NARROW BAND ULTRAVIOLET – B RADIATION THERAPY IN PATIENTS OF VITILIGO

Saadia Tabbasum, Syed Dilawar Abbas Rizvi, Rehan Uddin, Khawar Saleem, *Nasser Rashid Dar, **Simeen Ber Rehman

PNS SHIFA Karachi, *Combined Military Hospital Bhawalpur, **Military Hospital Rawalpindi

ABSTRACT

Objectives: To determine the efficacy of Narrow Band Ultra Violet B (NB-UVB) therapy to induce repigmentation in vitiligo patients with skin Fitzpatrick phototype IV.

Study Design: Descriptive study.

Place and Duration of Study: Department of Dermatology, PNS Shifa Karachi, from April 2004 to October 2005.

Patients and Methods: Thirty-five patients were included in the study during a period of eighteen months starting from 23rd April 2004. Each patient had thrice weekly exposure to NB-UVB therapy on nonconsecutive days for a maximum period of one year. Results were evaluated clinically and by comparing digital photographs taken before, during and at the completion of treatment. Improvement was objectively assessed by grading it into four groups depending on percentage of re-pigmentation in the affected areas.

Results: Out of the 35 patients, two dropped out and 33 completed the course of therapy successfully. The extent of vitiligo varied from 5% to 40% of body surface area. At the end of one year 9 (27.3%) patients had grade 4 recovery (> 75% repigmentation), 15 (45.4%) had grade 3 recovery (50-75% repigmentation) and the rest had grade 2 recovery (25-50% repigmentation). No significant side effects were observed during the study period.

Conclusions: Narrow-band UVB is a safe and effective treatment option for patients with Vitiligo.

Keywords: Narrow band ultra violet radiation, vitiligo.

INTRODUCTION

Vitiligo is a common idiopathic acquired depigmentation disorder affecting all races and age groups. It is characterized by depigmented patches involving variable surface areas of skin. The condition is slowly progressive with unpredictable course [1]. In half of the cases it develops before the age of 20 years [2]. The psychosocial impact of white patches specially on exposed areas is immense. Patients are often regarded as social outcasts causing considerable emotional and physical morbidity. During childhood it is specially associated with significant psychological trauma leading to lasting effects on the person's self-esteem and necessitating an effective management plan [3].

Treatment outcome of vitiligo unfortunately remains unpredictable. Different modalities of treatment include topical and systemic steroids, psoralen followed by exposure to sunlight or UVA and grafting techniques but none is universally effective [4]. Recently, Narrow Band Ultra

Correspondence: Surg Cdr Syed Dilawar Abbas Rizvi, Classified Dermatologist, PNS Shifa, Karachi.

Violet B therapy has emerged as an effective and safe therapeutic option [5]. The purpose of our study was to assess its efficacy to induce repigmentation in vitiligo patients with skin Fitzpatrick phototype IV [6].

PATIENTS AND METHODS

This was a descriptive study conducted in the Department of Dermatology, PNS Shifa, Karachi, a tertiary care hospital, from April 2004 to October 2005. Initially 35 patients of clinically diagnosed vitiligo were included in the study using non-probability convenience sampling, two dropped out due to domestic problems and 33 completed the course of therapy successfully. Patients included in the study were of age above eight years having skin Fitzpatrick phototype IV [6]. Extent of disease varied from 5% to 40% of body surface area calculated by the rule of nine [7]. Patients having lip and tip variant of vitiligo, photo-mediated disorders or side effects to previous phototherapy were not included in the trial. Those getting radiotherapy, chemotherapy or immunosuppressive therapy for any disease during previous 6 months were also excluded.

The phototherapy unit used contained 24 narrow-band fluorescent tubes (Philips TL 100W/01) with a spectrum of 310 to 315 nm installed in a Waldmann UV-1000 cabinet. Each patient had thrice weekly exposure to narrow-band UVB radiation therapy on nonconsecutive days for a maximum period of 12 months. During treatment the eyes were protected by UV-blocking goggles. Patients with lesions on the eyelids were instructed to keep their eyes closed during therapy. Patients were also advised to shield the genitals with underwear unless the region was involved. The dose was started at 0.1 Joules/cm2; an increment of 0.1 J with each successive session was made to maintain a mild, asymptomatic erythema in the lesions. Results were evaluated clinically and by comparing digital photographs taken before instituting therapy, during and at the completion of 12 months therapy. Progress of improvement during study was recorded by taking digital photographs after every 10 sessions of UVB exposure. All demographic features were also recorded on a prescribed proforma.

The data was analyzed by using SPSS version 10. Descriptive statistics i.e frequency and percentages were computed for presentation of qualitative variables like repigmentation grades while quantitative variables like UVB dose and duration of disease were presented with mean and Standard deviation.

RESULTS

A total of 33 patients, 17 (51%) males and 16 (49%) females suffering from vitiligo with skin phototype IV were recruited in the study. Mean age of patients was 28.52, (SD=14.01) ranging. Extent of involvement ranged from 5% to 40% of body surface area (fig. 1). Seventeen patients had already been treated with topical steroids without any improvement. The minimal erythema dose (MED) for each patient was calculated. Treatment was started with an initial dose of NB-UVB 0.1 Joules/cm2; an increment of 0.1 J with each successive session was made to maintain a mild, asymptomatic erythema in the lesions. Therefore, the patients showed variations in their MED. During one year therapy the cumulative dose ranged from 113.0 to 382.00 J/cm2 (mean = 256.70 and SD = 67.32).

The response to NB-UVB therapy was objectively assessed at the end of 6 months and one year by grading it into four groups depending upon percentage of repigmentation in the affected areas (table-1) which varied from 30% to 100%. One patient had complete recovery. The varying grades of improvement seen after one year of therapy are illustrated (fig. 2-5).

Most of the patients experienced initial repigmentation that was darker than the surrounding non lesional skin. In all cases, the color intensity normalized over several weeks, providing a good cosmetic result,

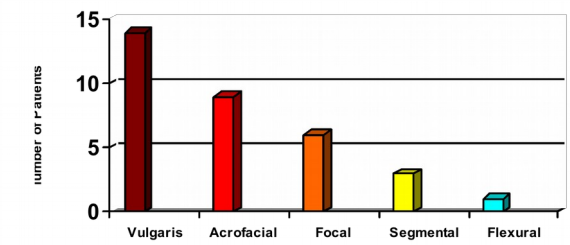

Fig. 1: Clinical variants of vitiligo observed in the study.

Fig. 2: Peripheral as well as follicular pattern of repigmentation observed in a patient with more than three years history of vitiligo.

Fig. 3: Almost complete repigmentation of patch of vitiligo in axilla after 06 months.

Fig. 4: Almost 90% recovery in a patient with more than ten years history of vitiligo.

Fig. 5: Lesions on acral areas showing poor response.

Table-1: Response to treatment after six months and one year.

Grade of improvement	Percentage of repigmentation	Number of patients	
		6 months	12 months
4	76-100%	1 (3%)	9 (27.3%)
3	51-75%	5 (15.1%)	15 (45.4%)
2	26-50 %	13	9 (27.3%)

despite continued therapy. Six (18%) patients reported mild erythema and pruritus after therapy which subsided spontaneously within 24 hrs. Three (9%) cases needed application of an emollient or occasionally an antihistamine. Phototoxic or photoallergic reactions were not observed.

DISCUSSION

Many treatment modalities have been employed in the past 30 years for vitiligo. Use of UVB phototherapy for treating vitiligo was first reported in 1997 by Westerh of and Nieuweboer-Krobotova [6]. Its mechanism is probably similar to PUVA i.e. stabilization of the depigmenting process through immunomodulating effects and stimulation of residual follicular melanocytes [8,9]. Its distinct advantages over PUVA include the lack of psoralen related side effects and precautions.

In 2000, Njoo et al [2] reported a study of 51 children with vitiligo involving more than 5% of body surface area. They gave twice weekly exposure with the initial dose of 250 mJ/cm^2, independent of the skin type. The dose was increased by 20% with each treatment. More than 75% repigmentation was seen in 27 (53%) patients after 1 year of

treatment. It was carried out only in paediatric population, the skin types were II and III in most of the cases. In 2001, Scherschun, Kim, and Lim [10] published a retrospective analysis of patients with vitiligo who were treated with narrow-band UVB over a period of 1 year. It was given as monotherapy 3 times a week. The starting dose was 280 mJ/cm^2 with 15% dose increments at each subsequent treatment. Five of the 7 (71.42%) patients achieved more than 75% repigmentation and remaining two patients had 50% and 40% improvement. The sample size was much smaller in this study and the dose regimen was also different. In 2003, Natta et al11 published a retrospective analysis in Asian patients with recalcitrant vitiligo who did not respond to either topical therapy or PUVA. They were treated with NB-UVB from February 1998 to January 2001. Twice weekly exposure was given with an initial dose of 100 mJ/cm^2. It was increased by 10% to 20% per treatment for 20 sessions. The dose was then increased by 2% to 5% per treatment till 50% repigmentation was observed or persistent erythema developed. The treatment was continued till maximum repigmentation was achieved. The therapy was terminated if the patient showed less than 25% improvement after 40 to 50 exposures. Twenty-five of 60 (42%) cases showed more than 50% repigmentation. It did not demonstrate a significant difference between skin type distribution in either responders or non-responders.

Based on all previous studies, some factors that contribute to a good response in patients with vitiligo are higher initial dosage, more frequent exposure (3 times per week) and darker skin type. Repigmentation observed in present study can confidently be attributed to narrow-band UVB therapy as none of the patients had experienced "spontaneous" repigmentation before the start of therapy. The efficacy (58.18%) overall repigmentation) is comparable to the results of other international studies (table-2).

Table-2: Comparison of the present study with international studies.

Variables	Present study	Njoo, et al	Scherschun, Kim, and Lim	Natta et al
No of patients	33	51	11	60
Mean age in years	28.52	9.9	37.6	36
Sex M/F	17/16	20/31	6/5	22/38
Skin types	33: IV	26: II,III 25: IV,V	4: II,III 3: IV,V	25: III 33: IV 2: V
Duration of therapy	1 year thrice weekly	1 year twice weekly	1 year thrice weekly	5 months to 2 years
Mean cumulative dose in J/cm^2	256.70 ± 67.32	91.3 ± 46.6	31.3	73 ± 56
Efficacy in % of repigmentation	>75% = 27.3% 50-75% = 45.4%	>75% = 53%	>75% = 71.42%	>75% = 33.3%

CONCLUSION

This study extends previous observations regarding narrow band UVB as a fairly effective and safe treatment option for both children and adults in vitiligo.

REFERENCES

1. Kovacs SO. Vitiligo. *J Am Acad Dermatol* 1998; 38: 647-66.
2. Njoo MD, Bos JD, Westerhof W. Treatment of generalized vitiligo in children with narrow-band (TL-01) UVB radiation therapy. *J Am Acad Dermatol* 2000; 42: 245-53.
3. Grimes PE. White patches and bruised souls: advances in the pathogenesis and

treatment of vitiligo. *J Am Acad Dermatol* 2004; 51(suppl 2):5-7.

4. Barman KD, Khaitan BK, Verma KK. A Comparative study of punch grafting followed by topical corticosteroid versus punch grafting followed by PUVA therapy in stable vitiligo. *Dermatol Surg* 2004; 30: 49-53.
5. Westerhof W, Nieuweboer-Krobotova L. Treatment of vitiligo with UV-B radiation vs. psoralen plus UV-A. *Arch Dermatol* 1997; 133: 1525-8.
6. Pathak MA, Nghiem P, Fitzpatrick TB. Acute and chronic effects of the sun. In: Freedberg IM, Eisen AZ, Wolff K, Austen KF, Goldsmith LA, Katz SI et al, editors. *Dermatology in General Medicine*. New York: McGraw-Hill; 1999. p. 1598-1607.
7. Kennedy CTC. Mechanical and Thermal injury. In: Champion RH, Burton JL, Burn DA, Brcalhnack SM, editors. *Rook / Wilkinson / Ebling Textbook of Dermatology*. Oxford: Blackwell Science; 1998. p. 942-3.
8. Lotti TM, Menchini G, Andreassi L. UV-B radiation microphototherapy. An elective treatment for segmental vitiligo. *J Eur Acad Dermatol Venereol* 1999; 13: 102-8.
9. Cui J, Shen LY, Wang GC. Role of hair follicles in the repigmentation of vitiligo. *J Invest Dermatol* 1991; 97: 410-6.
10. Scherschun L, Kim JJ, Lim HW. Narrow-band ultraviolet B is a useful and well-tolerated treatment for vitiligo. *J Am Acad Dermatol* 2001; 44: 999-1003.
11. Natta R, Somsak T, Wisuttida T, Laor L. Narrowband ultraviolet B radiation therapy for recalcitrant vitiligo in Asians. *J Am Acad Dermatol* 2003; 49: 473-6.