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Clinical Outcomes and Safety of Topical Treatments for Palmoplantar Psoriasis: A Comparative Study

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ABSTRACT
Palmoplantar psoriasis (PPP) is a chronic, treatment-resistant inflammatory skin condition primarily affecting the palms and soles. Despite the availability of multiple topical therapies, a lack of comparative studies limits evidence-based treatment recommendations. To evaluate and compare the efficacy, safety and patient satisfaction of three topical treatment modalities for PPP: corticosteroid-salicylic acid combination, calcipotriol-betamethasone combination and coal tar-urea combination. A prospective, comparative study was conducted over six months with 45 patients aged 18-65 years diagnosed with PPP. Patients were divided into three equal groups (n=15 each) and treated with one of the following regimens: Group A received clobetasol propionate 0.05% with salicylic acid 6%., Group B received calcipotriol 0.005% with betamethasone dipropionate 0.05% and Group C received coal tar 3% with urea 10%. Treatments were applied twice daily for 12 weeks. Efficacy was assessed using Psoriasis Area and Severity Index (PASI), Dermatology Life Quality Index (DLQI) and patient satisfaction. Safety was evaluated by documenting adverse effects. All groups showed significant PASI reductions, with the greatest improvement observed in Group B ($p<0.05$). Group B also demonstrated the highest patient satisfaction (VAS 8.9±1.0) and fewest adverse effects. Group A achieved moderate efficacy, while Group C was less effective but well-tolerated. The calcipotriol-betamethasone combination was the most effective and well-tolerated treatment for PPP, providing significant clinical improvement and high patient satisfaction. These findings support its use as a preferred first-line therapy for PPP. Further studies with larger sample sizes are recommended.

INTRODUCTION

The chronic inflammatory skin disorder known as palmoplantar psoriasis (PPP) is typified by erythematous, hyperkeratotic plaques that mostly affect the palms and soles. These areas' distinct structure, which includes thicker epidermis and significant mechanical stress, adds to the disease's tenacity and resistance to therapy. PPP has a substantial negative influence on quality of life, restricting everyday activities and professional performance in addition to causing physical discomfort from cracks and scaling[1]. Because of the hands and feet's functional importance, PPP is disproportionately onerous, accounting for 3-4% of all psoriasis cases. According to studies, psoriasis affects between 2 and 4% of people worldwide, with regional, climatic and genetic variations. According to research, palmoplantar psoriasis is more prevalent in adults and equally distributed in men and women. Exacerbation of palmoplantar lesions is significantly linked to factors including smoking, obesity and mechanical stress[2]. Numerous therapy approaches, including as topical corticosteroids, vitamin D analogues, calcineurin inhibitors and keratolytic drugs, have been studied for PPP. Strong corticosteroids are still a mainstay of therapy, although prolonged use of them can cause tachyphylaxis and skin atrophy[3]. Particularly when used with corticosteroids, vitamin D analogues like calcipotriol have demonstrated potential in lowering inflammation and hyperkeratotic. Newer treatments, including as topical retinoids and Janus kinase inhibitors, have been studied recently, although their function is yet unknown. Zhang *et al.'s* comprehensive review[4] emphasized the necessity for strong comparison trials and the paucity of head-to-head research comparing various topical treatments in PPP. Even with the wide range of available treatments, PPP is still difficult to control and many patients have insufficient response or recurrences often[5]. There is a substantial information vacuum caused by the absence of comparison research on the effectiveness of different topical treatments in practical settings. In order to enhance patient outcomes and inform therapeutic decision-making, this study compares and assesses the efficacy of several topical therapies for PPP.

Aims and Objectives:

Aims: To evaluate the effectiveness of various topical therapy approaches in treating palmoplantar psoriasis by looking at patient-reported results and clinical improvement.

Objectives: To assess the clinical improvement in palmoplantar psoriasis using Physician Global Assessment (PGA) ratings and the Psoriasis Area and Severity Index (PASI) for different topical therapies.

MATERIALS AND METHODS

Study Design and Setting: This prospective, comparative investigation was carried out in a tertiary care center's dermatology department. After receiving institutional ethics committee approval, the study was conducted over a six-month period.

Study Population: Patients aged 18-65 years diagnosed with palmoplantar psoriasis were included in the study. Diagnosis was made based on clinical features and, if necessary, histopathological confirmation. Patients with severe systemic illness, pregnant or lactating women and those with a history of hypersensitivity to the study drugs were excluded.

Sample Size: A total of 45 patients were enrolled and divided equally into three groups (n=15 per group), each receiving a different topical treatment modality.

Study Groups and Interventions:

- **Group A:** Received a combination of a topical corticosteroid (clobetasol propionate 0.05%) and salicylic acid ointment (6%).
- **Group B:** Treated with topical calcipotriol (0.005%) and betamethasone dipropionate (0.05%) ointment.
- **Group C:** Administered coal tar preparation (3%) in combination with urea cream (10%).

All patients were advised to apply the respective medications twice daily for 12 weeks and to avoid any other topical or systemic treatments during the study period.

Data Collection and Follow-Up: At baseline, a detailed history was recorded and physical examination was conducted to determine the PASI score. Follow-ups were scheduled at 4-week intervals for clinical evaluation and reassessment of the PASI score. Adverse effects, if any, were documented at each visit.

RESULTS AND DISCUSSIONS

In this study, three topical therapy regimens for palmoplantar psoriasis were examined for safety and effectiveness. Our results show that all treatment groups saw substantial improvements in Psoriasis Area and Severity Index (PASI) ratings, with Group B showing the biggest decrease at Week 12. Additionally, Group B had the highest participant satisfaction and the fewest and most well-tolerated negative effects. A randomized controlled study by Paolo[6] shown the greater effectiveness of calcipotriol and betamethasone combination treatment in treating palmoplantar psoriasis and the decrease in PASI scores seen in Group B is consistent with those findings. In a similar vein, a research by Efstratios[7] highlighted this combination's quick start of action and long-lasting effectiveness in comparison to other topical

Table 1: Baseline Characteristics of the Study Participants (n=45)

Characteristics	Group A (n=15)	Group B (n=15)	Group C (n=15)	p-value
Mean age (years)	42.5±8.3	44.2±7.6	43.0±6.9	0.78
Male (%)	9 (60%)	10 (66.7%)	8 (53.3%)	0.65
Duration of psoriasis (years)	6.2±3.4	5.8±3.1	6.0±3.2	0.88
PASI score (baseline)	12.4±2.1	12.8±2.3	12.7±2.2	0.92

Table 2: Reduction in PASI Scores Over 12 Weeks

Time Point	Group A (Mean±SD)	Group B (Mean±SD)	Group C (Mean±SD)	p-value
Baseline	12.4±2.1	12.8±2.3	12.7±2.2	0.92
Week 4	9.8±2.0	8.7±1.9	8.9±2.1	0.45
Week 8	6.5±1.7	4.8±1.5	5.2±1.6	0.03*
Week 12	3.2±1.1	2.1±0.8	2.5±0.9	0.02*

*Significant differences noted at Week 8 and Week 12

Table 3: Adverse Effects Observed in Study Groups

Adverse Effect	Group A (n=15)	Group B (n=15)	Group C (n=15)	p-value
Skin irritation (%)	4 (26.7%)	2 (13.3%)	3 (20%)	0.64
Hyper pigmentation (%)	1 (6.7%)	0 (0%)	2 (13.3%)	0.53
Peeling (%)	5 (33.3%)	3 (20%)	4 (26.7%)	0.68
Other (%)	2 (13.3%)	1 (6.7%)	2 (13.3%)	0.78

Table 4: Participant Satisfaction Scores at Week 12

Satisfaction Level (VAS)	Group A (n=15)	Group B (n=15)	Group C (n=15)	p-value
Mean VAS score (0-10)	7.8±1.2	8.9±1.0	8.5±1.1	0.04*
Highly satisfied (%)	10 (66.7%)	12 (80%)	11 (73.3%)	0.71
Moderately satisfied (%)	4 (26.7%)	3 (20%)	4 (26.7%)	0.85
Dissatisfied (%)	1 (6.7%)	0 (0%)	0 (0%)	0.62

*Statistically significant difference in mean satisfaction scores.

treatments. On the other hand, Group A, which was given a preparation based on tar, showed a modest level of effectiveness. According to Gold[8], tar-based therapies are still a good choice for mild to moderate instances, but their later start of effect and poorer patient satisfaction restrict their appeal. Although topical corticosteroid-only Group C significantly reduced PASI, it was somewhat less successful than Group B's combo treatment. A research by Broggi[9] found similar patterns, stating that although corticosteroids are good at reducing inflammation, they might not be as efficient when used alone to treat the hyperkeratotic lesions that are characteristic of palmoplantar psoriasis. Skin irritation and peeling were among the study's modest side effects, which were in line with earlier studies. Our results in Group B were supported by research by van de Keer, which showed that combination therapies are linked to less local side effects than monotherapy with corticosteroids or tar-based treatments. Studies on long-term corticosteroid usage have previously documented hyper pigmentation, which was seen in a limited percentage of Group C individuals[10] (Wang *et al.,* 2023). This emphasizes the necessity of using corticosteroids sparingly, particularly in darker skin types that are more susceptible to pigmentary alterations. The findings of Sarma[11], who observed that patient satisfaction is highly connected with both the speed at which symptoms resolve and the absence of negative effects, are similar to the greater satisfaction levels in Group B individuals. In line with findings by Samarasekera[12], tar-based treatments (Group A) were less preferred despite their efficacy because of their smell and application-related drawbacks. Although this study offers solid insights into the relative effectiveness of topical therapies, the results may not be as broadly applicable due to the single-center approach and limited sample size. To validate these findings, larger, multicenter studies are necessary. Long-term monitoring is also required to determine the durability of therapy effects and recurrence rates.

CONCLUSION

In treating palmoplantar psoriasis, this study compares the safety and effectiveness of many topical therapy approaches. All treatment groups saw significant decreases in PASI scores, with certain modalities showing better outcomes at the conclusion of the trial. The effectiveness and tolerance of the therapies determined participant satisfaction, even if side effects were mild and controllable across groups. These results highlight how crucial it is to customize treatment to each patient's requirements and level of tolerance in order to attain the best possible therapeutic results.

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