



International
Transplant Nurses
Society

POST-TRANSPLANT **DIABETES**

What Every Patient Needs to Know





What is Diabetes?

Diabetes is an illness that effects how your body makes and uses a hormone called insulin. Insulin is produced by the pancreas. Foods we eat, particularly carbohydrates (such as bread, pasta, sugar) and fats (such as butter, cheese, ice cream) are changed into a sugar called glucose. Our bodies use glucose for energy. To turn glucose into energy the body can use, our bodies must produce insulin. If insulin is not made or used in the right way, glucose will build up in the blood. Serious health problems may occur with high levels of glucose causing damage to the kidneys, eyes, small blood vessels, and the nervous system.

There are two types of diabetes. Type 1 diabetes is when the body cannot produce insulin. In 2015, 29 million Americans, or approximately 9% of the population, had diabetes. Approximately 1.25 million children and adults in the United States have Type 1 diabetes.

Type 2 diabetes occurs when the body is insulin “resistant,” meaning that the body cannot properly use the hormone. Close to 28 million people in the United States have Type 2 diabetes.

Is Diabetes Common?

Diabetes is one of the most common chronic diseases. It is increasing throughout the developed and developing world. According to the 2015 IDF Diabetes Atlas, there are more than 415 million people, a little over 8% of the world’s population, with diabetes worldwide. Most of these people have Type 2 diabetes. One out of every 2 people with diabetes does not know they have it.

What are the Risk Factors for Diabetes?

Diabetes can affect anyone, but some people are more at risk than others.

- **Family history** is a risk for diabetes. Some people have inherited a tendency to develop the disease, particularly if this tendency is in both parents or a sibling.
- **Ethnic background** increases risk. African-American/black, American Indian, Alaskan Native, Hispanic, Pacific Islander or Asian are at the highest risk. People in some ethnic groups have two to three times the risk of developing diabetes compared with all people. Type 1 diabetes, inherited from both parents, is more common in Caucasians.
- **Obesity** increases risk for type 2 diabetes, particularly for those who are at a young age and have been obese for many years.
- **Inactive life style**
- **Older age** combined with other risk factors increases risk.
- **Abnormal blood fats** (cholesterol or triglycerides).
- **Anti-rejection drugs** (immunosuppression) medications used by transplant recipients so that the transplanted organ is not rejected increase the risk of diabetes.

Why Should I be Concerned About Diabetes?

Diabetes is a serious disease that is associated with many health problems and complications. Diabetes is an even greater risk for people who have had organ transplants. The type of diabetes that occurs after transplant is called “new onset diabetes” or post-transplant diabetes mellitus (PTDM). Transplant recipients with new onset or PTDM may have features of either type 1 or type 2 diabetes.



Why Am I at Risk for Diabetes After Transplant?

Some of the medications that you take to prevent your body from rejecting the transplanted organ (immunosuppressive medications) may increase your risk of developing diabetes. As a result, your body will now respond differently to the foods you eat. This sometimes leads to post transplant diabetes mellitus, or PTDM. Although most anti-rejection medications may increase the risk of diabetes, some are linked with a higher risk.

Can I Lower my Risk of Developing Diabetes?

Some risk factors, like your ethnic background and age, cannot be changed. But there are several risk factors that you can change.

- Improve your overall health through diet and exercise.
- If you are overweight, it is important to lose weight to reduce your risk for diabetes.
- Improve your nutrition with a balanced diet. Talk to your dietitian, transplant coordinator, and/or provider about the best diet for you.
- Exercise is an important treatment, particularly when combined with a weight loss program and stress reduction.
- Try to reduce stress. You may feel comfortable talking with your social worker, transplant coordinator, and/or provider about any increased stress you are experiencing after your transplant. They can help or refer you for additional counseling and advice.
- Review your immunosuppressive therapy with your transplant team. Your team can prescribe anti-rejection medications with the least potential of increasing your risk for diabetes.

What are the Signs and Symptoms of Post-Transplant Diabetes?

As a transplant patient, you are faced with many responsibilities to assure your continued good health. One of those responsibilities is watching for the symptoms of diabetes. Early detection and treatment of diabetes may reduce your chance of developing complications. It is important to be tested frequently if there is a history of diabetes in your family or if you have any of the other risk factors for diabetes. Though it is possible to develop diabetes without noticing any symptoms, it is common to have some of the following:

- Frequent urination
- Excessive thirst
- Extreme hunger
- Tiredness
- Tingling or numbness in hands or feet
- Sudden vision changes
- Irritability
- Unexpected weight loss
- Slow healing cuts or infections
- Constant itching

How is Diabetes Diagnosed and Treated?

Diabetes is diagnosed by checking blood levels of glucose (sugar) through several types of tests. A fasting glucose test involves analyzing a small sample of blood after you have fasted for several hours. A glucose tolerance test also may be done. This test requires several blood samples over several hours. Your provider will monitor your blood glucose levels as you eat. Glucose levels in people who have diabetes will build up. This occurs when there is not enough insulin, or when the insulin isn't working properly to allow glucose to enter the cells.

For some patients, simple changes in anti-rejection medications help control diabetes. In others, changing eating habits and losing excess weight does the trick. Adding daily exercise helps control the disease. Diabetes may require daily insulin shots or medications that can be taken by mouth. Insulin replaces the hormone in people whose bodies cannot produce it (Type 1). Oral medications stimulate the pancreas to produce insulin when the supply is inadequate (Type 2).

It is essential for you to check your glucose levels regularly throughout the day if you are diagnosed with post-transplant diabetes. This usually is done with a hand-held monitor every morning, before meals, and at bedtime. Your provider will ask you to record your numbers every day and bring that information with you to your clinic appointment.

You will meet with a nurse educator or dietitian who helps you choose the best foods and food combinations to eat as well as those to avoid. The nurse will discuss the importance of taking thorough care of your feet, skin, eyes, teeth and gums and being watchful of any problems.

Your provider will routinely check your blood pressure, examine your feet and skin, calculate your A1C (a long-term blood measurement of glucose levels), and review and discuss your daily recorded glucose levels.



What are the Long-term Complications of Diabetes?

If left untreated, diabetes can result in serious health problems including:

- Heart disease and stroke
- Nerve damage and decreased blood flow to the feet resulting in risk for foot wounds
- Damage to the small vessels of the eyes resulting in blindness
- Kidney failure: diabetes is the number one cause of kidney failure
- Risk of death: 2 times greater in those with diabetes. Being aware of and watching for symptoms leading to these problems is important for early treatment and reducing the risk of developing these problems. Notify your provider if you have any of these symptoms.

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- Pounding headaches, blurred vision, dizziness, numbness and tingling, irregular heartbeat and shortness of breath. These may be symptoms of heart problems.
- Tingling, decreased sensation, and pain in the arms and legs. This is caused by damage to nerve endings (diabetic neuropathy).

- Vision changes. Long-term uncontrolled diabetes results in a thickening of the blood vessels in the eye (diabetic retinopathy). If left undetected, it can cause blindness. Since patients often do not experience symptoms, routine eye exams are necessary.
- High blood pressure. High blood pressure often is a sign that the kidneys are not working well. Diabetics have a 50% greater risk of kidney disease than non-diabetics. High blood pressure (hypertension) that is not treated is a major contributor to kidney disease. It is important to have your blood pressure checked frequently. You may receive a blood pressure cuff after transplant. Your nurse will teach you how to take your blood pressure, how to record the numbers, and will explain what the normal range is for you. If you have high blood pressure, you will be prescribed medications (antihypertensives) to lower your blood pressure and to reduce the development of kidney disease.
- Swelling (edema) in the lower legs, numbness and cold feet, poor or slow wound healing. Poor blood flow in the extremities due to a thickening of the blood vessels (arteriosclerosis) may increase the risk of infections. This may be severe enough to eventually require amputation of toes, feet or even part of the leg. Additionally, arteriosclerosis is a risk factor for heart disease.

Living With Diabetes

Although there is no cure for diabetes, it is treatable. Remember, living with and even controlling diabetes is certainly within your reach. If you are diagnosed with post-transplant diabetes, start by learning as much as you can about the disease.

- Talk to your provider and your diabetes educator about your immunosuppressive therapy and routine care.
- Follow your medication regimen as prescribed by your health care team.
- Record your glucose levels.
- Make healthy lifestyle choices:
 - Maintain a healthy weight as determined by your health care professional.
 - Diet. Reduce sugar and saturated fats. Eat 3–5 servings of fruits and vegetables each day.
 - Exercise: Be active for 30 minutes most days.
 - Reduce stress.
 - Avoid tobacco products.
- Get support from your family, friends, and other diabetics as well as your transplant team, diabetes team, and primary care provider. The more you learn, the more you can do to help keep diabetes under control.



RELATED LINKS FOR MORE INFORMATION

These sites are provided as a network resource. Information from the Internet in regard to your transplant should always be discussed with your transplant team. ITNS is not responsible or liable for any information received from these websites.

ITNS is the first professional nursing organization to focus on the professional growth and development of the transplant clinician. ITNS offers nurses a forum for learning about the latest advances in transplantation and transplant patient care. To access more transplant education materials for patients and healthcare workers please visit the International Transplant Nurses website at itns.org.

International Diabetes Foundation

www.idf.org

American Diabetes Association

www.diabetes.org

International Diabetes Foundation: Diabetes Atlas

www.eatlas.idf.org

Centers for Disease Control; Diabetes Public Health Resource

www.cdc.gov/diabetes

International Diabetes Federation (Europe)

www.staff.ncl.ac.uk/philip.home/guidelines

National Institutes of Diabetes and Digestive and Kidney Diseases

www.niddk.nih.gov

Primary Care Diabetes Europe

www.pcdeurope.org

Information clearinghouse about diabetes; a service of the National Institutes of Diabetes and Digestive and Kidney Diseases

www.niddk.nih.gov/health-information/health-topics/diabetes/Pages/default.aspx

Patient Education Materials (available in many languages)

www.nlm.nih.gov/medlineplus/diabetes.html

National Diabetes information clearinghouse in partnership with NIH

www.ndep.nih.gov

Diabetes India

www.mendosa.com/diabetesindia.htm

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