

Study of Lipid Profile in Patients of Hypothyroidism

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Abstract: Association between hypothyroidism and lipid profile has been focussed in this study. This is an observational study. Lipid profile in 200 patients of hypothyroidism has been studied in this study. Chemiluminescence (CLIA) Method was used to estimate levels of T3, T4, TSH quantitatively serum was estimated on the fully automated biochemistry analyser using the analyser specific Roche kit for total serum cholesterol, HDL cholesterol, and triglycerides. Friedwalds formula was used to calculate LDL cholesterol. Out of 200 patients 135 were of subclinical hypothyroidism and 65 belong to overt hypothyroidism. Females had higher prevalence consisting of 85% of cases.

Keywords: Cholesterol, Dyslipidemia, Hypothyroidism, Lipid, Lipoprotein

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I. Introduction

Commonly encountered endocrine abnormalities are hypothyroidism and hyperthyroidism. They might occur as subclinical or overt clinical form. Prevalence of hypothyroidism is 4.6% as per NHANES 3 study¹. Basal energy expenditure is directly or indirectly regulated by thyroid hormones through their effect on protein, carbohydrate and lipid metabolism.² Thyroid hormones have multiple effects on the regulation of lipid digestion, absorption, synthesis and catabolism. Thyroid hormones regulate the expression of enzymes involved in all steps of lipid metabolism leading to the development of qualitative and quantitative changes of lipids in thyroid dysfunction.³ Most patients with dyslipidemia are due to primary cause or genetic cause and some are due to secondary causes.⁴ As per the recommendations of American thyroid association adults must be screened for thyroid dysfunction by measurement of serum TSH, beginning at the age of 35 and every 5 years thereafter.⁵ Subclinical hypothyroidism is characterised by biochemical evidence of thyroid hormone deficiency in patients who may or may not have clinical features of hypothyroidism⁶. It comprises of high serum TSH concentration and normal serum total or free T4 and T3 concentrations associated with a few or no symptoms and signs of hypothyroidism. It is a state of mild thyroid failure.^{7,8} It is more common than overt clinical hypothyroidism.⁹ Classical symptoms and signs of hypothyroidism are fatigue, weight gain, cold intolerance, constipation, dry skin, hoarseness of voice, mental abnormalities, decrease in appetite and arthralgia. Preferentially due to altered lipid profile patients with thyroid dysfunction have increased risk of cardiovascular diseases.¹⁰

II. Materials And Methods

1. 200 patients of hypothyroidism attending OPD and Indoor were included in the study.
2. Fasting venous samples were drawn. Taken samples were allowed to clot for 5 min and then were centrifuged to separate the serum. T3, T4, and TSH were quantitatively estimated by chemiluminescence method.
3. Normal reference range of T3, T4, TSH are 77-135 ng/dl, 5.4-11.7 microgram/dl and 0.34-4.25 uIU/ml respectively.
4. Fully automated biochemistry analyzer using the the analyser specific Roche kit was used for lipid profile estimation. Friedwalds formula was used for LDL cholesterol estimation. Total cholesterol >200 mg/dl, Triglycerides > 150 mg/dl, HDL cholesterol < 35 mg/dl and LDL cholesterol was > 130 mg/dl were considered abnormal.

III. Inclusion Criteria

Patients of hypothyroidism attending MEDICINE OPD and admitted in Indo

IV. Exclusion Criteria

1. Pregnancy
2. patients with diabetes mellitus or hypertension

- 3.patients on statins, amiodarone and other drugs affecting thyroid function
- 4. Patients with familial hyperlipidemias

V. Result And Discussion

Out of 200 patients 135 were of subclinical hypothyroidism and 65 were of overt hypothyroidism. Prevalence rate among females was higher i.e 85%.

TABLE 1: SEX WISE DISTRIBUTION OF PATIENTS

MALES	30(15%)
FEMALES	170(85%)
TOTAL	200

TABLE 2: AGE WISE DISTRIBUTION OF PATIENTS

AGE GROUPS (IN YEARS)	SUBCLINICAL HYPOTHYROIDISM	OVERT HYPOTHYROIDISM
20-35	30	18
35-50	52	24
50-65	48	19
>65 YEARS	5	4
TOTAL	135	65

In subclinical hypothyroid patients, mean level of serum cholesterol, HDL cholesterol ,LDL cholesterol, and triglycerides were found to be 265.32+12.38, 40.82+6.76, 151.52+16.33,182.38+13.69 , respectively. In overt hypothyroid patients mean level of serum cholesterol, HDL cholesterol, LDL cholesterol, and triglycerides were 280+18.43,35.55+6.78,176.38+18.58,211.28+16.54, respectively.

TABLE NO-3: MEAN VALUES OF LIPID PROFILE

	SUBCLINICAL	OVERT
TOTAL CHOLESTEROL	265.32+12.38	280+18.43
HDL	40.82+6.76	35.55+6.78
LDL	151.52+16.33	176.38+18.58
TRIGLYCERIDES	182.38+13.69	211.28+16.54

TABLE NO:4: MEAN VALUES OF T3, T4, TSH

T3	1.30+0.36
T4	6.6+2.31
TSH	13.94+8.34

Mean values of T3,T4,TSH were 1.30+0.36,6.6+2.31,13.94+8.34, respectively.

Present study shows consistent results with the Keyes WG, Heimberg M and Laker ME which indicate elevated triglyceride level in hypothyroid patients.^{11,12}

Archana et al. In her study concluded that hypothyroidism results in a small increase in serum LDL, total serum cholesterol and decrease in serum HDL that increases the risk for development of atherosclerosis and coronary artery disease.¹³ This study suggests reduction of HDL cholesterol in hypothyroidism, which is consistent with study carried out by Abrams and Grundy.¹⁴

Hypothyroidism is associated with many biochemical abnormalities. In hypothyroid patients, there is reduced activity of HMG CoA reductase. Still, there is an increase in the serum total cholesterol concentration, mainly due to raised levels of serum LDL cholesterol and intermediate density lipoprotein (IDL) cholesterol¹⁵. Decreased thyroid secretion and decreased activity of lipoprotein lipase, decreased rate of cholesterol secretion in the bile and consequent diminished loss in the faeces due to decreased number of LDL receptors on liver cells lead to hypercholesterolemia¹⁶. Hypothyroidism affects the cardiovascular, pulmonary, renal, neuromuscular, nervous and the reproductive systems. Most of the cardiovascular signs and symptoms are associated with a lipid profile abnormality¹⁷.

VI. Conclusion

From this study, it can be concluded that most patients with hypothyroidism are females and hypothyroid patients show dyslipidemic profile. Thus, patients with dyslipidemia should be investigated for hypothyroidism.

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