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Original Article

Comparative study of efficacy of topical anthralin (0.5%) and topical calcipotriol (0.005%) in management of chronic plaque psoriasis

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Abstract

Objective The aim of the study is to compare the efficacy of topical calcipotriol (0.005%) and topical anthralin (0.5%) in treatment of Chronic Plaque Psoriasis (CPP).

Methods This randomized, interventional study was conducted at Pak Emirates Military Hospital, Rawalpindi and Combined Military Hospital, Rawalpindi for 6-month period (10th January 2020 to 10th July 2020). A sample of 186 patients was randomly distributed in two groups. In group A, patients applied topical anthralin (0.5%) every night for 12 weeks. In group B, patients applied topical calcipotriol (0.005%) every night for 12 weeks. The follow up period was 12 weeks and assessment of the efficacy was done at 4, 8 and 12 weeks by utilizing PASI score.

Results The age range of the individuals was from 15 to 50 years. The average duration of presenting complaint for Group A was 8.903±1.85 months while for Group B was 9.193±2.58 months. In Group A, the average PASI score before and after the treatment was 16.22±3.02 and 4.784±3.28 respectively and in Group B the average PASI score before and after the treatment was 16.03±2.09 and 2.376±2.39 respectively. The number of male patients in each group was more than female. Efficacy i.e. reduction in PASI score by 75% was seen in 21.5% patients of Group A as compared to 43% in Group B (p=0.001).

Conclusion In conclusion, 0.005% calcipotriol is considerably more efficacious than 0.5% anthraline in bringing disease improvement and patient satisfaction than 0.5% anthraline.

Key words
Chronic plaque psoriasis; Calcipotriol; Anthraline; Efficacy.

Introduction

Psoriasis is a chronic inflammatory and proliferative disorder with systemic manifestations. Pathogenesis of psoriasis encompasses immune mediated disruption of T cells and cytokines being primary effectors of the disease. The severity of disease varies from mild to severe affecting the quality of life of the individuals. Psoriasis is heterogenic disorder having both genetic and environmental factors influencing the pathogenesis. This skin disorder and the associated medical conditions adversely effecting QOL. These conditions include depression, metabolic syndrome, cardiovascular disease, obesity, diabetes and arthritis.

In the era of biologics and other novel therapies, there is still a place of topical therapy in

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controlling of mild to moderate psoriasis. Various topical agents in use are calcineurin inhibitors, corticosteroids, coal tar, keratolytic, retinoids, dithranol and vitamin D analogues.[1,2] The choice of treatment depends upon extent and severity of disease, patient compliance, forbearance and consent. Before advising any treatment it is mandatory to set the treatment goals i.e. relief of symptoms like itching, scaling, cracking and soreness and reduction in PASI score.[5]

In recent years, anthralin has been observed to be one of the foremost and effective topical treatment of stable plaque psoriasis. It might be utilized as a short contact anthralin therapy (SCAT) for limited, scaly plaques on the body or the scalp that have not cleared by other treatment.[9] It is applied for 10 minutes every night and duration is consecutively increased till irritation occurs. Anthralin prevents T-cell activation decreases keratinocyte proliferation and restores cell differentiation, most likely through mitochondrial disfunction. Additionally, production of free radicals could contribute to its result/effect.[9,10] It is associated with untoward effects including local irritation, temporary yellowish brown staining of skin and permanently staining of clothes that come in contact with the ointment.

Calcipotriol use in psoriasis dates back to 1930s. It is vitamin D analogue, which has an immunomodulatory role in reduction of keratinocyte proliferation. It has an immunomodulatory effect on T cells, dendritic cells, macrophages and monocytes. Topical calcipotriol is metabolized rapidly therefore it is not associated to hypercalcemia as seen with other vitamin D analogs e.g. calcitriol and tacalcitol. It is considered as the treatment of first choice for psoriasis on the scalp, trunk or limbs.[6] Nevertheless, about 35% of patients using calcipotriol experience topical adverse effects for example itching, dryness or erythema.[7]

There has not been any local study which compares topical anthralin to topical calcipotriol. Result of international studies cannot be generalized on our population due to different skin types, genetic makeup and other confounding variables. Results of our study will be a way forward to select the better topical management of mild to moderate CPP.

Methods

This is a randomized controlled trial of total of 186 patients of both gender with chronic plaque psoriasis involving less than 10% body surface area, having age in range 15-50 years are included in the study. Patients on oral medications for psoriasis and with joint or nail involvement or other comorbidity are excluded from the study. The study is carried out in Pak-Emirates Military Hospital and Combined Military Hospital, Rawalpindi from 10th January 2020 to 10th July 2020. Patients were randomly divided into two groups. Randomization was performed on basis of arrival time of the subject in OPD and time of registration into the study. Informed written consent taken and demographic data along with basal PASI at time of induction into study were recorded. In group A, patient applied topical anthralin (0.5%) every night for 12 weeks. In group B, patients applied topical calcipotriol (0.005%) every night for 12 weeks. Patients were told not to apply any other topical formulation during the day and were assessed for efficacy measure by the PASI at weeks 4, 8 and 12. Data regarding efficacy was recorded as per operational definition from both groups. Permission from institutional ethical committee was taken for the study.

The patients suffering from plaque psoriasis involving less than 10% body surface area,

having age between 15 to 50 years are included in the study.

Patients on oral medication for psoriasis, and the disease with joint or nail involvement or any other comorbidity are excluded from the study.

Results

Total 186 individuals based on the inclusion criteria were enrolled in the study. These patients were divided into two groups having 93 patients in each group, labeled as Group A and Group B. This division is achieved through randomization. In group A, patients applied topical anthralin (0.5%) every night for 12 weeks. In group B, patients applied topical calcipotriol (0.005%) every night for 12 weeks. The patients were instructed to wash off the medicine in the morning and not to apply any other topical medication during the day, throughout the study period.

At the enrolment, the patient's biodata, postal address, phone number, demographic data and PASI score were recorded in a separate register along with informed consent of the patient. Each patient was instructed regarding possible adverse effects of each topical agent and methods to avoid them and were encouraged to visit the outpatient department as soon as there is any local irritation, blisters formation or staining at site of application of topical agent, so that the adverse reactions could be managed appropriately.

After initiation of treatment the compliance is ensured through regular follow up visits to Dermatology Department Outpatient Department at Pak-Emirates Military Hospital and Combined Military Hospital at 4, 8 and 12 weeks, and PASI score was recorded in each follow-up visit. A record of follow up visits is maintained and appointment for next follow-up is communicated to the patient or his/ her attendant to avoid drop outs.

At the end of 12 weeks of study period the results were statistically analyzed by SPSS Ver. 22. Efficacy was considered as improvement of PASI score by 75% from PASI recorded at the first visit. This end point could be achieved at any time during the 12 weeks course of study. Improvement in PASI score less than 75% by the end 12 weeks of topical treatment was considered as ineffective treatment.

The frequency distribution and its percentage for qualitative variables (i.e., age group gender and efficacy) were calculated. The mean±standard deviation was computed for some quantitative variables i.e., age, duration of illness, weight and PASI measurements. For inferential analysis, we incorporated Chi-Square test for the comparative analysis of efficacy in both groups, with 0.05 significance level. The overall age range of the study sample units was 15-50, the average age range of Group A was 32.548±6.24 years and the average age range of the Group B is 33.914±6.36. The mean duration of illness in Group A was 8.903±1.85 months while in Group B it was 9.193±2.58 months. The average weight range for Group A was 69.322±10.77 Kg while for Group B it was 66.634±10.26 Kg. The PASI score before treatment in Group A was 16.22±3.02 and 16.03±2.09 in Group B. The PASI score after treatment in Group A is 4.784±3.28 and 2.376±2.39 in Group B. All these results are presented in the **Table 1**. The percentage of efficacy for the treatment used in Group-A was 21.5% while the efficacy of treatment in Group B was 43% with computed P-value =0.001, presented in **Table 2**.

Discussion

A total of 186 patients were enrolled in the study, who were divided into two groups. The

Table 1 Average ranges of each group sample units ages, complain duration, before and after treatment PASI score and weight.

Demographics	*Group A No. of patients=93 (Mean±Standard Deviation)*	*Group A No. of patients=93 (Mean±Standard Deviation)*
Age (years)	32.548± 6.24	33.914± 6.36
Duration of complain (months)	8.903±1.85	9.193±2.58
PASI score before treatment	16.22 ± 3.02	16.03 ± 2.09
PASI score after treatment	4.784±3.28	2.376±2.39
Weight (Kgs.)	69.322±10.77	66.634±10.26

Table 2 Frequency and percentages regarding the efficacy for each group.

Efficacy	*Group A (n=93)*	*Group B (n=93)*	*P Value of data in significant/ effective groups*
Yes	20 (21.5%)	40 (47%)	
No	73 (78.5%)	53 (53%)	0.01
Total	93 (100%)	93 (100%)	

age and weight of patients and mean duration of illness were comparable in both groups. As far as the efficacy of treatment modalities is considered, topical calcipotriol was far more effective than topical anthralin with P value <0.01.

A number of trials have been conducted comparing the efficiency of calcipotriol with complementary topical agents i.e., coal tar and steroids. Sharma *et al*. described greater than 50% improvement in the body surface area score at 4th week in 60% of plaques managed through calcipotriol in comparison with 23.3% improvement with coal tar with a P value=0.01**.**

Pinheiro *et al*. stated remarkable improvement by twelve hourly calcipotriol application in comparison with coal tar–alienation-hydrocortisone group at 8th week.[15] Tham *et al*. observed rapid decline in the score of PASI by calcipotriol twelve hourly application in contrast to coal tar, 15% w/v once a day and correspondingly found a significant difference at all follow-up visits on 2nd, 4th and 6th week. It was described that calcipotriol applications led to rapid clearance in first 2 weeks whereas substantial outcome was observed after 4 weeks.[16]

Combined preparation of betamethasone with calcipotriol was observed to be more effective to either component alone in a giant trial based on the 1605 patients, during which end point of absent-to-mild disease was attained in 48% patients treated by the combination of calcipotriene betamethasone compared to just 16.5% patients treated by the calcipotriene only and 26.3% patients treated with betamethasone only.[17] Recceri F *et al.* has showed in a study that percentage of topical calcipotriol efficacy was 19% in CPP treatment.[20] Sabidian E *et al.* has showed in a study that efficacy of topical anthralin was 37.4 % in treatment of chronic plaque psoriasis.[14]

In our study the efficacy was observed 21.5% for the treatment (Anthralin) of Group A while the efficacy for the Group B treatment (calcipotriol) was 47% with the P value=0.001. Hence, finding of our study are consistent to the finding in all previous studies.

Conclusion

The efficacy of topical calcipotriol (0.005%) significantly better with more patient's satisfaction and clinical improvement as compared to the topical anthralin (0.5%), which was associated with local pruritus, staining of skin and discomfort leading to poor patient compliance and drop outs from the study.

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