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Original Article

Hypothyroidism in Adult Obese Patients

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Abstract

Background: To determine the frequency of hypothyroidism in adult obese patients.

Methods: In this cross sectional study 116 obese patients who reported in the outpatient department were included. Patients having body mass index (BMI) of more than 30 were considered obese. Patients suffering from chronic diseases such as tuberculosis, hypertension, ischemic heart disease, other endocrine disorders and patients under 18 years of age were not included. Registration at patient selection was followed by drawing of 4 - 5 ml of blood sample in the morning in plain serum bottle. The drawn samples were sent for serum TSH and serum free T4 levels . Patients having serum TSH level of more than 4.5 mIU/L and T4 levels of less than 8.0 pmol/L were considered hypothyroid. The patient's height and weight were also measured using same machine for every patient for calculating BMI. The mean with standard deviation was calculated for age (years). Frequencies were calculated for hypothyroidism in obese patients and Chi Square test was applied to calculate the p value.

Results: Out of 116 patients 6 (5.2%) of the obese cases were hypothyroid. The frequency of hypothyroid in our obese population is insignificant.

Conclusion: There is no significant correlation between hypothyroid and obesity in our population.

Key Words: Hypothyroidism, Obese

Introduction

Over weight population is a major health issue in the world. Hypothyroidism appears to be associated with obesity but little data is available as regards the association between variations in thyroid function tests seen in general population and in people with increased body weight.[1] Both hypothyroidism and obesity are independent cardiovascular risk factors as well.[2] Thyroid hormones have been suggested in the treatment of obesity. Various studies on obese women have shown a relationship between decreased thyroid functions and increased body weight.[3] Hypothyroidism appears to improve in majority of morbidly obese patients who underwent laparoscopic Roux-en-Y (LRYGB) surgery.[4] The diagnosis of hypothyroidism in obese patients is thus sometimes missed because it is not always associated with symptoms or signs attributed to it or because the clinical features manifest so slowly that clinicians may fail to notice them.[5]

One study carried out in Hyderabad India showed overt hypothyroidism was present in 33% of the obese population which is a significant number.[6] No such study has been carried out in our population to determine the association between hypothyroidism and obesity.

Patients and Methods

The study was carried out in the Department of Medicine, Military Hospital Rawalpindi. All the obese patients who reported in the outpatient department from 2nd March, 2009 to 2nd Sep 2009 were included in the study. Patients having body mass index (BMI) of more than 30 were considered obese. Patients suffering from chronic diseases such as tuberculosis, hypertension and ischemic heart disease, or other endocrine disorders and patients under 18 years of age were not included. Registration at patient selection was followed by drawing of 4 - 5 ml of blood sample in the morning in plain serum bottle. The drawn samples were labelled and sent for serum TSH and serum free T4 levels . The samples were analyzed on fully automated hormone analyzer. The reference range for normal serum TSH level was 0.4 to 4.5 mIU/L and for serum T4 it was 8.0 to 21pmol/L. Patients having serum TSH level of more than 4.5 mIU/L and T4 levels of less than 8.0 pmol/L were considered hypothyroid. The patient's height and weight were also measured using same machine for every patient for calculating BMI. The mean with standard deviation was calculated for age (years). Frequencies were calculated for hypothyroidism in obese patients and Chi Square test was applied to calculate the p value.

Results

Mean age of the patients (n=116) was 39 (± 15 years) with range of 18 to 75 years. Ninety one (78.4%) were males and 25 (21.6%) were females. Out of 116 patients, 6 (5.2%) of the obese cases were hypothyroid

and the frequency of hypothyroidism in males was 4 (4.39%) and in females was 2 (8%) (Table 1). Mean value of TSH in hypothyroid patients was14.6 (± 2.34) mIU/L , while in euthyroid patients it was 2.5 (± 0.23) mIU/L (Table 2). Chi Square test was applied and p value was more than 0.05 which implies that frequency of hypothyroid patients in obese individuals is insignificant.

Table 1. Gender wise thyroid status of the patients

		Thyroid status of the Patient(Frequencies)		% of Hypothyroid patients
		Normal	Hypothyroid	
Patient's gender	Male	87	4	4.39%
	Female	23	2	8%
Total		110	6	5.2%

Table 2. Mean values of TSH and T4 in euthyroid and hypothyroid patients.

Mean Value	Hypothyroid Patients	Euthyroid Subjects
TSH	14.6 (± 2.34)mIU/L	2.5 (± 0.23) mIU/L
T4	5.6 (± 0.44)pmol/L	16.4 (± 3.2) pmol/L
p-value= >0.05 *		

*insignificant

Discussion

Implicating abnormal thyroid function continues to be debated and identifying thyroid disease clinically can be challenging. Symptoms often develop so insidiously that they go unnoticed.[7] When symptoms are reported, they are frequently confused with other health problems. [7,8] The picture of a typical hypothyroid patient vividly painted in medical textbooks is seldom seen in clinical practice. What we often see is a presentation that is not always identified by the history and the physical examination. The diagnosis of hypothyroidism is sometimes missed because it is not always associated with the symptoms or signs attributed to it or because the clinical features manifest so slowly that clinicians may fail to notice them.[9,10] Symptoms also lack specificity and clinicians often attribute them to common non-thyroid diseases. Conversely, several individuals with non-specific symptoms are diagnosed to have hypothyroidism when evaluated with the help of thyroid function tests.[9] The U.S. Preventive Services Task Force recommends that clinicians remain alert to the subtle or non-specific nature of thyroid dysfunction and maintain a low threshold for the diagnostic evaluation of thyroid dysfunction.[11] In one of the local studies carried out it was found that the presentation of hypothyroidism is non-specific and high degree of suspicion is required for its early diagnosis in our population. Lethargy was the commonest symptom and facial edema was the most prevalent sign in our population.[5]

Variations in thyroid function are seen between individuals.[12] Such differences in individual thyroid function are caused by a combination of genetic and environmental factors.[13] Considerable differences may be seen in thyroid function between populations when estimated by median serum TSH levels. The optimal level for thyroid hormones and TSH in serum to attain physical and mental well being has not been established, but the trend these years is to narrow the range of serum TSH, regarded as optimal. Detrimental effects on the cardiovascular system have been reported for suppressed and particularly elevated serum levels of TSH. Even small differences in thyroid function with TSH variation within the normal laboratory range for patients on T4 substitution therapy are associated with measurable differences in resting energy expenditure (REE), but the impact on body mass index (BMI) remains unsettled.[14] A prolonged decrease in REE might well lead to increased body weight in the current environment of food plenty and physical inactivity in many industrialized countries. Association between thyroid hormone levels, as seen in the general population, and body weight or BMI has only been described in few previous studies. A Puerto Rican study included 575 obese patients and concluded that 8.2 % of their patients were either hypothyroid or had sub clinical hypothyroidism. The DanThyr Study showed a positive correlation between BMI and serum TSH, a negative correlation between BMI and serum free T4, and no association between BMI and serum free T3.

Overweight is a major threat to public health, with the prevalence of obesity now exceeding 30% in the United States.[15] Lifestyle is undoubtedly of major importance for weight gain in the population, but the interaction with other factors is far from elucidated in detail.[16] In euthyroidism, subjects with a TSH in the upper normal range (2·5–4·5 mU/l) were more obese, had higher triglycerides, and had an increased likeliness for the metabolic syndrome. however it is suggested that in these subjects TSH should be followed on a regular bais.[17]

Conclusion

Incompatibility of studies performed to date has generated much confusion. The existence of the

components increases one's cardiovascular disease risk. There is growing awareness among health care professionals to identify and initiate therapy for 'nontraditional' cardiovascular disease risk factors, without negating the importance of identifying and treating the other traditional risk factors (e.g. smoking, age, sex and family history).Both hypothyroid and obesity still plays an important role in CVD . Therefore, if the identification of a 'syndrome' helps clinicians to recognize high-risk individuals, then the definition has served its clinical utility.

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