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TO STUDY THE EFFICACY OF ORAL VITAMIN D SUPPLEMENTATION AND TOPICAL VITAMIN D APPLICATION IN THE MANAGEMENT OF LOCALISED CHRONIC PLAQUE PSORIASIS AT THE TERTIARY HOSPITAL

Dermatology

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ABSTRACT

Background: Topical steroid use in Psoriasis is rampant inducing skin atrophy, telangectasia, striae & superficial dermatophytosis **Aim:** We are conducting a study for knowing the efficacy of oral Vitamin D supplementation and topical application of Vitamin D in the management of localised chronic plaque Psoriasis Vulgaris so as to reduce the long term use of topical steroids and replacing it with topical Vitamin D supplements (Calcipotriol) & Oral Vitamin D supplementation (60000 IU/ once a week for four weeks). **Results:** This study shows sharp correlation of Vitamin-D supplementation with Psoriasis immunopathology and in improving the treatment response. The patients were commonly observed between 11-20years of age and female predilection was mostly observed. Topical application of vitamin D is more efficient than only oral vitamin D supplement in the management of localised chronic plaque psoriasis.

KEYWORDS

Psoriasis, Vitamin D, Immunopathology, Skin Diseases, Topical Vit D, Immunopathogenesis.

INTRODUCTION

Psoriasis is a chronic immune-mediated inflammatory skin disease, with a prevalence of about 2%–3% in the general population [1]. The primary manifestation of psoriasis most commonly manifests on the skin, although inflammatory processes can occur also in other organs [1]. Vitamin D, also known as the sunshine vitamin, has long been known to be a hormone that regulates calcium-phosphorous homeostasis and safeguards the integrity of the skeletal system [4]. Disease onset may occur at any age, including childhood, with two peak age ranges, 16 to 22 and 57 to 60 years [2, 3].The epidermis is the natural source of vitamin D synthesis by the action of ultraviolet light (UV) B of the sun or other UVB source [5]. Vitamin D treatment is effective when applied topically to the skin for plaque-type psoriasis. Oral vitamin D supplementation cholecalciferol 60000kIU (0.25 to 2 µg/day) might be effective as an adjuvant treatment. Calcipotriol (30gram tube with 50mcg/nmol) Calcitriol (1,25-dihydroxycholecalciferol), Tacalcitol (1,24-dihydroxyvitamin D_3) and calcipotriol (calcipotriene) with steroid combination treatment that comes in different formulations are used as treatment option in psoriasis (02 to .25 µg/day.).

Methodology

This is a randomised, prospective, cohort, comparative, hospital based study was conducted after obtaining Institutional Ethical Committee approval. It was conducted from January 2024 to February 2025

Study Material

A randomized hospital-based comparative study was done on 50 patients of psoriasis in the department of Dermatology, Venereology, and Leprology for 1 year period after approval of the protocol by the local ethical committee and written informed consent of patients.

Inclusion Criteria

1. Patients having localised chronic plaque psoriasis
2. Patients not on any topical steriods applications
3. Patients who have given consent

Exclusion Criteria

1. Patients on any systemic immunosuppresant therapy
2. Patients with comorbidities like diabetes, hypertension, thyroid, TB, epilepsy
3. Patients with any pregnancy or on lactation
4. Patients with any malignancy

Statistical Analysis

Responses to treatment at all the follow-up visits among different subjects within a group were compared and analyzed using related samples Friedman's test considering a P value of <0.05 as statistically significant. The categorical variables were analyzed statistically using Spearman's rho or Fisher's exact test wherever applicable.

The data were entered in the form of a data matrix in Microsoft® Excel 2011and analyzed statistically employing appropriate tests of significance using IBM® SPSS version 20.0.0.

RESULTS:

Female patients most commonly showed higher predisposition. 11-20 years is the common age group seen with low Vitamin D levels. Topical application of Vitamin D is more efficacious than oral Vitamin D supplementation

S.no	Patient name	age	Value
1	Mrs. SULOCHANA	51 Y/F	17.9
2	Mrs. SWAROOPA	38 y/F	10.4
3	Mrs. K.RADHIKA	41 Y/F	13.5
4	Dr. BHUVNA	35 Y/F	20.7
5	Ms. APARNA LANKA	32 Y/F	17.1
6	Mrs. MOUNA FATIMA	34Y/F	30.8
7	Mr. MOHAMMED MUJEEB	46 Y/M	13.2
8	Mr. RAJUVASALA	36Y/M	9.9
9	Mrs. Y.BALAMANI	56 Y/M	23.9
10	Mrs. VARALAXMI	35Y/F	11.3
11	Mrs. IFTHEQAR UNNISA	75 Y/F	25.55
12	Mrs. NAFEES FATIMA	31Y/F	19.6
13	Mrs. SWETHA	35Y/F	30.6
14	Mrs. SUREKHA KOPPALA	49 Y/F	19.2
15	Dr. RAJAH V KOPPALA	51 Y/M	14.6
16	Mrs. SAMHITA	26Y/F	7.7
17	Mr. SIDDARTH	27 Y/M	6.3
18	Mr. MOHD MAQBOOL UDDIN	45 Y/M	5.6
19	Mr. ASGHAR SHAREEF	45 Y/M	26.4
20	Mr. A.V.RAO	82 Y/M	12.1
21	Mrs. SRIVALLI DUGGIRALA	55 Y/F	8.5
22	Mrs. SAYYEDA NAFEES BANU	50 Y/F	16.3
23	SYED SIRAJ UDDIN HUSSA	18 Y/M	5.2
24	Mr. V.J.M.REDDY	64Y/M	23.3
25	Mr. PURNACHANDRA MAITY	51/M	12.8
26	Mr. SHAREEF NAZHAR	66 Y/M	20.8
27	Ms. SHAILAJA	29 Y /F	8.6
28	Mrs. SHAHEEN BEGUM	55 Y/F	17
29	Mrs. NAVATHA	26 Y/F	26.9
30	Mr. CHINNA REDDY	78 Y/M	20.8
31	Mrs. SADIQA BEGUM	80Y/F	16.9
32	Mrs. SYEDA SALEHA BEGUM	60 Y/F	47.2
33	Mr. LOHIT SARMA	35Y/M	22.3
34	Mrs. DEVYANI	57 Y/F	7.2
35	Mr. KHADER PASHA	50 Y/M	15
36	Mrs. SHAHNAZ BEGUM	32 Y/F	7.7
37	Mr. SYED NAAZ AHMED RAZV	39 Y/F	23.6
38	Mr. SHAKIR	58 Y/M	3
39	Mrs. BHAGYA LAXMI	28 Y/F	26
40	Mr. M.SHEKAR	39 Y/M	19.5
41	Ms. NANDHINI	29 Y/F	12.3
42	Mrs. ASHWINI	33 Y/F	23.9
43	Mr. N. NARASIMHA RAO	54 Y/M	14.4
44	Mr. T. GOPALA MURTHY	74 Y/M	16.5
46	Mrs. K.SAROJA	42 YF	8.8
47	Mrs. R. HEMANTHA	68 Y/F	33.5
48	Mr. D. PRASHANTH	52 Y/M	18.1
49	Mrs. NEMATH FATIMA	27 Y/F	9.7
50	Baby. AYESHA FATIMA	10 Y/F	7.7

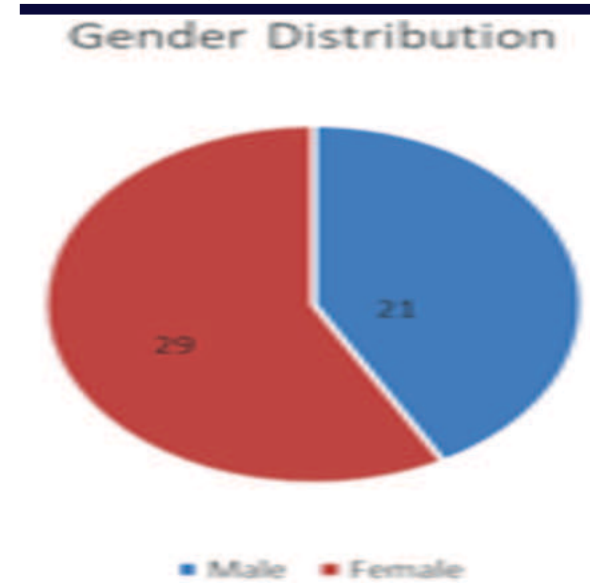

Fig 1: Of the study participants, 21(42%) were males and 29 (58%) were females.

Form of Vitamin – D administered	No. of Patients	No. of Patients observed to have an improvement in symptoms	Chi square value
Topical	25	19	the chi square statistic is 0.983. the P – value is 0.32. The result is not significant at p<0.05.
Oral	25	12	

Fig 2: Efficacy of topical and oral forms of Vitamin – D in the management of Psoriasis

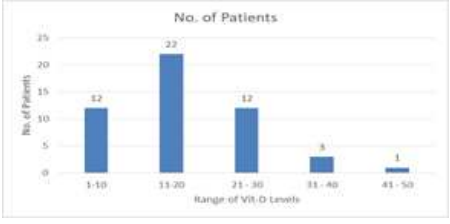

Fig 3: Of the 50 patients , majority i.e., 44% (22 patients) were found to have Vitamin – D values in between 11 – 20ng/ml.

Age groups (years)	Number of Patients (n= 50)	Percentage of Patients
1-10	12	24%
11-20	22	44%
21 - 30	12	24%
31-40	03	6%
41-50	01	2%

Fig 4. Percentage of patients showing low Vitamin D values

DISCUSSION

Psoriasis lesions are characterized by hyper-proliferation with incomplete differentiation of epidermal keratinocytes and decreased keratinocyte apoptosis, associated with inflammatory cellular infiltrate in both dermis and epidermis [8]. The precursor of vitamin D, 7-dehydrocholesterol, is located in the membranes of keratinocytes of the basal and spinous layer of epidermis [6]. By the action of UVB (wavelength between 290 and 315 nm), 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) by the enzymes CYP27A1 and CYP2R1 and then to 1,25-hydroxyvitamin D (1,25(OH)D or calcitriol) the active form of vitamin D, by CYP27B1 [10] The 1,25(OH)D has been shown to exert anti-proliferative effects on keratinocytes [1,25(OH)D and analogous reduce S100A7 levels, generally up-regulated in psoriatic skin, in the reconstituted human epidermis stimulated by IL-22 [12], in interleukin (IL)-17-stimulated keratinocytes and in skin of patients with psoriasis [13]. 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 [7,9,10]. vitamin D helps to regulate the synthesis of glycosyl ceramides needful for the barrier integrity and permeability in the stratum corneum [7,9,11]. 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 [3, 14]. 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 [7,15,16,17] The therapeutic effects of topical vitamin D occur via a VDR mediated genomic mechanism resulting in inhibition of keratinocyte proliferation and mediated non-genomic mechanisms inducing keratinocyte differentiation by increasing intracellular calcium levels [18]. The anti-inflammatory effects may also result from inhibition of production of IL-2, IL-6, and interferon-gamma (IFN-γ). Further, topical calcipotriol inhibits human beta defensin and proinflammatory cytokines which are vitamin D dietary reference intakes by life stage found in increased levels in psoriatic lesions [13]1 mg of supplemental vitamin D is associated with an increase in serum 25(OH)D of between 0.7 nmol/L [21] and 2 nmol/L [20].

Life-stage group	RDA (intake that covers needs of ≥ 97.5% of population)		Serum 25 OHD level (corresponding to the RDA) *
	IU/d	mcg/d	ng/ml
Infants (0–12 months)	400**	10**	20
1–70 yr	600	15	20
+ 70 yr	800	20	20
Pregnant	600	15	20
Lactating	600	15	20

CONCLUSION:

This study is helpful to show the correlation of Vitamin-D with psoriasis immunopathology and in improving the treatment response. Topical application of Vitamin-D is more efficient than only oral Vitamin-D supplement. So, hence forth all the psoriasis patients can be benefited with the good response of topical and systemic supplementation of Vitamin-D.

Limitations

The study is based on observations done in the enrolled small population which cannot give the overall estimation of the management protocols in the management of psoriasis which is variable according to the patients' circumstance and with the compliance issues.

Declaration Of Patient Consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patients had given their consent for their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Compliance With Ethical Standards

Conflict Of Interest Statement And Funding Sources

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Use Of AI

This article is entirely original and has not been generated or assisted by any AI tools

Use Of Artificial Intelligence (AI)

We confirm that AI was not used in any aspect during the manufacture presentation

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