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Co-morbidities in Hypothyroid Patients in a Tertiary Health Care Hospital in India

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Abstract

Introduction: Prevalence of different co-morbidities associated with hypothyroid patients is higher than in general population. This study was done to find out the prevalence of different co-morbidities in hypothyroid Indian Population, comparison of different co-morbidities between overt and subclinical hypothyroid patients, and prevalence of different type of blood groups in hypothyroid patients.

Materials and methods: 41 hypothyroid (HT) patients including 21 subclinical and 20 overt HT patients were examined for asthma, hypertension, obesity and diabetes. Blood groups of all HT patients were detected. Data analyses were done by SPSS software.

Results: 34.1 % HT patients were suffering from asthma. 31.7%, 31.7% and 29.3% HT patients had obesity, diabetes and hypertension respectively. Most common blood group in HT patients was B positive. Statistically significant difference of prevalence of hypertension was seen between overt and subclinical hypothyroidism (p value = 0.031). But there was no difference of prevalence of diabetes (p value = 0.819), asthma (p value = 0.440) and obesity (p value = 0.368) between overt and subclinical hypothyroidism.

Conclusion: High prevalence of asthma, obesity, diabetes and hypertension were seen in hypothyroid patients than in general population. Overt HT patients are more commonly suffering from hypertension than subclinical HT. From this study it is clear that screening tests for diabetes, hypertension, obesity and asthma should be carried out in hypothyroid patients for early diagnosis and treatment because their prevalence is much higher than in general population.

Keywords: Hypothyroidism; Obesity; Hypertension; Obesity; Asthma; Blood groups

Introduction

Obesity especially central obesity is associated to many endocrine abnormalities [1], including thyroid dysfunction [2]. It is shown that hypothyroidism is characterized by insulin resistance [3]. In type 2 diabetic patients the presence of the sub-clinical forms of hyperthyroidism should be ruled out since it may be associated with higher cardiovascular risk [3]. Hypothyroidism may also be associated with asthma [4]. Hypothyroidism is recognized as a secondary cause of hypertension [5,6]. There is high frequency of hypothyroidism in patients with blood type A [7].

This study was done to find out the prevalence of different co-morbidities in hypothyroid Indian Population, comparison of different co-morbidities between overt and subclinical hypothyroid patients and prevalence of different type of blood groups in hypothyroid patients.

Materials and Methods

This study subjects included consecutive 41 Thyroid peroxidase antibody (TPO ab) positive hypothyroid patients. After taking consent, all subjects underwent a careful interview, a clinical examination with an evaluation of patient history based on hospital and outpatients records and laboratory investigations. Venous blood was taken in the morning after an overnight fast for at least 12 hours for biochemical analysis. All biochemical tests were performed at department of biochemistry, Burdwan Medical College.

Plasma glucose was estimated by a "glucose oxidase-peroxidase" method. Diabetes was diagnosed according to "American Diabetes Association" when a previous or current 12 h fasting glucose level is 7mmol/l or greater (≥126mg %) [8].

For measurement of blood pressure the mean of three consecutive measurements was recorded in the sitting position taken 5 min apart. Diagnosis of Hypertension was done according to the current guidelines [9] as when blood pressure levels ≥ 140/90 mm Hg or the use of anti-hypertensive drugs.

Body mass index (BMI) was calculated by dividing weight (kg) by height (m^2). BMI value of ≥ 23.0 is considered as obese in Asian population, as per WHO Experts [10]. Asthma was diagnosed according to GINA guideline. Hypothyroidism was diagnosed by using both clinical history (e.g., physician diagnosis of hypothyroidism by Thyroid swelling, presence of clinical features of hypothyroidism and patient taking thyroid supplementation) and laboratory analysis of thyroid-stimulating hormone (TSH) levels. Thyroid function test was carried out by enzyme linked immunosorbent assay. Hypothyroidism

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was diagnosed when TSH level was >4.5 mIU/L [11]. Subclinical hypothyroidism was diagnosed when there was raised TSH with normal total triiodothyronine (T_3) and thyroxine (T_4) [12]. Overt hypothyroidism was diagnosed when there was raised TSH with low total triiodothyronine (T_3) and thyroxine (T_4) [12].

Chi-square test, Odd ratio and prevalence calculation were performed by suing SPSS soft ware (17th version for window). P value < 0.05 was considered as significant. Data was expressed as mean ± SE (standard error).

Result and Analysis

41 hypothyroid (HT) patients were included in this study. Among them, 13 (31.7%) were male and remaining 28 (68.3%) were female. Mean age of the study subject was 43.17 ± 2.03 years. 48.8% and 51.2% patients were suffering from overt hypothyroidism and subclinical hypothyroidism respectively (Table 1).

14 (34.1%) HT patients were suffering from asthma. 8 (40%) overt hypothyroid and 6 (28.57%) subclinical hypothyroid patients had asthma. Risk of developing of asthma in overt hypothyroidism was 1.667 times higher compared to subclinical hypothyroidism. There was no significant difference of prevalence of asthma (p value = 0.440) between overt and subclinical hypothyroidism (Table 2).

13 (31.7%) HT patients had diabetes. 6 (30%) overt HT and 7 (33.33%) subclinical HT patients were suffering from diabetes. Risk of developing of diabetes in overt HT was 0.857 times than in subclinical HT. There was no significant difference in prevalence of diabetes between overt HT and subclinical HT (p value = 0.819) (Table 2).

13 (31.7%) HT patients were suffering from obesity. 5 (25%) overt HT and 8 (38.1%) subclinical HT patients had obesity. Prevalence of obesity in overt HT was 0.542 times than in subclinical HT. But there was no difference of prevalence of obesity (p value = 0.368) between overt and subclinical hypothyroidism (Table 2).

12 (29.3%) HT patients were suffering from hypertension. 9 (45%) overt HT and 3 (14.28%) subclinical HT were suffering from hypertension. Risk of developing of hypertension in overt HT was 4.9 times higher compared to subclinical HT. Statistically significant difference of prevalence of hypertension was seen between overt and subclinical hypothyroidism (p value = 0.031) (Table 2).

11 (26.83%) and 10 (24.39%) HT patients had blood group B (Positive), O (Positive) respectively (Table 3).

Discussion

In concordance with "Harrison's Principles of Internal Medicine" [13], our study also showed that hypothyroidism is more common in female sex.

	Hypothyroid patients	Overt hypothyroid Patients	Subclinical Hypothyroid Patients
Number	41`	20	21
Age (years)	43.17 ± 2.03	41.95 ± 2.80	44.33 ± 2.97
Asthma	14 (34.1%)	8 (40%)	6 (28.57%)
Diabetes	13 (31.7%)	6 (30%)	7(33.33%)
Obesity	13 (31.7%)	5 (25%)	8 (38.1%)
Hypertension	29.3%	9 (45%)	3 (14.28%)

Table 1: Demographic characters of hypothyroid patients.

Co---morbidities	Two groups of hypothyroidism	P value
Obesity	Overt HT : Subclinical HT	0.368
Hypertension	Overt HT : Subclinical HT	0.031
Diabetes	Overt HT : Subclinical HT	0.819
Asthma	Overt HT : Subclinical HT	0.440

Abbreviations: HT, hypothyroidism

Table 2: comparison of different co-morbidities between two groups of hypothyroid patients by chi-square test.

Blood Groups	Hypothyroid patients
A Positive	6 (14.63%)
A Negative	2 (4.88%)
B Positive	11 (26.83%)
B Negative	3 (7.32%)
AB Positive	7 (17.07%)
AB Negative	2 (4.88%)
O Positive	10 (24.39%)
O Negative	0

Table 3: Distribution of blood groups in hypothyroid patients.

Jindal et al. [14], showed that prevalence of asthma in general population of India is 4%. So, in our study Prevalence of asthma in hypothyroid patients was 34.1% which is higher than in general population of India. The risk of development of asthma is higher in overt hypothyroidism compared to subclinical hypothyroidism.

Perros et al. [15], demonstrated that an overall prevalence of thyroid diseases in diabetics is 13.4%. Prevalence of Hypothyroid among Greek diabetic patients was 12.3% [16] and 16% of Saudi patients with type 2 diabetes were found to have thyroid dysfunction [17]. Wide variability was seen in the prevalence of diabetes in hypothyroidism reported in different studies varying between 4·8% and 31·4%, partly explained by the different definitions used for the diagnosis of DM and thyroid disorders [18]. The overall prevalence of hypothyroidism among women with diabetes was 8.8% varied by age ranging from 5% among women age < 60 years to 21% among women aged ≥ 60 years [19]. Our study showed the prevalence of diabetes in hypothyroidism in India is 31.7%. Over all, in general Indian population, prevalence of diabetes was 13.8 % [20]. So, hypothyroidism is associated with higher prevalence of diabetes than in general population. Marina et al. [21], demonstrated that in obese individuals, the prevalence of overt and subclinical hypothyroidism was 19.5%. A study showed that in Italy, subclinical HT was recorded in 13.7% obese patients [22] Mohan et al. [23], reported that prevalence of obesity among men and women aged 20 years and above was 20%. In our study, the prevalence of obesity in hypothyroidism was quite higher (31.7%) in India.

Saxena et al. [24], documented that 28.33% Indian HT patients were hypertensive comprising of 19.75% cases of subclinical HT and 37.5% cases of overt HT. Misra et al. [25], reported that prevalence of hypertension in northern India was 12%. Our study showed that the prevalence of hypertension in hypothyroidism was 29.3%, among them 14.28% were subclinical hypothyroid and 45% were overt hypothyroidism in Indian population. The risk of development of hypertension is higher in overt hypothyroidism compared to subclinical hypothyroidism (p value = 0.031).

Carmel R and Spencer CA [7], showed that hypothyroidism is

more common in Blood group A. But in our study, hypothyroidism was more common in Blood group B (Positive).

The limitation of our study- study subject's number was small and other autoimmune conditions could not be examined.

Conclusion

High prevalence of asthma, obesity, diabetes, and hypertension were seen in hypothyroid patients than in general population. Overt HT patients are more commonly suffering from hypertension than subclinical HT. From this study it is clear that screening tests for diabetes, hypertension, obesity, asthma should carried out in hypothyroid patients for early diagnosis and treatment because their prevalence is much higher than in general population.

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