



E-ISSN: 2706-9575
P-ISSN: 2706-9567
IJARM 2021; 3(2): 604-606
Received: 06-05-2021
Accepted: 19-06-2021

Dr. Sanjay Singh
Assistant Professor,
Department of Medicine, FH
Medical College and Hospital,
Etmadpur, Agra, Uttar
Pradesh, India

Cardiovascular manifestations in hyperthyroid disorder patients: A clinical study

Dr. Sanjay Singh

DOI: <https://doi.org/10.22271/27069567.2021.v3.i2i.381>

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 in hyperthyroid disorder patients.

Materials and Methods: 112 patients of hyperthyroidism of both genders were included. Data such as name, age, gender etc. was recorded. A thorough clinical examination was carried out. Assessment of CBC, RFT, LFT, serum electrolytes, triglycerides, LDL, HDL, total cholesterol, FT4, FT3 and TSH and radiological variables were recorded. All underwent ECG and 2D ECHO.

Results: Out of 112 patients, males were 70 and females were 42. common symptoms were pallor seen in 86, edema in 75, moist skin in 60 and eye signs in 51. Cardiovascular symptoms recorded were chest pain in 92, palpitations in 85 and breathlessness in 72. The difference was significant ($P < 0.05$). ECG changes were seen in 40 patients. Out of this, sinus tachycardia was seen in 70%, ST T changes in 10%, AF in 3%, RVH in 2%, LVH in 10% and RBBB in 5%. The difference was significant ($P < 0.05$).

Conclusion: Cardiovascular manifestations were common in hyperthyroid patients.

Keywords: Cardiovascular, hyperthyroidism, sinus tachycardia

Introduction

Thyroid hormones have significant effects on the heart and cardiovascular system through many direct and indirect mechanisms^[1]. Since the first descriptions of hyperthyroidism and thyrotoxicosis, the cardiovascular symptoms have been alarming signs for the physician in the clinical presentation of the patient. 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^[2].

Cardiovascular signs of hyperthyroidism include tachycardia, widened pulse pressure, marked increase in cardiac output with impaired cardiovascular and respiratory exercise capacity^[3]. 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^[4].

The involvement of the heart in hyperthyroidism patients has a considerable prognostic value and causes significant morbidity and mortality. Even more so, with early diagnosis and adequate therapy, affected patients may be able to reverse their condition^[5]. AF can lead to secondary problems such as cerebral stroke. When hyperthyroidism is treated with anti-thyroid medicines, and thyroid hormone levels return to normal, cardiac issues begin to dissipate. The majority of hyperthyroidism problems are prevented by early and rapid detection of cardiac symptoms and signs and early and suitable therapy^[6]. The present study was conducted to assess cardiovascular manifestations in hyperthyroid disorder patients.

Materials and Methods

The present study comprised of 112 patients of hyperthyroidism of both genders. They were informed regarding the study and their written consent was obtained.

Corresponding Author:
Dr. Sanjay Singh
Assistant Professor,
Department of Medicine, FH
Medical College and Hospital,
Etmadpur, Agra, Uttar
Pradesh, India

Data such as name, age, gender etc. was recorded. A thorough clinical examination was carried out. Assessment of CBC, RFT, LFT, serum electrolytes, triglycerides, LDL, HDL, total cholesterol, FT4, FT3 and TSH and radiological variables were recorded. All underwent ECG and 2D ECHO. Results thus obtained were studied statistically using Mann Whitney U test. P value less than 0.05 was considered significant.

Results

Table 1: Distribution of patients

Total- 112		
Gender	Male	Female
Number	70	42

Table 1 shows that out of 112 patients, males were 70 and

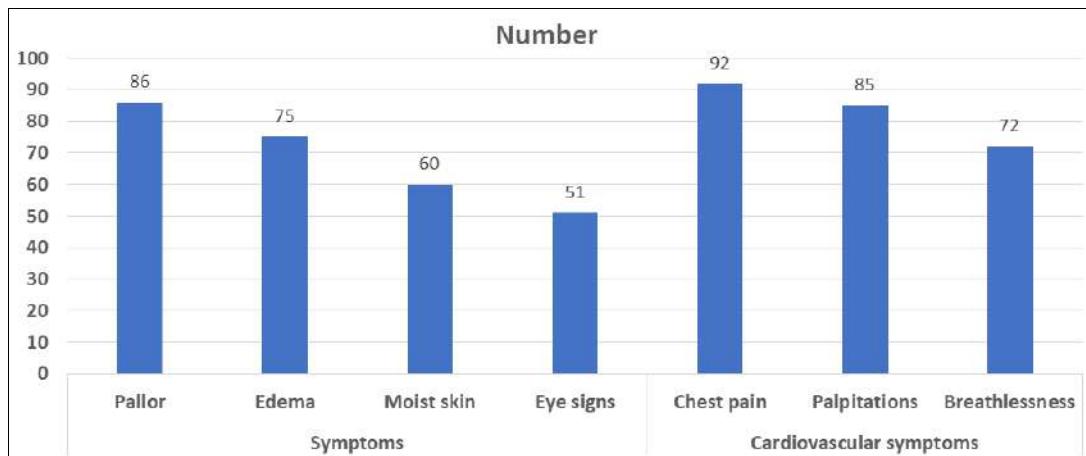


Fig 1: Assessment of parameters

Table 3: Assessment of ECG changes in hyperthyroid patients

ECG changes	Percentage	P value
Sinus tachycardia	70%	0.01
ST T change	10%	
AF	3%	
RVH	2%	
LVH	10%	
RBBB	5%	

Table 3 shows that ECG changes were seen in 40 patients. Out of this, sinus tachycardia was seen in 70%, ST T changes in 10%, AF in 3%, RVH in 2%, LVH in 10% and RBBB in 5%. The difference was significant ($P < 0.05$).

Discussion

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 [7]. Hyperthyroidism is very prevalent worldwide. Various direct and indirect mechanisms are responsible for the influence of thyroid hormone on the heart and cardiovascular system [8]. The present study was conducted to assess cardiovascular manifestations of hyperthyroid disorder patients.

In present study, out of 112 patients, males were 70 and females were 42. Nijith *et al.* [9] enrolled 140 newly diagnosed and untreated confirmed cases of hyperthyroidism of any etiology for nine months. The mean

females were 42

Table 2: Assessment of parameters

Parameters	Variables	Number	P value
Symptoms	Pallor	86	0.85
	Edema	75	
	Moist skin	60	
	Eye signs	51	
Cardiovascular symptoms	Chest pain	92	0.91
	Palpitations	85	
	Breathlessness	72	

Table 2, Figure 1 shows that common symptoms were pallor seen in 86, edema in 75, moist skin in 60 and eye signs in 51. Cardiovascular symptoms recorded were chest pain in 92, palpitations in 85 and breathlessness in 72. The difference was significant ($P < 0.05$).

age of study subjects was 43.2 years. Females made up 85.0% of the subjects in the current study, while males made up 15.0%. The etiology of hyperthyroidism was primarily due to Grave’s disease (59.3%). Heat intolerance (67.9%) was the most typical presenting symptom among the patients. The most common cardiac symptom was palpitation among 76.4% of subjects in the present study. Upon clinical examination, 80.7% of subjects had tachycardia. The ECG showed atrial fibrillation (AF) in 17.9% of subjects. The echocardiogram (ECHO) findings revealed systolic dysfunction in 17.8% of subjects.

We found that common symptoms were pallor seen in 86, edema in 75, moist skin in 60 and eye signs in 51. Cardiovascular symptoms recorded were chest pain in 92, palpitations in 85 and breathlessness in 72. Kandan *et al.* [10] 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 ECG changes were seen in 40 patients. Out

of this, sinus tachycardia was seen in 70%, ST T changes in 10%, AF in 3%, RVH in 2%, LVH in 10% and RBBB in 5%. 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 [11]. 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. 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. 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 [12].

In the systematic review of Völzke *et al.*, [13] eight studies suggesting a relationship between mortality and hyperthyroidism were evaluated and the relationship was not sufficient for clinical suggestions, except elderly patients with subclinical hyperthyroidism.

Conclusion

Authors found that cardiovascular manifestations were common in hyperthyroid patients.

References

1. Poliker R. The thyroid and the heart. *Circulation*. 1993;87:1435-41.
2. Boindi B. Effects of subclinical thyroid dysfunction on the heart. *Annals Internal Med*. 2002;137:904-14.
3. Klein I. Thyroid Hormone and the cardiovascular system. *Am J Med*. 1990;88(6):631-7.
4. Tribulova N, Knezl V, Shainberg A, Seki S, Soukup T. Thyroid hormones and cardiac arrhythmias. *Vascul Pharmacol*. 2010;52(3):102-12.
5. Jayaprasad N, Francis J. Atrial Fibrillation and Hyperthyroidism. *Indian Pacing Electrophysiol J*. 2005;5(4):305-11.
6. Symons C. Thyroid heart disease. *Br Heart J*. 1979;41:257-62. Von OK. Cardiac arrhythmias and heart rate in hyperthyroidism. *Am J Cardiol*. 1989;63:930-3.
7. Klein I, Ojamaa K. The cardiovascular system in hyperthyroidism. 8th ed. In: Werner and Ingbar's *The Thyroid: A fundamental and clinical text*, Braverman LE, Utiger RD, eds. Philadelphia: Lippincott Williams and Wilkins, 2000, 777-82pp.
8. Osman F. Cardiovascular manifestations of hyperthyroidism before and after antithyroid therapy: a matched case-control study. *J Am Coll Cardiol*. 2007;49(1):71-81.
9. Nijith L, Ranjan R. Cardiovascular Manifestations in Hyperthyroidism: A Cross-Sectional Study in a Tertiary Care Hospital in South India. *Cureus*, 2022 May 23, 14(5).
10. Kandan V, Sathyamurthy P, Rajkumar M, Narayanan L. Cardiovascular manifestations in hyperthyroidism. *Int J Res Med Sci*. 2016;4:3032-8.
11. Fadel BM, Ellahham S, Ringel MD, Lindsay J Jr, Wartofsky L, Burman KD. Hyperthyroid heart disease. *Clinical Cardiology*. 2000;23:402-8.
12. Osman F, Franklyn JA, Holder RL, Sheppard MC, Gammage MD. Cardiovascular manifestations of hyperthyroidism before and after antithyroid therapy: a matched case-control study. *Journal of the American College of Cardiology*. 2007 Jan 2;49(1):71-81.
13. Völzke H, Schwahn C, Wallaschofski, Dörr M. The association of thyroid dysfunction with all-cause and circulatory mortality: is there a causal relationship? *J Clin Endocrinol Metab*. 2007;92:2421-9.