June 2021

Michigan Quality Improvement Consortium Guideline

Medical Management of Adults with Hypertension

The following guideline recommends diagnostic evaluation, education and pharmacologic treatment that support effective patient self-management.

Eligible Population	Key Components	Recommendation and Level of Evidence
Adult patients ≥ 18 years of age. Not pregnant. **Correct Blood Pressure Technique:** - Resting 5 minutes in a chair with feet flat on the floor - Legs uncrossed - Back supported - Arm supported at heart level - Cuff on bare arm - Appropriate size cuff - Empty bladder - Do not have a conversation List of clinically validated devices- (www.validatebp.org)	Initial assessment	The objectives of the initial evaluation are to assess lifestyle, cardiovascular risk factors, concomitant disorders, reveal identifiable causes of hypertension and check for target organ damage and cardiovascular disease. Physical examination: 2 or more blood pressure measurements on 2 or more office visits using calibrated blood pressure device and correct technique. Ideally confirm with at-home monitoring or 24-hour ABPM. Blood pressure measurements should be separated by at least 2 minutes with the patient seated and standing, verification in contralateral arm, heart and lung exam, abdominal exam for bruits or aortic aneurysm,extremity pulses and neurological assessment **[D].** Laboratory tests: basic metabolic profile urinalysis.
	Patient education and nonpharmacologi cinterventions	Lifestyle modification: weight reduction (BMI goal < 25), reduction of dietary sodium to less than 2.4 gm/day, DASH diet **[A]** (i.e., diet high in fruits and vegetables, reduced saturated and total fat), aerobic physical activity ≥ 30 minutes most days of the week, tobacco avoidance, increased dietary potassium and calcium, moderation of alcohol consumption[2] **[A].** Encourage out of office BP measures using validated equipment and technique with communication of results, frequent checks for accuracy, and lifestyle and medication adjustments. Home readings are often 5 mm Hg lower than office.
	Goals of Therapy	Goal, based on office-based readings: <130/80 mm Hg if at risk (ASCVD, CKD, diabetes) and ambulatory. <140/90 mm Hg if no risk factors. Caution: low diastolic or orthostatic symptoms may limit ability to control systolic. Use caution if diastolic is below 60. For diabetics, mortality increases if diastolic is below 70.
	Pharmacologic interventions	Hypertension, **Stage 1** (130/80-139/89) and no risk factors: use non-pharmacologic interventions. Can consider medication if continues over 130/80. Shared decision making. Hypertension, **Stage 1** (130/80-139/89) with risk factors: monotherapy treatment; start with thiazide-type diuretic, ACE-I, ARB, DHP-CCB[3] for almost all patients **[A]**. Hypertension, **Stage 2** (≥140/90): consider two-drug combination (thiazide plus ACE-I or DHP-CCB). In general, diuretics and DHP-CCB appear to be more effective as an initial treatment in African-Americans. ACE-I or ARB recommended in patients with CKD or heart failure. **[A]** Beta-blockers are recommended in patients with ischemic heart disease or heart failure but otherwise not first line therapy. Intensify treatment until treatment goals are met; 3 or more drugs may be necessary for some patients to achieve goal BP. Multi-drug regimen at moderate dose is preferable to maximum dose monotherapy. Add mineralocorticoid antagonist (e.g., spironolactone) for resistant hypertension. Do not use ACE-I and ARB concurrently. Caution: NSAIDs may complicate management of hypertension and worsen renal function.
	Monitoring and adjustment of therapy **[D]**	Adjust treatment based on home blood pressure readings. Ensure technique is appropriate and home readings correlate with in-office blood pressure readings with optimal technique. Take blood pressure monthly if adjusting medications. Hypertension, **Stage 1**: if therapy initiated, adjust medications within 2 months, then monthly until within goal. Hypertension, **Stage 2**: initiate therapy and recheck weekly or more often if indicated. Persistent hypertension with evidence of acute end organ damage may require hospital monitoring and treatment. Recheck at each visit using optimal technique. Check serum potassium, eGFR and urine albumin/creatinine ratio at least annually.

[1]American Medical Association. Essential Guide to Hypertension: Accurate Blood Pressure Readings (www.mqic.org/pdf/BP_Readings.pdf)
[2]Moderate alcohol consumption is generally defined as up to two drinks per day for men, one drink per day for women.
[3]ACE-I = angiotensin converting enzyme inhibitor, ARB = angiotensin receptor blocker, DHP-CCB = long-acting dihydropyridine calcium channel blocker (e.g. amlodipine, felodipine)

Levels of Evidence for the most significant recommendations: A = randomized controlled trials; B = controlled trials, no randomization; C = observational studies; D = opinion of expert panel

This guideline represents core management steps. It is based on 2017 ACC/AHA/AAPA/ABC/ACPM/AGS/APhA/ASH/ASPC/NMA/PCNA Guideline for the Prevention, Detection, Evaluation, and Management of High Blood Pressure in Adults: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. J Am Coll Cardiol 2018;71:e127-e248; andKidney Disease: Improving Global Outcomes (KDIGO) Blood Pressure Work Group. KDIGO Clinical Practice Guideline for the Management of Blood Pressure in Chronic Kidney Disease. Kidney inter., Suppl. 2012; 2:337–414. Individual patient considerations and advances in medical science may supersede or modify these recommendations.