Narrowband UVB Therapy in Yemeni Patients

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Abstract

Objective: **This study aimed to assess the usefulness of narrow band UVB (NB-UVB) therapy in Yemeni patients with different skin conditions.**

Methods: **A prospective clinical audit was conducted of 120 Yemeni patients (45 males and 75 females), aged 5-54 years from all patients with different skin diseases in dermatology clinic (January 2013 - May 2014), treated by NB-UVB irradiation without being combined with topical steroid or topical chemotherapy during the course of the study.**

Results: **120 patients enrolled in this study with mean age 25.8±12.6 years old. Females consisted of the major rate (62.5%), and patients who came from Aden had a high rate (77.5%).**

Ninety four (78.3%) patients had complete response to treatment, 6.7% had partial and 15% had no response. Mycosis fungoid and atopic dermatitis had a high mean number of session (84.50±0.70), followed by vitiligo with mean number of sessions 27.10±23.70. The Lichen planus, Mycosis and Pityriasis had complete response (100%) to treatment, followed by vitiligo 79.3%, while partial response appeared in patients with alopecia (66.7%) and atopic dermatitis (22.2%). Patients with chronic renal failure had no response to treatment in 33.3%, followed by Parapsoriasis (20%).

Conclusion: **Our study proves that NB-UVB therapy is an effective and safe tool in the management of skin diseases and is considered the first-line phototherapeutic option for many skin conditions.**

Key words: **Narrowband UVB, Phototherapy, Skin Diseases, Response.**

Introduction

For years, phototherapy has been used in a wide range of skin diseases, which is unsurprising as skin is the anatomical feature most directly exposed to light. Phototherapy became a common practice in dermatology at the beginning of the 20thcentury, when Goeckerman introduced a combination of coal tar and UVB. Later, Ingram developed a similar treatment protocol, which consisted of a 15-30-minute bath in a tar solution followed by a UVB dose. It started with 30-50% of the minimum erythema dose and this light dose was increased by 30-50% at each session. Subsequently, an anthralin paste with low concentrations (0.05-0.1%) was applied to and maintained on the treated intertegument for 6-24 hours (1).

Nowadays phototherapy is a popular treatment option, which includes both of the generalized ultraviolet B (UVB) therapies, broadband UVB (BB-UVB) and narrowband UVB (NB-UVB). UVB delivers a high amount of energy to the stratum corneum and superficial layers of the epidermis and is primarily responsible for sunburn, suntan, and skin cancers. It produces tanning more efficiently than UVA (2).

Narrow band UVB (NB-UVB) with the wavelength range from 311 to 313 nm phototherapy offers potential for the future and is an established method for managing patients with psoriasis, as well as difficult eczema, atopic dermatitis (3) mycosis fungoides (4) and other skin disorders. It works by reducing inflammation in the skin using very narrowly defined wavelengths of UV light to reduce the problems and risks of broadband ultraviolet light typically seen with sun beds. It is effective with a fraction of the dose normally delivered by these commercial machines, reducing skin cancer risk and side effects. The results of present studies provides evidence that narrow band UVB is superior to broad band UVB as regards to the efficacy of the treatment of generalized lichen Planus patients. Narrow -band phototherapy has a higher ratio of therapeutic to erythemogenic activity, resulting in increased efficacy, reduced incidence of burning and longer remission (2). This study aimed to assess the usefulness of narrow band UVB (NB-UVB) therapy in Yemeni patients with different skin conditions.

Materials and Method

Our study is a descriptive prospective clinical audit of 120 patients with different skin diseases who were referred for Narrowband Ultraviolet B (NB-UVB) therapy at the dermatology clinic in Aden, Yemen.

All patients were treated with NB-UVB phototherapy alone without being combined with topical steroid or topical chemotherapy. The NB-UVB irradiation was performed in a UV7001K phototherapy cabinet (Waldmann, Villingen-Schwenningen, Germany) equipped with TL-01 lamps (Philips Lighting BV, Roosendaal, Netherlands) emitting NB-UVB wavelengths between 311 and 313 nm. Fifty patients were of skin type III and 70 patients were of skin type IV.

Full history, general examination, and dermatological examination were carried out before starting treatment. Severity of psoriasis was ascertained using the Psoriasis Area Severity Index (PASI) score. The score ranges from 0 to 72.

The patients were treated three times weekly. We started with a standard starting dose (0.3 J/cm2) and stepwise increase (20% increase of the previous dose) depending upon the patient's erythema response, if mild erythema occurred, we decreased to the previous dose without further increase, in case of moderate or severe erythema, we stopped sessions until erythema faded and then started with 50% of the previous dose without further increase.

Improvement was considered as complete (75-100 %), partial (50 -75%) and no response (<50%(.

Therapeutic efficacy and responses to phototherapy were clinically assessed by the researchers using clinical photographs with the same digital camera in the same position under controlled lighting conditions at each follow-up visit. Data were collected during the period January 2013 to May 2014.

The data was processed and analyzed by computer using SPSS program version 17. Percentage was calculated as summary measure for the qualitative variables. Mean and standard deviation were calculated for quantitative ones, to identify any significant relationship between the study variables. Chi-Square test was applied with a significance level of 0.05.

Result

Table 1 reveals the descriptive characteristics of the 120 patients. The age of patients ranged between 5-54 years with a mean age 25.8 ± 12.6 years. There were 38 (31.7%) cases in the age group 21-30 years followed by the age group 11-20 years.

Female patients represented 75 (62.5%) of cases. The majority of patients came from Aden governorate 93 (77.5%) and 58 (48.3%) of cases were vitiligo, followed by psoriasis 34(28.3%) cases.

Seventy nine (65.8%) of patients under phototherapy had no side effect, while 35 (29.2%) with hyperpigmentation, erythema 4(3.4%) and flaring and itching for each one 1(0.8%).

Table 1: Frequency of selected variables among the study patients (n=120)

Characteristics	N0	(%)
Age group (years):		
≤10	12	(10)
11-20	34	(28.3)
21-30	38	(31.7)
31-40	12	(10)
41-50	23	(19.2)
>50	1	(0.8)
Sex:		
Male	45	(37.5)
Female	75	(62.5)
Governorate:		
Aden	93	(77.5)
Other governorates	27	(22.5)
Diagnosis:		
Vitiligo	58	(48.3)
Psoriasis	34	(28.3)
Atopic dermatitis	9	(7.5)
Lichen planus	5	(4.2)
Parapsoriasis	5	(4.2)
Alopecia	3	(2.5)
Chronic renal failure	3	(2.5)
Mycosis fungoides	2	(1.7)
Pityriasis rubra pilaris	1	(0.8)
Side effect:		
None	79	(65.8)
Erythema	4	(3.4)
Flaring	1	(0.8)
Itching	1	(0.8)
Hyperpigmentation	35	(29.2)

Note: % taken from total cases (120)

The complete response appeared in 78.3% of cases, but 15% of cases had no response while partial response was 6.7% as shown in Table 2.

Table 2: Response rate of patients with different skin diseases

Response	No	%
Complete response	94	78.3
Partial response	8	6.7
No response	18	15
Total	120	100

The patients with mycosis fungoid and atopic dermatitis had high mean number of sessions (84.50 ±0.70) and cumulative of Joules (81.69±4.02), followed by the vitiligo with mean session 27.10 ±23.70 and Joules 35.18±56.89 as appears in Table 3.

Table 3: Frequency of study subject according to mean number of sessions

Diagnosed disease	Mean No. of session ± SD	Mean cumulative dose (J/cm²)
Mycosis fungoid	84.50 ±0.70	81.69±4.02
Atopic dermatitis	84.50 ±0.70	84.50 ±0.70
Vitiligo	27.10 ±23.70	35.18±56.89
Psoriasis	19.50 ±12.17	18.17±17.93
Parapsoriasis	18.40 ±16.31	17.60±24,95
Alopecia	16.33±13.65	12.48 ±14.99
Chronic renal failure	15 ±7.55	7.91±7.63
Pityriasis rubra pilaris	12±5.2	5.87±5.02
Lichen planus	11.8 ±5.45	6.35 ±6.30

Data are mean ± standard deviation

According to Table 4, all cases of Lichen planus, Mycosis and Pityriasis enrolled in this study had complete response (100%) to treatment, followed by vitiligo with 79.3% complete response. Partial response appears in patients with alopecia with 66.7% and atopic dermatitis with 22.2%. One the cases with chronic renal failure had no response to treatment with 33.3%, followed by Parapsoriasis with 20%. There was a significant statistical relationship between response and type of skin diseases (p=0.03).

Table 4: Percentage of patients with degree of response after phototherapy

Diagnosis	Complete	Partial	No response	Total
Vitiligo	46 (79.3%)	2 (3.5%)	10 (17.2%)	58
Psoriasis	27 (79.4%)	2 (5.9%)	5(14.7%)	34
Atopic dermatitis	6 (66.7%)	2 (22.2%)	1(11.1%)	9
Lichen planus	5 (100%)	0 (0.0%)	0(0.0%)	5
Parapsoriasis	4 (80%)	0 (0.0%)	1 (20%)	5
Alopecia	1(33.3%)	2 (66.7%)	0(0.0%)	3
Chronic renal failure	2 (66.7%)	0 (0.0%)	1 (33.3%)	3
Mycosis fungoid	2 (100%)	0 (0.0%)	0 (0.0%)	2
Pityriasis	1 (100%)	0 (0.0%)	0 (0.0%)	1
Total	94(78.3%)	8(6.7%)	18(15%)	120

Chi-square ($p<0.05$)

As appears in Table 5 the complete response by use NB-UVB phototherapy had mean number of sessions 39.93± 27.15 and mean cumulative dose of Joules 53.88 ±6042.

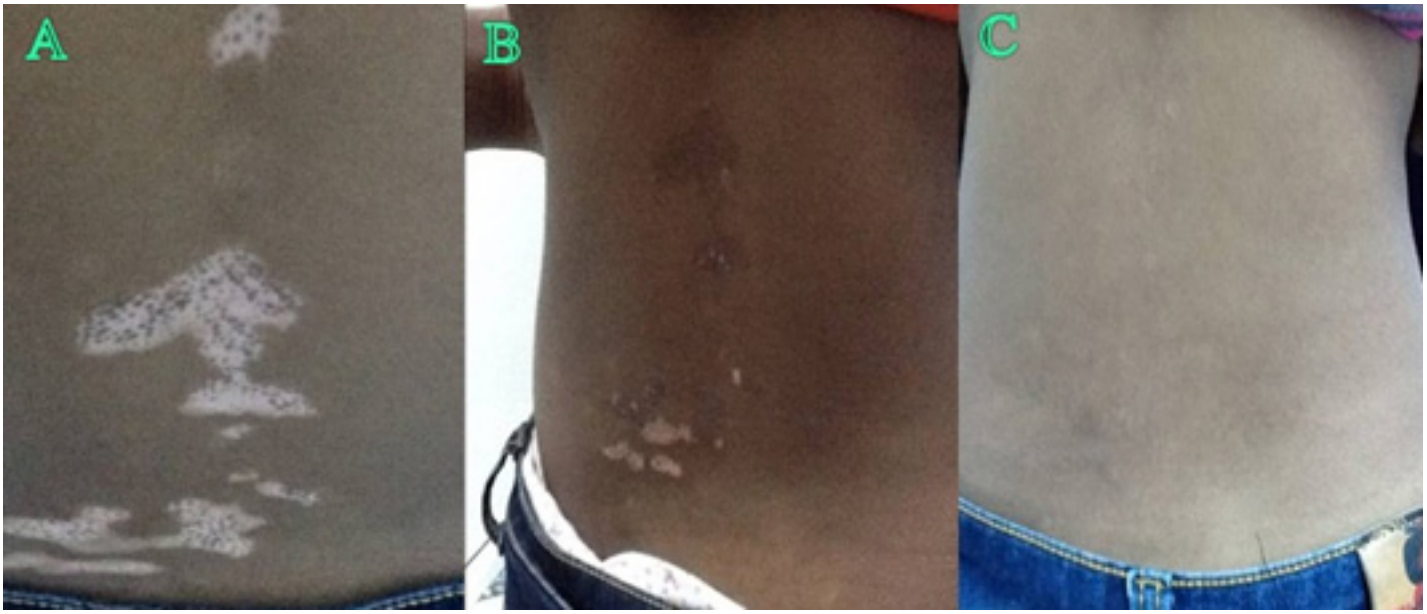
Table 5: Number of Session and Dose of Joules Needs for Complete Response

Response	Mean No. of session ± SD	Mean cumulative dose (J/cm2)
Complete	39.93± 27.15	53.88 ±6042
Partial	23.30 ± 19.04	27.00±44.84
No response	15.16 ± 1.20	12.62±22.09

Figure 1 and Figure 2 show the vitiligo and psoriasis cases before and after phototherapy.

Figure 1: A, Case of psoriasis patient. B, Improvement with NB-UVB after 25 sessions

Figure 2: A, Vitiligo case. B, Repigmentation vitiligo patches after 45 sessions of NB-UVB treatment. C, after 63 sessions



Discussion

NB-UVB is effective in the treatment of such skin disorders, like plaque psoriasis, primary cutaneous T-cell lymphomas, atopic eczema, seborrhoeic dermatitis, pityriasis rubra pilaris, lichen planus, prurigo nodularis, uremic pruritus or even vitiligo (5,6). Since its development, use of NB-UVB has been prompted by a combination of its therapeutic efficacy and good safety profile regarding acute adverse events (7,8).
Our study could be considered as the first study in Aden, Yemen to study the benefit and outcome of using NB-UVB in dermatology clinic.

In the current study we found 65.8% of the patients under NB-UVB had no side effect, while 29.2% of them have hyperpigmentation and required time to resolve, 3.4% burning erythema.

A study from Malaysia mentioned that 3(16.7%) were excluded from treatment response analyses as treatment was prematurely discontinued due to development of side effects (9).

Shamsuddin et al (10) from Pakistan reported that 3(9.4%) patients developed moderate erythema which settled after using the standard protocol treatment guidelines while painful erythema was seen in none of their patients. Two (6.3%) patients complained of itching after phototherapy sessions which was managed by regular use of emollients. Generalized hyperpigmentation developed in all patients and lesional post-inflammatory hyperpigmentation occurred in 14(43.8%) patients.

In this study 78.3% of patients had complete response to treatment, but the partial response in this study was 6.7%.

Adauwiyah et al (9) reported in their evaluation of repigmentation response to NB-UVB, 40% patients had moderate response, 20% had good response and another 20% had excellent response while 13.3% patients responded poorly and 6.7% patients did not show any repigmentation.

In the present study patients with mycosis fungoid had complete response with 100%, and with mean session 84.50 ±0.70 and cumulative of Joules 81.69±4.02.

A study from Spain reported that 57% of patients with mycosis fungoid enrolled in the study had complete response (4).

Hofer et al (11) from Austria studied 20 patients, 6 with early-stage mycosis fungoides and 14 with small-plaque parapsoriasis, demonstrating a histopathologically confirmed complete response in 19 cases, after a mean of 20 sessions. The mean time to recurrence was 6 months after stopping phototherapy.

Clark et al (12) from Scotland observed a complete response in 6 out of 8 patients with patch-stage mycosis fungoid (75% of cases), after a mean of 26 treatment sessions (20-37 sessions), that is, 9 weeks of treatment.

A study done by Salah et al (13) from Jordan showed complete remission achieved in 76.4% of patients, within 5-14 weeks (mean 12.7 weeks). During this period, 15-42 sessions (mean 28.9 sessions), equivalent to a cumulative NB-UVB dose of 17.3-48.2 J/cm2 (mean 38.7 J/cm2), were needed to achieve this rate of complete remission.

Our study revealed that atopic dermatitis had high mean number of session 84.50 ±0.70 and cumulative of Joules 84.50 ±0.70 and with 66.7% complete response.

There is a large body of evidence indicating that NB-UVB is effective in the treatment of atopic dermatitis (14). Hudson-Peacock et al (15) described a response rate of 81% with complete clearance in 43% for NB-UVB.
A randomized controlled double blind study with 73 patients treated with NB-UVB, broadband ultraviolet (bUVB)/ ultraviolet A (UVA) or visible light twice a week showed NB-UVB to be most effective (16,17).
Haroon et al (18) in his study reported the mean cumulative dose of 25.91 J/cm2 NB-UVB at a wavelength of 311nm was given in a mean of duration 5.2 weeks treatment reduced the atopic dermatitis scores from mean 32.2 (range 20.2-45.5) to 14.2 range (6.2-12.4) and concluded that NB- UVB appears to be a promising treatment for atopic dermatitis.

In the current study, vitiligo had complete response in 79.3% of cases (mean session 27.10 ±23.70 and cumulative of Joules 35.18±56.89) which is less than that reported from study done in Malaysia in which repigmentation was moderate in 40% of patients, good response to treatment represented in 20%, while 20% achieved excellent results (9). A study in India showed that the majority of vitiligo cases achieved 75% repigmentation (complete response) (19). Westerhof et al (20) and Scherschun et al (21) achieved up to 75% repigmentation (complete response) in about two thirds of patients, while Tjioe et al (22) reported that repigmentation more than 90% can even be observed.

In this study, patients with psoriasis had complete response with 79.4%, partial 5.9% and no response 14.7%. Our finding was higher than that reported from a study done in China where the total cured was 25.6 % and 4.7% ineffective or no response (23).

Different studies reported that the NB-UVB is more effective than BB-UVB as a monotherapeutic agent in the treatment of psoriasis even in children (24,25,26,27).

According to Syed Shamsuddin et al (10) NB-UVB is safe and effective in the treatment of psoriasis. Psoriasis; twenty-three out of 28 (93.3%) patients were cleared on a mean cumulative dose of 42 J/cm2 within 41 sessions over a period of 13.6 weeks.

Conclusion

The findings of this study revealed that NB-UVB is considered the first-line phototherapeutic option for many skin conditions, but large patient series, different dosing schedules and long- term safety considerations should be carefully evaluated in the future, to determine its carcinogenic effects.

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