

Study of Thyrodiabetes in a Tertiary Care Hospital

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INTRODUCTION

Diabetes mellitus is a common endocrine as well as a multisystem disorder, characterized by hyperglycemia, resulting from defects in insulin secretion, insulin action or both.

Diabetes is a health problem affecting the population worldwide in general and India in particular. Uncontrolled diabetes with its many adverse effects like cardiovascular and kidney diseases along with dyslipidemia increase morbidity and mortality.

In pursuit of controlling hyperglycemia a lot of emphasis is given on treating hypertension, dyslipidemia but an often forgotten fact is the presence of a second endocrinal disorder like thyroid dysfunction, which may be the root cause of poor glycemic control, complications or progressive morbidity and mortality.

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, excess or deficit of one of these hormones results in functional derangement of the other.

The aim of this study was to establish the relationship between diabetes and thyroid function. Thyroid function was assessed based on the clinical findings, laboratory estimation of serum FT3, FT4 and TSH levels; and structural disturbances were made out by USG study and FNAC/FNABx of thyroid gland. The study was taken up to note the prevalence and spectrum of thyroid dysfunction in type 2 diabetes.

MATERIALS AND METHODS

Ours was a cross-sectional and observational study, which was done at a tertiary care hospital in Kolkata. The study was approved by institutional ethical committee. Total study duration was 12 months. The study group included type 2 diabetes patients (as per ADA criteria), selected randomly from OPDs and IPDs of department of General Medicine and Endocrinology and Metabolism of our study centre. All patients with type 2 diabetes mellitus irrespective of glycaemic status and treatment were included in this study. Critically ill patients and patients on multi drug therapy were excluded. Pregnant females were also not included. All data were collected using predefined protocol. Detailed history of every

patient was taken, relevant clinical examinations were performed and necessary investigations including plasma glucose, both fasting (FPG) and 2 hr post prandial (PPPG); glycated hemoglobin (HbA1C); complete hemogram (CH); lipids; urea (Ur); creatinine (Cr); thyroid stimulating hormone (TSH); free thyroxin (FT4) and free triiodothyronine (FT3) were done. Special investigations like anti-TPO antibody (anti-TPO Ab), ultrasound study of thyroid gland (USS THY), Tc^{99m} scan and fine needle aspiration cytology/biopsy (FNAC/FNABx) were done in selected cases. Data derived from the study was tabulated in Microsoft Excel Sheet and all the relevant data were calculated using standard statistical tools and were represented by the relevant graphical tables and charts. All values of $p < 0.005$ were considered statistically significant in this study.

RESULTS

In our study, the prevalence of thyroid dysfunction was found to be 29% in diabetic patients and elderly patients had higher incidence (34.4%). Subclinical hypothyroidism (SCH) was most common (22%). Thyroid disorders were more prevalent in female patients (36%) than their male counterparts (22%). Anti-TPO antibody was positive in 29.4% of hypothyroid patients. Patients with hyperthyroidism were presented with clinical features of thyroid disorders (61%) whereas hypothyroid patients usually did not have any signs and symptoms. Heat intolerance and palpitations were specific symptoms of hyperthyroidism. Thirty six percent (36%) of people with thyroid dysfunction had poor glycaemic control even with intensive treatment of diabetes. Severe forms of diabetic complications were noted in SCH. Hence, patients with SCH must undergo frequent ophthalmic checkup and renal function test among others. There was no relation of thyroid disorders with duration of diabetes. A serum TSH within euthyroid range almost always eliminated the diagnosis of hypo or hyperthyroidism. This showed that TSH was the preferred screening test for thyroid dysfunction in diabetes.

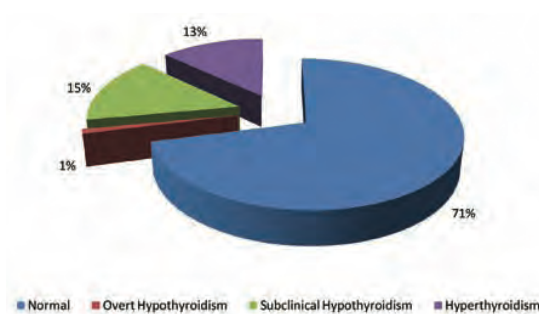


Figure -1

DISCUSSION

In our study, of 100 type 2 diabetes patients, 50 were males and 50 females. We have found 29 patients with thyroid disorders.

Pasupathi et al.¹ in their study found that prevalence of thyroid disorder was 45% among type 2 diabetes. Hypothyroidism was present in 28% and 17% had hyperthyroidism.

In a study done by Unnikrishnan et al. the overall prevalence of hypothyroidism was 10.95%. A significantly higher ($P < 0.05$) proportion of females versus males (15.86% vs. 5.02%) and older versus younger (13.11% vs. 7.53%) adults were diagnosed with hypothyroidism. Additionally, 8.02% ($n = 430$) patients were diagnosed to have SCH (normal serum free T4 and TSH $> 5.50 \mu\text{IU/ml}$ but $< 10 \mu\text{IU/ml}$). Anti-TPO antibodies, suggesting autoimmunity were detected in 21.85% ($n = 1171$) patients,² thus supporting our observation.

In a population-based study done in Cochin on 971 adult subjects, the prevalence of hypothyroidism was 3.9%.³ The prevalence of SCH was also high in this study, the value being 9.4%. In women, the prevalence was higher, at 11.4%, when compared with men, in whom the prevalence was 6.2%. About 53% of subjects with SCH were positive for anti-TPO antibodies.

The prevalence of thyroid dysfunction was high and was commoner in women than men (24.7% vs. 18.2%). SCH was the commonest abnormality encountered and affected 19.3% subjects (15.9% men, 21.4% women). The prevalence of SCH in men and women with anti-TPO antibody was 15.8% and 25.9%, respectively. Overt hypothyroidism was the second commonest abnormality and affected a total

of 181 subjects (4.2%), which included 75 (1.7%) subjects with newly diagnosed disease and 106 subjects with previously diagnosed hypothyroidism on therapy.⁴

Udiong et al.⁵ 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 (Table 1).

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.

Our study showed that SCH was more among females (22%) compared to males (8%) and it was more prevalent in elderly females (12%). Hyperthyroidism was almost equal in sex, 12% in males and 14% in females. Overt hypothyroidism was present in one male patient in our study. Many studies have shown increased incidence of SCH in elderly females compared to males.^{6,7}

As our study was hospital based, comprised only 100 patients, chosen from a particular OPD and IPD, it should not be compared to population-based studies, where study population was huge. So our study may not reflect true picture.

TPO antibody was positive in 29.4% of patients. Other studies have reported higher prevalence of

TPO-Ab both in general population and in diabetes and opined that they have a 90% negative predictive value. The association of positive TPO Ab and future development of hypothyroidism is known. Hence, this cannot be used as the diagnostic tool because of the high negative predictive value.⁸

In this study, we found 34.4% patients with thyroid disorders over the age of 60 years compared to that of 26.4% below the age of 60 years. SCH was 31.2% in patients above 60 years.

Flatau et al.⁹ have also observed similar findings. They have reported 38% with sub clinical hypothyroidism after the age of 60 years. They have concluded that diabetes mellitus and primary hypothyroidism are common disorders in elderly subjects. T2DM in the elderly can usually be handled with diet and oral hypoglycemic drugs. As the clinical features of hypothyroidism in the elderly are often atypical, we suggest that elderly subjects should be screened for hypothyroidism.

We found that there was variation in TSH and T3, and T4 levels found in diabetics were with and without thyroid disorders. Patients with thyroid disorders had higher levels of TSH compared to those without thyroid disorders, whereas there was no much difference in T4 and T3 levels. Findings in our study were similar to that of Pasupathi et al.¹ and Gupta et al.¹⁰

In this study, we found that patients with hyperthyroidism presented with definite clinical features compared to that of hypothyroidism. Not many papers regarding clinical features of thyroid disorders in T2DM are present. Udiong et al.⁵ have reported similar observation in their study on clinical examination.

CONCLUSION

Type 2 diabetes mellitus is like an octopus with several tentacles, as a physician, our role is to catch hold of them at the earliest. It is not only mere hyperglycemia, but also an endocrinopathy. The earlier we identify these associates, better we treat. We tried to find out the spectrum of thyroid dysfunction in diabetic population, and beyond that we came to

Table 1 | Prevalence of thyroid dysfunction

Study	Year	Subjects Group	Prevalence of thyroid dysfunction in diabetes
Celani et al. ¹¹	1994	T2DM	31.4%
Smithson ¹²	1998	DM	10.8%
Nobre et al. ¹³	2002	T2DM	12.7%
Bal et al. ¹⁴	2003	T2DM	40%
Rajan et al. ¹⁵	2003	DM	15%
Shomon ¹⁶	2003	T1DM	60%
Radaideh et al. ¹⁷	2004	T2DM	12.5%
Pimenta et al. ¹⁸	2005	DM	51.6%
Akbar et al. ¹⁹	2006	T2DM	16%
Udiong et al. ⁵	2007	DM	46.5%
Papazafilopoulou et al. ²⁰	2010	T2DM	12.3%
Pasupati et al. ¹	2008	DM	45%
Present Study	2013	T2DM	29%

know thyroid dysfunction is associated with much more complications of diabetes. This knowledge becomes valuable from therapeutic perspective all together. One must have strong suspicion of thyroid dysfunction in patients with uncontrolled glycaemia and such patients, especially young and middle aged, must be evaluated for thyroid function.

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