The Metabolic Syndrome

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What Is the Metabolic Syndrome?

The metabolic syndrome is not a specific disease but a cluster of factors, often occurring together in the same person, that put one at risk for developing cardiovascular disease. There is currently some debate regarding the specific definition of the metabolic syndrome, but the most accepted group of factors that are required to make the diagnosis are listed in Table 1.[1] These factors are most frequently found in people with either abdominal obesity, in whom most excess body fat is located in the abdomen, or a decreased ability of the body to use insulin, which is known as insulin resistance. A diagnosis does not require all 5 risk factors. A person is considered to have the metabolic syndrome if he or she has 3 or more of these factors. There is a subgroup of white, black, and Hispanic adults who are genetically predisposed to developing insulin resistance at lower waist circumferences than those listed in Table 1.[1]

How Common Is the Metabolic Syndrome?

The percentage of people with the metabolic syndrome differs by age group.[2] It is currently estimated that 13% of adolescents in the United States have the metabolic syndrome. Approximately 24% of young to middle-aged adults and 40% of adults aged 70 years or older have the metabolic syndrome. The number of people with the metabolic syndrome also differs by sex, race, and ethnicity.[2] Only 16% of black men have the metabolic syndrome, whereas 37% of Hispanic women and 28% of Hispanic men have the syndrome.

Why Should I Be Concerned About the Metabolic Syndrome?

The cardiovascular risk factors associated with the metabolic syndrome contribute to development of atherosclerosis, which is also commonly referred to as hardening of the arteries. Atherosclerosis is caused by a build-up of fatty deposits (plaque) along the walls of the arteries in the heart and brain. Over time, this plaque can rupture and cause a blood clot to develop, which can lead to a heart attack or a stroke. People with the metabolic syndrome who do not receive treatment have twice the risk of developing atherosclerosis as do people without the syndrome. This means that people with the metabolic syndrome also have a much higher risk of having a heart attack or stroke. People with the metabolic syndrome are also more likely to develop type 2 diabetes mellitus. Those with type 2 diabetes mellitus who also have the metabolic syndrome are at even higher risk for atherosclerosis. People with the metabolic syndrome are also at higher risk of developing heart failure, a condition in which the heart is not able to adequately supply the body with blood.

What Causes the Metabolic Syndrome?

The metabolic syndrome is likely the result of multiple metabolic changes rather than a single cause. The 2 factors most strongly linked to the metabolic syndrome are abdominal obesity and insulin resistance. Although the number of people with the metabolic syndrome has increased over the past 2 decades, our genetic makeup has not changed. This suggests that contemporary environmental changes have interacted with our genetic predisposition to store energy as body fat to produce the metabolic syndrome. The likely culprits are the progressive increase in food serving sizes, the expanded number of commercially prepared foods high in salt, simple sugars, and saturated fats, and the multiple factors that promote sedentary lifestyles, including the wide variety of home entertainment options, work-place automation, and reliance on automobiles.

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TABLE 1. Factors Required for the Diagnosis of the Metabolic Syndrome*

Increased waist circumference	>40 inches in men (>35 inches for Asian men) >35 inches in women (>31 inches for Asian women)
High blood pressure	≥130 mm Hg systolic (top number) ≥85 mm Hg diastolic (bottom number) or taking medication for high blood pressure
High triglycerides	≥150 mg/dL or taking medication for high triglycerides
Low HDL-C (good cholesterol)	<40 mg/dL in men <50 mg/dL in women or taking medication for low HDL-C
High blood sugar	≥100 mg/dL or taking medication to control blood sugar

HDL-C indicates high-density lipoprotein cholesterol.
*Metabolic syndrome is diagnosed when a person has 3 or more of these factors.
Adapted from Grundy et al,[1] with permission from the American Heart Association.

What Can I Do to Keep From Developing the Metabolic Syndrome?

The lifestyle changes recommended for the prevention of the metabolic syndrome are the same as those recommended for treatment of the metabolic syndrome, which are described below. People who are overweight or who have insulin resistance or any one of these factors should consider adopting lifestyle changes to prevent development of the metabolic syndrome.

How Is the Metabolic Syndrome Treated?

The treatment of the metabolic syndrome is aimed at preventing the development of atherosclerosis. This is done by treating the cardiovascular risk factors associated with the syndrome. The 2 primary treatment approaches are lifestyle changes and medications. Important lifestyle recommendations are listed in Table 2. These lifestyle changes, which include regular exercise, weight loss, and a diet that is low in salt, sugar, and saturated fats, are not only good for the heart but also benefit the whole body. For people who smoke, quitting will provide additional health benefits and further lower the risk of developing atherosclerosis.

When lifestyle changes are not sufficient or cannot be accomplished, drugs can be prescribed to treat most of the risk factors. There are 4 classes of drugs commonly prescribed for high blood pressure: angiotensin-converting enzyme inhibitors or angiotensin receptor blockers, diuretics, calcium-channel blockers, and beta-blocking agents. Common drugs used for treatment of high low-density lipoprotein (bad) cholesterol, low high-density lipoprotein (good) cholesterol, and high triglycerides include statins and niacin (nicotinic acid). The most common drug prescribed for high blood sugar in people with the metabolic syndrome is metformin. If diabetes is present, additional drugs may be prescribed. The specific drugs that are prescribed will vary depending on a person's individual health and tolerance of specific drugs. For some people, treatment may require a combination of lifestyle changes and medications.

TABLE 2. Lifestyle Changes to Prevent or Treat the Metabolic Syndrome

Risk Factor	Lifestyle Change
Increased waist circumference	Lose weight with a goal of 7% to 10% over the first year; continue slow weight loss thereafter.
	Reduce portion size of foods to decrease caloric intake.
	Exercise regularly (30 minutes 5 to 7 days per week) to promote weight loss.
High blood pressure	Lose weight; even 5% can lower blood pressure.
	Follow DASH or similar diets that are low in salt (less than 6 g or 1 teaspoon per day) and saturated fats (less than 7% of calories) and high in fruits, vegetables, whole grains, poultry, fish, and nuts.
High triglycerides Low HDL-C (good cholesterol)	Replace saturated fats with monounsaturated fats (canola, olive, and peanut oils) and polyunsaturated fats (corn, soybean, and sunflower oils).
	Eat fatty fish twice per week.
	Follow DASH diet to improve triglyceride and cholesterol levels.
High blood sugar	Exercise regularly and lose weight to improve insulin sensitivity.
	Avoid simple sugars (for example, sodas, candy) and add more whole grains, nuts, and legumes (for example, beans, peas) to improve blood sugar levels.

DASH indicates Dietary Approaches to Stop Hypertension; HDL-C, high-density lipoprotein cholesterol.

Disclosures

None.

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