

## The Prevalence of Autoimmune Thyroid Disease in Amasya Province

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### Abstract:

**Introduction:** Autoimmune thyroid diseases are widely known as autoimmune diseases all over the world. The basis underlying of these diseases are in the multifactorial etiology which is related to environmental, genetic and gender as in other autoimmune diseases. We aimed to investigate the frequency of autoimmune thyroid disease in the Amasya province where adjacent to the Eastern Black Sea region, which has a high frequency of autoimmune thyroid disease locally.

**Materials and Methods:** A total of 2400 patients examined with positive anti-Thyroid Peroxidase (ATPO) and anti-Thyroglobulin (ATG) at least one positive or both negatives between the dates 01/01/2018-30/06/2018 in Amasya University Sabuncuoğlu Şerefeddin Research and Training Hospital were included in this study. Patients were grouped as 0-17 years and 18-65 years according to their age and the changes in thyroid autoantibodies were observed at different periods.

**Results:** When the patients (n=2400) were evaluated without dividing as their ages, only 251 (10,5%) patients were ATPO positive, 137 (5,7%) of patients were ATG positive, 293 (12,2%) of patients were positive for both antibodies and 1791 (71,6%) of patients were negative for both antibodies.

**Conclusion:** Our results show that the frequency of autoimmune thyroid disease in Amasya Province is higher in females. We believe that using more data with wide regional studies may provide more information on the frequency of autoimmune thyroid disease.

**Keywords:** Thyroid Disease, Hashimoto's Thyroiditis, Graves' Disease, Anti-Thyroid peroxidase, Anti-Thyroglobulin.

### 1. INTRODUCTION

Prevalence of Autoimmune thyroid diseases (AITD) are highly common diseases in the World and Turkey and affects 2% of the population.[1, 2] Pathology in AITD is comprised by autoimmunity from both T-cell and B-cell mediated pathways. Autoantibodies and B cell dysfunction are thought to be primer immunoreactions in AITD. Subsequently, the excessive reaction of the T cell clusters causes autoimmunity against the thyroid tissue and disruption of the immun homeostasis.[3] Prevalence of the two major autoimmune thyroid diseases (AITDs), Graves disease

(GD) and Hashimoto's thyroiditis (HT), which are characterized by thyrotoxicosis and hypothyroidism respectively.[3]

AITDs have multifactorial etiology. There are reasons such as genetic and environmental in pathogenesis of AITDs. AITDs include quite complex etiology and are due to the formation of autoimmunity against thyroid tissue.[4] It is believed that AITD occur when interactions of genetic susceptibility factors with environmental triggers lead to loss of immune self-tolerance at peripheral and central levels.[1] AITD has a different prevalence in different societies and affects 5% of the all population.[5] The prevalence of HT (also known as chronic autoimmune thyroiditis or autoimmune hypothyroidism) is ranges from 300 to 980 in 100,000 in different geographical areas.[6] HT is the most common autoimmune disease and is the most common cause of hypothyroidism.[7, 8] Diagnosis of Hashimoto's disease may confirm the presence of antibodies against thyroid peroxidase (TPO antibodies) and thyroglobulin.[9] Similarly, GD is the other most common autoimmune disease. The prevalence of GD is ranges from 50 to 626 in 100,000 and associated with anti thyroid-stimulating hormone antibodies.[6] Although the manifestation of two diseases is different each other, the immunological imbalance, which is thought to play a critical role in the development of the diseases, leads to the loss of immunological tolerance.[10]

Antibodies against thyroid tissue develop in both GD and HT and lead to destruction in the thyroid. The major autoantibodies in HT are thyroid peroxidase antibody (ATPO or TPOAb) and thyroglobulin antibody (ATG or TGAb). These antibodies are also positive in patients with GD. The major antibody in GD is thyroid-stimulating hormone receptor antibody and it is also positive in HT patients.[10]

ATPO is mostly used in patients who investigate AITD. Because in most patients with ATPO positive, ATG will also be positive. ATG is present in low titers in the elderly and some autoimmune diseases. Prevalence of AITD that be only positive Atg is around 5%. Therefore, Ordering of Atg during routine screening is not recommended. ATPO and ATG are 95-100% positive in HT and 60-90% positive in GD.[4, 11]

In Turkey, Eastern Black Sea region has a high prevalence of AITD.[12] From this result, we aimed to

investigate the prevalence of autoimmune thyroid disease in Amasya due to neighboring to the eastern Black Sea region.

## 2. MATERIALS AND METHODS

A total of 2400 patients (1860 female, 540 male) examined with positive anti-Thyroid Peroxidase (ATPO) and anti- Thyroglobulin (ATG) at least one positive or both negatives between the dates 01/01/2018-30/06/2018 in Amasya University Sabuncuoğlu Şerefeddin Research and Training Hospital were included in this study.

Patients were divided into two groups: 0-17 years old and 18-65 years old. When patient criteria were determined, all patients with both ATPO and ATG were selected. even if the antibody level was positive, patients who only wanted an antibody level were not included in the study. The positivity of the antibodies was determined by their reference intervals. If there are several outcomes for the patients, the latest results are preferred. Patients with malignant status were excluded because of the low titers of ATG positivity in malignant conditions. Patients who were over 65 years of age were not included in the study. Every patient has no results of thyroid function tests, so thyroid function tests weren't evaluated.

SPSS 15 for Windows program was used for statistical analysis. Descriptive statistics were given as mean, standard deviation and percentage.

## 3. RESULTS

When the results of the patients (n = 2400) were evaluated, only ATPO positive patients were 251 (10.5%), only ATG positive patients were 137 (5.7%) and both antibody positive patients were 293 (% 12,2), and the number of patients with negative antibody levels was 1719 (71.6%). A total of 2400 patients were 1860 (77,5%) female, 540 (22,5%) male. When a total positive antibody ratio of patients was evaluated, ATPO positive patients were 540 (22,66%), ATG positive patients were 430 (17,91%). The distributions of ATPO and ATG according to the genders of the patients were shown in Table 1.

**Table 1.** The distributions of ATPO and ATG according to the genders of the patients

	Female Patients (n=1860)	Male Patients (n=540)
Age (year)	36,47±15,65	32,40±19,94
Only ATPO positive patients	220 (11,8%)	31 (5,7%)
Only ATG positive patients	121 (6,5%)	16 (3,0%)
Both antibody positive patients	243 (13,1%)	50 (9,3%)
Both antibody negative patients	1276 (68,6%)	443 (82,0%)

When the results of patients were evaluated according to age ranges; Patients between the ages of 0 and 17 (n=367) were 214 (58,3%) female patients, were 153 (41,7%) male patients. For both genders; only ATPO positive patients were 26 (7,1%), only ATG positive patients were 6 (1,6%), both antibodies positive patients were 15 (4,1%), both antibodies positive patients were 320 (87,2%). The distributions of ATPO and ATG according to the genders of 0-17 age group are shown in Table 2.

**Table 2.** The distributions of ATPO and ATG according to the genders of 0-17 age group

	Famale Patients (n=214)	Male Patients (n=153)
Only ATPO positive patients	18 (8,5%)	8 (5,2%)
Only ATG positive patients	6 (2,8%)	-
Both antibody positive patients	11 (5,2%)	4 (2,6%)
Both antibody negative patients	179 (83,6%)	141 (92,2%)

When the results of patients were evaluated according to age ranges; Patients between the ages of 18 and 65 (n=2033) were 1647 (81,01%) female patients, were 386 (18,9%) male patients. For both genders; only ATPO positive patients were 224 (11%), only ATG positive patients were 132 (6,5%), both antibodies positive patients were 276 (13,6%), both antibodies positive patients were 1401 (68,9%). The distributions of ATPO and ATG according to the genders of 18-65 age group are shown in Table 3.

**Table 3.** The distributions of ATPO and ATG according to the genders of 18-65 age group

	Female Patients (n=1647)	Male Patients (n=386)
Only ATPO positive patients	201 (12,2%)	23 (6,06%)
Only ATG positive patients	116 (7,0%)	16 (4,1%)
Both antibody positive patients	230 (14%)	46 (11,9%)
Both antibody negative patients	1100 (66,8%)	301 (78%)

## 4. DISCUSSION

In this study performed by Baştemir et al (2009), the prevalence of iodine deficiency, autoimmune thyroid and thyroid dysfunction regionally was investigated. For this, the Eastern Black Sea region and the Central Anatolia region were compared each other and the prevalence of these diseases was found is higher in the Eastern Black Sea region. Furthermore, It has been reported that iodine deficiency in the Eastern Black Sea region triggers thyroid autoimmunity and leads to thyroid dysfunction in young participants.[12]

In this study performed by Atmaca et al, Patients (n = 473) were retrospectively screened for the prevalence of ATPO and ATG positivity. Only ATPO positive 50 (10,57%) patients, only ATG positive 106 patients (22,41%), both antibodies positive 317 patients (67,02%) were found. It was suggested that only 5% of the ATG positivity indicated in the guidelines did not support the findings of the study, and that extensive participatory regional studies were required to determine the test requirements by region.[2]

Of the 2400 patients who applied to our hospital, only ATPO positive patients were 251(10.5%), only ATG positive patients were 137 (5.7%), were both antibodies positive patients were 293 (12.2%) and the number of negative patients was determined as 1719 (71.6%).our results were found to be consistent with only the percentage of ATG positivity frequency (approximately 5%) in the AITD that indicated in the thyroid guidelines.

In our study, the patient groups were also studied in two groups as 0-17 years and 18-65 years. It affects genetic factors as well as environmental factors in the development of autoimmune thyroid diseases. HT is the most common cause of goiter and hypothyroidism in areas without iodine deficiency in childhood.[13]For this reason, thyroid antibody positivity rates were evaluated in the 0-17 age group.Of the 367 patients in the 0-17 age group, Female patients were 214 (58.3%), and male patients were 153(41,7%).The number of positive ATPO for male patients (n=153) was 12, the number of positive ATG was 4. Number of positive ATPO for female patients (n=214) was 29, the number of positive ATG was 15.

Children patients who diagnosed with HT were evaluated by Dilek et al and was found that HT ratio in girl was higher than in boys (girl/boy 7,5/1). [13]In our study, autoimmune thyroid disease type could not be determined because all patients did not have diagnoses and thyroid function tests. However, when the only ratio of those with positive thyroid antibodies was evaluated, the ratio of girls/boys was found to be 2.56 / 1.And was found that HT ratio in girl was higher than in boys. In this study performed by Ozer and et al, When laboratory findings of 43 (31 (72.1%) female and 12 (27.9%) male) children were evaluated, it was found that the HT rate was 2.6 (2.6 / 1) times higher in females.[14]

## 5. CONCLUSIONS

Our results are similar to the antibody prevalence ratio that indicated in the guidelines. According to our results, AITD prevalence of female gender in Amasya province was found to be higher than male gender. Generally, when doing a test request, both antibodies levels are requested together. Prevalence of AITD

which is only high level of ATG is %5 in the thyroid guidelines. Therefore, ATG request is not routinely recommended. In our study, only the ATG positivity ratio was found to be 5.7% and We believe that only ATG request could not be enough for AITD diagnosis in routine use, only ATPO request could promote more the diagnosis of AITD. However, when environmental and genetic factors are taken into consideration, different results could be obtained in different regions. Therefore, we suggest that the ATPO and ATG positivity ratio should be supported by more regional studies and more participants when the prevalence of autoimmune thyroid disease is investigated.

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