Evolution of Hypertension Guidelines

Osama Sanad (MD)
Prof. of Cardiology
Benha University
2016
Back in time.... 1912
Back in time....

1912

No body knows that hypertension is a lethal disease...
Some Early Views on the Controversy

• “The greatest danger to a man with high blood pressure lies in its discovery, because then some fool is certain to try and reduce it.” - J.H. Hay, 1931.

• “Hypertension may be an important compensatory mechanism which should not be tampered with, even were it certain that we could control it.” Paul Dudley White, 1937.
Hypertension in 1940s...

- Among anti-hypertensives mentioned were thiocyanates, barbiturates, Bithmus and bromides.
- Franklin Roosevelt represents an open textbook for the natural history of untreated HTN.
- In 1937, BP 160/100 with no symptoms and no treatment.
- In 1941, BP 180/110 with heart failure symptoms treated with digitalis.
- In 1945, he died of cerebral hage with BP 300/190!!

In the late 1940s, Dr. Charles Friedberg wrote in his textbook *Diseases of the Heart*,

> In a patient with mild benign hypertension—defined as a blood pressure \(<200/<100\) mm Hg, there is no indication for use of hypotensive drugs. Continued observation is desirable and conservative treatment consisting of reassurance, mild sedatives, and weight reduction is indicated.\(^\text{12}\)

In the 1948 textbook *Cardiology*, Evans noted that

> The blood pressure is [considered to be] raised when the systolic pressure is 180 or over, and/or the diastolic pressure is 110 or over, on three consecutive examinations, and in the presence of clinical, radiological and cardiographic evidence of cardiovascular hypertrophy.\(^\text{13}\)
“People with **mild** benign hypertension with levels up to **210/110** need not be treated”

“There is a psychopathologic personality associated with hypertension”
Hypertension in 1950s...

- Dr. Harrison stated in PRINCIPLES OF INTERNAL MEDICINE that hypertension should be treated **ONLY** when coronary symptoms occur.

- **Hydralazine** was first discovered but its use was limited due to side effects.

- In 1957, **Thiazide** diuretics were discovered and used as effective drugs to lower BP safely.

- In late 1950s, **Page et al.** provided the 1\textsuperscript{st} mosaic theory for HTN **pathogenesis** as a multifactorial disease involving kidney, liver and endocrine-nervous system.
Hypertension Facts:

- Affects 1 billion people worldwide
- US – about 1 in 3 adults
  - 73 million have hypertension (SBP >140/90)
- A 55yo normotensive person has up to a 90% lifetime risk of developing hypertension (Vasan 2001)
- Number one reason listed for office visits
- Causes/contributes to 457,000 admissions per year
- A leading cause/contributor to death (MI, stroke, vascular disease)
if we still guided by the old information we might still treat our HTN patients to **200/100mmHg** as a target
IT'S NOT THAT SIMPLE
Plethora of HTN guidelines
US Hypertension Guideline Mania
The Joint National Committee (JNC)
Hypertension in 1960s to 1990s ...

- During 1960s, debate continued as whether to treat HTN or not !!
- In late 1960s, Framingham Heart Study was reported a strong correlation between HTN and heart attacks, congestive heart failure and strokes.
- After that, discovery of β-blockers changed the paradigm.

1977
The birthday of 1st JNC report
JNC – 1 recommendations ...(1977)

1. BP of ≥ 160/95 should not be treated and should be re-checked one month later in all.

2. Persons younger than 50 years with BP > 140/90 & < 160/95 should be re-checked in 2-3 months.

3. Persons older than 50 years with the above range should be re-assessed in 6-9 months.

4. DO NOT treat HTN as long as diastolic BP is ≤ 105 mmHg !!

5. The emphasis of JNC-I was only on diastolic BP.

1. No staging based upon systolic BP.
Through JNC -2 & 3 ... (1980-1984) ... BP target goals were arbitrary and classification Systems were vague...
JNC-4 first introduced a classification system ...(1988)

<table>
<thead>
<tr>
<th>JNC–IV Blood Pressure Classification in Adults (18 Years or Older)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Category</strong></td>
</tr>
<tr>
<td>----------------</td>
</tr>
<tr>
<td>Normal BP</td>
</tr>
<tr>
<td>High–normal BP</td>
</tr>
<tr>
<td>Mild hypertension</td>
</tr>
<tr>
<td>Moderate hypertension</td>
</tr>
<tr>
<td>Severe hypertension</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SBP (DBP &lt;90 mm Hg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal BP</td>
</tr>
<tr>
<td>Borderline systolic hypertension</td>
</tr>
<tr>
<td>Isolated systolic hypertension</td>
</tr>
</tbody>
</table>

JNC – 5 changed the classification system a little bit ...(1993)

<table>
<thead>
<tr>
<th>JNC–V Classification of Hypertension for Adults (18 Years and Older)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Category</strong></td>
</tr>
<tr>
<td>----------------</td>
</tr>
<tr>
<td>Normal</td>
</tr>
<tr>
<td>High–normal</td>
</tr>
<tr>
<td>Hypertension</td>
</tr>
<tr>
<td>Stage 1 (mild)</td>
</tr>
<tr>
<td>Stage 2 (moderate)</td>
</tr>
<tr>
<td>Stage 3 (severe)</td>
</tr>
<tr>
<td>Stage 4 (very severe)</td>
</tr>
</tbody>
</table>
The Sixth Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure

The purpose of the “Sixth Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure” (JNC VI) is to provide guidance for primary care clinicians. The committee recognizes that the responsible clinician’s judgment of the individual patient’s needs remains paramount. Therefore, this national guideline should serve as a tool to be adapted and implemented in local and individual situations. Using evidence-based medicine and consensus, the report updates contemporary approaches to hypertension control. Among the issues covered are the important need for prevention of High Blood Pressure Education Program (NHBPEP) Coordinating Committee will release other advisories as the scientific evidence becomes available.

SECTION 1: INTRODUCTION

The NHBPEP, coordinated by the National Heart, Lung, and Blood Institute (NHLBI) of the National Institutes of Health, was established in 1972. The program is succeeding in its mission of increasing awareness, prevention, treatment, and control of hypertension (Table 1). From the 1976-1980 National Health and Nutrition Examination Survey (NHANES II) to the 1988-1991 survey (NHANES III, phase 1), the percent-
# JNC-6 New Classification

## Classification of Blood Pressure for Adults Age 18 and Older

<table>
<thead>
<tr>
<th>Category</th>
<th>Systolic (mm Hg)</th>
<th>Diastolic (mm Hg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optimal†</td>
<td>&lt; 120</td>
<td>and &lt; 80</td>
</tr>
<tr>
<td>Normal</td>
<td>&lt; 130</td>
<td>and &lt; 85</td>
</tr>
<tr>
<td>High-normal</td>
<td>130-139</td>
<td>or 85-89</td>
</tr>
<tr>
<td>Hypertension‡</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stage 1</td>
<td>140-159</td>
<td>or 90-99</td>
</tr>
<tr>
<td>Stage 2</td>
<td>160-179</td>
<td>or 100-109</td>
</tr>
<tr>
<td>Stage 3</td>
<td>≥ 180</td>
<td>or &gt; 110</td>
</tr>
</tbody>
</table>
The goal of prevention and management of hypertension is to reduce morbidity and mortality by the least intrusive means possible. This may be accomplished by achieving and maintaining SBP below 140 mm Hg and DBP below 90 mm Hg and lower if tolerated.
Goals in specific population

The Sixth Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure

- In older persons, diuretics are preferred and long-acting dihydropyridine calcium antagonists may be considered.

- Specific therapy for patients with left ventricular hypertrophy, coronary artery disease, and heart failure are outlined.

- Patients with renal insufficiency with greater than 1 gram per day of proteinuria should be treated to a therapy blood pressure goal of 125/75 mm Hg; those with less proteinuria should be treated to a blood pressure goal of 130/85 mm Hg. ACE inhibitors have additional renoprotective effects over other antihypertensive agents.

- Patients with diabetes should be treated to a therapy blood pressure goal of below 130/85 mm Hg.
The Sixth Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure

Demographics. Neither sex nor age usually affects responsiveness to various agents. In general, hypertension in African Americans is more responsive to monotherapy with diuretics and calcium antagonists than to beta-blockers or ACE inhibitors. However, if a beta-blocker or ACE inhibitor is needed for other therapeutic benefits, differences in efficacy usually can be overcome with reduction of salt intake, higher doses of the drug, or addition of a diuretic.
Hypertension
JNC DBP Classifications from 1977 : 2003

DBP (mm Hg)

80 85 90 95 100 105 110 115 120 125 130

JNC I  JNC II  JNC III  JNC IV  JNC V  JNC VI  JNC 7

Hypertensive  Moderate  Severe  Severe  Stage 4  Stage 3  Stage 3
Consider therapy  Mild  Mild  Moderate  Stage 2  Stage 2  Stage 2
Mild  Mild  High-normal  High-normal  Stage 1  Stage 1  Stage 1
High-normal  High-normal  Normal  Normal  Optimal  Optimal  Normal
Normal  Normal  Normal  Optimal  Optimal  Normal  Optimal

JNC II. Arch Intern Med. 1980;140:1280-1285.
JNC III. Arch Intern Med. 1984;144:1045-1057.
Hypertension
JNC SBP Classifications: from 1977 : 2003

JNC II. Arch Intern Med. 1980;140:1280-1285.
JNC III. Arch Intern Med. 1984;144:1045-1057.
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
More simplified classification system

<table>
<thead>
<tr>
<th>Classification of Blood Pressure (BP)*</th>
<th>SBP mmHg</th>
<th>DBP mmHg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>&lt;120</td>
<td>&lt;80</td>
</tr>
<tr>
<td>Prehypertension</td>
<td>120–139</td>
<td>80–89</td>
</tr>
<tr>
<td>Hypertension, Stage 1</td>
<td>140–159</td>
<td>90–99</td>
</tr>
<tr>
<td>Hypertension, Stage 2</td>
<td>≥160</td>
<td>≥100</td>
</tr>
</tbody>
</table>

JNC-7 first introduced the term Prehypertension...
What's Changed: JNC 7 vs JNC 8

- JNC 7 recommended a treatment threshold of 140/90 mm Hg regardless of age, whereas JNC 8 raises the systolic threshold at age 60.

- In addition, JNC 7 recommended a lower treatment threshold (130/80 mm Hg) for patients with diabetes or chronic kidney disease, but JNC 8 does not.

Controversy surrounds long-awaited JNC 8 guideline
The controversial JNC 8 relaxed BP goals from 140/90 to 150/90

<table>
<thead>
<tr>
<th>Patient Status</th>
<th>Target SBP (mm Hg)</th>
<th>Target DBP (mm Hg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 60 years</td>
<td>&lt;150</td>
<td>&lt;90</td>
</tr>
<tr>
<td>&lt; 60 years</td>
<td>&lt;140</td>
<td>&lt;90</td>
</tr>
<tr>
<td>&gt; 18 years with CKD</td>
<td>&lt;140</td>
<td>&lt;90</td>
</tr>
<tr>
<td>&gt; 18 years with diabetes</td>
<td>&lt;140</td>
<td>&lt;90</td>
</tr>
</tbody>
</table>

CKD = chronic kidney disease; DBP = diastolic blood pressure; SBP = systolic blood pressure

Is JNC 8’s hypertension treatment threshold too high?
Despite Controversy, JNC 8 Guideline Provides Much-needed Standards for Hypertension Management

Hypertension Guidelines: Clear as Mud

Blood pressure targets: are clinical guidelines wrong?

A call to retract the JNC-8 hypertension guidelines
AHA: JNC 8 Putting Older Adults at Risk?
Analysis warns of potential harm from BP guideline change.

New Analysis Questions Higher JNC 8's SBP Target for Patients Over 60
Proportion of US Adults Potentially Affected by the 2014 Hypertension Guideline


If the JNC 8 recommendations are used:-

- **6 million** adults in the US aged 60 years and older would be ineligible for treatment with antihypertensive drugs.

- Treatment intensity would be decreased for an additional **13.5 million** older persons.

- Increase **IN incidences** of coronary events, stroke, heart failure, cardiovascular mortality, and other adverse events associated with inadequate control of hypertension.
Impact of the 2014 Expert Panel Recommendations for Management of High Blood Pressure on Contemporary Cardiovascular Practice: Insights From the NCDR PINNACLE Registry
J Am Coll Cardiol. 2014 Dec 2;64(21):2196-203

Of 1,185,253 patients in the study cohort:-

- 706,859 (59.6%) achieved the 2003 JNC-7 goals.
- 880,378 (74.3%) achieved the 2014 LNC-8 goals.
- Nearly 1 in 7 who did not meet JNC-7 recommendations would now meet the 2014 treatment goals.
A Randomized Trial of Intensive versus Standard Blood-Pressure Control

The SPRINT Research Group
November 9, 2015 | DOI: 10.1056/NEJMoa1511939

Comments open through November 16, 2015
INTENSIVE BLOOD PRESSURE MANAGEMENT MAY SAVE LIVES

WHAT'S THE BEST WAY TO TREAT HIGH BLOOD PRESSURE IN PATIENTS 50 AND OLDER?
The SPRINT trial enrolled more than 9,300 participants at UAB and other locations to find out. Investigators divided them into two groups:

STANDARD TREATMENT

TARGET: 140 mmHg
Systolic BP

THERAPY:
Avg. 2 different blood pressure medications

INTENSIVE TREATMENT

TARGET: 120 mmHg
Systolic BP

THERAPY:
Avg. 3 different blood pressure medications

RESULTS: ABOUT 30% lower rates of heart attack, heart failure, and other cardiovascular events

ABOUT 25% lower risk of death among participants receiving intensive treatment
NEW DETAILS FROM THE LANDMARK SPRINT STUDY, conducted at UAB and elsewhere, confirm that targeting a systolic pressure of 120 mm Hg, instead of the current target of 140 mm Hg, can save lives and reduce the risk of cardiovascular disease in non-diabetic adults 50 years and older with high blood pressure.
A guideline-changing trial??

“New Hypertension Recommendations Anticipated in 2016”
Conclusion

The aim of science is:-

- Not to open a door to endless Wisdom
- But to put a limit to endless error
The new recommendations are expected to be in the next years.