

**Original Article**

Topical Calcitriol 0.5µg/Gm Ointment: An Effective and Safe Treatment of Psoriasis

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ABSTRACT

Vitamin D has been used to treat psoriasis in the topical form with great success. It affects cellular function by acting through the vitamin D receptor on keratinocytes. In this study, we documented the effectiveness and tolerability of topical Vitamin D in adult patients with active chronic plaque type psoriasis (psoriasis vulgaris).

Keywords: Psoriasis, calcitriol.

INTRODUCTION

Psoriasis is a complex, chronic inflammatory disease that involves hyper proliferation of keratinocytes in the epidermis, with an increase in the epidermal cell turnover rate. The disease most commonly affects skin over the elbows, knees, scalp and trunk. The typical psoriasiform lesions are inflamed, edematous plaques covered with silvery white scales.

Estimates of the prevalence of psoriasis have varied across studies. According to a systematic review of international population-based studies, there is a wide variation in the global prevalence

of psoriasis, ranging from 0.91 to 8.5 percent in adults and 0 to 2.1 percent in children.^[1] Moreover, geographic location appears to influence the likelihood of having psoriasis; disease prevalence tends to increase with increasing distance from the equator. In India, from the available studies, the prevalence of psoriasis ranges from 0.44 to 2.8%^[2] In a study from tertiary health care centre from North India, psoriasis patients accounted for 2.3% of the total dermatology outpatients.^[3]

Besides being a common public health problem, psoriasis has a profound impact on quality of life. The largest survey of people with psoriasis in

Europe was conducted by Dubertret L et al, in which responses were received from 18,386 patients (36%), of whom 17,990 had psoriasis. 59% of respondents had self-reported moderate to severe psoriasis. Overall, 77% replied that psoriasis was a problem or a significant problem. The greatest impact was on activities of daily living, especially affecting clothing choice, bathing routine and sporting activities.^[4] While patients were satisfied with the information and care from their dermatologist (40% highly satisfied), available treatment options were less satisfactory, with over 70% reporting only low to moderate satisfaction.

All currently available treatment options for psoriasis remain largely unspecific, and many patients do not achieve the desired outcome. Topical agents including corticosteroids, vitamin D analogous, Tazarotene, coal tar, and dithranol are predominantly used for mild disease, and systemic agents including photochemotherapy, methotrexate, ciclosporin, retinoids fumarates, and biological agents are used for severe disease.^[5]

Psoriasis was first described as a disease that primarily affects epidermal keratinocyte proliferation.^[6] It has now become evident that psoriasis is a systemic immune-mediated inflammatory disease primarily involving Th1 cells which lead to release of a cascade of inflammatory cytokines eventually leading to the proliferation of keratinocytes.^[7]

1- α , 25-dihydroxyvitamin D₃ (calcitriol), the hormonally active form of Vitamin D has been used to treat psoriasis in the topical form with great success.^[8,9] It affects cellular function by acting through the vitamin D receptor (VDR) on keratinocytes.^[10]

In this study, we documented the effectiveness and tolerability of topical Vitamin D in adult patients with active chronic plaque type psoriasis (psoriasis vulgaris).

METHODS

A total of 6 unselected out-patients with chronic plaque psoriasis as diagnosed by a dermatologist or experienced general practitioner were taken. All the patients had history of waxing and waning courses and unsatisfactory response to treatments taken in the past. Baseline Psoriasis Area and Severity Index (PASI) score was calculated. Demographic characteristics and co-morbidities (if any) were noted. The patients were treated with topical homemade preparation of active vitamin D, i.e. 1,25 (OH)vitamin D₃ (calcitriol) with petroleum jelly in a concentration of 0.5mcg/gram. Treatment duration was scheduled for an average of 6 months. Baseline serum calcium and 25 (OH) vitamin D levels were done in all patients and repeated after the treatment course. Informed consent was taken from all the patients.

Preparation of Cream: We prepared the cream containing vitamin D (calcitriol) and petroleum jelly at home. Petroleum jelly (50 grams) was taken in a bowl. Contents of 50 capsules containing 0.5 mcg 1,25(OH)D₃ were then added into the jelly by carefully piercing the capsules with a sterile pin. The ingredients were then mixed by gently heating the vessel. The cream was then allowed to cool and stored in a suitable container for use by the patients. Patients were asked to apply the cream twice daily and hereby to cover all skin lesions with a thin layer of cream.

All patients were evaluated at monthly intervals and assessment of disease activity with calculation of PASI score was done at baseline and at the time of treatment completion. Check was kept on the development of any side effects. There was no selection of patients by age, gender, localization and severity of disease, or previous treatments.

Table 1 : showing the details of the patients under the study

Case no.	Age (years)/Sex	Co morbidity	Baseline PASI score	Previous treatment	Baseline S. calcium (mg/dl)	Baseline 25 (OH)D ₃ at 6 months	S. calcium (mg/dl) at 6 months	Serum 25(OH) D ₃ at 6 months	Adverse effects	PASI score at 6 months
1	60/M	COPD	11.2	Oral and topical steroids	8.8	10.0	9.2	25	Nil	4.2
2	45/F	none	7.3	Topical steroids	8.5	8.0	8.9	28	Nil	2.0
3	26/M	DM	14.1	None	8.2	12	8.6	27	Nil	6.3
4	44/F	None	3.6	Topical treatment from local practitioner	8.0	<8.0	8.5	22	Nil	1.2
5	50/M	none	10.5	Oral and topical steroids	9.0	14	9.2	30	Nil	4.0
6	49/F	DM	14.3	Topical treatment from local practitioner	7.9	26	8.6	32	Nil	7.5

RESULTS

The age of the patients ranged from 26 to 60 years and the mean age was 45.6 years. All patients had a confirmed diagnosis of psoriasis. The majority of patients had received previous standard topical and/or a systemic therapy but were treatment-resistant.

All the patients showed clearing of the lesions within one month of starting therapy and complete disappearance within an average period of six months.

There was no exacerbation of the symptoms and no side effect noted in any patient. None of the patients developed hypercalcemia.

There was >50% reduction in PASI score in all the patients and a significant improvement in the quality of life.



We pierced the capsule each one by one, with a sterile needle



We took the contents of petroleum jelly in a clean bowl



The contents of the capsule were poured into the bowl containing jelly

Case 1



**BEFORE
TREATMENT**

**AFTER ONE
MONTH**

**AFTER SIX
MONTHS**

Case 2



BEFORE TREATMENT

AFTER SIX MONTHS

Case 3



BEFORE TREATMENT

AFTER FOUR MONTHS



LEFT AND RIGHT LATERAL SIDES OF TRUNK OF THE SAME PATIENT, BEFORE AND AFTER FOUR MONTHS OF TREATMENT

Case 4**BEFORE TREATMENT****AFTER FIVE MONTHS****Case 5****BEFORE TREATMENT****AFTER ONE MONTH****(Patient is on follow up)****DISCUSSION**

This study was done to determine the role of a topical homemade preparation containing active form of vitamin D in the treatment of chronic plaque psoriasis.

Psoriasis was first described as a disease that primarily affects epidermal keratinocyte proliferation. In spite of the well established role of topical vitamin D analogs in psoriasis, the precise mechanisms underlying their therapeutic effectiveness are still not completely understood. Modulation of various markers of epidermal proliferation, proliferating cell nuclear antigen (PCNA) and Ki-67 antigen, and differentiation (involucrin, transglutaminase K, filaggrin, cytokeratins 10, 16) has been shown *in situ* in lesional psoriatic skin following topical application of vitamin D analogs.^[11] Calcitriol has also been

shown to have immunomodulatory effects on monocytes, macrophages, T cells, and dendritic cells.^[10,12]

Clinical experience and multiple studies with topical vitamin D analogues have demonstrated efficacy with both monotherapy and combination therapy, with the latter approach found to be more applicable in the clinical setting.

Our study showed efficacy of low dose vitamin D₃ in concentration of 0.5mcg/gm in all the patients of chronic plaque psoriasis. The efficacy and safety of topical calcitriol ointment applied twice daily have been earlier examined in two identically designed, placebo-controlled, randomized, multicenter, parallel group, eight-week clinical trials in subjects more than 12 years of age with CPP.^[13]

Another multicenter clinical trial compared the cutaneous safety and efficacy of calcitriol (3µg/g) ointment and calcipotriene (50µg/g) ointment in patients (N=75) with mild-to moderate CPP affecting sensitive skin areas, such as the face, hairline, retroauricular folds, and flexural areas. Global assessment of improvement was significantly greater with calcitriol than with calcipotriene ($P<0.02$). With regard to overall tolerability, the calcitriol side was rated significantly better by 37 of 75 patients (49.3%) compared to 8 of 75 patients (10.7%) in the calcipotriene group ($P<0.0001$)^[14]

Clinical studies have revealed that topical vitamin D3 therapy has been shown to extend the duration of remission when added to topical corticosteroid treatment and allows for reduction in the frequency of corticosteroid application, and hence lowers the risk of adverse effects, including local cutaneous reactions, such as atrophy and striae.

None of the patients in our study showed any side effects with topical therapy in form of local irritation, burning or hypercalcemia. In earlier studies also, topical vitamin D analogues have been found to be safe for long term treatment as well. There were no emergent safety concerns, including the risk of hypercalcemia, with prolonged twice daily application of calcitriol ointment based on both long-term studies, including the larger 52-week study, which assured that at least 100 subjects were treated for 12 months and did not reveal an adverse effect on calcium homeostasis.^[15]

CONCLUSION

Topical vitamin D is an effective and safe treatment option in patients with chronic plaque psoriasis. Moreover, the cream is easy to prepare and relatively cheap.

Conflicts of Interest: None Declared

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