ORIGINAL RESEARCH

Assessment of lipid profile in patients with sub clinical hypothyroidism

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ABSTRACT

Background: Globally, there is a rise in endocrine disorders. Thyroid diseases rank among the most common endocrine conditions worldwide, second only to diabetes mellitus.The present study was conducted to assess lipid profile in patients with sub clinical hypothyroidism. **Materials & Methods:** 55 patients with sub clinical hypothyroidism of both genders were kept in group I and healthy controls in group II. All were subjected to assessment of thyroid profile such as T3, T4, TSH, TC, TGL, LDL, and HDL. **Results:** Out of 55 patients, males were 30 and females were 25. In group I and group II, the mean T3 was 4.8 and 5.9, T4 was 12.4 and 15.7, TSH was 9.3 and 2.6, TC was 238.5 and 157.3, TGL was 165.2 and 95.8, LDL was 188.4 and 97.2 and HDL was 34.1 and 41.5 respectively. The difference was significant (P< 0.05). **Conclusion:** There was high level of lipid profile in patients with subclinical hypothyroidism. Therefore, the estimation of lipid profile should be made as a routine investigation in all cases of subclinical hypothyroidism.

Keywords: hypothyroidism, lipid, HDL

INTRODUCTION

Globally, there is a rise in endocrine disorders. Thyroid diseases rank among the most common endocrine conditions worldwide, second only to diabetes mellitus.[1] A common endocrine condition called hypothyroidism lowers life expectancy and is linked to changed lipid levels, which raises the risk of cardiovascular disease.[2] There are two types of hypothyroidism: primary, caused by a thyroid gland defect, and secondary, caused by a pituitary gland problem. The condition known as overt hypothyroidism is linked to dyslipidemia, which in turn causes atherosclerosis and cardiovascular diseases.[3] It is commonly known that overt hypothyroidism and dyslipidemia are related. Laboratory findings are used to diagnose subclinical hypothyroid disease. Subclinical hypothyroidism is defined as having a high serum concentration of thyroid stimulating hormone (TSH) and normal serum concentrations of total or free thyroxine (T4) and triiodothyronine (T3), along with few or no symptoms or signs of hypothyroidism.[4]

According to certain studies, subclinical hypothyroidism has been linked to dyslipidemia, which raises the risk of atheroscelerosis and coronary artery disease. Serum levels of these substances are elevated for total cholesterol, triglycerides, and low-density lipoprotein (LDL) and decreased for high-density lipoprotein (HDL).[5] Subclinical hypothyroidism is identified by laboratory findings, while other studies did not find any correlation between subclinical hypothyroidism and dyslipidemia with little or no symptoms and indicators of hypothyroidism.[6]The present study was conducted to assess lipid profile in patients with sub clinical hypothyroidism.

MATERIALS & METHODS

The present study was conducted at Patna Medical College and Hospital, Bihar from June 2022 to December 2022 on 55 patients with sub clinical hypothyroidism of both genders.All were informed regarding the study and their written consent was obtained.

Data such as name, age, gender etc. was recorded. Patients were kept in group I and healthy controls in group II. All were subjected to assessment of thyroid profile such as T3, T4, TSH, TC, TGL, LDL, and HDL. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Total- 55		
Gender	**Male**	**Female**
Number	30	25

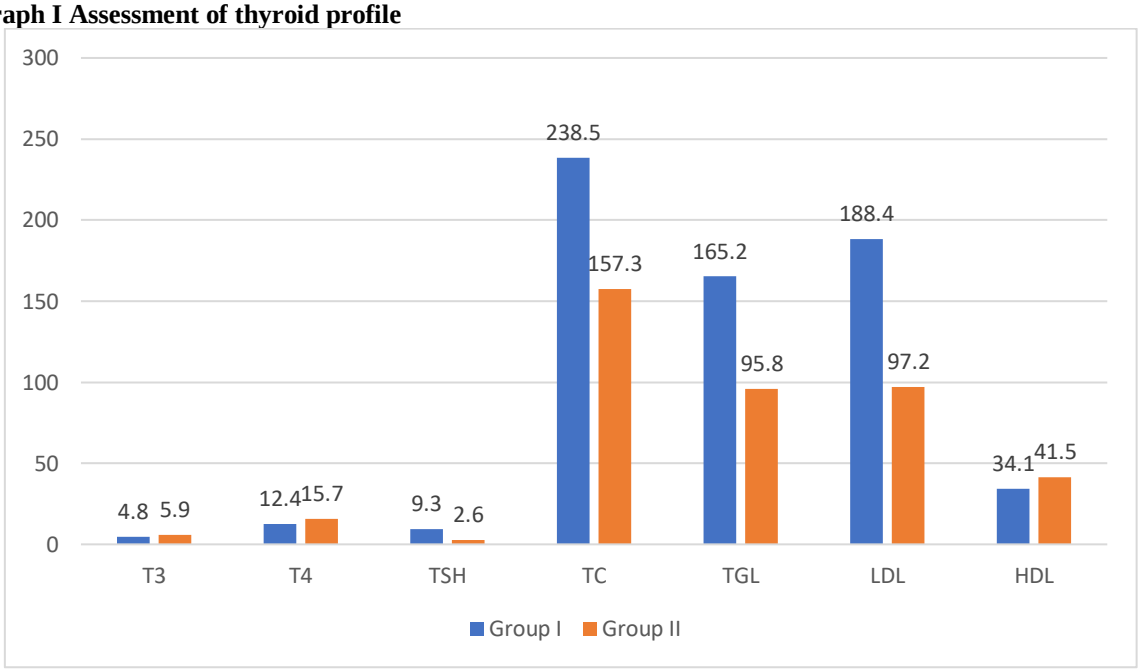
Table I shows that out of 55 patients, males were 30 and females were 25.

Table II Assessment of thyroid profile

Thyroid profile	Group I	Group II	P value
T3	4.8	5.9	0.01
T4	12.4	15.7	0.05
TSH	9.3	2.6	0.01
TC	238.5	157.3	0.01
TGL	165.2	95.8	0.02
LDL	188.4	97.2	0.01
HDL	34.1	41.5	0.05

Table II shows that in group I and group II, the mean T3 was 4.8 and 5.9, T4 was 12.4 and 15.7, TSH was 9.3 and 2.6, TC was 238.5 and 157.3, TGL was 165.2 and 95.8, LDL was 188.4 and 97.2 and HDL was 34.1 and 41.5 respectively. The difference was significant (P< 0.05).

Graph I Assessment of thyroid profile



DISCUSSION

Hypothyroidism, a condition characterized by insufficient thyroid hormone production, can significantly impact lipid metabolism, leading to various changes in lipid profiles.Hypothyroidism often leads to elevated total cholesterol levels.[7] Thyroid hormones regulate the synthesis and metabolism of cholesterol, and their deficiency slows down these processes, leading to cholesterol buildup.[8]LDL cholesterol, often referred to as "bad" cholesterol, typically rises in individuals with hypothyroidism. This increase is partly due to reduced LDL receptor activity, leading to decreased clearance of LDL from the bloodstream.[9]Some individuals with hypothyroidism may also experience elevated triglyceride levels. Thyroid hormones play a role in the breakdown of fats, and their deficiency can lead to increased triglyceride levels.[10]The present study was conducted to assess lipid profile in patients with sub clinical hypothyroidism.

We found that out of 55 patients, males were 30 and females were 25. Singh et al[11] assessed serum lipid profile such as total cholesterol, low-density lipoprotein cholesterol, high-density lipoprotein cholesterol, very low -density lipoprotein cholesterol and triglyceride from 100 patients in the age range of 15-65 years of both sex having subclinical hypothyroidism with euthyroid controls to observe that whether subclinical hypothyroidism is associated with abnormal lipid levels or not in a population-based sample from Northern Indians study. A significant increase in triglycerides and very low-density lipoprotein cholesterol levels were observed in patients of subclinical hypothyroidism with respect to

euthyroid controls while a nominal increase in serum cholesterol, low-density lipoprotein and high-density lipoprotein levels were recorded. However, there was no statistical difference found in any of the lipid fraction levels with change in the severity of subclinical hypothyroidism.

We found that in group I and group II, the mean T3 was 4.8 and 5.9, T4 was 12.4 and 15.7, TSH was 9.3 and 2.6, TC was 238.5 and 157.3, TGL was 165.2 and 95.8, LDL was 188.4 and 97.2 and HDL was 34.1 and 41.5 respectively. Ananthi et al[12]among the 110 human subjects, 55 were euthyroid controls and 55 were subclinical hypothyroid cases. Serum total cholesterol, serum triglycerides, serum low-density lipoproteins, levels were increased in subclinical hypothyroid cases than Euthyroid controls with a high statistical significance with the P-value <0.001.

Guntaka et al[13] studied thirty patients with subclinical hypothyroidism. Between the two groups (group I - controls vs. group II - cases), the values were as follows: Mean serum total T3 value was 115.03 ± 28.22 ng/dl vs. 107.13 ± 35.26 ng/dl (P = 0.3474); mean total T4 was 7.0787 ± 1.6952 µg/dl vs. 6.8633 ± 1.3106 µg/dl (P = 0.532); mean TSH was 3.1730 ± 1.2772 µIU/ml vs. 9.7607 ± 4.1853 µIU/ml (P < 0.0001). Lipid profile pattern (group I vs. group II) was as follows: Mean total cholesterol (TC) 127.50 ± 7.18 mg/dl vs. 163.07 ± 41.32 mg/dl (P < 0.0001), mean triglycerides (TG) is 135.67 ± 13.84 mg/dl vs. 147.90 ± 66.27 mg/ dl (P = 0.3231), low-density lipoprotein (LDL)-cholesterol is 61.17 ± 7.60 mg/dl vs. 99.83 ± 32.24 mg/dl (P < 0.0001), high-density lipoprotein (HDL)-cholesterol 39.13 ± 6.66 mg/dl vs. 35.27 ± 8.63 mg/dl (P = 0.0701), very low-density lipoprotein (VLDL) levels are 33.533 ± 14.375 mg/dl vs. 31.077 ± 14.202 mg/dl (P = 0.5235).

The shortcoming of the study is small sample size.

CONCLUSION

Authors found that there was high level of lipid profile in patients with subclinical hypothyroidism. Therefore, the estimation of lipid profile should be made as a routine investigation in all cases of subclinical hypothyroidism.

REFERENCES

1. Bates CM and Warren GSC (1989). Estimation of low-density lipoprotein cholesterol. South Medical Journal 582 570.
2. Bakker SJL, TerMaaten JC, Popp-Snijders C, Slaets JPJ, Heine RJ and Gans ROB (2001). The relationship between Thyrotropin and Low- Density Lipoprotein Cholesterol is modified by insulin sensitivity in healthy euthyroid subjects. Journal of Clinical. Endocrinology & Metabolism. 86 1206–1211.
3. Bhaskaran S, Kumar H, Nair V, Unnikrishnan RV and Jayakumar C (2004). Subclinical hypothyroidism. Indications for thyroxine therapy. Thyroid Research & Practice 1 10 – 14.
4. Burstein, M., Scholnick, HR and Morfin R (1970). Estimation of HDL-C. Journal of Lipid Research 19 583-593.
5. Cooper DS, Halpern R, Wood LC, Levin AA and Ridgway EC (1984). L-thyroxine therapy in subclinical hypothyroidism: a double-blind, placebo-controlled trial. Annals of Internal Medicine 101 18–24.
6. Cooper DS (1987). Subclinical hypothyroidism. Journal of American Medical Association 258 246-7.
7. Danese MD, Landenson PW, Meinert CL and Powe NR (2000). Effect of thyroxine therapy on serum lipoproteins in patients with mild thyroid failure: A quantitative review of the literature. Journal of Clinical Endocrinology Metabolism 85 2993–3001.
8. Helfand, M. 2004. Screening for Subclinical Thyroid Dysfunction in Nonpregnant Adults: A Summary of the Evidence for the U.S. Preventive Services Task Force. Annals of Internal Medicine, 140(2):128–128.
9. Hueston, W. J. 2004. Subclinical Hypothyroidism and the Risk of Hypercholesterolemia. The Annals of Family Medicine, 2(4):351–355.
10. Kaviprasanna, S., Saikumar, P., Alaguveni, T. 2015. Effect of Thyroxin Therapy on Lipid Profile in Dyslipidemia in Subclinical Hypothyroidism. Research journal of pharmaceutical biological and chemical sciences, 6(2):158–161.
11. Singh K., Singh S. Alterations in Lipid Fraction Levels in Subclinical Hypothyroidism in North Indian Population. Indian Journal of Fundamental and Applied Life Sciences Online) An Online International Journal 2011; 2231–6345.
12. Ashwin Raj H, Ananthi N, Sabarinathan M. A study on lipid profile in sub clinical hypothyroidism of patients attending a tertiary care hospital. Int. J. Res. Pharm. Sci., 2020; 11(SPL) (2):6-12.
13. Guntaka M, Hanmayyagari B, Rosaline M, Nagesh V. Lipid profile in subclinical hypothyroidism: A biochemical study from tertiary care hospital. CHRISMED Journal of Health and Research. 2014 Oct 1;1(4):266-70.