New Guidelines for Hypertension Management

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Course Learning Objectives

At the completion of this case, the learner will be able to:

- Discuss key points of the JNC-8 hypertension guidelines.
- Compare and contrast key differences between JNC-8 guidelines and other recent hypertension guidelines, such as Canadian Hypertension Education Program (CHEP 2014) and ASH/ISH 2013 hypertension guidelines.
- Describe importance of balancing competing benefits and risks of hypertension management in the frail elderly, especially with regard to hypotension and falls and fractures.
- Discuss the advantages and disadvantages of key therapeutic agents prescribed for control of hypertension in elderly patients.
- Recommend nonpharmacologic strategies for geriatric patients based on their lifestyle.
- Assess patient's stage or class of hypertension and identify thresholds for initiating pharmacotherapy.
- Identify secondary causes of hypertension and develop a plan of care aimed at those causes.
- Establish individualized target blood pressure goals and formulate a plan to attain those goals through pharmacotherapy.
- Choose to utilize classes of medications for hypertension based on specific patient needs.
- Develop an ongoing monitoring plan to maintain the patient at or near goal blood pressure.

Case Study

FDR is a 63 yo WM with a PMH of HTN, chronic lung disease (cough), polio, and heart failure (mild)
- Smoker (20 cig/day)
- Current medications:
  - Digitalis (HF)
  - Phenobarbital (HTN)
- Recently re-elected for 4th term as POTUS

BP history
- 03/1944: 186/108 mmHg
- 04/1944: 200/108 mmHg
- 11/1944: 210/112 mmHg
- 02/1945: 260/150 mmHg

“On the morning of April 12 ... Roosevelt lit a cigarette, raised his left hand to his temple, and then seemed to squeeze his forehead. As he reached for the back of his neck, he said, ‘I have a terrific headache.’ Then he lost consciousness ...”

(His physician) was summoned and within minutes took his patient’s blood pressure. The numbers, an unsustainable 300/190, went well beyond an indication of danger. They were evidence that the tragedy had already occurred. Two hours later, at 3:45 pm, the president was dead.”

Case Study

“Following Roosevelt’s death and World War II, the nation’s scientists persuaded President Truman to make medical research a national priority. In 1948, Congress created the National Heart Institute. That same year, the Framingham Heart Study began.”
“Factors of Risk in the Development of Coronary Heart Disease”

- Six-Year Follow-up Experience
- Observational longitudinal design
- Framingham, MA
  - 4,469 patients (30 – 59 years)
- “Factors of risk”


“Effects of Treatment on Morbidity in Hypertension. Results in Patients With Diastolic Blood Pressures Averaging 115 Through 129 mm Hg”

- Randomized, double-blind, placebo-controlled
  - N = 143 patients
  - Male, DBP>115 mmHg
- HCTZ 100 mg
- Reserpine 0.2 mg
- Hydralazine 150 mg

Effects of treatment on morbidity in hypertension. Results in patients with diastolic blood pressures averaging 115 through 129 mm Hg. JAMA. 1967 Dec 11;202(11):1028-34.

“Health outcomes associated with various antihypertensive therapies used as first-line agents: a network meta-analysis”

- Meta-analysis
  - Medline search
    - 1995-2002
- Criteria
  - Long term
  - Randomized
  - Placebo Controlled
- Results
  - 42 clinical trials
  - N = 192,478

Hypertension

- Hypertension is currently classified based upon language developed by the Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC7)

<table>
<thead>
<tr>
<th>Stage</th>
<th>Systolic</th>
<th>Diastolic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-hypertension</td>
<td>120-139</td>
<td>80-89</td>
</tr>
<tr>
<td>Stage I</td>
<td>140-159</td>
<td>90-99</td>
</tr>
<tr>
<td>Stage II</td>
<td>≥160</td>
<td>≥100</td>
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</table>

JNC7 Recommendations

<table>
<thead>
<tr>
<th>Stage</th>
<th>Lifestyle</th>
<th>Initial Rx</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>Encourage</td>
<td>No</td>
</tr>
<tr>
<td>Pre-hypertension</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Stage I</td>
<td>Yes</td>
<td>Thiazide (ACEI, ARB, CCB, BB)</td>
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<tr>
<td>Stage II</td>
<td>Yes</td>
<td>Thiazide + ACEI, ARB, CCB, BB</td>
</tr>
</tbody>
</table>

Lifestyle

- Initial Rx

- Stage II: Yes
- Stage I: Yes
- Pre-hypertension: Yes
- Normal: No

Hypertension

- The benefits of BP lowering are well-established.
- Randomized clinical trials suggest 35–40% reduction in stroke, 20–25% reduction in acute MI, and >50% reduction in heart failure.

Relative Risk Reduction with BP Lowering

- Stroke
- AMI
- Heart Failure


Lancet 2002;360:1903-1913

**Hypertension in the Very Elderly Trial (HYVET)**

- **Inclusion Criteria**
  - Age > 80 years
  - Systolic BP > 160 mmHg

- **Treatment**
  - Indapamide SR 1.5 mg
  - PLUS perindopril 2-4 mg if BP > 150/80 mmHg
  - Placebo-controlled

- **Outcomes**
  - Primary: Any stroke (fatal or non-fatal)
  - Secondary: Death, cardiovascular death, cardiac death, stroke death, heart failure

**HYVET (2008)**

- The trial was stopped early after a median follow-up of 1.8 years due to an interim analysis showing significant reductions in stroke and mortality among patients receiving BP treatment.
- Upon completion of time-to-event analysis, however, the primary outcome did not achieve statistical significance. However, a compelling trend toward stroke reduction remained (~30%, P=0.06).
- Other secondary outcomes showed similar effects:
  - Total mortality (~21%, P=0.02)
  - Stroke death (~39%, P=0.03)
  - Cardiovascular death (~23%, P=0.026)
  - Heart failure (~64%, P<0.001)
- The combination treatment approach was remarkably safe, as fewer serious adverse events occurred among patients receiving BP treatment versus placebo (358 vs 448, P=0.001).

**The Action to Control Cardiovascular Risk in Diabetes (ACCORD)**

- **Inclusion Criteria**
  - Diabetes
  - Age > 40 years plus cardiovascular disease
  - Age > 55 years plus albuminuria, left ventricular hypertrophy, atherosclerotic disease, or other high risk criteria

- **Exclusion Criteria**
  - Severe obesity (BMI > 45 kg/m²), chronic kidney disease (Scr > 1.5 mg/dL), or other severe illnesses

**ACCORD-BP (2010)**

- **Treatment**
  - Patients were randomized to a BP target of < 140/90 mmHg (standard) or < 120/80 mmHg (intensive)
  - No particular medication regimen was specified. Investigators were allowed to use a variety of evidence-based antihypertensives, including ACE inhibitors, calcium channel blockers, thiazide diuretics, and β-blockers.
  - Patients were also part of 2 x 2 factorial randomization to simvastatin +/- fenofibrate.

- **Outcomes**
  - Primary: Composite (MI, stroke, or cardiovascular death)

**How did we get to JNC8?**

- **Panel** (17 members)
  - Academia (15), NHLBI (1), NIDDK (1)
  - 2 program officials (NHLBI)
- **January 2013 --- Sent out for review**
- **20 reviewers (selected by NHLBI) --- 16 responded**
- **16 federal agencies --- 5 responded**
- **No official endorsements prior to publication**
- **Published 12/18/2013**

**BP group** | Target (mmHg) | Baseline Systolic BP | Baseline Diastolic BP | Follow-up Systolic BP | Follow-up Diastolic BP |
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<tbody>
<tr>
<td>Intensive</td>
<td>&lt; 120/80</td>
<td>139</td>
<td>76</td>
<td>119*</td>
<td>64*</td>
</tr>
<tr>
<td>Standard</td>
<td>&lt; 140/90</td>
<td>139</td>
<td>76</td>
<td>134</td>
<td>70</td>
</tr>
</tbody>
</table>

*P<0.001 for between Intensive versus Standard BP groups

- Despite compelling BP reduction in patients randomized to < 120/80 mmHg, there was no significant risk reduction (HR = 0.88 [95% CI 0.73 – 1.06], P=0.20).
- Of the pre-specified secondary endpoints, only stroke risk showed evidence of protection with intensive BP lowering
  - Total mortality (~7%, P=0.33)
  - Stroke (~43%, P=0.02)
  - Nonfatal MI (~25%, P=0.12)
  - Heart failure (~14%, P=0.67)
- However, the potential stroke benefit was offset by significant increases in serious adverse events related to BP lowering (~3.1% versus 1.3%, P=0.001) and reduced kidney function (eGFR < 30 mL/min/1.73m², 4.2% versus 2.2%, P=0.001)
JNC8 – What does it say?

- “3 critical questions”
  - In adults with HTN, does initiating antiHTN pharmacologic therapy at specific BP thresholds improve health outcomes?
  - In adults with HTN, does treatment with antiHTN pharmacologic therapy to a specified BP goal lead to improvements in health outcomes?
  - In adults with HTN, do various antiHTN drugs or drug classes differ in comparative benefits and harms on specific health outcomes?

**Recommendation 1**
In the general population aged ≥60 years, initiate pharmacologic treatment to lower blood pressure (BP) at systolic blood pressure (SBP) ≥150 mm Hg or diastolic blood pressure (DBP) ≥90 mm Hg and treat to a goal SBP <150 mm Hg and goal DBP <90 mm Hg. (Strong Recommendation – Grade A)

**Corollary Recommendation**
In the general population aged ≥60 years, if pharmacologic treatment for high BP results in lower achieved SBP (eg, <140 mm Hg) and treatment is well tolerated and without adverse effects on health or quality of life, treatment does not need to be adjusted. (Expert Opinion – Grade E)

**Recommendation 2**
In the general population <60 years, initiate pharmacologic treatment to lower BP at DBP ≥90 mm Hg and treat to a goal DBP <90 mm Hg. (For ages 30-59 years, Strong Recommendation – Grade A; For ages 18-29 years, Expert Opinion – Grade E)

**Recommendation 3**
In the general population <60 years, initiate pharmacologic treatment to lower BP at SBP ≥140 mm Hg and treat to a goal SBP <140 mm Hg. (Expert Opinion – Grade E)

**Recommendation 4**
In the population aged ≥18 years with chronic kidney disease (CKD), initiate pharmacologic treatment to lower BP at SBP ≥140 mm Hg or DBP ≥90 mm Hg and treat to goal SBP <140 mm Hg and goal DBP <90 mm Hg. (Expert Opinion – Grade E)

**Recommendation 5**
In the population aged ≥18 years with diabetes, initiate pharmacologic treatment to lower BP at SBP ≥140 mm Hg or DBP ≥90 mm Hg and treat to a goal SBP <140 mm Hg and goal DBP <90 mm Hg. (Expert Opinion – Grade E)
Recommendation 6
In the general non-black population, including those with diabetes, initial antihypertensive treatment should include a thiazide-type diuretic, calcium channel blocker (CCB), angiotensin-converting enzyme inhibitor (ACEI), or angiotensin receptor blocker (ARB). (Moderate Recommendation – Grade B)

Recommendation 7
In the general black population, including those with diabetes, initial antihypertensive treatment should include a thiazide-type diuretic or CCB. (For general black population: Moderate Recommendation – Grade B; for black patients with diabetes: Weak Recommendation – Grade C)

Recommendation 8
In the population aged ≥18 years with CKD, initial (or add-on) antihypertensive treatment should include an ACEI or ARB to improve kidney outcomes. This applies to all CKD patients with hypertension regardless of race or diabetes status. (Moderate Recommendation – Grade B)

Recommendation 9
The main objective of hypertension treatment is to attain and maintain goal BP. If goal BP is not reached within a month of treatment, increase the dose of the initial drug or add a second drug from one of the classes in recommendation 6 (thiazide-type diuretic, CCB, ACEI, or ARB). The clinician should continue to assess BP and adjust the treatment regimen until goal BP is reached. If goal BP cannot be reached with 2 drugs, add and titrate a third drug from the list provided. Do not use an ACEI and an ARB together in the same patient. If goal BP cannot be reached using only the drugs in recommendation 6 because of a contraindication or the need to use more than 3 drugs to reach goal BP, antihypertensive drugs from other classes can be used. Referral to a hypertension specialist may be indicated for patients in whom goal BP cannot be attained using the above strategy or for the management of complicated patients for whom additional clinical consultation is needed. (Expert Opinion – Grade E)
JNC8 – Summary

• Focused update
  – Not comprehensive
  – No new definitions
  – Treatment based
• Simple
  – Fewer goals
  – Fewer drugs
• Follow-up, follow-up, follow-up
  – 1 month!!