

A Study Of Thyroid Dysfunction In Type 2 Diabetes Mellitus

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Abstract

BACKGROUND : Type 2 diabetes mellitus and thyroid disorders are the most common endocrine disorders and growing problem in our country. we have observed that many diabetes mellitus patients are associated with thyroid dysfunction. we conducted this study to study the proportion of thyroid dysfunction in patients with type 2 diabetes.

AIM: To study the prevalence of thyroid dysfunctions in type 2 diabetes mellitus

MATERIAL AND METHOD : The current study was a prospective, cross-sectional study. All the type-2 Diabetic patients and normal subjects with no diabetes attended to the outpatient clinic and admitted in MAHARAJAH'S INSTITUTE OF MEDICAL SCIENCES, NELLIMARLA. After obtaining informed written consent, a structured questionnaire was used to analyse the patient's chief complaints, General and local examination was performed by measuring BMI, waist circumference. Lab investigations were recorded. Analysis based on patient's lab values for FBS, PPBS, HbA1C, TSH and LIPID PROFILE.

RESULTS : The difference in the proportion of gender between study groups was statistically not significant, the difference in weight and BMI between the two groups was statistically significant. There was no statistically significant difference in cholesterol, triglyceride, LDL between two groups. The difference in the proportion of thyroid dysfunction between the two groups was statistically significant.

CONCLUSION : The present study showed a high prevalence of thyroid dysfunctions in patients of type 2 DM.

Keywords : Diabetes Mellitus, Thyroid Dysfunction FBS, PPBS, HBA1C, BMI, Waist Circumference.

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I. INTRODUCTION

Diabetes mellitus is one of the primary health problems present globally which is assuming epidemic proportions. The co-existence of dysfunction of thyroid in type 2 diabetes mellitus will worsen the macro vascular and microvascular complications, morbidity, mortality, and quality of life. Detecting dysfunction of the thyroid gland in type 2 DM will inform clinicians to give optimal treatment for metabolic conditions. since thyroid condition such as hypothyroidism will delicate achievement of glycaemic target and other comorbidities. Although the autoimmune mechanism is very clear in establishing the association between Type I diabetes and Thyroid dysfunction, the connection between Type II Diabetes mellitus and Thyroid dysfunction is still not completely understood. It is very complex and involves many variables such as synthesis of TRH, the circadian rhythm of TSH, insulin resistance, autoimmunity, and the use of metformin. Since much of the focus is given to major microvascular and macrovascular complications in diabetes, the focus on thyroid dysfunction and its effect on various end organs in diabetes have not been studied in detail. So, we did evaluation thyroid dysfunction prevalence in subjects with Type 2 Diabetes mellitus and determined the correlation between various metabolic parameters such as Lipid profile, FBS, Body Mass Index (BMI), PPBS, HbA1C, Waist circumference and Thyroid dysfunction measured using levels of thyroid hormones.

II. MATERIALS AND METHODS

Study Design: prospective, cross- sectional study.

Study Setting: OPD and Medical wards in MAHARAJAH'S INSTITUTE OF MEDICAL SCIENCES, NELLIMARLA and consent was taken from cases and controls before commencing the study.

Sample size: 496 (248controls and 248 cases).

Study Period: DECEMBER 2022 TO AUGUST 2023.

SUBJECT AND SELECTION CRITERIA: A complete clinical examination of subjects was done. About 5ml of fasting blood was collected for the determination of different biochemical parameters. The plasma obtained

was analysed for fasting blood sugar (glucose oxidase-peroxidase method), PPBS, HbA1c, lipid profile and thyroid profile.

STATISTICAL ANALYSIS: The statistical analysis was performed using students 't' test to compare mean values of variables in control and different groups of diabetes mellitus. The correlations were assessed by Pearson rank correlation coefficient. Differences were considered statistically significant when $p < 0.001$.

INCLUSION CRITERIA: All the type-2 Diabetic patients and normal subjects with no diabetes aged more than 30yrs attended to the outpatient clinic and admitted in the MAHARAJAH'S INSTITUTE OF MEDICAL SCIENCES, NELLIMARLA were considered as the study population.

EXCLUSION CRITERIA : Exclusion criteria included patients of type 1 diabetes mellitus, previously on medications affecting thyroid dysfunction and pregnant females.

III. RESULTS

A total of 496 subjects were included in the final analysis. Out of the 496 subjects, 248 were cases (Type 2 diabetes Mellitus) and the remaining 248 were controls.

Table showing comparison of age and gender between cases and controls

parameter	Group		p-value
	Cases(N=248)	Control(N=248)	
age	55.98±11.19	54.54±10.08	0.131
Gender			
male	162(65.32%)	169(68.14%)	0.505
female	86(34.67%)	79(31.85%)	

Table-1 comparison of age and gender between cases and controls

The mean age of subjects in cases was 55.98 ± 11.19 years and it was 54.54 ± 10.08 years in controls. The difference in the age between the two groups was statistically not significant (P-Value 0.131).

Table showing Comparison of mean of anthropometric parameters between the study groups

Parameter	Group		P-value
	Cases (N=248) (Mean± SD)	Control (N=248) (Mean± SD)	
Height (in cm)	161.02 ± 8.3	161.01 ± 7.79	0.988
Weight (in kg)	69.2 ± 12.64	65.47 ± 10.86	<0.001
BMI	26.21 ± 4.7	24.8 ± 4.15	<0.001
Waist circumference	92.82 ± 13.6	93.39 ± 12.53	0.632

Table-2: Comparison of mean of anthropometric parameters between the study groups (N=496)

With regard to anthropometric variables, there was a significant difference in weight and BMI in diabetic subjects compared to controls and this difference was statistically significant (<0.001).

Table showing median of clinical parameters between cases and controls

Parameter	Group		P-value (Mann Whitney U test)
	Cases (N=248) Median (IQR)	Control (N=248) Median (IQR)	
FBS	133 (102, 175.5)	106.5 (94, 119)	<0.001
PPBS	184 (137.75, 250.75)	137 (111, 166)	<0.001
HBA1C	7.5 (6.5, 9.4)	5.6 (5.2, 6)	<0.001
Cholesterol	155 (121, 194)	163.5 (137, 194)	0.082
Triglycerides	134 (96.775, 199)	122.5 (89, 178.75)	0.054
HDL	34 (26, 42)	36 (30, 47)	<0.001
LDL	92.9 (68.15, 120)	97.2 (72.1, 119)	0.289

Table-3: Comparison of the median of clinical parameters between cases and controls (N=496)

With regards to laboratory parameters, the median FBS, PPBS, HbA1C ,HDL levels were higher in the diabetic group compared to controls, and this difference was statistically significant (<0.001)

Table showing comparison of thyroid dysfunction and type of thyroid between groups

Parameter	Group		Chi square	P value
	Cases (N=248) Median (IQR)	Control (N=248) Median (IQR)		
Thyroid dysfunction				
Yes	50 (20.16%)	23 (9.27%)	11.710	<0.001
No	198 (79.84%)	225 (90.73%)		
Type of Thyroid				
Hyperthyroidism	5 (2.02%)	3 (1.20%)	12.223	0.016
Hypothyroidism	11 (4.44%)	5 (2.02%)		
Subclinical Hyperthyroidism	1 (0.4%)	0 (0%)		
Subclinical Hypothyroidism	33 (13.31%)	15 (6.05%)		
ND	198 (79.84%)	225 (90.73%)		

Table-4: Comparison of thyroid dysfunction and type of thyroid between group (N=496)

The difference in the proportion of thyroid dysfunction between the two groups was statistically significant. (P-value 0.001).

IV. DISCUSSION

- We did a Single-Centre prospective, cross-sectional study in MAHARAJAH'S INSTITUTE OF MEDICAL SCIENCES.NELLIMARLA, A total of 496 subjects were included in our final analysis, out of which 248 (50%) were cases of Type 2 diabetes mellitus and the remaining 248 were controls.
- 65.32% were males in the diabetic group, while 68.14% of controls were males in our study. We found no significant difference between the 2 study groups with respect to gender distribution and mean age
- With regards to anthropometric variables, there was a significant difference in weight and BMI. The diabetic subjects had a higher mean BMI (26.21) compared to controls (24.8), and this difference of 1.41 was statistically significant(<0.001).
- With regards to laboratory parameters, the median FBS, PPBS, HbA1C levels were higher in the diabetic group compared to controls, and this difference was statistically significant (<0.001).
- The median HDL level was higher in controls compared to cases with statistical significance Thyroid dysfunction is more common among diabetic females.
- The most common thyroid dysfunction observed was subclinical hypothyroidism
- There was association of Thyroid dysfunction with Insulin resistance. Association of Hyper- and hypothyroidism with insulin resistance has been considered to be the major cause of impaired glucose metabolism in T2DM".
- The prevalence of thyroid dysfunction in cases was 20.16% while it was only 9.27% in controls in our study.
- This higher prevalence of thyroid dysfunction in cases compared to controls was statistically significant (<0.001) in our study.
- In our study, among the spectrum of thyroid disorders, Subclinical hypothyroidism was the most commonly observed disorder in both cases (13.3%) and also controls (6.048%)

V. CONCLUSION

The present study showed a high prevalence of thyroid dysfunction in patients of type 2 DM. Hence, screening for thyroid dysfunction in diabetic patients should be performed routinely, so as to recognize these dysfunctions early, thus helping in improving the quality of life and reducing the morbidity rate in them.

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