|| ISSN(online): 2589-8698 || ISSN(print): 2589-868X ||
International Journal of Medical and Biomedical Studies
Available Online at www.ijmbs.info
NLM (National Library of Medicine ID: 101738825)
Index Copernicus Value 2020: 79.44
Original Research Article Volume 6, Issue 03; March: 2022; Page No. 29-31

Dyslipidemia In Thyroid Disorders

Dr. Prem Kumar Arora[1], Dr Jayant Nath[2]

[1]Principal Specialist Medicine, Government Hospital Medicine, Sri Ganganagar

[2]Principal Specialist Medicine, Government Hospital Medicine, Sri Ganganagar

Article Info: Received 17 January 2022; Accepted 11 March 2022
doi: https://doi.org/10.32553/ijmbs.v6i3.2458
Corresponding author: Dr Jayant Nath
Conflict of interest: No conflict of interest.

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 50 patients with suspicion of thyroid disorders were taken as cases. 50 patients with normal thyroid profile and no history of other chronic diseases were taken as control group.

Results: The serum TC, TG and LDL levels in hypothyroid individuals (both overt and subclinical) were significantly higher than euthyroid subjects but the levels were comparable between hyperthyroid and euthyroid group.

Conclusion: We conclude that, dyslipidemias are associated with thyroid disorders, so biochemical screening for thyroid dysfunction in all dyslipidemic patients. Therefore, patients presenting with dyslipidemia are recommended for investigation to explore thyroid dysfunction.

Keywords: Total cholesterol, Triglycerides and LDL.

Introduction

Hypothyroidism is characterised by reduced thyroid activity resulting from less secretion of both T3 and T4.It is a clinical manifestation irrespective of the cause. It is the most common pathologic hormone deficiency among other endocrine disorders. Hypothyroidism may be due to primary disease of the thyroid gland itself or lack of pituitary TSH. Biochemical decrease in T4 and T3 concentrations causes hypersecretion of pituitary TSH, thus an amplified increase in serum TSH levels. This is a key laboratory finding, particularly in the early detection of thyroid failure. [1-2]

Thyroid hormones significantly effect on synthesis, mobilization and metabolism of lipids. In general, overt and subclinical hypothyroidism is associated with hypercholesterolemia which is mainly due to elevation of low density lipoprotein (LDL) cholesterol levels, whereas high density lipoprotein (HDL) cholesterol concentration is usually normal or even elevated.[3] In hypothyroid patients, despite the reduced activity of HMG CoA reductase, there is often an increase in the serum total cholesterol concentration, mainly due to raised levels of serum LDL cholesterol and intermediate density lipoprotein (IDL) cholesterol. [4]

Decreased thyroid secretion greatly increases 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 low density lipoprotein receptors on liver cells. Decreased activity of LDL receptors resulting in decreased receptor-mediated catabolism of LDL and IDL is the main cause of the hypercholesterolemia observed in hypothyroidism. Hypertriglyceridemia in hypothyroidism is due to decreased activity of lipoprotein lipase (LPL), which results in decreased clearance of triglyceride-rich lipoproteins.[5]

Materials and Methods

A cross-sectional study was conducted on 50 patients with suspicion of thyroid disorders were taken as cases. 50 patients with normal thyroid profile and no history of other chronic diseases were taken as control group. Detailed informations of the patients were collected after taking informed consent with the help of pre-test proforma that included age, sex and family or personal history of chronic diseases.

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.

Results

Table 1: Comparison of biochemical parameters in case and controls

Parameters	Subclinical hypothyroidism	Overt hypothyroidism	Subclinical hperthyoidism	Overt hypothyroidism	Control
TC	260.32±62.35	289.36±68.2	179.23±59.3	140.32±10.02	130.23±12.01
LDL	95.36±15.23	120.0±33.12	90.23±21.36	81.23±7.70	80.31±10.01
HDL	45.11±12.03	31.29±6.32	36.23±5.23	36.23±5.02	53.26±11.36
TG	210.01±45.32	231.20±36.2	115.23±23.21	60.02±4.02	78.32±110.32

The serum TC, TG and LDL levels in hypothyroid individuals (both overt and subclinical) were significantly higher than euthyroid subjects but the levels were comparable between hyperthyroid and euthyroid group.

Discussion

Thyroid dysfunction, along with a higher prevalence of goiter, is a major public health problem in India population. In this study, the prevalence of hypothyroidism was higher than hyperthyroidism similar finding observed by findings by Baral et al.[6] and Holowell et al.[7]

The serum TC and LDL levels in hypothyroid individuals (both overt and subclinical) were significantly higher than euthyroid subjects but the levels were comparable between hyperthyroid and euthyroid group in our study.

Jung[8] 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 hypothyroidism[9].

Keyes & Heimberg[10], Laker & Mayes[11] found triglyceride level elevated in hypothyroid patients. Thompson[12] and Abrams & Grundy[13] have stated decreased activity of LDL receptors as the main cause of hypercholesterolemia in hypothyroidism.

Conclusion

We conclude that, dyslipidemias are associated with thyroid disorders, so biochemical screening for thyroid dysfunction in all dyslipidemic patients. Therefore, patients presenting with dyslipidemia are recommended for investigation

to explore thyroid dysfunction. As our sample size was small and duration of study was limited, another study with large sample size and longer duration is also recommended.

References

1. Liberopoulos EN, Elisaf MS. Dyslipidemia in patients with thyroid disorders. Hormones 2002, 1(4):218-23.
2. Stone NJ. Secondary causes of hyperlipidemia. Med Clin North Am 1994; 78:117-41.
3. Guyton AC, Hall JE. The thyroid metabolic hormones. In: Textbook of medical physiology. 10th edn. New York: W B Saunders Company, 2000:858-68.
4. Thompson GR, Soutar AK, Spengel F A, Jadhav A,Gavigan S, Myant NB. Defects of the receptor mediated low density lipoprotein metabolism In homozygous familiar hypecholesterolemia and hypothyroidism in vivo. Proct Natl Acad Sci USA 1981; 78:2591-5.
5. Nikkilia EA, Kekki M. Plasma triglyceride metabolism in thyroid disease. J Clin Invest 1972; 51:2103-14.
6. Baral N, Lamsal M, Koner BC, Koirala S. Thyroid dysfunction in eastern Nepal. South Asian J Trop Med Public Health 2002; 33: 638-41.
7. Hollowell JG, Staehing NW, Flanders WD et al. Serum TSH, T4, and thyroid antibodies in the United States Population (1988 to 1994): National Health and Nutrition Examination Survey (NHANES III). J Clin Endocrinol Metabol 2002; 87: 489-99.
8. Jung CH, Sung KC, Shin HS, Rhee EJ, Lee WY, Kim BS, Kang JH, Kim H, Kim SW, Lee MH, Park JR, Kim SW. Thyroid dysfunction and their relation to cardiovascular risk factors such as lipid profile, hsCRP and waist hip ratio in Korea. Korean J Intern Med 2003;18:146-153.
9. Skanse B. On the difference in serum cholesterol between hypothyroidism of pituitary and of thyroid origin. In: Pitt-Rivers R, Green R, Tata JR, McCartney W, Taylor S, Pochin EE, Trotter WR (eds). The fourth international goitre conference. London: Pergaman Press, 1961:108-118.
10. Keyes WG, Heimberg M. Influence of thyroid status on lipid metabolism in the perfused rat liver. J Clin Invest 1979;64:182-190.
11. Laker ME, Mayes PA. Effect of hyperthyroidism and hypothyroidism and carbohydrate metabolism of the perfused rat. Biochem J 1981;96:247-255.
12. Thompson GR, Soutar AK, Spengel F A, Jadhav A, Gavigan S, Myant NB. Defects of the receptormediated low density lipoprotein metabolism in homozygous familiar hypecholesterolemia and hypothyroidism in vivo. Proct Natl Acad Sci USA 1981;78:2591-2595
13. Abrams JJ, Grundy SM. Cholesterol metabolism in hypothyroidsm and hyperthyroidism in man. J Lipid Res 1981;82:323-338.