

Metabolic Syndrome Backgrounder

Metabolic syndrome

Metabolic syndrome is a health condition defined by a clustering of independent risk factors that increase a patient's chance of developing heart disease, stroke and diabetes.^{1,2} These risk factors include: abdominal obesity, insulin resistance, elevated triglycerides, abnormal cholesterol profile and high blood pressure. When two or more individual risk factors appear in a single patient, the patient is deemed as having metabolic syndrome.

Metabolic syndrome may sometimes be referred to as insulin resistance, Syndrome X, glucose intolerance or Reavens syndrome.

Risk factors of metabolic syndrome

Though metabolic syndrome is closely associated with insulin resistance, its underlying cause is a topic of much debate. The International Diabetes Federation's definition of metabolic syndrome is based on the person having central obesity – waist circumference ≥ 94 cm (37 in) for men and ≥ 80 cm (31.5 in) for women – plus any two of the following four factors at each defining level:

- Raised blood pressure ($\geq 135/85$) or previous treatment for high blood pressure
- Raised fasting blood sugar (5.6mmol/L) or previously diagnosed type 2 diabetes
- Reduced HDL (good) cholesterol in the blood or specific treatment for this lipid abnormality (< 1.03 mmol/L in men and < 1.29 mmol/L in women)
- Raised triglyceride level in the blood (≥ 1.7 mmol) or specific treatment for this lipid abnormality

Diagnosis of metabolic syndrome

Each individual risk factor presents a certain level of cardiovascular risk, however when several risk factors are combined, a patient is twice as likely to die from cardiovascular disease.³ A physician can easily diagnose the clinical signs of metabolic syndrome. Blood tests can measure triglyceride and cholesterol levels and abdominal obesity can be determined by measuring waist circumference.⁴ As well, checking blood pressure may help determine at-risk levels.

Prevalence of metabolic syndrome

Metabolic syndrome affects approximately one in four Canadians and varies significantly among ethnic groups. The metabolic syndrome is particularly high in Aboriginals.² Due to a steady rise in obesity and an ageing population, the frequency of metabolic syndrome is expected to increase significantly in the coming years.⁵

Treatment of metabolic syndrome*

Targeting and treating the individual risk factors of the disorder to bring them to healthy ranges may treat metabolic syndrome. Since patients that have metabolic syndrome are usually overweight or obese, primary attention should be given to the following treatment areas:

- **Weight reduction** through a balanced calorie diet combined with increased physical activity may help reduce risk of metabolic syndrome.
- **Lifestyle changes** including physical activity to improve glycemic control and decrease insulin resistance minimizes the risk of metabolic syndrome.⁶

*It is important to note that no one medication in Canada is indicated to treat the metabolic syndrome.

Canadian Cholesterol Guidelines released in 2003 suggest that the TC:HDL-C ratio may be more important than the single reading of total cholesterol. According to the guidelines, adults at high risk of coronary heart disease should have an LDL level of less than 2.5 mmol/L and a TC:HDL-C ratio of less than 4.0.¹

1 Genest J, Frohlich J, Fodor G, et al. Recommendations for the management of dyslipidemia and the prevention of cardiovascular disease: 2003 update, CMAJ, Oct. 28, 2003; 169 (9), 921.

2 Anand SS et al. Relationship of Metabolic Syndrome and Fibrinolytic Dysfunction to Cardiovascular Disease. 2003;108:420-425.

3 Isomaa B, Almgren P, et al. Cardiovascular Morbidity and Mortality Associated with the Metabolic Syndrome. Diabetes Care, Volume 24 Number 4, April 2004.

4 Blackburn G, Bevis L. The Obesity Epidemic: Prevention and Treatment of the Metabolic Syndrome. 2003.

5 Meigs JB. Epidemiology of the metabolic syndrome. American Journal of Managed Care 2002;8:S282-92

6 Canadian Diabetes Association 2003 Clinical Practice Guidelines for the Prevention and Management of Diabetes in Canada.

Key Risk Factors Of Metabolic Syndrome Fact Sheet

Metabolic syndrome is a health condition defined by a clustering of independent risk factors that increase a patient's chance of developing heart disease, stroke and diabetes.^{1, 2} These risk factors include insulin resistance, abdominal obesity, elevated triglycerides, abnormal cholesterol profile and high blood pressure. When two or more individual risk factors appear in a single patient, the patient is deemed as having metabolic syndrome.

Metabolic syndrome may sometimes be referred to as insulin resistance, Syndrome X, glucose intolerance or Reavens syndrome.

At this time, there is no one medication in Canada indicated to treat the metabolic syndrome.

Insulin Resistance

Metabolic syndrome is closely associated with insulin resistance. Insulin resistance is the body's inability to respond to and use the insulin it produces. Linked to obesity, hypertension, and high levels of fat in the blood, insulin resistance is found to increase a patient's chance of developing type 2 diabetes and heart disease.³

Reducing caloric intake and increasing activity levels can reverse insulin resistance and lessen the chance of developing type 2 diabetes and heart disease.³

Abdominal Obesity

The main visual risk factor of metabolic syndrome is abdominal obesity. If a patient's abdominal circumference meets the defining levels they are considered abdominally obese. Measuring waist circumference can help determine risk for developing metabolic syndrome.

- The defining levels for abdominal obesity waist circumference for males is \geq 94 cm (37 in)
- The defining levels for abdominal obesity waist circumference for females is \geq 80 cm (31.5 in)

There are more than nine million overweight or obese adult Canadians who are at risk of developing chronic heart disease or suffering from a stroke.⁴

Triglycerides

Triglycerides are high-energy fatty acids that provide necessary energy for cell function. Lack of exercise, poor nutrition and genetics can lead to elevated triglycerides, which can lead to heart disease, heart attack and stroke.⁵

- The defining levels for triglycerides is = 1.7 mmol/L¹

High Cholesterol (Dyslipidemia)

Cholesterol is a necessary component for many bodily functions: It builds cell membranes and aids in the process of making hormones. Cholesterol is comprised of LDL cholesterol (the bad cholesterol) and HDL cholesterol (the good cholesterol). Healthy levels of cholesterol should have low LDL values and high HDL values. High LDL cholesterol levels and low HDL cholesterol levels – also referred to as dyslipidemia – pose serious threat to the body. When there is too much cholesterol in the blood, the excess can settle on the inside of the blood vessels. Over time, fatty deposits called plaque build up in the blood vessels, clogging them so that blood can't flow properly. When this happens, chances of a heart attack or stroke are increased.⁶

With respect to metabolic syndrome, HDL cholesterol levels are important, as they are a major contributor to the overall cholesterol ratio. In maintaining healthy cholesterol levels, LDL levels should be kept low and HDL levels should be high. The following are the defining at-risk levels for metabolic syndrome.

- The defining levels for HDL cholesterol in males is <1.03 mmol/L
- The defining levels for HDL cholesterol in females is <1.29 mmol/L

Dyslipidemia can be controlled by making healthy dietary choices, such as reducing intake of foods high in saturated and trans fat, and through increased physical activity. If lifestyle changes are not enough to reduce cholesterol levels, medications such as statins may need to be initiated.

High Blood Pressure (Hypertension)

High blood pressure has no obvious visual symptoms, however checking blood pressure as part of annual physicals can help identify at-risk patients. Undiagnosed high blood pressure can lead to a heart attack or stroke. Contributing factors to high blood pressure include, obesity, stress, smoking and excessive alcohol consumption.

- Defining levels of high blood pressure >135/85 mmHg¹

High blood pressure can be controlled by making dietary changes, increasing physical activity, maintaining a healthy weight and checking blood pressure on a regular basis.

1 Genest J, Frohlich J, Fodor, et al. Recommendations for the management of dyslipidemia and the prevention of cardiovascular disease: summary of the 2003 update, CMAJ, Oct.28, 2003 169 (9).

2 Anand SS et al. Relationship of Metabolic Syndrome and Fibrinolytic Dysfunction to Cardiovascular Disease. 2003; 108:420-425.

3 <http://www.diabetes.org/uedocuments/05-insulinresistance.pdf>

4 Heart and Stroke Foundation of Canada. Nova Scotia Website, www.heartandstroke.ca; News/Media Room; Tummy bulge "bigger" than just healthy eating and exercise.

5 Healing Daily; Website, www.healingdaily.com; Conditions; Triglycerides

6 <http://heartdisease.about.com/cs/cholesterol/a/choletri.htm>