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Biochemistry

A STUDY OF SERUM VITAMIN D IN PSORIATIC PATIENTS IN A TERTIARY CARE HOSPITAL OF ASSAM.

KEY WORDS: Psoriasis, Serum 25-OH Cholecalciferol, Serum Calcium.

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ABSTRACT

Psoriasis vulgaris (PV) is a common chronic autoimmune disease manifesting as thick scaly red plaques on the skin. The role of vitamin D is considered to vary, and some evidence suggests vitamin D to be a modulatory factor of the activity in dendritic cells and keratinocytes, or the proliferation in T-cells. Serum 25 hydroxycholecalciferol and serum calcium were estimated in 40 patients of psoriasis vulgaris and compared statistically with the values of 40 age and sex matched healthy controls. 25 hydroxycholecalciferol was estimated in both the case and the control group by chemiluminescence method in VITROS 5600. Calcium was estimated using reflectance photometry method in the same machine. The values obtained were statistically evaluated. The mean value of vitamin D was significantly lower in the case group than in the control group ($p<0.01$). No significant difference was found in the calcium levels between the two groups.

INTRODUCTION

Psoriasis is a chronic immune-mediated inflammatory skin disease, the primary manifestation being mostly on the skin, although other organs can also be affected. Indeed, nowadays psoriasis is considered a systemic disease as it includes psoriatic arthritis to obesity and metabolic disease. The aetiology of psoriasis is not fully understood though several factors contribute to its development, such as auto-immunological, genetic, hormonal and psychosomatic issues (1).

The active form of vitamin D_3, 1,25-dihydroxyvitamin D_3, is well known for its influence on bones and control of calcium and phosphate homeostasis. It is now evident that $1,25(OH)_2D_3$ exerts much more effects in various tissues which express the vitamin D receptor (VDR) or possess certain enzymes – those necessary for generation of $1,25(OH)_2D_3$ by activating hydroxylation of vitamin D_3 metabolites. It is believed that most tissues have the ability to convert vitamin D_3 into its active form, $1,25(OH)_2D_3$, which in turn binds to the VDR and forms the $1,25(OH)_2D_3$/VDR complex, which subsequently regulates the expression of several genes (2).

Vitamin D plays a role in decreasing the risk of many chronic illnesses, including autoimmune diseases, infectious diseases, cardiovascular disease, and common cancers such as colorectal, breast, and prostate cancers. It mainly affects cellular proliferation, differentiation, apoptosis, and angiogenesis. Vitamin D has also been found to be beneficial by acting as an immune regulatory hormone in inflammatory diseases such as diabetes, psoriasis, Crohn's disease, and multiple sclerosis(3).

This study thrives to find an association between serum vitamin D and Psoriasis vulgaris in patients of North east India .

MATERIALS AND METHODS

This being a case control study consisted of 40 confirmed psoriasis vulgaris patients who came to seek treatment in Gauhati Medical College & Hospital in the Departments of Biochemistry and Dermatology and 40 age and sex matched non psoriatic normal subjects without psoriasis .The samples were collected and analysed during the same time to avoid any seasonal variations. Prior approval of hospital ethics committee was taken and a written informed consent was taken from all the study subjects. The inclusion criterion was the diagnosis of psoriasis vulgaris in OPD or during hospital admission without any intake of calcium or vitamin D supplementation . Any patients with presence of chronic inflammatory or other autoimmune disease such as DM, MS, inflammatory bowel disease, RA, IDDM, lupus erythematosus, chronic kidney or hepatic diseases, cutaneous lymphoma, non melanoma skin cancer, or any other cancer etc. were excluded from the study. On basis of Psoriasis Area and Severity Index (PASI) the case group was divided into Mild psoriasis : PASI score < 7, Moderate psoriasis : PASI score 7 – 15 and Severe psoriasis : PASI score > 15. 25 –OH Vitamin D was estimated in both the cases and the control group by chemiluminescence method in VITROS 5600 of Ortho Clinical Diagnostics.Serum 25-OH Vitamin D levels of 30-100ng/mL were considered within normal range, 20-30 ng/dL as insufficient and a value of less than 20ng/dL as deficient(4).Serum calcium was estimated using reflectance photometry method in the same machine. The results obtained were statistically analysed and compared between the different groups of the study. Baseline characteristics of the study participants were expressed in mean ± SD. Student t-test whenever applicable to analyse differences in baseline characteristics between the control and the test groups was used. The results were considered significant when the probability (p-value) was less than 0.05 % of the observed values of "t" at a particular degree of freedom. Statistical analysis was done using Graph Pad InStat version 3.00. All the statistical graphs were prepared using Microsoft Excel 2007.

RESULTS

The mean age of the case and control groups were 34±13 years and 40±10 years respectively. Of the case group, 18 were females and 22 were males. The serum calcium levels of the case and control groups were 9.21±0.55mg/dL and 9.93±0.60mg/dL respectively with an insignificant p value of more than 0.05.There was highly significant difference ($p<0.001$) of serum 25-OH Vit D levels with a value of 18.67±6.85ng/dL in the case group and 35.54±10.67ng/dL in the control group. Of the case group 23(57.5%) patients had deficient, 16(40%) patients had insufficient and 1(2.5%) had normal levels of serum 25OH-Vit D. In the case group, males had a serum 25-OH Vit D level of 9.93±0.60ng/dL and females had a level of 9.21±0.55ng/dL, the difference being insignificant($p>0.05$).

Table 1. Showing serum 25OH-Vit D levels in the case group according to the severity of disease (PASI score).

25-OH VITAMIN D LEVELS	
ACCORDING TO PASI SCORE	MEAN ± S.D. (ng/mL)
MILD (<7)	22.01 ± 6.11
MODERATE (7-15)	18.92 ± 6.2
SEVERE	11.97 ± 4.14

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Table 2. Showing comparison of serum 25OH-Vit D levels between the different groups as per PASI score in the case group

	COMPARISON
MILD vs MODERATE	$p > 0.05$
	NOT SIGNIFICANT
MILD vs SEVERE	$p < 0.001$
	HIGHLY SIGNIFICANT
MODERATE vs SEVERE	$p < 0.05$
	SIGNIFICANT

DISCUSSION

The relation between 25-hydroxycholecalciferol and psoriasis has been studied since the 1930s. A chance discovery was reported in 1985 by Morimoto *et al.*, who no- ticed that the administration of vitamin D_3 could improve psoriasis in some cases (5).

In our study, the serum level of 25-hydroxycholecalciferol was signicantly lower in patients with psoriasis than in healthy individuals, with levels lowering with severity of disease.These results cor- relate with similar observations of other authors. Studies by Ricceri *et al.* and Orgaz-Molina *et al.* conform to our findings by revealing a high prevalence of insuffciency and deciency in serum 25-hydroxy cholecalciferol(6).

Insufficient sun exposure and less intake of foods rich in Vit D_3 are the contributory factors for such decreased levels. In a pilot study, Finamor *et al* (7) observed that prolonged high-dose vitamin D_3 administration could be very beneficial for patients with psoriasis. It was found that treatment with vitamin D_3(35,000 IU daily) resulted in a significant increase in serum level of 25-hydroxycholecalciferol, which correlated with a significant improvement in the PASI score of all patients..(2)

Vitamin D deficiency in patients with psoriasis may be associated with alterations in isoenzymes that affect the synthesis of vitamin D. Some studies have shown differences in vitamin D receptors polymorphisms between patients with psoriasis and the general population.(8)

25-hydroxycholecalcifero has been shown to exert anti-proliferative effects on keratinocytes (9). Numerous in vitro and in vivo studies have demonstrated dose-dependent effects of vitamin D on proliferation and differentiation of keratinocytes. Of interest, low concentration of vitamin D promotes keratinocyte proliferation in vitro, while at higher pharmacological doses a clear inhibitory effect became apparent (10). Indeed, 1,25(OH)D regulates the cell proliferation in the stratum basale and increases the synthesis of keratins (K1 and K10), involucrin, transglutaminase, loricrin, and filaggrin, in the stratum spinosum (11).

Furthermore, vitamin D helps to regulate the synthesis of glycosylceramides needful for the barrier integrity and permeability in the stratum corneum (12). These actions are due to the capacity of vitamin D to regulate intracellular calcium level, through induction of the calcium receptor, and the phospholipase C enzymes (13). A decrease or deficiency in 1,25(OH)D or a loss-of-function of its receptor has been shown to disrupt the differentiation of the epidermis, with reduced levels of involucrin and loricrin and loss of keratohyalin granules, resulting in hyperproliferation of the basal layer (1)

On the contrary, Ruchi et al found no significant difference in serum 25-OH Vit D levels between the case and control groups.

CONCLUSION

This study strived to find any existing occurrence of 25-OH Vit D deficiencies in Northeastern Indian psoriatic patients and we can conclude that indeed such deficiency exists. However, more such studies are required in this part of India and with larger study groups. Our endeavour in future will be to conduct studies related to this field in a larger scale and may be at genetic level.

REFERENCES

1. Barrea L, Savanelli MC, Somana CD, Napalitano M, Megna M, Colao A, Sanastano S. Vitamin D and its role in psoriasis: An overview of the dermatologist and nutritionist, Rev Endocr Metab Discord 2017; 18: 195-205.
2. Czop BB, Wcisto LB. Serum Vitamin D level-the effect on the clinical course of psoriasis, Adv Dermatol Allergol 2016; XXXIII(6): 445-449.
3. Fu LW, Vender R. Systemic role for vitamin D in the treatment of psoriasis and metabolic syndrome 2011, Article ID 276076.
4. Holick MF et al. Evaluation, treatment and prevention of Vitamin D deficiency: an Endocrine Scociety Clinical Practice Guideline; J Clin Endocrine Metab July 2011; 96(7).
5. Ricceri F, Pescitelli L, Tripo L, Prignano F. De ciency of se- rum concentration of 25-hydroxyvitamin D correlates with severity of disease in chronic plaque psoriasis. J Am Acad Dermatol 2013; 68: 511-2.
6. Orgaz-Molina J, Buendía-Eisman A, Arrabal-Polo MA, et al. De ciency of serum concentration of 25-hydroxyvitamin D in psoriatic patients: a case-control study. J Am Acad Der- matol 2012; 67: 931-8.
7. Finamor DC, Coimbro RS, Neves LCM, Crutierrez M et al. A pilot tudy assessing the effect of prolonged administration of high daily doses of vitamin D on the clinical course of vitiligo and psoriasis, Dermato-Endocrinology; 5(11): 222-234.
8. Park BS, Park JS, Lee DY, Youn JI, Kim IG. Vitamin D receptor polymorphism is associated with psoriasis. J Invest Dermatol 1999; 112: 113-116.
9. Matsumoto K, Hashimoto K, Nishida Y, Hashiro M, Yoshikawa K. Growth-inhibitory effects of 1,25-dihydroxyvitamin D3 on normal human keratinocytes cultured in serum-free medium. Biochem Biophys Res Commun. 1990; 166(2): 916–23.
10. Reichrath J. Vitamin D and the skin: An ancient friend, revisited. Exp Dermatol. 2007; 16(7): 618–25.
11. Bikle DD. Protective actions of vitamin D in UVB induced skin cancer. Photochem Photobiol Sci. 2012; 11(12): 1808–16.
12. Gniadecki R. Stimulation versus inhibition of keratinocyte growth by 1,25-dihydroxyvitamin D3: dependence on cell culture conditions. J Invest Dermatol. 1996; 106(3): 510–6.
13. Tu CL, Oda Y, Komuves L, Bikle DD. The role of the calcium- sensing receptor in epidermal differentiation. Cell Calcium. 2004; 35: 265–73.