

## ENDOTHELIAL DYSFUNCTION AND VON WILLEBRAND FACTOR ALTERATIONS IN PATIENTS WITH AUTOIMMUNE THYROIDITIS

Nasirova Aziza Kamoljonovna

Kimyo International University in Tashkent

D.K. Najmutdinova

Tashkent State Medical University

A.D. Rasulov

Tashkent State Medical University

<https://doi.org/10.5281/zenodo.21214921>

### Abstract

Autoimmune thyroiditis (AIT) is a common autoimmune endocrine disorder associated with thyroid dysfunction, cardiovascular complications, and endothelial injury. Von Willebrand factor (vWF) is an important marker of endothelial dysfunction and hemostatic imbalance. This study aimed to evaluate serum vWF levels across different clinical stages of AIT. A total of 113 patients with AIT and 94 healthy controls were included and classified into euthyroid, subclinical hypothyroid, overt hypothyroid, and hyperthyroid groups. Serum vWF levels were measured using immunological methods. Results showed normal vWF levels in euthyroid patients, a mild decrease in subclinical hypothyroidism, a marked reduction in overt hypothyroidism, and significantly elevated levels in hyperthyroidism. These findings suggest that vWF levels vary according to thyroid functional status and may serve as a useful marker of endothelial dysfunction and cardiovascular risk in AIT.

**Keywords:** autoimmune thyroiditis, von Willebrand factor, endothelial dysfunction, hypothyroidism, hyperthyroidism.

### Background

Autoimmune thyroiditis (AIT) is one of the most common autoimmune endocrine disorders and is associated not only with thyroid dysfunction but also with cardiovascular complications and endothelial injury. Von Willebrand factor (vWF) is considered an important biomarker of endothelial dysfunction and vascular hemostasis.

### Objective

To evaluate serum von Willebrand factor levels in patients with different clinical phases of autoimmune thyroiditis.

### Materials and Methods

The study included 113 patients with autoimmune thyroiditis and 94 healthy controls. Patients were divided into euthyroid, subclinical hypothyroid, overt hypothyroid, and hyperthyroid groups. Serum vWF levels were assessed using immunological methods.

### Results

Patients with euthyroid AIT demonstrated vWF levels comparable to controls ( $105.40 \pm 23.44\%$  vs.  $106.74 \pm 24.85\%$ ). Subclinical hypothyroidism was associated with a moderate decrease in vWF levels ( $93.75 \pm 26.80\%$ ). The most significant reduction was observed in overt hypothyroidism ( $40.38 \pm 7.09\%$ ;  $p < 0.05$ ), indicating severe endothelial and hemostatic impairment. Conversely, hyperthyroid patients exhibited markedly elevated vWF concentrations ( $172.11 \pm 15.94\%$ ;  $p < 0.05$ ), reflecting endothelial activation and hypercoagulability.

### Conclusion

Alterations in von Willebrand factor levels are closely associated with thyroid functional status in autoimmune thyroiditis. Assessment of vWF may serve as an additional marker of endothelial dysfunction and cardiovascular risk stratification in patients with autoimmune thyroid disease.

### **Adabiyotlar, References, Литературы:**

1. Antonino Bianco, Salvatore Benvenga. Autoimmune thyroid diseases: new insights into pathogenesis and clinical management. *Frontiers in Endocrinology*. 2021;12:672732.
2. Leonidas H. Duntas, Bruno Biondi. The interconnections between thyroid dysfunction and cardiovascular disease. *Endocrine*. 2022;75(1):12–25.
3. Joseph A. Bosch, et al. Endothelial dysfunction biomarkers in autoimmune diseases: current evidence and future perspectives. *International Journal of Molecular Sciences*. 2022;23(14):7684.
4. Ayman A. Sayed, et al. Hemostatic alterations and von Willebrand factor activity in thyroid disorders. *Journal of Clinical Medicine*. 2023;12(8):2846.
5. European Society of Endocrinology. Clinical practice recommendations for the management of autoimmune thyroid disease. *European Thyroid Journal*. 2023;12(4).
6. Terry B. Strom, et al. Endothelial activation and cardiovascular risk in autoimmune disorders. *Frontiers in Immunology*. 2023;14:1185423.
7. George J. Rodgers, et al. Von Willebrand factor as a marker of vascular dysfunction and thrombosis risk. *Thrombosis Research*. 2024;236:45–53.
8. Sarah J. Thompson, et al. Thyroid hormone imbalance and endothelial function: mechanisms and clinical implications. *Reviews in Endocrine and Metabolic Disorders*. 2024;25(2):311–324.
9. American Thyroid Association. Advances in autoimmune thyroid disease research and cardiovascular outcomes. *Thyroid*. 2024;34(7):901–915.
10. Maria L. Fernandez, et al. Emerging biomarkers of endothelial dysfunction in endocrine diseases. *Biomedicines*. 2025;13(2):278.