

## Original Article

# Efficacy and safety of narrowband ultraviolet B therapy in moderate to severe atopic dermatitis

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**Abstract** *Background* Atopic dermatitis is an inflammatory skin disorder with a chronic relapsing course. In troublesome cases of moderate and severe atopic dermatitis, phototherapy can be an effective treatment modality

*Objective* To evaluate the efficacy and safety of narrowband UVB 311nm as a monotherapy in patients with moderate to severe atopic dermatitis.

*Patients and methods* Patients suffering from moderate to severe atopic dermatitis, diagnosed according to criteria described by Hanifin and Rajka between ages of 6-70 were enrolled in the study. Severity of the disease was assessed by using SCORAD score. UVB irradiation was done thrice a week on alternate days. Efficacy was assessed every two weeks by reduction in modified SCORAD score.

*Results* The mean cumulative dose of 25.91 J/cm<sup>2</sup> UVB at a wavelength of 311nm was given in a mean of duration 5.2 weeks treatment. Therapy reduced the atopic dermatitis scores from mean 32.2 (range 20.2-45.5) to 14.2 range (6.2-12.4).

*Conclusion* We conclude that narrowband UVB appears to be a promising treatment for AD, but large patient series, different dosing schedules and long- term safety considerations should be carefully evaluated in the future

**Key words**

Atopic dermatitis, narrowband UVB.

## Introduction

Atopic dermatitis is an inflammatory skin disorder with a chronic relapsing course. This disease results from an interaction between susceptibility genes, the host's environment, skin barrier defects, and immunological factors.<sup>1</sup> Conventional therapy of atopic dermatitis

includes treatment of acute exacerbation with topical corticosteroids as well as systemic immunosuppressants, along with avoidance of triggering factors. As these treatment modalities can be associated with severe cutaneous and systemic side effects, recently phototherapy has been used to treat atopic dermatitis which has immunomodulatory effect.<sup>2</sup>

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In troublesome cases of severe atopic dermatitis, phototherapy can be effective treatment modality but no sufficient data exist on therapeutic efficacy and safety in our population.

This prompted us to conduct this study to evaluate the clinical effects of narrowband ultraviolet B (UVB) therapy in patients with atopic dermatitis.

### **Patients and methods**

This study was carried out jointly in the Skin Clinic, Lahore and Skin Glow Center, Quetta. All patients suffering from moderate to severe atopic dermatitis, diagnosed according to criteria by Hanifin and Rajka between ages of 6-70 were enrolled in the study. Severity of the disease was assessed by using SCORAD score that was developed in 1993 by the European task standardized assessment methods for atopic dermatitis. Exclusion criteria included local treatment with corticosteroids or other medical topical agents within the last 2 weeks or systemic treatment with antibiotics, corticosteroids or oral immunosuppressive drugs within the last 4 weeks. The scoring index combines the extent (rule of 9) and severity of 5 intensity items (erythema, edema/papules, oozing/crust, excoriation, and lichenification) and subjective symptoms (daytime pruritus, sleep loss). Efficacy was assessed every two weeks by reduction in modified SCORAD score.

Narrowband UVB irradiation was done thrice a week on alternate days. Depending on the minimal erythema dose (MED) of skin type the patients were irradiated using all the protective measures. Doses were gradually increased according to the standard protocol and no additional systemic or topical treatment except emollient ointment was permitted.

### **Results**

There were total 16 patients with 6 males and 10 females their age range was 7 to 63 years. Results of the study showed that the mean

cumulative dose of 25.91 J/cm<sup>2</sup> UVB at a wavelength of 311nm was given in a mean duration of 5.2 weeks treatment. Therapy reduced the atopic dermatitis scores from mean 32.2 (range 20.2-45.5) to 14.2 range (6.2-12.4).

Mild erythema was seen in one third of the patients which resolved after few hours. Burning erythema was seen in 11% patients and required topical steroid application to resolve.

### **Discussion**

Our study confirmed the efficacy of narrowband UVB in the treatment of moderate to severe atopic dermatitis. These results are supported by variety of studies which have been done in the past and shown to have beneficial effects. Reynolds studied his patients for 24 weeks with a mean dose of 24.8J/cm<sup>2</sup> and at the end of the treatment mean reduction in total disease activity was 90.4%. As the patients were allowed to use moderate to potent topical steroids so it was difficult to draw a conclusion on the efficacy of narrowband UVB.<sup>3</sup> Derpetrossian *et al.*<sup>4</sup> gave their patients narrowband UVB thrice a week for six weeks with the mean dose of 14J/cm<sup>2</sup>. No other treatment was allowed to be used except for emollients. The mean baseline skin score decreased by 64.1%.<sup>4</sup> Moreover, Legat *et al.*<sup>9</sup> studied 9 patients with chronic atopic dermatitis with narrowband UVB. Clinical scoring and patient self evaluation demonstrated a greater therapeutic efficacy for NB UVB and score reduced by 40%.<sup>5</sup> Similar positive results were shown by Grundmann-Kollmann *et al.* who performed narrowband UVB on 5 patients with moderate to severe atopic dermatitis. A complete remission was seen in their patients after a mean 19 irradiation and no relapse was seen during an 8 weeks follow-up period.<sup>6</sup>

Phototherapy is thought to improve AD by immunosuppressive action.<sup>7,8</sup> The main mechanisms by which phototherapy induces immunosuppression include the induction of apoptosis (cell death) in infiltrating T cells, induction of immunomodulatory cytokines, and reduction in the number of Langerhans cells. The effect of phototherapy on regulatory T cells (Tregs) in human beings has not been studied so far.

Majoie *et al.*<sup>9</sup> did immunohistochemical studies on the skin biopsy specimens at the same locations before and after the therapy and they demonstrated marked reduction in the number of T cells, dendritic cells, and neutrophils in the epidermis. Similarly dermis also showed decrease in T-cells and neutrophils.<sup>9</sup> No change was observed in the number of epidermal eosinophils. Moreover, Silva *et al.*<sup>10</sup> evaluated cutaneous microbial population and exotoxin production before and after phototherapy and concluded that UVB phototherapy beneficial effects in AD may be attributable not only to reduction of skin surface bacteria but also to the suppression of superantigen production from *Staphylococcus aureus*.<sup>1</sup>

As regards the side effect profile, the treatment was well tolerated by the patients. Mild erythema was seen in one third of the patients which resolved after few hours. Burning erythema was seen in 11% patients and required topical steroid application to resolve. To date long term side effects of narrowband UVB in human are still unknown so the elevated risk of skin cancer should be evaluated through long term follow-up studies.

## Conclusion

We conclude that narrowband UVB appears to be a promising treatment for AD, but large

patient series, different dosing schedules and long-term safety considerations should be carefully evaluated in the future.

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