

Original Article

Assessment of subclinical hypothyroidism in type II diabetes patients

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ABSTRACT:

Background: Thyroid diseases and type 2 diabetes mellitus are the two most common endocrine disorders encountered in clinical practice. The present study was conducted to assess subclinical hypothyroidism in type II diabetes patients. **Materials & Methods:** 102 adult patients age ranged 40-80 years of both genders were included. Serum freeT3, freeT4, TSH was measured. **Results:** Group I had 80 males and 42 females and group II had 70 males and 52 females. FBS was 94.2 mg/dl in group I and 160.2 mg/dl, RBS was 152.4 mg/dl in group I and 226.8 mg/dl, cholesterol was 160.2 in group I and 198.2 in group II, LDL was 92.4 in group I and 120.4 in group II, HDL was 46.2 mg/dl in group I and 41.2 mg/dl in group II, serum creatinine was 0.91 mg/dl and 1.03 mg/dl in group II, TSH was 2.80 mIU/dl in group I and 5.42 mIU/dl in group II, T3 was 0.89 µg/dl in group I and 0.91 µg/dl in group II, T4 was 6.12 µg/dl in group I and 5.25 µg/dl in group II. The difference was significant (P< 0.05). **Conclusion:** There was high prevalence of subclinical hypothyroidism among type 2 diabetes mellitus patients.

Key words: Diabetes mellitus, subclinical hypothyroidism, Thyroid diseases

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INTRODUCTION

Thyroid diseases and type 2 diabetes mellitus are the two most common endocrine disorders encountered in clinical practice. Diabetes mellitus and thyroid disorders are shown to mutually influence each other.¹ Diabetes mellitus appears to influence thyroid function in two sites; firstly at the level of hypothalamic control of TSH release and secondly at the conversion of T4 to T3 in the peripheral tissue. Subclinical hypothyroidism is more common in type 2 diabetes mellitus patients.²

Diabetes is the most common chronic endocrine disease characterized by hyperglycemia resulted from impaired insulin secretion and/or insulin action. Chronic diabetic hyperglycemia is associated with long-term organ damage, dysfunction and failure. Complications, such as vision loss, renal failure and cardiovascular diseases, are often outcomes of diabetes. As the population ages and obesity increases, diabetes will increase as well. The global prevalence is predicted to be 11.1% in 2033, affecting 600 million people.³

Subclinical hypothyroidism (SCH) is defined as a serum thyroid stimulating hormone (TSH) level above normal despite normal levels of serum free thyroxine. In various studies, it has been shown to be associated with elevation in serum total cholesterol, triglycerides (TGL), low density cholesterol (LDL-C), coronary artery disease (CAD), LV diastolic dysfunction, LV systolic dysfunction with exercise and increased peripheral vascular resistance, thereby increasing the risk of CAD.^{4,5} The present study was conducted to assess subclinical hypothyroidism in type II diabetes patients.

MATERIALS & METHODS

The present study was commenced with the approval from institutional ethical committee involving 102 adult patients age ranged 40-80 years of both genders. Written approval was sorted from all involved subjects. Equal number of healthy subjects were also recruited.

Data such as name, age, gender etc. was recorded. A detailed clinical history, complete physical examination was carried in all patients. Assessment of

fasting blood sugar (FBS), random blood sugar (RBS), glycosylated haemoglobin (HbA1C), urine albumin excretion, fundus examination and neurological examination was conducted. Serum freeT3, freeT4, TSH was measured. Anti-thyroid peroxidase antibody (anti-TPO) titres were measured by immunoenzymatic assay. Subclinical hypothyroidism was defined as serum TSH value

between 4.2 μ IU / ml and 10 μ IU / ml. Subclinical hyperthyroidism was defined as serum TSH < 0.27 μ IU / ml, with normal levels of serum free T3 (2.0 – 4.4 pg / ml) and serum free T4 (0.93 – 1.7 ng / dl). Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

RESULTS

Table I Distribution of subjects

Groups	Group I	Group II
Status	Diabetics	Control
M:F	80:42	70:52

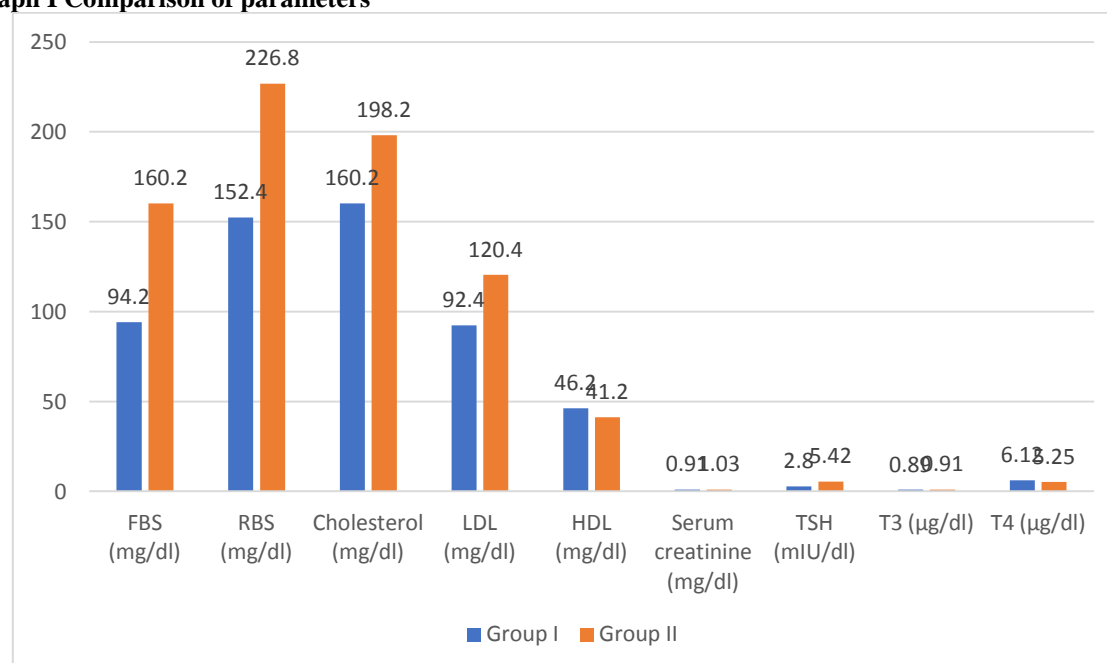
Table I shows that group I had 80 males and 42 females and group II had 70 males and 52 females.

Table II Comparison of parameters

Parameters	Group I	Group II	P value
FBS (mg/dl)	94.2	160.2	0.02
RBS (mg/dl)	152.4	226.8	0.04
Cholesterol (mg/dl)	160.2	198.2	0.03
LDL (mg/dl)	92.4	120.4	0.01
HDL (mg/dl)	46.2	41.2	0.05
Serum creatinine (mg/dl)	0.91	1.03	0.04
TSH (mIU/dl)	2.80	5.42	0.03
T3 (μ g/dl)	0.89	0.91	0.12
T4 (μ g/dl)	6.12	5.25	0.15

Table II, graph I shows that FBS was 94.2 mg/dl in group I and 160.2 mg/dl, RBS was 152.4 mg/dl in group I and 226.8 mg/dl, cholesterol was 160.2 in group I and 198.2 in group II, LDL was 92.4 in group I and 120.4 in group II, HDL was 46.2 mg/dl in group I and 41.2 mg/dl in group II, serum creatinine was 0.91 mg/dl and 1.03 mg/dl in group II, TSH was 2.80 mIU/dl in group I and 5.42 mIU/dl in group II, T3 was 0.89 μ g/dl in group I and 0.91 μ g/dl in group II, T4 was 6.12 μ g/dl in group I and 5.25 μ g/dl in group II. The difference was significant ($P < 0.05$).

Graph I Comparison of parameters



DISCUSSION

There is great variability in the prevalence of thyroid disorders in general population, ranging from 6.6% to

13.4%. In diabetic patients, the prevalence is still greater and varies from 10 to 24%.⁶ These differences can be explained by the degree of iodine intake among

different regions, and the diversity in the population. Chronic hyperglycemia from any route of cause leads to hypothyroidism and elevated thyroid stimulating hormone, dyslipidemia, cardiovascular disease.⁷ Numerous epidemiological studies indicate the higher prevalence of overt hypothyroidism in type 2 diabetes mellitus (T2DM) population than in the general population. However, the relationship between subclinical hypothyroidism (SCH) and T2DM is controversial. SCH, the slight hypothyroidism state, is asymptomatic but mild elevations in thyroid-stimulating hormone (TSH) with normal circulating free thyroid hormone concentrations are observed.⁸ Numerous studies suggest that SCH is associated with hypertension, high cholesterol, and abnormal homocysteine level and patients with SCH have a higher risk of metabolic syndrome, atherosclerosis, cardiovascular events, and mortality. Presently, controversy persists about indications for treatment of SCH and whether individuals should be routinely screened for this dysfunction.⁹ The present study was conducted to assess subclinical hypothyroidism in type II diabetes patients.

In present study, group I had 80 males and 42 females and group II had 70 males and 52 females. We found that FBS was 94.2 mg/dl in group I and 160.2 mg/dl, RBS was 152.4 mg/dl in group I and 226.8 mg/dl, cholesterol was 160.2 in group I and 198.2 in group II, LDL was 92.4 in group I and 120.4 in group II, HDL was 46.2 mg/dl in group I and 41.2 mg/dl in group II. Galag et al¹⁰ found that the mean and standard deviation (S.D.) of thyroid stimulating hormone (TSH) was statistically, significantly higher in the diabetes mellitus group (5.48 ± 2.32 mIU/dl), when compared to control group (2.91 ± 1.44 mIU/dl). This sub clinical hypothyroidism leads to dyslipidemia. The results also showed elevated total cholesterol, low density lipoprotein (LDL) in diabetes mellitus group, when compared to control group. Thus, subclinical hypothyroidism in type 2 diabetes mellitus can aggravate the classical risk factors such as hypertension and dyslipidemia, arising from an undiagnosed thyroid dysfunction and can lead to an increased cardiovascular risk in these patients.

We found that serum creatinine was 0.91 mg/dl and 1.03 mg/dl in group II, TSH was 2.80 mIU/dl in group I and 5.42 mIU/dl in group II, T3 was 0.89 µg/dl in group I and 0.91 µg/dl in group II, T4 was 6.12 µg/dl in group I and 5.25 µg/dl in group II. Han et al¹¹ found that prevalence of SCH in T2DM population, and investigated whether T2DM increase the risk of SCH and whether SCH was associated with diabetic complications. The adjusted pooled prevalence of SCH in T2DM patients was 10.2%, meanwhile, T2DM was associated with a 1.93-fold increase in risk

of SCH. Furthermore, SCH might affect the development of diabetic complications with an overall OR of 1.74 (95% CI: 1.34, 2.28) for diabetic nephropathy, 1.42 for diabetic retinopathy, 1.85 for peripheral arterial disease, and 1.87 for diabetic peripheral neuropathy.

CONCLUSION

Authors found that there was high prevalence of subclinical hypothyroidism among type 2 diabetes mellitus patients.

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