

EFFECTIVENESS AND SAFETY OF NARROW BAND ULTRAVIOLET B THERAPY IN CHRONIC PLAQUE PSORIASIS

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ABSTRACT

Objectives: To determine the effectiveness and safety of narrowband ultraviolet B in chronic plaque Psoriasis.

Methodology: This descriptive case series study was carried out at skin unit Lady Reading Hospital Peshawar from June 2009 to Dec 2010. Sixty patients suffering from chronic plaque psoriasis, between the ages of 12 and 70 years were included in the study. Minimum erythema dose was determined in every patient according to skin types (1-6). All the patients were exposed to narrowband ultraviolet B. At zero, fourth, eighth weeks and sixteen weeks, Psoriasis Area Severity Index (PASI) was determined and decision was made to increase or decrease the dose according to response of patient.

Results: Out of sixty patients fifty eight patients showed response showing effectiveness of 97.1%. Two patients showed poor response. Four patients suffered from moderate erythema itching and vesicles.

Conclusion: Narrowband ultraviolet B is a safe and effective therapy for chronic plaque psoriasis but long term follow up is needed to determine its carcinogenic effects.

Key Words: Psoriasis, chronic plaque psoriasis, narrowband ultraviolet B (NB-UVB), Psoriasis Area Severity Index

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INTRODUCTION

Psoriasis is a common, chronic, disfiguring, inflammatory and proliferative disease of the skin, affecting nail and joints in which both genetic and environmental factors play a key role. The most characteristic lesion on the skin consist of erythematous, scaly, well defined, indurated plaques, present mainly over extensor surfaces and scalp¹. It affects 2% of the world's population with 30% patients suffering from psoriasis

having a first-degree relative suffering from this disease².

Phototherapy, photochemotherapy and systemic immunosuppressive agents are good therapeutic options for chronic plaque psoriasis resistant to topical emollients and keratolytics³.

NB-UVB(311) is used as a phototherapy in a number of dermatology departments as an alternative to broad-band UVB (270-350 nm) or psoralen plus UVA (PUVA).

NB-UVB interfere the synthesis of proteins and nucleic acid, decreases the proliferation of epidermal keratinocytes, down regulate the number of Langerhan's cells, preventing the capacity of dendritic cell to present an antigen. NB-UVB decreases subset of T-cells, Th 17 cell, which plays an important role in the immunopathogenesis of psoriasis⁴.

The theoretical risk of carcinogenicity of BBUVB limits its use⁵. PUVA causes nausea, impaired liver functions, immunosuppression, cataract, is contraindicated in pregnancy and has recognized carcinogenic effect with up to fifty times the normal risk (uvirradiated individuals) of developing cutaneous squamous cell carcinoma⁶.

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The present study is designed to determine the effectiveness and safety of narrowband UVB in chronic plaque psoriasis in type III and IV skin.

METHODOLOGY

This is a descriptive case series study of 60 patients started in June 2009 to December 2010 at the department of dermatology, Lady Reading Hospital Peshawar. Patients of either sex between 12 to 70 years of age, having a PASI score of at least 10, were included in the study.

Body was divided into four different parts such as head, arms, trunk and legs for calculation of PASI score which was calculated as,

(a) Erythema, thickness and scale for each of these areas were graded as 0-4 scale, as given

0	None
1	Slight
2	Mild
3	Moderate
4	Severe

below:

(b) Sum scores of erythema, thickness and scale for each part.

(c) Generate a percentage for skin covered with psoriasis for each area and convert that to a

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

0-6 scale according to following criteria:

(d) Multiply score of item (c) and item (d) above for each site and multiply that by area multiplier (0.1,0.2,0.3,and 0.4 for head, arms, trunk, and legs, respectively).

Add these score to get the PASI score⁷.

PASI score of at least ten were included in study.

For description purpose each portion of body (scalp, abdomen, upper limb, lower limb) is graded (1-4) on basis of erythema scaling and thickness as shown in above table. Sum up the score of that area. Now that sum up score is multiplied by an area constant which is 0.1 for

scalp, 0.2% for upper limb, 0.3% for trunk and for lower limb 0.4. Then total PASI was calculated by adding score of each body part.

Response was considered excellent if reduction in PASI score was greater than 75%, marked if it was 46-74%, moderate if it was 30-45% and poor if it was less than 30%.

Exclusion criteria included previous skin malignancy, phototherapy in the preceding 3 months or more than 150 sessions in the patient's lifetime, drug known to frequently cause photosensitivity, topical anti-psoriatic treatment in the previous 4 weeks or systemic anti-psoriatic therapy in the last 3 months.

Diagnosis was made on history and relevant clinical examination. After taking informed consent, patients were exposed to whole body narrowband UVB radiation chamber consist of 24 Philips 100-W fluorescent tubes emitting radiation of a wavelength 311-313 nm thrice a week. The narrowband UV-B radiation in its chamber at the surface of the patient's skin was 7 mW/ cm².

The radiation intensity was measured monthly. The dose was given according to skin type. Starting dose in all the patients was according to skin type (1-6) J/ cm². Our population consists mainly of Type 3&4 skin. The dose increment was 15% of initial dose on subsequent visits till the clearance of lesions which was defined by reduction in PASI score to 3 or less. During exposure, eyes and genitals were protected by goggles and plastic shields. Treatment was stopped after 36 exposures if no improvement occurs and continued up to six month (72 exposures) or clearance of body.

Safety was measured by appearance of side effects like erythema, burning, vesicle or blister formation, pigmentation and alopecia.

RESULT

Sixty patients suffering from chronic plaque psoriasis were included in the study. There were 34 (56.7%) female and 26 (43.3%) male patients with an overall female to male ratio of 1.3:1.

Twenty two patients (36.66%) were <40 years of age, 26 (43.33%) patients in the age range of 40-60 years and 12 (20%) patients were more than 60 years of age. Duration of disease ranged from 2 month to 7 years with the mode of 6 months.

Gender wise distribution of PASI score which is insignificant at base line as well as after treatment which shows that gender is not an effect

modifier as shown in Table 1.

Excellent response was seen in 42(70%) patients, while 6(10%) showed marked response, 10(16.6%) moderate and 2(3.4%) patients showed no response after 16 weeks of treatment (Table 2).

Paired T-test was compared at different

follow up with base line and showed that there are highly significance results (Table 3).

In 56 (93.33.0%) patients, side effects of treatment did not occur while 4(6.7%) patients showed side effects like erythema, burning, itching and vesicle formation.

Table 1: Gender wise PASI Score(n=60)

	Sex	N	Mean	Std. Deviation	(Chi-square) P-value
Base Line PASI Score	Male	26	20.6154	4.71658	0.610
	Female	34	21.1765	5.46876	
4th Week PASI Score	Male	26	18.0731	4.18603	0.706
	Female	34	18.4676	4.96489	
8thWeek PASI Score	Male	26	13.4846	3.36722	0.441
	Female	34	14.2794	4.88497	
12th Week PASI Score	Male	26	9.1423	2.46952	0.231
	Female	34	9.6706	4.48874	
16th Week PASI Score	Male	26	5.4308	2.91723	0.178
	Female	34	4.6226	4.92011	

Table 2: Effectiveness of NB-UVB

Response	No. of patients	Percent
Effectiveness*	58	96.6
No response	2	3.4
Total	60	100

*Excellent=42 (70%), Marked=6(10%), Moderate=10(16.6%)

Table 3: Improvement in PASI Score

	Paired Differences					t	df	Paired Samples t- Test Sig.(2- tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 1 Base Line PASI Score – 4th Week PASI Score	2.6366	1.06548	.13755	2.36142	2.91191	19.168	59	.000
Pair 2 4th Week PASI Score - 8thWeek PASI Score	4.3616	1.59173	.20549	3.95048	4.77285	21.226	59	.000
Pair 3 8thWeek PASI Score – 12th Week PASI Score	4.4933	1.94761	.25144	3.99021	4.99645	17.871	59	.000
Pair 4 12th Week PASI Score- 16th Week PASI Score	4.4688	2.43538	.31441	3.83971	5.09796	14.214	59	.000

DISCUSSION

The safety of TL-01 lamp (NB-UVB) with higher therapeutic advantage over broad band UVB and less carcinogenic potential than PUVA led to continuously increasing use of narrowband UVB (NB-UVB) phototherapy in psoriasis⁸.

In the present study there was no significant difference between male and female patients regarding PASI score at baseline and on subsequent follow ups (p value >0.05).

The results of our study showed 70% success rate in 60 patients in 36 treatment sessions. There was significant improvement in PASI score with NB-UVB, at baseline and on subsequent follow ups at 04, 08, 12 and 16 weeks (p value 0.000) Table 3. Different studies have shown that efficacy of PUVA and NB UVB in patients with chronic plaque psoriasis is comparable⁸. Similar results were seen in studies carried out at skin department mayo hospital using PUVA and PUVB in patients of chronic plaque psoriasis in previous years. PUVA showed more side effects as compared to NB UVB⁹. Narrowband UVB therapy in chronic plaque psoriasis has been proved more effective and well tolerated than that of broad band UVB (BB UVB)¹⁰.

In our study, patients who were followed for one year showed good remission. Study carried by Green C *et al* showed that patients treated with NB UVB had better remission rates than that of those who were exposed to BB UVB¹¹.

Shams *et al* also showed comparable success rate of NB UVB with our study in chronic plaque psoriasis (type IV skin)¹². There was incomplete response of hairy area of body probably due to poor penetration of UVB in these areas. Owing to its limited penetration, the direct effects of UVB are mostly restricted to cells residing in the epidermis and papillary dermis and are associated with epidermal depletion of Langerhans cells and T-cells¹³.

We did not observe any serious adverse effects associated with this treatment modality. In fact, most of the patients tolerated the light doses very well but moderate erythema was seen in few patients at higher fluences. Long term follow up is required to determine the safety of this device.

Study conducted by Weischer *et al* did not reveal any carcinogenic potential treated with either broadband or narrowband UVB therapy¹⁴. In summary, NB UVB phototherapy is a safe and effective treatment of psoriasis where there are limitations to use other effective systemic therapies and the disease is not controlled by local modalities. However, availability of the set up and

its cost management are the main concerns in developing countries like ours.

It is one of the safest treatment modality for chronic plaque psoriasis but long term follow up is required to study its carcinogenic effects.

CONCLUSION

Effectiveness and safety of narrowband UVB has also been described in previous studies in chronic plaque psoriasis. Our study also concludes that it is safe and effective but long term follow up is needed to determine its carcinogenic effects.

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None Declared

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CONTRIBUTORS

MMP conceived the idea and planned the study. I, ZA & SA did the data collection and analyzed the study. All the authors contributed significantly to the research that resulted in the submitted manuscript.