

C-Peptide compound analysis in type 2 diabetic patients

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ABSTRACT

In adults, a fragment of diabetic individuals with β cell autoantibodies has initially non Insulin requiring diabetes clinically performing as type 2 diabetes mellitus (T2DM), named latent autoimmune diabetes in maturity (LADA) which on later years requires Insulin. LADA is either unnoticed or misdiagnosed in many cases. The occurrence GAD autoantibodies and positive levels of C-peptide analysis are tested to determine and finalize the patients' Insulin dependency. The frequency of β cell autoantibodies (GAD) and C-Peptide analysis was determined in 31 Type 2 diabetic adults. The type of diabetes was classified by doing a Postprandial Blood Glucose test. Ten Type 1 diabetic patients and 10 ordinary people were also subjected to the three tests for comparative study. Twenty-three per cent of the adults with T2DM were tested positive for GAD autoantibody, and 61 per cent were tested positive (who came in T1DM range) for C-peptide analysis among them. 19% of the patients were tested positive for both GAD antibody and C-peptide analysis. Patients had the common symptoms of polyuria, polyphagia and polydipsia. In T2DM patients, 61% were females, and 39% were males, and all were non-obese. β -cell autoantibodies were evident in a subcategory of initially non-insulin needy diabetic adults with the clinical entrance of T2DM. This proves the existence and necessity for change in Insulin dependency.

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INTRODUCTION

Recent reports suggest a growing occurrence of Type I Diabetic Mellitus (T1DM) and type 2 Diabetic Mellitus (T2DM) in kids and adults. T1DM is categorized by way of insulin dependence, in comparison to T2DM, wherein there may be a comparative insulin deficiency with a mutable degree of insulin confrontation. Typically, adults with T1DM aren't

overly heavy and have a short length of symptoms. In assessment, people with T2DM seldom occur with ketosis, have few signs, have the clinical capabilities of insulin opposition, and the prognosis is made thinking about their family history and weight problems [1, 2].

In some patient, a medical difference among T1DM and T2DM isn't conceivable at appearance and autoantibodies are used to describe the sort of diabetes. Beta-cell autoantibodies are found only in T1DM patients due to the obliteration of Beta cells and hence reduced Insulin secretion [3, 4].

LADA (Latent Autoimmune Diabetes in Adults) is a condition where a patient is mistakenly thought to have T2DM based on their Insulin levels, family history, age at diagnosis, obesity And initially responds to diabetic tablets. It is now thought that possibly twenty percentage of a patient with obvious Type 2 diabetes truly have LADA. Patient with LADA do now not have insulin resistance, as do humans with

Type 2 and the amount of Insulin secretion gradually reduces to the range of T1DM [5].

The postprandial test is taken for all the patients, and it measures the Blood Glucose level after two hours of having a meal. This gives details of whether a proper amount of Insulin is secreted for the amount of glucose liberated [6]. The postprandial test is preferred over Fasting Blood glucose tests because measuring basal Insulin cannot be taken since most of the day is spent only after having a meal and the amount of Insulin secreted concerning the glucose level cannot be found out.

Glutamic acid decarboxylase (GAD₆₅) is an enzyme that is shaped chiefly by pancreatic islet cells. GAD is the biosynthetic enzyme for the neurotransmitter inhibitor gamma-aminobutyric acid, GABA. GAD is an enzyme that catalyzes the decarboxylation of glutamate to GABA and CO₂. GAD is usually present in the blood serum for the conversion of glutamate to GABA. The presence of GAD autoantibody is found only in T1DM patients or ones who has the risk of getting Type 1 diabetic in the future, since it has a role in the destruction of beta cells of the Islets and thus impairing Insulin secretion.

C-peptide Serves as an important linker between the A- and the B- chains of Insulin and lets in the Proinsulin green assembly, folding, and processing of Insulin in the endoplasmic reticulum. Equimolar quantities of C-peptide and Insulin are then saved in secretory granules of the pancreatic beta cells, and each is at the end launched to the portal circulate. The sole hobby in C-peptide end up as a marker of insulin secretion and has as such been of tremendous fee in furthering the facts of the pathophysiology of kind 1 and kind 2 diabetes. The necessity of measuring C-peptide is that it circulates in the blood for nearly 2 hours. In contrast, Insulin is used up by the body cells within 20 minutes after the secretion for glucose-glycogen conversion. So measuring levels of C-peptide will be more precise to find the amount of insulin secretion. Consequently, this study aimed to analyze a class of clinically classified T2DM patients for the incidence of β cell autoantibodies(GAD) and do C-Peptide analysis on them and to describe the possibility and occurrence of LADA [7].

MATERIALS AND METHODS

The patients were selected based on few criteria: 1) Patients above the age of 30, who have been identified Type 2 diabetes before 5-10 years 2) Non-obese Type 2 Diabetes patients 3) Patients lacking a family history of Type 2 Diabetes 4) Patients who are not under Insulin therapy. 31 T2DM patients were

tested for Postprandial blood glucose levels, and their anthropometric parameters are noted. The weight status was chronicled as body mass index (BMI), and they were measured using weight in kilogram and height in inches. 10 T1DM patients and 10 Normal people were also tested as controls and were subjected to these tests [8].

The following GAD autoantibodies were decided inside the lab by way of doing Biochemical tests and undoubtedly evaluated in line with in-residence reference reduce offs [8]. The C-peptide assay is a two-site sandwich immunoassay using direct chemiluminescent technology which uses constant amounts of two antibodies. Anti- C-Peptide antibody is added to each well, which is already coated with a secondary antibody followed by the sample. The conjugate HRP-Streptavidin is added, which helps in catalyzing colour developing reactions. This is followed by the TMB One-Step Substrate Reagent, and colour development occurs in this step. It is measured spectrophotometrically, and the intensity of the colour developed gives the value of C-peptide analysis.

RESULTS AND DISCUSSION

The clinical appearances of patients with T2DM are observed. At the appearance, adults with T2DM were meaningfully older, had the same symptoms as that of insulin-dependent Diabetes Mellitus and predominantly female. Blood Glucose was meaningfully subordinate in the T2DM adults associated with adults with T1DM. The callous age of the T2DM patients was 49 years [9].

Anti-GAD was determined, and GAD autoantibody was present in 23% of the adults confidential as T2DM, while 60% of the children with T1DM presented positive results. In Normal people, 2 out of 10 were tested positive for GAD. The GAD values are obtained by automatic calculations wherein the absorbance values of each patient's serum example must be rehabilitated into GAD values using a best-fit linear deterioration computer program. The GAD value results: <1.00 is Negative. >1.05 is Positive, and 1.00-1.05 are considered as Intermediate or borderline [10-12].

The C-peptide analysis was done on the T2DM patients, and 61% of patients came under the lower range. 100% of patients were positive in the T1DM group, and one patient was tested positive in the Control or Normal group. The C-peptide has a standard range of (2.7-5.6 ng/ml). The amount of C-peptide in the blood serum equals the amount of Insulin secreted. For patients with T1DM condition, the amount of Insulin secreted will be considerably less than the average amount, and hence the value

will be less than 2.7 ng/ml. For T2DM diseased condition, the Insulin secretion is either normal or excess than the normal range. In our study, since we intend to find the patients with LADA condition (progression towards T1DM), we consider T1DM range as a positive result [13, 14].

19% of the patients in the T2DM group were tested positive for both the tests and it is clear that they are progressing towards Insulin-dependent Diabetes Mellitus and they have become Insulin dependent for the rest of their lives. Table 1 gives the comparative details of the three groups of patients we have tested upon and their mean and standard deviation [15]. Table 1

Table 1: Statistical comparison of details

	Normal	Type 1	Type 2
GAD65AVG	0.786	1.109	0.912
GAD65 St.Dev.	0.188	0.319	0.369
C-Peptide AVG	3.91	1.26	1.861
C-Peptide St.Dev.	1.69	0.739	1.319
B.G AVG	114.2	207.781	187.5
B.G St.Dev.	14.919	30.144	90.811

CONCLUSION

This is the study commentary β -cell autoantibodies and C-peptide results in adults clinically seeming as T2DM. In this study, the adults with T2DM were older, non-obese, and mainly females associated with male patient. Surprisingly, 61% of the patients confidential as T2DM had positive β -cell autoantibody (GAD). 39% of the patients were tested positive for C-peptide analysis. The normal range for C-peptide analysis is 2.7-5.6 ng/ml. The C-peptide levels indicate the amount of Insulin secreted by the pancreatic beta cells. In T1DM patients, the amount of Insulin secreted is less, and hence the C-peptide level will also be lesser than the normal range. T2DM patients have Insulin secretion (C-peptide levels) either within the normal range or above the range.

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CONFLICT OF INTEREST

The authors declare that they have no conflict of interest for this study.

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