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THYROID LEVELS IN TYPE 1 DIABETES MELLITUS PATIENTS OF WESTERN UP

Biochemistry

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ABSTRACT

Background Diabetes mellitus (DM) and thyroid dysfunction (TD) are the two most common endocrine disorders in clinical practice. There is a great variability in prevalence of TD in general population from 6 to 14 % and in DM it is more that is 10 to 24 %. **Materials & Method** After obtaining Institutional ethical clearance a total of 53 diagnosed patients of Type 1 Diabetes mellitus (T1DM) and 50 age & sex matched subjects (controls) were selected from UHTC and RHTC of Subharti Medical College, Meerut in the age group of 15-40 years. Fasting plasma glucose (FPG) was processed by Vitros 250 auto analyzer and HbA1c was analyzed by Biorad D-10 analyzer. T3, T4, TSH were analyzed by Vidas –PC. Data Analysis was done by Excel 2007, R2.8.0 statistical package for social sciences (SPSS). **Results** In the study 54.5% study subjects were females (n= 29) and 45.5% were males (n=24) while among the controls 52% were females (n=26) and 48% were males (n=24). The prevalence of thyroid disease was found to be 30% in diabetes patients. Fasting blood glucose, HbA1c and TSH were significantly higher in T1DM subjects as compared to controls while T3 and T4 were significantly lower in cases as compared to controls. **Conclusion** In our study we found T1DM patients have high prevalence of thyroid disorder as compared to controls.

KEYWORDS

HbA1c, T1DM, Thyroid dysfunction, TSH

Introduction

Diabetes mellitus (DM) is a serious disease and increasing global health burden[1]. It has involved approximately 20% of urban population and 10% of rural population[2]. Type 1 diabetes mellitus (T1DM) or Insulin dependent diabetes mellitus (IDDM), is an autoimmune disorder where insulin producing cells are destroyed[3]. T1DM accounts for 5 to 10% of all diabetes cases[4].

DM and TD Asymptomatic thyroid dysfunction is one of the more common occurrences in diabetic population particularly in T1DM[5]. There is a great variability in prevalence of TD in general population ranging from 6.6 % to 13.4 %. In diabetes it is more, from 10 to 24%.

Mechanism of interaction between DM and TD are complex and unclear. Insulin and thyroid hormones contribute in cell metabolism together; any fluctuation in each of them can impair the function of others[6]. Since the thyroid glands play a central role in regulation of metabolism, abnormal thyroid function can have a major impact on the control of diabetes. In addition, untreated thyroid disorder can increase the risk of certain diabetic complications and can aggravate many diabetes symptoms[7].

Researchers have found that T1DM is an autoimmune disease and people with an autoimmune disease are more likely to have thyroid disease[8]. The strong link between diabetes and thyroid disease encouraged the American Diabetes Association (ADA) to scrutinized diabetics periodically for thyroid dysfunction[9].

Materials

The present study was conducted at RHTC and UHTC of Subharti medical college, Meerut, UP, after obtaining Institutional ethical clearance. A total of 53 patients of pre diagnosed T1DM ranging from 15 to 40 years of age group and 50 age & sex matched subjects were studied as controls. Patients of Type 2 DM, other autoimmune diseases (like Addison's disease, Arthritis etc.), multinodular goiter, known thyroid disease on medication and pregnant ladies were excluded from the study. were taken as controls. Informed consent was taken from each subject and from parents in case of minors.

Sample collection, storage and processing

Overnight fasting 5 ml venous blood was collected. Fasting plasma glucose (FPG) was processed by Vitros 250 autoanalyzer using dry chemistry kits from ortho clinical diagnostics from Johnson & Johnson USA. HbA1c was analyzed by Biorad D-10 analyzer. T3, T4, TSH were analyzed by Vidas –PC from Biomerieux, France.

Data Analysis was done by Excel 2007, R2.8.0 statistical package for social sciences (SPSS). A p value of < 0.05 is used to establish statistical significance.

Results

This study was hospital based study conducted to find levels of thyroid hormones in Type 1 diabetes subjects. This study comprised 53 T1DM subject as case and 50 healthy non diabetic subjects as controls. In the study 54.5% study subjects were females (n= 29) and 45.5% were males (n=24) while among the controls 52% were females (n=26) and 48% were males (n=24). The prevalence of thyroid disease was found to be 30% in patients with diabetes compared to 10% in controls.

Fasting plasma glucose, HbA1c and TSH were significantly higher in T1DM subjects as compared to controls while T3 and T4 were significantly lower in cases as compared to control (Table)

Table - Levels of FBS, HbA1c, T3, T4 and TSH in Type 1 Diabetes Mellitus patients

Parameters	Case	Controls	p-value
Fasting plasma glucose (in mg/dl)	164.1 ± 27.2	79.8 ±19.6	< 0.001
HbA1c (in %)	8.3 ±1.6	4.9 ± 1.8	< 0.001
T3 (in ng/dl)	122.1 ± 13.4	157 ± 19.7	< 0.001
T4 (nmol/L)	43.8 ± 9.4	84.6 ± 8.7	< 0.001
TSH (mIU/L)	7.7 ± 0.8	2.5 ± 0.9	< 0.001

Discussion

In Diabetes mellitus, large number of patients present with complications due to poor glycemic control. One of the possible factors that contribute to poor glycemic control is thyroid dysfunction which tends to occur concomitantly with diabetes mellitus. The present study was undertaken to find out levels of thyroid hormones in patients of T1DM.

Our study showed that 30% of diabetics were having TD. A study showed that in T1DM 33% had TD. Out of which 27% had subclinical hypothyroidism, 4% had clinical hypothyroidism and 2% had clinical hyperthyroidism[10]. This was in accordance with other studies; based on a 2010 review 3-8% of pediatric patients with T1DM have been

reported to develop autoimmune hypothyroidism[11]. A recently published review and meta-analysis reported a much higher rate of 7-30% for the prevalence of hypothyroidism in patients with T1DM[12,13]. Balsamo et al in their study documented the association of severe metabolic derangement and impaired thyroid function in patients with newly diagnosed T1DM[14]. Lin et al showed significantly lower levels of T3, T4 and free T4 among children who were newly diagnosed T1DM and presented with Diabetic Ketoacidosis (DKA) as compared to patients without DKA at initial diagnosis[15].

Thyroid hormones stimulate glucose uptake into peripheral tissues and enhance an additive effect of insulin action on glucose transport into cells. Therefore in hypothyroid patients insulin dependent glucose clearance could get affected[16-19].

Conclusion

In our study we found T1DM patients have high prevalence of thyroid dysfunction compared with controls. There was no difference in HbA1c in patients with or without thyroid dysfunction. Our study shows that hypothyroidism is prevalent among patients with T1DM, therefore screening for thyroid disease among patients with T1DM should be routinely considered to detect thyroid disorders.

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