Role of Iron Deficiency in Male Pattern Hair Loss

Faizan Younus Shah[1], Ifrah Shafat Kitab[2], Faisal Younis Shah[3], Aaqib Aslam Shah[4], Uzair Khursheed Dar[5], Irfan Tasaduq[6], Mohd Younus Shah[7], Sidra Javaid Thakur[8]

ABSTRACT

Introduction: Hair has great social and psychological significance for human beings. Loss of hair from the scalp can have a significant impact on the social functioning and confidence of a person. Male pattern hair loss (MPHL) is a common affliction which may affect upto 50% of men by the age of 50 years. Iron deficiency is associated with a number of abnormalities but its role in hair loss remains deceptive.

Material and methods: The study included a total of 20 patients of MPHL and 20 controls who were assessed for the presence of iron deficiency and assessment of serum ferritin levels.

Results: The mean serum ferritin levels in the cases was found to be 343 ± 98 µg/L as compared to 394 ± 108 µg/L in controls. The difference was found to be statistically insignificant using the student t-test (p-value = 0.67). The mean hemoglobin levels amongst the cases was found to be 14.2 ± 2.1 g/dl while the controls documented a mean level of 14.8 ± 2.4 g/dl. The difference again did not have any statistical relevance when assessed with student t-test (p-value = 0.56).

Conclusion: The role of nutritional deficiencies particularly iron deficiency in the causation of male pattern hair loss has not been fully elucidated. Although some studies have found a role of iron deficiency in causation of hair loss of various types, others have failed to document similar findings. We found that the mean serum ferritin level in cases of MPHL was less as compared to that of controls but the difference did not have a statistical significance. Further large scale are required to fully comprehend the role of depleted iron stores in the causation of MPHL.

Keywords: Male Pattern Hair Loss, Androgenetic Alopecia, Iron Deficiency, Serum Ferritin

INTRODUCTION

Hair has immense social and psychological significance for human beings, in addition to its biological role in thermoregulation and protection from ultraviolet radiation, which have largely become obsolete in case of human species. Loss of hair from the scalp, though not a serious or life threatening condition, can certainly have disastrous consequences on the psychological well-being of a patient**.** Androgenetic alopecia (AGA) or patterned hair loss is a common affliction among males as well as females which can lead to disfiguring loss of hair from the scalp and almost complete baldness in severe cases. It is believed to be the most common cause of hair loss in both sexes following puberty.[1] Male pattern hair loss (MPHL) or male AGA can affect up to 50% of men by the age of 50 years.[2]

Iron deficiency is believed to be the most common nutritional deficiency prevalent in the world and has been implicated in a number of skin, hair and nail disorders. The total iron in the body is distributed among three compartments; storage iron in the form of ferritin and hemosiderin, transport iron in the form of transferrin and functional iron bound to hemoglobin, myoglobin, cytochromes, etc. Deficiency of iron generally occurs in a continuum of increasing severity which includes stage of iron depletion followed by stages of iron deficient erythropoiesis and iron deficient anemia.[3] In iron depletion, the body reserves of iron are exhausted but the functional and transport iron remain normal. Further depletion of iron results in stage of iron deficient erythropoiesis wherein both storage and transport iron are diminished which is followed by exhaustion of functional iron as well presenting as iron deficient anemia. This can lead to impaired functioning of a number of organ systems.

Hairs are rapidly proliferating appendages and the role of multiple micronutrients in its growth and disorders has been speculated and studied. Iron deficiency is associated with a number of pathological conditions but its exact role in hair loss particularly MPHL remains elusive. The prevalence of iron deficiency in adolescent and young females is much higher than in their male counterparts.[3] As a consequence, the exact role of iron deficiency in MPHL remains elusive. The aim of the present study was to compare the iron levels in patients of androgenetic alopecia and controls and assess the role of iron deficiency in male pattern hair loss, if any.

[1]Senior Resident, Department of Skin & STDs, SKIMS Medical College, SKIMS Deemed University, Srinagar, Jammu & Kashmir, [2]Junior Resident, Department of Ophthalmology, Government Medical College, University of Kashmir, Srinagar, Jammu & Kashmir, [3]Senior Resident, Department of Orthopedics, Ealing Hospital, UK, [4]Junior Resident, Department of Dermatology, STDs & Leprosy, Government Medical College, University of Kashmir, Srinagar, Jammu & Kashmir. India, [5]Junior Resident, Department of Dermatology, STDs & Leprosy, Government Medical College, University of Kashmir, Srinagar, Jammu & Kashmir. India, [6]Junior Resident, Department of Dermatology, STDs & Leprosy, Government Medical College, University of Kashmir, Srinagar, Jammu & Kashmir. India, [7]Professor, Department of Medicine, NC Medical College, Israna, Haryana, India, [8]Junior Resident, Department of Ophthalmology, SKIMS Medical College, SKIMS Deemed University, Srinagar, Jammu & Kashmir, India.

Corresponding author: Dr Faizan Younus Shah. 318 Mustafabad, Bemina, Srinagar, J&K, India. 190018

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Characteristic	Groups	Cases (n =20)	Controls (n = 20)
Age group	11-20 years	7 (35%)	7 (35%)
	21-30 years	8 (40%)	8 (40%)
	31-40 years	4 (20%)	4 (20%)
	41-50 years	1 (5%)	1 (5%)
Hamilton Norwood grade	Grade 1	-	14 (70%)
	Grade 2	-	6 (30%)
	Grade 3	6 (30%)	-
	Grade 4	8 (40%)	-
	Grade 5	3 (15%)	-
	Grade 6	2 (10%)	-
	Grade 7	1 (5%)	-
Mean ferritin levels (µg/L)		343 ± 98 µg/L	394 ± 108 µg/L
Mean hemoglobin level		14.2 ± 2.1 g/dl	14.8 ± 2.4 g/dl

Table-1: Clinical and laboratory characteristics of cases of male pattern hair loss and controls

MATERIAL AND METHODS

The study included a total of 20 consecutive male patients presenting with androgenetic alopecia. Twenty age and gender matched healthy individuals were used as controls. The patients were assessed for the extent of hair loss using Norwood-Hamilton scale and only those individuals who had grade 3 to grade 7 androgenetic alopecia were included in the study. The controls did not have any evidence of MPHL and could be classified as grade 1 or 2 on the scale. Serum ferritin levels were done in all cases and controls. All the data from the cases and controls was compiled in the form of a master chart and subjected to statistical analysis.

RESULTS

The study included a total of 20 cases of androgenetic alopecia and 20 age and gender matched controls. The demographic data of the patients is presented in table 1. The mean age of the cases was 24.2 ± 9.4 years while the age of the controls was comparable with a mean of 25.1 ± 10.2 years. The most common age group was the 21-30 year age group comprising 40% of the patients. Majority of the patients (40%) were suffering from grade 4 hair loss on the Norwood Hamilton scale. The mean serum ferritin levels in the cases was found to be 343 ± 98 µg/L as compared to 394 ± 108 µg/L in controls. The difference was found to be statistically insignificant using the student t-test (p-value = 0.67). The mean hemoglobin levels amongst the cases was found to be 14.2 ± 2.1 g/dl while the controls documented a mean level of 14.8 ± 2.4 g/dl. The difference again did not have any statistical relevance when assessed with student t-test (p-value = 0.56).

DISCUSSION

Male pattern hair loss or androgenetic alopecia is the most common type of thinning and hair loss reported in males. A combination of genetic factors and hormonal influence of androgens is believed to partake in the causation of the disorder. The role of nutritional deficiencies in the causation of MPHL has been obscure owing to the implication of multiple micronutrients in promotion of hair growth and difficulty in clinical demonstration of deficiencies. A number of studies have documented the role of iron in hair loss. Kantor et al documented lower concentration of serum ferritin in females with hair loss as compared to controls.[4] Rushton et al found nutritional deficiencies as the major cause of hair loss among young females in childbearing group. Decreased iron stores along with a deficient intake of amino acid L-lysine were proposed as the major nutritional deficiencies.[5] In contrast, Olsen et al found that there was no significant difference in prevalence of iron deficiency between cases of female pattern hair loss and chronic telogen effluvium compared to controls.[6] Thus, the role of iron deficiency in various forms of hair loss remains elusive. Moreover, the data related to incidence of iron deficiency among male patients suffering from AGA is lacking in literature. Hence, this study was conducted with an aim to assess the role of iron deficiency in MPHL.

Serum ferritin level is the most commonly used indicator for detection of iron deficiency. It is the first marker of iron deficiency as transport and functional forms of iron are depleted only after the reserves of ferritin have been exhausted. A serum ferritin level of less than 15 µg/L is generally considered indicative of iron deficiency by the WHO.[7] None of the patients or controls in our study was found to be suffering from iron deficiency. Although the mean serum ferritin concentration was slightly higher among the controls as compared to cases, the difference was not found to be significant. Similarly there was an inconsequential difference in the mean hemoglobin concentration between the cases and controls. The findings were similar to those reported by Park et al who reported lower serum ferritin concentration among MPHL patients as compared to controls but couldn't document a statistical significance.

CONCLUSION

This study tried to document the role of iron deficiency in MPHL as there are not many studies that have been conducted in this regard. We didn't document a significant role of iron deficiency or a correlation of serum ferritin levels in MPHL although a tendency for lower serum. The restricted number of participants in this study was a limitation. Further studies in this direction are warranted so that a role of iron deficiency

in MPHL and iron supplements in its treatment can be fully understood.

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