Hypertension: Diet Therapy

Description/Etiology
Hypertension (HTN) refers to high blood pressure (BP). Normal BP for adults is commonly considered to be < 120/80 mm Hg (millimeters of mercury). In the United States, new guidelines for the diagnosis of HTN have been issued by the American College of Cardiology (ACC) and the American Heart Association (AHA), which state that HTN is diagnosed after elevated BP readings have been sustained across three or more periodic readings, and is categorized as
- elevated: 120–129/< 80 mm Hg
- HTN stage 1: 130–139/80–89 mm Hg
- HTN stage 2: ≥ 140/≥ 90 mm Hg

Left untreated, HTN can lead to serious complications, including myocardial infarction, heart failure (HF), kidney failure, and stroke.

Treatment of elevated BP and HTN includes weight reduction for overweight patients and lifestyle modifications such as dietary changes (e.g., reduction of dietary sodium and potassium supplementation), exercise, smoking cessation for smokers, and pharmacologic intervention.

Facts and Figures
Approximately 978 million persons worldwide and 80 million adults (> 20 years) in the US have HTN (identified as a BP of > 140/> 90 or having been advised more than once that one has HTN by a health practitioner). Prevalence of HTN increases with age. Men experience HTN more than women until 45 years of age but experience similar rates of HTN occurrence between 45 and 64 years of age followed by a higher percentage of women experiencing HTN over the age of 64 years. Blacks, particularly black women, develop HTN more frequently and at an earlier age than persons of other racial demographics (e.g., White patients, Hispanic patients). HTN is a predominant contributor to cardiovascular disease (CVD), which is the leading cause of death worldwide accounting for 17.3 million deaths per year. It is estimated that up to 80% of premature deaths caused by CVD may be prevented by lifestyle modifications, including adherence to a healthy dietary regimen (Mozaffarian et al., 2015). Between 30% and 50% of patients with HTN are salt-sensitive (i.e., they experience increases in BP in response to excess dietary sodium intake) (Savica et al., 2010).

Risk Factors
Risk factors for developing HTN include black race, family history of HTN, obesity, hyperlipidemia, diabetes mellitus (DM), kidney disease, physical inactivity, and stress. Dietary factors that increase HTN risk include excess intake of sodium, calories, and alcohol and inadequate intake of potassium, magnesium, and calcium. HTN increases the risk of CVD, sudden death, coronary artery disease (CAD), HF, peripheral artery disease, and kidney injury.

Signs and Symptoms/Clinical Presentation
Because HTN is often asymptomatic, it is commonly called “the silent killer.” Headache, blurred vision, flushed face, fatigue, and dizziness may be present when BP is very elevated.
Assessment
For information on the assessment and diagnosis of HTN, see Quick Lesson About ... Hypertension: an Overview.

Treatment Goals
› Promote Adherence to Diet Therapy to Reduce BP, Maintain Optimal Physiologic Status, and Reduce Risk for Complications
  • For information on treatment unrelated to diet, see Quick Lesson About ... Hypertension: an Overview referenced above and Quick Lesson About ... Hypertension: Therapy -- an Overview
  • Monitor vital signs, assess all physiologic systems, and review laboratory results; immediately report abnormalities and treat, as ordered
  • Monitor weight
    – Note that weight loss may indicate inadequate caloric intake or fluid loss, and weight gain may indicate fluid retention
• Encourage appropriate nutrition; request referral to a registered dietitian for evaluation and education about diet therapy for HTN, serving sizes, food choices, restricted substances, and meal planning
  – Dietary treatment strategies for HTN include the following:
    - The Dietary Approaches to Stop Hypertension (DASH) eating plan
      - The DASH diet is high in fruits, vegetables, and low-fat dairy products, along with lower amounts of total fat, saturated fat, and cholesterol
      - DASH includes the following number of daily servings: 7–8 of grains/grain products; 4–5 of vegetables; 4–5 of fruits; 2–3 of low-fat or nonfat dairy products; ≤ 2 of meat, poultry, and fish; and 2–3 of fats. Weekly servings are 4–5 of nuts weekly and 5 of sweets weekly
      - The DASH diet lowers systolic BP by an average of 8–14 mm Hg and diastolic BP by an average of 6 mm Hg
      - DASH can be used to reduce BP and improve diet quality in both adults and adolescents with HTN
    - Reducing salt intake
      - The 2015–2020 Dietary Guidelines for Americans issued by the US Department of Agriculture and DHHS recommend that individuals who have HTN reduce sodium intake to 1,500 mg/day
      - Following the DASH diet and a reduced-sodium diet is similar in effectiveness to receiving single-drug therapy, although response varies; results of decreased BP are greatest in Blacks and women
      - The no-added-salt (NAS) diet eliminates all added salt in the diet, which typically reduces the average daily sodium intake to approximately 3,000 mg/day
      - A sodium-controlled diet of < 2,000 mg/day eliminates added salt and most processed foods. This diet is usually recommended for HTN management, although it can be a difficult diet to maintain with the wide use and availability of high-sodium foods and medications that contain sodium
      - Medications with the potential to increase blood sodium levels include anabolic steroids, birth control pills, certain antibiotics, clonidine, corticosteroids, laxatives, lithium, and nonsteroidal antiinflammatory drugs (NSAIDs)
      - Restricting sodium intake to < 1,000 mg/day is prescribed occasionally. This extreme degree of restriction is difficult for most people to maintain and is typically reserved for hospitalized patients
    - Increasing potassium intake
      - The ratio of sodium to potassium intake should be about 1:2. The typical high sodium diet can increase the need for potassium in order to maintain normal balance. Higher sodium to potassium ratios have been associated with a higher risk for CVD and all-cause mortality
      - Potassium supplementation of 60–120 mmol/day is associated with average systolic and diastolic BP reductions of 4.4 mm Hg and 2.5 mm Hg, respectively
      - The World Health Organization (WHO) has published recommendations for potassium intake that include the following:
        - Increase potassium intake from food sources for the reduction of BP and to reduce the risk of CVD, stroke, and coronary heart disease (CHD)
        - The WHO suggests a simultaneous decrease in sodium (< 2000 mg/day) consumption to remain within established guidelines with an increase in potassium intake to at least 3,510 mg/day for adults in order to achieve a more balanced ratio of sodium to potassium
    - Limiting alcohol intake
      - Limiting alcohol intake to ≤ 2 drinks daily in men and ≤ 1 drink daily in women is associated with an average systolic BP reduction of 2–4 mm Hg as well as decreased cardiovascular risk
- Excessive and chronic alcohol intake is associated with a higher cardiovascular risk
- Increasing dietary fiber
  - Fiber supplementation (e.g., 11.5 g daily) decreases systolic and diastolic levels by 1.0 mm Hg and 1.3 mm Hg, respectively
  - BP reductions resulting from increasing dietary fiber are greater in patients with HTN who are > 40 years of age
  - Soluble fiber is more effective than insoluble fiber in reducing BP
- Supplementation
  - Fish oil and essential fatty acids (e.g., > 3 gm daily omega-3 fatty acids) reduce BP by an average of 3.0 mm Hg systolic and 1.5 mm Hg diastolic
- Along with lifestyle modifications, pharmacologic treatment may be necessary
  - The use of a single pharmacologic agent (e.g., diuretics, beta blockers, angiotensin-converting enzyme [ACE] inhibitors, or calcium channel blockers) is recommended (Whelton et al., 2017)
  - as secondary intervention for the prevention of recurrent CVD events in patients with stage 1 HTN who have clinical CVD (i.e., CHD, congestive HF, and stroke)
  - as primary intervention for patients with stage 1 HTN if they have a 10 year risk of cardiovascular events of 10% or higher and for patients with stage 2 HTN
  - The aggressive management of HTN, possibly using combinations of drugs, is recommended for patients who are unable to meet BP goals upon a 1-month assessment of treatment responsiveness (Whelton et al., 2017)

### Promote Emotional Well-Being and Educate
- Evaluate for knowledge deficits related to nutrition and assess anxiety level, coping ability, and level of commitment to diet therapy adherence; educate and encourage discussion about HTN risk factors, the physiologic dysfunction caused by HTN, treatment risks and benefits (e.g., medication side effects), dietary and other lifestyle changes that promote lowered BP (e.g., regular exercise, weight reduction, reduced alcohol intake, dietary restrictions, stress reduction, adequate sleep), the importance of strict adherence to the dietary regimen, and individualized prognosis
- Acknowledge the difficulty of maintaining lifestyle changes and reinforce the importance of cardiac risk reduction with lowered BP; encourage joining a support group for contact with others who face similar health challenges
- Request referral to a social worker, if appropriate, for identification of local resources for dietary education, in-homeresources (e.g., meal delivery), and support groups

### Food for Thought
- The DASH diet has proven its effectiveness in reducing HTN (Siervo et al., 2015), particularly in Blacks, in whom it has shown the most remarkable reduction in heart disease risk compared with other ethnic groups (Boggs et al., 2015)
  - Unfortunately, cultural differences and fewer food options have impeded compliance in under resourced black American communities. Evidence shows that applying culturally relevant modifications to the DASH diet can increase acceptability, lower perceived barriers to adherence, and improve patient well-being (Whitt-Glover et al., 2013)
  - Authors conducting a meta-analysis of 6 studies regarding adherence to DASH dietary patterns and incidence of stroke, CVD, CHD, and HF report that following a DASH-like diet significantly reduces the risk of stroke (by 19%), CVD (by 20%), CHD (by 21%), and HF (by 29%) (Salehi-Abargouei et al., 2013)
  - The authors of a 2016 study found that patients who followed a modified DASH diet, which allowed for a more liberal intake of healthy fats, experienced a similar decrease in BP as experienced by patients on a traditional DASH diet, with the added benefit of reductions in triglycerides and very low density lipoprotein (VLDL) levels (Chiu et al., 2016)
- Using data from the Korean National Health and Nutrition Examination Survey, 2007–2012, which included 24,096 adults (> 18 years), researchers determined that participants with high sodium/low potassium intake and low sodium/low potassium intake were at higher risk of developing high BP than participants with low sodium/high potassium diets, indicating that increasing potassium in the diet could reduce the risk of HTN for persons with diets that are low in potassium (Noh et al., 2015)
- Using data from 188,518 participants in the Nurses’ Health Study, Nurses’ Health Study II, and Health Professionals Follow-Up Study, researchers determined that consuming at least one serving of red meat per day is associated with a 30% increased risk of developing HTN, compared to consuming less than one serving per month (Yang et al., 2016)

### Red Flags
- A 24-hour urinary salt excretion test result of > 100 mEq of sodium suggests poor adherence to a prescribed low-salt diet
What Do I Need to Tell the Patient/Patient’s Family?

- Emphasize the importance of measurement of BP at home and keeping regular healthcare follow-up visits; educate regarding lifestyle modifications that may help control BP, including eating a low-salt diet, avoiding tobacco, weight loss, regular exercise, and stress reduction.
- As appropriate, recommend a calorie-appropriate diet that includes fish and other lean proteins, unsaturated fats (including omega-3), complex carbohydrates (e.g., whole unrefined grains), legumes, nuts and seeds, and a variety of fruits and vegetables. (For more information on eating a balanced diet, see the USDA food guidance system, ChooseMyPlate, at http://www.choosemyplate.gov/)
- Participate in regular moderate physical activity of at least 150 minutes each week, including strength training at least 2 days each week, if medically appropriate.
- Educate that adherence to the treatment regimen of antihypertensive drugs is essential for lasting BP control and to avoid rebound HTN that may result from sudden discontinuation of medications; educate that patients who experience adverse effects from drugs should promptly contact the prescribing clinician, who may suggest that the adverse effects will disappear with continued use or give the option of switching to a different antihypertensive drug if the patient is experiencing overwhelming discomfort.

References