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An Individualized Laser Approach to Congenital Becker's Nevus: A Case Report

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Abstract

Becker's nevus is a benign cutaneous lesion characterized by hyperpigmentation, with or without hypertrichosis. Laser therapy is commonly used for cosmetic management, although clinical responses remain variable. Here, we report a case of congenital Becker's nevus treated with a 1064-nm picosecond laser and a 694-nm Q-switched ruby laser. Progressive lightening was observed over three treatment sessions, with transient crusting and no permanent adverse effects. This case illustrates cosmetic improvement with an individualized laser approach, although the contribution of each modality and long-term durability remain uncertain.

Categories: Healthcare Technology, Dermatology
Keywords: becker's melanosis, becker's nevus, picosecond laser, qs ruby laser, skin hyperpigmentation

Introduction

Becker's nevus, also known as pigmented hairy epidermal nevus, is characterized by a solitary light-brown patch or plaque that may progressively darken over time, with or without associated hypertrichosis. It occurs in both men and women, with a male predominance, and may be congenital or develop during adolescence or adulthood [1,2]. Although autosomal dominant inheritance with variable cutaneous penetrance has been proposed, most cases are acquired [3]. The upper trunk is the most frequently involved anatomical site, accounting for approximately 66% of cases. Although generally benign, its emergence and progression during adolescence may cause considerable cosmetic concern and psychosocial distress, prompting patients to seek treatment for hyperpigmentation and associated hypertrichosis [4].

When treatment is desired for cosmetic reasons, laser therapy is often considered as the primary treatment modality for Becker's nevus, although alternative approaches, including oral antiandrogens and topical glycolic acid, have been described [1]. Various laser systems have been used alone or in combination, with wavelengths ranging from 504 to 10,600 nm and treatment courses comprising 1-12 sessions. Despite the potential complementary effects of different wavelengths, clinical responses remain variable, and the benefit of combining laser modalities has yet to be established [3]. Evidence specific to congenital Becker's nevus is particularly limited, leaving uncertainty regarding laser selection and the outcomes of using multiple modalities within a single treatment course. In this context, we report the case of a 35-year-old man with congenital Becker's nevus treated with a 1064-nm picosecond laser and a Q-switched ruby laser. By documenting the treatment course and short-term clinical response, this report adds an individual clinical observation regarding the use of these two laser systems in congenital Becker's nevus.

Case Presentation

A 35-year-old male patient with Fitzpatrick skin phototype IV presented for cosmetic treatment of a congenital Becker nevus involving the left upper arm, measuring approximately 11 cm in greatest diameter (Figure *1A*). The diagnosis was established based on the characteristic clinical features of the lesion, and a biopsy for histopathological confirmation was not considered necessary. The patient reported that the lesion initially exhibited hypertrichosis, which had resolved following multiple previous laser treatments at outside institutions; however, details of the treatment modalities were unavailable. He sought further improvement because of persistent hyperpigmentation. After discussing the expected benefits and limitations of laser therapy, informed consent was obtained. The patient was advised that multiple treatment sessions would likely be required and that complete clearance was unlikely, although significant cosmetic improvement could be achieved.

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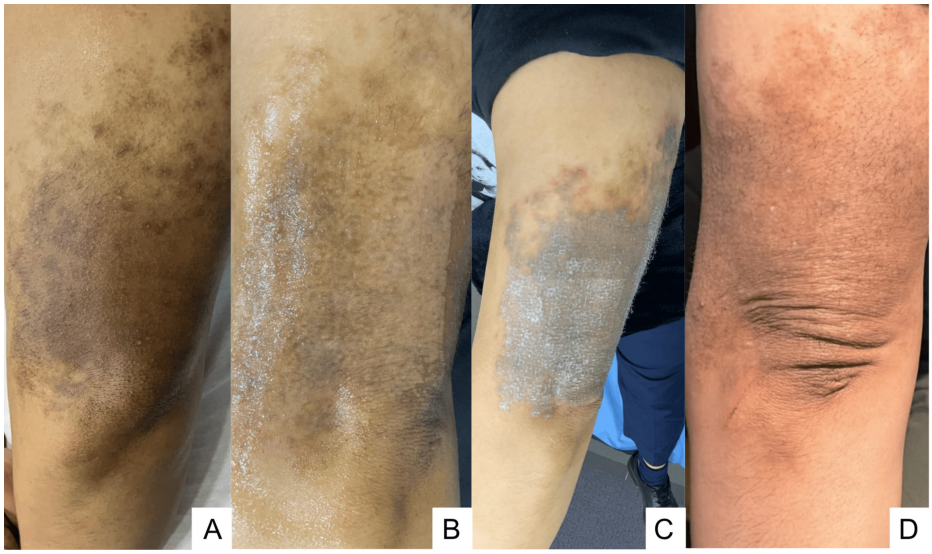


FIGURE 1: Clinical progression of congenital Becker's nevus involving the left upper arm.

(A) Baseline appearance before treatment. (B) Appearance after the first treatment session. (C) Immediate frosting and gray discoloration following the second session. (D) Clinical outcome one month after the third and final treatment session.

Prior to each treatment session, a topical anesthetic cream containing 23% lidocaine and 7% tetracaine (Dermazone Telica) was applied under occlusion for one hour. Standardized clinical photographs were obtained before and after each procedure. Following treatment, a skin repair cream (Cicaplast Baume B5+) and a broad-spectrum sunscreen were prescribed, and detailed post-procedure care instructions were provided.

The first treatment session was performed on the same day using the Discovery PICO laser platform (Quanta System SpA, Samarate, Italy). A 1064-nm picosecond laser with a 4-mm square spot size was used at 10 Hz and 2.4 J over the entire lesion. More intensely pigmented areas were subsequently treated with a 694-nm Q-switched ruby laser using a 4-mm round spot at 2.5 J, delivering around 117 pulses. The remaining pigmented areas were completed with a 694-nm Q-switched 9 mm fractional handpiece, at 3 Hz and 0.62 J, delivering 278 pulses (Figure *1B*). The second session, performed five weeks later, consisted of a 1064-nm picosecond laser using a 5-mm square spot at 10 Hz and 2 J, delivering a total of 1,668 pulses in the entire lesion, followed by 2,907 pulses with a 694-nm ruby Q-switched laser using a 3-mm square spot at 1 Hz, and 4.4 J. Immediate frosting and gray discoloration of the treated skin were observed, consistent with an appropriate laser endpoint (Figure *1C*). The procedure was well tolerated without complications. At follow-up, the patient reported that recovery after the second session required approximately two weeks and included transient crust formation. He also noted that this session produced the greatest improvement in pigmentation compared with previous treatments. A third treatment session was performed eight weeks later, using a 694-nm ruby Q-switched laser with a 4-mm square spot at 7 J/cm^2 and 1 Hz, delivering a total of 2,612 pulses. During the previous sessions, the ruby laser had been applied selectively to areas of greater pigmentation. Because these areas showed more pronounced subjective lightening, the ruby laser was selected as the sole modality for the final session.

Subjective improvement in lesion pigmentation was noted throughout the treatment course, based on comparison of clinical photographs and the patient's reported perception (Figure *1D*). No permanent adverse effects, including scarring or pigmentary alteration, were observed. Additional treatment sessions were recommended to further improve cosmetic appearance; however, the patient elected to discontinue treatment because of financial limitations.

Discussion

Several laser modalities have been used to treat Becker's nevus, with efficacy influenced by skin phototype and the presence or absence of hypertrichosis [4]. A scoping review by Zhang et al. identified 20 studies evaluating laser treatment of the pigmentary component of Becker's nevus, with a mean of 39 patients per study [5]. Fitzpatrick skin phototypes III and IV were the most frequently represented, appearing in nine and 10 studies, respectively. The review defined treatment success within a study as lesion clearance reported by

at least 50% of patients. Based on this criterion, Nd:YAG (neodymium-doped yttrium aluminium garnet), the most extensively investigated modality, achieved a success rate of 100% across five studies. The Q-switched ruby laser likewise achieved a success rate of 100%, although it was evaluated in only two studies. Patients underwent a mean of 2.42 treatment sessions. The most frequently reported adverse effects were hyperpigmentation, documented in nine studies, followed by erythema and hypopigmentation, each reported in seven.

Mao et al. evaluated the 1064-nm Nd picosecond laser in 49 patients with Becker's nevus and Fitzpatrick skin phototype IV, reporting moderate pigmentary improvement [6]. Among patients without hypertrichosis, 28% achieved greater than 25% improvement in pigmentation, with treatment response positively correlated with the number of sessions. In patients with hypertrichosis, concomitant diode laser treatment resulted in greater than 25% hair reduction in 62.5% of cases, although pigmentary improvement did not correlate with session number. Adverse effects were mild and transient, with post-inflammatory hyperpigmentation occurring in 32.7% of patients and resolving completely within 4-6 months after the final treatment session. These findings underscore the variable response of Becker's nevus to laser therapy according to lesion characteristics, including the presence of hypertrichosis, while supporting the overall good tolerability and moderate efficacy of the 1064-nm Nd picosecond laser.

On the other hand, the Q-switched ruby laser targets melanin with minimal absorption by hemoglobin, allowing treatment of superficial and deeper pigmentation while minimizing the risk of bleeding. Zhong et al. summarized variable outcomes in Becker's nevus, including substantial pigment reduction, up to 60%, after a single session and sustained improvement in both hyperpigmentation and hypertrichosis for at least 10 months after treatment [1]. Reported adverse effects included reactive hyperpigmentation, transient pain, burning, and mild erythema. Similarly, a case report documented partial improvement after four sessions, although complete clearance was not achieved [7]. No adverse effects, including post-inflammatory hyperpigmentation, were reported, and no recurrence was observed during follow-up.

Conclusions

This case illustrates progressive pigmentary improvement in congenital Becker's nevus following treatment with a 1064-nm picosecond laser and a Q-switched ruby laser, without permanent adverse effects. The favorable pigmentary response observed after the second session, which the patient perceived as providing the greatest improvement, supported the subsequent use of the Q-switched ruby laser as the sole treatment modality. This decision reflects an individualized approach guided by clinical response and tolerability. However, because both laser modalities were used during the initial sessions, their respective contributions to the overall improvement cannot be distinguished, and this single case does not establish the superiority of the ruby laser over the 1064-nm picosecond laser. Individualized treatment and realistic expectations remain essential, as complete clearance may not be achieved and multiple sessions may be required. Further controlled studies with long-term follow-up are needed to determine optimal treatment protocols and the durability of clinical improvement.

Additional Information

Author Contributions

All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

Concept and design: Daniela Gómez Guerra, Luis Velázquez Arenas, Sarahi Garay Enriquez

Acquisition, analysis, or interpretation of data: Daniela Gómez Guerra

Drafting of the manuscript: Daniela Gómez Guerra

Critical review of the manuscript for important intellectual content: Daniela Gómez Guerra, Luis Velázquez Arenas, Sarahi Garay Enriquez

Supervision: Luis Velázquez Arenas, Sarahi Garay Enriquez

Disclosures

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