



ATHEROSCLEROSIS IN HYPOTHYROIDISM: THE RISK OF CORONARY ARTERY DISEASE

Biochemistry

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ABSTRACT

Background And Aims: The aim of this study is to investigate the association between hypothyroidism and the risk of developing atherosclerosis. **Methods:** A cross-sectional study at BVDU Medical College & Hospital Sangli included 95 diabetic patients from Dec 12 2023 to May 30, 2024. Blood samples were collected, measuring TSH, serum triglyceride, and cholesterol levels using the Abbott Architect system. The hospital offers a range of medical services, catering to internal medicine, chronic illness care, laboratory, radiology, dental, pharmacy, pediatrics, family planning, maternity, gynecologic/obstetric, surgery, emergency, ambulatory clinic, TB, and HIV services for the local population. **Results:** In 95 hypothyroidism patients Triglycerides, and Cholesterol. Cholesterol and Triglyceride levels were significantly elevated (Cholesterol: 276.31 mg/dl, Triglycerides: 191.11 mg/dl), indicating a strong association with a heightened risk of Atherosclerosis in 70 out of 95 hypothyroidism. **Conclusion:** The data highlights a strong correlation between hypothyroidism and elevated cholesterol and triglyceride levels, which significantly increases the risk for atherosclerosis in these patients. Given the highly significant statistical findings, healthcare providers should prioritize lipid management and regular monitoring in hypothyroidism patients to mitigate the risk of atherosclerosis and associated cardiovascular diseases.

KEYWORDS

Lipid Profile in Hypothyroidism.

INTRODUCTION

Atherosclerosis, characterized by the buildup of plaque within the arterial walls, is a major contributor to coronary artery disease (CAD) and other cardiovascular disorders. Among the various risk factors for atherosclerosis, hypothyroidism stands out as a significant, yet often underappreciated, condition that exacerbates the development and progression of this vascular pathology. Hypothyroidism, defined by inadequate production of thyroid hormones, impacts numerous metabolic processes, including lipid metabolism and vascular function. The resulting dyslipidemia, endothelial dysfunction, and increased systemic vascular resistance seen in hypothyroid patients contribute to an elevated risk of atherosclerosis and subsequent coronary artery disease. This introduction sets the stage for a detailed exploration of the mechanisms linking hypothyroidism to atherosclerosis, the clinical implications of this association, and the importance of early diagnosis and effective management strategies to mitigate cardiovascular risk in hypothyroid patients. Understanding this connection is crucial for improving cardiovascular outcomes and reducing the burden of coronary artery disease in this vulnerable population.

AIM:

The aim of this study is to investigate the association between hypothyroidism and the risk of developing atherosclerosis.

Study Design- Cross sectional study

Inclusion Criteria –

Adult hypothyroidism patients (age ≥ 18 years) who had attended chronic illness clinic follow-up at the study area were included.

Exclusion Criteria-

Patients aged 80 years and over were excluded.

METHOD:

This study was conducted at the Chronic Illness Institute of BVDU Medical College & Hospital, Sangli, from December 12 2023 to May 30, 2024, among diabetic patients attending follow-up appointments. The study utilized a facility-based cross-sectional design, with blood samples collected from 95 participants of both genders. Using the Abbott Architect system, the research measured levels of thyroid-stimulating hormone (TSH), triglycerides, and cholesterol. Details regarding sample collection, participant characteristics, and measurement procedures are described in the study.

Statistical Methods:

The study utilized SPSS-22 software for data analysis, employing descriptive statistics. Values were presented as Mean $\pm$ Standard Deviation, and frequency was expressed as a percentage. Pearson's correlation coefficient was calculated to evaluate the correlation between variables such as TSH, TG, and cholesterol.

RESULTS:

The p-values for both cholesterol (0.000) and triglycerides (0.000) are highly significant, meaning that the elevated levels observed in the hypothyroidism group are not due to random chance. The high t-values (5.252 for cholesterol and 4.822 for triglycerides) further confirm the significant differences from expected norm. The mean cholesterol level in hypothyroidism patients is 276.31 mg/dl. This is significantly higher than the typical upper limit of 200 mg/dl, indicating that hypothyroidism is associated with elevated cholesterol levels. The mean triglyceride level in hypothyroidism patients is 191.11 mg/dl, which is also above the normal upper limit of 150 mg/dl. This suggests that hypothyroidism contributes to higher triglyceride levels.

Table No-1

Correlation Between TSH, Triglycerides (TG), and Cholesterol in Hypothyroidism Patients: Implications for atherosclerosis.

	Cholesterol mg/dl	TG mg/dl
Group	Hypothyroidism (n=70)	Hypothyroidism (n=70)
Mean	276.31	191.11
Std. Deviation	58.32	20.10
Std. Error Mean	6.78	2.34
unpaired t	5.252	4.822
p value	0.000	0.000
Significance	Highly Significant	Highly Significant

DISCUSSION:

Thyroid hormones play a crucial role in regulating lipid metabolism. They influence the synthesis, mobilization, and degradation of lipids. In hypothyroidism, reduced levels of thyroid hormone can impair the liver's ability to process and clear lipids from the bloodstream, leading to elevated cholesterol and triglyceride levels. The data demonstrates a significant correlation between hypothyroidism and elevated levels of cholesterol and triglycerides, with mean values of 276.31 mg/dl and 191.11 mg/dl, respectively. The standard deviations and standard errors indicate variability and precision within the sample of 70 patients. Both cholesterol and triglyceride levels are significantly higher than the typical upper limits (200 mg/dl for cholesterol and 150 mg/dl for triglycerides), with highly significant p-values of 0.000 and substantial t-values (5.252 for cholesterol and 4.822 for triglycerides), confirming these elevations are not due to random chance. These findings suggest that hypothyroidism substantially contributes to dyslipidemia, which is a key risk factor for atherosclerosis. Elevated cholesterol, particularly LDL cholesterol, and high triglycerides can lead to plaque formation and arterial stiffening, increasing the risk of cardiovascular events such as heart attacks and strokes. Therefore, managing lipid levels through thyroid hormone replacement, lifestyle modifications, and potentially lipid-lowering medications is crucial in hypothyroidism patients to reduce the risk of atherosclerosis and improve overall cardiovascular health.

CONCLUSIONS:

The data highlights a strong correlation between hypothyroidism and

elevated cholesterol and triglyceride levels, which significantly increases the risk for atherosclerosis in these patients. Given the highly significant statistical findings, healthcare providers should prioritize lipid management and regular monitoring in hypothyroidism patients to mitigate the risk of atherosclerosis and associated cardiovascular diseases.

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