

The estimation of Serum 25(OH) D (Vitamin D) levels in atopic dermatitis patients

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Abstract

Objective Atopic dermatitis is an itchy dry skin problem commonly present in children. The evaluation of vitamin D level in atopic patients with regular supplementation can help to improve disease outcome and prognosis. To find frequency of serum 25(OH) D (vitamin D) level in patients of atopic dermatitis.

Methods This cross sectional study was performed at Mayo Hospital Lahore, dermatology facility, over a period of 6 months. A total of 95 clinically diagnosed cases of atopic dermatitis (AD) meeting inclusion criteria were enrolled after taking informed consent. All basic demographical data and other contact details were taken from each patient. Blood samples were taken from the antecubital veins and were sent to hospital laboratory for the measurement of serum 25(OH) D levels.

Results The mean age of cases was 21.93 ± 13.02 years with minimum and maximum age as 1 and 45 years. There were 51 male and 44 female cases. The mean body mass index (BMI) was 25.39 ± 3.62 with minimum and maximum BMI as 20.10 and 32.70. The mean serum vitamin D level was 31.26 ± 13.85 ng/ml with minimum and maximum serum vitamin D level as 15.20 and 54.90 ng/ml. There were 44 (46.3%) cases who had serum level of vitamin D < 20 ng/ml and 51 (53.7%) cases had serum level of vitamin D ≥ 20 ng/ml.

Conclusion It is concluded that frequency of serum vitamin D level < 20 ng/ml was seen in 46.3%. Hence in patients of atopic dermatitis vitamin D levels should be checked and if found low then vitamin D supplementation must be given additionally. This additional supplementation will help patients to reduce the severity of the disease and better prognosis of standard care.

Key words

Serum; Vitamin D; Low levels; Atopic dermatitis.

Introduction

Atopic dermatitis (AD) is a chronic dry skin problem. Its pathogenesis is poorly understood, but genetic and environmental factors have an impact in impaired functioning of skin barrier and alteration in immune responses.^{1,2} Many evidences suggest that gene polymorphism is

involved in innate and adaptive immunity. The recalcitrant AD is a difficult problem to treat for dermatologist. Topical therapies should be the first approach for the management of AD. This approach has four main components, each focusing on skin manifestations of AD: (1) maintain a healthy skin barrier; (2) to control the inflammatory response; (3) to suppress pruritis; (4) treatment of infectious triggers and flares.³

There is a possibility that level of vitamin D has an impact on the activity and pathogenesis of

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atopic dermatitis, as vitamin D has immunomodulatory and immunologic properties which are important in its pathogenesis.^{4,5}

In 2016 a study was done on 105 children in which 45 individuals (42.9%) showed vitamin D deficiency and 45 (42.9%) individuals showed insufficient vitamin D levels.⁶ In another study conducted on atopic dermatitis patients, 16 of 95 (16.8%) showed normal levels of vitamin D, insufficient levels were seen in 16 of 95 (16.8%), deficient vitamin D level were seen in 25 of 95 (26.4%) and hypo-vitaminosis in 38 of 95 (40.0%). So, a total of 41 (44.56%) cases had low level of vitamin D i.e.vitamin D level <20.⁴

Atopic dermatitis is very commonly seen disorder in our society. It severely affects the quality of life of patient and their parents. There are different studies which show low vitamin D level associated with atopic dermatitis but no such study has been done in our setup. The current study is being planned to evaluate serum vitamin D level in these patients and if found deficient, early management will be important to prevent complications associated with this miserable disease.

Methods

The current cross sectional study was carried out at Dermatology Department, Mayo Hospital Lahore over a duration of 6 months. 95 patients of atopic dermatitis meeting the inclusion criteria were enrolled in study. All patients aged 1-45 years of either gender with a clinical diagnosis of Atopic Dermatitis were enrolled. Patients having history of taking supplements, steroid hormones, oral contraceptive pills, anti-epileptic agents and anticoagulants were excluded. Pregnant or lactating mothers were not included in study. Patients of hypercalcemia, sarcoidosis, tuberculosis, using solar irradiation and who applied photo protection within 6

months were also excluded.

Demographical data and other contact details were taken from each patient. Blood samples (5ml each) were collected from the antecubital veins and were sent to laboratory for analysis. Serum vitamin D levels were measured and noted. Using SPSS version 20 data were entered and analyzed. Mean±SD was used for quantitative data like serum vitamin D levels, age, duration and BMI. Frequency (%) was used for gender and low levels of vitamin D.

Results

The mean age of cases was 21.93±13.02 years with minimum and maximum age as 1 and 45 years. There were 51 male and 44 female. The mean BMI was 25.39±3.62 ng/ml with a minimum 20.10 and maximum 32.70 ng/ml. The mean serum vitamin D level was 31.26±13.85ng/ml with minimum and maximum serum vitamin D level as 15.20 and 54.90 ng/ml. Eight obese patients with atopic dermatitis showed low level of vitamin D <20ng, while 36 non-obese patients showed hypo-vitaminosis. The frequency of serum vitamin D level <20ng/ml was statistically considered same regardless of BMI, p-value <0.05 (**Table 1**). There were 48 (50.5%) cases who were 1-19 years old and 47 (49.5%) cases were 20-45years old. There were 44 (46.3%) cases who had serum level of vitamin D <20ng/ml and 51 (53.7%) cases had serum level of vitamin D as ≥20ng/ml.

Table 1 Comparison of Serum Vitamin D level (ng/ml) with respect to BMI.

BMI	Serum Vitamin D level (ng/ml)		Total
	<20ng/ml	≥20ng/ml	
Obese	8(50%)	8(50%)	16(100.0%)
Non-obese	36(45.6%)	43(54.5%)	79(100.0%)
Total	44(46.3%)	51(53.7%)	95(100.0%)

Chi-square test=0.105; p-value=0.746 (insignificant)

Table 2 Comparison of Serum Vitamin D level (ng/ml) with duration of disease.

Duration (weeks)	Serum Vitamin D level (ng/ml)		Total
	<20ng/ml	≥20ng/ml	
<2weeks	21(38.2%)	34(61.8%)	55(100.0%)
2-4weeks	23(57.5%)	17(42.5%)	40(100.0%)
Total	44(46.3%)	51(53.7%)	95(100.0%)

Chi-square test=3.47; p-value=0.062(insignificant)

In patients who had duration of disease <2 weeks the frequency of serum vitamin D level <20ng/ml and ≥ 20ng/ml was seen in 21 (38.2%) and 34 (61.8%) of the cases while in cases who had duration of disease since 2-4weeks the frequency of serum vitamin D level <20ng/ml and ≥20ng/ml was seen in 23 (57.5%) and 17 (42.5%) of the cases respectively. The frequency of serum vitamin D level <20ng/ml was same regardless of duration of disease, p-value <0.05 (Table 2).

Discussion

Vitamin D is considered as a new contributor to immune regulations and also has impact on the outcome of immune responses. Vitamin D is involved in cardiovascular diseases, cancer, obesity, maternal/ fetal health and immune function. Vitamin D has protective role against allergy. Low serum 25-hydroxyvitamin D levels have found to be correlated with higher rates of allergy and IgE sensitization.⁷ Atopic dermatitis is a common chronic allergic skin disease with a more prevalence in children than adults.

The incidence of atopic dermatitis is more in families with high socioeconomic status and in urban areas. The prevalence of atopic dermatitis was found to 19.3% in Hong Kong school children. Another study of 37 children with atopic dermatitis showed strong correlation between AD and serum 25(OH) D levels.⁸ Another birth cohort study conducted on Finnish population showed that vitamin D

supplementation during pregnancy was not correlated with increased incidence of atopic dermatitis in children when vitamin D level was checked at 5 years.^{10,11} Another study conducted on 23 high-risk Australian infants showed correlation between low vitamin D level in cord blood of those infants that developed atopic dermatitis after birth.¹²

In current study the mean serum vitamin D level was 31.26±13.85ng/ml with minimum and maximum serum vitamin D level as 15.20 and 54.90ng/ml. There were 44(46.3%) cases who had serum level of vitamin D <20ng/ml and 51 (53.7%) cases had serum level of vitamin D as ≥20ng/ml.

Another study was done on adult population and reported at baseline that 20% of atopic eczema subjects had serum vitamin D below 20ng/ml, which supported current study results.⁵

One study was conducted on 498 children and 328 non-allergic controls and they assessed serum 25-hydroxyvitamin D level by immunoassay. Patients were divided into three groups like sufficient (≥50ng), deficient (<25ng) and insufficient (25-49.9ng) groups. Short-term and long- term Atopic dermatitis severity was Assessed by two scores like physician-diagnosed Scoring Atopic Dermatitis (SCORAD) and Nottingham Eczema Severity Score (NESS) respectively. The findings of the study revealed that the mean serum 25(OH) D levels in controls and in AD groups were and 34.2 (14.5)ng and 28.9 (15.3)ng respectively (< 0.001). A high number of patients had serum vitamin D levels <25ng than controls. Atopic dermatitis severity showed inverse correlation with serum vitamin D levels (p=0.004).

Conclusion

The present study concluded that there was low

level of serum vitamin D i.e. 20ng/ml (46.3%) in our patients. Hence, in patients of atopic dermatitis vitamin D levels should be checked regularly and if found low then vitamin D supplementation must be given additionally as a potential treatment in these patients to reduce the severity and for a better prognostic outcome.

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