Who are these people? Where are they? And why are we discussing them at a talk about HTN?
The Yalta Conference
February 4–11, 1945
Yalta Conference

- Meeting between FDR, Stalin and the British Prime Minister, Winston Churchill, took place at the Crimean resort in February 1945
- The meeting was held to agree to a post-war settlement - not just in regard to Germany and Japan, but in relation to the creation of the United Nations.
- FDR was suffering from HTN and CHF at the time and died 2 months later secondary to a hemorrhagic stroke.
- Personal physician Admiral Ross McIntire did not believe in treating his HTN and secretly hid FDR's condition from the world.
- FDR had HTN encephalopathy which at times prohibited him from concentrating on the small details of a post-war Europe.
- James Farley, DNC chairman stated at the Yalta Conference: “FDR.....should not be called upon to make decisions affecting this country or the world”
- His premature death lead the way for Soviet gains in Europe and the start of the Cold War.

Poorly treated HTN can influence World History!!
Presidential Leadership, Illness, and Decision Making
Rose McDermott

Woodrow Wilson, Franklin Delano Roosevelt, John F. Kennedy and Richard Nixon

When Illness Strikes the Leader: The Dilemma of the Captive King
Prof Robin Roberts

Mad King Ludwig of Bavaria, Woodrow Wilson, Adolf Hitler, Idi Amin, Deng Xiao-peng, Ferdinand Marcos, Franklin Delano Roosevelt, and Menachem Begin
Source Material for this Lecture

Best Resource

Fifty Shades of the Kidney

G. L. Omerulus
#1 New York Times Bestseller
Epidemiology, Complications and Treatment of Hypertension 2015

Warren Kupin, MD
Professor of Clinical Medicine
Miami Transplant Institute
University of Miami Miller School of Medicine
Case Presentation

- Your patient is a 65 year old black male with newly diagnosed HTN
- PMH : Type II DM
- Meds : Insulin – Lantus
- Labs (unchanged for 6 months):

<table>
<thead>
<tr>
<th>Creatinine</th>
<th>eGFR</th>
<th>Microalbuminuria / creatinine</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.3</td>
<td>65</td>
<td>75</td>
</tr>
</tbody>
</table>

- PE : BP 150/90 confirmed on 3 separate readings
Case Presentation

• What treatment other than lifestyle modification do you offer him?
  • A) Based on JNC 7 start a thiazide
  • B) Based on JNC 8 start a thiazide
  • C) Based on JNC 7 start an ACEI or ARB due to CKD
  • D) Based on JNC 8 start an ACEI or ARB due to CKD
  • E) Based on JNC 7 don’t do anything else
  • F) Based on JNC 8 don’t do anything else
  • G) What is JNC ????
BLOOD PRESSURE MEASUREMENT

- Patient seated comfortably with back and feet supported
- **No recent coffee, smoking, exercise**
  - *Within 1 hour of measurement*
- Upper arm at heart level where the cuff is placed
- Arm is supported in a resting position
- No difference in bare arm or sleeved arm
- Correct size cuff
  - **The official guidelines specify the following cuff sizes:**
    - Arm circumference 22 to 26 cm, 'small adult' cuff, 12 x 22 cm
    - Arm circumference 27 to 34 cm, 'adult' cuff: 16 x 30 cm
    - Arm circumference 35 to 44 cm, 'large adult' cuff: 16 x 36 cm
    - Arm circumference 45 to 52 cm, 'adult thigh' cuff; 16 x 42
- **Always check for orthostatic changes**
Diagnosis of HTN

Document *elevated* BP on a *minimum of 3 office visits*
The initial screening visit and 2 additional visits
(Take 2 BP readings at each visit and calculate the average)
DEFINITION of HYPERTENSION

Hypertension is:

- A disorder of intra-arterial pressure regulation such that the longer the duration and higher the pressure the greater the target organ damage

Is this true??
For all age groups?
For all ethnicities?
<table>
<thead>
<tr>
<th>JNC</th>
<th>Year</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1977</td>
<td>$&lt; 169/90$ mmHg</td>
</tr>
<tr>
<td>2</td>
<td>1980</td>
<td>Diastolic $&lt; 90$ mmHg</td>
</tr>
<tr>
<td>3</td>
<td>1984</td>
<td>$&lt; 140/90$</td>
</tr>
<tr>
<td>6</td>
<td>1997</td>
<td>$&lt; 140/90$</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$&lt;130/85$ for high risk</td>
</tr>
<tr>
<td>7</td>
<td>2003</td>
<td>$&lt; 140/90$</td>
</tr>
<tr>
<td>8</td>
<td>2014</td>
<td>$&lt; 140/90$ for $&lt; 60$ yrs old</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$&lt; 150/90$ for $&gt; 60$ yrs old</td>
</tr>
</tbody>
</table>
Worldwide Prevalence of Hypertension

1 billion people worldwide
30% of the adult population
78 Million in the USA
7.5 million deaths

Poland 70%
Germany 55%
Japan 45%
Spain 45%
England 38%
Italy 37%
USA 30%
Canada 22%
Changing Prevalence of HTN

A person with normal BP at age 55 has a 90% lifetime risk of HTN

Overall 30% of the population

HTN and Aging

- Blood pressure increases with age

- Among US adults ≥65 years of age
  - prevalence of hypertension was 70.8%
  - awareness of hypertension was 75.9%
  - treatment for hypertension was 69.3%
  - control of hypertension was 48.8%

- Women had a higher prevalence than men and a significantly lower rate of hypertension control
Mean SBP and DBP by Age and Race or Ethnicity
US Population 18 Years and Older

CLINICAL HYPERTENSION

NHANES III; Kaplan's 8th Fig.1-3
Types of HTN based on Age

Caveat:
ISH is more common in the elderly
IDH is more common in young adults
Racial Prevalence of HTN


- Mexican American: 25.5%
- Caucasian: 28.8%
- Black: 42%
Risk Factors for Essential HTN

• Age
• Race (Black ancestry)
• Family History
  – Either paternal or maternal history of HTN
    • Doubles the risk of HTN
  – Genetic factors account for 30% of the risk of Essential HTN
    – Exact genes have not been identified
• Diabetes
• Smoking
• Sodium intake
• Alcohol intake
• Dyslipidemia
• Obesity
Racial Prevalence of HTN

- Compared with Caucasians, Black race is associated with HTN earlier in life, with higher average BPs
  - a 1.3-times greater rate of nonfatal stroke
  - a 1.8-times greater rate of fatal stroke
  - a 1.5-times greater rate of death attributable to Heart Disease
  - a 4.2-times greater rate of end-stage kidney disease

Fifth and Sixth Reports of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure
HTN and Obesity

Wofford M. Current Hypertension Reports 2009, 11:323–328

70% of patients with HTN are obese

BMI < 25

BMI > 30
Current U.S. Salt intake Exceeds the Recommended Levels

77% of Sodium comes from processed foods

Most Sodium Comes from Processed and Restaurant Foods

- Bread: 77%
- Processed and restaurant foods: 12%
- Home cooking: 6%
- Naturally occurring: 5%

Bar chart showing:
- Sodium (g/day): Current level 3.4, Recommended Level 2.3
- Salt (g/day): Current level 8.5, Recommended Level 5.8
White Coat HTN

- Defined as BP > 140/90 in the doctors office and < 140/90 when taken at home by a reliable BP device

- 10-20% of patients diagnosed with Stage 1 HTN at their first office visit
  - Highest incidence in children and elderly

- Prognosis
  - Not a benign condition!
  - These patients are at higher risk of developing sustained HTN, CVD and all cause mortality
  - Require close long term followup
Ambulatory BP Monitors

- Records BP every 20 minutes during the day and 30-60 minutes at night
- Used for ambiguous cases of HTN
  - White coat HTN
  - Uncontrolled HTN
  - Episodic HTN
- Provides information of the mean daytime and night-time BP
- Defines 2 new indices
  - Presence or absence of nocturnal dip
  - Blood pressure load
    - Percent of readings > 140/90
      - > 40% indicates high risk of complications
Ambulatory Monitor

- **Nocturnal dip**
  - 10% decline of BP during sleep
  - Absence of a dip is an independent risk factor for CVD

- **Ambulatory Monitors** are currently used only in selected circumstances and home BP measurements should be emphasized.
Summary

• Blood pressure increases by age in men and women
• Race influences the incidence and severity of HTN
  – Black race is associated at any age with a higher risk and complications of HTN
• Pulse pressure increases with age and leads to a predominance of isolated systolic HTN in the elderly
• Recommendations: BP should be measured every 2 years in healthy adults and yearly for patients with Pre-HTN
Theoretical Etiologies of Essential HTN

- Increased neural sympathetic activity
- Increased angiotensin II
- Intrinsic renal abnormalities
  - Congenital reduced nephron mass
    - Black race is associated with fewer nephrons
  - Acquired reduction in renal mass
    - Intrauterine growth retardation
      - Low birth weight
      - Nutritional deficiency

Impaired Na excretion appears to be a key universal finding
Prevalence of HTN

69% MI
74% CHF
77% CVA
Proportion of deaths attributable to leading risk factors worldwide (2000)

High blood pressure
Tobacco
High cholesterol
Underweight
Unsafe sex
High BMI
Physical inactivity
Alcohol
Indoor smoke from solid fuels
Iron deficiency

Systolic blood pressure greater than 115 mmHg

Attributable Mortality

Mortality According to Blood Pressure in Men Age 50 to 69

Life Expectancy in relation to BP in Men, age 35

<table>
<thead>
<tr>
<th>Blood Pressure</th>
<th>Life Expectancy (years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal 120/80</td>
<td>71</td>
</tr>
<tr>
<td>130/90</td>
<td>67</td>
</tr>
<tr>
<td>140/95</td>
<td>65</td>
</tr>
<tr>
<td>150/100</td>
<td>59</td>
</tr>
</tbody>
</table>
Risk of CHD Death According to SBP and DBP in MRFIT

Decile        SBP (mmHg)       DBP (mmHg)
1  (lowest 10%)  <112           <71
2               112-117       71-76
3               118-121       77-80
4               122-125       81-84
5               126-129       85-88
6               130-132       89-92
7               133-137       93-96
8               138-142       97-100
9  (highest 10%) 142-151       >98
10              >151          >100

Relative risk of CHD mortality

SBP = Systolic blood pressure
DBP = Diastolic blood pressure

CHD = coronary heart disease

HTN and CVD

Starting at BP 115/75

CVD risk doubles for every increment of
20 mmHg Systolic
or
10 mmHg Diastolic
Ischemic Heart Disease

For the same BP, older pts have a significantly higher risk of death from CAD.
Risk of Stroke Death According to SBP and DBP in MRFIT

- **Systolic blood pressure (SBP)**
- **Diastolic blood pressure (DBP)**

Decile 1 (lowest 10%) - SBP <112, DBP <71
Decile 2 - SBP 112-118, DBP 71-76
Decile 3 - SBP 118-121, DBP 76-79
Decile 4 - SBP 121-125, DBP 79-81
Decile 5 - SBP 125-129, DBP 81-84
Decile 6 - SBP 129-132, DBP 84-86
Decile 7 - SBP 132-137, DBP 86-89
Decile 8 - SBP 137-142, DBP 89-92
Decile 9 - SBP 142-151, DBP 92-98
Decile 10 (highest 10%) - SBP >151, DBP >98

Blood Pressure and Risk of Stroke Mortality

For the same BP, older pts have a significantly higher risk of death from CVA.
Primary Diagnoses for Patients Who Start Dialysis

- **Diabetes**: 50%
- **Hypertension**: 27%
- **Glomerulonephritis**: 13%
- **Other**: 10%
HTN is an additive risk factor for the progression of renal disease in patients with Diabetes or other renal diseases.

**Type 2 DM**

HTN is an additive risk factor for the progression of renal disease in patients with Diabetes or other renal diseases.

**RENAAL Study**

Bakris et al.

*Arch Intern Med* 2003;163:1555-65
Economic Impact of HTN

States with the **Highest** workplace absenteeism from HTN
1) California
2) Texas
3) Florida
4) New York
5) Illinois

States with the **Lowest** workplace absenteeism from HTN
1) Wyoming
2) Washington DC
3) Alaska
4) North Dakota
5) Vermont
Benefits of Lowering BP

In stage 1 HTN (BP 140-159/90-99) and additional CVD risk factors

sustained 12 mmHg reduction in SBP over 5 years will prevent 1 death for every 11 patients treated
Risk Reduction with BP control

- Stroke incidence: 35-40%
- MI: 20-25%
- Heart failure: 50%
Population-Based Strategy

SBP Distributions

After Intervention

Before Intervention

Reduction in SBP mmHg

2
3
5

% Reduction in SBP mmHg

Reduction in BP

Reduction in Mortality

Reduction in Stroke

-6
-8
-14

Reduction in CHD

-4
-5
-9

Reduction in Total Mortality

-3
-4
-7

Changing Prevalence of HTN Control

BP Control Rates Based on Ethnicity

Caucasian: 52.6%
Black: 42.5%
Hispanic: 34.4%
Mexican American: 30.3%
Summary

• HTN is a proven risk factor for CVD, stroke and ESRD
• The incidence of HTN is rising especially in women
• Control of HTN remains suboptimal even though a reduction in BP significantly reduces mortality
Joint National Commission (JNC)
Guidelines on HTN Management

JNC 1 - 1976 ➔ JNC 2 - 1980 ➔ JNC 3 - 1984


JNC 7 - 2003 ➔ JNC 8 - 2014 (LATE)
# Evolving Target of Controlled BP

<table>
<thead>
<tr>
<th>JNC</th>
<th>Year</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>JNC 1</td>
<td>1977</td>
<td>&lt; 169/90 mmHg</td>
</tr>
<tr>
<td>JNC 2</td>
<td>1980</td>
<td>Diastolic &lt; 90 mmHg</td>
</tr>
<tr>
<td>JNC 3</td>
<td>1984</td>
<td>&lt; 140/90</td>
</tr>
<tr>
<td>JNC 6</td>
<td>1997</td>
<td>&lt; 140/90</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&lt;130/85 for high risk</td>
</tr>
<tr>
<td>JNC 7</td>
<td>2003</td>
<td>&lt; 140/90</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&lt; 130/80 for high risk</td>
</tr>
<tr>
<td>JNC 8</td>
<td>2014</td>
<td>&lt; 140/90 for &lt; 60 yrs old</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&lt;150/90 for &gt; 60 yrs old</td>
</tr>
</tbody>
</table>
JNC 8

- National Heart, Lung, and Blood Institute (NHLBI) originally commissioned the JNC 8 guidelines and appointed the commission members in 2008
  - National Heart, Lung, and Blood Institute (NHLBI) subsequently withdrew its sponsorship of the 17 member panel
- JNC 8 was not sanctioned by the National Heart, Lung, and Blood Institute (NHLBI) or any major specialty organization
- Separate guidelines are being submitted by
  - ACC/AHA
  - American Society of Hypertension
  - International Society of Hypertension
  - European Society of Hypertension
# JNC VII Blood Pressure Classification

<table>
<thead>
<tr>
<th>BP Classification</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>Stage 1 HTN</td>
<td>140-159</td>
<td>90-99</td>
</tr>
<tr>
<td>Stage 2 HTN</td>
<td>≥ 160</td>
<td>≥100</td>
</tr>
</tbody>
</table>
### Prevalence of Blood Pressure Categories in US Adults 18-20 Years of Age and Older

<table>
<thead>
<tr>
<th>BP Category</th>
<th>Prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>40%</td>
</tr>
<tr>
<td>Pre- Hypertension</td>
<td>30%</td>
</tr>
<tr>
<td>Hypertension</td>
<td>30%</td>
</tr>
</tbody>
</table>

Heart Disease and Stroke Statistics—2013 Update
A Report From the American Heart Association
JNC VIII Blood Pressure Classification

<table>
<thead>
<tr>
<th>BP Classification</th>
<th>SBP mmHg</th>
<th>DBP mmHg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal age &lt; 60</td>
<td>&lt;140</td>
<td>and</td>
</tr>
<tr>
<td>HTN age &lt; 60</td>
<td>&gt;140</td>
<td>or</td>
</tr>
<tr>
<td>Normal age ≥ 60</td>
<td>&lt;150</td>
<td>and</td>
</tr>
<tr>
<td>HTN age ≥ 60</td>
<td>&gt;150</td>
<td>or</td>
</tr>
</tbody>
</table>
Confused ???
## Lifestyle Modifications - Both JNC 7 and JNC 8 Agree !!!

<table>
<thead>
<tr>
<th>Modification</th>
<th>Approximate SBP Reduction (range)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight Reduction (Goal – BMI &lt; 25)</td>
<td>5-20 mmHg/10kg</td>
</tr>
<tr>
<td>Adopt DASH eating plan</td>
<td></td>
</tr>
<tr>
<td>Dietary Approaches to Stop Hypertension</td>
<td></td>
</tr>
<tr>
<td>fruits / vegetables /dairy</td>
<td>8-14 mmHg</td>
</tr>
<tr>
<td>Dietary sodium reduction (&lt; 100 meq/ day)</td>
<td>2-8 mmHg</td>
</tr>
<tr>
<td>Physical activity (30 minutes/day)</td>
<td>4-9 mmHg</td>
</tr>
<tr>
<td>Moderation of alcohol consumption (1 can of beer /day)</td>
<td>2–4 mmHg</td>
</tr>
</tbody>
</table>
JNC 7 - Algorithm for Treatment of Hypertension

Not at Goal Blood Pressure (<140/90 mmHg) (<130/80 mmHg for those with diabetes or chronic kidney disease)

Initial Drug Choices

With Compelling Indications (CKD/CAD/CHF)

Drug(s) for the compelling indications
Other antihypertensive drugs (diuretics, ACEI, ARB, BB, CCB) as needed.

Without Compelling Indications

Stage 2 Hypertension (SBP >160 or DBP >100 mmHg)
2-drug combination for most (usually thiazide-type diuretic and ACEI, or ARB, or BB, or CCB)

Optimize dosages or add additional drugs until goal blood pressure is achieved. Consider consultation with hypertension specialist.

Stage 1 Hypertension (SBP 140–159 or DBP 90–99 mmHg)
one drug - Thiazide-type diuretics for most. May consider ACEI, ARB, BB, CCB, or combination.

Lifestyle Modifications

Optimize dosages or add additional drugs until goal blood pressure is achieved.
Consider consultation with hypertension specialist.
JNC 8
Age Is an Important Determinant of Therapeutic Targets

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)

Age > 60
Target 150/90 !!

HTN Experts believe this is the most serious flaw of JNC 8 and will lead to > 8000 new strokes /yr
Borden W. J Am Coll Cardiol. 2014;64(21):2196-2203
JNC 8

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)

For patients less than 60 years old – the JNC 8 target of 140/90 is identical to the JNC 7 guidelines
For patients with CKD this recommendation is in direct contradiction to the JNC 7 and Kidney Foundation recommendations of targeting a lower BP of 130/80. No mention of the importance of proteinuria as an indication for RAAS inhibition and lower target BP.
What is the Definition of CKD?
**New KDIGO GFR Categories**

To completely confuse you !!!

**Persistence for > 3 months**

<table>
<thead>
<tr>
<th>Stage</th>
<th>GFR</th>
</tr>
</thead>
<tbody>
<tr>
<td>G1</td>
<td>&gt;90</td>
</tr>
<tr>
<td>G2</td>
<td>60 - 89</td>
</tr>
<tr>
<td>G3a</td>
<td>45 – 59</td>
</tr>
<tr>
<td>G3b</td>
<td>30 - 44</td>
</tr>
<tr>
<td>G4</td>
<td>15 – 29</td>
</tr>
<tr>
<td>G5</td>
<td>&lt; 15 or dialysis</td>
</tr>
</tbody>
</table>

CKD

Split Stage 3
New KDIGO Albuminuria Categories

Persistence for $\geq 3$ months

<table>
<thead>
<tr>
<th>Stage</th>
<th>Albuminuria</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>&lt; 30 mg/g</td>
</tr>
<tr>
<td>A2</td>
<td>30 – 300 mg/g</td>
</tr>
<tr>
<td>A3</td>
<td>&gt; 300 mg/g</td>
</tr>
</tbody>
</table>

Albuminuria based on a spot albumin / creatinine ratio

Category A2 = Microalbuminuria = CKD
<table>
<thead>
<tr>
<th>G1</th>
<th>G2</th>
<th>G3a</th>
<th>G3b</th>
<th>G4</th>
<th>G5</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 90 cc/min</td>
<td>60 – 79 cc/min</td>
<td>45 – 59 cc/min</td>
<td>30 – 44 cc/min</td>
<td>15 – 29 cc/min</td>
<td>&lt; 15 cc/min</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>A1</th>
<th>A2</th>
<th>A3</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 30 mg/g</td>
<td>30 – 300 mg/g</td>
<td>&gt; 300 mg/g</td>
</tr>
</tbody>
</table>

**Moderate risk of CVD**

**High risk of CVD**

**Very High risk of CVD**

No evidence of CKD (unless there is structural or functional defects)
JNC 8 does not place an emphasis on thiazide diuretics as the first line therapy compared to JNC 7.

In addition, beta blockers have been removed from early use recommendation which also contrasts with JNC 7. JNC 8 does not discuss the co-morbid criteria of CAD/CHF as an indication for beta blockers.
JNV 8 and CKD

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.

This is similar to the subset of “compelling” indications defined in JNC 7.
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.

All guidelines agree on the need for strict medical followup and continued titration of anti-HTN therapy until goal BP is reached.
European Hypertension Guidelines

<table>
<thead>
<tr>
<th>Recommendations</th>
<th>Classa</th>
<th>Levelb</th>
<th>Ref. c</th>
</tr>
</thead>
<tbody>
<tr>
<td>A SBP goal &lt;140 mmHg:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) is recommended in patients at low–moderate CV risk;</td>
<td>I</td>
<td>B</td>
<td>266, 269, 270</td>
</tr>
<tr>
<td>b) is recommended in patients with diabetes;</td>
<td>I</td>
<td>A</td>
<td>270, 275, 276</td>
</tr>
<tr>
<td>c) should be considered in patients with previous stroke or TIA;</td>
<td>IIa</td>
<td>B</td>
<td>296, 297</td>
</tr>
<tr>
<td>d) should be considered in patients with CHD;</td>
<td>IIa</td>
<td>B</td>
<td>141, 265</td>
</tr>
<tr>
<td>e) should be considered in patients with diabetic or non-diabetic CKD.</td>
<td>IIa</td>
<td>B</td>
<td>312, 313</td>
</tr>
<tr>
<td>In elderly hypertensives less than 80 years old with SBP ≥160 mmHg there is solid evidence to recommend reducing SBP to between 150 and 140 mmHg.</td>
<td>I</td>
<td>A</td>
<td>265</td>
</tr>
<tr>
<td>In fit elderly patients less than 80 years old SBP values &lt;140 mmHg may be considered, whereas in the fragile elderly population SBP goals should be adapted to individual tolerability.</td>
<td>IIb</td>
<td>C</td>
<td>-</td>
</tr>
<tr>
<td>In individuals older than 80 years and with initial SBP ≥160 mmHg, it is recommended to reduce SBP to between 150 and 140 mmHg provided they are in good physical and mental conditions.</td>
<td>I</td>
<td>B</td>
<td>287</td>
</tr>
<tr>
<td>A DBP target of &lt;90 mmHg is always recommended, except in patients with diabetes, in whom values &lt;85 mmHg are recommended. It should nevertheless be considered that DBP values between 80 and 85 mmHg are safe and well tolerated.</td>
<td>I</td>
<td>A</td>
<td>269, 290, 293</td>
</tr>
</tbody>
</table>

CHD, coronary heart disease; CKD, chronic kidney disease; CV, cardiovascular; DBP, diastolic blood pressure; SBP, systolic blood pressure; TIA, transient ischaemic attack.

*Class of recommendation.

Level of evidence.

Reference(s) supporting levels of evidence.

Contradicts JNC 8 in regard to CKD BP goals and removal of age 60 as a breakpoint for easing back on the BP goals
AHA/ACC/CDC Science Advisory Hypertension 2013

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

Systolic >160 or diastolic >100 (Stage 2 hypertension)
Two drugs preferred:
- Lifestyle modifications and
- Thiazide and ACEI, ARB, or CCB
- Or consider ACEI and CCB

Recheck and review readings in 2–4 weeks**

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**

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

No

- 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

Maintains JNC 7 Definitions!
• JNC 8 is not supported by the vast majority of the Cardiology and HTN Societies

• Every physician must weigh the characteristics of the patient when considering therapy

• Dr Kupin’s recommendation is to continue to adhere to the JNC 7 BP targets especially those that pertain to CKD
Implementation of JNC 8
Decrease in the Number of Eligible Patients for Treatment

- 1% fewer young patients
- 8% of patients > 60 yrs
- 28 million U.S. patients
Essential HTN

Resistant HTN
  • 6-8%
  • 2.5-4.5 million people

Secondary Cause
  • 5-10%
Causes of Resistant Hypertension

- Improper BP measurement (pseudohypertension)
- Excess sodium intake
- Inadequate diuretic therapy
- Medication
  - Inadequate doses
  - Drug actions and interactions (e.g., nonsteroidal anti-inflammatory drugs (NSAIDs), illicit drugs, sympathomimetics, oral contraceptives)
  - Over-the-counter (OTC) drugs and herbal supplements
- Excess alcohol intake
- Identifiable causes of HTN
Identifiable Causes of Hypertension: Secondary HTN

Sleep apnea

Primary aldosteronism
Renovascular hypertension
Chronic kidney disease
Drug induced or drug related
Coarctation of the aorta
Cushing’s syndrome and other glucocorticoid excess states
Obstructive uropathy
Mineralocorticoid-like excess states
Thyroid or parathyroid disease
Pheochromocytoma
The Economic Burden of HTN

- Essential HTN: $9814
- Resistant HTN: $20018

Diagram showing the economic burden in dollars between Essential HTN and Resistant HTN.
Sympathetic Nervous System and Resistant HTN

60% of pts with Resistant HTN have elevated catecholamine levels
Renal Denervation for Resistant HTN

- Four-six 2-minute treatments
- Proprietary RF generator
  - Automated
  - Low power
  - Built-in safety algorithms
Renal Denervation by Radiofrequency Ablation and HTN : Symplicity HTN-2 Trial

Inability to Achieve Complete Sympathetic Ablation with Catheter based Therapy

**Symplicity -3**
Final word on Renal Ablation

• HTN Societies in Europe and in the U.S. do not recommend catheter based renal ablation at the present time

• Newer techniques to achieve a more sustained and complete non-surgical radiofrequency induced renal sympathetic ablation are being developed
Case Presentation

• Your patient is a 65 year old black male with newly diagnosed HTN
• PMH : Type II DM
• Meds : Insulin – Lantus
• Labs :

<table>
<thead>
<tr>
<th>Creatinine</th>
<th>eGFR</th>
<th>Microalbuminuria / creatinine</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.3</td>
<td>65</td>
<td>75 (30 - 300)</td>
</tr>
</tbody>
</table>

• PE : BP 150/90 confirmed on 3 separate readings

CKD + Diabetes + Microalbuminuria
Case Presentation

• What treatment other than lifestyle modification do you offer him?
  • A) Based on JNC 7 start a thiazide
  • B) Based on JNC 8 start a thiazide
  • C) Based on JNC 7 start an ACEI or ARB due to CKD + microalbuminuria
  • D) Based on JNC 8 start an ACEI or ARB due to CKD + microalbuminuria
  • E) Based on JNC 7 don’t do anything else
  • F) Based on JNC 8 don’t do anything else
  • G) What is JNC ???

But we would target a blood pressure 130 / 80 as per JNC 7
Go Blue Devils
Elite 8
JNC 7 not 8! Break Time!