Hypertension 2020: Evidence-Based Treatment Guidelines

Wendy L. Wright,
MS, ANP-BC, FNP-BC, FAANP, FAAN, FNAP
Adult/Family Nurse Practitioner
Owner – Wright & Associates Family Healthcare @ Amherst, NH
Owner – Wright & Associates Family Healthcare @ Concord, NH
Owner – Partners in Healthcare Education, LLC

Wright, 2020

1

Disclosures

- Speaker Bureau: Sanofi-Pasteur, Merck, Pfizer, Amgen
- Consultant: Pfizer, Sanofi-Pasteur, Merck, Gilead, GSK

Wright, 2020

2

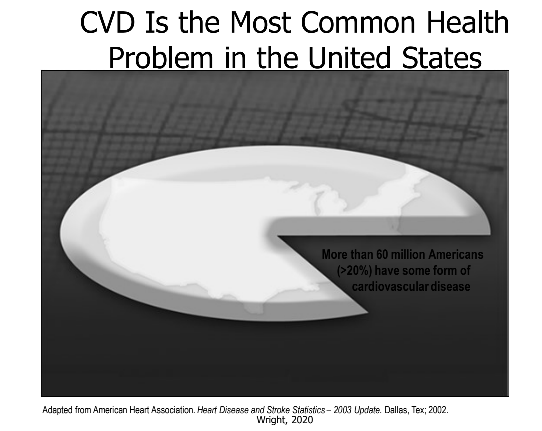
Objectives

- Upon completion of this lecture, the participant will be able to:
  - Identify complications associated with hypertension
  - Discuss the revised JNC VII/AHA/ACC guidelines
  - Discuss nonpharmacologic and pharmacologic options for the treatment of hypertension

Wright, 2020

3

CVD Is the Most Common Health Problem in the United States



Adapted from American Heart Association. *Heart Disease and Stroke Statistics – 2003 Update*. Dallas, Tex; 2002.

Wright, 2020

4

Evolution in Understanding Cardiovascular Disease: Total Risk Perspective

Dyslipidemia

Smoking

Hypertension

Age

Gender

Diabetes Mellitus

Cardiovascular Disease Is an Interplay of Risk Factors

Kannel WB. *Am J Hypertens*. 2000;13:3S-10S; Poulter N. *Am J Hypertens*. 1999;12:92S-95S.

Wright, 2020

5

Impact of Hypertension

- Hypertension is the most common condition seen in primary care
- **75 million** American adults (**29**%) have high blood pressure—that's 1 of every 3 adults
- 277,000 deaths annually in US due to hypertension[2]

[1]American Association of Clinical Endocrinologists Medical Guidelines For Clinical Practice for the Diagnosis and Treatment of Hypertension. Endocrine Practice, Vol 12 No. 2 March/April 2006

[2]National Center for Health Statistics. Health, United States, 2005, with Chartbook on the Health of Americans. Hyattsville, Maryland: 2004. Available at: http://www.cdc.gov/nchs/hus.htm

Wright, 2020

6

It is currently estimated that…

- For a 45 year old adult without hypertension, 40 year risk for developing is:
  - 93% African Americans
  - 92% Hispanics
  - 86% Whites
  - 84% Asians

Wright, 2020

7

Hypertension Remains One of the Most Important Multipliers of CV Risk

BP >140/90 mm Hg is associated with:

- 277,000 deaths in 2003

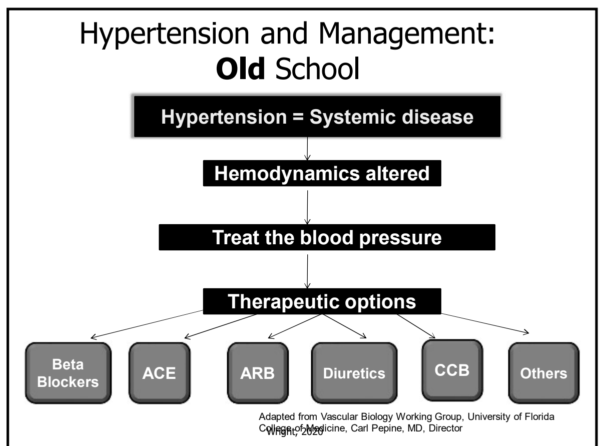
BP, blood pressure; CHF, congestive heart failure; MI, myocardial infarction.

Rosamond W et al. *Circulation*. 2007;115:1-103.

Wright, 2020

8

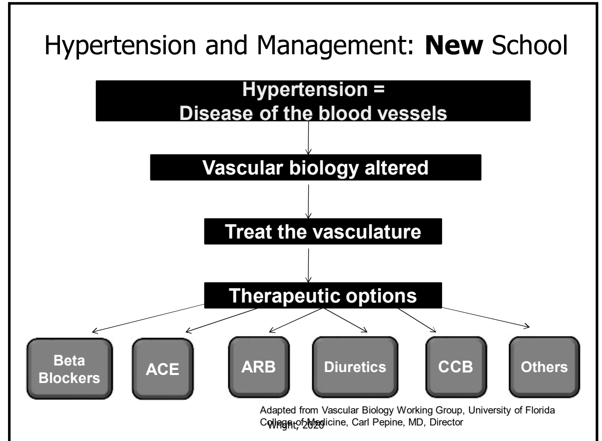
Hypertension and Management: **Old** School



Adapted from Vascular Biology Working Group, University of Florida College of Medicine, Carl Pepine, MD, Director

Wright, 2020

9



10

Case Study: MS

- 62 year old white today
- VS: 97.9, 84 bpm, 16 respirations/min, BP 142/94
  - BMI: 32
  - Eye: retinal examination normal
  - AAO, smiling, conversant
  - Carotids: 2+ bilaterally, no bruits
  - Heart: S1S2, RRR, no S3, S4, murmurs
  - PV: DPPT – 2+ bilaterally without edema

Wright, 2020

11

Patient: MS

- Todays visit
  - VS: Pulse: 88 bpm, BP 148/94 mm/Hg
  - BMI: 32
  - Eye: retinal examination normal
  - AAO, smiling, conversant
  - Carotids: 2+ bilaterally, no bruits
  - Heart: S1S2, RRR, no S3, S4, murmurs
  - PV: DPPT – 2+ bilaterally without edema

Wright, 2020

12

2017 ACC/AHA/AAPA/ABC/ACPM/AGS/APhA/ASH/ASPC/NMA/PCNA Guideline for the Prevention, Detection, Evaluation, and Management of High Blood Pressure in Adults

© American College of Cardiology Foundation and American Heart Association, Inc.

13

Best Proven Nonpharmacological Interventions for Prevention and Treatment of Hypertension*

	Nonpharmacological Intervention	Dose	Approximate Impact on SBP: Hypertension	Approximate Impact on SBP: Normotension
Weight loss	Weight/body fat	Best goal is ideal body weight, but aim for at least a 1-kg reduction in body weight for most adults who are overweight. Expect about 1 mm Hg for every 1-kg reduction in body weight.	-5 mm Hg	-2/3 mm Hg
Healthy diet	DASH dietary pattern	Consume a diet rich in fruits, vegetables, whole grains, and low-fat dairy products, with reduced content of saturated and total fat.	-11 mm Hg	-3 mm Hg
Reduced intake of dietary sodium	Dietary sodium	Optimal goal is <1500 mg/d, but aim for at least a 1000-mg/d reduction in most adults.	-5/6 mm Hg	-2/3 mm Hg
Enhanced intake of dietary potassium	Dietary potassium	Aim for 3500–5000 mg/d, preferably by consumption of a diet rich in potassium.	-4/5 mm Hg	-2 mm Hg

*Type, dose, and expected impact on BP in adults with a normal BP and with hypertension.
DASH indicates Dietary Approaches to Stop Hypertension; and SBP, systolic blood pressure.
Resources: Your Guide to Lowering Your Blood Pressure With DASH—How Do I Make the DASH? Available at: https://www.nhlbi.nih.gov/health/resources/heart/hbp-dash-how-to.
Top 10 Dash Diet Tips. Available at: http://dashdiet.org/dash_diet_tips.asp

14

Best Proven Nonpharmacological Interventions for Prevention and Treatment of Hypertension* (cont.)

	Nonpharmacological Intervention	Dose	Approximate Impact on SBP: Hypertension	Approximate Impact on SBP: Normotension
Physical activity	Aerobic	● 90–150 min/wk ● 65%–75% heart rate reserve	-5/8 mm Hg	-2/4 mm Hg
	Dynamic resistance	● 90–150 min/wk ● 50%–80% 1 rep maximum ● 6 exercises, 3 sets/exercise, 10 repetitions/set	-4 mm Hg	-2 mm Hg
	Isometric resistance	● 4 × 2 min (hand grip), 1 min rest between exercises, 30%–40% maximum voluntary contraction, 3 sessions/wk ● 8–10 wk	-5 mm Hg	-4 mm Hg
Moderation in alcohol intake	Alcohol consumption	In individuals who drink alcohol, reduce alcohol† to: ● Men: ≤2 drinks daily ● Women: ≤1 drink daily	-4 mm Hg	-3 mm

*Type, dose, and expected impact on BP in adults with a normal BP and with hypertension.
†In the United States, one “standard” drink contains roughly 14 g of pure alcohol, which is typically found in 12 oz of regular beer (usually about 5% alcohol), 5 oz of wine (usually about 12% alcohol), and 1.5 oz of distilled spirits (usually about 40% alcohol).

15

Do We Have a Diagnosis of Hypertension?

Wright, 2020

16

Diagnosis

- Use the average of 2 or more readings obtained on 2 or more occasions to estimate the individuals BP

Wright, 2020

17

Selection Criteria for BP Cuff Size for Measurement of BP in Adults

Arm Circumference	Usual Cuff Size
22–26 cm	Small adult
27–34 cm	Adult
35–44 cm	Large adult
45–52 cm	Adult thigh

Wright, 2020

18

Additional Recommendations

- Out of the office and self-monitoring of BP are recommended to confirm the diagnosis and for titration of BP-lowering medications
- For adults with untreated systolic BP of > 130 but < 160 or diastolic BP > 80 but < 100 mm Hg, it is reasonable to screen for white count hypertension using ABPM or HBPM prior to diagnosis

Wright, 2020

19

Corresponding Values of SBP/DBP for Clinic, HBPM, Daytime, Nighttime, and 24-Hour ABPM Measurements

Clinic	HBPM	Daytime ABPM	Nighttime ABPM	24-Hour ABPM
120/80	120/80	120/80	100/65	115/75
130/80	130/80	130/80	110/65	125/75
140/90	135/85	135/85	120/70	130/80
160/100	145/90	145/90	140/85	145/90

ABPM indicates ambulatory blood pressure monitoring; BP, blood pressure; DBP diastolic blood pressure; HBPM, home blood pressure monitoring; and SBP, systolic blood pressure.

Wright, 2020

20

Categories of BP in Adults*

BP Category	SBP		DBP
Normal	<120 mm Hg	and	<80 mm Hg
Elevated	120–129 mm Hg	and	<80 mm Hg
Hypertension			
Stage 1	130–139 mm Hg	or	80–89 mm Hg
Stage 2	≥140 mm Hg	or	≥90 mm Hg

*Individuals with SBP and DBP in 2 categories should be designated to the higher BP category.
BP indicates blood pressure (based on an average of ≥2 careful readings obtained on ≥2 occasions, as detailed in DBP, diastolic blood pressure; and SBP systolic blood pressure.

Wright, 2020

21

Case Study: MS

- $\geq$ 60 years of age
- 2 readings confirm diagnosis
- Benign Essential Hypertension
  - Stage 2
  - What does this mean for treatment?

Wright, 2020

22

Basic and Optional Laboratory Tests for Primary Hypertension

Basic testing	Fasting blood glucose*
	Complete blood count
	Lipid profile
	Serum creatinine with eGFR*
	Serum sodium, potassium, calcium*
	Thyroid-stimulating hormone
	Urinalysis
	Electrocardiogram
Optional testing	Echocardiogram
	Uric acid
	Urinary albumin to creatinine ratio

*May be included in a comprehensive metabolic panel.
eGFR indicates estimated glomerular filtration rate.

Wright, 2020

23

Treatment of Hypertension

Wright, 2020

24

Benefits of Lowering Blood Pressure

Average Percent Reduction

CVA: 35% - 40%
MI: 20% - 25%
CHF: 50%

The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, And Treatment of High Blood Pressure. http://jama.ama-assn.org/cgi/content/full/289.19.2560v1. Assessed 5-1-08

Wright, 2020

25

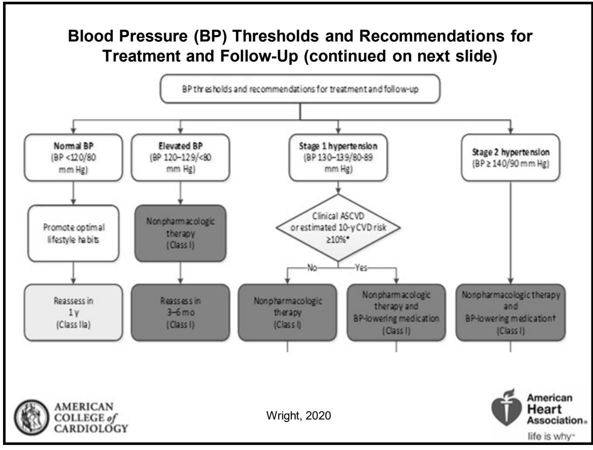
Case Study: MS

- How should she be treated?

Wright, 2020

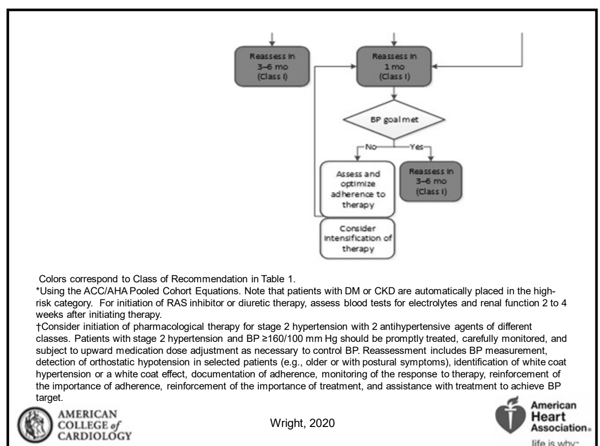
26

Blood Pressure (BP) Thresholds and Recommendations for Treatment and Follow-Up (continued on next slide)



Wright, 2020

27



28

Treatment and Follow-up Recommendations

- Elevated blood pressure or Stage 1 hypertension with low CVD risk
  - Repeat BP after 3-6 months of nonpharmacologic therapy
- Stage 1 Hypertension and high ASCVD risk (> 10%, 10-year risk)
  - Nonpharmacologic and pharmacologic therapy out of the gate
  - Recheck in 1 month

Wright, 2020

29

Treatment and Follow-up Recommendations

- Stage 2:
  - Nonpharmacologic and 2 anti-hypertensives out of the gate
  - F/u in 1 month
- SBP $\geq$ 160 or DBP $\geq$ 100 mm Hg
  - Initiate nonpharmacologic and 2 anti-hypertensives out of the gate
  - Careful monitoring; within days

Wright, 2020

30

Pharmacologic Treatments

Wright, 2020

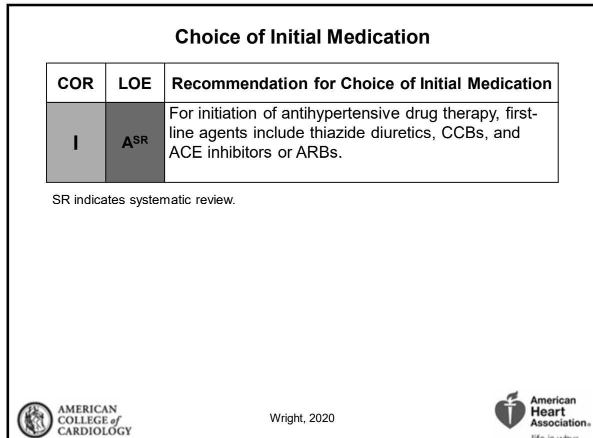
31

Recommendations for Treatment

- Stage 1 hypertension
  - ACE, ARB, CCB, Thiazides
- Stage 2 hypertension
  - Two first line medications
- CKD
  - ACE or usual first line medications
- Blacks
  - Thiazides and CCB are preferred

Wright, 2020

32



Choice of Initial Medication

COR	LOE	Recommendation for Choice of Initial Medication
I	A[SR]	For initiation of antihypertensive drug therapy, first-line agents include thiazide diuretics, CCBs, and ACE inhibitors or ARBs.

SR indicates systematic review.

33

Follow-Up After Initiating Antihypertensive Drug Therapy

COR	LOE	Recommendation for Follow-Up After Initiating Antihypertensive Drug Therapy
I	B-R	Adults initiating a new or adjusted drug regimen for hypertension should have a follow-up evaluation of adherence and response to treatment at monthly intervals until control is achieved.

AMERICAN COLLEGE of CARDIOLOGY — Wright, 2020 — American Heart Association life is why

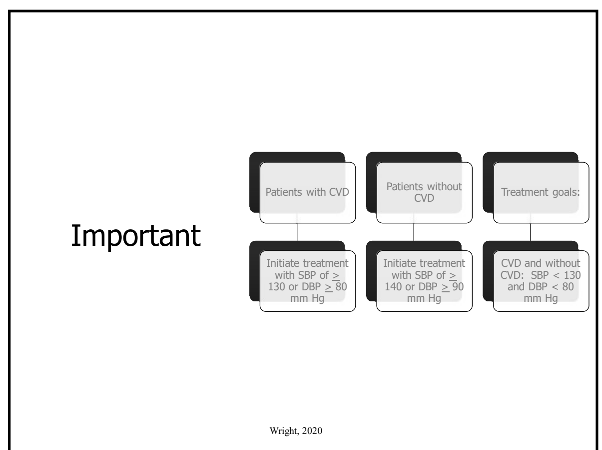
34

Racial and Ethnic Differences in Treatment

COR	LOE	Recommendations for Race and Ethnicity
I	B-R	In black adults with hypertension but without HF or CKD, including those with DM, initial antihypertensive treatment should include a thiazide-type diuretic or CCB.
I	C-LD	Two or more antihypertensive medications are recommended to achieve a BP target of less than 130/80 mm Hg in most adults with hypertension, especially in black adults with hypertension.

AMERICAN COLLEGE of CARDIOLOGY — Wright, 2020 — American Heart Association life is why

35



36

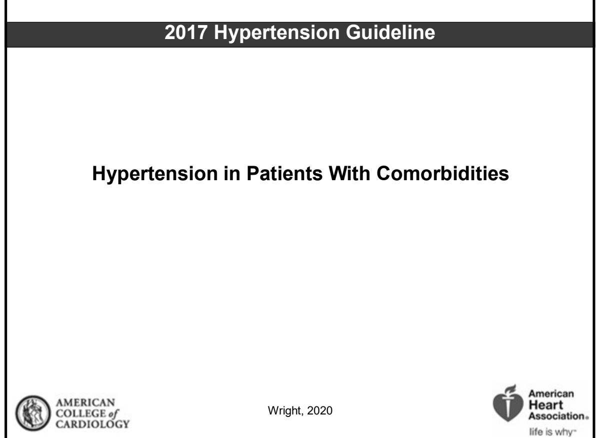
BP Treatment Threshold and the Use of CVD Risk Estimation to Guide Drug Treatment of Hypertension

COR	LOE	Recommendations for BP Treatment Threshold and Use of Risk Estimation* to Guide Drug Treatment of Hypertension
I	SBP: A DBP: C-EO	Use of BP-lowering medications is recommended for secondary prevention of recurrent CVD events in patients with clinical CVD and an average SBP of 130 mm Hg or higher or an average DBP of 80 mm Hg or higher, and for primary prevention in adults with an estimated 10-year atherosclerotic cardiovascular disease (ASCVD) risk of 10% or higher and an average SBP 130 mm Hg or higher or an average DBP 80 mm Hg or higher.
I	C-LD	Use of BP-lowering medication is recommended for primary prevention of CVD in adults with no history of CVD and with an estimated 10-year ASCVD risk <10% and an SBP of 140 mm Hg or higher or a DBP of 90 mm Hg or higher.

*ACC/AHA Pooled Cohort Equations (http://tools.acc.org/ASCVD-Risk-Estimator/) to estimate 10-year risk of atherosclerotic CVD.

AMERICAN COLLEGE of CARDIOLOGY — Wright, 2020 — American Heart Association. life is why

37



38

Diabetes Mellitus

COR	LOE	Recommendations for Treatment of Hypertension in Patients With DM
I	SBP: B-R[SR] DBP: C-EO	In adults with DM and hypertension, antihypertensive drug treatment should be initiated at a BP of 130/80 mm Hg or higher with a treatment goal of less than 130/80 mm Hg.
I	A[SR]	In adults with DM and hypertension, all first-line classes of antihypertensive agents (i.e., diuretics, ACE inhibitors, ARBs, and CCBs) are useful and effective.
IIb	B-NR	In adults with DM and hypertension, ACE inhibitors or ARBs may be considered in the presence of albuminuria.

SR indicates systematic review.

AMERICAN COLLEGE of CARDIOLOGY — Wright, 2020 — American Heart Association. life is why

39

Heart Failure

COR	LOE	Recommendation for Prevention of HF in Adults With Hypertension
I	SBP: B-R DBP: C-EO	In adults at increased risk of HF, the optimal BP in those with hypertension should be less than 130/80 mm Hg.

AMERICAN COLLEGE of CARDIOLOGY — Wright, 2020 — American Heart Association. life is why

40

Heart Failure With Reduced Ejection Fraction

COR	LOE	Recommendations for Treatment of Hypertension in Patients With HF*r*EF
I	C-EO	Adults with HF*r*EF and hypertension should be prescribed GDMT titrated to attain a BP of less than 130/80 mm Hg.
III: No Benefit	B-R	Nondihydropyridine CCBs are not recommended in the treatment of hypertension in adults with HF*r*EF.

AMERICAN COLLEGE of CARDIOLOGY — Wright, 2020 — American Heart Association. life is why

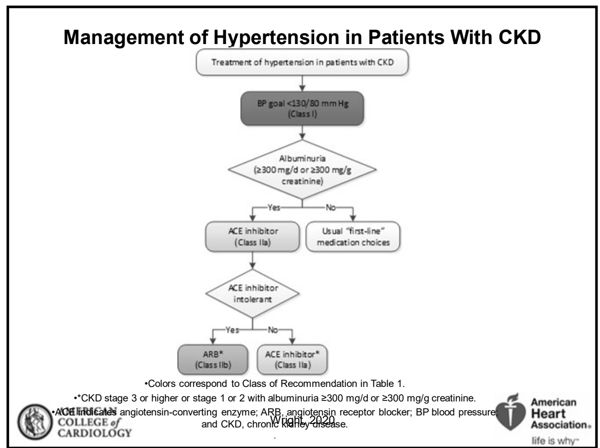
41

Heart Failure With Preserved Ejection Fraction

COR	LOE	Recommendations for Treatment of Hypertension in Patients With HF*p*EF
I	C-EO	In adults with HF*p*EF who present with symptoms of volume overload, diuretics should be prescribed to control hypertension.
I	C-LD	Adults with HF*p*EF and persistent hypertension after management of volume overload should be prescribed ACE inhibitors or ARBs and beta blockers titrated to attain SBP of less than 130 mm Hg.

AMERICAN COLLEGE of CARDIOLOGY — Wright, 2020 — American Heart Association. life is why

42



43

Thiazide Diuretics

- Dosing:
  - Start @ 12.5 mg of HCTZ
  - Increase to 25 mg at 6 weeks
- Benefits
  - 55% reduction in CHF
  - 37% reduction in CVA
  - 27% reduction in cardiac events
- If not adequately controlled, add additional agents

Wright, 2020

44

Chlorthalidone

- Making a come back into thiazide arena; preferred in 2017 guidelines
- Dosage: 25 mg once daily
- May increase dosage to 100 mg once daily
- Chlorthalidone and thiazide diuretics
  - May be associated with a 21% decrease in fracture risk compared with lisinopril and amlodipine[1]

[1]Joshua I. Barzilay, MD et al. **Association of 3 Different Antihypertensive Medications With Hip and Pelvic Fracture Risk in Older Adults: Secondary Analysis of a Randomized Clinical Trial**. *JAMA Internal Medicine*, November 2016 DOI: 10.1001/jamainternmed.2016.6821

Wright, 2020

45

Decreased Efficacy

- When GFR decreases below 30 mL/min, thiazide diuretics are likely ineffective
- Consider changing to loop diuretic at that time

Wright, 2020

46

Diuretic Precautions

- Electrolyte imbalances
- Syncope/presyncope when combined with ACE/ARB
- Hemoconcentration
- Decrease in urate excretion
- Worsening of insulin resistance at higher doses
- Fatigue

Product inserts accessed 04-20-2008

Wright, 2020

47

Angiotensin Converting Enzyme (ACE) Inhibitors

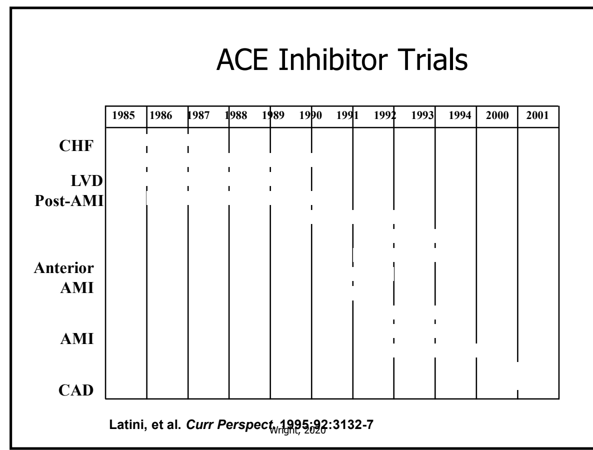
- •Increased nitrous oxide at vessel for vasodilatation
- •Improved glucose disposal
- •Reduction in LV geometry changes
- •Reduction in inflammation
- •Stabilization of fibrous cap of lipid lesion
- •Decreased proteinuria
- •Improves endothelial function
- •Reduced mortality in patients with CHF
- •Decreases post-MI mortality

Sato Atsuhisa, Pleiotropic effects of angiotensin-converting enzyme inhibitors; differentiation Among ace inhibitors may lead to further organ protection. Abstr 21st *Sci Meet Int Soc Hypertens* 2006. 423(2006)

Wright, 2020

48

ACE Inhibitor Trials



Latini, et al. *Curr Perspect.* 1995;92:3132-7

Wright, 2020

49

ACE Inhibitors Precautions

- Hyperkalemia
- Increase in creatinine
- May improve insulin sensitivity
- Decrease in serum Na+ may result in syncope and dizziness when used with diuretics

- Angioedema
- Cough

Product inserts accessed 04-20-2009

Wright, 2020

50

Angiotensin Receptor Blockers

Wright, 2020

51

Angiotension Receptor Blockers (ARB's)

- Utilized since April 1995
- Blocks uptake at receptor site
- Angiotension II produced in locations other than in the lungs
- BP decreased by reducing vascular tone and enhancing NA+ and water clearance

Wright, 2020

52

Metabolic Effects of ARB's

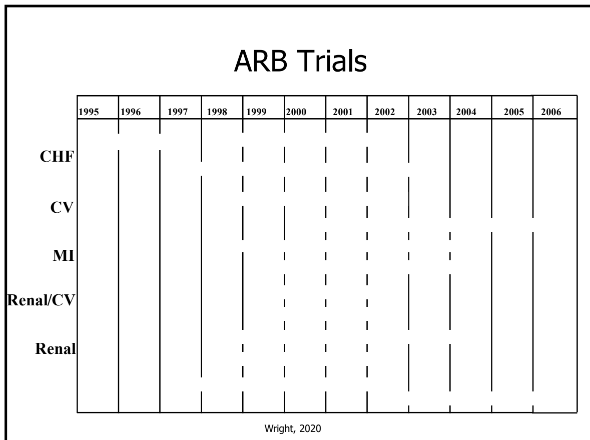
- Angiotensin II Receptor Blockers
  - Metabolically neutral
  - No impact on lipids
  - No impact on insulin
  - No impact on K+
  - Lowers uric acid levels
  - Minimal side effect profile

Product Inserts accessed 04-20-2009

Wright, 2020

53

ARB Trials



Wright, 2020

54

ACE vs ARB
ONTARGET Trial

	1. **Assess the effects of ACE VS ARB in terms of efficacy** 2. **Assess if the combination ACE & ARB was superior**
Results:	Telmisartan was found to be “noninferior” to ramipril in patients with vascular disease or high risk diabetes
	Combination of these two agents was associated with more adverse events without an increase in benefit.

Yusuf, S, Teo KK, Pogue, J et al for the ONTARGET investigators. Telmisartan, ramipril, or both in patients At high risk for vascular events *N Engl J Med* 2008;358:1547-1559.

Wright, 2020

55

Calcium Channel Blockers

Wright, 2020

56

Calcium Channel Blockers

- Effectively treat systolic hypertension
- May be superior to other antihypertensives for stroke prevention
- Effective in patients with:
  - Comorbid conditions (Raynauds, migraine)[1]
- Particularly effective in
  - Elderly and African American’s[2]

1. Materson BJ, Reda DJ, eta l. Single drug therapy for hypertension in men. A comparison of six Antihypertensive agents with placebo. N Engl J Med. 1993;328:914-921.
2. Tuomilehto J, Rastenyte D, et al. Effects of calcium channel blockade in older patients with Diabetes and hypertension. N Engl J med. 1999;340:677-684.

Wright, 2020

57

The Calcium Blockers

Dihydropyridines

- Studies of DPH's effects on proteinuria have produced conflicting results
- NKF recommends that in patients who have diabetes and kidney disease, DPH's should only be used in combination with and ACE or ARB

Thornley-Brown D, et al for the African American Study of Kidney Disease and Hypertension Study Group. Differing effects of antihypertensive drugs on the incidence Of Diabetes mellitus among patients with hypertensive kidney disease. *Arch Intern Med.* 2006;166(7):797-805.

Nondihydropyridines

- Regression of proteinuria
- Combination of Verapamil + ACE, reduction in proteinuria can be greater than achievable with verapamil alone.
- NKF now recommends adding a NDH to treat hypertension with an ACE inhibitor or an ARB to slow the progression of kidney disease.

National Kidney Foundation. K/DOQI clinical practice guidelines on hypertension and antihypertensive agents in chronic kidney disease. *Am J Kidney Dis.* 2004; 43(suppl 1):S1-S290.

Wright, 2020

58

What About Other Antihypertensives? When Do You Use?

Wright, 2020

59

Update

- AHA/ACC: highlighted beta-blockers, renin-angiotensin-aldosterone system blockers, and thiazide diuretics as the mainstays of drug treatment for patients with CAD

http://www.pm360online.com/ahaacc-updates-hypertension-guidelines-for-cad-patients/ accessed 05-27-2015

Wright, 2020

60

Beta blockers

- More cardioselective beta blockers are preferred
  - Bisoprolol and metoprolol succinate
  - Carvedilol (alpha and beta receptor activity) preferred in HFrEF
- Not first line unless CAD or HFrEF
- Should not be abruptly discontinued

Wright, 2020

61

Alpha Blockers

Wright, 2020

62

Alpha Blockers

- End in azosin
- Block postsynaptic $Alpha_1$ Receptors
- Results in vasodilatation and can cause orthostatic hypotension
- Relatively inexpensive
- Additive agent for older men to decrease BPH symptomatology
- Add-on agent only
- Should never be used as monotherapy due to increased risk of stroke and CHF

The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, And Treatment of High Blood Pressure. *http://jama.ama-assn.org/cgi/content/full/289.19.2560v1*. Assessed 5-1-08

Wright, 2020

63

Centrally Acting Blockers

Wright, 2020

64

Centrally Acting Agents

- Stimulates central $alpha_2$ receptors which results in:
  - Inhibiting efferent sympathetic activity
- Additive agents
- Should be used last line
  - Examples: Clonidine (catapress, catapress TTS); methyldopa
- Caution: sedation, orthostatic hypotension

Wright, 2020

65

Aldosterone Agonists

Wright, 2020

66

Aldosterone Antagonists

- Spironolactone (Aldactone)
- HCTZ/spironolactone (Aldactazide)
- Eplerenone (Inspra)

Wright, 2020

67

Aldosterone Antagonists

- May be recommended in the following individuals:
  - Post MI
  - NYHA Class III or IV
  - Ejection fraction of < 35%
  - Serum creatinine of < 2.5 mg/dl
  - K+ < 5.0 mmol/L

Mardi Gomberg-Maitland, Baran DA, Fuster, V. Treatment of Congestive Heart Failure Guidelines for the Primary Care Physician and Heart Failure Specialist. *Arch Intern Med* 2001;161:324-352et al. ACC/AHA 2005 Chronic Heart Failure Guideline Update. *JACC*.2005; 46:1116-43.

Wright, 2020

68

Aldosterone Antagonists

- Spironolactone or eplerenone is preferred in treatment of primary aldosteronism and in resistant hypertension

Wright, 2020

69

Precautions

- Must monitor electrolytes
- Must obtain baseline renal function
- Should discontinue the K^+ supplement
- Should limit to use in severe heart failure and post MI patients

Clavell, Alfredo L. Common Mistakes made in the Treatment of Congestive Heart Failure. Success with Failure: New Strategies for Evaluation and Treatment of CHF.
Whistler BC, Canada 8-2000.

Wright, 2020

70

Direct Renin Inhibitor

Renin is the enzyme at the beginning of the RAAS, one of the key regulating centers for blood pressure. Blocking this enzyme can decrease the downstream impact of the RAAS system.

Suppression of the RAAS has been shown to treat hypertension and reduce target organ damage.

Wright, 2020

71

Direct Renin Inhibition Inhibits the Entire Renin System[1-4]

Class	PRA	Ang I	Ang II
ACEI	↑	↑	↓
ARB	↑	↑	↑
Direct Renin Inhibitor (DRI)	↓	↓	↓

Increased peptide levels have not been shown to overcome the blood pressure–lowering effect of these agents.
ACEI, angiotensin-converting enzyme inhibitor; Ang, angiotensin; ARB, angiotensin receptor blocker;
PRA, plasma renin activity.

1. Johnston CI. *Blood Press Suppl*. 2000;1:9(suppl 1):9-13.
2. Widdop RE et al. *Hypertension*. 2002;40:516-520.
3. Fabiani ME et al. *Angiotensin II Receptor Antagonists*. 2001:263-278.
4. Lin C et al. *Am Heart J*. 1996;131:1024-1034.

Wright, 2020

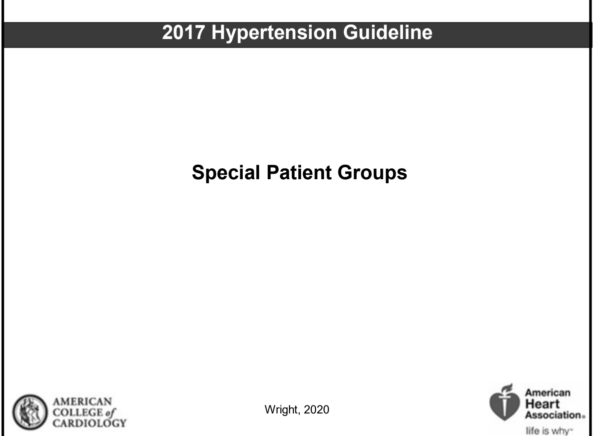
72

Warning re: Aliskiren

- Do not combine with ACE or ARB
- Avoid use of aliskiren and valsartan (Valturna)
- Warning followed after early termination of the ALTITUDE trial
  - Offered no benefit and was associated with an increased risk of CVA's

Wright, 2020

73



74

Pregnancy

COR	LOE	Recommendations for Treatment of Hypertension in Pregnancy
I	C-LD	Women with hypertension who become pregnant, or are planning to become pregnant, should be transitioned to methyldopa, nifedipine, and/or labetalol during pregnancy.
III: Harm	C-LD	Women with hypertension who become pregnant should not be treated with ACE inhibitors, ARBs, or direct renin inhibitors.

AMERICAN COLLEGE of CARDIOLOGY

Wright, 2020

American Heart Association life is why

75

Age-Related Issues

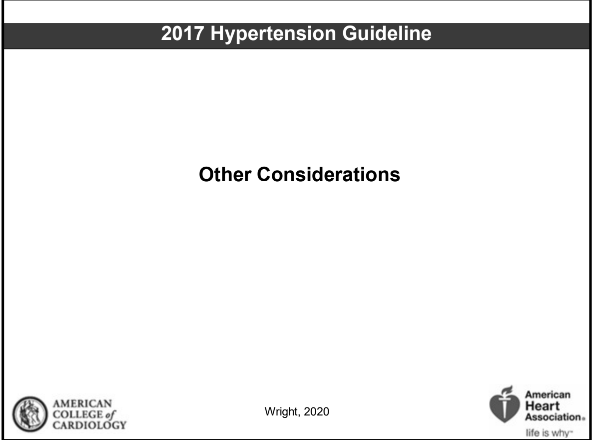
COR	LOE	Recommendations for Treatment of Hypertension in Older Persons
I	A	Treatment of hypertension with a SBP treatment goal of less than 130 mm Hg is recommended for noninstitutionalized ambulatory community-dwelling adults (≥65 years of age) with an average SBP of 130 mm Hg or higher.
IIa	C-EO	For older adults (≥65 years of age) with hypertension and a high burden of comorbidity and limited life expectancy, clinical judgment, patient preference, and a team-based approach to assess risk/benefit is reasonable for decisions regarding intensity of BP lowering and choice of antihypertensive drugs.

AMERICAN COLLEGE of CARDIOLOGY

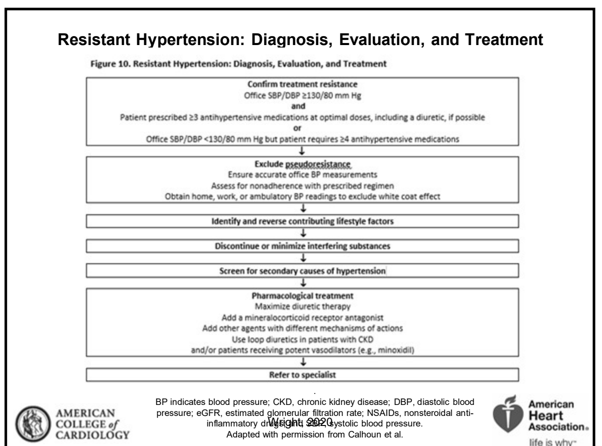
Wright, 2020

American Heart Association. life is why

76

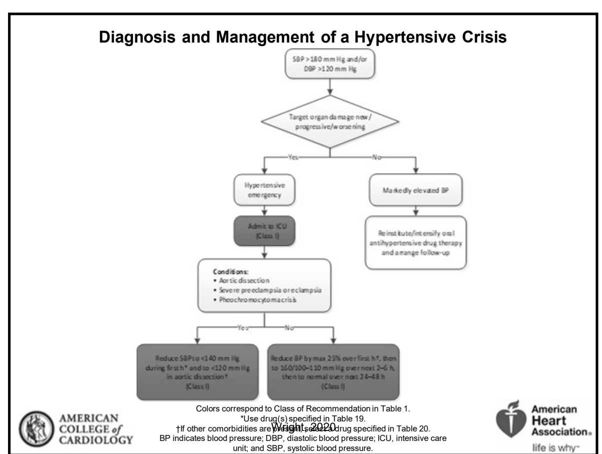


77



78

Diagnosis and Management of a Hypertensive Crisis



Colors correspond to Class of Recommendation in Table 1.
*Use drug(s) specified in Table 19.
†If other comorbidities are present, select a drug specified in Table 20.
BP indicates blood pressure; DBP, diastolic blood pressure; ICU, intensive care unit; and SBP, systolic blood pressure.

Wright, 2020

79

Hypertensive Urgency vs. Emergency

- Urgency
  - BP ≥ 180/120
  - No TOD
  - Often asymptomatic but may have headache, SOB
  - Adjust oral medications and f/u within 1 –few days
- Emergency
  - BP ≥ 180/120
  - + TOD
  - IV medication indicated
  - Goal: reduce mean arterial pressure by 25% in 1 hour
  - Monitored in ICU

http://www.consultant360.com/articles/acute-hypertension-hypertensive-urgency-and-hypertensive-emergency accessed 12-01-2016

Wright, 2020

80

Patients Undergoing Surgical Procedures

COR	LOE	Recommendations for Treatment of Hypertension in Patients Undergoing Surgical Procedures
		Preoperative
I	B-NR	In patients with hypertension undergoing major surgery who have been on beta blockers chronically, beta blockers should be continued.
IIa	C-EO	In patients with hypertension undergoing planned elective major surgery, it is reasonable to continue medical therapy for hypertension until surgery.
IIb	B-NR	In patients with hypertension undergoing major surgery, discontinuation of ACE inhibitors or ARBs perioperatively may be considered.

AMERICAN COLLEGE of CARDIOLOGY

Wright, 2020

American Heart Association
life is why

81

Patients Undergoing Surgical Procedures (cont.)

COR	LOE	Recommendations for Treatment of Hypertension in Patients Undergoing Surgical Procedures
Preoperative		
IIb	C-LD	In patients with planned elective major surgery and SBP of 180 mm Hg or higher or DBP of 110 mm Hg or higher, deferring surgery may be considered.
III: Harm	B-NR	For patients undergoing surgery, abrupt preoperative discontinuation of beta blockers or clonidine is potentially harmful.
III: Harm	B-NR	Beta blockers should not be started on the day of surgery in beta blocker–naïve patients.
Intraoperative		
I	C-EO	Patients with intraoperative hypertension should be managed with intravenous medications until such time as oral medications can be resumed.

AMERICAN COLLEGE of CARDIOLOGY

Wright, 2020

American Heart Association. life is why

82

Combination Therapy

Wright, 2020

83

Choice of Initial Monotherapy Versus Initial Combination Drug Therapy

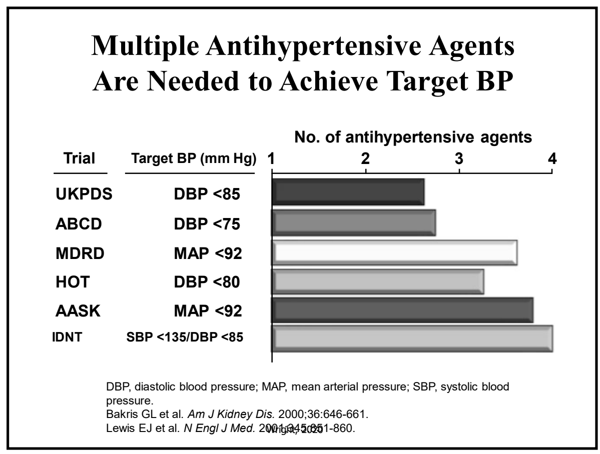
COR	LOE	Recommendations for Choice of Initial Monotherapy Versus Initial Combination Drug Therapy*
I	C-EO	Initiation of antihypertensive drug therapy with 2 first-line agents of different classes, either as separate agents or in a fixed-dose combination, is recommended in adults with stage 2 hypertension and an average BP more than 20/10 mm Hg above their BP target.
IIa	C-EO	Initiation of antihypertensive drug therapy with a single antihypertensive drug is reasonable in adults with stage 1 hypertension and BP goal <130/80 mm Hg with dosage titration and sequential addition of other agents to achieve the BP target.

AMERICAN COLLEGE of CARDIOLOGY

Wright, 2020

American Heart Association. life is why

84



85

Sprint Trial

- Compares standard hypertensive treatment vs. intensive treatment
- 9300+ patients
- Goal:
  - Standard < 140 mm/Hg
  - Intensive < 120 mm/Hg
- Primary end point: MI, CVA, CHF, Death
- Stopped early at 3.26 years
  - 1.65%/year vs. 2.19%/year
  - All cause mortality decreased as well

http://www.nejm.org/doi/full/10.1056/NEJMoa1511939 accessed 02-10-2016

Wright, 2020

86

Medication Adherence

- Significant problem in United States
- Factors which affect adherence rates
  - Uninsured
  - Cost of medication
  - Multiple pills vs. one combined medication
  - Number of pharmacy visits
  - Patients who do not monitor BP at home

Wright, 2020

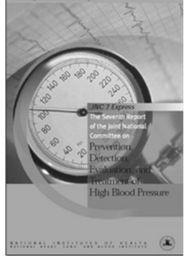
87

Wright, 2020

88

Target Organ Damage

- Heart
  - LVH, Angina, CHF, MI
- Brain
  - Stroke or TIA
  - Dementia
- Chronic Kidney Disease
- Peripheral Vascular Disease
- Retinopathy



JAMA. 2003:289:2560-2577.

Wright, 2020

89

BP Thresholds for and Goals of Pharmacological Therapy in Patients With Hypertension According to Clinical Conditions

Clinical Condition(s)	BP Threshold, mm Hg	BP Goal, mm Hg
General		
Clinical CVD or 10-year ASCVD risk ≥10%	≥130/80	<130/80
No clinical CVD and 10-year ASCVD risk <10%	≥140/90	<130/80
Older persons (≥65 years of age; noninstitutionalized, ambulatory, community-living adults)	≥130 (SBP)	<130 (SBP)
Specific comorbidities		
Diabetes mellitus	≥130/80	<130/80
Chronic kidney disease	≥130/80	<130/80
Chronic kidney disease after renal transplantation	≥130/80	<130/80
Heart failure	≥130/80	<130/80
Stable ischemic heart disease	≥130/80	<130/80
Secondary stroke prevention	≥140/90	<130/80
Secondary stroke prevention (lacunar)	≥130/80	<130/80
Peripheral arterial disease	≥130/80	<130/80

ASCVD indicates atherosclerotic cardiovascular disease; BP, blood pressure; CVD, cardiovascular disease; and SBP, systolic blood pressure.

Wright, 2020

90

Thank You For Your Time and Attention!

Wright, 2020

91

Wendy L. Wright

Adult/Family Nurse Practitioner
WendyARNP@aol.com

Wright, 2020

92