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Original Research Article

Clinical profile of primary hypothyroidism

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Abstract

Background: Hypothyroidism is a clinical syndrome resulting from deficiency of thyroid hormones in the target tissues. Primary hypothyroidism is common worldwide especially in iodine deficient areas like India. Subclinical hypothyroidism (SCH) occurs due to an under functioning thyroid gland and presents with varied symptoms and signs. The present study was undertaken to find out clinical profile of primary hypothyroidism with special reference to subclinical hypothyroidism.
Methods: Total 62 cases of primary hypothyroidism were included in the study and evaluated for age and sex distribution, clinical profile, biochemical parameters, thyroid profile, ECG, X-ray, 2-D-echo and complications. A special emphasis was given in evaluation of cases of SCH.
Results: The mean age in primary hypothyroidism was 40.72 years with females (70.96%) predominance. Most common symptoms were tiredness, weight gain and odema feet (51.61% each) whereas commonest signs were bradycardia and edema feet being noticed in 64.51% cases each. Mean TSH, T3 and T4 was 30.25µLu/ML, 103.25 ng/dl and 4µg/dl respectively. Out of 62 cases, 14 (22.58%) cases were of SCH and all of which were females having mean age of 36.35 years. In these patients' commonest presenting symptoms were tiredness and menorrhagia (35.71% in each). Hypertension and goiter was found in 14.28% each. Clinical picture of patients of primary hypothyroidism was depending on age, sex and TSH level.
Conclusion: There was no impact of iodised salt on clinical presentation. Subclinical hypothyroidism may be the early stage of primary hypothyroidism. Patients having TSH> 60 µLu/ml present with more clinical signs, symptoms and complications.
Keywords: Hypothyroidism,Thyroid gland, Odema, Bradycardia, Menorrhagia, Goiter, TSH.

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1. Introduction

Hypothyroidism is the most common disorder arising from thyroid hormone deficiency. The prevalence of hypothyroidism in India is about 5-6% [1]. According to the time of onset it is divided in congenital and acquired, according to the level of endocrine dysfunction in primary and secondary or central and according to the severity in severe, mild or subclinical hypothyroidism [2].

Primary hypothyroidism is more common than central [3,4] worldwide especially in iodine deficient areas like India. The most common cause is autoimmune [5]. It usually results from Hashimoto thyroiditis and is often associated with a firm goiter or, later in the disease process, with a shrunken fibrotic thyroid with little or no function.

The 2nd most common cause is post-therapeutic hypothyroidism, especially after radioactive iodine therapy or surgery for hyperthyroidism or goiter [6]. However, primary hypothyroidism is a graded phenomenon with different levels of severity showing a wide range of clinical and biochemical presentation.

The earliest form of hypothyroidism called as subclinical hypothyroidism or mild thyroid failure is defined by increased serum thyroid stimulating hormone (TSH) level in presence of normal concentration of circulatory thyroid hormone[7, 8]. It occurs in 10-15% general population, more common in females and increases with age. Western studies have shown a prevalence of 4.3% to 8.5% [9, 10].

Regional and hospital based studies in India have shown a prevalence ranging from 9% to26%. The prevalence is higher in lower socioeconomic groups [11]. However; the patients with hypothyroidism present a morbid life. The quality of life is low. Under this scenario, understanding the clinical profile of these patients helps to modest their quality of life by the physician. The development of intensive TSH assay, opened up the window to discover the clinical state of subclinical hypothyroidism.

There is paucity of literature about clinical profile of primary and subclinical hypothyroidism in Indian set up. Hence, the present study was carried out with objectives to study the clinical features of primary hypothyroidism, find out cases of subclinical hypothyroidism and assess them clinically, also study factors modifying the clinical features of hypothyroidism like sex, age and TSH level.

2. Materials and Methods

The present hospital based cross-sectional observational study was conducted in 62 indoor and outdoor patients of primary hypothyroidism attending all Departments of Government Medical College and Hospital, Nagpur during the period of 14 months. Inclusion criteria were- 1) All the cases having symptoms suggestive of hypothyroidism supported by biochemical tests in the form of increased TSH and decreased T3 and T4 levels, 2) Cases minimally symptomatic for hypothyroidism with normal T3 and T4 and elevated TSH i.e.> 10µlU/ml, 3) Asymptomatic cases detected on biochemical parameters. Cases of secondary hypothyroidism, pregnant women and chronic renal failure cases were excluded from the study.

A detail clinical history was taken and clinical, general and systemic examination was done in all the cases. The presenting clinical symptoms, mode of presentation and entire clinical picture were documented. Haemoglobin estimation was done by Sahil's method. Peripheral smear was studied and typing of anemia was done. In all cases serum T3, T4 and TSH estimation was done using fluorescent microparticle enhanced immunoassay [12]. In addition serum cholesterol was done by oxidase peroxidase method [13]. Blood urea and serum creatinine estimation was done by using Berthelot method and Jaffe's method respectively [14]. In all cases ECG, chest X-ray, 2-D-echocardiogram was done. Ultrasonography of thyroid was done to find out any goiter or thyroiditis. Fine needle aspiration was done in patients having goiter on USG of thyroid gland to find etiology of hypothyroidism. The presence of complications if any was recorded.

In present study cases were labeled as subclinical hypothyroidism when TSH was more than 10 mlU/lit with normal T3 and T4 levels [15]. All these cases further analyzed for age and sex distribution, clinical profile, biochemical parameters, thyroid profile, ECG, X-ray, 2-D-echo and complications. The factors modifying clinical profile of hypothyroidism were also evaluated. Age, sex and TSH levels were the three factors considered and the clinical profile, biochemical parameters and complications if any were studied for this purpose.

3. Observations and Results

Total 62 cases of primary hypothyroidism were studied during the period of 14 months. The mean age of patients was 40.72 years, ranged from 15-82 years. The maximum (27.41%) number of patients was in the age group of 40-49 years, (Table 1). Females (70.96%) predominance observed in the study with male to female ratio of 1:2.4.

Table 1: Age and Sex Distribution of Patients in Primary Hypothyroidism

Age (years)	Male	Female	Total	Percentage
Upto 19	1	4	5	8.04
20-29	4	11	15	24.19
30-39	3	3	6	9.60
40-49	3	14	17	27.41
50-59	4	10	14	22.4
60-69	1	1	2	3.20
>70	2	1	3	4.80
Total	**18**	**44**	**62**	**100**

Amongst 62 cases, exact cause was undetectable in 58 cases (93.54%). The disease was following prolonged use of neomercazole in 4 cases (6.45%). There was no case of post-surgery hypothyroidism observed in the study. Forty four patients (70.96%) were taking iodised salt whereas 18 patients (29.03%) were taking non iodised salt.

The commonest symptoms in primary hypothyroidism were tiredness, weight gain and odema feet being observed in 32 cases (51.61%) each followed by menorrhagia (in 44.44% female) and constipation (30.69%). Commonest signs were bradycardia and Oedema feet being noticed in 64.51% cases each followed by puffiness of face (53.22%) and hypertention (45.16%), (Table 2).

Table 2: Presenting Sign and Symptoms incases ofPrimary Hypothyroidism

Symptoms	No. of patients (%)	Signs		No. of patients (%)
		General Examination		
Tiredness	32 (51.61)	Bradycardia		40 (64.51)
Weight gain	32 (51.61)	Tachycardia		2 (3.2)
Odema feet	32 (51.61)	Hypertension		28 (45.16)
Menorrhagia	20 (44.44)	Oedema feet		40 (64.5)
Constipation	19 (30.64)	Paffiness of face		33 (53.22)
Muscle pain	16 (25.80)	Pallor		23 (37.09)
Change in voice	14 (22.96)	Dryness of skin		16 (25.80)
Breathlessness	13 (20.96)	Change in voice		16 (25.80)
Depression	8(12.90)	Goiter		12 (19.35)
Swelling in neck	7 (11.29)	Coarse skin		9 (14.50)
Hypersomnalonce	6 (9.60)	Alopecia		6 (9.6)
Cold intolerance	3 (4.8)	Dryness of hair		4 (4.5)
		Systemic Examination		
Amenorrhoea	3 (4.8)	CVS-	Pericardial effussion	25 (40.32)
Infertility	3 (4.8)	RS	Pleural effusion	7 (11.29)
Unconsciousness	3 (4.8)	Abdomen-	Ascites	10 (16.12)
Skin changes	2 (3.2)	CNS	Delayed deep tendon reflexes	23 (37.09)
Parastheia	1 (1.61)		Absent deep tendon reflexes	13 (20.96)
			Myopathy	10 (16.12)

Hemoglobin levels >7 gm% was present in 3 cases (6.6%). Maximum cases (29.03%) were having hemoglobin in 8.1 to 9 gm%. Out of 62 patients of anemia peripheral smear was suggestive of normocytic normochromic in 28 cases (45.16%) and normocytic hypochromic in 34 cases (54.83%).Serum cholesterol >250 mg% was present in 53.22% in primary hypothyroidism, between 200-250 mg% in 11 cases (17.74%). Thus, 44 (70.96%) cases had raised serum cholesterol levels. Mean TSH in primary hypothyroidism was 30.25µLu/ML. T3 was 103.25 ng/dl, T4 was 4µg/dl.

An electrocardiographic change in form of T wave inversion was present in 56.54%, low voltage complexes 40.32%, bradycardia 32.51%, depression of ST segment in 25.80%. USG thyroid was normal in 80.64% and suggestive of simple goiter in 6 (9.6%) cases while multinodular goiter and thyroiditis were noticed in 3 cases each (4.8%). The fine needle aspiration cytology was studied in only 12 cases, which had clinically enlarged thyroid gland. It showed colloid goiter in 7 (11.29%) cases and thyroiditis in 5 (8.04%) cases. Complications like pericardial effusion were present in 40.32% cases, ischemic heart disease in 25.8% cases, congestive heart failure, myxedema coma and infertility in 6.6% cases each and psychosis in 3.2% cases.

Out of 62 cases of primary hypothyroidism, 14 (22.58%) cases were of SCH and all of which were females having mean age of 36.35 years. The maximum (35.71%) cases were in the age group of 20-29 years as shown in Table 3.

Table 3: Age Distribution in Cases of SCH

Age (years)	No. of patients	Percentage
Upto 19	1	7.14
20-29	5	35.71
30-39	1	7.14
40-49	4	28.57
50-59	3	21.44

Amongst 14 cases, exact cause was undetectable in 13 cases (92.85%) while in one case (7.17%) it was following prolonged use of neomercazole. All these cases were taking iodised salt. Commonest presenting symptoms were tiredness and menorrhagia (35.71% in each) followed by weight gain, odema feet, hypersomnalence (21.4% in each). Odema feet and hoarseness of voice was the most common signs found in 21.44% cases each, (Table 4).

Table 4: Clinical Sign and Symptoms in Subclinical Hypothyroidism

Symptoms	No. of patients (%)	Signs	No. of patients (%)
Menorrhagia	5 (35.71)	Odema feet	3 (21.44)
Tiredness	5 (35.71)	Hoarseness of voice	3 (21.44)
Weight gain	3 (21.44)	Hypertension	2 (14.28)
Odema feet	3 (21.44)	Goiter	2 (14.28)
Hypersomnalence	3 (21.44)	Dryness of skin	1 (7.14)
Infertility	2 (14.28)	tachycardia	1 (7.14)
		Bradycardia	1 (7.14)

In SCH systemic examination was normal. All patients were having hemoglobin percentage above 9 gm% and TSH value between 10-20 µlU/ml with normal T3 and T4 levels. Serum cholesterol >250 mg present in 14.4% cases and between 200-250 mg% in 28.57%. There was no cardiomegaly or pleural effusion and pericardial effusion in subclinical hypothyroidism. ECG was normal in all cases. Ultrasound was suggestive of normal gland in 87.71% cases. Simple and multinodular goiter was present in 7.14 cases each. Complications in the form of infertility was present in 14.20% cases, other complications were absent in SCH.

Clinical picture of patients of primary hypothyroidism was depending on age, sex and TSH level. For evaluating relationship of age on hypothyroidism 3 age groups (i.e. <40, between 40-60 and >60 years) were identified. The common sign and symptoms were studied in all three age groups as shown in table 5.

Table 5: Common sign and symptoms in all three age groups

Sign and Symptoms		Age group (Years)		
		<40	40-60	>60
Symptoms	Tiredness	11	20	1
	Weight gain	9	23	-
	Constipation	5	12	2
	Depression	7	1	-
Signs	Bradycardia	6	30	5
	Hypertension	5	18	5
	Delayed deep tendon reflexes	10	30	-
	Absent deep tendon reflexes	-	-	5
Complications	IHD	-	-	5
	Myxodema coma	-	-	3

Presenting signs and symptoms in male and female are summarized in table 6.

Table 6: Signs and Symptoms in Male and Female

Sign and Symptoms		Sex	
		Male	Female
Symptoms	Pallor	8	18
	Depression	5	3
	Hypersomnolence	4	2
	Menorrhagia	-	20
Signs	Bradycardia	12	28
	Hypertension	8	20
	Delayed deep tendon reflexes	5	18
Complications	IHD	6	10
	Myxodema coma	2	1
	Infertility	-	3

For studying the effect of level of TSH on clinical presentation, patients were divided in to 3 groups (TSH<20µlU/ml, TSH between 20-40 µlU/ml and TSH >60 µlU/ml) and results were depicted in table 7.

Table 7: Common sign and symptoms in all three TSH groups

Sign and Symptoms		TSH level in µlU/ml		
		<20	20-60	>60
Symptoms	Tiredness	5	12	15
	Menorrhagia	4	20	8
	Weight gain	3	9	20
Signs	Bradycardia	1	18	21
	Hypertension	2	6	20
Complications	Cardiomegaly	-	6	16
	Pericardial effusion	-	7	18

4. Discussion

Epidemiology of thyroid disorders among Indian population is poorly understood and this study provides valuable insights into the clinical picture of patients with primary hypothyroidism with special reference to subclinical hypothyroidism. In present study most of the patients belonged to age groups of 40-49 years. The female population constituted about 70.96% of the total, this female preponderance of cases was well comparable with the study done by Shetty *et al* [16] and Kumar *et al* [17].

Male to female ratio was1:2.4; this is well in concordance to Harrison's Principles of Internal Medicine Sex ratio in various studies [18-20].

The most common symptoms in primary hypothyroidism patients was tiredness, weight gain and odema feet followed by constipation, muscle pain, change in voice, and breathlessness. Many studies [21,22] disclose these features amid the primary symptoms that patients present to the physician. Menorrhagia was found to account for 44.44% of primary hypothyroidism patients who were being worked up for infertility; was a common menstrual abnormality amongst hypothyroid females in a study by Fauzia *et al* [23]. Commonest signs observed were bradycardia and Oedema feet followed by puffiness of face and hypertention, which was comparable with the study done by Singh *et al* [21] and Cahier's [22]. In these studies the incidence of symptoms and signs is more as compared to present study, this could be explained by the fact that patients were selected on biochemical parameters and may be diagnosed at early stage before full clinical picture is developed. In current study, pallor was present in 23 (37.09%) of primary hypothyroidism out of which only two patients were male and 21 were female. Thus, pallor present in mainly females could be because of menstrual abnormalities present in hypothyroidism.

Compared to overt hypothyroidism, subclinical hypothyroidism may prove challenging to diagnose. Because the clinical presentation of subclinical hypothyroidism is non-specific and symptoms are usually subtle as compared to overt hypothyroidism. In present study, out of 62 cases of primary hypothyroidism, subclinical hypothyroidism was noticed in 14 (22.58%) cases. This finding was correlated with the study done by Shetty *et al* [16], in which they reported 25 % of subclinical hypothyroidism. All our SCH cases were females and maximum cases (5; 35.71%) were in the age group of 25-29 years that is in child bearing age group. This was contrast to study done by Battacharjee [24] in which the maximum number of SCH cases were in the age group of 51-60 years. The demographic differences and age distribution of the study subjects have provided a distinct picture of the spectrum of subclinical hypothyroidism amongpatients attending multispecialty, tertiary care hospital that caters to a diverse population from all socio-economic levels. Senthilkumaran *et al* reported a prevalence of 9% among rural women of south India [25]. Several other studies also have reported a high prevalence of subclinical hypothyroidism among Indians [26]. Similar to most studies a higher number of women subjects were detected with subclinical hypothyroidism [25]. The higher number of women with subclinical hypothyroidism may have implications on fertility and future pregnancies.

The commonest presenting symptoms in SCH cases were tiredness and menorrhagia (35.71% in each) followed by weight gain, odema feet, hypersomnalence (21.4% in each). Odema feet and hoarseness of voice was the most common signs found in 21.44% cases each. The incidence of symptoms and signs in SCH was less as compared to study done by Das and Basu [27] and Colorado [28], this may be because of less number of patients in present study. In SCH, infertility was present in 2 (14.20%) cases while other complications like pericardial effusion, IHD, myxedema coma and psychosis were absent.

The factors modifying clinical presentation like age, sex and TSH value was also studied. The clinical presentation of elderly patients was different from young patients and complications were noticed more in elderly patients. In females menstrual complaints were main presenting symptoms while in malebradycardia (66.66%), pallor (44.44%) and, hypertension (44.44%) were main presenting sign and symptoms. Also, the clinical presentation was found to be different in patients having different TSH levels. It is observed that patients having higher TSH value present with more clinical signs and symptoms and more complications.

5. Conclusions

The present study reported no impact of iodised salt on clinical presentation. Subclinical hypothyroidism may be the early stage of primary hypothyroidism. Presenting symptoms and signs in SCH was less as compared to primary hypothyroidism. High index of suspicion is required to detect maximum cases of subclinical hypothyroidism because of presenting symptoms and signs are not specific. Patients having TSH > 60 µLu/ml present with more clinical signs, symptoms and complications.

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