



STUDY OF ASSOCIATION BETWEEN VITAMIN D3 AND PSORIASIS.

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ABSTRACT

Background: Psoriasis is a common, chronic, disfiguring, inflammatory and proliferative condition of the skin. The epidermal layer of skin on exposure to sun by the action of UVB, via a photochemical reaction, the B ring of 7-dehydrocholesterol is broken to form pre-vitamin D₃ or cholecalciferol, which is subsequently converted first to 25-hydroxyvitamin D (25OHD) and then to 1, 25-hydroxyvitamin D (1, 25(OH) D or calcitriol) the active form of vitamin D.

Aim and Objectives: To analyse the serum level of, **Vitamin D₃**. To compare & correlate serum levels of, **Vitamin D₃** in cases of psoriasis and in same patients under treatment after time period of 6 month.

Material and Methods: 30 freshly diagnosed patients of psoriasis were included in the study.

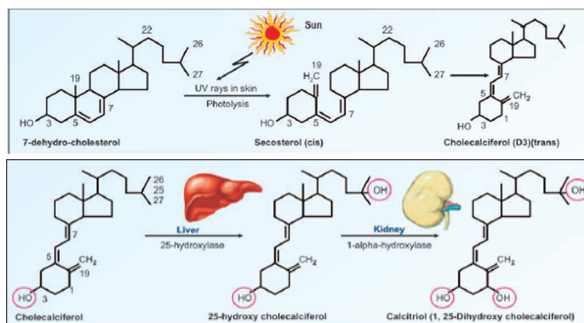
Results: Paired t-test was statistically significant.

Conclusion: Damage to epithelial layer affects vitamin d synthesis, evidence is accumulating that vitamin D represents a key modulator of immune and inflammation mechanisms. Both these mechanism have cumulative effect in exacerbation epidermal damage in skin lesions results in proper vitamin D synthesis which also supplements skin healing immunologically for skin lesion

KEYWORDS :**INTRODUCTION**

Psoriasis is defined as common, chronic, disfiguring, inflammatory and proliferative condition of the skin, in which both genetic and environmental influences have a critical role. The most characteristic lesions consist of **red, scaly, sharply demarcated, indurated plaques**, present particularly over **extensor surfaces and scalp** (C.E.M. Griffiths & J.N.W.N. Barker, 2010). In India prevalence is **-0.44 to 2.8%**, twice more common in males compared to females. Most of the patients are in their third or fourth decade at the time of presentation (Parsi R, Symmons DPM, Griffiths CEM, 2013). The aetiology of psoriasis are **Genetic, Trauma, Infection, Drugs, Sunlight, Metabolic factors, Psychogenic factors, Alcohol & smoking, HIV and acquired immune deficiency syndrome**. Psoriasis has an important genetic component. **Lomholt's** - Incidence of psoriasis was much greater amongst **first- and second degree relatives** of sufferers than unaffected control subjects (G., 1963). Psoriasis at the site of an injury is well known (**Koebner phenomenon**). A wide range of injurious local stimuli, including physical, chemical, electrical, surgical, infective and inflammatory insults, has been recognized to elicit psoriatic lesions (B, 1989). **Acute guttate psoriasis** is strongly associated with preceding or concurrent **streptococcal infection**, particularly of the throat (Telfer NR, Chalmers RJ, Whale K, 1992). There is evidence that streptococcal infection may be important in chronic plaque psoriasis (Tervaert WCC, 1970), and that treatment with rifampicin and penicillin may lead to clearance of skin lesions. In a small minority of patients, may be provoked by strong sunlight and cause summer exacerbations in exposed skin. Study of 2000 patients in Sweden, the prevalence of photosensitivity in psoriasis was estimated at 5.5% (Dawe RS, Arsecularatne G, 2005). Considerable clinical evidence exists for the **role of stress in onset and exacerbation of psoriasis Seville** (RH, 1977). In a UK study, over 60% of a sample of psoriasis patients believed stress was a principal factor in the cause of their psoriasis (Gupta MA, Gupta AK, 1989).

Vitamin D is a fat soluble vitamin, derived either from 7-dehydrocholesterol by the action of ultraviolet radiations its receptor regulate the differentiation and proliferation of keratinocytes, the balance of the cutaneous immune system and the process of apoptosis, it helps to regulate the synthesis of glycosylceramide's needful for the barrier integrity and permeability in the stratum corneum (Soleymani T, Hung T, 2015). The 1, 25(OH) D has been shown to exert anti-proliferative effects on keratinocytes (Matsumoto K, Hashimoto K, Nishida Y, Hashiro M, 1990). In psoriasis, vitamin D is involved in the maintenance of cutaneous barrier homeostasis, several studies have identified an association between polymorphisms of vitamin D receptor (VDR) and psoriasis susceptibility (Mattozzi C, Paolino G, Richetta AG, 2016).



1. Vitamin D synthesis.

AIMS & OBJECTIVE:

- To analyse the serum level of, **Vitamin D₃**.
- To compare & correlate serum levels of, **Vitamin D₃** in cases of psoriasis and in same patients under treatment after time period of 6 month.

MATERIALS AND METHODS:

- Approval taken from Institutional Ethics Committee.
- Type of study:** Longitudinal observational study.
- Source of patients:** Department of Dermatology.
- Place of study:** Tertiary care hospital.
- SAMPLE SIZE:** Total 30 patients were studied (each patient is assessed at start of study & after 6 months of treatment.)
- Analysed** -Chemiluminiscence immunoassay (CLIA) on UniCelDxi 600 analyzer.
- Methods of collection of data:**
- Procedure for collection of blood sample was explained completely to patients.
- Informed consent was taken.
- Blood sample was collected under proper aseptic care.
- Vitamin D₃ analysis was done.
- After 6 months treatment, Vitamin D₃ analysis was done again.

INCLUSION CRITERIA

- a) Age group 18yrs-60yrs.
- b) Both sex male and female.
- c) Clinically diagnosed Psoriatic cases.

EXCLUSION CRITERIA

- a) History of medication-Anti malarial drug, beta-blockers and steroid.
- b) Any other dermatological diseases like contact dermatitis and leprosy etc.

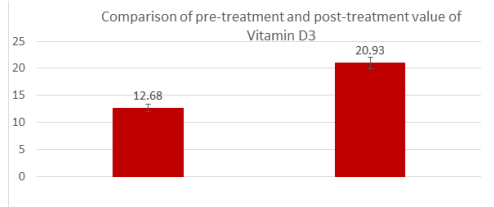
- c) Inflammatory or disabsorptive bowel diseases.

RESULTS

- The analysis with **Paired t-test** revealed a statistically significant difference in the pre-treatment and post-treatment value of serum Vitamin D₃ level after 6 month.

[Table No-1]

Parameter	Pre-treatment value	Post-treatment value	P value (Paired t test)	Difference
Vitamin D	12.68 ± 4.58	20.93 ± 5.90	< 0.0001	significant



[Graph No-1]

DISCUSSION

- In our study the level of measured analyte's before and after 6 month of treatment showed significant difference.
- Comparison of serum level of vitamin D₃ between pre-treatment case [12.68 ± 4.58] and in same case after 6 month of treatment [20.93 ± 5.90], increase in serum level of vitamin D₃ was observed [p- value<0.0001] which is **significant and which correlated with the conditions of Psoriatic patients.**
- Low levels of vitamin D has important implications in the pathogenesis of psoriasis. Vitamin D acts mainly on the vitamin D receptor to regulate keratinocyte growth and differentiation, but also has an influence on immune functions of dendritic cells and T lymphocytes. Vitamin D inhibits production of interleukin (IL)-2 and (IL)-6, blocks transcription of interferon- γ and granulocyte-macrophage colony-stimulating factor mRNA, and inhibits cytotoxic T cells and natural killer cell activity.
- Topical vitamin D derivatives, including calcipotriol (calcipotriene) and calcitriol, have immunomodulatory effects on monocytes, macrophages, T cells and dendritic cells. Indeed, topical vitamin D derivatives are extensively used as monotherapy or in combination with steroids for the topical treatment of psoriasis.
- Psoriasis pathogenesis implicates the innate and adaptive segments of the immune system.
- There is an increasing interest on broad regulatory effects exerted by vitamin D on cells of the adaptive and innate immune system.
- Indeed, vitamin D acts as a pluripotent Immunomodulator that inhibits proliferation of T lymphocytes, induces generation of CD25⁺/CD4⁺ T cell, a phenotype of T cells promoting tolerance and inhibiting immunity after stimulation with antigen. Moreover, vitamin D induces the expression of the C-C chemokine receptor type 10 on surface of T lymphocytes, a receptor involved in T cell-mediated skin inflammation, leading their migration from dermal blood vessels to epidermal keratinocytes.
- Finally, vitamin D helps to defend from opportunistic infections, by inducing autophagy in human macrophages, and to support the innate skin barrier, by stimulating endogenous antimicrobial peptides expression in resident epithelial cells of the skin.
- Antimicrobial peptides, like cathelicidins and defensins, have not only properties against bacteria, fungi and viruses, but also other immune regulatory properties, including cytokine and chemokine release, antigen presentation, cell proliferation, increasing vascular permeability, angiogenesis and wound healing.
- In psoriasis, vitamin D is involved in the maintenance of cutaneous barrier homeostasis.
- Several studies identified an association between polymorphisms of vitamin D receptor (VDR) and psoriasis susceptibility.
- Chandrashekar L et al**(Chandrashekar L, Kumarit GR, Rajappa M, Revathy G, Munisamy M, n.d.) -25-hydroxy vitamin D showed a significant decline, as compared with controls.
- Gisoni et al**, (Gisoni et al., n.d.) the participants with psoriasis presented with 25-hydroxyvitamin D deficiency than those without the disease.
- Orgaz-Molina et al** (Orgaz-Molina J, Buendia-Eisman A, Arrabal-Polo MA, Ruiz JC, 2012) observed lower serum levels of vitamin D in patients with psoriasis.

- Ricceri et al**(Ricceri F, Pescitelli L, Tripo L, 2013) found a prevalence of 68% of vitamin D deficiency and 97% of insufficiency in the patients with psoriasis studied, while the percentages found in the control group were 10% of deficiency and approximately 53% of insufficiency of this hormone .
- Zuchi MF et al**(Zuchi, Eduardo, Machado, & Azevedo, n.d.) did not find significant differences in vitamin D levels between patients with psoriasis and controls ($P=0.735$)
- Wilson et al** (Millsop, Bhatia, & Liao, n.d.)carried out a study using the National Health and Nutrition Examination Survey (NHANES) information base and found, in a group of 5841 individuals, 148 patients with psoriasis that were compared to the 5693 individuals without the disease. The investigators did not report differences in serum levels or deficiency of vitamin D between the patients with and without psoriasis, with prevalence of deficiency in 33% and 34.9% of the participants with and without the disease, respectively [16].

SUMMARY & CONCLUSION

- There is cumulative evidence that human epidermis is not only the natural source of Vitamin D but also the main regulator of skin physiology.
- Overall status of Vitamin D₃ as measured by serum concentration Vitamin D₃ have strong impact on skin physiology, thus vitamin D analogues are currently used or tested for potential therapy of skin diseases such as psoriasis.
- Topical vitamin D derivatives, including calcipotriol (calcipotriene) and calcitriol, have immunomodulatory effects on monocytes, macrophages, T cells and dendritic cells.
- Indeed, topical vitamin D derivatives are extensively used as monotherapy or in combination with steroids for the topical treatment of psoriasis.
- This study also had few limitations, as this being done on pilot basis, it could not enrol a larger sample size but established proof of concept for future larger studies to validate these parameters in Indian context.

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