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ORIGINAL RESEARCH

Evaluation of thyroid function in patients with diabetes mellitus

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ABSTRACT
Background: Diabetes mellitus is a major health concern affecting a large proportion of the world's population. The present study was conducted thyroid function in patients with diabetes mellitus.
Materials & Methods: 78 type II diabetes mellitus patients of both genders were subjected to assessment of serum TSH (Thyroid Stimulating Hormone), free T3 (Triiodothyronine) and free T4 (Thyroxine) were assessed in the fasting serum samples using chemiluminescent immunoassay method technology.
Results: Out of 78 patients, 36 were males and 42 were females. The mean serum TSH was normal in 60, increased in 9 and decreased in 7. Free T3 was normal in 62, increased in 4 and decreased in 10 and free T4 was normal in 68, increased in 4 and decreased in 4 patients. The difference was significant (P< 0.05). Hypothyroidism was seen in 3,7,10 and 10 patients and hyperthyroidism in 1,4,6 and 6 patients with duration of diabetes <1 year, 1-5 years and 5-10 years respectively.
Conclusion: The prevalence of thyroid dysfunction was higher in patients with diabetes. Therefore, thyroid hormone monitoring in type 2 diabetics is required to improve quality of life and reduce morbidity.
Keywords: Diabetes mellitus, thyroid function, hyperthyroidism

Introduction

Diabetes mellitus is a major health concern affecting a large proportion of the world's population. It is characterized by anomalies in the metabolism of proteins, fats, and carbohydrates, as well as a complete or partial lack of insulin secretion and/or action. Chronic hyperglycemia is another characteristic.[1] Thyroid hormones are essential for metabolism and energy homeostasis and play a part in insulin action and glucose regulation. Research has indicated that individuals with type 2 diabetes mellitus (T2DM) are more likely to have overt hypothyroidism, and that thyroid abnormalities are more common in diabetic patients than in non-diabetics.[2]

Patients with diabetes who have hypothyroidism experience worsening dyslipidemia, hypertension, and cardiovascular disease. Therefore, in order to stop the progression of diabetes problems, patients with hypothyroidism must be identified and treated. A straightforward, widely accessible blood test can be used to diagnose hypothyroidism.[3] The primary care physician who treats patients with diabetes may carry out this task. Patients with diabetes who receive early treatment for thyroid dysfunction will have improvements in their lipid profile and glycemic status.[4]

There have been reports linking subclinical hypothyroidism in diabetic patients to a higher risk of cardiovascular disease and nephropathy.[5] Micro-angiopathic diabetic consequences, such as neuropathy and retinopathy, can deteriorate when dyslipidemia-induced hypothyroidism coexists. Patients with diabetes can receive early therapy for both overt and subclinical thyroid dysfunction by having their thyroid abnormalities screened.[6] The present study was conducted thyroid function in patients with diabetes mellitus.

Materials & Methods

The present study was conducted on 78 type II diabetes mellitus patients of both genders. All patients agreed with their written consent for participation in the study.

Data such as name, age, gender etc. was recorded in case file. A detailed history and clinical examination were carried out. 5 ml of venous blood sample was drawn from all patients and subjected to measurement of thyroid function tests, blood sugar fasting and postprandial, HbA1c, serum insulin levels, serum creatinine, and urinary albumin creatinine ratio. Serum TSH (Thyroid Stimulating Hormone), free T3 (Triiodothyronine) and free T4 (Thyroxine) were assessed in the fasting serum samples using chemiluminescent immunoassay method technology. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

Results

Table: I Distribution of patients

Total-78		
Gender	**Male**	**Female**
Number	36	42

Table I shows that out of 78 patients, 36 were males and 42 were females.

Table: II Assessment of thyroid function test

Parameters	Normal	Increased	Decreased	P value
Serum TSH	60	9	7	0.05
Free T3	62	4	10	0.04
Free T4	68	4	4	0.05

Table II, graph I shows that serum TSH was normal in 60, increased in 9 and decreased in 7. Free T3 was normal in 62, increased in 4 and decreased in 10 and free T4 was normal in 68, increased in 4 and decreased in 4 patients. The difference was significant (P< 0.05).

Graph: I Assessment of thyroid function test

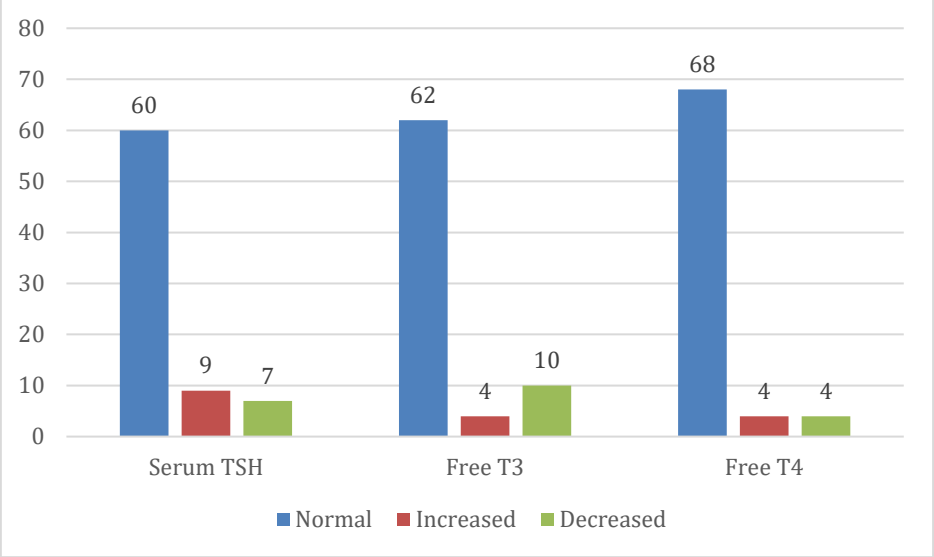

Table: III Thyroid dysfunction test according to duration of diabetes

Duration of diabetes (years)	Hypothyroidism	Hyperthyroidism
<1	3	1
1-5	7	4
5-10	10	6
Total	20	11

Table III shows that hypothyroidism was seen in 3,7,10 and 10 patients and hyperthyroidism in 1,4,6 and 6 patients with duration of diabetes <1 year, 1-5 years and 5-10 years respectively.

Discussion

Diabetes mellitus (DM) is a prevalent metabolic disorder marked by hyperglycemia and metabolic abnormalities of carbohydrates, proteins, and lipids.[7] Pancreatic beta-cell failure, hyperglucagonemia, and increased renal glucose reabsorption are the main causes of DM. DM is quickly rising to the top of the list of global health issues.[8,9] In 2000, there was an estimated 2.8% global prevalence of DM, and by 2030, that incidence was expected to reach 4.4%.[10] The present study was conducted thyroid function in patients with diabetes mellitus.

We found that out of 78 patients, 36 were males and 42 were females. The mean serum TSH was normal in 60, increased in 9 and decreased in 7. Free T3 was normal in 62, increased in 4 and decreased in 10 and free T4 was normal in 68, increased in 4 and decreased in 4 patients. Mehalingam et al[11] in their study 331 patients with type 2 diabetes mellitus without any prior history of thyroid disease, chronic liver disease or acute illness were recruited for the study. All subjects were screened for diabetic complications (nephropathy, neuropathy, retinopathy & cardiovascular disease). Thyroid function test was done in all subjects using chemiluminescent

immunoassay method. Hypothyroidism was seen in 13.9%, while hyperthyroidism was observed in 3.6% of the study subjects. Thyroid dysfunction was more common among females than males. No correlation was seen between thyroid dysfunction and diabetic complications in the study subjects.

We found that hypothyroidism was seen in 3,7,10 and 10 patients and hyperthyroidism in 1,4,6 and 6 patients with duration of diabetes <1 year, 1-5 years and 5-10 years respectively. Khassawneh et al[12] determined the prevalence and predictors of thyroid disorders in T2DM patients. A total of 998 T2DM patients attending a tertiary hospital were included and underwent investigations for thyroid function: thyroid-stimulating hormone (TSH), free thyroxine (FT4), and free triiodothyronine (FT3); and glycated hemoglobin (HbA1c). They were compared with 343 non-diabetic subjects as controls. A total of 1341 participants were included in the study. The mean age ± SD was 60.14 ± 12.21, and 47.9% were females. Among T2DM patients, 140 (14%) were known to have thyroid disorders; and as a direct result of screening, 126 (12.6%) new cases of thyroid disorder were diagnosed. Thus, the overall prevalence of thyroid disorders was found to be 26.7% in T2DM patients which significantly higher than the controls (13.7%), (p<0.001). Subclinical hypothyroidism was the most common one. Using logistic regression, after adjusting for age, gender, obesity, smoking, anemia, presence of goiter, disease duration, and poorly controlled, the risk factors for thyroid dysfunction among T2DM patients were an age of ≥50 years with an adjusted OR of 3.895 (95% CI 2.151–7.052, p<0.001); female gender (OR 1.757, 95% CI 1.123–2.747, p=0.013); goiter (OR 2.904, 95% CI 1.118–7.547, p=0.029), and HbA1c>7% (OR 2.553, 95% CI 1.472–4.429, p=0.001). However, there were no significant associations between thyroid disorders and complications or duration of diabetes.

Rajeswari et al[13] found that women were found to have a higher prevalence of thyroid dysfunction than men, including low T3 syndrome and subclinical hypothyroidism. TSH levels and insulin were found to be positively correlated in patients with subclinical hypothyroidism (SCH).

The shortcoming of the study is small sample size.

Conclusion

Authors found that the prevalence of thyroid dysfunction was higher in patients with diabetes. Therefore, thyroid hormone monitoring in type 2 diabetics is required to improve quality of life and reduce morbidity.

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