronic stable angina pectoris should be treated with beta blockers plus nitrates as antianginal agents^[7]. Hypertension in these patients should be treated with beta blockers plus an angiotensin-converting enzyme inhibitor or angiotensin receptor blocker with addition of a thiazide or thiazide-like diuretic if needed. If either the angina pectoris or the hypertension remains uncontrolled, a long-acting dihydropyridine calcium channel blocker can be added to the therapeutic regimen. Nondihydropyridine calcium channel blockers such as verapamil and diltiazem cannot be used if there is left ventricular systolic dysfunction. Combining a beta blocker with either verapamil or diltiazem must be used cautiously because of the increased risk of bradyarrhythmias and heart failure developing^[7].

Acute Coronary Syndromes

In patients with an acute coronary syndrome, initial management of hypertension should include a short-acting beta 1 selective beta blocker without intrinsic sympathomimetic activity such as metoprolol tartrate or bisoprolol^[7]. Treatment with beta blockers should be started initially within 24 hours of symptoms. In patients with severe hypertension or ongoing ischemia, intravenous esmolol may be used^[7]. In hemodynamically unstable patients or those with decompensated heart failure, administration of beta blockers should be delayed until the patient is stabilized^[7].

In patients with acute coronary syndromes with hypertension, nitrates can be used to reduce blood pressure or to reduce ongoing myocardial ischemia or pulmonary congestion^[7]. However, nitrates should not be administered to patients with suspected right ventricular infarction or in those with hemodynamic instability. Intravenous or sublingual nitroglycerin is preferred initially^[7].

An angiotensin-converting enzyme inhibitor or angiotensin receptor blocker should be given to patients with an acute coronary syndrome, especially in patients with an anterior myocardial infarction if hypertension persists, if there is a decreased left ventricular ejection fraction, or if diabetes mellitus is present^[7]. If hypertension persists after use of a beta blocker plus an angiotensin-converting enzyme inhibitor or angiotensin receptor blocker, a long-acting dihydropyridine calcium channel blocker may be added to the therapeutic regimen^[7]. Aldosterone antagonists are indicated in patients receiving beta blockers plus angiotensin-converting enzyme inhibitors or angiotensin receptor blockers after myocardial infarction who have left ventricular systolic dysfunction and either heart failure or diabetes mellitus^[7]. However, aldosterone antagonists should not be administered if the serum potassium is ≥ 5.0 mEq/L or if the serum creatinine is ≥ 2.5 mg/dL in men or ≥ 2.0 mg/dL in women^[7]. Loop diuretics are preferred to thiazide and thiazide-type diuretics in

patients with heart failure or in patients with chronic kidney disease and an estimated glomerular filtration rate less than 30 mL/minute^[7].

CONFLICT OF INTERESTS

There are no conflicts of interest with regard to the present study.

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