Original Research Article

A study of thyroid functions on patients of type 2 diabetes milletus

Vidyadhar G Maske[1], Mahendra N Sonwane[2*]

[1,2]Associate Professor, Department of Medicine, SRTR Medical College, Ambajogai, Beed, Maharashtra, INDIA.
Email: vgmaske@gmail.com

Abstract

Background: The association between type 2 diabetes mellitus (T2DM) and thyroid dysfunction (TD) has been reported in medical literature since 1979. Many studies have reported varying prevalence (10%–24%) of TD in T2 DM. **Aims and objective:** To study the thyroid functions in the patients of type 2 diabetes mellitus. **Materials and method:** Total 84 patients were suffering from Type II diabetes were enrolled in the present study. Patients with Type 2 diabetes aged more than 30 years, irrespective of glucose control and irrespective of type of treatment (OHA/insulin) were enrolled in the study. A detailed history was taken regarding presenting symptoms, duration of type 2 diabetes mellitus and clinical course of disease. A family history was taken with special reference to type 2 diabetes mellitus, hypertension, coronary artery disease and cerebrovascular accident. All the findings were recorded in a prestructured proforma. A thorough clinical examination was done. Detailed blood investigations were done including serum TSH, free T3 and free T4. Five mL of venous blood was drawn from each subject. **Results:** Majority of the patients of were in the age group of 51-60years (41.67%) of age followed by 41-50 years (28.57%) and 61-70 years (19.05%). Majority of the patients were male (61.90%) in the present study. It was observed that majority of the patients (60.71%) were suffering from diabetes mellitus for less than 5 years. Majority of the patients (75%) were on oral hypoglycaemic drugs followed by combined treatment with OHA and insulin (14.29%) and only insulin treatment (10.71%). It was observed that 85.71% diabetic patients were having normal thyroid profile while prevalence of abnormal thyroid profile was 14.29%. It was seen that Subclinical hypothyroidism was present in 9.52% patients. Overt hypothyroidism was diagnosed in 2.38% patients. Overt hyperthyroidism and Subclinical hyperthyroidism was seen in 1.19% patients each. **Conclusion:** Thus we conclude that the prevalence of abnormal thyroid profile was 14.29%. Where subclinical hypothyroidism the common finding followed by overt hypothyroidism. Overt hyperthyroidism and Subclinical hyperthyroidism was seen in 1.19% patients each.

Key words: type 2 diabetes milletus, thyroid functions

[*]**Address for Correspondence:**
Dr. Vidyadhar Gopinathrao Maske, Associate Professor, Department of Medicine, SRTR Government Medical college, Ambajogai, Beed, Maharashtra, INDIA.
Email: drmnsonwane@rediffmail.com

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INTRODUCTION

Diabetes mellitus (DM) is a common endocrine disorder which involves multiple organ systems and leads to significant morbidity and mortality due to accompanying complications.[1-5] Thyroid dysfunction is a disorder of the thyroid gland which manifests either as hyper - or hypothyroidism and is reflected in the levels of thyroid stimulating hormone (TSH). Type 2 diabetes and thyroid disorders are the two most common endocrine diseases to be recognized in clinical practice. Thyroid hormones are found to influence almost all the metabolic pathways including carbohydrate metabolism. On the other hand, in type 2 DM, there are variable degrees of insulin resistance (IR) and/or impaired insulin secretion and increased glucose production. Hence, there is derangement of metabolism, especially the carbohydrate in both the conditions that are in thyroid disorders and type 2 DM.[6,7,8] The association between type 2 diabetes mellitus (T2DM) and thyroid dysfunction (TD) has been reported in medical literature since 1979.[6] Many studies

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have reported varying prevalence (10%–24%) of TD in T2 DM.[9] This could partially be due to variation in autoimmunity and iodine status. A previous study from India[10] suggested a thyroid disease prevalence of 31.2% among T2 DM patients. Defective insulin secretion leads to various metabolic aberrations in T2DM, spanning from hyperglycemia due to defective insulin-stimulated glucose uptake and up regulated hepatic glucose production, along with dyslipidemia, which includes impaired homeostasis of fatty acids, triglycerides, and lipoproteins.[11,12] DM appears to influence thyroid function at two sites; firstly at the level of hypothalamic control of TSH release and secondly at peripheral tissue by converting T4 to T3. Hyperglycemia causes reduction in hepatic concentration of T4, 5-deiodinase, low serum concentration of T3, raised levels of reverse T3 and low, normal, or high level of T4. Thyroid hormone regulate metabolism whereas diabetes can alter metabolism of glucose, fatty acids, triglycerides and lipoprotein.[13,14,15]

MATERIALS AND METHOD

The present cross sectional study was conducted in the department of medicine of the tertiary care institute to study the thyroid functions among the patients of type 2 diabetes mellitus.Total 84 patients were suffering from Type II diabetes were enrolled in the present study. Patients with Type 2 diabetes aged more than 30 years, irrespective of glucose control and irrespective of type of treatment (OHA/insulin) were enrolled in the study. Known cases of hypothyroidism, type 1 diabetes mellitus, pregnant females and patients on drugs that affect thyroid profile were excluded. A detailed history was taken regarding presenting symptoms, duration of type 2 diabetes mellitus and clinical course of disease. A family history was taken with special reference to type 2 diabetes mellitus, hypertension, coronary artery disease and cerebrovascular accident. All the findings were recorded in a prestructured proforma. A thorough clinical examination was done. Detailed blood investigations were done including serum TSH, free T3 and free T4. Five mL of venous blood was drawn from each subject. It was dispensed into fluoride oxalate bottles for plasma glucose estimation. The rest of the blood sample was discharged into a plain sample bottle and allowed to clot. The serum was separated from the red blood cells, divided it into three aliquots and stored them frozen at -20 degree C. Plasma glucose was determined on the same day while all other tests were done within 2 weeks of collection. Fasting plasma glucose estimation was done by the glucose–oxidase peroxidise method, and TSH, T4, T3 and Insulin by enzyme immunoassay (EIA) kit method using commercial kits. We adhered strictly to the manufacturer instructions on the procedures. All sample analysis was done in duplicate and the mean of both the sample analysis used for evaluation.

RESULTS

Table 1: Distribution of patients according to age, sex and duration of Diabetes

		Number of cases	Percentage
Age group	35-40	9	10.71
	41-50	24	28.57
	51-60	35	41.67
	61-70	16	19.05
Sex	Male	52	61.90
	Female	32	38.10
Duration of DM (in years)	Up to 5 years	51	60.71
	6-10 years	19	22.62
	>10 years	14	16.67

It was observed that majority of the patients of were in the age group of 51-60years (41.67%) of age followed by 41-50 years (28.57%) and 61-70 years (19.05%).Majority of the patients were male (61.90%) in the present study. It was observed that majority of the patients (60.71%) were suffering from diabetes mellitus for less than 5 years.

Table 2: distribution of patients according to type of treatment and regularity of treatment

		Number of cases	Percentage
Type of treatment	Insulin	9	10.71
	OHA	63	75.00
	OHA/Insulin	12	14.29
Regularity of treatment	Regular	61	72.62
	Irregular	21	25.00
	Newly detected diabetic patients	2	2.38

It was seen that majority of the patients (75%) were on oral hypoglycaemic drugs followed by combined treatment with OHA and insulin (14.29%) and only insulin treatment (10.71%)

Table 3: Distribution of patients according to Thyroid function

Thyroid function	Number of cases	Percentage
With normal thyroid profile	72	85.71
With abnormal thyroid profile	12	14.29

It was observed that 85.71% diabetic patients were having normal thyroid profile while prevalence of abnormal thyroid profile was 14.29%.

Table 4: Distribution of patients according to Thyroid profile

Thyroid profile	Number of cases	Percentage
Normal	72	85.71
Overt hypothyroidism	2	2.38
Subclinical hypothyroidism	8	9.52
Overt hyperthyroidism	1	1.19
Subclinical hyperthyroidism	1	1.19

It was seen that Subclinical hypothyroidism was present in 9.52% patients. Overt hypothyroidism was diagnosed

in 2.38% patients. Overt hyperthyroidism and Subclinical hyperthyroidism was seen in 1.19% patients each.

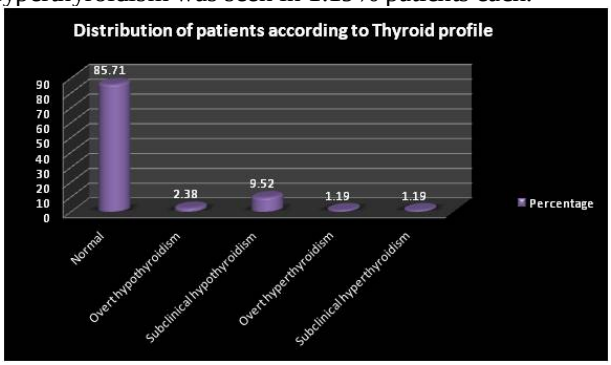

Figure 1:

DISCUSSION

Hypothyroidism, as defined by underactive thyroid gland, has been estimated to affect ~10% of the Indian population.[16] Diabetes and hypertension have shown a significant association with hypothyroidism.[17,18] The present study was undertaken to study the thyroid functions among the patients of type 2 diabetes mellitus attending the tertiary care institute. It was observed that majority of the patients suffering from diabetes mellitus were in the age group of 51-60years (41.67%) of age followed by 41-50 years (28.57%) and 61-70 years (19.05%). Thus majority of the patients were more than 40 years of age. Sreelatha M.[19] in their study of 108 Type 2 diabetic patients also observed majority of the patients with diabetes were more than 40 years of age. This observation is also similar to Pramanik, *et al.*[20] who reported that maximum number of cases were diagnosed between 40 and 59 years of age with no significant difference between the genders. Majority of the patients were male (61.90%) in the present study. It was observed that majority of the patients (60.71%) were suffering from diabetes mellitus for less than 5 years. It was seen that majority of the patients (75%) were on oral hypoglycaemic drugs followed by combined treatment with OHA and insulin (14.29%) and only insulin treatment (10.71%). It was observed that 85.71% diabetic patients were having normal thyroid profile while prevalence of abnormal thyroid profile was 14.29%. A recent meta-analysis[21] of 61 studies performed worldwide described adjusted pooled prevalence of SC-Hypo in T2DM patients was 10.2%. Similarly Radaideh, *et al.* [ref5-9] and Papazafiropoulu[22] observed prevalence of 12.5% and 12.3% respectively. While as compared to present study higher prevalence was reported by Uppal, *et al.*[23] (24.5%) and Demitrost[24] (31.5%). It was seen that Subclinical hypothyroidism was present in 9.52% patients. Overt hypothyroidism was diagnosed in 2.38% patients. Overt hyperthyroidism and Subclinical hyperthyroidism was seen in 1.19% patients each. Krunal Talsaniya, [25] observed occurrence of thyroid dysfunction in 16% of patients with Type 2 DM. 10% patients had overt hypothyroidism and 6% patients had subclinical hypothyroidism whereas hyperthyroidism was not seen in any patients. Insulin and thyroid hormones are intimately involved in cellular metabolism and thus excess or deficit of either of these hormones result in the functional derangement of the other. The physiological and biochemical interrelationship between insulin and the influence of both insulin and iodothyronines on the metabolism of carbohydrates, proteins and lipids are recorded. Such records indicate that iodothyronines are insulin antagonist with high levels being diabetogenic while absence of the hormone inhibits the development of diabetes[26].

CONCLUSION

Thus we conclude that the prevalence of abnormal thyroid profile was 14.29%. Where subclinical hypothyroidism the common finding followed by overt hypothyroidism. Overt hyperthyroidism and Subclinical hyperthyroidism was seen in 1.19% patients each.

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