**Challenges and Scientific Considerations in Hypertension Management Reflected in the Canadian Hypertension Education Program Recommendations for 2012**

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Abstract

This article addresses the scientific considerations that are reflected in t**he 2012 Canadian Hypertension Education Program (CHEP) Recommendations for the Management of Hypertension: Blood Pressure Measurement, Diagnosis, Assessment of Risk and Therapy**

This is a summary of the theme, key new recommendations and supporting science of the 2012 Canadian Hypertension Education Program (CHEP).

For 2012 the major change to the CHEP clinical practice recommendations is the change of the blood pressure target for patients with chronic kidney disease without diabetes to < 140/90 mmHg. The blood pressure target for people with diabetes remains < 130/80 mmHg. There is now strengthened evidence for the use of home blood pressure monitoring to diagnose and confirm white coat hypertension. Aldosterone antagonists (mineralocorticoid receptor antagonists) have been added for the treatment of hypertension in the setting of systolic heart failure. The theme for 2012 is the prevention of hypertension.

The full CHEP recommendations are available online at [www.hypertension.ca](http://www.hypertension.ca) .

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Managing Hypertension by the Numbers

Prevalent cases of hypertension are predicted to reach 7,500,000 in 2012/2013: over 1000 people are newly diagnosed with hypertension daily 1. Prior to the initiation of CHEP in 1999, self-reported “aware but untreated hypertension” was decreasing by 0.6% per annum; with the advent of CHEP, the rate of untreated hypertension decreased by 3.2% annually over the next decade. 2 In 1992, 13% of hypertensive individuals were treated and controlled, vs 66% in recent surveys. 3’2 Associated with better control of blood pressure (BP), mortality rates for stroke, heart failure and heart attack have fallen faster in the past 10 years than in the previous decade 4. The prevalence of hypertension and cardiovascular disease (CVD) are expected to increase considerably over the next twenty years, along with associated costs 5. Projections suggest that hypertension in the US will increase by 9.9%, coronary heart disease by 16.6%, heart failure by 25% and stroke by 25%, with hypertension alone responsible for an extra $130.4 billion in health costs in 2030 compared to 20105. This increase is largely related to aging of the baby-boom generation 6 as well as the sedentary lifestyle and unhealthy eating habits (in particular excess sodium) leading to adolescent overweight 7.

The Theme for 2012’s Clinical Practice Recommendations is Prevention

Despite the continuous advancement in CVD reduction, CVD remains a major cause of disability and premature death, and contributes substantially to escalating health care costs in Canada 8. Modifying exposures to behavioral, environmental and societal risk factors can prevent or delay the onset of chronic disease and resulting disabilities, and is a feasible and practical target for change at both clinical and population levels 9. High BP is the most common and important modifiable risk factor for a range of chronic diseases including coronary heart disease, stroke, congestive heart failure, chronic kidney disease, peripheral arterial disease and dementia10.

The majority of Canadians will develop hypertension over their lifetime11. Therefore, even modest changes in BP have significant potential to reduce the current chronic disease burden. CHEP has a particular role in primary and secondary prevention associated with suboptimal BP control by providing health care providers with guidance on the promotion of adherence to lifestyle and pharmacologic therapy for their patients and clients.

More emphasis on healthy lifestyle and on preventing or delaying chronic diseases will improve the quality of life of Canadians while reducing the impact these conditions have on individuals, families, communities, the health-care system and society. Expanded use of the CHEP recommendations in the prevention and management of other chronic diseases may help Canada become a world leader in chronic disease prevention and management.

The Government of Canada and the Public Health Agency of Canada (PHAC) are playing an important role in the achievement of high levels of BP awareness, treatment, and control in this country3. Prevention of hypertension is reflected in nine specific CHEP 2012 recommendations for lifestyle management as well as screening for hypertension. These recommendations are in continuity with the 2011 CHEP theme, a call to action to Canadians to advocate for policies to keep Canadians healthier though improved prevention and control of hypertension 12. A challenge for Canadians in 2012 and beyond is engaging all levels of government to work with the food and beverage processing industry to reduce excessive dietary sodium content by establishing sodium targets for foods and monitoring for excessive sodium content in our food supply.

Clinical Vignette

A 65 year old male is seen in your office for hypertension. He has a past medical history of previous MI with known systolic dysfunction, dyslipidemia and stable chronic kidney disease stage 3 (eGFR 50 ml/min) and is a former smoker. There is no history of diabetes. His current medications include an ACE inhibitor and a beta blocker. On examination he is euvolemic, his blood pressure is 142/76 mmHg. His creatinine is stable at 140 umol/L, his potassium is 4.4 mmol/L and the rest of his labs are unremarkable. He asks whether he is on appropriate medications and if his blood pressure is controlled to target according to recent clinical practice recommendations. He enquires whether you support the home measurement of blood pressure.

The 2012 CHEP recommendations.

BP measurement

New information on BP measurement has expanded the role of home BP monitoring to aid the diagnosis of white coat and masked hypertension. The greater number of BP measurements in these automated measures reduces variability and provides more precise and accurate reflections of true BP by removing the white coat effect13.

Controversy and emerging data for the use of office automated devices like the BpTRU14 have led to the formation of a blood pressure measurement working group to report in the fall of 2012.

BP target in Chronic Kidney Disease (CKD) without Diabetes is now < 140/90 mmHg

The target BP for CKD without diabetes has been <130/80 mmHg 15-17. In recent years there has been a retrenchment from this lower target. In 2008, the NICE chronic kidney disease guidelines maintained the target of <130/80 mmHg but only when the urine protein was 1g/day or greater, otherwise targeting < 140/90 mmHg 18. This recommendation was based on a meta-analysis showing a relative risk of 4.5 for doubling of serum creatinine or end stage renal disease (ESRD) in individuals with > 1 g/day proteinuria who achieved a systolic BP of 110-119 vs. 130-139 mmHg 19 and a sub-analysis of the Modification of Diet in Renal Disease (MDRD) study showing a greater decline in GFR in patients with over 3g/day of proteinuria 20. It was on the strength of the MDRD study that BP targets for non-diabetic chronic kidney disease with proteinuria were set at < 120/75 mmHg in 1999 18;21. In 2006 however, the African American Study of Kidney Disease (AASK) and the Blood Pressure Control for Renoprotection in Patients with Chronic Renal Disease (REIN-2) studies 22 showed no renal benefit for the lower BP target of < 120/75 mmHg. Blood pressure targets for all patients with chronic kidney disease were kept at < 130/80 mmHg, largely on the strength of the MDRD23.

A new AASK trial analysis including an additional cohort phase, found that patients with proteinuria (but not those without) benefited from the lower targeted BP, supporting the NICE guidelines approach of a differential blood pressure target of < 130/80 mmHg for proteinuria (> 1 gm/day) and < 140/90 mmHg for those with less proteinuria 24. The AASK trial included 1094 African American individuals with hypertensive CKD and assessed the effect on GFR of reducing BP to a usual BP goal (achieved BP 141/85 mmHg) or a low BP goal (achieved BP 128/78mmHg). In the cohort phase, the blood pressure target was < 130/80 mmHg and follow-up ranged from 8.8 to 12.2 years. On critical appraisal of this study it was noted that a secondary outcome from the original study was used as the primary outcome (change in creatinine) and no benefit was found for the primary outcome of the original study, the change of GFR over time, even in participants with proteinuria 25. This post-hoc subgroup analysis of a secondary endpoint would therefore be considered only as hypothesis generating. A critical appraisal of the MDRD study for patients with proteinuria, noted that the finding of slower loss of GFR in patients with proteinuria ≥3 grams/day was a post-hoc subgroup analysis in only 32 patients20. The lack of strong evidence for a benefit of more intensive blood pressure lowering for patients with non-diabetic chronic kidney disease with or without proteinuria, led to the change of blood pressure target to < 140/90 mmHg. An intensive review of the blood pressure target in patients with hypertension and diabetes including those with chronic kidney disease confirmed the blood pressure target of < 130/80 mmHg (see Rabi D, CMAJ in Press).

Another AASK sub-study shed interesting light on the impact of adherence to recommended therapy. While no differences were found in GFR outcomes between randomly assigned BP goals, there was a substantial slowing of loss of GFR for patients observed to achieve lower BPs within each group 26. Further, patients in the low BP group who failed to achieve target-BP had significantly worse outcomes than those in the usual-BP group with the same blood pressure, suggesting that a confounding of comorbidities may have been involved26.

In summary, randomized controlled trials do not provide sufficient evidence to recommend a lower BP target in individuals with non-diabetic chronic kidney disease, even with proteinuria.

Mineralocorticoid Receptor Antagonists, Heart Failure and Hypertension

Until now, there has not been sufficient evidence to recommend the aldosterone antagonists in the Canadian hypertension recommendations. The RALES 27, EPHESUS 28 and EMPHASIS-HF 29 studies all demonstrated reductions of death and heart failure hospitalizations in patients with systolic dysfunction receiving mineralocorticoid inhibitors. Over 60% of these study patients had a diagnosis of hypertension and blood pressure was controlled in most patients at study entry. Based on the results of these studies an aldosterone antagonist is recommended for patients with hypertension and recent cardiovascular hospitalization, acute myocardial infarction, elevated B-type natriuretic peptide or N-terminal pro B-type natriuretic peptide levels, or NYHA class II to IV symptoms. Because of the risk of hyperkalemia, after starting this therapy appropriate monitoring for hyperkalemia is recommended.

Resolution of clinical vignette. The blood pressure target for this patient with non-diabetic chronic kidney disease is < 140/90 mmHg and given his history of systolic heart failure, an aldosterone antagonist should be considered. He is started on spironolactone , electrolyte testing for potassium is arranged for the following week and he is counseled about the potential for gynaecomastia. Support is given for home blood pressure monitoring and the Measure BP at Home information sheet is given to the patient (see [www.hypertension.ca](http://www.hypertension.ca) for this patient tool).

Conclusions

For 2012 the major change to the CHEP clinical practice recommendations is the change of the BP target for patients with chronic kidney disease without diabetes to < 140/90 mmHg. There is now strengthened evidence for the use of home BP monitoring to diagnose and confirm white coat hypertension. Aldosterone antagonists (mineralocorticoid receptor antagonists) have been added for the treatment of hypertension in the setting of systolic heart failure. The goal of CHEP is greater awareness, treatment and control of hypertension and the theme for 2012 is the prevention of hypertension.

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