Hypertension Part 2

Overview of Hypertension

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Prognosis

The higher the BP and the more severe the retinal changes and other evidence of target-organ involvement, the worse is the prognosis. Systolic BP predicts fatal and nonfatal cardiovascular events better than diastolic BP. Without treatment, 1-yr survival is < 10% in patients with retinal sclerosis, cotton-wool **exudates**, arteriolar narrowing, and hemorrhage (grade 3 retinopathy), and < 5% in patients with the same changes plus papilledema (grade 4 retinopathy). CAD is the most common cause of death among treated hypertensive patients. **Ischemic** or **hemorrhagic stroke** is a common consequence of inadequately treated hypertension. However, effective control of hypertension prevents most complications and prolongs life.

General Treatment

- Weight loss and exercise
- Smoking **cessation**

- Diet: Increased fruits and vegetables, decreased salt, limited alcohol
- Drugs if BP is initially high (> 160/100 mm Hg) or unresponsive to lifestyle modifications

Primary hypertension has no cure, but some causes of secondary hypertension can be corrected. In all cases, control of BP can significantly limit adverse consequences. Despite the theoretical efficacy of treatment, BP is lowered to the desired level in only one third of hypertensive patients in the US.

For all patients, treatment aims to reduce BP to < 140/90 mm Hg; for those with a kidney disorder or diabetes, the goal is < 130/80 mm Hg or as near this level as tolerated. Even the elderly and frail elderly can tolerate a diastolic BP as low as 60 to 65 mm Hg well and without an increase in cardiovascular events. Ideally, patients or family members measure BP at home, provided they have been trained to do so, they are closely monitored, and the sphygmomanometer is regularly calibrated. Treatment of hypertension during pregnancy requires special considerations because some antihypertensive drugs can harm the fetus.

http://s1.ibtimes.com/sites/www.ibtimes.com/files/styles/article_large/public/2012/01/04/212589-dash-diet.jpg

Lifestyle modifications: Recommendations include regular aerobic physical activity at least 30 min/day most days of the week; weight loss to a **body mass index** of 18.5 to 24.9; smoking cessation; a diet rich in fruits, vegetables, and low-fat dairy products with reduced **saturated** and total fat content; dietary sodium[Na^+] of < 2.4 g/day (< 6 g NaCl); and alcohol consumption of ≤ 1 oz/day in men and ≤ 0.5 oz/day in women. In stage 1 (mild) hypertension with no signs of target-organ damage, lifestyle changes may make drugs unnecessary. Patients with uncomplicated hypertension do not need to restrict their activities as long as BP is controlled. Dietary modifications can also help control diabetes, obesity, and **dyslipidemias**. Patients with prehypertension are encouraged to follow these lifestyle recommendations.

Drugs: If systolic BP remains > 140 mm Hg or diastolic BP remains > 90 mm Hg after 6 mo of lifestyle modifications, antihypertensive drugs are required. Unless hypertension is severe, drugs are usually started at low doses. Drugs are initiated simultaneously with lifestyle changes for all patients with prehypertension or hypertension plus diabetes, a kidney disorder, target-organ damage, or cardiovascular risk factors and for those with an initial BP of >160/100 mm Hg. Signs of hypertensive emergencies require immediate BP reduction with parenteral antihypertensives.

For most hypertensive patients, one drug, usually a thiazide-type diuretic, is given initially. Depending on the patient's characteristics and coexisting disorders, other drugs can be used initially or added to the thiazide. Low-dose aspirin (81 mg once/day) appears to reduce incidence of cardiac events in hypertensive patients and is recommended when tolerated and not contraindicated; some evidence suggests it is better to take the aspirin in the evening rather than in the morning—this timing appears to increase efficacy of antihypertensive drugs.

Some antihypertensives are contraindicated in certain disorders (eg, β-blockers in asthma) or are indicated particularly for certain disorders (eg, β-blockers or Ca channel blockers for angina pectoris, ACE inhibitors or angiotensin II receptor blockers for diabetes or proteinuria. When a single drug is used, black men may respond best to a Ca channel blocker (eg, diltiazem). Thiazide-type diuretics appear to be particularly effective in people > 60 and in blacks.

Table 2

Choice of Antihypertensive Drug Class	
Drugs	**Indications**
Diuretics*	Old age Black race Heart failure
β-Blockers*	Youth Angina pectoris Atrial fibrillation (to control ventricular rate)† Essential tremor Hyperkinetic circulation Migraine headaches† Paroxysmal supraventricular tachycardia† Post-MI (cardioprotective effect)*† Systolic heart failure
Long-acting Ca channel blockers	Old age Black race Angina pectoris Arrhythmias (eg, atrial fibrillation, paroxysmal supraventricular tachycardia) Isolated systolic

	hypertension in elderly patients (dihydropyridines)* High CAD risk (nondihydropyridines)*
ACE inhibitors‡	Youth Left ventricular failure due to systolic dysfunction* Type 1 diabetes with nephropathy* Severe proteinuria in chronic renal disorders or diabetic glomerulosclerosis Erectile dysfunction due to other drugs
Angiotensin II receptor blockers‡	Youth Conditions for which ACE inhibitors are indicated but not tolerated because of cough Type 2 diabetes with nephropathy Left ventricular failure with systolic dysfunction Secondary stroke

□ *Reduced morbidity and mortality rates in randomized

studies.

- †β-Blockers without intrinsic sympathomimetic activity.
- ‡Contraindicated in pregnancy.
- CAD = coronary artery disease.

If the initial drug is ineffective or has intolerable adverse effects, another drug can be substituted. If the initial drug is only partly effective but well tolerated, the dose can be increased or a second drug with a different mechanism added.

If initial systolic BP is > 160 mm Hg, 2 drugs are often used. Options include combining a diuretic with a β-blocker, an ACE inhibitor, or an angiotensin II receptor blocker and combining a Ca channel blocker with an ACE inhibitor or an angiotensin II receptor blocker. An appropriate combination and dose are determined; many are available as single tablets, which improve compliance. For severe or refractory hypertension, 3 or 4 drugs may be necessary.

Achieving adequate control often requires several evaluations and changes in drug therapy. Reluctance to titrate or add drugs until BP is at an acceptable level must be overcome. Lack of patient adherence, particularly because lifelong treatment is required, can interfere with adequate BP control. Education, with empathy and support, is essential for success.

Table 3

Antihypertensives for High-Risk Patients

Coexisting Condition	Drug Classes
Heart failure	ACE inhibitors Angiotensin II receptor blockers β-Blockers K-sparing diuretics Other diuretics*
Post-MI	β-Blockers

	ACE inhibitors K-sparing diuretics
Cardiovascular risk factors	β-Blockers ACE inhibitors Diuretics Ca channel blockers
Diabetes	Diuretics β-Blockers ACE inhibitors Angiotensin II receptor blockers Ca channel blockers
Chronic kidney disorders	ACE inhibitors Angiotensin II receptor blockers
Risk of recurrent stroke	ACE inhibitors Diuretics

* Long-term diuretic use may increase mortality in patients with heart failure who do not have pulmonary congestion.

Table 4

Combination Drugs Used for Hypertension

Classes	Drugs	Available Strengths (mg/mg)
Diuretic/diuretic	Triamterene/hydrochlorothiazide	37.5/25, 50/25, 75/50
	Spironolactone/hydrochlorothiazide	25/25, 50/50

	Amiloride/hydrochlorothiazide	5/50
β-Blocker/diuretic	Propranolol/hydrochlorothiazide	40/25, 80/25
	Metoprolol/hydrochlorothiazide	50/25, 100/25
	Atenolol/chlorthalidone	50/25, 100/25
	Nadolol/bendroflumethiazide	40/5, 80/5
	Timolol/hydrochlorothiazide	10/25
	Propranolol LA (long acting)/hydrochlorothiazide	80/50, 120/50, 160/50
	Bisoprolol/hydrochlorothiazide	2.5/6.25, 5/6.25, 10/6.25
Adrenergic inhibitor/diuretic	Guanethidine/hydrochlorothiazide	10/25
	Methyldopa/hydrochlorothiazide	250/15, 250/25, 500/30, 500/50
	Methyldopa/chlorothiazide	250/150, 250/250
	Reserpine/chlorothiazide	0.125/250, 0.25/500
	Reserpine/chlorthalidone	0.125/25,

		0.25/50
	Reserpine/hydrochlorothiazide	0.125/25, 0.125/50
	Clonidine/chlorthalidone	0.1/15, 0.2/15, 0.3/15
ACE inhibitor/diuretic	Captopril/hydrochlorothiazide	25/15, 25/25, 50/15, 50/25
	Enalapril/hydrochlorothiazide	5/12.5, 10/25
	Lisinopril/hydrochlorothiazide	10/12.5, 20/12.5, 20/25
	Fosinopril/hydrochlorothiazide	10/12.5, 20/12.5
	Quinapril/hydrochlorothiazide	10/12.5, 20/12.5, 20/25
	Benazepril/hydrochlorothiazide	5/6.25, 10/12.5, 20/12.5, 20/25
	Moexipril/hydrochlorothiazide	7.5/12.5, 15/25
Angiotensin II receptor blocker/diuretic	Losartan/hydrochlorothiazide	50/12.5, 100/25

	Valsartan/hydrochlorothiazide	80/12.5, 160/12.5
	Irbesartan/hydrochlorothiazide	75/12.5, 150/12.5, 300/12.5
	Candesartan/hydrochlorothiazide	16/12.5, 32/12.5
	Telmisartan/hydrochlorothiazide	40/12.5, 80/12.5
Ca channel blocker/ACE inhibitor	Amlodipine/benazepril	2.5/10, 5/10, 5/20, 10/20
	Verapamil (extended-release)/trandolapril	180/2, 240/1, 240/2, 240/4
	Felodipine (extended-release)/enalapril	5/5
Vasodilator/diuretic	Hydralazine/hydrochlorothiazide	25/25, 50/25, 100/25
	Prazosin/polythiazide	1/0.5, 2/0.5, 5/0.5
Triple combination	Reserpine/hydralazine/hydrochlorothiazide	0.10/25/15

Reference: http://www.merckmanuals.com