

ORIGINAL ARTICLE

Frequency of Hyperthyroidism among Patients with Congestive Heart Failure Presenting at Tertiary Care Hospital, Peshawar

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World-wide, cardiac as well as vascular diseases poses an ever bigger effect on the health system which in accordance to WHO (World Health Organizations); in 2004; there was roughly 17.1 million peoples leading to death because of cardiovascular diseases globally, accounting for overall fatality of 29%; which are anticipated to be approx. 23.6 million peoples dying by end of 2030.¹ Congestive cardiac failure (CCF) is a complicated set of symptoms, occurring as result of both structurally and functionally abnormal cardiac conditions resulting in distorting the competence of the cardiac pumping in supporting the normal physiological flow.² Roughly 2%, of the populations in west part of the world are affected by cardiac failure, with pervasiveness and incidence at an immensely greater rate from 1% at 40 year of age to round about 10% above 75 year of age with almost the leading basis for recurrent hospitalisations among individuals older than 65 years.³ Congestive cardiac failure (CCF) individuals compared to normal patient's population as well diseases with persistent symptoms will be going through a striking mutilation of HRQoL (health-related quality of life).⁴ Shortness of breath and easy fatigability are the foremost cardiac failure manifestations persisting in majority of the diseased in spite of optimally titrated medical therapy and along with devices management options.⁵

The influences of thyroid hormones on the structural as well as functional abilities of heart is great with excessively increased thyroid hormones levels affecting the heart hemodynamically adversely, leading to high output cardiac failure and, later on; dilated cardiomyopathy (DCM).⁶ Patients with hyperthyroidism can exhibits clinically signs and symptoms of cardiac failure without heart disease previously ;labeling it wrongly as "high output cardiac failure," with contradictory clinical presentations of an increased cardiac output and contractions that are typified by excessive thyroid hormones.⁷ Heart failure manifests as decreased cardiac contractility, abnormal diastolic compliance, and volume overload, all of which can be results of severe and chronic hyperthyroidism, tachycardia, and atrial fibrillation.⁸ Thyrotoxic cardiomyopathy is defined as myocardial injury as a result of increased thyroid hormone toxicity, leading to tainted myositis generation of energy metabolism intracellular, and contractility related functions of myofibrils. Hypertrophied left ventricle, dysrhythmias, atrial fibrillation, and dilated cardiac chambers, cardiac failure, pulmonary arterial hypertension (PAH), and LV diastolic dysfunctions are the chief outcomes.⁹ Exceptional

shortness of breath, easy fatigability, and fluids withholding and edematous peripheries, effusion of pleura, liver clogging, and pulmonary artery hypertension are manifested in patients having high output cardiac failure.¹⁰

In one report, the thyroid dysfunction was recorded in 6.1% of which 2.12% had hyperthyroidism and 3.98% had hypothyroidism.¹¹ On the other hand, a survey established by Akhter et al¹⁹ in year 2001; demonstrated the occurrence of subclinical hypothyroidism among wide ranging populations groups as about 5.4%, and that of subclinical hyperthyroidism is 5.8%.¹²

As no such survey has been accomplished in our setup for the last five years, so this study was conducted that provided us the latest and updated statistics frequency of hyperthyroidism in patients presenting with congestive heart failure symptoms to tertiary care hospitals, Peshawar. Moreover the results of this survey were communicated with other health professionals and cardiac physicians and upcoming proposals can be chosen each for conducting further research along with handy amendments.

MATERIAL AND METHODS

The study was conducted after approval from IRB board of the concerned hospital. Patients reporting to the Outpatient department of Cardiology Department, Khyber Teaching Hospital, Peshawar from 18 Sept, 2019 to 18 Mar, 2020 with the diagnosis of congestive heart failure were included based on the inclusion/exclusion criteria.

Patients of age group 30 to 70 years and both genders with CHF with duration >6 month were included in this study. Patients on lipid lowering drugs, renal failure, hepatic failure, history of thyroid surgery on medical records and laboratory investigations were excluded from the study. Sample size was calculated of 200 patients keeping 2.12%¹¹ proportion of hyperthyroidism among patients with CHF, 95% confidence level and 2% absolute precision.

All patients were subjected to detailed history, followed by complete routine examination and baseline investigations was done by researcher and cross checked by consultant supervisor with minimum qualification of FCPS cardiology. From all the patients, 5cc of venous blood was obtained and sent to hospital laboratory to detect hyperthyroidism. All the laboratory investigations were done by single experience pathologist having minimum of five years of experience.

The collected data was stored and analyzed in SPSS version 23 for windows. Mean + SD was calculated for numerical variables and frequencies and percentages were calculated for categorical variables. P value of < 0.05 was considered as significant.

RESULTS

Total 50 (25%) patients were recorded in 30-50 years age group while 150 (75%) patients were recorded in 51-70 years age group. Total 135 (67.5%) patients were males while 65 (32.5%) patients were females as presented in table 1. As per descriptive statistics, mean and sds for age was 64.5+8.42, mean and sds for height was 5.8+0.10, mean and sds for weight was 94.5+2.54, mean and sds for BMI was 32.58+0.97, mean and sds for duration of CHF was 2.5+1.51, mean and sds for levels of TSH was 0.47+0.01 whereas mean and sds for level of thyroxin was 1.6+0.13 as presented in table 2. Total 174 (87%) patients were having diabetes mellitus, 164 (82%) patients with hypertension and 08 (4%) patient with hyperthyroidism as shown in table 3. Stratification of hyperthyroidism with age, gender, duration of CHF, BMI, diabetes mellitus and hypertension has been computed in table 4.

Table 1: Distribution of age and gender of the patients

Parameter	Age (years)	Frequency	Percentage
Age	30-50 Years	50	25%
	51-70 Years	150	75%
Gender	Male	135	67.5%
	Female	65	32.5%

Table 2: Descriptive Statistics of the study sample (N=200)

Numerical Variables	Frequency
Age	64.5+8.42
Height	5.8+0.10
Weight	94.5+2.54
BMI	32.58+0.97
Duration of CHD	2.5+1.51
Levels of TSH	0.47+0.01
Levels of Thyroxin	1.6+0.13

Table 3: Frequency of different variable in study sample

Parameter	Age (years)	Frequency	Percentage
Diabetes Mellitus	Yes	174	87%
	No	26	13%
Hypertension	Yes	164	82%
	No	36	18%
Hyperthyroidism	Yes	08	4%
	No	192	96%

Table 4: Stratification of hyperthyroidism with age group, gender, duration of CHD, BMI, diabetes mellitus and hypertension

Parameter	Sub-division of Parameter	Hyperthyroidism		P Value
		YES	NO	
Age Group	30-50 Years	03 (1.5%)	47 (23.5%)	0.804
	51-70 Years	05 (2.5%)	145 (72.5%)	
Gender	Male	06 (3%)	129 (64.5%)	0.643
	Female	02 (1%)	63 (31.5%)	
Duration of CHD	< 2.5 Years	05 (2.5%)	105 (52.5%)	0.663
	> 2.5 Years	03 (1.5%)	87 (43.5%)	
BMI	< 32 kg/m ²	03 (1.5%)	138 (69%)	0.367
	> 32 kg/m ²	05 (2.5%)	54 (27%)	
Diabetes Mellitus	Diabetic	06 (3%)	168 (84%)	0.302
	Non Diabetic	02 (1%)	24 (12%)	
Hypertension	Hypertensive	07 (3.5%)	157 (78.5%)	0.679
	Normotensive	01 (0.5%)	35 (17.5%)	

DISCUSSION

This study showed that most patients were male (67.5%) with a mean age of 64.5+8.42 years. A recent study showed similar sex and mean-age distributions to those observed in our study.¹³ The analysis of study sex distribution showed that the male patients are having Heart failure of 46.59% and female patients with

53.4 % which was study conducted by Sasthanathan et al. (2019).¹⁴

In our study, 174 (87%) patients were having diabetes mellitus, 164 (82%) patients with hypertension, only 08 (4%) patient presented with CHF were recorded with hyperthyroidism. In one report, the thyroid dysfunction was recorded in 6.1% of which 2.12% had hyperthyroidism and 3.98% had hypothyroidism which was comparable to this study.¹¹ However in a study in 2001 by Akhter et al.¹³, the frequency of subclinical hypothyroidism in population is 5.4%, and that of subclinical hyperthyroidism is 5.8%¹² which comparing with this study where only 08 (4%) patient presented with CHF were recorded with hyperthyroidism.

In our present study, it is observed that BMI in subclinical hypothyroidism does not differ and also supported by previous study by La Rue A et al. (2010).¹⁵ In this study, the association for hyperthyroidism between gender and age was proved statistically insignificant (P = 0.643&0.804).

These findings of our study are controversial with the findings of the other studies they showed that there is statistically significant relationship between hyperthyroidism and age & gender.^{16,17} The strong area of our study was an adequate sample size. Among the weak areas was the less diverse ethnicity.

CONCLUSION

In my study I have come to this conclusion that hyperthyroidism can cause high cardiac output and left ventricular hypertrophy, therefore, early and effective treatment of hyperthyroidism is highly recommended in preventing thyrotoxic cardiomyopathy.

REFERENCES

- Daniel S, Menees, Bates E. Evaluation of patients with suspected coronary artery disease. *Coron Artery Disease* 2010;21(7):386-90.
- Blanche C, Fumeaux T, Polikar R. Heart failure with normal ejection fraction: is it worth considering? *Swiss Med Wkly* 2010;139:66-72.
- Donal E, Lund LH, Linda C, Edner M, Lafitte S, Persson H et al. Rationale and design of the Karolinska-Rennes prospective study of dyssynchrony in heart failure with preserved ejection fraction. *Eu J Heart Failure* 2009;11:198-204.
- Comin-Colet J, Lainscak M, Anker SD. The effect of intravenous ferric carboxymaltose on health-related quality of life in patients with chronic heart failure and iron deficiency: a subanalysis of the FAIR-HF study. *Eur Heart J* 2013;34(1):30-38.
- Witte KK, Clark AL. Why does chronic heart failure cause breathlessness and fatigue? *Prog Cardiovasc Dis.* 2007;49:366-84.
- Danzi S, Klein I. Thyroid disease and the cardiovascular system. *Endocrinol Metab Clin North Am.* 2014;43(2):517-28.
- Vargas-Uricoechea H, Bonelo-Perdomo A, Sierra-Torres CH. Effects of thyroid hormones on the heart. *Clin Investig Arterioscler.* 2014;26(6):296-309.
- Klein I, Danzi S. Thyroid disease and the heart. *Curr Probl Cardiol.* 2016;41(2):65-92.
- Tănase DM, Ionescu SD, Ouatu A, Ambăruș V, Arsenescu-Georgescu C. Risk assessment in the development of atrial fibrillation at patients with associate thyroid dysfunctions. *Rev Med Chir Soc Med Nat Iasi.* 2013;117(3):623-9.
- Nanchen D, Gussekloo J, Westendorp RG. Subclinical thyroid dysfunction and the risk of heart failure in older persons at high cardiovascular risk. *J Clin Endocrinol Metab.* 2012;97(3):852-61.
- Ullah A. Subclinical hypothyroidism and hyperthyroidism in patients with congestive heart failure. *Khyber Med Uni J* 2013;5(3):137-40.
- Akhter S, Khan A, Siddiqi M, Nawab G. Frequencies of thyroid problem in different age, sex and seasons. *Sciences* 2001;153-9.
- Doğan S, Dursun H, Can H, Ellidokuz H, Kaya D. Long-term assessment of coronary care unit patient profile and outcomes: analyses of the 12-years patient records. *Turkish J Med Sci.* 2016;46(3):801-806.
- Sasthanathan, Prabhu G, Dhandapani. A study on incidence of subclinical hypothyroidism in patients with heart failure. *Int J Med Res Rev.* 2019;7(3):157-161.
- Kahaly GJ. Cardiovascular and atherogenic aspects of subclinical hypothyroidism. *Thyroid.* 2010;10(8):665-79.
- De Leo S, Lee SY, Braverman LE. Hyperthyroidism. *Lancet.* 2016, 388:906-918.
- Meng Z, Liu M, Zhang Q, et al.: Gender and age impacts on the association between thyroid function and metabolic syndrome in Chinese. *Medicine (Baltimore).* 2015, 94:e2193.