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Original Article

Clinical Profile of Hypothyroidism with Special Reference to Cardiovascular Complications

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Abstract
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. In non-endemic areas chronic autoimmune thyroidectomy and destructive treatment of thyrotoxicosis are common. . The yearly incidence of spontaneous hypothyroidism per 1000 was estimated to be 3.5 and 0.6 in females and in males respectively[1]. The cardiovascular abnormalities associated with thyroid dysfunction, remain barely unattended which ultimately lead to heart failure and death. Here we have made a modest attempt to define the clinical spectrum of hypothyroidism with special reference to cardiovascular manifestation
Aims and Objectives: ***1.*** *To study correlation of symptomatology with serum thyroid hormone levels.*
2. To study the cardiovascular changes associated in hypothyroidism.
3. To study co-morbid condition associated with hypothyroidism
Methods and Material: *This study was conducted on 100 patients admitted in S.G.M.H. REWA, >12 years of age showing signs and symptoms of hypothyroidism or known case of hypothyroidism and detailed history, physical examination, thyroid profile, ECG, 2D-echocardiography were done.*
Result: *The most common ECG feature was nonspecific ST-T wave changes in 77.61% Low voltage complexes were seen in 37.31%, prevalence of low voltage complexes was higher in the group with TSH levels >10 mili IU/l, pericardial effusion was present in 37.5% and left ventricular hypertrophy in 23.43%. the prevalence of pericardial effusion was higher in the group with TSH levels >10 mili IU/l,the clinical parameters were more abnormal in the group with TSH levels >10 mili IU/l*
Conclusion: *Hypothyroidism is a multitude of clinical presentations involving various systems in the body. cardiovascular disease are very common among these patients physicians should suspect hypothyroidism from the subtle signs and symptoms of the disease so that an early diagnosis and timely treatment is initiated.*

INTRODUCTION

Hypothyroidism is a clinical syndrome resulting from deficiency of thyroid hormones in the target tissues, leading to generalized slowing of all metabolic processes. Primary hypothyroidism is common worldwide especially in iodine deficient areas like India. In non-endemic areas chronic autoimmune thyroidectomy and destructive treatment of thyrotoxicosis are common. The prevalence of overt hypothyroidism is 2% in adult

women and 0.1-0.2% in adult men according to the 20 year follow up of the Wickham survey. This study had also demonstrated high prevalence (18/1000) of subclinical hypothyroidism, female preponderance and increasing incidence with age. The yearly incidence of spontaneous hypothyroid-dism per 1000 was estimated to be 3.5 and 0.6 in females and in males respectively[1].

The clinical manifestations of hypothyroidism are protean, encompassing almost all body systems. Diagnosis of hypothyroidism anchors onto a good clinical history and meticulous examination, supplemented by thyroid function tests. Although symptom scoring scales with significant predictive power have been described but they remain too insensitive and nonspecific for a definitive diagnosis. Even in patients with overt biochemical hypothyroidism, symptom and signs may be minimal or absent. So the physician has to resort to Biochemical assays too often to rule out the disease. However the wide use of these biochemical measurements has led to a spectrum of abnormalities being detected, ranging from subclinical to overt disease[1].

The cardiovascular abnormalities associated with thyroid dysfunction have attracted a great deal of investigative efforts in recent times. At the cellular level it represents myofibrillar swelling, interstitial oedema and interstitial fibrosis of cardiac tissue. In the functional aspect, hypothyroidism results in abnormalities of systolic contractile function as well as diastolic relaxation. Besides, hypothyroidism contributes to two important risk factors for the development of coronary artery disease, namely hypertension and hyperlipidemia[2]. Here we have made a modest attempt to define the clinical spectrum of hypothyroidism with special reference to cardiovascular manifestations.

METHODOLOGY

This study was conducted on 100 patients admitted in S.G.M.H. REWA, >12 years of age showing signs and symptoms of hypothyroidism or known case of hypothyroidism and detailed history, physical examination, T_3, T_4 *and* TSH levels assessed in all patients. FT_4 assay performed in affording patients, method was chemiluminescence Immunoassay. A 12-lead ECG was done in all cases and analyzed. All patients were subjected to cardiac evaluation by Echocardiography. The parameters that were calculated were Interventricular Septal Thickness (IVS), Left Ventricular Posterior Wall Thickness (LVPWT), Left Ventricular Dimensions in Systole and Diastole, Ejection Fraction (EF), Pericardial Effusion (PE), Regional Wall Motion Abnormalities, Aortic and Mitral Regurgitation. All these parameters were calculated by M-MODE using PHILIPS HD7XE Echocardio-graphy machine, by keeping the probe in the parasternal long axis view. Diastolic function of the left ventricle was calculated by Pulse Doppler. The parameters calculated were early flow velocity across the mitral valve in diastole (E) and flow velocity into the left ventricle by atrial contraction (A) and their ratio (E/A), normal being 1-2:1. Stage 1 of diastolic dysfunction correlates well with altered E/A ratio <1. Asymmetric septal hypertrophy- is defined as IVS/LVPWT ratio > 1.3.

RESULT

Table:1 Distribution of cases according to ECG features

	No. of Cases	**Percentage**
I. Normal	33	33%
II. Abnormal(N=67)		
Sinus bradycardia	9	13.43%
ST-wave changes (Non specific)	52	77.61%
Low voltage complex	25	37.31%
LVH	3	04.4%
LAHB	8	11.94%
RBBB	4	05.97%
1^0AV Black	2	02.9%
QT>0.44 sec	10	14.92%

ECG showed sinus bradycardia in 13.43% patients, nonspecific ST-T changes in 77.61% patients, low voltage complexes in 37.31%, LVH in 4%, LAHB in 11.94%, RBBB in 5.97%, 1^0 AV block in 2.90% and QT prolongation in 14.92%. 50% of patients with QT prolongation were hypertensives. Sinus bradycardia was observed in

31% patients, Q-T prolongation in 8%, flatting or inversion of T -waves in 8% and low voltage of P, QRS and T waves in 10% by Roos A et al[2].

Table:2 Distribution of cases according to Low Voltage complexes in relation to TSH

TSH (MilliIU/ml)	Low Voltage complexes in ECG			
	Present	Absent	Total	Percentage of positive cases
>10	22	49	71	30.98%
<10	3	26	29	10.34%

The above table shows, that the prevalence of low voltage complexes was higher in the group with TSH levels >10, but this association was statistically not significant.

Table: 3 Distribution of cases according to echocardiography

	No. of Cases	Percentage
I. Normal (n=36)	36	36%
II. Abnormal (n=64)		
Pericardial effusion	24	37.5%
Left ventricular hypertrophy	15	23.43%
Diastolic dysfunction	13	20.31%
Regional Wall motion abnormality	4	6.25%
Asymmetric Septal Hypertrophy	8	12.5%

2-D echocardiography revealed pericardial effusion in 37.50% patients. 30% prevalence of pericardial effusion in myxedema is reported by Kerber RB et al[3]. Rajan SK et al[4] reported 10% incidence of pericardial effusion in hypothyroidism. Low voltage complexes in ECG was less sensitive to detect pericardial effusion as compared to 2-D echo. This was also suggested by Kerber RB et al[3].

23.43% of patients in the present study had left ventricular hypertrophy which is possibly related to the higher incidence of hypertension in the study population. ECG was also less sensitive to detect the presence of LVH as compared to 2-D Echo. This emphasises the need for *echocardio-graphic* evaluation in patients of hypothyroidism with hypertention.

Diastolic dysfunction was observed in 20.31% of the study population. Rajan SK et al[4] reported 40% prevalence of diastolic dysfunction in hypothyroidism. This is related to the impairment of diastolic myocardial relaxation related to the hypothyroid state (Vora J et al[5])

Asymmetric septal hypertrophy was observed in 12.50% of patients in the study population. In his echocardiographic study of hypothyroid patients, Rajan SK et al[4] found out that interventricular septal thickness and left ventricular posterior wall thickness were increased in hypothyroid patients as compared to controls. Mohandas et al[6] confirmed the existence of hypothyroid cardiomyopathy which included hypertrophy of IVS, increased ratio of septal thickness to LV posterior wall thickness and decreased global function of left ventricle.

Table:4 Distribution of cases according to Pericardial effusion in relation to TSH

TSH (MilliIU/ml)	Pericardial effusion			
	Present	Absent	Total	Percentage of positive cases
>10	32	39	71	45.07%
<10	8	21	29	27.58%

P>0.05

The above table shows that, the prevalence of pericardial effusion was higher in the group with TSH levels >10, but the association was statistically not significant.

Table No. – 5 Distribution of cases according to relation of clinical parameters to TSH levels

Clinical Parameter	TSH LEVELS			
	>10 (n=71)		<10 (n=29)	
	No.	%	No.	%
Pallor	58	81.61%	18	62.06%
Delayed DTR relaxation	20	28.16%	23	79.31%
Dry Skin	51	71.83%	18	62.06%
Change in voice	49	61.01%	12	41.37%

The peripheral manifestations of hypothyroidism were higher in the group with TSH levels >10 milli IU/ml, but there was no statistically significant correlation between clinical parameters and TSH levels. In the present study blood pressure level correlated with TSH values but clinical parameters like pallor, delayed DTR relaxation, dry skin, change in voice failed to

correlate. Zulewski et al[7] also demonstrated that his clinical score correlated poorly with TSH levels. In overt hypothyroidism pituitary TSH stimulation is at the top of the dose response curve with maximal TSH secretion, so that it becomes a poor indicator of tissue hypothyroidism.

CONCLUSION

Hypothyroidism is a multitude of clinical presentations involving various systems in the body, cardiovascular disease are very common among these patients physicians should suspect hypothyroidism from the subtle signs and symptoms of the disease so that an early diagnosis and timely treatment is initiated.

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