

Efficacy of various topical agents in chronic plaque type psoriasis

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Abstract

Psoriasis is a common, chronic, inflammatory, hyper-proliferative disease of the skin and joints characterized by erythematous plaques covered with silvery white scales. There are many topical and systemic modalities for its treatment. Out of all topical treatment, ammonium lactate has been studied very little for its role in psoriasis vulgaris. As there is paucity of literature on ammonium lactate as monotherapy and its combination with other topical agents, this study has been undertaken and it was found that combination therapy is effective, well tolerated with minimal side effects and better compliance was seen. Ammonium lactate can also be considered as one of the topical option as a monotherapy and also as a maintenance therapy.

Keywords: Psoriasis, Ammonium lactate, Topical, Calcipotriol.

Introduction

Psoriasis is a common, chronic, inflammatory, hyper-proliferative disease of the skin and joints. The natural course of the disease is characterized by relapses and remission and thus has a highly unpredictable course.

The estimated global prevalence of Psoriasis is 1% - 11.8% of the general population depending on the ethnicity served^{1,2} and the approximate estimate of psoriatic patients in India accounts for 2.3%³⁻⁵

Etiopathogenesis in Psoriasis is multifactorial, a combination of environmental and genetic factors. Various studies have been postulated in its etiopathogenesis. The T cells, antigen presenting cells (APC's), langerhan cells, macrophages, natural killer (NK) cells, Th1 type cytokines, various growth factors like vascular endothelial growth factor (VEGF), keratinocyte growth factor (KGF), etc play a important role in its pathogenesis.^{6,7}

Psoriasis manifests in varied forms including chronic plaque type, guttate psoriasis, pustular psoriasis and its variants, inverse flexural psoriasis, exfoliative type of psoriasis, regional psoriasis (involving scalp, napkin area, palms and soles).

The most common form is chronic plaque psoriasis (psoriasis vulgaris), which accounts for the majority of cases. Psoriasis is characterized by well circumscribed, erythematous plaques with silvery white scales that represent a response to an infiltration of inflammatory T cells producing disease-stimulating cytokines in skin lesions. Although no cure is available, the disease can be effectively controlled by various therapeutic options, used alone or in combination.^{8,9} Topical treatment is best used to treat psoriasis affecting less than 10% of total body surface area.⁶ Topical treatments including emollients, topical corticosteroids, vitamin D analogues, tar based preparations, dithranol, salicylic acid and topical retinoids can be used as monotherapy or in combination with other agents..

Ammonium lactate lotion 12% is composed of ammonium lactate (lactic acid), cetyl alcohol, glycerin, magnesium aluminum silicate, water, light mineral oil,

propylene glycol, methyl and propylparabens, laureth-4, and polyoxyl 40 stearate.^{10,11} When applied to the skin, it has been shown to create a stimulatory response that induces an epidermal proliferation increasing epidermal thickness and hydration and an increased number of granular layers and underlying dermal cells. Lactic acid is an alpha-hydroxy acid and may act as a humectant when applied to the skin. Topical Calcipotriol 0.005% is effective and well tolerated for the treatment of psoriasis. It reduces keratinocytes proliferation and enhances differentiation. These actions are mediated via vitamin D receptors located in the nucleus of keratinocytes. It also inhibits T-cell proliferation and decreases ICAM-1 expression thus exerting an immunomodulatory effect.¹²

Clobetasol propionate 0.05% exert anti-inflammatory, anti-proliferative and immunosuppressive action by the induction of phospholipase A2 inhibitory proteins.¹³

To the best of our knowledge, ammonium lactate has been studied for atopic dermatitis but only few studies are available for its usage in psoriasis vulgaris.

Material and Methods

The aim of our study was to determine the effect of various topical agents in chronic plaque type psoriasis and objectives were to study the effect of ammonium lactate 12% lotion as monotherapy and in combination with clobetasol propionate (0.05%) and calcipotriol (0.005%) in patients of chronic plaque type psoriasis and to study the side effects of ammonium lactate, clobetasol propionate and calcipotriol in patients of chronic plaque type psoriasis.

The present study was carried out on patients having chronic plaque type psoriasis vulgaris attending dermatology OPD of Department of Dermatology, Venereology and Leprosy at Acharya Vinoba Bhave Rural Hospital, Sawangi (Meghe), Wardha. After obtaining ethical clearance, written, informed and signed consent patients suffering from stable chronic plaque type psoriasis involving less than 10% of body surface area and those had neither applied topical for last 2 weeks and nor taken

systemic drugs for psoriasis for last three months, were enrolled. Total 75 patients were enrolled and were divided in three groups comprising of 20 patients in each group. Group A patients were asked to apply ammonium lactate twice a day, Group B patients were asked to apply ammonium lactate in morning and clobetasol propionate in evening, Group C patients were asked to apply topical ammonium lactate in morning and calcipotriol in evening. Each patient was asked to do follow up at four weeks and eight weeks interval and response of treatment was evaluated subjectively and objectively. PASI scoring of each patient was done at baseline, at the end of 4 weeks and at the end of 8 weeks. So that after 8 weeks psoriasis, severity and clinical response will be assessed based on PASI scores and subjective assessment by Physician Global Assessment Scale.

PASI (Psoriasis Area Severity Index) Score for the selected patients was taken at baseline, at the end of 4 weeks

and at the end of 8 weeks during the study period. The efficacy of the treatment regimen was analyzed by how many patients attained PASI 50 (i.e. 50% reduction in disease) at the end of the study i.e. 8 weeks. In literature attainment of PASI 50 is considered a satisfactory and a meaningful response.¹²

Assessment of the effect of treatment

Physicians Global Assessment Scale (PGAS)

Poor	0–24% clearing
Fair	25–49% clearing
Good	50–74% clearing
Excellent	75–99% clearing
Clear	100% clearing

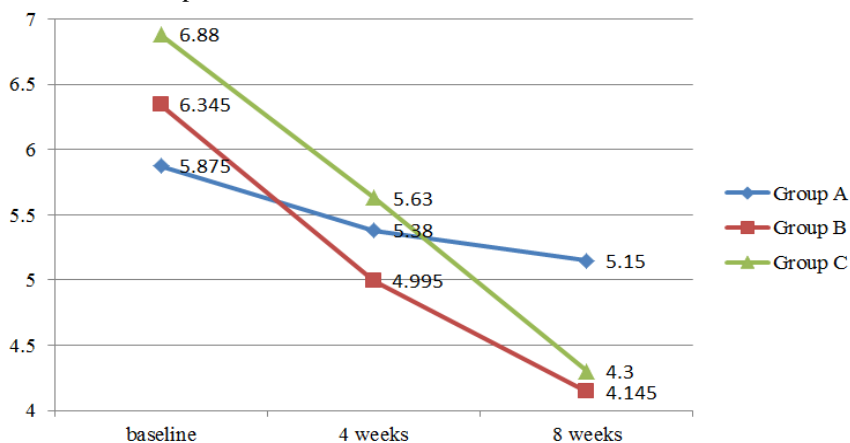
Observation and Result

Table 1: Multiple Comparisons of mean PASI at 8 weeks between groups (Post hoc analysis using Tukey’s HSD)

Dependent Variable	(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	P value	95% Confidence Interval	
						Lower Bound	Upper Bound
PASI at 8 weeks	Group A	Group B	1.00500	1.12068	.045	-1.6918	3.7018
	Group A	Group C	.85000	1.12068	.030	-1.8468	3.5468
	Group B	Group C	-.15500	1.12068	.990	-2.8518	2.5418

In Table 1 Comparison of mean PASI at 8 weeks between study groups was performed using ANOVA. No significant difference was noted between study groups (p=0.630). Further on comparison of individual groups it was found that significant difference was present between PASI at 8 weeks between group A and group B (p=0.045), group A and group C (p=0.030) but between group B and group C (p=0.990) difference was not significant.

Graph 1: Comparison of PASI in Groups A, B and C at end of 8 weeks



Graph 1 this graph shows fall in PASI in Groups A, B and C from baseline to 4 weeks and from 4 weeks to 8 weeks.

Table 2: Assessment of PASI 50 in Groups (A, B, C)

Characteristics		Group		
		Group A	Group B	Group C
PASI 50	No	11(55%)	7(35%)	7(35%)
	Yes	9(45%)	13(65%)	13(65%)
Total		20	20	20

In Table 2 PASI 50 was calculated in all three groups and it was found that 9(45%) out of 20 subjects attained PASI 50 in group A, 13(65%) out of 20 patients in group B and 13(65%) out of 20 patients in group C.

Table 3: Comparison of Physician Global assessment scale between Groups (A, B, C)

PGAS		Group		
		Group A	Group B	Group C
Poor	0-24%	7(35%)	4(20%)	5(25%)
Fair	25-49%	4(20%)	3(15%)	2(10%)
Good	50-74%	4(20%)	7(35%)	7(35%)
Excellent	75-99%	5(25%)	6(30%)	6(30%)
Total		20	20	20

In Table 3 Physician global assessment scale shows that in Group A, 5(25%) patients had excellent response, 4(20%) patients had good response, and 4(20%) patients had fair response whereas 7(35%) patients had poor response. In group B, 6(30%) patients had excellent response, 7(35%) patients had good response, and 3(15%) patients had fair response whereas 4(20%) patients had poor response. In group C, 6(30%) patients had excellent response, 7(35%) patients had good response, and 2(10%) patients had fair response whereas 5(25%) patients had poor response.

Discussion

Psoriasis is a common, chronic, inflammatory disease of the skin. The present study was done on patients having psoriasis vulgaris less than 10% body surface area and they were treated with various topical agents. In present study, all baseline parameters were compared and were found to be compatible with each other. In all three groups mean PASI was calculated at 4 and 8 weeks. When efficacy was compared individually between groups at 4 weeks and 8 weeks, significant difference was found between group A and group B (p value =0.020 and 0.045 at 4 and 8 weeks respectively) and between group A and group C (p value= 0.019 and at 0.030 at 4 and 8 weeks respectively) but no significant difference was found between group B and group C (p value= 0.585 and 0.990 at 4 and 8 weeks respectively) showing that group B and group C are equally effective but group A is less effective than group B and group C. PASI 50 was attained by 45% patients in group A, 65% patients each in group B and in group C. Physician Global Assessment Scale was used, 45% patients in group A, 65% patients in group B and 65% patients in group C had $\geq 50\%$ clearing of lesions. In each group one patient had erythema and one had skin irritation (burning sensation). During the course of the study, 7 patients dropped out in group A, 3 patients in group B and 5 patients in group C. On telephonic conversation they informed inability to come on scheduled date because of personal reasons such as duties, financial issues for travelling and not getting satisfactory response after topical

Regular and appropriate use of emollients improves comfort and reduces scaling, fissuring, and itching in patients with plaque or scalp psoriasis (14,15). Guidelines of care for the management of psoriasis and psoriatic arthritis state that when used as a control in topical steroid trials, non-medicated topical moisturizers demonstrated a response rate ranging from 15 to 47%.^{13,16} This broad range shows great variability of their composition. In 2 small clinical trials which includes 111 patients shows that emollients used as a monotherapy may improve skin hydration, barrier function, as well as proliferation and differentiation markers in patients with psoriasis^{17,18} the clinical response showed only a slight symptomatic improvement of psoriasis.¹⁷ In a randomized study done by Emer et al it was found that

combination therapy of twice-daily ammonium lactate lotion and halobetasol ointment for two weeks effectively cleared plaque psoriasis in approximately 75% of patients whereas Halobetasol ointment weekend-only maintenance therapy in combination with twice-daily ammonium lactate lotion effectively sustained initial improvement for a significantly longer period of time when compared with placebo.¹⁹ Adding a second agent (keratolytic, emollient, vitamin D analogue) may also help effectively maintain clearance and offer a corticosteroid sparing option. A meta-analysis of 22 studies reported that clearing rates following monotherapy ranged from 2 to 85 percent versus clearance rates of 39 to 100 percent for combination the rapies.²⁰

Thus emollient (ammonium lactate 12% lotion) as a monotherapy is also effective. Study explains that the combination therapy is more efficacious as compared to monotherapy.

Conclusion

Combination therapy is effective, well tolerated with minimal side effects and better compliance was seen with patients. Ammonium lactate 12% can also be considered as one of the topical option as a monotherapy and also as a maintenance therapy. But more number of Indian studies are required as there is paucity of literature on topical treatment of psoriasis.

Conflict of Interest: None.

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