10.5005/jp-journals-10050-10071

ORIGINAL ARTICLE

Role of Narrow-band Ultraviolet B Phototherapy with Topical Tacrolimus 0.03% for Treatment of Childhood Vitiligo

[1]Ambika Dixit, [2]Prerna Yadav, [3]Praveen K Rathore, [4]Sapna Goyal

ABSTRACT

Vitiligo in children is a challenging disease to treat, as fewer safe options are available compared with the adult population. The combination of topical tacrolimus (0.03%) with narrow-band ultraviolet B (NBUVB) phototherapy is a safer option and hence we decided to explore this in our study. The extent of repigmentation was assessed at baseline, 12 weeks, and 24 weeks by photographic documentation. We observed that out of 16 patients, 3 (18.75%) had <25% repigmentation, 7 (43.75%) had 25 to 75% repigmentation, and 6 (37.5%) achieved >75% repigmentation. Combined therapy with topical tacrolimus and NBUVB phototherapy is an excellent and safe modality in childhood vitiligo.

Keywords: Childhood vitiligo, Narrow-band ultraviolet B, Tacrolimus.

How to cite this article: Dixit A, Yadav P, Rathore PK, Goyal S. Role of Narrow-band Ultraviolet B Phototherapy with Topical Tacrolimus 0.03% for Treatment of Childhood Vitiligo. Int J Adv Integ Med Sci 2017;2(1):37-39.

Source of support: Nil

Conflict of interest: None

INTRODUCTION

Vitiligo is an acquired condition of depigmentation resulting from progressive loss of melanocytes.[1] It can begin at any age, but in the majority of cases it becomes apparent between the age of 20 and 30 years.[1] Children affected with vitiligo suffer from psychological trauma with a profound effect on their quality of life.[2] There are various treatment modalities available for the adult population. However, fewer safe options are available in pediatric population. Narrow-band ultraviolet B (NBUVB) radiation is a safe treatment modality, i.e., often used two to three times weekly as monotherapy or in combination with other drugs. An alteration of immune surveillance has been proposed as a primary event resulting in dysfunction and destruction of melanocytes.[3] Topical tacrolimus inhibits expression of several inflammatory T-cell cytokines. Our study aims to evaluate the synergistic effect of topical tacrolimus 0.03% and NBUVB therapy in childhood vitiligo.

[1]Junior Resident (2nd Year), [2]Junior Resident (1st Year) [3,4]Professor

[1-4]Department of Dermatology, Venereology and Leprosy Rohilkhand Medical College & Hospital, Bareilly, Uttar Pradesh India

Corresponding Author: Prerna Yadav, Junior Resident (1st year), Department of Dermatology, Venereology and Leprosy Rohilkhand Medical College & Hospital, Bareilly, Uttar Pradesh, India, e-mail: dr.prernayadav25@gmail.com

AIM

This study aims to evaluate the role of NBUVB phototherapy with topical tacrolimus 0.03% for the treatment of childhood vitiligo.

MATERIALS AND METHODS

This was an open, prospective, nonrandomized study carried out in the outpatient department of Dermatology, Venereology, and Leprosy, Rohilkhand Medical College & Hospital, Bareilly, India. Totally 16 children (10 females, 6 males) with vitiligo between the age group of 5 and 14 years were included (Table 1). Children with any photosensitizing disorder, premalignant lesion, dysplastic nevi, and claustrophobia were excluded from this study. Written consent was taken from parents. Relevant history and complete general and cutaneous examination were done. The parents and children were shown the phototherapy unit and were briefed about the procedure, advantages, safety, and limitations. The children were instructed to apply tacrolimus 0.03% ointment over the vitiliginous lesions in the evening. Concomitant NBUVB was given twice weekly on nonconsecutive days. The starting dose given was 150 mJ/cm^2 with an increment dose by 10% at each visit. The patients were advised to apply sunscreen throughout the day. Photographic documentation was done at baseline, 12, and 24 weeks. The response was graded as group I: <25% repigmentation, group II: 25 to 75% repigmentation, and group III: >75% repigmentation.[4]

Table 1: Duration of vitiligo

Duration of vitiligo	*Males*	*Females*
<6 months	0	2
6 months–2 years	1	2
2–5 years	4	4
>5 years	1	2

Equipment used: Whole body, 24 tubes, Phillips TL 01/100 W fluorescent lamp, 6-feet chamber.

RESULTS

Out of 16 patients, 3 (18.75%) had <25% repigmentation, 7 (43.75%) had 25 to 75% repigmentation, and 6 (37.5%) achieved >75% repigmentation (Table 2, Figs 1 to 3). The response to therapy was noted more over the lesions involving trunk and limbs than those on face, hands, and feet. Follicular and peripheral type of repigmentation was observed in the patients. The repigmented color was found to be similar to the surrounding normal skin.

Table 2: Response to NBUVB therapy with tacrolimus 0.03%

Groups	*Number of responders*
I (<25% repigmentation)	3
II (25–75% repigmentation)	7
III (>75% repigmentation)	6

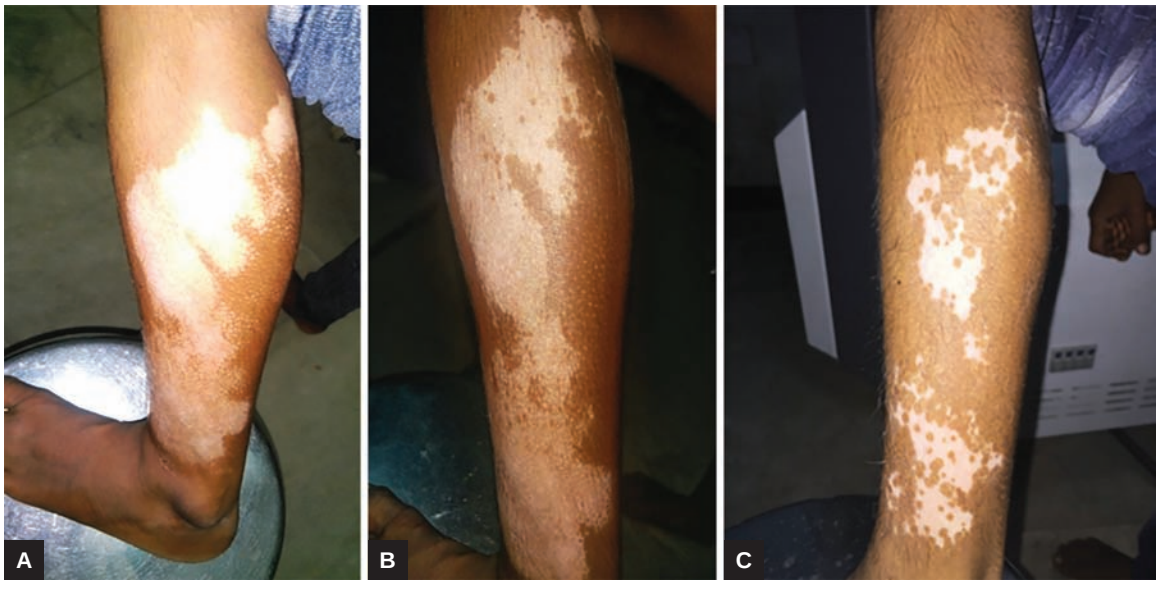
All patients were compliant and good tolerability was observed. Minimal side effects were observed and hence, permanent discontinuation of therapy was not done.

Only 1 (6.25%) patient developed burning sensation followed by pruritus after irradiation with NBUVB. This was resolved by topical application of emollient and tapering the irradiation dose.

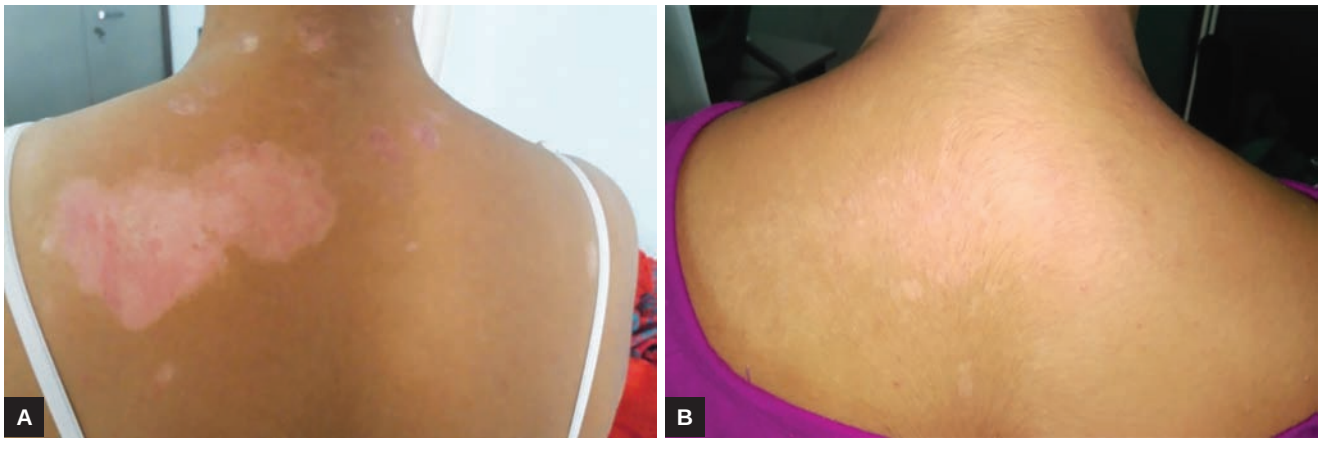
DISCUSSION

Vitiligo in pediatric age group is a challenging condition to treat as most of the treatment modalities available for adult population have serious side effects.

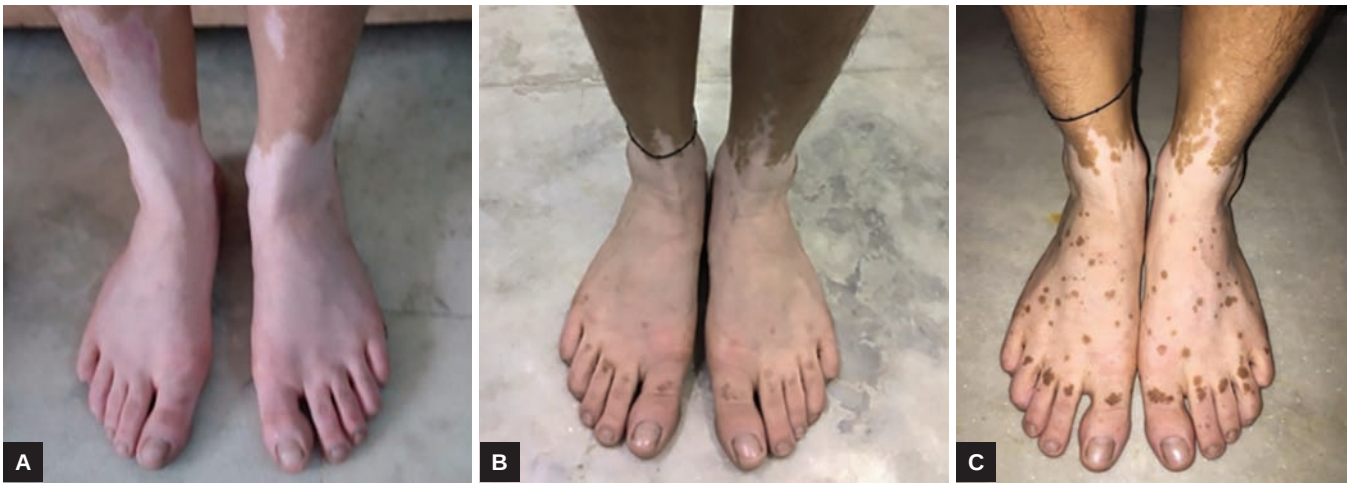
Narrow-band ultraviolet B with the emission spectrum of 311–312 nm is a safe modality in children and has minimal side effects. It remains a gold standard in the treatment of vitiligo. It acts on epidermal pigment cells.[5] Narrow-band ultraviolet B is shown to directly stimulate hair follicle-derived neural crest stem cells to differentiate into melanocyte lineage.[5] It enhances the mobility of



Figs 1A to C: Response at 0, 12, 24 weeks respectively.



Figs 2A and B: Responses at 0 and 24 weeks respectively



Figs 3A to C Repigmentation at 0, 12, and 24 weeks respectively

NCCmelan5 cells via upregulation of pp125FAK (protein) as well as increased melanin formation and also tyrosinase expression.[5]

Tacrolimus is a topical immunomodulator and inhibits calcineurin action, thereby preventing T-cell activation and production of various inflammatory cytokines. Topical tacrolimus downregulates proinflammatory cytokines, namely interleukin (IL)-2, IL-3, IL-4, IL-5, interferon gamma, tumor necrosis factor alpha and granulocyte-stimulating factor.[6] Topical tacrolimus is safe and has no serious adverse effects. Tacrolimus has an added advantage over corticosteroids as it can be used for prolonged period of time without much adverse effects.

Dayal et al[7] performed an open label study on 20 children, 4 to 14 years of age group, with symmetrical vitiligo lesions over 24 weeks to assess the efficacy of the synergistic combination of tacrolimus 0.03% ointment with NBUVB phototherapy. They found a statistically significant difference in the mean percentage of repigmentation at 4 and 6 months between combination therapy and NBUVB monotherapy.

Our study showed appreciable improvement over the vitiliginous lesions in children with good compliance and cumulative dose. The response started appearing as appreciable erythema after the first two to three doses in most children. The first repigmented lesion usually appeared around 3 weeks of starting the therapy. The repigmentation observed matched well with the color of the surrounding skin. Acral sites and face showed <25% repigmentation in contrast to lesions on trunk and limbs.

Our study has a limitation of being an open label nonrandomized model. There is a paucity of literature available for the concomitant use of NBUVB with topical tacrolimus in pediatric cases of vitiligo. Hence, it needs to be studied in detail.

CONCLUSION

Our study concludes that the combination of NBUVB phototherapy with topical tacrolimus 0.03% is a safe and highly effective treatment modality for childhood vitiligo, wherein the treatment options are very limited.

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