


2011

Is the Use of Narrowband Ultraviolet B (NB-UVB) Phototherapy Effective Monotherapy in the Treatment of Adults with Plaque Psoriasis?

Andrea M. Cardine

Philadelphia College of Osteopathic Medicine, AndreaCa@pcom.edu

Follow this and additional works at: http://digitalcommons.pcom.edu/pa_systematic_reviews

 Part of the [Skin and Connective Tissue Diseases Commons](#), and the [Therapeutics Commons](#)

Recommended Citation

Cardine, Andrea M., "Is the Use of Narrowband Ultraviolet B (NB-UVB) Phototherapy Effective Monotherapy in the Treatment of Adults with Plaque Psoriasis?" (2011). *PCOM Physician Assistant Studies Student Scholarship*. Paper 42.

This Selective Evidence-Based Medicine Review is brought to you for free and open access by the Student Dissertations, Theses and Papers at DigitalCommons@PCOM. It has been accepted for inclusion in PCOM Physician Assistant Studies Student Scholarship by an authorized administrator of DigitalCommons@PCOM. For more information, please contact library@pcom.edu.

**Is the Use of Narrowband Ultraviolet B (NB-UVB) Phototherapy
Effective Monotherapy in the Treatment of
Adults with Plaque Psoriasis?**

Andrea M. Cardine, PA-S

A SELECTIVE EVIDENCE BASED MEDICINE REVIEW

In Partial Fulfillment of the Requirements for

The Degree of Master of Science

In

Health Sciences - Physician Assistant

Department of Physician Assistant Studies
Philadelphia College of Osteopathic Medicine
Philadelphia, Pennsylvania

December 17, 2010

ABSTRACT

OBJECTIVE: The objective of this systematic review is to determine whether or not narrowband ultraviolet B (NB-UVB) phototherapy is effective monotherapy in the treatment of adults with plaque psoriasis.

STUDY DESIGN: Review of three English language primary randomized controlled studies published in 2006 and 2009.

DATA SOURCES: Randomized, investigator-blind, active treatment-controlled trials comparing NB-UVB phototherapy to other treatment options were found using MEDLINE, OVID, and COCHRANE databases.

OUTCOME(S) MEASURED: Each of the three trials assessed improvement of the overall psoriatic lesions by the investigator and the patient based on the presence and severity of erythema, scaling, induration, itch, redness/irritation, burning sensation, height of lesion, size/area, and roughness/texture. Investigators completed a Psoriasis Area Severity Index score, Physician's Global Assessment of Clearance, and rated severity of symptoms on a scale of 0 (none) to 4 (severe). Patients completed a Dermatology Quality of Life Index, Visual Analog Scale from 0 (none) to 10 (worse ever experienced), and rated severity of symptoms on a scale of 0 (none) to 6 (severe).

RESULTS: Three randomized controlled trials were included in this review. Results from each trial indicate that NB-UVB monotherapy can successfully treat plaque psoriasis in that it provides relief of symptoms and clearance of the lesions. However, although NB-UVB was effective, each of the comparison treatments demonstrated alleviation of symptoms and treatment of lesions in a shorter period of time. In all three trials, erythema was found to be an adverse reaction.

CONCLUSIONS: Each trial portrays that NB-UVB is effective monotherapy for the treatment of plaque psoriasis. In spite of this, the efficiency of this treatment option is of question due to the findings that the comparison treatment options showed a more prompt clearance of lesions.

KEY WORDS: Psoriasis; UVB; phototherapy

INTRODUCTION

Psoriasis is a genetically inherited dermatologic condition that affects 1.5 to 2% of the world's western population, and it currently affects 7.5 million people in the United States.^{1,2} This diagnosis has multiple different presentations such as plaque psoriasis, guttate psoriasis, pustular psoriasis, inverse psoriasis, amongst others. Eighty to ninety percent of psoriasis patients have plaque-type psoriasis.¹ Plaque psoriasis specifically can cause physical and cosmetic problems for patients, which can in turn lead to a negative impact on the patient's quality of life. These patients typically present with erythematous raised patches of silvery skin which are mainly found on the extensor surfaces of the body, and can lead to long term sequelae.

Unfortunately, at the current time, there is no cure for psoriasis. It is estimated that \$11.25 billion are spent annually for psoriasis patients, and it has been reported that more than three million health care visits occur each year.^{2,3} The exact cause of psoriasis is unknown; however, at this time it has been found that there is an autoimmune component which involves an overstimulated T-cell response of the immune system, as well as increased cell turn over time of the keratinocytes.¹ Physician assistants working in primary care settings may be the first healthcare provider to recognize and educate patients on the diagnosis of plaque-type psoriasis. Gaining knowledge and being able to prescribe a patient with the best treatment options is an important role for physician assistants as the condition can be uncomfortable both physically and cosmetically for the patient.

There are multiple treatment options available for the condition. Common systemic methods include narrowband ultraviolet B (NB-UVB) phototherapy, oral psoralen-ultraviolet-A (PUVA) photochemotherapy such as 8-methoxypsoralen (8-MOP) and exposure to UVA, oral retinoids such as acitretin and isotretinoin, oral methotrexate, oral cyclosporin, and monoclonal

antibodies such as alefacept, efalizumab, infliximab, adalimumab, and etanercept.¹ Adjunctive therapy is also available for localized plaques including topical glucocorticoids, vitamin D analogues, tararotene, and topical tacrolimus/pimecrolimus.¹ The treatment options mentioned above all play an effective role in treating psoriasis. However, as with all medications, each option will have a different effect on each patient with different rates of efficacy and adverse reactions. NB-UVB phototherapy has been shown to be effective in the treatment of generalized plaque psoriasis, and will be discussed further in this review.

OBJECTIVE

The objective of this systematic review is to determine whether or not NB-UVB phototherapy is effective monotherapy in the treatment of adults with plaque psoriasis.

METHODS

Each of the three studies selected were randomized controlled clinical trials and met the following criteria. The population included patients who were greater than 18 years of age with diagnosed chronic, stable, plaque psoriasis. The intervention used consisted of NB-UVB phototherapy. This intervention was compared to a different treatment option in each of the three different studies. These comparisons included 0.1% 8-MOP cream followed within 15 minutes by NB-UVB phototherapy, 15% liquor carbonis distillate (LCD) solution plus NB-UVB phototherapy, and a 10 mg 8-MOP tablet two hours before receiving PUVA. Outcomes of each of the treatment options were determined by the improvement of the overall psoriatic lesions which were assessed by the investigator and the patient. These improvements were based on the presence and severity of erythema, scaling, induration, itch, redness/irritation, burning sensation, height of lesion, size/area, and roughness/texture.

Key words used to locate literature were psoriasis, UVB, and phototherapy. All articles were published in English, and published in peer-reviewed journals. Research for the articles was performed by the author via MEDLINE, OVID, and COCHRANE databases. Articles were selected based on relevance and that the outcomes of the studies mattered to patients (POEMs). Inclusion criteria for consideration of the study was that it was a randomized controlled trial published after 1996. Exclusion criteria included patients who were under the age of 18 years old, had recent treatment for psoriasis, or photosensitivity disorders. Statistics were reported using p-value, numbers needed to treat (NNT), relative benefit increase (RBI), and absolute benefit increase (ABI).

OUTCOMES MEASURED

Each of the three trials assessed improvement of the overall psoriatic lesions. This assessment was completed by both the investigator and the patient based on the presence and severity of erythema, scaling, induration, itch, redness/irritation, burning sensation, height of lesion, size/area, and roughness/texture of the lesions. Investigators completed a Psoriasis Area Severity Index (PSI-95) score, the Physician's Global Assessment of Clearance, and rated the severity of symptoms on a scale of 0 (none) to 4 (severe). Patients completed a Dermatology Quality of Life Index, Visual Analog Scale from 0 (none) to 10 (worse ever experienced), and rated severity of symptoms on a scale of 0 (none) to 6 (severe). Digital photographs were also taken throughout the studies to demonstrate the improvement of the lesions.

Bagel also asked patients to evaluate the comparison treatment option which was LCD. Patients graded the product on a scale of 1 (poor) to 9 (excellent). Each parameter used to determine the outcome of each study was patient-oriented evidence that matters to the patient involved.

Table 1. Demographics and characteristics of included studies.							
Study	Type	# Pts	Age (yrs)	Inclusion Criteria	Exclusion Criteria	W/D	Interventions
Amor-piny-okeit, 2006 (1)	RCT	12	18-61	Patients who were 18 years or older with stable, plaque-type psoriasis	Patients who received photo (chemo) therapy within the past 8 wks, topical treatments within the past 4 wks, are pregnant, lactating, have a hypersensitivity to psoralen, or have photosensitivity disorders	2	NB-UVB phototherapy VS. 0.1% 8-MOP cream, followed within 15 minutes by NB-UVB phototherapy
Bagel, 2009 (2)	RCT	13	25-67	Adults who were in good health apart from the diagnosis of chronic symmetrically distributed plaque psoriasis	Patients who were receiving any other treatments for psoriasis, or who had intolerance to coal tar or ultraviolet radiation.	1	NB-UVB phototherapy VS. 100 mL of 15% liquor carbonis distillate (LCD) solution applied BID to psoriatic lesions (except face, scalp, groin) plus NB-UVB phototherapy
Yones, 2006 (3)	RCT	93	18-70	Patients 18-70 years old with chronic plaque psoriasis with at least 8% body surface area involvement with a Psoriasis Area and Severity Index (PASI) score of at least 8	Patients with previous skin malignancy, recent photo(chemo)therapy or > 150 sessions in lifetime, history of or use of a drug causing photosensitivity, topical/systemic antipsoriatic treatment in the past 3 months pregnancy, lactation, or renal/hepatic disease	5	Placebo tablet 2 hours before receiving NB-UVB phototherapy VS. 10 mg 8-methoxypsoralen tablet 2 hours before receiving psoralen-ultraviolet-A (PUVA)

RESULTS

The results of each of the three trials evaluated were presented as dichotomous data in order to evaluate the improvement of the lesions with NB-UVB monotherapy.

Amornpinyokeit et al found that of the ten patients involved in the study, three patients achieved clearance of the psoriatic lesions with NB-UVB monotherapy. However, four of the ten patients experienced clearance with 8-MOP/NB-UVB combination therapy. This data demonstrates that there is a -25% RBI and a -10% ABI when comparing NB-UVB with 8-MOP/UVB combination therapy. NNT for this study was found to be -10 patients and the p-value was 0.199 (Table 2). The negative value of NNT indicates that for every ten patients who were given NB-UVB monotherapy, there would be one fewer patient who would achieve PSI-95 than if they would have been treated with the combination therapy.

Yones et al compared the treatment of NB-UVB and 8-MOP/PUVA combination in a study enrolled with eighty-eight patients. It was calculated that the RBI was -35% and the ABI was -28%. The NNT was determined to be -4 patients and neither a p-value nor confidence interval was given (Table 2). The negative value of NNT in this study indicates that for every four patients who were given UVB monotherapy, there would be one fewer patient who would have complete clearance than if they would have been treated with the combination 8-MOP/PUVA.

The study performed by Bagel determined the results of NB-UVB monotherapy versus LCD/NB-UVB combination therapy. RBI and ABI were calculated to be -14.2% and -8.3%, respectively. NNT was -13 patients and p-value was reported to be insignificant (Table 2). In this trial, the negative value of NNT indicates that for every thirteen patients who were given

UVB monotherapy, there would be one fewer patient who would have complete clearance than if they would have been treated with the combination LCD/UVB therapy.

Table 2. Analysis of efficacy and safety in the evaluation of the clearance of psoriatic lesions with NB-UVB monotherapy.				
Study	Relative benefit increase (RBI)	Absolute benefit increase (ABI)	Number needed to treat (NNT)	p-value
Amornpinyokeit, 2006	-25%	-10%	-10	0.199
Yones, 2006	-35%	-28%	-4	Not given
Bagel, 2009	-14.2%	-8.3%	-13	Insignificant

In addition to the overall evaluation of the clearance of the lesions, each of the clinical trials determined the mean number of treatment sessions the patients underwent in order to obtain PSI-95. Each of the three studies showed to have a reduced amount of sessions needed for clearance when using the comparison treatment option. As can be seen in Table 3, patients who received the 8-MOP/UVB treatment, the 8-MOP/PUVA combination therapy, or the LCD/NB-UVB treatment achieved clearance in an average of 5 sessions, 11.5 sessions, and 9 sessions, respectively, less than when treated with NB-UVB monotherapy. Therefore, although both lesions receiving treatment cleared with time regardless of the treatment option used, results showed that “the side that received the combination cleared faster than the contralateral lesions receiving the NB-UVB treatment...however, did not find that such combinations were superior to NB-UVB alone.”⁴

Furthermore, two of the three trials discussed the length of time until the patient experienced relapse of their psoriatic lesions. This data is also presented in Table 3 and

reinforces the lack of cure for plaque type psoriasis, as all patients relapsed with time regardless of treatment. In the trial conducted by Amornpinyokeit et al, all patients had relapse of lesions by twelve weeks with both the NB-UVB monotherapy and 8-MOP/NB-UVB combination therapy. Similar results were found with the comparison of the NB-UVB monotherapy versus the 8-MOP/PUVA combination. Yones et al reported “that patients treated with PUVA had significantly longer remissions, with the median time to relapse being eight months versus four months among patients being treated with NB-UVB.”⁵

Table 3. Number of treatment session until clearance of lesions and length of time until remission.		
Treatment	Number of treatment sessions until clearance	Length of time until remission
NB-UVB monotherapy vs. 8-MOP/NB-UVB	7.67 vs. 2.50	All patients relapsed by 12 weeks post-treatment
NB-UVB monotherapy vs. 8-MOP/PUVA	28.5 vs 17.0	16 weeks vs. 32 weeks
NB-UVB monotherapy vs. LCD/NB-UVB	21.0 vs 12.0	Not discussed

Lastly, adverse effects of the treatment options were discussed in each of the trials. Among the three studies, no major complications were encountered. The most common complication reported was erythema which was reported in each trial to a different degree. The information is displayed below in Table 4. All ten patients enrolled in the Amornpinyokeit et al study reported erythema with both treatment options. In the trial conducted by Yones et al, a significantly less amount of erythema was reported by those who underwent the NB-UVB therapy versus the 8-MOP/PUVA combination therapy with reported cases being 22% versus 49% respectively. The study that evaluated LCD/NB-UVB therapy was more specific in

documenting the degree of erythema. Bagel stated that “adverse reactions consisted of one report of mild and two reports of moderate post-UVB erythema, which appeared uniformly on both sides of the body.”⁶

Table 4. Adverse Effects: Erythema reported during trials		
Treatment	Reported cases of erythema	Percentage
NB-UVB monotherapy vs. 8-MOP/NB-UVB	10/10 vs. 10/10 of enrolled patients	100% vs. 100%
NB-UVB monotherapy vs. 8-MOP/PUVA	10/45 vs. 21/43 of enrolled patients	22% vs 49%
NB-UVB monotherapy vs. LCD/NB-UVB	3/12 vs 3/12 of enrolled patients	25% vs 25%

DISCUSSION

NB-UVB has been shown to be an effective treatment option for plaque-type psoriasis, as demonstrated through each of the trials discussed above. This type of phototherapy is also utilized to treat many other dermatological diagnoses. NB-UVB treatment is a readily accepted and available treatment option in the United States. Despite this, healthcare professionals may encounter problems with patient compliance due to the frequent and continuous need for phototherapy sessions, as well as its cost. Common side effects encountered while using NB-UVB are erythema, hyperpigmentation, photosensitivity, and worsening of the condition. Erythema is the most prevalent adverse reaction, and was reported to some extent in each of the clinical trials. This side effect may be avoided by beginning the treatment at a lower dosage. Contraindications for the use of NB-UVB are photosensitivity disorders, chronic phototherapy use in the past, pregnancy, lactation, and previous or current skin cancer.

Although the data presented supports the use of NB-UVB, not all of the data presented in this review is considered to be clinically significant as shown by the p-values in the studies by Amornpinyokeit et al and Bagel et al. Also, study size in these trials puts a limit on the validity of the results, with participants only adding up to a total of 110 patients for all three trials.

CONCLUSION

In conclusion, NB-UVB phototherapy is an effective monotherapy for the treatment of adults with plaque psoriasis. However, other treatment options have been presented and have also been shown to be effective for clearance of lesions and alleviation of symptoms for psoriasis patients. Therefore, an important conclusion can be made that NB-UVB phototherapy alone may be a less efficient treatment option, but it is not a less superior treatment when compared to other options available.

Future research for the use of NB-UVB phototherapy would be beneficial if the trial was exclusively for patients with the same skin types in order to focus on the most effective dosage to achieve resolution without sustaining adverse effects. Also, the future for the treatment of adults with plaque-type psoriasis includes finding a cure; therefore, research that would lengthen remission time and ultimately eliminate remission all together would provide the most benefit.

REFERENCES

- ¹ Wolff K, Johnson RA. *Fitzpatrick's Color Atlas & Synopsis of Clinical Dermatology*. 6th ed. New York, NY: The McGraw-Hill Companies; 2009: 53-71.
- ² About psoriasis: Statistics. National Psoriasis Foundation Website. <http://www.psoriasis.org/netcommunity/learn/about-psoriasis/statistics>. Accessed October 2, 2010.
- ³ Marchetti A, Feldman SR, Kimball AB, et al. Treatment for mild-to-moderate recalcitrant plaque psoriasis: Expected clinical and economic outcomes for first-line and second line care. *Dermatology Online Journal*. 2005; 11 (1): 1. <http://dermatology.cdlib.org/111/original/psoriasis/marchetti2.html>. Accessed October 2, 2010.
- ⁴ Amornpinyokeit N, Asawanonda P. 8-methoxypsoralen cream plus targeted narrowband ultraviolet B for psoriasis. *Photodermatol Photoimmunol Photomed*. 2006; 22: 285-289.
- ⁵ Yones SS, Palmer RA, Garibaldinos TT, Hawk JL. 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: 836-842.
- ⁶ Bagel J. LCD plus NB-UVB reduces time to improvement of psoriasis vs. NB-UVB alone. *J Drug Dermatol*. 2009; 8 (4): 351-357.