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RESEARCH ARTICLE

THE TREATMENT OF CONGENITAL MELANOCYTIC NEVUS USING DR.HOON HUR'S OPTIMAL MELANOCYTIC SUICIDE-4 PARAMETER THERAPY WITH A 308nm EXIMER LASER

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ABSTRACT

A congenital melanocytic nevus (CMN) is a type of melanocytic nevus found in approximately 1% of newborn infants at birth. To remove CMN with a traditional laser without complications is very difficult because of the extension of nevus cells into the deep dermis in this lesion. Unfortunately, there is no standard laser therapy for CMN yet. Therefore, this study was performed to evaluate the efficacy and safety of Dr. Hoon Hur's Optimal Melanocytic Suicide-4(OMS-4) Parameter Therapy using a 308nm eximer laser for treating CMN. Fifteen Korean patients with CMN were treated with a 308nm eximer laser at a 2-week interval for 30 treatment sessions. The parameters were a spot size of 20mm x 20mm, a fluence of 3000mJ/cm² and a pulse rate of 400Hz with 3 passes of pulse stacking by 20% overlapping technique over the CMN. At the week of the final treatment, all of the 15 patient with CMN were achieved the complete clearance of dark brown to black pigmented lesions without scarring. There were no recurrences after a follow-up of 12-30 months. We suggest that Dr. Hoon Hur's OMS-4 Parameter Therapy using a 308nm eximer laser is a safe and effective method without scarring and recurrence in treatment of CMN.

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INTRODUCTION

The congenital melanocytic nevus (CMN) is a type of melanocytic nevus which is composed of nevus cells present at birth or immediately after birth. It is known to be found in approximately 1% of neonates (Tannous, 2005 and Krengel 2013). It may be divided by the maximum diameter of the lesion. In general, the lesion less than 1.5 cm in diameter is classified as a small-sized CMN, the lesion from 1.5 cm to 20 cm as a medium-sized CMN, and the lesion from 20 cm and more as a giant CMN (Tannous, 2005 and Krengel 2013). At the present time, various treatment modalities such as surgical excision, cryotherapy, chemical peeling, electrical cauterly and laser therapy are tried for treating CMN (Marghoob, 2003 and Suzuki, 2005). However, there is no satisfactory treatment to remove the entire nevus cells, improve cosmetic problems and preserve perilesional function. Therefore, this study was performed to investigate the efficacy and safety of Dr. Hoon Hur's Optimal Melanocytic Suicide-4(OMS-4) Parameter Therapy using a 308nm eximer laser for treating CMN.

MATERIALS and METHODS

This study was performed on fifteen Korean patients (age range: 1-62 years old, mean age: 12.5 years old) who were

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clinically diagnosed with CMN(Fig.1,3,5,7,9). No significant medical or familial history was found in the patients. Written informed consents were obtained from all of the 15 patients before proceeding into treatment. The perilesional areas were covered by the white plaster but a topical anesthetic was not used before the laser treatment. And all of the 15 patients were received 30 treatment sessions of Dr. Hoon Hur's OMS-4 Parameter Therapy using a 308nm eximer laser (XTRAC Velocity 400 Laser, Photo Medex, USA) at a 2-week interval with a spot size of 20mm x 20mm, a fluence of 3000mJ/cm² and a pulse rate of 400Hz using 3 passes of pulse stacking by 20% overlapping technique over the CMN. After the laser treatment, the lesion of CMN was cooled with ice packs and a topical 0.1% gentamicin cream was used to prevent secondary infection during the period of treatment. Standardized digital photography using a Canon Camera G11 (Japan) was used for the evaluation by comparing photos taken on the day of the treatment and those taken 4 weeks after the final treatment session. The physician's clinical assessment of the degree of improvement of the patients (mean score of two investigators who did not attend the treatment) was also carried out 4 weeks after the last treatment session and reported as percentage resolution as follows: poor (0-25% clearance), fair (26-50% clearance), good (51-75% clearance), excellent (76-95% clearance) and complete (96-100% clearance) by analyzing the clinical photographs of patients.

The patients were asked to notify immediately if pain, discomfort or any side effects occurred during each treatment.

RESULTS

Fifteen Korean patients with CMN were enrolled in this study (Table 1). All of the 15 patients with CMN were achieved the complete clearance of dark brown to black pigmented lesions (Table 2). And there were no significant side effects such as depressive scar and hypertrophic scar except mild pain during the laser treatment (Fig.2,4,6,8,10). No recurrences have been detected after a follow-up of 12-30 months (Fig.11).

DISCUSSION

Histologically, a CMN is characterized by the benign proliferation of nevus cells at the epidermal-dermal junction as well as within the dermis. It tends to better involve the hair follicles, sweat glands, sebaceous glands, blood vessels and nervous tissues than acquired melanocytic nevus (AMN). Sometimes the extension of nevus cells into the reticular dermis or the subcutaneous fat layer is present (Tannous, 2005 and Krengel 2013). The color of the lesion is mainly dark brown or black. The surface is most commonly flat but may be raised, rugged, nodular or accompanied by hair. In proportion to the growth of the body with age, the size may gradually increase, the color may darken and the thickness may become thicker (Tannous, 2005 and Krengel 2013). Because the CMN not only causes cosmetic problems, but also has the possibility of progressing to the malignant melanoma, the treatment method should be decided in consideration of this (Tannous, 2005 and Yun, 2012). It is very rare that the small-sized CMN and medium-sized CMN progress to a malignant melanoma, so prophylactic surgical excision is still controversial. But 2.3% of the Korean patients with giant CMN may progress to a malignant melanoma (Yun, 2012).

Therefore, treatment should be performed to preserve the function of the lesional site, to improve cosmetic problems, and to remove the nevus cells as much as possible (Suzuki, 2005 and Kono, 2005). If the lesion occurs in a cosmetically or functionally important area or the lesion is large, laser treatment should be performed to minimize scarring (Burd, 2004). Laser resurfacing with CO₂ laser or Er: YAG laser delicately vaporizes the lesions of the CMN from the epidermis to the upper dermis. But it often damages the papillary dermis or deeper dermis, leaving a depressed scar or hypertrophic scar (Suzuki, 2005 and Rajpar, 2007). In addition, traditional laser treatments may also result in crust and skin ulceration. And the recovery time is very long. If the nevus cells are in deep dermis, it is difficult to remove effectively (Burd, 2004). The Q-switched Nd: YAG laser (QSNL), the Q-switched ruby laser, and the Q-switched alexandrite laser, which targets melanocytes, have been used to remove CMN with scarring using relatively selective photothermolysis (Kono, 2005). But the therapeutic effect is not permanent and recurrence is common. Thus, it is difficult to treat the CMN with traditional lasers (Suzuki, 2005 and Kono, 2005). Therefore, the author devised a new treatment using Dr. Hoon Hur's OMS-4 Parameter Therapy with a 308nm eximer laser (XTRAC Velocity 400 Laser, Photo Medex, USA) at a 2-week interval for 30 treatment sessions. The parameters are a spot size of 20mm x 20mm, a fluence of 3000mJ/cm² and a pulse rate of 400Hz using 3 passes of pulse stacking by 20% overlapping technique over the CMN.



Fig.1. A single dark brown papillomatous plaque on the left lower leg (before treatment)



Fig. 2. A complete clearance of CMN (after Dr. Hoon Hur's OMS-4 Parameter Therapy)



Fig. 3. A single dark brown papillomatous plaque on the right cheek (before treatment)



Fig.4. A complete clearance of CMN (after Dr. Hoon Hur's OMS-4 Parameter Therapy)



Fig.7. A single dark brown to black papillomatous patch on the right nasolabial fold (before treatment)



Fig. 8. A complete clearance of CMN (after Dr. Hoon Hur's OMS-4 Parameter Therapy)



Fig.5. A single dark brown to black papillomatous plaque on the right thigh (before treatment)



Fig. 6. A complete clearance of CMN (after Dr. Hoon Hur's OMS-4 Parameter Therapy)



Fig. 9. A single dark brown to black papillomatous patch on the nose (before treatment: 9/17/2014)

The goal of Dr. Hoon Hur's OMS-4 Parameter Therapy using a 308nm eximer laser is to remove the nevus cells at the epidermal-dermal junction as well as within the dermis without scarring. In the previous papers, the author already reported the therapeutic effects of Dr. Hoon Hur's GPT/OMS-1 Parameter Therapy using a high 1064 nm QSNL in various skin diseases



Fig.10. A complete clearance of CMN (after Dr. Hoon Hur's OMS-4 Parameter Therapy:3/4/2016)



Fig.11. There is no recurrence at 30 months' follow-up (9/10/2018).

Table 1. The demographic data of 15 patients with CMN and the characteristics of CMN

Age [Ⓢ]	
Age range [Ⓢ]	1-62 years old
Mean age [Ⓢ]	12.5 years old
Gender [Ⓢ]	
Male [Ⓢ]	6/15(40%)
Female [Ⓢ]	9/15(60%)
Family history [Ⓢ]	unremarkable
Location [Ⓢ]	
Face [Ⓢ]	6/15(40%)
Trunk [Ⓢ]	3/15(20%)
Arm [Ⓢ]	2/15(13.3%)
Thigh [Ⓢ]	2/15(13.3%)
Lower leg [Ⓢ]	2/15(13.3%)
Characteristics of lesion [Ⓢ]	
Flat lesion [Ⓢ]	4/15(26.7%)
Papillomatous, raised lesion [Ⓢ]	11/15(73.3%)
Hairy lesion [Ⓢ]	6/15(40%)

Table 2. The result of treatment with Dr. Hoon Hur's OMS-4 parameter

Treatment response [Ⓢ]	Number of patients [Ⓢ]
Poor (0-25% clearance) [Ⓢ]	0 [Ⓢ]
Fair (26-50% clearance) [Ⓢ]	0 [Ⓢ]
Good (51-75% clearance) [Ⓢ]	0 [Ⓢ]
Excellent (76-95% clearance) [Ⓢ]	0 [Ⓢ]
Complete (96-100% clearance) [Ⓢ]	15/15(100%) [Ⓢ]

such as café au lait spot, partial unilateral lentiginosis, Becker's nevus, Ota's nevus, Hori's nevus, Riehl's melanosis, erythema ab igne and congenital melanocytic nevus without side effects such as PIH, mottled hypopigmentation and scarring (Hur, 2016, 2017 & 2018). And Dr. Hoon Hur's OMS-2 Parameter Therapy can remove solar lentigo, and also Dr. Hoon Hur's OMS-3 Parameter Therapy can remove acquired melanocytic nevus (Hur, 2017 & 2018). Generally, a 308nm eximer laser is used to treat vitiligo, atopic dermatitis and psoriasis but it can remove the CMN (Spencer, 2002 and Nistico, 2009). Because first, the nevus cells containing the melanin pigment which are the target of Dr. Hoon Hur's OMS-4 Parameter Therapy are abundant in the epidermis and dermis. Second, the 308nm wavelength of eximer laser is absorbed in much more melanin compared to the 532 nm wavelength of QSNL, the 694 nm wavelength of ruby laser, the 755 nm wavelength of alexandrite laser and the 515-755 nm wavelength of intense pulsed light, therefore the laser energy due to the higher absorbance by the melanin that can easily lead to the destruction of the nevus cells. Third, simultaneously, the 308nm wavelength of eximer laser can induce the minimal damage to the upper dermis because of less penetration by its short wavelength. Theoretically, using relatively long wavelengths such as 532nm, 694nm and 755 nm seems to penetrate into the deeper dermis and remove the nevus cells effectively. However, using the long wavelengths may cause the improper photothermal damage to the deeper dermis, which may lead to a depressed scar or hypertrophic scar (Nistico, 2009; Hur, 2016 & 2017). In this study, all of the 15 patients were received 30 treatment sessions of Dr. Hoon Hur's OMS-4 Parameter Therapy using a 308nm eximer laser at a 2-week interval with a spot size of 20mm x 20mm, a fluence of 3000mJ/cm² and a pulse rate of 400Hz using 3 passes of pulse stacking by 20% overlapping technique over the CMN. Dr. Hoon Hur's OMS-4 Parameter Therapy using a 308nm eximer laser was tried to find a safer and more effective treatment for CMN than the methods tried so far (Suzuki, 2005; Kono, 2005 and Rajpar, 2007). Because all of the 15 patient with CMN were achieved the complete clearance of dark brown to black pigmented lesions without scarring. There were no recurrences after a follow-up of 12-30 months. The advantage of Dr. Hoon Hur's OMS-4 Parameter Therapy is that the recovery time is short, the dressing is not necessary because of no skin ulceration, and the side effects such as a depressive scar and hypertrophic scar are relatively low. Dr. Hoon Hur's OMS-4 Parameter Therapy is also suitable for multiple treatments of children. Because there is no need for anesthesia and the procedure time is as short as 1-2 minutes, it is easy to cooperate with pediatric patients. But Dr. Hoon Hur's OMS-4 Parameter Therapy requires a long-term treatment for 15 months.

Conclusion

In this study, Dr. Hoon Hur's OMS-4 Parameter Therapy using a 308nm eximer laser achieved the complete clearance of CMN

without significant side effects and recurrences. We suggest Dr. Hoon Hur's OMS-4 Parameter Therapy using a 308nm excimer laser is a new, safe and good option for treating CMN.

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