

To Study Electrocardiographic (ECG) & Echocardiographic (ECHO) finding in Relation with Thyroid Disorder

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Abstract

Original Research Article

Background: In this study 100 cases of thyroid dysfunction were studied for the cardiovascular manifestations. Out of these, 60 cases were of hypothyroidism and 40 cases were of hyperthyroidism. There was no age bar for inclusion in the study. All of these cases were selected from those attending the Endocrinology OPD in IMCHRC Hospital, Indore. **Result:** In our study most common ECG finding is ST/T changes found in 63.3% of patients. Second most common finding is the Low voltage complex (51.6%) & prolonged QTc interval (38.3%). Sinus bradycardia found in 29.9% of patients. V.P.C. & S.V.P.C. are present in 23.25 and 1.6% cases respectively. In patients with hyperthyroidism most common ECG finding is Sinus tachycardia found in 82.5% of patients. Second most common finding is the prolonged QTc interval (42.5%) and L.V.H. found in (27.5%) cases. ST/T changes found in 15% of patients. Atrial fibrillation found in 10% of cases & V.P.C. & S.V.P.C. had incidence of 7.5% each. **Conclusion:** In our study most common ECG finding is ST/T changes found in 63.3% of patients. Second most common finding is the Low voltage complex (51.6%) & prolonged QTc interval (38.3%). Sinus bradycardia found in 29.9% of patients. V.P.C. & S.V.P.C. are present in 23.25 and 1.6% cases respectively. Gender wise study of ECG in hypothyroidism revealed 1 case with sinus bradycardia, and 2 cases of ST/T changes, 1 case of LVC, and 1 case of VPC among male patients. In female patients predominant ECG finding was ST/T changes (36 cases) followed by LVC (30 cases) prolonged QTc interval (23 cases), sinus bradycardia (17 cases), 13 cases of VPC and 1 case of SVPC.

Keywords: Cardiac, Manifestation, Thyroid, Hyperthyroidism & Hypothyroidism.

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Study Designed: Observational Study.

INTRODUCTION

The concept of -Thyrocardiac diseases| was first proposed by Levine and Sturgis in 1924. They described atrial dysrhythmias, congestive cardiac failure and cardiac enlargement which may occur in hyperthyroidism with or without goiter or exophthalmos [1]. They stressed that when a patient of cardiac diseases did not benefit from the routine treatment, when the nature of illness is obscure or is not entirely in character with its cause, disorder of thyroid function should be considered [2].

Initially it used to think that thyroid disorder and manifestations of thyroid disorders are due to change in cardiac function. The swollen vascular goiter was through by early observation represent the result of

and not the cause of hyperdynamic circulation. Over the period it has become clear that the explanation for the altered circulatory hemodynamics of thyroid diseases is exceedingly complicated [3].

MATERIAL & METHOD

It is cross sectional, observational and descriptive study for the assessment of cardiovascular manifestations in patients of thyroid disorder. Study started from 2015 December completed on 2017 January.

In this study 100 cases of thyroid dysfunction were studied for the cardiovascular manifestations. Out of these, 60 cases were of hypothyroidism and 40 cases were of hyperthyroidism.

There was no age bar for inclusion in the study. All of these cases were selected from those attending the Endocrinology OPD in IMCHRC hospital, Indore. Complete evaluation was done of each patient according to the Performa prepared to facilitate a systematic study in all cases. Investigation like ECG, 2 D-ECHO done.

INCLUSION CRITERIA

Following criteria were used for selection of the patients.

1. Age: Patients from all age groups were included in this study.
2. Sex: Patients of both sexes were studied.
3. Therapy: Only fresh cases were selected. Also those who had admitted treatment for more than 6 months were included.
4. All types of thyroid disorder were included except those which are included in exclusion criteria.
5. Population: Indian patients from all socio - economical class, casts, and from rural and urban areas were studied.

EXCLUSION CRITERIA

1. Seriously ill patient.
2. Patients with multi-system diseases or cancer.
3. Drug induced thyroid disorder.
4. Patients with sick Euthyroid syndrome.
5. Pregnant women.
6. Patients who are suffering from active renal and liver diseases.
7. Patients suffering from acute psychiatric illness.

On clinical suspicion of thyroid dysfunction (hypothyroidism or hyperthyroidism) with or without thyroid enlargement the patient was subjected to further clinical and laboratory evaluation

1. Biodata: The particulars of the patients including age, sex, locality etc were recorded.
2. Therapy: The particular regarding thyroid surgery, antipsychotic treatment and previous treatment for hyper or hypothyroidism was noted
3. Symptomatology: Non cardiac symptoms were recorded to aid the clinical diagnosis of thyroid dysfunction.

RESULTS

Table-1: Gender Wise Distrubtion According to ECG Finding in Hypothyroidism

ECG finding	Sex				Total	%
	Male N=03		Female N=57			
	No.	%	No.	%		
ST/T changes	02	5.2	36	94.7	38	63.3
Low voltage complex	01	3.2	30	96.8	31	51.6
Prolonged QTc interval	00	00	23	100	23	38.3
Sinus bradycardia	01	5.6	17	94.4	18	29.9
V.P.C.	01	7.1	13	92.8	14	23.2
S.V.P.C.	00	00	01	100	01	1.6

In our study most common ECG finding is ST/T changes found in 63.3% of patients. Second most common finding is the Low voltage complex (51.6%) &

prolonged QTc interval (38.3%). Sinus bradycardia found in 29.9% of patients. V.P.C. & S.V.P.C. are present in 23.25 and 1.6% cases respectively.

Table-2: Gender Wise Distrubtion According to ECG Finding in Hyperthyroidism

ECG finding	Sex				Total	%
	Male		Female			
	No.	%	No.	%		
ST/T changes	01	2.5	05	12.5	06	15
Prolonged QTc interval	00	00	17	42.5	17	42.5
Sinus Tachycardia	05	12.5	28	70	33	82.5
L.V.H.	01	2.5	10	25	11	27.5
Atrial fibrillation	00	00	04	10	04	10
V.P.C.	01	2.5	02	05	03	7.5
7S.V.P.C.	01	2.5	02	05	03	7.5

In patients with hyperthyroidism most common ECG finding is Sinus tachycardia found in 82.5% of patients. Second most common finding is the prolonged QTc interval (42.5%) and L.V.H. found in (27.5%) cases. ST/T changes found in 15% of patients.

Atrial fibrillation found in 10% of cases & V.P.C. & S.V.P.C. had incidence of 7.5% each

DISCUSSION

Arber *et al.*, in his study on hypothyroid patients found higher incidence of low voltage pattern and sinus bradycardia [4].

The electrocardiographic findings of our study correlated well with a study carried by Saha *et al.*, on hypothyroid patients. They found ST-T changes as the commonest electrocardiographic finding. He found ST-T changes (81%), low voltage pattern (30%) and sinus bradycardia (16 %) in descending order in his 91 patients [5].

Hylander *et al.*, found 21% of hypothyroid patients having tachyarrhythmias which were not reversed by thyroid hormone. The cause of tachycardia in hypothyroid patients can be due to nervousness in hospital environment and due to early diagnosis due to early approach to the hospital. The cause of bradycardia in hypothyroid patients might be caused by edema of heart muscles and conduction system which later become fibrotic [6].

Kerber *et al.*, found low voltage pattern in many patients of myxedema with pericardial effusion and many patients without pericardial effusion had normal voltage pattern [7]. The mechanism by which thyroid hormones induce electrocardio-graphic changes viz prolonged Q-Tc interval, may be related to their effects on sodium pump density and enhancement of Na⁺-K⁺ permeability [8].

In a study by Kerber *et al.*, 13 out of 33 patient showed cardiomegaly on Chest X- Ray, out of which seven patients did not show pericardial effusion on echocardiography [7].

CONCLUSION

In our study most common ECG finding is ST/T changes found in 63.3% of patients. Second most common finding is the Low voltage complex (51.6%) & prolonged QTc interval (38.3%). Sinus bradycardia found in 29.9% of patients. V.P.C. & S.V.P.C. are present in 23.25 and 1.6% cases respectively.

Gender wise study of ECG in hypothyroidism revealed 1 case with sinus bradycardia, and 2 cases of ST/T changes, 1 case of LVC, and 1 case of VPC among male patients.

In female patients predominant ECG finding was ST/T changes (36 cases) followed by LVC (30 cases) prolonged QTc interval (23 cases), sinus bradycardia (17 cases), 13 cases of VPC and 1 case of SVPC.

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