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Original Research Article

A study to compare the efficacy and safety of narrow band-UVB alone as well as in combination with topical calcipotriol in patients with psoriasis vulgaris

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ABSTRACT

Introduction : Psoriasis is a complex disease that requires carefully designed therapy in order to achieve sustained remission. The disease can be effectively controlled by various therapeutic options, used alone or in combination. Phototherapy may be combined with topical or systemic agents to achieve higher clearance rates, longer disease free intervals and a lower carcinogenic risk. The combination of NB-UVB with calcipotriol increases the therapeutic efficacy of phototherapy as well as UVB reduces the irritation caused by calcipotriol

Objective : The chief purpose of this study was to compare the efficacy and safety of Narrow Band-UVB alone and in combination with topical calcipotriol in patients with psoriasis vulgaris.

Materials a nd Methods: Patients with chronic plaque type psoriasis of 100 numbers involving less than 20% of body surface area were randomly allocated to any one of the following 2 groups. Group A- Narrow Band UVB phototherapy. & Group B- Narrow Band UVB with topical calcipotriol ointment

Results : In group A (NB-UVB), the mean baseline PASI score was 12.1 and the mean PASI score at the end of 12 weeks was 2.54. There was 79% reduction in PASI score at the end of 12 weeks. 31 patients showed good response and 13 patients showed more than 70% clearance.

When NB-UVB group was compared with NB-UVB and calcipotriol combination group, there was a significant difference ($p<0.05$) in PASI scores at 4 weeks, 8 weeks and 12 weeks.

Limitations : Further studies with additional numbers of patients are essential to compare the efficacy and safety of Narrow Band-UVB alone as well as in combination with topical calcipotriol in patients with psoriasis vulgaris

1. Introduction

Psoriasis is a chronic, genetically determined, inflammatory and proliferative disease involving the skin, nail, joint and mucous membrane. About 30% of people affected with the disease had psoriasis in their family.[1]

It is a complex disease that requires carefully designed therapy in order to achieve sustained remission. Effective management of psoriasis frequently necessitates combining therapies in order to achieve optimum response while minimizing any side effects.

Phototherapy may be combined with topical or systemic agents to achieve higher clearance rates, longer disease free intervals and a lower carcinogenic risk.[2]

Narrowband UVB appears to have a more immunosuppressive effect than broadband UVB on natural killer cell activity, cytokine responses and lymphoproliferative responses of peripheral blood mononuclear cells and photoisomerization of trans- to cis-urocanic acid is more effective with NBUVB than with BBUVB.[3,4]

Vitamin D analogues can be useful adjuncts in psoriasis patients treated with phototherapy.

Topical vitamin D analogues are particularly useful for localized plaque on difficult to treat areas, such as the lower

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extremities.

Calcipotriol inhibits T cell proliferation in response to IL-1, and decreases T cell infiltration and keratinocytes intracellular adhesion molecule-1 expression in treated plaques, thus exerting an immunomodulatory effect.[5]

Combination of topical calcipotriol with NBUVB appears to have synergistic effects and clearly reduces the cumulative doses of UVB and improves the response of psoriasis to phototherapy. It can be used in pregnancy, lactation and it is useful and well tolerated treatment for children, but concerns remain regarding its long term complications.

Indeed, there are limitations to this type of combination therapy. Excessive use of topical calcipotriol may cause hypercalciuria and hypercalcaemia, even with short-term topical application. Hyperpigmentation, photosensitivity and skin irritation have also been observed in patients undergoing treatment with calcipotriol and phototherapy.

Photocombination therapies can broaden the therapeutic options for the treatment of patients with psoriasis.

2. Materials and Methods

Patients diagnosed with psoriasis vulgaris of 100 numbers who attended the dermatology outpatient department of our hospital from march 2018 to April 2019 were included in the study after the approval by the Ethics committee and obtaining written informed consent from the all patients included in the study.

The diagnosis of psoriasis was made on clinical & histopathological examination and all patients were explained about the disease and the benefits and the side effects of treatment. All patients were evaluated with complete History, General, Systemic and Dermatological examination and with following blood investigations like complete blood hemogram, RBS, RFT, LFT, Urine routine & serum calcium

2.1. Treatment Protocol & Methodology

Patients with chronic plaque type of psoriasis of 100 numbers involving less than 20% of body surface area were randomly allocated to any one of the following 2 groups.

Group A- Narrow Band UVB phototherapy.

Group B- Narrow Band UVB with topical calcipotriol ointment.

2.2. Group A: NB-UVB Group

50 Patients were included in this study. All patients were asked to wear UV goggles when inside the phototherapy unit. Men were advised to protect their genitalia. Patients were asked to apply liquid paraffin oil on the plaques of psoriasis prior to exposure. As all patients were of skin types IV and V, initial UVB dose of 260 mJ/cm^2 was started in all patients. Patients were advised to expose only the affected parts during treatment and protect other uninvolved areas. Patients were instructed to come out of the chamber when the light switches off or if they became uncomfortable during the treatment either due to burning or stinging sensation of the skin. If the initial dose was tolerated, subsequent 20% incremental dose was given at each subsequent visit depending on the patient's erythema response.

Treatment was given thrice weekly on nonconsecutive days. Patients were monitored regularly every week. Patients were instructed to report immediately if any of the adverse effects were noted

2.3. Group B: NB-UVB with topical cacipotriol ointment

50 patients were included in this study. Patients were advised to apply 0.005% ointment once daily at bed time. Patients were asked to apply the ointment in a thin layer only over the plaques. Patients received Narrow Band UVB phototherapy thrice weekly similar to patients in group A in addition to topical calcipotriol ointment once daily. Patients were monitored regularly every week.

Patients were asked to report immediately if any of the adverse effects were noted

2.4. Efficacy Assessment

Severity and extent of psoriasis were evaluated using "Psoriasis Area and Severity Index" (PASI).

Severity of Erythema (E), Desquamation (D) and Induration (I) was recorded on a 5 point scale as follows:

0 - Nil
1 - Mild
2 - Moderate
3 - Severe
4 - Very Severe

The area of involvement was recorded on a 7 point scale as follows:

0 - Nil
1 - $<$ 10 %
2 - 10 % - 29 %
3 - 30 % - 49 %
4 - 50 % - 69 %
5 - 70 % - 89 %
6 - 90 % - 100 %

PASI was calculated as follows:

PASI = 0.1 (EH + IH + DH) AH + 0.2 (EU + IU + DU)AU + 0.3 (ET + IT + DT) AT + 0.4 (EL + IL + DL)AL

A - Area
H - Head
U - Upper Limb
T - Trunk
L - Lower Limb

2.5. Inclusion criteria

Patients with psoriasis vulgaris involving less than 20% body surface area included in this study.

2.6. Exclusion criteria

2.7. Following patients were excluded:-

Patients with photo allergy or polymorphic light eruption

Patients on photosensitizing agents or on medications negatively affecting psoriasis.

Patients with guttate, erythrodermic, pustular or isolated palmoplantar psoriasis

Patients already treated with systemic therapy/PUVA within the previous 8 wks., topical therapy/ UVB within past 4 weeks.

Pregnant and lactating women

Patient with history of malignancies

Patient less than 18 yrs. of age

3. Results

Out of 50 patients in NB-UVB group the maximum number of patients belonged to the age group of 41-50years (36%) followed by 19-30years (22%) and 31-40 years (20%). Eight patients belonged to 51-60 years age group and the least number of patients were present in more than 60 years age group. Out of 50 patients in calcipotriol combination group the maximum number of patients belonged to the age group of 41-50 years (32%) followed by 51-60 years (26%) and 19-30 years age group. Seven patients present in 31-40 years age group and least number of patients were present in more than 60 years age group. Samples are age matched with P=0.042

30 males and 20 females each were present in both NB-UVB and Calcipotriol combination groups. The overall male to female ratio was observed to be 60% : 40%. Samples are gender matched with P=0.812

Out of 50 patients in NB-UVB group, the maximum number of patients had a duration of 13-36 months (28%) followed by a duration of <12 months (26%) and 37-60 months (24%). 16% patients had a duration of 61-120 months and the least number of patients (6%) had a duration of >120 months.

Out of 50 patients in the calcipotriol combination group the maximum number of patients had a duration of 13-36 months (36%) followed by a duration of 37-60 months (26%). 16% patient had a duration of <12 months and 14% had 61-120 months. The least number of patients (8%) had a duration of >120 months.Duration of illness matched with P=0.001. Marital status matched with p<0.05. Family history was present in 3 patients- 1 patient in NB-UVB group and 2 patients in calcipotriol combination group. DM was seen in 9 patients in our study- 4 patients in NB-UVB group and 5 patients in the calcipotriol combination group. HTN was seen in 7 patients- 3 patients in the NB-UVB group and 4 patients in the calcipotriol combination group. Koebnerisation was seen in 20 patients in our study- 12 patients in NB-UVB group and 8 patients in the Calcipotriol combination group. 5 patients in our study had joint involvement- 3 patients in NB-UVB group and 2 patients in combination group. Twelve patients in our study had nail findings- 5 patients in NB-UVB group and 7 patients in Calcipotriol combination group.

Nail pitting was noted in 8 patients followed by onycholysis in 2 patients, subungal hyperkeratosis and yellow discolouration in one patient each. Serum calcium distribution matched with p <0.05. PASI reduction matched with P=0.044. Percentage reduction in PASI matched with p=0.061.

3.1. In NB-UVB group

Out of 50 patients, 31 patient had good response,13 patients had moderate response and 4 patients were resistant to NB-UVB. Two patients discontinued therapy due to unknown reasons.

3.2. In NB-UVB+Calcipotriol combination group

Out of 50 patients, 35 patient had complete clearance,12 patients had good response and 2 patients had poor response to NB-UVB+ calcipotriol combination group. One patients discontinued therapy due to unknown reasons.

Table 1:

S. No	Variable	Group A (NB-UVB)	Group B (NB-UVB+Calcipotriol)
1	**Age in years**		
	19-30	11(22%)	12(24%)
	31-40	10(20%)	07(14%)
	41-50	18(36%)	16(32%)
	51-60	08(16%)	13(26%)
	>60	03(06%)	02(04%)
2.	**Gender**		
	Female	20(40%)	20(40%)
	Male	30(60%)	30 (60%)
3.	**Co-morbidities**		
	HTN	03(6%)	04(9%)
	DM	04(8%)	05(10%)

From the above table, we can see that the mean baseline PASI scores for NB-UVB group and calcipotriol combination group are 12.10 and 11.90 respectively. There is no statistically significant difference (p>0.05) in baseline PASI among NB-UVB group and calcipotriol combination group. At 4 weeks, PASI score has reduced to 8.02 and 6.12 respectively in the above mentioned groups. Thus there is 33.72% reduction in the NB-UVB group whereas 48.57% reduction in the calcipotriol combination group. There is

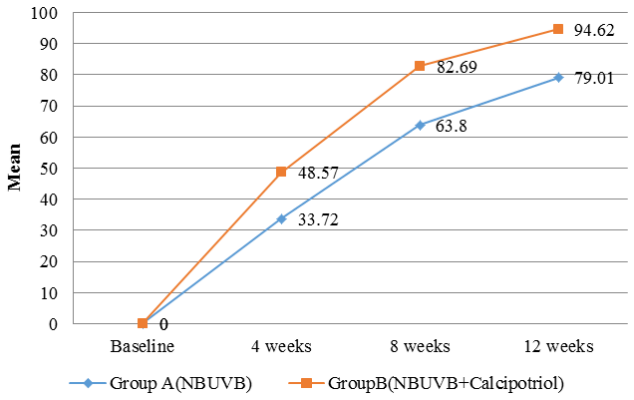

Fig. 1:

further fall in PASI score at 8 weeks to 4.38 and 2.06 in the NB-UVB group and calcipotriol combination group which corresponds to reduction in percentages of 63.80% and 82.69% respectively. A further reduction of PASI score is observed at 12 weeks to 2.54 in the NB-UVB group which corresponds to a percentage reduction to 79.01%. In the calcipotriol combination group, the reduction in PASI score is more rapid with mean PASI score of 0.64 at 12 weeks corresponding to a percentage of 94.62%. There is a statistically significant difference ($p<0.05$) in PASI between NB-UVB and calcipotriol combination group at 4, 8 and 12 weeks.

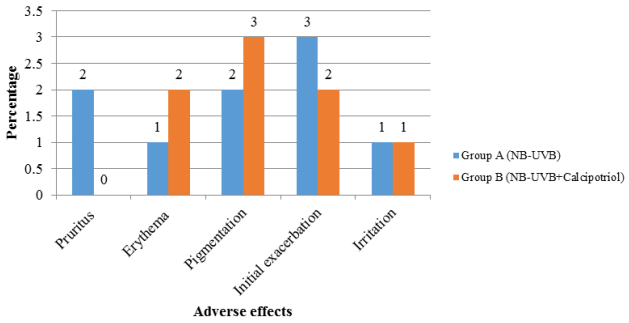

Fig. 2:

4. Discussion

At the present time, phototherapy with narrow band UVB is considered one of the most effective therapeutic modalities for patients with psoriasis. Many studies have documented improved efficacy and therapeutic index for narrow band UVB. However, the long term side effects of narrow band UVB therapy have not been fully documented. As a result, there have been a great deal of interest in photo combination therapies that are capable of both reducing cumulative UVB doses and accelerating resolution of skin lesions. To gain our own experience, this study was designed to compare NB-UVB therapy with a combination of NB-UVB and topical calcipotriol ointment in the management of chronic plaque type psoriasis'

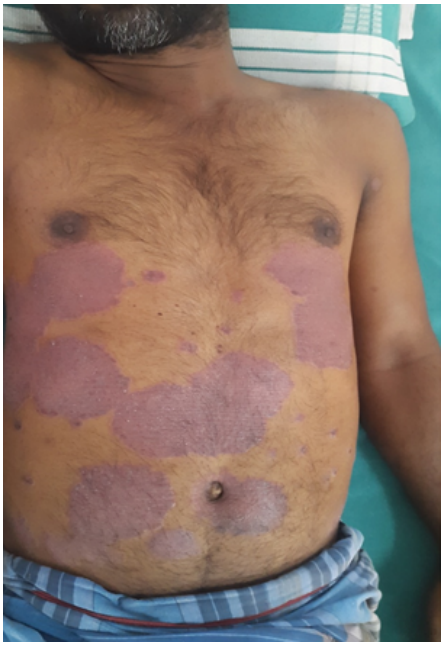

Fig. 3: Before

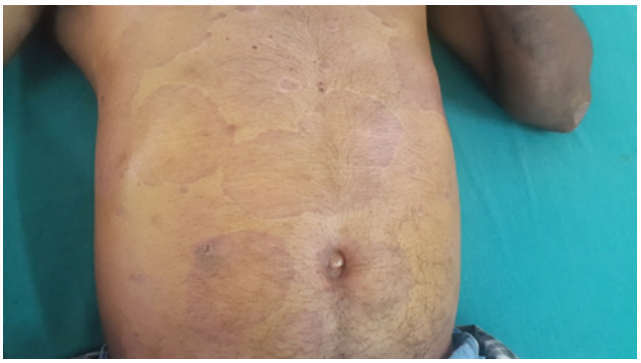

Fig. 4: After

In group A (NB-UVB), the mean baseline PASI score was 12.1 and the mean PASI score at the end of 12 weeks was 2.54. There was 79% reduction in PASI score at the end of 12 weeks. 31 patients showed good response and 13 patients showed more than 70% clearance. The side effects were also few and treated symptomatically. This shows that NB-UVB is highly effective and safe in psoriasis. Though our study was of low number, the results were consistent with previous studies.[6–8]

Group A (NB-UVB) was compared with group B (NB-UVB with calcipotriol). The final evaluation involved comparison of both the treatments according to the response, cumulative dose and adverse effects. The response of the patient was ranged from good response (>75%

reduction in PASI score) to poor response (<25% reduction in PASI score). In our study, the basic demographic data in both the groups were similar.

When NB-UVB group was compared with NB-UVB and calcipotriol combination group, there was a significant difference ($p<0.05$) in PASI scores at 4 weeks, 8 weeks and 12 weeks. At 4 weeks there was 48.5% reduction in PASI in the calcipotriol combination group and only 33.7% reduction in NB-UVB group. There was further reduction in PASI score to 82.7% and 94.6% at the end of 8 weeks and 12 weeks respectively in the calcipotriol combination group while there was only 63.8% and 79% reduction at 8 weeks and 12 weeks respectively in the NB-UVB group. This explain that there was a rapid fall in PASI score in calcipotriol combination group. The mean duration of treatment was 8.2 weeks in the calcipotriol combination group and 8.2 weeks in the NB-UVB group. The mean cumulative dose was 21.5J/cm2 in calcipotriol combination group and 34.3J/cm2 in the NB-UVB group. This explain that calcipotriol combination group showed a faster clearance with a lesser cumulative dose.

Nadia et al[8] reported that combination of calcipotriol with NB-UVB phototherapy is significantly more effective than NB-UVB phototherapy alone for the treatment of psoriasis and mean cumulative UVB exposure required is significantly lower when calcipotriol was combined. The same observation were reported by Rim JH et al[7] and Woo WK et al.[6] In our study also, calcipotriol combination proved to be more effective than NB-UVB monotherapy and achieved faster clearance with lesser cumulative dose.

Poor response was seen 4 patients in the NB-UVB group and 2 patients in the calcipotriol combination group. It correlates with the long duration of illness and it has no correlation with PASI score at the initiation of therapy.

The adverse effects in our study were minimal and none of the patients required discontinuation of therapy. In our study, the common side effects noted were pruritus, erythema and initial exacerbation. No significant differences in the side effects between two therapies. The adverse effect profile observed in our study was similar to that reported in the literature. Georgiou S[9] found that excessive use of topical calcipotriol may cause hypercalciuria and hypercalcaemia, even with short-term topical application. But in our study, serum calcium level is not significantly affected after the treatment with topical calcipotriol.

In conclusion, combination of calcipotriol and NB-UVB phototherapy is significantly more effective than NB-UVB phototherapy alone for the treatment of psoriasis. The addition of calcipotriol to NB-UVB phototherapy promotes faster clearing of psoriasis when compared with NB-UVB monotherapy. Photocombination therapies can broaden the therapeutic options for the treatment of patients with psoriasis.

5. Source of funding

None.

6. Conflict of interest

None.

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