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Original Research Article

Correlation between association of hypothyroidism and cardiovascular risk indices

Rajendra Datt Mathur[1], Rameshwar Prasad Gupta[1]*, Deepak Gupta[1], Reenika Mathur[2], Ajay Kumar Bhargav[3]

[1]Department of Medicine, Jhalawar Medical College Jhalawar, Rajasthan, India
[2]Department of Medicine, SRG Hospital and Medical College, Jhalawar Rajasthan, India
[3]Department of Biochemistry, Jhalawar Medical College Jhalawar, Rajasthan, India

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***Correspondence:**
Dr. Rameshwar Prasad Gupta,
E-mail: dr.rpgupta98@gmail.com

ABSTRACT

Background: Association of hypothyroidism and cardiovascular diseases are important in development of Atherosclerosis. Hypothyroidism and sub clinical hypothyroidism reported highly risk factors due to lipid levels dearranged. Present study to demonstre of correlation of hypothyroidism and cardiovascular disease.
Methods: The present study has carried out in the department of medicine and Biochemistry SRG Hospital and associated hospital, Jhalawar Medical College Jhalawar (Raj.) Total 100 Hypothyroidism cases and 100 euthyroidism subject were included in the study Information regarding clinical history were recorded in self Constructed present questionnaires Patients were examined and estimated TSH, T3, T4 total Cholesterol, LDLc, HDCc, TG data were analyzed by SPPS version 20.0.
Results: Present study demonstrated increased levels of total cholesterol, LDH, VLDLC and TG and decreased level of HDLC and increased TSH level and decreased T3 and T4 Level in hypothyroidism cases when compared with euthyroid cases It was found significant.
Conclusions: In present study hypothyroidism and hormone Level (TSH, T3, T4) and lipid level dearranged values are associated with development cardiovascular disease atherosclerosis.

Keywords: Cardiovascular disease, Hypothyroidism, Lipid profile, Thyroid profile

INTRODUCTION

Correlation between Hypothyroidism and cardiovascular disease reported in literature.[1] Hypothyroidism defined as increased level of TSH and decreased level as T3 and T4 in blood.[2] Normal T3 and T4 level however Subclinical Hypothyroidism defined as normal T3 and T4 level but Increase in TSH level than the normal range (Euthyroid) lipid profile and progression of atherosclerosis as both are linked due to higher cholesterol low density lipoprotein (LDL) Triglyceride and decrease level of high density lipoprotein (HDL) in Hypothyroidism and sub clinical Hypothyroidism.[3]

Determination as lipid levels are important in diagnosis and medical management not only cardiovascular disease but also sub clinical Hypothyroidism or Hypothyroidism. Increased level of TSH and decreased T3 and T4 hormone level are important risk factor for development of cardiovascular disease. In present study we have determined TSH, T3, T4 levels, Lipid Profile (total cholesterol LDLc, HDLc and TG) in Patients of Hypothyroidism in euthyroid subjects.

Thyroid hormone regulates the expression of enzyme involved in all the pathways of lipid metabolism.[4]

METHODS

The study was designed to evaluate 100 subject of Hypothyroidism and 100 subjects of Euthyroidism in patients coming to OPD of medicine department SRG Hospital and Associated Hospital Jhalawar Medical College, Jhalawar (Rajasthan). Venous blood samples were collected in morning in fasting conditions serum sample separated and ready to use for determination of total cholesterol LDL (Fridewald Formula), HDL, TG and TSH, T3, T4 by commercial Kit method.[5]

TSH, T3 and T4 levels were estimated chemieuminiscence immunoassay analyzer by commercial kit method.[5]

Inclusion criteria

All Patients with Hypothyroidism, Diabetes mellitus, Obesity and coronary heart disease included in the study.

Exclusion criteria

Patients with renal and hepatic failure, pregnancy and lactation, malignancy, myopathy and end stage Pulmonary disease are excluded from the study.

Reference range

- TSH - 0.4-4.2 µIU/ml
- T3 - 0.7-2.0 ng/ml
- T4 - 55-110 ngl/ml

Statistical analysis

Statistical analysis of data was done by help of SPSS version 20.0, unpaired t-test was used in data analysis which define to find difference between two groups mean whose the group is differ to each other.

RESULTS

Biochemical parameters such as T3, T4, TSH, total cholesterol, HDLc, LDLc, TG were estimated in subject as hypothyroidism and euthyroidism. History of patients were recognized in self constructed questionnaire.

Subject with Hypo cholesterimic drugs history of Hypothyroidism, thyrodectony diabetic subject, kidney disease and liver disease patients were not included in present study

The mean age of patients was 47.82+9.33 (both male and female). Total cholesterol, LDLC, and TG were found to be significantly higher when compared with euthyroid subject group (P<.001) however HDL lower than euthyroid patients TSH, T3, T4 levels in Hypothyroidism and euthyroid subjects were significant when compared to each other (Table 1) (P<0.001).

Table 1: Comparison of different biochemical parameters in hypothyroidism and controls.

Biochemical parameter (ng/dl)	Hypothyroidism group	Euthyroid group
Total cholesterol (ng/dl)	248.99±10.27	172.38±13.55
Low density lipoprotein (ng/dl)	182.11±60	135.72±9.26
High density lipoprotein (ng/dl)	25.72±3.91	38.92±38
Triglyceride (ng/dl)	190±12.43	121.01±11.88
TSH (µ Iv/ml)	7.28±1.91	2.9±1.30
T3 (ng/ml)	8.24±2.52	0.55±0.77
T4 (ng/ml)	127.82±9.36	37.26±11.83

DISCUSSION

Present study we have determined Hypothyroidism subject and their lipid profile and thyroid hormone (TSH, T3, T4) levels in serum and correlated there parameters with increased risk factor for coronary artery disease. Present study demonstrated that subject with Hypothyroidism significantly increased levels of total cholesterol, LDL cholesterol, Triglyceride and VLDL however HDL level significantly decreased. Thyroid stimulating hormone (TSH), has significantly increased and T3 and T4 significantly decreased. Other reports were similar to present study.[6-8]

However, Kottagi S et al reported that cardiovascular risk factors and their correlation with sub clinical Hypothyroidism and showed that cardiovascular risk factors are highly associated with dislipidemia and risk factor for atherogenesis.

Increased level of total cholesterol, LDL cholesterol and triglyceride level are important parameters in Hypothyroidism cases as compared to euthyyroid subjects which leads to development as coronary heart disease.[9,10]

CEJ et al reported that male was found to be lower values of TSH than females suffering from diabetes and showed that preference of Hypothyroidism higher in females (16%) than males (10%).[11]

Suzuki et al studied thyroid hormone binding inhabitation and free fatty acid and concluded Hypothyroid and hyperphysical thyroid involved in abnormal thyroid dysfunction.[12]

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