REVIEW

THE AMERICAN JOURNAL of MEDICINE®

Treatment of Hypertension in Patients with Coronary Artery Disease. A Case-Based Summary of the 2015 AHA/ACC/ASH Scientific Statement

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ABSTRACT

The 2015 American Heart Association/American College of Cardiology/American Society of Hypertension Scientific Statement "Treatment of Hypertension in Patients with Coronary Artery Disease" is summarized in the context of a clinical case. The Statement deals with target blood pressures, and the optimal agents for the treatment of hypertension in patients with stable angina, in acute coronary syndromes, and in patients with ischemic heart failure. In all cases, the recommended blood pressure target is <140/90 mm Hg, but <130/80 mm Hg may be appropriate, especially in those with a history of a previous myocardial infarction or stroke, or at high risk for developing either. These numbers may need to be revised after the publication of the SPRINT data. Appropriate management should include beta-blockers, angiotensin-converting enzyme inhibitors or angiotensin receptor blockers, and in the case of heart failure, aldosterone antagonists. Thiazide or thiazide-like (chlorthalidone) diuretics and calcium channel blockers can be used for the management of hypertension, but the evidence for improved outcomes compared with other agents in hypertension with coronary artery disease is meager. Loop diuretics should be reserved for patients with New York Heart Association Class III and IV heart failure or with a glomerular filtration rate of <30 mL/min.

Published by Elsevier Inc. • The American Journal of Medicine (2016) 129, 372-378

KEYWORDS: Acute Coronary Syndrome; Coronary Artery Disease; Heart Failure; Hypertension; Myocardial Infarction; Stable Angina; Unstable Angina

"To study the phenomena of disease without books is to sail an uncharted sea, while to study books without patients is not to go to sea at all."

William Osler, Books and Men, in *Aequanimitas* (p 32).[1]

July 2015 saw the publication of the Scientific Statement "Treatment of Hypertension in Patients with Coronary Artery Disease," sponsored by the American Heart Association, the American College of Cardiology, and the American Society of Hypertension.[2-5] The motivation for the Statement was clear: there is a strong epidemiologic association between hypertension and coronary artery disease; they have many pathophysiologic features in common and there are unique management challenges in these patients.

The Oslerian epigraph above provides a cue to structure this summary of the clinical sections of the Statement around a real patient.

Funding: None.

Conflict of Interest: CR does not have any actual or potential conflicts of interest, including relevant financial interests, activities, relationships, and affiliations.

Authorship: The author is solely responsible for writing this manuscript.

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0002-9343/$ -see front matter Published by Elsevier Inc.
http://dx.doi.org/10.1016/j.amjmed.2015.10.045

BLOOD PRESSURE TARGETS

A 62-year-old man has hypertension and coronary artery disease. His hypertension is currently treated with lisinopril 20 mg per day and hydrochlorothiazide 25 mg per day. His blood pressure at his latest clinic visit is 138/88 mm Hg. He had a myocardial infarction 5 years previously.

What Is an Appropriate Blood Pressure Target for This Patient?

A major section of the statement addresses blood pressure targets. The debate on this revolves around the issue of whether targets lower than the conventional <140/90 mm Hg are appropriate or even safe for patients with coronary artery disease. Because the diastolic blood pressure is the coronary perfusion pressure, the diastolic blood pressure is the critical value in this discussion (Figure 1).[6]

There are very few clinical trial data to help us. Some studies with surrogate outcomes support a "lower is better" blood pressure target. In one of these, the intravascular ultrasound substudy of CAMELOT,[7] those subjects with a sustained blood pressure of <120/80 mm Hg had a significant decrease in coronary atheroma volume.

However, we had to wait until the ACCORD study[8] to give us some more direct evidence on which to base decisions about blood pressure goals. In ACCORD there was no significant difference in the cardiovascular outcomes (except stroke) among subjects, all with type 2 diabetes and other risk factors for cardiovascular disease, treated to an intensive (systolic blood pressure <120 mm Hg) vs a standard (systolic blood pressure <140 mm Hg) blood pressure target. However, with a mean achieved diastolic blood pressure in the intensive-therapy group at 4-8 years after randomization in the range 60-65 mm Hg, there was a numerical but statistically nonsignificant decrease in cardiovascular events. This suggests that lower diastolic blood pressures are safe, at least in the 60-65 mm Hg range, and may protect against stroke.

Our Statement is somewhat flexible:

The <140/90 mm Hg blood pressure target is reasonable for the secondary prevention of cardiovascular events in patients with hypertension and coronary artery disease (Class IIa; Level of Evidence B), but a lower target blood pressure (<130/80 mm Hg) may be appropriate in some individuals with coronary artery disease, with previous myocardial infarction, stroke or transient ischemic attack, or coronary artery disease risk equivalents (carotid artery disease, peripheral artery disease, abdominal aortic aneurysm) (Class IIb; Level of Evidence B).

CLINICAL SIGNIFICANCE

- Blood pressure target for patients with hypertension or coronary artery disease is <140/90 mm Hg, or <130/80 mm Hg if high risk for myocardial infarction or stroke.
- Beta-blockers and angiotensin-converting enzyme inhibitors or angiotensin receptor blockers are the mainstay of treatment, supplemented where appropriate by calcium channel blockers, or thiazide or thiazide-like diuretics. Loop diuretics should be reserved for those with severe heart failure or severe chronic kidney disease.
- Mineralocorticoid inhibitors (spironolactone and eplerenone) are effective in ischemic heart failure as well as resistant hypertension.

Even more compelling is the news[9] from SPRINT in nondiabetic subjects, with a design very close to that of ACCORD. In this study, those subjects randomized to the intensive group (systolic blood pressure goal <120 mm Hg), compared with the standard group (systolic blood pressure goal <140 mm Hg), had a reduction of 25% in the composite cardiovascular outcome measure and a 27% reduction in all-cause mortality.

The blood pressure target for our patient described above is either <140/90 mm Hg ("reasonable") or <130/80 mm Hg ("may be appropriate," especially with his history of a previous myocardial infarction). This flexibility restores to the physician and the patient the discretion to make personalized decisions on a topic about which there is no definitive consensus. It is possible that these numbers will be lowered even further when the SPRINT data are fully evaluated.

MANAGEMENT OF HYPERTENSION IN PATIENTS WITH CORONARY ARTERY DISEASE AND STABLE ANGINA

Three months later, our patient, the 62-year-old man with hypertension and coronary artery disease, is still being treated with lisinopril 20 mg per day and hydrochlorothiazide 25 mg per day. His blood pressure today is 132/76 mm Hg. He had a myocardial infarction 5 years previously, and now reports that he has angina on exertion, after walking briskly for 4 blocks.

What Is the Appropriate Antihypertensive Drug Regimen for This Patient?

Management of hypertension in patients with chronic coronary artery disease and chronic stable angina is to prevent death, myocardial infarction, and stroke; reduce the frequency and duration of myocardial ischemia; and ameliorate symptoms.

Figure 2 is a summary of the pharmacologic treatment of hypertension in patients with stable angina, acute coronary syndrome and ischemic heart failure.

Beta-blockers. Beta-blockers are the drugs of first choice for the treatment of hypertension in patients with coronary artery disease and angina.[10,11] They reduce ischemia and angina primarily because of their negative inotropic and chronotropic actions. The decreased heart rate increases diastolic filling time for coronary perfusion, and the negative