

STUDY ON THYROID - DYSFUNCTION IN PATIENTS WITH TYPE 2 DIABETES IN A TERTIARY CARE HOSPITAL

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Received : 10/01/2024
 Received in revised form : 23/02/2024
 Accepted : 07/03/2024

Keywords:

Type 2 Diabetes Mellitus, sub-clinical hypothyroidism, hyperthyroidism.

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DOI: 10.47009/jamp.2024.6.3.131

Source of Support: Nil,
 Conflict of Interest: None declared

Int J Acad Med Pharm
 2024; 6 (3); 647-649

**Abstract**

Background: The study was undertaken with an objective to know the thyroid functions in Type 2 diabetics and to know the spectrum of thyroid dysfunction in Type 2 DM. **Materials and Methods:** A total of 128 patients with Type 2 DM who were diagnosed on the basis of ADA criteria or who were taking treatment for Diabetes were included in the study. All patients in the study underwent thyroid profile tests for the thyroid status and also target organ evaluation for Diabetes. TPO-Ab, thyroid USG and FNAC were done where ever required. A detailed history and examination was done on these patients. **Result:** A total of 128 Type 2 DM patients were included in the study. Thyroid disorders were present in 36%. Hypothyroidism in 2, hyperthyroid in 16 and sub-clinical hypothyroidism in 11 cases. In this study 50 patients were males and 50 were females. Females (38%) had high incidence of thyroid disorders than males (23%). Sub-clinical hypothyroidism was more common among elderly (33.25%). Elderly females had high incidence of sub-clinical hypothyroidism (19.2%). Clinical features were present in 9 patients, all of them were diagnosed hyperthyroid. Other patients did not have any sings and symptoms. Patients with hyperthyroidism had a poor glycemic control 56.5% duration of diabetes had no relation with incidence of thyroid disorders. Patients with severe diabetic micro vascular complication had sub-clinical hypothyroidism. **Conclusion:** Prevalence of thyroid disorders in Diabetics was 36%. Elderly population had more incidence than those below sixty. Sub-clinical hypothyroidism was more common among females. Diabetics with hyperthyroidism had poor glycemic control. Severe diabetic complications where noted in patients with sub-clinical hypothyroidism. Duration of Diabetes had not impact on thyroid dysfunction.

INTRODUCTION

Among all the endocrinal metabolic diseases, Diabetes Mellitus is the most common disorder seen. The impact of this disease on the quality of life, and on morbidity and mortality through the complications that affect the small and large vessels resulting in retinopathy, nephropathy, neuropathy, IHD, and large vessel obstruction has been emphasized by the findings of the national commission (USA) on diabetes and DCCT trial.^[1]

Diabetes being the most common endocrine metabolic disorder, there was curiosity to understand and learn the association of this with another common endocrine gland function that is thyroid gland. The association between these two disorders has long been recognized although the prevalence of thyroid dysfunction in diabetic population varies widely between studies. With insulin and thyroid hormone being intimately involved in cellular

metabolism and thus excess or deficit of these hormones result in functional derangement of the other. Enhanced sensitivity and specificity of TSH has greatly enhanced assessment of thyroid functions.^[2,3]

There are numerous lines of evidence to suggest that Type 1 DM is an autoimmune disorder. These include the presence of insulinitis, presence of antibodies, auto-reactive T- cell's against islet antigens, an association with some other known organ specific autoimmune diseases (thyroid disorders and pernicious anemia) and a strong association between HLA genes and lastly remission of the disease with immune-modulator therapy. Thus association between thyroid and Type 1 diabetics may be an auto-immune process.^[4,5]

Association of poorly controlled diabetes and thyroid results in a low T3 state and loss of TSH response to TRH. Regardless of glycemic control there is an absence of nocturnal THS peak.^[6]

The aim of this study is to establish the relationship between the diabetes and thyroid dysfunction probably affected as a consequence to the auto immune pathology. The thyroid dysfunction was assessed on the basis of clinical findings and laboratory estimation of serum T3 and T4 and TSH levels and structural disturbances were made out by FNAC of thyroid gland. The present study was taken up to note the prevalence of thyroid dysfunction in Type 2 diabetics and spectrum of thyroid dysfunction.^[7,8]

Aims and objectives of the study: To study the thyroid functions in diabetes mellitus.

MATERIALS AND METHODS

Study group: The study includes all type 2 diabetics from OPD'S and IPD'S of all the departments of MVJ MC & RH, HOSKOTE. 128 patients of type 2 are selected from OPD and IPD in a random fashion, studied and followed up for 2 years.

Inclusion Criteria

- All patients with Type 2 diabetes aged more than 30 years.
- All diabetics irrespective of glucose control.
- All diabetics irrespective of treatment(OHA/insulin).

Exclusions Criteria

1. Type 1 DM
2. Patients with:
 - Gestational diabetes mellitus.
 - Fibrocalculouspancreatitis.
 - Pancreatitis.
 - Steroid induced Diabetes, would be excluded.
3. All those who had proven thyroid disorder and on treatment.

A detailed history was taken and examination done as per the proforma. All patients in addition to haematological and routine urine work up underwent target organ evaluation for diabetes. All patients were evaluated for thyroid status; assessment of T3, T4 and TSH levels and as required FNAC and biopsy was done by our pathologist in DMCH Hospital.

The laboratory evaluation of thyroid functions was done by estimation of serum T3, T4 and TSH levels by chemi-luminescence assay method. Two ml of blood was drawn and centrifuged and serum (500microml)

collected from that and incubated with the reagent (separate for T3, T4 and TSH) for about 1 hour at room temperature. Later the readings were taken from the instrument COBAS 6000.

The method employed for FNAC thyroid was under aseptic precaution, using 10ml sterile syringe and 22-24G needle aspiration were taken from two different sites of the thyroid gland. The aspirates were smeared over the glass slide and covered by a cover slip of 0.4mm thickness. The slide dipped in the container containing the fixative 70-90% ethanol. Later the slide was studied under the high power microscope. The reporting was done by the pathologist.

Diabetic states of the patients were estimated by analyzing RBS/PPBS/FBS by glucose oxides wherein 1ml of blood was drawn and centrifuged to collect the serum, 10mu of serum is incubated with 1ml of reagent at room temperature for 15min. Later the reading taken from the instrument. Patients were diagnosed based on the ADA criteria for diabetes.

- Symptoms of diabetes plus random blood glucose concentration of 11.1 mmol/L (200 mg/dL)
- Fasting plasma glucose of 7.0 mmol/L (126 mg/dL)
- Two-hour plasma glucose of 11.1 mmol/L (200 mg/dL) during an oral glucose tolerance test.

RESULTS

A total of 128 Type 2 DM patients were included in the study. Thyroid disorders were present in 36%. Hypothyroidism in 2, hyperthyroid in 16 and sub-clinical hypothyroidism in 11 cases. In this study 50 patients were males and 50 were females. Females (38%) had high incidence of thyroid disorders than males (23%). Sub-clinical hypothyroidism was more common among elderly (33.25%). Elderly females had high incidence of sub-clinical hypothyroidism (19.2%). Clinical features were present in 9 patients, all of them were diagnosed hyperthyroid. Other patients did not have any signs and symptoms. Patients with hyperthyroidism had a poor glycemic control 56.5% duration of diabetes had no relation with incidence of thyroid disorders. Patients with severe diabetic micro vascular complication had sub-clinical hypothyroidism.

Table 1: Prevalence of thyroid dysfunction in diabetes

Thyroid Disorders	No. of cases
Normal	78
Hypothyroidism	8
Sub-clinical Hypothyroidism	22
Hyperthyroidism	20

Table 2: Age and sex distribution of thyroid dysfunction in diabetics.

Age	Male (50)				Female (50)			
	Hypothyroid	Hyperthyroid	Sub Clinical Hypothyroid	Normal	Hypothyroid	Hyperthyroid	Sub Clinical thyroid	Normal
<60	2	8	0	36	0	7	6	28
>60	0	0	6	17	0	2	7	19
Total	2	8	6	46	0	8	12	39

DISCUSSION

Among the endocrinal metabolic diseases diabetes occupies the major share. India has the dubious distinction of being home to the largest number of people suffering from diabetes in any country. The disease is responsible for significant mortality and morbidity due to the complications. A total of 128 type 2 diabetics were studied. All were confirmed diabetics who previously had plasma glucose levels of >126 mg/ dl or RBS of >199 on more than one occasion and were receiving treatment such as Insulin, OHA's or physical exercise therapy. All these patients comprised of rural population. Prevalence and spectrum of thyroid disorders in type 2 diabetics. In this study of 128 patients with type 2 diabetes 50 were males and 50 females. We have found 36 patients with thyroid disorders that are 36%, and number of reports have also indicated higher than normal prevalence of thyroid disorders. 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. A prevalence of 12.3% was reported among Greek diabetic patients and 16% of Saudi patients with type 2 diabetes were found to have thyroid dysfunction. In Jordan, A study reported that thyroid dysfunction was present in 12.5% of Type 2 diabetic patients. Perros et al. demonstrated an overall prevalence of 13.4% of thyroid diseases in diabetics with the highest prevalence in type 1 female diabetics (31.4%) and lowest prevalence in type 2 male diabetics (6.9%). In this study out of the 36 patients with thyroid dysfunction 22 had hypothyroidism, 2 had overt hypothyroidism and 20 had hyperthyroidism. It is noted that there is a lower incidence of Thyroid dysfunction in diabetics among Europeans as compared to that of Indians as per the Indian studies. In this study sub-clinical hypothyroidism was more among females 29% compared to males 15%. Sub-clinical hypothyroidism was more common among elderly females 19%. Hyperthyroidism was almost equal in either sex with 19% in males and 21% in females. Overt hypothyroidism was present in one male patient in our study. Many studies have shown increased incidence of sub-clinical hypothyroidism in elderly females compared to males. Hyperthyroidism was more common in males than in females. The presence of both high and low levels of thyroid hormones in diabetics in this study may be due to modified TRH synthesis and release, and may depend on the glycemic status of the diabetics studied. Glycemic status is influenced by insulin, which is known to modulate TRH and TSH levels.^[9,10]

CONCLUSION

Prevalence of thyroid dysfunction was seen in 36% of diabetics studied. Sub-clinical hypothyroidism

was more common than other conditions which constituted 29% of the thyroid dysfunction in the Diabetics. Elderly patients had higher incidence (35.4%) of thyroid dysfunction. Thyroid disorders are more in females (37%) than males 29%. Patients with hyperthyroidism presented with clinical features of thyroid disorders (62%) where as hypothyroid patients did not have any signs and symptoms. Thirty six percent of people with thyroid dysfunction had poor glycemic control even with treatment. Severe forms of diabetic complications were noted in sub-clinical hypothyroidism. Hence, patients with sub-clinical hypothyroidism must undergo frequent ophthalmic check-up's to rule out retinopathy and also renal function test for nephropathy, There is no relation of thyroid disorders with duration of diabetes. A serum TSH within euthyroid range almost always eliminates the diagnosis of hypo or hyperthyroidism. This shows that TSH is preferred screening test for thyroid dysfunction in diabetics.

Heat intolerance and palpitations are specific symptoms of hyperthyroidism in Diabetes. One must have strong suspicion of thyroid dysfunction in patients with uncontrolled glycemic levels and must be evaluated for hyperthyroidism especially in young and middle-aged diabetics with poor glycemic control.

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