

HYPERTENSION

Treatment Goal: Systolic < 130 mmHg AND Diastolic < 80 mmHg (for most)

Normal < 120/<80

Elevated BP

Systolic BP = 120-129
AND Diastolic BP < 80

Lifestyle Changes

<130/80

Reassess in 3-6 months

Stage 1

Systolic BP =130-139
OR
Diastolic BP = 80-89

10 Year
Risk Score
≥ 7.5% or†

† h/o DM,
CVA, clinical
CVD, CKD

No

Yes

≥130/80

Stage 2

Systolic BP ≥ 140**
OR
Diastolic BP ≥ 90

Medications (start 2
meds if BP ≥20/10 from
goal) and Lifestyle
Changes

Start Rx + TLC

Diagnosis and Other Guidelines

- Diagnose based on 2 readings over 2-3 visits
- May treat immediately if ≥180/120 (or 160/110 if end organ damage)
- AAFP 2022 Guidelines BP Goal: < 140/< 90 (consider < 135/85 to reduce CV risk)
- ACP 2017 Guidelines BP Goal: < 150/< 90 (elderly)

**Older Patients

For those >65 yrs with more comorbid conditions or limited life expectancy, use clinical judgement and consider patient preference. Caution if diastolic BP is < 55 to 60 mmHg.

HTN: Impact of Lifestyle Interventions on SBP

Diet (DASH)	5-8 mmHg
Exercise	4-8 mmHg (aerobic), 5-10 mmHg (isometric)
Salt (ideal < 1.5g/day)	6-8 mmHg
Potassium (aim for 3500-5000mg/day)	6 mmHg
Weight loss	~1 mmHg per 1 Kg of weight loss
Alcohol	4-6 mmHg

Major Drug Classes for HTN

- ACE inhibitors (ACE)*
- Angiotensin receptor blocker (ARB)*
- Thiazide diuretic*
- Long Acting DHP Calcium channel blocker (CCB)*
- Beta-blockers (BB)
- Mineralocorticoid Receptor Antagonist (MRA)

* Typically first line

GLPs/Bariatric Sx

- BMI ≥ 27: GLP RA may be effective for BP
- BMI ≥ 35: Bariatric Sx may be effective for BP

Resistant HTN Management

- **Resistant HTN – uncontrolled despite 3 meds including ARB or ACEi, diuretic, and CCB**
- **TLC:** DASH/Mediterranean diet, ETOH reduction, smoking/vaping/THC cessation, stress management, exercise regimen, sleep hygiene, address mood disorders
- Review meds/supplements* (see other side)
- **Workup:**
 - CBC/CMP/TSH/UA/Lipids. Renin/Aldosterone, Echocardiogram, Renal artery u/s with dopplers, OSA testing/evaluation.
 - Test all for primary aldosteronism regardless of whether hypokalemia is present; other tests based on clinical suspicion
 - Next step: Plasma free metanephrines, AM cortisol, UDS (if concern).
- **Pharmacological**
 - Optimize triple therapy
 - Long-acting dihydropyridine CCB + ACEi/ARB + thiazide/thiazide-like diuretic
 - Prefer chlorthalidone or indapamide over HCTZ (better outcome data, longer half-life).
 - Switch diuretic to chlorthalidone or loop diuretic if eGFR <30.
 - If still uncontrolled:
 - Add mineralocorticoid receptor antagonist (MRA) → spironolactone or eplerenone
 - Add agent w/ different MOA:
 - Beta-blocker (1st line if CHD, HFrEF, Afib), non DHP CCB (if elevated HR), Alpha blocker (doxazosin), vasodilator (hydralazine/minoxidil), central agent (clonidine)
 - Add Newer agent
 - dual endothelial receptor antagonists (e.g., aprocitentan) or aldosterone synthase inhibitor (baxdrostat)
- In select patients, reasonable to consider renal denervation

Preferred Meds by Disease

INDICATION	TREATMENT CHOICE
Heart Failure	ACE/ARB + BB + diuretic + MRA
Post-MI/Clinical CAD	ACE/ARB and BB
CAD	ACE, BB, diuretic, CCB
Diabetes	ACE/ARB, CCB, diuretic (ACE/ARB preferred with albuminuria)
CKD	ACE/ARB
Recurring Stroke Prevention	ACE, diuretic
Pregnancy	1st line: labetalol or nifedipine ER; methyldopa
African-American	If CHF or CKD follow indications above; all others (including diabetics) - thiazide diuretic or CCB is first line

Severe Asymptomatic Hypertension (Previously “Hypertensive Urgency”) in Nonpregnant Adults

- SBP ≥ 180 or DBP ≥ 110 without end organ damage (no exact BP)
- Do not send to ER & DO NOT USE ACUTE BP LOWERING MEDS
- Gradually lower BP over several days to weeks
 - If existing HTN - Restart oral meds, follow up visit in 1-2 weeks
 - If previously normal BPs and has current reason (pain, acute life stressor, recent substance use to elevate BP, or other explainable cause) – Address underlying issue, f/u with BP logs in 1-2 weeks.
 - If new diagnosis of HTN and no other cause for high BP start 2 meds and f/u 1-2 weeks
- Immediate diagnostic tests are rarely needed
- Consider hospitalizing if noncompliant, escalating BP or signs of end organ damage develop

Secondary Hypertension

EVALUATION: HTN LABS

LABS - Perform on patient’s with newly diagnosed HTN

- CMP
- HgA1C
- Urinalysis and UACR
- Lipid profile
- CBC
- TSH

EKG

Possible Secondary HTN Cause	Signs/Symptoms	Diagnostic Test Options	Prevalance in Unselected HTN Patients *
Coarctation of the aorta	• Arm to leg systolic BP difference ≥ 20 mm Hg • Delayed or absent femoral pulses ◦ Murmur	• MRI or CTA in adults (TTE for children)	<1%
Renal Parenchymal Disease	• h/o UTIs • Urinary outlet obstruction, hematuria, urinary frequency, nocturia • Analgesic abuse • Fhx of PCKD	• BMP, UA, Renal U/S	1-2%
Renal Vascular Disease	• Resistant hypertension • Hypertension of abrupt onset or worsening or increasingly difficult to control • Flash pulmonary edema (atherosclerotic) • Early-onset hypertension, especially in women (fibromuscular hyperplasia)	• BMP • CT Angio • Doppler ultrasonography of renal arteries • MRA w/ contrast	5-34%
Thyroid Disorders	• Bradycardia/tachycardia • Cold/heat intolerance • Constipation/diarrhea • Irregular, heavy, or absent menses	• Thyroid-stimulating hormone	1-2%
Aldosteronism	• Hypokalemia • Resistant hypertension • Hypertension and family history of early-onset hypertension or stroke	• Renal and aldosterone levels to calculate aldosterone/renin ratio	8-20%
Obstructive Sleep Apnea	• Apneic events during sleep • Daytime sleepiness • Snoring	• Screening questionnaire • Polysomnography • Sleep Apnea Clinical Score with nighttime pulse oximetry	25-50%
Pheochromocytoma	• 5 Ps: ◦ pallor ◦ Pounding HA ◦ Paroxysmal HTN ◦ Palpitations ◦ Perspiration	• Plasma free metanephrines	<1%
Cushing Syndrome	• Buffalo hump • Central obesity • Moon facies • Striae	• 24-hour urinary cortisol • Late-night salivary cortisol • Low-dose dexamethasone suppression	<1%

*Medications causing secondary HTN: NSAIDs, stimulants, decongestants, steroids, antidepressants, herbal (ephedra, ginseng, Ma Huang, etc), illicit drugs, sodium-containing antacids; caffeine; nicotine (smoking); alcohol, oral contraceptives, cyclosporine or tacrolimus, sympathomimetics (decongestants, anorectics), neuropsychiatric agents, erythropoiesis-stimulating agents, clonidine withdrawal

Hypertensive Emergency ---> ER

- Hypertensive Emergency = Elevated blood pressure with acute signs of end organ damage
 - Malignant Hypertension
 - Severe BP elevation, commonly >200/120 (can be less), with advanced bilateral retinopathy (hemorrhages, cotton wool spots, papilledema)
 - Hypertensive encephalopathy
 - Severe BP elevation associated with lethargy, seizures, cortical blindness and coma in the absence of other explanations.
 - Hypertensive thrombotic microangiopathy: Severe BP elevation associated with hemolysis and thrombocytopenia in the absence of other causes and improvement with BP-lowering therapy.
 - Can also present with cerebral hemorrhage, acute stroke, acute coronary syndrome, cardiogenic pulmonary edema, aortic aneurysm/dissection, severe preeclampsia/eclampsia.
 - Symptoms include headaches, vision changes, chest pain, dyspnea, neurological symptoms, dizziness, etc.

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