

# The association of ABO blood groups and serum ferritin levels with telogen effluvium in women

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## Abstract

**Aim:** Telogen effluvium (TE) in women is a common problem in dermatology and has multiple etiologic causes. Low iron stores can be a possible contributing factor in TE. Although etiopathogenesis is not fully understood, many studies show remarkable associations between various diseases and ABO blood groups. Genomewide association studies have reported alleles in the ABO locus to be associated with ferritin levels. We had done this study with TE patients to detect serum ferritin levels and to find this relation between blood groups.

**Material and Methods:** Healthy people and patients with TE were included in this study. A total of 103 females who have telogen effluvium and 125 controls were included.

**Results:** ABO blood group and Rhesus factor distribution in patients with TE and distribution of healthy donors were similar. There haven't any significant association between ferritin levels and blood groups in TE patients.

**Conclusion:** There are many different causes in TE etiology, for this reason in our opinion, ferritin levels and other laboratory tests must be done. We conclude that there was no evocation between ABO blood groups, Rhesus factor and ferritin levels in TE, but this is the first study that can show this relationship and can be important for new studies which will be carried out in other centers with wider series.

**Keywords:** Telogen Effluvium; Blood Groups; Rhesus Factor; Ferritin.

## INTRODUCTION

Kligman was first described telogen effluvium in 1961. It is a most common reason of diffuse hair loss in women (1). Hair is linked with femininity, sexuality, attractiveness and personality in women. Hair loss is a condition that lowers the quality of life in women than in men (2).

The normal hair cycle causes all hair on the scalp to be replaced within 3-5 years (1). TE is a non-scarring, diffuse, hair loss that occurs around 3 months after a triggering event and is usually self-limited, ending for over 6 month (3).

A wide kind of potential triggers have been confused in the pathogenesis of TE. For the elucidation of etiology of telogen effluvium, we must do laboratory tests to deport the endocrine, nutritional and autoimmune disorders (4). In 1963, nonanemic iron deficiency was first suggested as an etiologic factor of diffuse hair loss in women, than low iron stores have been considered a possible subscribing factor in both forms (5). It is generally recommended

that to assessment of serum ferritin levels as part of the routine investigation in TE patients. There are very various studies which have evaluated the relationship between reduced ferritin levels and hair loss (5-9).

Blood groups, red cell isoenzymes, hemoglobin variants, and serum proteins are genetic markers used to define the human gene variation like HLA systems. The ABO system has four common blood groups: O, A, B, and AB blood groups are an extremely useful and valuable resource because they are not affected by any environmental factors (10). After the discovery of blood group associations with gastric cancers in 1953, many studies have been done to investigate the relationship between blood types and cancer types, and other diseases (11). There were found significant associations between blood groups and some dermatological diseases such as, Behçet disease, psoriasis, malignant melanoma, keloids, autoimmune diseases, alopecia areata (11-16). And in a study, they found a probable evocation between the ABO blood group and ferritin levels (17). As far as we know, there

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are no studies, showing the association between telogen effluvium and blood groups. Here, we are getting opinions from these studies done, we aimed to explore, if ABO blood groups are associated with iron stores expressed as ferritin levels and Telogen effluvium.

**MATERIAL and METHODS**

This study has been authorized by the Institutional Review Board of Selçuk University Ethics Committee numbered 2018/25. All participants got informed consent. Telogen effluvium patients and healthy subjects who applied to our dermatology clinic between January 2018 and March 2018 were included in this study. From all the participants received information about their blood groups and rhesus factor. Serum ferritin levels are routine measured in TE patients. Healty controls didn't have telogen effluvium and other alopecia forms. Upon study enrollment, participants completed questionnaire providing health-related information including anthropometric measures, smoking etc.. SPSS (Statistical Package for Social Sciences) for Windows 22.0 program was used to analyzed the data. Number, percentage, mean, and standard deviation were used as illustrative statistical methods in the evaluation of the data. The relationship between variables was tested by chi-square analysis. The T test was used to compare quantitative continuous data between two independent groups. The findings were evaluated at the 95% confidence interval and at the 5% significance level.

**RESULTS**

A total of 103 females who have telogen effluvium and 125 controls were included to the study. The mean age of telogen group and control group is shown in Table 1.

**Table 1. Age average of groups**

Groups	Telogen effluvium group (n=103)		Control group (n=125)		t	p
	Ort	Ss	Ort	Ss		
Age	25,680	8,084	26,240	7,729	-0,534	0,594

The duration of TE in patient group is 14,631 ± 18,224 month; ferritin levels of patient group is 25,976 ± 21,002 (Table 2).

**Table 2. The duration of TE and ferritin levels of TE patients**

	N	Ort	Ss	Min.	Max.
Duration (month)	103	14,631	18,224	1,000	120,000
Ferritin levels (ug/L)	103	25,976	21,002	2,750	118,500

There was no significant relationship between ABO blood group and patients or control group (X<sup>2</sup>=0,570; p=0,903>0.05). Thirty two of the patients (%31,1) were O, 45 (%43,7) were A, 8 (%7,8) were AB, 18 (%17,5) were B; it was seen that 44 of the control group (%35,2) were O, 49 (%39,2) were A, 10 (%8,0) were AB, 22 (%17,6) were B.

There was no relationship between Rhesus factor and patients and control group too (X<sup>2</sup>=0,374; p=0,341>0.05). Twelve of the patients (%11,7) were Rh (-), and 91(%88,3)

were Rh (+); 18 (%14,4) of the control group were Rh (-) and 107 (%85,6) were Rh (+) (Table 3).

**Table 3. Relationship between blood groups and Rhesus factor**

		TE group		Control group		p
		n	%	n	%	
Blood groups	O	32	%31,1	44	%35,2	X <sup>2</sup> =0,570 p=0,903
	A	45	%43,7	49	%39,2	
	AB	8	%7,8	10	%8,0	
Rhesus factor	B	18	%17,5	22	%17,6	X <sup>2</sup> =0,374 p=0,341
	(-)	12	%11,7	18	%14,4	
	(+)	91	%88,3	107	%85,6	

Ferritin values were evaluated in two groups as below 40ug/L and above 40ug/L. There was no significant relationship between ABO blood group and Rhesus factor and ferritin levels. Ferritin levels ≤40ug/L were 26 (%30,6) of O, 38 (%44,7) of A, 6 (%7,1) of AB, 15 (%17,6) of B, 10 (%11,8) of Rh (-), 75 (%88,2) of Rh (+); ferritin levels ≥40ug/L were 6 (%33,3) of O, 7 (%38,9) of A, 2 (%11,1) of AB, 3 (%16,7) of B, 2 (%11,1) of Rh (-), 16 (%88,9) of Rh (+) (Table 4).

**Table 4. Relationship between blood groups, Rhesus factor and ferritin levels**

		Ferritin levels≤40ug/L		Ferritin levels≥40ug/L		p
		n	%	n	%	
Blood groups	o	26	%30,6	6	%33,3	X <sup>2</sup> =0,473 p=0,925
	A	38	%44,7	7	%38,9	
	AB	6	%7,1	2	%11,1	
Rhesus factor	B	15	%17,6	3	%16,7	X <sup>2</sup> =0,006 p=0,650
	(-)	10	%11,8	2	%11,1	
	(+)	75	%88,2	16	%88,9	

**DISCUSSION**

This is the first study that shows the possible relation between blood groups and serum ferritin levels with telogen effluvium in women. Previous studies have shown other disease associations with blood groups and have not been associated with ferritin levels with TE. In these studies, they have demonstrated the associations between blood groups and certain skin diseases (11-16). This association has elucidated some aspects of the pathogenesis of these disorders. In malignancies such as stomach, colon and rectum, ovary, uterus, cervix, and salivary glands, blood group A has been demonstrated to be significantly more prevalent compared with O blood group (18,19). In malignant melanoma showed a statistically significantly increased risk in the O Rh-negative group (11). During the last two decades, several reports associated various infections with particular ABO blood groups, such as tuberculoid and lepromatous leprosy, gonore, smallpox and Escherichia Coli O 157 infection (18-20). In a new study, showing the connection

of alopecia areata which is a type of hair loss, they didn't find a significant relationship between blood groups and alopecia areata. A blood group was the most common group in the study groups. However, when they looked at the Rhesus factor, they found that the alopecia areata is more associated with the positive ones. And finally this study, alopecia areata is more common in the Rh-positive people (15). But in our study, we couldn't find a significant relation between blood groups and Rhesus factor with telogen effluvium.

Low serum ferritin levels are related with hair loss in females with TE in many studies (4-9). According to the literature, ferritin values should be at least 40ng/dl (4,21). There are several postulated mechanisms which iron has likely effects on hair growth. Hair follicle matrix cells are some of the fastest growing cells in the body. At the cellular level, ferritin levels are increased in nondividing cells, such as stem cells and terminally differentiated cells, whereas rapidly proliferating cells appear to have lower levels of ferritin and higher levels of free iron.

C-Myc which is a transcription factor controls partly the balance of ferritin and iron (22). Another likely mechanism for the possible effect on of iron on hair growth stems from its requirement as a metabolic cofactor for ribonucleotide reductase, the rate-limiting enzyme for DNA synthesis. Iron depletion can prevent this enzyme from functioning properly, leading to inhibition of proliferation (23).

Recently, a genome wide association study reported that the ABO location was significantly related with ferritin levels. However, it was not possible to establish which ABO blood group was associated with increased ferritin levels (24). In other study, they found non-O individuals have lower ferritin levels and an increased risk of a ferritin level of less than 15 ng/mL for both men and women (17). In our study, we found decreased ferritin levels  $\leq 40$  ug/L in 85 of patients like studies.

But we couldn't find a relationship between reduced ferritin levels in a specific blood group or Rhesus factor. A limitation of our study is, we could not compare the ferritin values with the control groups.

## CONCLUSION

In conclusion, the associations with dermatological diseases and blood groups are a low probability but an interesting hypothesis. The results of the mentioned studies, serum ferritin levels reflect total body iron storage and decreased ferritin levels are an etiological factor for TE. Our findings could not show a relationship between blood groups and serum ferritin levels but further studies in different centers with larger groups may be more valuable to identify this hypothesis clearly and the high number of control groups will increase the accuracy of this association.

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