

Postinflammatory Hyperpigmentation 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 occurring as a result of variable inflammatory processes, such as trauma, and inflammatory dermatosis. Although topical agents are the first-line treatment of PIH, treatment of PIH remains challenging. In this report, we treated a patient with PIH using picosecond-domain Nd:YAG lasers. After five sessions of 1,064-nm picosecond-domain Nd:YAG laser treatment, the patient presented nearly complete improvement, with no remarkable side effects or recurrence for the duration of 6 months. We suggest that 1,064-nm picosecond-domain Nd:YAG laser can be effectively and safely used to treat pigmented lesions in the dermis, particularly PIH, in Asian patients.

Key words

Post-inflammatory hyperpigmentation; Picosecond; Nanosecond; Neodymium:yttrium-aluminum-garnet laser

Received June 24, 2018

Accepted June 25, 2018

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INTRODUCTION

Postinflammatory hyperpigmentation (PIH) is a reactive hypermelanosis of the skin.¹ PIH appears as symptom-free macules or patches with variable size and distribution depending on the causative pathology. It usually occurs as a result of an inflammatory dermatosis, such as acne, eczema, drug reactions, burns, chemical peelings, and laser applications.² In PIH, there is either 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.³ 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 1,550-nm erbium-doped fiber laser.^{4,5} However, there is no published data of therapeutic efficacy of picosecond-domain lasers in PIH.

Herein, we report a case of PIH using 1,064-nm picosecond-domain Nd:YAG lasers. After weekly five sessions of 1,064-nm nanosecond-domain Nd:YAG laser treatment, the patient presented nearly complete improvement in the PIH lesions with no remarkable side effects or recurrence over the duration of 3 months.

CASE REPORT

A 53-year-old, Korean woman visited our clinic with irregular shaped abrasion wound on the right perinasal area due to fall down. After one week of daily dressing with topical antibiotics, the wound became dark brownish to erythematous patch which showed the features of PIH (Fig. 1). The patient presented no remarkable treatment history for facial pigmentation within the last six months. The patient was clinically diagnosed with PIH (Fig. 1A and C) and was scheduled to undergo laser treatment. After obtaining written informed consent, the patient was treated with weekly 5 sessions of 1,064-nm picosecond domain Nd:YAG laser treatment (PICOPLUS; Lutronic Corp., Goyang, Korea) was performed at the treatment settings of a 8 mm spot size, a 0.6 J/cm² fluence in a single pulse mode, and a total of approximately 200 shots on the skin lesion. The treated areas were cooled with icepacks, and no prophylactic systemic or topical corticosteroids were prescribed. The patient was recommended to apply sunscreen. At 6 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 D).

DISCUSSION

Pigmentation abnormalities developing after trauma or cosmetic procedures are always a concern, especially in

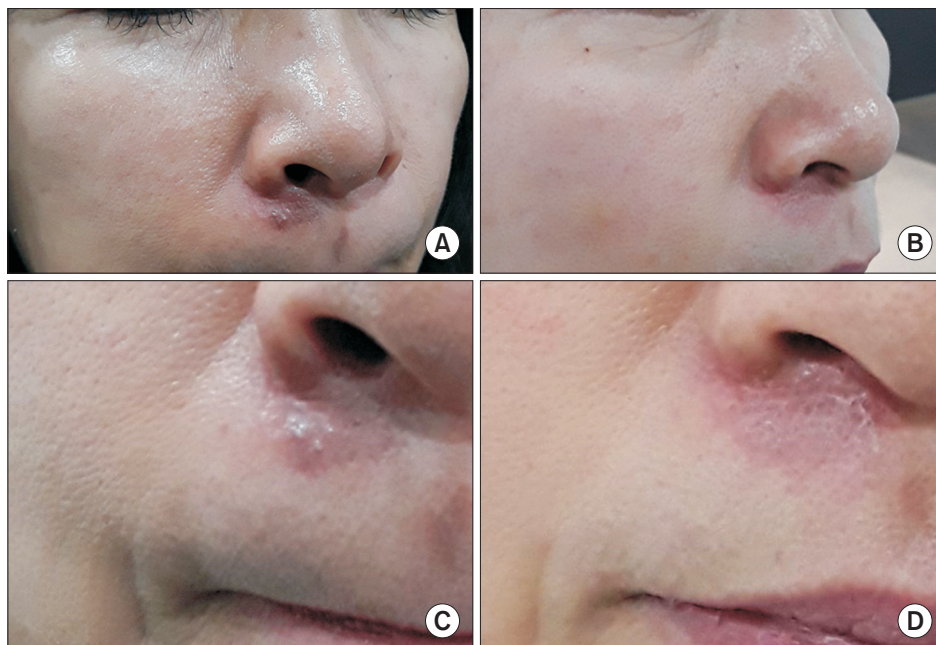


Fig. 1. Photographs of a 53-year-old, Korean female with postinflammatory hyperpigmentation (PIH) (A, C) at baseline (B, D), after weekly 5 sessions of 1,064-nm picosecond-domain neodymium: yttrium-aluminum-garnet (Nd:YAG) laser treatment (6 weeks after baseline).

Asians.⁵ Although some cases of PIH tend to be spontaneously regressed, certain forms of PIH need to be treated with several therapeutic attempts, including bleaching creams, several kinds of Q-switched lasers, erbium-doped fractional photothermolysis system, with various treatment outcomes. There are few reports regarding the efficacy of different laser systems in the treatment of PIH. Oram and Akkaya² have reported refractory PIH treated with fractional CO₂ Laser. Cho et al.⁵ have reported successful results with the use of low-energy Q-switched Nd:YAG laser with nanosecond-domain in three cases of PIH that developed after different laser applications. 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 shares pathologic similarity with tattoo pigmentations. PIH shows hyperpigmentation due to hypermelanosis composed with melanin pigments. 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.⁶ 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.⁷ In this report, we demonstrated near-complete clinical improvement in pigmented lesions after 5 times of treatments with 1,064 nm picosecond-domain Nd:YAG lasers in a Korean patient with PIH. The laser pulses at the picosecond-pulse duration were seemed to effectively destroy target chromophores in our patient. Although further studies are needed to clarify the therapeutic effects of 1,064 nm picosecond-domain Nd:YAG lasers, we showed that the picosecond-domain laser treatments might be an effective therapeutic option

of the treatment on PIH.

In conclusion, the authors suggest that 1,064-nm picosecond-domain Nd:YAG lasers can be effectively and safely used for treating pigmented lesions in the dermis and epidermis, 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.

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