

The Study of Thyroid Dysfunctions in Type 2 Diabetes Mellitus

Bala Koteswara Rao P¹, Jayshree C Awalekar², Rahul Surve³, ajay⁴

1,4Junior Resident, 2Professor, 3Assistant Professor, Department of Medicine, Bharati Vidyapeeth (Deemed to be University) Medical College and Hospital, Sangli, Maharashtra, INDIA.

Corresponding Author: Dr. Jayshree C Awalekar, Professor, Department of Medicine, Bharati Vidyapeeth(Deemed to be University) Medical College and Hospital, Sangli, Maharashtra, INDIA.

Abstract

Background: Diabetes mellitus (DM), a common endocrine metabolic disorder, is an important cause of morbidity and mortality worldwide. Patients with diabetes have a higher prevalence of thyroid disorders when compared with general population. Type 2 diabetes and thyroid dysfunction, insulin resistance has been common. Both hyperthyroidism and hypothyroidism are having insulin resistance. Alteration in thyroid function complicates the management of DM and its complications. **Aims and Objectives:** To study thyroid dysfunction in Type 2 Diabetes Mellitus **Materials and Methods:** 100 patients with known Type 2 DM were included in the study. All the patients were evaluated for thyroid dysfunction by testing thyroid profile (triiodothyronine, thyroxine, and thyroid-stimulating hormone). The prevalence of thyroid disorder with, age distribution, hemoglobin A1C, duration of diabetes was done. The observations and interpretations were recorded, and results obtained were statistically analysed. **Results:** In our study, 100 patients of type 2 diabetes mellitus were screened for thyroid disorders. Altered Thyroid functions tests were present in 16(16%) patients of type 2 diabetes mellitus and remaining 84 (84%) had normal thyroid function. Among 16 patients of type 2 diabetes mellitus, 2 subjects had hyperfunctioning of thyroid gland and low thyroid function was noted in 14 patients. The prevalence of thyroid abnormality is more common in females than in males. **Conclusion:** The occurrence of thyroid dysfunction among Type 2 DM patients is very high (16%) with subclinical hypothyroidism is being most common. All patients with Type 2 DM should be screened for thyroid dysfunction to reduce the mortality rate.

Key words: Diabetes mellitus, Hyperthyroidism, Hypothyroidism

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I. Introduction

Diabetes mellitus (DM) is a group of aetiologically different metabolic disorders, described by increase glucose levels due to variable interaction of hereditary and environmental factors and it is due to defect in insulin secretion as well as insulin action or both¹

Impaired metabolism and glucose disposal between four major organ systems i.e. adipocytes, liver, muscle, pancreatic beta cells (defective insulin secretion) play main role in pathogenesis of Type 2 diabetes mellitus².

DM is an endocrine disorder so it may affect other endocrine functions, one of which is thyroid. The excess or deficit of insulin and thyroid hormones causes functional imbalance of the other, because both are involved in cellular metabolism³.

The present work is a modest attempt to study the occurrence of thyroid disorders in patients with Type 2 DM.

II. Material And Methods

Study design. -Descriptive study.

Study place – Dept. of General Medicine, Tertiary Care Center.

Study Duration: 1 year and 6 months.

Study population: The study group included 100 persons with known Type 2 DM without known thyroid disorders come to Dept. of General Medicine, Bharati Vidyapeeth (Deemed to be University) Medical College and Hospital, Sangli

Study subjects: Type2 Diabetes Mellitus patients Above 30years of age.

All diabetics nevertheless of treatment (OHA/insulin).

Methods;Fasting blood sugar, post-prandial blood sugar, fasting lipid profile, thyroid profile triiodothyronine (T3), thyroxine (T4) and thyroid-stimulating hormone (TSH), haemoglobin A1C(HbA1C).

Inclusion criteria:

- 1) All T2 DM patients Above 30years of age.
- 2) All diabetics nevertheless of treatment.
- 3) All diabetic individuals nevertheless of glucose control.

Exclusion criteria:

- 1) Type 1 diabetes mellitus
- 2) Patients with.
 - a) Gestational diabetes mellitus.
 - b) Fibro- calculus pancreatitis.
 - c) Pancreatitis.
 - d) Steroid or any other drug induced DM.
 - e) Any drugs or radiation induced thyroid dysfunction.
 - f) DM2 with CKD patients,
- 3) Patients having known thyroid disorder.

Definition of terms: Patients on oral hypoglycemic drugs, Insulin or those having fasting blood sugar > 126 g/dl or 2 h PLBS >200 mg/dl or Symptoms of diabetes and random plasma glucose concentration >200 mg/dl were regarded as having diabetes mellitus. Normal Thyroid function values are Triiodothyronine – 0.69- 2.15ng/ml, Tetraiodothyronine– 52- 127ng/ml, Thyroid stimulating hormone- 0.3- 4.6 microIU/ml.

III. Results:

In our study 53 were males and 47 were females (Table 1). Abnormal thyroid function was found in 16 (16%) patients and 84(84%) patients had normal thyroid function (Table 2). Out of the 100 diabetic subjects 6 had overt hypothyroidism and 8 had Sub-clinical hypothyroidism. Overt Hyperthyroidism was noted in 2 people (Table 3).

Table 1: sex distribution

Sex	Number	Percentage
Male	53	53%
Female	47	47%
Total	100	

Table 2: Thyroid function tests

Thyroid function tests	Number of patients	Percentage
Abnormal	16	16%
Normal	84	84%

Table 3: Spectrum of thyroid dysfunction

Thyroid dysfunction	Number of patients	Percentage
Hypothyroidism	6	6%
Subclinical Hypothyroidism	8	8%
Hyperthyroidism	2	2%

IV. Discussion

Insulin and thyroid hormones, both act on cellular metabolism of carbohydrates, proteins and lipids. T2DM alters thyroid function at two sites. First T4-5-deiodinase activity and concentration are reduced by hyperglycemia. Second hypothalamic control of TSH is altered⁴. The knowledge of relation between thyroid disease and diabetes is of importance to guide clinicians on the optimal management of both these conditions. In present study thyroid dysfunctions were found in 16% of diabetic patients. The prevalence of thyroid disorder was 45% in Type 2 diabetics, in a study conducted by Pasupthi et al⁴. Vinu V et al demonstrated an overall prevalence of 28.75% % of thyroid diseases in diabetics⁵. Navneet A et al study recorded 27.8% of thyroid dysfunction in patients with type 2 DM. Diez et al study from Spain reported 32.4% prevalence of thyroid dysfunction⁶. Radaideh et al study reported that the overall prevalence of thyroid dysfunction in T2DM patients was 12.5% in Jordan⁷. In Perros et al study 13.4% diabetes patient had thyroid dysfunction⁸. In present study subclinical hypothyroidism is most common thyroid disorder constituting 8% of diabetes as compared to

overhyperthyroidism 2%, and overt hypothyroidism 6%, similar finding observed in Vaghasiya K et al study⁹. Many previous studies showed subclinical hypothyroidism was most common thyroid disorder in diabetes^{5,7,9}.

V. Conclusion

This study concludes that thyroid dysfunction is observed in high prevalence among T2DM patients. More longitudinal cohort studies are needed to give high level of evidence to confirm this association in order to establish the need to be more aggressive in risk factor control in these individuals. The main limitation of our study is small sample size. More population-based studies with large sample size needed in future; various geographical areas and populations should be considered.

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