



PREVALENCE OF AUTOIMMUNE THYROID DISORDERS IN TYPE 2 DIABETES MELLITUS- HOSPITAL BASED STUDY

Pratima Chouhan

Assistant Professor, Department of Medicine, Dr. S. N. Medical College and Associated Group of Hospital, Jodhpur.

Conflicts of Interest: Nil

ABSTRACT:

Background: Autoimmunity has been implicated to be the major cause of thyroid-dysfunction associated diabetes mellitus.

Methods: Present study was conducted in Department of Medicine, S.N. Medical College & Associated Group of Hospitals, Jodhpur, Rajasthan. This study was a cross sectional study.

Results: Out of 120 cases prevalence of autoimmune thyroid disorders are 22(18.33 %). Prevalance of Autoimmune Thyroiditis and Subclinical hypothyroidism is 10 (8.3%). Prevalence of Autoimmune Thyroiditis and Overt Hypothyroidism is 5 (4.1%).

Conclusion: Thyroid dysfunction was present in a large number of diabetic patients (28.33%).

Keywords: Hypothyroidism, Overt Hypothyroidism, Diabetes Mellitus.

Introduction

Diabetes Mellitus is a clinical syndrome characterized by hyperglycemia caused by absolute or relative deficiency of insulin. Lack of insulin affects the metabolism of carbohydrate, protein and fat and can cause significant decrease of water and electrolytes homeostasis

Autoimmunity has been implicated to be the major cause of thyroid-dysfunction associated diabetes mellitus .Autoimmunity in which circulating antibodies exist to numerous body tissue components destroy such tissues was stated to be the underlying mechanism behind the increase prevalence of thyroid disorders in type 1 diabetes mellitus ,despite the fact autoimmune thyroid diseases are know to be highly prevalent in all forms of the diabetes ; no specific reason has been adduced for an increased prevalence of thyroid disorders in type 2 diabetes mellitus. However, insulin; the hormone required for transporting glucose from plasma across cell membranes into the cytosol of many cells (including those of the skeletal muscle) is absolutely deficient in type 1 diabetics and relatively deficient in type 2 diabetics. Some authors have postulated that insulin treatment in type 1 diabetics and insulin

resistance with resultant high plasma insulin levels in type 2 diabetes may equally predispose both groups to deranged thyroid function.

So, thyroid dysfunction is quite common in diabetic patients and can produce significant metabolic disorder. Therefore regular screening for thyroid abnormalities in all diabetic patients will allow early treatment of subclinical thyroid dysfunction. Moreover not many studies have been done on thyroid dysfunction in type 2 diabetes mellitus in this part of the country.

MATERIALS AND METHODS

Present study was conducted in Department of Medicine, S.N. Medical College & Associated Group of Hospitals, Jodhpur, Rajasthan. This study was a cross sectional study. Ethical approval was obtained from institutional research ethics committee and written informed consent will be taken from all subjects.

Method of selection of subjects:

This study was include adults having type 2 DM attending medical outdoor or admitted in medicine wards. Before enrollment, details about nature and utility of present study were explained to all patients and informed consent was taken. All

participants were subjected to detailed clinical examination and relevant investigations. Only after the inclusion and exclusion criteria's are met, the subjects were included in the study.

Inclusion criteria:

All adult ≥ 40 years of age with already diagnosed and newly diagnosed T2 diabetes mellitus.

Exclusion criteria:

1. Pregnant women.
2. Patients who are under intensive care.
3. Patients with previous history of thyroid surgery.
4. Patients who are not willing to participate.
5. Connective tissue disorder.

Statistical analysis:

Pearson's chi- square test is used to see if there is any association between categorical variables. We

compared continuous variables with **Student's t test**. Statistical analysis was performed with **IBM SPSS Statistics version 21 Software**. **p-value** less than or equal to **0.05** was considered as significance.

RESULTS AND OBSERVATIONS

The present study was conducted in the department of medicine, Silchar Medical College and Hospital. We have selected 120 cases (60 males and 60 females) of T2DM following the inclusion and exclusion criteria of our study protocol from medicine ward.

All the cases were subjected to a thorough history, clinical examination and laboratory investigations. The results found in patients were as follows:

TABLE: AGE AND SEX DISTRIBUTION OF THE CASES (n:-120)

| AGE GROUP (in years) | NO. OF CASES | | | | TOTAL | |
|-------------------------|--------------|------|---------|------|-------|------|
| | MALES | | FEMALES | | | |
| | NO. | (%) | NO. | (%) | NO. | (%) |
| 31—40 | 2 | 33.3 | 4 | 66.7 | 6 | 5.0 |
| 41—50 | 17 | 56.7 | 13 | 43.3 | 30 | 25.0 |
| 51—60 | 25 | 51.0 | 24 | 49.0 | 49 | 40.8 |
| 61—70 | 14 | 45.2 | 17 | 54.8 | 31 | 25.8 |
| 71 — 80 | 2 | 50.0 | 2 | 50.0 | 4 | 3.4 |
| TOTAL | 60 | | 60 | | 120 | 100 |

In the present study, age of the patients were varied from 35 years to 78 years with maximum number of patients (25 males and 24 females) were observed in the age group 51- 60 years. The mean ages of the patients were 56.23 ± 8.88 . Minimum numbers of patients (2 males and 2 females) were observed in the age group of 71 – 80 years (3.4%). We have taken equal number of male and female (60:60) diabetic patients to avoid sex bias.

TABLE 2: PREVALANCE OF AUTOIMMUNE THYROID DISORDERS

| TOTAL NUMBER OF CASES : 120 | | |
|---|--------|------------|
| TYPE | NUMBER | PERCENTAGE |
| Autoimmune Thyroiditis and Subclinical hypothyroidism | 10 | 8.3% |
| Autoimmune Thyroiditis and Overt Hypothyroidism | 5 | 4.1% |
| Autoimmune Thyroiditis and Primary Hyperthyroidism | 3 | 2.5% |
| Autoimmune Thyroiditis and Sick Euthyroid syndrome | 4 | 3.3% |

From the table it is seen that out of 120 cases prevalence of autoimmune thyroid disorders are 22(18.33 %). Prevalance of Autoimmune Thyroiditis and Subclinical hypothyroidism is 10 (8.3%). Prevalence of Autoimmune Thyroiditis and Overt Hypothyroidism is 5 (4.1%). Prevalance of Autoimmune Thyroiditis and Primary Hyperthyroidism is 3 (2.5%). Prevalence of Autoimmune Thyroiditis and Sick Euthyroid syndrome 4 (3.3%).From above table it can be seen that prevalence of autoimmune thyroid disorder very high in DM type 2 patients.

TABLE 4: THE MEAN VALUES OF FREE T3, FREE T4 & TSH OF CASES

| PARAMETERS | CASES | |
|------------|-------|----------------|
| | Mean | Std. Deviation |
| FREE T3 | 3.96 | 1.22 |
| FREE T4 | 12.56 | 2.72 |
| TSH | 5.23 | 3.89 |

From the above table it was observed that Free T3 and Free T4 value were significantly reduced in cases (3.96 \pm 1.22) Pmol/L and (12.56 \pm 2.72) Pmol/L respectively. The TSH value of cases was slightly more (5.2 \pm 3.89) mIU/L.

DISCUSSION

Diabetes mellitus is the one of the most common serious metabolic disorder of human being. According to recent estimates, overall prevalence of T2DM was 4.3% in India. In recent study, about 42 million people in India suffer from thyroid diseases. The prevalence of overt hypothyroidism in India is 3.9%. The prevalence of subclinical hypothyroidism is also high in this study, the value being 9.4%. The prevalence of subclinical and overt hyperthyroidism in India is 1.6% and 1.3%. T2DM has an intersecting underlying pathology

with thyroid dysfunction. Altered thyroid hormones have been described in patients with diabetes especially those with poor glycemic control. In diabetic patients, the nocturnal TSH peak is blunted or abolished and the TSH response to thyrotropin releasing hormone is impaired. Reduced T3 levels have been observed in uncontrolled diabetic patients and it become normal with improvement in glycaemic control. This “low T3 state” could be explained by impairment in peripheral conversion of T4 to T3. The abnormal thyroid hormone level may also be the outcome of various medications that the diabetic patients were receiving. For

example, it is known that insulin, an anabolic hormone enhances the level of FT4 while it suppresses the level of T3 by inhibiting hepatic conversion of T4 to T3. On the other hand some of the oral hypoglycaemic agents such as the phenylthioureas (sulfonylureas) are known to suppress the level of FT4 and T4, while causing raised levels of TSH.^[3]

The most probable mechanism leading to hyperglycemia in thyroid dysfunction could be attributed to perturbed genetic expression of a constellation of genes along with physiological aberrations leading to impaired glucose utilization and disposal in muscles, overproduction of hepatic glucose output, and enhanced absorption of splanchnic glucose. These factors contribute to insulin resistance. Insulin resistance is also associated with thyroid dysfunction. Both hyperthyroidism and hypothyroidism have been associated with insulin resistance which has been reported to be the major cause of impaired glucose metabolism in T2DM. The state of art evidence suggests a pivotal role of insulin resistance in underlining the relation between T2DM and thyroid dysfunction. A plethora of preclinical, molecular, and clinical studies have evidenced an undeniable role of thyroid malfunctioning as a comorbid disorder of T2DM.

In our study the mean value of serum Free T3 (FT3) was 3.96 ± 1.22 Pmol/L. The mean value of serum FT4 was 12.56 ± 2.72 Pmol/L in study group. The mean value of serum TSH was 5.23 ± 3.89 mIU/L in study group. The mean TSH value was higher in study group probably because in diabetic patients, the nocturnal TSH peak is blunted or abolished, and the TSH response to TRH is impaired.^[4]

In the present study thyroid dysfunction was found in 28.33% cases, of which 16.7% of cases were having subclinical hypothyroidism, 8.3% of case were having overt hypothyroidism and 3.3% of cases were having primary hyperthyroidism. Kiran Babu *et al*^[5] reported 28% of thyroid dysfunction

in T2DM case with 13.2% having hypothyroidism, 8.8% having hyperthyroidism and low T3 syndrome in 5.8%. Celani M F *et al*^[6] reported 31.4% thyroid dysfunction in T2DM cases. Out of these, Subclinical hypothyroidism was most common (48.3%), followed by subclinical hyperthyroidism (24.2%) and by definite hypothyroidism (23.1%). Definite hyperthyroidism was found in 4 patients (4.4%).

CONCLUSION

Thyroid dysfunction was present in a large number of diabetic patients (28.33%).

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