Melasma Showing Response to Combination Therapy with Oral Tranexamic Acid and the Q-Switched Nd:YAG Laser

Melasma is a relatively common skin disorder associated with dark, brown, symmetrical patches of hyperpigmentation involving the sun-exposed areas of the face. While various treatments are currently being used, there is no treatment regarded as entirely satisfactory.\(^1,2\) Recently, the low-fluence 1064 nm Q-switched Nd:YAG (QSNY) laser has been shown to be an effective and safe treatment option for patients with melasma.\(^1\) Additionally, topical, intralesional tranexamic acid administration has been reported to improve clinical efficacy in melasma treatment.\(^2\) Therefore, we attempted to treat patients with melasma using oral tranexamic acid and QSNY laser combination therapy.

Two female patients, aged 38 and 43 years (Fitzpatrick skin type IV), were observed to have symmetric, multi-size, brown-colored patches on the malar area that had onset several weeks prior to examination (Fig. 1A, 2A). They both had normal menstruation with no significant past medical history. They were diagnosed with melasma based upon clinical appearance. The severity of the melasma was assessed using the modified Melasma Area and Severity Index (mMASI), with scores of 7.5 and 7.8. We began to treat for melasma with a combination of oral tranexamic acid (500 mg twice daily) and once-weekly use of the QSNY laser (Revlite\(^\circledR\), HOYA ConBio, USA) set at 1,064 nm wavelength, 8 mm spot size, and 2.8 J/cm\(^2\). After 12 weeks, their melasma lesions greatly improved without complications, and mMASI scores decreased to 4.8 and 5.0 (Fig. 1B, 2B).

Melasma may be treated using various therapeutic methods including topical or oral agents, chemical peeling, or laser treatment. These methods have been used alone or together as a form of combination therapy.\(^1\) However, a satisfactory treatment regimen has yet to be found for patients with melasma and dark skin.

Fig. 1. F/38, Malar type melasma was totally cleared after treatment. (A) Before the treatment. (B) 12 weeks after treatment.

<Received: December 20, 2013, Revised: April 27, 2014, Accepted for publication: May 7, 2014>
Corresponding author: Sung Yul Lee
Department of Dermatology, Soonchunhyang University College of Medicine, 31 Soonchunhyang 6gil, Dongnam-gu, Cheonan 330-721, Korea
Tel: 82-41-570-2272, Fax: 82-41-570-2783, E-mail: dermasung@schmc.ac.kr
QSNY treatment is based on photothermal and photomechanical interactions induced by selective photothermolysis. The 1064 nm QSNY laser can cause dermal and epidermal melanosome rupture in melanocytes and destruction of dermal melanophages. Recently, the use of the 1064 nm QSNY laser has become increasingly referred to as “laser toning” for melasma in Asian countries. Although multiple passes of the low-fluence laser are delivered to obtain clinical improvement with less downtime in laser toning, it is possible to cause painful swelling and post-inflammatory hyper- or hypo-pigmentation.

Tranexamic acid is used as a hemostatic agent due to its selective antifibrolytic action. More recently, tranexamic acid has been used in the treatment of hyperpigmentation. Ultraviolet irradiation induces plasminogen activator synthesis and increases plasmin activity in keratinocytes and stimulates the release of arachidonic acid. Free arachidonic acid stimulates melanogenesis via its metabolite, prostaglandin. Tranexamic acid attaches to the lysine-binding site of plasminogen activator, which inhibits the plasminogen/plasmin system. This results in interference with keratinocyte-melanocyte interactions and lower arachidonic acid and prostaglandin levels. This mechanism down-regulates the tyrosine activity of melanocytes, resulting in improvement in patients with melasma hyperpigmentation lesions. Karn et al. reported that the addition of oral tranexamic acid provided rapid and sustained improvement in the treatment of melasma as compared to routine topical therapies only. Histologically, tranexamic acid decreases the epidermal pigmentation associated with melasma and also reverses melasma-related dermal changes, such as increased numbers of vessels and mast cells.

Side effects of tranexamic acid, such as gastrointestinal discomfort and hypomenorrhea, were observed in 5.4-8.1% of patients in 1 study; however, no severe complications were found until 6 months had passed, and the recurrence of melasma was observed in only a small portion of treated patients. Currently, there are no long-term follow-up studies regarding this combination therapy. A 4-week follow-up study showed that in combination with low-fluence QSNY, oral tranexamic acid enhanced the efficacy of laser treatments, and reduced the risk of laser side effects by allowing for longer laser treatment intervals. However, the treatment of melasma remains challenging due to its frequent recurrence, even after successful removal of lesions. Therefore, a long-term follow-up study of ongoing treatment is needed.

We observed improvement in our patients with melasma after oral tranexamic acid and QSNY laser treatment. Therefore, we suggest that combination therapy using tranexamic acid and the QSNY laser should be considered as an effective modality for the treatment of melasma.

Key Words: Melasma, Tranexamic acid

REFERENCES
