Hypertension: an Overview

**Description/Etiology**

Hypertension (HTN) is defined in the Eighth Report of the U.S. Joint National Committee on Prevention and Detection, Evaluation, and Treatment of High Blood Pressure (JNC8) as a systolic blood pressure (BP) of 140 mm Hg or greater and/or a diastolic BP of 90 mm Hg or greater on two separate occasions (Chobanian et al., 2003; James et al., 2014). Often called a “silent killer” because it is commonly asymptomatic, HTN is a leading risk factor for cardiovascular disease (CVD) and chronic kidney disease (CKD). Untreated HTN can lead to transient ischemic attack, erectile dysfunction, aortic regurgitation, peripheral arterial disease (PAD), coronary artery disease (CAD), atrial fibrillation, myocardial infarction, heart failure (HF), stroke, intracerebral hemorrhage, or kidney failure. In the United States, HTN is divided into 3 stages:

- Prehypertension is a systolic BP of 120–139 mm Hg or a diastolic BP of 80–89 mm Hg
- Stage 1 HTN is a systolic BP of 140–159 mm Hg or a diastolic BP of 90–99 mm Hg
- Stage 2 HTN is a systolic BP ≥ 160 mm Hg or a diastolic BP ≥ 100 mm Hg

The majority of cases of HTN (~ 85%) are classified as primary (also called essential), meaning that the underlying cause of elevated BP cannot be identified. Secondary HTN occurs in persons with HTN that can be traced to underlying conditions that are known to elevate BP; secondary HTN can result from certain medications and supplements (e.g., corticosteroids, oral contraceptives, herbal remedies containing licorice or ePHEDrine), renal disease, obstructive sleep apnea (OSA), primary hyperaldosteronism, hyperparathyroidism, acromegaly, Cushing’s syndrome, pheochromocytoma, and coarctation of the aorta.

International guidelines, including those from the U.S. Preventive Services Task Force and the Canadian Hypertension Education Program, now recommend that in-office diagnoses of HTN be confirmed by ambulatory BP measurement prior to treatment (this excludes cases in which patients exhibit signs of a hypertensive emergency; such patients should be treated immediately). Classification of HTN as primary or secondary is made based on patient history, clinical presentation, and laboratory study results to assess for an underlying cause. Patients should be managed based on total cardiovascular risk, rather than focusing only on blood pressure levels. Treatment involves lowering BP to reduce the risk of complications and death and includes patient education about making dietary and behavioral changes and prescribing pharmacologic therapy. The main classes of antihypertensive drugs are diuretics, angiotensin-converting enzyme (ACE) inhibitors, angiotensin receptor blockers (ARBs), beta blockers, and calcium channel blockers (CCBs). In some cases, surgery is required (e.g., unilateral adrenalectomy for primary aldosteronism due to an aldosterone-secreting adenoma) to resolve HTN. The DASH [Dietary Approaches to Stop Hypertension] diet is a common dietary approach for managing HTN, and includes incorporating a moderate intake of low-fat dairy, a high intake of fresh fruits, vegetables, nuts and seeds, a limited intake of sodium, and replacing refined grains with whole grains. For information on dietary and pharmacologic therapy for HTN, see *Quick Lesson About ... Hypertension: Diet Therapy* and *Quick Lesson About ... Hypertension: Drug Therapy*.

**Facts and Figures**

HTN affects about 1 billion persons worldwide, including more than half of adults who are > 60 years of age in some countries. HTN affects approximately 86 million adults in...
the United States with an annual economic cost of $94 billion per year. The prevalence of HTN increases with age and varies among racial/ethnic groups; in the U.S. HTN affects 32% of Blacks, 25% of American Indians/Alaska Natives, 23% of Whites, 21% of Latinos/Hispanics, and 21% of Asians. In the U.S., the prevalence of HTN is highest in the southeastern states, which are known as the “stroke belt,” and BP control is worst in the South and Northwest. In the UK, HTN is the most common chronic health condition. The risk of cardiovascular events doubles with every 20/10 mm Hg increase in BP over 120/80 mm Hg. Antihypertensive therapy reduces risk of stroke by 35–40%, risk of myocardial infarction by 20–25%, and risk of heart failure by > 50%. An estimated 50–80% of patients with HTN do not take their medications as prescribed.

**Risk Factors**

Men, older adults, and Blacks are at increased risk for HTN. Additional risk factors include a family history of HTN, obesity, DM, excess sodium intake, stress, physical inactivity, smoking, shorter sleep duration, and excessive alcohol consumption. Older age and obesity are the primary risk factors for refractory HTN (i.e., BP that remains above established goals despite the concurrent use of at least 3 antihypertensive medications; for more information, see *Quick Lesson About ... Hypertension, Refractory*).

**Signs and Symptoms/Clinical Presentation**

Hypertensive patients are usually asymptomatic. Markedly elevated BP may be associated with headache, dizziness, blurred vision, and retinal changes (e.g., hemorrhages, exudates, arteriolar narrowing).

**Assessment**

- **Physical Findings of Particular Interest**
  - Extreme elevations in BP (e.g., stage 2 HTN) may cause headache, nausea, vomiting, seizures, retinopathy, visual disturbances, chest pain, shortness of breath, focal neurologic deficits, stupor, coma, pulmonary edema, hemorrhage, thrombosis, embolus, acute renal failure, and/or abdominal pain

- **Laboratory Tests That Can Be Ordered**
  - Blood glucose testing may show hyperglycemia in patients with DM who have HTN
  - Serum chemistry analysis may show elevated BUN and creatinine levels, indicating renal dysfunction
  - UA may show hematuria or proteinuria in patients with renal dysfunction

- **Other Diagnostic Tests/Studies**
  - EKG may be abnormal, indicating left ventricular hypertrophy
  - Chest X-ray may show enlargement of the heart

**Treatment Goals**

- **Promote Optimum Physiologic Status and Reduce Risk of Complications**
  - Monitor BP and other vital signs at frequent intervals, monitor all physiologic systems (especially cardiovascular, respiratory, renal, and neurologic status) and review laboratory results, immediately report abnormalities to the treating clinician, and treat, as ordered
  - It is essential to measure BP correctly, including proper positioning of the patient and the BP cuff. For more information on obtaining an accurate BP reading, see *Nursing Practice & Skill ... Blood Pressure Reading, Indirect: Taking in an Adult Patient*
  - Administer prescribed antihypertensive agents such as diuretics (e.g., hydrochlorothiazide), ACE inhibitors (e.g., captopril), ARBs (e.g., losartan), beta blockers (e.g., atenolol), and/or CCBs (e.g., amLODIPine); monitor treatment efficacy and for adverse effects
  - Many patients require treatment with a combination of 2 or more antihypertensive drugs from different classes to achieve BP goals
  - Although the BP goal of < 140/90 mm Hg has been the standard for the general population with HTN, a lower BP goal (e.g., < 130/80 mm Hg) is set for patients with DM or CKD and JNC 8 sets less strict thresholds for treatment initiation and BP goals as follows:
    - Patients who are > 60 years of age: initiate treatment in patients with BP > 150/90 mm Hg and treat to below these thresholds; treatment to systolic BP < 140 mm Hg is acceptable if it is well tolerated and without adverse effects on the patient’s health and quality of life
    - Patients who are < 60 years of age, including patients with CKD or DM: initiate treatment in patients with BP > 140/90 mm Hg and treat to below these thresholds
The JNC recommends the following:
- In the general non-Black population (including patients with DM), initial treatment should include a diuretic, CCB, ACE inhibitor, or ARB
- In the general Black population (including patients with DM), initial treatment should include a diuretic or CCB
- In patients with CKD, initial or add-on treatment should include an ACE inhibitor or ARB to improve renal outcomes

Provide Emotional Support and Educate
- Assess patient anxiety level and coping ability; provide emotional support, educate, and encourage discussion about the etiology of HTN and the disease process, health risks associated with HTN, treatment risks and benefits, the importance of treatment adherence and making lifestyle changes, 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), in-home services, and programs for smoking cessation, exercise, and weight reduction
- Request referral to a dietitian for patient evaluation and nutritional education (e.g., about the DASH diet)

Food for Thought
- Poor adherence to the prescribed antihypertensive agent regimen significantly increases the risk of vascular events, hospitalization, and healthcare costs, and significantly decreases patient quality of life
- Renal sympathetic denervation is a novel treatment for refractory HTN in which radiofrequency energy is delivered via catheter to deactivate renal nerves, which reduces BP. Investigators who conducted a meta-analysis of 5 trials including 800 patients with refractory HTN calculated that the procedure reduces systolic BP by an average of 19.4 mm Hg and diastolic BP by an average of 6.4 mm Hg at 6 months follow-up (Pancholy et al., 2014)
- Exposure to air pollution may be a risk factor for HTN. Researchers who conducted a meta-analysis of 15 population-based cohorts including 113,926 patients found weak positive correlation between traffic-related air pollution and HTN risk (Fuk et al., 2014)
- In a literature review of 70 research studies, authors reported that the use of nutrition therapy in hypertension management, including the Dietary Approaches to Stop Hypertensive (DASH) diet, limiting alcohol consumption, increasing dietary potassium and calcium, and limiting dietary sodium is beneficial in reducing BP in adults 18 years and older (Lennon et al., 2017)

Red Flags
- ACE inhibitors and ARBs are contraindicated in pregnancy
- Although systolic HTN is a major risk factor for CAD, a lower diastolic BP decreases coronary perfusion and is associated with an increase in incidence of CAD; diastolic BP should not be lowered to < 60 mm Hg in patients with CAD

What Do I Need to Tell the Patient/Patient’s Family?
- Educate about the importance of adherence to the prescribed treatment regimen of antihypertensive drugs
  - Explain that patients who experience adverse effects from antihypertensive medication should not discontinue their drugs without discussing the situation with their treating clinician because sudden rebound HTN is possible
  - Educate that hypotension should be reported immediately, it is important to change positions slowly, and older adult patients may need to use supportive devices to prevent falls that could result from dizziness
- Educate about how to correctly monitor BP at home and explain lifestyle modifications that are an important component of any HTN treatment regimen (e.g., participation in aerobic activity [e.g., a brisk 30-minute walk each day]; weight loss, if applicable; practicing relaxation techniques for stress management; eating a reduced-sodium diet [< 2.4 g per day], including monitoring salt intake and avoiding canned, processed, and fast food; increasing potassium intake by eating foods rich in potassium [e.g., dried figs, bananas, mushrooms, and orange juice]; avoiding nicotine; and limiting alcohol consumption)

References


