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The Relationship Between Blood Groups and Hidradenitis Suppurativa: A Retrospective Evaluation

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Abstract

Aims: This study aims to investigate the potential relationship between ABO blood groups and the incidence of hidradenitis suppurativa.

Methods: This retrospective study included adult patients with clinically diagnosed hidradenitis suppurativa followed at a tertiary dermatology clinic (2019–2023) and healthy controls. ABO and Rh blood groups were determined using standard agglutination methods. Statistical analyses were performed using chi-square and t-tests

Results: A total of 100 patients with hidradenitis suppurativa and 365 healthy controls were included in the analysis. The distribution of ABO blood groups was comparable between the two groups (p=0.650). Blood group A Rh (+) was the most common in both patients (40%) and controls (39.2%), followed by O Rh(+) (30% vs. 27. 1%). Similarly, the Rh factor distribution showed no significant difference, with 89% of patients and 89.6% of controls being Rh positive (p=1.000). When ABO and Rh blood groups were evaluated together, the overall distribution remained statistically similar across groups (p=0.958).

Conclusions: This study found no significant association between ABO or Rh blood groups and the occurrence of hidradenitis suppurativa. Further studies with larger and more diverse populations are needed to confirm these findings and investigate potential underlying mechanisms.

Keywords: Hidradenitis suppurativa, Blood groups, ABO antigens, Rh antigen

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Kan Grupları ile Hidradenitis Suppurativa Arasındaki İlişki: Retrospektif Değerlendirme

Öz

Amaç: Bu çalışma, ABO kan grupları ile hidradenitis suppurativa (HS) görülme sıklığı arasındaki olası ilişkiyi araştırmayı amaçlamaktadır.

Yöntemler: Bu retrospektif çalışma, 2019–2023 yılları arasında üçüncü basamak bir dermatoloji kliniğinde takip edilen, klinik olarak HS tanısı almış erişkin hastalar ile sağlıklı kontrolleri içermektedir. ABO ve Rh kan grupları standart aglütinasyon yöntemleriyle belirlenmiştir. İstatistiksel analizler ki-kare ve t-testi kullanılarak yapılmıştır.

Bulgular: Analize 100 HS hastası ve 365 sağlıklı kontrol dahil edilmiştir. ABO kan grubu dağılımı iki grup arasında benzer bulunmuştur (p=0,650). Her iki grupta da en sık görülen kan grupları A Rh(+) (sırasıyla %40 ve %39,2) ve O Rh(+) (sırasıyla %30 ve %27,7) olmuştur. Rh faktörü dağılımı da benzer olup, hastaların %89'u ve kontrollerin %89,6'sı Rh pozitif bulunmuştur (p=1,000). ABO ve Rh kan grupları birlikte değerlendirildiğinde de gruplar arasında istatistiksel olarak anlamlı fark saptanmamıştır (p=0,958).

Sonuç: Bu çalışma, ABO veya Rh kan grupları ile hidradenitis suppurativa gelişimi arasında anlamlı bir ilişki saptamamıştır. Ancak, bu sonuçların doğrulanması ve hastalığın olası genetik ya da immünolojik bağlantılarının ortaya konması için daha geniş kapsamlı ve çok merkezli çalışmalara ihtiyaç vardır.

Anahtar kelimeler: Hidradenitis suppurativa, Kan grupları, ABO antijenleri, Rh antijeni.

INTRODUCTION

Hidradenitis suppurativa (HS) is a chronic, inflammatory, and recurrent skin disease characterized by painful, inflamed lesions primarily occurring in regions where apocrine glands are present, commonly found in the axillary, inguinal and anogenital areas[1]. The estimated prevalence of HS is approximately 1%. Although the exact pathophysiology and etiology of HS remain unclear, a family history is reported in about one-third of patients, suggesting a genetic component. Recent studies indicate that the genetic background of HS is complex, involving multiple genes and possible environmental factors, rather than a single autosomal dominant inheritance pattern[2]. Hormonal influences have also been implicated in HS, supported by its higher prevalence in women and symptom fluctuations with hormonal changes, including premenstrual exacerbations and improvement during pregnancy, possibly related to elevated estrogen levels[3].

The ABO blood group system consists of complex carbohydrate molecules on the surface of erythrocytes, comprising four groups: A, B, AB, and O, located on chromosome 9 (9q34.2). ABO antigens are present on erythrocytes, endothelium, platelets, lymphocytes, and epithelial cells, as well as in soluble forms secreted by the body[4]. Alterations on chromosome 9 can lead to various diseases, and since ABO blood group antigens are encoded by this chromosome, they serve as useful markers for studying disease associations. The inheritance of ABO antigens is not affected by environmental factors, making the relationship between blood type and disease a longstanding and relevant research topic[5].

Previous studies have shown associations between blood groups and various diseases, such as a higher risk of stomach cancer in blood type A, and links to cardiovascular diseases, infections, and autoimmune disorders[6]. Additionally, the relationship between blood groups and skin diseases, including acne vulgaris, Behçet's disease, psoriasis, pemphigus, vitiligo, alopecia areata, oral lichen planus, discoid lupus erythematosus, and skin tumors, has been investigated[7-18]. However, there is

limited evidence regarding the association between ABO blood groups and hidradenitis suppurativa. This study aims to determine the association between blood groups and hidradenitis suppurativa through a retrospective evaluation.

METHODS

This retrospective study included 100 patients aged 18 and over with hidradenitis suppurativa who were followed in the tertiary hospital Dermatology Clinic between January 2019 and 2023 and had recorded blood groups. The patients included were previously diagnosed with HS based on clinical criteria. Age, gender, and blood types were recorded. Additionally, 365 healthy individuals were enrolled in the study. Individuals with systemic diseases such as diabetes mellitus, autoimmune diseases, kidney and liver diseases, cardiovascular diseases, neurological or pulmonary system diseases, any skin diseases, history of malignancy, and active local or systemic infections were not included in the control group. Blood samples were picked up from each donor's venous circulation into vacuum tubes containing ethylenediaminetetraacetic acid (Vacutainer, Becton Dickinson, Marseille, France). ABO and Rh blood type determinations were carried out using tube and gel methods. Participants were classified into A, B, AB, O blood groups and Rh+ and Rh- statuses according to their blood types.

Statistical Analysis

IBM SPSS Statistics 22 software (SPSS Inc., Chicago, IL, United States) was utilized for statistical analysis of the obtained data. The distribution of parameters was evaluated using the Kolmogorov-Smirnov test, and it was determined that the parameters followed a normal distribution. Illustrative statistical methods (mean, standard deviation, frequency) were utilized to evaluate the data of the study. Student's t-test was employed for the comparison of quantitative data, while Chi-square test, Continuity (Yates) correction, and Fisher Freeman Halton Exact Chi-square test were utilized for the comparison of qualitative data. Odds ratio was calculated for univariate risk. Statistical significance was assessed at $p<0.05$ level. Informed consent was taken from all participants included in the study. Ethics Committee was obtained on the date September 23, 2023; Decision No: 46. The study was carried out in terms with the principles of the Helsinki Declaration.

RESULTS

The study included 100 patients and 365 control subjects, with a total sample size of 465 participants. The patient group had a significantly higher proportion of males than the control group (73% vs. 51.2%, $p<0.001$). The risk of HS occurrence in males is 2.574 times higher (OR: 2.574; 95% CI: 1.582-4.188). The mean age was 38.95 ± 12.85 years in the patient group and 36.46 ± 10.89 years in the control group ($p=0.079$). There was no significant difference in ABO blood group distribution between the groups ($p=0.650$). Blood group A was present in 43% of both patients and controls (43/100 vs 157/365), while blood group O was observed in 36% of patients and 31.5% of controls (36/100 vs 115/365). Blood group B was detected in 16% of patients and 17.3% of controls (16/100 vs 63/365), and blood group AB in 5% of patients and 8.2% of controls (5/100 vs 30/365). The Rh factor distribution was similar between groups ($p=1.000$), with 89% of patients and 89.6% of controls being Rh-positive. The combined ABO and Rh blood group distribution showed no statistically significant differences ($p=0.958$). The most frequent blood group was A Rh(+) (40% in patients, 39.2% in controls), followed by O Rh(+) (30% in patients, 27.1% in controls). Rh-negative subgroups were less common, with A Rh(-) observed in 3% of patients and 3.8% of controls (Table 1).

Table I: Demographic characteristics, ABO and Rh blood group distribution of the patient and control groups.

		Patient (n=100)	Control (n=365)	Total (n=465)	p
Gender n (%)					
	Female	27 (27%)	178 (48.8%)	205 (44.1%)	[1]**0.001***
	Male	73 (73%)	187 (51.2%)	260 (55.9%)	
Age Mean±SD		38.95±12.85	36.46±10.89	36.99±11.37	[2]0.079
ABO group	**A**	43 (43%)	157 (43%)	200 (43%)	
	B	16 (16%)	63 (17.3%)	79 (17%)	[1]0.650
	O	36 (36%)	115 (31.5%)	151 (32.5%)	
	AB	5 (5%)	30 (8.2%)	35 (7.5%)	
Rh	**(-)**	11 (11%)	38 (10.4%)	49 (10.5%)	[3]1.000
	(+)	89 (89%)	327 (89.6%)	416 (89.5%)	
ABO/Rhn (%)	**A Rh(-)**	3 (3%)	14 (3.8%)	17 (3.7%)	
	A Rh(+)	40 (40%)	143 (39.2%)	183 (39.4%)	
	B Rh(-)	2 (2%)	6 (1.6%)	8 (1.7%)	
	B Rh(+)	14 (14%)	57 (15.6%)	71 (15.3%)	[4]0.958
	O Rh(-)	6 (6%)	16 (4.4%)	22 (4.7%)	
	O Rh(+)	30 (30%)	99 (27.1%)	129 (27.7%)	
	AB Rh(-)	0 (0%)	2 (0.5%)	2 (0.4%)	
	AB Rh(+)	5 (5%)	28 (7.7%)	33 (7.1%)	

*1 Chi-square test 2 Student t-test 3 Continuity (Yates) correction 4 Fisher Freeman Halton Exact test *p<0.05*

The distribution of ABO and Rh blood groups according to gender was evaluated separately in the patient and control groups. In the patient group, blood group A was the most frequent in both females (37%) and males (45.2%), followed by blood group O (48.1% in females, 31.5% in males). Blood groups B and AB were less common, with proportions of 11.1% and 3.7% in females, and 17.8% and 5.5% in males, respectively. No significant difference was found in ABO blood group distribution between genders (p=0.531). The Rh-positive rate was 88.9% in females and 93.2% in males. The combined ABO/Rh blood group distribution did not show significant variation between genders (p=0.839). In the control group, blood group A remained the most common in both females (44.4%) and males (41.7%), followed by blood group O (29.2% in females, 33.7% in males). Blood groups B and AB were observed in 19.7% and 6.7% of females, and 15% and 9.6% of males, respectively. No significant difference was found in ABO blood group distribution between genders (p=0.428). The Rh-positive rate was 94.4% in females and 95.5% in males. The combined ABO/Rh blood group distribution did not differ significantly between genders (p=0.463) (Table2).

Table II: Evaluation of blood groups according to gender in patients and control group

			Female	Male	Total	p
			n (%)	n (%)	n (%)	
Patient Group	Blood group	A Rh(-)	0 (0%)	3 (4.1%)	3 (3%)	
		A Rh(+)	10 (37%)	30 (41.1%)	40 (40%)	
		B Rh(-)	0 (0%)	2 (2.7%)	2 (2%)	
		B Rh(+)	3 (11.1%)	11 (15.1%)	14 (14%)	0.839
		O Rh(-)	2 (7.4%)	4 (5.5%)	6 (6%)	
		O Rh(+)	11 (40.7%)	19 (26%)	30 (30%)	
		AB Rh(+)	1 (3.7%)	4 (5.5%)	5 (5%)	
	ABO	A	10 (37%)	33 (45.2%)	43 (43%)	
		B	3 (11.1%)	13 (17.8%)	16 (16%)	0.531
		O	13 (48.1%)	23 (31.5%)	36 (36%)	
		AB	1 (3.7%)	4 (5.5%)	5 (5%)	
Control Group	Blood group	A Rh(-)	7 (3.9%)	7 (3.7%)	14 (3.8%)	
		A Rh(+)	72 (40.4%)	71 (38%)	143 (39.2%)	
		B Rh(-)	2 (1.1%)	4 (2.1%)	6 (1.6%)	
		B Rh(+)	33 (18.5%)	24 (12.8%)	57 (15.6%)	0.463
		O Rh(-)	10 (5.6%)	6 (3.2%)	16 (4.4%)	
		O Rh(+)	42 (23.6%)	57 (30.5%)	99 (27.1%)	
		AB Rh(-)	1 (0.6%)	1 (0.5%)	2 (0.5%)	
		AB Rh (+)	11 (6.2%)	17 (9.1%)	28 (7.7%)	
	ABO	A	79 (44.4%)	78 (41.7%)	157 (43%)	
		B	35 (19.7%)	28 (15%)	63 (17.3%)	0.428
		O	52 (29.2%)	63 (33.7%)	115 (31.5%)	
		AB	12 (6.7%)	18 (9.6%)	30 (8.2%)	

Fisher Freeman Halton Exact test

DISCUSSION

Hidradenitis suppurativa, is a chronic inflammatory multifactorial skin disease where genetic and environmental elements have a major effect in its development, particularly affecting regions of the body rich in apocrine sweat glands. The main mechanism in HS pathophysiology comprises the follicular occlusion of the folliculopilosebaceous unit, followed by follicular rupture and the subsequent immune responses that occur. Due to the inflammatory vicious cycle, patients experience pain, discharge, purulence, tissue damage, and scarring[7].

The ABO blood group system, a product of specific genes, results in antigens found on the surface of various cell types, including erythrocytes, epithelial cells, and in bodily fluids. The fundamental role of ABO antigens in different diseases may be linked to their interaction with von Willebrand factor, proinflammatory, and adhesion molecules[8]. ABO glycosyltransferase activity can influence endothelial and platelet biology and has been associated with circulating levels of soluble adhesion molecules such as E selectin, P-selectin, and ICAM-1, which regulate leukocyte rolling, firm adhesion, and transmigration, key steps in inflammatory cell recruitment[9]. Because HS is characterized by cytokine-driven inflammation with prominent immune-cell recruitment (including neutrophil-associated pathways involving IL-1β/TNF-α/IL-17), ABO-related differences in adhesion and endothelial activation could represent a biological link to HS susceptibility or phenotype, although our results did not demonstrate an association[10].

Numerous studies have investigated the relationship between ABO blood groups and various skin diseases. Higher frequencies of the AB blood group have been observed in acne

vulgaris patients, suggesting that the co-expression of A and B antigens may stimulate follicular keratinization[11]. Another study of 380 acne vulgaris patients and 1000 healthy controls found that those with blood group A experienced more severe acne, while Rh groups showed no difference[12]. In Behçet's disease, the A blood group prevalence was found similar to the normal population[13]. In psoriasis patients, Türsen et al. noted higher occurrences of A and AB blood groups compared to controls, though not statistically significant[14]. Additionally, another study reported no statistical significance in the prevalence of O blood group although found more common in psoriasis patients[15]. Valikhanive et al. observed the O blood group as most common in pemphigus patients, with no significant difference compared to the normal population[16]. In vitiligo, the B blood group was found more common with no significant correlation with ABO and Rh blood groups compared to controls[17]. İslamoğlu et al. and Altunisik et al. found no significant association between blood groups and alopecia areata or androgenetic alopecia[18,19]. Dahalan et al highlighted the prominence of the O blood group in patients with allergic rhinitis and asthma, while Gangopadhyay et al. reported higher A and B phenotypes in atopic dermatitis patients, with a significantly lower O phenotype[20,21]. However, a Danish study found no significant difference in blood groups among atopic dermatitis patients[22]. Öztürk et al. and Shahidi-Dadras et al. found no relationship between blood groups and rosacea or lichen planus, respectively, while Kumar et al found a significant correlation between oral lichen planus and blood group A[23-25]. Tamega et al found no significant difference in blood group frequency between discoid lupus erythematosus patients and the normal population, but noted an association between the A blood group and the disseminated form of the disease[26].

In our study on hidradenitis suppurativa (HS), we found no statistically significant differences in the distribution of ABO-Rh blood groups between patients and controls. Given the known sex-related/hormonal modulation of HS, we evaluated ABO/Rh distributions stratified by sex; however, no gender-specific differences were observed in blood group distribution within the patient and control groups. Thus, our findings do not support a relationship between blood groups and HS. Despite the established links between ABO blood groups and various diseases, our findings should be interpreted in light of the retrospective single-center design and the relatively limited sample size. In addition, the control group was not sex-matched to cases; therefore, residual confounding by sex cannot be excluded. Larger, multicenter studies are warranted to further clarify any potential association.

CONCLUSION

Our study aimed to investigate the potential role of ABO blood groups in the etiology of hidradenitis suppurativa. The findings indicate no significant relationship between blood groups and HS. The main limitations of our study include its retrospective design and the small sample size. Further research involving larger and more diverse populations is required to confirm these results and better understand the role of blood groups in HS. Future studies should also explore the underlying mechanisms that may link blood groups to inflammatory processes in skin diseases.

Ethical approval: Informed consent was taken from all participants included in the study. Ethics Committee was obtained on the date September 23, 2023; Decision No: 46. The study was carried out in terms with the principles of the Helsinki Declaration.

Conflict of Interest: The authors declared no conflicts of interest.

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