# Hypertension 2023: What's new in the treatment guidelines?

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**Disclosure**

- Speaker Bureau
  - Sanofi-Pasteur, Merck, Pfizer, Seqirus, Moderna – Vaccines
  - AbbVie and Biohaven – Migraines
  - Idorsia – Insomnia
- Consultant
  - Sanofi-Pasteur, Merck, Pfizer, Moderna, and Seqirus – Vaccines
  - GlaxoSmithKline – OA and Pain
  - Bayer – Chronic Kidney Disease
  - Idorsia – Insomnia
  - Shield Therapeutics – Iron Deficiency Anemia

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**Objectives**

- At the end of this presentation, the participant will be able to:

1. Identify complications associated with hypertension.
2. Discuss the revised JNC VIII/AHA/ACC guidelines.
3. Discuss nonpharmacologic and pharmacologic options for the treatment of hypertension.

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**Tips**

- References
  - Listed at the end of the presentation
- To facilitate your learning
  - Specific tables/images can be viewed full page at the end of your handout.

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**CVD is the most common health problem in the United States.[1]**

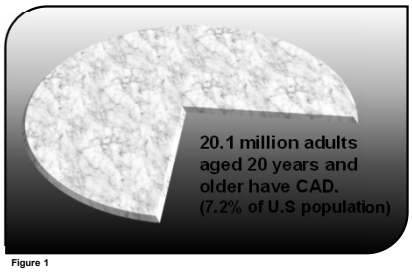


Figure 1

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## Evolution in Understanding Cardiovascular Disease: Total Risk Perspective[2,3]

**Cardiovascular disease is an interplay of risk factors.**

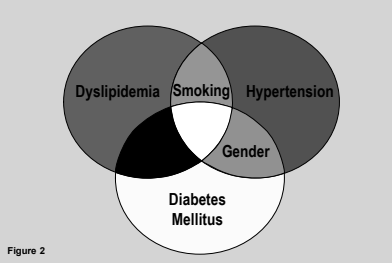


Figure 2

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## Impact of Hypertension[1]

- Hypertension is the most common condition seen in primary care.
- **108 million** American adults (**29**%) have high blood pressure.
  - 1 of every 3 adults
- Only 1 out 4 Americans have their blood pressure under control.
- 500,000 deaths annually in the U.S. due to hypertension.

Figure 3

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## It is currently estimated that…

- For a 45-year-old adult without hypertension, 40-year risk for developing is…
  - 93% for Black individuals
  - 92% for Hispanic individuals
  - 86% for White individuals
  - 84% for Asian individuals

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## Hypertension Remains One of the Most Important Multipliers of CV Risk

- Hypertension is the most prevalent cause of stroke worldwide.[2]
- Studies show a positive linear relationship between blood pressure and incident cardiovascular disease.[3]
- Hypertension is a leading risk factor for kidney disease.[4]

Figure 4

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## Hypertension and Management: Old School

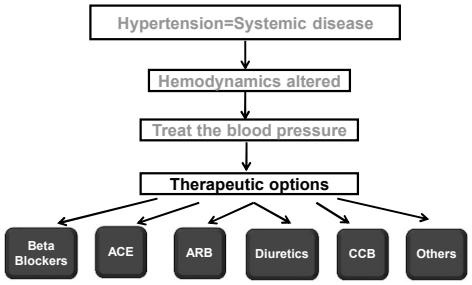


Figure 5

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## Hypertension and Management: New School

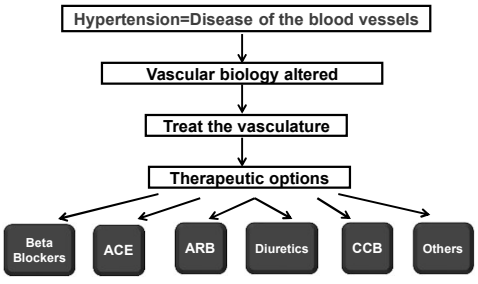


Figure 6

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## Case Study – MS

62-year-old female – **PE 3 months ago**

Vital signs

- Temp: 97.9°F (36.6 °C)
- Pulse: 84 bpm
- RR: 16 bpm
- BP:142/94 mm Hg
- BMI: 32 kg/m$^2$
- Eye: Retinal examination normal
- AAO, smiling, conversant
- Carotids: 2+ bilaterally, no bruits
- Heart: $S_1S_2$, RRR, no $S_3$, $S_4$, murmurs
- PV: DPPT – 2+ bilaterally without edema

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## Case Study – MS (continued)

62-year-old female – **Today's visit**

Vital signs

- Pulse: 88 bpm
- BP:148/94 mm Hg
- BMI: 32 kg/m$^2$
- Eye: Retinal examination normal
- AAO, smiling, conversant
- Carotids: 2+ bilaterally, no bruits
- Heart: $S_1$, $S_2$, RRR, no $S_3$, $S_4$, murmurs
- PV: DPPT – 2+ bilaterally without edema

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**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**

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**Do we have a diagnosis of hypertension?**

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## Diagnosis

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

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## 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 |

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**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 mm Hg but <160 mm Hg or diastolic BP >80 mm Hg but <100 mm Hg, it is reasonable to screen for white count hypertension using ABPM or HBPM prior to diagnosis.

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**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 |

Measurement of units: mm Hg
Ambulatory blood pressure monitoring (ABPM); Blood pressure (BP); DBP diastolic blood pressure; Home blood pressure monitoring (HBPM); and Systolic blood pressure (SBP).

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**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. Blood pressure (BP) based on an average of ≥2 careful readings obtained on ≥2 occasions, as detailed in diastolic blood pressure (DBP); and systolic blood pressure (SBP).

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**Case Study – MS (continued)**

- ≥60 years of age
- 2 readings confirm diagnosis.

- Benign essential hypertension
  - Stage 2
  - What does this mean for treatment?

Figure 7

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**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. Estimated glomerular filtration rate=eGFR

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**Purpose of Laboratory Evaluation and Diagnostic Testing**

- Risk profiling
- Identify secondary causes of hypertension.
  - Pheochromocytoma
  - Sleep apnea
  - Hyperthyroidism
  - CKD/PCKD
  - Cushing's syndrome
  - Hyperaldosteronism
  - Substance use disorder

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## Treatment of Hypertension

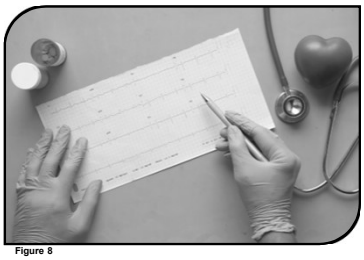

Figure 8

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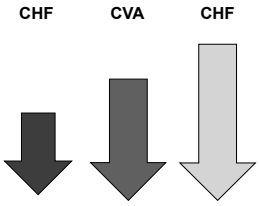
**Benefits of Lowering Blood Pressure[5]**




**Average Percent Reduction**

CVA: 26%
CV events/MI: 41%
CHF: 37%
Renal Failure: 28%
All cause mortality: 35%

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**Case Study – MS**

How should she be treated?

Figure 9

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## Lifestyle modification is important!


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## Best Proven Nonpharmacological Interventions for Prevention and Treatment of Hypertension*[6, 7]

| | Nonpharmacological Intervention | Dose | Approximate Impact on SBP | |
|---|---|---|---|---|
| | | | Hypertension | 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.; Dietary Approaches to Stop Hypertension (DASH); and systolic blood pressure (SBP).

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## Best Proven Nonpharmacological Interventions for Prevention and Treatment of Hypertension*[6, 7](cont.)

| | Nonpharmacological Intervention | Dose | Approximate Impact on SBP | |
|---|---|---|---|---|
| | | | Hypertension | Normotension |
| **Physical activity** | Aerobic | • 90–150 min/wk<br>• 65%–75% heart rate reserve | -5/8 mm Hg | -2/4 mm Hg |
| | Dynamic resistance | • 90–150 min/wk<br>• 50%–80% 1 rep maximum<br>• 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<br>• 8–10 wk | -5 mm Hg | -4 mm Hg |
| **Moderation in alcohol intake** | Alcohol consumption | In individuals who drink alcohol, reduce alcohol† to:<br>• Men: ≤2 drinks daily<br>• 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 (0.35 L) of regular beer (usually about 5% alcohol), 5 oz (0.15 L) of wine (usually about 12% alcohol), and 1.5 oz (0.04 L) of distilled spirits (usually about 40% alcohol).

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

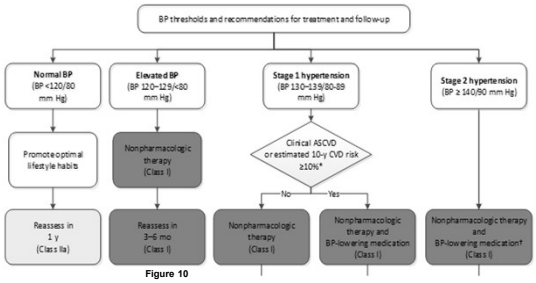


Figure 10

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Colors correspond to Class of Recommendation in Table 1.
*Using the ACC/AHA Pooled Cohort Equations. Note that patients with DM or CKD are automatically placed in the high-risk category. For initiation of RAS inhibitor or diuretic therapy, assess blood tests for electrolytes and renal function 2 to 4 weeks after initiating therapy.
†Consider initiation of pharmacological therapy for stage 2 hypertension with 2 antihypertensive agents of different classes. Patients with stage 2 hypertension and BP ≥160/100 mm Hg should be promptly treated, carefully monitored, and subject to upward medication dose adjustment as necessary to control BP. Reassessment includes BP measurement, detection of orthostatic hypotension in selected patients (e.g., older or with postural symptoms), identification of white coat hypertension or a white coat effect, documentation of adherence, monitoring of the response to therapy, reinforcement of the importance of adherence, reinforcement of the importance of treatment, and assistance with treatment to achieve BP target.

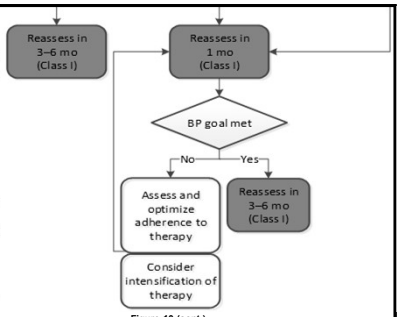


Figure 10 (cont.)

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## Treatment and Follow-up Recommendations

SBP ≥160 or DBP ≥100 mm Hg

- Initiate nonpharmacologic and 2 antihypertensives out of the gate.
- Careful monitoring; within days

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## Pharmacologic Treatments

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## Treatment Options

Figure 11

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**Medications for Hypertension Treatment**

Generally accepted that the first three medication classes are:

1. ACE or ARB
2. CCB
3. Thiazide diuretic (HCTZ vs. chlorthalidone)

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**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

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**Chlorthalidone[8]**

- 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

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**Decreased Efficacy**

- When GFR decreases below 30 mL/min/1.73 $m^2$ thiazide diuretics are likely ineffective.

↓

Consider changing to loop diuretic at that time.

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**Diuretic Precautions**

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

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**Diuretic Guidance – Resistant Hypertension**

- Maximize diuretic therapy.
- Use loop diuretics in individuals with CKD +/or those receiving potent vasodilators.

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## Angiotensin Converting Enzyme (ACE) Inhibitors[9, 10]

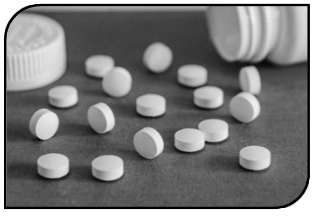

Figure 12

- 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

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## ACE Inhibitor Trials[11]

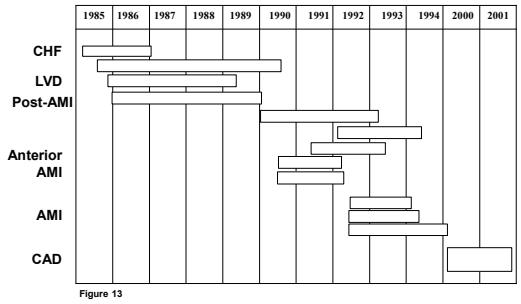

Figure 13

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## 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
- Category D in pregnancy

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## Angiotensin Receptor Blockers


Figure 14

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**Angiotensin Receptor Blockers (ARBs) (continued)**

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

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**Metabolic Effects of ARBs**

**Angiotensin II Receptor Blockers**

| | |
|---|---|
| Metabolically neutral | No impact on lipids |
| No impact on insulin | No impact on K+ |
| Lowers uric acid levels | Minimal adverse effect profile |

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## ARB Trials

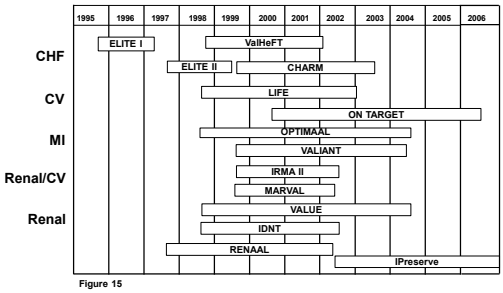


Figure 15

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**ACE vs. ARB: ONTARGET Trial[12]**

| | |
|---|---|
| **Goal:** | **1. Assess the effects of ACE VS ARB in terms of efficacy**<br>**2. Assess if the combination ACE and 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. |

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## Calcium Channel Blockers

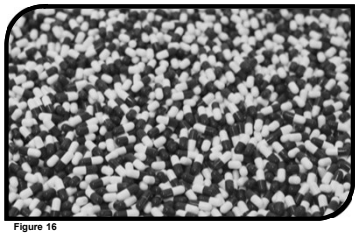

Figure 16

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**Calcium Channel Blockers [13, 14]**

- Effectively treat systolic hypertension
- May be superior to other antihypertensives for stroke prevention
- Effective in patients with comorbid conditions (i.e., Raynaud's)
- Particularly effective in older adults and individuals of color

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**The Calcium Blockers[14, 15]**

**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

**Non-dihydropyridine CCBs consistently reduce albuminuria and slow the decline in kidney function. Dihydropyridine CCBs should not be used as monotherapy in proteinuric CKD patients but always in combination with a RAAS blocker.**

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**The Calcium Blockers[15] (continued)**

**Non-dihydropyridines**

Regression of proteinuria

Combination of verapamil + ACE, reduction in proteinuria can be greater than achievable with verapamil alone.

NKF: **Non-dihydropyridine CCBs consistently reduce albuminuria and slow the decline in kidney function. Dihydropyridine CCBs should not be used as monotherapy in proteinuric CKD patients but always in combination with a RAAS blocker**

**Non-dihydropyridine CCBs consistently reduce albuminuria and slow the decline in kidney function. Dihydropyridine CCBs should not be used as monotherapy in proteinuric CKD patients but always in combination with a RAAS blocker.**

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**What is next?**

Figure 15

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**Laboratory Tests**

- Check aldosterone level via plasma or 24-hour urine.
- Check plasma renin activity (PRA).
  - Primary hyperaldosteronism will have increased aldosterone production associated with a decreased PRA.
  - Patients with secondary hyperaldosteronism (that is, caused by kidney disease or renal vascular disease) will have increased plasma levels of renin and aldosterone.
- 24-hour urinary metanephrines or plasma free metanephrines (normetanephrine and metanephrine) if a pheochromocytoma is suspected.

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**Resistant Hypertension**

- Definition
  - Blood pressure of ≥130/>80 mm Hg
    ***and***
  - Patient on ≥3 medications at optimal doses (one of which is a thiazide diuretic, if able)
    ***or***
  - Office blood pressure <130/80 mm Hg but requiring ≥4 medications to achieve that blood pressure.

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**Resistant Hypertension: Diagnosis, Evaluation, and Treatment**

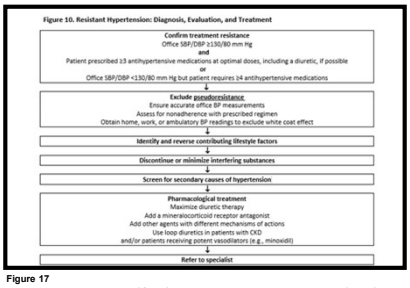


**Figure 17**

Blood pressure (BP); chronic kidney disease (CKD); DBP, diastolic blood pressure (DBP); estimated glomerular filtration rate (eGFR); nonsteroidal anti-inflammatory drugs (NSAIDs); and systolic blood pressure (SBP).

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**Resistant Hypertension (continued)**

- Once these agents have been used, then consider other classes of medications with different mechanism of action
  - Beta-blockers
  - Alpha-blockers
  - Alpha-2 adrenergic receptor agonists
  - Central agonists
  - Vasodilators

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**NICE Guidelines[16]**

- Spironolactone therapy as a fourth-line agent in patients with potassium of <4.5 mmol/L who are likely to respond to a mineralocorticoid receptor blocker.

- For patients with potassium of >4.5 mmol/L, it is recommended that the existing diuretic (thiazide or thiazide-like) be doubled.

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**Add a Mineralocorticoid**

**Options**

**Spironolactone** | **Eplerenone** | **Finerenone**

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## Aldosterone Antagonists

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

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## Newest Option

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**Finerenone (Kerendia®)[17]**

- Class
  - Non-steroidal mineralocorticoid receptor antagonist (MRA)
  - Finerenone blocks MR mediated sodium reabsorption and MR overactivation in both epithelial (e.g., kidney) and nonepithelial (e.g., heart, and blood vessels) tissues.
  - It has no relevant affinity for androgen, progesterone, estrogen, and glucocorticoid receptors.

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**Finerenone (Kerendia®)[17] (continued)**

- Indication

  Reduce the risk of sustained eGFR decline, end-stage kidney disease, cardiovascular death, nonfatal myocardial infarction, and hospitalization for heart failure in adult patients with chronic kidney disease (CKD) associated with type 2 diabetes (T2D)

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**Finerenone[17] (continued)**

- Dosage
  - 10–20 mg starting dose based upon eGFR and potassium dosed daily
    - eGFR: ≥60 mL/min/1.73 $m^2$ – 20 mg daily
    - eGFR: ≥25 to < 60 mL/min/1.73 $m^2$ –10 mg daily
    - eGFR: <25 mL/min/1.73 $m^2$ – Not recommended
  - Increase dose to 20 mg daily at 4 weeks based upon eGFR and serum potassium.
  - May be dosed with or without food; may be crushed and mixed with water or soft foods

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**Finerenone[17](continued)**

| | 10 mg Once Daily | 20 mg Once Daily |
|---|---|---|
| Potassium: ≤4.8 mEq/L | Increase dose to 20 mg daily. | Maintain dose of 20 mg daily. |
| Potassium: >4.8–5.5 mEq/L | Maintain 10 mg daily. | Maintain dose of 20 mg daily. |
| Potassium: >5.5 mEq/L | Withhold finerenone Consider restarting at 10 mg daily when potassium ≤5.0 mEq/L. | Withhold finerenone Restart at 10 mg daily when potassium ≤5.0 mEq/L. |

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**Finerenone[17] (continued)**

**Efficacy**

| | | |
|---|---|---|
| • Reduced the incidence of the primary composite endpoint of a sustained decline in eGFR of ≥40%, kidney failure, or renal death | • The treatment effect reflected a reduction in a sustained decline in eGFR of ≥40% and reduced progression to kidney failure. | • Reduced the incidence of the composite endpoint of cardiovascular (CV) death, nonfatal myocardial infarction (MI), nonfatal stroke or hospitalization for heart failure |

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**Finerenone[17] (continued)**

**Adverse events (drug vs. placebo)**

| | | |
|---|---|---|
| Hyperkalemia (18.3% vs. 9.0%) | Hypotension (4.8% vs. 3.4%) | Hyponatremia (1.4% vs. 0.7%) |

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**Beta Blockers**

- More cardioselective beta-blockers are preferred.
  - Bisoprolol and metoprolol succinate
  - Carvedilol (alpha and beta receptor activity) preferred in HFrEF.
  - Monitor heart rate.
- Not first-line unless CAD or HFrEF
- Do not use with non-dihydropyridine CCBs.
- Should not be abruptly discontinued

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## Alpha Blockers

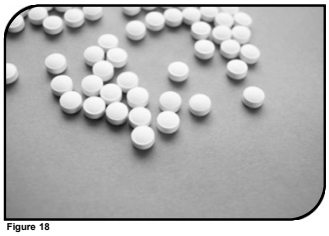

Figure 18

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### Alpha Blockers (continued)

- 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

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### Alpha-2 Adrenergic Receptor Agonist

- Reduce blood pressure by decreasing the activity of the sympathetic (adrenaline-producing) portion of the involuntary nervous system

- Methyldopa is considered a first-line antihypertensive during pregnancy because adverse effects are infrequent for the pregnant woman or the developing fetus.

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## Central Agonists

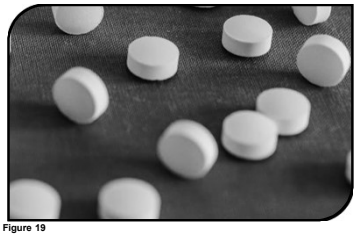

Figure 19

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**Centrally-acting Agents**

- Prevent vasoconstriction
- Can cause orthostatic hypotension, sedation, dry mouth
- Examples
  - Alpha methyldopa
  - Clonidine
  - Guanfacine

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**Vasodilators**

- Examples – Hydralazine and minoxidil
  - Hydralazine can cause headaches, edema, palpitations.
  - Minoxidil should only be used for resistant hypertension and in men due to hair growth.
    - Associated with edema

75

**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

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## 2017 Hypertension Guidelines

Special Patient Groups

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## 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. |

Figure 20

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## Combination Therapy

Figure 21

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## 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. |

Figure 22

80

## Sprint Trial[18]

- 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

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**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

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**Hypertension is more than a number!**

83

**Target Organ Damage[19]**

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

Figure 24

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## 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 |

**Figure 25** ASCVD indicates atherosclerotic cardiovascular disease; BP, blood pressure; CVD, cardiovascular disease; and SBP, systolic blood pressure.

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## Refer to specialty if still not controlled.

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## 2017 Hypertension Guidelines

Other Considerations

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**Hypertensive Urgency vs. Emergency[20]**

- Urgency
  - BP ≥180/120 mm Hg
  - No TOD
  - Often asymptomatic but may have headache, SOB
  - Adjust oral medications and follow up within one to few days
- Emergency
  - BP ≥180/120 mm Hg
  - + TOD
  - IV medication indicated
  - Goal – Reduce mean arterial pressure by 25% in 1-hour
  - Monitored in ICU

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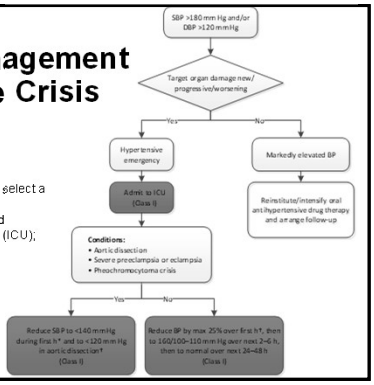
## Diagnosis and Management of a Hypertensive Crisis




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.
Blood pressure (BP); diastolic blood pressure (DBP); intensive care unit (ICU); and systolic blood pressure (SBP).

Figure 26

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**I would be happy to entertain any questions you have!**

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## End of Presentation!
## Thank you for your time, attention.

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