Hypertension (HTN): Evaluation Summary

Revised 8/3/14

Classification of Blood Pressure (BP) for Adults Aged 18 and Older *(p5)*

Category	Systolic*		Diastolic
Normal**	<120	*and*	<80
Pre-Hypertension	120-139	*or*	80-89
Hypertension			
Stage 1	140-159	*or*	90-99
Stage 2	≥160	*or*	≥100

* Systolic hypertension may be more important than diastolic in patients over 50.

**Cardiovascular risk begins at 115/75 mmHg (JNC 7)

- **Diagnosis is based on ≥4 measurements (2 per visit, averaged);**
- **Monitor arm with the highest reading.**
- **When SBP & DBP are in different categories, the higher category should be selected to classify the HTN.**

Recommendations for Follow-up Based on Initial Elevated BP Measurements for Adults

Systolic	Diastolic	Follow-up Recommended
<120	<80	Recheck in 1-2 years.
120-139	80-89	Confirm on subsequent visits (within 1 month).
140-159	90-99	Confirm on subsequent visits (within 1 month). Consider home monitoring.
160-179	100-109	Confirm on subsequent visits (within 1 month). Consider home monitoring.
>180	>110	Refer to source of care immediately or within 1 week depending on clinical circumstances.

SUMMARY of Evaluation Steps

Step 1. Establish diagnosis of HTN or pre-HTN
Step 2. Determine the stage of hypertension.
Step 3. Evaluate patient for
a) possible causes,
b) CVD risk factors
c) end organ damage.
Step 4. Assess the patient's overall risk factors.

HISTORY *(p7)*

Current Symptoms

- Angina, shortness of breath
- Swelling in the lower extremity, orthopnea (suggesting CHF);
- Dizziness, fainting, balance problems, confusion (suggesting CHD or stoke);
- Polyuria, polydipsia, polyphagia, polyneuritis (suggesting diabetes);
- Heat intolerance, unexplained changes in weight, tremor (suggesting hyperthyroidism)

History *continued*

Personal History

- Known duration and prior levels of HTN
- CHD (e.g., MI. angina)
- CHF
- Sleep apnea (consider CPAP)
- Cerebrovascular disease (e.g., TIA, stoke)
- Peripheral vascular disease
- Renal disease
- Diabetes mellitus
- Dyslipidemia
- Hyperthyroidism
- Gout
- Sexual dysfunction
- Other conditions
- History of prescription and OTCs, herbal remedies, illicit drugs, and "performance enhancing" supplements; *oral contraceptives require regular Bp monitoring.*
- Results/adverse effects of previous antihypertensive therapy

Family History (especially first degree relative)

- HTN
- Premature CHD
- Stroke
- Diabetes
- Dyslipidemia
- Renal disease

Lifestyle Factors

- Physical activity levels
- Tobacco use
- Dietary assessment (e.g., sodium, alcohol, saturated fat, and caffeine)
- Psychosocial influences (e.g., family situation, employment status and working conditions, educational level)

PHYSICAL EXAM *(p9)*

- Take BP and heart rate (see page 4 for details).
- Measure height, weight, waist circumference; calculate BMI (weight in kilograms divided by the square of the height in meters).
- Auscultate heart and major vessels; assess jugular distension.
- Auscultate lungs.
- Palpate chest wall for thrills, heaves, heart size.
- Check peripheral pulses (and for edema).
- Palpate thyroid gland.
- Exam abdomen for bruit, masses and enlarged abdominal aorta.
- Perform neurological screen.
- Examine fundus (optional).

ROUTINE TESTS (recommended before initiating therapy) *(p10)*

- Urinalysis (include microscopic analysis for blood and protein)
- CBC or hematocrit, serum potassium, sodium, calcium, creatinine, BUN, uric acid, fasting, glucose, fasting lipid profile (HDL, LDL, and triglycerides)
- 12-lead electrocardiogram.

For interpretation of lipid profiles, see Appendix 2.

IDENTIFYING SECONDARY HTN

(Also see Appendix 3)

Nonspecific clues

- A sudden increase in BP which had been previously normal or previously controlled by antihypertensive therapy.
- A gradual increase in BP over a year in a normotensive middle-aged person without changes in medication, weight, alcohol intake, or salt intake.
- Hypertension in young people (aged <40 years) and those with a family history of hypertension or stroke at age <50 years.

Specific clues

- A history of persistent urinary tract infections may suggest pyelonephritis.
- Labile or paroxysms of HTN with headache, palpitations, pallor, and perspiration suggest pheochromocytoma.
- Drugs that may cause hypertension
  - older high dose oral contraceptives
  - herbals: ephedra (ma huang), ginseng
  - amphetamines, cocaine
  - NSAIDS: Cyclooxygenase-2 inhibitors, ibuprofen, naproxen (Naprosyn)
  - psychiatric**:** Buspirone (Buspar), carbamazepine (Tegretol), clozapine (Clozaril), fluoxetine (Prozac), lithium, tricyclic antidepressants
  - steroids: methylprednisolone (Depo-Medrol), prednisone
  - decongestants
  - diet pills
  - thyroid medications
  - migraine medications,
  - alcohol and other re-creational drugs (e.g., cocaine)
  - "performance enhancing" supplements.

Causes of secondary HTN

Age	*Most common diseases*
19 to 39	Thyroid dysfunction Fibromuscular dysplasia Renal disease
40 to 64	Aldosteronism Thyroid dysfunction Obstructive sleep apnea Cushing syndrome
≥65	Pheochromocytoma Atherosclerotic renal artery stenosis Renal failure Hypothyroidism

Assess Patient's Overall Risk

Group A – No major risks.

Group B – The patient has ≥1 risk factors but no end organ damage. This includes no heart LVH, angina, prior MI, prior coronary revascularization surgery or heart failure), stroke, TIAs, renal disease, peripheral artery disease or retinopathy. Risk factors: smoking, poor lipid profile (see Appendix 5), age >60, male or postmenopausal women, family history of cardiovascular disease (women < 65-years old or men < 55).

Group C – Evidence of target organ damage or cardiovascular disease or diabetes.
NOTE: *The presence of LVH on ECG or echocardiogram implies a major independent risk for cardiac death, MI and morbid CV events.*

UWS CHARTING GUIDELINES

Charting elevated BP: In the SOAP, record elevated BP in the O and a note to check BP on the next visit in the P.

Alternatively, if not a transient response to acute pain, it can be entered on the problem list (e.g., "ICD-9 796.2 elevated blood pressure without diagnosis of hypertension").

Epic TIP: Blood pressure measures must be recorded in the Vitals section.

Charting elevated HTN in the Problem List:

- Add the stage as well as a notation of end-organ damage. For example, "stage I with retinal changes."
- If medically managed, notate this in the and the management plan.
- Significant end organ damage (e.g., renal disease, LVH) must also be added to the problem list as a separate problem.

Concomitant diseases such as diabetes or established coronary artery disease should be entered as separate problems. A timeline for treatment and dates of follow-up tests must be clearly charted in the management plan.

Hypertension (HTN): Management Summary

Revised 8/3/14

SUMMARY OF MANAGEMENT STEPS

1. Establish appropriateness of nonpharmacologic intervention. *(p14)*
2. Educate the patient on risks and options. *(p18)*
   * Educate the patient about overall effect on health (morbidity and mortality).
   * Discuss the pros and cons of lifestyle change versus antihypertensive medication.
   * Discuss the issues of compliance and long term dedication to lifestyle interventions.
3. Establish a treatment protocol. (p*20-32)*
4. Set definite parameters and a time line with specific therapeutic goals. *(p32)*

BP Class	Systolic BP, mmHg	Diastolic BP, mmHg	Lifestyle Modification	Without Compelling Indications	With Compelling Indications*
Normal	< 120	< 80	Encourage		
Pre-HTN	120-139	80-89	Yes	Anti-HTN drug(s) not indicated	----------
Stage 1 HTN	140-159	90-99	Yes	Trial of lifestyle changes for up to 3-12 months or referral for anti-HTN drugs. Some guidelines suggest drug therapy starting SBP 150 in patients > 60 years old (or >80)	More immediate referral for drugs for compelling indication(s),
Stage 2 HTN	≥ 160	≥ 100	Option of aggressive lifestyle changes	Start with lifestyle changes or several weeks or immediate referral for 2-drug combination in most cases	Referral for drugs for compelling indication(s),

* Compelling indications include heart failure, post-myocardial infarction, high coronary disease risk, diabetes, chronic kidney disease, and recurrent stroke prevention

SUMMARY: Lifestyle Modifications for Hypertension Prevention and Management

ADVICE	Drops in Systolic Blood Pressure
Lose weight if overweight (at least 22 lbs or 10 kg).	5 to 20 points for every 10% loss
DASH diet: Reduce intake of dietary saturated and total fat; eat *low-fat* dairy foods; increase fruits and vegetables.	8 to 14 points
Increase aerobic physical activity (30-45 min most days of the week).	4 to 9 points
Reduce sodium intake to no more than 2400 mg (1500 mg may be better, but is controversial) of sodium or 6000 mg of sodium chloride.	2 to 8 points
Limit alcohol intake – have no more than: 2 drinks/day for men; 1 drink/day for women (1 drink = 12 oz/360 ml beer, 5 oz/150 ml wine, or 1.5 oz/30 ml 80-proof whiskey)	2 to 4 points
Stop smoking.	unknown
Supplementation Note that in some cases the reported effect of supplements may be greater than that of dietary or lifestyle changes. The supporting evidence, however, tends to be less robust for supplementation. Taking individual supplements is also more likely to narrowly target blood pressure as opposed to having a wider effect on multiple cardiac risk factors.	
CoQ_{10} (100-200 mg/day)	11 points
Fresh garlic powder, yielding at least 4000 mcg allicin per daily dose	8 to16 points
Fish and fish oils, delivering at least 3000 mg daily of long-chain omega-3 (EPA + DHA).	3 to 6 points
Dark chocolate with high polyphenol content, at least one ounce (28 grams) containing at least 50% cocoa content.	3 points
Maintain adequate intake of dietary calcium and magnesium for general health.	
Maintain adequate intake of dietary potassium (approximately 90 mmol/day).	

MANAGEMENT TIMELINE *(p32-33)*

Stage 1 HTN (systolic 140-149 or diastolic 90-99): 6 months to 1 year.

Patients with stage 1 hypertension who do not have evidence of end organ damage nor significant risk factors are good candidates for nonpharmacological management.

- If patients come in for regular care, monitor every visit or weekly.
- If patients are not coming in routinely, it is recommended to contact them weekly to encourage adherence to the program. Check BP at the end of one month. Address any compliance problems.
- Patients should be encouraged to track their own BP with a home unit (see Appendix 2)
- A combination of phone support and close monitoring should continue until target BP is met.
- Re-evaluate every 3 months until BP target is met. If BP increases to stage 2 or there are new significant risk factors or new evidence of target organ damage, then consider referral for the addition of pharmaceutical therapy.
- When BP target has been consistently met, encourage the patient to continue self-monitoring and to seek care if they again become consistently hypertensive. If they do not have a home unit, encourage them to have their BP checked at least once a year.

Stage 2 or Stage 1 HTN with target organ damage / significant risk factors: Referral.

Patients in the above categories should be referred for medical consult. At the same time, the patient should be educated about appropriate lifestyle and dietary changes. When the hypertension is pharmacologically controlled, management can then be aimed at reducing or eliminating medication (in cooperation with the prescribing physician).

1. WEIGHT LOSS

Strength of recommendation: Strong
Level of evidence: A
Treatment effect: 4.4/3.6 (with average loss of 5kg)
Response time: Starting with 5 kg of weight loss

A) **Calorie reduction:** Screen diet for high amounts of empty-calorie foods (excessive fat, sugar and/or alcohol). Suggest lower-calorie alternatives, high in fiber whenever possible (see Appendix 6).

B) **Fat reduction:** Determine calorie intake based on basal requirements* and activity level. Determine a limit for daily fat intake (20-30% of total calories converted to g/dy of fat); selectively cut saturated fats and trans-fatty acids. Teach how to read food labels and evaluate non-labeled food items for fat content.

C) **Healthful choices:** Teach how to distinguish between 1) whole-grain vs refined-grain products (white rice, white flour products, potatoes, pasta, and sweets) and 2) healthful oils (non-hydrogenated plant oils, oily fish, nuts and seeds) vs unhealthful fats (red meat and dairy fat, commercial fried and baked foods, regular margarine and shortening). Emphasize daily consumption of high quality, low-glycemic index fruits, vegetables and legumes. Have patients monitor their diet with a diary. (See Appendices 9 and 10.)

D) **Carbohydrate reduction** Teach how to track carbohydrate intake or refer patients to resources on healthy low carbohydrate diets (e.g., Omniheart, South Beach or Paleo diet) which emphasize replacing high carbohydrate foods with non-starchy vegetables, foods high in protein (lean meats, fish, poultry, vegetarian meat substitutes) and healthy fats (nuts, seeds, avocado, healthy oils). *Note that a very low carbohydrate intake (usually limited to the initial stage) requires carefully monitored for ketoacidosis during this period.*

* To compute a patient's basal caloric requirements, a validated on-line calculator can be used (see http://fnic.nal.usda.gov/fnic/interactiveDRI/. However, more commonly, a simple alternative is to inspect the current diet for high-fat foods and recommend reducing them or using lower-fat alternatives.

Hypertension (HTN): Management Summary – Cont'd

2. DASH AND DASH-LIKE DIETS

DASH Diet (see Appendix 7)
Strength of recommendation: I[1]
Level of evidence: A
Treatment effect: decrease 5-6/3 mmHg
Response time: 2 weeks

Combine the DASH with lower salt intake
Strength of recommendation: I
Level of evidence: A
Treatment effect: greater than the DASH diet
Response time: 2 weeks

The Mediterranean Diet
Strength of recommendation: I
Level of evidence: low
Treatment effect: decrease 2-7/1-3 mmHg (depending on patient population)
Response time: 6 weeks

The OmniHeart dietary pattern
Strength of recommendation: ?
Level of evidence: moderate
Treatment effect: decrease 1-3 SBP > than the DASH diet
Response time: 6 weeks

3. DECREASE SALT (SODIUM CHLORIDE) (Also see Appendix 8)

Strength of recommendation: I
Level of evidence: A
Treatment effect: depends on amount of decrease

Decrease patient's baseline intake by 1,000 mg
Strength of recommendation: IIa[2]
Level of evidence: B
Treatment effect: decrease 3-4/1/2 mmHg
Response time: 1-3 months

Reduction Targets: 2,400 mg
Strength of recommendation: IIa[2]
Level of evidence: B
Treatment effect: decrease 4-5/1 mmHg
Response time: 1-3 months

Reduction Target: 1,500 mg
Strength of recommendation: IIa[2]
Level of evidence: B
Treatment effect: decrease 7/3 mmHg (greater with the 2,400 restriction)
Response time: 1-3 months

4. EXERCISE

Strength of recommendation: IIa[2]
Level of evidence: A
Treatment effect: decrease 2-7/1-4 mmHg
Frequency: 3 to 4x/wk (or more)
Level of evidence: Strong evidence
Duration: average 40 minutes per session,
Intensity: moderate-to-vigorous intensity

5. DECREASE ALCOHOL INTAKE. Moderate alcohol consumption can be helpful in protecting against cardiovascular events, but greater amounts of alcohol can raise blood pressure. Men should not exceed 2 drinks a day, women 1 per day.

6. SMOKING CESSATION. Although smoking causes a transitory increase in blood pressure, evidence is poor that stopping smoking will lower blood pressure. Nonetheless, it is important to eliminate this risk for heart disease and stroke.

7. OTHER DIETARY INTERVENTIONS

- **Avoid/reduce consumption of sugar sweetened and artificially sweetened beverages**.
- **Consume small amounts of chocolate**. The chocolate should be of high polyphenol content, at least one ounce (28 grams) with 50% or more cocoa.
- **Manage caffeine intake.** Caffeinated soft drinks and energy drinks may contribute to HTN, but coffee is not likely one of the offenders, perhaps because it is a more complex substance.

[1] A recommendation of I indicates that the benefits greatly outweigh the risks and the guidelines panel indicates that the treatment SHOULD be followed.
[2] A level IIa recommendation indicates that the benefits out-weigh the risks but that additional studies are needed with more focused objectives. The guidelines panel suggests that based on current evidence it is REASONABLE to administer the treatment. The Institute of Medicine , on the other hand, concluded that there was insufficient evidence to recommend for/ against reductions to < 2,300g/dy .

Dietary Supplements/Botanicals

- **POTASSIUM** (35g/d) (Also see Appendix 11). Special considerations for patients taking diuretics:
    - if K wasting: ensure adequate K, Mg, Ca replacement
    - if K sparing: do not supplement
    - K dosage: 10-20 mEq (60 mEq/d = 2-3 g of K); 1 tsp KCL has 60-70 mEq.
- **OMEGA-FATTY ACIDS** FROM FISH OIL (3 g/d). Large amounts of omega-3 fatty acids may lower blood pressure; however, some patients experience abdominal discomfort.
- **CALCIUM SUPPLEMENTATION** (1-2 g/d). Calcium supplementation may cause a drop of 6/3 over a 2-3 month period (especially if the patient has decreased serum renin, decreased serum calcium or increased calcium secretion). Calcium targets range from a threshold effect of 800 to about 1,000 mg/d.
- **MAGNESIUM SUPPLEMENTATION** (300-400 mg/d).The highest food content: green leafy vegetables, unrefined grains, and nuts. Contraindications: renal failure or heart block without artificial pacemaker.
- **COENZYME Q_{10}** (100-200 mg/d). Split does in half, twice a day for better absorption. 3-4 weeks for anti-hypertensive effect to take place and only 7-10 days for its effects to recede if supplementation is discontinued.
- **GARLIC POWDER** (STANDARDIZED FOR ALLICIN YIELD, 4000-5000 mcg)