



A Comparative Study of Prevalance of Thyroid Dysfunction in Patients Having with and Without Type II Diabetes Mellitus

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INTRODUCTION

Thyroid dysfunction (TD) is defined as the altered serum thyroid stimulating hormone (TSH) According to a projection from various studies on thyroid diseases, it has been estimated that about 42 million people in India suffer from thyroid diseases 1 and hypothyroidism is the most common thyroid disorder 2 and also hypothyroidism is ten times more common in women than in men 3. Diabetes has emerged as pandemic health problem and it's prevalence is increasing at an alarming rate. World Health Organization (WHO) has declared that incidence of diabetes is increasing rapidly world-wide to become a major public health concern 4. It is the commonest endocrine disorder and is the leading cause of death worldwide. Diabetic patients have higher prevalence of thyroid disorders compared with the normal population 7. The prevalence of thyroid disease in patients with diabetes is significantly higher than the general population 8. Number of studies have estimated the prevalence of thyroid dysfunctions among diabetes patients to be varying from 2.2 to 17%

AIM

To study the prevalence of thyroid disorders in T2DM subjects with previously undiagnosed thyroid dysfunction, and compare with normal adult population and thus find the relation between T2DM and thyroid dysfunctions. Therefore the present study has been aimed to find out any relation between thyroid dysfunction in T2DM subjects and hence the necessity of its analysis in T2DM studies patients. This study may be a foundation for future studies which can influence screening and management of thyroid dysfunctions in attempting to achieve glycemic control in T2DM.

PATIENTS AND METHODS

It was a hospital based prospective study conducted by the Department of general medicine ,king George hospital ,Andhra medical college , Visakhapatnam. An Informed consent was taken from each subject. The study was carried out on patients attending the General medicine OPD and also on IPD patients falling within the age group of 35 to 65 Years. Total 100 patients of Type 2 Diabetes Mellitus were selected.

Type 1 DM, Patients with: a) Gestational diabetes mellitus b) Patients with chronic renal failure and Diabetic nephropathy c) Postoperative subjects, chronic illnesses, other physical illnesses, and those who had proven thyroid disorder and in treatment were excluded.

A total of 50 age, sex matched control (nondiabetic) were selected randomly.

Overnight fasting 5 ml venous blood was collected. 1 ml was collected in EDTA vial for HbA1c measurement. 1ml was collected in fluoride oxalate vial for fasting plasma glucose measurement and 3 ml was collected in a plain vial and allowed to clot and centrifuged at 2500 r. p. m. for 10 minutes for other blood parameters. The hormonal analysis Total T3, T4 & TSH were carried using Biomerieux Vidas under standard quality control measures. Fasting Plasma Glucose (FPG), serum TG, TC and HDL-C were processed in Vitros-250 auto analyzer using readymade dry chemistry kits procured from Ortho-Clinical Diagnostics, Johnson & Johnson, USA. HbA1c was processed in Bio-Rad D-10 HbA1c analyzer. Levi-jenning Plot was fed in equipment and

reading checked. Readings outside the range of 2 SD were reprocessed/ discarded.

Mean, standard deviation, student independent t tests, square test used to calculate p-value. Data was analyzed by using Excel 2007, R2.8.0 and Statistical Package for the Social Sciences.

(SPSS) for windows version 20.0 (SPSS Inc; Chicago, IL,USA). A p-value of <0.05 was used to establish statistical significance.

RESULTS :

In our study, mean HbA1c of patients were 8.31+ 2.29% with 66 subjects having HbA1c>7% and 34 having HbA1c <7%. We observed that T2DM with TD (n=31) patients had poorly controlled glycaemia, which is seen with HbA1c >7% in 2020 (64.5%) Patients. Only 11(35.5%) patients had HbA1c <7%. This relation was significant with p value <0.05.

We observed that a total of 31 out of 100 (31%) case subjects were affected with thyroid dysfunction in comparison to 6 (12%) out of 50 subjects from control group. We observed that in T2DM cases out of 31 TD cases, 25(41.67%) were females and 6 (15%) were males, whereas in control out of 6 TD cases 5 (17.24%) were females and 1 (4.76%) was male respectively. .

TABLE 1- PREVALENCE OF THYROID DYSFUNCTION IN T2DM CASE AND CONTROL.

THYROID DYSFUNCTIONS	CASE		CONTROL	
	FEMALE	MALE	FEMALE	MALE
HYPO-THY-ROID/ SUB-CLINICAL HYPO-THY-ROID	22 (36.66%)	5(12.5%)	5(17.24%)	NIL
HYPO-THY-ROID/ SUB-CLINICAL HYPER-THY-ROID	3 (5%)	1(2.5%)	NIL	1(4.76%)
EUTHY-ROID	35(58.34%)	34(85%)	24(82.75%)	20(95.23%)
TOTAL	60(100%)	40(100%)	29(100%)	21(100%)
	N=100		N=50	

p-value = <0.05 (statistically significant) using chi-square test

it was also observed that out of 100 T2DM cases 69% (n=69) of the patients were euthyroid and 31% (n=31) had thyroid dysfunction. Among thyroid dysfunction affected patients, majority had subclinical or overt hypothyroidism (n=27) and only 4 had subclinical or overt hyperthyroidism. In hypothyroid cases (n=27) females were more with n=22(36.66%), and males were n=5(12.5%). In hyperthyroid cases (n=4) females were more with n=3(5%) and males n=1(2.5%). In control subjects, out of 50 subjects, 6 subjects were affected with TD in which 5 (17.24%) females were affected with hypothyroidism with no males affected by this TD.

TABLE 2 – BIOCHEMICAL PARAMETERS IN CASE AND CONTROL.

PARAMETER	CASE	CONTROL	<0.05*
FPG(mg/dl)	193.8+72.64	82.48+8.86	<0.05*
HbA1c(%)	8.31+2.29	5.2+1.1	<0.05*
TC(mg/dl)	196.25+41.73	175.96+27.96	<0.05*
HDL(mg/dl)	39.75+10.76	47.7+13.4	<0.05*
TG(mg/dl)	186.92+83.83	140.2+34.23	<0.05*
T3(nmol/L)	1.37+0.49	1.64+0.67	<0.05*
T4(nmol/L)	83.14+18.29	86.9 +16.07	<0.05*
TSH(uIU/L)	4.14+4.77	2.55+1.94	<0.05*

***STATISTICALLY SIGNIFICANT**

Table 2 shows the levels of various laboratory parameters in T2DM case and control. FPG, HbA1c, serumcholesterol, serum triglycerides, were significantly higher in T2DM case as compared to control subjects while serum HDL was significantly lower in T2DM case as compared to control.

In T2DM case FPG (193.6+72.64, $P < 0.001$), HbA1c (8.31+2.29), total cholesterol (196.25 + 41.73, $P < 0.01$), serumtriglyceride (186.92+83.83, $P < 0.05$), were increased compared to FPG (82.48+8.86), HbA1c (5.2+1.1), Total cholesterol (175.96+27.96), serum Triglycerides (140.2 + 34.23) in control and HDL-C levels were significantly ($P < 0.05$) decreased in T2DM case (39.75 + 10.76, $P < 0.05$) when compared with control. (47.7 + 13.4).

In the thyroid profile; T3 in T2DM case was significantly decreased (1.37+0.05) as compared to control (1.64+0.67) t4 was decreased in T2DM case (83.14+18.29) but it was nonsignificant compared to control (86.9+16.07). TSH levels was significantly increased in T2DM case (4.14+4.77) compared to control (2.55+1.94) (Table 2).

FPG level was significantly and positively correlated with HbA1c ($r=0.598$, $P<1.001$). FPG was nonsignificant and very weakly correlated with T3($r=1.08$, $p=0.40$), T4 ($r=0.1$, $p=1.34$), and TSH ($r=-0.15$, $p=0.133$) (Table 2).

DISCUSSION :

Diabetes mellitus is a worldwide major problem and despite advances in treatment a large number of patients of patients preset with complications due to poor glycemic control is thyroid dysfunction, which tends to occur concomitantly with diabetes mellitus. The present study of T2DM patients have higher prevalence of thyroid dysfunction compared with the control subjects. The prevalence of thyroid disease was found to be 31% in patients with diabetes compared to 12% in controls. Our study findings are supported by Radaideh et al 11 who found that there was a significant difference between thyroid dysfunction in T2DM patients 12.5% versus 6.6% in control subjects $p=0.0064$. In diabetic cases. Domala Prasad et al 12 in their study observed, 13% of the total 108 patients with DM had abnormal thyroid profile. The prevalence with DM had abnormal thyroid profile. The prevalence of thyroid disease in the non diabetic control group was 6.6%. Anil kumar et al 13 reported abnormal thyroid functions in 24% of diabetic patients vs. 13% of controls in their study from south India. Ghazali, et al 14 saw thyroid dysfunction in 29.7% of type 2 DM patients, and in 2.8% of controls ($P=0.002$).

Study highlights that, females are affected more than males with TD both in T2DM cases and also in control subjects. Hypothyroidism was the most common thyroid abnormality found in T2DM patients and was much more common than in control. This was statistically significant in our study. ($P=0.009$) This finding was also supported by many other studies. (15-23).

In the present study, FPG was significantly correlated with HbA1c. There was no significant correlation of FPG with any of the parameters of thyroid profile in our study but increased level of FPG was associated with decrease level of TSH, which is similar to the study by the study by Taksali, et al 24. No correlation was found between fasting sugar levels and parameters of thyroid profile 25, 26. This may point out that there may or may not be a role of blood sugar level in

thyroid dysfunction. Pranav, et al 27 in their study of 80 subjects found significant correlation between FPG and T3 & TSH which is contradictory to our study finding.

CONCLUSION :

The prevalence of thyroid dysfunction was found higher at 31% in type 2 diabetes mellitus subjects as compared to non-diabetic i.e. control. Diagnosis and treatment of thyroid dysfunction might be important in management of T2DM patients as this condition affects glycemic control. There is little information about diabetes and thyroid dysfunction in India and also, there is a need for baseline studies and there is still a great need for further research and studies in this field to combat with thyroid dysfunction .

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