ORGINAL ARTICLE

Vitamin D Deficiency and Psoriasis: A Cross-Sectional study of Iranian Population in Yazd Province

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Abstract

Objective: Psoriasis is an inflammatory disease of the skin and the joints. Psoriatic patients sometimes suffer from vitamin D deficiency and hypocalcemia. The aim of our study was to evaluate the level of calcium and vitamin D in patients with psoriasis.

Materials and Methods: In this analytical cross sectional study, 110 cases of psoriasis that were referred to Shohadaye Mehrab clinic during 2015 and 110 non-psoriatic patients enrolled. Serum levels of calcium, phosphorus, parathyroid hormone (PTH), alkaline phosphatase (ALK) and 25- hydroxy vitamin D_3 [(25OH) D_3] were measured in both groups. Data were analyzed using SPSS software version 19. Chi square test and T-test were used for statistical analysis.

Results: Among110 patients with psoriasis 74 (67.3%) were men and 36 (32.75%) were women. There was no significant difference in the serum level of calcium (*P*-value: 0.563), phosphorus (*P*-value: 0.381), PTH (*P*-value: 0.364) and ALK (*P*-value: 0.639) between two groups. Vitamin D deficiency was found in 64.5% of psoriatic patients and 60% of the controls (*P*-value= 0.45); However 30.9% of psoriatic and 17.3% of the controls suffered from severe hypovitaminosis D. This difference was statistically significant (*P*-value= 0.014).

Conclusion: We found a significant relationship between severe hypovitaminosis D and psoriasis. This finding revealed the need for evaluation of psoriatic patients for the presence of vitamin D deficiency.

Keywords: Psoriasis, Vitamin D, Calcium, Parathyroid hormone

Introduction

Vitamin D is well recognized for its role in skeletal health, immune system, cardiovascular system, and diabetes (1). The function of vitamin D in the improvement of barrier function, immune modulation and production of antimicrobial peptides including cathelicidin and defensins was investigated (2,3). Previous studies have shown that vitamin D has an important effect on the pathogenesis and treatment of skin

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disorders such as psoriasis, atopic dermatitis and skin cancer (1). Vitamin D inhibits the abnormal proliferation of keratinocytes and subsequent maturation; however it has an immunomodulatory effect on type1 helper T cell pathway which plays a key role in the pathogenesis of psoriasis (4).

Psoriasis is a T cell mediated inflammatory disease of the skin and sometimes the joints with over activity of innate immune system (5,6).Vitamin D deficiency has been detected in patients with autoimmune diseases as well as in psoriatic patients (7-9).It is years that local vitamin D analogues are a mainstay of treatment in mild to moderate psoriasis (10). Improvement of adalimumab induced psoriasis after starting high doses of vitamin D in a woman with rheumatoid arthritis and vitamin D deficiency, demonstrates the possible role of vitamin D in the pathogenesis and treatment of psoriasis (11). A review of the literature reveals that oral vitamin D is effective for the treatment of psoriasis and psoriatic arthropathy (12).

The aim of our investigation was to determine the level of vitamin D in patients with psoriasis and compare them with normal population.

Materials and Methods

In this cross sectional study, all the patients with psoriasis who were referred to Shohadaye Mehrab clinic from during 2015 (110 patient) and 110 of healthy control subjects from the peers of cases were included after obtaining informed consent. The group matching was done between two studied groups. Inclusion criteria were age ≥ 18 and clinical diagnosis of psoriasis by dermatologist. The sampling method was survey and all patients with inclusion criteria were included. The patients who received calcium and vitamin D supplement or systemic steroids in the previous 3 months were excluded from our study.

Patients' information including age, sex, duration of disease, severity of psoriasis, presence or absence of arthritis and previous treatments were gathered. Severity of psoriasis was calculated by body surface area (BSA) as mild (2% BSA), moderate (3-10%) and severe (>10% BSA) (13).Severity of psoriasis was calculated by one dermatologist. BMI of all participants was also measured. Blood samples were collected for the evaluation of calcium, phosphorus, Alkaline phosphatase, parathyroid hormone (PTH) and 25- hydroxy vitamin D3 [(25 OH) D3].

Data were analyzed using SPSS software version 19. Chi square test and T-test were used for statistical analysis. A *P*-value of less than 0.05 was considered statistically significant.

Ethical considerations

This study was approved by the ethics committee of Shahid Sadoughi University of Medical Sciences. (IR.SSU.MEDICINE.REC. 1391.898).

Results

Our study included 110 patients with psoriasis and 110 matched controls. 74 (67.3%) of psoriatic patients were men and 36 (32.75%) were women. In the control group 75 (68.2%) of participants were men and 35 (31.8%) were women. The mean age of psoriasis patients was 39.01 (±14.8) years and the mean age of controls was 39.00 (±14.25). There were no significant differences in age and gender between two groups. The mean duration of psoriasis was 110 months ranged from 2 months to a maximum 45 years. According to the BSA, mild psoriasis was detected in 58.2% of the patients, 38.2% of the patients had moderate psoriasis and 3.6% of the patients had severe involvement. There was not a meaningful association between severity of psoriasis and vitamin D deficiency (*P*-value= 0.862).

Hypocalcemia (Ca< 8.6 mg/dl) was identified in 3.6% of the cases and 2.7% of the controls. This difference was not significant statistically (*P*-value= 0.366). Hypercalcemia (Ca> 10.3 mg/dl) was more common in the control group (2.7% vs 0.9) but the difference was not

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significant statistically (*P*-value= 0.563) (Table 1).

The prevalence of vitamin D deficiency (vit D< 20 ng/dl) was 64.5% in patients with psoriasis whereas it was detected in 60% of the controls (*P*-value= 0.45).The results showed that 30.9% of patients with psoriasis and 17.3%of the control group had severe vitamin D hypovitaminosis (vit D< 8 ng/dl) that was statistically significant (*P*-value= 0.014). Mean serum levels of 25 [OH D3] were 18.08 (± 12.86) ng/dl in male patients with psoriasis and 17.81 (± 17.13) ng/dl in female patients (*P*-value= 0.751). Table 2 contains the vitamin D status of the patients and controls.

The presence of vitamin D deficiency in psoriatic patients was statistically independent of psoriatic arthritis, previous treatments and BMI (*P*-value> 0.05).

Discussion

Vitamin D is an essential hormone classically related to bone metabolism and calcium homeostasis. Previous investigations showed that there is a relationship between vitamin D deficiency and increased risk of various cancers, cardiovascular disease and autoimmune diseases (14,15).

Although we could not confirm the association between vitamin D deficiency (vit D< 20 ng/dl) and psoriasis, but we found that severe vitamin D deficiency is more common in patients with psoriasis. This association was independent of age, gender, psoriatic arthritis, previous treatments and BMI. Previous investigation by Shakiba, et al revealed that 60% of healthy young females in Yazd suffered from vitamin D deficiency and 21% of them had severe hypovitaminosis D (16). Similar results were obtained in our study in that 64.5% of patients with psoriasis and 60% of controls had vitamin D deficiency, but severe hypovitaminosis was detected in 30% of psoriatic vs 17% of healthy people.

The relationship between vitamin D and psoriasis was evaluated in several studies and most of them showed a significant association between psoriasis and vitamin D deficiency. Gisondi et al measured vitamin D level in 145 patients with psoriasis and 141 healthy controls. Their results showed that vitamin D_3 deficiency is significantly more prevalent in patients with psoriasis (57.8% vs. 29.7%) (9).Similarly, Orgaz- Molina and his colleagues evaluated the level of vitamin D_3 in 46 patients with psoriasis and 46 control subjects. Vitamin D deficiency was detected in 54.4% of psoriatic patients vs 22.6% in the control group (8).

Although vitamin D_3 mainly produced in the skin upon exposure to sunlight, but the association between psoriasis and vitamin D deficiency was also detected in sun- rich countries. For instance Al Mutairi et al investigated the vitamin D_3 level of 100 patients with psoriasis and equal number of healthy controls in Kuwait. They found that 87% of patients with psoriasis and 56% of the controls had low vitamin D level (serum levels

Table 1. Biochemical characteristics of patients and controls

Variable	Psoriatic patients	Controls	*P*-value
Calcium mg/dl	9.29	9.45	0.563
Phosphorus mg/dl	3.35	3.49	0.381
ALK IU/L	210.38	205.02	0.639
PTH pg/dl	37.7	31.9	0.364
25 (OH) D ng/ml	17.77	18.59	0.487

ALK: Alkaline phosphatase; PTH: Parathyroid hormone; 25(OH)D: 25 hydroxy vitamin D

Table 2. Vitamin D levels of patients and control group

Variable	Patients with psoriasis	Controls
Vit D < 8 ng/dl, mean	19 (17.3%)	34 (30.9%)
Vit D 8-20 ng/dl, mean	47 (42.7%)	37 (33.6%)
Vit D > 20 ng/dl, mean	44 (40%)	39 (35.5%)
Total	110 (100%)	110 (100%)

P-value: 0.014

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of 25 [OH] vitamin D< 50 nmol/L), but vitamin D deficiency (serum levels of 25 (OH) vitamin D< 25 nmol/L) was detected in 12% of patients and 9% of healthy controls (17).

In another study, Atwa et al assessed vitamin D_3 status in 43 patients with psoriasis and 40 healthy controls of Saudi Arabia and found that serum vitamin D level is significantly lower in psoriatic patients than in controls (18). The mean level of 25 hydroxy vitamin D_3 was 11.74 ng/ml in psoriatic patients and 24.55 ng/ml in healthy subjects, while in our study the mean level of vitamin D_3 in patients and control group was 17.77 ng/ml and 18.59 ng/ml respectively.

To our knowledge in Iran the association between vitamin D deficiency and psoriasis has not been evaluated so far and only in a study by Qadim and his colleagues the serum level of calcium was investigated in 98 hospitalized patients with psoriasis and 100 of controls. They found that 37.2% of patients with psoriasis suffered from hypocalcemia (19), but in our study hypocalcemia were detected in 3.6% of patients and 2.7% of controls that was not statistically significant. Given the higher prevalence of vitamin D deficiency in hospitalized patients (20) and with regard to the important role of vitamin D in the absorption of calcium (21), higher prevalence of hypocalcemia among hospitalized patients with psoriasis is expected. However the level of vitamin D was not measured in the above mentioned study.

Our results are consistent with the study conducted among psoriatic patients in USA. Wilson PB evaluated 25 hydroxy vitamin D_3 levels in 148 patients with psoriasis. Prevalence of vitamin D deficiency was not different between psoriatic patients and control group (22). In this study there was an inverse association between BMI and 25 (OH) D but we could not find a significant correlation between BMI and vitamin D_3 deficiency in our study.

Zuchi MF et al assessed serum levels of vitamin D in 20 patients with psoriasis and 20 controls but they could not find significant differences between psoriasis patients and control group. In this study vitamin D levels were lower in women with psoriasis compared with men, a finding not found in control group (3). We also evaluated the relationship between vitamin D levels and gender but this association was not statistically significant in our investigation.

It seems that sun avoidance behaviors, lack of food enrichment with vitamin D and clothing habits are the main reasons for high prevalence of vitamin D deficiency in Iran (21,23).

Conclusions

The absence of significant association between vitamin D level and psoriasis in our study may be attributed to the high rate of vitamin D deficiency in general population of Yazd and small sample size; However because of severe vitamin D hypovitaminosis among psoriatic patients in our investigation, screening for vitamin D insufficiency should be considered for psoriasis.

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Conflict of Interest

There are no conflicts of interest.

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