VOLUME - 12, ISSUE - 01, JANUARY - 2023 • PRINT ISSN No. 2277 - 8160 • DOI : 10.36106/gjra

Original Research Paper

General Medicine

ASSOCIATION OF SUCLINICAL HYPOTHYROIDISM AND CORONARY ARTERY DISEASE - A PROSPECTIVE CROSS-SECTIONAL STUDY AMONG PATIENTS OPD IN A TERTIARY CARE HOSPITAL IN SOUTHERN INDIA

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KEYWORDS :

INTRODUCTION

Subclinical hypothyroidism is a common health problem when compared with overt hypothyroidism, with an incidence of 3 to 8%[1]. The SCH is a condition associated with mild thyroid dysfunction, with elevated TSH and normal levels of thyroid hormones [free triiodothyronine (FT3) and free thyroxine (FT4)]. The SCH is usually asymptomatic and diagnosed either on normal screening of TSH or on evaluating nonspecific symptoms. Various studies have shown a clinical impact of SCH on metabolism, endothelial dysfunction, and various CVD risk factors[2]. Subclinical hypothyroidism was associated with increased risk of dyslipidaemia, Coronary Artery Disease (CAD), left ventricular diastolic dysfunction and peripheral vascular diseases and chronic inflammation[3]. Chronic inflammation plays a significant role in clinical manifestations and systemic organs injury in hypothyroidism. If the chronic inflammation is untreated, it damages the thyroid gland and may lead to hypothyroidism.

There is substantial evidence that overt hypothyroidism alters several of the traditional risk factors for cardiovascular disease. The studies in this regard support a biologically plausible role for hypothyroidism increasing the risk of atherosclerotic cardiovascular diseases, via increases in circulating levels of highly atherogenic lowdensity lipoprotein (LDL) cholesterol particles, induction of diastolic hypertension, altered coagulability, and direct effects on vascular smooth muscle. Furthermore, some evidence suggests that hypothyroidism may exacerbate the cardiovascular risks associated with cigarette smoking and insulin resistance[4].

The association between subclinical hypothyroidism and coronary artery disease is not clear. The popular Whickham Survey[5], which evaluated vascular events over 20 years in community-dwelling subjects stratified by thyroid function and thyroid autoantibody status, found no association between ischemic heart disease (IHD) and a composite autoimmune thyroid disease group, comprising individuals with subclinical hypothyroidism (SCH), with positive thyroid antibodies or those using levothyroxine.

OBJECTIVES

- To find out the association between subclinical hypothyroidism and Coronary Artery Disease.
- To correlate the level of serum TSH and anthropometric parameters to assess the risk factors for CAD.

MATERIALS AND METHODS

Study Design: Hospital based cross-sectional study.

Study Participants: Patients with diagnosis of subclinical hypothyroidism based on biochemical values of thyroid profile and those with raised TSH level attending outpatient department of Rajah Muthiah Medical College Hospital during the study period were taken up for the study.

Study Period: Two years from December 2020 to June 2022

Sample Size: Overall prevalence of subclinical hypothyroidism is 6-8%. With a confidence interval of 95 %, the sample size was calculated to be 86 which was rounded to 100 subjects.

Sampling Technique

Convenient sampling technique was used for the present study.

Inclusion Criteria

Patient attenders visiting RMMCH OPD, are selected conveniently for Thyroid screening with the following criteria

- Age 25-45 years
- BMI ≥25 to 29.9

Exclusion Criteria

- Known thyroid disorder
- Systemic hypertension
- Diabetes mellitus
- Cerebrovascular accident
- Fever in last 10 days
- Pregnancy

METHODOLOGY

The present study was a part of my dissertation work. After obtaining approval from Institutional Human Ethics Committee, Patients were selected according to the inclusion and exclusion criteria. An informed consent was obtained from all the participants. Complete and relevant history was elicited and a thorough general and systemic examination was done as per proforma. Blood / Serum samples were collected after overnight fast for Thyroid function tests. In patients with subclinical hypothyroidism TSH values were evaluated and those values were correlated with coronary artery disease by taking ECG and ECHO.

Statistical Analysis

The data was collected using a preformed questionnaire and collected data was entered in Microsoft excel and stored. Statistical analysis was done using SPSS software. Descriptive statistics was done to find the mean age, mean TSH values of the participants. A chi-square test was done to find the association between subclinical hypothyroidism and coronary artery disease.

RESULTS

In our study, 52% (52) were male and 48% (48) were female (fig. 1). Mean age of the participants were 33.64 with a standard deviation of 6.058. Figure 2 shows age distribution of the study participants. 9% belonged to category of <25yrs, 31% belonged to age group 26 to 30 years, 13% belonged to age group of 31 to 35 years, 32% belonged to age group of 36 to 40 years and 15% belonged to more than 40 years of age

group (table 1).

Mean TSH value was found to be 7.03 with a standard deviation of 2.873 and among the study participants, 90 were found to be having TSH values less than 10 and 10 were found to be having TSH values more than 10 (table 2).

A chi-square test was done to find out the association between TSH value and CAD with a confidence interval of 95%. A p value of < 0.05 was considered to be statistically significant. It was shown that high TSH was strongly associated with CAD with a p vale of <0.01. It was statistically significant (table 3).

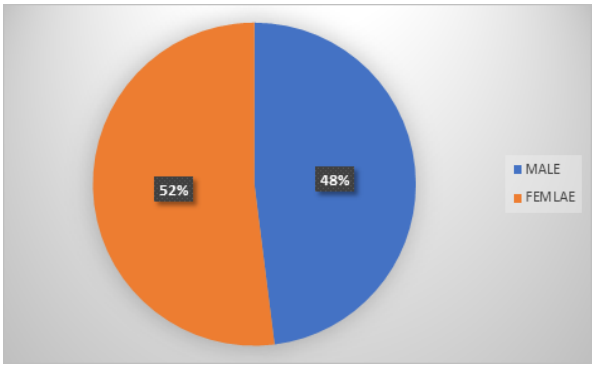

Figure 1: Gender Distribution

Table 1: Age Distribution

AGE	FREQUENCY	PERCENTAGE
< 25	9	9
26 to 30	31	31
31 to 35	13	13
36 to 40	32	32
>40	15	15
TOTAL	100	100

Table 2: TSH value distribution

TSH	FREQUENCY	PERCENTAGE
MORE THAN 10	10	10
LESS THAN 10	90	90

Table 3: Cross-tabulation with socio-demographic variables and ECHO

Variables		CAD		Df	P value
		PRESENT	ABSENT		
AGE	<25	3	6	4	0.090
	26-30	3	28		
	31-35	2	11		
	36-40	2	30		
	>40	0	15		
GENDER	MALE	3	45	1	0.194
	FEMALE	7	45		
TSH	>10	10	0	1	<0.01
	<10	0	90		
	1-3	0	19		
	>3	10	67		

DISCUSSION

A hospital based cross-sectional study was conducted in General Medicine Outpatient department on biochemically evident subclinical hypothyroidism defined by TSH,T3,T4 to to risk-categorize the patients for cardiovascular disorders.

All the participants were subjected to complete relevant history and physical examination, including anthropometry. Fasting samples of blood and serum were collected for the analysis of Thyroid hormones. The parameters were tabulated and analysed using SPSS.

A similar study has been conducted by Alpaslan et al[4] in Turkey, where they have analysed the levels of hs-CRP in patients with subclinical hypothyroidism. In the study, they have included plasma insulin levels, HOMAIR index and serum prolactin levels. Due to limited resources, we could not include these in our study.

There have been suggestions that age and gender may have an impact on IHD risk in people with SCH, but no quantitative analysis has been performed to investigate this[5,6].

In our present study, the mean age of the study participants was 33.64±6.058. majority of the study participants were in the gae group of 36 to 40 years followed by those in age group of 26 to 30 years.

Limitations Of The Study

Our study was conducted in southern part of India and hence cannot be generalised to other parts. Since the data was collected by self-answerable questionnaire, reporting bias could not be ruled out.

CONCLUSION

From our study it is clear that patients with subclinical hypothyroidism are more prone for Atherosclerotic Cardiovascular diseases. Hence, it is prudent to screen for this condition among those with other risk factors for coronary artery disease. Early institution of Thyroxine replacement may prevent or delay the onset of the same.

Acknowledgements

We thank all the participants who agreed to be a part of this study.

Declarations

Funding: no funding was availed

Conflict Of Interest: there is no conflict of interest

Ethical Approval: institutional human ethics committee approval was obtained.

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