Blood Pressure Targets in Older Adults with Kidney Disease

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Conflict of Interest Disclosure

Disclosure

I do not have any relationship(s) to disclose.
Treatment of hypertension improves cardiovascular outcomes

VA Cooperative Studies, JAMA, 1967 & 1970
Aus-BP, Lancet, 1980
MRC, BMJ, 1985

Mean Age 51
Mean Age 50.5
Mean Age 50-52

In adults, some blood pressure control is better than none to decrease cardiovascular events & death.
Dr. A
An 83 yo retired physician, referred by his primary care provider for recommendations on hypertension management.

PMH:
Hypertension
Diet-controlled DM
PUD
Edema (multifactorial)
BPH
Gout

188/66 → 169/72
HR 62

Medications:
Amlodipine 2.5 mg/d
Atenolol 50 mg bid
Lasix 20 mg daily
Tamsulosin 0.4 mg/d

My systolic blood pressure is almost exactly 100 + my age. I feel good about it where it is now.

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)

Recommendation 1
In the general population aged 60 years or older, initiate pharmacologic treatment to lower BP at systolic blood pressure (SBP) of 150 mm Hg or higher or diastolic blood pressure (DBP) of 90 mm Hg or higher and treat to a goal SBP lower than 150 mm Hg and goal DBP lower than 90 mm Hg.

Strong Recommendation – Grade A

New blood-pressure guidelines raise concern among heart-health groups
Lower BP target <140

- VALISH (2004, n=3,260)
- JATOS (2008, n=4,418)
- Cardio-sis (2008, n=1,111)

Lower BP target <150

- SHEP (1991, n=4,736)
- Syst-Eur (1997, n=4,695)
- HYVET (2008, n=3,845)

In adults, some blood pressure control is better than none to decrease cardiovascular events & death.

In older adults, SBP <150 can reduce the risk of stroke, can potentially reduce the risk of death and cardiovascular outcomes.
Dear Dr. Weiss,

I had labs done last week, and I learned that I have chronic kidney disease. Does this affect what my blood pressure should be?

Thank you,
Dr. A
What is the “right” blood pressure for older adults with kidney disease?

Recommendation 4
In the population aged 18 years or older with CKD, initiate pharmacologic treatment to lower BP at SBP of 140 mm Hg or higher or DBP of 90 mm Hg or higher and treat to goal SBP of lower than 140 mm Hg and goal DBP lower than 90 mm Hg.

*Expert Opinion - Grade E*

When weighing the risks and benefits of a lower BP goal for people aged 70 years or older with estimated GFR less than 60 mL/min/1.73m², antihypertensive treatment should be individualized, taking into consideration factors such as frailty, comorbidities, and albuminuria.
Lower BP target <140

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- JATOS (2008, n= 4,418)
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<table>
<thead>
<tr>
<th>Trial</th>
<th>Mean age</th>
<th>BP goals/treatment groups</th>
<th>Achieved BP</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-CKD population</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shulman 1989 (MDRD) N=10,940</td>
<td>50.8</td>
<td>DBP &lt;90 vs usual</td>
<td>NR</td>
<td>-- Faster rate in creatinine rise reported in those with higher BPs.</td>
</tr>
<tr>
<td>Walker 1992 (MRFIT) N=5,524</td>
<td>46.5</td>
<td>DBP &lt;95 vs usual</td>
<td>&lt;140 vs 150-159</td>
<td>-- Rate in renal function decline was faster for those with higher vs lower BPs.</td>
</tr>
<tr>
<td>Non-DM CKD population</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Klahr 1994 (MDRD) N=840</td>
<td>52</td>
<td>&lt;125/75 vs &lt;140/90</td>
<td>MAP 92 vs ~98</td>
<td>-- Lower BP significantly slowed GFR decline ONLY in those with proteinuria &gt;1 gm/d</td>
</tr>
<tr>
<td>Wright 2002 (AASK) N=1,094</td>
<td>54</td>
<td>MAP ≤92 vs MAP 102-107</td>
<td>BP 128/78 vs 141/85</td>
<td>-- NSD in GFR slope or composite of GFR decline/ESRD/death based on BP alone.</td>
</tr>
<tr>
<td>Ruggenenti 2005 (REIN-2) N=338</td>
<td>53-54</td>
<td>&lt;130/80 vs DBP &lt;90</td>
<td>130/80 vs 134/82</td>
<td>-- NSD ESRD, change in eGFR (stopped due to futility)</td>
</tr>
</tbody>
</table>
In adults, some blood pressure control is better than none to decrease cardiovascular events & death.

In older adults, SBP <150 can reduce the risk of stroke, can potentially reduce the risk of death and cardiovascular outcomes.

In adults ages ≤70, some BP control is better than none to slow CKD progression.

In adults ages ≤70 who have non-nephrotic CKD, SBP <125 was not better than SBP <140, in slowing renal disease progression.

In adults, some blood pressure control is better than none to decrease cardiovascular events & death.
Trials of blood pressure control in adults with mean age >60 in trial population

**Creatinine >1.5-1.9**  
ACCORD (1.5; eGFR 39 men, 29 women)  
BENEDICT (1.5; eGFR 46 men, 34 women)  
HYVET (1.7; eGFR 39 men, 29 women)  
JATOS (1.5; eGFR 44 men, 33 women)  
SCOPE women (1.6; eGFR 30)

**Creatinine >2-2.4**  
SCOPE men (2; eGFR 32)  
Cardio-Sis (2; eGFR 33 men, 24 women)  
FEVER (2; eGFR 32 men, 24 women)  
SYST-EUR (2; eGFR 33 men, 24 women)  
VALISH (2; eGFR 32 men, 24 women)

**Creatinine >2.5-2.9**  
EWPHE (2.5; eGFR 25 men, 19 women)  
SPRINT women (eGFR <20 women)

**Creatinine >3**  
RENAAL (eGFR 21 men, 16 women)  
SPRINT men (eGFR <20 men)

**Creatinine ≥3**

**More specific renal function exclusion**

SHEP, STONE, TRANSCEND

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**Figure 1.** Multivariable-adjusted relative hazards (hazard ratios [95% CI]) of all-cause mortality associated with SBP and DBP relative to a hypothetical patient with the mean time-varying SBP (133 mm Hg) and DBP (71 mm Hg).

Kovesdy et al, Annals IM, Aug 2013  
Weiss et al, CJASN, Sept 2015
SPRINT study group, NEJM, November 2015
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In older adults, SBP <150 can reduce the risk of stroke, can potentially reduce the risk of death and cardiovascular outcomes.

In adults ages ≤70, some BP control is better than none to slow CKD progression.

Observational data show a U-shaped relationship between SBP & death in older adults with CKD. For older adults with CKD/CV risk factors and no DM, SBP ≤120 may decrease risk of death and CV events.

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In adults, some blood pressure control is better than none to decrease cardiovascular events & death.
Creatinine: 1.5 mg/dL
eGFR: 45 ml/min/1.73m²
Urine prot/creat ratio: 0.15 mg/mg

**Patient instructions**

1. No change to your medications for now

2. Check blood pressure 2-3 times a week. Call if upper number is above 150 or below 110

3. Call if feeling excessively fatigued, dizzy, or light-headed.

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**TELEPHONE MESSAGE**

Date ........................  Time Received  ............... am/pm
from .................................................................

Patient calling because he got gastroenteritis from his great-grandson, and he's feeling really lousy. He stopped having vomiting and diarrhea 2 days ago, but is still really weak and tired. His blood pressure this morning was 112/50.

He also wants to update you that he was in an outside hospital a month ago with chest pain (ended up being heartburn), but they added Lisinopril 10 mg daily to his regimen. They told him he needs it because of his kidneys. **He would appreciate a call back.**

Received by ............................................
Are some blood pressure medications better than others for older adults with chronic kidney disease?

**Recommendation 8**
In the 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. *Moderate Recommendation – Grade B*

4.3: We suggest that an ARB or ACE-I be used in adults with diabetes and CKD ND with urine albumin excretion of 30 to 300 mg per 24 hours (or equivalent*). *(2D)*

3.4: We suggest that an ARB or ACE-I be used in non-diabetic adults with CKD ND and urine albumin excretion of 30 to 300 mg per 24 hours (or equivalent*) in whom treatment with BP-lowering drugs is indicated. *(2D)*

Ortiz et al, JAMA, 2013
In adults ages ≤70 who have CKD, SBP <125 was not better than SBP <140, in slowing renal disease progression.

In adults ages ≤70, some BP control is better than none to slow CKD progression.

In older adults, SBP <150 can reduce the risk of stroke, can potentially reduce the risk of death and cardiovascular outcomes

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Data for Ace-I/ARB use in adults with CKD is primarily from studies of relatively younger patients with significant proteinuria

Observational data show a u-shaped relationship between SBP & death in older adults with CKD. For older adults with CV risk factors and no DM, SBP <120 may decrease r/o death and CV events.

In adults, some blood pressure control is better than none to decrease cardiovascular events & death.

Mean age 45
Mean age 58
Mean age 54

Mean age 59

Marin et al, J HTN, 2001
Esnault et al, Clin Ther, 2008
Berl et al, JASN, 2005
Wright et al, JAMA, 2002

Mean age 45
Mean age 58
Mean age 54

Mean age 59
eGFR: 45 ml/min/1.73m²
Urine prot/creat ratio: 0.15 mg/mg

Now in clinic, BP 106/49, HR 67
Creatinine 3.2 (eGFR 19 ml/min/1.73m²)
BUN 58
Potassium 5.7
CO2 21
Na 135

Medications:
Metoprolol 25 mg bid
Lasix 20 mg/d
Lisinopril 10 mg/d
Amlodipine 7.5 mg/d

Mrs. A

83 yo woman, wife of Dr. A, recently broke her hip in a ground level fall and is in a SNF for rehabilitation.

PMH:
Moderate dementia
Heart failure
CKD IIIa
Hypertension
Osteoarthritis

198/63, HR 67

What should her blood pressure be?
ACCORD, ADVANCE, RENAAL, TRANSCEND

CARDIO-SIS, EWPHE, HOT, JATOS, SHEP, SPRINT, STONE

ACCORD, HYVET, SPRINT

ACCORD BENEDICT EWPHE HOT JATOS RENAAL SCOPE SPRINT STONE TRANSCEND VALISH

ONLY DM

NO DM

NO SNF NEEDS

NO DENTIA

NO HF

HYVET, SCOPE, SHEP, SPRINT, SYST-EUR

?
11/8/2016

Guiding Principles for the Care of Older Adults with Multimorbidity, JAGS, 2012

*What is the patient’s primary concern?*

- Conduct a complete review or focus on a specific aspect of care
- What are current medical conditions and interventions, and *is the patient comfortable with/adherent to the plan?*
- What are the *patient’s preferences?*
  - Consider the patient’s *prognosis*
- Consider interactions within and among treatments and conditions
- Weigh the *benefits and harms* of the plan
- Communicate and decide for or against the current or suggested intervention/plan.
- Reassess at intervals for benefit, feasibility, adherence, alignment, with preferences.
<table>
<thead>
<tr>
<th>Drug category</th>
<th>Concern</th>
<th>Recommendation</th>
<th>Quality/Strength of evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alpha blockers (Doxazosin, Prazosin, Terazosin)</td>
<td>High risk of orthostatic hypotension</td>
<td>Avoid</td>
<td>Moderate/Strong</td>
</tr>
<tr>
<td>Alpha Agonists, central acting (Clonidine, Methyldopa, Reserpine, Guanabenz, Guanfacine)</td>
<td>High risk of adverse CNS effects, Risk of bradycardia, Risk of orthostatic hypotension</td>
<td>Avoid clonidine as first line, Avoid others overall</td>
<td>Low/Strong</td>
</tr>
<tr>
<td>Spironolactone &gt;25 mg/d</td>
<td>In heart failure, risk of hyperkalemia is greater in older adults, Risk exacerbated in the setting of concurrent NSAIDS, RAAS blockade, or potassium supplementation.</td>
<td>Avoid in heart failure or significant renal dysfunction (CrCl &lt;30 ml/min)</td>
<td>Moderate/Strong</td>
</tr>
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</table>

Journal of the American Geriatrics Society, 2012
Mrs. A

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**PMH:**
- Moderate dementia
- Heart failure
- CKD IIIa
- Hypertension
- Osteoarthritis

**Medications:**
- Toprol XL 25 mg daily
- Nifedipine ER 60 mg qam

**MORE INFORMATION**

<table>
<thead>
<tr>
<th>Day</th>
<th>AM HR/PP</th>
<th>PM HR/PP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sat</td>
<td>198/63, HR 65</td>
<td>129/49, HR 60</td>
</tr>
<tr>
<td>Sun</td>
<td>185/72, HR 62</td>
<td>127/50, HR 53</td>
</tr>
<tr>
<td>Mon</td>
<td>181/66, HR 70</td>
<td>131/53, HR 61</td>
</tr>
<tr>
<td>Tues</td>
<td>165/60, HR 70</td>
<td>125/46, HR 75</td>
</tr>
<tr>
<td>Wed</td>
<td>190/73, HR 68</td>
<td>133/51, HR 55</td>
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Consider the individual.

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Thank you

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