

## DIABETES MELLITUS TYPE 1

### What is Diabetes Mellitus Type 1?

Type 1 diabetes is a chronic (lifelong) disease that occurs when the pancreas (an organ located in the area behind your stomach) does not produce enough insulin to properly control blood sugar levels and therefore results in high levels of sugar in the blood.

The body breaks down the carbohydrates you eat into blood glucose (also called blood sugar), which it uses for energy. Insulin is a hormone that the body needs to get glucose from the bloodstream into the cells of the body. In type 1 diabetes the body does not produce insulin.

Although it was formerly known as Insulin Dependent Diabetes Mellitus (I.D.D.M.) or Juvenile Diabetes Mellitus, Type 1 Diabetes occurs at any age, including adults.

### What causes it?

The exact cause is unknown. Genetics, viruses, and autoimmune problems may play a role.

Furthermore it may be linked or related to various other conditions such as pancreatic diseases, pernicious anaemia, endocrine diseases e.g. Thyroid diseases, drug induced diabetes mellitus and even possibly major stressful events.

### How is it diagnosed?

Initial diagnosis is made on the medical history as well as all of the above symptoms which then can be confirmed by doing the following tests and special investigations namely:

- Fasting blood glucose levels of 6 mmol/l or above
- Performing a "Glucose tolerance test" that is measuring the fasting glucose levels after which a bolus of glucose is administered to the patient with subsequent glucose level testing every 30 minutes for two hours. Certain values then can be defined as either "impaired" glucose tolerance or "pre-diabetic" or "full blown" Diabetes Mellitus
- Determination of the patient's HbA1C levels: Hemoglobin A1c (HbA1c) level should be checked every 3- 6 months. The HbA1c is a measure of average blood glucose during the previous 2- 3 months. It is a very helpful way to determine how well the blood glucose levels are controlled. Currently it is also used as another option for diagnosing diabetes and identifying pre-diabetes. Levels indicate:
  - Normal: Less than 5.7%
  - Pre-diabetes: Between 5.7%- 6.4%
  - Diabetes: 6.5% or higher
- Full clinical examination of the patient and identifying all the concomitant conditions

Ketone testing (urine sample test) is also used in Type 1 diabetes. Ketones are products of fat and muscle breakdown and are harmful at high levels. Ketone testing is usually done at the following times:

- When the blood sugar is higher than 240 mg/dL
- During an illness such as pneumonia, heart attack, or stroke
- When nausea or vomiting occur
- During pregnancy

### How can Type 1 Diabetes affect my health?

After many years, Diabetes can lead to serious problems with your eyes, kidneys, nerves, heart, blood vessels, and other areas in your body. If you have Diabetes, your risk of a heart attack is the same as someone who has already had a heart attack. Both women and men with Diabetes are at risk. You may not even have the typical signs of a heart attack.

In general, complications of Diabetes include:

- Cataracts
- Damage to the blood vessels that supply the legs and feet (peripheral vascular disease)
- Foot sores or ulcers, which can result in amputation
- Glaucoma
- High blood pressure
- High cholesterol
- Kidney disease and kidney failure (diabetic nephropathy)
- Macular edema

- Nerve damage, which causes pain and numbness in the feet, as well as a number of other problems with the stomach and intestines, heart, and other body organs (diabetic neuropathy)
- Stroke
- Worsening of eyesight or blindness due to diabetic retinopathy (eye disease)

Other complications include:

- Erection problems
- Infections of the skin, female genital tract, and urinary tract

## Treatment

Because Type 1 diabetes can start suddenly and have severe symptoms, people who are newly diagnosed may need to go to the hospital.

- The immediate goals are to treat diabetic ketoacidosis (coma) and high blood glucose levels
- The long-term goals of treatment are to:
  - Reduce symptoms
  - Prevent diabetes-related complications such as blindness, heart disease, kidney failure, and amputation of limbs
- These are accomplished through:
  - Blood pressure and cholesterol control
  - Careful self testing of blood glucose levels
  - Education
  - Exercise
  - Foot care
  - Meal planning and weight control
  - Medication or insulin use

### Medication:

Medicines to treat Type 1 diabetes include insulin. People with Type 1 diabetes cannot make their own insulin and therefore they must use insulin. They need daily insulin injections. Insulin does not come in pill form. Injections are generally needed one to four times per day.

### Insulin:

People with Type 1 diabetes can't make their own insulin and they must take insulin every day. Insulin lowers blood sugar by allowing it to leave the bloodstream and enter cells. Insulin preparations differ in how fast they start to work and how long they last. Your doctor will review your blood glucose levels to determine the appropriate type of insulin you should use. More than one

## Your role in managing this condition

### Self testing:

You are the most important person in managing your diabetes. You should know the basic steps to diabetes management:

- Test your blood glucose daily and keep a daily log of your results
- How to recognize and treat low blood sugar (hypoglycemia)
- How to recognize and treat high blood sugar (hyperglycemia)
- Diabetes meal planning
- How to give insulin
- How to monitor blood glucose and urine ketones
- How to adjust insulin and food intake during exercise
- How to handle sick days
- Where to buy diabetes supplies and how to store them

### Non drug / lifestyle:

Currently there is no way to prevent Type 1 diabetes. There is no effective screening test for Type 1 diabetes in people who don't have symptoms.

- To prevent complications of Diabetes, visit your doctor or diabetes educator at least four times a year. Talk about any problems you are having.
- Monitor your Diabetes and prevent complications of Diabetes by regularly having the following done:
  - Have your blood pressure checked every year (blood pressure goals should be 130/80 mm/Hg or lower)
  - Have your glycosylated haemoglobin (HbA1c) checked every 6 months if your diabetes is well controlled, otherwise every 3 months
  - Have your cholesterol and triglyceride levels checked yearly (aim for LDL levels below 3.0mmol/l, less than 2.5mmol/l in high-risk patients)
  - Get yearly tests to make sure your kidneys are working well (microalbuminuria and serum creatinine)
  - Visit your ophthalmologist (preferably one who specializes in diabetic retinopathy) at least once a year, or more often if you have signs of diabetic retinopathy
  - See the dentist every 6 months for a thorough dental cleaning and exam. Make sure your dentist and hygienist know that you have diabetes.
  - Make sure your health care provider inspects your feet at each visit.
  - Foot care: Diabetes causes damage to the blood vessels and nerves. This can reduce your ability to feel injury to or pressure on the foot. You may not notice a foot injury until severe infection develops. Diabetes can also damage blood vessels. Small sores or breaks in the skin may progress to deeper skin ulcers. Amputation of the affected limb may be needed when these skin ulcers do not improve or become larger or deeper. To prevent problems with your feet, you should:
    - Stop smoking if you smoke
    - Improve control of your blood sugar
    - Get a foot exam by your health care provider at least twice a year and learn whether you have nerve damage

## Disclaimer

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type of insulin may be mixed together in an injection to achieve the best blood glucose control. The injections are needed, in general, from one to four times a day. Diabetics are taught how to give insulin injections by their doctor or a diabetes nurse educator. At first, a child's injections may be given by a parent or other adult. By age 14, most children can be expected (but should not be required) to give their own injections.

Diabetics need to know how to adjust the amount of insulin they are taking in the following situations:

- When they exercise
- When they are sick
- When they will be eating more or less food and calories
- When they are travelling

### Medications to prevent complications:

Your doctor may prescribe medications to reduce your chances of developing eye disease, kidney disease, and other conditions that are more common in people with Diabetes.

- An ACE inhibitor - (or ARB) is often recommended as the first choice for those with high blood pressure and those with signs of kidney disease.
- Statin drugs - are usually the first choice to treat an abnormal cholesterol level. Aim for an LDL cholesterol level of less than 3.00mmol/l (less than 2.5mmol/l in high-risk patients).
- Aspirin - to prevent heart disease is most often recommended for people with Diabetes who:
  - Are older than 40
  - Have a personal or family history of heart problems
  - Have high blood pressure or high cholesterol
  - Smoke

- Check and care for your feet EVERY DAY, especially if you already have known nerve or blood vessel damage or current foot problems
- Make sure you are wearing the right kind of shoes
- Stay up-to-date with all of your vaccinations and get a flu shot every year around March
- People with Type 1 diabetes should eat at about the same times each day and try to be consistent with the types of food they choose. This helps to prevent blood sugar from becoming extremely high or low
- You should work closely with your health care provider to learn how much fat, protein, and carbohydrates you need in your diet. A registered dietician can help you plan your dietary needs

### When to Contact a Medical Professional

- Go to the emergency room or call the local emergency number (such as 911) if you have symptoms of ketoacidosis:
  - Abdominal pain
  - Deep and rapid breathing
  - Increased thirst and urination
  - Loss of consciousness
  - Nausea
  - Sweet-smelling breath
- Go to the emergency room or call the local emergency number (such as 911) if you have symptoms of extremely low blood sugar (hypoglycemic coma or severe insulin reaction):
  - Confusion
  - Convulsions or unconsciousness
  - Dizziness
  - Double vision
  - Drowsiness
  - Headache
  - Lack of coordination
  - Weakness

### Exercise

Regular exercise is especially important for people with Diabetes. It helps with blood sugar control, weight loss, and high blood pressure. People with Diabetes who exercise are less likely to experience a heart attack or stroke than those who do not exercise regularly.

### Outlook (Prognosis)

With good blood glucose and blood pressure control, many of the complications of Diabetes can be prevented.

Studies have shown that strict control of blood sugar, cholesterol, and blood pressure levels in persons with diabetes helps reduce the risk of kidney disease, eye disease, nervous system disease, heart attack, and stroke.