

A study of LDL-C among patients with hypothyroidism at tertiary health care centre

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Abstract

Background: Thyroid dysfunction has been implicated as to be have a great impact on lipids as well as a number of other coronary artery diseases. Community based studies have shown that subclinical hypothyroidism (SCH) is an independent risk factor for atherosclerosis (OR = 1.9). **Objectives:** To find out association between hypothyroidism and LDL-C levels at a tertiary care centre. **Material and Methods:** An observational study was done on 25 euthyroid and 75 hypothyroid cases. 75 cases divided into 3 groups equally as per levels of TSH hormone. LDL-C was evaluated after 1 year follow up. Data entered in excel and analyzed using SPSS version 20. ANNOVA test was used. **Results:** Women (68%) formed majority of study population, rest 32% was formed by males. Most common(41%) age group was 20-30 group, 31-40 age group formed 34% of the study population. Findings of T3 and T4 hormone were as per expected for hypothyroid patients in the study groups. while T3 and T4 were 1.2 ± 0.3 and 6.8 ± 1.6 respectively in group I (euthyroid) cases. LDL-C level mean \pm SD in group I was 96.4 ± 5.2 , group II was 120.9 ± 4.9 , group III was 133.4 ± 3.7 , group IV was 195.2 ± 18.3 . LDL C level was significantly ($p < 0.05$) associated with hypothyroidism in present study. **Conclusions:** Middle aged women most common age group. Hypothyroidism and higher LDL-C levels were significantly associated in this study.

Key Word: LDL-C, Hypothyroidism, TSH

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INTRODUCTION

Thyroid function regulates a wide array of metabolic parameters. Thyroid function significantly affects lipoprotein metabolism as well as some cardiovascular disease (CVD) risk factors, thus influencing overall CDV risk.¹⁻³ Hypothyroidism (SH), which refers to the status of mild elevation of thyroid-stimulating hormone (TSH) in patients with normal serum thyroxine levels, is the most common thyroid disorder.⁴⁻⁶ Prevalence of hypothyroidism in India is around 11%.⁷ Hypothyroidism has also been associated with nonalcoholic fatty liver

disease, cancer mortality, arthritis, and kidney dysfunction but the causality in these situations is controversial.⁸ Levels of total cholesterol and LDL cholesterol tend to increase as thyroid function declines.⁹ Thus hypothyroidism forms a significant cause of secondary dyslipidemia.¹⁰ In hypothyroid cases, despite the reduced activity of HMG CoA reductase, there is often an surge in the serum total cholesterol concentration, mainly because of raised levels of serum LDL cholesterol and intermediate density lipoprotein (IDL) cholesterol. Reduced thyroid secretion greatly enhance the plasma concentration of cholesterol because of lower rate of cholesterol secretion in the bile and consequent diminished loss in the feces due to decreased number of LDL receptors on hepatic cells.^{11,12} To prevent CHD in SH patients, it is important to investigate the association between SH and lipid profile. The oxidation of LDL converts it into an atherogenic form that contributes to the development of the atherosclerotic lesion.¹³ So to evaluate the role of hypothyroidism on levels of LDL-C we have conducted this study. Also there was less data available on this topic so we did this study at our hospital.

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MATERIAL AND METHODS

This prospective observational study was conducted in the department of India. 75 cases clinically diagnosed as hypothyroidism in the age range of 20-65 years along with 25 cases of age and sex matched euthyroids were included in this study. They were followed for a year. Cases with TSH level above 6 μ IU/ml were considered as having hypothyroidism. Critically ill patients, patients on anti-thyroids were excluded from the study. 5 ml of venous blood was withdrawn from patients fastesting from cases and euthyroid subjects after overnight fasting under all aseptic conditions. Then the serum was separated after 30 minutes of blood collection by centrifuging at 3000 rpm for 10 minutes. This serum sample was used for various biochemical assays. We have divided study population into following groups based on TSH level.

Group I – Euthyroids.

Group II – TSH levels of 6 – 20 μ IU/ml.

Group III – TSH levels of 21 – 50 μ IU/ml.

Group IV – TSH level > 51 μ IU/ml.

The data was entered in Microsoft excel and Mean \pm SD was calculated. ANOVA was used to analyze the significance in more than 2 group. Means. 'p' value of > 0.05 was considered as statistically significant. The analysis was performed through statistical package SPSS version 20.

RESULTS

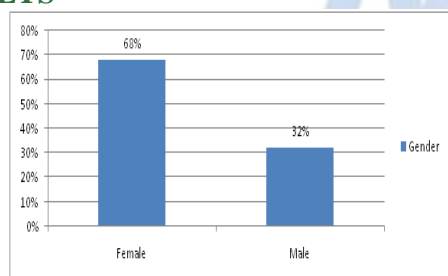


Figure 1: Distribution as per gender

Women (68%) formed majority of study population, rest 32% was formed by males.

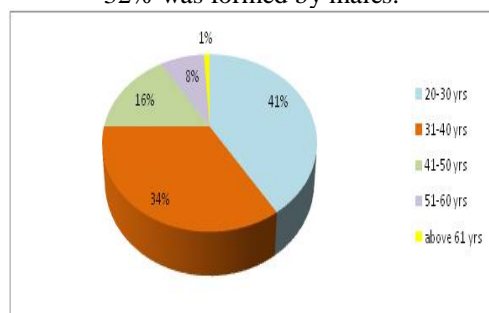


Diagram 1: Distribution as per age groups

Findings of T3 and T4 hormone were as per expected for hypothyroid patients in the study groups. While T3 and T4 were 1.2 ± 0.3 and 6.8 ± 1.6 respectively in group I (euthyroid) cases.

Table 2: Relation between LDL –C and study groups

Variable (mg/dl)	Study groups	Mean \pm SD	p value
LDL-C	Group I	96.4 \pm 5.2	< 0.05
	Group II	120.9 \pm 4.9	
	Group III	133.4 \pm 3.7	
	Group IV	195.2 \pm 18.3	

LDL –C level mean \pm SD in group I was 96.4 \pm 5.2, group II was 120.9 \pm 4.9, group III was 133.4 \pm 3.7, group IV was 195.2 \pm 18.3. LDL C level was significantly associated with hypothyroidism in present study.

DISCUSSION

This was observational follow up study carried out at Total of 75 patients divided in to groups as per TSH levels. 25 euthyroid subjects acted as a control in this study. They were followed for a year. Out of total 100 subjects 68 (68%) cases were females and rest 32 (32%) cases were males. While in Guntaka M *et al*¹⁴ study out of total 30 cases 27 (90%) cases were females and 3 (10%) cases were females. This slightly higher female proportion was may be due to smaller sample size in their study. Most of the participants belonged to <30 years of age (41%), followed by 31-40 years (34%). Only (1%) participants were over 61 years of age. Figure 1 shows the age distribution of the study participants. This was in accordance with Tumbanatham A *et al*¹⁵ study. The T3 level in group I (euthyroid) subjects was 1.2 ± 0.3 SD., in group II was 0.5 ± 0.4 SD, group III was 0.4 ± 0.3 and group IV was 0.2 ± 0.1 . This was in accordance with Guntaka M *et al*¹⁴ study. Similarly T4 levels in respective groups were 6.8 ± 1.6 , 3.2 ± 0.6 , 3.8 ± 0.5 and 2.9 ± 1 . this as similar to result seen in studies done by Guntaka M *et al*¹⁴ and Archana P *et al*.¹⁶ In this study the LDL – C concentration in euthyroid subjects was 96.4 \pm 5.2. While in group II, III and IV the LDL –C levels were 120.9 \pm 4.9, 133.4 \pm 3.7 and 195.2 \pm 18.3 respectively. This association of LDL – C and hypothyroidism was found to be significant (<0.05), which means as the level of hypothyroidism increases the LDL-C levels also increases significantly. Sunanda V *et al*¹⁷ study the level of LDL-C was 99.4 \pm 7.1 in euthyroid subjects, this was in accordance with our study. Almost similar LDL –C levels and statistical significance as with our study were seen in hypothyroid groups in Sunanda V *et al*¹⁷ study, which is in support of this study. Zha K *et al*¹³ study also had similar significance in LDL-C levels and hypothyroidism. The results in this study shows that the effect of degrees of hypothyroidism on lipid metabolism is more

pronounced in cases with more serum TSH levels. Hypothyroidism is often associated with diastolic hypertension, in association with dyslipidemia this may promote atherosclerosis and may cause coronary artery disease.¹⁸

CONCLUSION

We can conclude that hypothyroidism was found to be most common in middle aged women. We have found statistical significance between levels of hypothyroidism with higher LDL-C levels. So we should be diligent while dealing with middle aged women with hypothyroidism and altered LDL-C levels which may increase the risk for atherosclerosis leading to coronary artery disease ultimately death.

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