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CASE REPORT

Treatment of Laser Therapy-Induced Punctate Leukoderma Using a 308-nm Excimer Laser

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Punctate leukoderma presents as numerous, distinct, round or oval depigmented spots. Recently, laser therapy-induced punctate leukoderma associated with various Q-switched laser and carbon dioxide laser have been reported. A 25-year-old man presented with numerous, discrete, round, confetti-like, depigmented macules on his left neck. He had undergone 3 sessions of 532-nm Q-switched Neodymium:Yttrium-Aluminum-Garnet laser treatment for café-au-lait macules three years ago. After the last laser treatment session, the punctate leukoderma had been developed. We started treatment with the 308-nm excimer laser twice a week. After 7 months of treatment duration, complete repigmentation was achieved without serious adverse effects. We recommend the 308-nm excimer laser as an effective treatment modality for laser therapy-induced punctate leukoderma. **(Ann Dermatol 29(5) 630~632, 2017)**

-Keywords-
Excimer laser, Hypopigmentation, Leukoderma, Vitiligo

INTRODUCTION

Falabella et al.[1] first coined the term "leukoderma punctata" in vitiligo patients who developed numerous, tiny, distinct, round or oval, hypopigmented macules of sharply demarcated borders during treatment with oral psoralen followed by solar ultraviolet exposure, and similar cases associated with other phototherapies had been reported since then[2]. Recently, laser therapy-induced punctate leukoderma has also been reported in association with the Q-switched laser and the carbon dioxide laser[3-6]. In particular, Q-switched laser therapy was widely performed for the treatment of various pigmented disorders in ethnic populations, and punctate leukoderma occurs not infrequently as an adverse effect of Q-switched laser treatment. The overall incidence of leukoderma associated with the laser "toning" treatment with low-fluence Q-switched Neodymium:Yttrium-Aluminum-Garnet (Nd:YAG) laser for melasma was reported to be up to 16.8%[7]. As patients with this condition rarely recover spontaneously, it causes great distress for both patients and physicians. We report on our experience of a successful treatment of laser therapy-induced punctate leukoderma with the 308-nm excimer laser.

CASE REPORT

A 25-year-old man presented with numerous, discrete, round or oval, confetti-like, depigmented macules on his left neck (Fig. 1A). Three years ago, he had undergone three sessions of 532-nm Q-switched Nd:YAG laser treatment for café-au-lait macules on the same location in another hospital. After the last laser treatment session, the depigmented macules developed and persisted for 3 years without any change in color and size. Laser therapy-in-

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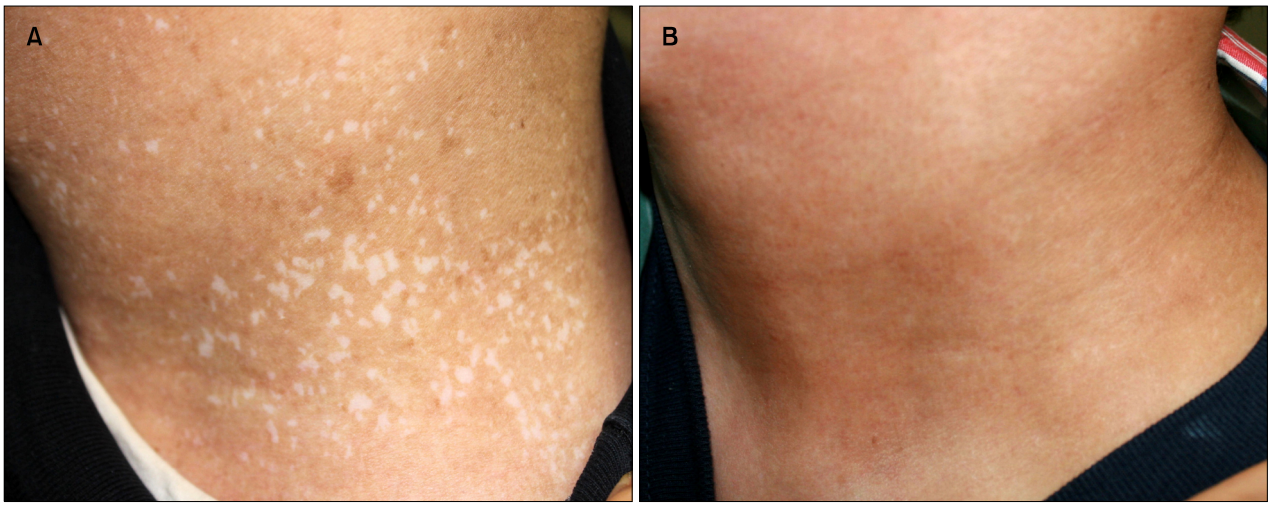

Fig. 1. Punctate leucoderma. (A) Numerous, discrete, round or oval, confetti-like, depigmented macules on the patient's left neck, which developed after Q-switched Neodymium:Yttrium-Aluminum-Garnet laser treatment for café-au-lait macules on the same location 3 years ago. (B) Complete repigmentation after 58 treatment sessions with the 308-nm excimer laser for 7 months.

Table 1. Summary of case reports on the treatment of laser therapy-induced punctate leukoderma

No.	Author	Site of lesion	Previous therapy	Duration of leuco-derma (mo)	Treatment modality	Treatment cycle	Initial dose (mJ/cm^2)	Dose increment (mJ/cm^2)	Clinical outcome at last follow-up	Total number of treatment sessions	Duration of treat-ment (mo)
1	Friedman and Geronemus[5] (2001)	Cheek	CO_2 laser	60	Excimer laser	Twice weekly	100～150	50	＞75% repigmentation	8	1
2	Friedman and Geronemus[5] (2001)	Upper lip	CO_2 laser	60	Excimer laser	Twice weekly	100～150	50	50%～75% repigmentation	10	1.25
3	Kim et al.[3] (2012)	Cheek	QSNY	Unknown	Excimer laser	Every 2 weeks	100	50～100	Significant improvement	15	7.5
4	Present case	Neck	QSNY	36	Excimer laser	Twice weekly	175	25	Complete repigmentation	58	7

QSNY: Q-switched Neodymium:Yttrium-Aluminum-Garnet laser.

duced punctate leukoderma was diagnosed at our clinic, and treatment with the 308-nm excimer laser (XTRAC®; PhotoMedex, Horsham, PA, USA) was started with an initial dose of 175 mJ/cm^2. The excimer laser treatment was performed twice weekly, and the dose was increased by 25 mJ/cm^2 at each subsequent session unless erythema persisted for more than 48 hours. Repigmentation was first observed after 10 treatment sessions, and complete repigmentation was achieved after a total of 58 treatment sessions and 7 months (Fig. 1B). The maximum and total cumulative doses were 700 and 31,950 mJ/cm^2, respectively. Treatment was tolerable with no serious adverse effects that led to withdrawal from treatment. No recurrence was observed within 1-year follow-up.

DISCUSSION

Although the pathogenesis of laser therapy-induced punctate leukoderma has not been fully understood yet, Chan et al.[8] suggested two possible mechanisms. First, excessive fluence might cause the cellular destruction of melanocytes directly. Second, the total cumulative dose after multiple treatment sessions with short intervals might also destroy the melanocytes, even if the fluence was not sufficiently strong to cause direct phototoxicity.

There have been a few case reports on the treatment of laser therapy-induced punctate leukoderma including narrowband-ultraviolet B (NB-UVB) and the 308-nm excimer laser, with various outcomes (Table 1)[3-5,8,9]. NB-UVB phototherapy was revealed to stimulate the proliferation and

migration of melanocytes in vitiliginous lesions, and the 308-nm excimer laser has advantages over NB-UVB in terms of targeting selective areas and delivering stronger energy[10]. All of the three patients who underwent excimer laser treatment showed repigmentation of remarkable, >75%, and 50%~75%, respectively. In our case, we demonstrated complete repigmentation of punctate leukoderma secondary to the Q-switched Nd:YAG laser with 308-nm excimer laser treatment despite a delay in treatment of 3 years.

We herein report a case of a successful treatment of laser therapy-induced punctate leukoderma by using the 308-nm excimer laser. Although laser therapy-induced punctate leukoderma is commonly encountered during the treatment of a variety of pigmented disorders, many physicians have difficulties in managing this condition. We recommend the 308-nm excimer laser as an effective treatment modality for laser therapy-induced punctate leukoderma.

CONFLICTS OF INTEREST

The authors have nothing to disclose.

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