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Comparison of Thyroid Gland Sonography Index with Serum Antithyroid Peroxidase, Antithyroglobulin, and Thyroid Function Tests in Patients with Hashimoto Thyroiditis

Fatemeh Eftekharian [1,2], Gholamhossein Ranjbar Omrani [1], Mohammad Hossein Dabbaghmanesh [1]✉, Reza Sahraei [3], Mohammad Ali Behnam [4], Marzieh Bakhshayeshkaram [1], Mohammad Mahdi Dabbaghmanesh [1]

[1] Endocrinology Research Center, Shiraz University of Medical Sciences, Shiraz, Iran
[2] Internal Medicine Department, Jahrom University of Medical Sciences, Jahrom, Iran
[3] Anesthesiology Department, Jahrom University of Medical Sciences, Jahrom, Iran
[4] Medical Physics and Engineering Department, Shiraz University of Medical Sciences, Shiraz, Iran

Abstract

Background: Ultrasound examination of the thyroid has emerged as a useful diagnostic and prognostic tool, along with measuring serum titers of anti-thyroid peroxidase (TPO), anti-thyroglobulin (Tg), and thyroid hormones, in patients with Hashimoto's thyroiditis. So, we aimed at considering correlations of ultrasonographic, antibodies, and thyroid hormone levels. **Materials and Methods:** A total of 149 patients (118 females, 31 males; aged 18–60 years; mean age: 38.60 ± 8.03 years) who were diagnosed with Hashimoto's thyroiditis were enrolled in the study. The blood sample was taken to measure serum titers of free T3 (FT3) and T4 (FT4), TSH, anti-TPO, and anti-Tg antibody titers. The thyroid sonography of each patient was classified into one of the five grades by real-time ultrasound (US) based on echogenicity, thyroid size, and thyroid pattern. We evaluated whether there was a correlation between thyroid characteristics observed via ultrasound and serum levels of thyroid hormones, anti-TPO antibodies, and anti-Tg antibodies. **Results:** Nodular structures were detected in 54 (36.2%) patients (38 micro-nodular and 16 macro-nodular). Echogenicity was recorded as isoechoic in 15(10.07%) and hypoechoic in 119 (79.87%) subjects. Euthyroid subjects had significantly thicker isthmus than overt and subclinical hypothyroid patients (P=0.018). Mean serum TSH, anti-Tg, and anti-TPO antibody titers showed a significant increase in patients with macro-nodules compared to those with micro-nodules and individuals without nodules (P<0.05). The thickness of the isthmus had a significant negative correlation with FT4 (P=0.046; r=0.11) and FT3 (P=0.017; r=0.15), respectively. Thyroid autoantibodies had positive significant correlations with different parameters of thyroid volume (P<0.05). **Conclusions:** Thyroid US findings, in addition to serum anti-Tg and anti-TPO antibody titers, might be correlated with the severity and extent of Hashimoto's thyroiditis, but further evaluations are needed. **[GMJ.2024;13:e3309] DOI:10.31661/gmj.v13i.3309**

Keywords: Hashimoto's Thyroiditis; Anti-Thyroid Antibody; Thyroid Ultrasound

✉ **Correspondence to:**
Mohammad Hossein Dabbaghmanesh, Endocrinology Research Center, Shiraz University of Medical Sciences, Shiraz, Iran.
Telephone Number: +989173001988
Email Address: Dabbaghm@sums.ac.ir

of hindering the synthesis of thyroid hormone, which results in the elevation of TSH [19]. Many thyroid growth stimulating factors, such as TSH, insulin-like growth factor-1, and fibroblast growth factor, might be involved in the development of adenomatous lesions in patients with Hashimoto's thyroiditis [22, 23]. One hundred twenty-five (85.9%) patients in our study had subclinical hypothyroidism or a euthyroid state. Subclinical hypothyroid patients with underlying thyroid disease have an increased risk of developing overt hypothyroidism, which is associated with adverse effects on lipid profile and cardiovascular function [24].

However, predicting disease progression and assessing the risk of evolution to a more severe form of thyroid dysfunction is challenging. In our study, based on the classification system published by Sostre and Reyes, the US pattern of the thyroid was found in most of our patients in the G2 class. Therefore, most patients suffering from Hashimoto's thyroiditis had a sonographic thyroid pattern consisting of multiple hypoechoic foci or patches scattered throughout an otherwise normoechoic gland, which is more indicative of focal rather than diffuse involvement. The G2 pattern is more likely to indicate mild to moderate thyroid involvement, which is more common in patients with more subclinical symptoms. Furthermore, the results of the present study showed that the highest Anti-TPO antibody titers were in G4. The anti-TPO antibody could cause a defective thyroid organization and shift the surface area of the thyroid structure and the thyroid ultrasound pattern of the thyroid toward higher grades.

Limitations of Study

There were some limitations in this study; it used a cross-sectional design and included a relatively small number of participants who underwent US examinations in a single institution. Additionally, we did not conduct a follow-up ultrasound of consecutive patients. A study with a larger sample size and follow-up should be conducted to validate our results. Our study ultrasonographic assessments were conducted by a single physician which might have biased study results and there should be more observers in future studies for evaluation of inter-observer agreement. As another limitation, the extent of dose and time passing the initiation of the levothyroxine treatment causes fluctuations in the TSH, FT3, and FT4 levels that make it impossible to consider all these confounding factors in a cross-sectional study, so we excluded patients who were previously treated for Hashimoto.

Conclusions

Our findings suggest that elevated levels of anti-TPO antibodies may lead to notable alterations in the US thyroid markers, potentially due to the disruptive impact of this autoantibody on thyroid organization. Consequently, integrating US evaluation with the assessment of anti-TPO and anti-Tg antibody titers could prove beneficial in identifying and investigating the severity and extent of Hashimoto's thyroiditis. This combined approach may assist in identifying patients at greater risk of developing hypothyroidism, facilitating timely and regular follow-up care.

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Conflicts of Interest

The authors declare that they have no competing interests. Authors disclose all relationships or interests that could have direct or potential influence or impart bias in the work.