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.

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<0.01) of serum 25-OH Vit D levels with 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.

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

<table>
<thead>
<tr>
<th>PASI Score</th>
<th>Mean ± S.D. (ng/mL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MODERATE (7-15)</td>
<td>18.92 ± 6.2</td>
</tr>
<tr>
<td>SEVERE</td>
<td>11.97 ± 4.14</td>
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25-OH VITAMIN D LEVELS

ACCORDING TO PASI SCORE

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INTRODUCTION

Psoriasis is an acute 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 etiology 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 D₃, 1,25-dihydroxyvitamin D₃, is well known for its influence on bones and control of calcium and phosphate homeostasis. It is now evident that 1,25(OH)₂D₃ 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)₂D₃ by activating hydroxylation of vitamin D metabolites. It is believed that most tissues have the ability to convert vitamin D into its active form, 1,25(OH)₂D₃, which in turn binds to the VDR and forms the 1,25(OH)₂D₃/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 as colorectal, breast, and prostate cancers. It mainly affects 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, IIDD, 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.

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

Biochemistry
This study strived to find any existing occurrence of 25-OH Vit D levels between the case and control groups. On the contrary, Ruchi et al. found no significant difference in serum 25-OH Vit D levels between the case and control groups.

In our study, the serum level of 25-hydroxycholecalciferol was significantly lower in patients with psoriasis than in healthy individuals, with levels lowering with severity of disease. These results correlate 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 insufficiency and deficiency in serum 25-hydroxycholecalciferol.

Insufficient sun exposure and less intake of foods rich in Vit D are the contributory factors for such decreased levels. In a pilot study, Finamor et al. observed that prolonged high-dose vitamin D administration could be very beneficial for patients with psoriasis. It was found that treatment with vitamin D3 (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-hydroxycholecalciferol 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)2D regulates the cell proliferation in the stratum basale and increases the synthesis of keratin (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)2D 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 endeavor in future will be to conduct studies related to this field in a larger scale and may be at genetic level.

**REFERENCES**


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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**

<table>
<thead>
<tr>
<th>COMPARISON</th>
<th>MILD vs MODERATE</th>
<th>MILD vs SEVERE</th>
<th>MODERATE vs SEVERE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>p &gt; 0.05</td>
<td>p &lt; 0.001</td>
<td>p &lt; 0.05</td>
</tr>
<tr>
<td></td>
<td>NOT SIGNIFICANT</td>
<td>HIGHLY SIGNIFICANT</td>
<td>SIGNIFICANT</td>
</tr>
</tbody>
</table>

**DISCUSSION**

The relation between 25-hydroxycholecalciferol and psoriasis has been studied since the 1930s. A chance discovery was reported in 1988 by Morimoto et al., who noticed that the administration of vitamin D could improve psoriasis in some cases (5).