



ASSESSMENT OF LIPID PROFILE IN NEWLY DIAGNOSED HYPOTHYROID PATIENTS- A CROSS- SECTIONAL STUDY

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ABSTRACT

Background : Primary hypothyroidism is a common disorder affecting a large group of population and is a cause of the secondary hyperlipidemia. Hypothyroidism is an important metabolic disorder and is associated with many biochemical abnormalities. Many studies were done regarding the biochemical status of hypothyroid patients including lipid profile. But controversies still prevail. So, a cross sectional study was done in our population to assess the relation between the lipid profile and thyroid profile in newly diagnosed hypothyroid. **Aims and Objectives:** The aim of this study was to assess the relation between the lipid profile and thyroid profile in newly diagnosed hypothyroid patients. **Materials and Methods:** It was a hospital based, cross-sectional, observational study. The study was conducted in a tertiary care centre in eastern India and lasted for 18 months. There were 100 subjects in the study with an age range from 20 to 76 years. Of which 50 were newly diagnosed hypothyroid patients and 50 were non hypothyroid subjects taken as Control and were confirmed by thyroid profile studies. **Results:** Majority of patients in both groups Were in the age range of 31-50 years, in Hypothyroid 54% and in Non-Hypothyroid also 54%. In our study, the age range of 31-50 years in the Hypothyroid patients, there were 21(53.8%) Female patients out of total 39 females. The mean total Cholesterol of the hypothyroid patients is 250.8+42.77 and in Non-Hypothyroid subjects it is 157.8#12.58. P value is <0.0001. The Mean value of HDL Cholesterol in Hypothyroid patients and Non-Hypothyroid subjects are 44.87#9.372 and 45.12#8.278respectively. **Conclusion:** The alteration of lipid profile is positively correlated with the Severity of hypothyroidism. Therefore, thyroid dysfunction can have an important effect on lipid profile. Biochemical screening for thyroid dysfunction should be done in all dyslipidemic patients.

KEYWORDS : Hypothyroidism, Dyslipidemia, Lipid Profile, Total Cholesterol, Triglycerides

INTRODUCTION

Diseases of thyroid gland are amongst the most abundant endocrine disorder in the world second only to diabetes mellitus.^[1] Hypothyroidism is a clinical syndrome which is caused due to the deficiency thyroid hormone, resulting in generalized slowing down of the metabolic process. Thyroid function significantly affects lipoprotein metabolism as well as some cardiovascular disease (CVD) risk factors, thus influencing overall CDV risk.^[2,3,4] Indeed, even within the normal range of thyroid- stimulating hormone (TSH) values, a linear increase in total cholesterol (TC), low- density lipoprotein cholesterol (LDL-C) and triglycerides (TGs) and a linear decrease in high-density lipoprotein cholesterol (HDL-C) levels has been observed with increasing TSH. Substitution therapy is beneficial for patients with overt hypothyroidism, improving lipid profile. Overt hypothyroidism is characterized by hypercholesterolemia and a marked increase in LDL cholesterol because of a decreased fractional clearance of LDL by a reduced number of LDL receptors in the Liver.

Materials And Methods

It was a hospital based, cross-sectional, observational study. The study was conducted in a tertiary care centre in eastern India and lasted for 18 months. There were 100 subjects in the study with an age range from 20 to 76 years. Of which 50 were newly diagnosed hypothyroid patients and 50 were non hypothyroid subjects taken as Control and were confirmed by thyroid profile studies. Data was redacted and anonymised data was stored in a password protected computer.

All patients were studied on the basis of following variables-

1. Fasting Lipid profile: Total cholesterol ,Triglyceride, LDL, VLDL, HDL
2. Thyroid profile: TSH, FT3 (free T3), FT4 (free T4).

Patients with newly diagnosed clinical &subclinical hypothyroidism were included in the study and patients with Diabetes Mellitus, Chronic Renal Failure, Chronic Liver Disease, History of familial dyslipidemia, Known case of hypothyroidism, Patients on antilipidemic agents, Medication that can cause dyslipidemia and Alcoholism were excluded from the study.

and in absolute numbers and percentages for the discrete variables. ANOVA was applied to analysed the significans in more than two groups. P value of <0.05 was considered as statistically significant.

Ethical consideration

The research protocol was approved by the Institutional Ethics Committee, Medical College, Kolkata and all participants gave written informed consent.

Results And Analysis

There were 50 patients in the case group, all were newly diagnosed Hypothyroid and 50 subjects in the control group who were all Non-Hypothyroid. in our study, the age range of patients was from 20-76 year old. Out of 50 patients in the case group 11 (22%) were Male, and 39 (78%) were Female. Whereas, in the control group 10 (20%) were Male, and 40 (80%) were Female. Majority of patients in both groups Were in the age range of 31-50 years, in Hypothyroid 54% and in Non-Hypothyroid also 54%. In our study, the age range of 31-50 years in the Hypothyroid patients, there were 21(53.8%) Female patients out of total 39 females. (Table 1)

Table 1. Age and sex distribution of patients:

Age and sex distribution of patients (n=100)						
Age	Hypothyroid (n=50)			Non- Hypothyroid (n=50)		
	Male	Female	Total	Male	Female	Total
20-30 YRS	0	13	13 (26%)	1	13	14 (28%)
31-40 YRS	4	11	15 (30%)	3	11	14 (28%)
41-5 YRS	2	10	12 (24%)	2	11	13 (26%)
51-60 YRS	2	1	3 (6%)	2	1	3 (6%)
61-70 YRS	3	2	5 (10%)	2	2	4 (8%)
70-76 YRS	0	2	2 (4%)	0	2	2 (4%)
Total	11 (22%)	39 (78%)	50	10 (20%)	40 (80%)	50

Table 2 : Distribution of newly diagnosed hypothyroid patients according to Lipid Profile

TSH	CH	HDL	TG	LDL	VLDL	
6	Mean	157.83	45.12	121.22	86.590	24.310
	N	50	50	50	50	50

Data are expressed as meant SD for continuously distributed variables,

	Std. Deviation	12.576	8.278	38.789	15.2712	7.7786
6-20	Mean	217.07	43.33	168.43	140.987	33.675
	N	26	26	26	26	26
	Std. Deviation	16.205	8.003	53.868	14.1639	10.7654
20-40	Mean	269.92	44.05	203.37	186.375	40.663
	N	13	13	13	13	13
	Std. Deviation	24.881	7.099	50.022	33.1992	9.9985
>40	Mean	307.95	49.48	242.65	201.780	48.545
	N	11	11	11	11	11
	Std. Deviation	23.169	13.389	63.519	33.8985	12.6905
Total	Mean	204.32	45.00	157.53	126.376	31.537
	N	100	100	100	100	100
	Std. Deviation	56.273	8.798	62.978	48.7417	12.5800

Table 2 reveals that The mean total Cholesterol of the hypothyroid patients is 250.8 ± 42.77 and in Non-Hypothyroid subjects it is 157.8 ± 12.58 . Pvalue is <0.0001 . Thus the difference in total Cholesterol values in the hypothyroid patients and NonHypothyroid subjects is statistically significant.

The Mean value of HDL Cholesterol in Hypothyroid patients and Non-Hypothyroid subjects are 44.87 ± 9.372 and 45.12 ± 8.278 respectively. Here the P value is 0.388 which is statistically not significant.

The Mean Triglyceride values in Hypothyroid patients and vroid subjects are 193.8 ± 61.79 and 121.2 ± 38.79 respectively. Thus the P Non-Hypothyroid subjects 0.0014. So the difference of Triglyceride values in Hypothyroid and Non Hypothyroid subjects was statistically significant.

The Mean LDL Cholesterol values in Hypothyroid and Non-Hypothyroid Groups 166.2 ± 436.56 and 86.59 ± 15.27 respectively. So P value is <0.0001 which is statistically significant.

The Mean VLDL Cholesterol values in Hypothyroid and Non-Hypothyroid are 38.7632 ± 12.3555 and 24.31 ± 7.7786 respectively. So P value is 0.0015 which is statistically significant.

On the basis of the TSH range the hypothyroid patients have been divided into 4 groups.

In the 1st group TSH is <6 IU/ML and it is non-hypothyroid group.
2nd group where TSH is 6-20 m IU/ml
3rd group where TSH is 20-40 m IU/ml
4th group where TSH is >40 m IU/ml

Among the 21 group, TSH have been recorded from 6-10 m IU/ml and considered as subclinical hypothyroidism.

In the 1st group (TSH <6 m IU/ml) there are 50 non-hypothyroid Control whose Total cholesterol, HDL, TG, LDL, VLDL have mean & SD, 157.83 ± 12.576 , 45.12 ± 8.278 , 121.22 ± 38.789 , 86.590 ± 15.2712 , 24.310 ± 7.7786 respectively.

In 2nd group (TSH 6-20 m IU/ml) : There are 26 patients in this group. The mean and SD of CH, HDL, TG, LDL, VLDL are 217.07 ± 16.205 , 43.33 ± 8.003 , 168.43 ± 53.868 , 140.987 ± 14.1639 , 33.675 ± 10.7654 respectively.

In the 3rd group (TSH 20-40 m IU/ml) : There are 13 patients and the mean & SD of CH, HDL, TG, LDL, VLDL are 269.92 ± 24.881 , 44.05 ± 7.099 , 203.37 ± 50.022 , 186.375 ± 33.1992 , 40.663 ± 9.9985 Respectively.

In the 4th group (TSH >40 m IU/ml) : There are 11 patients in this group. The mean and SD of CH, HDL, TG, LDL, VLDL are 307.95 ± 23.169 , 49.48 ± 13.389 , 242.65 ± 63.519 , 201.780 ± 33.8985 , 48.545 ± 12.6905 respectively.

Among the 2nd group there are 12 patients who have TSH 6-10 m IU/ml and considered as subclinical hypothyroidism, and the mean & SD Of CH, HDL, TG, LDL, VLDL are 212.18 ± 13.337 , 43.17 ± 9.495 , 151.18 ± 67.279 , 138.050 ± 8.9680 , 30.217 ± 13.4393 .

DISCUSSION

There were in total 100 subjects at the start of the study of which 50 thyroid and 50 were non-hypothyroid as the control Subjects.

Although decreased thyroid function is accompanied by reduced activity of HMGCoA reductase, TC and LDL-C levels are increased in patients with hypothyroidism.^[5,6,7,8,9] This is due to the decreased LDL-receptors' activity, resulting in decreased catabolism of LDL and IDL.^[10,11,12]

In our study, 50 patients with newly diagnosed hypothyroidism had Total cholesterol values with mean and SD of 250.8 ± 42.77 , and the 50 subjects in Non- Hypothyroid group had 157.8 ± 12.58 . The difference here was statistically significant ($P < 0.0001$).

A decrease in LPL activity is found in hypothyroidism, decreasing the clearance of TG-rich lipoproteins.^[13] Therefore, hypothyroid patients may also present with elevated TG levels associated with increased LDL. In our study 50 patients of newly diagnosed hypothyroid patients had Triglyceride values with mean and SD of 193.8 ± 61.79 and 50 subjects in Non - Hypothyroid group had 121.2 ± 38.79 . Here P value is 0.0014 which is statistically significant.

The HDL cholesterol level in hypothyroidism may remain normal decreased and even increase, as found by Kutty MK, Brynt Kutty MK. Brynt DG and Fatid NR.^[14] In our study, 50 its with newly diagnosed hypothyroidism had HDL values with mean and SD of 44.87 ± 9.372 , and the 50 subjects in Non-Hypothyroid group had 45.12 ± 8.278 .

The P value is 0.3880 which is statistically not significant. So there is no significant difference observed between the two groups.

In Hypothyroidism, both the synthesis and both the synthesis and the degradation of lipid are depressed, latter more, so the net effect being of lipid accumulation especially of LDL. In this de 50 patients of newly diagnosed hypothyroidism had LDL values with mean and SD of 166.2 ± 36.56 and in 50 subjects of non-hypothyroid control group it was 86.59 ± 15.27 . The P value is <0.0001 and is statistically significant A decreased in LPL activity is found in hypothyroidism decreasing the clearance TG - rich lipoproteins, therefore hypothyroid may also present with increased levels along with increased levels of VLDL. In our study 50 patients of hypothyroidism had VLDL values with mean and SD of 38.7632 ± 12.3555 and 30 subjects of control group it was 24.31 ± 7.7786 . Here P value is 0.0015 and it is statistically significant.

CONCLUSION

In our study, it is found that serum total cholesterol, triglyceride, & VLDL were significantly increased in newly diagnosed hypothyroid patients paired with euthyroid controls. There is no significant difference of serum HDL observed between the two groups.

The alteration of lipid profile is positively correlated with the Severity of hypothyroidism. Therefore, thyroid dysfunction can have an important effect on lipid profile. Biochemical screening for thyroid dysfunction should be done in all dyslipidemic patients.

Limitations of study

As it is a cross-sectional single center study therefore it does not accurately represent the course of the disease, whereas a larger sample size would have increased the power of the study. Response to therapy could not be evaluated.

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