

Evaluation of blood groups in patients with anti TPO positive



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ABSTRACT

Background: In studies, ABO blood group system has been shown to be associated with type 2 diabetes mellitus, chronic renal failure, gestational diabetes mellitus, postpartum depression, coronary artery disease, Crohn's disease as well as various cancer types such as stomach, breast, skin cancers and rheumatologic diseases. **Aims and Objective:** The relationship between anti TPO positivity and ABO blood group system is aimed to be investigated by using blood groups which are the product of genetic structure and easy to identify by considering the relationship between anti TPO positivity and blood group. **Materials and Methods:** 4312 patients with determined blood groups were included among the patients, who were admitted to the internal medicine outpatient clinics of our hospital between January 2, 2017 and May 28, 2019 and were screened for thyroid antibodies with thyroiditis susceptibility. **Results:** The most common blood group was A in both anti TPO positive and anti TPO negative patient groups. The rate of those with O blood group was 2.65% higher in anti TPO positive group than anti TPO negative group. B blood group was found to be 4.87% higher in anti TPO negative group than anti TPO positive group (p:0.148). **Conclusion:** In conclusion, it was found that O blood group may be a risk factor for anti TPO positivity and B blood group is much lower in anti TPO positive ones. However, it is obvious that more comprehensive prospective multicentered clinical and experimental studies are needed to establish the relationship between blood groups and autoimmune diseases, especially autoimmune thyroiditis.

Key words: ABO and Rh blood groups; Anti TPO; Autoimmune

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INTRODUCTION

Thyroid peroxidase, known as microsomal antigen in 1980s, is the most important and first positive antigen of Hashimoto thyroiditis (HT).¹ Anti TPO is positive in 90% of HT patients, regardless of hypothyroidism and euthyroidism. While TPO causes thyroid infiltration and destruction by stimulating immunoglobulin G (IgG) class autoantibodies and TPO specific T cells with high affinity, Anti TPO causes complement-dependent cytotoxicity.^{2,3}

The blood groups found on the erythrocyte surface discovered in the 19th century are a kind of cell identity determined by the antigenic structure. The system of blood groups discovered by Landsteiner is the general blood group system known as ABO. In addition, a grouping

known as the Rh system and classified as the absence or presence of antigenic structure is used.⁴

In terms of genetics, blood groups are a qualitative feature whose phenotypic variation is completely reflecting the genetic structure in which the environmental effect is zero. In this sense, blood groups are very important in terms of reflecting the genetic structure. Blood group antigens are genetically coded and these antigens can be susceptibility factors to some diseases and resistance factors for others. In studies, ABO blood group system has been shown to be associated with type 2 diabetes mellitus, chronic renal failure, gestational diabetes mellitus, postpartum depression, coronary artery disease, alopecia areata, gastroduodenal ulcers, Crohn's disease, hepatitis B infection, as well as various cancer types such as

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stomach, brain, breast, skin cancers and rheumatologic diseases.⁵⁻¹⁷ Although there are recent studies examining the relationship between thyroid diseases and blood group,^{18,19} there are no studies examining the relationship between anti TPO positivity and blood groups. The relationship between anti TPO positivity and ABO blood group system is aimed to be investigated by using blood groups which are the product of genetic structure and easy to identify by considering the relationship between anti TPO positivity and blood group.

MATERIALS AND METHODS

This study was designed retrospectively and the data were obtained through the hospital information management system (HIMS). After obtaining the ethics committee approval by the clinical observation ethics committee of our hospital on June 28, 2019, 4312 patients with determined blood groups were included among the patients, who were admitted to the internal medicine outpatient clinics of our hospital between January 2, 2017 and May 28, 2019 and were screened for thyroid antibodies with thyroiditis susceptibility. Anti TPO was measured with electrochemiluminescence method on Cobas E601 device (Roche Diagnostic, Germany). The reference range for anti TPO was accepted <34IU/ml. The blood group distributions of 628 anti TPO positive and 3684 anti TPO negative patients were analyzed.

Statistical analysis

Statistical evaluation was performed using SPSS 20 for Windows (IBM SPSS Inc., Armonk, NY, USA). Normal distribution of data has been evaluated with Kolmogorov-Smirnov test. Normal distribution of numerical variables was shown as mean \pm standard deviation. Chi-square and Fisher's exact tests were used to compare categorical data. $p < 0.05$ was considered statistically significant.

RESULTS

Eighty five percent (n: 3665) of the patients included in our study were female and 15% (n: 647) were male. Of the 628 patients who were anti TPO positive, 561 (89%) were female and 67 (11%) were male. Blood group distribution of anti TPO positive patients was determined as; 35.35% A Rh (+), 32.80% O Rh (+), 12.89% B Rh (+), 5.78% AB Rh (+), 4.61% A Rh (-), 4.23% ORh (-), 2.87% B Rh (-) and 1.11% AB Rh (-). Among anti-TPO positive patients, 86.82% Rh positivity and 13.18% Rh negativity were detected.

Blood group distribution of anti TPO negative patients was determined as; 34.01% A Rh (+), 30.86% O Rh (+), 18.13% B Rh (+), 5.99% AB Rh (+), 4.12% A Rh (-),

3.52% O Rh (-), 2.60% B Rh (-) and 0.67% AB Rh (-). Among anti-TPO negative patients, 88.99% Rh positivity and 11.01% Rh negativity were detected.

The blood group distribution of the anti-TPO positive and negative patients is given in Chart 1.

In our study, 39,96% A, 37,03% O, 15,76% B, 6,89% AB blood groups were detected in anti TPO positive patients. 40.81% A, 34.38% O, 18.53% B, 6.66% AB blood group were detected in anti TPO negative patients. (Chart 2).

The most common blood group was A in both anti TPO positive and anti TPO negative patient groups. The rate of those with O blood group was 2.65% higher in anti TPO positive group than anti TPO negative group. B blood group was found to be 4.87% higher in anti TPO negative group than anti TPO positive group ($p: 0.148$). When the patients were classified according to blood groups, gender and age did not differ in terms of blood groups ($p > 0.05$).

DISCUSSION

In our study, we found that the ratio of O blood group was higher in anti TPO positive patients than in anti TPO

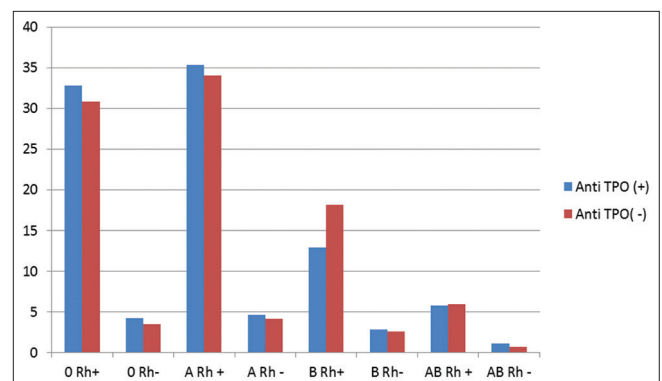


Chart 1: The blood group distribution of the anti-TPO positive and negative patients

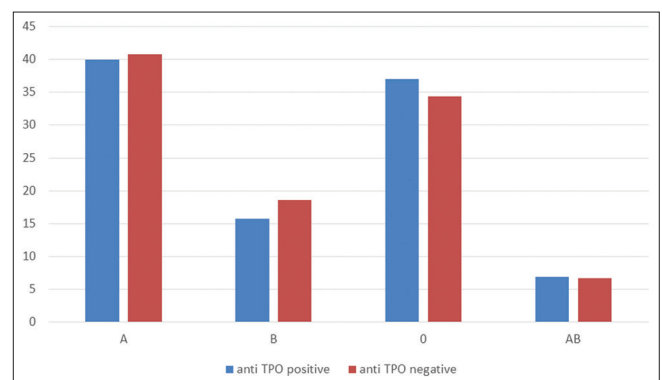


Chart 2: Distribution of blood groups according to anti TPO without Rh factor

negative patients. In addition, the proportion of B blood group was significantly lower in patients who were anti-TPO positive. The incidence of Rh antigen was found to be similar in both patient groups. Recently, the number of studies investigating the relationship between blood groups and autoimmune and rheumatologic diseases, in addition to malignancies, is increasing. Studies have shown that many autoimmune diseases such as multiple sclerosis, celiac disease, rheumatoid arthritis and alopecia areata may be associated with blood groups.^{13,20} The pathogenesis of this relationship has not yet been established. A study conducted in Ankara in 2019 showed that there may be a relationship between O blood group and Hashimoto's thyroiditis and that the risk of autoimmune thyroid disease may be lower in patients with AB blood group.¹⁸ Some previous studies have shown that the rate of O blood group is higher in some autoimmune diseases such as familial Mediterranean fever, systemic lupus erythematosus, and systemic sclerosis.⁷ Since people with O blood group do not have A and B antigens, there are anti-A and anti-B antibodies that develop against them. The high rate of autoimmune thyroid diseases in the blood group O, in which antibodies against both blood group antigens are present, has emerged that there may be a relationship between blood group antibodies and these diseases, but there is no clear evidence to reveal this relationship yet.

Our study had some limitations. These can be counted as retrospective file scanning, including only follow-up patients in a single center, and absence of a control group. Therefore, it is certain that the data obtained will not reflect the general population. Findings supporting our hypothesis were obtained, but our study does not reflect nationwide data.

CONCLUSION

In conclusion, it was found that O blood group may be a risk factor for anti TPO positivity and B blood group is much lower in anti TPO positive ones. However, it is obvious that more comprehensive prospective multicentered clinical and experimental studies are needed to establish the relationship between blood groups and autoimmune diseases, especially autoimmune thyroiditis.

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Authors Contribution:

Contribution of all Authors towards this manuscript:

EA- Concept and design of the study, manuscript preparation, statistically analyzed and interpreted, critical revision of the manuscript, review of the study;
İS- Reviewed the literature, collected data, statistically analyzed and interpreted, helped in preparing first draft of manuscript, review of the study.

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