

Use of the 532-nm Q-switched neodymium-doped yttrium aluminum garnet laser for the treatment of recalcitrant repigmentation in vitiligo



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INTRODUCTION

Vitiligo is a disorder characterized by the development of depigmented patches and macules. Patients with extensive involvement may opt for complete depigmentation using monobenzyl ether of hydroquinone (MBEH).¹ However, after depigmentation, a subset of patients note repigmentation that is significantly darker than their original skin tone and is resistant to treatment with MBEH.² Here we present a vitiligo patient who had recalcitrant repigmentation after depigmentation with MBEH, which was responsive to treatment with the 532-nm Q-switched neodymium-doped yttrium aluminum garnet (QS Nd:Yag) laser.

CASE REPORT

A 63-year-old South Asian man with a medical history of progressive generalized vitiligo for the last 10 years presented with depigmentation of more than 60% of his body surface area. Previous treatments to induce repigmentation, including topical corticosteroids and narrowband ultraviolet B phototherapy, were unsuccessful. A depigmentation protocol using 20% MBEH was initiated, leading to almost complete depigmentation. However, the following year, hyperpigmented macules developed on the left cheek that were significantly darker than his original skin tone. Hyperpigmentation then developed on his forehead, right cheek, axilla, groin,

Abbreviations used:

MBEH:	Monobenzyl ether of hydroquinone
QS Nd:Yag:	Q-switched neodymium-doped yttrium aluminum garnet

and feet. MBEH was discontinued briefly, and then reinitiated at a higher concentration of 30%. Despite this adjustment, the hyperpigmented macules and patches continued to develop. The hyperpigmentation was not associated with any textural changes or mucosal involvement, and the patient had not started any new medications. In light of the worsening hyperpigmentation, punch biopsy was performed at 2 locations of hyperpigmentation to rule out ochronosis or other pigmentary abnormalities. The results showed pigment progressing to areas of vitiligo, which was consistent with spontaneous repigmentation.

Because of the recalcitrant nature of the hyperpigmentation, another course of MBEH was not prescribed. Instead, the patient was treated with 2 sessions of the 532-nm QS Nd:Yag laser to hyperpigmented areas on the face and ears. Laser settings were as follows: a fluence of 3.4 to 3.5 J/cm², a frequency of 5, and a spot size of 4. The intermediate endpoint was immediate whitening of the skin. At baseline, the patient had hyperpigmented patches covering approximately 40% of his face, mainly

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Fig 1. Recalcitrant hyperpigmented macules resistant to treatment with MBEH at baseline involving approximately 40% of the face.



Fig 2. Face 15 weeks after the first session of the 532-nm QS Nd:Yag laser shows improvement in hyperpigmentation with 10% facial involvement.

involving the bilateral temples, upper-mid cheeks, and periorbital regions (Fig 1). Ten weeks after the first session with the 532-nm QS Nd:Yag laser, the patient had some improvement in hyperpigmentation, with approximately 10% of the face being affected (Fig 2). He received a second treatment with the 532-nm QS Nd:Yag laser 15 weeks after the first treatment. Six weeks after the second session, slight improvement was noted, with hyperpigmentation present on approximately 5% of the face. On follow-up 6 and a half months after the first laser treatment and 3 months after the second laser treatment, hyperpigmented macules and patches were present on less than 1% of the face (Fig 3).

The patient was prescribed 30% MBEH for maintenance daily along with counseling on rigorous



Fig 3. Face after 2 sessions with the 532-nm QS Nd:Yag shows improvement in hyperpigmentation with less than 1% facial involvement.

photoprotection. The patient tolerated both sessions well and did not report any adverse events.

DISCUSSION

MBEH is the current standard of treatment for vitiligo patients who desire to undergo depigmentation. However, a small subset of patients develop darker repigmentation that is recalcitrant to therapy with MBEH. In these cases, use of the 532-nm QS Nd:Yag laser is a viable treatment option to achieve depigmentation.³ The mechanism by which the 532-nm QS Nd:Yag laser treats recalcitrant hyperpigmentation in vitiligo is two-fold; the laser targets and destroys epidermal melanin and also initiates an inflammatory process, which leads to reactivation of vitiligo and subsequent depigmentation. Other lasers can also be used as long as they emit a wavelength that targets melanin in a nanosecond pulse width. This includes the QS ruby and QS alexandrite lasers. Multiple treatments may be required for complete clearing of pigmentation and should be spaced 3 to 4 months apart to allow for maximal treatment response. Adjunct therapies, such as strict photoprotection and MBEH, can be used to improve treatment response.^{1,4} Although no reported cases of exogenous ochronosis secondary to MBEH, which is a hydroquinone derivative, exist, it is still important to differentiate it from spontaneous repigmentation based on clinical presentation and histology. Exogenous ochronosis, which involves the accumulation of homogentisic acid caused by excessive hydroquinone use,

presents as blue-gray discoloration of the skin with characteristic pinpoint, caviarlike papules in photo-exposed areas.⁵ On histology, comma or banana-shaped ochronotic collagen bundles are present, which are not seen with repigmentation.⁶ Spontaneous dark repigmentation refractory to MBEH occurs rarely in people with vitiligo, but it can be extremely psychologically distressing. However, depigmentation can be induced safely and effectively with the 532-nm QS Nd:Yag, ultimately improving the quality of life in patients with vitiligo.

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