OBJECTIVES

- Review recent evidence affecting the diagnosis and management of patients with elevated blood pressure.
- Discuss the therapeutics of various antihypertensive agents used in managing patients with hypertension.
- Compare and contrast BP targets and first-line therapy options from various clinical practice hypertension guidelines (e.g., JNC 8, ADA).

RESOURCES

- 2014 Evidence-based guideline for management of high BP in adults: report from the panel members appointed to the 8th JNC (JNC-8)
  – JAMA 14;311:507-20
- Treatment of Hypertension in Patients With Coronary Artery Disease: AHA/ACC/ASH
  – Circulation. 2015; 131: e435-e470
  – http://circ.ahajournals.org/content/131/19/e435
- 2015 Canadian HTN Education Program

CASE

- 55 y/o male routine f/u visit
- PMH: HTN, type 2 DM, hyperlipidemia,
- SHx: 1 ppd, etoh 1/d
- FHx: Father MI 54 y/o; brother MI 55 y/o
- Meds
  – HCTZ 25 mg/d
  – Metformin 850 mg bid
  – Simvastatin 40 mg/d

EXAM/LAB

- BP 156/86, P 76, RRR
- 5’7”, 128 kg, BMI 44.2
- SCr 0.9, BUN 18, K 3.8, CO2 28.7, FPG 175
- Lipids
  – TC 180; TG 96; HDL 35; LDL 115
- A1C 8%
- AHA/ACC CV risk >30%
- What next?
HYPERTENSION

**Most common modifiable CVD risk factor**
- Contributes to >50% of adverse CVD outcomes
  JAMAD 16:17-571-3 edit.
- Morbidity/mortality correlates with **BP > 115/75**

**BP control**
- Reduces HF 50%; CVA 40%; MI 25%
- Presence of **other CV risk factors**
  - “multiplicative increase in risk for CV events”
  Circulation 15;131:e435-e70

**HTN in US – AHA 2014 Update**
- ~78 million adults (33% of population)
  - By 2030 ~41.4%
- NHANES 2010
  - 81.5% aware
  - 74.9% current treatment
  - 52.5% controlled
  - 47.5% not controlled
  - ~75% have visits at least 2x/y

**Screening for High BP in Adults**
- Office BP monitoring (OBPM)
- Ambulatory BP monitoring (ABPM)
  - Record regular intervals (eg, 20-30 min) over 24-48h
- Home BP measurement (HBPM)
  - Record BP by automated oscillometric devices

**BP Measurement**
- “use of HTN guidelines is inappropriate without accurate and reliable BP readings.”
- “…accurate BP readings & recognizing white-coat and masked hypertension is imperative”
- HBPM and ABPM correlate better with HTN outcomes than OBPM

**High Blood Pressure in Adults: Screening**

<table>
<thead>
<tr>
<th>Recommendation Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
</tr>
<tr>
<td>Adults aged 18 years or older</td>
</tr>
</tbody>
</table>

Screening for High BP in Adults: A Systematic Review for the USPSTF

- OBPM elevated BP best confirmed by ABPM
  - Decreases overdiagnosis of isolated clinical HTN & overtreatment
- “convincing evidence” that ABPM best for confirming elevated OBPM
- “Good-quality evidence” that confirmation of HTN by HBPM may be acceptable
- “USPSTF considers ABPM to be the reference standard for confirming the diagnosis of HTN”

CHOICE OF ANTIHYPERTENSIVE

- Primary prevention of CV complication
  - Lowering BP more important than the choice of drug
- Secondary CV protection with underlying comorbid illnesses (compelling indications)
  - Not all antihypertensives provide the same benefit
  - Assumption is that for the most part there are class effects for thiazides, ACEIs, ARBs
  - Class effects may not occur for ßBs & CCBs

Guidelines for Use of Diuretics: A View From a Member of JNC 7

- Benefit either as 1st- or 2nd-line therapy
- CTD twice as potent as HCTZ
  - CTD longer duration of action
- HCTZ 25-50 mg/d vs. CTD 12.5-25 mg/d
  - Lower doses may have less CV benefit
- HCTZ may have less than 24 h activity
  - BP at end of dosing interval (eg, before next dose)
  - If 24-h control not optimal & HCTZ is continued consider 2xd

HCTZ VS. CHLORTHALIDONE (CTD)

- Thiazide RCTs consistently show:
  - Decreased mortality, CVA, coronary events, CHF, renal failure, and malignant HTN
  - Major studies used CTD
- No randomized head-to-head outcome studies CTD vs. HCTZ
  - Meta-analyses: no difference OR better outcomes with CTD
- USE CTD OR HCTZ?

HCTZ VS. CHLORTHALIDONE

- AHA and ASH recommends Chlorthalidone
  - More potent and longer acting vs. HCTZ
  - “superior potency, longer half-life, & evidence … improved CV outcomes, … diuretic agent of choice” if eGFR is >30 mL/min
- Chlorthalidone is preferred

Thiazide (-Like) Diuretics

<table>
<thead>
<tr>
<th>Drug</th>
<th>Relative potency</th>
<th>Oral bioavailability</th>
<th>T1/2</th>
<th>Ineffective GFR &lt; 30-40</th>
</tr>
</thead>
<tbody>
<tr>
<td>HCTZ</td>
<td>1</td>
<td>~70%</td>
<td>~2.5 h</td>
<td>Yes</td>
</tr>
<tr>
<td>Chlorthalidone</td>
<td>2*</td>
<td>~65%</td>
<td>~47 h</td>
<td>Yes</td>
</tr>
<tr>
<td>Indapamide</td>
<td>20</td>
<td>~93%</td>
<td>~14 h</td>
<td>No</td>
</tr>
<tr>
<td>Metolazone</td>
<td>10</td>
<td>~65%</td>
<td>?</td>
<td>No</td>
</tr>
</tbody>
</table>

*Twice as potent in lowering BP on mg-per-mg basis as HCTZ.

Goodman & Gilman’s The Pharmacological Basis of Therapeutics, 12e . 2011
Pharmacotherapy: A Pathophysiologic Approach, 9e. 2014


Circulation 08;117:e510-e26 J Clin Hypertens 14;16:14-26

**Head-to-Head Comparisons of HCTZ With Indapamide & Chlorthalidone**

- Meta-analysis
- INDAP & CTD > lowering SBP
  - -5 to -3.6 vs. HCTZ; P=0.004 & P=0.052
- No differences in metabolic effects
- HCTZ < 24 h duration & < nighttime BP control
- “these results support the view that CTD and INDAP are preferable to HCTZ for managing hypertension in general”


**RECENT CASE**
- 78 y/o female admitted with feeling “icky” (nausea) for several days. Vomited twice
- PMH: HTN dx 3 wks PTA 163-173/82-85 at 3 office visits; DM; LDL
- Meds
  - Enalapril 10 mg 2xd
  - Metformin 1000 mg 2xd
  - Simvastatin 20 mg/d
  - Oxybutynin 5 mg 2xd
  - ASA 81 mg/d
  - Chlorthalidone 12.5 mg/d for 3 wks

**MAJOR HTN DRUG TRIALS**
- STOP-2: Diuretic + ßB vs ACEI + CCB  NO DIFFERENCE
- ALLHAT: Diuretic vs. ACEI vs. CCB  NO DIFFERENCE
- INVEST: Diuretic + ßB vs CCB + ACEI  NO DIFFERENCE
- ASCOT: Diuretic + ßB vs CCB + ACEI  NO DIFFERENCE
- LIFE: ARB vs ßB  NO DIFFERENCE
- ANBP2: Diuretic vs ACEI  ACEI superior in men
- ACCOMPLISH: ACEI + Diuretic vs ACEI + CCB
  ACEI/CCB superior

NEJM 09;361:878-87

**ßBs AS INITIAL THERAPY IN HTN**
- ßBs less suitable for routine initial therapy, especially elderly
  - < effective at preventing major CV events, especially CVA than CCBs and ACEIs
  - > new onset diabetes
  - Unfavorable effect on the metabolic profile, especially in combination with diuretics
- May not be true for vasodilating ßBs (eg. Carvedilol, Nebivolol, Labetalol)

Cochrane Database Syst Rev. 2012;11:CD002003
JNC 7 – TREATING BP TO GOAL

<table>
<thead>
<tr>
<th>Patient type</th>
<th>JNC 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uncomplicated*</td>
<td>&lt; 140/90</td>
</tr>
<tr>
<td>DM**, CKD</td>
<td>&lt; 130/80</td>
</tr>
</tbody>
</table>

* “there is little evidence to support this recommendation for elderly patients”
Clin Interventions Aging 13;8:1505-17

** Recommendation not based on evidence from randomized, controlled trials.
NEJM 10.362.1628-30. editorial

TREATING BP TO GOAL STUDIES

- African American Study of Kidney Disease and Hypertension (AASK) trial – SBP <140 vs <130
  - No decrease in progression of CKD or mortality
  NEJM 10.363.918-29

- Action to Control Cardiovascular Risk in Diabetes (ACCORD) trial – SBP <140 vs <120
  - No decrease in composite of CV events
  - CVA reduced 0.32% vs. 0.53% (HR 0.59, p=0.01)
  - Serious ADEs 3.3% vs 1.3% (p<0.001)
  NEJM 10.362.1575.85

JNC 8 2014

<table>
<thead>
<tr>
<th>Initiate BP</th>
<th>Goal BP</th>
<th>Initial meds</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥ 60 y</td>
<td>≥ 150/90</td>
<td>&lt; 150/90</td>
</tr>
<tr>
<td>&lt; 60 y</td>
<td>≥ 140/90</td>
<td>&lt; 140/90</td>
</tr>
<tr>
<td>DM, no CKD</td>
<td>≥ 140/90</td>
<td>&lt; 140/90</td>
</tr>
<tr>
<td>CKD, ≥ DM</td>
<td>≥ 140/90</td>
<td>&lt; 140/90</td>
</tr>
</tbody>
</table>

Meds in Presence of Certain Medical Conditions

- CAD/Post MI: BB, ACEI
- Systolic HF: ACEI or ARB, BB, aldosterone blocker, thiazide
- Diastolic HF: ACEI or ARB, BB, thiazide
- DM: ACEI or ARB, thiazide, BB, CCB
- Kidney disease: ACEI or ARB
- Stroke or TIA: Thiazide, ACEI

An effective approach to high blood pressure control: science advisory from AHA/ACC/CDC Hypertension 2014;63:878-85

ANTIHYPERTENSIVES DOSING JNC 8 – STRATEGIES

- Doses to achieve outcomes seen in the RCTs
- Strategy A
  - One drug titrate to max and then add 2nd drug
- Strategy B
  - One drug started and then add 2nd drug before max dose of the initial drug
- Strategy C
  - Start 2 drugs especially for higher BP, eg > 20/10 above goal BP

EXAMPLES OF EVIDENCE-BASED DOSING JNC 8

<table>
<thead>
<tr>
<th>Meds</th>
<th>Initial daily dose (mg)</th>
<th>Target dose (mg)</th>
<th>Doses/d</th>
</tr>
</thead>
<tbody>
<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>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>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>Amlodipine</td>
<td>2.5</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td>Diltiazem XR</td>
<td>120-180</td>
<td>360</td>
<td>1</td>
</tr>
<tr>
<td>HCTZ</td>
<td>12.5-25</td>
<td>25-100</td>
<td>1-2</td>
</tr>
<tr>
<td>Chlorthalidone</td>
<td>12.5</td>
<td>12.5-25</td>
<td>1</td>
</tr>
</tbody>
</table>
Proportion of US Adults Potentially Affected by 2014 HTN Guideline

- Data from NHANES 2005-2010
- Treatment-eligible HTN JNC 7 vs JNC 8
  - 18-59 y – 20.3% vs. 19.2%
  - > 60 y – 68.9% vs. 61.2%
- Met BP goals JNC 7 vs JNC 8
  - 18-59 y – 41.2% vs. 47.5%
  - ≥ 60 y – 40% vs. 65.8%

DM and HTN Goals
ADA Guidelines 2017

- Confirmed office-based BP
  - > 140/90
    - Prompt drug initiation & titration to achieve BP goals (A)
  - >160/100
    - Start 2 drugs demonstrated to reduce CV events in DM (A)
- Therapy
  - ACEI, ARBs, thiazide, DHP CCBs
  - Albuminuria – ACEI or ARB

SBP Intervention Trial (SPRINT)

- Effect of more intensive BP treatment in non DM with much increased risk of CV events
  - SBP < 120 vs. < 140
- Primary outcome CVD composite of 1st occurrence
  - MI, non-MI ACS, CVA, ADHF, or CVD death
- Sponsored by NHLBI; National Institutes of: DM & Digestive & Kidney Diseases, Neurological Disorders & Stroke, and Aging


DM and HTN Goals
ADA Guidelines 2017

- Most SBP target of < 140/90 (A)
  - Lower targets (eg, < 130/80) may be appropriate in some patients (C)
  - High CV risk if can be achieved without undue treatment burden
  - SPRINT did not include DM
- BP >120/80
  - Should be advised on lifestyle changes (B)

DM and HTN Goals
ADA Guidelines 2017

<table>
<thead>
<tr>
<th>YR</th>
<th>Goal BP</th>
<th>GOAL BP ↑AGE</th>
<th>GOAL BP DM, CKD</th>
</tr>
</thead>
<tbody>
<tr>
<td>JNC 7</td>
<td>2003</td>
<td>&lt;140/90</td>
<td>&lt;140/90</td>
</tr>
<tr>
<td>JNC 8</td>
<td>2014</td>
<td>&lt;140/90</td>
<td>≥60 y &lt;150/90</td>
</tr>
<tr>
<td>ACC/AHA</td>
<td>2015</td>
<td>&lt;140/90</td>
<td>CAD ≤ 80y &lt;140/90; &gt;80y &lt;150/90</td>
</tr>
<tr>
<td>ASH/ISH</td>
<td>2014</td>
<td>&lt;140/90</td>
<td>&lt;80 y SBP &lt;140; ≥ 80 y SBP &lt;150</td>
</tr>
<tr>
<td>ADA</td>
<td>2017</td>
<td>&lt;140/90</td>
<td></td>
</tr>
</tbody>
</table>
**INCLUSION/EXCLUSION CRITERIA**

**INCLUSION**
- ≥ 50 y
- SBP 130-180 (treated or untreated)
- ≥ 1 additional CVD risk
  - Clinical or subclinical CVD (excluding CVA)
  - CKD (eGFR 20-<60)
  - Framingham Score 10-y CVD risk ≥ 15%
  - ≥ 75 y

**EXCLUSION**
- CVA
- DM
- Polycystic kidney disease
- HF (s/s or EF < 35%)
- Proteinuria ≥1 g/d
- CKD with eGFR < 20
- Adherence concerns

**SPRINT ANTIHYPERTENSIVES**

- Used regimens that have been shown to confer strong CV benefits from previous RCTs
- Preferred regimens
  - A thiazide-type diuretic, CCB, ACEI and ARB
  - > 50% of intensive group on these agents
  - The preference for the order of use left to investigators

**RECOMMENDATIONS FOR DRUG SELECTION**

- CTD 12.5-25 mg/d was diuretic of choice
  - More potent and longer-acting than HCTZ
- Amlodipine CCB of choice
- ACEI (& other RAAS inhibitors)
  - < effective lowering BP & preventing CVD in African Americans unless combined with thiazide-type diuretic or CCB

**RECOMMENDATIONS FOR DRUG SELECTION**

- Loop diuretic may be needed in CKD with eGFR <30
- Combination of ACEI, ARB, and renin inhibitor is discouraged.
- βBs
  - Now considered to be < effective in preventing CVD events as primary treatment of hypertension
  - May be indicated for HTN in some patients
    - eg, Post MI, HF, AF

**Summary and Conclusions**

- BP response in study – baseline 139.7/78
  - Intensive 121.4/68.7 vs. standard 136.2/76.3
  - Intensive 2.8 meds vs standard 1.8 meds
- Trial stopped early (9/11/15) after median of 3.26 y
  - Composite of CVD events RRR 25%
    - ≥ 75y RRR 33%
    - 50-75y RRR 20%
  - All-cause mortality RRR 27% (p=0.005)
    - CV mortality RRR 43% (p=0.002)
  NEJM 15;373:2103-16

**Summary and Conclusions**

- No difference in serious adverse events
- More common (0.6-1% more) in Intensive Group
  - Hypotension, syncope, electrolyte abnormalities, and hospital discharge reports of AKI
- CKD
  - At baseline, no differences in renal outcomes
  - Without at baseline eGFR reduction ≥ 30% more common
- Benefits exceeded potential for harm
  NEJM 15;373:2103-16
Generalizability of SPRINT Results to the U.S. Adult Population

- Population-based study from NHANES 2007-12 using SPRINT study inclusion/exclusion criteria
- Meeting eligibility criteria
  - All US adults 219.4 M
  - 7.6% (16.8 M) US adults
  - 16.7% (8.2 M) treated for HTN (1 in 6 patients)
  - 25.5 M at increased CV risk

JACC 16;67:463-72

SPRINT To Whom Do the Results Apply?

- Key question is with SBP 130-139
  - Should therapy be intensified to further ↓ BP?
  - Most studies show that within this range there are the lowest CV events (except CVA) vs. above or below
  - Also show a J-shaped curve in those with CAD
- SPRINT used a unique study population excluding those with DM, CVA & drug-resistant HTN

Gradman AH. Edit. JACC 16;67:473-5

SPRINT Generalizability of SPRINT Results to the U.S. Adult Population

- Usually SBP > 140 used to guide when to start antihypertensives or intensify therapy
- SPRINT trial showed benefit for SBP < 120 in those without DM or CVA
- ~16.8 M may be eligible for starting or notifying antihypertensive therapy
- Additional data needed to quantify the medical & economic implications of this goal across the population

JACC 16;67:463-72

SPRINT To Whom Do the Results Apply?

- Cannot be applied to every eligible patient
  - May belong to subgroup with a small contribution to the overall results
  - A study just with subgroup may see different results
- “residual uncertainty regarding optimal BP targets … not prudent to radically alter treatment [if] achieved SBP levels considered optimal on the basis of prior evidence.”
- “I favor the addition of 1 (only) additional agent … without further pursuit of SBP<120”

Gradman AH. Edit. JACC 16;67:473-5

SPRINT To Whom Do the Results Apply?

- Some untreated SBP 130-139 could be treated
  - CKD, CAD, LVH, and/or HF
  - Some of these conditions should be treated with drugs such as ACEI, ßBs, etc regardless of BP
  - compelling indications

Gradman AH. Edit. JACC 16;67:473-5

SPRINT To Whom Do the Results Apply?

- Small number of untreated patients the SPRINT results “are also insufficient to mandate drug treatment … SBP 130-139 and a high Framingham risk score”
- Many treat BP to 130-139 in high-risk patients on the basis of epidemiologic evidence of increased risk

Gradman AH. Edit. JACC 16;67:473-5
**SPRINT**

**To Whom Do the Results Apply?**

- “The SPRINT findings are consistent with this practice, and treatment is a reasonable option.
- “There is presently no justification for extending the findings of SPRINT to encompass the >25 million Americans >50 years of age with SBP >120 mm Hg and increased CV risk”

Gradman AH. Ed. JACC 16;67:473-5

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**SPRINT RAMIFICATIONS**

- High CV risk patients will have greatest benefit
  - SBP target < 120 is appropriate if > 50 y & at high risk for CV events if there are low side effects
- What about the low CV risk patients?
- “The results of SPRINT should be carefully weighed in the context of current guidelines”

Med Clin N Am 16;100:665-93

---

**BP Lowering in Intermediate-Risk Persons without CVD. HOPE-3**

- RCT 12,705 men > 55 and women > 65
  - ~ 38% had HTN
  - ≥ 1 CV risk factor: increased waist-to-hip ratio; low HDL; current or recent tobacco, dysglycemia, FHx premature coronary disease; mild renal dysfunction
    - Women ≥ 60 y who had ≥ 2 risk factors
  - Exclusion: known CVD; indications or contraindications to trial drugs; ≥ moderate CKD; symptomatic hypotension

Sponsored by AstraZeneca & Canadian Institutes of Health Research
Published on April 2, 2016, at NEJM.org. DOI: 10.1056/NEJMoa1600175

---

**BP Lowering in Intermediate-Risk Persons without CVD. HOPE-3**

- Candesartan 16 mg/d + HCTZ 12.5 mg/d vs placebo for a median of 5.6 y
  - Also evaluated rosuvastatin 10 mg/d alone & candesartan/HCTZ + rosuvastatin
- Co primary outcomes
  - Composite of death from CV, nonfatal MI or CVA
  - Additionally included resuscitated cardiac arrest, HF and revascularization

---

**BP Lowering in Intermediate-Risk Persons without CVD. HOPE-3**

- About ~ 38% had HTN at enrollment
  - ~22% taking BP agents other than ACEIs, ARBs or thiazides
- BP response
  - Baseline 138.1/81.9
  - Active decreased 5.7 vs. placebo 2.7
    - ACCORD and SPRINT > decrease in BP
- No difference in coprimary outcomes

---

**HOPE-3 SBP SUBGROUPS**

- The greater the baseline SBP may see reduced CV risk with small decreases in BP
- SBP > 143.5 subgroup
  - ~25% decrease in primary outcomes
- SBP 131.6-143.5
  - No benefit in either outcomes (HR ~1.05)
- SBP ≤ 131.5
  - Trend to harm (HR 1.16 1st coprimary to 1.25 2nd coprimary)
BP Lowering in Intermediate-Risk Persons without CVD. HOPE-3
• Evaluated fixed-dose combination of an ARB and a thiazide
  – Relatively low doses
  – Persons at intermediate risk who did not have CVD
  – Very few had DM or CKD & ~20% had been on antihypertensives
• No significant benefit of BP-lowering
  – The higher SBP subgroups therapy reduced the risk of CV events

Published on April 2, 2016, at NEJM.org. DOI: 10.1056/NEJMoa1600175

Effects of intensive BP lowering on CV & renal outcomes
• Updated systematic review and meta-analysis
  – 19 trials with 44,989 participants
• Intensive lowering 133/76 vs less intense 140/81
• Benefits
  – Major CV events RRR 14% (p=0.005)
  – MI RRR 13% (p=0.042)
  – CVA RRR 22% (p=0.001)
  – Albuminuria RRR 10%
  – Retinopathy progression RRR 19%

Lancet 16;387:435-43

Effects of intensive BP lowering on CV & renal outcomes
• No clear benefits
  – HF, CV death, total mortality, ESRD, CV death
• Additional lowering of BP had benefit even in SBPs < 140
• Most benefits in trials in patients with vascular disease, CKD or DM
• Severe hypotension more frequent RR 2.68 (0.3% vs 0.1%) p=0.015

Lancet 16;387:435-43

Redefining BP Targets – SPRINT Starts the Marathon
• Currently difficult to determine who benefits from BP lowering or from specific target
• SPRINT supports drug decisions based on absolute risk levels
  – Similar to current the lipid lowering guideline
• Those at high CV risk
  – SPB < 120 is appropriate

Perkovic V & Rodgers A. Eds. NEJM 15;372:2175-8

BP Lowering for Prevention of CVD and Death: Review & Meta-analysis
• 123 studies with 613,815
• Every SBP decrease by 10 reduced
  – Major CV events by 20%
  – CHD 17%
  – CVA 27%
  – HF 28%
  – All-cause mortality 13%
• Benefit was not reduced if SBP <130

Lancet 16;387:957-67
BP Lowering for Prevention of CVD and Death: Review & Meta-analysis

- Benefit not reduced even if baseline SBP < 130 in CV high risk – no J curve??
- Larger benefit in those at high absolute CV risk
- Lack of benefit for renal failure
- Drug classes were mostly similar
  - ßB inferior: CV events, CVA, renal failure, trend for all-cause mortality
  - CCBs: superior for CVA; inferior for HF
  - Diuretics: superior for HF

IMPLICATIONS

- Demonstrates that BP lowering results in proportional reductions in risk of CVD and death to a mean baseline SBP < 130
- BP lowering to < JNC 8 target (<140) decreases CVD risk
- No evidence a BP lowering threshold for reducing CVD risk
  - Individualize BP decrease for potential net benefit
  - Do not reduce BP as a treatment of a risk factor to a specific target

IMPLICATIONS

- Findings are consistent with or without prior CVD
  - May simplify guidelines for use of BP drugs
- Differences between classes of agents
  - Use targeted drugs for individuals at high risk of specific outcomes – eg, specific indications
    - eg, CCBs is high risk of CVA

IS THERE EVIDENCE TO:

Redefining BP Targets – SPRINT Starts the Marathon

- “Current guidelines and guideline processes require revision.”
- “SPRINT redefines BP target goals & challenges us to improve BP management. Success will require a marathon effort.”

GOAL BP IN ≥ 60 YEARS JNC 8

- Goal < 150/90 reduces CVA, HF, CHD
  - Good evidence from RCTs
- SBP < 140
  - No additional benefit vs. SBP 140-160 or 140-149 in this age
- Panel did not all agree
  - Some wanted to continue SBP < 140 as goal based on expert opinion
**SPRINT**
To Whom Do the Results Apply?

- “little evidence, however, to support routine antihypertensive therapy in adults > 75 w SBP >130”
  - “SPRINT results are consistent with the possibility of significant benefit, they must be considered preliminary and insufficient to mandate universal drug therapy”
  - Treatment is an acceptable option
  - Need more clinical trials in elderly


---

**GOAL BP IN ≥ 60 y/o**

- “Older persons are currently being undertreated for hypertension.”
- JNC 8 ramifications
  - 6 million no longer eligible for therapy
  - Treatment intensity reduced for 13.5 million
    - Increased CV events?

Aronwo WS. Edit. JAMAD 16:17:571-3

---

**Optimal SBP Goal Be in Treating Older Persons with HTN?**

- “… SPRINT data, which included frail older persons, I recommend reducing the SBP in the elderly at increased CV risk to < 120 or to < 130 depending on clinical judgment for each individual person.”
- Intensive monitoring if < 120:
  - Hypotension, syncope, electrolytes, AKI
  - Increases cost of care


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**ANTIHYPERTENSIVE ADHERENCE**

- Newly diagnosed HTN
  - >40% d/c 1st-line antihypertives within 1 y
  - ~ 20% continue
  - ~ 22% combine
  - ~ 18% switch

Hypertens 05:23:2093-100
- “What hope is there for us to convince patients with mild hypertension to take 3 … drugs for the duration of their lifetime to achieve lower SBP targets?”

Lobo MD. Editorial JACC 16:67:1372-4

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**SUMMARY BENEFITS OF TREATING HYPERTENSION**

“Reducing chronically increased blood pressure using medications clearly reduces the incidence of coronary artery disease, stroke, congestive heart failure, and chronic kidney disease”

Med Clin N Am 16:100:665-93

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**GUIDELINES**

- Provide a population-based minimum standard
  - Useful in treating most patients
- Should not be substitute for good clinical judgment
- Being linked to performance measures and clinicians may become less likely to deviate from guidelines
- Individual patients and unique circumstances may mean guideline exceptions