

Hypertension: A discussion of the guidelines

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The American College of Cardiology/American Heart Association Task Force published their clinical practice guidelines on hypertension in 2017. These guidelines hold important implications for nurse practitioners as they care for these patients. Definitions of hypertension, as well as related lifestyle changes, pharmacologic treatment, and financial implications to access to care, are discussed. Differences in treatment modalities for women versus men are also reviewed.

KEY WORDS: hypertension, DASH diet, pharmacologic treatment, financial implications

Cardiovascular disease (CVD) is the leading cause of mortality in the United States and is attributed to 1 in 4 deaths across all races and ethnicities.^{1,2} The economic burden for CVD is up to 200 billion dollars each year.² Hypertension is linked to cardiovascular events and is the leading risk factor for conditions such as heart failure, myocardial infarction, stroke, and chronic kidney disease. Prevention and effective treatment of hypertension have a significant impact on the reduction of CVD mortality.

Blood pressure increases with age in men and women, having a similar prevalence of hypertension in both genders as they reach early and middle adulthood. Women are most likely to develop hypertension after the fifth decade of life and have higher rates than men later in life.^{3,4} This condition, however, is not limited to middle and late adulthood. In fact, an estimated 45 million women older than age 20 years have hypertension.⁴ This has additional importance for reproductive-aged women, considering that 1% to 1.5% of pregnant women present with chronic hypertension that when uncontrolled may result in significant maternal, fetal, and neonatal morbidity and mortality.⁵

Updated definitions of hypertension

Hypertension traditionally has been defined as a blood pressure of



greater than or equal to 140/90 mm Hg. In 2017, however, the American College of Cardiology (ACC) and the American Heart Association (AHA) jointly issued updated clinical practice guidelines and changed the standard definition for hypertension by lowering the blood pressure parameters. The term “prehypertension” has also been replaced by elevated blood pressure (EBP), which is now delineated as a systolic blood pressure (SBP) of 120 to 129 mm Hg and a diastolic blood pressure (DBP) of less than 80 mm Hg.³ See *Table 1* for the updated categories.³ The ACC and AHA based the decision to lower blood pressure parameters for the definition of hypertension on the knowledge that earlier treatment with lifestyle changes and, in some patients, medication can reduce complications. Although the new definition is resulting in a larger number of individuals being diagnosed with hypertension, the expectation is that more individuals can be successfully treated with lifestyle interventions and will not require antihypertensive medication. The new guidelines also place hypertensive crisis into the categories of hypertensive urgency and hypertensive emergency. Hypertensive urgency is an SBP of greater than 180 mm Hg and a DBP of greater than 120 mm Hg.³ A hypertensive emergency is a blood pressure of systolic greater than 180 mm Hg and diastolic greater than 120 mm Hg with the presence of new, progressive, or worsening target organ damage (TOD).³

Proper measurement of blood pressure

All staff who measure blood pressure in the clinical setting should be instructed on and follow proper technique. The ACC/AHA guidelines outline six essential steps for the proper

Table 1. Updated definitions of hypertension³

Blood pressure category	SBP and DBP
Normal blood pressure	SBP < 120 mm Hg and DBP < 80 mm Hg
Elevated blood pressure (EBP)	SBP 120–129 mm Hg and DBP < 80 mm Hg
Stage I hypertension	SBP 130–139 mm Hg and DBP 80–89 mm Hg
Stage II hypertension	SBP < 140 mm Hg and DBP < 90 mm Hg

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

Table 2. Antihypertensive medication classifications³

Medication classification	Examples	Usual dosage
Thiazide-type diuretics	Hydrochlorothiazide Chlorthalidone	25–50 mg daily 12.5–25 mg daily
ACE inhibitors	Captopril Lisinopril	12.5–150 mg twice a day 10–40 mg daily
ARB	Azilsartan Valsartan	40–80 mg daily 80–320 mg daily
CCB	Amlodipine Nifedipine LA	2.5–10 mg daily 30–90 mg daily

ACE, angiotensin-converting enzyme; ARB, angiotensin II receptor blockers; CCB, calcium channel blocker; LA, long acting.

measurement of blood pressure. Step 1 advises that the patient rests for 5 minutes in a chair and avoids caffeine, smoking, and exercise at least 30 minutes prior to taking the blood pressure.³ Step 2 advises that all equipment be calibrated for accuracy and that the blood pressure cuff encircle 80% of the arm.³ Step 3 warrants that blood pressure is measured in both arms with the first visit and the healthcare provider records the arm with the higher reading to be used in subsequent visits.³ Step 4 describes the correct technique of taking blood pressure if using the auscultatory method, and step 5 suggests using an average of more than two readings. Step 6 advises giving the patient the reading verbally and in writing.³ White coat hypertension is a phenomenon in which the blood pressure in the healthcare provider’s office is elevated but is normal when taken in another setting. Out-of-

office measurements may be recommended to confirm a diagnosis of EBP or hypertension.³ The patient should be provided with specific instructions on how to correctly obtain an accurate reading. Decisions regarding treatment should be based on more than two readings in the healthcare provider’s office as well as home blood pressure records.

Management Initial evaluation

The initial evaluation of a patient with newly diagnosed hypertension has three primary objectives: identify other CVD risk factors or concomitant health conditions that may define prognosis and guide treatment, assess for TOD (eg, eyes, brain, blood vessels, heart, kidneys), and identify signs/symptoms of potential secondary causes. The initial evaluation should include a complete history to assess current health

conditions, current health behaviors (eg, diet, exercise, smoking, alcohol, drug use), current prescription and over-the-counter medications, family history for hypertension and CVD, and symptoms of TOD. The physical examination needs to include height, weight, and body mass index (BMI).⁶ Other components of the physical examination should focus on evaluation for signs of TOD, other complications, and indicators of potential secondary causes for hypertension. This includes assessment of the neck for carotid artery bruits and jugular venous distention, heart for abnormal sounds or rhythm, lower extremities for edema, and eyes for retinal hemorrhages. Basic laboratory and diagnostic tests should include fasting glucose, complete blood count, lipid profile, serum sodium, potassium, and calcium, creatinine or an estimated glomerular filtration rate, thyroid stimulating hormone, urinalysis, and electrocardiogram.³

A referral for further evaluation of potential secondary causes is indicated when a patient with newly diagnosed hypertension has an abrupt onset, onset at younger than age 30 years, disproportionate signs of TOD for severity of the hypertension, new onset of diastolic hypertension in a patient age 65 years or older, or severe hypokalemia.³

Common causes of secondary hypertension are: renal parenchymal disease, renovascular disease, primary aldosteronism, obstructive sleep apnea, and drug- and alcohol-induced hypertension.³

Nonpharmacologic lifestyle changes

The ACC/AHA guidelines recommend lifestyle changes and medications that lower blood pressure. Patients within normal range (< 120/80 mm Hg) should be encouraged to

follow healthy lifestyle behaviors to reduce their risk for hypertension. If blood pressure is elevated, healthy lifestyle changes should be recommended with a re-check of blood pressure in 3 to 6 months.³ The lifestyle changes recommended are: weight loss if overweight or obese, following the Dietary Approaches to Stop Hypertension (DASH) or similar diet, sodium reduction, exercise, smoking cessation, and alcohol moderation.^{3,7} The healthcare provider can use patient-centered behavioral change strategies that include motivational interviewing and shared decision making to facilitate success in modifying lifestyle behaviors. Group education/counseling can be helpful for some patients. To promote maintenance of healthy behaviors and monitor blood pressure, the healthcare provider or appropriate staff should follow up with the patient on a regular basis through office visits, phone, electronic messaging, and/or telehealth technology.

Weight loss

For the overweight patient (BMI > 25) or obese patient (BMI > 30), 1 kg of weight loss leads to a reduction of blood pressure of about 1 mm Hg.³ This makes strategies for weight loss a primary goal, with counseling to increase physical activity and reduce caloric consumption.³

Weight should be assessed with each office visit and the importance of diet and physical activity reinforced. Patients with hypertension and a BMI of 35 or greater who are unable to lose weight with diet and exercise may be candidates for bariatric surgery.⁶

DASH diet

The DASH diet has been recommended since 1992 and is supported by evidence to lower blood

pressure. The DASH diet is rich in vegetables, fruit, whole grains, low-fat dairy products, fish, poultry, beans, nuts, and vegetable oils. It limits foods high in saturated fats such as red meat and full-fat dairy products, and in calories such as sugar-sweetened beverages.⁷ Other diets including the Mediterranean dietary pattern have also been shown to decrease blood pressure.³ Patients with hypertension can be instructed about several options in dietary guidelines to reduce hypertension and therefore reduce cardiovascular mortality risk. Reduction of sodium should be discussed with an optimal goal of no more than 1,500 mg a day but an aim to reduce intake by at least 1,000 mg a day.³ It is essential to teach the patient how to read food labels and to avoid foods high in sodium such as condiments, canned products, and fast food. The guidelines also recommend adequate potassium in the diet, as a higher level of potassium appears to dull the effect of excess intake of sodium on blood pressure.⁸ The DASH diet and Mediterranean diet include intake of foods that are high in potassium.³ Referral to a dietician and inclusion of family members who prepare meals can be helpful.

Physical activity

Blood pressure has been shown to be lowered with both low- and high-intensity exercise, interval and continuous training, and isometric exercise.³ Low aerobic capacity is a significant risk factor for hypertension even among patients with a normal BMI.⁹ The goal for physical activity is aerobic exercise, including dynamic resistance of 90 to 150 minutes per week and three sessions a week of isometric resistance exercises.³ A discussion of interventions to promote physical activity should be discussed with each blood pressure check.

Smoking cessation

Prior evidence revealed that blood pressure was not always reduced after smoking cessation, but that it is known that smoking tobacco leads to arterial stiffness and possibly raises central blood pressure.¹⁰ Current evidence, however, reveals that smoking 10 cigarettes a day is a risk factor for developing hypertension as well as respiratory disease and myocardial infarction.^{10,11} Being exposed to secondhand smoke for longer than 2 hours a day has also been associated with the development of hypertension in women who have never smoked.¹² Smoking cessation interventions should be individualized in relation to the patient's physical and psychological dependence and stage of readiness to quit. Self-help materials (written and online), smoking cessation classes, and pharmacologic aids may be appropriate.

Alcohol moderation

The effect of alcohol intake on blood pressure is directly related to the amount ingested. Women should limit alcohol intake to no more than one drink a day or not consume any alcoholic beverages.³ Men can consume two or less alcoholic drinks a day.³ Research has shown that for women with systolic blood pressure greater than 140 mm Hg, a decrease in alcohol consumption leads to a 1% to 2% reduction in blood pressure.¹³

Sleep hygiene

Lack of sleep or excessive sleep has been associated with hypertension in women. Sleep length of less or more than 7 hours has been shown to be a risk factor for higher blood pressure.¹⁴ The ACC/AHA guidelines do not specifically mention sleep amount but recommend treatment for sleep apnea with only a small re-

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duction (2–3 mm Hg) of blood pressure with continuous positive airway pressure (CPAP).^{3,15}

Pharmacologic treatment

Stage I hypertension

Stage I hypertension is a blood pressure of 130 to 139 mm Hg systolic or 80 to 89 mm Hg diastolic. For patients with stage I hypertension and a calculated 10-year risk for atherosclerotic CVD (ASCVD) of less than 10%, lifestyle recommendations are the first line of therapy.³ If the 10-year risk for ASCVD is 10% or greater or if the patient has CVD, diabetes, or chronic kidney disease, then one antihypertensive medication is recommended.¹⁶ Agents that should be considered first are thiazide diuretics, calcium channel blockers, and angiotensin-converting enzyme (ACE) inhibitors or angiotensin II receptor blockers (ARB), with a follow-up appointment to check blood pressure in 1 month.³ Common side effects of antihypertensive medication including cough with use of ACE inhibitors and edema with use of calcium antagonists are observed more often in women than men.³

Stage II hypertension

Stage II hypertension is defined as blood pressure of 140 mm Hg or

greater systolic and 90 mm Hg or greater diastolic.³ Along with lifestyle changes, two antihypertensive medications are recommended from two different classes, with reassessment of the patient in 1 month, and if the goal is met, again in 3 to 6 months.³ Hypertensive crisis (blood pressure > 180/120 mm Hg) should be treated promptly, with the patient admitted to the intensive care unit of the hospital to prevent organ damage.³ Antihypertensive classifications and examples are provided in *Table 2*.

Aspirin is not routinely recommended for the primary prevention of hypertension. In a recent study, the efficacy of low-dose aspirin at 100 mg was found to have no effect on the incidence of death from a cardiovascular event, but it was associated with an increased risk of hemorrhagic stroke.¹⁶

Special considerations for reproductive-aged women

Women of all ages with hypertension should be evaluated and in general treated as previously described. Because hypertension, especially when uncontrolled, can lead to increased risks for maternal, fetal, and neonatal morbidity and mortality, additional considerations are critical.^{5,17}

Reproductive-aged women with hypertension who could become pregnant should be counseled regarding the risks of uncontrolled hypertension in pregnancy.⁵ In this context, any antihypertensive medications being taken should be reviewed. ACE inhibitors and ARBs are contraindicated during pregnancy because of known teratogenic and/or fetotoxic effects.⁵ Women taking these medications should be counseled regarding the use of effective contraception.

Estrogen-containing contraceptive methods (eg, pills, patches, vaginal rings) are contraindicated for women with uncontrolled hypertension or vascular disease due to the increased risk for stroke, myocardial infarction, and peripheral artery disease. Estrogen-containing contraceptive methods are not recommended even for women with adequately controlled hypertension unless no other method is available or acceptable. Long-acting reversible contraceptive methods such as intrauterine devices and the progestin implant as well as progestin-only pills are options that are safe and effective for women with hypertension. Unlike other progestin-only methods, the use of depot medroxyprogesterone acetate by women with uncontrolled hypertension is generally not recommended because of the theoretical risk of unfavorable lipoprotein changes that could contribute to cardiovascular risk.¹⁸

Adherence to treatment

Adherence to treatment for hypertension is critical but can be challenging both in terms of lifestyle changes and medication regimens. Assessment of and attention to socioeconomic determinants such as finances, health insurance, literacy, living environment, transportation, and access to healthy foods are critical to develop a patient-centered,

realistic plan of care.

The healthcare provider needs to stress the importance of adherence to all treatments, especially medications. The provider must emphasize that the patient cannot stop the medication abruptly, because this may inadvertently lead to an adverse event such as stroke. Medications that can be taken daily instead of 2 to 3 times a day will help the patient adhere to the protocol. Information regarding local pharmacies with the lowest price for a medication should be provided to the patient. Several applications (apps) are available that can assist in finding the lowest price of a medication.

Both oral and written information provided should be appropriate to the patient's literacy level and language. Medical interpreters should be available as needed. The teach-back method can be used to assess understanding.

Patients in many inner cities may not have access to fresh fruits and vegetables or have money to pay for them. Particularly vulnerable are the elderly and those who are socioeconomically disadvantaged. Dietitians may be able to assist the patient regarding healthy food choices that are available. Transportation assistance may be needed.

Accessibility to locales and services that can provide the patient with the opportunity for regular physical activity should also be assessed. Neighborhoods with a high crime rate will discourage patients to be physically active in simple ways like taking a walk.

Family members and caregivers who assist the patient with instrumental activities of daily living required to prepare meals, shop for meals, and prepare medication should be included in education by the healthcare provider on the plan of care.

Conclusion

Hypertension is one of the leading causes of CVD and mortality. It is essential that healthcare providers are proficient in screening for EBP and hypertension, thorough assessment, and initiation of interventions that include lifestyle behavioral changes. Pharmacologic treatments if needed may be prescribed or the patient referred for management. Early diagnosis and treatment can prevent serious TOD and CVD. The healthcare provider should remain up to date on and follow evidence-based guidelines for assessment and treatment of EBP and hypertension. Those providers who focus on women's reproductive healthcare have a specific role in counseling women with hypertension who could become pregnant about the importance of optimizing blood pressure and evaluating the need for any antihypertensive medication changes prior to pregnancy. Contraceptive counseling should include attention to the use of the most effective method of the patient's choice that is safe in regard to her blood pressure status. ●

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