

TO STUDY THE PATTERN OF DYSLIPIDEMIA IN HYPOTHYROID PATIENTS

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Abstract

Background: Thyroid hormones play an important role in regulating lipid metabolism and thyroid dysfunctions can result in lipid abnormalities which increase the risk of endothelial dysfunction, hypertension and cardiovascular disease.

Methods: A cross-sectional study was conducted on 100 patients selected as a sample of convenience in this cross sectional study from out-patient department of Medicine. Meticulous history taking and thorough clinical examinations were done. Report of lipid profile and thyroid function tests were recorded from patients file. All the information's were recorded in a pre-designated structured questionnaire. Collected data were classified, edited, coded and entered into the computer for statistical analysis by using Epi-info software.

Results: The serum TC, TG and LDL levels in hypothyroid individuals were significantly higher than euthyroid subjects.

Conclusion: We conclude that hypothyroid subjects had dyslipidemia. The present study indicated that hypothyroidism was associated with an abnormal lipid profile, especially with respect to the levels of TC, LDL and TG.

Keywords: Total cholesterol, Triglycerides and LDL

Introduction

Thyroid hormones have profound metabolic effects, the most striking action being an increase in energy expenditure^{1,2}. Thyroid hormones play an important role in regulating lipid metabolism; and thyroid dysfunctions can result in lipid abnormalities which increase the risk of endothelial dysfunction, hypertension and cardiovascular disease³. It is well known that alterations in thyroid functions result in changes in the composition and transport of lipoproteins⁴⁻⁶.

Hypothyroidism is associated with many biochemical abnormalities. An association between thyroid dysfunction and dyslipidemia was first reported in 1930.⁷ Levels of total cholesterol (TC) and low density lipoprotein (LDL) cholesterol tends to increase as thyroid function declines. Decreased thyroid secretion greatly increase the plasma concentration of cholesterol because of 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. Decreased activity of LDL receptors resulting in decreased receptor mediated catabolism of LDL and LDL is the main cause of the hypercholesterolemia observed in hypothyroidism. Thus hypothyroidism constitutes a significant cause of secondary dyslipidemia.⁸

Materials and Methods

A cross-sectional study was conducted on 100 patients selected as a sample of convenience in this cross sectional study from out-patient department of Medicine. Meticulous history taking and thorough clinical examinations were done. Report of lipid profile and thyroid function tests were recorded from patients file. All the information's were recorded in a pre-designated structured questionnaire. Collected data were classified, edited, coded and entered into the computer for statistical analysis by using Epi-info software.

INCLUSION CRITERIA:

CASE- individuals having hypothyroidism with an age group between 25-35 years.

CONTROL- Individuals with normal thyroid profile in the age group of 25-35 years.

EXCLUSION CRITERIA:

Persons with any acute or chronic illness like diabetes, hypertension, familial hyperlipidemia.

After 12 hours overnight fasting, 5 ml blood was collected by standard venipuncture method, and the serum was separated. T3, T4 and TSH were quantitatively estimated by Enzyme linked immunosorbent assay (ELISA) method.

Lipid profile measured following methods

➤ Serum total cholesterol: was measured by Enzymatic method
Normal serum cholesterol: 150-250 mg/dl

- Serum HDL cholesterol: was measured by "Phosphotungstate method. Normal HDL – Cholesterol: 30 – 70 mg/dl.
- Serum LDL cholesterol: If the value of Triglycerides is known, LDL-cholesterol can be calculated based on Friedewald's equation.
- Serum Triglycerides: was measured by enzymatic colorimetric method Normal Serum Triglycerides: Male: 60-165 mg/dl Female: 40-140 mg/dl.

Results

Table 1: Socio-demographic profile

| Variable | Cases | Control | p-value |
|-----------|------------|------------|---------|
| Age | 31.10±6.21 | 29.42±7.13 | >0.05 |
| Sex (M:F) | 42:58 | 44:56 | >0.05 |
| BMI | 28.12±2.13 | 21.26±2.13 | <0.05 |

The demographic characteristics of study population and the results were shown as follows. Mean and SD values of analytes were calculated, they were used for calculation of p value by using student t- test. p value<0.05 consider as significant. BMI significantly higher in case as compare to control.

Table 2: Thyroid profile

| Thyroid profile | Cases | Control | p-value |
|-----------------|-------------|-------------|---------|
| T3 | 2.26±1.82 | 1.86±0.77 | >0.05 |
| T4 | 72.36±26.12 | 110.2±21.06 | <0.01 |
| TSH | 21.32±6.12 | 3.21±2.13 | <0.01 |

TSH level & T4 level was significantly higher in cases as compare to control.

Table 3: Thyroid profile

| Lipid profile | Cases | Control | p-value |
|-------------------|--------------|--------------|---------|
| Total cholesterol | 224.12±21.30 | 166.31±19.21 | <0.05 |
| HDL | 33.21±1.98 | 39.26.2±2.06 | <0.01 |
| Triglyceride | 166.23±11.98 | 161.23±16.23 | >0.05 |
| LDL | 155.23±18.92 | 98.12±13.20 | <0.01 |

Total cholesterol, LDL and triglyceride level was significantly higher in cases as compare to control.

Discussion

Thyroid dysfunction, along with a higher prevalence of goiter, is a major public health problem in India population. The serum TC and LDL levels in hypothyroid individuals were significantly higher than euthyroid subjects.

Jung⁹ found mean plasma total cholesterol and LDL cholesterol levels elevated in hypothyroid cases than in normal controls.

In another study, average serum total cholesterol level was found elevated in primary and secondary hypothyroidism¹⁰.

Keyes & Heimberg¹¹, Laker & Mayes¹² found triglyceride level elevated in hypothyroid patients. Thompson²³ and Abrams & Grundy¹⁴ have stated decreased activity of LDL receptors as the main cause of hypercholesterolemia in hypothyroidism.

Conclusion

We conclude that hypothyroid subjects had dyslipidemia. The present study indicated that hypothyroidism was associated with an abnormal lipid profile, especially with respect to the levels of TC, LDL and TG. As our sample size was small and duration of study was limited, another study with large sample size and longer duration is also recommended.

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