Type 1 Diabetes: What you need to know

O Let's take a closer look at Type 1 Diabetes, its management and the Evolution of Treatment options available.

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THERE are two common types of diabetes, known as Type 1 and Type 2 diabetes, that occur when the pancreas does not produce sufficient insulin. Insulin is a hormone that moves blood sugar into cells to have energy.

Type 2 diabetes generally occurs during adulthood and is associated with multiple factors, including genetic, hormonal, environmental, lifestyle, and other medical conditions. On the other hand, Type 1 diabetes is less commonly known and generally affects children and young adults.

Type 1 diabetes is an autoimmune condition where a person produces abnormal antibodies that attack their normal cells and tissues. In the case of people with Type 1 diabetes, these antibodies attack and damage specifically the insulin-producing cells in the pancreas, also known as the beta cells. Type 1 diabetes affects over 9 million people worldwide, including Nick Jonas, Halle Berry and Theresa May.

Once the beta cells are completely damaged, the person will experience high glucose (hyperglycaemia) and eventually a life-threatening condition called diabetic ketoacidosis (DKA).

Why is Diabetic Ketoacidosis (DKA) Life Threatening?

Diabetic ketoacidosis (DKA) is a medical emergency caused by very high glucose and the accumulation of ketone bodies in the blood. When people do not have enough insulin, they cannot utilise it as the primary source. In response, the body breaks down fat tissues and releases ketone bodies in excessive amounts.

Once too many ketone bodies are in the blood, it causes the blood to become too acidic, leading to multiple organ failures, including heart failure and coma.

The main symptoms of Type 1 diabetes include unexplained weight loss, increased urination at night, and excessive lethargy. When a person or a child develops DKA, they will also experience abdominal pain, vomiting, breathing difficulties, and eventually, lose consciousness if not promptly treated.

How is Type 1 Diabetes Diagnosed?

Once a person experiences the symptoms of Type 1 diabetes but does not receive the correct diagnosis and treatment, they may progress to develop

DKA within 2 to 4 weeks. However, given this rapid progression of symptoms, most children and adults with Type 1 diabetes are diagnosed only at a later stage, when they have already developed DKA.

The diagnosis of Type 1 diabetes can be made by demonstrating high blood glucose in people with the typical symptoms in the absence of other features to suggest different types of diabetes, for example, obesity, older age, and pregnancy.

The confirmation of Type 1 diabetes diagnosis can be made by measuring the antibodies specific to the beta cells. Still, the test results are only received after a few weeks. However, treatment for Type 1 diabetes should be started immediately when the blood glucose is found to be elevated to avoid DKA, without waiting for these antibody test results.

How is Type 1 Diabetes treated?

All patients with Type 1 diabetes require insulin treatment for the rest of

their lives.

Otherwise, they will relapse back into DKA. However, insulin treatment in people with Type 1 diabetes can be complex and requires continuous learning.

Studies have also shown that despite insulin treatment, people with Type 1 diabetes can still develop long-term diabetes complications such as kidney failure, blindness, amputations, and cardiovascular diseases. These complications can be prevented by aiming for lower HbA1c (average blood sugar levels over the last two to three months) with intensive insulin treatment.

Patients with Type 1 diabetes are also prone to experience low blood glucose (hypoglycaemia) from insulin treatment. To achieve the target HbA1c and minimise the risk of hypoglycaemia, such intensive insulin treatment often involves multiple daily insulin injections, frequent blood glucose monitoring by finger pricking, carbohydrate counting, and matching insulin doses to carbohydrate intakes. Acquiring these skills and selfmanaging Type 1 diabetes daily requires continuous learning and communicating regularly with the diabetes care providers.

Technological Advancements in Diabetes Management

However, new technologies have been developed to make selfmanagement of Type 1 diabetes more manageable. This includes treatment options such as: 0

A continuous glucose monitoring (CGM) system is designed to track glucose levels using a sensor placed on the skin that automatically tracks glucose levels throughout the day. It lets patients see their results in realtime without pricking their fingers through a mobile app or a handheld device. It has been used by people with Type 1 diabetes with encouraging results.

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Insulin pumps are small, computerised devices that deliver a continuous insulin infusion into the skin without requiring multiple injections. These devices can be programmed to deliver customised rates of insulin at different times of the day and for different amounts of carbohydrate intakes, especially when eating larger volumes.

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Closed-loop system technology (Artificial pancreas) combines the best CGM systems and insulin pumps to create an automated insulin delivery system based on the monitored continuous glucose data. These closed-loop systems are often also called the "artificial pancreas", although they still have some limitations as compared to the average human pancreas.

Can Type 1 Diabetes be cured?

While there is still no cure for Type 1 diabetes, islet cell transplantation containing beta cells has been used for remission for patients with Type 1 diabetes; however, this remission is often short-lived. However, as new treatments, including fully automated insulin delivery systems and stem-cell-derived beta cells, are being developed, we can expect to see new treatment possibilities that will improve the lives of people with Type 1 diabetes.