2006 Recommendations for the Management of Dyslipidemia

Note: Readers are referred to the original guidelines document for supporting references and evidence grading.

* = New Recommendation

PREVENTION

People with type 1 or type 2 diabetes should be encouraged to adopt a healthy lifestyle to lower their risk of CVD. This entails adopting healthy eating habits, achieving and maintaining a healthy weight, engaging in regular physical activity, and smoking cessation.

RISK ASSESSMENT

* Most people with type 1 or type 2 diabetes should be considered at high risk for vascular disease. The exceptions are younger peo ple with type 1 or type 2 diabetes with shorter duration of disease and without complications of diabetes (including established CVD) and without other CVD risk factors. A computerized risk engine (e.g. UKPDS risk engine, Cardiovascular Life Expectancy Model) can be used to estimate vascular risk.

SCREENING

Fasting lipid levels (TC, HDL-C,TG and calculated LDL-C) should be measured at the time of diagnosis of diabetes and then every 1 to 3 years as clinically indicated. More frequent testing should be performed if treatment for dyslipidemia is initiated.

TARGETS

* The primary target of therapy is the LDL-C; the secondary target is the TC/HDL-C ratio.
* If the TC/HDL-C ratio is ≥4.0, consider strategies to achieve a TC/HDL-C ratio <4.0, such as improved glycemic control, intensi fication of lifestyle (weight loss, physical activity, smoking cessation) and, if necessary, pharmacologic interventions.

Plasma apo B can be measured, at the physician's discretion, in addi tion to LDL-C and TC/HDL-C, to monitor adequacy of lipid-lowering therapy in the high-risk patient. Target apo B should be <0.9 g/L.

TREATMENT

* Patients at high risk of a vascular event should be treated with a statin to achieve an LDL-C of 2.0 mmol/L. Clinical judgment should be used as to whether additional LDL-C lowering is required for patients with an on-treatment LDL-C of 2.0 to 2.5 mmol/L.
* In patients with serum TG >10.0 mmol/L, despite best efforts at optimal glycemic control and other lifestyle interventions, a fibrate should be prescribed to reduce the risk of pancreatitis. For those with moderate hyper-TG (4.5-10.0 mmol/L), either a statin or a fibrate can be attempted as first-line therapy, with the addition of a second lipidlowering agent of a different class if target lipid levels are not achieved after 4 to 6 months on monotherapy.

For patients not at target(s), despite optimally dosed first-line therapy as described above, combination therapy can be considered. Although there are as yet no completed trials demonstrating clinical outcomes in patients receiving combination therapy, pharmacologic treatment options include (listed in alphabetical order):

- Statin plus ezetimibe
- Statin plus fibrate

-Adapted from Canadian Diabetes Association Clinical Practice Guidelines Expert Committee[1] and Conway et al[2]

1. Canadian Diabetes Association Clinical Practice Guidelines Expert Committee. Dyslipidemia in adults with diabetes. Can J Diabetes 2006;30:230-40.
2. Conway R et al. Aggressive cardiovascular treatment needed for people with diabetes. Canadian Diabetes 2006;19:1-8.

Canadian Cardiovascular Society 2006 Guidelines for the Management and Treatment of Dyslipidemia and Prevention of Cardiovascular Disease

GLOBAL RISK ASSESSMENT

FRAMINGHAM RISK FACTOR SCORE SCREENING

- Screen with a full lipid profile, every one to three years, all men who are 40 years of age or older and all women who are postmenopausal or 50 years of age or older.
- In addition, adults with the following risk factors should be screened at any age:
  -Diabetes mellitus;
  -Current or recent (within past year) cigarette smoking;
  -Hypertension;
  -Abdominal obesity (metabolic syndrome) – waist circumference of greater than 102 cm for men and greater than 88 cm for women (lower cut-offs are appropriate for South and East Asians);
  -Family history of premature coronary artery disease (CAD);
  -Stigmata of hyperlipidemia (e.g., xanthoma);
  -Exertional chest discomfort, dyspnea, erectile dysfunction, claudication, chronic kidney disease; or
  -Evidence of atherosclerosis.
- Screen children who have a family history of severe hypercholesterolemia or chlomicronemia.
- Other patients may be screened at the discretion of their physician, particularly when lifestyle changes are indicated.
- Statin plus niacin

RISK CATEGORIES

Risk level	10-year CAD	Risk Recommendations
High	≥20%	*Treatment targets:*
		Primary target: LDL-C <2.0 mmol/L
		Secondary target: TC/HDL-C <4.0
Moderate	10% - 19%	*Treat when:*
		LDL-C ≥3.5 mmol/L or TC/HDL-C ≥5.0
Low	<10%	*Treat when:*
		LDL-C ≥5.0 mmol/L or TC/HDL-C ≥6.0

High risk includes coronary artery disease (CAD), peripheral artery disease, cerebrovascular disease and most patients with diabetes.

OTHER FACTORS INFLUENCING CAD RISK

Apolipoprotein B

Plasma apolipoprotein B measurement may be used to determine CAD risk, especially in hypertriglyceridemia, and to monitor treatment. Optimal levels of apolipoprotein B are less than 0.85 g/L in high-risk patients, less than 1.05 g/L in moderate-risk patients and less than 1.2 g/L in low-risk patients.

Lipoprotein (a)

A lipoprotein (a) concentration greater than 0.3 g/L in an individual with a total cholesterol to high-density lipoprotein cholesterol ratio of greater than 5.5 or other major risk factors indicates the need for earlier, more intensive low-density lipoprotein cho lesterol (LDL-C) lowering.

High-sensitivity C-reactive protein

High-sensitivity C-reactive protein may be clinically useful in identifying individuals who are at higher risk for CAD than that predicted by a global risk assessment, in particular in patients with abdominal obesity or a calculated 10-year risk between 10% and 20%. A high-sensitivity C-reactive protein level of less than 1.0 mg/L indi cates low risk for cardiovascular disease, between 1.0 mg/L to 3.0 mg/L indicates moderate risk and more than 3.0 mg/L indicates high risk.

Indexes of glycemia

Fasting glucose should be measured every one to three years in adults 40 years of age or older and in younger adults with abdominal obesity and/or a family history of type 2 diabetes. Measurement of glycated hemoglobin is not recommended unless fasting glucose is elevated. Moderate elevations in glycated hemoglobin may indi cate increased CAD risk.

Homocysteine

Although it is a marker of CAD risk, treatment with vitamins to lower homocysteine is not recommended.

NONINVASIVE INVESTIGATIONS

After a careful history review and physical examination, noninvasive investigations that may be useful for patients in the moderate-risk category to detect subclinical atherosclerosis and/or to further define future CAD risk are the ankle-brachial index, carotid ultrasound and graded exercise testing.

TREATMENT

Lifestyle

An important focus should be to decrease caloric consumption by decreasing saturated and transfat intake, reducing intake of sugar and refined carbohydrates, and by increasing exercise (to more than 200 min per week) as needed to achieve and maintain a body mass index of less than 27 kg/m^2 (ideally less than 25 kg/m^2).

Medication

- In high-risk individuals, treatment should be started immediately and concomitantly with diet and exercise. The treatment goal for most high-risk patients is first to achieve an LDL-C of less than 2.0 mmol/L; an optimal reduction in LDL-C for most CAD patients is at least 50%. Once the LDL-C target has been reached, attempts should be made to achieve a total cholesterol to high-density lipoprotein cholesterol ratio of less than 4.0 by further lifestyle modification. Adjuvant lipid-modifying therapy may also be considered.
- Patients in the low- or moderate-risk categories may be at high long-term cardio vascular risk. This group includes many patients with abdominal obesity. The reduction in CAD and stroke events and overall cost-effectiveness of therapy is proportional to the decrease in LDL-C.
- For those low- and moderate-risk individuals who are candidates for statin therapy, treatment to lower LDL-C by at least 40% is generally appropriate.

Generic name	Trade name	Recommended dose range
STATINS		
Atorvastatin	Lipitor (Pfizer Canada Inc)	10 mg - 80 mg
Fluvastatin	Lescol (Novartis Pharmaceuticals Canada Inc)	20 mg - 80 mg
Lovastatin	Mevacor (Merck Frosst Canada)	20 mg - 80 mg
Pravastatin	Pravachol (Bristol-Myers Squibb, Canada)	10 mg - 40 mg
Rosuvastatin	Crestor (AstraZeneca Canada)	5 mg - 40 mg
Simvastatin	Zocor (Merck Frosst Canada)	10 mg - 80 mg
BILE ACID AND/OR CHOLESTEROL ABSORPTION INHIBITORS		
Cholestyramine	Generic	2 g - 24 g
Colestipol	Colestid (Pfizer Canada Inc)	5 g - 30 g
Ezetimibe	Ezetrol (Merck Frosst/Schering Pharmaceuticals Canada)	10 mg
FIBRATES*		
Bezafibrate	Bezalip (Hoffman-La Roche Limited, Canada)	400 mg
Fenofibrate	Lipidil Micro/Lipidil Supra/Lipidil EZ (Fournier Pharma Inc, Canada)	100 mg, 145 mg, 160 mg, 200 mg
Gemfibrozil	Lopid (Pfizer Canada Inc)	600 mg - 1200 mg
NIACINS		
Nicotinic acid	Generic crystalline niacin	1 g - 3 g
Niaspan	(Oryx Pharmaceuticals Inc, Canada)	0.5 g - 2 g

* Fibrates should generally be reserved if triglyceride levels are greater than 10 mmol/L despite lifestyle changes; follow creatinine levels.

-Adapted from McPherson R et al. Canadian Cardiovascular Society position statement – recommendations for the diagnosis and treatment of dyslipi demia and prevention of cardiovascular disease. Can J Cardiol 2006;22:913-27.