



Our Experience with Narrow-Band UVB for 15 Years: A Retrospective Study of 205 Patients

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Abstract

Aim: Widely used in many indications in dermatology practice, narrow-band ultraviolet B is a kind of ultraviolet with a wavelength usually condensing at 312nm. Our aim in this study is to introduce our 15-year experience with narrow-band UVB on 205 patients.

Materials and Methods: Gender, diagnosis, distribution of lesions, beginning dose, maximum dose, number of sessions, and cumulative dose of patients treated with narrow band UVB were retrospectively studied.

Results: The mean age of patients was 37,2 years. 44,4% of the patients was males, 55,6% was females. 34,1% of the patients were diagnosed with psoriasis and 14,6% of the patients with mycosis fungoides. 73,7% of distribution of lesions was diffused, 28% was central, and 26% was peripheral. The mean number of sessions was 27,1 and the mean cumulative dose was 21070 mJ/cm² in the first treatment. The mean starting dose was 125,4 mJ/cm² and the mean maximum dose was 21070 mJ/cm².

Conclusion: Differences between the means of the number of sessions, maximum doses, cumulative doses, and diseases were statistically significant.

Key Words: Mycosis Fungoides; Narrow Band UVB; Phototherapy; Psoriasis.

15 Yıllık Dar Bant UVB Deneyimi: 205 Hastanın Retrospektif İncelenmesi

Özet

Amaç: Dermatoloji pratiğinde birçok endikasyonda kullanım alanı bulan dar bant ultraviyole B, dalga boyu genellikle 312nm’de yoğunlaşmış bir ultraviyole B türüdür. Bu çalışmadaki amacımız, 205 hastamızı içeren 15 yıllık dar bant UVB deneyimimizi ortaya koymaktır.

Gereç ve Yöntem: Dar bant UVB tedavisi alan hastaların yaşı, cinsiyeti, tanısı, lezyonlarının yerleşim yeri, başlangıç dozu, maksimum dozu, seans sayısı ve toplamda aldığı doz retrospektif olarak değerlendirildi.

Bulgular: Hastaların yaş ortalaması 37,2 yıldır. Hastaların %44,4’ü erkek, %55,6’sı kadındır. Hastaların %34,1’i psoriasis ve %14,6’sı mikozis fungoides tanısı almıştır. Lezyonların %73,7’si diffüz, %28’i santral, %26’sı ise periferik yerleşim gösteriyordu. İlk tedavi periyodundaki ortalama seans sayısı 27,1, toplam doz ortalaması ise 21070 mJ/cm² idi. Başlangıç dozu ortalaması 125,4 mJ/cm², maksimum doz ortalaması 1463mJ/cm² olarak saptandı.

Sonuç: Hastalıklar ile ortalama seans sayıları, maksimum doz ve toplam doz arasındaki farklar istatistiksel olarak anlamlıydı.

Anahtar Kelimeler: Dar Bant UVB; Fototerapi; Mikozis Fungoides; Psoriasis.

INTRODUCTION

The first known phototherapy treatment in history was around the 1400s BC in India when vitiligo patients were given psoralen-containing plants and then exposed to direct sunlight. The first scientific use of the treatment took place in the 19th century (1). Niels Finsen, the first and only dermatologist to have won a Nobel Prize, used UV (ultraviolet) rays to cure various dermatological diseases in 1903. The first use of UVB (ultraviolet B), however, can be traced back to 1978 (2). These developments have been replaced by several recent studies on the effects of narrow-band UVB on various indications and the side effect profile of narrow-band UVB (1, 3, 4). While the broadband UVB wavelength is between 280 and 330 nm, narrow-band UVB is generally concentrated in the 311-312 nm wavelength. Narrowband UVB is used in the treatment of many diseases like vitiligo, psoriasis, atopic dermatitis, alopecia, mycosis fungoides, pruritus, pityriasis

lichenoides, lichen planus, and pityriasis rosea. Narrowband UVB is remarkable with its lower side-effect profile and higher treatment efficacy compared to broadband UVB (1).

There is only a very limited number of studies on narrowband UVB in Turkey. In this respect, we believe that our study is significant. Our goal is to demonstrate our 15-year narrowband UVB experience on 205 patients with various indications.

MATERIALS and METHODS

We retrospectively evaluated the records of patients who received narrowband UVB therapy between the years 2000-2014 at our phototherapy unit set in Erzurum. Throughout the narrowband UVB therapy, we used a Daavlin spectra 311/350 phototherapy equipment. Patient records included the following parameters: age, gender, diagnosis, location of lesions, initial treatment doses, maximum doses, number of

sessions, and total doses. The distribution of the lesions were classified as central (trunk and/or proximal of extremities), common (common involvement of trunk and extremities), and peripheral (involvement of only head or extremities). The treatment was performed in the supervision of a dermatologist and a nurse trained on the subject. All patients were treated through three or five sessions a week. The standard starting dose method was the reference point for initial doses for the majority of the patients. In each session, we increased the dose by 10% to 40%. All patients used UV protective glasses during the therapy. We also protected the ultraviolet-sensitive parts like nevi and lips against ultraviolet rays using zinc oxide pomades.

Most of the parameters in our study are descriptive. Statistical analysis was performed using the SSPS 18.0 software. To compare the groups, we used the independent samples t-test and $p < 0.05$ was considered statistically significant.

RESULTS

Our unit gave narrow-band UVB therapy to a total of 205 patients over a 15-year period. The average age of patients was 37.2 years (range: 4-88). 91 patients (44.4%) were males and 114 (55.6%) patients were females. The two most common indications were psoriasis and mycosis fungoides. 70 (34.1%) patients were treated for psoriasis while 30 (14.6%) patients received treatment with a diagnosis of mycosis fungoides. 19 (9.3%) patients were diagnosed with lichen planus, 15 (7.3%) with lichen simplex chronicus, 12 (5.9%) with parapsoriasis, 9 (4.4%) with vitiligo, 9 (4.4%) with plevna (pityriasis lichenoides et varioliformis acuta), and 7 (3.4%) with PLC (pityriasis lichenoides chronica). The remaining 6 patients (2.9%) received narrow-band UVB therapy for ureic pruritus while 7 (3.4%) were treated for pruritic nodularis and 5 (2.4%) for atopic dermatitis. 16 patients received treatment for rare indications. The distribution of lesions

was as follows: diffused in 73.7%, central in 28%, and peripheral in 26%. The average number of sessions in the first treatment period was 27.1 (range: 11-105). The highest mean number of sessions was 56.6 (for vitiligo patients) whereas the lowest number of sessions was 14 (for patients with contact dermatitis). The average number of sessions for patients with mycosis fungoides was 31.9; this number was 25.2 in patients with psoriasis. The mean number of sessions for vitiligo patients was considerably higher than the number of sessions for patients with mycosis fungoides and psoriasis ($p = 0.001$ and $p = 0.000$, respectively). The average starting dose was 125.4 (range: 15-300) mJ/cm² while the mean maximum dose was 1463 (range: 190-3000) mJ/cm². The average amount of the total dose administered in the first treatment period was 21070 (range: 865-185400) mJ/cm² and the average number of sessions was 27.1 (range: 11-105).

The difference between the number of sessions and the diseases was considered statistically significant ($p = 0.000$). Similarly, there was significant correlation between the diseases and the total dose administered ($p = 0.000$). Also, the difference between types of diseases and the maximum doses was statistically significant ($p = 0.005$). However, there was no statistically significant difference between the initial doses and the diseases ($P = 0.3$). 21 patients (10.2%) were given narrow-band UVB phototherapy again after the treatment. Of these patients, 11 received PUVA (psoralen and ultraviolet A) while 10 were given narrow-band UVB therapy. Of these patients who were re-admitted to the phototherapy programme, one received PUVA one more time while we also re-administered narrow-band UVB therapy for 2 patients. One of these patients was again given PUVA in the 4th treatment period. All the demographic findings and comparisons of treatment modalities according to the diagnosis are given in detail in Table 1 and Table 2, respectively.

Table 1. The demographic and clinical characteristics of the patients.

Characteristics	Percentage (%)
Mean age	37,2 (4–88) years
Sex	
Males	91 (%44,4)
Females	114 (%55,6)
Distribution of lesions	
Diffused involvement	%73,7
Central involvement	%28
Peripheral involvement	%26
Mean starting dose in the initial treatment	125,4 (15–300) mJ/cm ²
Mean maximum dose in the initial treatment	1463 (190–3000) mJ/cm ²
Mean total dose in the initial treatment	21070 (865–185400) mJ/cm ²
Mean number of sessions in the initial treatment	27,1 (11–105)

Table 2. Comparison between treatment doses according to disease types.

Diagnosis	Total number of patients	Mean number of sessions	Mean starting doses	Mean maximum doses	Mean total doses
Mycosis fungoides	30	31,9	155,0	1783,7	30204,0
Psoriasis	70	25,2	119,2	1410,5	16905,5
Lichen	19	25,6	115,9	1476,1	17639,4
Pityriasis rosea	4	15,5	137,5	1087,5	8050,0
Lichen simplex chronicus	15	23,7	120,6	1360,6	17657,6
Vitiligo	9	56,6	143,3	2222,2	78205,5
Alopecia	1	36,0	150,0	2650,0	32100,0
Neurogenic pruritus	6	20,1	116,6	1166,6	11698,3
Prurigo nodularis	7	26,2	99,2	1041,4	16021,4
Graft versus host disease	1	41,0	100,0	2100,0	44300,0
PLC	7	25,0	121,4	1229,2	15785,7
PLEVA	9	23,8	133,3	1580,0	13459,4
Parapsoriasis	12	27,5	128,7	1359,4	19612,9
Lichen amyloidosis	1	20,0	100,0	1050,0	10700,0
Atopic dermatitis	5	20,4	97,2	839,6	7356,0
Morphea	1	32,0	150,0	2550,0	27400,0
Romberg Parry syndrome	1	20,0	100,0	950,0	10700,0
Contact dermatitis	1	14,0	200,0	1300,0	10650,0
Nummular eczema	1	25,0	150,0	2000,0	16700,0
Macular amyloidosis	2	16,0	90,0	1065,0	7000,0
Dermatitis herpetiformis	1	28,0	100,0	950,0	19400,0
Dermatitis artefacta	1	23,0	50,0	580,0	12240,0
Confluent reticulate papillomatosis	1	19,0	100,0	1000,0	9650,0
Total	205	27,1	125,4	1463,1	21070,8

DISCUSSION

The mechanism behind narrow-band UVB, which is widely used in many indications in dermatology practices, is not fully understood. It has been suggested that, through pyrimidine dimers, narrow-band UVB blocks DNA synthesis, decreases the number of basal layers and proliferative cells in the epidermis, and, therefore, causes T cell apoptosis. In addition to its effects on the cell cycle, its antimicrobial effects as well as the changes it causes in the skin flora, narrow-band UVB can trigger anti-inflammatory and immunosuppressive cytokines and be influential in treating numerous diseases (3, 4). Narrow-band UVB reduces the production of natural killer cells, lymphocyte proliferation, and immunoregulatory cytokines such as IL-2, INF- γ , and IL-10 produced by Th1 and Th2 cells (5). Narrow-band UVB therapy can be used in the treatment of many diseases like vitiligo, psoriasis, atopic dermatitis, mycosis fungoides, parapsoriasis, lichen planus, pityriasis rosea, pruritus, seborrheic dermatitis, prurigo nodularis, scleroderma, and pityriasis lichenoides.

In addition to these indications, it has also been put forward that low doses of narrow-band UVB therapy given as prophylactic treatment provides desensitisation in photodermatoses such as actinic prurigo, hydroa vacciniforme, solar urticaria, and cutaneous porphyria (6). Photodermatoses were not

regarded as one of the narrow-band UVB therapy indications in our study. Prophylactic phototherapy, a controversial method of treatment, is not applied in our

clinic. Psoriasis and mycosis fungoides were the two most common indications treated with narrow-band UVB treatment in our unit and this is consistent with the literature. Another meta-analysis concerning psoriasis has stated that narrow-band UVB is found to be more effective compared to broadband UVB (7). As a result of these data in the literature, broadband UVB can not find a wide range of applications in many clinics, including our clinic. The effects of PUVA and narrow-band UVB treatment on psoriasis have been compared in several studies. Some studies have found PUVA more effective, though slightly, while some other studies have not observed any significant difference (4). Keeping in mind the side effects and psoralen use of PUVA, narrow-band UVB can be considered as the first option. Phototherapy in the treatment of psoriasis can be combined with topical treatments such as coal tar, dithranol, calcipotriol, and tazarotene (8). Many studies have found narrow-band UVB treatment to be effective in atopic dermatitis. In a prospective study on 21 patients with atopic dermatitis, it has been reported that, among patients receiving narrow-band UVB treatment, 68% have shown decrease in terms of the severity of the disease while 88% of the patients have shown decrease in the need for topical steroids (9). In our study, we provided 5 atopic dermatitis and 9 vitiligo patients with narrow-band UVB treatment. Comparing the use narrow-band UVB and PUVA in vitiligo patients, narrow-band UVB was found to be more effective along with a lower side effect profile compared to local PUVA. Therefore, narrow-band UVB is considered to be one of the first options in vitiligo treatment (10). Narrow-band UVB therapy is also effectively used in mycosis fungoides.

There is no consensus on the treatment dose but it is usually administered in 3 to 5 sessions per week. In a study conducted in Europe, 5 sessions per week has been shown to be more effective than administering 3 sessions (7). Although we often apply a treatment of 3 session per week in our clinic, we administered 5 sessions per week in 14 patients with rapid response. Treatment dosage is usually determined by two methods. In the first method, minimal erythema dose is calculated and the treatment starts with 70% of this dose and the dose is increased by 10%-40% in each session. The second method poses 280 mJ/cm² as the standard starting dose. Then, considering clinical response, this is increased by 20% in each session. In our study, we used the standard starting dose method but the average starting dose was determined to be 125.4 mJ/cm². Dogra et al. have stated that the standard starting dose is often fixed at 280 mJ/cm² (1). Compared with the literature data, our starting dose was remarkably lower. In cases with burns or painful erythema, the dose can be fixed at a certain level or the treatment may be interrupted. After side effects disappear, treatment is continued with 50% of the last dose, but there is no consensus on this subject (1). Narrow-band UVB treatment is usually well tolerated. However, it may bring about side effects like erythema, xerosis, lentiginous lesions, or and herpetic infections (11, 12). As in other types of phototherapy, narrow-band UVB is also thought to trigger long-term photo-aging and carcinogenesis. But these side effects have been reported to be rarer in narrow-band UVB than in PUVA (5). In a study conducted over a ten-year period in the follow-ups of 3000 patients, researchers have not detected increased risk of carcinogenesis; however, it is clear that more studies are needed to reach a definitive judgment in this matter (11).

Our study is one of the few retrospective studies evaluating the narrow-band UVB treatment experiences within a long period of time in Turkey. The lack of parameters like treatment effectiveness, skin types, side effect profile, development of carcinogenesis, disease severity score, and staging are some of the limitations of our study resulting from the retrospective nature of our reserach.

CONCLUSION

In line with the literature, psoriasis and mycosis fungoides were the two most common indications of narrow-band UVB in our study. The total duration of treatment was longer in vitiligo patients compared to

patients with other diseases. The difference between the diseases and the average number of sessions as well as the difference between the maximum doses and total doses were significant. It is without any doubts that there is need for prospective studies in Turkey on the standardisation of the narrow-band UVB treatment parameters prepared for the population and for research on the efficacy and side effect profile of the use of narrow-band UVB treatment. We believe that our work will provide an opinion that might help form a treatment profile for narrow-band UVB therapy in the country while it may also pave the way for more comprehensive studies.

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