

SHORT REPORT

Narrow band UVB: is it effective and safe for paediatric psoriasis and atopic dermatitis?

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Abstract

Background Phototherapy has a time-honoured place in the treatment of variety of skin diseases in adults. The use of this modality in children is limited mainly due to concerns about long-term carcinogenic potential. Only a few clinical trials have been performed on the efficacy and safety of phototherapy in children.

Objectives To determine the efficacy and safety of NB-UVB phototherapy in children with atopic dermatitis (AD) and psoriasis.

Methods This is a retrospective review of the treatment outcomes of 129 children with psoriasis and AD, who were treated with NB-UVB between 1998 and 2006 at our institute.

Results Fifty per cent of the psoriatic patients and 25% of patients with AD achieved clearance by the end of the treatment. NB-UVB phototherapy was well-tolerated, with no serious adverse effects except one doubtful case of melanoma *in situ*.

Conclusions NB-UVB may be considered as a viable therapeutic option in children with psoriasis and AD. Children who are treated by phototherapy should remain under annual dermatologic observation. To determine true carcinogenic risk of UV therapy, longer follow-up is essential.

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Keywords

AD – atopic dermatitis, MED – Minimal erythematous dose, NB-UVB – Narrow band UVB

Conflict of interest

None declared.

Introduction

Phototherapy has become one of the most commonly used modalities for the treatment of a variety of skin diseases in adults.

The role of this modality in children is limited by fear of long-term toxicity because of patients' prolonged life expectancy after treatment; the likelihood that repeated courses of treatment will be required for recurrent disease; and the practical difficulties associated with delivering phototherapy in this age group.¹

Guidelines regarding the use of phototherapy in general and Narrow band UVB (NB-UVB) in particular in children are scarce, with advice on its use coming mainly from experts in the field and reports review rather than from trial data.^{1–5}

Our study represents the largest study to date on the use of NB-UVB in children. The aim of this work was to determine the

efficacy and the safety of NB-UVB phototherapy in children with atopic dermatitis (AD) and psoriasis.

Methods

Study population and design

We performed a retrospective analysis of all children up to the age of 18 years, suffering from AD and psoriasis, who had undergone NB-UVB in the Sheba medical centre, Tel-Hashomer between the years 1998 and 2006. The patients were identified from the phototherapy unit computer database.

The study was approved by the institution's Helsinki committee (no7557).

The patient's clinical files were reviewed for age, gender, skin type, diagnosis, adjuvant therapy, previous therapy, adverse effects,

duration of treatment, cumulative dose, response to treatment and subsequent length of remission.

We found that determining the minimal erythral dose (MED), which is a common practice in adults, can be too long and exhausting in children.

Therefore, the initial dose of NB-UVB was determined on the basis of the patient's skin type according to the classification of Pathak *et al.*⁶

Narrow Band UVB therapy was administered three times a week to the children treated as outpatients and six times a week to the hospitalized children.

The treatment protocol was identical to that previously reported by our group.⁷

Patients wore a face shield unless there was facial involvement, and the genital area was always protected with clothes. During treatment with NB-UVB, children were supervised by their parent or legal guardian. For very young children, parents accompanied their children inside the cabin for at least the first few exposures.

Irradiation cubicles

Phototherapy was performed in a Waldmann (GmbH) UV7001 or UV1000 irradiation cabin containing Waldmann 100 W TL-01 (311 ± 2 nm) fluorescent tubes. Irradiance was measured monthly in accordance with the British Photodermatology Group Guidelines with an international light IL1400A meter with associated IL240/UVB-1 filter/TD Teflon cosine corrector detector assembly (International Light Inc., Newburyport, MA, USA).

Assessment of treatment response

During the treatment, the children were assessed by an authorized dermatologist.

The response rate was recorded and defined as complete, good or partial response.

Complete response (CR) was defined as full disappearance of lesions and/or pruritus.

Patients achieving at least 75% improvement were defined as having good response. Partial response was less than 75% improvement.

Children were followed up by invitation to the dermatology clinic for the evaluation of duration of the response and for the total body nevi scan. For children that could not get to the clinic, a brief telephonic questioner of the parents was performed.

Statistical analysis

The chi-squared test was used for the analysis of the response to NB-UVB. The Kaplan – Meier estimator was used to estimate the difference in the duration of remission.

Analysis was carried out using SPSS 16 software (SPSS Inc., Chicago, IL, USA).

Results

Over the study period, 129 children (80 girls and 49 boys); median age 12 years, (range 2–18 years) suffering from psoriasis (68%) or atopic dermatitis (32%) were treated in our institution. The mean duration of the illness, duration of treatment and the cumulative exposure doses are shown in Table 1.

Of the 129 children, 79 psoriatic and 36 AD children were available for final analysis.

Of psoriatic patients, 51% (40/79) achieved clearance and another 41% (33/79) had good response.

Of AD patients, 25% (9/36) achieved clearance, whereas another 44% (16/36) had partial response (Table 2).

Table 1 Study Population characteristics according to diagnosis

Diagnosis	Patients treated, No	Gender	Mean age at the beginning of Tx (years)	Mean duration of illness (years)	Mean duration of Tx (months)	Mean cumulative dose (J/cm ²)
AD	41	18 M 23 F	13 (± 4.12)	8.7 (± 5) ($P < 0.01$)	3.3 (± 2.43)	51.6
Psoriasis	88	31 M 57 F	12 (± 4)	3.6 (± 3.6)	3.1 (± 2.26)	46.5
Total	129	49 M 80 F	12	5.2	3	5764.41

F, female; M, male.

Table 2 Treatment response and side effects according to diagnosis

Diagnosis	Response			Duration of remission (months)	Side effects		
	Partial response <i>n</i> (%)	Good response <i>n</i> (%)	Clearance <i>n</i> (%)		Mild Erythema <i>n</i> (%)	Pruritus <i>n</i> (%)	Burn <i>n</i> (%)
AD	11 (31)	16 (44)	9 (25)	5	6 (14)	3 (7)	1 (2)
Psoriasis	6 (8)	33 (41)	40 (51)	20	13 (15)	2 (1)	3 (3)

AD, atopic dermatitis.

In the responding children, the median duration of remission was 20 months for psoriatic and 5 months for AD patients (Table 2).

Adverse events

The therapy was generally well-tolerated, and mostly mild adverse events were reported in 10 children with AD and 18 children with psoriasis.

In the AD group: six children experienced mild erythema, one child experienced first-degree burn and three children experienced pruritus.

In the psoriasis group: 13 children experienced mild erythema, three had first-degree burns and two pruritus (Table 2).

There was no statistical difference in the frequency of the adverse events between the two groups, but younger children were more likely to experience side effects (data not shown).

Follow-up data from the outpatient clinic or telephonic questioner were obtained for 54 children. The median follow-up period was 3 years. One 11-year-old psoriatic girl developed a pigmented lesion on her left arm, eleven months after the beginning of treatment, which was biopsied and initially diagnosed as melanoma *in situ* so she had to go for wide excision; however, in final revision of the slide we concluded it as a Spitz nevus.

Discussion

Although NB-UVB is a well-established treatment for a range of skin conditions in adults, there is little in the literature about its use in children.

Compared with the published data regarding the use of NB-UVB, our data for psoriasis concur with the results available in the literature. In our population of 88 psoriatic patients, 50% achieved CR by the end of treatment. This is broadly similar to results published from Croatia,⁸ where 45% of 20 children with psoriasis after a mean of 19 treatments demonstrated a response graded 'excellent'.

In a study published by Zamberk *et al.*⁹ in which, of the 20 patients included in the study, 52.17% improved by more than 90% of the initial PASI at the end of the treatment.

Altogether 92% of our psoriatic children had more than 75% improvement (CR or GR).

In our AD group, CR or GR was obtained in 69% of 41 children; this is similar to a Glasgow group, which reported a Minimal Residual Disease (MRD) response in 68% of children.⁴ It should be noted that the mean number of treatments was significantly higher in the AD group than in psoriatic group.

There are no data in the literature regarding the duration of remission following NB-UVB phototherapy in psoriatic paediatric patients. In our experience, the median duration of remission was 20 months, which is much higher than the 3–6 months remission expected for adult psoriatic patients (personal experience and¹⁰).

Regarding the duration of remission in AD paediatric patients, the only recent relevant publication reported remission of 6 months and more in 50% of the patients.¹¹ In our study, the median duration of remission was 5 months.

It should be stated that in our study, phototherapy was not used as a monotherapy and topical remedies were allowed as well. However, all of the treated children failed previous intensive topical therapy.

There were no serious short-term side effects including the median follow-up of 3 years. The only exception was a doubtful melanoma *in situ* case. Recently published reviews did not find connection between NB-UVB, BB UVB and melanoma or non-melanoma skin cancer in adults.^{12,13} Phototherapy is administered infrequently in children with skin disorders, mainly because of concern about long-term adverse effects.^{14–16} This concern is always well-intentioned and often correct, but in many instances, phototherapy has fewer and less serious problems than the systemic alternatives.

We suggest that NB-UVB therapy should be used with caution and for carefully selected children. Children who are treated by phototherapy should remain under annual dermatologic observation, and to determine true carcinogenic risk of NB-UVB therapy, longer follow-up is essential.

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