



TO STUDY THE PREVALENCE OF THYROID DYSFUNCTION AND ITS EFFECTS IN PATIENTS WITH TYPE 2 DIABETES MELLITUS IN TERTIARY CARE HOSPITAL

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ABSTRACT **Background:** The relationship between normal thyroid function and type 2 diabetes has been a particular focus of concern. Type 2 Diabetes being the most common endocrine, metabolic disorder, there lies a curiosity to understand and learn the association of this disease with another common endocrine gland that is the thyroid gland. This study is aimed to describe the association of poorly controlled diabetes and thyroid dysfunction.

OBJECTIVES:

- To study the thyroid functions in patients with type 2 diabetes mellitus.
- To study the spectrum of thyroid dysfunction in patients with type 2 diabetes mellitus.

Materials And Methods: A hospital-based observational prospective study was conducted in the Santhiram Medical College and General Hospital for six months. Patients with type 2 diabetes mellitus of age more than 30 years, from OPD and IPD of all the departments in Santhiram General Hospital irrespective of glucose control and treatment, with informed written consent were studied. Thyroid profile tests, target organ evaluation for type 2 diabetes mellitus were performed for all patients in this study group. Thyroid USG was done.

Results: 100 cases of type 2 diabetes mellitus without proven thyroid disease were included in the study. Thyroid disorders were diagnosed in 29 % cases. Hypothyroidism in 1, hyperthyroidism in 13 and subclinical hypothyroidism in 15 cases. In this study 50 patients were male, 50 were females. Females (36%) had high incidence of thyroid disorder than males (22%). Subclinical hypothyroidism was more common (31.25%) in elderly age group. Elderly females had high incidence of subclinical hypothyroidism (18.2%). Clinical features of hyperthyroidism are seen in 8 patients. In the patients with hyperthyroidism (55.5%) there was poor glycemic control. Duration of diabetes has no relation with incidence of thyroid disorders. Majority of patients with subclinical hypothyroidism had uncontrolled sugars with microvascular complications.

Conclusion: Prevalence of thyroid disorders in diabetes mellitus is 29%. Incidence is higher in elderly population. Duration of diabetes mellitus has no impact on thyroid dysfunction. Severe diabetic complications are noted in patients with subclinical hypothyroidism. Subclinical hypothyroidism is seen commonly among females. Diabetes with hyperthyroidism has poor glycemic control.

KEYWORDS : type 2 diabetes mellitus, subclinical hypothyroidism, hyperthyroidism, target organ damage, poor glycemic control.

INTRODUCTION:

Type 2 diabetes mellitus is common among all the endocrine metabolic diseases. It has huge impact on the quality of life, morbidity and mortality through its complications resulting in retinopathy, nephropathy, neuropathy, ischemic heart disease and large vessel obstruction. While the insulin and thyroid hormone being involved in cellular metabolism, increase or decrease levels of these hormones result in pathological disease.¹ Measurement of TSH is highly sensitive and specific which has amplified the assessment of thyroid functions.² The linkage between thyroid disease and type 2 diabetes mellitus is more complicated. The pathophysiological association between type 2 diabetes mellitus and thyroid disease is believed to be the result of interplay between biochemical, genetic and hormonal malfunctions. Increased expression of hepatic GLUT2 receptor is found in hyperthyroidism.³ Intracellular T3 may also play a role in insulin sensitivity. Excess circulating thyroid hormones is associated with poor glycemic control. The present study is taken to note the prevalence and spectrum of thyroid dysfunction in patients with type 2 diabetes mellitus. It is important to screen for thyroid disease in type 2 diabetes mellitus as these endocrinopathies have complex interdependent interactions that increase cardiovascular risks.

AIMS AND OBJECTIVES:

- To study the thyroid functions in patients with type 2 diabetes mellitus.
- To study the spectrum of thyroid dysfunction in patients with type 2 diabetes mellitus.

MATERIAL AND METHODS-

A Hospital-based observational prospective study was conducted among the patients who attended and admitted in OPDs and IPDs respectively in all the clinical departments, Santhiram Medical College, and General Hospital for six months after taking approval from the Hospital Ethics and Research Committee.

Sampling Technique and Sample Size:

Universal Sampling Technique was used for the selection of study subjects. All the patients attending to the OPDs and admitting in IPDs in all clinical departments during this study period and fulfilling the

inclusion criteria were taken for the study after taking prior informed written consent. The final sample size came to be 100 subjects with type 2 diabetes mellitus irrespective of glycemic control and thyroid status.

Inclusion Criteria:

- All patients with Type 2 diabetes of age >30 years.
- All patients diagnosed with type 2 diabetes regardless of their glucose control.
- All patients diagnosed with type 2 diabetes regardless of treatment (OHA/Insulin)
- All patients with type 2 diabetes who are willing to give informed written consent.

Exclusion Criteria:

- Type 1 diabetes mellitus
- Patients with:
 - a) gestational diabetes mellitus
 - b) Pancreatitis
 - c) Fibrocalculous pancreatitis
 - d) Steroid induced diabetes
 - e) Those Patients not willing to give informed written consent.
- All patients who had proven thyroid disease and on treatment were excluded.

Data Analysis:

Association between qualitative variables was done with the help of the Chi square test. P-value <0.05 was taken as significant. Quantitative data was represented using mean ± SD and median & IQR (Interquartile range).

RESULTS:

In this study, 100 confirmed diabetic patients were screened for thyroid disorders by thyroid function tests.

Table 1 : Prevalence Of Thyroid Dysfunction In Diabetics

Prevalence of thyroid dysfunction in diabetics

Thyroid disorders	No. of cases
Normal	71
Hypothyroidism	01
Subclinical hypothyroidism	15
Hyperthyroidism	13

Abnormal thyroid function was found in 29 type2 diabetes mellitus cases and remaining diabetics had normal thyroid function. Among 29 cases, hypothyroidism was noted in 16 patients and 13 patients had hyperthyroidism. Out of 16 hypothyroid patients, 1 had overt hypothyroidism and 15 had subclinical hypothyroidism.

Table 2: Sex Distribution Of Thyroid Dysfunction In Diabetics

Sex distribution of thyroid dysfunction in diabetics					
Sex	Hypothyroidism		Hyperthyroidism	normal	total
	Hypothyroidism	Subclinical Hypothyroidism			
Male	1 (2%)	4 (8%)	6(12%)	39	50
Female	0 (0%)	11(22%)	7(14%)	32	50

The prevalence of thyroid dysfunction was high among females (22%) than in males (8%).The spectrum of thyroid disorders varied among either sex. Subclinical hypothyroidism is more among females (22%) than males (8%). Hyperthyroidism is nearly equal in both sex.

Table 3: Sex And Age Distribution Of Thyroid Dysfunction In Diabetics

Sex and age distribution of thyroid dysfunction in diabetics								
Age	Male				Female			
	Hypo- thyroid	hyper- thy	subclinical	normal	Hypo- thy	hyper- thy	subclinical	normal
<60	1	6	0	29	0	6	5	21
>60	0	0	4	10	0	1	6	11
	1	6	4	39	0	7	11	32

In this study, prevalence of subclinical hypothyroidism is more in elderly >60 yr age (31.25%) compared to adult and middle age group (7.36%).Hyperthyroidism was more among adult and middle age group (17.65%).

Table 4: Dysfunction Of Thyroid Hormone In Relation To Duration Of Diabetes

Dysfunction of thyroid hormone in relation to duration of diabetes			
Duration of DM	no.of patients	thyroid disorder	%
0-5 yr	54	18	33.33
6-10 yr	36	10	27.77
>11 yr	10	1	10

In this study, increased duration of diabetes had no significance to increase in thyroid dysfunction.

Table 5: Thyroid Dysfunction In Patients With Diabetic Complications

Thyroid dysfunction in patients with diabetic complications			
	Total no.of patients	Pt. with thyroid dysfunction	%
DM with micro vascular complications	43	12	27.9
No complications	57	17	36.17

In this study, 43 patients developed micro vascular complications among which 12 patients had thyroid dysfunction.

It has been found that patients with hyperthyroidism had poor glycemic control (mean HbA1C 7.32) compared to patients with subclinical hypothyroidism(mean HbA1C 6.7). This might be due to effect of thyroid hormone on insulin.

DISCUSSION:

A total of 100 patients of type 2 diabetes mellitus were studied. All patients were diagnosed as diabetics who had fasting plasma glucose levels of >126 mg/dl or RBS of > 199 on more than one occasion and history of receiving treatment such as insulin , OHA's or physical exercise therapy . In this study of 100 patients 50 were males and 50 were females. It was found that thyroid disorders present in 29 %. Pasupathi et al in their study found that prevalence of thyroid disorder was 45 % among type 2 diabetics. Hypothyroidism was present in 28 % and 17% had hyperthyroidism. C.E.J. Udiong in his study from Nigeria found that prevalence of thyroid disorder was 46.5 %. Hypothyroidism was present in 26.6 % and 19.9% had hyperthyroidism. Perros et. al demonstrated an overall prevalence of 13.4 % of thyroid diseases in diabetics with the highest prevalence in type1 female diabetics (31.4%) and lowest prevalence in type 2 male diabetics(6.9%)⁴.In this present study, subclinical hypothyroidism was more among females (22%) compared to males (8%).Subclinical hypothyroidism was more common among elderly females (12%).Hyperthyroidism was almost equal in either sex. Increased incidence of sub-clinical hypothyroidism was observed among elderly female compared to males in most of the studies done. In this study , it is found that 34.4% patients ith thyroid disorders over the age of 60 yrs compared to 26.4% below the age of 60 yrs. Subclinical hypothyroidism was 31.2 % in patients above 60 yrs. Flatau E, Trougoubof P have also observed similar findings. They have reported 38 %with subclinical hypothyroidism after the age of 60 years. They concluded that diabetes mellitus and primary hypothyroidism are common disorders in elderly subjects and show atypical presentation.⁵ The guidelines of American Thyroid Association and American Association of clinical endocrinology recommend serum TSH measurement as single most relevant test to diagnose all forms of hypo and hyperthyroidism.⁶ In this study , 17% hyperthyroid patients had poor glycemic control compared to that of hypothyroid patients. Hypoglycemia was not found in any patients with hypothyroidism. Pasupathi et al in their study concluded that there is a need for routine assay of thyroid hormones in diabetics, particularly in those patients whose conditions are difficult to manage.⁷Thyroid stimulating hormone confirms or excludes the diagnosis in all patients with primary hypothyroidism, an elevated concentration being present in both overt and mild hypothyroidism.⁸ Hyperthyroidism impairs glycemic control in diabetics, while hypothyroidism increase susceptibility to hypoglycemia thus complicating diabetes management. Thyroid dysfunction if not diagnosed could negatively impact diabetes and its complications. A high frequency of retinopathy and nephropathy was observed in diabetics with subclinical hypothyroidism . Hence management of subclinical hypothyroidism in diabetics is beneficial.

CONCLUSION:

Prevalence of thyroid dysfunction was seen among 29 % of diabetics studied. Subclinical hypothyroidism was more common (22%) than other conditions . Thyroid dysfunction had higher incidence (34.4%) among elderly patients. Thyroid disorders are more common among females (36%) than males (22%). 36% of diabetics on treatment and diagnosed with thyroid dysfunction showed poor glucose control . Increased Severity of diabetic complications were noted in sub-clinical hypothyroidism. Hence patients with subclinical hypothyroidism should undergo frequent ophthalmic check up to rule out retinopathy and renal function tests for nephropathy. There is no

relation of thyroid dysfunction with duration of diabetes. Normal levels of serum TSH almost always eliminates the diagnosis of hypo or hyperthyroidism. This shows TSH is the preferred screening test for thyroid dysfunction in diabetes mellitus. Hence one must have strong suspicion of thyroid dysfunction in patients with uncontrolled glycemic levels and must be evaluated for hyperthyroidism especially in adult and middle aged diabetics with poor glycemic control.

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