Highlights of the new blood pressure and cholesterol guidelines: A whole new philosophy

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Oklahoma City, OK
April 4, 2014

Objectives

• Recognize the differences between the NCEP ATP 3 guidelines and the ACC/AHA 2013 Blood Cholesterol Guidelines as well as between the JNC 7 and 2014 Guideline for Management of High Blood Pressure from the Panel Appointed to JNC 8.

• Implement principles of the ACC/AHA 2013 Blood Cholesterol Guidelines into a clinical pharmacy practice.

• Implement principles of the 2014 Guideline for Management of High Blood Pressure from the Panel Appointed to JNC 8 into a clinical pharmacy practice.
Overview

• History and evolution of the guidelines
• Lipid Guidelines
  • ATP 3
  • 2013 ACC/AHA
• Blood pressure Guidelines
  • JNC 7
  • 2014 “JNC 8”

Clinical Practice Guidelines
National Heart Lung and Blood Institute

• Detection, Evaluation, & Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel)
• NCEP ATP 3 2002
• Updated 2004
• Joint National Committee on Prevention, Detection, Evaluation, & Treatment of High Blood Pressure
• JNC 7 2003
Clinical Practice Guidelines in Development

The following table reflects the status of each report and progress through the remaining stages of the review process before the guidelines are released.

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<td>In Progress</td>
<td>In Progress</td>
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- Draft Completed: Expert panelists have completed a full draft of the systematic review and recommendations.
- Federal Review: Federal agency representatives of the NHLBI’s National Program to Reduce Cardiovascular Risk (NP2CR) coordinating committee provide review and comment.
- Expert Review: External peer reviewers with expertise in the relevant risk factors provide review and comment.
- Advisory Council: The National Heart, Lung, and Blood Advisory Council provides review and comment and recommends approval.
- Public Comment: The draft is offered publicly for review and comment.
- HHS Clearance: The U.S. Department of Health and Human Services provides editorial review, comment, and approval.

To check status: http://www.nhlbi.nih.gov/guidelines/indevelop.htm

Clinical Practice Guidelines in Development

Director’s Corner Message: NHLBI adopts new collaborative partnership model for clinical practice guidelines development

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Updated June 2013
Lipid Guidelines

Review of NCEP ATP 3
Highlights of the new 2013 ACC/AHA Blood Cholesterol Guidelines

NCEP ATP 3
Released: 2001
Updated: 2004
Prevention of CHD

• Primary Prevention
  • Prevention of 1st cardiovascular event
  • Goal: ↓ long term risk (>10 y) and short term (<10 y)
  • Therapeutic Lifestyle Changes (TLC) are a focus
    • ↓ saturated fat and cholesterol
    • ↓ weight
    • ↑ physical activity


Prevention of CHD

• Secondary Prevention
  • Prevention of subsequent cardiovascular events after a first (MI, CABG, PCI, CVA)
  • Goal: ↓ long term risk (>10 y) and short term (<10 y)
  • TLC remains a focus
  • Drug therapy typically required
  • Higher risk = a stricter goal LDL
Goal Values or Targets

- TC < 200mg/dL
- HDL > 40 mg/dL (>50mg/dL for women)
- TG < 150mg/dL
- LDL goal must be determined based on risk

NCEP ATP III Guidelines

“LDL is the major atherogenic lipoprotein and has long been identified by NCEP as the primary target of cholesterol-lowering therapy”

“This focus on LDL has been strongly validated by recent clinical trials, which show the efficacy of LDL-lowering therapy for reducing risk for CHD”
NCEP ATP III Guidelines

Treatment of elevated triglycerides (>150 mg/dL)

- Primary aim of therapy is to reach LDL goal
- Intensify weight management
- Increase physical activity
- If triglycerides are >200 mg/dL after LDL goal is reached, set secondary goal for non-HDL cholesterol (total - HDL) 30 mg/dL higher than LDL goal.

If triglycerides ≥500 mg/dL, first lower triglycerides to prevent pancreatitis:

- very low-fat diet (≤15% of calories from fat)
- weight management and physical activity
- fibrate or nicotinic acid
- when triglycerides <500 mg/dL, turn to LDL-lowering therapy.

Three Categories of Risk that Modify LDL-Cholesterol Goals

<table>
<thead>
<tr>
<th>Risk Category</th>
<th>LDL Goal (mg/dL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHD and CHD risk equivalents</td>
<td>&lt;100</td>
</tr>
<tr>
<td>Multiple (2+) risk factors</td>
<td>&lt;130</td>
</tr>
<tr>
<td>Zero to one risk factor</td>
<td>&lt;160</td>
</tr>
</tbody>
</table>
CHD Risk Equivalents

- Risk for major coronary events equal to that in established CHD
- 10-year risk for CHD event >20%

Other clinical forms of atherosclerotic disease
- peripheral arterial disease
- abdominal aortic aneurysm
- symptomatic carotid artery disease
- Diabetes
- Multiple risk factors that confer a 10-year risk for CHD >20%
Major Risk Factors (Exclusive of LDL Cholesterol) That Modify LDL Goals

- Cigarette smoking
- Hypertension (BP $\geq 140/90$ mmHg or on antihypertensive medication)
- Low HDL cholesterol ($< 40$ mg/dL)$^\dagger$
- Family history of premature CHD
  - CHD in male first degree relative $< 55$ years
  - CHD in female first degree relative $< 65$ years
- Age (men $\geq 45$ years; women $\geq 55$ years)

$^\dagger$ HDL cholesterol $\geq 60$ mg/dL counts as a “negative” risk factor; its presence removes one risk factor from the total count.


Risk Assessment

Count major risk factors

- For patients with multiple (2+) risk factors
  - Perform 10-year risk assessment (Framingham Risk Assessment)
- For patients with 0–1 risk factor
  - 10 year risk assessment not required
  - Most patients have 10-year risk $< 10\%$

### LDL Cholesterol Goals and Cutpoints for Therapeutic Lifestyle Changes (TLC) and Drug Therapy in Different Risk Categories

<table>
<thead>
<tr>
<th>Risk Category</th>
<th>LDL Goal (mg/dL)</th>
<th>LDL Level at Which to Initiate TLC (mg/dL)</th>
<th>LDL Level at Which to Consider Drug Therapy (mg/dL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHD or CHD Risk Equivalents (10-year risk &gt;20%)</td>
<td>&lt;100 (optional &lt;70)</td>
<td>≥100</td>
<td>≥100 (&lt;100: consider drug options)</td>
</tr>
<tr>
<td>2+ Risk Factors (10-year risk ≤20%)</td>
<td>&lt;130</td>
<td>≥130</td>
<td>10-year risk 10–20%: ≥130 (100-129: consider drug options)</td>
</tr>
<tr>
<td>0–1 Risk Factor</td>
<td>&lt;160</td>
<td>≥160</td>
<td>≥190 (160-189: LDL-lowering drug optional)</td>
</tr>
</tbody>
</table>

Grundy SM. Circulation. 110:227-39;2004

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### Optional LDL goal < 70 mg/dL

- Option for patients at “very high risk”
  - Must have **established CVD** plus any of:
    - Multiple major risk factors (especially diabetes)
    - Severe and poorly controlled risk factors (especially cigarette smoking)
    - Multiple risk factors of Metabolic Syndrome
      - High TG > 200 mg/dL plus
      - Non-HDL ≥ 130 mg/dL with low HDL < 40 mg/dL
    - History of acute coronary syndromes (ACS)

Grundy SM. Circulation. 110:227-39;2004
Algorithm for Lipid-Lowering Medication Therapy

Initiate LDL-lowering drug therapy

If LDL goal not achieved, intensify LDL-lowering therapy

If LDL goal not achieved, intensify drug therapy or refer to a lipid specialist

Monitor response and adherence to therapy

- Start statin or bile acid sequestrant
- First, maximize current statin or BAS dose
- Second, add ezetimibe, or fibrate, or niacin

- If LDL goal achieved and TG >200mg/dL, calculate non-HDL
- Treat other lipid risk factors and metabolic syndrome

Not good enough?

- “Half of all myocardial infarctions and strokes occur despite apparently healthy men and women with LDL levels below currently recommended thresholds for treatment”

- “Even with adequate LDL lowering, many patients on statin therapy have significant CVD risk”

21

22
Brunzell JD. Diabetes Care. 2008; 31:811-22
2013 ACC/AHA Guideline on the Treatment of Blood Cholesterol to Reduce Atherosclerotic Cardiovascular Risk in Adults

Released Mid-November 2013
Journal of the American College of Cardiology

Stone NJ, et al.
2013 ACC/AHA Blood Cholesterol Guideline

2013 ACC/AHA Guideline on the Treatment of Blood Cholesterol to Reduce Atherosclerotic Cardiovascular Risk in Adults

A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines

Endorsed by the American Association of Cardiovascular and Pulmonary Rehabilitation, American Pharmacists Association, American Society for Preventive Cardiology, Association of Black Cardiologists, Preventive Cardiovascular Nurses Association, and WomenHeart: The National Coalition for Women with Heart Disease

2013 ACC/AHA Blood Cholesterol Guidelines

• Expert panel for ATP 4
• Partnered with ACC/AHA
• Focus on ASCVD risk reduction, not comprehensive lipid management
• Only used RCT, systematic reviews, meta-analyses of RCT

3 Critical Questions

1. What is the evidence for LDL and non-HDL goals for the secondary prevention of ASCVD?
2. Same as #1, but primary prevention
3. For primary and secondary prevention, what is the impact on lipid levels, effectiveness, and safety of specific cholesterol-modifying drugs used for lipid management in general and in selected subgroups?

Findings

• “unable to find evidence to support titrating statins to a target LDL or non-HDL goal”

• “extensive evidence that appropriate statin intensity should be used to reduce ASCVD risk”

• “use of non-statin to additionally lower non-HDL once LDL goal achieved, DID NOT further reduce ASCVD outcomes”


Findings

• Non-statin therapies in general have not demonstrated significant ASCVD event reduction.

• Lifestyle modifications remain a critical component of health promotion and ASCVD risk reduction

• Identification of 4 statin benefit groups to focus on ASCVD risk reduction

4 Statin Benefit Groups

- Clinical ASCVD ≤75 yo (secondary prevention)
- Primary elevation of LDL ≥190 mg/dL
- 40-75 yo with Diabetes and LDL 70-189 mg/dL
- No clinical ASCVD or Diabetes, 40-75 yo and LDL 70-189 mg/dL and 10-year ASCVD risk of 7.5% or higher

Clinical ASCVD ≤75 years

- High-intensity statin therapy (1st line)
- If not tolerated, use moderate-intensity
- If >70 years, consider benefits vs risks and may use moderate- or high-intensity statin

LDL ≥190 mg/dL

- High-intensity statin therapy
- If not tolerated, use maximum tolerated intensity
- Once maximum intensity achieved, may consider addition of non-statins to further lower LDL (weak data—expert opinion)
40-75 years with Diabetes and LDL 70-189 mg/dL

- Moderate-intensity statin therapy
- If ASCVD 10-year risk ≥7.5%, use high-intensity
- If <40 or >75 years, consider benefits vs risks and patient preferences

No clinical ASCVD or Diabetes, 40-75 yo and LDL 70-189 mg/dL and 10-year ASCVD risk of 7.5% or higher

- Moderate- to High-intensity statin therapy
Adults with LDL <190 mg/dL not fitting into a statin benefit group

• Additional factors may be considered to inform treatment decision making
  • LDL ≥160 mg/dL
  • Genetic hyperlipidemia
  • Family history of premature ASCVD ♂<55 years or ♀<65 years
  • High C-reactive Protein (CRP) >2 mg/L
  • Coronary artery calcium score ≥300 Agatston units or ≥75 percentile for age, sex, ethnicity
  • ABI <0.9
  • Lifetime risk of ASCVD

Intensity of Statin Therapy

• Expected LDL-lowering:
  • High-intensity ≥50%
  • Moderate-intensity 30 to <50%
  • Low-intensity <30%

• High-intensity reduces ASCVD risk more
• However, moderate- or low-intensity still provides protection, just not as much as high-intensity
### Statin Intensity Categories and Drugs

<table>
<thead>
<tr>
<th>High-intensity</th>
<th>Moderate-intensity</th>
<th>Low-intensity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atorvastatin 40-80 mg</td>
<td>Atorvastatin 10-20 mg</td>
<td>Simvastatin 10 mg</td>
</tr>
<tr>
<td>Rosuvastatin 20-40 mg</td>
<td>Rosuvastatin 5-10 mg</td>
<td>Pravastatin 10-20 mg</td>
</tr>
<tr>
<td>Simvastatin 20-40 mg</td>
<td>Pravastatin 40-80 mg</td>
<td>Lovastatin 20 mg</td>
</tr>
<tr>
<td>Lovastatin 40 mg</td>
<td>Fluvastatin 20-40 mg</td>
<td>Pitavastatin 1 mg</td>
</tr>
<tr>
<td>Fluvastatin XL 80 mg</td>
<td></td>
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<tr>
<td>Fluvastatin 40 mg BID</td>
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<td></td>
</tr>
<tr>
<td>Pitavastatin 2-4 mg</td>
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</tbody>
</table>


**Patient is a 58 year old male with diabetes and an LDL of 198 mg/dL. Per the 2013 ACC/AHA guidelines, how should he be treated?**

A. No statin  
B. Low-intensity statin  
C. Moderate-intensity statin  
D. High-intensity statin
Patient is a 58 year old male with diabetes and an LDL of 198 mg/dL. Per the 2013 ACC/AHA guidelines, how should he be treated?

A. Pravastatin 80 mg
B. Rosuvastatin 20 mg
C. Atorvastatin 20 mg
D. Fluvastatin 40 mg

Patient is a 62 year old female with diabetes, an LDL of 82 (on no statin), and an ASCVD 10-year risk of 7.8%. Per 2013 ACC/AHA guidelines, how should she be treated?

A. Atorvastatin 80 mg
B. Pitavastatin 1 mg
C. Lovastatin 20 mg
D. Pravastatin 80 mg
Calculation of ASCVD 10-year Risk (%)

- **Pooled Cohorts Equations**
  - Calculates risk of CHD death, fatal or non-fatal MI or stroke
  - Used for “white and black men and women” without clinical ASCVD
- Controversial calculation
  - This places many more people in higher risk categories than the Framingham Risk tool

Statin Safety Recommendations

• Moderate-intensity statin should be used instead of high-intensity if high risk of statin-associated adverse effects
  • Impaired renal or hepatic function
  • Previous statin intolerances or muscle disorder
  • ALT >3 times upper limit of normal (CI)
  • On drugs that affect statin metabolism
  • >75 years of age
  • Possibly history of hemorrhagic stroke
  • Possibly Asian ancestry


Statin Safety Recommendations

• Monitor creatine kinase (CK or CPK)
  • Baseline and if myopathy symptoms
• Monitor ALT (liver function)
  • Baseline and if hepatotoxic symptoms
• Consider ↓ statin dose if 2 consecutive LDL <40 mg/dL
• Avoid simvastatin 80 mg
• Evaluate for new onset diabetes

Management of Myopathy

• Establish baseline of muscle symptoms

• Unexplained symptoms:
  • Stop statin
  • Measure CK (10 x normal = rhabdomyolysis), Scr, and UA


Management of Myopathy

• Mild to moderate symptoms
  • Stop statin—evaluate for cause
  • Sx resolve: give original or lower dose of same statin to establish causal relationship
  • If recurrence, stop original statin
  • When sx resolve, start new statin, low dose
  • Once tolerated, increase dose
  • If not resolved >2 months, likely not statin; resume original dose
  • If intolerant of statins, may use non-statin

Monitoring Statin Therapy

• Initial fasting lipid panel (then start drug)
• Check fasting lipid panel 4-12 weeks (often 6-8 weeks); to check adherence, NOT to achieve a target or goal
• Then check fasting lipid panel 3-12 months


Monitoring Statin Therapy

• Insufficient response to statin dose
  • Reinforce adherence to med and lifestyle
  • Exclude secondary causes
  • If higher-risk ASCVD patients on max statin dose, may consider adding non-statin
    • Clinical ASCVD <75 years
    • Baseline LDL ≥190 mg/dL
    • 40-75 years old with diabetes

Triglycerides >500 mg/dL

- Risk of pancreatitis
- Treat as a priority over LDL
- Treat with fibrates or niacin
- Once TG <500, focus on LDL reduction for ASCVD risk reduction (back to statins)
Summary of Lipid Guideline Differences

**ATP 3**
- Focus on LDL goals
- Use statins or any lipid-lowering drugs to attain goal

**2013 ACC/AHA**
- Focus on statin intensity
- Use statins almost exclusively

Blood Pressure Guidelines

Review of JNC 7
Highlights of the new 2014 Blood Pressure Guidelines by the JNC 8 Panel
JNC 7
Released: 2003

AHA 2007: essentially an update to JNC 7

JNC-7 Classification of BP for Adults

Table 1. Classification and management of blood pressure for adults*

<table>
<thead>
<tr>
<th>BP Classification</th>
<th>SBP* mmHg</th>
<th>DBP* mmHg</th>
<th>LIFESTYLE Modification</th>
<th>INITIAL DRUG THERAPY</th>
<th>WITHOUT Compelling INDICATION</th>
<th>WITH Compelling INDICATIONS (See Table 8)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>&lt;120</td>
<td>&lt;80</td>
<td>Encourage</td>
<td>No antihypertensive drug indicated</td>
<td>Drug(s) for compelling indications</td>
<td></td>
</tr>
<tr>
<td>Prehypertension</td>
<td>120-139</td>
<td>80-89</td>
<td>Yes</td>
<td>Thiazide diuretic for most. May consider ACEI, ARB, BB, CCB, or combination.</td>
<td>Drug(s) for the compelling indications</td>
<td></td>
</tr>
<tr>
<td>Stage 1 Hypertension</td>
<td>140-159</td>
<td>90-99</td>
<td>Yes</td>
<td>Two-drug combination for most (usually thiazide diuretic and ACEI or ARB or BB or CCB).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stage 2 Hypertension</td>
<td>≥160</td>
<td>≥100</td>
<td>Yes</td>
<td>Two-drug combination for most (usually thiazide diuretic and ACEI or ARB or BB or CCB).</td>
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## Specific BP Goals

<table>
<thead>
<tr>
<th>Condition</th>
<th>Goal</th>
<th>Unit</th>
</tr>
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<tbody>
<tr>
<td>Uncomplicated hypertension (JNC-7)</td>
<td>&lt; 140 / &lt; 90 mm Hg</td>
<td></td>
</tr>
<tr>
<td>Diabetes (ADA 2013-14)</td>
<td>&lt; 140 / &lt; 80 mm Hg</td>
<td></td>
</tr>
<tr>
<td>(JNC-7 and NKF recommended &lt;130/80)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Renal disease (JNC-7, NKF)</td>
<td>&lt; 130 / &lt; 80 mm Hg</td>
<td></td>
</tr>
<tr>
<td>Diabetes with proteinuria (NKF)</td>
<td>(&lt;&lt; 130 / &lt; 80) mm Hg</td>
<td></td>
</tr>
<tr>
<td>(JNC-VI reported this goal as &lt;125/75)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CAD or high CAD risk (AHA 2007)</td>
<td>&lt; 130 / &lt; 80 mm Hg</td>
<td></td>
</tr>
<tr>
<td>Heart failure (AHA 2007)</td>
<td>&lt; 120 / &lt;80 mm Hg</td>
<td></td>
</tr>
</tbody>
</table>

## “CAD” or “high CAD risk” (coronary artery disease)

- Stable angina
- Unstable angina
- Myocardial infarction (MI)(NSTEMI)(STEMI)
- Carotid artery disease
- Peripheral arterial disease (PAD)(PVD)
- Abdominal aortic aneurysm
- Diabetes
- Chronic kidney disease
- Framingham risk score ≥ 10%
Pharmacologic Therapy Overview
JNC-7 and AHA 2007

• There is much data proving that several drug classes reduce cardiovascular events associated with HTN
  • Thiazide-type diuretics
  • Angiotensin converting enzyme inhibitors (ACE-I)
  • Angiotenesin receptor blockers (ARB)
  • Beta-blockers (BB)
  • Calcium channel blockers (CCB)
AHA 2007 on BB

- Agree that there is protective data for thiazides, CCB, ACE-I, and ARBs in uncomplicated HTN
- Don’t use a BB in uncomplicated HTN
- Continue to use BB initially in patients with compelling indications (angina, post MI, HF)


Preferred Initial Agent

- Thiazide-type Diuretics
  - basis of antihypertensive therapy in most trials
  - virtually unsurpassed in preventing cardiovascular complications of HTN
  - generally well tolerated
  - inexpensive

**ALLHAT**  
*JAMA. 2002;288:2981-2997*

- Showed thiazides ↓ BP as well as ACE-I, CCB, or alpha blocker
- Thiazide, ACE-I, and CCB similar in reduction of CHD death and non-fatal MI
- Thiazide superior to CCB preventing heart failure
- Thiazide superior to ACE-I preventing stroke, combined CVD events, and possibly heart failure

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**Principles of Drug Addition and Titration**

- Begin low dose
- Use once-daily agents if possible to improve compliance

- **Initial therapy** with a **thiazide diuretic** alone or in combo with ACE-I, ARB, or CCB unless compelling indication for different initial therapy

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AHA 2007 on initial therapy of uncomplicated hypertension

- AHA reports that actual BP lowering is more important than the choice of drug class for primary prevention

- AHA recommends starting with thiazide, ACE-I, ARB, or CCB
Compelling Indications

- Ischemic Heart Disease
- Heart Failure
- Diabetes
- Chronic Kidney Disease
- BB (ACE-I also protective)
- ACE-I and BB
- ACE-I or ARB
- ACE-I or ARB

Principles of Drug Addition and Titration

- If initial drug is not tolerated or is contraindicated, use one of the other classes proven to ↓ cardiovascular events
- Many patients will require ≥ 2 drugs to attain BP goal.
  - Second drug should be added when first drug, at proper dose, fails to reach goal
  - Allow about 4 weeks to assess effect before adjusting dose or adding another drug
Principles of Drug Addition and Titration

- If BP > 20/10 mmHg above goal (or stage 2)
  - Initiate therapy with 2 drugs (one a thiazide)
  - If not at max doses this may reduce adverse effects
  - Use caution in those at risk of orthostatic hypotension

- If a drug or dose is failing, consider possible reasons before adding new agent
  - Noncompliance

Follow-up and Monitoring

- Once drug therapy begins, f/u monthly until at goal BP

- Once stable, potassium and creatinine should be checked ≥ 1-2 times/year

- Once BP at goal, f/u every 3-6 months
HTN in African-Americans

- Lifestyle modifications to ↓ salt intake
- Less responsive to BB, ACE-I, or ARB
- More responsive to diuretics or CCB
- Drug of choice = thiazide diuretic

2014 Evidence-Based Guideline for the Management of High Blood Pressure in Adults

Report From the Panel Members Appointed to the Eighth Joint National Committee (JNC-8)

JNC-8

2014 Evidence-Based Guideline for the Management of High Blood Pressure in Adults
Report From the Panel Members Appointed to the Eighth Joint National Committee (JNC-8)

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JNC-8

- Expert panel originally for NHLBI JNC-8
- Independently published with JAMA
- Currently not endorsed by organizations
- Not meant to be a comprehensive guideline for BP management
- Only used RTC

3 Critical Questions

1. In adults with HTN, does initiating antihypertensive pharmacologic therapy at specific BP thresholds improve health outcomes?
2. In adults with HTN, does treatment with antihypertensive pharmacologic therapy to a specific BP goal lead to improvements in health outcomes?
3. In adults with HTN, do various antihypertensive drugs or drug classes differ in comparative benefits and harms on specific health outcomes?
Findings

• No change in definition of HTN (≥140/90)
• Still emphasize Lifestyle Modifications

• 9 recommendations
  • 1-5 address critical questions 1-2
  • 6-8 address critical question 3
  • 9 addresses strategies of add-on therapy

Recommendation 1

• ≥60 years, treat to <150/90
• Okay if gets to SBP <140

  • Reduces stroke, CHF, CHD
  • No benefit targeting SBP <140
Recommendations 2 & 3: General population <60 years old

**Recommendation 3**
- Treat to SBP <140
  - Only expert opinion
  - Keep current recommendation
  - If DBP <90, usually also see SBP <140
  - It is a typical recommendation in JNC-8

**Recommendation 2**
- Treat to DBP <90
  - Reduces CVA, CHF, overall mortality
  - No benefit treating to DBP <80 or <85

Recommendation 4
- Adults with CKD, treat to <140/90
  - Not enough evidence to determine if there is benefit treating to a lower BP goal such as <130/80
Recommendation 5

- Adults with diabetes, treat to <140/90

- Treating to SBP <150 improves cardiovascular and cerebrovascular outcomes and lowers mortality
- No RCT address if treating to SBP <140 is better.
- Panel chose <140/90 to be consistent with their other recommendations


Recommendation 6

- Non-black population, with or without diabetes

- Initiate therapy with either:
  - Thiazide-type diuretic
  - CCB
  - ACE-I
  - ARB

- These classes have strong protective data
- Panel feels achieving control is more important than which agent was used to achieve it

Recommendation 6 cont

• Important points
  • Many will require multiple drugs
    • Any of these 4 classes are used for add-on therapy
  • Thiazide-type diuretics include
    • Thiazide diuretics
    • Chlorthalidone
    • Indapamide
  • Strive to target doses used in RCT
    • See table 4


Table 4. Evidence-Based Dosing for Antihypertensive Drugs

<table>
<thead>
<tr>
<th>Antihypertensive Medication</th>
<th>Initial Daily Dose, mg</th>
<th>Target Dose in RCTs Reviewed, mg</th>
<th>No. of Doses per Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACE inhibitors</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Captopril</td>
<td>50</td>
<td>150-200</td>
<td>2</td>
</tr>
<tr>
<td>Enalapril</td>
<td>5</td>
<td>20</td>
<td>1-2</td>
</tr>
<tr>
<td>Lisinopril</td>
<td>10</td>
<td>40</td>
<td>1</td>
</tr>
<tr>
<td>Angiotensin receptor blockers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hyprocarnit</td>
<td>400</td>
<td>600-800</td>
<td>1-2</td>
</tr>
<tr>
<td>Candesartan</td>
<td>4</td>
<td>12-32</td>
<td>1</td>
</tr>
<tr>
<td>Losartan</td>
<td>50</td>
<td>100</td>
<td>1-2</td>
</tr>
<tr>
<td>Valsartan</td>
<td>40-80</td>
<td>160-320</td>
<td>1</td>
</tr>
<tr>
<td>Irbesartan</td>
<td>75</td>
<td>300</td>
<td>1</td>
</tr>
<tr>
<td>B-Blockers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Atenolol</td>
<td>25-50</td>
<td>100</td>
<td>1</td>
</tr>
<tr>
<td>Metoprolol</td>
<td>50</td>
<td>100-200</td>
<td>1-2</td>
</tr>
<tr>
<td>Calcium channel blockers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amlodipine</td>
<td>2.5</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td>Diltiazem extended release</td>
<td>120-180</td>
<td>360</td>
<td>1</td>
</tr>
<tr>
<td>Nifedipine</td>
<td>10</td>
<td>20</td>
<td>1-2</td>
</tr>
<tr>
<td>Thiazide-type diuretics</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bendroflumethiazide</td>
<td>5</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td>Chlorthalidone</td>
<td>12.5</td>
<td>12.5-25</td>
<td>1</td>
</tr>
<tr>
<td>Hydrochlorothiazide</td>
<td>12.5-25</td>
<td>35-100</td>
<td>1-2</td>
</tr>
<tr>
<td>Indapamide</td>
<td>1.25</td>
<td>1.25-2.5</td>
<td>1</td>
</tr>
</tbody>
</table>

Abbreviations: ACE, angiotensin-converting enzyme; RCT, randomized controlled trial.
*Current recommended evidence-based dose that balances efficacy and safety is 25-50 mg daily.
Recommendation 7

• Black population, with or without diabetes
  • Initiate therapy with either:
    • Thiazide-type diuretic
    • CCB

• Controversy:
  – The ADA still recommends starting an ACE-I or ARB in anyone with diabetes

Recommendation 8

• Adults with CKD and HTN (all ages and races with/without DM)
  • Initiate therapy with either:
    • ACE-I
    • ARB
Conflict with 7 & 8

• Controversy: Black patient with CKD
  • Black patient with CKD with proteinuria
    • ACE-I or ARB first line
  • Black patient with CKD without proteinuria
    • Start with either thiazide, CCB, ACE-I, or ARB

• Most patients with CKD and HTN will require multiple drugs; make sure an ACE-I or ARB is one of them

Recommendation 9

Table 5. Strategies to Dose Antihypertensive Drugs

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Start one drug, titrate to maximum dose, and then add a second drug</td>
<td>If goal BP is not achieved with the initial drug, titrate the dose of the initial drug up to the maximum recommended dose to achieve goal BP. If goal BP is not achieved with the use of one drug despite titration to the maximum recommended dose, add a second drug from the list (thiazide-type diuretic, CCB, ACE-I, or ARB) and titrate to the maximum recommended dose of the second drug to achieve goal BP. If goal BP is not achieved with 3 drugs, select a third drug from the list (thiazide-type diuretic, CCB, ACE-I, or ARB), avoiding the combined use of ACE-I and ARB. Titrate the third drug up to the maximum recommended dose to achieve goal BP.</td>
</tr>
<tr>
<td>B</td>
<td>Start one drug and then add a second drug before achieving maximum dose of the initial drug</td>
<td>Start with one drug then add a second drug before achieving the maximum recommended dose of the initial drug. If goal BP is not achieved with 2 drugs, select a third drug from the list (thiazide-type diuretic, CCB, ACE-I, or ARB), avoiding the combined use of ACE-I and ARB. Titrate the third drug up to the maximum recommended dose to achieve goal BP.</td>
</tr>
<tr>
<td>C</td>
<td>Begin with 2 drugs at the same time, either as 2 separate pills or as a single pill combination</td>
<td>Initiate therapy with 2 drugs simultaneously, either as 2 separate drugs or as a single pill combination. Some committee members recommend starting therapy with 2 drugs when SBP is &gt;160 mm Hg and/or DBP is &gt;100 mm Hg, or if SBP is &gt;20 mm Hg above goal and/or DBP is &gt;10 mm Hg above goal. If goal BP is not achieved with 2 drugs, select a third drug from the list (thiazide-type diuretic, CCB, ACE-I, or ARB), avoiding the combined use of ACE-I and ARB. Titrate the third drug up to the maximum recommended dose.</td>
</tr>
</tbody>
</table>

Abbreviations: ACE-I, angiotensin-converting enzyme inhibitor; ARB, angiotensin receptor blocker; BP, blood pressure; CCB, calcium channel blocker; DBP, diastolic blood pressure; SBP, systolic blood pressure.
PJ is a 65 year old male with a history of HTN, arthritis and coronary artery disease. According to JNC 8, what is his goal BP?

A. < 150/90 mmHg
B. < 140/90 mmHg
C. < 130/80 mmHg
D. < 120/80 mmHg

JNC-8 BP Goals

- Age ≥60 years <150/90
- Age <60 years <140/90
- Diabetes <140/90
- CKD <140/90
CC is a 55 year old African American male with HTN and diabetes.
According to JNC 8, what drug should initially be used for HTN?

A. Atenolol  
B. Amlodipine  
C. Lisinopril  
D. Valsartan

JNC-8 Initial Drug Recommendations

- Non-Black
  - $\geq 60$, $<60$, or with diabetes
    - Thiazide-type diuretic, ACE-I, ARB, OR CCB
- Black
  - $\geq 60$, $<60$, or with diabetes
    - Thiazide-type diuretic OR CCB
- CKD
  - All ages, all races, with or without diabetes
    - ACE-I OR ARB

Summary of Blood Pressure Guideline Differences

**JNC 7**
- Blood pressure goals are low
- Goals based on comorbidities such as DM, CKD, CAD, or CHF
- Compelling indications for IHD, CHF, DM, CKD

**2014 “JNC 8”**
- Blood pressure goals are not as low
- Goals based on age or comorbidities of DM or CKD (not CAD or CHF)
- Compelling indications for race and CKD
Highlights of the new blood pressure and cholesterol guidelines: A whole new philosophy

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OSHP 2014 Annual Meeting
Oklahoma City, OK
April 4, 2014

References