

Original Research Article

Clinical profiling of subclinical hypothyroidism at presentation at tertiary care center

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ABSTRACT

Background: Subclinical hypothyroidism (SCH) is defined as serum thyroid-stimulating hormone (TSH) level above upper limit of normal despite normal levels of serum free thyroxine, stable over a period of one month in the absence of any non thyroidal illness. Present study is aimed at evaluating prevalence of SCH in developing countries and evaluating the clinical spectrum of these patients highlighting the importance of treatment of SCH.

Methods: Total number of 120 patients with established SCH was enrolled for the study over 3 years. The values were measured by third generation non-isotopic immunochemiluminiscence method using the standard protocol as indicated in the kit.

Results: Patients were aged 15-50 years old. The most common manifestation was generalized weakness, lethargy and tiredness (60%) followed by generalized body ache (52.5%). 46.7% % of the patients had complaints of weight gain. Triglyceride levels and serum cholesterol levels were deranged in 28.3% of all cases. Body mass index was increased in 28.3% of all patients with obesity in only 2 patients. 15 patients (11.7%) were found to be anaemic with increased MCV and MCH/MCHC, attributable to hypothyroidism.

Conclusions: These symptoms caused significant debilitated life style and poor outcome in SCH patients. Treatment of these patients can help in improving their lifestyle and perform better on daily basis.

Keywords: Hypothyroidism, TSH, Thyroxine (T4), Subclinical hypothyroidism

INTRODUCTION

Subclinical hypothyroidism (SCH) is defined as a serum thyroid-stimulating hormone (TSH) level above the upper limit of normal despite normal levels of serum free thyroxine, stable over a period of one month in the absence of any non thyroidal illness.^{1,2}

As per the recommendations of European Thyroid Association (ETA) subclinical hypothyroidism (SCH) should be considered in two categories according to the elevation in serum thyroid-stimulating hormone (TSH) level: mildly increased TSH levels (4.0-10.0mIU/L) and more severely increased TSH levels (>10mIU/L).³

Subclinical hypothyroidism or mild thyroid failure is a common problem, with a prevalence of 3% to 8% in the population without known thyroid disease.^{4,5} The prevalence increases with age and is higher in women. After the sixth decade of life, the prevalence in men approaches that of women, with a combined prevalence of 10%. Antithyroid antibodies can be detected in 80% of patients with SCH, and 80% of patients with SCH have a serum TSH of less than 10mIU/L.

The consequences of SCH are variable at several levels and may depend on the duration and the degree of elevation of the serum TSH. Although various studies have suggested it to be a cardiovascular risk factor, yet a

number of important questions about SCH remain, including whether it increases cardiovascular (CV) risk or mortality, whether it negatively influences metabolic parameters and whether it should be treated with L-thyroxine. The effect of T4 replacement on lipids is uncertain. However, in several randomized trials of patients with subclinical hypothyroidism treated with T4 versus placebo, serum total and LDL cholesterol and apoprotein B-100 concentrations decreased significantly whereas serum HDL cholesterol, triglyceride, and lipoprotein (a) concentrations did not change.⁶

METHODS

This was prospective observational study conducted in Department of Medicine, Vivekanand Polyclinic and Institute of Medical Sciences, (VPIMS), and charitable tertiary care hospital and in Department of Endocrinology and department of pathology of King George's Medical University, Lucknow. All patients presenting in outpatient department of the institute were included in the study. Indoor patients were not included in the study.

Total number of patients enrolled for the study was 120 over period of 3 years. All patients with clinically and biochemically established to have hypothyroidism (raised mean TSH over 4.67 μ IU/mL with normal T3 and T4 levels over period of 3 months, evaluated three times over 3 months); providing valid informed consent for participation and belonging to the age group of 15-50 years were included in the study.

All the critically ill patients, patients taking irregular treatment of thyroid or suffering from other thyroid disorder, pregnant females were excluded from the study. The values were measured by third generation non-isotopic immunochemiluminiscence method using the standard protocol as indicated in the kit. The study was done over a period of 3 years.

All patients were subjected to detailed clinical history, clinical examination and biochemical tests. Body mass index was calculated by recording of height in meters and weight in kg. The detailed past history, family history, drug history and medical records were looked into. All patients found to interfere in thyroid studies were excluded from the study. All the clinical findings were noted. Biochemical tests done were thyroid profile, total cholesterol, triglyceride, random blood sugar was done by immunochemiluminiscence method using standard kits and protocols mentioned in them. The simple statistics was employed to calculate the percentage and ratio of clinical symptoms and signs.

RESULTS

In the present total of 120 patients fulfilling the inclusion criteria and diagnosed with subclinical hypothyroidism were enrolled in the study. The patients were aged 15-50 years old (Median age 33.50 years). Mean age of the

patient was 33.07 \pm 9.69 years. The proportion of patients were highest in the age group 31-40 years (43/120;35.83%) followed by age group of 21-30 years and 41-50 years (both 31/120;25.83%) (Table 2). Out of the 120 patients enrolled, 101 were females (84.17%) and 19 were males (15.83%) (Table 3). Male to female ratio was 19/101 (1:0.19). TSH values ranged from 5.10-17.85mIU/ml with a mean of 8.229mIU/ml. T3 values ranged from 0.79-1.48ng/dl with a mean value of 1.151ng/dl. Similarly, T4 values ranged from 4.57-11.85 μ g/dl (Table 4).

Table 1: Clinical presentation of the patients.

Clinical symptoms	Number of patients	%
Weakness/lethargy/tiredness	72	60.0
body ache	63	52.5
Weight gain	56	46.7
Paresthesia	38	31.7
Constipation	26	21.7
Hair fall	22	18.3
Menstrual disturbance	20	16.7
Dryness of skin	19	15.8
Hyperinsomnia	16	13.3
Memory loss	12	10.0
Dyspnoea	04	3.3
Change in voice	02	1.7

Table 2: Age profile of study population.

Age group (years)	Total (N=120)	
	No.	%
\leq 20 years	15	12.50
21-30 years	31	25.83
31-40 years	43	35.83
41-50 years	31	25.83
Min-Max (Median)	15-50 (33.50)	
Mean \pm SD	33.07 \pm 9.69	

Table 3: Gender of study population.

Gender	Total (N=120)	
	No.	%
Female	101	84.17
Male	19	15.83
Female:Male	1:0.19	

The clinical manifestations of subclinical hypothyroidism were varied. The most common manifestation was generalized weakness, lethargy and tiredness (60%) followed by generalized body ache (52.5%). 46.7% % of the patients had complaints of weight gain. Other presenting symptoms were paresthesia, constipation, hair fall, menstrual disturbance, dryness of skin etc. All patients had some presenting complaints. None of the patients were asymptomatic (Table 1).

Table 4: Thyroid Profile of study population.

Group	No. of patients	Min.	Max.	Median	Mean	SD
Baseline TSH (MIU/ml)	120	5.1	17.85	7.86	8.23	2.47
baseline T3 (NG/DL)	120	0.79	1.48	1.15	1.51	0.19
Baseline T4 (µG/DL)	120	4.57	11.85	8.08	8.16	2.2

All patients were evaluated for dyslipidemia, body mass index and obesity. The triglyceride levels and serum cholesterol levels were deranged in 28.3% of all cases. The average cholesterol levels were 183.21mg/dl (range 58.0-313.0mg/dl). The mean triglyceride levels were 168.8mg/dl (range 98.0-396.0mg/dl). Body mass index was increased in 28.3% of all patients with obesity in only 2 patients. The mean body mass index of all patients was 23.82 (range 19.87-35.06). 15 patients (11.7%) were found to be anaemic with increased MCV and MCH/MCHC, attributable to hypothyroidism. However, there were patients suffering from microcytic hypochromic anaemia as well. This could be due to coexisting iron deficiency anaemia in our patients. 5 patients were found to have coexisting thrombocytopenia. On bone marrow findings these patients were suggestive of Immune thrombocytopenia. 4 patients were found to have immune mediated hemolysis with increased reticulocyte count. Anti TPO antibodies were present in 43 patients (35.8%). All the patients were treated with replacement therapy as per the standard guidelines for subclinical hypothyroidism.

DISCUSSION

Thyroid diseases are, arguably, among the commonest endocrine disorders worldwide. India too, is no exception. According to a projection from various studies on thyroid disease, it has been estimated that about 42 million people in India suffer from thyroid diseases.⁷ There are five types of thyroid disorders prevalent in India: hypothyroidism, hyperthyroidism, goiter and iodine deficiency disorders, Hashimoto's thyroiditis, and thyroid cancer. Hypothyroidism is characterized by a broad clinical spectrum ranging from an overt state of myxedema, end-organ effects and multisystem failure to an asymptomatic or subclinical condition with normal levels of thyroxine and triiodothyronine and mildly elevated levels of serum thyrotropin. The prevalence of hypothyroidism in the developed world is about 4-5%.⁸ The prevalence of subclinical hypothyroidism in the developed world is about 4-15%.^{9,10} Cross-sectional studies from India indicate its prevalence to range from 9.27-10.95% with majority of affected people having subclinical hypothyroidism

Owing to its ability to control and modulate metabolism, thyroid is often called as master gland of metabolism in common parlance.¹¹ Thyroid hormones are recognized as

catabolic hormones and they regulate various processes of metabolism including the synthesis, mobilization, and breakdown of lipids. Hypothyroidism is reported to be associated with an increased risk for cardiovascular disease. Thyroid is also considered to have an effect on reproductive hormones and is often associated with diseases like polycystic ovarian syndrome. It also has an impact on psychological and psychiatric well-being of the individual. Subclinical hypothyroidism in children has also been shown to be associated with intellectual, cognitive and physical growth impairment.^{12,13}

The clinical manifestations of subclinical hypothyroidism vary from asymptomatic to frank manifestations of hypothyroidism. Most common manifestation in our study was generalized weakness, lethargy, tiredness (60%) and generalized body ache (52.5%). Other patients complained of weight gain (46.7%), paresthesia, constipation, menstrual disturbance etc. The study clearly shows that the disease is prevalent across all age groups. Our study also indicates that females are more likely to have subclinical hypothyroidism as compare to males. The disease is prevalent more in adolescent females and females of reproductive age group. In our study approximately 61.7% (74/120) of patients belonged to 21-40 years of age. These young females having subclinical hypothyroidism have increased chances of infertility. It is very important to recognize them and treat them with Levothyroxine for their proper growth and development and for future pregnancies.

Owing to these severe health related implications, treatment of hypothyroidism is essential. Levothyroxine is the treatment of choice for hypothyroidism. It has a 7-day half-life, allowing daily dosing.¹⁴ It is also used as a treatment modality in subclinical hypothyroid.

The limitation of the study is that this is a single centered study at tertiary care center, where majority of the patients are referred from other centers. Thus, this may not represent the holistic prevalence of subclinical hypothyroidism in the society. However, the findings of this study and earlier studies will promote researchers to do larger and multicentre studies.

CONCLUSION

Phenomenal number of patients presenting in the outpatient department are of subclinical hypothyroidism

and they have varied clinical presentation. Therefore, to diagnose these patients there should be high index of suspicion. SCH patients commonly presented with generalized weakness, lethargy, tiredness and generalized body ache. They also complained of weight gain, constipation and menstrual disturbances. These symptoms caused significant debilitated life style and poor outcome. Treatment of these patients can help in improving their lifestyle and perform better on daily basis.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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