Hypertension in the elderly

New blood pressure targets and prescribing tips

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Bruce M. is an 82-year-old patient with moderate dementia (Mini-Mental State Examination score of 12), recently admitted to long-term care following surgery for a hip fracture 6 weeks ago. Other relevant medical history includes coronary artery disease (myocardial infarction [MI] 10 years ago treated with angioplasty and stent), long-standing hypertension, stage 3 chronic kidney disease (estimated glomerular filtration rate of 40 mL/min), and benign prostatic hypertrophy. Medications include 10 mg of ramipril daily, 25 mg of hydrochlorothiazide daily, 50 mg of metoprolol twice daily, 10 mg of rosuvastatin daily, 81 mg of acetylsalicylic acid daily, 0.4 mg of controlled-release tamsulosin daily, 70 mg and 5600 IU of alendronate–vitamin D weekly, and 1000 mg of acetaminophen 3 times daily. The bisphosphonate–vitamin D pill and acetaminophen are the only new medications since his hip fracture.

The nursing staff report that Bruce appears to be light-headed and unsteady when he stands up to move with his walker. They are concerned that he will fall. Clinical data from the past week show blood pressure (BP) readings ranging from 130/84 to 118/60 mm Hg and a regular pulse of 54 to 70 beats/min. Apart from cognitive impairment and evidence of recent hip surgery, findings of his clinical examination are unremarkable, with no signs of heart failure and only a 5–mm Hg postural BP drop.

As the family physician providing ongoing care to Bruce, would you consider any changes in his medical management?

Bringing evidence to practice

Blood pressure targets in the elderly

- Recent changes in the recommendations for BP targets in older adults have been the subject of considerable discussion. Variation among guidelines has resulted from evidence that aggressive BP lowering in older adults might lack benefit while increasing adverse event risk (**Table 1**).[1-3] The Canadian Hypertension Education Program has proposed a revision of the recommendation for those older than 80 years of age with isolated systolic hypertension:

> In the very elderly (age 80 years and older), who do not have diabetes or target organ damage, the [systolic BP] threshold for initiating drug therapy is ≥160 mm Hg and the BP target is <150 mm Hg (Grade C).[4]

- One trial (Hypertension in the Very Elderly Trial) has looked specifically at those aged 80 and older (**Table 2**).[5] Although guidelines differ somewhat, BP targets are more aggressive for those with diabetes (**Table 3**).[4-9] Individualize BP targets in older adults based on their frailty, comorbidities, life expectancy, and tolerability to medications.
- Diastolic BP is also important. Recent guidelines caution against lowering diastolic BP to below 60 or 65 mm Hg when isolated systolic hypertension and established coronary artery disease are present, owing to concerns about myocardial ischemia.[4,10] Diastolic BP below 65 mm Hg has been associated with an increased risk of stroke and cardiovascular events.[11]

Pharmacotherapy considerations for hypertension in the elderly

- β-Blockers are not necessarily indicated indefinitely following MI.[12] Evidence is lacking to support use of β-blockers for more than 3 years after MI, unless there are other compelling indications (eg, heart failure, stable angina, atrial fibrillation).[13] They are a less effective antihypertensive option in older adults. If a decision is made to discontinue a β-blocker, it is important to taper the dose gradually, by 25% to 50% every 1 to 2 weeks, to minimize withdrawal symptoms (eg, reflex tachycardia, angina, anxiety, and general malaise).
- When combined with an angiotensin-converting enzyme inhibitor (ACEI) or angiotensin receptor blocker (ARB), thiazide diuretics are often synergistic and lower doses are often effective.[14] Many combination products (ACEI or ARB combined with thiazide diuretics) are available to lessen the pill burden for those who are stable on such 2-drug regimens.
- Thiazide diuretics might lose their effectiveness in those with impaired renal function (creatinine clearance <30 mL/min). Use in combination with furosemide is effective in those with a greater degree of chronic kidney disease.
- Better trial evidence for benefit of thiazide diuretics has been shown with chlorthalidone and indapamide as opposed to hydrochlorothiazide.[5,11,15] Chlorthalidone is

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Table 1. Hypertension treat-to-target randomized controlled trials (mean age > 70 y)

TRIAL	POPULATION STUDIED	AGE RANGE (MEAN), Y	TARGET SBP, MM HG	ACHIEVED MEAN BP, MM HG	PRIMARY OUTCOME AND COMMENTS
JATOS[1] (N = 2418)	Japanese patients with SBP ≥ 160 mm Hg	65-85 (74)	Treatment: < 140 Control: 140-159	136/75 vs 146/78	• No benefit on primary composite outcome of CV events or renal dysfunction after 2-y follow-up • Used a long-acting CCB (efonidipine) as base of therapy
VALISH[2] (N = 3260)	Japanese patients with ISH (SBP 160-199 mm Hg)	70-84 (76)	Treatment: < 140 Control: 140-149	137/75 vs 142/77	• No benefit on primary composite outcome of CV events or renal dysfunction after 3.1-y follow-up • Used an ARB (valsartan) as base of therapy
ACCORD-BP[3] (N = 4733)	Patients with T2DM with high risk of CV disease	40-79 (62)	Treatment: < 120 Control: < 140	119.3 vs 133.5	• No difference in primary outcome of CV events after 4.7-y follow-up • Some decrease in stroke, but increase in adverse events • Trial was randomized and controlled but not blinded

ACCORD-BP—Action to Control Cardiovascular Risk in Diabetes–Blood Pressure, ARB—angiotensin receptor blocker, BP—blood pressure, CCB—calcium channel blocker, CV—cardiovascular, ISH—isolated systolic hypertension, JATOS—Japanese trial to assess optimal systolic blood pressure in elderly hypertensive patients, SBP—systolic blood pressure, T2DM—type 2 diabetes mellitus, VALISH—Valsartan in Elderly Isolated Systolic Hypertension.

about 1.5 to 2 times more potent at the same dose (in milligrams) as hydrochlorothiazide. Some would consider a switch to chlorthalidone; however, the availability of only a single scored 50-mg strength tablet is inconvenient if the lower 12.5-mg dose is needed.

- Ramipril is often given at 10 mg daily as a result of the HOPE (Heart Outcomes Prevention Evaluation) trial.[16] The HOPE trial compared 10 mg of ramipril daily at bedtime with placebo in a population at high cardiovascular risk (average age 55). This higher dose might be preferred if there is another compelling indication (eg, heart failure). However, a lower dose is more suitable for those experiencing falls, dizziness, or other possible adverse events.
- Thiazides, ACEIs, ARBs, and calcium channel blockers are all reasonable options for older adults. All of these, and especially diuretics, can cause orthostatic hypotension. Caution is required with calcium channel blockers, as pedal edema is a common complaint, often unnecessarily treated with furosemide, leading to a "prescribing cascade."
- α-Blockers (also used for benign prostatic hypertrophy) might be particularly problematic in causing orthostatic hypotension.[17,18] (See the RxFiles Q&A on Orthostatic Hypotension available from **CFPlus.***)[18]

*The RxFiles Q&A on Orthostatic Hypotension is available at **www.cfp.ca**. Go to the full text of the article online and click on **CFPlus** in the menu at the top right-hand side of the page.

Nonhypertension-related options for those with recent history or risk of falls and fractures

- Assess for and consider the deprescribing of other possible medications that can increase fall risk (eg, antipsychotics, sedatives, benign prostatic hypertrophy treatment, antihyperglycemics).[19] Both the Beers and STOPP (Screening Tool of Older Persons' Potentially Inappropriate Prescriptions) screening criteria are useful in identifying potentially problematic medications in the elderly.[20,21]
- Implement nondrug measures to decrease the risk of falling (eg, removing area rugs, keeping walking area free of obstacles, ensuring adequate lighting, providing assistive devices for walking and transferring).
- Ensure adequate vitamin D supplementation (eg, 800 to 2000 IU daily).[22]
- Ensure adequate total calcium intake (1200 mg elemental calcium daily) from diet and supplements.[22]
- Consider the role of a bisphosphonate for fracture prevention in high-risk individuals.[22]
- Consider if hip protectors might be indicated to reduce fracture risk.[23,24]

Back to our case

Metoprolol was tapered from 50 mg twice daily to 25 mg twice daily for 2 weeks, with plans for a further reduction to 12.5 mg twice daily after an additional 2 weeks. Bruce was monitored for any symptoms of withdrawal such as reflex tachycardia or angina.

Table 2. Hypertension trials in the very elderly (age ≥ 80 y)

TRIAL	POPULATION STUDIED	AGE, Y	TREATMENT (TARGET BP 150/80 MM HG)	ACHIEVED MEAN BP, MM HG	PRIMARY OUTCOME, AND COMMENTS
HYVET[5] (N = 3845)	Healthy elderly patients with SBP 160-199 mm Hg	≥ 80 (mean 84)	Treatment: Indapamide with or without perindopril Control: Placebo (unless SBP was ≥ 220 mm Hg or DBP ≥ 110 mm Hg)	144/78 vs 159/84 mm Hg	• No benefit on primary composite outcome of fatal or nonfatal stroke after 1.8 y follow-up (trial stopped early for decreased mortality) • Decrease all-cause death (10.1% vs 12.3%; NNT = 46) and fatal stroke in treatment group at second interim analysis; trial stopped early • Trial technically studied indapamide with or without perindopril and was not a "treat-to-target trial"; however, does provide some reference point for a BP target of < 150/80 mm Hg as beneficial and safely achievable in a very elderly, relatively healthy population

BP—blood pressure, DBP—diastolic blood pressure, HYVET—Hypertension in the Very Elderly Trial, NNT—number needed to treat, SBP—systolic blood pressure.

Table 3. Comparison of guidelines for BP targets: *BP targets in older adults should be individualized based on a person's frailty, comorbid conditions, and tolerability of the medications and adverse effects. The optimal target for BP remains undetermined. Benefits of treatment including reduction in heart failure and death from stroke or any cause in people > 80 y (mean 84 y) have been demonstrated with a target SBP < 150 mm Hg.[5]*

GUIDELINE	SBP TARGET, MM HG	DBP TARGET, MM HG
< 80 y	Threshold to treat (without target organ damage or associated conditions): ≥ 160	Threshold to treat: ≥ 100
• 2014 CHEP guidelines[4]	Target: < 140	< 90
• 2013 ESH-ESC guidelines[6]	Target: reduce to between 150 and 140 (solid evidence for this recommendation)	< 90
In fit individuals < 80 y	Target: < 140 can be considered	< 90
≥ 80 y	Threshold to treat: ≥ 160	
• 2014 CHEP guidelines[4]	Target: < 150 (if no target organ damage or diabetes)	< 90
• 2013 ESH-ESC guidelines[6]	Reduce to between 150 and 140 (provided good physical and mental condition)	< 90
≥ 60 y	Threshold to treat: ≥ 150	Threshold to treat: ≥ 90
• JNC8 guidelines[7]	Target: < 150*	< 90
Diabetes		
• 2014 CHEP guidelines,[4] 2013 CDA guidelines[8]	Target: < 130	< 80
• 2014 ADA guidelines[9]	Target: < 140	< 80
• 2013 JNC8 guidelines[7]	Target: < 140	< 90
All others (including CKD)	Target: < 140	< 90

ADA—American Diabetes Association, BP—blood pressure, CDA—Canadian Diabetes Association, CHEP—Canadian Hypertension Education Program, CKD—chronic kidney disease, DBP—diastolic blood pressure, ESH-ESC—European Society of Hypertension and European Society of Cardiology, JNC8—Joint National Committee 8, SBP—systolic blood pressure.
*This higher treatment target reflects current evidence and heightened concerns of precipitating adverse effects, particularly in frail individuals.

Hydrochlorothiazide was reduced to 12.5 mg daily and ramipril was reduced to 5 mg daily, with plans to reassess and switch to a combination product after 4 to 8 weeks if his BP were stable. A goal is set to avoid symptoms of hypotension, such as light-headedness, while managing hypertension with a target BP of below 150/90 mm Hg.

Tamsulosin was continued because Bruce's family perceived it to be valuable; however, if Bruce continues to have light-headedness, it might be discontinued.

Further relaxing of BP targets and reduction in antihypertensive medication use might be considered if Bruce continues to have symptoms of hypotension or adverse effects from antihypertensive medications. Patient safety, quality of life, life expectancy, time-to-benefit from therapy, and overall pill burden are valid considerations in contextualizing guideline recommendations in older adults with increasing frailty. It is important to be alert for, and avoid, a potential prescribing cascade where a drug is added to counteract or treat the side effect of another drug.

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