Management of Adult Hypertension

BLOOD PRESSURE (BP) GOALS
≤ 139 / 89 mm Hg – Uncomplicated Hypertension
≤ 129 / 79 mm Hg – Diabetes or CKD Stages 1–3, CVA, TIA

ACE-Inhibitor\(^2\) / Thiazide Diuretic

Lisinopril / HCTZ
(Advance as needed)
20 / 25 mg X \(\frac{1}{2}\) daily
20 / 25 mg X 1 daily
20 / 25 mg X 2 daily

Pregnancy Potential: Avoid ACE-Inhibitors\(^2\)

If not in control

Thiazide Diuretic

Chlorthalidone 12.5 mg \(\rightarrow\) 25 mg
OR
HCTZ 25 mg \(\rightarrow\) 50 mg

If ACEI intolerant or pregnancy potential

Calcium Channel Blocker

Add amlodipine 5 mg X \(\frac{1}{2}\) daily \(\rightarrow\) 5 mg X 1 daily \(\rightarrow\) 10 mg daily

If not in control

Beta-Blocker OR Spironolactone

Add atenolol 25 mg daily \(\rightarrow\) 50 mg daily (Keep heart rate \(>55\))
OR
IF on thiazide AND eGFR \(\geq\) 60 mL/min/1.73m\(^2\) AND K < 4.5
Add spironolactone 12.5 mg daily \(\rightarrow\) 25 mg daily

If not in control

- Consider medication non-adherence.
- Consider interfering agents (e.g., NSAIDs, excess alcohol).
- Consider white coat effect. Consider BP checks by medical assistant (e.g., two checks with 2 readings each, 1 week apart).
- Consider discontinuing lisinopril/HCTZ and changing to chlorthalidone 25 mg plus lisinopril 40 mg daily.
- Consider additional agents (hydralazine, terazosin, reserpine, minoxidil).
- Consider stopping atenolol and adding diltiazem to amlodipine, keeping heart rate \(>55\).
- Avoid using clonidine, verapamil, or diltiazem together with a beta blocker. These heart-rate slowing drug combinations may cause symptomatic bradycardia over time.
- Consider secondary etiologies.
- Consider consultation with a hypertension specialist.

1. Includes essential hypertension, DM and Stage 1-3 CKD, CVA, TIA; excludes CAD, Heart Failure, Stage 4 CKD, and pregnancy.
2. ACE-Inhibitors are contraindicated in pregnancy and not recommended in most child-bearing age women.
3. NNT = number needed to treat to prevent one event, maintaining hypertension control for at least 5 years. (See Appendix A of Hypertension Guidelines for age-based NNT analysis: http://cl.kp.org/pkc/national/cmi/programs/hypertension/guideline/index.html OR Clinical Library \(\rightarrow\) National tab \(\rightarrow\) National Evidence-Based Guidelines \(\rightarrow\) Hypertension Guidelines \(\rightarrow\) Background \(\rightarrow\) Appendix A).
Medication up-titrations are recommended at 2 – 4 week intervals (for most patients) until control is achieved. Consider follow up labs when up-titrating or adding lisinopril/HCTZ, chlorthalidone, HCTZ, or spironolactone.

Use lipid lowering therapy according to Dyslipidemia Management in Adults Guideline.*

If pregnant, refer to OB/GYN for hypertension management. If on ACEIs or ARBs, discontinue immediately.

Lifestyle changes are recommended when SBP > 119 and/or DBP > 79 mm Hg

- DASH diet (low in fat, and high in fruit, vegetables and low-fat dairy products).
- Sodium restriction (≤ 2.4 gm sodium daily).
- Weight reduction if BMI ≥ 25 kg/m².
- Exercise (at least 30 min ≥ 4 times per week).
- Limit daily alcohol to no more than 1 drink (women) or 2 drinks (men).
- Smoking cessation is strongly recommended; counsel tobacco users on the health risks of smoking and the benefits of quitting.

Recommendations for patients with ACEI intolerance

1. In the absence of an ARB indication, start with a thiazide diuretic and proceed to amlodipine as needed.
2. ARB substitution therapy is recommended if any of the following indications are present:
   - Diabetic microalbuminuria (≥30 mcg/mg creatinine on 2 or more occasions even if later suppressed with treatment)
   - CKD³ in the presence of DM
   - Non-diabetic CKD with proteinuria
   - Left ventricular ejection fraction (LVEF) ≤40%

* CKD means chronic kidney disease and can be identified by proteinuria (urine protein ≥ 300 mg/day, urine protein/creatinine ratio ≥ 0.3, or urine 'micro'albumin ≥ 300 mcg/mg creatinine on 2 or more occasions even if later suppressed with treatment) or eGFR <60 mL/min/1.73m² for more than 3 months.

### SELECTED ANTIHYPERTENSIVE MEDICATIONS**

<table>
<thead>
<tr>
<th>Class of Medication</th>
<th>Brand Name</th>
<th>Usual Dosage Range</th>
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<tbody>
<tr>
<td><strong>Thiazide-type Diuretics</strong></td>
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<tr>
<td></td>
<td>Chlorthalidone (Hygroton)</td>
<td>12.5 – 25 mg daily</td>
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<tr>
<td></td>
<td>Hydrochlorothiazide (HCTZ) (Esidrix)</td>
<td>25 – 50 mg daily</td>
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<tr>
<td><strong>Thiazide Combinations</strong></td>
<td>Lisinopril/HCTZ (Prinzide)</td>
<td>10/12.5, 20/12.5, 20/25 mg daily</td>
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<tr>
<td></td>
<td>Spironolactone/HCTZ (Aldactazide)</td>
<td>25/25 mg daily</td>
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<tr>
<td><strong>ACE Inhibitors (ACEI)</strong></td>
<td>Lisinopril (Zestril, Prinivil)</td>
<td>10 – 40 mg daily</td>
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<td></td>
<td>Captopril (Capoten)</td>
<td>12.5 – 50 mg BID</td>
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<tr>
<td><strong>Long-Acting Dihydropyridine Calcium Channel Blockers (CCB)</strong></td>
<td>Amlodipine (Norvasc)</td>
<td>2.5 – 10 mg daily</td>
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<td></td>
<td>Felodipine ER (Plendil)</td>
<td>2.5 – 20 mg daily</td>
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<td></td>
<td>Nifedipine ER (Nifedipine XL)</td>
<td>30 – 90 mg daily</td>
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<tr>
<td><strong>Beta-Blockers (BB)</strong></td>
<td>Atenolol (Tenormin)</td>
<td>25 – 100 mg total, taken daily or BID</td>
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<td></td>
<td>Carvedilol (Coreg)</td>
<td>3.125 – 25 mg BID</td>
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<td>Metoprolol (Lopressor)</td>
<td>25 – 100 mg BID</td>
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<td></td>
<td>Metoprolol ER (Toprol XL)</td>
<td>25 – 200 mg daily</td>
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<tr>
<td><strong>Aldosterone Receptor Blocker</strong></td>
<td>Spironolactone (Aldactone)</td>
<td>12.5 – 25 mg daily</td>
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<tr>
<td><strong>Potassium-sparing Diuretic</strong></td>
<td>Amiloride (Midamor)</td>
<td>5 – 10 mg total, taken daily or BID</td>
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<tr>
<td><strong>Angiotensin II Receptor Blockers (ARB)</strong></td>
<td>Losartan (Cozaar – not available as generic)</td>
<td>25 – 100 mg daily</td>
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<tr>
<td><strong>Direct Vasodilators</strong></td>
<td>Hydralazine (Apresoline)</td>
<td>25 – 100 mg BID</td>
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<td></td>
<td>Minoxidil (Loniten)</td>
<td>2.5 mg daily – 20 mg BID</td>
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<tr>
<td><strong>Alpha Blockers</strong></td>
<td>Terazosin (Hytrin)</td>
<td>1 – 20 mg daily</td>
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<td>Doxazosin (Cardura)</td>
<td>1 – 16 mg daily</td>
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<td></td>
<td>Prazosin (Minipress)</td>
<td>1 – 10 mg BID</td>
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<tr>
<td><strong>Alpha-2 Agonists</strong></td>
<td>Clonidine (Catapres)</td>
<td>0.1 mg – 0.4 mg BID</td>
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<tr>
<td><strong>Peripheral Adrenergic Inhibitor</strong></td>
<td>Reserpine</td>
<td>0.05 – 0.2 mg daily</td>
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* http://cl.kp.org/pko/scal/cpg/cpg/html/Dyslipid.html OR National Tab | Administration of Hypertension Management in Adults
** Availability of medications may vary depending on regional formularies.

This guide is based on the 2009 National Hypertension Guideline. It is not intended or designed as a substitute for the reasonable exercise of independent clinical judgment by practitioners. A PDF of this document can be downloaded from Clinical Library → National Tab → National Evidence-Based Guidelines → Hypertension Management in Adults → Management of Adult Hypertension OR go to http://cl.kp.org/pko/national/cmi/programs/hypertension/guideline/clinicianTools.htm.