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General Medicine

A Hospital-Based Cross-Sectional Study on Cardiovascular Changes in Newly Diagnosed Hypothyroid Patients

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Abstract **Original Research Article**

Objective: Hypothyroidism is the most common pathological hormone deficiency. This clinical state is due to either the decreased secretion or decreased action of thyroid hormones. These hormones have a profound effect on multiple organ systems, with the heart being particularly sensitive to this effect. Hence it is important to identify any clinical or sub clinical hypothyroidism at the earliest to blunt its cardiovascular effects. ***Aim:*** To assess the cardiovascular changes in newly diagnosed hypothyroid patients. ***Methods****:* Among the patients attending the Medicine OPD at Venkataeswara Hospital, Chennai-35. Newly detected hypothyroid patients were diagnosed based on their symptoms, clinical examination and hormone assays. These study subjects were subjected to detailed cardiovascular examination, ECG and echocardiography. ***Results:*** Out of 44 patients, who participated in the study, 27.3% patients had bradycardia; 22.7% had low voltage complexes; 20.5% had pericardial effusion; 11.3% had diastolic dysfunction. Systolic function was normal for all study subjects. ***Conclusion****:* This study provides a clinical profile on the cardiovascular effects of newly diagnosed hypothyroid patients. Early diagnosis and treatment of hypothyroidism with thyroxine helps to reduce these cardiovascular risks.

Keywords: Hypothyroid, Cardiovascular, ECHO.

INTRODUCTION

The most common functional disorder of the thyroid gland is hypothyroidism [1]. Hypothyroidism is a clinical manifestation brought about by the decreased synthesis, secretion or action of thyroid hormones. Hypothyroidism is classified into primary and secondary types. Primary hypothyroidism is due to failure of the thyroid gland per se. whereas; secondary hypothyroidism is due to a failure of the pituitary gland to secrete TSH. Thyroid hormones have a widespread action on multiple organ systems and every tissue is affected to a greater or lesser extent [2]. The heart is seen to be particularly sensitive to these changes [3], presenting with multiple manifestations such as bradycardia, hypertension and pericardial effusion. These changes have also been noted in patients with sub-clinical hypothyroidism, suggesting that the levels of thyroid hormones are not related to these cardiovascular changes. Hence it is important to diagnose hypothyroidism at the earliest and assess the cardiovascular risks of these patients to reduce and even prevent cardiovascular mortality.

METHODOLOGY

Source of Data

Patients attending General Medicine OPD at Venkataeswara Hospital, Chennai-35. Hospital between the time periods of May 2019 to October 2019.

Sample Size: 44

Inclusion Criteria

All cases of newly detected hypothyroidism diagnosed based on serum TSH, total T4, total T3 levels.

Exclusion Criteria

1. Hypothyroid patients already on treatment
2. Patients with diagnosed co-morbidities such as diabetes, hypertension, endocrine disorders, pregnancy and other endocrine disorders
3. Secondary hypothyroidism patients

After obtaining informed written consent, patients satisfying the above inclusion and exclusion criteria were first subjected to history-taking and detailed cardiovascular examination. ECG was recorded for all patients with the standard 12 lead electrocardiograph. ECHO was done using 2D mode, Doppler and M-modes. Specific screening was done to identify systolic and diastolic function and for pericardial effusion.

RESULTS AND DISCUSSION

During the study period, 44 patients were newly diagnosed with hypothyroidism based on hormone assays. Out of these 44 patients, 14 were male patients and 30 were female patients. 20 patients (45%) were seen to have cardiovascular symptoms (Table-1). 12 cases (27.3%) were seen to have bradycardia (Table-2). On electrocardiograph, 10 patients (22.72%) (Table-3) had low voltage complexes. When the subjects had an echocardiograph evaluation, 9 patients (20.45%) (Table-4) had pericardial effusion and 5 patients (11.36%) had diastolic dysfunction (Table-5).

Table-1: Cardiovascular symptoms

Symptoms	Number/Percentage
Chest Pain	5 (11.3%)
Breathlessness	6 (13.6%)
Effort intolerance	8 (18.1%)
Palpitations	1 (2.2%)

Table-2: Pulse rate

Pulse Rate	No of Cases	%
50-59	12	27.3%
60-69	10	22.7%
70-79	16	36.4%
80-89	6	13.6%
Total	44	100%

Table-3: Low voltage complexes on ECG

Low voltage complex	Male cases	Female cases	Total
Present	6	4	10
Absent	24	10	34
Total	30	14	44

Table-4: Pericardial effusion on ECHO

Pericardial effusion	No of cases	%
Mild	8	18.2
Moderate	1	2.3
Absent	35	79.5
Total	44	100.0

Table-5: Ventricular dysfunction

Ventricular dysfunction	Present	Absent
Systolic dysfunction	0	44
Diastolic dysfunction	5	39

CONCLUSION

This study presents a clinical profile of newly diagnosed hypothyroid patients in our hospital. The study helps to conclude that early diagnosis, cardiovascular assessment and prompt treatment can help in lowering cardiovascular risks. A program of regular moderate-intensity physical activity for 30 to 60 minutes daily, at least 5 days per week, is recommended.

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