Hypertension Management

Based on the 2017 ACC/AHA Guideline for the Prevention, Detection, Evaluation, and Management of High Blood Pressure in Adults

Blood Pressure Categories

BP Category	Systolic BP (mmHg)		Diastolic BP (mmHg)
Normal Blood Pressure	<120	AND	<80
Elevated Blood Pressure	120-129	AND	<80
Stage 1 Hypertension	**130-139**	**OR**	**80-89**
Stage 2 Hypertension	**≥140**	**OR**	**≥90**

Use average of **≥2 BP readings** obtained on **≥2 occasions**

Hypertension Treatment Goals

Goal for all **ages <65 years** with hypertension, regardless of chronic comorbidities, if tolerated is **<130/80 mmHg**

BP goal for **ages ≥65 years** is **<130 mmHg** (SBP)

Reasonable to adjust BP goal based on patient factors including: high comorbidity burden, life expectancy, clinical judgment, patient preference,

Hypertension Treatment Algorithm

Normal BP
<120/<80 mmHg

- Promote healthy lifestyle habits
- Reassess Annually

Elevated BP
120-129/<80 mmHg

- Nonpharmacological interventions
- Reassess in 3-6 months

Stage 1 Hypertension
SBP 130-139 or DBP 80-89 mmHg

Clinical CVD, estimated 10-year ASCVD risk of ≥10%?

Yes

- Nonpharmacological interventions
- \+
- Drug treatment for BP reduction
  - Ideally use first-line agents, otherwise those preferred for existing comorbidities, or based on tolerability
- Reassess BP & adherence in **1 month**; assess tolerability sooner as needed
- **If BP is above goal**
  - Titrate dose as tolerated
  - If dosing is optimized then add additional drug; first use either first-line agents, those preferred for existing comorbidities, or based on tolerability
  - Do not combine ACEi, ARB, or aliskiren

No

- Nonpharmacological interventions
- Reassess in 3-6 months
- If BP is still above goal, consider pharmacological intervention

Stage 2 Hypertension
SBP ≥140 or DBP ≥90 mmHg

- Nonpharmacological interventions
- \+
- Drug treatment for BP reduction
  - Consider 2 agents from different drug classes, especially if BP >20/10 mmHg above goal
  - Use first-line agents, those preferred for existing comorbidities, or based on tolerability
  - Do not combine ACEi, ARB, or aliskiren
- Reassess BP & adherence in **1 month**; assess tolerability sooner as needed
- **If BP is above goal**
  - Titrate dose as tolerated
  - If dosing is optimized then add additional drug; first use either first-line agents, those preferred for existing comorbidities, or based on tolerability
  - Do not combine ACEi, ARB, or aliskiren

Antihypertensive Medications

Primary Medications (Generally First-Line)

Thiazide diuretics chlorthalidone, indapamide hydrochlorothiazide, metolazone	• Chlorthalidone preferred: long half-life, evidence for CVD benefit • HCTZ: may be cheaper, more widely available, more tolerable • Monitor electrolytes: hyponatremia, hypokalemia, uric acid, calcium
ACE inhibitors lisinopril, benazepril, enalapril, ramipril, etc.	• Do not combine with ARBs or aliskiren • Risk of hyperkalemia, esp. with CKD, K supplements, K-sparing drugs • Avoid in pregnancy
ARBs losartan, valsartan, olmesartan, etc.	• Do not combine with ACEis or aliskiren • Risk of hyperkalemia, esp. with CKD, K supplements, K-sparing drugs • Avoid in pregnancy
CCBs, dihydropyridines amlodipine, felodipine, etc.	• Dose-related lower leg edema, more common in females • Avoid use with HFrEF; use amlodipine or felodipine if required
CCBs, non-dihydropyridines* diltiazem, verapamil	• *Generally less preferred than the dihydropyridine CCBs • Avoid regular use with BBs due to risk of bradycardia and heart block • Do not use with HFrEF • Drug interactions: both are CYP3A4 substrates, moderate inhibitors

Secondary Medications

Beta-blockers atenolol, metoprolol, carvedilol, bisoprolol, labetalol, nebivolol, etc.	• May be first-line with compelling indication (e.g. IHD, post-MI, HF) • HFrEF preferred agents: metoprolol *succinate*, carvedilol, bisoprolol • Bronchospastic airway disease preferred: atenolol, metoprolol, bisoprolol • Generally avoid use of BBs with intrinsic sympathomimetic activity (e.g. acebutolol, pindolol, penbutolol), especially with IHD or HF • Avoid abrupt cessation: risk of rebound tachycardia
Loop diuretics furosemide, torsemide, bumetanide	• Preferred diuretics with symptomatic HF • Preferred over thiazides with significant CKD (GFR <30 mL/min)
K-sparing diuretics triamterene, amiloride	• Minimal antihypertensive effect; used to protect from hypokalemia • Avoid in patients with significant CKD (GFR <45 mL/min)
Aldosterone antagonists spironolactone, eplerenone	• Preferred add-on with resistant HTN and in primary aldosteronism • K-sparing diuretic effect: avoid with K-sparing diuretics, or CKD • Spironolactone > risk of gynecomastia, impotence than eplerenone
Alpha-1 blockers doxazosin, prazosin, terazosin	• May be considered second-line in those with concomitant BPH • Risk for orthostatic hypotension, especially in older adults
Direct vasodilators hydralazine, minoxidil	• Use w/ a diuretic and BB: causes fluid retention and reflex tachycardia • Hydralazine has risk of drug-induced lupus-like syndrome • Minoxidil has risk of hirsutism and requires use with a loop diuretic
Central alpha-2 agonists clonidine, guanfacine, methyldopa	• Generally last-line due to CNS adverse effects, orthostatic hypotension • Avoid abrupt cessation: risk of rebound hypertension (esp. clonidine)

Reference:
[1] Whelton PK, Carey RM, Aronow WS, et al. 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: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines [published correction appears in J Am Coll Cardiol. 2018 May 15;71(19):2275-2279]. J Am Coll Cardiol. 2018;71(19):e127-e248. doi:10.1016/j.jacc.2017.11.006
[2] Jones DW, Whelton PK, Allen N, et al. Management of Stage 1 Hypertension in Adults With a Low 10-Year Risk for Cardiovascular Disease: Filling a Guidance Gap: A Scientific Statement From the American Heart Association. Hypertension. 2021;77(6):e58-e67. doi:10.1161/HYP.0000000000000195

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