

# Diabetes.

### **CHARACTERISTICS:**

According to the 2014 National Diabetes Statistics Report, a publication of the Centers for Disease Control and Prevention, diabetes affects 29.1 million people in the United States, which is 9.3% of the population. The numbers have been rising over the past few decades in parallel with the obesity epidemic. Most diabetics in this country have Type 2 diabetes.

Type 2 diabetes is a progressive metabolic disorder characterized by hyperglycemia due to inadequate insulin production by beta cells of the pancreas and to insulin resistance, which is suboptimal utilization of insulin by the muscles, the liver, and other body tissues.

## **RISK FACTORS:**

Some risk factors for Type 2 diabetes include obesity, prediabetes, a family history of diabetes, increasing age, lack of physical activity, a history of gestational diabetes, and the metabolic syndrome, which is the coexistence of a number of abnormalities, including elevated blood pressure, elevated blood glucose, abnormal lipids, and an increased distribution of fat in the abdominal area.

#### **DIAGNOSIS:**

There are a number of diagnostic criteria for diabetes, including a fasting plasma glucose value of at least 126 mg/dL, a hemoglobin A1C value of at least 6.5%, and a two hour plasma glucose value of at least 200 mg/dL during an oral glucose tolerance test. Repeat testing is recommended to confirm the diagnosis.

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SUCCESSFUL MANAGEMENT OF TYPE 2 DIABETES IS OFTEN MULTIFACTORIAL, INCLUDING LIFESTYLE CHANGES, SUCH AS INCREASED PHYSICAL ACTIVITY, DIET MODIFICATION, WEIGHT LOSS, AND MEDICATIONS. SURGICAL PROCEDURES FOR OBESITY HAVE ALSO BEEN FOUND TO IMPROVE GLYCEMIC CONTROL.

Diabetes can also be diagnosed with a random plasma glucose of at least 200 mg/dL if symptoms of hyperglycemia are present, such as polyuria (excessive urination), polyphagia (excessive appetite), weight loss, and blurry vision.

Prediabetes is present if there is a fasting plasma glucose value of 100 to 125 mg/dL, a hemoglobin A1C value of 5.7% to 6.4%, or a two hour plasma glucose value of 140 mg/dL to 199 mg/dL during an oral glucose tolerance test.

The 2014 National Diabetes Statistics Report stated that in 2012 there were an estimated 86 million Americans age 20 or older with prediabetes.

Hemoglobin A1C levels reflect average glucose control over the prior two to three months. Elevated hemoglobin A1C values are associated with increased mortality risk, even in nondiabetics.

#### TREATMENT:

Successful management of Type 2 diabetes is often multifactorial, including lifestyle changes, such as increased physical activity, diet modification, weight loss, and medications. Surgical procedures for obesity have also been found to improve glycemic control.

There are multiple medication classes available to treat Type 2 diabetes, with various mechanisms of action, although metformin is usually considered to be the initial medication of choice. Metformin, which helps to decrease glucose production by the liver, avoids some serious adverse effects seen with some of the other medications, since it is associated with a low risk of hypoglycemia, which is low blood glucose, and also does not promote weight gain. In fact, metformin can result in some weight loss.

Some of the ways in which other medications improve glycemic control include stimulating pancreatic insulin release, improving insulin sensitivity, delaying carbohydrate absorption from the gastrointestinal tract, and increasing the action of intestinal substances that stimulate insulin secretion after food ingestion.

Some Type 2 diabetics may need multiple medications for adequate glycemic control, and some may eventually require insulin. Since Type 2 diabetes is a progressive disease, glycemic control may worsen over time and require alteration of the treatment regimen.

Diabetes is associated with an increased mortality risk, largely due to a high prevalence of vascular disease. Diabetic vascular disease can be divided into microvascular (involving small blood vessels) and macrovascular (involving large blood vessels).

Microvascular disease can involve the eyes, which is termed retinopathy; the nerves, which is called neuropathy; and the kidneys, which is termed nephropathy, and which can be detected with an elevated urine microalbumin/creatinine ratio.



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Achieving tight glucose control, such as by maintaining a hemoglobin A1C of 7.0% or less, has been found to help prevent microvascular disease in Type 2 diabetics. Medications known as ACE inhibitors and ARBs have also been found to help prevent and improve diabetic nephropathy.

Macrovascular disease includes coronary artery disease, cerebrovascular disease, and peripheral vascular disease. While it is possible that tight glucose control may help prevent macrovascular disease in diabetics, the studies are not as conclusive as those for microvascular disease. Outcomes in diabetics can be improved with control of other cardiovascular risk factors, such as obesity, hypertension and abnormal lipids.

A common lipid abnormality seen in Type 2 diabetics consists of low HDL cholesterol, elevated triglycerides, and an elevated total cholesterol/HDL ratio. Although many of these people may not have elevated LDL cholesterol, they tend to have small dense LDL particles, which are atherogenic, meaning that they tend to promote atherosclerosis.

In addition to vascular disease, diabetics are at increased risk for a number of other impairments, including liver disease, some types of cancer, a variety of skin conditions, depression, cognitive impairment, and others.

When underwriting a diabetic case, a number of factors need to be kept in mind, including age of onset, adequacy of glycemic control, whether vascular disease or other complications are present, and how well other cardiovascular risk factors are controlled.

#### **CASE STUDIES:**

**APPLICANT 1** is a 65 year old who was diagnosed with Type 2 diabetes at age 50, has a hemoglobin A1C level of 6.5%, has a favorable microalbumin/creatinine ratio, has regular medical follow up, is compliant with prescribed medications, and has no known diabetic complications. *This would be Standard Plus*.

**APPLICANT 2** is a 35 year old who was diagnosed with Type 2 diabetes at age 27, has a hemoglobin A1C level of 11.0%, has a highly abnormal microalbumin/creatinine ratio, has not seen a doctor in two years, and takes no medications. *This would be a decline.* 

**APPLICANT 3** is a 50 year old applicant who was diagnosed with Type 2 diabetes at age 40, has a hemoglobin A1C level of 8.5%, and has a mildly abnormal microalbumin/creatinine ratio. *This would be Table 4.* 

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