Reducing Cardiovascular Risk: Updates to the Hypertension and Cholesterol Guidelines

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Learning Objectives

• Discuss current guideline recommendations for hypertension management

• Discuss current guideline recommendations for dyslipidemia management

• Given a patient case, apply current dyslipidemia and hypertension guidelines to develop an optimal treatment plan

Disclosures

• None
2017 Hypertension Guidelines

Background

VA 1967 and 1970
Is HTN treatable? Outcome: treating=less strokes/CHF

HDFP 1979
Goal BP vs. standard
Outcome: Diastolic<90 reduced CVA by 36%

JNC 7 (2003)

JNC 8 (2014)

JNC Guidelines (1977)

SPRINT 2015
Goal BP syst 120 vs 140
Outcome: 27% reduction all cause mortality

ACC 2017 Guidelines


New Categories of Hypertension

<table>
<thead>
<tr>
<th></th>
<th>Systolic Blood Pressure</th>
<th>Diastolic Blood Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>&lt; 120 mmHg</td>
<td>&lt;80 mmHg</td>
</tr>
<tr>
<td>Elevated</td>
<td>120-129 mmHg</td>
<td>&lt;80 mmHg</td>
</tr>
<tr>
<td>Hypertension</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stage 1</td>
<td>130-139 mmHg</td>
<td>80-89 mmHg</td>
</tr>
<tr>
<td>Stage 2</td>
<td>≥ 140 mmHg</td>
<td>≥ 90 mmHg</td>
</tr>
</tbody>
</table>

New Laboratory Markers to Gather

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Testing</td>
<td>FBG, SCr, Lipids, CBC</td>
</tr>
<tr>
<td>Optional Testing</td>
<td>Echo, Lipid profile, TSH</td>
</tr>
<tr>
<td></td>
<td>Na, K, Ca</td>
</tr>
</tbody>
</table>
**Treatment Recommendations**

ASCVD Risk Calculator App - Assess patients 10 year risk of a CV event


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**Lifestyle Modifications**

<table>
<thead>
<tr>
<th>Modification</th>
<th>Recommendation</th>
<th>Approx. SBP Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight Loss</td>
<td>Best goal is ideal body weight (BMI 18.5-24.9 kg/m²), but aim for at least a 1 kg reduction in body weight for most adults who are overweight.</td>
<td>~1 mmHg/1 kg</td>
</tr>
<tr>
<td>DASH diet</td>
<td>Consume a diet rich in fruits, vegetables, and low-fat dairy products with a reduced content of saturated and total fat</td>
<td>8-14 mmHg</td>
</tr>
<tr>
<td>Reduce salt intake</td>
<td>&lt;1500 mg/day</td>
<td>2-8 mmHg</td>
</tr>
<tr>
<td>Exercise</td>
<td>At least 30 min a day</td>
<td>4-9 mmHg</td>
</tr>
<tr>
<td>Moderation of EtOH consumption</td>
<td>Limit consumption to no more than 2 drinks (men) 1 drink (woman)</td>
<td>2-4 mmHg</td>
</tr>
<tr>
<td>Smoking cessation</td>
<td>Quit smoking</td>
<td>0-4 mmHg</td>
</tr>
</tbody>
</table>

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**Treatment Algorithm (No Comorbidities)**

Treatment Algorithm (Comorbidities)

- Diagnosed HTN
- Comorbidities
  - Prior Stroke, Diabetes, CKD (albuminuria)
  - Coronary artery disease (ischemic heart disease)
  - Heart Failure
- ACE/ARB
- ACE/ARB or Beta blocker
- ACE/ARB + Beta blocker +/- ARA

Alternative Agents

- Aldosterone Antagonist - spironolactone
- Alpha antagonist - doxazosin
- Centrally acting alpha antagonist - clonidine
- Direct arterial vasodilator - hydralazine
- Direct renin inhibitor - aliskirin
- Adrenergic uptake inhibitor - reserpine

Case #1

- MM is a 66 yoM with PMH of DMII, angina, dyslipidemia, who comes in for hypertension management
- Medications include benazepril 40mg BID, amlodipine 10mg QD, hydrochlorothiazide 25mg QD, lovastatin 40mg QD, isosorbide mononitrate ER 60mg QD, nitroglycerin PRN
- BP = 154/50 (today), 148/52 (4 weeks ago)
- What recommendations would you make?
**White Coat Syndrome**

Screen for white coat effect with ABPM (Class III)

If normotensive at goal

White coat effect; Confirm with ABPM (Class II)

Continue grooming therapy

**Resistant Hypertension**

**Confirm Treatment Resistance**

Office BP > 130/80 mm Hg

And

Patient prescribed > 3 HTN medications at optimal doses including a diuretic if possible

Or

Office BP < 130/80 mm Hg on > 4 BP medications

Exclude Pseudoresistance

Ensure accurate office BP measurement

Assess for nonadherence to BP medications

Obtain home or ambulatory BP readings

**Treatment Approaches**

Maximize diuretic therapy

Add an aldosterone antagonist

Add other BP medications with different MOA

Use a loop diuretic in patients with CKD or receiving potent vasodilators

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**Case #2**

- AA is a 38 yo black male who presents to your clinic to establish care. PMH of hypercholesteremia.
- Social history: Smoker (1 pack/day x 10 years), drinks 3-4 beers a day, and does not exercise.
- Medications: simvastatin 10mg daily
- Labs: TC=180 mg/dL, LDL=110 mg/dL, HDL=30 mg/dL
- Vitals: BP=134/91 mmHg (138/93 at previous provider) Potassium=4.4, SCR=1.4 mg/dL (eGFR=63 mL/min/1.73m²), ASCVD=14.2%
Case #2

• Should he be started on HTN medications?

• What would you like to do for his blood pressure?
  a) Lifestyle Modifications
  b) Begin hydrochlorothiazide
  c) Begin chlorthalidone
  d) Begin lisinopril
  e) Begin clonidine

  Chlorthalidone is guideline recommended thiazide due to better pharmacokinetics and longer half-life

Case #2

• When would you like to reassess his blood pressure?
  a) In 2 weeks
  b) In 4 weeks
  c) 3-6 months
  d) Yearly

Follow-Up

<table>
<thead>
<tr>
<th>Stage of HTN</th>
<th>Follow-up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal BP (&lt;120/80)</td>
<td>1 year</td>
</tr>
<tr>
<td>Elevated BP (120-129/ &lt;80)</td>
<td>3-6 months</td>
</tr>
<tr>
<td>Stage 1 HTN (130-139/ 80-89) ASCVD&lt;10%</td>
<td>3-6 months</td>
</tr>
<tr>
<td>Stage 1 HTN (130-139/ 80-89) ASCVD&gt;10%</td>
<td>1 month</td>
</tr>
<tr>
<td>Stage 2 HTN (≥140/90)</td>
<td>1 month</td>
</tr>
<tr>
<td>After initial Visit</td>
<td></td>
</tr>
<tr>
<td>If BP at goal</td>
<td>3-6 months</td>
</tr>
<tr>
<td>For every change in therapy</td>
<td>Reassess in 1 month for adherence and ADEs</td>
</tr>
</tbody>
</table>
Case #3

- SM is a 35 yo female with PMH of GERD, gout and depression
- Social History: Smoker (10 pack-year history), alcohol= 2 drinks per week. Exercise- 30 min of walking daily
- Medications: omeprazole 40mg daily, allopurinol 300mg daily, amitriptyline 25mg daily

Case #3

- Labs: TC- 220 mg/dL, LDL= 149 mg/dL, HDL= 35 mg/dL, TG= 180mg/dL
- BP= 122/88 mm Hg, prior 125/86 A1c= 6%, BMI= 28 kg/m², SCR= 1.2 (eGFR= 91 mL/min/1.73m²).
- ASCVD= 7.2%

Case #3

- What would be appropriate management of her hypertension
  a) Recommend lifestyle modifications and follow up in 3-6 months
  b) Initiate chlorthalidone and follow up in 1 month
  c) Initiate lisinopril and follow up in 1 month
  d) No management needed at this time
2018 Blood Cholesterol Guidelines

Almost one-third of the U.S. population has hypercholesterolemia

Prevalence of Lipid Abnormalities

TC = total cholesterol
LDL-C = low-density lipoprotein cholesterol
HDL-C = high-density lipoprotein cholesterol


ACC/AHA 2013 Blood Cholesterol Guidelines identified four statin benefit groups

The 2018 Guidelines focus on 10 take-home messages

1. Emphasize a heart-healthy lifestyle across the life course
2. In clinical ASCVD, reduce LDL-C with high-intensity statin therapy or maximally tolerated statin therapy
3. In very high-risk ASCVD, use a LDL-C threshold of 70 mg/dl to consider addition of nonstatins to statin therapy
4. In severe primary hypercholesterolemia (LDL-C ≥ 190 mg/dl) without calculating 10-year ASCVD risk, begin high-intensity statin therapy
5. 40 to 75 years of age with diabetes mellitus and LDL-C ≥70 mg/dl, start moderate-intensity statin therapy without calculating 10-year ASCVD risk
6. 40 to 75 years of age primary ASCVD prevention, have a clinician–patient risk discussion before starting statin therapy


The 2018 Guidelines focus on 10 take-home messages

7. 40 to 75 years of age without diabetes and LDL-C ≥70 mg/dl, at a 10-year ASCVD risk of ≥7.5%, start a moderate-intensity statin if a discussion of treatment options favors statin therapy
8. 40 to 75 years of age without diabetes and 10-year risk of 7.5-19.9% (intermediate risk), risk-enhancing factors favor statin therapy
9. 40 to 75 years of age without diabetes and LDL-C 70-189 mg/dl, at a 10-year ASCVD risk of 7.5-19.9%, if a decision about statin therapy is uncertain, consider measuring coronary artery calcium
10. Assess adherence and % LDL-C–lowering response with repeat lipid measurement 4 to 12 weeks after statin initiation or dose adjustment, repeated every 3 to 12 months as needed


The 2018 Guidelines expand on the 2013 Guidelines

The 2018 Guidelines expand on the 2013 Guidelines

- LDL-C ≥190 mg/dL → High-intensity statin
- If LDL-C remains ≥100 mg/dL → Consider adding ezetimibe or PCSK9 inhibitor

Have a clinician-patient risk discussion:

1. Major risk factors
2. Risk-enhancing factors
3. Potential benefits
4. Potential adverse effects and drug-drug interactions
5. Costs of statin therapy
6. Patient preferences and values
Recommendations are still based on 10-year ASCVD risk.

- **<5% “Low Risk”**: Lifestyle changes
- **5% - <7.5% “Borderline Risk”**: Moderate-intensity
- **7.5% - <20% “Intermediate Risk”**: Moderate-intensity
- **≥20% “High Risk”**: Reduce LCL-C by ≥50% (high-intensity)


Measuring coronary artery calcium can be helpful in patients hesitant to start a statin.

- **Age 40-75 yo**
  - LDL-C 70-189 mg/dL
  - ASCVD 7.5-10.9%
  - Consider measuring CAC
- **CAC = 0**: Can withhold or delay statin
- **CAC = 1-99**: Favors statin initiation
- **CAC ≥100**: Statin should be initiated


A 50-year-old woman with diabetes has a baseline LDL-C of 90 mg/dL and a 10-year ASCVD risk score of 3%. She does not have any other medical conditions and all other laboratory tests are normal. According to the 2018 ACC/AHA cholesterol guidelines, what treatment is recommended for primary prevention in this patient?

a. Lifestyle modifications alone
b. Lifestyle modifications and moderate-intensity statin therapy
c. Lifestyle modifications and high-intensity statin therapy
d. Lifestyle modifications, high-intensity statin therapy and ezetimibe
A 52-year-old Hispanic male with hypertension, gout, and history of MI 2 months ago was started on rosuvastatin 20 mg daily after his MI and he is here today for follow-up. Labs are below:

<table>
<thead>
<tr>
<th></th>
<th>TC</th>
<th>HDL-C</th>
<th>LDL-C</th>
<th>TG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>207</td>
<td>45</td>
<td>130</td>
<td>160</td>
</tr>
<tr>
<td>Current</td>
<td>174</td>
<td>44</td>
<td>100</td>
<td>150</td>
</tr>
</tbody>
</table>

Which of the following is the first assessment that is warranted based on this patient’s presentation?

a. Thyroid stimulating hormone  
b. Medication cost  
c. ASCVD risk score  
d. Medication adherence

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PHARMACOLOGY OF NON-STATINS

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Ezetimibe reduces absorption of dietary cholesterol
Ezetimibe comes in a single dose

- **Dosing**
  - 10 mg once daily
- **Special populations**
  - No renal adjustments
  - Not recommend in Child-Pugh Class B or C
- **Onset of action**
  - Within 1 week
  - Maximum effect in 2-4 weeks

Adverse effects are uncommon and similar to those seen with statins

- **Warnings/precautions**
  - Elevated hepatic transaminases (1%)
  - Myopathy (<1%)
- **Adverse effects**
  - Diarrhea (4%)
  - Fatigue (2%)
  - Arthralgia (3%)
  - Upper respiratory tract infections (4%)

PCSK9 inhibitors include alirocumab and evolocumab

### Alirocumab (Praluent®) and Evolocumab (Repatha®)

**Dosing (subcut):**
- 75-150 mg every 2 weeks or 300 mg every 4 weeks
- 140 mg every 2 weeks or 420 mg every 4 weeks

**Special Pops:**
- Renal adjustment most likely not necessary
- Not studied in severe hepatic impairment

**Onset:** 4-8 weeks

**Warnings/Adverse effects:**
- Allergic reaction
- Injection site reaction
- Elevated liver enzymes
- Upper respiratory tract infection
- Influenza

### A 65-year-old female has a history of ACS 6 months ago, HTN, is a current smoker, and has peripheral arterial disease. Current lipid-lowering therapy is atorvastatin 80 mg daily. Most recent fasting lipid panel is:

<table>
<thead>
<tr>
<th>TC</th>
<th>HDL-C</th>
<th>LDL-C</th>
<th>TG</th>
</tr>
</thead>
<tbody>
<tr>
<td>125</td>
<td>30</td>
<td>75</td>
<td>125</td>
</tr>
</tbody>
</table>

Which change to her lipid-lowering regimen is recommended?

a. Continue current regimen unchanged
b. Add alirocumab
c. Add ezetimibe
d. Add omega-3 fatty acids

### Putting it all together…
Combined Case

• YP is a 62 yo male who comes into clinic to establish care. PMH include HTN (diagnosed 2008), osteoarthritis, obesity, and DMII.
• Medications: Naproxen BID, metformin 1000mg BID, HCTZ 25mg daily, amlodipine 2.5mg daily
• Labs: SCr= 1.2 (eGFR=68ml/min/1.73m²), TSH=2.1, UACR=52, TC=230, HDL=40, LDL= 150, TG=200, FBG= 89
• BP= 149/88 (repeat 152/89)

Combined Case

• How would you manage YP’s dyslipidemia and hypertension?
  a) Add a moderate-intensity statin + increase amlodipine to 5mg daily
  b) Add a moderate-intensity statin + ACEi
  c) Add a high-intensity statin + ACEi
  d) Add a moderate-intensity statin and ezetimibe + increase amlodipine

Thank You