Postinflammatory Hyperpigmentation Secondary to Acupuncture and Cupping Successfully treated with 1,064-nm Picosecond-Domain Neodymium:Yttrium-Aluminum-Garnet Laser

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Postinflammatory hyperpigmentation (PIH) is a reactive hypermelanosis of the skin that occurs as a result of variable inflammatory processes, such as trauma, and many inflammatory conditions. Although a range of modalities of managing PIH have been reported, the treatment of PIH is challenging. In this report, a patient with PIH was treated using picosecond-domain Nd:YAG lasers. After three sessions of 1,064-nm picosecond-domain Nd:YAG laser treatment, the patient showed almost complete improvement with no remarkable side effects or recurrence over the duration of six months. Overall, 1,064-nm picosecond-domain Nd:YAG laser can be used effectively and safely for treating pigmented lesions in the dermis, particularly PIH, in Asian patients.

Key words

Postinflammatory hyperpigmentation; Picosecond-domain Nd:YAG laser; Acupuncture and cupping

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INTRODUCTION

Postinflammatory hyperpigmentation (PIH) is a reactive hypermelanosis of the skin due to variable inflammatory processes, such as trauma, and many inflammatory conditions with acne, eczema, drug reactions, burns, chemical peelings, and laser applications.^{1,2} PIH appears as macules or patches with variable size and distribution without symptom depending on the causative pathology. PIH can also occurred in artificial trauma with acupuncture and/or cupping which procedures are frequently performed in oriental medicine.³ The skin with PIH has excess melanin production or an abnormal distribution of melanin pigment deposited in the epidermis and/or dermis.^{1,2}

There are several modalities of treatment of PIH with medications and procedures including topical application of hydroquinone, azelaic acid, kojic acid, retinoids, vitamin C, chemical peels, laser therapy, and sunscreens.⁴ Among various treatment modalities for PIH, nanosecond-domain lasers have been most widely utilized including Q-switched ruby laser, the low-dose Q-switched neodymium-doped yttrium aluminum garnet (Nd:YAG) laser, and the fractional 1550 nm erbium-doped fiber laser.^{5,6} However, there is a few published report of therapeutic

efficacy of picosecond-domain lasers in PIH.

Herein, we report an additional case of PIH using 1,064-nm picosecond-domain Nd:YAG lasers. After monthly three sessions of 1,064-nm picosecond-domain Nd:YAG laser treatment, the patient presented nearly complete improvement in the PIH lesions with no remarkable side effects nor recurrence over the duration of 6 months.

CASE REPORT

A 36-year-old, Korean man visited our clinic with 3 month-duration of multiple 5x5 cm-sized dark brownish round patches on the back and both legs which showed the features of PIH. The patient mentioned that the skin lesions occurred after acupuncture and cupping on the back and both legs (Fig. 1). The patient presented no remarkable treatment history for pigmentation within the last three months. The patient was clinically diagnosed with PIH (Fig. 1 A and 1C) and was scheduled to undergo laser treatment. After obtaining written informed consent, the patient was treated with monthly 3 sessions of 1,064-nm picosecond domain Nd:YAG laser treatment (PICO-WAY; Candela Corp., Wayland, MA, USA) was performed at the treatment settings of a 4 mm spot size, a 1.2 J/cm² fluence with 10 Hz without topical anesthesia, and fin-

Fig. 1. Photographs of a 36-year-old, Korean male with postinflammatory hyperpigmentation (PIH) (A, C) at baseline, (B, D) after monthly 3 sessions of 1,064-nm picosecond-domain neodymium:yttrium-aluminum-garnet (Nd:YAG) laser treatment (3 months after baseline).

ished each session of treatment when petechiae occurred slightly (Approximately 1-2 passes per each session). The treated areas were cooled with icepacks, and no prophylactic systemic corticosteroids were prescribed. Topical corticosteroids were prescribed due to prevention of erythema after laser therapy. The patient was recommended to apply sunscreen. At 12 weeks after the first treatment of 1,064-nm picosecond-domain Nd:YAG laser treatment, the patient presented nearly complete improvement of the PIH lesions without worsening or recurrence (Fig. 1B and 1D).

DISCUSSION

Pigmentation disorders occurring after mechanical trauma or cosmetic procedures are always a concern, especially in Asians.⁶ Although some cases of PIH are self-limiting, certain patients with PIH are needed to treat with several therapeutic ways including bleaching creams, several kinds of Q-switched lasers, erbium-doped fractional photothermolysis system which has variable therapeutic outcomes. There are few reports regarding the efficacy of different laser systems including fractional CO₂ laser and low-energy Q-switched Nd:YAG laser with nanosecond-domain in the treatment of PIH.^{2,6} A 1064-nm Q-switched Nd:YAG with low fluence therapy is easily applicable and the therapeutic trial was revealed to have minimal downtime without post-therapy bleeding or crust formation, and the post-therapy erythema spontaneously resolved within a few hours.

PIH shows hyperpigmentation due to hypermelanosis composed with melanin pigments, which are similar with tattoo pigmentations. In recent studies, picosecond-domain lasers are more efficacious in removing pigment in the form of tattoos with lower risk of side effects than nanosecond-domain lasers.⁷ Smaller size of particles among target chromophores after consecutive treatment would be better responsive to subsequent picosecond-domain laser treatment than nanosecond domain laser treatment.⁸ Recently, Lee et al.⁹ reported a case of PIH treated with picosecond-domain Nd:YAG laser. The authors performed weekly 5 sessions of treatments with nearly complete response. In this report, we also demonstrated near-complete clinical improvement in pigmented lesions after monthly 3 sessions of treatments with 1,064 nm picosecond-domain Nd:YAG lasers in a Korean patient with PIH. Along with previous report of Lee et al.⁹, the laser pulses at the picosecond-pulse duration were seemed to effectively destroy target chromophores. Although further studies are needed to clarify the effective

therapeutic doses and duration of 1,064 nm picosecond-domain Nd:YAG lasers, as well as the possibility of spontaneous remission, we showed that the picosecond-domain laser treatments might be an effective therapeutic option of the treatment on PIH.

The authors suggest that 1,064-nm picosecond-domain Nd:YAG lasers could be effectively and safely used for managing pigmented lesions in the skin, particularly PIH, in Asian patients. Further prospective, controlled investigations are needed to be followed to compare the efficacy and safety of nanosecond- and picosecond-domain lasers and to optimize the treatment settings for PIH.

CONFLICT OF INTEREST

The authors declare no conflicts of interest.

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