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Research Article

The Correlation between Melasma and ABO Blood Type

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Abstract

Aim: Melasma is an irregular brown hyperpigmentation mostly observed in the middle face. Although genetic predisposition, ultraviolet radiation and female sex hormones have been reported as the main causes, inflammatory processes were also considered to play a role in melasma. It has been determined that blood groups play a role in many genetic and inflammatory diseases. Since the genes that encode blood types were associated with inflammation, blood type could play a role in the etiology of melasma, an inflammatory and genetically inherited disease. The present study aimed to investigate the correlation between melasma and ABO/Rh blood types, which has never been investigated before.

Material and Methods: The study was conducted 100 patients with melasma and 1000 healthy controls. The patient and healthy control blood types and Rh factor data were collected from the hospital automation system retrospectively.

Results: Female gender ratio was significantly higher in the patient group compared to the control group ($p<0.05$). The mean patient age was significantly higher when compared to the controls ($p<0.05$). The analysis of the ABO blood type distribution revealed that the AB-type incidence was significantly higher in melasma patients, while the B-type incidence was higher in the control group ($\chi 2:4.512$; $p<0.05$). There was no significant difference between the A and 0 blood types in the patient and control groups. Rh positivity was significantly higher in the patient group ($p<0.05$).

Conclusion: Since this is the first ABO blood type study conducted on melasma patients, multicenter studies with large samples are needed to clarify our findings.

Keywords: Melasma, ABO blood types, hyperpigmentation

INTRODUCTION

Melasma is a melanogenesis dysfunction that leads to chronic and regional hyperpigmentation of the skin (1). Melasma usually appears as irregular brown spots on sun-exposed areas such as the face.It is observed less frequently in the neck and forearms (2-4). Although it could be observed in men, it is more common in women in their thirties and forties and with darker skins. Hyperpigmentation significantly affects the quality of life of the patients due to cosmetic concerns (3-6).

Genetic characteristics, ultraviolet radiation and female sex hormones have been cited as the main factors behind melasma (4). Recently, it was reported that inflammatory processes play a role in the development of melasma (7,8). Recent research indicated a more heterogeneous pathogenesis that involved interaction between keratinocytes, mast cells, gene regulation abnormalities, high vascularization, and basal membrane problems (5,9). Clinicians should be familiar with the pathogenesis development of melasma, since it could help determine successful therapy combinations in melasma, a difficult and recurrent disease.

One of the most important genetic human characteristics is the blood type. ABO blood type antigens are complex carbohydrate molecules and serve as red blood cell surface markers. They are also expressed in bodily fluids, various cell and tissue types, and the skin. The presence of antigens in several tissues suggested that blood type antigens may not only determine the blood type but also play wider roles (10). The correlation between ABO antigene system and various proinflammatory mediators suggested that it could play a role in inflammatory diseases (11).

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Possible correlations between dermatological diseases such as acne, rosacea, alopecia areata, lichen planus, skin cancers, vitiligo, urticaria, pemphigus, psoriasis have been investigated (12-18). However, there are no studies where the correlation between melasma and ABO/Rh type was investigated. Since the genes that encode blood types were associated with inflammation, it could be suggested that blood type might play a role in the etiology of melasma, an inflammatory and genetically inherited disease, and we planned the current study to help understand the influence of blood groups on the etiology of melasma.

MATERIAL AND METHOD

The study was started after approval from the local ethics committee (2023/01-12). The study was conducted on hundred over the age of 18 patients who presented to the Elazig Urban Dermatology Center between January 2020 and March 2022 and diagnosed with melasma based on clinical examinations. The control group included thousand over the age of 18 healthy individuals who applied to the hospital to obtain health reports required for applications or routine check-ups. Melasma patients who had no concomitant dermatological disease, systemic diagnose, cardiovascular disease, neurological disease, cancer, and did not abuse alcohol or substances were included in the patient group. Medical data, blood type and Rhesus (Rh) factor data of the patients and healthy controls were collected retrospectively from the hospital automation system. Declaration of Helsinki and good clinical practice standards were considered while conducting the study.

Statistical Analysis

Statistical Package for Social Science for Windows (SPSS) 24.0 software was used to analyze the study data. Frequency and percentage distribution analysis was employed to determine the gender and blood type distributions of the patients. Also, the means and standard deviations were analyzed to determine the mean participant age. Independent samples t-test was used to determine the differences between the mean participant age of the patient and control groups. Chi-square test was employed to determine whether there were significant differences between the gender and blood type distributions of the patient and control groups. $p<0.05$ was considered statistically significant.

RESULTS

Ninety-two percent of the patient group were female. A statistically significant difference was determined between the gender of the melasma patients and the controls (χ^2:97.349; $p<0.05$) (Table 1). The mean patient age (32.73±8.40) was significantly higher than the mean age of the control group (27.22±7.97) (t:6.550; $p<0.05$) (Table 2).

A significant difference was determined between the ABO blood types of the melasma patients and the control group (χ^2:4.512; $p<0.05$). There was no significant difference between the A and 0 blood type melasma and control group members, AB blood group prevalence was significantly higher in the melasma group, and B blood type prevalence was significantly higher in the control group (Table 3).

The analysis of the Rh blood group distribution in the melasma patients revealed that 93% Rh(+), 7% were Rh(-). On the other hand in controls, 88% were Rh(+). A significant difference that favored the melasma patients was determined in the number of Rh(+) individuals between melasma and controls (χ^2:4.176; $p<0.05$). The investigation of the ABO and Rh blood type distribution across the participants is presented in Table 4.

Table 1. Participant gender distribution

			Group		Total
			Patient	Control	
Gender	Female	N	92	405	497
		Gender %	18.5%	81.5%	100.0%
		Group %	92.0%	40.5%	45.2%
		Total %	8.4%	36.8%	45.2%
	Male	N	8	595	603
		Gender %	1.3%	98.7%	100.0%
		Group %	8.0%	59.5%	54.8%
			0.7%	54.1%	54.8%
Total		N	100	1000	1100
		Gender %	9.1%	90.9%	100.0%
		Group %	100.0%	100.0%	100.0%
		Total %	9.1%	90.9%	100.0%
Pearson Chi-Square			97.349		
P			.001<0.05		

Table 2. Participant gender distribution

Variable	Patient (n=100)	Control (n=1000)	p
Age "x̄(±sd)"	32.73 (±8.40)	27.22 (±7.97)	.0001*
Independent samples t-Test, *p<0.05			

Table 3. Participant ABO blood type distribution

	A n (%)	B n (%)	AB n (%)	0 n (%)	Total n (%)
Melasma	39 (39%)	12 (12%)	14 (14%)	35 (35%)	100 (100%)
Control	404 (40.4%)	193 (19.3%)	75 (7.5%)	328 (32.8%)	1000 (100%)

Table 4. Participant ABO/Rh distribution

	Melasma n (%)	Control n (%)	Totaln (%)
A+	36 (36.0%)	359 (35.9%)	395 (35.9%)
A-	3 (3%)	45 (4.5%)	48 (4.4%)
B+	12 (12%)	168 (16.8%)	180 (16.4%)
B-	0 (0%)	25 (2.5%)	25 (2.3%)
AB+	13 (13%)	70 (7.0%)	83 (7.5%)
AB-	1 (1.0%)	5 (5.0%)	6 (0.5%)
0+	32 (32.0%)	283 (28.3%)	315 (28.6%)
0-	3 (3.0%)	45 (4.5%)	48 (4.4%)
Total	100 (100%)	1000 (100%)	1100 (100%)

DISCUSSION

The ABO blood type system was described several years ago. According to, there are Four main blood types were determined based on the presence of A/B antigens (A, B, AB and 0) (19,20). Rhesus system was classified as Rh (-) or Rh (+) based on the presence of Rhesus D antigen on red blood cell surface (21).

ABO antigens are expressed from the endothelium, skin and many organs and tissues in the body (13,22). It is also present in various body secretions (23). ABO antigens are located in the layers of the skin and hair follicles (15,22). Due to the presence of these antigens in several tissues, studies have been conducted on the correlations between blood types and development of certain diseases such as infections, cancer, and coagulation disorders. Most studies reported a correlation between the studied disease and the ABO blood type and in some studies, no relationship was found. (24,25).

Studies have shown that there is a relationship between cancer and the ABO blood group (15). A study conducted by Xie et al. found that people with blood type 0 have a higher risk of developing non-melanoma skin cancers. (26). In another study, it was determined that cutaneous malignant melanoma was more common in people with A blood group (27).

An older study that investigated the correlation between vitiligo and blood type reported that groups A and B were significantly more prevalent in vitiligo patients, and group 0 was less prevalent (16). However, a recent study reported no correlation between vitiligo and ABO blood type (17).

A study conducted on mild acne vulgaris, severe acne vulgaris and healthy controls reported significant findings. Severe acne was found to be higher in type A, while mild acne was significantly higher in blood groups other than type A (12).

Studies where the correlations between rosacea (13), alopecia areata (14), chronic spontaneous urticaria (18), and androgenetic alopecia (28) and ABO blood type did not report significant correlations.

CONCLUSION

In our study, female gender was significantly higher in the melasma group than in the control group. The incidence of AB blood type was significantly higher among melasma group. The incidence of type B was significantly higher in the control group. There was no significant difference between the patient and control groups based on A and 0 blood types. ABO blood group iso-antigens are known to be expressed in various skin layers. In this study, the high presence of AB blood group antigens may contribute to the etiopathogenesis of melasma by causing melanogenesis dysfunction. However, this should be confirmed by future studies. Since this was the first ABO blood type study in melasma patients, multicenter studies with large samples are needed to clarify our findings.

Study Limitations

Since this study is a retrospective study, patient information is limited to the data of the hospital database. Prospective studies with a larger number of patients may be more useful in enlightening this issue.

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Conflict of Interest: *The authors declare that they have no competing interest.*

Ethical approval: *This study was approved by the Fırat University ethics committee (2023/01-12).*

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