

# Retrospective evaluation of laboratory data of patients with telogen effluvium

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## Abstract

**Aim:** Telogen effluvium (TE) is a diffuse non-cicatricial alopecia that is frequently encountered in daily practice. This study aimed to evaluate laboratory data (whole blood count (WBC), iron (Fe), iron binding capacity (TIBC), ferritin, B12 and vitamin D, Zinc (Zn)) of female patients with chronic TE.

**Material and Methods:** One hundred seventy nine female patients who applied to Selçuk University Faculty of Medicine Hospital's dermatology polyclinic between June 2015 and March 2017 with chronic TE (TE complaint of longer than 6 months) were included in the study.

**Results:** The mean age of the patients was 24±7.4 years. The levels of hemoglobin (HGB) (8.9%) and hematocrit (HCT) (8.9%) , mean corpuscular volume (MCV) (16.2%), Fe (16.8%) , vitamin B12 (15.1%), Zinc (62%) and vitamin D (68.7%) were lower, TIBC (39.7%) level was higher than the reference range.

**Conclusion:** Although the examinations related to the chronic TE etiology are not clear, we think that laboratory evaluation should be performed for the parameters of vitamin D, B12, Zn and anemia in these patients and the remedy of their deficiencies through supplements may be useful in the treatment.

**Keywords:** Iron; telogen effluvium; vitamin B12; vitamin D; zinc

## INTRODUCTION

Telogen effluvium (TE) was first identified by Kligman in 1961. Telogen is a hair loop abnormality that results in excessive loss of hair. TE is classified in two groups. Acute or classical TE; it manifests itself with extensive hair loss 2-3 months after triggering events such as high fever, major surgery, sudden starvation and then limits itself within 2-3 months. If diffuse hair loss lasts longer than 6 months, it is called chronic TE (1). Various vitamins and minerals such as B12, vitamin D and iron (Fe), zinc (Zn) play a role in the development of hair follicle. Nutritional deficiency causes hair loss and laboratory tests are requested according to the patient's history. Although there have been many studies on the relationship between TE and vitamin and mineral deficiencies and the supplement effectiveness of these deficiencies in the treatment, no clear result has been obtained about which

type of examinations can be required in the patients who presents with TE (2). In our study, we have retrospectively analyzed the laboratory values; whole blood count (WBC), Fe, iron binding capacity (TIBC), Ferritin, B12 and vitamin D and Zn of female patients with chronic TE according to the reference intervals. In this way, we aimed to determine changes in laboratory values in patients with TE.

## MATERIAL and METHODS

In our study, 179 female patients who applied to Selçuk University Faculty of Medicine Hospital's dermatology clinic between June 2015 and March 2017 with chronic TE (TE complaint of longer than 6 months) were included in the study. The study was approved by the Local Ethics Committee of Faculty of Medicine of Selçuk University (approval number: 2017/115). Patients with outstanding laboratory results, oral contraceptive use

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and chemotherapy, history of surgery, pregnancy, scalp scar and atrophy were not included in the study. The data were evaluated by SPSS statistics program and the value, mean, standard deviation of each parameter, the rate of incidence and frequency at overall patients were recorded.

## RESULTS

The mean age of the patients was 24±7.4 years. While, of 179 patients with chronic TE, in 16 (8.9%) the hemoglobin (HGB) and hematocrit (HCT) levels, in 29 (16.2%) the mean corpuscular volume (MCV) levels, in 30 (16.8%) the Fe levels, in 27 (15.1%) the Vitamin B12 level, in 111 (62%) the Zn level, in 123 (68.7%) the vitamin D level were lower than the reference range, in 71 (39.7%) the TIBC level was found higher than the reference range. Ferritin level was present in 49 of 179 patients. Ferritin level was found to be below the minimum value in 16 (32.7%) of 49 patients (Table 1).

**Table 1. The mean values of vitamins and minerals parameters, reference ranges and the ratio of cases below the reference value in patients with TE**

Parameters	Mean±SD	Reference Value	Case Rate under Reference Value n (179)
HGB	13.2 ± 1.14	12-15,5	8.9% (16)
HCT	39.6 ± 3.79	34.9-44.5	8.9% (16)
MCV	87.3 ± 6.24	81.6-98.3	16.2% (29)
Zn	10.21 ± 1.56	10.7-17.5	62% (111)
Fe	68.4 ± 38.6	37-65	16.8% (30)
TIBC	283.3 ± 75.47	155-300	39.7% (71)*
Ferritin	29.8 ± 23.03	13-150	32.7 % (16)**
Vit B12	302 ± 122	191-663	15.1 % (27)
Vit D	14.3 ± 17.3	20-50	68.7% (123)

\* TIBC level was found higher than the reference range

\*\* Ferritin level was present in 49 of 179 patients. Ferritin level was found to be below the minimum value in 16 (32,7%) of 49 patients.

## DISCUSSION

TE is the most common diffuse non-cicatricial alopecia. Chronic TE, which lasts longer than 6 months, occurs most frequently in women, in the 4th and 5th decade (3). The pull test, the trichogram, the photo trichogram, the histopathological examination of punch biopsy can be used in the diagnosis (4). Chronic diffuse TE is multifactorial and Fe deficiency anemia, thyroid diseases, malnutrition, Zn deficiency are shown as the most common causes (5).

Fe deficiency is one of the most common nutritional deficiencies in daily life. The most common cause of Fe deficiency anemia in women in premenopausal period is pregnancy and menstrual blood loss (6). Deloche et al. (7) in their study of 5110 patients between the ages of 35 and 60 years with extensive hair loss the low ferritin level (<40microg / L) was evident and recommended to examine the serum ferritin levels in these patients. Many studies examined the relationship between Fe deficiency

and hair loss but the results are contradictory (8). Although some authors (9) reported a reduction in hair loss following a treatment of Fe deficiency, there are also some who reported on the contrary that there is no help of Fe supplement in the chronic TE and no direct relationship can be established between low serum ferritin and hair loss (10).

In the study of Avcı et al. (11) who retrospectively evaluated the laboratory findings of 563 patients with TE at a Medical University Hospital, the low serum Fe was found in 13.68%, TIBC in 39.25%, HCT in 9.59% of the patients. In this study, while 30.91% of patients had low ferritin levels, HGB levels were not taken into consideration. In our study, similarly, HGB and HCT levels were low in 8,9% patients and Fe levels in 16,8% of patients and the 39,7% of patients had high TIBC. In our study, ferritin level was measured in 49 of 179 patients. Ferritin level was found to be below the minimum value in 16 of 49 patients. Although we do not have any data on the severity of hair loss, we believe that Fe deficiency in patients with chronic TE should be investigated.

Zn is a potent inhibitor of hair root regression and accelerates regeneration in the hair root (12). Besides Zn deficiency can lead not also to TE but also to thin, white and brittle hair (13). Although the Zn deficiency is one of the leading causes in TE, there are no conclusive data yet showing the relationship between Zn and hair loss (3). In the study of Khudhair et al. (14) in which they compared a group of patients with chronic TE (n = 100) and a control group (n = 50) Zn levels were found significantly lower compared to the control group. On the contrary in the studies of Özden Guler et al. (15) and Cheung et al. (2) the Zn deficiency is found respectively in only 9% and 9.6% of the patients. In our study, 111 of the 179 patients (62%) were found to have lower Zn levels than the reference range. Zn deficiency in children and women, is common in Turkey because of the grain-based nutrition. The high percentage of bread consumption and lower Zn and higher phytate content of this bread, reduces the bioavailability of Zn. The fact that grain-weighted nutrition is widespread in Konya, Central Anatolian city and Zn content in the grain content is a risk for Zn deficiency (16). We consider that, the low level of Zn found in the most of our patients may be related to a general Zn deficiency as well as its association with TE.

Vitamin B12 is a cyanocobalamin and abundant in red meat, chicken, fish and eggs. The relationship between low serum B12 vitamin concentrations and increased hair loss is still unclear (8,9). In our study, vitamin B12 levels were found to be low in 27 of 179 patients (15.1%). In two separate studies performed in patients with TE regardless of whether TE is chronic or not, and conducted by Avcı et al. (11), and Cheung et al (2) the B12 deficiency was identified as 3.02% and 2,6% respectively. Perihan et al. (8), in a study performed among female patients with chronic TE, a B12 deficiency was found at a rate of 21.2%,

closer to our results. Based on these data, we think that chronic TE and B12 deficiency may be related.

Vitamin D plays a role in hair growth, keratinocyte differentiation and hair follicle cycle. In many studies in patients with several types of non-cicatricial alopecia, serum 25-hydroxyvitamin D levels have decreased, therefore it is suggested that it plays a role in the pathogenesis of hair loss (17). In a study in which the serum ferritin and 25-hydroxyvitamin D levels of 80 patients with chronic TE and female pattern hair loss (FPHL) and of 40 healthy women were compared, it was found that they were low and there was an association with disease severity at both parameters in patient groups (18). Nayak et al. (19) showed that vitamin D deficiency was significantly higher in patients with diffuse hair loss compared to the control group (81.8%, 45.5%, respectively), while vitamin D levels were significantly lower in female patients than in the control group. In our study, 68.7% of patients had lower levels of vitamin D. In a study by Güzel et al. (20), ultraviolet light utilization rates were evaluated in Turkish women, compared among young Turkish women with covered and non-covered dressing habits and although vitamin D deficiency was not found in women wearing covered clothing, Vitamin D levels were considerably lower compared to women with uncovered dressing habit group. Since the clothing habits of the women in the city where our study is performed are generally covered, we also found a high rate of vitamin D deficiency in our cases similar to those in this study. Although the relationship between hair loss and vitamin D has not been clarified yet, it is recommended to examine serum vitamin D levels in hair loss (13,17,21-22). Similarly, we also believe that vitamin D levels in chronic TE patients should be required by considering many risk factors such as living, indoor clothing style and seasonal changes influencing Vitamin D.

The limitations of our study are as follows.

- 1) Since it is a retrospective study, data on disease severity and course are limited,
- 2) Post-treatment responses of patients with vitamin and mineral deficiency were not evaluated,
- 3) No comparison with the control group.

Many nutritional supplements are frequently used in the treatment of hair diseases, but data on their use in patients with no deficiency are limited (13).

## CONCLUSION

As a result, all these nutritional reasons playing a role in any mechanism involved in the hair cycle may lead to the emergence of TE in their deficiencies. Although the investigations for chronic TE etiology are not clear, it may be useful in the treatment to examine of vitamin D, B12, Zn and Fe deficiency in these patients and remedy these deficiencies with the help of supplements. We believe that prospective control based comparative studies to be performed will be more enlightening.

*Competing interests:* The authors declare that they have no conflict of interest.

*Financial Disclosure:* There are no financial supports.

*Ethical approval:* The study were approved by the Selçuk University Faculty of Medicine Local Ethics Committee (approval number: 2017/115)

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