

An Update on Juvenile Diabetes Mellitus **Ritika Gupta***

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Diabetes mellitus can be characterized as metabolic homeostasis which is controlled by insulin, and it leads to lipid and carbohydrate metabolism. Type 1 diabetes is also known as insulin dependent diabetes mellitus (IDDM) and juvenile onset diabetes mellitus. It is an autoimmune destruction of pancreatic beta cells. It is the common metabolic disorder found in children. Type 2 diabetes is characterized by insulin resistant which further prevents the insulin secretion from matching the increased insulin requirements. Insulin pumps, recombinant insulin analogs and newer devices for glucose monitoring have significantly improved the lives of diabetic patients. Failure and dysfunction of different organs is caused by hyperglycemia [1-3]. There is an urgent need to create awareness among children with new-onset type 1 diabetes and their families by (Diabetic health care) DHC team i.e. interdisciplinary pediatric diabetes healthcare. Specialized care is necessary to ensure the best long-term outcomes. Following topics should be covered such as

- Insulin action and administration
- Dosage adjustment
- Blood glucose (BG)
- Ketone testing
- Prevention of diabetic ketoacidosis (DKA)
- Nutrition therapy
- Exercise
- Treatment of hypoglycaemia

Individuals having deficiency in insulin secretion can be prone to ketoacidosis. The primary cause for type 1 diabetes is T-cell mediated pancreatic beta cells destruction [4,5]. Recent reports suggested that more than 40 distinct locations on genome are being associated with this disorder. Among all known genes, HLA gene is likely to have a strongest association with type 1 diabetes. Further autoantibodies, islet cells, genetic markers are also being associated with it. MODY (Maturity-onset diabetes of the young) is a rare form of monogenic disorders which results in beta cells destruction. It can be caused by mutation either glucokinase or hepatocyte nuclear factor gene.

Outpatient education has proved to be less expensive than inpatient education and is also associated with better outcomes when there is availability of appropriate resources. The treatment for pediatric patients suffering from type 1 diabetes

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should be insulin therapy [1,3]. It is the only medication which is helpful in lowering blood glucose levels. Insulin therapy results in honeymoon period in which children experiences temporary restoration of beta cells function. According to the survey, children eating habits can have a substantial impact on blood glucose levels.

Parents should focus on eating behavior of children with type 1 diabetes. Recent study suggested that there is a need to balance energy expenditure correlated with food intake while managing type 1 diabetes in children [4]. Some of the objectives which should be taken under consideration should be freedom from hypoglycemic reactions, psychological and physical growth and freedom from polyuria associated with excessive glucosuria. Management should not be too rigid for diabetic children who are less than five years of age. Blood glucose level should lie between 100-200 mg/dl, HbA1c levels should be <197 mg/dl [1]. There should be continuous monitoring of blood glucose level at least 4 times in a day associated with healthy diet. Self-monitoring of blood glucose can be invasive, exhaustive and painful therefore, glucose sensing devices would be extremely helpful to monitor continuous glucose level. GlucoWatch® Biographer is an example of noninvasive monitoring which has been approved by the Food and Drug Administration (FDA). It is worn on the forearm and its auto sensor is present on the underside of the device. A major drawback with it is its biostability which can be improved by coating of membrane layer with silicon oxide and polyethylene glycol nanoparticles. HGC1c is also a non-invasive glucose monitoring device which works on the principle of Raman spectroscopy. This device is worn on the abdomen and it measures the glucose level after every five minutes. Then the data is transmitted to the smartphone through the sensor which

is enabled with alarm during glucose excursion [5]. Recently, research is going on to develop spit test for diagnosing type 1 diabetes in children.

To cure type 1 diabetes, many novel therapies are continuously emerging but sustained efforts are required towards this distant

goal. Developmental, psychosocial and physiological issues are the challenges which are being faced by parents of type 1 diabetic children. Young children may exhibit susceptibility to hypoglycemia, insulin sensitivity and neuropsychological effects. Further research should be done on type 1 diabetes neurocognitive consequences and emerging glycemic variability.

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