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RESEARCH ARTICLE

Exploring the Link Between Hematological Disorders and Autoimmune Thyroid Diseases

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ABSTRACT

Background: Autoimmune thyroid disorders (AITDs), which include hypothyroidism and hyperthyroidism, are frequently accompanied with hematological abnormalities like anemia, leukopenia, and thrombocytopenia. Understanding this link is critical for early diagnosis and management.

Methods: This retrospective analysis comprised 100 patients diagnosed with autoimmune thyroid disease over the course of a year. Hematological markers were examined and linked with thyroid function. The Student's t-test and the Chi-square test were used in the statistical analysis.

Results: Hematological abnormalities were seen in 62% of individuals. The most prevalent observation was anemia (40%), followed by leukopenia (15%), and thrombocytopenia (7%). A strong link was discovered between hypothyroidism and anemia (p=0.01). Patients with hematological disorders had considerably different thyroid profiles.

Conclusion: Autoimmune thyroid illnesses are strongly associated with hematological problems, particularly anemia. Routine hematological examination is advised in patients with thyroid dysfunction for early diagnosis and therapy.

Keywords: Autoimmune, Thyroid disease, Haematological, Anemia, Thrombocytopenia.

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Introduction

Autoimmune thyroid diseases (AITDs), which include Hashimoto's thyroiditis and Graves' disease, are among the most common endocrine illnesses globally. These disorders occur when the thyroid gland is destroyed or stimulated by the immune system, resulting in hypothyroidism or hyperthyroidism. In addition to their core endocrine effects, AITDs have systemic manifestations, including considerable effects on the hematological system. Hematological problems are common in people with thyroid insufficiency. Anemia is the most common finding, which can be caused by iron deficiency, vitamin B12 deficiency, or chronic illness. Hypothyroidism is frequently linked with normocytic or macrocytic anemia, whereas hyperthyroidism can appear with normocytic anemia or, less typically, pancytopenia[1].

Autoimmune processes may also play a role in conditions like immune thrombocytopenia and autoimmune hemolytic anemia. The relationship between thyroid hormones and hematopoiesis is complex. Thyroid hormones affect erythropoiesis both directly and indirectly, boosting erythropoietin production and influencing bone marrow activity. Conversely, autoimmune mechanisms that because thyroid illness may also target hematopoietic cells, resulting in cytopenias[2].

Despite these correlations, hematological abnormalities in AITDs are generally overlooked in clinical practice. Early detection of these abnormalities is critical since they can affect patient outcomes and may

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necessitate specific therapy. This retrospective study seeks to investigate the prevalence and kinds of hematological problems in individuals with autoimmune thyroid illnesses, as well as their relationship to thyroid function status[3].

Methods

- Study Design: Retrospective study
- Duration: 1 year
- Sample Size: 100 patients

Inclusion Criteria

- Diagnosed cases of autoimmune thyroid disease
- Age > 18 years

Exclusion Criteria

- Chronic kidney disease
- Malignancy
- Recent blood transfusion

Parameters Studied

- Hemoglobin levels
- Total leukocyte count
- Platelet count
- Thyroid profile (TSH, T3, T4)

Statistical Analysis

Statistical analysis was carried out using the Student's t-test for continuous variables and the Chi-square test for categorical variables. Data were presented as mean ± SD or percentages, as appropriate. A p-value of <0.05 was judged statistically significant.

Results

Table 1: Demographic Data

Parameter	*Value*	*p-value*
Mean Age	42.5 ± 10.2	—
Female (%)	68%	0.03

Table 2: Prevalence of Hematological Disorders

Disorder	*Number (%)*	*p-value*
Anemia	40 (40%)	0.01
Leukopenia	15 (15%)	0.08
Thrombocytopenia	7 (7%)	0.12

Table 3: Thyroid Status

Type	*Number (%)*	*p-value*
Hypothyroidism	70 (70%)	0.02
Hyperthyroidism	30 (30%)	0.02

Table 4: Association Between Anemia and Thyroid Disease

Group	*Number*	*p-value*
Hypothyroid + Anemia	32	0.01
Hyperthyroid + Anemia	8	0.04

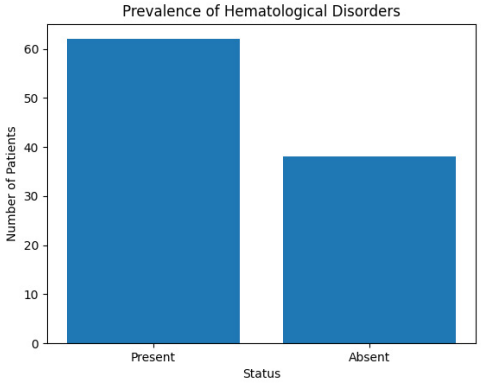

Figure 1: Prevalence of haematological disorders

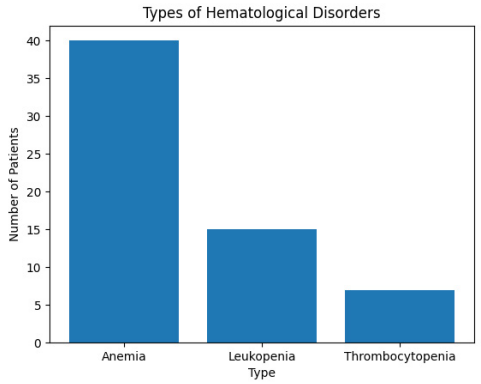

Figure 2: Types of haematological disorders

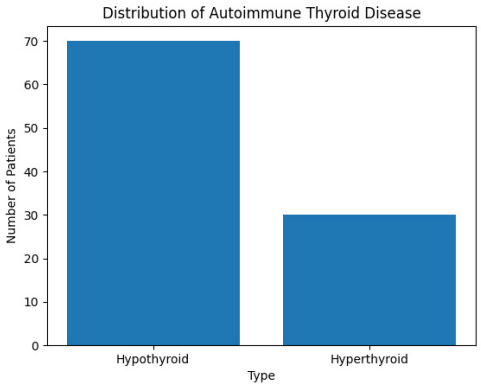

Figure 3: Distribution of autoimmune thyroid disease

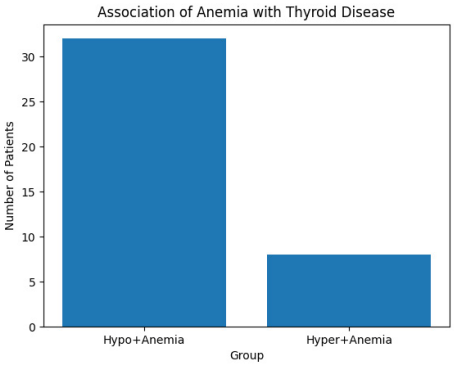

Figure 4: Association of anemia with thyroid disease

Discussion

This retrospective investigation found a strong link between autoimmune thyroid illnesses and hematological disorders. The data show that a significant proportion of patients with AITDs have aberrant hematological parameters, with anemia being the most common illness. The 40% prevalence of anemia in this study is consistent with earlier literature, which describes anemia as the most common hematological manifestation in thyroid diseases(4). Hypothyroid people are more likely to develop anemia due to decreased erythropoietin production, decreased bone marrow activity, and associated nutritional deficiencies such as iron and vitamin B12 deficiency. Furthermore, autoimmune processes may contribute to anemia via disorders such as pernicious anemia[5].

Leukopenia and thrombocytopenia were less common, but nonetheless significant findings. These abnormalities may be caused by autoimmune destruction of blood cells or inhibition of bone marrow function. Although the link was not statistically significant for all cytopenias, it emphasizes the importance of a thorough assessment. The study found a substantial correlation (p=0.01) between hypothyroidism and anemia, supporting the concept that thyroid hormones play an important role in erythropoiesis[6]. Reduced thyroid hormone levels inhibit erythropoietin synthesis, resulting in decreased red blood cell formation. Hyperthyroidism, on the other hand, is frequently associated with increased metabolism and, as a result of inadequate erythropoiesis, can cause mild anemia[7].

The predominance of female patients (68%) is consistent with the known higher frequency of autoimmune illnesses among women. Hormonal and genetic factors are thought to contribute to this gender preference. One of the study's strengths is its focus on a big sample size during a certain time span. However, its shortcomings include a retrospective design that may add selection bias, as well as a lack of extensive assessment of nutritional deficits and autoimmune markers[8].

Clinically, the findings highlight the significance of routine hematological evaluations in patients with autoimmune thyroid disorders. Early identification of anemia and other cytopenias can lead to better patient care and results.

Future research should use prospective designs and conduct in-depth analyses of underlying mechanisms, such as autoimmune markers and nutritional status. Longitudinal follow-up would also aid in studying the evolution and reversibility of hematological abnormalities in patients with thyroid illness[9].

Conclusion

This study found a strong link between autoimmune thyroid illnesses and hematological problems, particularly anemia. A large majority of patients with thyroid dysfunction have abnormal hemoglobin, leukocyte, and platelet counts. Hypothyroidism was more strongly linked to anemia, emphasizing the importance of thyroid hormones in erythropoiesis. Although leukopenia and thrombocytopenia were uncommon, their existence suggests autoimmune involvement of several hematopoietic cell lines.

These findings highlight the significance of routine hematological evaluation in patients with autoimmune thyroid disorders. Early detection and treatment of these anomalies can enhance both clinical results and quality of life. More prospective research with larger sample sizes and in-depth investigations are required to better understand the underlying mechanisms and develop complete management guidelines.

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