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One Size Does Not Fit Most: Identifying Blood Pressure Goals and Treatment Plans for those with Cardiac Conditions

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Learning Objective

- Determine a blood pressure goal for a patient with heart failure (HF) and/or coronary disease.
- Given a patient case, develop an anti-hypertensive regimen for a patient with heart failure (HF) and/or coronary disease.

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Hypertension Statistics

General Population
32.6% or 80 million people in the US have HTN

Stroke
77% of patients suffering a stroke have prior history of HTN

Heart Failure
75% of patients have prior history of HTN

US, United States, HTN, hypertension
Circulation. 2015;131:e29–e322

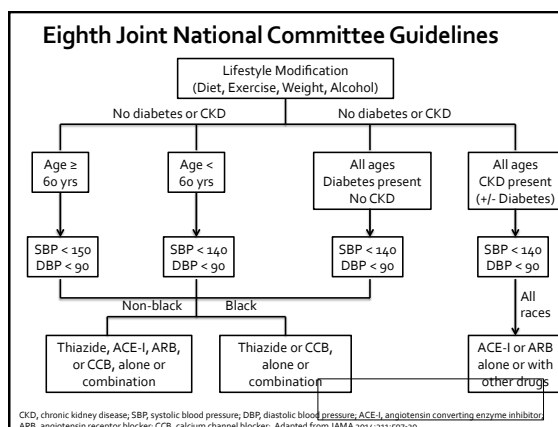
National Hypertension Guidelines

- Kidney Disease: Improving Global Outcomes (2012)
- American Society of Hypertension/International Society of Hypertension (2014)
- Eight Joint National Committee (2014)
- American Heart Association/American College of Cardiology/American Society of Hypertension – Cardiovascular Disease (2015)
- American Diabetes Association (2015)

Kidney Int Suppl 2012;2(5):337-414; J Clin Hyperten 2014;16:14-26; JAMA 2014;311:507-20; Circulation. 2015;131:e435-70; Diabetes Care 2015;38(Suppl. 1):S49-S57;

Guideline/Statement	Year	Patient Group	Goal (mm Hg)
Kidney Disease: Improving Global Outcomes	2012	No proteinuria	≤ 140/90
		Proteinuria	≤ 130/90
Eighth Joint National Committee	2014	Age 30-59	< 140/90
		Age > 60	< 150/90
		Diabetes	< 140/90
		Chronic kidney disease	< 140/90
American Society of Hypertension/International Society of Hypertension	2014	Age 18-79	< 140/90
		Age ≥ 80	< 150/90
		Diabetes	< 140/90
		Chronic kidney disease	< 140/90
American Heart Association Prevention/American College of Cardiology/American Hypertension Society (Patients with Cardiovascular Disease)	2015	Age > 80	< 150/90
		CAD, ACS, or HF	< 140/90
American Diabetes Association	2015	CAD, post-MI, stroke/TIA, carotid artery disease, PAD, or AAA	< 130/80
		Diabetes	< 140/90

CAD, coronary artery disease; ACS, acute coronary syndrome; HF, heart failure; MI, myocardial infarction; TIA, transient ischemic attack; PAD, peripheral arterial disease; AAA, abdominal aortic aneurysm.



Eighth Joint National Committee Guidelines - Concerns

- No recommendations for patients with coronary disease or HF
- Medication selection for special populations not addressed
- Definition of older patient as age > 60 inconsistent with other guidelines

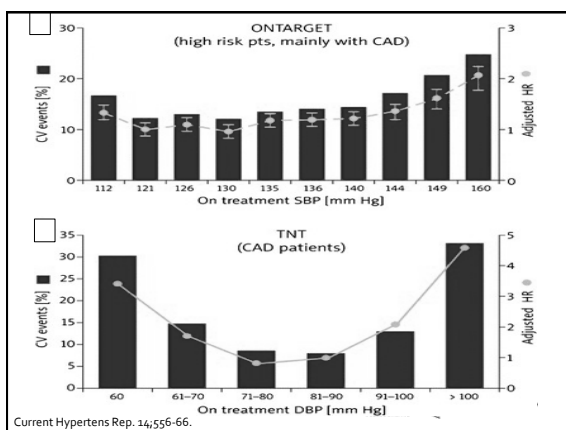
HF, heart failure
JAMA 2014;311:597-20



Hypertension Management with CAD

- Reduce excess morbidity and unnecessary deaths
- "Lower is better" blood pressure target
- Lower blood pressure target still intensely debated
 - Not consistently supported by high-quality, randomized, clinical trials

Circulation. 2015;131:e435-70;
Cochrane Database Syst Rev. 2009;CD004349.



ACCORD Trial

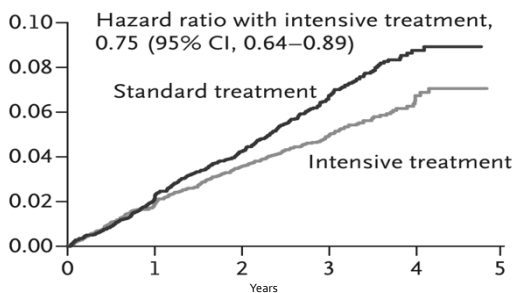
- Type 2 diabetic patients
- Intensive blood pressure control (BP < 120/80 mm Hg) vs. standard (BP < 140/90 mm Hg)
- No significant difference in CVD outcomes except:
 - Stroke: 0.32% vs. 0.53% (Hazard ratio 0.59, 95% CI: 0.39-0.89, P = 0.01)
- Mean achieved DBP of 60-65 mm Hg in intensive BP control group
 - Statistically nonsignificant decrease in CVD events

ACCORD, Action to Control Cardiovascular Risk in Diabetes; BP, blood pressure; CVD, cardiovascular; DBP, diastolic blood pressure
N Engl J Med. 2010;362:1575-1585.



SPRINT Trial

- Non-diabetic patients at high risk for CVD disease



SPRINT, Systolic Blood Pressure Intervention Trial
Adapted from N Engl J Med. 2015;373:2103-16.



Blood Pressure Goal in CAD

Disease State	BP Goal
Secondary prevention of CVD events	< 140/90 mm Hg
High-risk patients with CAD: <ul style="list-style-type: none"> • Previous MI • Previous stroke/TIA • Certain CAD risk equivalents (carotid artery disease, peripheral artery disease, abdominal aortic aneurysm) 	< 130/80 mm Hg

CVD, cardiovascular; CAD, coronary artery disease; MI, myocardial infarction; TIA, transient ischemic attack;

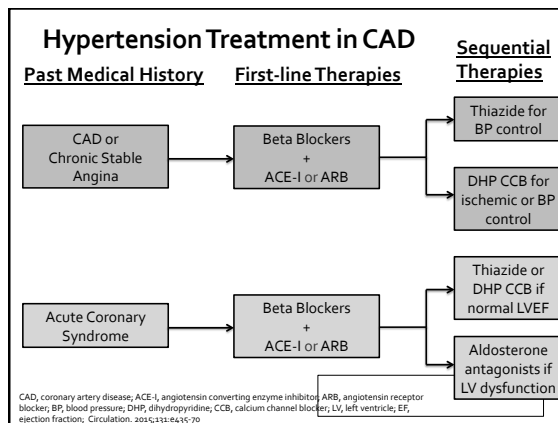
Circulation. 2015;131:e435-70



Blood Pressure Goal in ACS

- Not been well-studied in literature
- Target blood pressure < 140/90 mm Hg immediately post-ACS
- Goal of 130/80 mm Hg at discharge reasonable

ACS, acute coronary syndrome; Circulation. 2015;131:e435-70



Blood Pressure Goal for Heart Failure

- No definitive data for optimal blood pressure goal
- Conservative recommendation of < 140/90 mm Hg
- Consideration of < 130/80 mm Hg in select heart failure patients

Circulation. 2015;131:e435-70



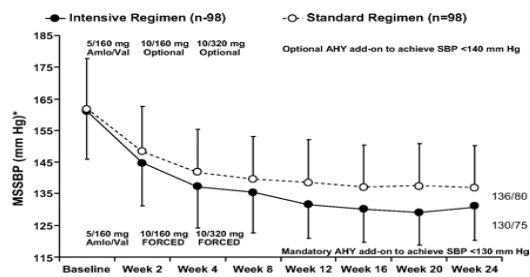
Evidence in HF

- SBP lowered to 110-130 mm Hg in most trials with clear benefit
- COPERNICUS trial
 - Evaluated carvedilol in severe chronic HF
 - Entry criteria included SBP as low as 85 mm Hg with mean pretreatment BP of 123/76 mm Hg
 - 27% reduction in combined risk of death or hospitalization for a cardiovascular reason (p = 0.00002)

SBP, systolic blood pressure; HF, heart failure; Circulation. 2002;106:2194-2199



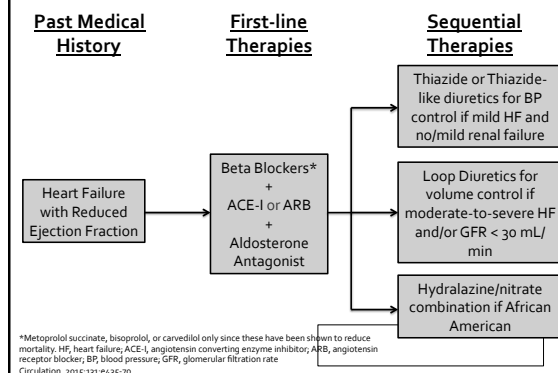
EXCEED Trial: Blood Pressure Control in HFpEF



Greater improvement in diastolic relaxation with lower SBP

HFpEF, heart failure with preserved ejection fraction; SBP, systolic blood pressure; Hypertension. 2003; 42:1206-1252; Hypertension. 2010; 55:241-248

Hypertension Treatment in Heart Failure



Conclusion

- Blood pressure goal should be patient-specific
- Eighth Joint National Committee guidelines for general population and patients with diabetes and/or chronic kidney disease
- Refer to disease-specific guidelines for management of CVD conditions and heart failure

Blood Pressure Goals and Treatment Plans

Disease State	BP Goal*	First-Line Therapies	Sequential Therapies
CAD or Chronic Stable Angina	< 140/90	<ul style="list-style-type: none"> • Beta blocker • ACE-I or ARB 	<ul style="list-style-type: none"> • Diuretic • DHP CCB
Acute Coronary Syndrome	< 140/90	<ul style="list-style-type: none"> • Beta blocker • ACE-I or ARB 	<ul style="list-style-type: none"> • Diuretic • DHP CCB • Aldosterone Antagonist
Heart Failure	< 140/90	<ul style="list-style-type: none"> • Beta blocker • ACE-I or ARB • Aldosterone Antagonists 	<ul style="list-style-type: none"> • Thiazide or thiazide-like diuretics if mild HF and no/mild renal impairment • Loop diuretics if moderate-to-severe HF and/or GFR < 30 mL/min • Hydralazine/nitrate combination if African American

* BP goal should be < 150/90 if Age > 80 yrs.

BP, blood pressure; CAD, coronary artery disease; ACE-I, angiotensin converting enzyme inhibitor; ARB, angiotensin receptor blocker; DHP, dihydropyridine; CCB, calcium channel blocker; HF, heart failure