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A STUDY TO ESTIMATE SERUM VITAMIN D LEVEL IN ALOPECIA AREATA

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Abstract

Background: Alopecia areata (AA) is an autoimmune disease which is characterized by patchy hair loss and affects any hair bearing area. Low level of vitamin D have been implicated in variety of autoimmune diseases. This study was conducted to assess the level of vitamin D in patients with AA and its correlation with severity, pattern & extent of disease.

Materials & Methods : This is hospital based Case control study including 50 cases with AA and 50 age and sex matched controls. AA cases were grouped according to severity, pattern & extent of disease. Level of vitamin D were assessed and compared to controls. The data was analysed and correlation was derived.

Results: Revealed significant difference between cases and control as regards with 25(OH) vitamin D level. There is also a significant difference between 25(OH) vitamin D status and degree of AA. However, there is non-significant difference in 25(OH) vitamin D status in all participants regarding age and sex of subjects.

Conclusion: Vitamin D deficiency may be one of the factors having a role in etiopathogenesis of AA. Thus, supplementation of vitamin D as a treatment modality may improve the clinical outcome of AA.

Keywords – Alopecia areata, SALT Score, Vitamin D.

Introduction

Alopecia Areata (AA) is an autoimmune disease which is characterised by hair loss and can affect any hair bearing area. AA present with different clinical manifestations varying from reversible patchy hair loss to complete baldness

or complete body hair loss. It affects approximately 1-2 % of general population[1].

AA is an organ specific autoimmune disease characterized by T cell infiltrates and cytokine production around anagen hair follicle.[2,3] .

AA has association with human leukocyte antigen – class I & Class II and known to occur with various autoimmune disorders such as Diabetes mellitus, Thyroiditis, vitiligo, SLE, rheumatoid arthritis [4,5]. Thus, AA is considered as hair follicle –specific autoimmune disease, triggered environment factors in genetically susceptible individuals [1,3] .

Vitamin D is synthesized in the epidermal keratinocytes under effect of UV-B lights (290–315 nm) or ingested in diet and dietary supplements [6]. Vitamin D was found to have immune-regulatory effects. 1,25-Dihydroxy vitamin D3 (1,25(OH)2 D3) which is the active form of vitamin D, is one of the regulators of both innate and adaptive immune responses as it modulates immune function and activities of both T-lymphocytes and B-lymphocytes.[7]

Vitamin D receptors (VDR) expression in epidermal keratinocytes and the mesenchymal dermal papilla cells were detected [8]. Expression of the VDR in keratinocytes is necessary for preservation of the normal hair cycle [9]. Lack of the VDR is associated with reduced epidermal differentiation and hair follicle growth.[10]

The increase incidence of AA let us search more for possible etiological factors. In view of these points, we designed this study to find the association between Vitamin D level and AA.

Methodology

This is case control study performed in outpatient department in Department of Dermatology, Venereology and Leprosy, JLN Medical college and Attached group of Hospitals, Ajmer , Rajasthan after taking approval from ethical committee. The study enrolled 100 subjects of either sex with different groups. Patients of AA of different age and sex attending the Department of Dermatology, Venereology and Leprosy were enrolled in study (Cases) group 'A'. Any patient taking vitamin D supplementation, iron preparations, or calcium (Ca) supplementations, topical vitamin D3 analog were excluded from the study. Patients with any associated disease that alter the blood 25(OH)D level as vitiligo, psoriasis, SLE, renal disease, liver disease, were also excluded from this study.

In control group (Group B) age and sex matched individuals without AA who were suffering from minor ailments were included in this study.

Clinical assessment of the degree of alopecia areata was determined by Alopecia SALT score.

Serum 25(OH)D concentration, the major circulating form of vitamin D, was measured using commercial Enzyme-Linked Immunosorbent Assay (ELISA) kits (Immunodiagnostic Systems Limited, Bolden, UK). Range of Vitamin D level is

Deficient (0-30 ng/ml)

Insufficient (31-39 ng/ml)

Normal (40-80 ng/ml)

RESULTS

Mean age of study group was 21.44 ± 12.301 years whereas of control group was 27.28 ± 10.859 years. In this study there were 32(64%) males and 18(36%) females while in control group 33(66%) males and 17(34%) females. Both age and sex are significantly different.

Table 1. Socio- demographic characters of control and cases.

Variable	Cases		Control		Test	P-Value
*Age						
Range	4-61		9-59		t=2.56	0.013
Mean±SD	21.44 ± 12.301		27.28 ± 10.859			Sig.
*Sex	N	%	N	%	χ2 value	
Male	32	64	33	66	χ2=5.120	0.048
Female	18	36	17	34	χ2=3.920	Sig.

When the level of serum 25(OH)D was compared in both the groups i.e. it was found that there were 30(60%) patient have deficient vitamin D level, 5(10%) have insufficient while 12(24%) have normal and 3(6%) have toxic level of vitamin D in case group whereas in control group 19(38%) have deficient level, 28(14%) have insufficient , 16 (32%) and 1(2%) have toxic level of vitamin D. Vitamin D deficiency is observed more in case group compared to control & difference is statistically significant.

Table 2. Comparison between cases and control regarding serum 25(OH)D status and level

Serum Vitamin D	Cases(n=50)	Control(n=50)
Deficient (0-30)	30 (60%)	19(38%)
Insufficient (31-39)	05 (10%)	28(14%)
Normal(40-80)	12 (24%)	16(32%)
Toxic (> 150)	03 (6%)	1(2%)

Study group shows Maximum 44 (88%) patients were suffering from Patchy pattern of hair loss, followed by 3 (6%) patients were suffering from A Totalis. 2 (4%) patients were suffering from Ophiasis. 1 (2%) patient was suffering from A Universalis.

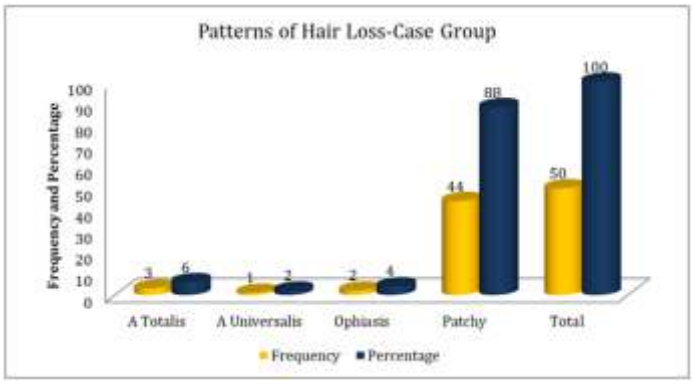

Figure 1 : Pattern of hair loss – Cases group

In our study There were 50 patients in both control and cases groups. The Mean of vitamin D levels in control group 36.40±17.94 . The Mean of vitamin D levels in control group was 29.23±21.74. The relationship between Control and Cases Groups regarding Vitamin D Levels was significant being the value < 0.05. The correlation between Control and Cases Groups regarding Vitamin D Levels was -0.197.

Table 3. Relationship between Control and Cases Groups regarding Vitamin D Levels

Control Group			Cases Group		
Number of Patients	Vitamin D Level (ng/ml) Mean ± SD	Range	Number of Patients	Vitamin D Level (ng/ml) Mean ± SD	Range
50	36.40±17.94φ	79.5	50	29.23±21.74φ	134.0
p-value			<0.05*		
Correlation			-0.197		

In our study of severity of hair loss is assessed by SALT Score. Present study shows association of SALT with mean serum vitamin D levels was significant(P< 0.05). Patients with higher SALT (S4 &S5) Had very low levels of vitamin D level.

Table 4. Relationship between Vitamin D Level and Severity of Hair Loss

SALT Score	Number of Patients (%)	Vitamin D Level (ng/ml) Mean ± SD	p-value
S0	0 (0)	0	<0.05*
S1	31 (62)	33.89±30.40	
S2	11 (22)	38.99±28.84	
S3	3 (6)	36.03±36.97	
S4	1 (2)	25.5	
S5	4 (8)	23.89±14.67	

In our study There were 3 (6%) patients were suffering from A Totalis, 1 (2%) patient was suffering from A Universalis, 2 (4%) patients were suffering from Ophiasis and 44 (88%) patients were suffering from Patchy pattern of hair loss. The pattern of hair loss was having the mean of 3.74 ± 0.777. On the other hand, vitamin D level is showing the mean of 29.23 ± 29.26. The Relationship between Patterns of Hair Loss and Vitamin D Levels is significant being the value less than the critical value of 0.05 and negatively correlated (r= -0.036)

Table 5. Relationship between Patterns of Hair Loss and Vitamin D Levels

Statistics	Pattern of Hair Loss				Vitamin D Level
	A Totalis	*A Universalis*	*Ophiasis*	*Patchy*	
Frequency	3	1	2	44	-
Mean ± SD	3.74±0.777				29.23±29.26
Correlation	-0.036				
p-value	<0.05*				

Discussion

Alopecia Areata is an autoimmune disease having various triggering factors. Vitamin D is prohormone which is synthesised by skin & regulate various immune response. It is hypothesised that development of hair follicle depends on Vitamin D receptors by controlling Vitamin D receptor expression.

We conducted study in patients Age ranged from 4-61 years with mean 21.44 ± 12.30. Maximum no of patients i.e 17 (34%) were in age group 21-30 followed by 14 (28%) in 11-20 which was comparable to study conducted by Panda et al 16 where max no of patients is 32 (44%) were in age group 21-30 followed by 21 (29 %) in 11-20.

In our study male patient were 64 % . The male to female ratio was (1.77: 1) . Similar male predominance ratio was also found

by Yilmaz N et al 8 (2:1), Cerman et al 12 (1.87: 1), Attawa EM et al 14 (1.87:1) and Nassiri et al 17(2.1:1).

Our results were almost equal to the study conducted by Yilmaz et al 8 in which severity of AA cases (According to SALT Score) was seen in decreasing trend as follows S1(71.4%) cases were in S1 grade then , 14.2% in S2, 7.4% in S3 , 4.7 % in S4 % and 2.5 % in S5 grade. This is similar to our study with maximum patients had S1 grade (n=31, 62 %) , followed by S2 (n=11, 22%) , S3 (n=3, 6 %), S4 (n=1, 2%), S5 (n=4, 8 %).

We noted that, the mean serum vitamin D level was significantly lower as compared to controls (29.23± 21.74 Vs 36.40± 17.94 ng/ml P< 0.05). Our results were parallel with study made by Yilmaz N et al 8, Cerman AA et al 12, Mahamid M et al 13 , Attawa EM et al 14, EL -Mongy NN et al 11 and Bhat YJ et al 15 found similar significant lower levels of serum vitamin D in Alopecia areata patients. The mean serum vitamin D levels were low in all studies as we observed.

Cerman AA et al 12 , Attawa EM et al 14 and Bhat YJ et al 15, found a significant inverse correlation between SALT score and serum vitamin D levels Similarly as we found in our study.

Bakry et al 18 in their study showed a significant inverse correlation with pattern of disease. In our study we noticed similar correlation.

These variations in mean serum vitamin D level may be due to studies being conducted in different geographical areas along with degree of sunlight exposure and dietary intake of vitamin D.

Conclusion

Vitamin D is deficient in more number of patients of Alopecia areata. Vitamin D level is also inversely correlated with Severity, extent & pattern of the disease. Hence Vitamin D deficiency may be one of the factors involved in etiopathogenesis of Alopecia areata or may be the exacerbating factors. Further clinical studies are required to confirm the role of vitamin D as a therapeutic agent in Alopecia areata.

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