

Serum Zinc level in Telogen Effluvium Patients

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Abstract

2-3 months after a stressor, such as stress, medications, trauma, endocrine disorders, nutritional deficiencies, event feverish conditions, telogen effluvium (TE) is characterised by diffuse hair loss. Zinc is an essential cofactor for more than 300 hair follicle enzymes with crucial physiological roles. The purpose of this research was to determine the zinc concentration in the serum of TE patients. This was a case-control study with 25 patients with TE (Group A) and 20 persons of the same age and gender who seemed to be healthy (Group B). Zinc levels in the Serum of all participants were evaluated. Comparing the sick group to the control group, serum zinc levels were insignificant.

Keywords: Serum, Zinc level in Telogen Effluvium, Patients.

1. Introduction

Telogen effluvium (TE) is one of the most prevalent types of hair loss, often affecting less than fifty percent of hair with diffuse, non-scarring club hair loss. In the majority of instances, its pathomechanism is defined by an aberrant shift in follicular cycling with distributed synchronisation of hair follicles in the telogen phase, leading to a worldwide rise in the number of hair follicles susceptible to falling out. Sometimes hair loss is severe, accompanied by obvious thinning [1].

Vitamins and minerals are needed for cell development and function, including appropriate hair cycle maintenance. Low levels of iron, zinc, and vitamin D have been demonstrated to be related with acute and chronic TE, although a causal association has not been proved. Type III TE (premature entrance into the telogen phase) is seen in nutritionally deficient people [2].

Zinc is an important trace element with several functions in human nutrition. Zinc is necessary for hair follicle functioning activities and aids in hair follicle healing. Zinc deficiency really causes degeneration of the protein structure that makes up the hair follicle; this weakening of follicles causes hair loss and shedding (3). Zinc may also influence hair biology via its immune-modulating properties. It produces an indirect antioxidant effect by inducing molecules such as metallothionein, the ultimate antioxidant. Moreover, zinc is a powerful inhibitor of endonucleases, the major components of the apoptotic mechanism, given the critical function of keratinocytes death in HF regression during the "catagen" phase of the hair cycle (4).

Zinc functions as a coenzyme throughout four phases of the cell cycle: G1, S, G2, and mitosis. In the G1 stage, RNA synthesis, protein synthesis, and cell size expansion occur. DNA synthesis occurs at S stage. In the G2 phase, cell division occurs, while mitosis involves nuclear division. In every one of these metabolic processes, zinc functions as a coenzyme. As DNA and RNA are required for hair follicle cell division and good hair development during the anagen stage of the hair growth cycle, zinc deficiency causes hair loss by preventing hair follicle cell division (5).

2. Patient and method

This research comprised 25 patients with TE and 20 healthy volunteers of similar age, gender, and body mass index. The Research Ethical Committee of Benha Faculty of Medicine authorised this research. Before obtaining blood samples, all patients and normal subjects provided written informed permission.

The exclusion criteria were as follows: presence of any type of alopecia other than telogen effluvium, BMI > 30, history of thyroid abnormality, patients who received any systemic or topical therapy at least 4 weeks prior to enrollment, history of systemic disease such as chronic liver or renal diseases, autoimmune diseases, and cardiovascular disease, history of previous surgery, pregnancy or lactation, low calorie diet, severe weight loss, active smoking.

3. Results

The patients and control groups showed a non-significant differences as regards age (P = 0.404), sex (P = 1.0), and BMI (P = 0.214) (Table 1).

Table (1) General characteristics of the studied groups

	Group A (n = 25)	Group B (n = 20)	P-value
Age (years)	27 ±6	28 ±3	0.404
sex			
Males	2 (8.0)	3 (15.0)	1.0
Females	23 (92.0)	17(85.0)	
BMI (Kg/m ²)	24 ±2	24 ±1	0.214

Regarding clinical examination, all patients had positive hair pull test and diffuse thinning. About one-third of the patients had Sinclair hair grade of 5, while two-thirds (66%) had Sinclair hair grade of 6.

There were no statistically significant differences were reported in zinc level (p = 0.551) between two groups Table (2).

Table (2) zinc in the studied groups

	Group A (n = 25)	Group B (n = 20)	P-value
Zinc (µg/dl)	126.2 ±25.4	129.2 ±23.9	0.551

4. Discussion

Telogen effluvium is a hair cycle deviation marked by severe telogen hair loss. It has several causes, including stress, starvation, surgery, pregnancy, and thyroid problems, resulting in hair loss throughout the whole scalp [6].

Zinc is essential for cell proliferation and differentiation, and it is engaged in a vast array of metabolic activities, including the creation of proteins and nucleic acids. Zinc is one of the elements in the aetiology of TE that has been investigated the most. Moreover, even in the absence of shortage, it has been frequently utilised to cure hair loss [7].

In the present investigation, serum zinc levels did not vary significantly between TE patients and controls. Regarding serum zinc levels in TE patients, research were contradictory.

Our results concurred with those of Rushton (2002) and Yavuz et al. (2018), who investigated zinc levels and found no statistically significant difference between TE patients and controls [8, 9]. Yavuz et al. (2018) investigated the blood zinc levels of 40 TE patients and 30 apparently healthy controls and found no statistically significant changes ($p=0.641$) between the two groups [9].

Our findings are consistent with those of Yorulmaz et al. (2022) and Farah et al. (2021), who demonstrated that the mean serum level of zinc in the TE case group was lower than in the control group, although the difference was not statistically significant [7, 10].

Mohammad et al. (2020) investigated blood levels of vitamin D and zinc in two groups of 50 TE Cases and 50 controls using the ELISA method. Zinc serum levels in the case group were 75/99 20/17 (g / dl) and in the control group they were 70/73 18/09 (g / dl), which was not statistically different from the control group [11].

In contrast to the findings of Hamad et al. (2010), Sinclair (2005), Nazik and Bengu (2019), and Surit et al. (2019), we observed significantly lower serum zinc levels in instances with telogen effluvium compared to controls (12)(13)(14). [15].

5. Conclusion

The mean blood zinc levels of telogen effluvium patients were different from those of healthy volunteers, although this difference was not statistically significant. In conclusion, it is suggested that more comprehensive research with bigger sample sizes and more exact sampling be conducted to study the problem.

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