

Diabetes Mellitus and my Heart

What is diabetes?

Diabetes is a disease state that is defined by a *lack of action of the hormone insulin*. This lack of action or efficacy could be related to the body's receptors being blunted to the effect of insulin (*insulin resistance*), or due to an absolute lack of sufficient levels of insulin. Insulin has many important roles in the body, one of which is to lower blood glucose/ sugar levels. In patients with diabetes, blood sugar levels are usually elevated, and the longstanding elevated level of blood sugar is toxic to blood vessels.

What is Type 1 vs Type 2 diabetes?

Type 1 diabetes occurs when a patient's pancreas produces too little insulin. This is usually associated with diabetic onset as a child. Management consists of supplemental insulin injections into the skin.

In Type 2 diabetes the pancreas usually produces enough insulin, but the body tissues are resistant to the effect of insulin. Here the cornerstone of management revolves around improving the sensitivity of the body to the available insulin levels, i.e. lowering resistance to insulin. Over time, many people with Type 2 diabetes will develop dysfunction of the insulin producing glands, and they may therefore also need to be on insulin.

How is diabetes diagnosed?

Diabetes is typically diagnosed when your fasting blood glucose levels are more than 7 mmol/l. It can also be diagnosed by an *HbA1c test* (see below). It is important to realize, that most patients with *undiagnosed* diabetes, are completely asymptomatic. This is why, feeling "normal" does not exclude the possibility that you may have diabetes. It is important to understand that blood glucose levels can be (a) 'normal', (b) 'abnormal' but not at the thresholds for diagnosing diabetes (pre-diabetes), and (c) abnormal in the diabetes range. Damage to blood vessels can already start to occur in the 'pre-diabetes' range.

What is the problem with having high levels of blood glucose?

High levels of blood glucose are toxic to the inner lining of blood vessels. Prolonged elevated glucose levels lead to inflammation, scar formation, calcification, and ultimately, clinical events such as heart attacks. All the blood vessels in the body are exposed to the high glucose levels, and therefore diabetes is a systemic illness which, if left untreated, may lead to heart attacks, gangrene, strokes, vision loss and renal failure.

Why did I develop diabetes?

Type 1 diabetes is an autoimmune disease; meaning that the body has attacked the pancreas (insulin producing gland), and caused destruction of the cells that produces insulin.

Type 2 Diabetes Mellitus is commonly associated with being overweight, poor diet, a sedentary lifestyle with partially a genetic component.

What can be done to improve my diabetes?

Comprehensive diabetes care requires input from various health care professionals, and the patient needs to be well informed about their illness. Generally speaking, the 4 main pillars of diabetes care are:

1. Lifestyle: dietary changes, being more active, weight loss.
2. The correct use of various anti-diabetic medications, possibly including insulin injections. This also includes monitoring of glucose levels and making sure target glucose levels are obtained. Typically, your fasting glucose in the morning should be below 7mmol/l.
3. Optimal control of other cardiovascular risk factors such as smoking, cholesterol, and high blood pressure.
4. Screening for complications of the diabetes, and the early and optimal detection and management of diabetes related complications (eyes, kidneys, heart, leg arteries).

What is a HbA1C test?

HbA1C is the most commonly used blood test to determine how well controlled your diabetes is. The blood test evaluates the percentage of *glycosylated* haemoglobin in your blood, and this correlates very well with the average glucose control over the previous 3 months. Your doctor will discuss a specific HbA1C target with you, and it is important to understand what the value means, and what your individual reading is.



HbA1C level	Predicted average blood glucose level (previous 3 months)
6.0%	6.8mmol/l
6.5%	7.8mmol/l
7.5%	9.4mmol/l
8.5%	10.9mmol/l
9.5%	12.6mmol/l
10.0%	13.4mmol/l

Speak to your cardiologist about your diabetes, plans to achieve optimal controls, and regarding the various team members that should be involved in the care of your diabetes.

Diabetes and coronary artery disease

Diabetes is one of the major risk factors for coronary artery disease, increasing the risk of heart disease by 4-fold. Also, patients living with diabetes often have more extensive coronary artery disease, and are therefore more likely to be treated with a coronary bypass surgery than with stents. Ensuring that your diabetes is well controlled now, is a major investment in your long-term health.

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