Hypertension CANADA

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Management of Hypertension for People with Diabetes

Clinical Summary

INTRODUCTION

Hypertension is a common problem in people with diabetes and is a major health risk for these individuals. This paper briefly summarizes the most current Canadian Hypertension Education Program (CHEP) and Canadian Diabetes Association (CDA) recommendations regarding the treatment of hypertension in people with diabetes including pharmacologic and lifestyle management, management of overall vascular risk, and strategies for self-management education.

BACKGROUND

Hypertension is a major health risk in patients with diabetes but many are poorly controlled

The majority of people with diabetes have hypertension.[1] Unpublished Canadian data from the 2010 Canadian Health Measures Survey suggests that 74% of patients with diabetes have a blood pressure greater than or equal to 130/80 mmHg. About 60 to 80% of people with diabetes will die from cardiovascular events and up to 75% of cardiovascular complications have been attributed to hypertension.[1] Hypertension is also a major factor contributing to retinopathy, nephropathy and non traumatic amputations.[2] Despite this, recent Canadian data show that one half to two thirds of people with hypertension and diabetes have sub-optimally controlled blood pressure.[3]

Treating hypertension prevents cardiovascular disease and other microvascular complications in people with diabetes

Several randomized controlled trials of blood pressure lowering treatments in people with diabetes have demonstrated major reductions in death, cardiovascular disease (i.e., stroke and myocardial infarction), and eye and kidney disease.[4-13] The largest individual study to date that illustrates the benefits of blood pressure lowering in patients with diabetes has recently been published.[7] It showed that a blood pressure reduction of 5.6/2.2 mmHg was associated with a 9% reduction in major macrovascular or microvascular events, an 18% reduction in the risks of cardiovascular death and a reduction of total mortality by 14%. Additionally, a large meta analysis has shown that lowering blood pressure by 6.0/4.6 mmHg was associated with a 27% reduction in total mortality and a 25% reduction in major cardiovascular events.[11] Lowering BP is likely the single most effective way to prevent disability and death in persons with diabetes.[14]

Target blood pressure for people with diabetes is less than 130/80 mmHg and this typically requires combinations of pharmacotherapeutic agents.

Both CHEP and CDA recommend that people with diabetes achieve and maintain a blood pressure of less than 130/80 mmHg.[15, 16] A large recently published randomized controlled trial looked at whether a lower systolic target of less than 120 mmHg might be preferable to a target of less than 140 mmHg. Although this study showed mostly neutral results, for now, CHEP recommends no change to the current blood pressure target of less than 130/80 mmHg.[17]

Many people with hypertension and diabetes will require the use of 3 or 4 medications to achieve target blood pressure levels.[5, 18] Although treatment with multiple drug regimens is more expensive, treating hypertension in people with diabetes is a cost-effective medical intervention that reduces death and disability.[2]

HYPERTENSION MANAGEMENT IN PEOPLE WITH DIABETES

There are 4 main components of therapy for hypertension in people with diabetes: pharmacotherapy to lower blood pressure, vascular risk reduction, lifestyle modification and self-management education. While lifestyle changes can have some effect in lowering blood pressure in people with diabetes, pharmacotherapy and lifestyle interventions should be initiated concurrently if blood pressure is over 130/80 mmHg.[15]

PHARMACOTHERAPY RECOMMENDATIONS[15]

- For persons with cardiovascular or kidney disease, including microalbuminuria or with cardiovascular risk factors in addition to diabetes and hypertension, an angiotensin converting enzyme (ACE) inhibitor or an angiotensin receptor blocker (ARB) is recommended as initial therapy.
- For persons with diabetes and hypertension not included in the above recommendation, appropriate choices include (in alphabetical order): ACE inhibitors, ARBs, dihydropyridine calcium channel blockers (CCBs), and thiazide/thiazide-like diuretics.
- If blood pressure is 150/90 mmHg or greater, combination therapy using 2 first line agents may be considered as initial treatment of hypertension. Caution should exercised in patients in whom a substantial fall in blood pressure is more likely or poorly tolerated.

Additional Therapy

If blood pressures remain above target, additional therapies should be pursued.

For persons in whom combination therapy with an ACE inhibitor is being considered, CHEP recommends that addition of a dihydropyridine CCB is preferable to a thiazide/thiazide like diuretic .[19]

- Alpha-blockers are not recommended as monotherapy or add on therapy.
- Combinations of ACE inhibitors and ARBs, have more adverse effects than ACE inhibitor therapy on its own and offers no therapeutic advantage, therefore combinations of an ACE inhibitor with an ARB are specifically not recommended in the presence of normal urinary albumin levels.
- CHEP still discourages the use of two drug antihypertensive combinations with an ACE inhibitor/ ARB and beta-blockers unless there is a compelling indication such as heart failure, angina or post-myocardial infarction.
- If blood pressure control is not achieved with sequential addition of antihypertensive drugs, consider making a referral to a physician or a healthcare provider who is an expert in hypertension.

VASCULAR RISK REDUCTION

Although hypertension is a leading risk in people with diabetes, a comprehensive approach to vascular risk reduction is required. Vascular risk may be reduced by addressing: dyslipidemia, smoking, hyperglycemia, and antiplatelet therapy.

Dyslipidemia

The benefits of lowering low-density lipoprotein (LDL) with statin therapy are well established for people with diabetes.[20] Weight control, healthy eating, smoking cessation and regular physical activity are also essential components of lifestyle modification required to manage blood lipid levels. The primary target for most people with diabetes is an LDL equal to or less than 2.0 mmol/L.

Smoking Cessation

Living and working in a tobacco free environment is recommended by CHEP and the CDA. It has been shown that the excess risk of coronary heart disease caused by smoking is reduced by about a half after 1 year of quitting smoking and then declines gradually.[21] It is never to late to stop smoking.

Hyperglycemia

Improved glycemic control improves microvascular complications in type 2 diabetes but has not been found to reduce major cardiovascular events.[22, 23] The CDA recommended targets for glycemic control for most individuals with type 1 or type 2 diabetes are: [24]

- Glycated hemoglobin (A1C) of less than or equal to 7.0%
- Fasting plasma glucose or preprandial plasma glucose: 4.0-7.0 mmol/L
- 2-hour postprandial plasma glucose: 5.0-10.0 mmol/L (5.0-8.0 mmol/L if A1C targets not being met)

Antiplatelet Therapy

The current evidence for the use of ASA in patients with hypertension and diabetes is unclear.

The CDA currently recommends consideration of low dose ASA therapy in people with stable cardiovascular disease. The decision to prescribe antiplatelet therapy for primary prevention of cardiovascular events should be based on individual clinical judgment.[25] Several recent studies have shown no benefit from ASA in the primary prevention of cardiovascular events in patients with diabetes.[26-29]

LIFESTYLE INTERVENTIONS

Lifestyle interventions can prevent hypertension and type 2 diabetes, reduce blood pressure and blood glucose, and improve other vascular risk factors including dyslipidemia, and abdominal obesity and therefore should be implemented in all patients (See Table 1). While lifestyle modifications can reduce blood pressure by 2 to 11 mmHg, note that the magnitude of blood pressure lowering benefits described are not derived specifically from people with hypertension and diabetes.

Healthy eating

A healthy diet is considered the cornerstone of diabetes management. Most people with diabetes are advised to follow a meal plan based on *Eating Well with Canada's Food Guide*. Additionally, the *Dietary Approach to Stop Hypertension* (DASH) diet has been shown to reduce blood pressure by 11.4/5.5 mmHg in people with hypertension.[30] The DASH diet principles fit well with typical meal plans recommended for people with diabetes.

Limiting sodium intake

For the prevention and control of hypertension in adults, CHEP recommends to reduce sodium intake towards 2,000 mg (5g of salt or 87mmol of sodium) per day.[15] It is estimated that the average adult Canadian consumes over 3,000 mg of sodium per day.[31] Several online resources are available (See Additional Resources).

Body weight & abdominal obesity

Attaining and maintaining a healthy weight improves blood pressure, diabetes management and reduces cholesterol. The *Trials of Hypertension Prevention* (TOHP) study showed that a decrease of 4.4 kg can lead to a blood pressure reduction of 4.0/2.8 mmHg.[32] Target body mass index (BMI) and waist circumference values are presented in Table 1.

Physical activity

CHEP recommends a moderate intensity activity such as, brisk walking, jogging, cycling or swimming be undertaken for 30 to 60 minutes 4 to 7 days a week. The CDA recommendations differ slightly in that they encourage the performance of resistance exercise 3 times per week in addition to aerobic exercise.[33] Regular physical activity has been shown to lower blood pressure by 3.8/2.6 mmHg in people who were previously inactive.[34] Starting an activity program can be difficult and individuals should be encouraged to start slowly and gradually build up in intensity and duration. An exercise ECG stress test should be considered in those who are sedentary and at high risk for cardiovascular disease and who wish to undertake more vigorous exercise than brisk walking.[33]

Low risk alcohol consumption

Alcohol intake should not exceed the recommended amount of two or less standard drinks a day, less than 14 drinks a week for men and less than 9 drinks a week for women.[35]

Stress management

CHEP recommends that for hypertensive people in whom stress may be a contributing factor to blood pressure elevation, stress management should be considered as an intervention.[15]

SELF-MANAGEMENT EDUCATION

Self-management education is one strategy to increase adherence to lifestyle interventions and medications. Ways to promote self-management education include: self-monitoring blood pressure, team-based health care and behavioral interventions including goal setting and patient participation in medical decision making.

Self-Monitoring Blood Pressure

Encouragement to self-monitor blood pressure is one way to facilitate self-management, as is educating people with hypertension and diabetes about their target blood pressure level. Self monitoring can be done with Hypertension Canada approved home monitoring devices. While targets have not been set for self monitoring of blood pressure, targets should be below the usual target for office measured blood pressure (i.e., 130/80 mmHg.) Individuals should know what to do when their blood pressure is not reaching this target level and also at what blood pressure level they should seek urgent treatment. CHEP recommends checking blood pressure twice a day, every day for one week prior to a scheduled visit to a healthcare professional.

Hypertension and Diabetes: Key Messages

Up to 80% of people with diabetes and hypertension will die of cardiovascular disease, especially stroke.

1. Ensure people with diabetes are screened for hypertension.

Diagnosis of hypertension in diabetes: Blood pressure ≥ 130/80 mm Hg, confirmed within one month.

2. Assess blood pressure at all appropriate healthcare visits.

Regular monitoring of blood pressure forms the basis for making decisions about treatment and reinforces the importance of maintaining a target blood pressure level.

3. Encourage home monitoring with approved devices.

- Home blood pressure readings are more strongly associated with improved cardiovascular outcomes than readings taken in a healthcare professional's office.
- Home readings can be used to:
  - confirm the diagnosis of hypertension
  - improve blood pressure control
  - reduce the need for medications in those with 'white coat' effect,
  - identify those with 'white coat' and masked hypertension and
  - improve medication adherence.
- Target home reading:
  - <130/80 mmHg

4. Pharmacotherapy and lifestyle should be initiated concurrently.

- Aggressive treatment using multiple (3 or more) blood pressure lowering medications is often required to achieve target levels of less than 130/80 mm Hg for people with diabetes.
- First line therapies include in alphabetic order ACE inhibitors, angiotensin receptor blockers, dihydropyridine calcium-channel blockers and thiazide or thiazide-like diuretics.

5. Assess and manage all other vascular risk factors.

A comprehensive approach is needed to address the following risk factors: smoking, dyslipidemia, glycemic control, obesity, unhealthy eating and physical inactivity. A reduction in these risk factors can more than half their vascular risk.

6. Enable sustained lifestyle modification and medication adherence.

- At every visit, people should be asked how they are managing their blood pressure.
- Recommended lifestyle changes, especially limiting sodium intake, and medication adherence should be reviewed at each visit.

Stay Informed!

For professionals

- Online course 15.5 “The Interdisciplinary Management of Hypertensive Patients”
- Sign up for free monthly news updates, featured research and educational resources
- Become a member for special privileges and savings

Healthcare professionals can also download current resources at www.hypertension.ca

A case-based interactive lecture series on clinically important hypertension topics will also be launched on the internet so healthcare professionals can learn and interact with top national hypertension experts. The lecture series will feature important clinical topics provided by national experts, have a case presentation and an opportunity to ask questions and make comments.

CHEP will also continue and expand a program to train community leaders in hypertension.

We invite you to visit the **Canadian Diabetes Association** website at www.diabetes.ca You can find material to assist healthcare professionals and those with diabetes in diabetes management.

ADDITIONAL RESOURCES

- www.hypertension.ca - CHEP guidelines, instructions for purchasing an using a home blood pressure monitor
- www.hypertension.ca/video - instructional video on home blood pressure measurement
- www.diabetes.ca - CDA guidelines and other resources
- www.diabetes.ca/documents/about-diabetes/DASH_diet_summary.pdf - DASH Diet
- www.nhlbi.nih.gov/health/public/heart/hbp/dash/new_dash.pdf - DASH Diet
- www.dietitians.ca - Healthy Eating
- www.csep.ca - Canadian Physical Activity Guidelines
- www.heartandstroke.ca - Online Blood Pressure Action Plan
- www.heartandstroke.ca/mobileapps - Heart and Stroke Foundation's *My Blood Pressure Action Plan* **App** for Apple, Android or Blackberry platforms
- www.phac-aspc.gc.ca/index-eng.php - Public Health Agency of Canada

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TABLE 1. SUMMARY OF LIFESTYLE RECOMMENDATIONS

Intervention	**Target**	
Sodium reduction	2g /day *	
Healthy diet	DASH diet, Eating Well with Canada's Food Guide	
Physical activity	30-60 minutes 4-7 days/week in addition to daily activities**	
Low risk alcohol consumption	≤ 2 drinks/day AND < than 14/week for men and < 9/week for women	
Tobacco free environment		
Attaining and maintaining ideal body weight	BMI 18.5-24.9 kg/m^2	
Waist circumference	Men	Women
Europid, Sub-Saharan African, Middle Eastern	< 102 cm	< 88 cm
South Asian, Chinese	< 90 cm	< 80 cm

*According to CHEP Recommendations, to decrease blood pressure, consider reducing sodium intake towards 2,000 mg (5g of salt or 87mmol of sodium) per day.

** Note the CDA encourages resistance exercise 3x/week in addition to aerobic exercise

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