



A Study of Lipid Profile in Sub Clinical Hypothyroidism

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Abstract

Hypothyroidism is a common metabolism disorder. In India, 42 million people are suffering from thyroid diseases. Hypothyroidism being a commonest metabolism disorder¹ (Unnikishnan AG and Menon UV, 2011). Wide arrays of functions are performed by the thyroid hormones such as regulation of lipid, carbohydrate, protein, electrolyte and mineral metabolism. The significant effect of thyroid hormones on synthesis, and metabolism of lipids leads to an alteration in the composition and transport of lipoprotein in thyroid disorders. The present study is undertaken to understand the association between the lipid profile and subclinical hypothyroidism's. The study was conducted for a period of six months in the Medicine Department, Government General Hospital, Vijayawada. A total number of 100 subjects (50 cases and 50 controls) were selected for the present study. Inclusion Criteria: Cases- 50, newly diagnosed cases of hypothyroidism in the age group of 15 -75 years attending the department of medicine were included in the study. Controls- 50, age and sex matched healthy euthyroid subjects were selected. Serum lipid profile was analyzed by using analytical kits from ERBA diagnostics in semi-auto analyzer. Serum thyroid profile was estimated using ERBA thyrokit. ⁶LDL was calculated from Friede walds' formula.

Results: *There was no significant difference in the mean of free T3 levels of both the case and control groups. Mean T4 was lower in control in comparison with the case. Mean TSH in case was significantly higher than the controls. The mean total cholesterol levels were significantly higher in patients with hypothyroidism than in the controls. The mean HDL was lower in patients with hypothyroidism than in the controls. There was significant difference between the LDL mean values of case and control subjects. There was significant increase in VLDL levels of controls in comparison to case subjects. There was a significant difference in the TG levels between the case and controls.*

Keywords: *Hypothyroidism, LDL, HDL, TG, Cholesterol.*

Introduction

In general population, Hypothyroidism is a common metabolism disorder. In India, 42 million people are suffering from thyroid diseases.

Hypothyroidism being a commonest metabolism disorder¹ (Unnikishnan AG and Menon UV, 2011). Wide arrays of functions are performed by the thyroid hormones such as regulation of lipid,

carbohydrate, protein and electrolyte and mineral metabolism.

The significant effect of thyroid hormones on synthesis, and metabolism of lipids leads to an alteration in the composition and transport of lipoprotein in thyroid disorders. Hypothyroidism is a state of high serum thyroid stimulating hormone (TSH) levels with normal serum total/free Thyroxine (T4) and Triiodo thyroxine (T3) levels, associated with few or no clinical signs and symptoms of hypothyroidism.^{2, 3} It is most common phenomenon and is⁴ found in 6.8% of women and 3% of men. There is increase in the prevalence of thyroidal disease with age. Thyroid hormones play an important role in maintenance of initial level of Phospholipids in cell membranes as well as fatty acids composition of the lipids⁵.

Recently, hypothyroidism has been claimed to be a risk factor for coronary artery disease, peripheral vascular disease and various biochemical abnormalities including dyslipidemia and negative influence on haemostatic profile. To prevent cardio vascular disease in hypothyroidism cases, it is important to investigate the association between hypothyroidism and lipid profile.

Aims and Objectives

The present study is undertaken to understand the association between the lipid profile and subclinical hypothyroidism.

Materials and Methods

The study was conducted for a period of six months in the Medicine Department, Government General Hospital, Vijayawada.

Selection of subjects: A total number of 100 subjects (50 cases and 50 controls) were selected for the present study.

Inclusion Criteria

Cases- 50, newly diagnosed cases of hypothyroidism in the age group of 15 -75 years attending the department of medicine were included in the study.

Controls- 50, age and sex matched healthy euthyroid subjects were selected.

Exclusion Criteria: Patients with hypothyroidism, thyroidectomy, cases consumption of drugs known to cause dyslipidemia, diabetes mellitus, hepatic, renal, and cardiovascular diseases were excluded from the study.

Ethical committee approval was taken. A written consent was taken from all subjects, before collection of sample details of the test was explained to the subjects and after consent only sample was collected.

Blood Sample Collection: Under all aseptic precautions, 8 ml of venous blood was drawn in a sterile plain bottle from selected subjects after overnight fasting for 12 hours, blood samples were centrifuged within 30 minutes at 3000 rpm for 5 minutes and serum was separated. Serum samples were stored at -20°C until assayed. Serum lipid profile was analyzed by using analytical kits from ERBA diagnostics in semi-auto analyzer. Serum thyroid profile was estimated using ERBA thyrokit.⁶ LDL was calculated from Friede walds' formula.

Statistical Analysis: The results were tabulated using statistical software namely⁷ SPSS 21.0v, the results of both cases and controls were compared by student 't' test. All parameters were compared with TSH levels.⁸ Pearson's correlation and 't' test of coefficient were calculated.

Results

Based on the clinical data collected for hypothyroidism in the selected population age and sex distribution was derived.

It was observed from figure 01 the maximum number of cases (31.4%) belonged to the age group 40-45 years; maximum number of controls (34%) belonged to age group 25-30 years.

The table 01 shows that the average mean of the cases was 36.86 and control was 34.68. The average age difference between the cases and controls was not large.

Figures 2 & 3 are graphic representation of serum total cholesterol and triglycerides levels

respectively in hypothyroid cases in comparison with the controls.

It can be observed from the figure 02 that the average TC levels of the Cases (206.36) were slightly higher than the controls (160.56).

It can be observed from the figure 03 that the average TG levels of the Cases (184.46) were slightly higher than the controls (107.00).

Table 02 shows that there was no significant difference in the mean of free T3 levels of both the case and control groups (.98138 pg/ml & .97232 pg/ml, p value is 0.8881). Mean T4 was lower in control in comparison with the case (8.53186 mg/dl Vs 7.95426 mg/dl, p value = 0.3424). Mean TSH in case was significantly higher than the controls (10.59066 mIU/ml Vs

2.29156 mIU/ml, P value = 0.0005). The mean total cholesterol levels were significantly higher in patients with hypothyroidism than in the controls (206.36 mg/dl Vs 160.56 mg/dl, p value =< 0.0001). The mean HDL was lower in patients with hypothyroidism than in the controls (36.46 mg/dl Vs 42.42 mg/dl, p value =< 0.0001). There was significant difference between the LDL mean values of case and control subjects (128.64 mg/dl Vs 43.78 mg/dl, p value =< 0.0001). There was significant increase in VLDL levels of controls in comparison to case subjects (41.227 mg/dl Vs 35.66 mg/dl, p value =0.0001). There was a significant difference in the TG levels between the case and controls (184.46 mg/dl Vs 107.00 mg/dl, p value =0.0001).

Table 01: Age distribution of Subjects

Age in years	Case		Control	
	Frequency	Percentage	Frequency	Percentage
15-20	3	6	1	2
20-25	6	11.8	1	2
25-30	8	15.7	17	34
30-35	6	11.8	14	28
35-40	7	13.8	8	16
40-45	16	31.4	4	8
45-50	3	5.9	5	10
50-75	1	2	0	0
Total	50	100	50	100
Mean \pm SD	36.86	10.669	34.68	6.784

Table 02: Comparison of variables in Case and Control subjects

Lab Variables	Case		Control		P value
	Mean	SD	Mean	SD	
T3 Values	.98138	.297303	.97232	.343315	0.8881
T4 Values	8.53186	3.538766	7.95426	2.40885	0.3424
TSH values	10.59066	16.197617	2.29156	.828262	0.0005
TC values	206.36	38.674	160.56	25.223	< 0.0001
TG Values	184.46	38.372	107.00	22.364	< 0.0001
HDL Values	36.46	3.845	42.42	4.794	< 0.0001
LDL Values	128.64	36.775	43.78	36.670	< 0.0001
VLDL Values	35.66	10.028	71.32	41.227	< 0.0001

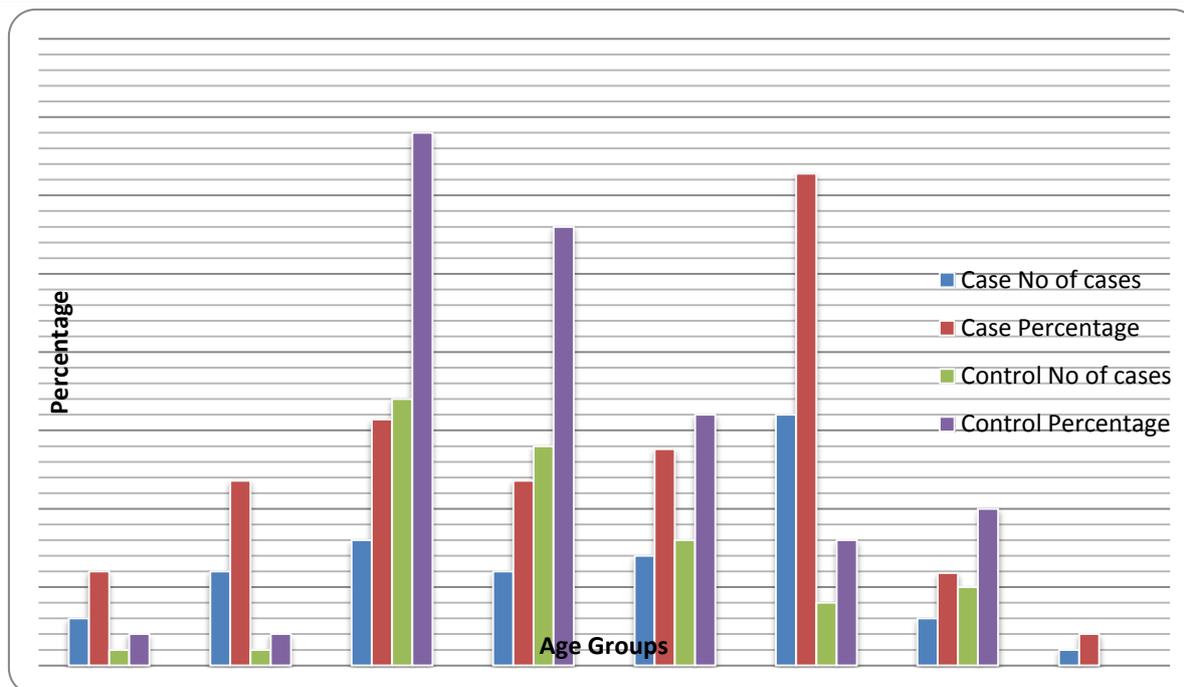


Fig 01: Graphic representation of distribution of Age groups

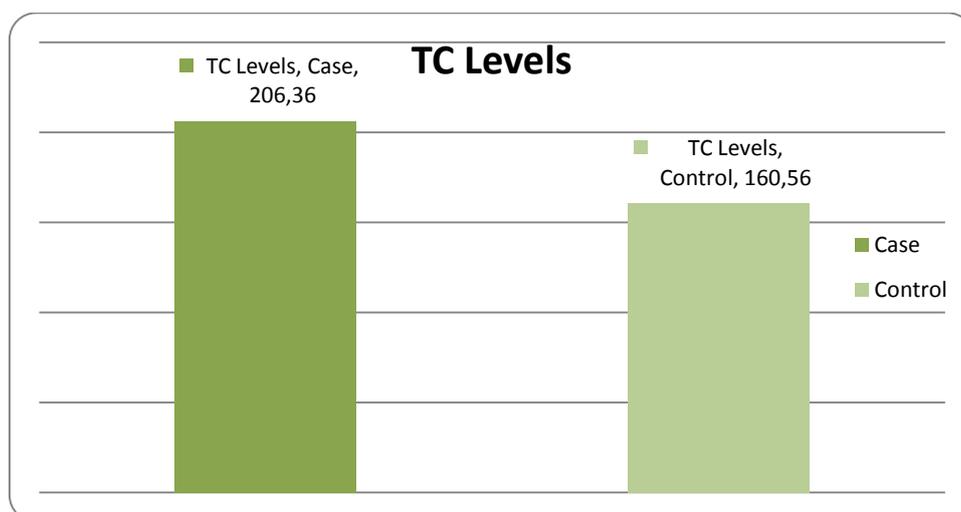


Fig 02: Graph showing the comparison between serum Total cholesterol (TC) levels in cases and controls

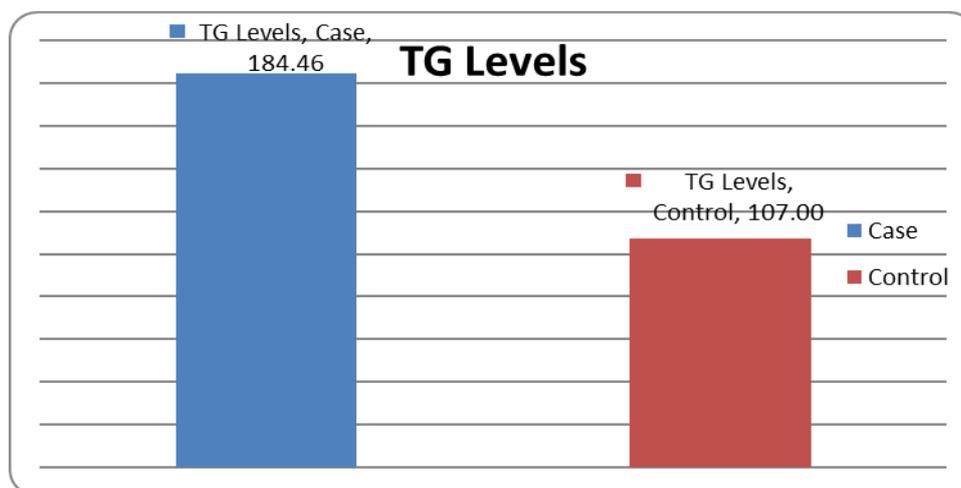


Fig 03: Graph showing the comparison between serum Triglycerides (TG) levels in cases and controls.

Discussion

Hypothyroidism is a condition where the body suffers from insufficient thyroid hormone. Since metabolisms are controlled by thyroid hormones, the thyroid patient generally suffers from a slow metabolism rate resulting in dyslipidemias and electrolyte disturbances. Hypothyroidism is a common condition seen mostly among women; hence the study subject chosen were only women. The study also shows that majority of the women patients belong to the age group 40-45 years. Early studies suggest that hypothyroidism was six times more in women than in men. The high prevalence might indicate that estrogen might be involved in pathophysiology of thyroid dysfunction. T3 and T4 hormones are influenced by estradiol. For binding on the receptor's estradiol competes with T3 and T4 hormones⁹ (Vasudevan N et al, 2002).

The thyroid hormones have a prominent role to play in metabolism of lipids. Any deficiency leads to hyperlipidemia, which is a known factor for development of atherosclerotic disease. The present study discusses the role of thyroid hormones on the levels of lipids and cholesterol levels. The study results reveal that total cholesterol and LDL levels were elevated in hypothyroid cases. A prospective study, conducted by Shiroetal¹⁰ Showed that LDL was increased in patients with subclinical hypothyroidism but after treatment with levothyroxine it is observed that in subclinical hypothyroidism patients there was a decrease in serum LDL level -

Conclusion

It can be concluded from the present study that the thyroid patients have high atherogenic parameters, has the developing risk of cardiovascular disorders. Even small reductions in the levels of Cholesterol, LDL, and triglyceride levels results in reduction in cardio vascular morbidity, Hence, monitoring could be done to serum levels of electrolytes and lipid profiles during the follow up.

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