Pharmacology and therapeutics

Treatment of vitiligo with broadband ultraviolet B and vitamins

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Abstract

Background While oral psoralen plus ultraviolet A (PUVA) remains the most popular therapeutic modality for vitiligo, recent reports have shown that narrowband ultraviolet B (UVB) also induces significant repigmentation. In this study we evaluated the efficacy of broadband UVB on actively spreading, progressive vitiligo in patients who had been followed for many months (12 or more) in our practice, who continued to depigment despite treatment.

Methods Nine patients with actively spreading vitiligo were exposed to broadband UVB 2–3 times per week at a starting dose of 20–30 mJ/cm^2. Radiation was increased by 10–20 mJ/cm^2 per session with adjustments for symptomatic erythema or missed visits. In addition, patients took vitamin C 500 mg twice a day (BID), vitamin B_{12} 1000 μg BID and folic acid 5 mg BID. The response to treatment and side-effects were assessed at each visit. The patient's response to treatment and progress were assessed by photographs and by physician evaluation of body surface area (BSA) (using the Rule of 9s) involved at monthly intervals. Photographs were taken and estimations of BSA by physical examination made at the start and finish of the trial and then compared by the physicians involved in the study.

Results Broadband UVB halted the progression of vitiligo in all nine patients and in general induced repigmentation early after 8–12 treatments (6–8 weeks). After 2–8 months of treatment, nine of nine patients achieved good (51–75%) or excellent response (76–100%). The percentage of repigmentation varied with length of treatment and anatomic site.

Conclusions This study confirms the only published report that broadband UVB is effective on actively spreading vitiligo. Since it is more cost effective than narrowband UVB and has numerous advantages compared to oral PUVA, broadband UVB may offer an alternative for future treatment of vitiligo. The role of vitamins in this therapy remains to be determined.

Introduction

Vitiligo, a hereditary or acquired disease with an incompletely understood pathogenesis, is characterized by amelanotic macules resulting from a loss of functional skin melanocytes.[1,2] Psoralen plus ultraviolet A (PUVA) is the most popular treatment currently used for vitiligo, but is not always efficient and is associated with several side-effects. Recent reports have shown that narrowband (311 nm) ultraviolet B (UVB) can induce significant repigmentation in either generalized[3,4] or segmental[5] vitiligo. In comparing the treatment of vitiligo with 311-nm UVB radiation versus topical PUVA, Westerhof[3] concluded that UVB therapy was slightly more effective, produced faster repigmentation and had fewer side-effects. However, narrowband UVB therapy is not readily available and implies significant start-up expenses. In 1990, Koster and Wiskemann[6] suggested in the only known published report that broadband UVB could also be effective in treating vitiligo. Consequently, we evaluated the efficacy of broadband UVB on actively spreading vitiligo.

Materials and Methods

Nine patients (seven women and two men, aged 16–71 years) of Hispanic origin (type III–IV skin), four of them with extensive vitiligo (20–50%), were included in this prospective study. At the time of enrollment, the anatomical distribution of the lesions and the degree of depigmentation were evaluated clinically and recorded.

Broadband UVB was delivered by a conventional UVB box, 2–3 times per week at a starting dose of 20–30 mJ/cm^2. Radiation was increased by 10–20 mJ/cm^2 per session with adjustments for symptomatic erythema and missed visits. Patients applied mineral oil prior to UVB therapy.

The patients also received oral vitamin supplementation, which included vitamin C 500 mg twice a day (BID), vitamin B_{12} 1000 μg BID and folic acid 5 mg BID. The response to treatment and side-effects were assessed at each visit. Treatment results were recorded for each anatomic area and estimated by classifying the degree of repigmentation into five groups: 0%, no repigmentation; 0–25%, poor repigmentation; 26–50%, moderate repigmentation; 51–75%, good repigmentation; 76–100%, excellent repigmentation.

Results

Broadband UVB halted the progression of vitiligo in all nine patients and in general induced repigmentation after 8–12 treatments (6–8 weeks) (Table 1). After 2–10 months of treatment, all nine patients experienced significant repigmentation: 51–75% in some areas and 76–100% in other areas (Figs 1–3). Similar to other therapeutic modalities, broadband UVB induced follicular, marginal, and homogeneous forms of repigmentation. Maximal responses were obtained on the trunk, and on the proximal and distal extremities, and intermediate responses were obtained on the face, neck, hands, and feet. The side-effects were minimal and included mild erythema, mild pruritis, reactivation of Herpes Simplex Virus (HSV), and folliculitis (mineral oil induced).

Discussion

Vitiligo is a common disease that affects 0.5–2% of the population, causing emotional distress, social isolation, and even depression. Although there are many therapeutic alternatives validated by clinical studies, such as PUVA, corticosteroids, or surgical techniques, the search for a more effective treatment continues.

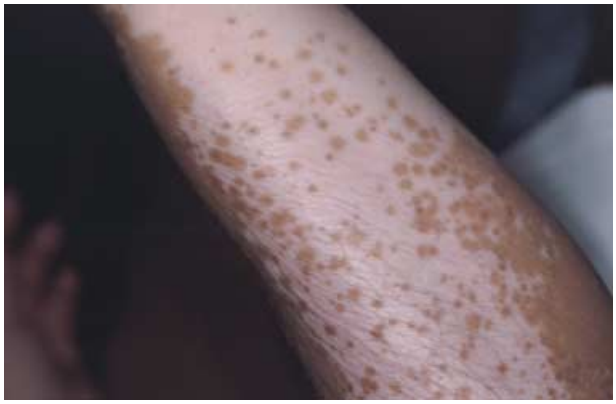

Figure 2 Repigmentation on the arm of patient 1

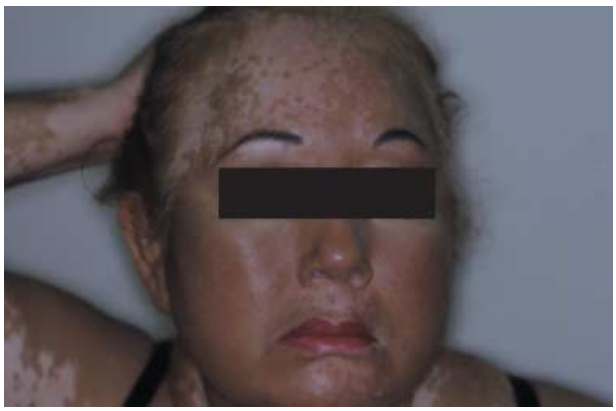

Figure 1 Repigmentation on the face of patient 1

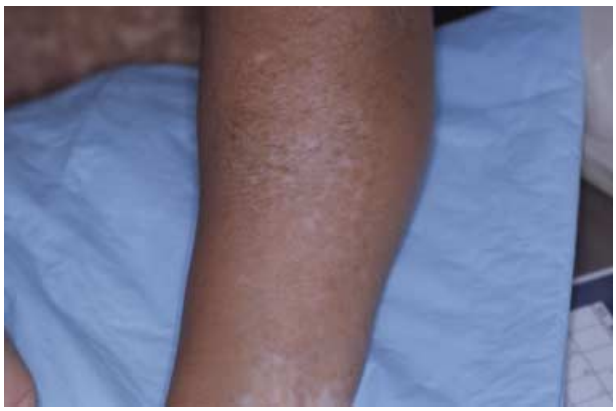

Figure 3 Repigmentation on the arm of patient 3

Table 1 Broadband UVB treatment for vitiligo, with raw data for nine patients

					% repigmentation				
Patient	Age/sex	Age at onset (years)	Duration (years)	% BSA of vitiligo	Face/ neck	Trunk	Arms	Legs	Hands/feet
1	71/F	60	11	30	NI	51–75	51–75	76–100	NI
2	44/F	29	15	50	76–100	26–50	26–50	26–50	0–25
3	70/M	54	16	50	26–50	51–75	51–75	51–75	26–50
4	45/F	24	21	20	NI	51–75	51–75	26–50	26–50
5	35/F	28	7	10	76–100	26–50	26–50	26–50	26–50
6	56/F	53	3	15	0–25	51–75	NI	26–50	26–50
7	18/F	14	4	5	NI	NI	76–100	76–100	51–75
8	16/M	13	3	5	NI	NI	76–50	76–100	51–75
9	32/F	7	25	5	0–25	0–25	0–25	0–25	0–25

BSA, body surface area; NI, not involved.

Similar to PUVA treatment, the underlying mechanism of repigmentation following UVB exposure is probably related both to an inhibitory effect on cytotoxic T lymphocytes and to a release of cytokines involved in melanocyte migration and proliferation.[7] The effect of UVA and UVB stimulation and migration of melanocytes from follicules also contributes to repigmentation.[2,4]

Broadband UVB, however, has numerous advantages compared to PUVA and may offer an alternative for patients who cannot tolerate or who have failed treatment with PUVA. Broadband UVB has fewer side-effects (no photoallergic or phototoxic reactions were seen) and the use of psoralen is no longer required. Broadband UVB induced repigmentation after 8–12 treatments (6–8 weeks). In a previous report,[3] narrowband UVB had the same effect after 6 weeks (12 treatments).

The decision to supplement the patients with high-dose vitamins was based on the previous successful experiences of associating adjunctive therapies with short-term UVB[8] and on a number of studies[9,10] that showed improvement of vitiligo when treated with vitamin supplementation, especially in sun-exposed areas. The exact role of vitamins has yet to be elucidated. It is not known whether vitiligo patients lack sufficient vitamin levels or whether the higher dose of vitamins somehow acts to stimulate repigmentation.

The possibility of vitamin deficiency has been debated in previous research.[9,10] In our study, vitamin levels prior to treatment were not assessed. Patient 9, who was breast-feeding, did not take the high-dose vitamins during 4 months of therapy and had minimal repigmentation but no progression of vitiligo. When she stopped breast-feeding she began vitamin therapy, and, after 8 weeks on UVB therapy and vitamins, she began showing significant repigmentation. Other studies using either narrowband or broadband UVB for repigmentation did not use vitamin supplementation and still reported repigmentation.[3,4] Our patients were all skin types III–IV as were patients treated in previous reports who improved with UVB. Patients with these skin types may have better responses using this therapy, as has been found with PUVA therapy.[2]

Patients tended to plateau in improvement after 8–10 months, then repigmentation occurred slowly, in minute increments. After peak repigmentation, UVB therapy continued with additional topical modalities,[2,11–13] which have been anecdotally reported to improve repigmentation, including copper cream, vitamin C cream, 5% minoxidil solution, high-potency steroids, dovonex, tretinoin cream, glycolic acid peels, trichloroacetic acid (TCA) peels, tar therapy and UVA, without success. Until more extensive studies have confirmed our results, we will confine our conclusions to stating that broadband UVB is not only readily available, but also at least as effective in treating vitiligo as 311-nm UVB in this small study.

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