Hypertension: How New Guidelines Should Change Your Practice?

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Overview of Presentation

- Hypertension Current Landscape
- Do we really need guidelines, are there unanswered questions?
- How Much Should Clinical Practice Change in Response to New Guidelines?
Global Burden of Hypertension  
2025 Projection

Year 2000
- 26.4% of world’s adults had hypertension
- A total of 972 million adults
- Highest prevalence in established market economies (eg, North America, Europe)

Year 2025
- 29.2% of world’s adults will have hypertension
- A total of 1.56 billion adults
  - 60% increase overall
- developed nations—24% increase
- developing nations—80% increase
- Highest prevalence will be in economically developing continents (eg, Asia, Africa)
  - will account for 75% of hypertensive patients


Clinical Epidemiology of Hypertension in the U.S. 1988–2008 by Race / Ethnicity

[Graphs showing trends over time for NH White, NH Black, Hispanic, and controlled blood pressure percentages with statistical significance indicated.]
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Hypertension Detection and Follow-up Program: Mortality Improves With Stepped Care

![Graph showing cumulative mortality over years of follow-up for Referred Care and Stepped Care.](image)

Referred Care (n=5,456)
Stepped Care (n=5,485)

* $P<0.01$

Un-answered Questions in Hypertension

- When should we initiate drug treatment?
- Are some drugs better than others?
  - General population and sub-populations
- How low should we go?
  - General population and sub populations

Questions Guiding the Evidence Review

- In adults with hypertension, does initiating antihypertensive pharmacologic therapy at specific BP thresholds improve health outcomes? Goals

- In adults with hypertension, does treatment with antihypertensive pharmacologic therapy to a specified BP goal lead to improvement in health outcomes? Targets

- In adults with hypertension, do various antihypertensive drugs or drug classes differ in comparative benefits and harms on specific health outcomes? Impacts of drugs
**Recommendation 1**

General population aged 60 years or older

- **Initiate Treatment at:**
  - SBP $> 150$ mmHg or
  - DBP $> 90$ mmHg

- **Goal of Treatment:**
  - SBP $< 150$ mmHg or
  - DBP $< 90$ mmHg

HYVET (threshold for initiation of $>160$ mmHg): the basis for the new 80+ recommendation

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**A: Fatal or Nonfatal Stroke**

<table>
<thead>
<tr>
<th>Follow-up (yr)</th>
<th>No. of Events per 100 Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Placibo group</td>
</tr>
<tr>
<td>1</td>
<td>2.8</td>
</tr>
<tr>
<td>2</td>
<td>3.0</td>
</tr>
<tr>
<td>3</td>
<td>3.4</td>
</tr>
<tr>
<td>4</td>
<td>3.8</td>
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</tbody>
</table>

P = 0.06

**B: Death from Any Cause**

<table>
<thead>
<tr>
<th>Follow-up (yr)</th>
<th>No. of Events per 100 Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Placibo group</td>
</tr>
<tr>
<td>1</td>
<td>2.3</td>
</tr>
<tr>
<td>2</td>
<td>2.7</td>
</tr>
<tr>
<td>3</td>
<td>3.2</td>
</tr>
<tr>
<td>4</td>
<td>3.6</td>
</tr>
</tbody>
</table>

P = 0.02

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**Recommendation 3**

**Goal of Treatment:**
- **DBP < 140 mmHg**

**Initiate Treatment at:**
- **SBP > 140 mmHg**

**General population < 60 years**

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**Recommendation 2**

**Goal of Treatment:**
- **DBP < 90 mmHg**

**Initiate Treatment at:**
- **DBP > 90 mmHg**

**General population < 60 years**
Recommendation 4
Population aged 18 years or older with CKD

Initiate Treatment at:
SBP > 140 mmHg
or
DBP > 90 mmHg

Goal of Treatment:
DBP < 140 mmHg
or
DBP < 90 mmHg

Recommendation 5
Population aged 18 years or older with diabetes

Initiate Treatment at:
SBP > 140 mmHg
or
DBP > 90 mmHg

Goal of Treatment:
DBP < 140 mmHg
or
DBP < 90 mmHg
**Primary & Secondary Outcomes**

<table>
<thead>
<tr>
<th></th>
<th>Intensive Events (%/yr)</th>
<th>Standard Events (%/yr)</th>
<th>HR (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>0.59 (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)
Recommendation 6

- In general non-black populations, including those with diabetes

- Initial antihypertensive treatment should include any of the following:
  - A thiazide-type diuretic
  - Calcium channel blocker (CCB)
  - Angiotensin-converting enzyme inhibitor (ACEI) or
  - Angiotensin receptor blocker (ARB)
Recommendation 7

- In general black populations, including those with diabetes:

- Initial antihypertensive treatment should include:
  - Thiazide-type diuretics
  - CCB
Adding Fat Inflames the Fat: Adipose Tissue Angiotensin


Obesity in Normotensive African-American Women
Inflammation and Oxidative Stress

Biomarker Profile of Obesity

- Isoprostanes
- CRP
- Adiponectin

Cumulative Event Rates for the Primary Outcome (Fatal CHD or Nonfatal MI) by ALLHAT Treatment Group

<table>
<thead>
<tr>
<th>ALLHAT Treatment Group</th>
<th>RR (95% CI)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>A/C</td>
<td>0.98 (0.90-1.07)</td>
<td>0.65</td>
</tr>
<tr>
<td>L/C</td>
<td>0.99 (0.91-1.08)</td>
<td>0.81</td>
</tr>
</tbody>
</table>

ALLHAT Chlorthalidone
Amlodipine
Lisinopril

Number at Risk:
- Chlorthalidone
- Amlodipine
- Lisinopril

Years to CHD Event
- 0
- 1
- 2
- 3
- 4
- 5
- 6
- 7

Cumulative Event Rate
- 0
- 0.04
- 0.08
- 0.12
- 0.16
- 0.2

Pemu, Ofili Gibbons 2007
Kaplan Meier for Primary Endpoint

- **ACEI / HCTZ**
- **CCB / ACEI**

HR (95% CI): 0.80 (0.72, 0.90)

20% Risk Reduction

Time to 1st CV morbidity/mortality (days)

\[ p = 0.0002 \]

**Primary Endpoint by subgroup in ACCOMPLISH**

- All ITT patient
- Age: <65
- ≥65
- <70
- ≥70
- Sex: Male
- Female
- Race: Black
- Non-Black
- Region: US
- Nordic
- Diabetes at baseline: Yes
- No
- CAD at baseline: Yes
- No
- Baseline GFR <60
- ≥60

Benazapril plus amlodipine
HCTZ

better
better

Recommendation 8

- Population aged 18 years or older with CKD and hypertension
  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
Recommendation 9

- 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 the drugs in recommendation 6 because of contraindication of the need to use more than 3 drugs to reach goal BP; antihypertensive drugs from other classes can be used

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Diagnostic algorithm for hypertension

Hypertension Visit 1
BP Measurement, History and Physical examination

Hypertension Visit 2
Target Organ Damage or Diabetes or BP ≥ 180/110?
Yes — Diagnosis of HTN
No — BP: 140-179 / 90-109

Office BPM
ABPM (if available)
Home BPM (if available)

Criteria for the diagnosis of hypertension and recommendations for follow-up

Hypertension visit 3
>160 SBP or >100 DBP
<160 / 100

<135/85
Diagnosis of HTN
24-hour
<130/80
ABPM or HBPM

Patients with high normal blood pressure (office SBP 130-139 and/or DBP 85-89) should be followed annually.

Hypertension visit 4-5
>140 SBP or ≥90 DBP
< 140 / 90

<135/85
Diagnosis of HTN
≥135 SBP or ≥85 DBP or ≥130 SBP or ≥80 DBP

Continue to follow-up
Diagnosis of HTN
Continue to follow-up
Diagnosis of HTN

Repeat Home BPM
If < 135/85
ACE inhibitor or ARB

ACE inhibitor or ARB + CCB

ACE inhibitor or ARB + CCB + thiazide-like diuretic

ACE inhibitor or ARB + CCB + thiazide-like diuretic + consider further diuretic or α- or β-blocker

NICE 2011 Hypertension Guidelines’ Treatment Algorithm

Aged <55 years

Aged ≥55 years or black person of African or Caribbean family origin of any age

NICE = National Institute for Health and Clinical Excellence; ACE= angiotensin-converting enzyme; ARB = angiotensin receptor blocker; CCB = calcium channel blocker; HF = heart failure.

aCCB is preferred, but consider a thiazide-like diuretic if CCB is not tolerated, or if the patient has edema, HF, or high risk of HF.

bConsider low-dose spironolactone or higher doses of thiazide-like diuretic.

cConsider further diuretic therapy is not tolerated, is contraindicated, or is ineffective.


ESH/ESC 2013 Guidelines Algorithm for the Treatment of Hypertension

Figure 3 Monotherapy vs. drug combination strategies to achieve target BP. Moving from a less intensive to a more intensive therapeutic strategy should be done whenever BP target is not achieved.

ESH = European Society of Hypertension; ESC = European Society of Cardiology; BP = blood pressure; CV = cardiovascular.

2013 ESH/ESC Guidelines for the management of arterial hypertension. The Task Force for the management of arterial hypertension of the European Society of Hypertension (ESH) and of the European Society of Cardiology (ESC). Eur Heart J first published online June 14, 2013 doi:10.1093/eurheartj/htt151
Conclusion

- Guidelines offer clinicians an analysis of what is known and not known about BP treatment thresholds, goals and drug treatment strategies.

- Provides evidence-based recommendation for the management of high BP.

- Should meet the clinical needs of most patients.

- However, these recommendations are not a substitute for clinical judgment, and decisions must carefully consider and incorporate the clinical characteristics of each individual.

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