

AntiHypertensive Medications

ACE Inhibitors, ARBs, and DRIs are preferred in diabetes due to their B/P lowering and renal-protection effects. These meds target the Renin-Angiotensin-Aldosterone-System (RAAS), delay progression from microalbuminuria to macroalbuminuria. Diuretics are often added as adjunct therapy.

Monitor B/P, renal function and electrolytes at baseline and on regular basis. Instruct pt to report signs of orthostatic hypotension and get up slowly.

ACE, ARBs, DRI – If B/P not at goal with these agents, add a diuretic or other class. Do not use during pregnancy or in persons w/ renal or hepatic dysfunction. Start w/ low dose, gradually increase.

Class / Action	Generic / Trade Name	Usual Daily Dose Range	Frequency	Considerations
ACE Inhibitors Angiotensin Converting Enzyme Action - Block the conversion of AT-I to AT-II. Also stimulates release of nitric oxide causing vasodilation.	benazepril / Lotensin [†]	10 – 40 mg	1 x a day	Try to take same time each day. Effects seen w/in 1 hr of admin, max effects in 6 hrs. Side effects: Can cause cough (due to increased bradykinin) – can try different med in same class. Also can cause fatigue, dizziness, hypotension. [†] These meds are also available as a combo w/ low dose HCTZ (hydrochlorothiazide). [‡] These meds are also available as a combo w/ CCB (calcium channel blocker) usually amlodipine
	captopril /Capoten* ^{††}	12.5 - 100 mg	2-3 x a day	
	Enalapril/ Vasotec* ^{††}	2.5 - 40 mg	1-2 x a day	
	Fosinopril / Monopril [†]	10- 40 mg	1 x a day	
	Lisinopril * ^{††} Prinivil Zestril	10 – 40 mg 10 - 40 mg		
	Ramipril / Altace* ^{††}	2.5 – 10 mg		
	Moexipril / Univasc [†]	3.75 - 15 mg		
	Perindopril/Aceon [‡]	2-16 mg		
	Perindopril/ Indapamide combo (Coversyl)	2 - 8 mg 0.625 - 2.5 mg		
	Quinapril /Accupril [†]	5 – 40 mg		
Trandolapril/ Mavik	1.0 – 4 mg			
Trandolapril/ Verapamil combo (TARKA)	1-4 mg 180 to 240 mg			
ARBs -Angiotensin Receptor Blockers Action -Block AT-I receptor which reduces aldosterone secretion and vasoconstriction	Azilsartan/Edarbi	40 - 80 mg	1 x daily	Try to take same time each day Side effects- Can cause dizziness, drowsiness, diarrhea, hyperkalemia, hypotension. [†] These meds are also available as a combo w/ low dose HCTZ (hydrochlorothiazide). [‡] These meds are also available as a combo w/ CCB (calcium channel blocker) usually amlodipine
	Azilsartan/ Chlorthalidone combo (Edarbyclor)	40 mg 12.5 - 25 mg		
	Candesartan/Atacand [†]	8 – 32 mg		
	Eprosartan/Teveten [†]	400 - 600 mg		
	Irbesartan/ Avapro [†]	75 – 300 mg		
	Losartan / Cozaar* ^{††}	25 – 100 mg		
	Olmesartan / Benicar ^{†‡} Tribenzor (triple combo)	20 – 40 mg		
	Telmisartan / Micardis	20 – 80 mg		
Valsartan / Diovan ^{†‡} Exforge HCT (triple combo)	80 – 320 mg			
Valsartan/ Nebivolol combo (Byvalson)	80 mg 5 mg			

*indicates medication is available in generic form.

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DRIs - Direct Renin Inhibitors -	Aliskiren / Tekturna†	150 – 160 mg	1 x daily	Generally well tolerated. †These meds are also available as a combo w/ low dose HCTZ (hydrochlorothiazide).

Beta Blockers are commonly prescribed as an add-on to other B/P meds for people with DM. Beta Blockers are beneficial for persons w/ concurrent cardiac problems and prevention of recurrent MI and heart failure. Caution in DM since Beta Blockers can cause hyperglycemia and mask hypoglycemia induced tachycardia (but do not block hypoglycemia related dizziness and sweating). Monitor B/P, heart rate, lipids and glucose.

Beta Blockers <i>β1- Selective</i> Action: Blockade β1 receptors & reduce cardiac output & kidney renin activation.g	Acebutolol / Sectral*	200 – 800 mg	2 x daily	Side Effects: Usually CNS related including sedation, dizziness, lightheaded . Watch for bradycardia, hypotension, depression and sexual dysfunction. Check heart rate each visit, adjust dose if HR <50. Can cause heart block – review package insert for drug-drug interactions. Watch for exercise intolerance. When stopping beta blockers, taper dose gradually. Use cautiously at lowest dose. †These meds are also available as a combo w/ low dose HCTZ (hydrochlorothiazide).
	Atenolol / Tenormin*	25 – 100 mg	1 x daily	
	Atenolol with Chlorthalidone/ Tenoretic	50 -100 mg 25 mg	1 x daily 1 x daily	
	Betaxolol / Kerlone	5 – 10 mg	2 x daily	
	Bisoprolol/ Zebeta†	2.5 – 10 mg	1 x daily	
	Metoprolol tartate/Lopressor*†	25 – 100 mg		
	Metoprolol succinate / Toprol XL	25 - 100 mg		
Beta Blockers <i>Non Selective</i> Action: Blockades β1 & β2	Nebivolol/Bystolic	5 to 40 mg	1 x daily	
	Nebivolol with Valsartan/ Byvalson	5 mg 80 mg		
	Nadolol / Corgard*	40 - 120 mg		
	Nadolol with Bendroflumethiazide	40-80 mg 5 mg		
	Penbutolol / Levatol	10 - 40 mg		
	Pindolol / Visken	10 – 40 mg		
	Propranolol / Inderal* Inderal LA (extended)	40 – 160 mg 60 – 180 mg		2 x daily 1 x daily
Timolol / Blocadren*	10 – 60 mg	2 x daily		
Combined α- and β- Blockers	Corvedilol / Coreg	6.25 – 50 mg	2 x daily	Same precautions as beta blockers.
	Coreg CR	20 – 80 mg	1 x daily	
	Labetalol / Normodyne*	100 – 2400 mg	2 x daily	

Diuretics are often used as adjunct therapy. Obtain baseline B/P, electrolytes, uric acid, glucose and lipids prior to starting and periodically. May require supplementation w/ magnesium and potassium.

Class / Action	Generic / Trade Name	Usual Daily Dose Range	Considerations
Thiazide Diuretics Action: cause diuresis and decrease vascular resistance. (Many meds combined with this class)	Hydrochlorothiazide (HCTZ)* HydroDIURIL Microzide	12.5 – 25 mg Most frequently prescribed	1 x daily in am with or w/out food Side effects: lyte imbalances; hypokalemia, hypomagnesemia, hyperuricemia, hyperglycemia, hyperlipidemia and hyper/hypocalcemia. S/S include muscle cramps, fatigue, dizziness and cardiac arrhythmias .
	Chlorthalidone / Clorpres*	12.5 – 25 mg	
	Metolazone / Zaroxolyn*	2.5 – 20 mg	
	Indapamide / Lozol*	1.2 – 2.5 mg	

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Loop Diuretics (resistant HTN)	Furosemide/Lasix*	20 – 600 mg 2x day	Side Effects as above, but more intense. Need K ⁺ supplement.	
	Torsemide / Demadex*	2.5 – 200 mg 1x day		
	Bumetanide / Bumex*	0.5 – 10 mg 2 x day	Used if GFR < 30 or if greater diuresis is needed	
Potassium Sparing Diuretics	Amiloride / Midamor	5 – 20 mg	1 x day	Usually combined with thiazide diuretic to balance serum potassium. Alone, they do little to lower BP.
	Triamterene / Dyrenium	37.5 – 75 mg	1 x day	
	Spironolactone / Aldactone*	25 – 100 mg	1-2 x day	
	Eplerenone / Inspra	50 - 100 mg	1 -2 x day	

Calcium Channel Blockers are usually second or third line BP med for diabetes, since they have less impact on CVD. They may also be used for those who can't tolerate ACE or ARB Therapy.

Class / Action	Generic / Trade Name	Usual Daily Dose Range	Frequency	Considerations	
Calcium Channel Blocker <i>Nondihydropyridine</i> Relaxes coronary blood vessels to decrease heart rate and cardiac output.	Diltiazem immediate release*	30 – 360 mg	4 x day	Monitor BP, heart rate, liver enzymes and cardiac function a baseline and periodically.	
	Diltiazem extended release*				
	Cardizem CD	120 – 480 mg	1 x day		
		Tiazac	120 – 540 mg	1 x day	Take at the same time each day (with meals if possible).
		Dilacor, Diltia	180 – 540 mg	1 x day	
		Verapamil immediate release*			
		Calan	80 -320 mg	3 x day	
	Verapamil sustained release*			Take in evening if experience drowsiness.	
	Calan SR, Veralan	120 mg – 480 mg	1 -2 x day		
	Verapamil extended release*			Side Effects: Watch for cardiac conduction abnormalities, bradycardia, CHF and edema. Can cause peripheral edema and constipation. Metabolized through CYP3A4, so review package insert for drug and food interactions (ie grapefruit).	
Calcium Channel Blocker – <i>Dihydropyridine</i> Causes vasodilation and decreases peripheral vascular resistance.	Amlodipine/Norvasc	2.5 – 10 mg	1 x day		
	Felodipine / Plendil	2.5 – 10 mg	1 x day		
	Isradipine controlled release DynaCirc CR	2.5 – 10 mg	1 x day		
	Nicardipine sustained release / Cardene SR	30 – 60 mg	2 x day		
	Nifedipine long-acting* Adalat CC /Procardia XL	30 – 120 mg	1 x day		
	Nisoldipine / Sular	10 – 40 mg	1 x day		

α1 – Receptor Blockers - Often used for pts with DM & benign prostatic hypertrophy (BPH).

α1 – Receptor Blockers Vasodilation	Doxazosin/Cardura*	1 – 8 mg	1 x day	Take at hs and low dose to reduce risk of postural hypotension/syncope.
	Prazosin / Minipress*	2 – 20 mg	2 - 3 day	
	Terazosin/ Hytrin*	1 – 10 mg	1 – 2 day	

α2 agonists- Not usually first line due to side effects. Effective in pts w/ renal disease, since does not compromise renal function.

α2 agonists – Centrally act to block influence of norepinephrine on the heart and lower B/P	Clonidine / Catapres*	0.1 to 0.8 mg	2 x day	Administer w/ diuretic. Side effects: sedation, dry mouth, bradycardia orthostatic hypotension, impotence. Do not stop abruptly, can cause hypertensive crisis.
	Methyldopa / Aldomet*	250 – 1000 mg	2-3 x day	

*indicates medication is available in generic form.