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Original Research Article

Narrowband UVB versus psoralen – narrowband UVB in cases of chronic plaque type psoriasis: a matched pair study

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ABSTRACT

Background: Psoriasis is a chronic inflammatory disease and various therapeutic options are available to treat the condition. The aim was to compare the efficacy of psoralen narrowband UV light (P-NBUVB) to conventional narrowband UVB light (NBUVB) in the treatment of psoriasis.
Methods: A total of 17 cases were included in our study. NBUVB was given on one half of the body and P-NBUVB was given on the other half and the response in two characteristic lesions was compared.
Results: The total lesional severity scale (TLSS) score of fourteen completed patients at the end of five sittings was 132 (mean- 9.42) for NBUVB and 127 (mean- 9.07) for P-NBUVB. The difference was not statistically significant. At the end of ten treatments the mean value was 5.76 for NBUVB and 4.92 for P-NBUVB. There was statistical significance at this point. However by the end of our study, after fifteen treatments the mean value for NBUVB and P-NBUVB were 3.0 and 2.76 respectively which were statistically not significant.
Conclusions: We conclude that P-NBUVB was as effective as NBUVB in clearing psoriasis and further studies with larger study population is required to prove the efficacy of this treatment modality.

Keywords: Psoriasis, Narrowband UVB, Psoralen

INTRODUCTION

Psoriasis is a chronic inflammatory skin condition of unknown aetiology which affects approximately 1-3% of the world's population.[1] Clinically psoriasis manifests as erythematous plaques covered with silvery scales. It is characterized by hyperproliferation and abnormal differentiation of epidermal keratinocytes, lymphocytic infiltration consisting mostly of T lymphocytes and various endothelial vascular changes in the dermis such as angiogenesis, dilation and high endothelial venule formation.[2] Both genetic and environmental factors contribute to the etiology. The therapeutic options are wide ranging from topical to systemic agents and phototherapy. UV radiation has been used in the management of skin diseases such as psoriasis and atopic dermatitis.

In the past three decades, phototherapy has greatly influenced treatment concepts in dermatology. Photochemotherapy (PUVA) consists of absorption of non-ionizing radiation by an exogenous molecule. This substance is usually psoralen that is derived from the plant source *Ammi majus, Psoralea corylofolia*.

The breakthrough came after 1988 when narrow-band UVB (NB-UVB) phototherapy was introduced for the treatment of psoriasis by Van Weelden et al.[3] UVB Phototherapy is believed to act by immunomodulatory effects on human skin and by suppression of accelerated DNA synthesis in psoriatic epidermal cells.[4] Narrow-band UVB (NB-UVB 311-313 nm) has proved as effective as PUVA with minimal long term side effects such as carcinogenicity.

NB-UVB is effective without the use of psoralen and so is gradually replacing photochemotherapy. There are certain cases which do not respond adequately to both PUVA and NB-UVB. Hence this study has been undertaken to determine whether addition of psoralen makes NB-UVB (P-NBUVB) more effective than NB-UVB without psoralen.

METHODS

Seventeen patients of chronic plaque type psoriasis were enrolled in our study. The study was prospective, open and non-randomised. The study was conducted in department of dermatology, PSG hospitals for a period of 2 years from Aug 2013 to Aug 2015. Informed consent was obtained from all patients. Chronic plaque type psoriasis, patients not on other modalities of treatment with minimum three weeks of wash off period and body involvement more than 20% were included. Unstable psoriasis, erythrodermic psoriasis, pustular psoriasis, pregnancy, lactation, children under 12 years and body involvement <20% body surface area were excluded.

A baseline total lesional severity scale (TLSS) to assess erythema, scaling and thickness were calculated and minimal erythema dose (MED) was determined for all the patients. MED was determined by standard method. A template with 10 apertures of 1½ × 1½ cm^2 was made over the back of a cotton suit. Cotton flaps were made over the apertures enabling us to either shut or keep the apertures open by using Velcro as shown in Figure 1. The source of NB-UVB (V-Care UV therapy unit, Bangalore, India) was the whole body phototherapy unit with 24 tubes-Philips TL-01 bulbs. To determine MED a single panel in the whole body unit with 6 bulbs (V-Care UV therapy unit, Bangalore, India) were used. All the apertures were kept opened and the back was irradiated with 250 mj of NB-UVB. The first aperture was closed and the remaining apertures were then closed one after the other after delivering 50 mj more than the previous aperture. The dosage scheduled for determining MED were 250 mj, 300 mj, 350 mj, 400 mj, 450 mj, 500 mj, 550 mj, 600 mj, 650 mj and 700 mj. The readings were taken 24hours after exposure. The dose at which the minimal perceptible erythema found was considered as MED.

For every patient, two clinically characteristic lesions for assessment were selected on either side of the body. NB-UVB was given on right half of the body and the left half was covered using a UV proof-suite. Oral psoralen at a dose of 0.5 mg/kg body weight was administered immediately to the patient and two hours later they were exposed to NB-UVB on the left half of the body while the right half was covered using the same suite as given in Figure 2. The initial dose for the treatment was taken as 70% of MED. The dose was gradually increased at the rate of 10% of the previous dose. The treatment was then administered thrice weekly over a period of five weeks thereby completing a total of 15 sittings and the TLSS scoring was determined at the end of 5th, 10th and 15th sittings respectively.

Figure 1: MED determination.

Figure 2: UV proof suit with NBUVB exposure.

Statistical analysis

For each patient an average score of erythema, scaling and thickness were calculated for NB-UVB as well as P-NBUVB at the end of 5, 10 and 15 sessions. These values were compared using Wilcoxon test. P value <0.05 was considered as statistically significant.

RESULTS

A total of seventeen patients were studied. The age range of the patients was between 31 years to 70 years with the mean age of 49 years. Of the seventeen patients, 15 were men and 2 were women. The duration of psoriasis varied between 2 years to 28 years with mean duration of 15 years. All these patients belonged to Fitzpatrick skin type IV / V.

The Minimal Erythema dose varied between 250 mj to 950 mj with mean of 457 mj as given in Table 1. Of the seventeen patients, thirteen completed the study, one patient was lost for follow-up, three patients (2 patients by the end of 4th treatment and 1 patient by the end of 8th treatment) could not continue due to aggravation of psoriasis. The severity of the index lesion according to

TLSS scoring before treatment and after five, ten and fifteen treatments was recorded. The values were compared using Wilcoxon test (p value <0.05). The statistical analysis was shown in Table I. The total TLSS score of fourteen completed patients at the end of five sittings is 132 (mean- 9.42) for NB-UVB and 127 (mean- 9.07) for P-NBUVB. The difference was not statistically significant. At the end of ten treatments the mean value was 5.76 for NB-UVB and 4.92 for P-NBUVB. There was statistical significance at this point (p value = 0.006). However by the end of our study, after fifteen treatments the mean value for NB-UVB and P-NBUVB were 3.0 and 2.76 respectively which were statistically not significant. Minimal side effects like erythema, pigmentation and pruritus were encountered during treatment.

Table 1: Paired samples statistics.

		Mean	N	Mean values	Reduction from baseline (in %)	p Value
Pair 1 (base line)	NB-UVB	13.5000a	14	13.50	100	-
	P-NBUVB	13.5000a	14	13.50	100	
Pair 2 (after 5 sessions)	NBUVB	9.4286	14	9.42	31	0.336
	P-NBUVB	9.0714	14	9.07	32.9	
Pair 3 (after 10 sessions)	NB-UVB	5.8462	13	5.76	57.4	0.006
	P-NBUVB	5.0769	13	4.92	63.6	
Pair 4 (after 15 sessions)	NBUVB	2.9231	13	3.00	77.8	0.837
	P-NBUVB	2.8462	13	2.76	79.6	

DISCUSSION

Phototherapy for psoriasis has been extensively modified since the landmark combination of UVB and topical tar emollient was introduced by Goeckerman in 1925. NB-UVB has not been uniformly effective for all cases of chronic psoriasis. Similarly PUVA also has failure rates. Since the absorption spectra of psoralen (325 nm) is closer to 311 nm, and considering the emission spectra of TL01 lamps of 311 nm, it is possible that NB-UVB may be effective like PUVA when combined with psoralen. It is also possible that the combination of psoralen and NB-UVB may reduce the dose required of either psoralen or NB-UVB or both thus minimizing the side effects.

UVB is mostly effective when administered three times a week, whereas PUVA is usually administered twice a week Thus it is possible that combination might also reduce the frequency of phototherapy thereby reducing the inconvenience, the cost and reduction in total cumulative dose of NB-UVB.

Our patients belonged to Type IV/ V/ VI skin (one – IV, fourteen- V, two -VI). The mean MED of our study was 457 mj. Various studies have recorded different values of MED depending on the patient's skin type. In a study done by Serish et al MED values of 33 individuals ranged from 300 mj to 1700 mj with mean MED of 714.15 mj/cm^2 whereas in another study conducted among the Caucasian skin on 11 patients with psoriasis of skin types I, II and III the MED for NB-UVB ranged from 135 mj/cm^2 to 540 mj/cm^2 with mean value of 293 mj/cm^2.[5,6]

We started with the initial dose of 70% of the MED and a baseline total lesional severity scale (TLSS). Scoring was calculated for each patient. The initial dose when compared to other studies varied from 0.03 J/cm^2 to 0.7 J/cm^2 where MED values were not determined to initiate the treatment.[7,8] In our study, the treatment was given thrice weekly for five weeks (15 sittings) with 10% increment following each dose and the TLSS scoring was calculated before starting the treatment (baseline) and at the end of five, ten and fifteen treatments . The mean TLSS score after the treatments were reduced in P-NBUVB when compared to NB-UVB after 10 sessions and this value (p value = 0.006) was statistically significant. However by the end of our study, after 15 treatments there was no statistical difference between NB-UVB & P-NBUVB (p value = 0.837).

In a similar study conducted by Sakuntabhai et al wherein the MED was not determined and the initial dose was 0.7 J/cm^2 the increment was 40 % after each dose given at twice weekly intervals for all patients.[7] They concluded that psoralen enhanced the therapeutic efficacy when combined with NB-UVB as compared to NB-UVB alone. In another study conducted by Morrison comparing the therapeutic effects of broad band UVB (FS-40 sunlamp bulbs) radiation versus UVB radiation plus methoxsalen in 10 cases of psoriasis, they concluded that there was no detectable difference in the response between UVB plus methoxsalen and UVB phototherapy alone.[8]

CONCLUSION

We conclude that P-NBUVB is as effective as NB-UVB in clearing psoriasis and further studies with larger study population is required to prove the efficacy of this treatment modality.

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