Lasers Med Sci (2014) 29:191–193
DOI 10.1007/s10103-013-1314-5

ORIGINAL ARTICLE

Hypertrichosis in Becker's nevus: effective low-fluence laser hair removal

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Received: 15 February 2013 / Accepted: 25 March 2013 / Published online: 5 April 2013

Abstract Becker's nevus is cosmetically bothersome both due to the hyperpigmentation and due to the hypertrichosis which can accompany it, particularly in males. Laser hair removal can be considered, but the pigmented background of the Becker's nevus makes the treatment more challenging. Fifteen patients with Becker's nevus underwent eight sessions of hair removal with low-fluence high-repetition-rate diode lasers (808–810 nm). All participants experienced significant hair reduction at 6 and 12 months. No adverse events were reported. The study supports the use of low fluence with high-repetition-rate diode laser hair removal as a safe and effective method for the management of hypertrichosis in Becker's nevus.

Keywords Laser hair removal · Becker's nevus · Hypertrichosis · Hyperpigmentation

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Introduction

Becker's nevus derives its name from S. William Becker, who described two young men with focal, unilateral, acquired melanosis with hypertrichosis in 1948 [1]. The estimated prevalence of Becker's nevus is approximately 0.52 % [2]. The lesion usually begins with hyperpigmentation, after which coarser hairs develop both within and in proximity to the patch, particularly in men, suggesting an androgenic influence [3]. Patients seek therapeutic interventions for Becker's nevus primarily for cosmetic improvement of the hypertrichosis and the hyperpigmentation.

Q-switched 694-nm ruby laser has exhibited variable results in the treatment of the hyperpigmentation of Becker's nevus [4–7]. In our experience, the response to Q-switched lasers and IPL is often disappointing, and any partial reduction in pigmentation is temporary. This might be explained by the histopathological findings after laser treatment, in which selective damage is observed in superficial melanocytes, while adnexal melanocytes persist [4]. Long-pulsed 755-nm alexandrite laser, as well as ablative and fractional ablative lasers, has been used in the treatment of Becker's nevus, with variable success rate and postinflammatory pigmentary changes [5, 8, 9].

To our knowledge, there are no studies assessing light-based treatment of hypertrichosis in Becker's nevus, aside from a case report using ruby laser in 1998 [10].

We present our clinical findings in 15 subjects with low-fluence high-repetition-rate diode lasers as a therapeutic modality for the treatment of hypertrichosis in Becker's nevus.

Material and methods

Fifteen subjects with hairy Becker's nevus were enrolled in a prospective, self-controlled, two-center study (Herzelia,

Fig. 1 **a** Before treatment. **b** Twelve months after the eighth treatment (Soprano SHR, Alma Lasers, Israel)

Israel, and Geneva, Switzerland). All lesions were located on the shoulders. Eleven patients were treated in Israel and four in Geneva, using low-fluence diode lasers. The patients in Geneva were treated with an 808-nm diode laser, (LEDA EPI, Quantel Derma, Germany) at 24 J/cm [2], pulse duration of 6 msec, in which the total fluence divided into multiple separate stacked sub-pulses, for gradual heating of the hair shaft and perifollicular tissue. The patients in Israel were treated with an 810-nm diode laser (Soprano SHR, Alma Lasers, Israel), using low-fluence pulses (10 J/cm [2]) at a high repetition rate (10 Hz) and pulse duration of 20 ms. Treatment was performed according to the technique described by Royo and others [11, 12].

Patients were followed up at 6 and 12 months after the last treatment. Hair clearance was quantified using photographs taken at baseline and at the 6- and 12-month follow-up visits. Evaluation was performed by two independent dermatologists using a grading scale of 0–5 (0, no clearance; 5, complete clearance). Changes in hair thickness and color, level of treatment-associated pain, and adverse events were additional study parameters. Patient satisfaction was assessed using the Global Aesthetic Improvement Scale (GAIS) [13].

Results

Fifteen subjects were enrolled. The mean age was 19 years (range 16–24). Fitzpatrick skin types representing the skin color of the pigmentation within the Becker's nevus were assessed prior to treatment. Three (20 %) were type IV, ten (67 %) were type V, and two (13 %) were type VI. It should be noted that fluence was not reduced in darker lesions so as not to affect the homogeneity of the study and test the safety contributed by this technology.

All subjects completed the study and the follow-up visits. Treatment was well tolerated overall by all participants, with no adverse events. Six patients reported feeling mild to moderate discomfort during treatment without the use of pretreatment anesthesia or skin cooling. After two laser epilation sessions, patients reported delayed regrowth and less dense hair in the treated lesions. Figures 1 and 2 show representative results at 12 months after eight treatments. There was significant hair clearance at 6 months (score 3.9) and 12 months (3.5) (Table 1). Subjective evaluation by patients revealed scores of 3.6 at 6 months and 3.4 at 12 months (Table 2). Remaining hairs were thinner and lighter at the 12-month follow-up visit. No patient was observed to have increased hair after treatment. No significant difference was observed between the two systems regarding patient satisfaction or improvement score.

Discussion

Becker's nevus poses a significant esthetic problem. The medical literature reports the treatment of hyperpigmentation with inconsistent results, and, in our experience, the response in reducing pigmentation is poor and transient at best. Hypertrichosis could be treated independently, but the

Fig. 2 **a** Before treatment. **b** Twelve months after the eighth treatment (LEDA EPI, Quantel Derma, Germany)

Table 1 Physician evaluation

Hair reduction score	Number of patients exhibiting score	
	6 months	12 months
5	3	1
4	8	8
3	3	4
2	1	1
1	0	1
0	0	0
Mean	3.9	3.5

hyperpigmented background poses a challenge. This study demonstrates that it is possible to treat the hypertrichosis of Becker's nevus safely and with significant efficacy using low-fluence diode lasers.

It has been shown that hair removal can be performed in darker skin using longer wavelengths, longer pulse duration, and more efficient cooling devices [14]. However, several low-fluence diode lasers have also been introduced to the market, with demonstrated safety and efficacy [11, 12, 15]. These have the potential to be applied to treatment of darker skin.

In contrast to traditional laser hair removal, in which short high-fluence pulses are used, low-fluence stacked pulse devices rely on longer, lower temperature heating of the perifollicular tissue. The use of repeated low-fluence pulses over a single area lead to cumulative dermal heating due to heat transfer from the laser-heated hair to the perifollicular dermis. After repeated short low-fluence pulses, the accumulated heat in the perifollicular tissue is maintained for a longer time, resulting in damage to the follicle and in durable hair reduction. Therefore, compared to traditional, high-fluence laser epilation, this approach has reduced pain, a lower risk of burns and adverse events, and is safer in darker skin. Therefore, it is a promising tool for treating the hypertrichosis of Becker's nevus.

We aware that the 15 patients were treated in two different centers with two different types of lasers, but since the wavelengths are the same (808- and 810-nm diodes are actually the same diodes; obviously, this difference from the clinical point of view is meaningless) and since the mode of action obtained with the two lasers is the same, we think that it will be right to merge the clinical results.

Another important issue that is noteworthy is that all the Becker's nevi in this study were on the shoulder, a relatively treatment-resistant area. Since the results were quiet satisfactory and we were able to achieve a significant hair reduction within eight treatments, we anticipate that Becker's nevi on other areas should respond even better.

Table 2 Patient evaluation (GAIS)

Hair reduction score	Number of patients reporting score	
	6 months	12 months
5	2	1
4	7	6
3	4	6
2	2	2
1	0	0
0	0	0
Average	3.6	3.4

References

1. Becker SW (1948) Concurrent melanosis and hypertrichosis in a distribution of nevus unius lateris. Arch Dermatol 60:155–160
2. Tymen R, Forestier JF, Boutet B, Colomb D (1981) Late Becker's nevus. One hundred cases. Ann Dermatol Venereol 108(1):41–46, French
3. Grande Sarpa H, Harris R, Hansen CD, Callis Duffin KP, Florell SR, Hadley ML (2008) Androgen receptor expression patterns in Becker's nevi: an immunohistochemical study. J Am Acad Dermatol 59(5):834–838
4. Kopera D, Hohenleutner U, Landthaler M (1997) Quality-switched ruby laser treatment of solar lentigines and Becker's nevus: a histopathological and immunohistochemical study. Dermatology 194(4):338–343
5. Nelson JS, Applebaum J (1992) Treatment of superficial cutaneous pigmented lesions by melanin-specific selective photothermolysis using the Q-switched ruby laser. Ann Plast Surg 29(3):231–237
6. Raulin C, Schönermark MP, Greve B, Werner S (1998) Q-switched ruby laser treatment of tattoos and benign pigmented skin lesions: a critical review. Ann Plast Surg 41(5):555–565
7. Choi JE, Kim JW, Seo SH, Son SW, Ahn HH, Kye YC (2009) Treatment of Becker's nevi with a long-pulse alexandrite laser. Dermatol Surg 35(7):1105–1108
8. Trelles MA, Allones I, Moreno-Arias GA, Vélez M (2005) Becker's naevus: a comparative study between erbium: YAG and Q-switched neodymium:YAG; clinical and histopathological findings. Br J Dermatol 152(2):308–313
9. Meesters AA, Wind BS, Kroon MW, Wolkerstorfer A, van der Veen JP, Nieuweboer-Krobotová L (2011) Ablative fractional laser therapy as treatment for Becker's nevus: a randomized controlled pilot study. J Am Acad Dermatol 65(6):1173–1179
10. Nanni CA, Alster TS (1998) Treatment of a Becker's nevus using a 694-nm long-pulsed ruby laser. Dermatol Surg 24(9):1032–1034
11. Royo J, Urdiales F, Moreno J, Al-Zarouni M, Cornejo P, Trelles MA (2011) Six-month follow-up multicenter prospective study of 368 patients, phototypes III to V, on epilation efficacy using an 810-nm diode laser at low fluence. Lasers Med Sci 26(2):247–255
12. Braun M (2011) Comparison of high-fluence, single-pass diode laser to low-fluence, multiple-pass diode laser for laser hair reduction with 18 months of follow up. J Drugs Dermatol 10(1):62–65
13. Narins R et al (2003) A randomized, double-blind multicenter comparison of the efficacy and tolerability of Restylane versus Zyplast for the correction of nasolabial folds. Dermatol Surg 29:6
14. Battle EF Jr, Hobbs LM (2004) Laser-assisted hair removal for darker skin types. Dermatol Ther 17(2):177–183
15. Halachmi S, Lapidoth M (2012) Low-fluence vs. standard fluence hair removal: a contralateral control non-inferiority study. J Cosmet Laser Ther 14(1):2–6.16