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Original Article

Efficacy and safety of narrowband ultraviolet B therapy in psoriasis in Asian skin

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Abstract

Background Narrowband (NB) UVB phototherapy has been proven to be clearly more effective than broadband UVB and safer and/ or more practicable than psoralen-UVA in the management of psoriasis.

Objectives To determine the efficacy and safety of narrowband UVB in chronic plaque psoriasis in Asian skin.

Patients and methods It was a multi-centre trial. 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 each and every patient. All the patients were exposed to narrowband UVB. At each visit, PASI was determined and decision was made to increase or decrease the dose.

Results Thirty two patients were enrolled, out of which, 28 were evaluable. Twenty three patients cleared over a period of 13.6 weeks. Five patients with poor response after 20 treatments were declared resistant. Three patients suffered from moderate erythema which settled later on. None of our patients developed painful erythema. Generalized hyperpigmentation occurred in all the patients.

Conclusion Narrowband UVB is safe and effective in the treatment of psoriasis, but long term follow up is needed to determine its carcinogenic effects.

Key words
Psoriasis, narrowband UVB.

Introduction

Psoriasis is a chronic, recurrent disease that affects between 1% and 3% of the population. Patients with moderate to severe disease generally require phototherapy (e.g. narrowband ultraviolet B radiation), photochemotherapy (oral psoralen plus ultraviolet A radiation) or systemic agents (e.g. ciclosporin, methotrexate, oral retinoids, fumaric acid esters) to control their disease adequately. In general, these therapeutic modalities have proven to be highly effective in the treatment of psoriasis. However, potentially serious toxicities can limit their long-term use.[1,2,3] Given that there is no standard therapeutic approach for patients with moderate to severe psoriasis, the benefits and risks of phototherapy, photochemotherapy and systemic therapy must be weighed carefully for each patient, and treatment individualized accordingly. The aim of this study was to determine the

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safety and efficacy of narrowband ultraviolet B in chronic plaque psoriasis.

Patients and methods

It was a multi-centre trial, carried out in two private clinics, one situated in Lahore and the other in Quetta, from July, 2004 to July, 2006. The inclusion criterion was chronic plaque psoriasis involving at least more than 30% of the body surface area. Exclusion criteria included age younger than 12 years or older than 70 year, patients with history of previous skin malignancies, photochemotherapy and any systemic antipsoriatic therapy in the preceding 3 months, administration of a drug known to cause photosensitization and a history of photosensitivity otherwise.

Written informed consent was taken and narrowband UVB was administered thrice a week, on alternate days. The dose was adjusted according to skin type of the patient, on the basis of 70% minimum erythema dosage (MED) schedule. MED was determined on the back of patients before the start of this clinical trial for skin types which included type III and IV. The dose increment continued until lesion clearance which was defined as 90% reduction in psoriasis area and severity index (PASI) scores. At each visit, the patient was assessed and psoriasis severity was graded by the treating physician. The decision to increase or decrease the dose was made following our unit's standard protocol (**Table 1**). Treatment was stopped in the event of any of the following i.e. clearance of psoriasis or minimal residual activity, absent or minimal improvement after 20 treatments or intolerance to treatment.

Table 1 Phototherapy regimen.

1. Determine minimal erythema dose (MED) at 24 hours
2. Initial dose: 70% of MED
3. Increments given at each visit, based on percentage of previous dose and erythema response:
   - no erythema**:** 20% increment
   - mild erythema: repeat previous dose and reduce to 10% increments
   - moderate erythema**:** postpone one treatment, repeat previous dose at next visit or reduce to 10% increment
   - severe erythema**:** no treatment and further treatment at the discretion of the doctor
4. Other unwanted effects: if itch develops, use emollients
5. Missed appointments:
   - 1 or 2 treatments missed**:** repeat previous dose
   - 3 treatments missed**:** treat with penultimate dose

Before each therapy session, a liberal use of olive oil was encouraged. All the patients were provided ultraviolet opaque goggles to protect their eyes. They were also instructed to protect their face and genitals by suitable clothing, when not affected by psoriasis. A three sided Waldmann NBUVB chamber with 8 fluorescent tube lights, each of 100 watts with an upright position, was used for irradiation of the body and proximal limbs while a small portable NBUVB unit was used to treat the hands and feet.

Results

Thirty two patients were enrolled and they were given NBUVB therapy, thrice a week on alternate days. Twenty eight patients completed the trial while 4 left the treatment for various reasons (2 patients were not

Table 2 Demographic and treatment data (n=32)

Characteristics	
Age (years)	
Range	12-52
Mean	32
Sex	
Male	20
Female	12
Skin type	
III	13
IV	19
Mean duration of disease (months)	32
Mean PASI Score at baseline	14.6
Mean PASI Score at the end of NB UVB therapy	2.3
Mean No. of NB UVB treatments	41
Mean cumulative UVB fluence J/cm^2	42

satisfied with the treatment response and the other two found it difficult to manage the procedure thrice a week). Twenty three out of 28 (93.3%) patients cleared on a mean cumulative dose of 42 J/cm^2 within 41 sessions over a period of 13.6 weeks (**Figures 1** and **2** show complete clearance in a patient). The average maximum dose of NBUVB was 1.3 J/cm^2 for skin type III and the average maximum dose for skin type IV was 1.4 J/cm^2 (mean of both these values was 1.4 J/cm^2). Five patients with poor response after 20 treatments were declared resistant and treated with alternate therapy. Among those who cleared, 3 patients were left with minimal residual activity on the lower limbs and scalp.

Three patients developed moderate erythema which settled after using the standard protocol treatment guidelines while painful erythema was seen in none of our patients. Two patients complained of itching after phototherapy sessions which was managed by regular use of emollients. Generalized hyperpigmentation developed in all patients and lesional postinflammatory hyperpigmentation occurred in 14 patients.

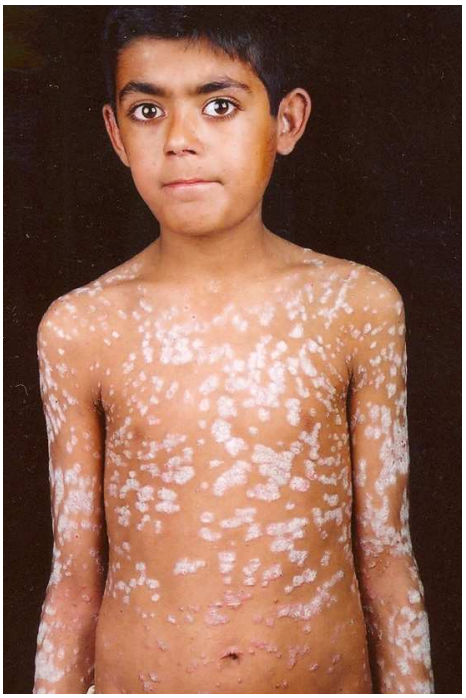

Figure 1 A child with chronic plaque psoriasis before treatment.

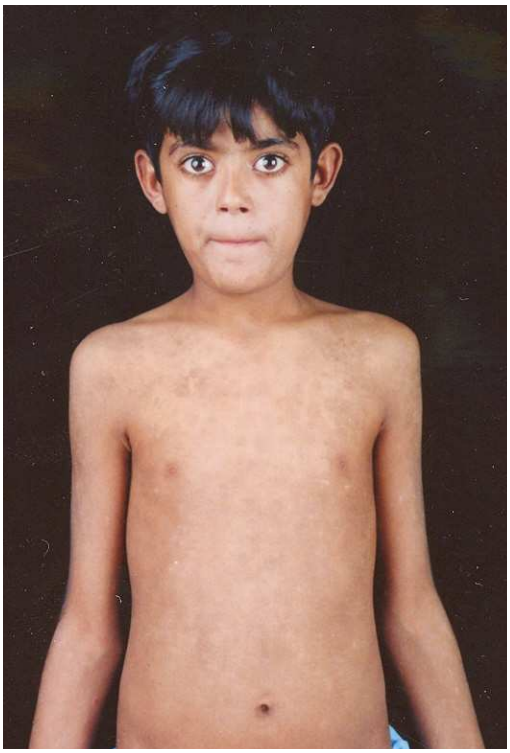

Figure 2 Complete clearance at the end of treatment.

Treatment was otherwise well tolerated by the patients.

Discussion

The treatment of psoriasis is not totally harmless. The use of methotrexate is associated with liver toxicity especially when long term treatment is used. Retinoids are teratogenic and cause a range of adverse effects, although mostly pharmacologic and dose related. Cyclosporin is cytotoxic. Among the ultraviolet therapies, Narrowband UVB phototherapy has considerable advantages over traditional treatment options such as broadband UVB and psoralen plus UVA (PUVA). It is clearly more effective than broadband UVB, safer than PUVA and well tolerated by patients, when taken in suberythemogenic doses.[4,5] Narrowband UVB phototherapy has an established role in the treatment of chronic plaque psoriasis and in this study we have proven its safety and efficacy in our skin type IV. The rarity and mildness of episodes of erythema caused by TL-01 Lamp allows regular progression of dose. In this way, it is superior to broadband UVB which often produces erythema and therefore the dose increments are slower and less regular.[6]

The mean cumulative dose documented in various studies for clearing psoriasis, is less as compared to our study. The possible explanation for this difference could be that most of our patients were of skin type IV contrary to the skin type I or II in the published studies, showing MED at low doses.[3,5] There is need to do more trials on a larger sample on Asian skin to support these findings. The mean cumulative dose for clearing psoriasis in type III skin in our patients was low as compared to that for skin type IV but the difference was not statistically significant. There was incomplete clearing on the scalp in most of the patients which supports the fact that UVB exerts its influence through local effects,[7] as it is difficult to irradiate the scalp in the presence of hair. 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-cells. The combination of UVB-induced apoptosis, increased secretion of anti-inflammatory cytokines and decreased trafficking to the skin may help to explain the beneficial effects on psoriasis.[8]

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. However, the long term safety of narrowband UVB is difficult to predict at the moment. It is well documented that sunburn especially in early years of life is associated with melanomas in later years.[9] Therefore, a long term follow up is required to determine the safety of this device. Weischer *et al*. did a retrospective study on psoriatic patients who received phototherapy and a six years follow up showed no evidence of skin cancers in patients treated with either broadband or narrowband UVB therapy.[10] In summary, NBUVB 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.

References

1. Naldi L, Griffiths CE. Traditional therapies in the management of moderate to severe chronic plaque psoriasis; an assessment of the benefits and risks. *Br J Dermatol* 2005; **152**: 597-615.
2. Kostovic K, Pasic A. Phototherapy of psoriasis: review and update. *Acta Derm Venereol Croat* 2004; **12**: 42-50.
3. Gupta G, Long J, Tillman DH. The efficacy of narrowband ultraviolet B phototherapy in psoriasis using objective and subjective outcome measures. *Br J Dermatol* 1999; **140**: 887-90.
4. Yones SS, Palmer RA, Kuno Y, Hawk JL. Audit of the use of psoralen photochemotharpy (PUVA) and narrowband UVB phototherapy in the treatment of psoriasis. *J Dermatol Treat* 2005; **16**: 108-12.
5. Asawanonda P, Nateetongrungsak Y. Methotrexate plus narrowband UVB phototherapy versus narrowband UVB phototherapy alone in the treatment of plaque-type psoriasis: a randomized placebo-controlled study. *J Am Acad Dermatol* 2006; **54**: 1013-8.
6. Picot E, Meunier L, Peyron JL. Treatment of psoriasis with a 311 nm UVB lamp. *Br J Dermatol* 1992; **127**: 509-12.
7. Dawe RS, Cameron H, Yule S *et al*. UVB phototherapy clears psoriasis through local effects. *Arch Dermatol* 2002; **138**: 1071-6.
8. Sigmundsdottir H, Johnston A, Gudjonsson JE, Valdimarsson H. Narrowband-UVB irradiation decreases the production of pro-inflammatory cytokines by stimulated T cells. *Arch Dermatol Res* 2005; **297**: 39-42.
9. Nelemans PJ, Groenendal H, Kiemeney LA *et al.* Effect of intermittent exposure to sunlight on melanoma risk among indoor workers and sun-sensitive individuals. *Environ Health Perspect* 1993; **101**: 252-5.
10. Toll A, Velez-Gonzalez M, Gallardo F *et al.* Treatment of localized persistent plaque psoriasis with incoherent narrowband ultraviolet B phototherapy. *J Dermatol Treat* 2005; **16**: 165-8.