

Hypertension

Williams and Hopper Text

Chapter 21

Blood Pressure

- Normal BP is below 120/80
- If SBP > 119mmHg or DBP > 79mmHG
 - Classified in the prehypertensive category that matches their highest reading
 - [JNC 7 Guidelines](#)

Hypertension

- Definition
 - The average BP of at least two or more readings on at least two different dates is above prehypertensive levels
 - Systolic 120-139
 - Diastolic 80-89
- Incidence increases w/age

Hypertension

Pathophysiology

- Normal blood pressure
 - The pressure exerted by blood on the sides of the vessel walls
- Determined by
 - Cardiac output (CO)
 - Peripheral vascular resistance (PVR)
 - Viscosity of the blood
 - Amount of circulating blood volume

Hypertension

Control Mechanisms

- Nervous System
- Baroreceptors and Chemoreceptors
- Renin-angiotensin mechanism
- Balancing of body fluids

Types of Hypertension

- Primary (Essential)
 - Chronic
 - Unknown cause
- Secondary
 - Known cause
- Isolated Systolic Hypertension (ISH)
 - SBP >140, DBP <90
 - Usually elderly

Hypertension

Signs and Symptoms

- Silent Killer
 - Often no symptoms
 - Often diagnosis made when pt seen for other health problem
- Small # of patients
 - Headache, bloody nose, or blurred vision
 - Does not correlate with degree of BP elevation
- Target organ damage
 - Cause most s/s of hypertension
 - Long-term damaging effects on heart, kidney, brain, and eyes

Hypertension

Diagnosis

- Health history
 - Previous diagnosis
 - Signs & symptoms
 - History
 - Heart or kidney disease
 - Current medications

Table 1. Classification and management of blood pressure for adults*

BP CLASSIFICATION	SBP [†] MMHG	DBP [†] MMHG	LIFESTYLE MODIFICATION	INITIAL DRUG THERAPY	
				WITHOUT COMPELLING INDICATION	WITH COMPELLING INDICATIONS (SEE TABLE 8)
NORMAL	<120	and <80	Encourage	No antihypertensive drug indicated.	Drug(s) for compelling indications.‡
PREHYPERTENSION	120–139	or 80–89	Yes		
STAGE 1 HYPERTENSION	140–159	or 90–99	Yes	Thiazide-type diuretics for most. May consider ACEI, ARB, BB, CCB, or combination.	Drug(s) for the compelling indications.‡ Other antihypertensive drugs (diuretics, ACEI, ARB, BB, CCB) as needed.
STAGE 2 HYPERTENSION	≥160	or ≥100	Yes	Two-drug combination for most† (usually thiazide-type diuretic and ACEI or ARB or BB or CCB).	

DBP, diastolic blood pressure; SBP, systolic blood pressure.

Drug abbreviations: ACEI, angiotensin converting enzyme inhibitor; ARB, angiotensin receptor blocker; BB, beta-blocker; CCB, calcium channel blocker.

* Treatment determined by highest BP category.

† Initial combined therapy should be used cautiously in those at risk for orthostatic hypotension.

‡ Treat patients with chronic kidney disease or diabetes to BP goal of <130/80 mmHg.

Hypertension

Diagnosis

- UA, BUN, and creatinine
- Electrolytes & Glucose
 - Sodium, potassium, chloride, phosphate, magnesium, calcium
- CBC
- Cholesterol and Triglycerides
- EKG

Hypertension

Risk Factors

- **Nonmodifiable** (cannot be changed)
 - Family history
 - Two times higher risk (check BP regularly)
 - Age
 - Plaque buildup
 - Stiff, less elastic vessels
 - Ethnicity
 - Refer to Box 24.1 (Williams & Hopper)
 - Diabetes mellitus
 - 2/3rd of hypertension pts

Hypertension

Risk Factors

- **Modifiable** (can be changed)
 - Weight reduction
 - Meal planning
 - Alcohol consumption
 - Exercise
 - Smoking

Hypertension

Lifestyle Modifications

- **L** – limit salt and ETOH
- **I** – include daily K⁺, Ca⁺, Mg⁺
- **F** – fight fat & cholesterol
- **E** – exercise regularly
- **S** – stay on BP regimen
- **T** – try to quit smoking
- **Y** – your meds are taken daily
- **L** – lose weight
- **E** – end-stage complications will be avoided

Hypertension

Treatment

- Refer to “JNC VII Risk Stratification and Treatment Recommendation” handout
 - Combo of lifestyle modifications and medications
- Teaching
 - Med must be continued unless d/c'd by MD or Advanced Practice Nurse
 - Side effects esp male patients

Hypertension

Diuretics

Types:

- Thiazide (promote water, NA, Cl excretion)
 - Hydrodiuril
- Loop (cause NA and H₂O loss at loop of Henle)
 - Bumex, Lasix
- Potassium Sparing (Na and Water loss)
 - Aldactone

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Diuretics (cont.)

- Contraindications:
 - Thiazides and Loop
 - Sulfa allergy or anuria
 - Loop
 - Severe hypokalemia, severe hyponatremia, hepatic coma, hypovolemia

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Diuretic Side Effects

- Urinary frequency
- Hypokalemia
- Hyponatremia
- Hypomagnesemia
- Dehydration
- Glucose intolerance
- Hyperlipidemia
- Ototoxicity (Loop)
- Hyperuricemia

Hypertension

Sympatholytics

- Beta Blockers(
 - Tenormin, Inderal, lopressor
- Alpha Blockers
 - Minipress, Hytrin
- Combined alpha and beta blockers
 - Coreg, Normodyne(labetolol)
- Central-Acting Adrenergic Inhibitors
 - Catapres, Aldomet
- Adrenergic Neuron Blockers
 - Ismelin

Hypertension

Adrenergic Inhibitors

Contraindications:

- Asthma
- Heart Block

Precautions:

- COPD
- Depression
- DM
- CHF

Hypertension

Adrenergic Inhibitors

- Side effects
 - Bradycardia
 - **CHF**
 - Bronchoconstriction
 - CNS effects
 - Impotence
 - Metabolic effects
 - Exercise intolerance

Hypertension

Angiotensin-Converting Enzyme (ACE) Inhibitors

- Blocks conversion of angiotensin I to II
- Captopril; Vasotec
- Contraindications
 - hypersensitivity, angioedema, pregnancy
- Drug interactions
 - NSAIDs, antacids, lithium

Hypertension

Angiotensin-Converting Enzyme (ACE) Inhibitors (cont.)

- Side Effects
 - Renal insufficiency
 - **Hyperkalemia**
 - **Cough**
 - Angioedema (rare, potentially life threatening)

Hypertension

Angiotensin receptor II blockers (ARBs)

- Directly block angiotensin II
- Useful as alternative to ACE inhibitors
 - Especially if cough a problem
- Losartan (Hyzaar), valsartan (Diovan)
- Side effects
 - Hyperkalemia
 - Angioedema (rare)
 - dizziness

Aldosterone Receptor Blockers

- Blocks binding of aldosterone
 - Reduce NA reabsorption and then BP
- Inspra
- Side Effects
 - Headache, Dizziness, hyperkalemia, increased creatinine

Must monitor potassium level

Hypertension

Calcium Channel Blockers

- Block entry of calcium into smooth muscle
 - Reduces afterload
- Procardia
- Cardizem
- Calan
- Isoptin
- Norvasc

Hypertension

Calcium Channel Blockers

- Side Effects
 - Constipation (verapamil)
 - Headache
 - Flushing
 - Edema
 - Tachycardia
 - Bradycardia

Complications of Hypertension

- Coronary artery disease (CAD)
- Atherosclerosis
- Myocardial infarction
- Heart failure
- Strokes
- Kidney damage
- Eye damage
- Hypertrophy of left ventricle

Hypertension

Hypertensive Emergency

- Hypertensive crisis
 - Severe , rapid elevation of SBP >180 and DBP>120
- Signs & Symptoms
 - Morning headaches nosebleeds, blurred vision, dizziness, and dyspnea, diminished LOC, weakness, paralysis, palpitations, or complaints of chest pain
- CCU need to decrease BP to prevent organ damage

Hypertension

Nursing Process (cont.)

- Nursing Interventions
 - Health information
 - Guidance and support
 - Referrals
 - Dietician, social worker, pharmacist, home health care
 - Encourage life style modifications

Hypertension

Nursing Process (cont.)

- Evaluation
 - Outcomes: lowered BP with minimal side effects and no evidence of target organ damage
 - Weight loss, diet maintenance, decreased or no smoking and stress management