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Clinical profile of female patients with chronic telogen effluvium and its association with serum ferritin level

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ABSTRACT

Background: Diffuse hair loss persisting longer than 6 months without any cause is referred to as chronic telogen effluvium (CTE). The role of iron deficiency without anemia in causing chronic diffuse hair loss is unclear. Some studies have reported a critical threshold of 40 mcg/mL of serum ferritin, below which increased telogen shedding was observed. Screening all patients with CTE for iron deficiency will aid us in finding a possible cause and help in its management. **Aims and Objectives:** To study the clinico-epidemiological profile of female patients with CTE and its association with serum ferritin levels. **Materials and Methods:** Cross-sectional study on 263 female patients aged 13–60 years with CTE attending the Department of Dermatology at Government Medical College, Kottayam. **Results:** The mean age of patients with CTE was 28.92 years. Trichodynia was reported by 20% among which 70% reported associated mental stress which was statistically significant. Bitemporal thinning was noted in 57% and 68% had short growing hairs in the frontal/bitemporal region. The hair pull test was positive in 37.6%, high visual analog grade of hair loss in 92%. Only 32% had anemia (Hb <12) but 86% had S. ferritin <40 mcg/L with the mean S. ferritin being 23.93 ng/mL and the majority were in the age group of 20–29 years. **Conclusion:** The majority were found to have low serum ferritin levels without clinical anemia, which could indicate an association between low iron stores and CTE. Additional case–control studies are needed to establish the role of iron deficiency in causing hair loss.

Key words: Chronic telogen effluvium; Trichology; Ferritin

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INTRODUCTION

Hair holds enormous importance in social interactions and boosting one's confidence. Therefore hair loss is understandably a very important issue encountered in dermatology clinics. One of the most common presentations is diffuse hair loss persisting longer than 6 months without any discernable cause due to an idiopathic change in hair dynamics, referred to as chronic telogen effluvium (CTE).[1]

Women unlike men constitute the majority of such patients, likely because they find it more distressing, with less societal acceptance leading to diminished self-esteem and even depression.[2] CTE is difficult to manage since the cause is often inapparent. The key lies in evaluating the commonly implicated causes such as iron deficiency, thyroid disorders, hypoproteinemia, and metabolic disturbances.[2]

Profound iron deficiency anemia is known to cause diffuse telogen hair loss however the association of mild anemia or iron deficiency without anemia with chronic diffuse hair loss is more complex.[1] Iron deficiency without anemia was first suggested as an etiological factor for diffuse hair loss in women in 1963.[3] Many studies have tried to explore this association since then with varying results. Most studies rely on serum ferritin as a sensitive marker of iron storage in the body. Some studies have observed that the critical threshold of serum ferritin is 40 mcg/mL, below which increased telogen shedding was observed. Moreover, some

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have even reported enhanced hair growth when S. ferritin exceeds 70 ng/mL.[4,5]

Screening all patients with CTE for iron deficiency using serum ferritin, even if there is no clinically detectable pallor or reduced hemoglobin will aid us in identifying a possible cause for CTE and help in its management. Through this study, we aim to find the clinico-epidemiological profile of female patients with CTE and further explore the role of low iron stores in causing CTE.

Aims and objectives

To study the clinico-epidemiological profile of female patients with chronic telogen effluvium and its association with serum ferritin level.

MATERIALS AND METHODS

The approval of the institutional ethical board was obtained from Government Medical College, Kottayam, Institutional Review Board under the letter number (IRB no. 29/2021). This was a cross-sectional descriptive study conducted on 263 female patients aged 13–60 years who were clinically diagnosed with CTE attending the Department of Dermatology, Government Medical College, Kottayam, during a period of 18 months from February 2021 to August 2022. A random sampling method was used. After obtaining informed consent, a brief history was elicited regarding onset, duration, course, and association of stress and trichodynia followed by an examination of the scalp to look for usual features of CTE such as thinning of hair, bitemporal recession, and short growing hairs in frontal/bitemporal regions. The activity of hair shedding was assessed by a hair pull test, where a bundle of 20–60 hairs is grasped between the thumb, index finger, and middle finger from the base near the scalp and tugged firmly. When more than 10% of grasped hairs are pulled out, the test is considered positive. This is positive during the active phase of CTE. The severity of hair shedding was assessed using the Visual Analog Scale by Sinclair,[6] where grades 5 and 6 indicate excessive hair shedding. All patients were subjected to investigations such as hemoglobin, serum ferritin, and thyroid stimulating hormone (TSH). All the information was entered into a prestructured pro forma.

The sample size was calculated using the formula $n=4pq/d^2$. P-value was obtained from a study by Sarkar et al.,[7] where p is the percentage of women with CTE found to have low serum ferritin. P=27.5%, q=72.5%, d=absolute precision=20% of P=5.5. The sample size was calculated to be 263.

Data were coded, verified, and entered in Microsoft Excel, further analysis was done using the statistical software SPSS 20. Statistical analysis was performed by Chi-square test and $P<0.05$ was considered statistically significant.

Inclusion criteria

Consenting non-pregnant females in the age group 13–60 years who are clinically diagnosed as having CTE.

Exclusion criteria

Exclusion criteria were as follows; History of childbirth in the last 6 months, patients on chemotherapy, known thyroid disease/connective tissue disease, known liver or renal diseases, and any current systemic illness.

RESULTS

A total of 263 female patients in the ages of 13–60 years with a clinical diagnosis of CTE were enrolled in the study. The age of the patients ranged from 13 to 58 years with a mean age of 28.92±11.31 years. The highest frequency was seen in the age group 20–29 years and the maximum number of patients reported a duration of hair loss lasting 6–12 months. The onset of hair loss was gradual in 81.7% with a continuous course of hair shedding reported by 91.6% of the patients. 20.9% had trichodynia associated with the hair fall; of them, 70.91% (n=39) were found to have stress which was found to be statistically significant with a P=0.03. Most of the women (74.5%) had menstrual flow duration lasting 5 days or less and the majority reported regular cycles. Only 19.4% had an easily visible scalp (Figure 1) due to decreased hair density but bitemporal hair thinning was noted in 57.4% (Figures 2 and 3), and short growing hairs in frontal/bitemporal regions (Figures 4 and 5) were noted in 68.8%. Hair pull test was positive in 37.6% and, of them, 60% reported having stress. 92.3% reported excessive hair shedding (grades 5 and 6) (Figure 6) based on visual analog grading of hair fall by Sinclair.[6] All the patients had normal

Figure 1: Easily visible scalp with bitemporal recession

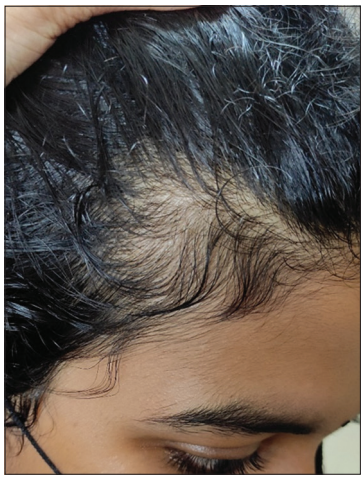

Figure 2: Bitemporal recession with short growing hairs in the temporal region

Figure 3: Bitemporal thinning

TSH values. Hemoglobin ranged from 8 to 15 g/dL with a mean hemoglobin of 12.029±1.3231 g/dL. Only 32.7% of the women had anemia (Hb <12 g/dL). The value of serum ferritin ranged from 3 to 110 ng/mL with a mean of 23.93±17.42 ng/mL. Eighty-six percent of the patients had ferritin below 40 ng/mL.

DISCUSSION

Diffuse hair shedding is a common issue faced by women but identification of its exact cause and treatment is still a challenge. CTE is diagnosed when there is diffuse hair shedding without any perceptible cause lasting beyond 6 months.[1] The association between profound iron deficiency and hair loss is proven; however, various studies have pointed out that iron deficiency even in the absence of clinical anemia due to lower iron stores as measured by serum ferritin can lead to CTE.[8-10] A study by Rushton[11] also found significantly lower hair shedding following iron supplementation in women with low iron stores compared to controls.

Figure 4: Bitemporal thinning with short growing hairs in bitemporal and frontal regions

Figure 5: Short growing hairs in the frontal region

Figure 6: Bundles of hair brought by a patient with excessive hair shedding

In this study, a total of 263 female patients with clinically diagnosed CTE satisfying the inclusion criteria were evaluated. The maximum number of patients were in the age group of 20–29 years with a mean age of 28.92 years. Similar demography was noted in the studies by Fatani et al.,[12] and Sarkar et al.[7] Although CTE was classically described as a condition mainly affecting middle-aged women,[13] the shift in demographics may be due to higher cosmetic concerns in the younger age group. 47.5% (n=125) of patients had a duration of hair fall ranging from 6 to 12 months. In the study by Malkud,[14] the duration of hair loss in CTE ranged from 6 months to 8 years.

70.9% of patients with trichodynia had associated stress and it was statistically significant with a P=0.03. Kıvanc-Altunay et al.,[15] reported that among 17 patients of CTE with trichodynia, 76.5% had associated psychological problems, which was significant in comparison to controls. Trichodynia associated with alopecia may be due to a pathologic alteration of sensorial perception or somatization of the anxiety and depression associated with hair loss; more studies are required to elucidate this dysesthetic symptom and its true origin.[15]

Features such as bitemporal recession and short growing hairs in temporal/frontal areas with the absence of an easily visible scalp constitute the typical features that aid in the diagnosis of CTE and it was present in the majority of the patients. The hair pull test helps us to assess the activity of hair shedding and it was positive in 37.6% of patients similar to a study by Malkud.[14] An approximate estimation of the severity of hair shedding was done using the Visual Analog Scale by Sinclair[6] which revealed excessive hair shedding, that is, grade 5 and 6, in 92.4% of the patients.

As thyroid abnormalities are implicated in causing hair shedding, laboratory tests to assess thyroid dysfunction are recommended in patients with diffuse effluvium of unknown etiology.[16] However, we failed to detect thyroid abnormalities in any of the patients similar to the findings by Malkud.[14]

Although only 32.7% of the patients were found to be anemic with a mean hemoglobin of 12.029 g/dL, comparable to the study by Moeinvaziri et al.,[10] 86% of study patients had serum ferritin below 40 ng/mL with a mean serum ferritin of 23.93 ng/mL. Various studies have explored the role of ferritin in CTE, and our study is comparable.[17,18] The ferritin cut-off used in most studies was ≤40 ng/mL based on the finding by Deloche et al.,[4] that a relationship between hair loss and ferritin was noticed when ferritin level fell below 40 ng/mL. Gangaiah et al.,[18] elucidated the same concept in their study where they reported that 60.7% of patients had serum ferritin ≤40 ng/mL versus 16.7% in controls which was statistically significant; however, only 46.4% of them were found to be clinically anemic. Thus, iron deficiency in the absence of anemia is postulated to result in CTE; however, more case–control studies are required to definitively establish the association between low ferritin and CTE. Further studies that assess the hair fall after iron supplementation to correct serum ferritin could also help to prove this association.

Limitations of the study

1) Lack of a control group.
2) Better quantitative assessment of hair loss is needed.

CONCLUSION

CTE was more common in the age group of 20–29 years in our study. Bitemporal recession and short growing hairs in frontal/bitemporal areas when present in a young female with diffuse hair loss may be suggestive of CTE. Thyroid abnormality was not detected in any of the patients. Serum ferritin was found to be low (≤40 ng/mL) in 86% of the patients which could indicate an association between low iron stores and CTE. It is useful to check for serum ferritin levels while evaluating for causes of CTE as the optimum serum ferritin level for effective treatment of hair loss is higher than those usually recommended for the treatment of anemia.[4] Additional case–control studies are needed to examine the role of iron deficiency in normal hair cycle and to better understand the significance of serum ferritin levels higher than 40 ng/ml in the etiology of hair loss.

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Authors' Contributions:
MS- Definition of intellectual content, literature survey, design of the study, prepared the first draft of the manuscript, implementation of the study protocol, data collection, data analysis, statistical analysis and interpretation, manuscript preparation, and submission of the article; **MZ-** Concept, design, clinical protocol, editing, manuscript revision, coordination, and preparation of figures.

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