CCHN Adult Hypertension [1] Treatment Algorithm

NNT CVA[3]	= 63
NNT MI[3]	= 86
NNT CVA or MI[3]	= 36

Alternate

Stage 1 Hypertension (SDP 140 – 159 or DBP 90-99 mm Hg)

Thiazide-type Diuretics for most. May consider ACEI, ARB, BB, CCB or combination.

Stage 2 Hypertension (SBP>160 or DBP>100 mm Hg)

2-drug combination for most (usually thiazide type diuretic and ACEI or ARB or BB or CCB. Consider starting diuretic first and adding second drug after monitoring for side effects).

Preferred

ACE=Inhibitor[2]/Thiazide Diuretic

Lisinopril / HCTZ
(Advance as needed)
20 / 25 mg X ½ daily
20 / 25 mg X 1 daily
20 / 25 mg X 2 daily

Pregnancy Potential: Avoid ACE-Inhibitors[2]

If not in control in 2-4 wks. on max dose, consider medication non-adherence before going to the next step.

or

If ACEI intolerant or pregnancy potential

Thiazide Diuretic

Chlorthalidone 12.5 mg → 25 mg
OR
HCTZ 25 mg → 50 mg

If not in control on max dose, consider medication non-adherence before going to the next step.

or

If not in control in 2-4 wks. on max dose, consider medication non-adherence before going to the next step.

Calcium Channel Blocker

Add amiodipine 5 mg X ½ daily → 5 mg X 1 daily → 10 mg daily

If not in control in 2 - 4 wks. at max dose, consider medication non-adherence before going to the next step.

Spironolactone otherwise Beta Blocker

IF on thiazide AND eGFR ≥ 60 ml/1.73^2 AND K < 4.5
Add spironolactone 12.5 mg daily →25 mg daily

Otherwise

Add atenolol 25 mg daily → 50 mg daily (Keep heart rate > 55)

- Consider medication non-adherence.
- Consider simvastatin if taking amlodipine. Simvastatin maximum dose is 20 mg.
- 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 chlorthaidone 25 mg plus lisinopril 40 mg daily.
- Consider additional agents (hydralazone, terazosin, reserpine, minoxidil).
- **Consider stopping atenolol and adding ditiazem to amlodipine, keeping heart rate > 55.**
- **Avoid using clonidine, verapamil or ditiazem together with a beta blocker. These heart-rate slowing drug combinations may cause symptomatic bradycardia over time.**
- Consider secondary etiologies.

1. Includes essential hypertension, MD 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 or prevent one event maintaining hypertension control for at least 5 years.

Initial Work-Up for Newly Diagnosed HTN

Thorough history and physical including BMI, BP in both arms, listening for subclavian and renal bruits, retinal exam, etc. If not done within the past year, check CBC, fasting BMP, LFT, lipid panel, TSH, UA, EKG. There is no need for an echocardiogram unless EKG is abnormal or there is a physical exam abnormality such as an S3, murmur, etc.

Hypertension Treatment Algorithm

- 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, chlorthaidone, 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, ARBs, or spironolactone, discontinue immediately.

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

- DASH diet (low in fat, and high in fruits, vegetables and low-fat dairy products).
- Sodium restriction (≤ 2.4 gm sodium daily).
- Weight reduction if BMI ≥ 25 kg/m^2.
- Exercise (at least 30 minutes ≥ 4 times per week). Consider cardiology evaluation and/or cardiac stress testing if multiple cardiac risk factors or known CAD'
- Limit daily alcohol to no more than 1 drink (women) or 2 (men).
- Smoking cessation is strongly recommended; counsel tobacco users on the health risks of smoking and the benefits of quitting.
- For patients with ACEI cough intolerance, switch to losartan. Avoid losartan/HCTZ (generic Hyzaar) due to HCTZ underdosing in this combination drug.

SELECTED ANTIHYPERTENSIVE MEDICATION*		**Usual Dosage Range**
Thiazide-type Diuretics	Chlorthaidone (Hygroton)	12.5 – 25 mg daily
	Hydrochlorothiazide (HCTZ) (Esidrix)	25 – 50 mg daily
Thiazide Combinations	Lisinopril /HCTZ (Prinzide)	10/12.5, 20/12.5, 20/25 mg daily
	Spironolactone/HCTZ (Aldactazide)	25/25 mg daily
ACE Inhibitors (ACEI)	Lisinopril (Zestril, Prinivil)	10 – 40 mg daily
	Captopril (Capoten)	12.5 – 50 mg BID
Long-Acting Dihydropyridine	Amiodopine (Norvasc)	2.5 – 10 mg daily
Calcium Channel Blockers (CCB)	Felodipine ER (Plendil)	2.5 – 20 mg daily
	Nifedipine ER (Nifedipine XL)	30 – 90 mg daily
Beta-Blockers(BB)	Atenolol (Tenormin)	25 – 100 mg total, taken daily or BID
	Carvedilol (Coreg)	3.125 – 25 mg BID
	Metoprolol (Lopressor)	25 – 100 mg BID
	Metoprolol ER (Toprol XL)	25 – 200 mg daily
Aldosterone Receptor Blocker	Spironolactone (Aldactone)	12.5 – 25 mg daily
Potassium-sparing Diuretic	Amiloride	5 – 10 mg total, taken daily or BID
Anglotensin II Receptor Blockers (ARB)	Losartan (Cozaar)	25 – 100 mg daily
Direct Vasodilators	Hydrailazine (Apresoline)	25 – 100 mg BID
	Minoxidil (Loniten)	2.5 mg daily – 20 mg BID
Alpha Blockers	Terazosin(Hytrin)	1 – 20 mg daily
	Doxazosin (Cardura)	1 – 16 mg daily
	Prazosin (Minipress)	1 – 10 mg BID
Alpha-2 Agonists	Clonidine (Catapres)	0.1 mg – 0.4 mg BID

* Availability of medications may vary depending on regional formularies.

This guide is based on the 2009 Hypertension Guidelines. It is not intended or designed as a substitute for the reasonable exercise of independent clinical judgment by practitioners.

Compelling Indication	**Initial Therapy options**
• Diabetes Mellitus (type 1) with proteinuria or > CV risk factor1	ACEI*
• Heart Failure	***Asymptomatic:*** ACEI+ or BB (Carvediolol, Metoprolol Succinate) ***Symptomatic or End stage heart disease:*** ACEI+, BB (Carvediolol, Metoprolol Succinate) or Aldosterone antagonist ± loop
• Post Myocardial Infarction	BB ACEI+
• Chronic Kidney Disease	ACEI+
• Recurrent Stroke prevention	Diuretic or ACEI+
	+ *Use ARB if ACEI not tolerated*