Case Report

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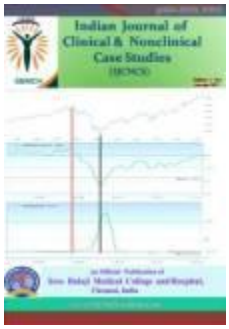

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LOW T3 SYNDROME IN CHRONIC HEART FAILURE; A CORRELATIONAL STUDY

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ABSTRACT:

Thyroid abnormalities are common in chronic heart failure. Severity of heart failure rises by several fold in patient with thyroid dysfunction. Aims and objectives: The purpose of this prospective study is to determine the patients of chronic heart failure by clinical and investigational methods. To screen the chronic heart failure patients by subjecting them to thyroid profile. To find an association between Low T3 syndrome and chronic heart failure. To determine the severity of cardiac failure in Low T3 syndrome patients. Method: it is hospital based study of 50 patients, which was conducted in Sree Balaji Medical College. The material for study is formed by adult patient with chronic heart failure between October 2017 to august 2018 fulfilling the inclusion and exclusion criteria. conclusion: There is a significant percentage of chronic heart failure patients having low T3 as biochemical parameter.

Keywords: Chronic Heart Failure, ,Systolic Blood Pressure, Diastolic Blood Pressure, , Segmental Hypokinesia ,Global Hypokinesia, PR Interval, Low T3 Syndrome

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INTRODUCTION:

Cardiovascular system is one of the most important targets on which thyroid hormone act more than 80% of biologically active hormone T3 derived from peripheral conversion of T4 secreted by thyroid gland.Clinical and experimental evidence shows T3 plays major role in modulating cardiac contractility and heart rate as well as arterial peripheral resistance[1]. T3 actions were carried out by binding to specific nuclear receptor which regulates gene encoding the functional and structural cardiac proteins, direct, extranuclear, non transcriptional effects. The pathophysiological mechanism for low T3 is reduced enzyme activity of 5' monodeiodinase responsible for converting T4 to T3 in peripheral tissues. Low T3 syndrome is euthyroid sick syndrome[2 -5].

MATERIALS AND METHODS:

Study design: prospective and cross sectional study
Sample size: 50
Year of study: 2017-2018
Place: Sree Balaji medical college and hospital, Chennai
Inclusion criteria:
Patients with chronic heart failure
Exclusion criteria:
1) Included clinical evidence of sepsis or cachexia
2) Concomitant presence of any predominant severe systemic disease including severe anaemia
Hb% <5g%
3) Other major surgical procedures performed before or within 6 months after the time of thyroid sampling

RESULTS:

Table number s shall be given together with the significance of the results presented shall be highlighted.

Table 1. Shows The prevalence of hyperthyroidism was 58% whereas 22% of the patients exhibited CHF and 20% of the patients showed a low T3.

Group	Number of patients	Percentage (%)
Hypothyroid	29	58
Low T3	10	20
CHF Only	11	22
Total	50	100

Table -1: Prevalence of hypothyroidism, low T3 and CHF

Parameter	Hypothyroid (n=29)	Low T3 (n=10)	CHF Only (n=11)	P-Value
	Mean	Mean	Mean	
Mean Age (years)	54.90±5.49(SD)	60.50±6.15(SD)	59.91±5.99(SD)	< 0.01
Duration of symptoms (months)	2.80± 2.24(SD)	3.85±1.63(SD)	5.64± 6.63(SD)	

Table: 2 Mean age and duration of hypothyroidism, low T3 and CHF

Age groups(yrs)	No. Patients (%)	Hypothyroid (n=29)		Low T3 (n=10)		CHF only (n=11)		Total (n=50)	
		Male	Female	Male	Female	Male	Female	Male	Female
45-50	7(14%)	6	0	0	0	1	0	7	0
50-55	9(18%)	7	0	1	0	0	1	8	1
55-60	16(32%)	5	5	2	1	2	1	9	7
60-65	11(22%)	1	3	1	2	2	2	4	7
65-70	7(14%)	1	1	2	1	1	1	4	3
Total	50	20	9	6	4	6	5	32	18

Table: 3 Age and sex distribution of hypothyroidism, low T3 and CHF

Groups	Mean pulse rate (per minute)
Hypothyroid (n=29)	94.9± 4.3 (SD)
Low T3 (n=10)	104± 6.9 (SD)
CHF Only (n=11)	90.9± 4.2 (SD)
Total (n=50)	95.8± 6.5 (SD)

Table: 4 Mean pulse rate of hypothyroidism, low T3 and CHF

Parameter	Group	Mean BP (in mm of Hg)	P value
Systolic blood pressure	Hypothyroid (n=29)	122.6± 9.0 (SD)	< 0.215
	Low T3 (n=10)	131.2± 20.8 (SD)	
	CHF Only (n=11)	125.8± 14.0 (SD)	
	Total (n=50)	125.0± 13.3 (SD)	
Diastolic blood pressure	Hypothyroid (n=29)	78.5± 8.0 (SD)	< 0.093
	Low T3 (n=10)	84.6± 12.4 (SD)	
	CHF Only (n=11)	84.1± 8.0 (SD)	
	Total (n=50)	81.0± 9.3 (SD)	

Table: 5 Mean systolic BP & Diastolic BP

PR Interval	Mean PR interval (in seconds)
Hypothyroid (n=29)	0.16± 0.027 (SD)
Low T3(n=10)	0.21± 0.023 (SD)
CHF Only (n=11)	0.15± 0.022 (SD)

(P <0.000)

Table: 6 Mean PR Interval

DISCUSSION:

The mean age of low T3 chronic heart failure patients was higher [60.50±6.15(SD) years], Fatigue and generalized weakness, dyspnoea on exertion, swelling of feet, cold intolerance, hair loss, hoarse voice and decrease libido were common symptoms of low T3 chronic heart failure, Alcoholism was higher in patients with low T3 chronic heart failure (80%). Higher number of diabetes mellitus patients was seen in low T3 chronic heart failure (50%). Higher numbers of hypertensive were seen in low T3 chronic heart failure patients. Cardiomyopathy was most common etiology for chronic heart failure patients (42%) and was common in the age group of 55-60 years (38%) in present study. Idiopathic etiology was common in the age group of 60-65 years (63%). Hypertensive heart disease as etiology was common with age group of 45-50 years (42.8%). IHD etiology was common with age group of 55-60 years (36.3%). Idiopathic etiology was x common etiology with low T3 chronic heart failure patients (60%) and all patients was seen in the age group of 55-65 years. The mean pulse rate was higher in low T3 chronic heart failure group [104±6.9 (SD) beats/min]. The systolic blood pressure was high in low T3 chronic heart failure group [131±20.8 (SD)

mm of Hg] and diastolic blood pressure was also higher in low T3 chronic heart failure groups [84.6±12.4 (SD) mm of Hg]. S3 heart sound was present in more number of patients with low T3 chronic heart failure (60%). The mean blood urea level was higher in low T3 chronic heart rate group [74.2±18.9 (SD) mg/dl]. The mean serum creatinine levels were higher in low T3 chronic heart failure group [2.3±0.5 (SD) mg/dl]. The estimated creatinine clearance was lower in low T3 chronic heart failure group [25.8±8.5 (SD) ml/min]. Mean serum LDL was lower in patients with low T3 chronic heart failure group [104.4±3.7 (SD) mg/dl]. The mean serum HDL was lower in patients with low T3 chronic heart failure [50.3±8.0 (SD) mg/dl]. The mean serum VLDL was higher in patients with low T3 chronic heart failure [29.3±22.8 (SD) mg/dl]. The mean serum total cholesterol was lower in patients with low T3 chronic heart failure [181±8 (SD)mg/dl]. The mean PR interval is more prolonged in low T3 chronic heart failure group [0.21±0.023 (SD) sec]. The systolic dysfunction on 2D Echo was more in hypothyroid chronic heart failure group (31.03%), diastolic dysfunction on 2D Echo was more in low T3 chronic heart failure group (30%) and pericardial effusion was seen in lower number of patients with low T3 chronic heart failure (10%). Global hypokinesia was seen in lesser number of patients with low T3 chronic heart failure (30%). Segmental hypokinesia was seen in more number of patients with low T3 chronic heart failure (3%) [6]. The mean ejection fraction was 36.78±5.08 (SD) % in patients with chronic heart failure in present study. The Mean ejection fraction was lower in low T3 chronic heart failure [34.8±3.293 (SD) %].The high pulmonary artery systolic pressure was seen in more number of patients in low T3 chronic heart failure (70%)

CONCLUSION:

There is significant percentage of chronic heart failure patients having low T3 alone as biochemical parameter. It is important to recognize this condition in patients with chronic heart failure as it is associated with increased severity of heart failure, increased in evidence of renal failure which may need additional support of thyroid hormone administration to have a better outcome in patients with chronic heart failure.

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