



THYROID PROFILE IN GERIATRIC AND NON-GERIATRIC TYPE 2 DIABETES MELLITUS

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ABSTRACT

Background: Thyroid disease is common in general population and its prevalence increases with age. Screening for thyroid dysfunction is indicated in certain high risk groups such as elderly and those with other endocrinal disorders especially diabetes mellitus. Presence of thyroid dysfunction may affect glycemic control in diabetics. **AIM:** To study thyroid profile in geriatric and non-geriatric type 2 diabetes mellitus. **Objectives:** To assess thyroid functions in geriatric and non-geriatric patients with type 2 diabetes mellitus. **Study Design:** Cross sectional, observational study. **Place of Study:** Department of General Medicine, Kamineni institute of medical sciences, Narketpally. **Duration of Study:** November 2020 to December 2022

KEYWORDS : Hypothyroidism, Hyperthyroidism, Type 2 diabetes mellitus, dyslipidemia, geriatric.

INTRODUCTION

Thyroid disease is common in the general population and its prevalence increases with age. Screening for thyroid dysfunction is indicated in certain high-risk groups such as the elderly and those with other endocrinal disorders especially Diabetes Mellitus.¹ A number of reports have also indicated a higher than normal prevalence of thyroid disorders in Type 2 diabetic patients, with hypothyroidism being the most common thyroid disorder and especially in older women. Hypothyroidism is usually autoimmune in origin presenting as either Primary Atrophic Hypothyroidism or Hashimoto's Thyroiditis. Thyroid failure secondary to radioactive iodine therapy or thyroid surgery is also common. Rarely, pituitary or hypothalamic disorders can result in secondary hypothyroidism¹. By contrast, hyperthyroidism is much less common, with a female to male ratio of 9:1. Grave's disease is the most common cause and primarily affects young adults. Toxic multi-nodular goitre tends to affect the older age groups.² Moreover nodular thyroid structure and parenchymatous goitre occurs more frequently in Type 2 diabetics.

According to the WHO and UN 2001, people aged 45-59 years are considered "middle aged" and those above 60 years are considered to be Geriatrics. The presence of thyroid dysfunction may affect glycemic control in diabetics.² Hyperthyroidism is typically associated with worsening glycemic control and increased insulin requirements. There is underlying increased hepatic gluconeogenesis, rapid gastrointestinal absorption of glucose and probably increased insulin resistance also. Indeed, thyrotoxicosis may unmask latent diabetes.¹

First, in hyperthyroid patients, the diagnosis of glucose intolerance needs to be considered cautiously since the hyperglycemic status may improve with the treatment of thyrotoxicosis. Second, underlying hyperthyroidism should be considered in diabetic patients with unexplained worsening glycemic control. Third, in diabetic patients with hyperthyroidism, physicians need to anticipate possible deterioration in glycemic control and adjust treatment doses accordingly as restoration of euthyroid state will lower blood glucose level.¹ However, the reduced rate of insulin degradation may lower the exogenous insulin requirements. The occurrence of hypoglycemic states is uncommon in

isolated thyroid hormone deficiency and should raise the doubt of hypopituitarism in a patient with hypothyroidism. More importantly, hypothyroidism is accompanied by a variety of abnormalities in lipid metabolism including elevated Triglyceride and Low Density Lipoprotein (LDL) concentrations. Even subclinical hypothyroidism can worsen the coexisting dyslipidemia commonly found in Type 2 Diabetics and hence further increase the risks of cardiovascular events. Adequate hormone replacement will reverse the lipid abnormalities.^{1,2}

Subclinical hypothyroidism can elevate serum LDL levels and worsen pre-existing dyslipidemia. It may also increase the risk of cardiac arrhythmias and may exacerbate angina. Since diabetic patients are at high risk for cardiovascular disorders, the diagnosis and treatment of subclinical thyroid diseases is important.

AIM:

To study the Thyroid profile in Geriatric and Non Geriatric Type 2 Diabetes Mellitus.

OBJECTIVES:

1. To assess thyroid functions in Geriatric and non-geriatric patients with Type 2 Diabetes Mellitus.
2. To determine comorbid conditions especially Cardiovascular Diseases in both the age groups and association with dyslipidemia

Inclusion Criteria

Patients diagnosed with Diabetes Mellitus according to American Diabetes Association (ADA) criteria Geriatric patients (> 60yrs old) with Type 2 Diabetes Mellitus Non Geriatric patients (20-59 yrs old) with Type 2 Diabetes Mellitus

Exclusion criteria

Patients with Type 1 Diabetes Mellitus Patients on Hormone Replacement Therapy or steroids. Pregnant women Patients on drugs known to cause Hypothyroidism (Propranolol, Iopanoic Acid, Iodide, Amiodarone, Salicylates, Phenytoin, Glucocorticoids, Lithium, Amphetamines, Sertraline, Aminoglutethimide, Dopamine, Somatostatin, Octreotide, Interleukins, Heroin)

Patients with cirrhosis of liver, Renovascular Hypertension or Renal failure and Heart failure.

METHODOLOGY:

After taking approval from the institutional ethics committee and prior informed consent from the patients the study was conducted. A detailed history was elicited. Emphasis regarding history of onset, duration, progression of chief complaints and associated complaints like Polyuria, polydipsia, polyphagia, paresthesia / numbness, blurred vision. A thorough general physical examination of patient was done. Cases were subjected to investigations such as routine Investigations Complete blood picture, ESR, Complete Urine Picture, thyroid profile, fasting blood sugar, post prandial sugar, HbA1c.

RESULTS

In present study of 150 patients, there are 90 non-geriatric patients and 60 geriatric patients. Among 90 non geriatric patients, 35 were males and 55 were females. Among 60 geriatric patients, there are 20 males and 40 females.

Table - 1: Duration Of Diabetes Mellitus In The Patients Studied

Duration of DM (Years)	Non-Geriatric	Geriatric
1-4	30 (33.33)	8 (13.33)
5-9	27 (30.00)	18 (30.00)
10-14	18 (20.00)	12 (20.00)
15-19	9 (10.00)	16 (26.67)
20-30	6 (6.67)	8 (13.33)

The duration of DM among non-geriatric patients was maximum at 1-4 years and among geriatric patients it is maximum at 5-9 years.

Table - 2: Distribution Of Patients According To Their Thyroid Profile

Age Group	Euthyroid	Hypothyroidism	Subclinical Hypothyroidism	Hyperthyroidism
Non Geriatric	36 (40%)	38 (42.22%)	13 (14.44%)	3 (3.33%)
Geriatric	30 (50%)	22 (36.67%)	5 (8.33%)	3 (5%)
Total	66 (44%)	60 (40%)	18 (12%)	6 (4%)

Based on the thyroid status, among non geriatric patients, majority of the patients are hypothyroid followed by patients with euthyroid condition. Among geriatric patients, majority of them are euthyroid followed by hypothyroid patients.

Table - 3: Distribution Of Patients According To Their Clinical Features Of Hypothyroidism

Clinical features of Hypothyroidism	Non-Geriatric N (%)	Geriatric N (%)
Lethargy/Fatigue	58 (64.44)	23 (38.33)
Puffiness of the face	27 (32.22)	38 (63.33)
Poor appetite	46 (51.11)	34 (56.67)
Dry Skin	41 (45.55)	31 (51.66)
Constipation	26 (28.22)	29 (48.33)
Lack of Concentration	18 (20.00)	31 (51.66)

Among non - geriatric hypothyroid patients, majority of them 64.44% present with lethargy or fatigue followed by 51.11% patients present with poor appetite. Among geriatric hypothyroid patients majority of them 63.33% present with puffiness of face, followed by poor appetite (56.67%), dry skin and lack of concentration (51.66%).

Table - 4: Distribution Of Non Geriatric Patients With Dyslipidemia According To Their Thyroid Profile

Dyslipidemia	No. of Patients	Euthyroid	Hypothyroidism	Subclinical Hypothyroidism	Hyperthyroidism
Present	43	17 (39.53%)	21 (48.83%)	3 (6.97%)	2 (4.65%)

Absent	47	19 (40.42%)	17 (36.17%)	10 (21.27%)	1 (2.12%)
Total	90	36	38	13	3

The prevalence of dyslipidemia is common among hypothyroid patients with 48.83% and it is absent in euthyroid patients (40.42%).

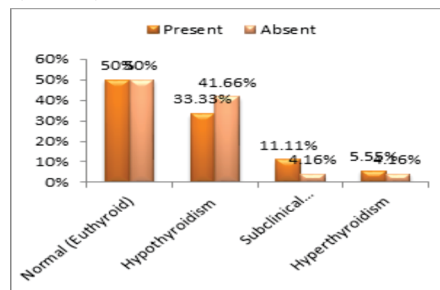


Figure 1: Distribution Of Geriatric Patients With Dyslipidemia According To Their Thyroid Profile

Table - 5: Distribution Of Geriatric Patients With Dyslipidemia According To Their Thyroid Profile

Dyslipidemia	No. of Patients	Euthyroid	Hypothyroidism	Subclinical Hypothyroidism	Hyperthyroidism
Present	36	18 (50.00%)	12 (33.33%)	4 (11.11%)	2 (5.55%)
Absent	24	12 (50%)	10 (41.66%)	1 (4.16%)	1 (4.16%)
Total	60	30	22	5	3

The patients are then distributed according to the prevalence of dyslipidemia and it is highest among euthyroid patients (50.0%) and it is absent in euthyroid patients (50%) followed by 41.66% of hypothyroid patients.

DISCUSSION

In this study thyroid dysfunction was prevalent in 88 (55%) patients out of the 150 included of which 90 were in the non-geriatric age group with 38% of the 75 patients in that group being hypothyroid, 8 (15.38%) having subclinical hypothyroidism and 1 (14.28%) having hyperthyroidism whereas the remaining 42 (52.5%) were in the geriatric age group with 22 (50%) being hypothyroid, 5 (9.09%) having subclinical hypothyroidism and 3 (4.54%) having a hyperthyroid state.

In a study conducted by Hollowell J.G³ et al, the prevalence of thyroid disease was found to be 15% with subclinical hypothyroidism, 11% hypothyroidism, 1% subclinical hyperthyroidism-2% and hyperthyroidism at 1%. The prevalence was higher than that in the general population and in females.

A study by Nobre E.L⁴ et al showed that among 200 patients with type 2 diabetes mellitus 69% had euthyroid, 31 % had thyroid dysfunction, 25% had subclinical hypothyroidism, 3.5% had clinical hypothyroidism, and 2.5% had clinical hyperthyroidism.

Among geriatric patients majority of patients (53.33%) do not present with any symptoms of dyslipidemia and among geriatric patients majority of them present with dyslipidemia (60.0%).

The prevalence of dyslipidemia is common among hypothyroid patients with 48.83% and it is absent in euthyroid patients (40.42%). The patients are then distributed according to the prevalence of dyslipidemia and it is highest among euthyroid patients (50.0%) and it is absent in euthyroid patients (50%) followed by 41.66% of hypothyroid patients.

In a study conducted by Wolide AD⁵ et al, The burden of hypothyroidism and subclinical hypothyroidism among T2DM study participants were 73 (17.05%) and 13 (3.04%) respectively. Comparatively, T2DM study participants had significantly higher serum lipid level than non-diabetics. Stratified by TSH, hypothyroid T2DM study participants had increased lipid level than euthyroid subjects. T2DM serum TSH have shown a positive significant correlation with all lipid profile parameters except HDL-C. In the final model, diabetics serum TSH significantly and positively associated with TG and BMI. Diabetic serum fT3 and fT4 negatively associated with body mass index. In addition, diabetics serum fT3 negatively and serum fT4 positively associated with TC and HDL-C respectively.

CONCLUSION

Thyroid dysfunction was seen in a significant percentage of patients with Type 2 Diabetics with the most predominant dysfunction being overt hypothyroidism followed by subclinical hypothyroidism, females being predominantly affected. Hypothyroidism was seen more in patients with increasing age as was noticed with a higher prevalence among the older patients in the Non-geriatric group as well as those well past the geriatric age group.

The presence of secondary dyslipidemia due to hypothyroidism as a consequence of previously undiagnosed hypothyroidism is a major risk factor for atherosclerosis and its accompanying vascular complications especially if these patients are affected with a dual endocrinological disorder, the other being Diabetes Mellitus.

Even subclinical hypothyroidism was significantly associated with dyslipidemia. In conclusion screening should be strongly recommended for all diabetics to rule out thyroid dysfunction especially in patients with increasing age in order to timely diagnose and prevent major cardiovascular morbidity and mortality.

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