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Assessment of cardiovascular manifestations of hyperthyroid disorder patients

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ABSTRACT:
Background: Hyperthyroidism is defined as excess concentration of thyroid hormones in the body due to either increased synthesis of the thyroid hormone, increased release of preformed thyroid hormones, or from endogenous or exogenous extrathyroidal sources. The present study was conducted to assess cardiovascular manifestations of hyperthyroid disorder patients.
Materials & Methods: 104 patients of hyperthyroidism of both gendersunderwent clinical evaluation, basic laboratory tests like CBC, RFT, LFT and ECG and 2D ECHO were performed in these patients to evaluate the presence of any cardiac manifestations.
Results: There were 34 males and 70 females. Age group upto 40 years had 20, 41-60 years had 34 and >61 years had 50 patients. Common symptoms were pallor in 90, edema in 86, moist skin in 74 and eye signs in 53. Cardiovascular symptoms recorded were chest pain in 82, palpitations in 95 and breathlessness in 60. Among 104 patients, ECG changes were seen in 42 patients. Out of this, sinus tachycardia was seen in 65%, AF in 10%, ST T changes in 6%, RVH in 7%, LVH in 11% and RBBB in 5%. The difference was significant (P< 0.05).
Conclusion: Cardiovascular manifestations are quite common in hyperthyroid patients.
Key words: Cardiovascular, Hyperthyroidism, ECG

I. INTRODUCTION

Thyroid hormones have a profound effect on numerous metabolic processes, virtually in all tissues and hence every tissue in the body gets affected to a greater or lesser extent in thyroid hormone disturbances, the heart being particularly sensitive to its effect.[1]

Hyperthyroidism is defined as excess concentration of thyroid hormones in the body due to either increased synthesis of the thyroid hormone, increased release of preformed thyroid hormones, or from endogenous or exogenous extrathyroidal sources.[2] Hyperthyroidism is very prevalent worldwide. According to a 2002 study, Pakistan reported a prevalence of 5.1% for hyperthyroidism and 5.8% for clinical hyperthyroidism. Clinical symptoms of hyperthyroidism depend upon various factors including patient's age, sex, presence of other diseases, duration of the disease, and cause of the disease.[3] Older patients exhibit fewer and less severe symptoms but may end up with more cardiovascular complications. Various cardiovascular symptoms such as palpitations, exercise intolerance, dyspnea, angina, edema, and congestive heart failure are commonly present in patients with hyperthyroidism. Atrial fibrillation is reported in 10-25% of hyperthyroid patients and may cause further complications.[4]

Cardiovascular signs of hyperthyroidism include tachycardia, widened pulse pressure, marked increase in cardiac output with impaired cardiovascular and respiratory exercise

capacity. 6 In the elderly hyperthyroid patient the symptoms and signs of heart failure or worsening of angina pectoris may dominate the clinical picture and mask the more classical endocrine manifestations of the disease.[5] The present study was conducted to assess cardiovascular manifestations of hyperthyroid disorder patients.

II. MATERIALS & METHODS

The present study comprised of 104 patients of hyperthyroidism of both genders. All were informed regarding the study and their written consent was obtained.

Demographic profile of each patient was recorded. All the patients underwent clinical evaluation, basic laboratory tests like CBC, RFT, LFT, serum electrolytes, fasting lipid profile such as serum triglycerides, LDL, HDL, total cholesterol, FT4, FT3 and TSH and radiological variables were recorded. ECG and 2D ECHO were performed in these patients to evaluate the presence of any cardiac manifestations. Results thus obtained were studied extensively and statistically using Chi- square test. P value less than 0.05 was considered significant.

III. RESULTS

Table I Characteristics of patients

Characteristics	Parameters	Number	P value
Gender	Male	34	0.01
	Female	70	
Age group (Years)	Upto 40	20	0.05
	41-60	34	
	>61	50	
Symptoms	Pallor	90	0.91
	Edema	86	
	Moist skin	74	
	Eye signs	53	
Cardiovascular symptoms	Chest pain	82	0.81
	Palpitations	95	
	Breathlessness	60	

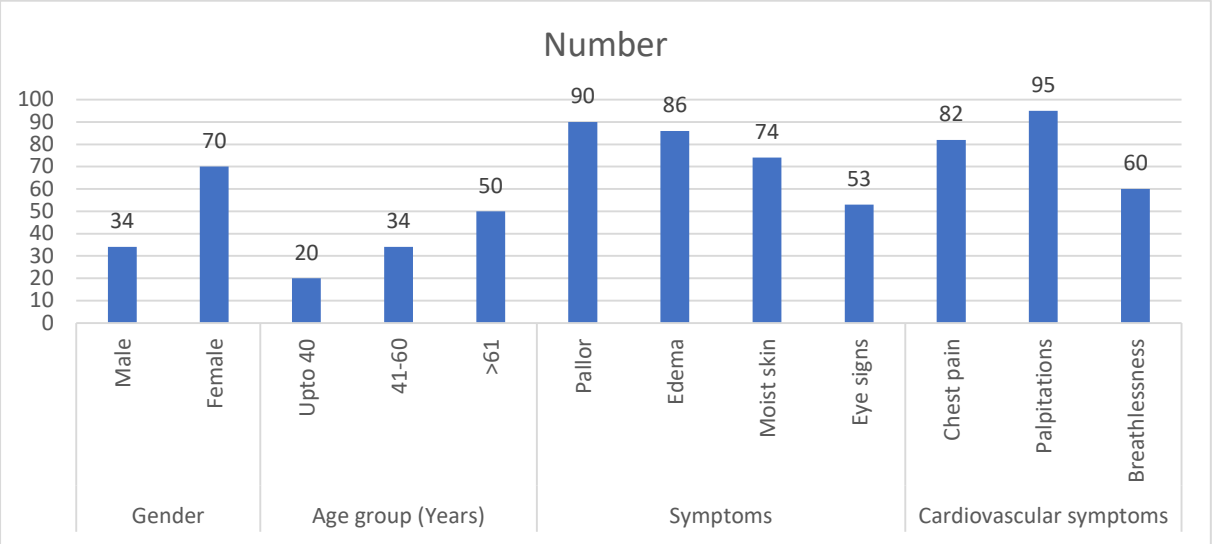
Table I, graph I shows that there were 34 males and 70 females. Age group upto 40 years had 20, 41-60 years had 34 and >61 years had 50 patients. Common symptoms were pallor in 90, edema in 86, moist skin in 74 and eye signs in 53. Cardiovascular symptoms recorded were chest pain in 82, palpitations in 95 and breathlessness in 60. The difference was significant (P< 0.05).

Table II ECG changes in hyperthyroid patients

ECG changes	Percentage	P value
Sinus tachycardia	65%	0.01
AF	10%	
ST T change	6%	
RVH	7%	
LVH	11%	
RBBB	5%	

Table II shows that among 104 patients, ECG changes were seen in 42 patients. Out of this, sinus tachycardia was seen in 65%, AF in 10%, ST T changes in 6%, RVH in 7%, LVH in 11% and RBBB in 5%. The difference was significant (P< 0.05).

Graph ICharacteristics of patients



IV. DISCUSSION

Various direct and indirect mechanisms are responsible for the influence of thyroid hormone on the heart and cardiovascular system. Thyroid hormones influence myocytes by upregulating alpha (α)-chain, but downregulates beta (β)-chain.[6] It may also influence sarco/endoplasmic reticulum, which may increase the rate of calcium uptake during diastole. Thyroid hormone also directly acts on ion channels such as Na/K-ATPase, Na/Ca++ exchanger, and some voltage-gated K channels, hence affecting myocardial and vascular functions.[7] Other than the cellular impact of thyroid hormone, it also influences the hemodynamic balance in the body by its direct effects on the heart and blood vessels.[8] Thyroid hormones may cause rapid use of oxygen by the body, increased production of metabolic products, and relaxation of arterial smooth muscle, which may lead to peripheral vasodilation.[9] Cardiac symptoms seen in hyperthyroidism either may be due to the effect of increased sympathoadrenal activity or due to the direct effect of thyroid hormones on the heart.[10] The present study was conducted to assess cardiovascular manifestations of hyperthyroid disorder patients.

In present study, there were 34 males and 70 females. Age group upto 40 years had 20, 41-60 years had 34 and >61 years had 50 patients. Common symptoms were pallor in 90, edema in 86, moist skin in 74 and eye signs in 53. Cardiovascular symptoms recorded were chest pain in 82, palpitations in 95 and breathlessness in 60. Kandan et al[11] studied the prevalence of various cardiac manifestations in overt and subclinical hyperthyroidism in 50 patients. In this study females (60%) were more than males (40%), commonest cardio vascular symptoms were palpitation (78%), followed by dyspnoea (26%) and chest pain (4%). The commonest cardio vascular signs were found to be tachycardia (82%), widened pulse pressure (50%) and pedal edema (12%). The commonest ECG finding was found to be Sinus tachycardia (46%) followed by atrial fibrillation (28%), Non-Specific ST-T changes, left ventricular hypertrophy, RV hypertrophy and RBBB. Systolic dysfunction and chamber enlargement (18%) were the commonest echo findings.

We found that among 104 patients, ECG changes were seen in 42 patients. Out of this, sinus tachycardia was seen in 65%, AF in 10%, ST T changes in 6%, RVH in 7%, LVH in 11% and RBBB in 5%. In the study by Barsela S et al 21% of patients had atrial fibrillation, while 8.9% in that of Zarg 28% patients in this study had atrial fibrillation et al and 6% of that of

Osman et al. Osman et al[12] evaluated the prevalence of cardiovascular abnormalities in patients with overt hyperthyroidism before and after antithyroid therapy. A total of 393 (312 women, 81 men) consecutive unselected patients with overt hyperthyroidism were recruited and compared with 393 age- and gender-matched euthyroid control subjects. Hyperthyroid patients were re-evaluated after antithyroid therapy. A higher prevalence of cardiovascular symptoms and signs, as well as abnormal hemodynamic parameters, was noted among hyperthyroid patients at recruitment compared with control subjects. Cardiac dysrhythmias, especially supraventricular, were more prevalent among patients than among control subjects. Palpitation and dyspnea, postural decrease in systolic pressure, and atrial fibrillation (AF) remained more prevalent in treated hyperthyroid subjects with subclinical hyperthyroidism compared with control subjects, and remained more prevalent after restoration of euthyroidism. Predictors for successful reversion to sinus rhythm in those with AF associated with hyperthyroidism were lower BP measurements at recruitment and an initial hypothyroid state induced by antithyroid therapy. Mortality was higher in hyperthyroid subjects than in control subjects after a mean period of follow-up of 66.6 months.

V. CONCLUSION

Authors found that cardiovascular manifestations are quite common in hyperthyroid patients.

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