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# STUDY OF LIPID PROFILE IN HYPOTHYROIDISM PATIENTS

**KEY WORDS:** hypothyroidism, cholesterol, TG, VLDL, LDL, HDL and FBS.

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**ABSTRACT**

Hypothyroidism includes a broad range of spectrum from asymptomatic stage to multi-system failure. The prevalence of hypothyroidism in India is about 11%. Hypothyroidism may have an adverse effect on the serum lipid profile. This study aims to assess the association of hypothyroidism with lipid abnormalities that might be helpful for clinical management of hypothyroid patients with dyslipidaemia. In this study thyroid function tests (T3, T4 &TSH), lipid profile (Total cholesterol,Triglycerides,LDL,HDL and VLDL) and fasting blood sugar were measured in 100 subjects, of age groups 30-60 years and of both sexes. Of these 50 were healthy individuals as controls, 50 were hypothyroid patients with decreased T3, T4 values. Results showed that the total cholesterol, triglycerides, VLDL and LDL are elevated and HDL is decreased in patients when compared to controls. In conclusion, dyslipidaemias are associated with Hypothyroidism, so biochemical screening for thyroid dysfunction is of paramount importance in all dyslipidemic patients.

## INTRODUCTION

Hypothyroidism is a disorder of the endocrine system in which the thyroid gland does not produce enough thyroid hormone.[1] Hypothyroidism includes a broad range of spectrum from asymptomatic stage to multi-system failure. It can cause a number of symptoms, such as cold intolerance, tiredness, constipation, depression, and weight gain.[2] Occasionally there may be swelling of the front part of the neck due to goitre.[2]

According to a projection from various studies on thyroid disease, it has been estimated that about 42 billion people in India suffer from thyroid disease. Hypothyroidism is believed to be a common health issue in India, as it is worldwide. It is more common in women compared to men. In India hypothyroidism is usually due to dietary deficiency of iodine. In countries where there is no iodine deficiency, the main cause is autoimmune diseases. Thyroid function tests include estimation of T3, T4, TSH, free T3 and free T4. In primary hypothyroidism T3,T4 are decreased and TSH is increased. In secondary hypothyroidism, which is due to pituitary causes, T3, T4 and TSH all are decreased. In subclinical hypothyroidism T3,T4 levels are normal and TSH is slightly elevated. 2-4% people with subclinical hypothyroidism develop overt hypothyroidism every year.

Thyroid dysfunction has a great impact on lipid metabolism which may predispose to atherosclerotic disease. Hypothyroidism is relatively common and is associated with an unfavourable effect on lipids. In general, total cholesterol and LDL levels are elevated in hypothyroid patients. The objective of present study is to estimate the lipid profile in hypothyroid patients and compare them with controls.

## Materials and methods:

**Study center and period:** This research was conducted at Rangaraya Medical College during the period from September 2018 to January 2019.

**Subjects selection:** Patient selection was done by selecting the individuals among the age group 30-60 years of both sexes, presenting to the O.P. department, Government General Hospital, Kakinada. An informed consent was taken from the patients and controls before collecting the sample. Fasting sample is taken from all the subjects. The cases and controls were selected based on the following inclusion and exclusion criteria.

**Inclusion criteria:**

1. 50 diagnosed cases of hypothyroidism based on clinical findings, history and decreased T3, T4 levels .
2. Controls were healthy individuals, age and sex matched without any major illness.

**Exclusion criteria:**

Patients with chronic renal failure, diabetes mellitus, liver diseases, chronic diseases, pregnancy, women on oral contraceptives and age less than 20 and more than 60 years were excluded.

**Study pattern:**

**Group1:** controls- 50 age and sex matched healthy individuals.
**Group2:** cases- 50 hypothyroidism patients.

Assay of markers: T3, T4 and TSH are estimated by chemi luminescent immune assay method on Beckman Coulter Access 2 analyzer.. In the Lipid profile, total cholesterol is estimated by CHOD-PAP method. Triglycerides are estimated by enzymatic method. HDL-C is estimated by precipitation method. VLDL and LDL are calculated by Friedewald formula. Lipid profile estimation is done on Beckman Coulter AU480 analyser. FBS is estimated by hexokinase method on Beckman Coulter AU480 analyser.

**Statistical analysis:** all results were expressed as Mean± S.D. The data obtained were analysed using student t- test for p value, where p<0.001 was considered as highly significant.

**Results and observation:** the results obtained for various parameters are tabulated as follows-

**Table1: levels of biochemical parameters in controls and cases**

| Parameter | Group 1(n==50) | Group 2(n=50) |
|---|---|---|
| T3(0.6-2 ng/ml ) | 1.2353+0.3874 | 0.4070+0.1184 |
| T4(4-12 µg/dl) | 8.5660+1.9678 | 2.4773+1.2796 |
| TSH(0.4-5 µIU/ml) | 2.1410+1.0142 | 12.2257+11.3027 |
| Total cholesterol (<200mg/dl) | 182.10+22.74 | 260.03+53.45 |
| Triglycerides (<150 mg/dl) | 116.83+40.95 | 304.67+70.85 |
| HDL-C (40-60 mg/dl) | 40.83+8.43 | 22.60+11.02 |
| LDL-C (100-140 mg/dl) | 123.30+11.15 | 181.33+38.25 |
| VLDL-C (5-30 mg/dl) | 21.53+7.76 | 50.60+14.16 |
| FBS ( <126 mg/dl ) | 98±12.36 | 105±13.68 |

The value of cholesterol, triglycerides, VLDL and LDL are elevated in hypothyroid patients when compared to healthy people. And the value of HDL is decreased in group 2 patients when compared to group 1 people. The FBS values are in range of impaired glucose tolerance in hypothyroid patients.

**Table No:2:- comparision of two groups with P Value**

| Parameter | P value (group1 & 2) |
|---|---|
| T3 | <0.001 |
| T4 | <0.001 |
| TSH | <0.001 |
| Totalcholesterol | <0.001 |
| Triglycerides | <0.001 |
| HDL-C | <0.001 |
| VLDL-C | <0.001 |
| LDL-C | <0.001 |
| FBS | 0.003 |

## DISCUSSION:

A very important inference can be drawn on the basis of results in our present study. Although decreased thyroid function is accompanied by decreased activity of HMG-CoA reductase, TC and LDL-C levels are increased in hypothyroidism patients.[2-6]. This is due to the decreased LDL-receptors' activity, resulting in decreased catabolism of LDL and IDL [7,8]. And a decrease in lipoprotein lipase activity is found in hypothyroidism, decreasing the clearance of TG-rich lipoproteins [9]. Therefore, hypothyroid patients may also present with elevated TG levels associated with increased levels of VLDL. The results of this study are in consistent with the findings of C.V.Rijos, M.S. Elisaf and E.N. Liberopoulos. Findings of JankiPinakin Desai1, Uday N Vachhani2 are also in accordance with this study. In hypothyroid patients HDL-C is decreased when compared to control group. This may be due to increased transfer of cholesteryl esters from HDL to VLDL and increased catabolism of HDL2. This might precede atherosclerosis development in these patients. These changes are also associated with insulin resistance and impaired glucose tolerance might be developed in hypothyroid patients.

## Conclusion:

The results of the present study provide valuable information and association between lipid profile and hypothyroidism. The findings showed that there was unfavourable effect on lipid profile in hypothyroidism. Hence we suggest that patients presenting with dyslipidemia are recommended for investigation to explore hypothyroidism. And hypothyroid patients may have dyslipidemia and impaired glucose tolerance so investigation for lipid profile and FBS is also useful along with thyroid function tests during the treatment.

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