Hypertension (HTN) is defined as sustained elevated blood pressure (BP). According to the 2017 guidelines of the American College of Cardiology (ACC) and the American Heart Association (AHA), elevated BP is defined as a systolic BP (SBP) 120–129 mm Hg with a diastolic BP (DPB) > 80 mm Hg; Stage 1 HTN is defined as an SBP 130–139 mm Hg or a DPB 80–89 mm Hg, and Stage 2 HTN is defined as an SBP ≥ 140 mm Hg or a DPB ≥ 90 mm Hg. The 2018 guidelines of the European Society of Cardiology (ESC) and the European Society of Hypertension (ESH) consider an SBP of 130–139 mm Hg or a DPB of 85–89 mm Hg to be high normal, and define HTN as Grade 1 with an SBP 140–159 mm Hg or a DPB 90–99 mm Hg, Grade 2 with an SBP 160–179 mm Hg or a DPB 100–109 mm Hg, and Grade 3 with an SBP ≥ 180 mm Hg or a DPB ≥ 110 mm Hg. BP readings should be performed in both arms; the higher value is considered the true BP and the arm with the higher reading should be used for all subsequent readings.

HTN is an important risk factor for cardiovascular disease (e.g., stroke, heart attack, heart failure [HF]) and kidney disease, as well as neuropathy and retinopathy. The first step in HTN treatment is lifestyle changes (e.g., weight loss, smoking cessation, exercise, reduced sodium intake, reduced alcohol intake). If these changes are insufficient, pharmacotherapy is necessary. The goal of pharmacotherapy for HTN is to achieve a target BP of < 130/80 and prevent both microvascular and macrovascular complications with minimal adverse effects. Pharmacotherapy is indicated for patients with elevated HTN and a history of cardiovascular disease (CVD) to prevent future CVD-related events, and in patients with Stage 1 or 2 HTN as a primary preventative strategy against CVD. ESC/ESH guidelines recommend pharmacotherapy along with lifestyle changes for all grades of HTN.

Antihypertensive medications include thiazide or thiazide-like diuretics, angiotensin-converting enzyme inhibitors (ACEIs), angiotensin receptor blockers (ARBs), β-adrenergic antagonists (commonly called β-blockers), calcium channel blockers (CCBs), and direct renin inhibitors (DRIs). Thiazide diuretics reduce BP by increasing renal excretion of water and sodium. ACEIs block the formation of angiotensin II (Ang II), the primary active product of the renin-angiotensin-aldosterone system, reducing peripheral vasoconstriction and inhibiting aldosterone secretion (which causes sodium and water retention). ARBs have neurohormonal and hemodynamic effects similar to those of ACEIs; however, they block the effects of Ang II at receptor sites and have fewer adverse effects. β-blockers reduce nerve impulses to the heart and blood vessels, causing the heart to beat more slowly and with less force. CCBs keep calcium from entering muscle cells, relaxing vascular smooth muscle and reducing BP. DRIs reduce BP by directly inhibiting renin and renin activity, and by inhibiting the conversion of angiotensinogen to angiotensin I (Ang I).

According to the ACC/AHA, initial HTN therapy for nonblack patients consists of a thiazide diuretic, CCB, or an ACEI or ARB. An ACEI should be considered in patients with chronic kidney disease (CKD) because it can help slow disease progression. Black patients without heart failure should be started on either a thiazide diuretic or CCB. If treatment goals are not reached after one month of maximal dosing of the initial drug, a second drug from a different recommended class is added and titrated until goal BP or maximum dose is reached. Two or more agents are often necessary; however, combination therapy with both ACEI and an ARB should be avoided. If combination therapy does not control HTN, a
A moderate reduction in BP leads to a significant reduction in risk of complications: reducing systolic BP by 10 mm Hg reduces risk for major cardiovascular events, coronary heart disease, heart failure, and stroke with a 13% decrease in mortality rate.

**Risk Factors**

For information on risk factors for HTN, see *Quick Lesson About ... Hypertension: an Overview*

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**Facts and Figures**

Based on a study that evaluated the BP of 19.1 million adults worldwide, roughly 24% of men and 20% of women worldwide had an elevated BP in 2015. Approximately 86 million adults aged ≥ 20 years in the United States have HTN. Approximately 16% of patients are unaware of their diagnosis, and roughly 46% of those treated for HTN do not have it well controlled. There were close to 80,000 deaths attributed to HTN in the United States in 2015, an increase of 37.5% over the number of deaths reported in 2005. The highest death rate was among black males, and 30% do not receive antihypertensive treatment. HTN is higher among men than in women in individuals aged < 45 years, and between ages 45–64 years HTN affects men and women equally. After age 64, HTN is more common among women.

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**Signs and Symptoms/Clinical Presentation**

Patients with HTN are usually asymptomatic. Severe HTN can be associated with headache, nausea, vomiting, dizziness, blurred vision, chest pain, shortness of breath, and retinal changes (e.g., hemorrhages, exudates, arteriolar narrowing, minor infarctions).

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**Assessment**

For information on the assessment and diagnosis of HTN, see the *Quick Lesson* referenced above.

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**Treatment Goals**

› **Administer Antihypertensives and Maintain Optimum Physiologic Status**
  • Frequently monitor BP; assess all physiologic systems (especially cardiovascular, respiratory, renal, and neurologic), and review laboratory test results; immediately report abnormalities to the treating clinician and treat as ordered
  – Assess for fall risk; maintain patient safety (i.e., airway, circulation, injury prevention)
  • Administer prescribed antihypertensives, which can include diuretics (e.g., hydrochlorothiazide, chlorthalidone, indapamide), ACEIs (e.g., captopril, benazepril, enalapril), ARBs (e.g., losartan, valsartan, candesartan), CCBs (e.g., amLODIPine, NIFEdipine, nisoldipine), β-blockers (e.g., labetalol, carvedilol, metoprolol), and/or DRIs (e.g., aliskiren)
  • Monitor treatment effectiveness and for adverse reactions
  – Diuretics can cause cardiac arrhythmias, sexual dysfunction, fatigue, photosensitivity, and hyperglycemia
  – ACEIs can cause dry cough, hyperkalemia, dizziness, postural hypotension, angioedema, and renal insufficiency
  – ARBs can cause hypotension, angioedema, dizziness, and dry cough
–CCBs can cause headache, ankle edema, palpitations, and facial flushing
–β-blockers can cause fatigue, depression, impotence, bronchospasm, hypoglycemia, disturbed sleep, and peripheral vascular disease (PVD)
–DRIs can cause diarrhea, dizziness, rash, and fatigue

Provide Emotional/Psychosocial Support and Educate
• Assess your patient’s anxiety level and coping ability; educate and encourage discussion about HTN etiology and disease process, associated health risks, treatment risks and benefits, the importance of drug regimen adherence, continued in-home and medical surveillance of BP, and individualized prognosis
• Request clinician referral, if appropriate, to a social worker for identification of local resources for support groups, advocacy organizations (for subsidized medication cost), financial aid, nutrition education, in-home services, and programs for smoking cessation, exercise, and weight reduction

Food for Thought
• Researchers who conducted a systematic review and meta-analysis indicated that although acupuncture therapy is insufficient in controlling BP, it is effective in lowering BP as an adjunctive therapy to Western medicine (Zhao et al., 2015)
• Cochrane reviewers found moderate-quality evidence that risk of all-cause mortality in patients with HTN is similar in those receiving and ACEI or ARB as first-line therapy compared to those receiving another first-line antihypertensive medication. Risk of total cardiovascular events and stroke was lower in patients treated with first-line thiazide diuretics than in those treated with a first-line ACEI or ARB (Xue et al., 2015)
• Patients with psoriasis are known to be at increased risk for developing HTN, but less is known about the risk for developing psoriasis in patients with HTN. Researchers in a prospective study of 77,728 women from the Nurses’ Health Study found that both long-term hypertensive status and long-term regular use of β-blockers seem to be associated with increased risk of new-onset psoriasis (Wu et al., 2014)

Red Flags
• ACEIs, ARBs, direct renin inhibitors, and spironolactone are contraindicated in pregnancy (Brown et al., 2014)
• The DRI aliskiren is contraindicated with ACEIs and ARBs in patients with DM, and the combination is not recommended for patients with glomerular filtration rate (GFR) < 60 mL/min (Kistner et al., 2016)
• Severe HTN (BP ≥ 180/110 mm Hg) combined with symptoms of acute end-organ damage (e.g., encephalopathy, preeclampsia in pregnant women, acute renal failure) is a medical emergency requiring immediate treatment with IV antihypertensives aiming initially to lower BP within minutes to an hour by no more than 25% from baseline BP, to be followed with lowering BP to the range of 160/100–110mmHg within 2–6 hours (Alexander, 2017; Hemphill et al., 2015)

What Do I Need to Tell the Patient/Patient’s Family?
• Adherence to the antihypertensive treatment regimen is essential for lasting BP control; rebound HTN can occur with sudden discontinuation. Patients who do not feel better or develop adverse drug reactions should promptly contact the treating clinician
• There might not be a correlation between high BP and presence or absence of symptoms
• Antihypertensive therapy can cause orthostatic hypotension; advise HTN patients to sit up or stand up slowly and use supportive devices to help prevent falls

References


