Combination of Topical Tacrolimus, Antioxidants, and Probiotics in the Treatment of Periorbital Vitiligo

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Abstract

Vitiligo is a chronic depigmenting skin disease with a major impact on quality of life, especially in young patients. The disease is autoimmune in nature, and the mainstay of treatment is based on immunosuppression with or without phototherapy. The roles of oxidative stress and dysbiosis have been established in the pathogenesis as well. In this report, we present a case of a 13-year-old male with new-onset periorbital vitiligo. A combination of topical tacrolimus plus an antioxidative and probiotic regimen could reach a complete repigmentation after 6 weeks. To date, no relapse has been noted after 52 weeks. The time to achieve repigmentation in this case was relatively lower compared to studies on tacrolimus monotherapy, which is the current first-line recommendation for facial vitiligo (although not officially approved). This report could highlight the potential of adjuvant therapy with antioxidants and probiotics to achieve an earlier, effective, and sustained response.

Introduction

Vitiligo is a depigmenting skin disease of chronic nature, affecting 0.5% to 1% of the general population [1]. The disease has a major impact on quality of life, especially when presenting on visible areas and at a young age [2,3]. Suggested pathogenesis of vitiligo includes autoimmune, biochemical, and neural theories [4,5]. The main characteristic of the disease is the loss of epidermal melanocytes [1]. The underlying mechanism involves environmental and genetic factors, leading to infiltration of the skin by CD8+ T lymphocytes, which in turn produce elevated levels of TNF-α and IFN-γ [1,6]. Currently, there is no approved treatment for vitiligo, and limited off-label options are mainly based on immunosuppression and phototherapy [1,4]. Topical corticosteroids have shown good repigmentation rates; however, their chronic use is limited due to the risk of skin atrophy, striae, and telangiectasia [7]. Especially, on lesions of the face, neck, and intertriginous areas and lesions in children, non-steroidal agents are highly preferred [8]. Topical Calcineurin Inhibitors (TCIs) such as Tacrolimus have shown good efficacy and better side effect profile, and are the recommended first-line for face and neck vitiligo lesions [8]. Antioxidants, in conjunction with other treatments, have been shown to be effective and increase the repigmentation rate in a few studies [8,10]. Additionally, the use of probiotics has been suggested for vitiligo recently. There is evidence that microbiome changes play a role in vitiligo pathogenesis, by affecting immune homeostasis, oxidative stress, skin barrier, and even gene expression [11].

In this report, we present a case of facial vitiligo who was treated with a novel combination of topical tacrolimus, antioxidants, and probiotics and reached complete repigmentation after 6 weeks, with no relapse after 52 weeks to date.

Case Presentation

The patient is a 13-year-old male, with no specific past medical history and no history of autoimmune diseases in the family, who presented after noticing a hypopigmented area of 3 mm x 8 mm on his right upper eyelid (Figure 1). The patient and the family were in severe distress, and especially concerned about the effect of this condition on the patient’s quality of life and social interactions. The diagnosis of vitiligo was confirmed clinically by a dermatologist.

A combination of topical tacrolimus 0.1% once a day, an over the counter antioxidant cocktail containing vitamin A 14320 IU, vitamin C 226 mg, vitamin E 200 IU, Zinc 34.8 mg, and copper 0.8 mg once a day, and an over the counter probiotic cocktail containing calcium 140 mg and Bacillus...
Lesion reached complete repigmentation after 6 weeks of treatment. In a study on monotherapy with Tacrolimus 0.1% showed a complete response, respectively [4]. Another study with 8 and 16 weeks were required to gain some degree of repigmentation and complete response, respectively [4]. Another study on monotherapy with Tacrolimus 0.1% showed a complete repigmentation rate of up to 75% after 24 weeks, with 40% relapse in a study on monotherapy with Tacrolimus 0.1% showed a complete response, respectively [4]. Another study on monotherapy with Tacrolimus 0.1% showed a complete response, respectively [4].

The role of oxidative stress in vitiligo has been established in many studies [16,17]. This oxidative stress exerts a pro-inflammatory effect and induces melanocyte damage [16]. Deregulations in oxidative metabolism most notably include elevated superoxide dismutase, decreased catalase, and increased lipid peroxidation [16]. Using Antioxidants as an adjuvant with other treatments has been shown to increase the repigmentation rate [8,10,17]. Specifically, it was shown that when combined with Narrowband Ultraviolet B light therapy (NB-UVB), they can increase the repigmentation rate up to 75%, compared to 18% in the control group [18]. Recent studies highlighted the importance of dysregulations in the skin and gut microbiome in vitiligo patients. There is an association between dysbiosis, mitochondrial damage, and immunity in vitiligo [19]. The mitochondrial alterations in vitiligo lead to increased production of oxygen species, increasing oxidative damage [20]. Dysbiosis is also associated with an increase in cytokine production, including IFN-γ [19].

Based on these, a combination of Tacrolimus (the first-line treatment option for facial vitiligo) along with an antioxidative and probiotic regimen as an adjuvant could provide a scientifically reasonable treatment regimen. In this report, we presented a case who was treated with this regimen and reached complete repigmentation in a relatively short period of 6 weeks, and no relapse has been noted up to 52 weeks to date. This report could highlight the potential of adjuvant therapy with antioxidants and probiotics to achieve an earlier, effective, and sustained response. Nevertheless, a broader investigation with a greater sample size is required to accurately comment on the efficacy of this regimen.

**References**


