

The Patient's Guide to Psoriasis Treatment. Part 1: UVB Phototherapy

Rasnik K. Singh · Kristina M. Lee · Margareth V. Jose · Mio Nakamura ·
Derya Ucmak · Benjamin Farahnik · Michael Abrouk · Tian Hao Zhu ·
Tina Bhutani · Wilson Liao

Received: May 6, 2016 / Published online: July 29, 2016
© The Author(s) 2016. This article is published with open access at Springerlink.com

ABSTRACT

Background: Psoriasis is a chronic immune-mediated disease that affects 2–3% of the world population. Ultraviolet B (UVB) phototherapy is an effective treatment for psoriasis compared to other systemic treatments. Currently there is a lack of easily accessible online patient educational material regarding this form of treatment.

Enhanced content To view enhanced content for this article go to www.medengine.com/Redeem/C9D4F0600C816B7E.

R. K. Singh (✉)
University of California–Los Angeles, David Geffen
School of Medicine at UCLA, Los Angeles, CA, USA
e-mail: Rasnik.s@gmail.com

K. M. Lee · M. V. Jose · M. Nakamura · D. Ucmak ·
T. Bhutani · W. Liao
Department of Dermatology, University of
California–San Francisco, San Francisco, CA, USA

B. Farahnik
University of Vermont College of Medicine,
Burlington, VT, USA

M. Abrouk
University of California–Irvine, School of Medicine,
Irvine, CA, USA

T. H. Zhu
University of Southern California Keck School of
Medicine, Los Angeles, CA, USA

Objective: To present a freely available online guide and video on UVB treatment that is informative to patients and increases the success and compliance of patients starting this therapy.

Methods: The UVB treatment protocol used at the University of California—San Francisco Psoriasis and Skin Treatment Center as well as available information from the literature was reviewed to design a comprehensive guide for patients receiving UVB treatment.

Results: We created a printable guide and video resource that reviews the fundamentals of UV light, UVB safety considerations, flow of treatment, side effects, and post-phototherapy skin care.

Conclusion: This guide serves as a valuable resource for patients preparing for UVB phototherapy, the clinicians who treat them, and trainees wishing to learn more about this form of therapy.

Keywords: Patient education; Phototherapy; Psoriasis; Ultraviolet B; UVB; Video guide

INTRODUCTION

Phototherapy, or light therapy, involves regularly exposing the skin to specific

wavelengths of ultraviolet (UV) light under medical supervision to treat various skin conditions. The UV light spectrum is divided into UVC (200–280 nm), UVB (280–320 nm), and UVA (320–400 nm). UVB is further subdivided into broadband (280–320 nm) and narrowband (311–313 nm) portions [1].

Dermatologists began utilizing broadband UVB (BB-UVB) for the treatment of psoriasis in the late 1970s. In the following two decades, they discovered that narrowband UVB (NB-UVB) was potentially safer and more effective, with faster skin clearance and longer-lasting remission. Furthermore, it is thought that NB-UVB encompasses “therapeutic” wavelengths that are distinct from “burning” wavelengths in the UVB spectrum [2]. NB-UVB subsequently replaced BB-UVB as a first-line treatment for psoriasis [3–7].

Common indications for NB-UVB phototherapy include psoriasis, atopic dermatitis, and vitiligo [1, 8]. Although BB-UVB is now rarely used for psoriasis, it can be effectively used for atopic dermatitis and generalized pruritus. Moreover, some patients who respond inadequately to NB-UVB may benefit from a trial of BB-UVB.

Typically, patients with moderate-to-severe psoriasis require 20–36 sessions of NB-UVB phototherapy at a frequency of three sessions per week to see a significant improvement in their skin [9]. Each phototherapy appointment usually lasts about 15 min, although some patients may require up to 30 min, if more time preparing for phototherapy is needed. A minimum of 24 h is required between each session. Additionally, physician follow-up is required every 3 months for the first year of treatment and then every 6 months thereafter. At the end of the initial phase of therapy, clearance rates are often reported to be in the

60–70% range, which is comparable to many of the systemic agents available for the treatment of moderate-to-severe psoriasis today [4, 10, 11]. After skin clearing, the frequency of phototherapy is gradually reduced to once weekly for long-term maintenance.

Initial dosing of phototherapy at the University of California–San Francisco (UCSF) Psoriasis and Skin Treatment Center is based on a patient’s Fitzpatrick skin type, for instance with skin type I starting at 130 mJ and skin type VI starting at 400 mJ. If a patient is on a concomitant photosensitizing drug at the start of treatment, the initial dose is shifted down one level to that of the preceding Fitzpatrick skin type. As treatment progresses, small incremental increases in dose are introduced as tolerated to minimize skin toxicity and total UVB exposure. The treatment goal is to maintain a mild amount of erythema for optimal results [12].

If a patient does not receive UVB phototherapy for a period of 12–20 days, the dose is decreased by at least 25% to prevent skin from burning. A 21- to 27-day break requires a 50% reduction in dose. Finally, 28 or more days off requires the patient to start the regimen again.

Patients are encouraged to consistently use topical medications as prescribed in conjunction with phototherapy to achieve the best results. This may include topical corticosteroids, topical vitamin D analogs, or topical retinoids [13–16]. Patients taking acitretin, an oral retinoid, may continue to do so; however, it is recommended that the initial phototherapy dose may be decreased by 25%. Biologic agents can be successfully combined with phototherapy for enhanced efficacy. Other systemic agents such as cyclosporine and methotrexate are not typically used in conjunction with phototherapy [17] due to a

possible increased risk of skin cancer or phototoxicity, respectively [18].

Below, we will describe the safety considerations, flow of treatment, appropriate skin care, and possible side effects of UVB phototherapy.

METHODS

We reviewed the UVB phototherapy treatment protocol used at the UCSF Psoriasis and Skin Treatment Center. We also performed a PUBMED search using “ultraviolet B” or “UVB” AND “phototherapy” to identify relevant articles to design a comprehensive guide for patients receiving UVB treatment.

This article does not involve any new studies of human or animal subjects performed by any of the authors. All photos are printed with the consent of the subject(s).

RESULTS AND DISCUSSION

Overview

Each UVB phototherapy session involves the patient as well as a care team of nurses, supporting staff, and/or doctors (Table 1). The phototherapy is delivered in a light box with

Table 1 Overview of ultraviolet B phototherapy

Typically requires 20–36 sessions
3 sessions per week
Appointments last between 15 and 30 min
Minimum 24-h interval between each session
Physician follow-up every 3 months for the first year
Physician follow-up every 6 months after the first year
Clearance rates range from 60 to 70%

adjustable energy settings, a fan, and a timer that are all controlled by a nurse. Although the light administration itself is often very brief (ranging from several seconds to a few minutes), much of the appointment consists of before-and-after precautions taken to ensure patient safety while maximizing treatment efficacy. Therefore, each appointment generally lasts about 15 min, although some patients may require up to 30 min, if more time preparing for light therapy is needed.

Safety Precautions

Patients must bring a list of all current medications, including herbs and supplements, to the first appointment for review with the phototherapy nurse (Table 2; Fig. 1). In general, patients should notify the nurse of any medication changes as they arise. For each session of phototherapy, patients must have bare skin that is free of lotions and perfumes or colognes, as these may make skin more sensitive to light. Eye protection with UVB-filtering goggles provided in the clinic is required unless there are periorbital lesions (skin involvement around the eyes) that may benefit from UVB light. In that case, closing the eyelids during irradiation will suffice, as it has

Table 2 Safety precautions for ultraviolet B phototherapy

Disclosure of all current medications, herbs, and supplements
Bare skin (no skin care products) prior to phototherapy sessions
Eye protection with clean goggles or close the eyes (Fig. 1)
Face shielding with towel
Male genital coverage with cone or towel
Safe for use in pregnancy



Fig. 1 UVB eye protection

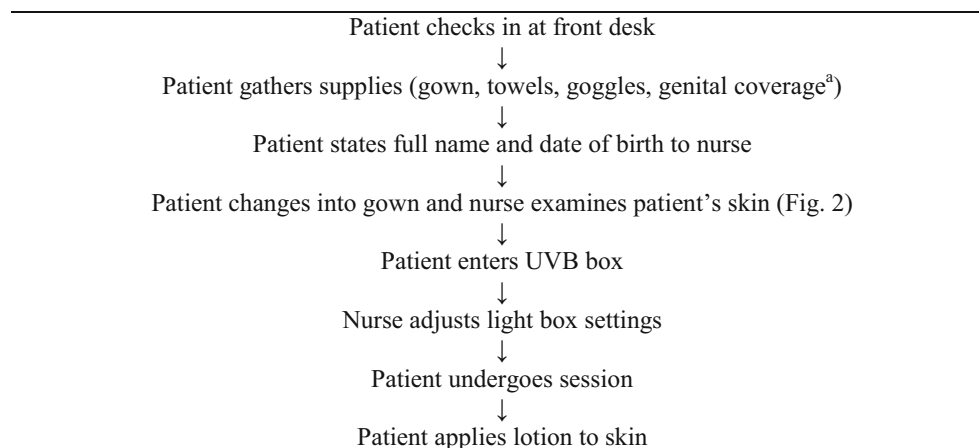
been shown that UV light does not penetrate the eyelids [19]. A towel is also generally wrapped around the face if the skin condition is not present there. Finally, genital coverage is required of all male patients unless an exception has been approved by a physician. NB-UVB is also safe for use in pregnancy [20, 21].

Flow of Treatment

At each session of phototherapy, the patient checks in at the front desk and proceeds to gather all necessary supplies, which include

clean goggles, a hospital gown, towels, and genital coverage for men (Table 3; Fig. 2). The phototherapy nurse asks the patient to state his/her full name and date of birth to ensure safety. The patient then changes into a hospital gown in a dressing room. The nurse then examines the patient's skin thoroughly to assess skin response from previous phototherapy treatments, if applicable. This helps the nurse determine if any phototherapy dose adjustment will be required for the session. Next, the patient is asked to step into the UVB box and to assume a position that ensures maximal light penetration to all affected areas. The nurse then adjusts the light settings according to the patient's needs and the session is started. UVB light is administered to the patient's skin for several seconds to minutes, depending on the dose. In some cases, the nurse may cover the patient's face and/or trunk and give additional doses to the arms and legs. This is because the arms and legs can typically withstand higher doses of light without burning, and higher doses of light may be required to treat the

Table 3 Flow of treatment for UVB phototherapy



UVB ultraviolet B

^a Genital coverage may be required for male patients



Fig. 2 Pre-phototherapy skin inspection

affected areas on the arms and legs compared to the face and trunk. In some cases in which the patient has psoriasis lesions on the lower legs, the patient may be asked to stand on a step stool to allow for a greater amount of light to reach the lower legs. After treatment, the patient steps out of the UVB box and returns to the dressing room where the nurse offers to apply lotion to hard-to-reach areas such as the back, and gives the patient extra lotion to moisturize the rest of his/her skin. Following this, the patient can get dressed and the treatment session is complete.

Post-Phototherapy Skin Care

It is important to minimize skin irritation post-phototherapy (Table 4). When bathing, patients should use a mild soap or skin cleanser. Shortening shower times and

Table 4 Post-phototherapy skin care for ultraviolet B phototherapy

Bathe with mild soap or cleanser
Shorten shower times
Limit to one shower per day
Use warm (not hot) water only
Moisturize skin twice daily ^a

^a Best time to moisturize is immediately after bathing

limiting showers to once per day is helpful. In addition, water temperature should be warm at most, but not hot. It is important for patients to moisturize their skin very thoroughly at least twice daily while receiving phototherapy. The best time to moisturize is immediately after bathing.

Side Effects

Although maintenance of a mild skin erythema is desired for optimal results, burning should be avoided (Table 5). Signs and symptoms of burning post-phototherapy include moderate-to-severe redness, tenderness, pain, tightness, itching, and rarely blistering of skin. Normally, if a burn is secondary to light treatment, it will become noticeable 4–6 h after the phototherapy session. If patients experience any of the signs or symptoms of burning, they should promptly apply a topical steroid to the affected skin in an effort to lessen and arrest the burn. Patients are also encouraged to call their phototherapy clinic for further assistance if needed.

Other possible side effects of phototherapy include photoaging and tanning [12]. No significant increased risk of skin cancer,

Table 5 Side effects of UVB phototherapy

Side effect ^a	Signs/symptoms
Burning	Redness, tenderness, pain, tightness, itching, and rarely blistering Noticeable 4–6 h after treatment
Photoaging	Coarseness, wrinkling, laxity, increased fragility, mottled pigmentation, telangiectasias, and atrophic or fibrotic areas
Tanning	Skin darkening

UVB ultraviolet B

^a Skin cancer is not a side effect of UVB phototherapy

including basal cell carcinoma, squamous cell carcinoma, and melanoma, has been seen in association with NB-UVB phototherapy regardless of the patient's skin type [7, 22–24].

CONCLUSIONS

UVB phototherapy is a safe and effective treatment option for patients with psoriasis, eczema, vitiligo, and other photo-responsive disorders. The key to success with phototherapy is consistency. To achieve optimal results, patients must commit to at least 20 sessions of treatment. With the appropriate safety and skin care precautions taken, phototherapy can help patients safely achieve rapid skin clearance and long-lasting remission. We hope this guide will be a valuable resource for patients preparing for UVB phototherapy, the clinicians who treat them, and trainees wishing to learn more about this form of therapy.

ACKNOWLEDGMENTS

We would like to thank Tim Sarmiento for producing, directing, and editing the educational video that accompanies this manuscript. We would also like to thank the amazing staff and nurses at the UCSF Psoriasis and Skin Treatment Center for inspiring and helping make the video possible. We thank Olivia Chen for her help reviewing the Spanish translation of the accompanying video. No funding or sponsorship was received for publication of this article. All named authors meet the International Committee of Medical Journal Editors (ICMJE) criteria for authorship for this manuscript, take responsibility for the integrity of the work as a whole, and have given final approval for the version to be published.

Disclosures. Wilson Liao receives funding from the NIH (R01AR065174, U01AI119125) and serves as a research investigator for Abbvie, Janssen, Pfizer, and Novartis. Tina Bhutani is an advisor for Cutanea, and conducts research for Abbvie, Janssen, and Merck. Wilson Liao and Tina Bhutani have no stocks, employment, or board memberships with any pharmaceutical company. Rasnik K. Singh, Kristina M. Lee, Margareth V. Jose, Mio Nakamura, Derya Ucmak, Benjamin Farahnik, Michael Abrouk, and Tian Hao Zhu have nothing to disclose.

Compliance with Ethics Guidelines. This article does not involve any new studies of human or animal subjects performed by any of the authors. All photos are printed with the consent of the subject(s).

Open Access. This article is distributed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits any noncommercial use, distribution, and reproduction in any medium, provided you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license, and indicate if changes were made.

REFERENCES

1. Totonchy MB, Chiu MW. UV-based therapy. *Dermatol Clin.* 2014;32:399–413.
2. Parrish JA, Jaenicke KF. Action spectrum for phototherapy of psoriasis. *J Invest Dermatol.* 1981;76:359–62.
3. Walters IB, Burack LH, Coven TR, Gilleaudeau P, Krueger JG. Suberythemogenic narrow-band UVB is markedly more effective than conventional UVB in treatment of psoriasis vulgaris. *J Am Acad Dermatol.* 1999;40:893–900.

4. Almutawa F, Alnomair N, Wang Y, Hamzavi I, Lim HW. Systematic review of UV-based therapy for psoriasis. *Am J Clin Dermatol*. 2013;14:87–109.
5. Picot E, Meunier L, Picot-Debeze MC, Peyron JL, Meynadier J. Treatment of psoriasis with a 311-nm UVB lamp. *Br J Dermatol*. 1992;127:509–12.
6. Storbeck K, Hölzle E, Schürer N, Lehmann P, Plewig G. Narrow-band UVB (311 nm) versus conventional broad-band UVB with and without dithranol in phototherapy for psoriasis. *J Am Acad Dermatol*. 1993;28:227–31.
7. Hearn RMR, Kerr AC, Rahim KF, Ferguson J, Dawe RS. Incidence of skin cancers in 3867 patients treated with narrow-band ultraviolet B phototherapy. *Br J Dermatol*. 2008;159:931–5.
8. Hofer A, Hassan AS, Legat FJ, Kerl H, Wolf P. Optimal weekly frequency of 308-nm excimer laser treatment in vitiligo patients. *Br J Dermatol*. 2005;152:981–5.
9. Lapolla W, Yentzer BA, Bagel J, Halvorson CR, Feldman SR. A review of phototherapy protocols for psoriasis treatment. *J Am Acad Dermatol*. 2011;64:936–49.
10. Gordon PM, Diffey BL, Matthews JNS, Farr PM. A randomized comparison of narrow-band TL-01 phototherapy and PUVA photochemotherapy for psoriasis. *J Am Acad Dermatol*. 1999;41:728–32.
11. Yones SS, Palmer RA, Garibaldinos TT, Hawk JLM. Randomized double-blind trial of the treatment of chronic plaque psoriasis: efficacy of psoralen-UV-A therapy vs narrowband UV-B therapy. *Arch Dermatol*. 2006;142:836–42.
12. Schneider LA, Hinrichs R, Scharffetter-Kochanek K. Phototherapy and photochemotherapy. *Clin Dermatol*. 2008;26:464–76.
13. Abel EA. Phototherapy: UVB and PUVA. *Cutis*. 1999;64:339–42.
14. Rim J-H, Choe Y-B, Youn J-I. Positive effect of using calcipotriol ointment with narrow-band ultraviolet B phototherapy in psoriatic patients. *Photodermatol Photoimmunol Photomed*. 2002;18:131–4.
15. Ramsay CA, Schwartz BE, Lowson D, Papp K, Bolduc A, Gilbert M. Calcipotriol cream combined with twice weekly broad-band UVB phototherapy: a safe, effective and UVB-sparing antipsoriatic combination treatment. The Canadian Calcipotriol and UVB Study Group. *Dermatology*. 2000;200:17–24.
16. Lowe N. Ultraviolet B phototherapy plus topical retinoid therapy. *Cutis*. 1999;39:144–8.
17. Kostovic K, Situm M, Nola I. Phototherapy (UVB) and photochemotherapy (PUVA) for psoriasis. *Acta clin Croat*. 2002;41:103–12.
18. Hadshiew I, Holzle E. Phototherapy of psoriasis. In: Honigsmann H, Jori G, Young A, editors. *Fundam. bases phototherapy*, 1st ed. Milan: OEMS; 1996. p. 117–30.
19. Prystowsky JH, Keen MS, Rabinowitz AD, Stevens AW, DeLeo VA. Present status of eyelid phototherapy. Clinical efficacy and transmittance of ultraviolet and visible radiation through human eyelids. *J Am Acad Dermatol*. 1992;26:607–13.
20. Tauscher AE, Fleischer AB, Phelps KC, Feldman SR. Psoriasis and pregnancy. *J Cutan Med Surg*. 2002;6:561–70.
21. Vun YY, Jones B, Al-Mudhaffer M, Egan C. Generalized pustular psoriasis of pregnancy treated with narrowband UVB and topical steroids. *J Am Acad Dermatol*. 2006;54:S28–30.
22. Lee E, Koo J, Berger T. UVB phototherapy and skin cancer risk: a review of the literature. *Int J Dermatol*. 2005;44:355–60.
23. Stern RS, Laird N. The carcinogenic risk of treatments for severe psoriasis. Photochemotherapy Follow-up Study. *Cancer*. 1994;73:2759–64.
24. Man I, Crombie IK, Dawe RS, Ibbotson SH, Ferguson J. The photocarcinogenic risk of narrowband UVB (TL-01) phototherapy: early follow-up data. *Br J Dermatol*. 2005;152:755–7.