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Research Paper

Clinical Profile of Primary Hypothyroidism: A Prospective Analysis At A Rural Tertiary Care Centre

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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 studywas undertaken to find out clinical profile of primary hypothyroidism. Methods: Total 50 cases of primary hypothyroidism were included in the study and evaluated for age and sex distribution,clinical profile, biochemical parameters, thyroid profile. Results: 54% of the patients aged between 21 and 40 years, 66% of the patients were females.Weight gain was the most common symptom among 36% patients followed by lethargy and fatigue (32%), menstrual problems (26%), and constipation (24%). Anti TPO antibody was positive in 32 (64%) patients and rest of the 18 (36%) patients were anti TPO antibody negative. Conclusion: Young age and female gender are the risk factors for the primary hypothyroidism.
Key words: *Hypothyroidism, TPO, Age, Gender*

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I. Introduction

Hypothyroidism is a clinical syndrome resulting from a deficiency of thyroid hormones, which results in a generalized slowing down of metabolic processes [1]. It is the most common functional disorder of the thyroid gland. It affects 2% of adult women and 0.1-0.2% of adult men [2].

Clinical Symptoms include tiredness, fatigue, dyspnea on exertion, weight gain. In addition to typical hypothyroid facies, skin changes and delayed reflexes patients with hypothyroidism have following cardiovascular signs, significant bradycardia, weak arterial pulses (narrow pulse pressure). Increased mean arterial pressure (hypotension in late stages), faint heart sounds, cardiac enlargement, non-pitting edema and evidence of congestive heart failure [1].

The present study evaluated clinical profile of primary hypothyroidism in the patients attending Dr RPGMC Kangra at Tanda.

II. Methods

This hospital based observational study was conducted in the Department of Medicine and Cardiology of Dr. Rajendra Prasad Government Medical College and Hospital, Kangra (at Tanda)for a period of one year (from December 2020 to November 2021) after approval from Institutional Ethics Committee.

Recruitment of patients was done in department of medicine both indoor and outdoor patients. The patients having symptoms suggested of hypothyroidism and, thyroid function suggested of hypothyroidism, attending medical OPD/ admitted in medical wards were included in the present study. A total of 50 patients fulfilling the inclusion and exclusion criteria were included, out of which 25 had overt hypothyroidism and 25 had subclinical hypothyroidism. Inclusion criteria were: newly diagnosed patients, detected hypothyroid patients not on treatment, and patients on L-thyroxine for less than 4 months. Exclusion criteria were patients with known cardiac disease, patients with COPD, severe anaemia, diabetes mellitus or any other endocrinal disorder, patients taking medications that alter the thyroid function like beta-blockers, lithium, OCP's, steroids and alcohol.

All subjects gave informed consent before participating in the study. Clinical assessment was done as per the proforma, which included a detailed history and examination. In patients with symptoms and signs suggestive of hypothyroidism hematological and biochemical investigations were carried out in the hospital-based laboratory.

Assessment of thyroid status

The blood samples were collected in the morning time after the overnight fast, 3 ml of venous sample was collected in a plane vacutainer after obtaining informed consent and taking care of ethical issues. The test was carried out using the chemiluminescence immunoassay technique in the hospital Laboratory.The normal reference levels of the thyroid panel according to the standards of the biochemistry of our laboratory were as follows,

1. TSH - 0.35-4.94 uIU/ml
2. T4 - 4.87-11.71ug/dl
3. T3 - 58-159 ng/dl

Diagnosis of hypothyroidism was confirmed by high TSH and decreased T4 andT3, from the above-defined reference range, and diagnosis of subclinical hypothyroidism was confirmed by

1. TSH >5mcIU/ml and
2. Normal T3, T4 levels

Anti-TPO Antibody normal level <5.61 IU/ml -: The level of anti-TPO above this was considered as antibody positive.

Data analysis

The data were presented as mean, standard deviation, frequency, and percentages.

III. Results

General characteristics

Table 1 shows general characteristics of the study subjects. 54% of the patients aged between 21 and 40 years, 66% of the patients were females.

Table 1: General characteristics

	Frequency	Percentages
Age		
21-40	27	54%
41-60	13	26%
61>80	10	20%
Gender		
Male	17	34%
Female	33	66%

Symptoms

Weight gain was the most common symptom among 36% patients followed by lethargy and fatigue (32%), menstrual problems (26%), and constipation (24%) (Table 2).

Table 2: Symptoms

Symptoms	**Frequency**	**Percentage**
Lethargy and fatigue	16	32%
Constipation	12	24%
Weight gain	18	36%
Decreased appetite	3	6%
Cold intolerance	7	14%
Forgetfulness and impaired memory	2	4%
Decreased concentration	2	4%
Dry skin	7	14%
menstrual problems	13	26%
Neck pain	2	4%
Dyspnea	2	4%

Blood pressure and hematological parameters
Distribution of Blood pressure of the study patients is tabulated in Table: 3. Mean ± SD Systolic BP was 114. 16 ± 10.79 and Diastolic BP was 77 ± 5.7.

Table 3: Mean and SD for SBP, DBP, RBC, Hb and WBC in hypothyroidism patients

Parameter	**Mean**	**SD**	**Range**
SBP(mmhg)	114.16	10.79	98-138
DBP(mmhg)	77	5.7	68-90
RBC(mil/ul)	4.49	1.022	3.27-4.9
Hb(g/dl)	11.86	1.48	9-14.1
WBC(thou/ul)	6790	1420	4300-9000

Heartrateandlipidprofile
HeartrateandLipidprofileparametersin subclinical hypothyroidismarelistedinbelowtable 4.

Table4:parametersinsubclinicalhypothyroidism

Parameter	**Mean**	**SD**	**RANGE**
Heartrate(bpm)	67.22	11.32	50-96bpm
Totalcholesterol(mg/dl)	195.25	43.63	113-300mg/dl
HDL(mg/dl)	53.08	8.27	36-71mg/dl
LDL(mg/dl)	97.32	34.75	45-196mg/dl
T4(ug/dl)	7.13	1.21	5-10.2ug/dl
T3(ng/dl)	90.544	23.15	60-154ng/dl
TSH(mIU/ml)	11.23	2.26	7.2-20mIU/ml

Overt hypothyroidism parameters
Table 5 shows mean, SD, and range of different parameters measured in overt hypothyroidism.

Table 5:Parameters in overt hypothyroidism

Parameter	**Mean**	**SD**	**Range**
Heart rate	62.24	8.105	48-76 bpm
Total cholesterol	210.56	65.87	95-320 mg/dl
Triglyceride	185.16	97.34	82-450 mg/dl
HDL	41.035	12.87	22-69 mg /dl
LDL	137.2	42.27	63-196 mg/dl
T4	2.52	0.92	1.2-4.1 ug/dl
T3	43.19	6.72	30-61.4 ng/dl
TSH	57.04	29.030	9.44->100mIU/ml

AntiTPOAntibody
Anti TPO antibody testing was done in all the patients and it was observed that it was positive in 32 (64%) patients and rest of the 18 (36%) patients were anti TPO antibody negative (Figure 1).

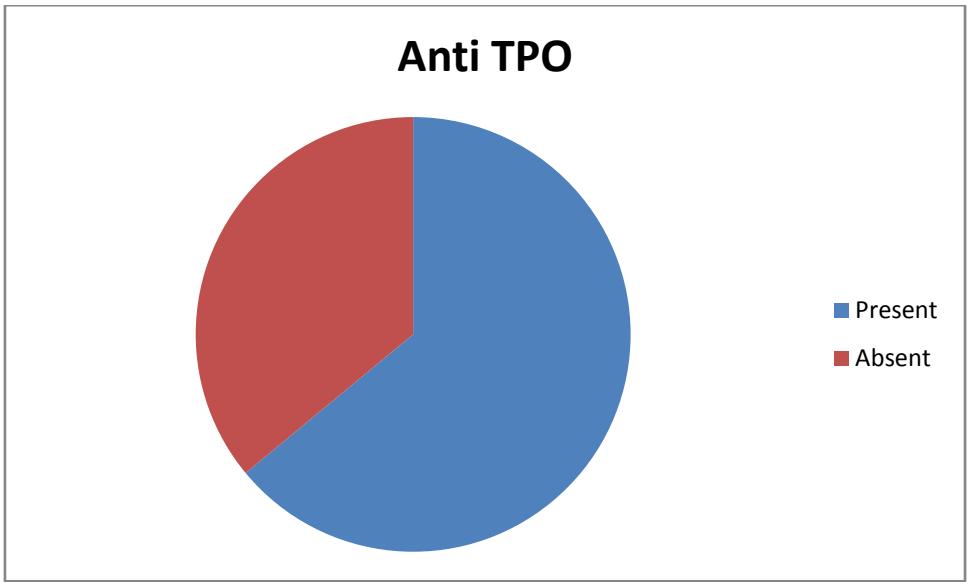

Figure 1: Anti TPO antibody

IV. Discussion

In the study, there was female predominance with female: male ratio of 1.67:1. Another similar study by Danzi et al., 2004 revealed that there was overall female preponderance. The female population constituted about 85.84% of total with female to male ratio being 6:1. [3] Similar to our study by Prasanna et al, out of the 72 patients, 44 (61.11%) were suffering from hypothyroidism, while hyperthyroidism was present in 28 (38.89%). Female:male ratio was 4.5:1. [4]

In our study, 54% of the patients were between the ages of 20 and 40 years, only 20% were beyond the age of 60. Similarly, Hassan-Kadle et al., included the patients who are 20 to 60 years, the mean age of the patients was 47 ± 18.5; most of the patients were in the age range of 31–50 (35.9%; n = 350) [5]. In contrast to our study, Pande et al., 2014 revealed that Among 50 cases in his study, Mean age of the patients was 50.21± 2.3. [6]

The most common symptoms in both genders of the present study noted were weight gain (36%), lethargy and fatigue (32%), menstrual problems (26%), constipation (24%), cold intolerance (14%). Khemka D [7] in their study observed that the commonest symptom in primary hypothyroidism was weight gain being observed in 32 cases (51.61%) followed by constipation (30.69%). Chabra et al. [8] observed that the most common symptoms seen are, weight gain, constipation, muscle cramps and cold intolerance in 65.62%, 63.28%, 40.62% and 37.5% patients respectively.

Mean ± SD range of Systolic BP implies 114.16 ± 10.79 and Diastolic BP was 77 ±5.7. All the basic blood parameters like RBC, Hb, WBC shows a normal Mean SD range in our study. There was no significant difference in office SBP and DBP between the S- HYPO group and the euthyroid group ($P > 0.05$), according to Cai et al., 2021. The daytime SBP, nighttime SBP, 24-h SBP, and DBP in the S-HYPO group were significantly higher than those in the euthyroid group ($P = 0.048$, $P = 0.002$, $P = 0.003$, $P = 0.014$, $P = 0.046$, respectively) on the ambulatory blood pressure level, and the proportion of nondipper blood pressure in the S-HYPO group was higher than that in the euthyroid group [9].

In our study HDL was decreased in subclinical hypothyroidism. There was a significant difference in HDL values with statistical significance ($p<0.01$). This implies the association between Lipid profile and subclinical hypothyroidism. Caron et al., 1990 identified that, total cholesterol, triglycerides and apolipoprotein (apo A1, A2, B) of women with subclinical hypothyroidism were not different from controls. HDL cholesterol was significantly decreased in subclinical hypothyroidism compared to the controls (P value less than 0.01)[10].Vigna et al., revealed that, Hypothyroid patients showed higher mean triglyceride levels and lower HDL-cholesterol than dyslipidemic euthyroid women, but the difference did not reach statistical significance[11].

Triglyceride levels in the present study showed statistical significance in correlation in overt hypothyroidism. In results of Gupta and Sinha, mean Serum cholesterol was significantly raised in both subclinical (192.13 ± 47.40 mg%) ($p < 0.05$) and overt hypothyroidism (231.27 ± 68.30 mg%) ($p < 0.005$) with respect to control group (157.63 ± 37.69 mg%). In overt hypothyroid patients mean serum Triglyceride (235.59 ± 137.53 mg%) ($p < 0.05$), LDL (126.09 ± 54.99 mg%) ($p < 0.05$) and Apo-B (0.698 ±0.354 g/L) ($p < 0.05$) levels were significantly higher as compared to control group (serum triglyceride 165.45 ± 49.15 mg%, LDL

88.72 ± 38.75 mg%, Apo-B 0.474 ± 0.176 g/L [12].There is an association between subclinical and overt hypothyroidism with dyslipidemia. This might be a potential risk factor for coronary artery disease.

Anti TPO antibody testing was done in all the patients and it was observed that anti-TPO antibody was positive in 32 (64%) patients and rests of the 18 (36%) patients were anti-TPO antibody negative. The presence of TPO antibodies should be evaluated in the patients with a risk for development of hypothyroidism [13]. According to results by Siriwardhane et al., 2019, 73% of hypothyroid subjects (from group A1) and 68.6% of hyperthyroid subjects (from group A2) had anti-TPO 252 (±33) and 277 (±151) days prior to the onset of the thyroid dysfunction, respectively. Both subclinical/overt hypothyroidism and hyperthyroidism showed a significantly higher percentage of subjects who had anti-TPO prior to the onset of thyroid dysfunction compared to the combined control group [14].

Another study by Engler et al., found that clearly elevated anti-TPO values (anti- TPO > 500 units/ml) in 59% of patients with thyroiditis but in none of the controls or the patients with non-thyroidal illness. The mean anti-TPO levels in these two control groups were 26 ± 31 units/ml and 39 ± 34 units/ml, respectively. The highest frequency of positive results (88%) was obtained in patients with auto-immune hypothyroidism [15].

V. Conclusion

Younger females should be more alert and need to immediately seek treatment to avoid further complications.An altered lipid profile, increased triglycerides, increased LDL and decreased HDL was found in hypothyroid patients, which increases the risk for cardiovascular disease.

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