2001 Canadian hypertension recommendations

What has changed?

Canadian Hypertension Recommendations Working Group

Canada is the only country with comprehensive, annually updated hypertension recommendations that are compiled using a systematic evidence-based approach.[1-3] This article briefly summarizes the 2001 recommendations, highlighting recommendations that are new, revised, or important to improve blood pressure (BP) control. The comprehensive recommendations are intended to be a scientific reference rather than a clinical practice guideline.[4,5] A slide kit and clinical practice algorithms supporting the full 2001 recommendations are available to download at **www.chs.md**.

Methods for producing the recommendations have been published previously,[6] but there have been some changes. In 2001, a separate meeting of those involved in producing the recommendations was held to discuss new, changed, or controversial recommendations and evidence. A voting process adopted in 2000 to exclude recommendations that 30% or more of those involved on the subgroups, central review committee, and steering committee disagreed with was continued, but people with direct conflicts of interest on specific recommendations were excluded from voting on those recommendations. Those with conflicts of interest did, however, participate in the discussions following disclosure. Recommendations were based on the results of literature searches (to at least March 2001), personal knowledge of published literature, contact with authors, and major clinical trials published before November 2001.

The recommendation causing the greatest disagreement was voted against by 8% of the eligible voters. Those involved in the recommendation process or in a subgroup could, however, have personally opposed specific recommendations. Therefore, involvement in developing the hypertension recommendations does not indicate personal support for any specific recommendation.

New recommendations of specific interest include an updated section on management of hypertension in people with diabetes and a new recommendation to lower BP after the acute phase of strokes or transient ischemic attacks. The arbitrary division of old and young people at age 60 has been removed, resulting in a more aggressive threshold for initiating therapy for those older than 60. The recommendation to switch first-line therapies when response is inadequate has been changed to a recommendation to combine first-line therapies. There are also new comprehensive sections on management of patients with pheochromocytoma and hyperaldosteronism.

Diagnosis

The recommendations highlight assessing all adults' BP using proper measurement techniques at all appropriate visits. Hypertension can be diagnosed immediately if a hypertensive urgency or crisis occurs and within three visits if there is target organ damage in patients who are clinically stable. Diagnosis requires up to five visits if there is no target organ damage and initial BP is below 180/105 mm Hg. Self-measurement and 24-hour ambulatory measurement continue to be recommended for assessing office-induced BP elevation and self-measurement for improving patient compliance. Only devices meeting international standards should be used.[7] Daytime BP below 135/85 mm Hg with ambulatory measurement and self-measurement is associated with a normal prognosis.

Laboratory investigation

Routine laboratory assessment should be done at diagnosis and include tests for electrolytes, creatinine, fasting glucose, complete blood count, and lipid profile (total cholesterol, high-density lipoprotein cholesterol, low-density lipoprotein cholesterol, and triglycerides); urinalysis; and electrocardiography. Criteria for screening patients for renovascular hypertension with a post-captopril renogram, for pheochromocytoma with a 24-hour urine assessment of metanephrines and creatinine, and for hyperaldosteronism

by measuring plasma aldosterone and renin activity are provided (**Table 1**).

Table 1. When screening should be considered

Screen for renovascular hypertension with a post-captopril renogram when patients who are candidates for angioplasty or revascularization have the following.

- Uncontrolled hypertension despite therapy with three or more drugs
- Deteriorating renal function
- Recurrent episodes of flash pulmonary edema

Screen for pheochromocytoma with a 24-hour urine test for metanephrines and creatinine* when patients have the following.

- Paroxysmal or severe sustained hypertension refractory to usual antihypertensive therapy
- Hypertension and two or more symptoms suggesting catecholamine excess (eg, headaches, palpitations, sweating)
- Hypertension triggered by β-blockers, monoamine oxidase inhibitors, micturation, or changes in abdominal pressure
- Incidental adrenal adenoma
- Multiple endocrine neoplasia 2A or 2B, von Recklinghausen's neurofibromatosis, or von Hippel-Lindau disease

Screen for hyperaldosteronism† for at least hypertensive patients who have the following.

- Spontaneous hypokalemia
- Profound diuretic-induced hypokalemia (<3.0 mmol/L)
- Hypertension refractory to treatment with three or more drugs
- Incidental adrenal adenomas

**Assessment of urinary vanillylmandelic acid is inadequate.*
†Screening for hyperaldosteronism should include assessment of plasma aldosterone and plasma renin activity measured in morning samples taken from patients in a sitting position after resting at least 15 minutes. Antihypertensive drugs, with the exception of aldosterone antagonists, may be continued before testing.

Risk assessment

The working group recommends assessing all hypertensive patients' cardiovascular risk and intervening to reduce all relevant risk factors. A variety of methods are available.[8-12]

Lifestyle modification

Individualized lifestyle modification is recommended for all patients with hypertension and those at risk of developing it. A diet consistent with Canada's Guide to Healthy Eating (ie, high in fresh fruit and vegetables and low-fat dairy products and low in saturated fat) and limiting salt additives and foods with excessive added salt will lower BP. Other lifestyle changes that are effective at reducing BP include weight loss (4.5 kg minimum) among those who are overweight, regular physical activity (optimum 45 to 60 minutes of moderate activity [eg, brisk walk] four to five times a week), and low-risk alcohol consumption (none to two drinks daily). Because smoking is a major cardiovascular risk factor, has greater than additive risk in hypertensive people, and reduces or abolishes the beneficial outcomes associated with antihypertensive therapy, all hypertensive patients should be strongly encouraged to quit smoking.

Drug therapy

Drug treatment is recommended if diastolic BP is higher than 90 mm Hg and there is cardiovascular disease or target organ damage or other cardiovascular risk factors. Most hypertensive patients have additional risk factors or target organ damage; if they do not, however, lower cardiovascular risk has resulted in a recommendation to treat diastolic BP of 100 mm Hg or more and systolic BP of 160 mm Hg or more. Recommended initial choices of drugs for managing hypertension are shown in **Table 2**.

The working group recommends reducing BP to below 140/90 mm Hg in most patients (including the elderly) and below 130/80 mm Hg in patients with diabetes mellitus or renal dysfunction. Lowering BP to below 125/75 mm Hg is recommended for patients with renal dysfunction and more than 1 g/d proteinuria.

A new change is the recommendation to use combinations of medications if an initial choice is ineffective and to switch to alternative first-line agents only if patients are intolerant or have adverse effects. Many patients need multiple agents. **Table 3** lists first-line agents that have additive hypotensive effects when used in combination with treatment for uncomplicated hypertension. For uncomplicated hypertension treated with triple or quadruple therapy, all potential antihypertensive combinations of first-line agents are effective. Among patients who have little response to appropriate therapy, consider non-adherence, secondary hypertension, interfering drugs or lifestyles, and office-induced increases in BP ("white coat" hypertension).

A notable change is the recommendation to strongly consider antihypertensive therapy after the acute phase of non-disabling strokes or transient ischemic attacks. A recent trial (PROGRESS) demonstrated a reduction in recurrent cerebrovascular events when BP was lowered in both hypertensive and normotensive people.[13]

Patients' compliance is still a serious challenge and should be addressed by health care professionals at each medical visit.

Hypertension is one of the most common reasons for adult patients to visit physicians and is estimated to be the third leading risk associated with death worldwide.[14] One in five adult Canadians have high BP, and only 16% of hypertension cases are treated and controlled.[15] It is important for family physicians to look for mechanisms to screen their adult patients for hypertension and to develop systematic approaches to treating it.

Table 2. Considerations for individualization of antihypertensive therapy: *When using two drugs specifically to lower blood pressure, use information in* **Table 3** *to maximize hypotensive effect. Short-acting calcium channel blockers are not recommended for treating hypertension.*

RISK FACTOR OR DISEASE	INITIAL THERAPY	SECOND-STEP THERAPY	NOTES AND CAUTIONS
Uncomplicated hypertension	Low-dose thiazidelike diuretics, β-blockers, ACE inhibitors, or long-acting dihydropyrine CCBs	Combinations of first-line drugs (**Table 3**)	α-Blockers are not recommended as initial therapy. β-Blockers are not recommended as initial therapy for those older than 60. Avoid hypokalemia by using potassium-sparing agents for those prescribed diuretics
Isolated systolic hypertension	Low-dose thiazidelike diuretics, or long-acting dihydropyrine CCBs	None recommended	Avoid hypokalemia by using potassium-sparing agents for those prescribed diuretics
Diabetes mellitus with nephropathy	ACE inhibitors or angiotensin II receptor blockers	One or more of low-dose thiazidelike diuretics, cardioselective β-blockers, and long-acting CCBs	If serum creatinine is >150 μmol/L and volume control is required, a loop diuretic should replace a low-dose thiazide diuretic
Diabetes mellitus without nephropathy	ACE inhibitors	One or more of angiotensin II receptor blockers, low-dose thiazidelike diuretics, cardioselective β-blockers, and long-acting CCBs	
Diabetes mellitus without nephropathy, with systolic hypertension	ACE inhibitors or low-dose thiazide diuretics, or long-acting dihydropyrine CCBs	None recommended	
Angina	β-blockers (consider ACE inhibitors as add-on therapy)	Long-acting CCBs	
Prior myocardial infarction	β-blockers or ACE inhibitors	Combinations of additional agents	
Systolic dysfunction	ACE inhibitors (thiazide or loop diuretics), β-blockers, spironolactone as additive therapy	Angiotensin II receptor blockers, hydralazine or isosorbide dinitrate, amlodipine	Avoid non-dihydropyrine CCBs (diltiazem, verapamil)
Past cerebrovascular accident or transient ischemic attack	Strongly consider blood pressure reduction after the acute phase	None recommended	Blood pressure reduction reduces recurrent cerebrovascular events
Renal disease	ACE inhibitors (diuretics as additive therapy)	Combinations of additional agents	Use ACE inhibitors if bilateral renal artery stenosis
Left ventricular hypertrophy	Does not affect initial treatment recommendations	Does not affect initial treatment recommendations	Avoid hydralazine and minoxidil
Peripheral arterial disease	Does not affect initial treatment recommendations	Does not affect initial treatment recommendations	Avoid β-blockers with severe disease
Dyslipidemia	Does not affect initial treatment recommendations	Does not affect initial treatment recommendations	

ACE—angiotensin-converting enzyme, CCB—calcium channel blocker.

Table 3. For additive hypotensive effect in dual therapy, combine a agent from column 1 with any agent in column 2: *Dual combinations of agents within column 1 and within column 2 have less than additive hypotensive effect but are indicated in specific settings (eg, column 2 drugs for patients after myocardial infarction).*

COLUMN 1	COLUMN 2
Low-dose thiazide diuretics	β-blockers
Long-acting dihydropyridine calcium channel blockers	ACE inhibitors*

ACE—angiotensin-converting enzyme.
**Angiotensin-receptor blockers are an alternative initial choice for patients with diabetes and nephropathy.*

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