

Metabolic Syndrome

What is metabolic syndrome?

Metabolic syndrome is a condition that includes the presence of a cluster of risk factors specific for cardiovascular disease. Metabolic syndrome significantly raises the risk of developing diabetes, heart disease, and/or stroke.

Most people who have metabolic syndrome have insulin resistance. The body makes insulin to move glucose (sugar) into cells for use as energy. Obesity, commonly found in persons with metabolic syndrome, makes it more difficult for cells to respond to insulin. If the body cannot make enough insulin to override the resistance, the blood sugar level increases and diabetes can result. Metabolic syndrome may be a beginning of the development of type 2 diabetes.

The cluster of conditions and risk factors related to metabolic syndrome was first named in 1988. Dr. Gerald Reaven proposed that insulin resistance was central to the cause of type 2 diabetes, high blood pressure, and cardiovascular artery disease. Reaven called this cluster of abnormalities "Syndrome X." Since that time, Syndrome X has come to be known by various names, including metabolic syndrome, dysmetabolic syndrome, and insulin resistance syndrome. Syndrome X is now widely known as metabolic syndrome.

The American Heart Association (AHA) recognizes metabolic syndrome as a problem of growing concern. For those over age 60, the percentage is estimated to be about 43 percent. Because the population of the United States is aging and because metabolic syndrome prevalence increases with age, the AHA has estimated that metabolic syndrome soon will become the primary risk factor for cardiovascular disease, ahead of cigarette smoking. Increasing rates of obesity are also thought to be related to the increasing rates of metabolic syndrome.

The cluster of metabolic factors involved as defined by the National Cholesterol Education Program's Adult Treatment Panel III (NCEP-ATP III) report, sponsored by the National Heart, Lung, and Blood Institute, includes:

abdominal obesity, in which the waist circumference measures more than 35 inches for women and more than 40 inches for men - an increased waist circumference is the form of obesity most strongly associated with metabolic syndrome.

high blood pressure of 130/85 mm Hg (millimeters of mercury) or higher - normal blood pressure is defined as 120 mm Hg or lower for systolic pressure (the top number), and 80 mm Hg or lower for diastolic pressure (the bottom number). High blood pressure is strongly associated with obesity and is often found in persons with insulin resistance.

insulin resistance - a condition in which being overweight or obese makes it hard for cells to respond to insulin. The body releases more insulin to help glucose enter the cells until blood sugar increases. Insulin resistance can lead to diabetes.

high triglyceride levels of more than 150 mg/dl (milligrams per deciliter) - triglycerides are a type of fat in the blood

HDL cholesterol (the "good" cholesterol) of less than 40 mg/dl for men and less than 50 mg/dl

For women

proinflammatory state - a condition that involves elevated C-reactive protein, a substance that is thought to be a marker for inflammation in the body

prothrombotic state - a condition that involves elevated blood clotting factors

What causes metabolic syndrome?

Because of the involvement of several interconnected factors in metabolic syndrome, the direct cause is not clearly understood. The rise in obesity, coupled with a sedentary lifestyle, contribute to risk factors for metabolic syndrome, such as high cholesterol, insulin resistance, and high blood pressure. These risk factors may lead to cardiovascular disease and type 2 diabetes.

Because metabolic syndrome and insulin resistance are closely associated, many healthcare professionals believe that insulin resistance may be a cause of metabolic syndrome. However, a direct link between the two conditions has not been established. Others believe that hormone changes, caused by chronic stress, lead to the development of abdominal obesity, insulin resistance, and elevated blood lipids (triglycerides and cholesterol).

Other factors which are thought to contribute to the development of metabolic syndrome include genetic variations in a person's ability to break down lipids (fats) in the blood, older age, and abnormalities in the distribution of body fat.

What are the risk factors for metabolic syndrome?

A risk factor is anything that may increase a person's chance of developing a disease. It may be an activity, such as smoking, diet, family history, or many other things. Different diseases have different risk factors.

Knowing your risk factors to any disease can help to guide you into the appropriate actions, including changing behaviors and being clinically monitored for the disease.

Risk factors most closely associated with metabolic syndrome include:

age - the incidence of metabolic syndrome increases with age

ethnicity - African Americans and Mexican Americans are more prone to metabolic syndrome. African-American women are about 60 percent more likely than African-American men to have the syndrome.

body mass index (BMI) greater than 25 - the BMI is calculated as a measure of body fat compared to height and weight.

personal or family history of diabetes - there is a greater risk for metabolic syndrome for those who have experienced diabetes during pregnancy (gestational diabetes) or who have a family member with type 2 diabetes.

smoking

history of heavy drinking

stress

post-menopausal status

high-fat diet

sedentary lifestyle

What are the symptoms of metabolic syndrome?

While there are few symptoms experienced in metabolic syndrome, there may be several signs. A symptom is evidence of disease or physical disturbance that a person experiences and can describe. By contrast, a sign is objective evidence of disease as observed and interpreted by a physician or other clinician.

Factors such as high blood pressure, elevated triglycerides, and/or overweight or obesity may be signs of metabolic syndrome. Persons with insulin resistance may have acanthosis nigricans, which is darkened skin areas on the back of the neck, in the armpits, and under the breasts. In general, however, persons do not directly experience symptoms of metabolic syndrome.

The indications of metabolic syndrome may resemble other conditions. Consult your physician for a diagnosis.

How is metabolic syndrome diagnosed?

The National Cholesterol Education Program's Adult Treatment Panel III (NCEP-ATP III), the World Health Organization (WHO), and the American Association of Clinical Endocrinologists (AACE) have each developed a set of criteria to be used as an aid in diagnosing metabolic syndrome.

Included among the criteria of these organizations are:

abdominal obesity

body mass index (BMI)

elevated triglycerides

low HDL cholesterol

high blood pressure (hypertension) or use of antihypertensive medication (medication used to lower blood pressure)

elevated fasting blood glucose - a blood test used to check how much glucose is in the blood after fasting for a certain period of time

prothrombotic state

insulin resistance as identified by type 2 diabetes, impaired fasting glucose, or impaired glucose tolerance (impaired glucose tolerance test measures the body's response to sugar)

other risk factors

Each organization has its own guidelines for using the above criteria to establish a diagnosis of metabolic syndrome.

Treatment for metabolic syndrome:

Specific treatment will be determined by your physician based on:

your age, overall health, and medical history

extent of the disease

your tolerance for specific medications, procedures, or therapies

your signs and symptoms

expectations for the course of the disease

your opinion or preference

Because metabolic syndrome increases the risk for the development of more serious, chronic conditions such as cardiovascular disease and type 2 diabetes, treatment for metabolic syndrome is important. Other conditions that may develop as a result of metabolic syndrome include:

polycystic ovarian syndrome

fatty liver

cholesterol gallstones

asthma

sleep disturbances

some forms of cancer

Types of treatment that may be recommended for metabolic syndrome include:

lifestyle management

A program of weight loss and exercise provide the foundation of treatment for metabolic syndrome. Weight loss increases HDL cholesterol (the "good" cholesterol) and decreases the harmful type of LDL cholesterol and triglycerides. Weight loss can also reduce the risk of type 2 diabetes.

Even a modest weight loss of five to ten percent of total weight can positively affect blood pressure and increase sensitivity to insulin, as well as reduce central obesity.

Together, diet and exercise improve risk factors more than diet alone.

Other lifestyle management factors include smoking cessation and limiting alcohol consumption.

Diet

Changes in dietary habits are important in the treatment of metabolic syndrome. According to the American Heart Association, treatment of insulin resistance is necessary to achieve the greatest benefit for modifying metabolic risk factors. In general, the best way to treat insulin resistance is through weight loss and increased physical activity.

There is a variety of methods used to lose weight and increase physical activity. Incorporating multiple methods, such as making diet changes as well as adding exercise, may be beneficial. These methods include, but are not limited to, the following:

Although diet plans high in protein and fat and low in carbohydrates are gaining in popularity, some of these plans may pose serious health risks in the long run because of the emphasis on saturated fat. Successful weight loss that is maintained over a long period of time depends more on limiting energy consumed (calories) and increasing energy expenditure (exercise and daily activity) than the composition of the diet.

Fasting may result in rapid weight loss, but lean muscle mass is lost as well as fat. All-liquid diets must be medically supervised and may be used for a short period of time in people who are obese, but these diets are not the long-term answer to weight loss. Fads, fasting, and popular diets in which health effects have not been determined by rigorous clinical trials may not be healthy options for weight loss. However, there are dietary recommendations that, if followed, will lead to weight loss.

To lose weight and keep it off for a lifetime, begin thinking about an individualized eating plan instead of a "diet." A plan tailored to personal likes and dislikes will have a better chance of producing sustainable weight loss. A balanced diet that is restricted in calories - 1,200 to 1,400 calories for women and 1,500 to 1,800 calories for men - may work well. A registered dietician (RD) can help to make an individualized diet plan based on a person's particular situation.

Include a variety of foods in the diet.

All fats are not bad. It is now known that polyunsaturated and mono-unsaturated fats provide health benefits such as helping to keep the heart healthy. This means that nuts, seeds, and some types of oils, such as olive, safflower, and canola, have a place in a healthy eating plan.

Choose whole grains such as brown rice and whole wheat bread rather than white rice and white bread. Whole grain foods are rich in nutrients compared to more processed products. They are higher in fiber and therefore absorbed by the body more slowly and do not cause a rapid spike in insulin, which can trigger hunger and cravings. The Dietary Guidelines 2005 from the US Department of Agriculture recommend that at least one half of the grain intake of persons of all ages and all calorie levels should be whole grains.

According to the Dietary Guidelines 2005, published by the US Department of Health and Human Services (HHS) and the US Department of Agriculture (USDA), a person on a 2,000 calorie per day diet should eat four and one-half cups daily of fruits and vegetables. This amount will vary depending on the calorie needs of each person. Be sure to choose a variety of fruits and vegetables, as different fruits and vegetables contain varying amounts and types of nutrients.

When dining out or ordering take-out food, ask for a take-home box or avoid super-size selections when you order. Many restaurant portions are too large for one person, so consider sharing an entrée or ordering an appetizer instead of a main dish from the entrée menu.

Read food labels carefully, paying particular attention to the number of servings contained in the product and the serving size. If the label says a serving is 150 calories but the number of servings per container is three and the contents of the entire container are consumed, the number of calories consumed is triple, or 450 calories.

Exercise

Exercise benefits people who are overweight or obese by helping to keep and add lean body mass, or muscle tissue, while losing fat. It also helps to increase the rate at which weight is lost if a person is eating healthy food according to a meal plan because muscle tissue has a higher rate of metabolism, thus burning calories faster.

Walking is an excellent choice of exercise for people who are obese. A walking program should start slowly by walking 30 minutes a day a few days a week and increase gradually to the goal of walking for longer periods most days of the week.

Exercise lowers blood pressure and can help prevent type 2 diabetes. Exercise also helps to improve emotional well-being, reduce appetite, improve sleeping ability, improve flexibility, and lower LDL cholesterol.

Consult your physician before starting any exercise program.

Medication

Persons who have metabolic syndrome and who are at risk may be candidates for medication therapy, especially if other measures, such as dieting and lifestyle changes, have failed to produce acceptable results with weight loss, decreased blood pressure, lowered cholesterol levels, and/or decreased insulin resistance.

Medications may be prescribed to help lower blood pressure, improve insulin metabolism, lower LDL cholesterol and raise HDL cholesterol, and/or increase weight loss.

Weight loss surgery

Weight-loss surgery (bariatric surgery) is the only option today that effectively treats morbid obesity in people for whom more conservative measures such as diet, exercise, and medication have failed.

Studies have shown that all aspects of metabolic syndrome including blood pressure, cholesterol, and increased body weight may be improved by gastric bypass surgery for morbid obesity at one year after the procedure.

There are a variety of approaches to bariatric surgery, but all procedures are either malabsorptive, restrictive, or a combination of the two. Malabsorptive procedures change the way the digestive system works. Restrictive procedures are those that severely reduce the size of the stomach to hold less food, but the digestive functions remain intact.