

MANAGEMENT OF HYPERTENSION IN SPECIAL POPULATIONS

HYPERTENSION IN THE ELDERLY:

Risks and therapeutic goals

The fundamental pathophysiology in this patient group is the age-related change in the elasticity of the blood vessels, resulting in arterial stiffening.¹ This stiffening leads to isolated systolic hypertension (ISH), which is characterized by progressive increases in the systolic blood pressure (BP), ie BP \geq 160 mmHg while the diastolic BP remains below 90 mmHg.¹

Like many developed nations, Singapore also has an increasing elderly population, indicated in one report to be as high as 74.1%. This translates to higher disease burden and expenditures.²

The benefits of treating hypertension in the elderly are no different from the younger population—an optimal BP reduces cardiovascular (CV) morbidity and mortality, and early treatment produces greater CV risk reduction.³ Figure 1 shows the magnitude of CV risk reduction from 3 trials that investigated active treatment vs placebo in the management of hypertension in the elderly.³



ELDERLY PATIENTS (80 years or older)

Treatment goal: Below <math>< 150/90 \text{ mmHg}</math>⁴

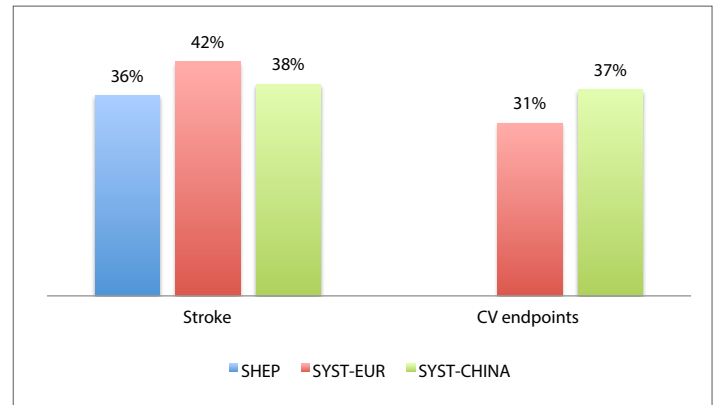


Figure 1. Degree of CV risk reduction with lowering of BP in the elderly from 3 studies³

SHEP=Systolic Hypertension Program (beta-blocker + diuretic vs placebo); SYST-CHINA=Systolic Hypertension in China trial (ACE inhibitor + calcium-channel blocker vs placebo); SYST-EUR=Systolic Hypertension in Europe trial (ACE inhibitor + calcium-channel blocker vs placebo).^{3,4}

CV endpoints: fatal and nonfatal endpoints (stroke, retinopathy, myocardial infarction, congestive heart failure, and renal insufficiency).³

The most important benefit of treatment is derived from the BP reduction and the choice of agent may not influence the outcome; therefore, any of the available pharmacotherapies can be used, although diuretics and calcium-channel blockers may be preferred in the setting of ISH.^{3,4} Lifestyle modification should accompany pharmacotherapy, and weight control and dietary salt restriction are especially encouraged in this age group.³

It is also important to consider medication adherence, cost, and drug-drug interactions in the elderly of whom many are on multiple medications. Furthermore, most patients will need 2 to 3 agents to reach their BP goal. In these circumstances, combination therapy or fixed-dose combinations of drugs that have complementary mechanisms of action are especially useful.³

HYPERTENSION AND DIABETES:

Risks and therapeutic goals

Hypertension and diabetes often co-exist—hypertension is at least twice as common in patients with type 2 diabetes, and diabetes contributes to a two-fold increase in coronary events, due in part to the associated hypertension.^{5,6} BP control is more difficult in patients with diabetes compared to those without.^{4,5} Patients with these concurrent conditions have a 10-year atherosclerotic CV risk of \geq 10%.⁵

DIABETICS

Treatment goal: <math>< 140/80 \text{ mmHg}</math>⁴

One of the well-known studies that showed the benefits of BP lowering was the UK Prospective Diabetes Study (UKPDS). This study demonstrated that diabetes-related complications decreased with every 10-mmHg decrease in systolic BP (Figure 2).⁶

Management in this group is almost always two-pronged, as with any patient profile. Lifestyle changes are an integral complement to pharmacotherapy. A weight loss of about 1 kg was shown to be associated with a mean arterial BP decrease of about 1 mmHg.⁶

With regard to pharmacologic agent choice, all drug classes are useful.^{5,6} However, the inherent difficulty of achieving BP control in this group often warrants the use of combination therapy.

The renin-angiotensin-aldosterone system (RAAS) system blockers—angiotensin-converting enzyme (ACE) inhibitors and angiotensin II receptor blockers (ARBs)—were shown to be effective on urinary protein excretion. Either may be combined with drugs from another therapeutic class (eg, a thiazide diuretic or a calcium antagonist) to achieve greater BP reduction.

Choice of antihypertensive agents in diabetics
Singapore Ministry of Health (MOH) Clinical Practice Guidelines (CPG) 2017 recommends the use of an ACE inhibitor, ARB, or calcium-channel blocker as first-line treatment in patients with diabetes without chronic kidney disease (CKD) or proteinuria.⁷

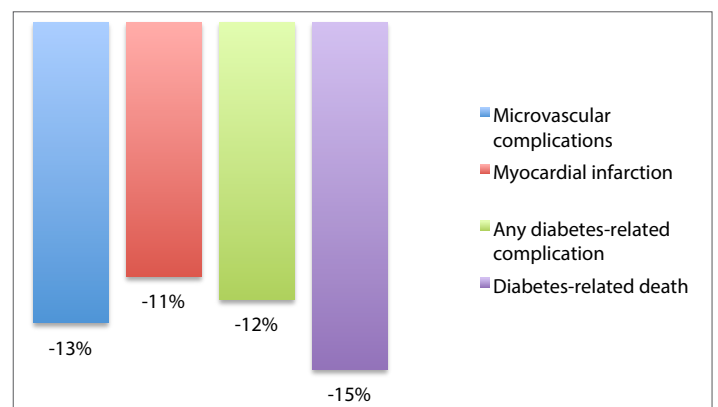


Figure 2. Reduction in diabetes-related complications with BP lowering⁶

HYPERTENSION AND CHRONIC KIDNEY DISEASE: Risks and therapeutic goals

For patients with CKD, the renal impairment increases the stimulation of the RAAS in response to the interstitial disease, fluid excess, and arterial stiffness, all of which contribute to hypertension. Hypertension, on the other hand, increases the retention of sodium leading to increased renovascular resistance.⁸

**CKD patients
(with moderate to severe proteinuria)
Treatment goal: <130/80 mmHg⁴**

Clinically, a persistently elevated BP (eg, 180/100 mmHg) accelerates kidney injury, such that progression to end-stage renal disease becomes 15 times more likely.⁹ Furthermore, hypertension, which is present in 80% of patients with CKD, is an important but independent contributor to increased CVD risk.^{10,11} These scenarios illustrate the overlapping relationship of hypertension and CKD.⁹

Management of hypertension in patients with CKD involves more than BP control. Close monitoring of the progression of albuminuria is essential, as it can prognosticate both kidney function and the occurrence of CVD events.¹¹ Therefore, albuminuria is not only surrogate marker of disease stage and impact but also a therapeutic target.¹¹

Strong support for the preferential use of a particular antihypertensive agent is lacking. CV risk reduction is influenced predominantly by BP control regardless of drug class. However, in patients with persistent or worsening albuminuria, RAAS system blockers are more beneficial.^{4,5,11} In fact, the Singapore MOH CPG recommends the use of either an ACE inhibitor or an ARB as the first-line drug, whenever treatment with BP-lowering drugs is indicated in diabetic and non-diabetic patients with CKD.⁷ However, combination



**Choice of antihypertensive agents
in CKD patients**
**The Singapore MOH CPG recommends
to use either an ACE inhibitor or an ARB
as the first-line drug, whenever treatment with
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However, in non-diabetic patients with CKD,
combination treatment
with both an ACE inhibitor
and an ARB should not be
routinely prescribed.⁷**

treatment with both an ACE inhibitor and an ARB should not be routinely prescribed in non-diabetic patients with CKD.⁷ Similar to the elderly and diabetic populations, a change in lifestyle habits, particularly a reduction in sodium intake should accompany pharmacotherapy to help improve CV and renal outcomes.¹¹

References:

¹ Oliva RV, Bakris GL. *J Gerontol A Biol Sci Med Sci* 2012;67:1343-1351. ² Seow LSE, Subramaniam M, Abdin E, et al. *J Clin Gerontol Geriatr* 2015;6:125-132. ³ Acelajado MA. *Integr Blood Press Control* 2010;3:145-153. ⁴ Mancia G, Fagard R, Narkiewicz K, et al. *Eur Heart J* 2013;34:2159-2219. ⁵ Whelton PK, Carey RM, Aronow WS, et al. 2017 ACC/AHA/AAPA/ABC/ACPM/AGS/APhA/ASH/ASPC/NMA/PCNA Guideline for the Prevention, Detection, Evaluation, and Management of High Blood Pressure in Adults: Executive Summary: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. Available at: <http://hyper.ahajournals.org/content/hypertensionaha/early/2017/11/10/HYP.000000000000065.full.pdf>. Accessed March 30, 2018. ⁶ American Diabetes Association. *Diabetes Care* 2003;26(suppl 1):S80-S82. ⁷ Ministry of Health (MOH) Singapore. Hypertension: MOH Clinical Practice Guidelines, 2017. Available at: https://www.moh.gov.sg/content/dam/moh_web/HPP/Doctors/cpg_medical/current/2017/hypertension/cpg_Hypertension%20Booklet%20-%20Nov%202017.pdf. Accessed March 30, 2018. ⁸ Wright J, Hutchison A. *Vasc Health Risk Manag* 2009;5:713-722. ⁹ Judd E, Calhoun DA. *Adv Chronic Kidney Dis* 2015;22:116-122. ¹⁰ Palmer BF, Fenvez A. *Proc (Bayl Univ Med Cent)* 2010;23:239-245. ¹¹ KDIGO Clinical Practice Guideline for the Management of Blood Pressure in Chronic Kidney Disease. December 2012. Available at: <http://www.kidney-international.org>. Accessed March 30, 2018.