The Treatment of Becker’s Nevus by Combination Therapy: Dr. Hoon Hur’s Golden Parameter Therapy and Dr. HOON Hur’s Optimal Melanocytic Suicide-1 Parameter Therapy

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Abstract: Becker’s nevus, a cutaneous hamartoma, usually occurs as a large, unilateral, hyperpigmented and hypertrichotic patch on the shoulder or upper trunk, which can be present in childhood or adolescence. Becker’s nevus can be treated with traditional laser therapy using various types of lasers including a 532nm potassium titanyl phosphate (KTP) laser, 694nm ruby laser and 755nm alexandrite laser. However, this may cause harmful side effects such as scarring, mottled hypopigmentation, post-inflammatory hyperpigmentation (PIH), purpurae, and crusts. As a result, no standard for the treatment of Becker’s nevus using lasers has been established. Therefore, this study was implemented to investigate the safety and efficacy of treating Becker’s nevus using Dr. Hoon Hur’s Golden Parameter Therapy (GPT) followed by Dr. Hoon Hur’s Optimal Melanocytic Suicide-1 Parameter Therapy (OMS-1 PT) which uses a high fluence 1064nm Q-switched Nd: YAG laser (QSNL). Forty-two Koreans suffering from Becker’s nevus participated in the study and received treatment on a weekly basis for 75-100 sessions using the QSNL according to Dr. Hoon Hur’s GPT then followed by Dr. Hoon Hur’s OMS-1 PT. The parameters for this study were a spot size of 7 mm, a fluence of 2.2 J/cm² and a pulse rate of 10 Hz using a sliding-stacking technique for a single pass over the Becker’s nevus, followed by Dr. Hoon Hur’s OMS-1 PT using a sliding technique for 5 passes with the QSNL over the Becker’s nevus. Upon completion of the last treatment, all 42 patients with Becker’s nevus were cured, having no side effects, and entirely removing the pigmented lesions. None of the 42 patients reported any recurrences after their follow-ups 6-15 months after the final treatment. As a result of this study, we propose therapy to safely and effectively treat Becker’s nevus using a fusion of Dr. Hoon Hur’s GPT and Dr. Hoon Hur’s OMS-1 PT with a high fluence 1064nm QSNL to avoid any recurrences or harmful side effects.

Keywords: Becker’s Nevus, 1064nm Nd: YAG Laser, Dr. Hoon Hur’s GPT, Dr. Hoon Hur OMS-1 PT

1. Introduction

Becker’s nevus, a benign cutaneous pigmented hamartoma with a localized hypertrichosis, may occur on the shoulder or upper trunk, occasionally elsewhere on the body during childhood or adolescence [1-3]. The histopathologic findings demonstrate that there is no nevus cell in the basal layer of epidermis and in the dermis and Becker’s nevus does not develop into malignant lesion [3, 4]. Treatment for Becker’s nevus may not be necessary except for cosmetic purposes. Moreover, Becker’s nevus is not easy to cure without side effects and recurrences because a non-selective photothermolysis occurs during laser irradiation [5-7]. Therefore, this study was performed to confirm the efficacy and safety of Dr. Hoon Hur’s Golden Parameter Therapy (GPT) and subsequently Dr. Hoon Hur’s Optimal Melanocytic Suicide-1 Parameter Therapy (OMS-1 PT) with a high fluence 1064nm Q-switched Nd: YAG laser (QSNL) for the treatment of Becker’s nevus without inducing any side effects and recurrences.

2. Objectives

Treatment of Becker’s nevus with traditional laser
therapies including 532nm potassium titanyl phosphate (KTP) laser, 694nm ruby laser and 755nm alexandrite laser may cause harmful side effects such as purpurae, crusts, post-inflammatory hyperpigmentation (PIH), mottled hypopigmentation and scarring. Unfortunately, therefore there has been no clear standard established for the laser treatment of Becker’s nevus. Therefore, this study was conducted to investigate the efficacy and safety of Dr. Hoon Hur’s Golden Parameter Therapy (GPT) and subsequently Dr. Hoon Hur’s Optimal Melanocytic Suicide-1 Parameter Therapy (OMS-1 PT) with a high fluence 1064nm Q-switched Nd: YAG laser (QSNL) for the treatment of Becker’s nevus.

3. Materials and Methods

A total of forty-two Korean patients (age range: 7-38 years old, mean age: 16.3 years old) with no significant medical or familial history who were clinically diagnosed with Becker’s nevus (Figures 1, 4, 6, 8) were participated in this study. Written consents were received from all of the patients before undergoing this laser treatment. Before this laser treatment, 9.6% lidocaine cream of topical anesthetics was not applied on the Becker’s nevus. The patients were received 75-100 treatment sessions of Dr. Hoon Hur’s GPT including a high fluence 1064nm QSNL (StarWalker Laser, Fotona, Slovenia) on a weekly basis with a spot size of 7mm, a fluence of 2.2J/cm$^2$ and a pulse rate of 10Hz with one pass by a sliding stacking technique over the Becker’s nevus, and subsequently Dr. Hoon Hur’s OMS-1 PT with 5 passes by a sliding technique using a high fluence 1064nm Q-switched Nd: YAG laser (QSNL) over the Becker’s nevus.

Post-each laser treatment, the lesion of Becker’s nevus was cooled with ice packs but the broad-spectrum sunscreen cream was not used. To evaluate the result, photos taken on the first day of the treatment were compared to those taken 4 weeks after the final treatment session and these standardized digital photography were produced by a Canon Camera G11 (Japan). 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 conducted 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 report any side effects, pain or discomfort during the laser treatment.

4. Results

Forty-two Korean patients who suffer from Becker’s nevus were participated in this study (Table 1 and Table 2). All of the 42 patients with Becker’s nevus were achieved the complete clearance of the pigmented lesions (Figures 2, 5, 7, 9). There were no side effects reported such as purpurae, crusts, PIH, mottled hypopigmentation or scarring except mild pain during this laser treatment. No recurrences have been observed after a follow-up of 6-15 months (Figure 3). All patients, given combination therapy of Dr. Hoon Hur’s GPT and Dr. Hoon Hur’s OMS-1 PT using a high fluence 1064nm QSNL were satisfied with the outcome of the therapy.
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Table 1. The demographic data of 42 patients with Becker’s nevus and the characteristics of Becker’s nevus.

| Demographic data |        |
|------------------|--------|
| Age              | 7-38 years old |
| Mean age         | 16.3 years old |
| Gender           | Male 30/42 (71.4%) |
|                  | Female 12/42 (28.6%) |
| Family history   | (-), unremarkable |
| Location         | Face 4/42 (9.5%) |
|                  | Shoulder 25/42 (59.5%) |
|                  | Chest 8/42 (19%) |
|                  | Thigh 3/42 (7.1%) |
|                  | Lower leg 2/42 (4.8%) |
| Characteristics of lesion | Brown pigmentation 42/42 (100%) |
|                  | Follicular accentuation 36/42 (87.5%) |
|                  | Hairy lesion 32/42 (76.2%) |

Table 2. The result of treatment with Dr. Hoon Hur’s GPT and Dr. Hoon Hur’s OMS-1 PT.

| 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) | 42/42 (100%) |

5. Discussion

A Becker nevus, a benign cutaneous hamartoma, is caused by overgrowth of the epidermis, epidermal melanocytes, hair follicles and dermal smooth muscles. It typically occurs as a unilateral, large brown hyperpigmented and hypertrichotic patch on the shoulders or upper trunk, occasionally elsewhere on the body, with onset in early adulthood, usually during or shortly after puberty [1-3]. It might appear in males at puberty because of gene defect and circulating androgens [8]. Becker’s nevus can be easily diagnosed clinically but sometimes a biopsy may be required in order to differentiate the lesions from congenital melanocytic nevus and congenital smooth muscle hamartoma [3, 4]. In order to distinguish it from congenital melanocytic nevus and congenital smooth muscle hamartoma, it is very essential to figure out whether the lesion was present at birth or developed subsequently. Congenital melanocytic nevus is present at birth and typically darker in color with no anatomic predilection, therefore demonstrating melanocytic nevus cells on skin biopsy [3, 20]. Congenital smooth muscle hamartoma typically presents at birth or infancy as a firm skin-colored or light brown plaque with less prominent pigmentation includes more localized hypertrichosis compared to Becker’s nevus. Moreover, in most cases, pseudo-Darier’s sign with temporary induration after rubbing the lesion is observed. Histologically, congenital smooth muscle hamartoma is characterized by the hyperplasia of smooth muscle bundles throughout the dermis [3, 4]. The histopathological findings of Becker’s nevus represents that moderate elongation and focal fusion of rete ridges with increased number of melanocytes and enhanced melanin deposition in the epidermis, and increased number of
arrector pili muscles and the hyperplasia of smooth muscles in the dermis. Becker’s nevus does not develop into a malignant lesion due to the non-presence of nevus cell [3, 4]. Lately, Becker’s nevus has been widely treated using traditional laser treatment involving a 694 nm ruby laser, 755 nm alexandrite laser, and 532 nm potassium titanyl phosphate (KTP) laser. Unfortunately these treatments are often looked at as rather unsatisfactory due to their possibility of negative side effects including scarring, mottled hypopigmentation, PIH, purpurae, and crusts [5-7]. In particular, Becker’s nevus is quite difficult to cure without inciting PIH [5-7]. Disappointing outcomes for Becker’s nevus using traditional laser therapy may have a few potential reasons. Normally, the melanin absorbs the 1064 nm wavelength of the QSNL much less than the 532 nm wavelength of the KTP laser, the 694 nm wavelength of the ruby laser, the 515-755 nm wavelength of intense pulsed light, and the 755 nm wavelength of the alexandrite laser [5-7]. This higher absorption by traditional therapy lasers creates laser energy, not only destroying epidermal melanocytes but also simultaneously damaging the surrounding keratinocytes contained within the lesions [5-7]. This causes the damaged keratinocytes to excrete interleukin-1 (IL-1), thus stimulating the keratinocytes to excrete prostaglandin (PGE2, PGF2α), endothelin-1, adrenocorticotropic hormone (ACTH), and α-melanocyte stimulating hormone (MSH), all of which are keratinocytic injury-induced cytokines. Unfortunately these melanogenic cytokines activate melanocytes, enhancing the synthesis of melanin in the melanosomes, leading to the PIH and thus aggravating Becker’s nevus [9-12]. Secretions of the single-chain urokinase type plasminogen activator (sc-uPA), from the damaged keratinocytes, convert plasminogen into plasmin, and basic fibroblast growth factor (bFGF) is excreted from these plasmin-stimulated keratinocytes. This bFGF activated the melanocytes, driving melanin synthesis in the melanosomes to increase, thus causing PIH [9-12]. The laser energy in tradition laser treatments has enough strength to damage mast cells, macrophages, lymphocytes, fibroblasts, and vascular endothelium in the dermis as well as create purpurae and crusts simultaneously. In particular, the excretions of hepatocyte growth factor (HGF) and stem cell growth factor (SCF) from damaged fibroblasts stimulate the enhancement of melanin synthesis in the melanosomes from melanocytes, leading to PIH, thus aggravating Becker’s nevus [9-12]. Lastly, the reactive oxygen species like free radical oxygen and peroxide or nitric oxide, having been produced by damaged keratinocytes, activates the melanocytes and strengthens melanin synthesis in the melanosomes, in time causing PIH and worsening Becker’s nevus [9-12]. The authors devised a new combination therapy using a Dr. Hoon Hur’s GPT and Dr. Hoon Hur’s OMS-1 PT with a high fluence 1064 nm QSNL (StarWalker Laser, Fotona, Slovenia). With the parameters being a spot size of 7 mm, a fluence of 2.2 J/cm², and a pulse rate of 10 Hz, a sliding-stacking technique with a single pass above the Becker’s nevus was done and subsequently Dr. Hoon Hur’s OMS-1 PT with 5 passes by a sliding technique with a high fluence 1064 nm QSNL over the Becker’s nevus at intervals of one week. We believe that the combination therapy of Dr. Hoon Hur’s GPT and Dr. Hoon Hur’s OMS-1 PT using a high fluence 1064 nm QSNL is safer and more effective for the Becker’s nevus treatment compared to traditional laser therapies. Authors from previous research papers claimed that treatment using Dr. Hoon Hur’s GPT with a high 1064 nm QSNL was extremely effective and did not cause any harmful side effects such as scarring, PIH, or mottled hypopigmentation in various pigmented skin diseases including café au lait spots [12-16], Becker’s nevus [13], partial unilateral lentiginosis [13, 17], Ota’s nevus [18], Hori’s nevus [19], congenital melanocytic nevus [20], Riehl’s melanosis [21], erythema ab igne [22], and pruigo pigmentosa [23]. We surmise a fusion of Dr. Hoon Hur’s GPT and Dr. Hoon Hur’s OMS-1 PT, being performed routinely without damage to the epidermis on a weekly basis, leads to gradual destruction of epidermal melanocytes and dermal smooth muscles, therefore causing apoptotic melanocytic cell death program and apoptotic smooth muscle cell death program. Due to the poor absorption by epidermal melanin, Dr. Hoon Hur’s GPT and Dr. Hoon Hur’s OMS-1 PT with the adoption of high fluence 1064 nm QSNL is able to destroy the melanosomes in the epidermal melanocytes and dermal smooth muscles without epidermal damage, finally causing epidermal melanocytes and dermal smooth muscles to lose functions and turn into ghost cells [12-16]. Getting Dr. Hoon Hur’s GPT and Dr. Hoon Hur’s OMS-1 PT using a high fluence 1064 nm QSNL for a longer weekly basis using a high fluence 1064 nm QSNL destroys more epidermal melanocytes and dermal smooth muscles and promotes the apoptosis of epidermal melanocytes and dermal smooth muscles. Furthermore, both the end product of destroyed melanocytes and the dispersed melamins and melanosomes are eradicated by transepidermal elimination or by dermal melanophages through the lymphatic system [12-16]. Normal melanocytes, which migrate from the outer root sheath of hair follicles by homeostasis and the apoptotic melanocytic cell death program, slowly replace the lesional melanocytes. And lastly, the removal of Becker’s nevus can happen without incurring any side effects or recurrences [12-16]. In this study, each of the 42 Becker’s nevus patients were treated with 75-100 session of Dr. Hoon Hur’s GPT using a high fluence 1064 nm QSNL, the spot size being 7mm, with a fluence of 2.2 J/cm² and a pulse rate of 10 Hz using a sliding-stacking technique with a single pass, followed by Dr. Hoon Hur’s OMS-1 PT with 5 passes by a sliding technique with a high fluence 1064 nm QSNL at a one-week interval. That said, Dr. Hoon Hur’s GPT and Dr. Hoon Hur’s OMS-1 PT with a high fluence 1064 nm QSNL does not create petechiae or purpurae, but induces erythema only. Since Dr. Hoon Hur’s GPT and Dr. Hoon Hur’s OMS-1 PT are less absorbed by epidermal melanin, they do not destroy normal background tissue but remove epidermal melanocytes and dermal smooth muscles without crusts and purpurae, eventually preventing PIH and scarring [12-16].
However, in order to remove Becker’s nevus completely without recurrences, 75-100 continuous treatments are required on a weekly basis. In this study, all 42 patients with Becker’s nevus (Figures 1, 4, 6, 8) were treated by Dr. Hoon Hur’s GPT and Dr. Hoon Hur’s OMS-1 PT with a high fluence 1064 nm QSNL. This complete removal of the pigmented lesions were accomplished without causing PIH and scarring in all 42 patients who suffer from Becker’s nevus (Figures 2, 5, 7, 9). There was no relapse after 6-15 months of follow-up (Figure 3). All patients, given the combination therapy of Dr. Hoon Hur’s GPT and Dr. Hoon Hur’s OMS-1 PT using a high fluence 1064 nm QSNL were satisfied with the outcome of the therapy.

6. Conclusion

This study included 42 patients with Becker’s nevus, all of whom were treated using a fusion of Dr. Hoon Hur’s Golden Parameter Therapy (GPT) and Dr. Hoon Hur’s Optimal Melanocytic Suicide-1 Parameter Therapy (OMS-1 PT). The patients suffered from no harmful side effects and had no recurrences, and therefore were completely cured of Becker’s nevus. It is our perspective that therapy using a fusion of Dr. Hoon Hur’s GPT and Dr. Hoon Hur’s OMS-1 PT with a high fluence 1064 nm QSNL is an effective, safe, and suitable treatment option for the complete removal of Becker’s nevus.

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