JNC 8: Relaxing the Pressure in the Hypertension Guidelines

Ashley Lawrance, Pharm.D.
PGY1 Pharmacy Practice Resident
Peninsula Regional Medical Center
Salisbury, MD
Learning Objectives

• Describe updated recommendations for blood pressure control from JNC 8 panel members in the 2014 Evidence-Based Guideline for the Management of High Blood Pressure in Adults

• Compare these updated recommendations for target blood pressure goals with:
  ▫ The seventh report of the Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure
  ▫ Other national and international organization guidelines on hypertension

• Identify controversies surrounding the 2014 update on hypertension management

• Develop treatment plan for patients with hypertension utilizing recommendations from the 2014 update on hypertension management
Case 1

- DB, a 38 y/o African American female with stage III chronic kidney disease, presents to her primary care physician with persistently elevated blood pressure despite initiating lifestyle changes about 3 months ago. Her blood pressure during today’s visit was 156/98. The physician has decided to initiate an antihypertensive agent for DB. He is thinking of sending DB home with a prescription for Lisinopril 5 mg to be titrated and consults you for recommendations. Is Lisinopril an appropriate option? If not, what agent do you recommend for DB?
Case 2

• PL is a 61 yr old Caucasian male who has recently suffered from an ischemic stroke. His current blood pressure 168/95 and he has not been on blood pressure medications before. The physician would like to start PL on antihypertensive medications. Which of the following agents do you recommend for PL?

A. Hydrochlorothiazide + ramipril
B. Chlorthalidone alone
C. Metoprolol + losartan
D. Diltiazem alone
High Blood Pressure

- Defined as an abnormal elevation of blood pressure
  - $\geq 140/90$
- 1 in 3 adults in the US have hypertension
- Only about 47% of people with hypertension have it controlled
- Prevalence by age:
  - $\leq 45$ years
    - men > women
  - 45-64 years
    - men = women
  - $\geq 65$ years
    - men < women
- Prevalence by Race
  - African Americans 44.3%
  - Mexican Americans 28.4%
  - Caucasians 32.6%

Causes of High Blood Pressure

- Essential hypertension

- Secondary hypertension
  - Sleep apnea
  - Drug-induced
  - Chronic kidney disease
  - Primary aldosteronism
  - Chronic steroid therapy or Cushing’s syndrome
  - Pheochromocytoma
  - Coarctation of the aorta
  - Thyroid or parathyroid disease
Drug-Induced HTN

- Amphetamines
- Antidepressants
- Corticosteroids
- Calcineurin inhibitors
- Decongestants
- Ergot alkaloids
- Erythropoietin stimulating agents
- Estrogen-containing oral contraceptives
- NSAIDS
Risks

• High blood pressure increases risk of:
  ▫ Heart failure
  ▫ Myocardial ischemia and infarction
  ▫ Stroke
  ▫ Aneurysms and dissection
  ▫ Kidney disease
  ▫ Retinopathy
  ▫ Peripheral vascular disease
**JNC 7**

**Summary Algorithm**

**Adults 18 years or older with HTN**

Implement lifestyle modifications

**Not at goal BP** (<140/90 or <130/90 for patients with diabetes or CKD)

**Initial Drug Choices**

**No compelling Indications** (Target: <140/90)

- **Stage 1 HTN:** Thiazide #1, may consider ACEI/ARB/BB/CCB or combo
- **Stage 2 HTN:** 2-drug combo for most, thiazide + ACEI/ARB/BB/CCB

**Compelling Indications** (Target:<140/90 or <130/80 if DM or CKD)

- **DM:** ACEI/ARB #1 (may add diuretic, BB, CCB)
- **CKD:** ACEI/ARB
- **MI:** BB, then add ACEI/ARB (may add Aldo ANT)
- **HF:** Diuretic + ACEI, then add BB (may add Aldo ANT or ARB)
- **CAD:** BB, then add ACEI/ARB (may add CCB or diuretic)
- **Stroke:** diuretic + ACEI
Special Communication

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)

Paul A. James, MD; Suzanne Oparil, MD; Barry L. Carter, PharmD; William C. Cushman, MD; Cheryl Dennison-Himmelfarb, RN, ANP, PhD; Joel Handler, MD; Daniel T. Lackland, DrPH; Michael L. LeFevre, MD, MSPH; Thomas D. MacKenzie, MD, MSPH; Olugbenga Ogedegbe, MD, MPH, MS; Sidney C. Smith Jr, MD; Laura P. Svetkey, MD, MHS; Sandra J. Taler, MD; Raymond R. Townsend, MD; Jackson T. Wright Jr, MD, PhD; Andrew S. Narva, MD; Eduardo Ortiz, MD, MPH
Course of Development

- March 2008 the National Heart Lung and Blood Institute (NHLBI) established the panel for the Eighth Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC 8)

- January 2013, the guideline was submitted for external peer review to 20 reviewers with expertise in hypertension, primary care, cardiology, nephrology, and other important related fields. (Comments reviewed by the Panel from March through June 2013)

- June 2013, NHLBI withdrew from process
  - Instead partner with selected organizations: American Heart Association (AHA), the American College of Cardiology (ACC)
  - August 2013, process to release guidelines under the auspices of the AHA and ACC failed

- Panel elected to pursue publication as an independent panel (December 2013)
Questions Guiding JNC 8

1. In adults with hypertension, does initiating antihypertensive pharmacologic therapy at specific blood pressure thresholds improve health outcomes?

2. In adults with hypertension, does treatment with antihypertensive pharmacologic therapy to a specified blood pressure goal lead to improvements in health outcomes?

3. In adults with hypertension, do various antihypertensive drugs or drug classes differ in comparative benefits and harms on specific health outcomes?
Classification of Recommendations

- Based on critical review of high quality randomized controlled trials

Classification of recommendations:

- **(A) Strong Recommendation**: high certainty based on evidence that the net benefit is substantial

- **(B) Moderate Recommendation**: moderate certainty based on evidence that the net benefit is moderate to substantial

- **(C) Weak Recommendation**: at least moderate certainty based on evidence that there is a small net benefit

- **(D) Recommendation against**: at least modest certainty based on evidence that there is no net benefit or that risks/harms outweigh benefits

- **(E) Expert Opinion**: Net benefit is unclear because there is insufficient evidence but this is what the committee recommends. Further research is necessary.
Summary of Recommendations

• General Population ≥ 60 yrs
  ▫ Initiate Tx at BP ≥ 150/90 mmHg (Grade A)
  ▫ Target BP < 150/90 mmHg (Grade A)
  ▫ Corollary: if BP achieved is lower than target and well tolerated, no adjustments needed to Tx (Grade E)

• General Population < 60 yrs
  ▫ Initiate Tx at BP ≥ 140/90 mmHg
  ▫ Target BP < 140/90 mmHg
  ▫ Diastolic goal: (30-59 years→ Grade A; 18-29 years→ Grade E)
  ▫ Systolic goal: (Grade E)

• Population ≥ 18 yrs with CKD or DM
  ▫ Initiate Tx at BP ≥ 140/90 (Grade E)
  ▫ Target BP < 140/90 (Grade E)
Summary of Recommendations

• General nonblack population ± DM
  ▫ Initial Tx should include thiazide-type diuretic, CCB, ACEI, or ARB (Grade B)

• General black population ± DM
  ▫ Initial Tx should include a thiazide-type diuretic or CCB
    (General black population → Grade B; black population w/DM → Grade C)

• Entire population ≥ 18 yrs with CKD
  ▫ Initial or add-on Tx should include an ACEI or ARB (Grade B)
Summary of Recommendations

• If BP goal not reached within 1 mo of Tx, increase dose of initial drug or add a second agent
  ▫ If goal still not reached with two agents titrated up, third agent from the recommended list (i.e. thiazide-type diuretic, CCB, ACEI/ARB) may be added
    • Following third agent, if goal still not reached, refer to a specialist.
    • Can add antihypertensive agents from other classes
    • Do not use ACEI and ARB together
Adult aged ≥18 years with hypertension

Implement lifestyle interventions (continue throughout management).

Set blood pressure goal and initiate blood pressure lowering-medications based on age, diabetes, and chronic kidney disease (CKD).

General population (no diabetes or CKD) vs Diabetes or CKD present

Age ≥60 years

Blood pressure goal
SBP <150 mm Hg
DBP <90 mm Hg

Nonblack

Initiate thiazide-type diuretic or ACEI or ARB or CCB, alone or in combination.³

Select a drug treatment titration strategy
A. Maximize first medication before adding second or
B. Add second medication before reaching maximum dose of first medication or
C. Start with 2 medication classes separately or as fixed-dose combination.

Age <60 years

Blood pressure goal
SBP <140 mm Hg
DBP <90 mm Hg

Nonblack

Initiate thiazide-type diuretic or ACEI or ARB or CCB, alone or in combination.

Blood pressure goal
SBP <140 mm Hg
DBP <90 mm Hg

Black

Initiate ACEI or ARB, alone or in combination with other drug class.³

All ages

Diabetes present

Blood pressure goal
SBP <140 mm Hg
DBP <90 mm Hg

No CKD

Blood pressure goal
SBP <140 mm Hg
DBP <90 mm Hg

All ages

CKD present with or without diabetes

Blood pressure goal
SBP <140 mm Hg
DBP <90 mm Hg
<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><strong>ACE inhibitors</strong></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><strong>Angiotensin receptor blockers</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eprosartan</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><strong>β-Blockers</strong></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><strong>Calcium channel blockers</strong></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>Nitrendipine</td>
<td>10</td>
<td>20</td>
<td>1-2</td>
</tr>
<tr>
<td><strong>Thiazide-type diuretics</strong></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>25-100*</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.
<table>
<thead>
<tr>
<th>Guideline</th>
<th>Population</th>
<th>Goal BP, mm Hg</th>
<th>Initial Drug Treatment Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014 Hypertension guideline</td>
<td>General ≥60 y</td>
<td>&lt;150/90</td>
<td>Nonblack: thiazide-type diuretic, ACEI, ARB, or CCB; black: thiazide-type diuretic or CCB</td>
</tr>
<tr>
<td></td>
<td>General &lt;60 y</td>
<td>&lt;140/90</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Diabetes</td>
<td>&lt;140/90</td>
<td>Thiazide-type diuretic, ACEI, ARB, or CCB</td>
</tr>
<tr>
<td></td>
<td>CKD</td>
<td>&lt;140/90</td>
<td>ACEI or ARB</td>
</tr>
<tr>
<td>ESH/ESC 2013&lt;sup&gt;37&lt;/sup&gt;</td>
<td>General nonelderly</td>
<td>&lt;140/90</td>
<td>Diuretic, β-blocker, CCB, ACEI, or ARB</td>
</tr>
<tr>
<td></td>
<td>General elderly &lt;80 y</td>
<td>&lt;150/90</td>
<td></td>
</tr>
<tr>
<td></td>
<td>General ≥80 y</td>
<td>&lt;150/90</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Diabetes</td>
<td>&lt;140/85</td>
<td>ACEI or ARB</td>
</tr>
<tr>
<td></td>
<td>CKD no proteinuria</td>
<td>&lt;140/90</td>
<td>ACEI or ARB</td>
</tr>
<tr>
<td></td>
<td>CKD + proteinuria</td>
<td>&lt;130/90</td>
<td></td>
</tr>
<tr>
<td>CHEP 2013&lt;sup&gt;38&lt;/sup&gt;</td>
<td>General &lt;80 y</td>
<td>&lt;140/90</td>
<td>Thiazide, β-blocker (age &lt;60y), ACEI (nonblack), or ARB</td>
</tr>
<tr>
<td></td>
<td>General ≥80 y</td>
<td>&lt;150/90</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Diabetes</td>
<td>&lt;130/80</td>
<td>ACEI or ARB with additional CVD risk ACEI, ARB, thiazide, or DHPCCB without additional CVD risk</td>
</tr>
<tr>
<td></td>
<td>CKD</td>
<td>&lt;140/90</td>
<td>ACEI or ARB</td>
</tr>
<tr>
<td>ADA 2013&lt;sup&gt;39&lt;/sup&gt;</td>
<td>Diabetes</td>
<td>&lt;140/80</td>
<td>ACEI or ARB</td>
</tr>
<tr>
<td>KDIGO 2012&lt;sup&gt;40&lt;/sup&gt;</td>
<td>CKD no proteinuria</td>
<td>≤140/90</td>
<td>ACEI or ARB</td>
</tr>
<tr>
<td></td>
<td>CKD + proteinuria</td>
<td>≤130/80</td>
<td></td>
</tr>
<tr>
<td>NICE 2011&lt;sup&gt;41&lt;/sup&gt;</td>
<td>General &lt;80 y</td>
<td>&lt;140/90</td>
<td>&lt;55 y: ACEI or ARB</td>
</tr>
<tr>
<td></td>
<td>General ≥80 y</td>
<td>&lt;150/90</td>
<td>≥55 y or black: CCB</td>
</tr>
<tr>
<td>ISHIB 2010&lt;sup&gt;42&lt;/sup&gt;</td>
<td>Black, lower risk</td>
<td>&lt;135/85</td>
<td>Diuretic or CCB</td>
</tr>
<tr>
<td></td>
<td>Target organ damage or CVD risk</td>
<td>&lt;130/80</td>
<td></td>
</tr>
</tbody>
</table>
Controlling Hypertension in Adults

Systolic 140–159 or diastolic 90–99 (Stage 1 hypertension)
- Lifestyle modifications as a trial
- Consider adding thiazide

Recheck and review readings in 3 months*

No

BP at goal?

Yes

- Thiazide for most patients or ACEI, ARB, CCB, or combo
- If currently on BP med(s), titrate and/or add drug from different class

Recheck and review readings in 2–4 weeks*

No

BP at goal?

Yes

- Encourage self-monitoring and adherence to meds
- Advise patient to alert office if he/she notes BP elevation or side effects
- Continue office visits as clinically appropriate

Optimize dosage(s) or add medications
- Address adherence, advise on self-monitoring, and request readings from home and other settings
- Consider secondary causes

Consider referral to HTN specialist

*Scheduled visit interval should be based on patient’s risk of adverse outcomes

This algorithm should not be used to counter the treating healthcare provider’s best clinical judgment.

Response to JNC 8: Minority Report

Minority (5/17) of the panel disagreed with recommendation to increase target SBP from 140 to 150 mm Hg in persons ≥ 60 years without DM or CKD.

1. Reduce intensity of antihypertensive treatment in groups at highest risk for cardiovascular disease (CVD)
   - African Americans
   - Patients with CVD
   - Patients with multiple CVD risk factors other than DM or CKD

2. Evidence supporting increase was insufficient and inconsistent with the evidence supporting other recommendations

3. The higher SBP goal may reverse the decades-long decline in CVD, especially stroke mortality.
Other Controversies

- No longer sanctioned by NHLBI or other agencies like AHA and ACC
- Discrepancies and lack of consensus between guidelines
- Raising target BP in highest risk group for CDV disease (age > 60) may lead to greater events
Case 1

- DB, a 38 y/o African American female with stage III chronic kidney disease, presents to her primary care physician with persistently elevated blood pressure despite initiating life style changes about 3 months ago. Her blood pressure during today’s visit was 156/98. The physician has decided to initiate an antihypertensive agent for DB. He is thinking of sending DB home with a prescription for Lisinopril 5 mg to be titrated and consults you for recommendations. Is Lisinopril an appropriate option? If not, what agent do you recommend for DB?

- 61 y/o with recent stroke
Case 2

- PL is a 61 yr old Caucasian male who has recently suffered from an ischemic stroke. His current blood pressure 168/95 and he has not been on blood pressure medications before. The physician would like to start PL on antihypertensive medications. Which of the following agents do you recommend for PL?

  A. Hydrocholorothiazide + ramipril
  B. Chlorthalidone alone
  C. Metoprolol + losartan
  D. Diltiazem alone