

METABOLIC SYNDROME AND DIABETES MELLITUS

The metabolic syndrome also known as “pre-diabetes” is characterized by a group of metabolic risk factors which include at least 3 of the following 5 disorders:

- Abdominal obesity (excessive fat tissue in and around the abdomen). Excessive waist circumference is defined as women with a waist greater than 35 inches and men greater than 40 inches.
- Elevated triglycerides. Less than 150 is desirable
- Low HDL (good) cholesterol. Men with less than 40 and women with less than 50 are considered significant. This particle is important in the removal of cholesterol plaque in the vessel walls. The higher the number the better.
- Elevated blood pressure of greater than 130/85.
- Elevated glucose in the fasting state of greater than 100 but less than 126. If greater than 126, the diagnosis of diabetes can be established. This generally is related to the body's inability to properly use insulin and process blood sugar.

At present, it is not clear whether the metabolic syndrome has a single cause, and it appears that it can be precipitated by multiple underlying risk factors. People with the metabolic syndrome are at increased risk of coronary heart disease and other diseases related to plaque buildups in artery walls (e.g., stroke and peripheral vascular disease) and type 2 diabetes. The metabolic syndrome has become increasingly common in the United States. A conservative estimate is that over 50 million Americans have this disorder. Obviously, this is very concerning because of the vast number of people who will have a tendency to develop diabetes and its subsequently costs. The direct and indirect costs of diabetes care currently exceed what Great Britain spends on their *entire* health care system. The dominant underlying risk factors for this syndrome appear to be abdominal obesity and insulin resistance. The larger the abdominal circumference, generally the higher risk of developing insulin resistance and diabetes. Insulin resistance is a generalized metabolic disorder, in which the body can't use insulin efficiently. This is why the metabolic syndrome is also called the insulin resistance syndrome. Some people are either genetically or ethnically predisposed to insulin resistance. Native Americans/Alaskans, Pacific Islanders, Hispanics and African Americans are considered high risk groups. Acquired factors, such as excess body fat and physical inactivity, can elicit insulin resistance and subsequently the development of metabolic syndrome particularly in these populations. The primary goal of clinical management of the metabolic syndrome is to reduce the risk for cardiovascular disease and type 2 diabetes. For managing both long- and short-

term risks, lifestyle therapies are the first-line interventions to reduce the metabolic risk factors. There are no FDA approved medications for the treatment of metabolic syndrome or the pre diabetic state. There are currently 5 different prevention trials which have completed to date. In none of these studies, were the medications superior to diet and exercise. Therefore, lifestyle medications need to be implemented early and include the following:

- Weight loss to achieve a desirable weight (BMI less than 25 kg/m²)
- Increased physical activity, with a goal of at least 30 minutes of moderate-intensity activity on most days of the week
- Healthy eating habits that include reduced intake of saturated fat, trans fat and cholesterol
- Stop smoking
- Optimal blood pressure reduction and cholesterol management are critical for the prevention of vascular complications. There are several classes of medications to treat these problems effectively.

There are a significant number of patients who develop metabolic syndrome who will eventually develop diabetes, if the necessary precautions are not taken. Diabetes is a disease in which the body doesn't produce enough insulin because of declining pancreas function or the inability to properly use insulin because of insulin resistance. Insulin is needed to turn sugar and other food into energy. When you develop diabetes, your body either doesn't make enough insulin or can't use its own insulin as well as it should, or both. This causes sugars to build up too high in your blood. In addition to elevated glucose, these patients usually have elevated triglycerides, low HDL, high blood pressure. Combined with sedentary activity and over consumption, this is a deadly combination for the development of vascular complications either early or late in the disease. Type 1 diabetes usually occurs in children and young adults, primarily. In type 1, the pancreas makes little or no insulin. Without daily injections of insulin, people with type 1 diabetes won't survive. The development of this form of diabetes is generally not behaviorally related. If a patient administers insulin for control of glucose, they can be a type 1 or type 2. In the type 2 diabetic, they receive insulin to either override insulin resistance or replace insulin for a failing pancreas. Approximately, 30-40% of type 2 diabetics will necessitate the use of insulin for proper glucose control at 10-15 years after the onset of diabetes. Type 2 diabetes is the most common form of diabetes affecting at least 24 million people in the United States. Approximately 6-8 million are not even aware that they have the disease. It appears most often in middle-aged adults; however, adolescents and young adults are developing type 2 diabetes at an alarming rate. This is primarily related to sedentary lifestyle, over

consumption of unnecessary calories and genetic or ethnic predisposition. Diabetes mellitus can be diagnosed by one of the 3 following ways: - Fasting blood glucose of 126 or more. - Random glucose of greater than 200 with symptoms (such as increased thirst, increased urination, weight loss, poor healing, recurrent infections)- Abnormal glucose tolerance test. A 2 hour glucose value of greater than 200 following a 75 gram carbohydrate load in the non-pregnant patient. Diabetes is treatable, but even when glucose levels are under control; it greatly increases the risk of heart disease and stroke. The same is true about controlling blood pressure. In fact, approximately 85% of people with diabetes die of some form of heart or blood vessel disease. One of the tenets that I teach my patients, is that diabetes is not a glucose problem but a vascular problem. Patients with diabetes have the same risk of having their first heart attack as a person that does not have diabetes and experiencing their second event. People with diabetes may avoid or delay heart and blood vessel disease by controlling the other risk factors in addition to their diabetes. It's especially important to control weight and blood cholesterol with a low-saturated-fat, low-cholesterol diet and regular aerobic physical activity. I cannot emphasize this point enough. *Dietary discretion and regular physical activity are the cornerstones of therapy.* When planning lifestyle changes, be reasonable in your expectations. Your plan should be discussed directly with your health care provider. The care of the diabetic involves many members of a health care team including diabetic educators, dieticians, primary care providers and specialists. They must communicate with each other for success.

With regard to the medical treatment of diabetes, there are several medication options available. These medications should be used to complement a patient's behavior rather than try to mimic normal human physiology. When medications are to be prescribed, a thorough understanding of the drug's principal mode of action as well as the patient's primary core defect must be considered when selecting therapy (i.e. insulin resistance or lack of insulin or a combination of both). Also, the patient must understand the reason why they are taking the medication, potential side effects and drug interactions. I would advise to carry a complete list of your medications, diabetes and non-diabetes, because of the complexity of treatment.

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