Original Article

Association of Serum Ferritin Levels and Non-Cicatricial Alopecia in Females

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Abstract

Objective: To find the association between serum ferritin levels and non-ciatricial alopecia in females.

Methods: 109 premenopausal women, fulfilling the inclusion and exclusion criteria, referred to Dermatology OPD, were enrolled during a period of one year . History taking and physical examination were done and related forms were completed. A clotted sample of blood was taken for measurement of serum ferritin level and haemoglobin level.

Results: Mean age of patients was 26.79 ± 6.962. Three clinical sub-types were noted i.e. out of total patients of non-scarring alopecia, 71 were suffering from chronic telogen effluvium (CTE), 23 from alopecia areata (AA) and 15 from androgenetic alopecia (AGA).

Among these 109 females, 19 (17.4 %) had optimal serum ferritin levels and 90 (82.6 %) had suboptimal serum ferritin levels.

Patients with non-scarring alopecia have significantly lower value of serum ferritin (p=0.002). Among different types of non scarring alopecia CTE had altogether lower estimations of serum ferritin (p=0.019). The values of haemoglobin were significantly lower in most (75.2%) of the patients.

Conclusion: There is statistically significant association between suboptimal serum ferritin levels and non-cicatricial alopecia, in our selected sample, verifies depleted iron stores as one of the causative factor of non-scarring alopecia.

Key Words: Non-Cicatricial Alopecia, Serum Ferritin, Premenopausal Females

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Introduction

Thinning of hair influences in excess of twenty-five percent females worldwide, during some phase of their lives.[1] There is restricted information about rate of individual collections of non-cicatricial alopecia.

An investigation in Brazil indicated that one percent prevalence of alopecia areata and 1.2% prevalence of telogen effluvium in patients.[2] Another study from Makkah, Kingdom of Saudi Arabia found that the prevalence of telogen effluvium is 1.74% among women.[3]

It is relevant to examine significance of iron in causing alopecia due to high prevalence of sub-optimal iron levels, in our local environment, especially in females in their reproductive years.

The examination at hand is expected to provide infor-mation on connotation between iron reserves and non-cicatricial alopecia in females.

More so, this examination will help to facilitate fresh approach in treatment of this prevalent issue, having negative impact on the emotional soundness of the affected patients.

Observational information have recommended that sub-optimal level of iron reserves may be involved in

incidence of alopecia.[4]

Iron is a basic component of human body comprising 2 and 6 grams in female and male respectively.[8] Iron lack is the most widely recognized insufficiency in the world.5 It is the key among miniature- supplements including minerals, nutrients and minor components which are prerequisite for human body. Extremely minute amount of iron is required which is available in a healthy eating routine. The most widely recognized micronutrient inadequacies incorporate iodine, vitamin A, folate, zinc, vitamin D, and iron.6 In any case one extra iron status parameter, for example, serum ferritin is needed to affirm iron insufficiency.

Incidence of non scarring alopecia is high and affected female seek dermatologist's recommendation. Strong and long hair are viewed as an indication of being pretty and womanhood in our general public. Alopecia isn't a dangerous condition and may sound as a minor issue to the unaffected, however it has significant crushing impact on the psychosocial health of the affected individuals. There is insufficient data about its exact etiology. Observational information has proposed that low iron stores may have some part in the pathogenesis of alopecia.[4]

Methods

A descriptive cross sectional study design was used. This study was carried out in Dermatology Department, Lahore General Hospital, Lahore during a period of one year. 109 women having non-cicatricial alopecia, fulfilling the inclusion and exclusion criteria were enrolled using consecutive purposive sampling technique on a predesigned performa|.

Post-pubertal, pre-menopausal females with non-cicatricial alopecia (i.e., androgenetic alopecia, telogen effluvium and alopecia areata) of any gravity and time span were enrolled. Pregnant females, patients with signs/manifestations of fundamental illness like connective tissue disease, chronic renal failure, chronic liver disease, thyroid disorders and so on were barred from inclusion. All patients were enrolled after informed consent. This study accepted under 40 µg/L as suboptimal serum ferritin levels. A detail history, comprehensive physical examination, and laboratory tests were completed. Statistical investigation utilizing the – SPSS (statistical package for social sciences) Version 19.0 was completed

Results

The mean age of patients was 26.79 ± 6.962. Most of the patients i.e. 25.7% were between the age group of 21-25 years as shown in table 4.1.

In our investigational group of 109 females with non-cicatricial alopecia, a majority 65.1% were suffering from telogen effluvium (TE), followed by 21.1%

suffering from alopecia areata [AA] and remaining 13.8% suffering from androgenetic alopecia (AGA). Patients having chronic telogen effluvium had a statistically significant association with low serum ferritin levels (p esteem=0.019).

Table 1: *Age-Wise Distribution of Patients (n =109)*

Age Groups (in Years)	No. of Women	Percentage
16---20	26	23.9
21---25	28	25.7
26---30	21	19.3
31---35	20	18.3
36---40	12	11.0
41---45	2	1.8
Total	**109**	**100.0**

Table 2: *SERUM FERRITIN LEVEL*

FERRITIN LEVEL	No.of Women	Percent
Greater than or equal 40µg /L (Normal)	19	17.4
Less than 40 µg /L (Below-Normal)	90	82.6
Total	**109**	**100.0**

However, similar statistically significant connotation could not be assessed in patients with androgenetic alopecia [p-value estimate 0.095] and alopecia aereata [P-value estimate 0.2770] as presented in figure 4.2.

Age stratification of the study group revealed that maximum number of patients having low serum ferritin were between 21 to 25 years of age as shown in figure 4.1.
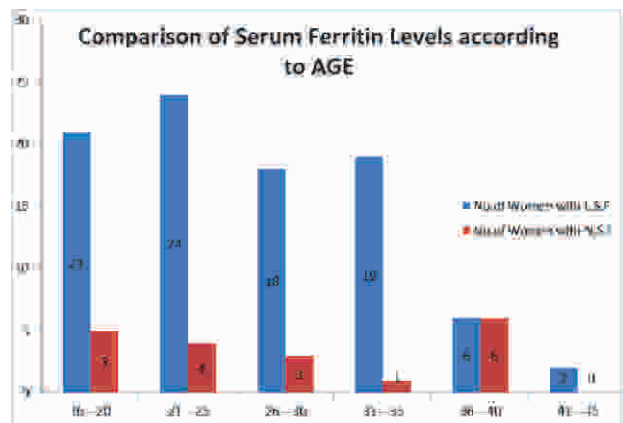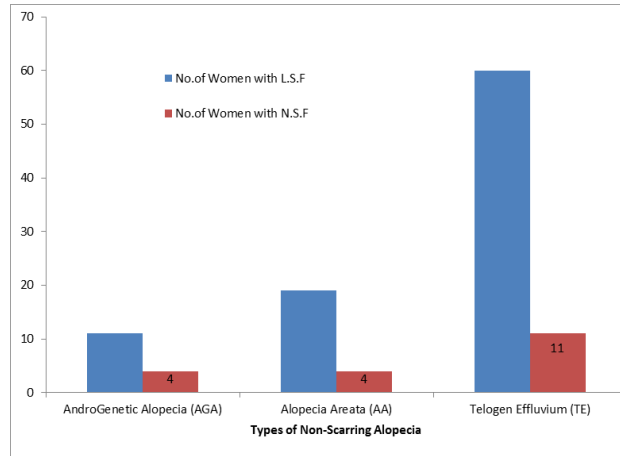

Figure 4.1

In our study group of 109 females with non cicatricial alopecia, a majority 71 were suffering from telogen effluvium (TE), followed by 23 suffering from alopecia areata [AA] and 15 suffering from androgenetic alopecia (AGA).

Patients having chronic telogen effluvium had a

statistically significant association with low serum ferritin levels (p esteem =0.019).

However, similar statistically significant connotation could not be assessed in patients with androgenetic alopecia [p-value estimate 0.095] and alopecia areata [P-value estimate 0.2770] as presented in figure 4.2.

It was additionally seen that in 109 females with non-scarring alopecia, 27 (24.8 %) patients had optimal hemoglobin levels and the rest 82 (75.2 %) had suboptimal hemoglobin levels. The mean hemoglobin level of the investigation group was discovered to be 10.727 gm/dl ± 1.738.

P value = 0.095   P value = 0.270   P value = 0.019

Figure 4.2: *Comparison of Serum Ferritin Levels According to Types of Non-Scarring Alopecia*

Discussion

The current investigation was directed to check the connotation between non- cicatricial alopecia and iron stores [serum ferritin level]. Prior investigations on this theme were performed by engulfing AA, AGA and TE [being prevalent types of cicatricle alopecia] which may have influenced the result of previous contemplates.

Nonetheless, we have tended to the previously mentioned issue via confirming the affiliation independently for AA, AGA and TE and just as by clubbing them together. Prior investigations, for example, Kantor et al1 was dependent on case-control strategy, while we have utilized descriptive cross sectional study design to check the connotation between non-cicatricial alopecia and iron stores [serum ferritin level] which has given further criticalness to this investigation.

Number complied during this study reflects statistically significant connotation [p=0.002] between non-cicatricial alopecia and iron stores [serum ferritin level]. Also, a large portion of these females (for example 75.2 %) had suboptimal hemoglobin levels.

Connotation is confirmed between TE and iron stores [serum ferritin levels] in female based on statistical outcome of results as reflected in P-value estimation = 0.019. Notwithstanding aforesaid, the connotation of AGA [p-value estimation = 0.095] and AA [p-value estimation = 0.270] with iron stores [serum ferritin levels] was not found as significant as per aforesaid statistical estimate.

Relevant to mention here that review led by Kantor et al.[1] established higher mean value of iron stores [serum ferritin levels] in females without alopecia as compared to those suffering from AGA and AA. At the same time aforesaid division could not be established in the mean values of iron stores of patients with TE. Investigation at hand expects under forty µg/L as suboptimal level of iron stores. The lower level of optimal serum ferritin level is controversial.

Kantor et al study established a connotation between lower level of iron stores and alopecia. Furthermore, similar findings were established by Headington with a cut off estimation of serum ferritin level going from 40 to 70 µg/L.[1,10] However, study of Sinclair and Olsen et al. established an opposing outcome demonstrating no reasonable relationship between low iron stores and alopecia utilizing a trim off restriction of 20 µg/L.[9,11] Investigation done by Rushton and Ramsay deduced that females with AA and iron stores level [serum ferritin] over 40 µg/L reacted impressively upon treatment with antiandrogen cyproterone acetate and ethinyl estradiol.[8]

A separate investigation by Rushton established that iron stores [serum ferritin] at 70 µg/L together with serum folate, vitamin B12, red cells inside normal ranges and hemoglobin more than 13.0gm/dl served as hair development at its prime level.[12] Pertinent to add here that since 1963 the argument of connotation between iron stores and diffuse hair loss is under research.[13] An investigation which took place in Saudia reasoned a positive relationship of diminished iron stores levels and non-scarring alopecia in females.

The serum ferritin level of female patients suffering from non-cicatricial alopecia needs evaluation to assess ideal reaction to remedy as the suggested setting off reason can be eliminated.[14] Some investigations have recommended probable connotation of TE with diminished iron stores in body.[4] An examination drove by Kantor J et al found the average iron store level of patients suffering from AGA (37.3ng/ml) and AA (24.9ng/ml) were markedly sub-optimal than in individuals without hair loss (59.5ng/ml).[1]

The average iron store level(serum ferritin) of patients suffering from TE [50.1 ng/ml] & AA [52.3 ng/ml] were not significantly sub-optimal as compared to their levels in individuals not having the said

diseases. Their perceptions had suggestions with respect to therapeutics, clinical preliminary plan, and understanding the causes of alopecia.[1] Another investigation presumed lower iron levels does not demonstrate critical variation in AA patients and may not be assumed as part of in the causes of AA.[15]

Aforesaid outcomes are in line with finding of study at hand. Not many investigations propose that iron insufficiency can fill in as a setting off component in AA. They proposed that sub-optimal iron stores (serum ferritin) may serve as restricting component in case hair are in anagen stage i.e. stage where redevelopment is conceivable. Rushton et al, demonstrated that hemoglobin and iron stores (ferritin levels) were diminished in numerous females with hair fall issue, yet these level remained in the optimal band. Subsequently, the purported "normal limit" of ferritin and hemoglobin may incorporate women who are physiologically exhausted of iron.[8]

They proposed assessment of iron stores (ferritin levels) in all patients suffering from hair loss.

Study under review checked the connotation of iron stores with non-cicatricial alopecia AA, AGA and TA using statistical tool X2 test.

We imply the "limit assumption" as suggested by Kantor et al which communicates that the lessened iron stores levels increase the probability of causing various sorts of alopecias.[1]

Study of Kantor et al proposed that in cases of substantial hereditary inclination to diffuse hairloss its connotation with low iron/serum ferritin levels becomes insignificant.[1] At the same time in cases of lesser inherited inclination or due to existence of other setting off variables, decreased iron/serum levels may reach to a level that hairfall may follow. Cases having aforesaid attributes shall be best suited for treatment via. iron stores/serum ferritin levels replenishment.

Sub-optimal level of iron stores may not become cause of alopecia for cases of innate inclination or other setting of components. Consequently, building up iron stores is recommended, for female patients suffering from non- cicatricial alopecia, so as to act as setting off element.

Conclusion

Existence of positive connotation between diminished iron store [serum ferritin] level and non-cicatricial alopecia is presumed. Hence the same to be build up for better outcomes.

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