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Original Article

Comparative study of calcipotriol ointment and mometasone furoate ointment in patients of psoriasis vulgaris: A double blind study

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ABSTRACT

Introduction: Psoriasis is a chronic, inflammatory papulosquamous disease clinically characterized by erythematous, sharply demarcated, indurated papules and rounded plaques covered by silvery, micaceous scales. Psoriasis is characterized by hyperproliferation and abnormal differentiation of epidermal keratinocytes, infiltration of mostly T lymphocytes and various endothelial vascular changes in the dermal layer, such as angiogenesis, dilatation and high endothelial venule (HEV) formation. **Material and Methods:** The study was conducted on 70 patients of psoriasis attending the outpatient department. Patients who fulfilled the selection criterion were alternately assigned into two groups, 35 patients in each group. The assessment of effectiveness was done with the help of PASI. Follow up of patients were done after 1st, 2nd, 4th and 6th week of initiation of treatment. **Results:** We observed 70 patients and both the group showed statistically significant reduction in the disease severity. **Conclusion:** The calcipotriol and mometasone furoate ointment were found to be equally effective in clearance of the disease.

Key words: Calcipotriol ointment; Mometasone furoate ointment; Psoriasis

INTRODUCTION

Psoriasis is a chronic, inflammatory papulosquamous disease clinically characterized by erythematous, sharply demarcated, indurated papules and rounded plaques covered by silvery, micaceous scales [1]. Recently there is increase in a number of population-based studies providing a global prevalence estimate of psoriasis. It has been found that the prevalence of psoriasis varies considerably in different parts of the world. Psoriasis affects approximately 3.5% of the world population [2]. Psoriasis vulgaris is identified as the most prevalent autoimmune disease which is caused by an inappropriate activation of the cellular immune system. The genetic basis of psoriasis has been known since many decades. The incidence of psoriasis in siblings has been found to be as high as 68% [3].

Psoriasis is characterized by hyperproliferation and abnormal differentiation of epidermal keratinocytes, infiltration of mostly T lymphocytes and various endothelial vascular changes in the dermal layer, such as angiogenesis, dilatation and high endothelial venule (HEV) formation [4]. The exact role of T-cells in the pathogenesis and development of lesions can be explained in 3 events that are initial activation of T lymphocytes, the migration of T lymphocytes into the skin, and the various roles played by cytokines released from T lymphocytes and other cells [5]. The typical psoriatic plaque is characterized by well demarcated, elevated, erythematous plaque with dry, loosely adherent silvery-white scales which preferentially involves extensors of the body. The various clinical variants of psoriasis are chronic plaque psoriasis, guttate psoriasis, exfoliative psoriasis, pustular psoriasis, psoriasis unguis and regional variants.

Topical therapies remain the mainstay of treatment for mild psoriasis and in combination with other modalities for patients with moderate to severe psoriasis. The main

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groups of topical therapies for psoriasis are emollients, keratolytics, corticosteroids, coal tars, dithranol (anthralin), vitamin D3 analogues (Calcipotriol), tazarotene, tacrolimus and pimecrolimus. Calcipotriol (calcipotriene) is already established to be effective topically in the treatment of psoriasis [6]. It has a high binding affinity to the vitamin D receptor (VDR) for the biologically active form of vitamin D3 (1,25-dihydroxy vitamin D3). VDR have been demonstrated in epidermal keratinocytes, melanocytes, dermal fibroblasts and many other cell types [7]. Calcipotriol reduces epidermal cell proliferation and enhances differentiation in the skin lesion by binding to the VDR located in the nucleus of keratinocytes which is found to be increased in number in psoriatic skin. Its advantage over corticosteroids is that it does not cause atrophy, so can be used for longer period. Recently calcipotriol, a synthetic vitamin D3 analogue, has become one of the most widely used treatments for psoriasis. To assess the effectiveness of calcipotriol compared with the more traditional topical treatments for psoriasis we undertook a study to compare 0.005% calcipotriol and 0.1% mometasone furoate ointment.

MATERIAL AND METHODS

The study was conducted as double blind, randomized comparative trial on 70 patients of psoriasis attending the outpatient department of dermatology at a tertiary care hospital.

Inclusion criteria

1. Patients having mild to moderate psoriasis.
2. Percentage of body surface area affected by psoriasis less than or equal to 20%.

Exclusion criteria

1. Patients suffering from hepatic or renal diseases.
2. Pregnant or lactating women.
3. Allergy to study medication.
4. Psoriatic lesions over face.

Approval from institutional ethical committee was obtained before initiation of the study. Patient fulfilling the entire inclusion and exclusion criterion and those willing to complete the follow up examinations were included in the study. A written consent was taken from all the patients. Then a detailed history was taken and recorded. The examination of psoriatic plaque was done in detail with special focus on erythema, induration and scaling. Auspitz 's sign has been performed in every patient to clinically confirm the diagnosis. Routine blood investigations were advised to confirm any association of underlying organ or system involvement. Patients who fulfilled the selection criterion were alternately assigned into 'Group A' and 'Group B' by one study coordinator who was not interested in the result of this study. Each group includes 35 patients. Name of the drug used in both the group was revealed after completion of study. The study has been carried out for 18 months.

The assessment of effectiveness was done with the help of 'Psoriasis Area Severity Index' (PASI) score which was recorded at the baseline and at each follow up.

Psoriasis Area Severity Index (PASI)

PASI is a commonly used measure in clinical trials for psoriasis treatments and the severity scores appear to be highly subjective. The classical psoriatic plaque is characterized by erythema, indurtion and scaling. This provides a means of assessing the severity of psoriasis. PASI is believed to be the gold standard for assessment of psoriasis [8]. The PASI score is calculated as follows [9].

PASI = 0.2 (EU+SU+IU) AU+0.3 (ET+ST+IT) AT+0.4 (EL+SL+IL) AL
Where;
E = Erythema or redness
I = Induration T = Trunk
S = Scaling L = lower limb
A = Area of involvement
U = Upper limb

Area of extent of lesion is classified on a 7-point scale as
0 – No involvement
1 – Less than 10%
2 – 10-29%
3 – 30-49%
4 – 50-69%
5 – 70-89%
6 – 90-100%

The severities of lesion (erythema, scaling, induration) are classified on a
5-point scale
0 – Complete lack of involvement
1 – Mild involvement
2 – Moderate involvement
3 – Severe involvement
4 – Severest possible involvement

Follow up of patients were done after 1st, 2nd, 4th and 6th week of initiation of treatment (Figs 1 and 2). Assessment of adverse effects was also done at each follow up. PASI score changes within the group were analyzed by non-parametric, Wilcoxon test. The post treatment PASI score changes between two groups were assessed by 'unpaired Student t-test'.

Drugs used in study

Group A: Topical calcipotriol (0.005%) ointment, once daily application in evening.
Group B: Topical mometasone furoate 0.1% ointment, once daily application in evening

Liquid paraffin was also given for topical application in morning to patients of both groups.

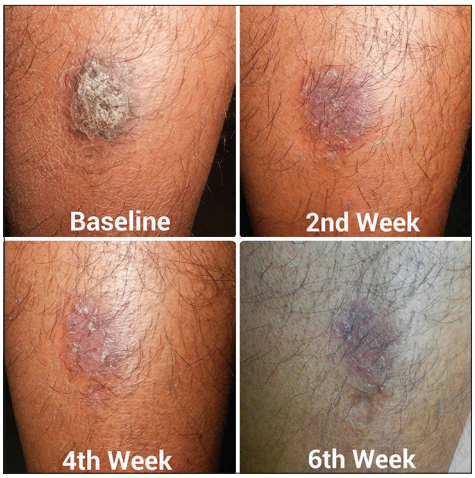

Figure 1: Clinical photograph showing reduction in erythema, induration and scaling of plaque after applying calcipotriol ointment.

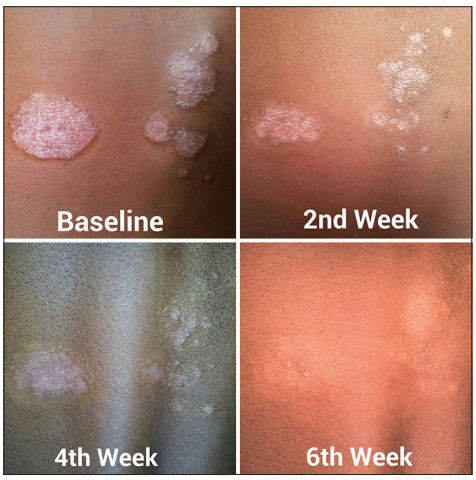

Figure 2: Clinical photograph showing reduction in erythema, induration and scaling of plaque after applying mometasone ointment.

Ethics

This study was performed on human subjects; thus, all patients were aware of the presence of the study and they were fully informed about the drug and its side-effects.

RESULTS

In our study maximum patients were presented in group A between 31 – 40 years (28.5%) and in group B between 21 – 30 years (25.7%) with mean age of presentation being 36.1 years in group A and 37.2 years in group B (Tabl 1). The overall male to female sex ratio was found to be 9:1. Disease exacerbation due to seasonal variation was observed by 26 patients (37.14%) and 4 patients (5.71%) in winter and summer respectively. In group A patients the mean PASI at baseline was 5.54 and it was reduced after 1st, 2nd, 4th and 6th by 19.4%, 36.9%, 50.5% and 73.1% respectively (Tabl. 2) and in group B patients the mean PASI at baseline was 5.13 and it was reduced after 1st, 2nd, 4th and 6th by 8.5%, 12.3%, 52.8% and 78.6% respectively (Tabl 3). The reduction of mean PASI score on each follow up in both the group were found to be statistically significant as compare to baseline PASI score.

After comparing both the groups the difference in mean PASI score was observed to be 4.05 in group A and 4.03 in group B on 6th follow up. From the above data we observed that there was no statistically significant difference between the reductions in PASI score of both the groups (Tabl 4). More than 75% reduction in PASI score is shown by 54.3 % and 68.6 % of patients in group A and group B respectively (Tabl 5). Adverse effect in the form of irritation and burning were experienced by 2 patients using calcipotriol.

DISCUSSION

Psoriasis is a common, chronic and relapsing inflammatory skin disease. Topical treatment is the mainstay of management for mild to moderate psoriasis and often the initial treatment for severe psoriasis. Despite the availability of several treatments, psoriasis is usually difficult to treat because of its sporadic course, variable response to treatments and adverse effects. Approximately 80% of the patients having psoriasis are treated by the topical therapy [10]. Topical corticosteroids and vitamin D3 analogue are the treatment of choice for mild to moderate psoriasis [11].

Table 1: Age distribution

Age group (years)	Group A		Group B		Total	
	Number	Percentage	Number	Percentage	Number	Percentage
< 20	6	17.14	4	11.43	10	14.29
21 – 30	8	22.86	9.00	25.71	17.00	24.29
31 – 40	10	28.57	8	22.86	18	25.71
41 – 50	5	14.29	8	22.86	13	18.57
51 – 60	0	0	2	5.71	2	2.86
61 – 70	5	14.29	4	11.43	9	12.86
>70	1	2.86	0	0	1	1.43
Total	35	100	35	100	70	100
Mean±SD	36.14±15.93		37.26±14.08		36.7±14.94	
Range	16-72 years		17 – 68 years		16 – 72	

Table 2: Group A comparison of changes in PASI scores (Calcipotriol)

Particulars	Baseline	1st week	% Diff.	2nd week	% Diff.	4th week	% Diff.	6th week	% Diff.
Mean	5.54	4.46	19.40	3.49	36.95	2.74	50.57	1.49	73.17
SD	2.19	2.03		1.85		1.56		1.02	
Z#	-	7.13		5.19		5.16		5.16	
P value		<0.001 (HS)		<0.001 (HS)		<0.001 (HS)		<0.001 (HS)	

#Wilcoxon test (Paired) Z, P<0.001 Highly significant (HS). % - Percentage. Diff. – Difference

Table 3: Group B comparison of changes in PASI scores (Mometasone Furoate)

Particulars	Baseline	1st week	% Diff.	2nd week	% Diff.	4th week	% Diff.	6th week	% Diff.
Mean	5.13	4.69	8.58	4.49	12.37	2.42	52.84	1.1	78.60
SD	2.11	2.06		2.02		1.45		0.96	
Z#		5.22		5.2		5.16		5.16	
P value		<0.001 (HS)		<0.001 (HS)		<0.001 (HS)		<0.001 (HS)	

#Wilcoxon test (Paired) Z, P<0.001 Highly significant (HS). % - Percentage. Diff. – Difference.

Table 4: Inter Group comparison of changes in PASI score

Groups	Particulars	Baseline	6th week	Difference
Group A	Mean	5.54	1.49	4.05
	SD	2.19	1.02	1.33
Group B	Mean	5.13	1.1	4.03
	SD	2.11	0.96	1.46
Unpaired t -Test	t			1.695
	P value	-	-	>0.05NS

Table 5: Treatment response in PASI

Groups	Percentage of patients showing clearance					Total (%)
	100	90-100	75-89	50-74	<50	
Group A	8.6	8.6	37.14	45.7	0	100
Group B	11.4	8.6	48.6	31.4	0	100

Bruce S et al and Queille-Roussel et al found that topical calcipotriol was effective in patients of psoriasis [12,13].

Topical corticosteroids are the oldest, effective and most commonly used treatment modality for mild to moderate psoriasis. Apart from its good effectiveness, topical corticosteroid failed to maintain the effect and showed decreased response, tolerance and tachyphylaxis [14]. They are also known to cause local adverse effects such as striae, hypopigmentation, atrophy, telangiectasis and contact dermatitis. According to the studies conducted by Gulam Kazem Ali Ahmad et al, a medium potent (class 4 and 5, American system classification) topical corticosteroid has been found to be effective in treatment of psoriasis [15]. Our study is consistent with the above studies in showing the effectiveness of mometasone furoate 0.1% (class 4 and 5, American system classification) ointment in treatment of psoriasis.

In our study both the topical agents were found to be effective in clearance of psoriatic lesions, but on comparing the effectiveness of calcipotriol with mometasone furoate ointment, we found at the last follow up of 6th week that there was no significant difference between the effectiveness of the two drugs ($P > 0.05$). Our study is consistent with a comparative study by Gulam Kazem Ali Ahmad et al which revealed that calcipotriol ointment was as effective as medium potent corticosteroid (class 4 and 5, American system classification) ointment [15].

Therefore the result of our study showed, topical calcipotriol can be used in treatment of mild to moderate psoriasis involving less than 20% of the body surface area as an alternative to topical corticosteroid, as it is equally effective and safe.

CONCLUSION

The calcipotriol and mometasone furoate were equally effective in clearance of the disease, Therefore from the current study we conclude that 0.005% calcipotriol ointment can be used in the treatment of psoriasis involving less than 20% of the body surface area as a replacement of the very commonly used topical corticosteroid ointment which are known to be associated with tolerance and many adverse effects.

Statement of Human and Animal Rights

All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2008.

Statement of Informed Consent

Informed consent was obtained from all patients for being included in the study.

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