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Comparison of Efficacy of Localized Narrow-Band UVB Therapy Versus Localized PUVA Therapy in Chronic Hand Eczema

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Abstract

Introduction: Hand eczema is a type of dermatitis largely confined to the hands. Narrowband UVB (NBUVB) appears to be as effective as topical PUVA therapy in the treatment of chronic hand dermatitis. However, the risks of phototoxicity and dyspigmentation associated with local PUVA therapy make localized NBUVB therapy a preferable initial therapeutic option.

Methods and Methodology: A total of 40 patients with chronic hand eczema were randomly divided into two groups: Group A (20) receiving localized NBUVB and Group B (20) receiving localized PUVA therapy. They were administered the designated treatment modality for the period of 8 weeks. They were evaluated every 2 weeks to see for the clinical response and any side effects.

Results: In group A, there was around 47% and 85% improvement in Clinical Assessment Score (CAS) at weeks 4 and 8 respectively. Similarly, in group B, there was around 52% and 86% improvement in CAS at weeks 4 and 8 respectively. The improvement in terms of the mean of CAS in cases of group B was more compared to group A. (p=0.636 at week 4 and 0.578 at week 8).

Conclusion: Light-based modalities of treatment in the form of localized NBUVB and PUVA can be considered as an alternative treatment of choice in cases of hand eczema as they have been shown effective by the reduction in the clinical assessment score. However, there was no statistically significant difference in the reduction in the mean clinical assessment score among the patients treated with either localized NBUVB or PUVA.

Key words: Clinical Assessment Score, Hand Eczema, Phototherapy

Introduction

Hand eczema (H.E), a type of dermatitis largely confined to the hands, with minor involvement of other areas, is characterized clinically by erythema, vesicles, papules, scales, fissures, hyperkeratosis, and symptoms of itch and pain. It affects 2% to 10% of the general population at any given time.

Phototherapy is one of the modalities available for the management of chronic hand eczema. The psoralen ultraviolet A (PUVA) treatment is well established with response rates of 82–100%.[1] Narrowband UVB (NBUVB) appears to be as effective as topical PUVA therapy in the treatment of chronic hand dermatitis. However, the risks of phototoxicity and dyspigmentation associated with local PUVA therapy make NBUVB therapy a preferable initial therapeutic option.[2]

Despite the availability of considerable modalities of treatment for hand eczema, a long-term therapy that effectively maintains the condition in remission with side effect profiles relatively safe enough for it to qualify for a chronic condition like hand eczema, is lacking. This study evaluated the efficacy of PUVA over NBUVB in patients with hand eczema.

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Methods and Methodology

An observer-blind, randomized controlled trial was conducted after taking ethical approval from the Institution Review Committee, BP Koirala Institute of Health Sciences (BPKIHS), Dharan on February 2020. A total of 50 patients above 15 years with chronic hand eczema attending the outpatient department of Dermatology, BPKIHS, Dharan from March 2020 to December 2020 were enrolled in the study after taking written well-informed consent.

A complete clinical assessment was done at the time of enrollment. Diagnosis of eczema was made based on the patient's history and clinical examination. In doubtful cases, a biopsy was taken and processed for histopathological examination to rule out other palmoplantar dermatoses.

The patients were divided randomly into two groups using the Ralloc software program: Groups A and Group B. Group 1: was treated with Localized NBUVB. Therapy was started at 280mj/cm^2 with an increasing percentile dose three times a week based on an increase of 20% since the last irradiation dose, which was used in every session till Minimal Erythema Dose (MED) was achieved, following which that dose was continued till the end of treatment.

Group 2: were treated with Localized PUVA. The hand treated with the PUVA regimen was painted with 1% 8-methoxy psoralen (MOP) lotion (Melanocyl), 5 minutes before the UVA exposure.

The assessment was made by an observer unaware of the treatment allocation every 2 weeks for a period of 8 weeks. The assessment was done by calculating the Clinical Assessment Score (CAS) at the start of treatment and at 2-week intervals. Complete clearance was defined as clearance among the patients who achieve a total clinical score of zero at the end of the treatment and marked clinical improvement was defined as improvement among the patients with a reduction of 70% or more with respect to the baseline scores at 8 weeks. During this period total cumulative dose of psoralen ultraviolet A (PUVA) and narrow band ultraviolet B (NBUVB) was calculated.

The patients from both groups who completed the treatment sessions were evaluated for a total of 6 weeks after the last therapy, at 2 weeks intervals. The severity of relapse was classified as either severe (>70% of pretreatment scores), moderate (30–70% of pretreatment scores), or mild (<30% of pretreatment scores). The patients without an increase in post treatment total clinical scores at the evaluation of follow-up visits were determined to be relapse-free.

Data was analyzed with SPSS version 11.5, and efficacy, adverse effect and DLQI was measured of an individual with diagnosis of chronic hand eczema using both the parametric and non-parametric tests (Chi-square test/ Mann-Whitney test and frequency percentage).

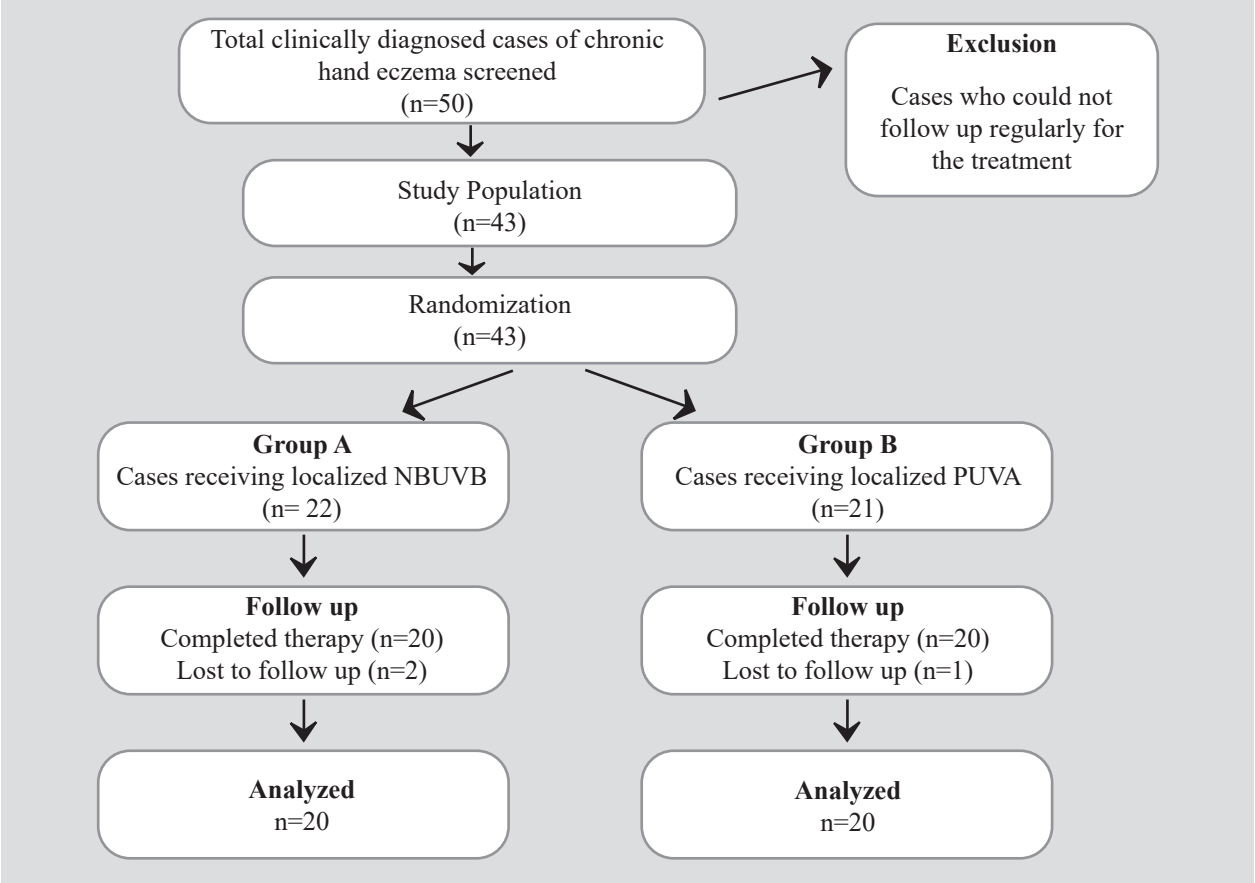


Figure 1: Flow chart showing the enrollment of patients

Results

A total of 50 patients with chronic hand eczema visiting Dermatology OPD were enrolled in the study. Seven cases were excluded from the study as they were reluctant to follow up regularly for the treatment. The remaining 43 patients were randomly divided into two groups: Group A including the patients receiving localized NBUVB and Group B receiving localized PUVA therapy and through this result interpretations the aforementioned groups will be mentioned. During randomization there were 22 patients in Group A and 21 in Group B. They were administered the designated treatment modality for the period of 8 weeks. They were evaluated every 2 weeks to see for the clinical response and any side effects. In Group A, 2 patients lost to follow up as they were unable to visit the center every alternate day due to their work. In group B, 1 patient lost to follow up as patient had gone abroad in the middle of study. (Figure 1)

Characteristics	Category	Group A n (%)	Group B n (%)	X^2/ t-test*	p-value
Age (in years)	Mean ± SD	30.35 ± 7.66	27.15 ± 6.06	1.46*	0.151
Age Group (in years)	15-30	8 (40)	12 (60)	1.60	0.206
	>30	12 (60)	8 (40)		
Sex	Male	6 (30)	6 (30)	0.001	1
	Female	14 (70)	14 (70)		
Occupation	Farmers	10 (50)	13 (65)	2.201	0.532
	Homemakers	3 (15)	4 (20)		
	Skilled	4 (20)	2 (10)		
	Students	3 (15)	1 (5)		
Education	Literate	17 (85)	16 (80)	0.173	0.677
	Illiterate	3 (15)	4 (20)		
Marital Status	Married	12 (60)	13 (65)	0.107	0.744
	Unmarried	8 (40)	7 (35)		

[**Table 1:** showing summary of Demographic characteristics of cases in Groups A and B.]

The summary of demographic profiles of group A and B is as shown in table 1. In group A, the duration of disease was less than 1 year in 9 (45%) cases and greater than 1 year in remaining patients. Similarly, in group B, 13 (65%) had disease duration of less than 1 year while 7 (35%) had duration greater than 1 year. Eighteen (90%) of the cases in group A and 19 (95%) of the cases in group B had one or more symptoms. Among various symptoms, itching was the most common symptom present in all the cases in both the groups. Other symptoms in cases in group A included dryness in 15 (75%), redness in 12 (60%), scaling in 17 (85%) and pain in 2 (10%) cases. In the cases in group B, 15 (75%) had dryness, 18 (90%) had redness, 18 (90%) had scaling and 7 (35%) had pain. There was history of atopy in 13 (65%) cases in group A and 14 70%) cases in group B. Cutaneous examinations in cases of both the groups examining sites and morphology of lesions were as shown in table 2.

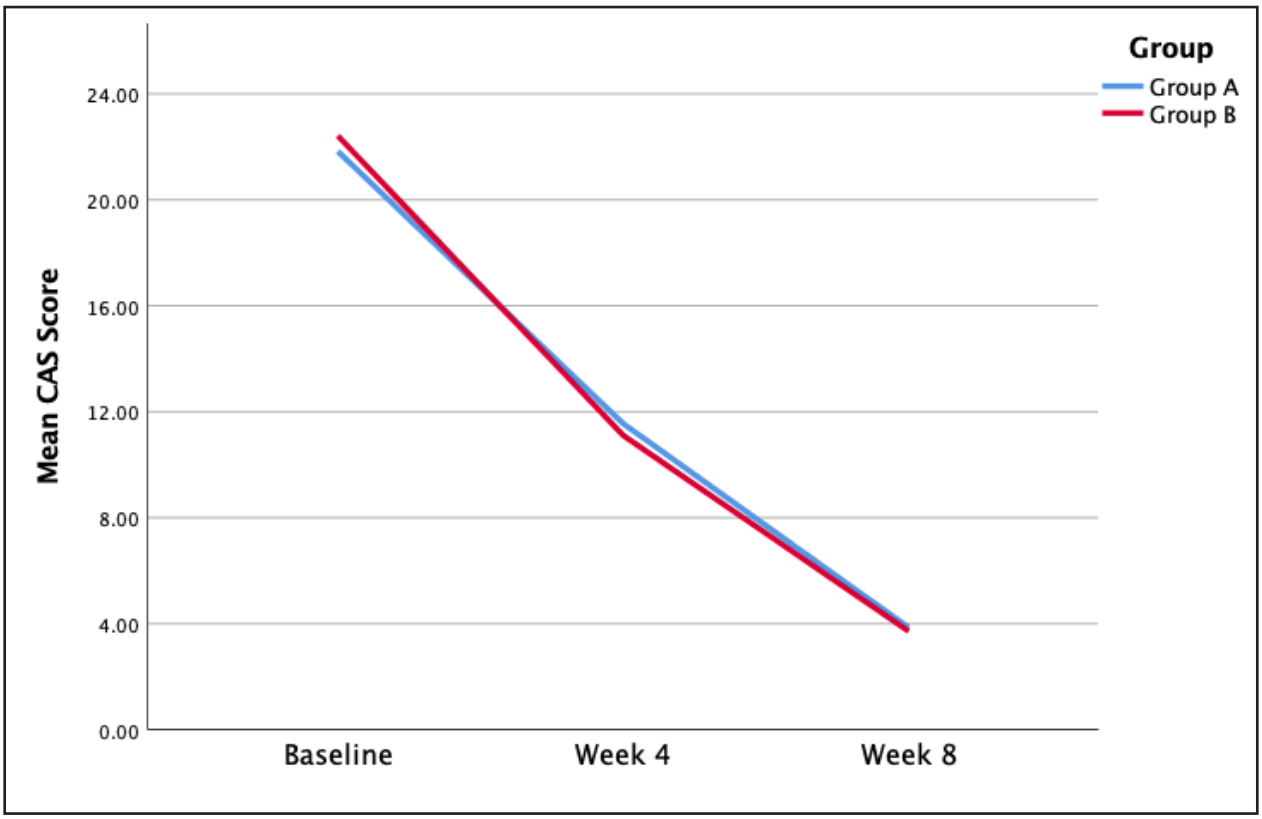
On comparing the mean of Clinical Assessment Scoring CAS in both groups there was significant improvement at week 4 and week 8 from the baseline value. In group A, there was around 47% and 85% improvement in CAS at week 4 and 8 respectively from the baseline value. Similarly, in group B, there was around 52% and 86% improvement in CAS at week 4 and 8 respectively from the baseline value. The improvement in terms of mean of CAS in cases of group B was more compared to group B but it was not statistically significant. (Table 3 and Figure 2)

Clinical Parameters		Group A N (%)	Group B N (%)
Site of lesions	Tips of fingers	7 (35%)	4 (20%)
	Web Spaces	2 (10%)	7 (35%)
	Dorsum of hands	11 (55%)	7 (36.8%)
	Palmar Creases	15 (75%)	9 (45%)
	Palms	11 (55%)	16 (84.2%)
	Side of fingers	7 (35%)	8 (40%)
	Wrist	5 (25%)	3 (15%)
	Forearm	2 (10%)	3 (15%)
Morphology of lesions	Erythema	9 (45%)	17 (85%)
	Vesicles	5 (25%)	4 (20%)
	Plaques	12 (60%)	16 (80%)
	Palmar Creases	15 (75%)	9 (45%)
	Hyperkeratosis	13 (65%)	15 (75 %)
	Lichenification	2 (10%)	3 (15%)

[**Table 2:** showing clinical characteristics of lesions of cases in Groups A and B.]

Time /Groups	Mean CAS ± SD		t-test	P-value
	Group A (n=20)	Group B (n=20)		
Baseline	21.83 ± 4.78	22.41 ± 5.69	0.351	0.727
Week 4	11.55 ± 3.27	11.10 ± 3.68	0.404	0.636
Week 8	3.85 ± 1.50	3.71 ± 1.66	0.280	0.578

[**Table 3:** showing mean CAS of cases in Groups A and B.]



[**Figure 2:** Showing mean CAS Score at baseline and follow up in group A and B]

Discussion

Hand eczema is a common chronic inflammatory condition with multiple etiologies. It is the most common occupational skin disease. It causes significant morbidity and may result in loss of the occupation.[3] The prevalence of hand eczema is variable as per the various studies done in different parts of the world. It ranges from around 1.2% to 30%.[4,5] The management of hand eczema is difficult. The first line of treatment is the use of emollients and topical corticosteroids. If the topical treatment fails to achieve control of hand eczema then light-based treatment in the form of PUVA and UVB are the options. Since hand eczema is localized, local light-based therapy is preferred. The use of light-based therapy is well-studied in psoriasis and atopic dermatitis. However, there are limited studies evaluating the role of light-based therapy in hand eczema, and hence the study was designed.

PUVA and UVB act with various mechanisms in the treatment of hand eczema. PUVA interferes with antigen presentation by Langerhans cells. This might cause a decrease in the symptom of hand eczema due to decreased immune response to endogenous and exogenous agents.[6,7] UVB has a similar effect. In addition to that UVB also causes apoptosis of T cells, increases anti-inflammatory cytokines, and decreases pro-inflammatory cytokines and hence causes modulation of the immune system which may have a beneficial effect on patients with eczema.[8,9]

Even, though theoretically, there is a beneficial role of UVB and PUVA on hand eczema, conclusive clinical evidence for this is lacking. Most of the studies on the effectiveness of UVB and PUVA have been done on psoriasis, however, there are limited clinical studies evaluating their use in hand eczema. The efficacy of the treatment in both groups was evaluated by a reduction in Clinical assessment score (CAS) and was compared. In the study, on comparing the mean of CAS in both groups there was significant improvement at week 4 and week 8 from the baseline value. In the group of patients treated with localized NBUVB, there was around 47% and 85% improvement in CAS at weeks 4 and 8 respectively from the baseline value. Similarly, in the group of patients treated with localized PUVA,

there was around 52% and 86% improvement in CAS at weeks 4 and 8 respectively from the baseline value. The improvement in terms of the mean of CAS in cases treated with localized PUVA was more compared to the cases treated with localized NBUVB but it was not statistically significant.

The findings in our study are similar to the study done by Sezer E et al.[10] that concluded both local NB-UVB photo-therapy and PUVA irradiation are equally effective for the treatment of hand eczema. However, the study used the crude scale for the evaluation of patients with hand eczema. Similarly, the study done by Simons et al with 13 patients of chronic hand eczema showed similar efficacy of topical PUVA and NBUVB.[2]

However, in the study done by D. Brass et al in 2018, around 56% of the patients treated with PUVA achieved clear or almost clear responses whereas only 30% of the patients treated with NB-UVB achieved clear or almost clear responses.[11] Similarly, a study by Rosen K et al, showed a clinical response in hand eczema was better in the patients treated with PUVA compared to those treated with local BB-UVB. In this study, BB-UVB was used which might be the reason for less effectiveness compared to PUVA. It has been shown in other studies that NB-UVB is more effective than BB-UVB.

There are few other studies done to evaluate the efficacy of localized PUVA. A study done by Stege H, et al. with 10 patients of hand eczema obtained complete remission in 7 patients treated with local PUVA.[13] Similarly, in another study, there were excellent or good results in 86% of the patients with hand and feet eczema treated with local bath-PUVA therapy[14].

The efficacy of localized PUVA and NBUVB in the treatment of chronic hand eczema has been proven by these studies. However, comparing the individual light-based therapy there are still debates with some studies suggesting the equal efficacy of the localized PUVA and NBUVB, whereas other studies prove the superiority of localized PUVA over NBUVB. Due to the high penetration capacity of UVA, localized PUVA may be more effective in cases of hyperkeratotic hand eczema in comparison to localized NBUVB. However, in other cases of chronic hand eczema, both may be equally effective.

Conclusion

Light based modalities of treatment in the form of localized NBUVB and PUVA can be considered as alternative treatment of choice in cases of hand eczema as they have been shown effective by reduction in the clinical assessment score compared to the baseline. However, there was no statistically significant difference in reduction in mean of clinical assessment score among the patients treated with either localized NBUVB or PUVA.

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