

The evaluation of serum Vitamin D levels in patients having chronic plaque psoriasis

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Abstract

Objective Psoriasis is chronic inflammatory disease having prevalence of 3% in developed world. Most of these patients have low levels of serum vitamin D. The objective of the study is to determine vitamin D levels in serum of patients having chronic plaque psoriasis.

Methods In this cross sectional study 400 patients who fulfilled the selection criteria were enrolled from Dermatology Department Mayo Hospital Lahore over 6 months (June 6, 2018–December 6, 2018). Informed consent was taken. Demographic profile was noted. Their blood samples were taken after aseptic measures and sent to hospital laboratory for analysis of Vitamin D levels by ELISA method. The levels of Vitamin D3 were labeled as; Deficient (<20ng/ml), Insufficient (20ng/ml-30ng/ml), Desirable (>30ng/ml).

Results The mean age of patients was 30.20±5.81 years with range of 18-40 years. 177(44.2%) cases were 18-29 years old and 223 (55.8%) cases were 30-40 years of age. There were 166 (41.5%) males and 234 (58.5%) cases were female. A total of 168(42%) cases had disease duration 6- >12 months and 232(58%) cases had disease duration >12 months. A total of 118 (29.5%) cases had mild, 183 (45.75%) cases had moderate and 99 (24.75%) cases had severe disease. There were 69(17.2%) cases that had desirable vitamin D levels, 135 (33.8%) cases had vitamin D deficiency while 196 (49%) cases had insufficient vitamin D levels.

Conclusion Findings of this study concludes that only 17.2% patients had desirable vitamin D levels while rest of the 82.8% cases had low levels of vitamin D levels. Hence, while treating patients with psoriasis, treatment of Vitamin D deficiency must also be considered.

Key words

Psoriasis; Vitamin D; Vitamin D deficiency; Inadequate levels.

Introduction

Plaque Psoriasis is a chronic inflammatory disease having both genetic and environmental triggers.¹ In the developed world psoriasis is prevalent in 3% of cases and around 4.6% in developing countries. There are different conditions that are found in these cases like obesity, cardiovascular disease, diabetes,

metabolic syndrome, hypertension, abnormal lipid profile, malignancies, depression, anxiety and others such as inflammatory bowel disease.² In psoriasis lesions there is hyper-proliferation of keratinocytes in the epidermis and inflammatory infiltrate in both epidermis and dermis and despite several hypotheses to explain the pathogenesis of Psoriasis, it is considered as a disease mediated by T cells and vitamin D has an important role in pathogenesis.³

In regulation of skin differentiation process, both calcium and vitamin D have important and

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interacting functions. Many studies have shown that vitamin D has effects on differentiation, proliferation and apoptosis of epidermal keratinocytes. It also has an effect on the formation of skin barrier.⁴ Vitamin D also has many effects on the cutaneous immune system, both innate and adaptive. The results of this study also show that few patients with psoriasis have desirable Vitamin D levels; hence while treating psoriasis patients the treatment of low levels of Vitamin D should also be considered.

From November 2016 to November 2017 at Thammasat University Hospital in the Northern Bangkok Conurbation, Thailand, a randomized, double blind, placebo controlled trial was done. 45 subjects were randomized to two groups; oral Vitamin D group and placebo group. The intent of this study was to find out the clinical effects of oral vitamin D supplementation on plaque psoriasis. This study demonstrated that oral supplementation of vitamin D and elevation in serum vitamin D concentration results in improvement of mild psoriasis.⁵

Methods

It was a cross sectional study and 400 patients of either gender aged 18-40 years with diagnosed psoriasis of at least 6 months duration were enrolled. Patients having chronic kidney disease, advanced liver disease, malabsorption, hyperthyroidism and sarcoidosis were excluded. Pregnant and lactating women and patients taking vitamin D supplements were not enrolled. Cases that fulfilled selection criteria were registered in the study from Dermatology department of Mayo Hospital Lahore. From each patient informed consent was taken. Demographic profile (name, age, sex, contact no.) was also taken. Blood samples were taken after aseptic measures and were sent to hospital laboratory for analysis of Vit. D3 levels by ELISA method. The levels of Vitamin D3 were

labeled as deficient (<20ng/ml), insufficient (20ng/ml- 30ng/ml), desirable (>30ng/ml). All data was recorded and analyzed using SPSS version 21. Vitamin D deficiency, insufficiency, desirable levels were recorded in the form of percentage and frequency. Stratification of data was done for gender, age, duration of disease and severity of disease. Chi-square test was applied post-stratification to address role of effect modifiers. The p-value ≤ 0.05 was taken as significant.

Results

The mean age of patients was 30.20 ± 5.81 years. There were 166 (41.5%) males and 234 (58.5%) cases were female. A total of 168 (42%) cases had disease duration 6-12 months and 232 (58%) cases had disease duration >12 months. A total of 118 (29.5%) cases had mild, 183 (45.75%) cases had moderate and 99 (24.75%) cases had severe disease. There were 69 (17.2%) cases who had desirable vitamin D levels, 135 (33.8%) cases had vitamin D deficiency, 196 (49%) cases had insufficiency of vitamin D levels. The data were stratified for gender, age, duration of disease and disease severity and serum vitamin D levels were checked in each group. There were 69 (17.2%) cases who had desirable vitamin D levels, 135 (33.8%) cases had vitamin D deficiency, 196 (49%) cases had insufficient vitamin D levels. Among age group 18-29 years there were 62 cases who had vitamin D deficiency, 85 cases had insufficiency and 30 cases had desirable vitamin D levels. Among age group 30-40 years of age 73 cases had deficiency, 111 cases had insufficiency and 39 cases had desirable vitamin D levels (**Table 1**). Among males 36 cases had vitamin D deficiency, 92 had insufficiency and 38 cases had desirable vitamin D levels. Among females, 99 cases had deficiency, 104 cases had insufficiency and 31 cases had desirable vitamin D levels (**Table 2**). In cases who had 6-12

Table 1

		Levels of Vitamin D			Total
		Deficiency	Insufficiency	Desirable	
Age groups (years)	18-29	62(35.0%)	85(48.0%)	30(16.9%)	177(100.0%)
	30-40	73(32.7%)	111(49.8%)	39(17.5%)	223(100.0%)
Total		135(33.8%)	196(49.0%)	69(17.2%)	400(100.0%)

Chi-square = 0.232; p-value=0.890 (Insignificant).

Table 2 Comparison of levels of vitamin D in relation to gender.

		Levels of Vitamin D			Total
		Deficiency	Insufficiency	Desirable	
Gender	Male	36(21.7%)	92(55.4%)	38(22.9%)	166(100.0%)
	Female	99(42.3%)	104(44.4%)	31(13.2%)	234(100.0%)
Total		135(33.8%)	196(49.0%)	69(17.2%)	400(100.0%)

Chi-square = 19.859; p-value=< 0.001 (Significant).

months of disease duration, there were 18 cases who had vitamin D deficiency, 99 cases had insufficiency and 18 cases had desirable vitamin D levels (**Table 3**). The frequency of different levels of vitamin D was also statistically different in mild, moderate and severe disease, p value <0.05 (**Table 4**).

Discussion

Psoriasis is a very common disease and prevalence rates worldwide are between 0.51% and 11.43%. There are many clinical and

research study findings which indicate that changes in components of the adaptive and innate immune systems function of keratinocyte, and vascular structure play a significant role in the psoriasis pathogenesis.⁷ Various studies have shown that vitamin D has effects on differentiation, proliferation and apoptosis of keratinocytes. The skin is very important organ because it is the main source of vitamin D for the body and it also has the required enzymatic mechanism for metabolization of vitamin D into its active form 1.25 (OH) 2D.⁸

Table 3 Comparison of levels of vitamin D with respect to duration of disease.

		Levels of Vitamin D			Total
		Deficiency	Insufficiency	Desirable	
Duration of Disease (months)	6-12 months	18(10.7%)	99(58.9%)	51(30.4%)	168(100.0%)
	>12 months	117(50.4%)	97(41.8%)	18(7.8%)	232(100.0%)
Total		135(33.8%)	196(49.0%)	69(17.2%)	400(100.0%)

Chi-square = 80.217, p-value = <0.000 (Significant)

Table 4 Comparison of levels of vitamin D with respect to severity of disease

		Levels of Vitamin D			Total
		Deficiency	Insufficiency	Desirable	
Severity of disease	Mild	24(20.3%)	67(56.8%)	27(22.9%)	118(100.0%)
	Moderate	50(27.3%)	91(49.7%)	42(23.0%)	183(100.0%)
	Severe	61(61.6%)	38(38.4%)	0(0.0%)	99(100.0%)
Total		135(33.8%)	196(49.0%)	69(17.2%)	400(100.0%)

Chi-square = 58.755; p-value=<0.001 (Significant)

In current study there were 69 (17.2%) cases that had desirable vitamin D levels, 135 (33.8%) cases had vitamin D deficiency, 196 (49%) cases had insufficiency of vitamin D levels. In 2016 a study was done and reported 45 patients out of 92 (48.9%) had insufficient vitamin D levels (defined as 25 (OH) D level of 20ng/ml to 30 ng/ml), 44 patients (47.82%) had deficient levels (<20ng/ml) and only in 3 (3.26%) patients vitamin D levels were sufficient.⁹ Another study in 2015 reported that 5 (25%) cases had deficiency, 13 (65%) had insufficiency and only 2 (10%) cases had sufficient vitamin D levels.¹⁰

The Departments of Biochemistry in collaboration with the Department of Dermatology, Venerology and Leprosy of Yenepoya Medical College Hospital, Mangalore India did a case-control study which compared serum Vitamin D levels in 285 cases of psoriasis and 317 controls. After comparing levels of serum vitamin D between cases and controls, it was concluded that 40.7% patients had sufficient (S), 28.4% had insufficient (I) and 30.9% psoriasis patients had deficient (D) serum vitamin D levels, and 82.0% and 18.0% of healthy controls had sufficient (S) and insufficient (I) serum vitamin D levels respectively. In healthy controls, the serum vitamin D levels were not deficient (D). This difference in was statistically significant (P <0.001).¹¹

Another case control study was done in Maharaja Agrasen Medical College (MAMC), Agroha, Haryana, which included 50 patients of chronic plaque psoriasis consisting of 35 females and 15 males and 50 healthy controls. The patients were enrolled from dermatology outpatient department representing patients from north India. The psoriasis patients had mean serum 25-hydroxyvitamin D level of 22.86±11.38 ng/ml and in controls it was 35.11±11.04 ng/ml (p<0.001). Serum levels of

25-hydroxyvitamin D in psoriasis patients were deficient (<20 ng/ml) in 26 (52%) and insufficient (20-30 ng/ml) in 8 (16%) patients.¹² The findings of current study also suggested that most patients of psoriasis have low serum vitamin D levels. More studies with control groups are needed for more effective assessment of deficiency of vitamin D in psoriasis patients and to determine accurate dose of vitamin D supplementation in these patients.

Conclusion

Findings of this study conclude that only 17.2% cases had desirable vitamin D levels while rests of 82.8% cases had low levels of vitamin D levels. Hence, while treating psoriasis, the correction in Vitamin D levels must also be considered.

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