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Case Study - Reversal of Type 1 Diabetes Using Plant Based Diet

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Reversal of Type 1 Diabetes Using Plant Based Diet: A Case Study

Abstract

Type 1 diabetes (T1D) is an autoimmune disease characterized by hyperglycemia, the inability to produce insulin due to self destruction of beta cells in the pancreas. The disorder of type 1 diabetes causes irreversible damages like retinopathy, nephropathy, neuropathy, foot complications, high blood pressure, and puts patients on a life sentence with insulin. The common perception in medical science is that sugar levels cannot be normalized without the help of medication. However, in the present study we examined a suspected type 1 diabetic patient by putting her on a diet plan with regular follow ups and studied all diabetes-related biochemical parameters. We were successfully able to eliminate her medication and insulin dependency.

Diabetes is one of the most common metabolic disorders Dassociated with many life threatening complications which make the life of a diabetic person worse. Diabetes is of two types-type 1 diabetes (T1D) and type 2 diabetes (T2D). T2D is the more common type of diabetes worldwide (90-95%), marked by an increased blood sugar level, frequent urination and weight loss. The other is T1D or gestational diabetes (5-10%). In T2D, impaired receptors do not respond to insulin, eventually leading to insulin resistance while in T1D, there is a deficiency of insulin[1] . Out of all diabetes cases 1-2% cases are Maturity Onset Diabetes of the Young[2] (MODY).

According to a recent estimate of International Diabetes Federation, South East Asia region, in 2017 there were 72,946,400 diabetic cases in India, 425 million cases in the world and 82 million in South East Asia region, which is likely to go up to 151 million by 2045[3] . According to an estimate drawn in 2015, India has about 97,700 children with type 1 diabetes mellitus (T1DM or T1D)[4] .

Although T1D is not as prevalent as T2D, it shows a trend of 3–5% increase every year. India itself records three new cases of T1DM/100,000 children in the age group of 0–14 years. Prevalence data of three regions shows 17.93 cases/100,000 children in Karnataka, 3.2 cases/100,000 children in Chennai and 10.2 cases/100,000 children in Karnal (Haryana) of T1D. It is a juvenile onset disorder which is characterized by pancreatic dysfunction due to autoimmune reaction of the body where beta cells continuously get destroyed, eventually leading to insulin deficiency[6] .

One highly sensitive method of C-peptide determination has shown that beta cells can be detected even up to 40 years after the clinical onset of the disease. These findings help patients in advanced stage, for example, it helps patients whose β-cell function was thought to have long ceased in getting benefit from interventions to preserve β-cell function or to prevent complications[7] . Alot of effort has been made to regenerate beta cells in vitro by providing growth factors and by reprogramming/transdifferentiation of terminally differentiated cell types. However, none of these approaches have proved to be successful in growing beta cells in vivo due to shortage of donors. The inefficient technique of β-cell generation and the difficulty of growing β-cell in adult humans sufficiently force a patient to adhere to medication for his whole life[8] . Change in food habits plays an important role in both type 1 and type 2 diabetes by modulating or completely restoring normal glucose levels, thereby either decreasing or eliminating the need of medicine/insulin [9] .

Case presentation

Here, we present a case of a 23-year-old female, weighing 60 kg, who was diagnosed with diabetes at Fortis, Mohali on 28 December 2011. She had been on insulin (60 U/day) for eight years before coming to us. She was diagnosed with T1D at 15 years of age and came to us at 23 years. Moreover, she was on insulin from the very first day, did not show any family history and showed higher values of Hb1Ac (9.3%) which are suggestive of T1D than MODY.

Furthermore, in the absence of initial C-peptide and Glutamic Acid Decarboxylase (GAD) reports diagnosis was difficult. However, such negligence in maintaining records by the clinical practitioners should be avoided which leads to such discrepancies in diagnosis. She complained about her vision, and was diagnosed with glaucoma in both her eyes and retinal detachment in her left eye. Her eyes

had been operated on thrice. She displayed a nephropathy condition as stones were also found in her kidney

She had been taking basic intervention through our video[10] for five months (August 2018-December 2018), after which, she approached us in January 2019. She was put on intensive intervention, where she was monitored for 72 hours by a sixmember health team in Faridabad.

Intervention

For the initial five months, she had been following the videorecommended diet that included cooked food along with raw food. This diet was divided into breakfast, lunch and dinner. Breakfast included four different types of fruits which weighed equal to body weight (in kg)×10 = …(gm). Lunch included four types of raw vegetables which weighed equal to body weight (in kg) ×5 = … (gm) along with a normal cooked meal. Dinner was calculated the same way as lunch. In addition to this, soaked nuts and sprouts were also a part of the diet and the quantity of these also was based on the patient's body weight (kg)… (gm).

Sunshine was also an integral part of the prescribed diet. Packed and refined food, nutritional supplements, nonsteroidal anti-inflammatory drugs (NSAIDs), animal, dairy products and dinner at late hours were strictly denied.

After five months, she was recommended to follow a more restricted diet plan mainly consisting of fruits and raw vegetables. Dairy products and cooked food were completely eliminated during intensive intervention [9] . A regular monitoring of glucose (fasting and post prandial) was carried out during intervention.

Table showing biochemical parameters before and after intervention

	Date	Insulin	C-peptide	GAD	HbA1c(%)	Blood sugar in average (mg/dl)
At the time of diagnosis 2011	(28.12.11)	Mixtard 28U+22U/day Actrapid 10U/day	–	—	9.3	160*
Basic intervention (2019)	Till mid August	50 U	–	–	–	156*
	From mid Aug to Dec	25U				159*
Intensive intervention (2019)	4th Jan	0	–	–	–	195
	5th Jan	0	–	–	–	181
	6th Jan	0	–	–	–	176
At the time of writing the article		0	.93 10.02.2019	7.0 05.03.2019	7.2 18.02.2019	

GAD=gluttamic acid decarboxylase Parenthesis (-) represents the non availability of data *glucose with insulin therapy

Biochemical parameters

Before intervention

The patient had been suffering from T1D for eight years as was diagnosed in December 2011. She was prescribed Mixtard insulin 28 units before breakfast and 22 units before dinner and Actrapid 10 units before lunch. In addition to that, she was taking 1000mg of Metformin per day. Her blood sugar level varied from 156±24 mg/dl with total insulin (60 Unit) and 159±5 with 25U insulin. Her HbA1c was 9.3% (2011) and mean plasma glucose was 197 at the time of diagnosis. (Table)

Post intervention

The intervention was divided into two phases.

a. **Basic intervention,**where cooked food was offered along with raw food (August 2018-January 2019). Her dependency on insulin decreased gradually from 60U to 25U during basic intervention.
b. **Intensive intervention,** where no cooked food was given (4-6 January 2019). She was no longer dependent on insulin during intensive intervention phase. Her HBA1c was 7.2% post intervention. Her C-peptide level was .93 (.81-3.85) ng/ml, mean plasma glucose was 160 and GAD, 7 U/ml (value <30 is considered negative) after dietary intervention (Table).

Discussion

T1D has been neglected for a long time and its nationwide prevalence is not yet known. The growing number of T1D cases is a cause of concern as its treatment is difficult in comparison to that of T2D[11]. In this article, we show a comprehensive analysis by stating the pre and post diabetic conditions of a proband severely affected case of suspected T1D who approached us in January 2019. She was diagnosed with diabetes at the age of 18 years and from the very first day she was on insulin. She did not show any family history of diabetes and her pre intervention HbA1c reading was 9.3%, which is on the higher side. All the evidences so far define her a T1D case than any other type of diabetes.

Her higher values of HBA1c are suggestive of diabetic complications[12] which are evident by her eye and kidney problems. Her insulin dependency reduced to less than half after a basic dietary intervention, and finally, to nil after intensive intervention. Originally, when she was diagnosed as diabetic, her insulin intake was 60U (2011) per day, and it came down to 25U (2018) per day owing to dietary intervention. Presently, she is no longer dependent on insulin. Her glucose levels are also in normal range without insulin (184±9). Her GAD values are suggestive of the reversal of type 1 diabetes. She adheres to regular follow ups.

Evidences of cases of T1D due to disturbed lifestyle are increasing[13] . Dietary intervention is a great help to medical science in curbing diabetes to a large extent, without causing any side effects. The complete reversal of chronic T1D through dietary intervention is a ray of hope to many patients who are in the trap of medicines.

Acknowledgements

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Amazing Stats…

⊛ The average adult human brain has the ability to store the equivalent of 2.5 million gigabytes digital memory!

⊛ The human heart pumps 182 million litres of blood during the average lifetime! memory!

⊛ The total length of all the blood vessels in human body is about 100,000 km!

⊛ Human skin is completely replaced about 900 -1,000 times during a person's lifetime!

⊛ The average person has about 10,000 taste buds being replaced in every two weeks or so!

⊛ The degeneration and regeneration of the cells in the body is so rapid that 50,000 cells in the body died and were replaced by new ones while this sentence is read!

⊛ The total surface area of lungs varies from 50 to 75 square metres!