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Medicine

Study to Find Out Incidence of Cardiac Manifestation in Thyroid Disorder (Hypo and Hyper Both)

Dr. AD Bhatnagar, Dr. Nitin Rawat*
Dept. of Medicine, MGM Medical College & MY Hospital, Indore, Madhya Pradesh, India

Original Research Article

***Corresponding author**
Dr. Nitin Rawat

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Abstract: In summary out of 56 patients of thyroid dysfunction one patient did not have any symptoms suggesting cardiac involvement. 55 patients (98.2 %) had some kind of cardiac symptom. 51 patients (91.07%) had evidence of cardiac involvement on clinical between the severity of cardiac involvement and level of thyroid dysfunction could not be established. Thus the importance of a thorough clinical examination in cases of borderline dysfunction cannot be underestimated.
Keywords: Cardiac, Thyroid, Hypo & Hyper.

INTRODUCTION

Thyroid hormones are like rainfall as excess as well as paucity of which will affect body metabolism. It mainly affects cardiovascular system and central nervous system along with other systems.

According to Rolleston, the thyroid gland was first described by Galen (AD 130-200). The name Thyroid was applied by Thomas Wharton and derived from its shield like shape.

The thyroid gland develops from the floor of the primitive pharynx during the third week of gestation. The gland migrates from the foramen cecum, at the base of tongue along the thyroglossal duct to reach its final position in the neck. Thyroid hormone synthesis normally begins at about 11 weeks of gestation.

Thyroid transcription factors stimulate thyroid cell development and induction of thyroid specific genes such as thyroglobulin, thyroid peroxidase, thyroid stimulating hormone receptor gene [1-3].

MATERIALS & METHODS

Study design

It is cross sectional, observational and descriptive study for the assessment of cardiovascular manifestations in patients of thyroid disorder.

Study period

Study started from 2012 January completed on 2012 October.

Study subjects

In this study 56 cases of thyroid dysfunction were studied for the cardiovascular manifestations. Out of these, 28 cases were of hypothyroidism and 28 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 a M.Y. 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, CXR, 2 D-ECHO done.

Inclusion criteria

Following criteria were used for selection of the patients.

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

Exclusion criteria

- Seriously ill patients.
- Patients with multi-system diseases or cancer.
- Drug induced thyroid disorder.
- Patients with sick euthyroid syndrome.
- Pregnant women.
- Patients who are suffering from active renal and liver diseases.
- 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

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

For Hyperthyroidism

History of weight loss, fatigability, weakness intolerance to heat, excessive sweating , increased appetite, increased frequency of bowel movements, insomnia, emotional disturbances, tremors , muscle weakness, eye complaints, pruritus, gynaecomastia, menstrual irregularrity and fever with chills were noted.

For hypothyroidism

History of weight gain, fatigability, intolerance to cold, decreased appetite, increased sleep, decreased frequency of bowel movements, skin changes, hoarseness of voice , swelling of face and extremities, menstrual disturbances like menorrhagia, galactorrhea, loss of body hairs, decreased memory, hearing impairment, ataxia, parasthesia, arthralgia, and muscle cramps were noted.

STATISTICAL METHODS

Sample size

56 cases attending endocrine OPD in M Y Hospital, Indore who gave informed consent and who met the inclusion criteria were recruited.

Data analysis

The Statistical software namely SPSS 15.0, Stata 8.0 and Graph Pad were used for the analysis of the data. Microsoft Word and Excel software have been used to generate graphs, tables etc**.**

RESULTS

Table-1: Age wise distribution of cardiac involvement in hypothyroidism

AGE	NO.OF CASES	CARDIAC INVOLVEMENT
11-20	5	5
21-30	7	5
31-40	7	6
41-50	6	6
51-60	3	3

Cardiac involvement is determined by clinical examination, ECG, X ray & Echocardiography. Three patients of our study group did not show any form of cardiac involvement. In significant number of patients cardiac involvement is present.

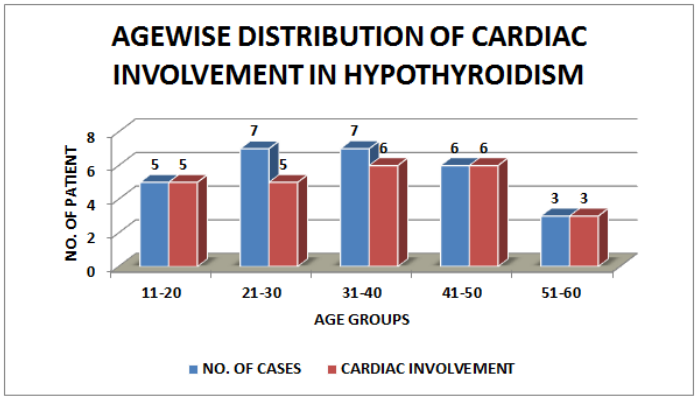

Fig-01: Agewise distribution of cardiac involvement in hypothyroidism

Table-2: Agewise distribution of cardiac involvement in hyperthyroidism

AGE	NO.OF CASES	CARDIAC INVOLVEMENT
11-20	4	4
21-30	8	7
31-40	6	6
41-50	5	5
51-60	4	4
61-70	1	1

Only one patient from age group 21-30 did not show cardiac involvement, rest all significant number of patients were found to have cardiac involvement.

In our study 100% males & 91% females found to have cardiac involvement. On applying Fisher's Exact Test of significance this observed difference between cardiovascular involvement in males & females is found not statistically significant (Table-3).

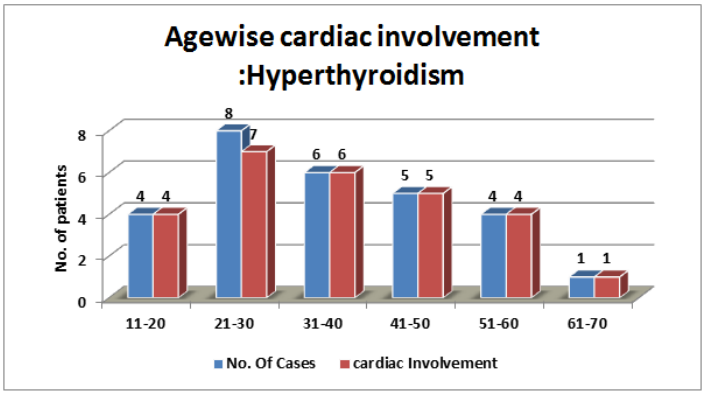

Fig-02: Agewise distribution of cardiac involvement in hyperthyroidism

Table-3: Comparison of cardiac involvement in males and females with thyroid disorder

GENDER	NO.OF CASES	CARDIAC INVOLVEMENT	PERCENTAGE
MALE	5	5	100%
FEMALE	51	47	91%

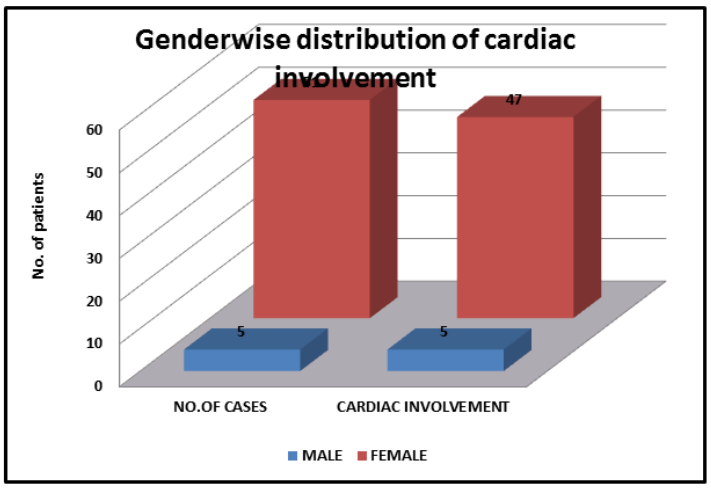

Fig-03: Comparison of cardiac involvement in males and females with thyroid disorder

DISCUSSION

It is well recognized that cardiovascular manifestations are frequent findings in thyroid disorders. 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. 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. This study had included 56 cases of which 28 cases were hyperthyroidism and 28 cases were hypothyroidism

SYMPTOMS

A) Hypothyroidism

In this study fatigue (79%) was the commonest cardiac symptom in hypothyroid patients. Dyspnea (50%) was present in almost half of the hypothyroid patients. Chest pain was present in 7 patients i.e. (25%) & palpitation in 15% of patients.

Watanakunakorn *et al*. have reported fatigue in 70% and lethargy and weakness in another 25%. Dyspnea was found in 32% and chest pain in 8.25% Jangid *et al*. from Delhi reported the incidence of fatigue to be 62%.our finding matches with above mentioned studies.

Many studies reported that reduction in cardiac output due to decreased myocardial contractility and reduction in oxygen consumption in hypothyroid patients at rest and during exercise causes increased fatiguability[4-6].

Forfar *et al*. studied the response of left ventricular function to exercise in hypothyroid patients. They conduced that with exercise though the left ventricular ejection fraction in hypothyroid individuals increased, it was still slightly less than the resting left ventricular ejection fraction in euthyroid states. The presence of anemia may also contribute to increased fatigability and breathlessness.

As regards the chest pain, Steinberg [7] noted that coronary artery disease was more prevalent in hypothyroid patients. This has been attributed to hypercholesterolemia of hypothyroidism 9, impaired coronary blood flow, atherosclerotic changes in coronary, extreme of blood pressure, changes in blood itself such as anemia, autoimmune changes in Hashimoto's thyroiditis may be the probable reasons for chest pain.

This is also the reason why replacement therapy with thyroxin is begun in a very low dose in patients with myxedema with ST-T changes on the electrocardiogram. Rapid replacement of thyroxin places an increase work load on the heart, which the diseased heart may not be able to cope up. This may precipitate cardiac failure or acute myocardial infarction [8].

In this study, 7 patients had a history of chest pain .Out of them, 6 patient showed ST-T changes suggestive of myocardial ischemia. One of them had pericardial effusion on Echocardiography. The remaining 6 patient were normal with respect to Echocardiography. There were 11 other patients who had ST-T changes on electrocardiogram but who did not complain of chest pain.

B) HYPERTHYROIDISM

The commonest cardiovascular symptom in this group was palpitations. 26 out of 28 patients (92.8%) had palpitations, 20 patients (71.4%) had fatigability, 20 patients (71.4%) had dyspnea and 6 patients (21%) had chest pain.

Lindsay and Fadel *et al*. [9] found palpitations (85%) as the commonest cardiac symptoms in hyperthyroid patients 25. They found dyspnea and fatigability in 50% patients. They found chest pain is uncommon and may result from either a mismatch between myocardial oxygen demand and supply or from vasospasm.

In this demonstrated that chronotropic effect of thyroid hormone on the myocardium. Dyspnea is a common complaint of patients with thyrotoxicosis. The cause of dyspnea remains controversial. The dyspnea may be due to weakness of respiratory muscles which is relieved with administration of propranolol alone [10]. Chest pain could be due to an underling coronary artery disease aggravating the mismatch between the oxygen supply to the myocardium and its oxygen requirement [18]. The subsequent cardiac hypertrophy adds to it. We had 6 patients who had chest pain. Their mean age was 48 yrs. This is because young patient with hyperthyroidism can compensate the increased oxygen demand adequately.

In our study we had one female patient who was a known case of ischemic heart disease and presented with worsening of angina along with signs of hyperthyroidism. She responded well to antianginal and antithyroid treatment. Kahaly *et al*. found that thyrotoxicosis can aggravate preexisting heart disease.

CONCLUSION

Cardiac manifestations present in significant number of patients (in hypothyroidism 90% patients have cardiac manifestations & in hyperthyroidism 97%). Patients not having cardiac manifestations were younger than others. Cardiovascular manifestations are major presenting features in both groups of patients.

No correlation could be established between the severity of cardiac manifestations and the degree of thyroid function derangement.

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