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Metabolic Consequences of Thyroid Autoimmunity: The Interplay of Dyslipidemia, Diabetes Mellitus, and Anemia

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Abstract

Introduction: Anti-Thyroid Peroxidase Antibody (anti-TPO) is a key biomarker in autoimmune thyroid disorders, particularly Hashimoto's thyroiditis, which is a leading cause of primary hypothyroidism (PH). In addition to its role in thyroid dysfunction, these antibodies have been associated with the regulation of lipid metabolism, insulin sensitivity, and hematopoiesis. This study aims to compare the levels of anti-TPO antibodies with biochemical parameters, such as lipid profile and plasma glucose, as well as the hematological parameter, hemoglobin (Hb), in patients with primary hypothyroidism (PH).

Materials and Methods: This is a retrospective analysis of patients diagnosed PH. In this study, we collected data records of PH patients (n= 91) for thyroid profiles and anti-TPO antibodies, which were then compared to their lipid profile, plasma glucose, and haemoglobin levels. Anti-TPO estimation done by immuno-enzymatic method.

Result: The study showed patient's mean age as 40.5 years, with 81.3% females and 18.7% males. Using SPSS software, mean of anti-TPO antibody 1678.7 U/ml, serum TSH 8.6 microIU/L, serum FT4 1.3 ng/ml, total cholesterol (TC) 172.9 mg/dl, serum triglyceride (TG) 142.6 mg/dl, random blood sugar (RBS) 141.2 mg/dl, fasting plasma glucose 96.6 mg/dl, glycosylated hemoglobin (HbA_1C) 5.8% and hemoglobin (Hb) level 11.4 g/dl was calculated. The study was divided among 56% positive anti-TPO (> 60 U/ml) and 44% negative anti-TPO (< 60 U/ml) subjects. Between TPO positive and negative PH participants, the levels of serum lipid, hemoglobin and sugar levels were compared. In our study, positive anti-TPO antibody individuals had 56.04% higher serum total cholesterol, 51.64% higher serum triglyceride, 56.04% lower hemoglobin, and 54.94% higher random blood sugar levels. The study showed Pearson correlation (r) as 0.51 (TC), 0.34 (TG), 0.24 (RBS), -0.43 (Hb) with anti-TPO antibody levels and $p < 0.05$ was considered significant.

Conclusion: Our results showed an increased incidence of dyslipidemia, hyperglycemia, and anemia in PH patients with positive anti-TPO antibodies. Dyslipidemia, diabetes, and severe anemia may contribute to the development of metabolic syndrome in these patients, highlighting the importance of early detection and management.

Keywords: *Anaemia, Anti-thyroid peroxidase antibody (Anti-TPO), Diabetes, Lipid profile, Hypothyroidism*

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