

Original article:

Objective assessment of cardiac involvement in thyroid disorders by ECG, Echocardiography and chest X-ray in Indian Population

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Abstract:

Introduction: Thyroid hormones affect cardiovascular system and central nervous system along with other systems. With this view present work was planned to study cardiac involvement in thyroid disorders using diagnostic tools.

Materials and methods: 72 consecutive fresh cases of thyroid disorders including hypothyroidism and hyperthyroidism were studied for the cardiovascular manifestations attending Pad. Dr. D. Y. Patil Medical College and Hospital, Pimpri, Pune. Herewith we using ECG . Echocardiography and X ray classified cardiac manifestations

Results: In present study we found ST-T changes as the commonest electrocardiographic finding. In present study 15 patients (34.09%) showed ST-T changes, 8 patients (18.18%) showed low voltage tracing, 12 patients (27.27%) had sinus bradycardia

Conclusion: Low voltage pattern on ECG and cardiomegaly on chest X-ray are not reliable indicator of pericardial Effusion. The only diagnostic investigation for pericardial effusion is Echocardiography.

Keywords: Thyroid disorders, cardiac manifestations, Echocardiography

Introduction

The magnitude of these cardiac related findings lead early observers to wrongly postulate that thyrotoxicosis was a disease originating within the heart. ¹But today there is a clear evidence for direct effects of these thyroid hormones on the myocardium in addition to indirect effects . The earliest description of thyrotoxicosis included reference to the rapid and occasionally irregular heart rate, warm skin, bounding pulses and hyperdynamic precordium. Hypothyroidism has equivalent but essentially opposite effects on the cardiovascular system. With this view present work was planned to study cardiac involvement in thyroid disorders using diagnostic tools. ²

Materials and methods

72 consecutive fresh cases of thyroid disorders including hypothyroidism and hyperthyroidism were studied for the cardiovascular manifestations attending Pad. Dr. D. Y. Patil Medical College and Hospital, Pimpri, Pune. The diagnosis was suspected clinically and established by biochemical investigations. Out of these, 44 cases were of hypothyroidism and 28 cases were of hyperthyroidism.

Clinically suspected thyroid disorders patients were subjected for the estimation of serum TSH, T4 and T3 levels. Biochemically confirmed thyroid dysfunction patients from both outpatient and inpatient departments were taken up for this study. Written consent was taken from all the patients. Detailed clinical examination was done of each patient according to the proforma prepared to facilitate a systemic study in all cases with special emphasis on cardiovascular involvement. In all confirmed thyroid disorder patients, necessary investigations were done where ever required.

Methods of collection of data

- Patients above the age of 13 years were included in this study.
- Patients of both sexes were studied.
- Newly diagnosed consecutive patients for thyroid disorders were included in this study.
- Indian patients from all socio - economical class, castes, and from rural and urban areas were studied.

Exclusion criteria:-

1. Pre existing heart diseases with subsequent thyroid disorders like Rheumatic heart disease, Ischeamic heart disease, hypertensive heart disease and cardiomyopathy.
2. Thyroid dysfunction due to drugs used in cardiovascular disorders like Amiodarone.
3. Other pre existing cardiovascular diseases like myocarditis due to viral, diptherial and other infections.
4. Pre existing or established ECG changes.
5. End stage renal disease and chronic kidney diseases.

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

Results:

Table 1) ECG findings in hypothyroidism (n = 44)

Findings	No. Cases	% age
ST - T changes	15	34.09 %
Low voltage	8	18.18 %
Prolonged Q - Tc Interval	8	18.18 %
Sinus bradycardia	12	27.27%
V.P.C.	2	4.55 %

- ST - T changes are the commonest findings in hypothyroidism .
- Sinus bradycardia was seen in 27.27 %.

Table 2) ECG findings in patients with hyperthyroidism (n = 28)

Findings	No. of Cases	%age
Sinus Tachycaria	17	60.71
Prolonged Q- Tc Interval	8	28.57
Chamber Hypertrophy	12	42.86
ST - T changes	6	21.43
AF	6	21.43
SVPC	2	7.14
VPC	1	3.57

- Sinus Tachycaria is the commonest finding in patients with hyperthyroidism .
- AF was seen in 21.43 % of patients with hyperthyroidism

Table 3) X- Ray changes in patients with Hypothyroidism (n = 44)

Findings	No. of Cases	%age
Cardiomegaly	8	18.18 %
Pericardia! Effusion	3	6.82%

- PE. Seen in 6.82 % of patients with hypothyroidism.
- Cardiomegaly is the most important finding on X-ray in hypothyroidism.

Table 4) X- Ray changes in patients with Hyperthyroidism (n = 28)

Findings	No. of Cases	%age
Cardiomegaly	3	10.71 %
Pulmonary Odema	3	10.71 %

Echocardiography findings :

- Eight patients showed diastolic dysfunction.(18.18%)
- There were 5 patients in whom PE was detected on ECHO (ie 11.36%)

- The avg. F S of left ventricular muscle fiber was found to be (28.53)

Discussion:

The magnitude of these cardiac related findings lead early observers to wrongly postulate that thyrotoxicosis was a disease originating within the heart. But today there is a clear evidence for direct effects of these thyroid hormones on the myocardium in addition to indirect effects .^{3,4} The earliest description of thyrotoxicosis included reference to the rapid and occasionally irregular heart rate, warm skin, bounding pulses and hyperdynamic precordium. Hypothyroidism has equivalent but essentially opposite effects on the cardiovascular system.⁵

In present study we found ST-T changes as the commonest electrocardiographic finding. In present study 15 patients (34.09%) showed ST-T changes, 8 patients (18.18%) showed low voltage tracing, 12 patients (27.27%) had sinus bradycardia and 8 patients (18.18%) showed prolonged Q-Tc interval. Zondek and many other workers in their study on hypothyroid patients found higher incidence of low voltage pattern and sinus bradycardia ^{6,7}

Conclusion:

Low voltage pattern on ECG and cardiomegaly on chest X-ray are not reliable indicator of pericardial effusion. The only diagnostic investigation for pericardial effusion is Echocardiography.

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