



ECHOCARDIOGRAPHY, USG NECK AND ELECTROCARDIOGRAPHIC FINDINGS IN PATIENTS OF HYPOTHYROIDISM

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ABSTRACT

Background: The cardiovascular system is one of the most important targets of thyroid hormones and is very sensitive to a minimal decrease of circulating thyroid hormones.

Material and method: Present cross sectional study comprised of 100 Patient admitted in a Medical College & Hospital Aurangabad, from December 2017 to September 2019

Objectives: To study Echocardiography, USG neck and electrocardiographic findings in cases of hypothyroidism

Results: Mean age was 35.78 ± 17.41 years. Most of cases were in age group of 31-40 years (34%). Most of the study subjects were having BMI in category overweight (71%).

Conclusion: Sinus bradycardia (32%) was the most common ECG finding. Thyroiditis (31%) was the most common USG neck finding and Diastolic dysfunction (38%) was the most common 2D echo finding in the study population.

KEYWORDS : Echocardiography, USG, Electrocardiography, Hypothyroid

INTRODUCTION:

Once diabetes is excluded, thyroid diseases constitute the main bulk of endocrine problems. Thyroid diseases presents with either excess hormonal activity, or with symptoms due to under production of the hormone or with a swelling due to a neoplastic process or due to the pressure effects.¹

The magnitude of cardiac related findings in thyroid diseases was wrongly postulated 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.²

Hypothyroidism may be associated with bradycardia, low voltage complexes, ST-T wave changes, atrioventricular and intraventricular conduction disturbances. Extrasystoles and tachyarrhythmias of both atrial and ventricular origins have been described in hypothyroidism with the ventricular tachyarrhythmias associated with prolonged QT interval.³

Ultrasonography (USG) is the single-most valuable imaging modality in the evaluation of the thyroid gland. Indications for thyroid USG include evaluation for a palpable thyroid nodule or suspected thyroid enlargement and workup of thyroid nodules discovered incidentally.⁴

With this view present work was planned to study echocardiography, electrocardiographic and USG neck findings in thyroid disorders.

MATERIALS AND METHODS

The present cross sectional study was conducted in department of Medicine in Government Medical College, Aurangabad, during the period from December 2017 to September 2019 with objective to study echocardiography, USG neck and electrocardiographic findings in cases of hypothyroidism. Permission from the Institutional Ethical Committee was taken before the start of the study.

All the diagnosed cases of hypothyroidism admitted in medicine wards & attending OPD of Medicine department in GMC Aurangabad during the study period was included in the study. Hemodynamically unstable patients; Patients with lung disease, such as chronic obstructive pulmonary disease, asthma, or pleural disease; patients with Known cardiovascular disease, Patient who had pacemakers, metallic intravascular devices, any malignant disease, Pregnant women and known diabetic patients were excluded from the study. Total 100 samples were selected by non-probability convenient sampling method.

After written valid informed consent by patient, case Performa was filled with all details like basic demographic data such as name, age, residence, clinical features, history, previous significant histories contributing to the present condition, general condition of patient, provisional diagnosis etc were recorded. After initial diagnosis, details regarding the status of the patient on admission with respect to vitals, general physical examination including vital signs and systemic examination were noted; investigations were collected like thyroid function test, ECG, 2D echo and USG neck.

All scans were done using Siemens Acuson X 300, Siemens Acuson X 600, colour Doppler equipment with a linear array high frequency (3-12 MHz) transducer. Patients who were fulfilling the inclusion and exclusion criteria were underwent for sonographic evaluation.

By using ECHO each case was specially screened for systolic and diastolic dysfunction and pericardial effusion. Diastolic dysfunction was assessed by means of the Canadian consensus criteria.⁵ finally all data were entered in Microsoft excel and analysed by SPSS trial version 20 for frequency and percentage.

RESULTS:

Among 100 study subjects, mean age was 35.78 ± 17.41 years. Most of cases were in age group of 31-40 years (34%) followed by in 21-30 years (24%). Very few (8%) were below 20 years of age. (Table No.1) There was an overall female preponderance over all age groups. The female population constituted about 84% of the total, with female: male ratio 5.2:1. (Pie Diag.1)

Most of the study subjects were having BMI in category overweight (71%) followed by obese (20%) and only 9% were normal. (Table No.2) Out of 100 study subjects, 51% patients were moderately hypothyroid, 30% were severe and 19% were mild. (Table No.3)

After doing ECG it was found that, most of i.e.80% was having abnormal ECG. Sinus bradycardia was seen in 32% (most common) of the patients and ST-T changes contributes 20%. (Table No.4)

USG neck was normal in 27% patients. Among abnormal USG, thyroiditis constitute 31% in the study population and is the most common USG neck finding in the study population. (Table No.5)

2D ECHO finding was normal in 27% patients. Among abnormal 2D echo reports, diastolic dysfunction constitute 38% of the study

population and is the most common 2D echo finding in the study population (Table No.6)

DISCUSSION:

In the present study mean age of study subject was 35.78 ±17.41 years. Most of cases were young adults i.e. in age group of 31-40 years (34%). Also most of study subjects were female, with female: male ratio of 5.2:1. These findings were similar with the study done by Sanjeet Bagechi et al showing that highest prevalence of hypothyroidism noted in young people. In study done by AG Unnikrishnan et al showed prevalence of hypothyroidism in Indian population as 10.95%, with significantly higher proportion in female as compared to male(15.86% vs 5.02%)

In this study Most of the study subjects were overweight (71%) followed by obese (20%) and only 9% were normal. In the study Anastasios Milionis and Charalampos Milionis et al comprising 736 euthyroid persons, 616 females and 118 males showed that almost 7 out of 10 subjects (70.9%) were overweight or obese (BMI > 25), 4 out of 10 (39%) were obese (BMI > 30), while almost 2 out of 10 (17%) were morbidly obese (BMI > 35).

Analysis of ECG of the study population showed that it is normal in 20% patients. Among abnormal ECG which constitutes 80% of the patients, bradycardia was seen in 32% of the patients and ST-T changes contributes 20%. This was correlating with the study done by Dr. Shashikanth.M et al showing that ECG was normal in 35% patients. Among abnormal ECG which constitutes 65% of the patients, low voltage complexes and bradycardia was seen in 30% of the patients. LBBB & RBBB was found in 4% & 14% respectively. In the study done by R.Verma et al showed that sinus bradycardia was the most common finding(30%).In the study done by Preshant Shrivastava , Anirudh Tiwari et al showed that ECG changes observed were Sinus bradycardia in 35.5%, Low voltage complexes in 16.6%, T Wave inversion in 7.8%, RBBB in 4.4%, and QTc prolongation in 2.2% cases.

Analysis of the USG neck in the study population showed that it was normal in 27% patients. Among abnormal USG, thyroiditis constitute 31% in the study population and was the most common USG neck finding in the study population. This study finding was correlating with study done by Dr. Anupriya et al showing that ultrasound was an excellent modality for diagnosing benign conditions such as thyroiditis, multinodular goiter and malignant conditions . In the study done by Hanushraj. R , Sudharsan.S et al Diffuse thymomegaly is the common radiological finding in USG. Multinodular goiter is the second common findings. Features of malignancy were seen in 6.67% of cases.

In this study, after doing 2D Echo of heart it was found that 27% study subjects were having normal finding. Among abnormal 2D echo reports, diastolic dysfunction constitute 38% of the study population and was the most common 2D echo finding in the study population. In the study done by Preshant Shrivastava , Anirudh Tiwari et al found that 35% of the study population had normal parameters of echocardiography. The commonest abnormal finding in the sample was "diastolic dysfunction" seen in 20%patients. Other findings were pericardial effusion seen in 16.7% cases, increased inter ventricular septum diastolic dimension in 16.7% cases and increased left ventricular posterior wall thickness in 11.1% cases.

CONCLUSION

Most of cases were young female adults. About half of the patients (51%) were moderately hypothyroid, 30% were severely hypothyroid and 19% were mildly hypothyroid. Sinus bradycardia was seen in up to 32% of the patients which was the most common ECG finding. Thyroiditis (31%) was the most common USG neck finding and Diastolic dysfunction (38%) was the most common 2D echo finding in the study population.

TABLE 1: AGE WISE DISTRIBUTION OF STUDY POPULATION

AGE Group (in years)	Frequency	Percentage	Mean ± SD
< 20	8	8%	35.78±17.41
21-30	24	24%	
31-40	34	34%	
41-50	20	20%	
>51	14	14%	
TOTAL	100	100	

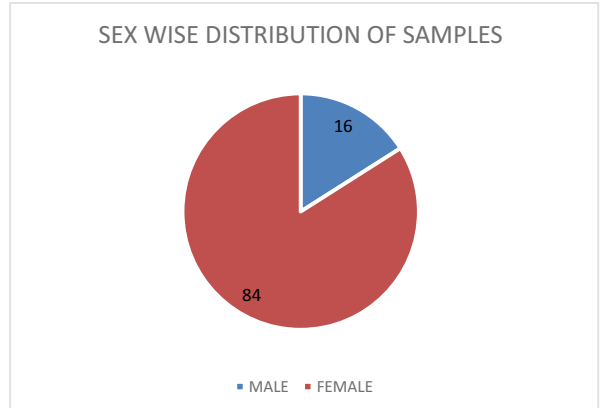


TABLE 2: BMI OF STUDY POPULATION (n = 100)

BMI	CATEGORY	FREQUENCY	PERCENTAGE
18.5-24.9	NORMAL	9	9%
25-29.9	OVERWEIGHT	71	71%
>30	OBESE	20	20%

TABLE 3: SEVERITY OF HYPOTHYROIDISM IN STUDY POPULATION (n=100)

SEVERITY OF HYPOTHYROIDISM	NO OF SAMPLES	PERCENTAGE
MILD	19	19%
MODERATE	51	51%
SEVERE	30	30%
TOTAL	100	100%

TABLE 4: ECG OF STUDY POPULATION (n = 100)

FINDINGS	FREQUENCY	PERCENTAGE
NORMAL	20	20%
SINUS BRADYCARDIA	32	32%
LOW VOLTAGE	13	13%
PROLONGED Q-TC	2	2%
ST-T CHANGES	20	20%
VPC	13	13%
TOTAL	100	100%

TABLE 5: USG NECK OF STUDY POPULATION (n = 100)

FINDINGS	FREQUENCY	PERCENTAGE
NORMAL	27	27%
THYROIDITIS	31	31%
COLLOID GOITRE	23	23%
MNG	3	3%
CARCINOMA	7	7%
MNG WITH THYROIDITIS	9	9%
TOTAL	100	100%

TABLE 6: 2D ECHOCARDIOGRAPHY OF STUDY POPULATION (n = 100)

FINDINGS	FREQUENCY	PERCENTAGE
NORMAL	27	27%
SYSTOLIC DYSFUNCTION	11	11%
PERICARDIAL EFFUSION	19	19%
DIASTOLIC DYSFUNCTION	38	38%
IVS THICKNESS	5	5%
TOTAL	100	100%

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