**Disclosures / Conflicts of Interest**

- None

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**Case 1, question 1**

A 78 year old woman with DM, CAD, and CKD (Cr=2.4 mg/dL), is referred to you for persistent HTN, despite being treated with 5 medications (lisinopril 40 mg, amlodipine 10 mg, furosemide 40 mg bid, metoprolol 50 mg, and diltiazem 120 mg). She is asymptomatic. She tells you that she is often dizzy when she wakes up in the morning. She checks her BP at home, and says it is typically 100 – 120 systolic. On exam, her BP is 164/70, non-orthostatic, HR 54, but otherwise unremarkable. Her UA shows 2+ albumin. BUN=42, Cr=2.38, K=4.1.

- Which one of the following next steps is most appropriate?
  - A.) Increase the dose of her diltiazem to achieve better BP control
  - B.) Ask her to continue to do home BP measurements and see her again in 3 months time.
  - C.) Do a screen for furosemide in her urine to see if she is being adherent with her medications
  - D.) Set her up for ambulatory BP monitoring
  - E.) Start her on a clonidine patch.

---

**Predictors of white coat HTN**

- Older (age ≥ 60 years)
- Female
- Morning clinic visit
- BP meds taken in AM (vs. PM)
- Obesity
- Active smoking
- Diabetes


---

**Indications For the Use of Ambulatory Blood Pressure Monitoring**

- White coat hypertension
- Informing equivocal treatment decisions
- Evaluation of nocturnal hypertension
- Evaluation of drug-resistant hypertension
- Determining efficacy of treatment over 24 hours
- Evaluation of symptomatic hypotension
- Evaluation of unusual variability*

---

**Recommendations for Clinical Use of ABPM: JNC 7 & WHO-ISH**

<table>
<thead>
<tr>
<th></th>
<th>JNC 7</th>
<th>WHO-ISH</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABPM endorsed</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Indications:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>White Coat HTN</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Labile BP</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>R/O hypotensive episodes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Resistant HTN</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Autonomic dysfunction</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

Classification of BP Findings on 24-hour Ambulatory Blood Pressure Monitoring

<table>
<thead>
<tr>
<th>24-hour Ambulatory BP</th>
<th>Office Blood Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 135/85</td>
<td>&lt; 140/90</td>
</tr>
<tr>
<td>≥ 135/85</td>
<td>≥ 140/90</td>
</tr>
<tr>
<td>&lt; 125/75</td>
<td>&lt; 130/80</td>
</tr>
<tr>
<td>≥ 125/75</td>
<td>≥ 130/80</td>
</tr>
</tbody>
</table>


Ambulatory Blood Pressure Monitor (ABPM)

- Shows blood pressure pattern over a 24 hour period
- Measures blood pressure through oscillometric technology which depends on the pulsatility in the brachial artery
- Arm must stay motionless during inflation and deflation
- Less accurate at extremes of systolic and diastolic blood pressure

Diurnal Pattern/Circadian Rhythm

- Abnormalities in pattern are associated with increased CV events
- Dipping is good
  - Circadian rhythm of blood pressure is a >10% fall in blood pressure during sleep
- A non-dipping pattern is associated with an increase risk of MI, stroke, dementia as blood pressure remains elevated during sleep

BP metric and risk of CV death


In fully adjusted models, including adjustment for clinic BP:
- 10 mmHg higher nighttime SBP → 21% higher risk of CV death
- 5 mmHg higher nighttime DBP → 9% higher risk of CV death

Non-dipping and risk of CV events


Each 10% higher nighttime ratio is associated with a 41% higher risk of CV events

Important Role for Home Blood Pressure Measurement

- Measuring blood pressure at home has a stronger association with CV prognosis than office based readings
- Home measurement can help to:
  - confirm the diagnosis of hypertension
  - improve blood pressure control
  - reduce the need for medications
  - improve medication adherence in non adherent patients
  - help to identify white coat and masked hypertension

2009 Canadian Hypertension Education Program Recommendations
Benefits 24 hour ABPM

- Provides large number of blood pressure readings outside clinic setting
- Helps determine the dynamic changes of blood pressure throughout 24 hour period
- Enables physician to adjust treatment appropriately to prevent target organ complications
- Rules out ‘White Coat’ hypertension
- Used to aid in diagnosis of ‘Masked Hypertension’
- Identifies ‘Dippers’ vs. ‘Non-dippers’

2009 Canadian Hypertension Education Program Recommendations

Systolic Hypertension in Europe (Syst-Eur)

Objective: To determine whether antihypertensive treatment reduces cardiovascular complications in older patients with elevated SBP

Patients: 4695 patients, ≥60 years of age, with SBP 160–219 mm Hg and DBP <95 mm Hg

Treatments: Nitrendipine (10–40 mg/day) with possible addition or substitution of:
- Enalapril (5–20 mg/day)
- Hydrochlorothiazide (12.5–25 mg/day)
- Placebo

Follow-up: 2 years (median)

Endpoint: Total stroke

Myocardial infarction


Syst-Eur: Outcomes

Percent Reduction

Risk Reduction


42* –26† –29‡ –30‡ –31 §

Stroke All CHD CHF MI Total CVD

-40  -30  -20  -10  0  10  20  30  40

P= .003; †P=.03; ‡P=.12; §P<.001.


Hypertension in the Very Elderly Trial: (HYVET)

Objective: To determine whether treatment of systolic hypertension in patients ≥80 years old lowers the risk of stroke

Design: Multicenter, randomized, double-blind, placebo-controlled

Patients: 3845 men and women >80 y (mean, 84 y) with sustained SBP > 160 mmHg

Treatments: Step 1: thiazide
- Step 2: ACEI
- Goal: SBP < 150 mmHg
- Placebo

Follow-up: 1.8 years (stopped early)

Endpoint: Fatal and non-fatal stroke

Beckett NS, et al. NEJM 2008; 358:1887

HYVET: Outcomes

Percent reduction

-30  -39*  -28  -64 §  -21*

Fatal and non-fatal stroke  Fatal stroke  Fatal and non-fatal MI  CHF All-cause mortality

*p<0.05  †p<0.001

Beckett NS, et al. NEJM 2008; 358:1887
Elderly with Hypertension

- Isolated systolic hypertension common
- Indicates decreased vascular compliance
- Pseudohypertension may mimic – calcified or stiff peripheral arteries
- Orthostatic hypotension can co-exist – measure blood pressure standing as well
- Thiazides and long acting dihydropyridine CCBs consistently effective

Octogenarians Benefit from Treatment of Hypertension

The HYVET Trial. Subjects 80+ years old with sustained SBP > 160 mm Hg, indapamide + perindopril vs. placebo, target SBP < 150/80. N = 2800. Follow-up = 2 years. Stopped early.

<table>
<thead>
<tr>
<th>End Point</th>
<th>Number of events</th>
<th>Hazard Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Achieved BP)</td>
<td>Active (SBP 143 mm Hg)</td>
<td>Placebo (SBP 159 mm Hg)</td>
</tr>
<tr>
<td>Stroke</td>
<td>51</td>
<td>69</td>
</tr>
<tr>
<td>Death</td>
<td>196</td>
<td>235</td>
</tr>
<tr>
<td>Heart failure</td>
<td>22</td>
<td>57</td>
</tr>
<tr>
<td>CVD</td>
<td>138</td>
<td>193</td>
</tr>
</tbody>
</table>

Beckett et al. Treatment of Hypertension in Patients 80 Years of Age or Older. NEJM 2008.

Case 2, question 1

- An 85 yo F is seeking a second opinion because her PCP advised her to take losartan-HCTZ to lower her BP. She only takes OTC medications, specifically a multivitamin, fish oil, and vitamin D. Her clinic and home BPs over the past 2 years have ranged from 150/90 to 180/70, consistent with isolated systolic hypertension (ISH). She has no diabetes, MI, or stroke, but her mother died of a stroke at age 77. She eats a healthy diet, walks for exercise 5 times/week, and does not drink alcohol.
- She is a thin and fit elderly woman (BMI=22), BP is 172/86. She has a 216 SEM, an S4, and no edema. Cr=0.8, UA is negative.

- You should advise her that:
  a) She should have 24-hour ABPM because she likely has white-coat HTN
  b) ISH is normal with aging and requires no therapy
  c) Although ISH should be treated in renal, there are no data pertiaining to women of her age
  d) Taking losartan-HCTZ may reduce her chances of dying and/or developing congestive heart failure during the next 5 years

Initial Drug Selection in Hypertension

- If > 20 mm Hg above target BP, start 2 drugs in combination
- First three drugs (no particular order)
  - Calcium channel blocker
  - ACE inhibitor / ARB
  - Thiazide diuretic (loop diuretic if eGFR < 30)

Initial Drug Selection in Hypertension

- The JNC7 recommends thiazide diuretic therapy for most patients excepting those with compelling indications for another drug class

Compelling Indications for Selected Antihypertensive Drugs

- Diabetes mellitus (with proteinuria)
- ACE-I, ARBs
- Heart Failure
  - ACE-I, ARBs, b-blockers, thiazide diuretics, aldosterone antagonists
  - Myocardial Infarction
  - b-blockers, ACE-I, aldosterone antagonists (with LV dys.)
  - Chronic kidney disease
  - ACE-I, ARBs
  - Isolated systolic hypertension / Stroke
  - Diuretics, Calcium channel antagonists
Controversies in Drug Selection

- Chlorthalidone may be preferred to hydrochlorothiazide
  - Better 24-hr BP profile
  - More clinical trial evidence (e.g. ALLHAT)
- Vasodilating beta blockers (e.g. carvedilol) may be preferred to non-vasodilating (e.g. atenolol)
  - Less insulin resistance
  - Improved aortic hemodynamics
- Combination ACE/ARB therapy more harmful than helpful
- Calcium channel blockers are as safe as other therapies, and may even be of unique benefit

ONTARGET

- 25,620 patients with either pre-existing vascular disease or diabetes randomly assigned ramipril, telmisartan, or the combination of the two
  - Followed for 4.5 years, primary outcome was a composite of CV death, MI, stroke, or hospitalized CHF; multiple secondary endpoints
  - No hint of benefit for any endpoint with combination therapy
  - Trend toward increased risk of death, 1.07 (0.98-1.16), with combination therapy
  - Many more adverse events
  New Eng J Med 2008; 358:1547

ONTARGET (and TRANSCEND)

- Secondary analysis in 5623 patients with eGFR<60 and/or proteinuria
  - Combination therapy reduced proteinuria to a greater degree than monotherapy
  - Combination therapy significantly increased the incidence of ESRD or doubling of Scr (0.79 vs. 0.56 % per year)
  - Combination therapy significantly increased the incidence of ESRD (2.7 vs. 1.6 % per year) among patients with both eGFR<60 and proteinuria
  Circulation 2011; 123:1098

Hypertension in Diabetes

- Guidelines say: Treat to <130/80
- ADA Recommends ACE/ARB first

Action to Control Cardiovascular Risk in Diabetes (ACCORD) Trial

- NHLBI 10,251 Type 2 diabetics
- Three Trial arms
  - Glycemic control
  - BP <120
  - Lipids: Fibrate added to Statin
- BP arm 4,773 randomized to SBP<120 or <140

www.nejm.org March 14, 2010
Primary & Secondary Outcomes

<table>
<thead>
<tr>
<th></th>
<th>Intensive Events (%/yr)</th>
<th>Standard Events (%/yr)</th>
<th>RR (95% CI)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary</td>
<td>208 (1.87)</td>
<td>237 (2.09)</td>
<td>0.88 (0.73-1.06)</td>
<td>0.20</td>
</tr>
<tr>
<td>Total Mortality</td>
<td>150 (1.28)</td>
<td>144 (1.19)</td>
<td>1.07 (0.85-1.35)</td>
<td>0.55</td>
</tr>
<tr>
<td>Cardiovascular Deaths</td>
<td>60 (0.52)</td>
<td>58 (0.49)</td>
<td>1.06 (0.74-1.52)</td>
<td>0.74</td>
</tr>
<tr>
<td>Nonfatal MI</td>
<td>126 (1.13)</td>
<td>146 (1.28)</td>
<td>0.87 (0.68-1.10)</td>
<td>0.25</td>
</tr>
<tr>
<td>Nonfatal Stroke</td>
<td>34 (0.30)</td>
<td>55 (0.47)</td>
<td>0.63 (0.41-0.96)</td>
<td>0.03</td>
</tr>
<tr>
<td>Total Stroke</td>
<td>36 (0.32)</td>
<td>62 (0.53)</td>
<td>0.69 (0.39-0.89)</td>
<td>0.01</td>
</tr>
</tbody>
</table>

Also examined Fatal/Nonfatal HF (HR=0.94, p=0.67), a composite of fatal coronary events, nonfatal MI and unstable angina (HR=0.94, p=0.50) and a composite of the primary outcome, revascularization and unstable angina (HR=0.95, p=0.40).

Primary Outcome

Nonfatal MI, Nonfatal Stroke or CVD Death

Total Stroke

HR = 0.88 95% CI (0.73-1.06)

NNT for 5 years = 89

Total Stroke

HR = 0.59 95% CI (0.39-0.89)

Adverse Events

<table>
<thead>
<tr>
<th></th>
<th>Intensive N (%)</th>
<th>Standard N (%)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serious AE</td>
<td>77 (3.3)</td>
<td>30 (1.3)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Hypotension</td>
<td>17 (0.7)</td>
<td>1 (0.04)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Syncope</td>
<td>12 (0.5)</td>
<td>5 (0.2)</td>
<td>0.19</td>
</tr>
<tr>
<td>Bradycardia or Arrhythmia</td>
<td>12 (0.5)</td>
<td>3 (0.1)</td>
<td>0.02</td>
</tr>
<tr>
<td>Hyperkalemia</td>
<td>9 (0.4)</td>
<td>1 (0.04)</td>
<td>0.01</td>
</tr>
<tr>
<td>Renal Failure</td>
<td>5 (0.2)</td>
<td>1 (0.04)</td>
<td>0.12</td>
</tr>
<tr>
<td>eGFR ever &lt;30 ml/min/1.73m²</td>
<td>99 (4.2)</td>
<td>52 (2.2)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Any Dialysis or ESRD</td>
<td>59 (2.5)</td>
<td>58 (2.4)</td>
<td>0.93</td>
</tr>
</tbody>
</table>

ACCORD Conclusions

- The ACCORD BP trial evaluated the effect of targeting a SBP goal of 120 mm Hg, compared to a goal of 140 mm Hg, in patients with type 2 diabetes.
- The results provide no conclusive evidence that the intensive BP control strategy reduces the rate of a composite of major CVD events in such patients.

Hypertensive Emergency and Urgency

Hypertensive emergency

BP >180/120 mm Hg complicated by evidence of impending or progressive end-organ damage

Hypertensive urgency

Severe elevation in BP without progressive end-organ damage

Hypertensive urgencies/emergencies: Patients and organ systems at risk

Cardiopulmonary
- Acute coronary syndromes
- Acute left ventricular failure
- Acute pulmonary edema
- Acute aortic syndromes

Neurovascular
- Encephalopathy
- Stroke
  - Hemorrhagic
  - Ischemic

Ocular
- Papilledema
- Renal
- Acute renal dysfunction
- Other
- Eclampsia

Parenteral (IV) Drugs for Treatment of Hypertensive Emergencies

- Nitroprusside: 0.25-10 mg/kg/min
- Esmolol: 250-500 mg/kg over 1 min, then 50-100 mg/kg for 4 min
- Phentolamine: 5-15 mg
- Nitroglycerin: 5-100 mg/min
- Fenoldopam: 0.03-0.1 mcg/kg/min; ↑ by 0.05-0.1 mcg/kg/min q 15 min
- Labetalol: 20-80 mg q10min or 0.5-2 mg/min
- Nicardipine: 5-15 mg/h
- Hydralazine: 10-20 mg
- Enalaprilat: 1.25-5 mg q8h
- Diazoxide: 50-100 mg bolus

Onset of Action

- Faster
- Slower


Hypertensive Emergencies: JNC 7 Consensus Recommendations

- Admit to ICU
- Administer short-acting parenteral antihypertensive with close monitoring
  - ↓ BP by ≤25% within 1 hour
  - ↓ BP to 160/100-110 mm Hg over next 2-6 hours
  - ↓ BP to 130/85 mm Hg over next 24-48 hours


Hypertensive Urgencies: JNC 7 Consensus Recommendations

- Some patients may benefit from short-acting oral antihypertensive treatments
  - However, in one recent study, resting for 60 min was associated with ↓ BP of >20% in 1/3 of patients
  - In addition, no evidence that failure to ↓ BP in emergency department is associated with ↓ short-term risk
- Adjust or reinstitute antihypertensive regimen to gradually ↓ BP over next few days


Case 3, question 1

A 27 year old woman who is 30 weeks pregnant presents for a routine OB visit and is found to have peripheral edema but no other symptoms, a BP of 150/90 (previously normotensive) and 2+ protein by dip, later quantified as 1.3 g protein/g of creatinine (previously normal). She is placed on bed rest; in addition, which of the following best describes the next step to address her high BP:

A. Begin triamterene-hydrochlorothiazide
B. Intravenous bolus of Mg-Sulfate, followed by oral magnesium supplementation
C. Begin enalapril
D. Advise a low salt (<2000 mg) diet
E. Begin methyldopa

A Quan. Early Hum Devel 2006; 82:23

Fetopathic effects of Angiotensin Blockade

- 1st Trimester
  - 3.7-fold increased risk of CV malformations (ASD, VSD, patent ductus, pulmonary stenosis)
  - 4.4-fold increased risk of neurologic malformations (spina bifida, microcephaly)
  - Risk not seen among infants exposed to other antihypertensive medications during the 1st trimester


- 2nd and 3rd Trimesters
  - Renal failure
  - Renal dysplasia
  - Fetal hypotension
  - Oligohydramnios
  - Pulmonary hypoplasia
  - IUGR

A Quan. Early Hum Devel 2006; 82:23

Pregnancy risk categories of BP meds

<table>
<thead>
<tr>
<th>Drug</th>
<th>Pregnancy class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methyldopa</td>
<td>A</td>
</tr>
<tr>
<td>Amiloride</td>
<td>B</td>
</tr>
<tr>
<td>Labetalol</td>
<td>C</td>
</tr>
<tr>
<td>Metoprolol</td>
<td></td>
</tr>
<tr>
<td>Prazosin</td>
<td></td>
</tr>
<tr>
<td>Nifedipine</td>
<td></td>
</tr>
<tr>
<td>Hydralazine</td>
<td></td>
</tr>
<tr>
<td>HCTZ</td>
<td></td>
</tr>
<tr>
<td>Furosemide</td>
<td></td>
</tr>
<tr>
<td>ACE-inhibitors</td>
<td></td>
</tr>
<tr>
<td>Spironolactone</td>
<td></td>
</tr>
<tr>
<td>Triamterene</td>
<td></td>
</tr>
<tr>
<td>Nifedipine SR</td>
<td></td>
</tr>
</tbody>
</table>

Pregnancy class

A. Good human studies show no increase in risk
B. Animal studies show no increased risk without human data, or animal studies how harm but human studies do not show harm
C. No human data combined with a lack of animal studies or studies showing harm
D. Human studies show possible harm, but benefit may outweigh the risk
X. Human studies show congenital abnormalities, and drug should not be used

A 27 year old woman who is 30 weeks pregnant presents for a routine OB visit and is found to have peripheral edema but no other symptoms, a BP of 150/90 (previously normotensive) and 2+ protein by dip, later quantified as 1.3 g protein/g of creatinine (previously normal). She is placed on bed rest; in addition, which of the following best describes the next step to address her high BP:

a. Begin triamterene-hydrochlorothiazide
b. Intravenous bolus of Mg-Sulfate, followed by oral magnesium supplementation
c. Begin enalapril
d. Advise a low salt (<2000 mg) diet
✓ e. Begin methyldopa
f. No anti-hypertensive medications can be used

Antihypertensive Drugs in Pregnancy

- Methyldopa (C) is drug of choice
- Hydralazine (C) is drug of choice for parenteral treatment
- b-Blockers: Atenolol (C), metoprolol (C), and labetolol (C)
  - Use with caution; concerns about growth retardation and fetal bradycardia
- ACE-I, Angiotensin Il Blockers
  - Fetal abnormalities and death; these drugs should not be used in pregnancy (D)
- Diuretics
  - Not recommended (volume depletion)

(C) = adverse effect in animals, use if justified
(D) = positive evidence of fetal risk


A. Add another antihypertensive agent (minoxidil 5 mg/d)
B. Intensify diuretic therapy
C. Evaluate for the presence of renal artery stenosis.
D. Avoid additional medical therapy as cumulative risk of side effects is prohibitive.

Resistant Hypertension

- Failure to achieve goal blood pressure* despite 3 antihypertensive medications of different classes and administered at optimal doses, ideally including a diuretic.

*≤ 140/90 mmHg ≤ 130/80 mmHg if diabetes, kidney disease or coronary artery disease

Most Common Cause Resistant Hypertension: Inadequate Diuretic Therapy

Chlorthalidone may be more potent than HCTZ
- Better 24-hr BP profile
- More clinical trial data
Loop diuretics are effective antihypertensives when dosed appropriately
- Lasix BID, Torsemide QD
- Essential when eGFR < 30
**Spironolactone is Remarkably Effective in Resistant Hypertension*\(^1\)**

\[\Delta \text{SBP} = 22 (21-23)\]
\[\Delta \text{DBP} = 9.5 (9-10)\]

*Mean blood pressure (mm Hg)*

\*4th line at investigator discretion
\*Median dose 25 mg
\*Median f/u 1 year

\*1411 ASCOT participants

**10 Clues to the Diagnosis of Renal Artery Disease**

- Onset of hypertension before age 30 or after the age of 55
- Exacerbation of hypertension
- Malignant hypertension
- Resistant hypertension
- Epigastric bruith
- Unexplained azotemia
- Azotemia on ACE inhibitors or ARB
- Discrepancy in kidney size
- Atherosclerosis elsewhere
- “Flash” pulmonary edema or recurrent CHF

**Diagnostic Evaluation of Renal Artery Disease**

- Duplex ultrasonography
  - Difficult exam, esp. in obese
  - Functional data (waveforms, resistive index)
- Magnetic Resonance Angiography
  - May miss distal lesions
  - Gadolinium: NSF risk @ eGFR < 30 mL/min
- Computed Tomographic Angiography
  - Tends to overestimate degree of stenosis
  - Iodinated contrast, radiation exposure
- Catheter-based Angiography
  - Invasive, radiation
  - Gold standard
  - Pressure wire—directly assess pressure gradient

**Recommended indications for stenting of renal artery stenosis**

- A good clinical indication and hemodynamically significant stenosis
- Accelerated hypertension, resistant hypertension, and malignant hypertension. (Class IIa, Level B)
- Progressive chronic kidney disease with bilateral renal artery stenosis or a stenosis to a solitary functioning kidney. (Class IIa, Level B)
- Recurrent, unexplained congestive heart failure or sudden, unexplained pulmonary edema (Class I, Level B)


**Case 4, question 1**

A 65 year-old man with h/o obesity, HTN, type 2 DM, dyslipidemia is admitted with flash pulmonary edema. BP medications: amlodipine 10 mg qd, labetolol 400 mg bid, clonidine patch TTS3 q/week, furosemide 40 mg qd, lisinopril 40 mg qd. Exam: BP 160/90 HR 60. Lungs clear. Heart: PMI not palpable, S4S1S2, no murmur. Abd: obese without bruitt. Ext: no edema. Pedal pulses absent.

A. Add another antihypertensive agent (minoxidil 5 mg/d)
B. Intensify diuretic therapy
C. Evaluate for the presence of renal artery stenosis.
D. Avoid additional medical therapy as cumulative risk of side effects is prohibitive.

**Summary**

- Ambulatory ABPM
- Initial BP management
- Special conditions
  - Diabetes
  - Pregnancy
  - Elderly
- Hypertensive urgency and emergency
- Resistant hypertension and renovascular disease