A Case Control Study to Determine the Correlation Between Serum Ferritin Levels and Chronic Telogen Effluvium in a Tertiary Hospital, Mandya

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Abstract

Background: Hair loss is a common problem which affects both sex of all ages. Telogen effluvium is the common cause of diffuse non-scarring alopecia. A Low Iron store which is indicated by low serum ferritin level is one of the cause for chronic telogen effluvium.

Objective: This study was undertaken to determine the correlation between serum ferritin levels and chronic telogen effluvium.

Materials and method: Study was undertaken with 40 females with chronic hair loss as cases and 40 healthy age and sex matched females. Serum ferritin levels and hemoglobin were estimated for the case group and some other investigations were done in selected cases as indicated. For controls only measurements of hemoglobin and serum ferritin levels were done and were statistically compared.

Results: 15 out of 40 patients had decreased SFL whereas only 7 out of 40 controls had decreased SFL, which is statistically significant and mean serum ferritin level is statistically significant in the cases compared with control group.

Conclusion: Assessment of SFL in CTE and correcting it plays important role in the management of CTE.

Introduction

Telogen efuvium is a common form of non scaring alopecia characterised by loss of club (telogen) hair in disease states of the follicle. The term telogen efuvium was first coined in 1961 by Kligman. Kligman’s hypothesis was that whatever the cause of the hair loss, the follicle tends to behave in a similar way - the premature termination of anagen. The follicle is precipitated into catagen and transforms into a resting stage that mimics telogen. Acute telogen efuvium is an acute-onset scalp hair loss that occurs 2–3 months after a triggering event such as a high fever, surgical trauma, sudden starvation or haemorrhage. Unless the trigger is repeated, spontaneous complete regrowth occurs within 3–6 months. Chronic diffuse telogen hair loss refers to telogen hair shedding persisting for longer than 6 months. It can be a result of a primary chronic telogen efuvium (CTE) or be secondary to a variety of causes including androgenetic alopecia (AGA). Common causes of chronic diffuse telogen hair loss are thyroid disorders, profound iron deficiency anaemia, acrodermatitis enteropathica and malnutrition. AGA leads to diffuse and episodic hair loss, and mimic a telogen efuvium.

Methods

This study included 80 females attending the outpatient clinic of Dermatology of Mandya Institute Medical Sciences, Mandya. Their age ranged from 15 - 45 years. They were classified into 2 groups, the patient group included 40 females having hair fall for more than 6 months. They were diagnosed as chronic telogen efuvium by clinical examination, trichogram, hair pull test and punch biopsy. The hair pull test was recorded as positive when greater than 25% of hairs are in telogen after the forced extraction of around 20 hairs, confirming the diagnosis of telogen efuvium. Control group included 40 age and sex matched healthy female without hair loss and who attended hospital for different reason.

The exclusion criteria included pregnancy and lactation or woman received any hormonal treatment such as estrogens, progesterone, androgen or thyroxin, dyeing, permanent waving or bleaching procedures, history of operation or exposure to chemical agents or irradiation, no evidence of
systemic diseases or chronic illness, and not on any iron supplementation. Subjects with identifiable causes of hair loss were excluded from the study, e.g., patients with thyroid disease or hyperandrogenism as measured by appropriate tests (thyroid function tests, serum testosterone and dehydroepiandrosterone levels).

Detailed history and through examination was done for the subjects. Hematocrit and SFL estimation was done for both cases and controls. Chi-square and Fisher’s exact t-test was used for statistical analysis.

Results

The mean age was 24.28 ± 6.17 years in patients and 23.11±4.67 years in control respectively. The mean disease duration among cases was 7.1 ± 1.42 months. The serum ferritin levels in patients and control ranged 12-144ng/ml and 14-156ng/ml respectively. Mean is SFL in cases and control were 32.6ng/ml and 39.2ng/ml respectively. Actual difference between the mean is 8.6 which is twice the standard error (SE=1.14) of difference between the two means and therefore low SFL in cases is statistically significant. SFL of 20ng/ml is taken as cut-off and values <20ng/ml is taken as decrease SFL in both cases and controls. A total of 22(27.5%) subjects had values <20ng/ml. 15 out of 40 patients had decreased SFL whereas only 7 out of 40 control had decreased SFL, which is statistically significant.

Discussion

Hair loss is a common problem which affects both sex of all ages. Telogen effluvium is the common cause of diffuse non-scarring alopecia. In a study, women with laboratory anaemia, 88.9% had diffuse telogen hair loss. All women with iron deficiency anaemia had serum ferritin level lower than 30 ng/mL. Generally, serum ferritin is directly related to intracellular ferritin and thus to total body iron stores. Only iron deficiency causes very low serum ferritin concentrations; therefore, low serum ferritin level is very specific for iron deficiency. Guyatt et al in their study concluded that serum ferritin has a greater predictive value than other tests of iron status, such as transferrin saturation and erythrocyte zinc protoporphyrin. Mechanism leading to loss of telogen hair in iron deficiency anaemia is not fully understood but possible explanation is hair follicle matrix cells as the most rapidly proliferating cells in the body appear to have lower levels of ferritin and higher levels of free iron. Another likely mechanism for the possible effect of iron on hair growth stems from its requirement as a cofactor for ribonucleotide reductase, the rate-limiting enzyme for DNA synthesis. Iron depletion could prevent proper function of this enzyme, resulting in inhibition of proliferation.

The mean SFLs in cases was 32.6ng/ml which is statistically significant indicating strong relation between CTE and low SFLs. Similar to present study, Deloche et al and Obaidat et al showed correlation between low SFL and CTE and provide further evidence that the iron status has to be taken into consideration when studying hair loss in women. Sinclair eta al in his study showed no direct relationship between low serum ferritin and hair loss and disproved the usefulness of serum ferritin in the routine investigation of women with chronic diffuse telogen hair loss. This discrepancy could be explained by difference in the design of studies and also serum SFLs measurement gives insight in evaluating CTE.

Conclusion(s)

Assessment of SFL in CTE and correcting it plays important role in the management of CTE.

References

7. Hard S. Non-anemic iron de? ciency as an etiologic factor in diffuse loss of hair of the scalp in women.
Illustrations

Illustration 1

Table

Illustration 1: Mean Hemoglobin & Serum ferritin levels

<table>
<thead>
<tr>
<th></th>
<th>Cases (n=40)</th>
<th>Control (n=40)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age ±SD (in years)</td>
<td>24.28 ± 6.17</td>
<td>23.11 ± 4.67</td>
</tr>
<tr>
<td>Mean Hb (mg/dl)</td>
<td>10.3 ± 1.4</td>
<td>12.1 ± 1.9</td>
</tr>
<tr>
<td>Mean serum ferritin level (ng/ml)</td>
<td>32.6 ± 19.3</td>
<td>39.2 ± 32.6</td>
</tr>
</tbody>
</table>
Illustration 2

Illustration 2: Bar graph indicating serum ferritin levels in cases and control groups
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