

To Evaluate Subclinical Hypothyroidism in Type 2 Diabetes Mellitus

Aligandula Ashok, Visampally Suresh Kumar

Associate Professor, Department of General Medicine, Government General Hospital, Government Medical College, Suryapet, Telangana, India

Abstract

Introduction: Diabetes is the most common endocrinal disorder seen in clinical practice. The prevalence of diabetes in west is between 6 and 7.6%. Type 2 diabetes mellitus is the predominant form of diabetes accounts for 90% of cases globally.

Aims and Objectives: This study aims to know the prevalence of subclinical hypothyroidism in Type 2 diabetes mellitus during the study period of 1 year 6 months patients attending Government General Hospital/Government Medical College, Suryapet.

Materials and Methods: This study was done on patients attending Government General Hospital/Government Medical College, Suryapet. The total duration of study was 1 year 6 months. Patients attending Government General Hospital who were either previously or newly diagnosed Type 2 diabetes mellitus were included in the study.

Results: Fifty known or newly detected cases of Type 2 diabetes mellitus more than 30 years were selected randomly from the patients attending to the Diabetic Clinic Government General Hospital during the study period September 2018 to February 2020.

Conclusion: Subclinical hypothyroidism has been associated with a greater prevalence of cardiovascular disease and is relatively common in patients with Type 2 DM. Hence, its effects would be exaggerated in patient with Type 2 DM.

Key words: Diabetes mellitus, Sub clinical hypothyroidism, Type 2

INTRODUCTION

Diabetes is the most common endocrinal disorder seen in clinical practice. The prevalence of diabetes in west is between 6 and 7.6%. Type 2 diabetes mellitus is the predominant form of diabetes accounts for 90% of cases globally. An epidemic of type 2 DM is under way in both developed and developing countries although the brunt of the disorder is felt disproportionately in non-European populations.

India has already become the “diabetes capital” of the world. The number of people with diabetes in India currently around 40.9 million and is expected to rise 69.9 million by 2025.^[1] Between 1995 and 2025, there is predicted

to be 35% increase in the worldwide prevalence of diabetes. The rising number of people with diabetes will occur mainly in populations of developing countries, globally the number of people with DM is expected to rise from current estimates of 150 million to 220 million in 2010 and 300 million in 2025.^[2] The prevalence of Type 2 diabetes mellitus in South Indian states, Andhra Pradesh 16.6% (Hyderabad) 2001, Tamil Nadu 14.3% (Chennai) 2006, Kerala – Ernakulam – 19.5% 2006, Thiruvananthapuram 16.3% 1999, and Karnataka 12.4 (Bangalore) 2001.^[1]

The disease has tremendous impact on the quality of life, and morbidity and mortality occur due to complications that affect the small vessels resulting in retinopathy, nephropathy, neuropathy, and large vessels resulting in ischemic heart disease and stroke.

Various studies done suggest that thyroid disorders are more common in diabetics (both Type I and Type II) than in the general population, highest in Type I diabetic females and lowest in Type II diabetic males; most common disorder being subclinical hypothyroidism. Thyroid dysfunction is also

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Corresponding Author: Dr. Visampally Suresh Kumar, Department of General Medicine, Government General Hospital, Government Medical College, Suryapet, Telangana, India.

common in Type 2 DM because both of these illnesses tend to occur more frequently as people age. Several alterations in thyroid function are found in DM. Plasma T4 is normal, whereas plasma T3 is diminished, and plasma level of T3 is elevated in patients with severely uncontrolled diabetes.

Thyroid peroxidase (TPO) antibodies (also called as antimicrosomal antibodies, AMA) are found with elevated TSH levels and when positive in those with normal TSH levels, indicate future probability of the development of hypothyroidism in a diabetic. Both conditions are expressed with greater frequency after the altered immune states of pregnancy.

Subclinical hypothyroidism is defined by elevated TSH secretion in the presence of normal concentration of circulating thyroid hormones. This syndrome affects approximately 10 millions of people in the United States and is most prevalent in elderly women. Patients with subclinical hypothyroidism will be detected more frequently in the future as these patients have no or only minimal symptoms.

Subclinical hypothyroidism is a strong risk factor for atherosclerosis and MI, in elderly women. It was found to be a greater risk factor for MI, in postmenopausal women than hyperlipidemia, diabetes, previous smoking, and hypertension. Type 2 DM patients with subclinical hypothyroidism are associated with an increased risk of sight-threatening diabetic retinopathy and increased risk of nephropathy and cardiovascular events. Type 2 DM patients should be screened for subclinical hypothyroidism to prevent development of complications.

Aims and Objectives

This study aims to know the prevalence of subclinical hypothyroidism in Type 2 diabetes mellitus during the study period of 1 year 6 months patients attending Government General Hospital/Government Medical College, Suryapet.

MATERIALS AND METHODS

This study was done on patients attending Government General Hospital/Government Medical College, Suryapet. The total duration of study was 1 year 6 months.

Patients attending Government General Hospital who were either previously or newly diagnosed Type 2 diabetes mellitus were included in the study.

Inclusion Criteria

Patients of Type 2 diabetes mellitus either previously or newly diagnosed aged more than 30 years were included in the study.

Exclusion Criteria

The following criteria were excluded from the study:

1. All patients <30 years of age
2. Known hypothyroidism and hyperthyroid patients
3. Known patients of Type 1 diabetes mellitus.

Study Design

1. Randomly selected Type 2 diabetic patients were subjected to evaluation for thyroid function clinically and biochemically

Table 1: Age distribution

Age group (years)	No. of patients	Percentage
30–40	7	14
40–50	16	32
50–60	19	38
60–70	7	14
>70	1	2

Table 2: Sex distribution

Sex	No. of patients	Percentage
Male	15	30
Female	35	70

Table 3: Distribution of serum TSH among the study group

Serum TSH level	No. of patients	Percentage
<4.5 µU/ml	41	82
>4.5–10 µU/ml	9	18

Table 4: Sex distribution of subclinical hypothyroidism

Sex	Type 2 DM without S.C.H.	Type 2 DM with S.C.H.
Male	15	0
Female	26	9

Table 5: Age distribution of Type 2 DM without subclinical hypothyroidism versus with subclinical hypothyroidism

Age group (years)	Type 2 DM without SCH	Type 2 DM with S.C.H.
30–40	7	0
40–50	13	3
50–60	15	4
60–70	5	2
>70	1	0

Table 6: Mean duration of Type 2 DM

Type 2 DM without SCH	Type 2 DM with SCH	P-value
3.73±3.18	5.06±6.98	0.382

AQ7 **Table 7: ???**

Study	Subject groups	Parameters	Subject no.		Total
			Male	Female	
Celani <i>et al.</i>	Type 2 DM	Prevalence of abnormal TSH and anti-TPO	131	159	290
The Fremantle diabetic study	Women Type 2 DM	Prevalence anti-TPO	-	420	420
Radaideh <i>et al.</i>	Type 2 DM and normal population comparative study	Prevalence of thyroid dysfunction and anti-TPO	-	-	902
Ishay <i>et al.</i>	Women with type 2 DM with normal population – comparative study	Prevalence lipids, anti-TPO HBA1C	-	-	410
Perrous <i>et al.</i>	Diabetes mellitus	Prevalence of thyroid dysfunction	-	-	1310
Cordoso <i>et al.</i>	DM type	Prevalence	-	-	60
Ramaswamy <i>et al.</i> , Hyd.	Type 2 DM	Prevalence of thyroid dysfunction	-	-	120
Rajan <i>et al.</i> , Chennai	Type 2 DM	Prevalence of thyroid dysfunction	-	-	100
Present study	Type 2 DM	Prevalence BMI, lipid profile	15	35	50

Table 8: Prevalence of subclinical hypothyroidism in different study groups

Study	Prevalence
Celani <i>et al.</i>	15.16
The fremantle diabetic study	8.6
Radaideh <i>et al.</i>	6.6
Ishay <i>et al.</i>	5.4
Perrous <i>et al.</i>	4.8
Cordoso <i>et al.</i>	8.3
Ramaswamy <i>et al.</i> , Hyderabad	11
Rajan <i>et al.</i> , Chennai	10
Present study	18

- Diagnosis of Type 2 diabetes mellitus was done as per the WHO guidelines.

RESULTS AND ANALYSIS

Fifty known or newly detected cases of Type 2 diabetes mellitus more than 30 years were selected randomly from the patients attending to the Diabetic Clinic Government General Hospital during the study period September 2018 to February 2020.

Among 50 subjects, 19 (38%) patients were in the age group of 50–60 years, 16 (32%) patients were in the age group of 40–50, 7 (14%) patients were in the age group of 30–40 years, and 1 (2%) patient was in the age group of >70 years. The age of the patient varied from a minimum of 35 years to max. 74 years. The mean age of the patient in the study was 53.06 ± 9.35 years [Table 1].

Among 50 subjects of Type 2 DM, 15 (30%) were male and 35(70%) were female [Table 2].

Type 2 DM patients with serum TSH levels below $4.5 \mu\text{U/ml}$ and above $4.5\text{--}10 \mu\text{U/ml}$. Mean TSH in the study group 3.09 ± 1.95 [Table 3].

Among 50 subjects of type 2 DM, 9 (18%) are having subclinical hypothyroidism. All are female [Table 4].

About 78% of the Type 2 diabetics with subclinical hypothyroidism are in the age group of 40–60 years [Table 5].

Mean duration of diabetes mellitus in Type 2 diabetes with subclinical hypothyroidism 5.06 ± 6.98 [Table 6].

Mean duration of diabetes mellitus, without subclinical hypothyroidism 3.73 ± 3.18 .

Mean duration of diabetes among two groups statistically not significant.

DISCUSSION

Few studies on the prevalence of the subclinical hypothyroidism in Type 2 DM and relation between them regarding various parameters have been done [Table 7].

Hence, the number of diabetic subjects included in various studies ranged from 60 Type 2 diabetics in a study by Cordoso *et al.* to 1310 diabetics in a study by Perrose *et al.*

Some studies included only Type 2 DM others both Type 1 and 2 DM.

The prevalence of subclinical hypothyroidism was 18% in the present study compared to 15.16% in a study by Selani *et al.*, the prevalence of subclinical hypothyroidism was more in females, aged, and associated with increased antithyroid peroxidase antibodies status in the present study like previous studies [Table 8].

CONCLUSION

Subclinical hypothyroidism has been associated with a greater prevalence of cardiovascular disease and is relatively common in patients with Type 2 DM. Hence, its effects would be exaggerated in patient with Type 2 DM.

Increased prevalence of subclinical hypothyroidism in females, aged, and associated with increased antithyroid peroxidase status in Type 2 DM.

All Type 2 DM patients should be screened for subclinical hypothyroidism to intervene early to prevent complications and progression of hypothyroidism.

Summary

1. Total number of subjects included in the present study was 50 Type 2 DM patients (males 15 and females 35)
2. The prevalence of subclinical hypothyroidism in Type 2 DM in the present study was 18%, all are female most of them are aged more than 50 years

and associated with increased antithyroid peroxidase antibody status

3. Body mass index, total cholesterol, HDL cholesterol, LDL cholesterol, VLDL cholesterol, and fasting triglycerides levels were more in Type 2 DM with subclinical hypothyroidism compared to Type 2 diabetics without subclinical hypothyroidism, but statistically not significant.

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