

## ASK EXPERT:

# Prevention of complications of uncontrolled type 1 diabetes in children



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### Type 1 Diabetes

Diagnosis of type 1 diabetes means that the child or a person with type 1 diabetes does not produce any insulin and requires insulin injections for survival and living. We all need insulin, which is made in our bodies by beta cells of pancreas to convert glucose into energy. When a person has diabetes two main things happen. Firstly, there is lot of glucose travelling around in the blood and at the same time, cells do not get enough glucose to produce energy, which makes people sick.

Any kind of treatment of diabetes should replace or supplement the body's own insulin and help in restoring normal or near-normal blood sugar levels. Along with insulin, people with type 1 diabetes need to monitor their blood glucose levels to check whether their diet, exercise, day to day activities and stress are managed adequately by their insulin dosage. Most of the diabetes complications are related to poor blood glucose control, so one needs to work constantly to keep blood sugar levels near normal range.

### Uncontrolled diabetes and its effects

#### Short-term Diabetes Complications

**Hypoglycaemia:** Hypoglycaemia or low blood glucose level is a condition which develops when there is too much insulin and this happens mostly when insulin administration is not properly planned according to meals or exercise. In the mild or moderate stage, most people can treat hypoglycaemia themselves or with help of other people by having sugar or any food containing sugar. However, severe hypoglycaemia can cause serious problems and may require hospitalization.

**Diabetic Ketoacidosis:** If the blood glucose levels are constantly above 250 mg/dL, then a person with type 1 diabetes can have diabetic ketoacidosis. It is a serious complication due to severe lack of insulin. Many children go into this stage because of lack of timely diagnosis of type 1 diabetes. However, it's also possible to develop diabetic ketoacidosis post detection, if a child is not taking care of blood glucose levels properly and is skipping or taking less dose of insulin or is having any other acute illness with high blood glucose levels. Test for ketones in the urine need to be done at home. If found positive; the child have to be taken to the nearest hospital emergency for evaluation and treatment.

### Long-term Complications

These complications develop over many years usually after around 10 years of diagnosis of type 1 diabetes. Uncontrolled blood glucose can, over time, damage the body's tiny and large blood vessels which results in microvascular and macrovascular complications respectively.

**Microvascular Complications:** The smaller blood vessels affect the eye, kidney and the nerves. Complications of uncontrolled type 1 diabetes include cataracts and/or retinopathy in eyes. Diabetic nephropathy (kidney diseases) and nerve damage, also known as diabetic neuropathy can also happen

**Macrovascular Complications:** The macrovascular complications include coronary artery disease, peripheral arterial disease and stroke. Diabetes dramatically increases risk of various cardiovascular problems which includes high blood pressure, coronary artery disease, heart attack and stroke.

### Elements for Good Glucose Control

- Injecting insulin at regular times as required
- Monitoring blood glucose levels daily
- Adjusting insulin doses according to food intake and exercise
- Following a diet and exercise plan
- Making regular visits to a health care center

### Prevention of Complications

Diet, exercise, insulin and monitoring along with diabetes education are four pillars essential for proper management of type 1 diabetes. By tightly controlling blood glucose levels, one can avoid most of the complications of type 1 diabetes. To avoid long term complications, people with diabetes need to undergo some more tests apart from glucose monitoring regularly. So, that if there is any complication it can be detected and treated at earliest stage and person with diabetes can live a healthy life.

Sl no.	Test	Frequency
1	Height	Ideally every quarter/ at least twice a year
2	Weight	Every Visit
3	BMI	Ideally every quarter/ at least twice a year
4	Blood Pressure	Once a year unless elevated
5	Blood Lipids	Three months after diagnosis, if 12 years or older. If normal, repeat every 5 years
6	HbA <sub>1c</sub>	Three - Four times / year
7	Microalbuminuria	At least once a year from puberty or from 7 years after diagnosis
8	S. Creatinine	At diagnosis and annually if microalbuminuria is present
9	Eye fundus examination	Once a year
10	Neuropathy	Once a year
11	TSH and Antibodies	Every second year
12	Coeliac Antibodies	Every year for first five years and if symptoms indicate

### Ultimate goal for treatment

The goal of treatment is to maintain the best possible level of glucose control by providing appropriate insulin at appropriate time as it will help children with diabetes to live healthy, long and near normal lives with least complications. The Diabetes Control and Complications Trial (DCCT), a major clinical study conducted from 1983 to 1993 involving 1,441 volunteers, ages 13 to 39, with type 1 diabetes showed conclusively that keeping blood glucose levels as close to normal as possible slows the onset and progression of the eye, kidney, and nerve damage caused by diabetes.

### Current Indian Scenario

Adequate management of type 1 diabetes requires intensive insulin treatment and monitoring. Almost all the burden of treatment falls on the family of the child with type 1 diabetes. Huge financial burden and lack of proper diabetes education because of scarce resources results in suboptimal treatment and thus suboptimal outcomes for the child.

### Changing Diabetes® in Children (CDiC) program

Novo Nordisk Education Foundation along with 21 specialized centres across India has tried to address the critical gap in the management of type 1 diabetes through its CDiC program. The 4000 children registered in the program are provided with free doctor consultations, human insulin, glucometer, strips, HbA<sub>1c</sub> test, other essential diagnostic tests and diabetes education on regular basis. CDiC aims to support normal and healthy childhood in these children with type 1 diabetes, so that they grow into healthy adults.

If you would like to have more information on type 1 diabetes you can write to us at:

#### Diabetes Educator

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