Effective Treatment of Hypertrichosis with Pulsed Light: A Report of Two Cases

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Hypertrichosis is an often stigmatizing cosmetic problem not only for women but also for male-to-female transsexual patients. The hitherto described therapeutic measures include chemical epilation, razoring, camouflage, electrolysis and thermolysis, and waxing. All of these measures are transient, more or less painful, and may lead to severe side effects (e.g., inflammatory responses and scarring). We report the successful treatment of the perioral and mandibular area of two transsexual patients (male to female), who we treated with a recently introduced intense, pulsed light source - the PhotoDerm VL. Two days after the nearly painless treatment, hair could be epilated easily with forceps. Biopsies of the treated area show an atrophy of the follicles, which can be contributed either to direct thermal injury or to an indirect photothermolytical effect. Six months after the last treatment, there is no local recurrence and no side effects.

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For women as well as for male-to-female transsexual patients, facial hypertrichosis may become a severe psychosocial problem. Temporary methods of symptomatic hair removal include waxing, mechanical epilation, shaving, and chemical depilation, and are supplemented by longer lasting therapies like electrolysis, thermolysis, and a combination of both. The therapeutic success, however, is limited and side effects (e.g., scarring, dermatitis, long-lasting hypersensitivity) are common [1 - 5].
Recently, laser pulses have been suggested as a promising therapeutic alternative for the removal of excess hair growth [6]. An alternative to the pulsed dye laser is the PhotoDerm VL, a pulsed light system with a broad wavelength spectrum ranging from 515 to 1,200 nm. PhotoDerm VL has been developed for the treatment of a wide range of benign vascular lesions, including essential telangiectasia [7, 8], nevi flammei [9, 10], and deep-seated hemangiomatous venous malformations [11 - 13]. When treating a dye laser-resistant port wine stain with the PhotoDerm VL, we observed an epilatory side effect in the treated area [10]. This led to an experimental treatment of perioral hypertrichosis in two transsexual (male-to-female) patients. Both patients are reported.

Patients and Methods

The PhotoDerm VL is a high-energy light source that emits noncoherent light in a continuous wavelength spectrum between 515 and 1,200 nm. The impulse length can be varied between 0.5 and 20 msec, and energy fluence ranges between 3 and 90 J per square centimeter. Single, double, or triple impulses may be applied. Lower cutoff Blters of 515, 550, 570, and 590 nm are available that limit the spectrum, and that are applied depending on the patients' skin type. The treatment area measures 2.8 cm2. Informed consent

following full explanation was obtained from both patients before therapy.

Patient 1

This 38-year-old transsexual patient presented in April 1995 with a strong, dark, perioral beard after years of frustrating and tedious symptomatic epilations (Fig 1A). A treatment attempt with the PhotoDerm VL was carried out (left cheek: 550-nm cutoff; single impulse, 5 msec; fluence, 40 J per square centimeter; right cheek: 570-nm cutoff; double impulse, 5 and 4 msec; fluence, 40 J per square centimeter). The erythema that appeared immediately afterward was treated with cool packs. At a routine checkup, 2 weeks after the initial treatment the patient reported that erythema and a discrete swelling lasted for 5 days. Two days after the treatment, hair could be pulled out easily or fell out automatically. This phenomenon encouraged us to pursue further treatment in 2-week intervals. In the beginning, a 550- and 570-nm cutoff filter were used. After 30 sessions, the 590-nm cutoff filter and triple impulses were applied. Fluence ranged between 32 and 40 J per square centimeter. To regions that were rated more sensitive (upper lip, angle of the mouth, and lateral neck), lower energy fluence was applied. After 2Z treatments, a first skin biopsy was performed, which showed an intense perifollicular and perivascular lymphohistiocytic infiltration of the upper corium with a striking dystrophy of the hair shafts and conserved hair follicles. During therapy, gradual hair loss could be observed (Fig 1C). The remaining and regrowing hair became structurally thinner, and the speed of regrowth decelerated and finally stopped. The therapy was ended after 41 treatments with an excellent clinical outcome (Fig 1D). Another skin biopsy of the treated area was performed 2 weeks after the last session. The histological picture showed an atrophy of hair follicles with substantial shaft dystrophia. The sporadic, intact follicles represented vellus hair. A typical male hair type could no longer be detected (Fig 1E). At a routine checkup 6 months after the last treatment no regrowth could be observed (Fig 1B).

Fig 1a: Patient 1 is a 38-year-o1d transsexual patient (male to female) with marked male hirsutism before treatment (April 1995).

Fig 1b: Clinical picture of patient 1, 6 months after the last treatment (October 1996).

Fig. 1c: Patient 1 after 33 treatments with the PhotoDerm VL (February 1996).

Fig. 1d: Clinica1 picture of the patient 5 weeks after the last treatment (May 1996).

Fig 1e: Biopsy of the treated area after 41 treatments (April 1996; Z weeks after the last treatment). H&E stain.

Patient 2

A 30-year-old transsexual patient (male to femme) presented after 2 years of unsuccessful needle epilation (Fig. 2A).

Fig. 2a: Patient2, a 30-year-old trassexual patient (male to female), before therapy (June 1995).

Fig. 2b: Patient2 after 13 treatments (July 1996).

Treatment with the PhotoDerm VL was begun in 2- to 4-week intervals. We used the 550-nm cutoff filter, single 5-msec impulses, and fluences between 28.5 and 33.5 J per square centimeter. After 13 sessions a cosmetically satisfactory result could be achieved (Fig 2B). Nine weeks after the last treatment a skin biopsy was performed that showed miniaturized, atrophic terminal follicles. No regrowth of hair could be observed 6 months after the last treatment.

Discussion

Facial hypertrichosis (i.e., superfluous hair growth in unwanted areas) is not only a cosmetic problem for women, but may lead to severe psychosocial stress. Male to female transsexuals are especially burdened because hormone therapy with estrogens and antiandrogens has only little elect on hair type. Hair removal by shaving, mechanical depilation, or waxing shows only transient elects and is particularly painful in the delicate perioral region. Likewise, blanching of the hair with chemical agents is unsatisfactory and bears a considerable risk of contact sensitization or even toxicity [4]. Even androgendependent hirsutism seems to be antiandrogen resistant [3].

However, longer lasting therapeutic effects could be observed after electrolysis, thermolysis, or a combination of both treatments ("blend method") [2, 4, 14]. The galvanic current that develops during electrolytic therapy leads to the formation of a base that in turn destroys the germinative cells of the follicle chemically. This method is mainly applied with a multineedle device and is considered extremely timeconsuming. The therapeutic principle of thermolysis is the coagulation of the follicle by the high-frequency alternative current. Both methods use needle devices that are inserted into the hair shaft. The damaged hair is then removed with tweezers. The blend method combines both procedures, which might lead to a more effective treatment due to heating of the base [2, 4, 15]. In addition, Hage and Bouman describe a surgical approach to hypertrichosis treatment [16]. As all of these methods carry a considerable risk of scarring or postoperative pigmental changes, and as they are painful and time-consuming, alternatives for permanent, painless, and effcient hair removal are sought. Recently, pulsed dye laser treatment has been suggested as an innovative approach [6].

Our patient reports have proved that Photo-Derm VL seems to be an effective and satisfactory hypertrichosis treatment, which can be easily applied in an outpatient setting. The exact mode of action of PhotoDerm VL epilation, however, needs to be clarified. Selective photothermolytic damage to the pigmented follicular cells, which serve as chromophores, may be discussed and seems to be the principle at least for ruby laser effciency [6]. On the other hand, the vessels supplying the follicle could be damaged by photothermolytic coagulation [11, 17]. This would lead to rudimentary hair growth, which in turn would result in complete follicular atrophy. The hair growth that was observed some time after therapy could be explained by telogenic follicles that were insensitive to the light beam at the time of treatment.

An experimental study to investigate the therapeutic effects of intense pulsed-light beams on hair follicles is currently underway at the Department of Dermatology, University Hospital of Maastricht, the Netherlands (C. Schroeter, personal communication, 1977). In that study, pigskin is used as model tissue. Treatment with the PhotoDerm VL leads to a selective destruction of follicle cells, which in turn are cleared by invading macrophages. After 15 months of follow-up a normal dermis without hair follicles can be observed (Schroeter and colleagues, publication in preparation).

To treat hypertrichosis we suggest high fluences between 30 and 45 J per square centimeter. Double and triple impulses in combination with the 590-nm cutoff filter seemed to lead to faster and more eficient hair removal. This might be due to the higher infiltration depth. The spot size of 2.8 cm2 allows a convenient and fast approach. The darker the hair color, the higher the efficiency of PhotoDerm VL. The light absorption capacity of brighter or fair hair may be enhanced by coloring. Hair length should be at least 1 mm (i.e., the patient should not be shaved).

Side effects that we observed were an immediate, discrete erythema that lasted for several days and a slight swelling of the treated area. We did not observe any crusting. Deeply tanned patients and skin types 4 and 5 (Fitzpatrick) are at risk for posttherapeutic hypopigmentation or intensive posttherapeutic sun exposure, and high fluence may lead to hyperpigmentation [9]. These pigmental changes are always transient but may take months to resolve.

Due to the multiple and variant treatment parameters (fluence, impulse length, cutoE, single vs. multiple impulses) treatment with the Photo-Derm VL is ambitious. Therefore, a careful approach and a strict observence of the skin type and the grade of tanning of the patient is recommended. Both patients did not show any regrowth 6 months after treatment. The clinical and histopathological results received thus far

should encourage the treatment of larger patient groups and may initiate long-term and multicenter studies. In our eyes the PhotoDerm VL seems to be a promising, therapeutic alternative in the treatment of hypertrichosis.

References

1 Raulin C. Epilation beim Becker Naevus. Hautarzt 1996; 47:557-558

2 Richards RN, McKenzie MA, Meharg GE. Electroepilation (electrolysis) in hirsutism. J Am Acad Dermatol 1986;15: 693 - 697

3 Rittmaster RS. Medical treatment of androgen-dependent hirsutism. J Clin Endocrinol Metab 1995;80:2559-2563

4 Wagner RF. Physical methods for the management of hirsutism. Cutis 1990;45:319 - 326

5 Richards RN, Marguerite U, Meharg G. Temporary hair removal in patients with hirsutism: a clinical study. Cutis 1990;45:199 - 202

6 Grossmann MC, Dierickx C, Farinelli W, et al. Damage to hair follicles by normal-mode ruby laser pulses. J Am Acad Dermatol 1996;35:889 - 894

7 Hellwig S, Schroter C, Raulin C. Behandlung essentieller Telangiektasien durch das PhotoDerm VL. Z Hautkr 1996; 71:44 - 47

8 Schroeter CA, Wilder D, Reineke T, et al. Clinical significance of the intense pulsed light source on leg telangiectasias up to 1 mm. Eur J Dermatol 1997;7:38 - 42

9 Raulin C, Goldman MP, Weiss MA, et al. Treatment of adult port-wine stains using intense pulsed light therapy (PhotoDerm VL). Dermatol Surg 1997 (in press)

10 Raulin C, Hellwig S, Schonermark M. Treatment of a non-responding port-wine stain with a new pulsed light source (PhotoDerm VL). Lasers Surg Med 1997 (in press)

11 Goldman MP, Eckhouse SE. Photothermal sclerosis of leg veins. Dermatol Surg 1996;22:323 - 330

12 Hellwig S, Schonermark M, Raulin C. Behandlung von GefaBmalformationen und Pigmentstorungen an Gesicht und Hals durch gepulsten Farbstofflaser, PhotoDerm VL und gütegeschalteten Rubinlaser. Laryngol Rhinol Otol 1995;75:635-641

13 Raulin C, Raulin SJ, Hellwig S, et al. Treatment of benign venous malformations with an intense pulsed light source (PhotoDerm VL). Eur J Dermatol 1997;7:279 - 282

14 Hurwitz JJ, Johnson J, Howarth D, et al. Experimental treatment of eyelashes with high-frequency radio wave electrosurgery. Can J Ophthalmol 1993;28:62 - 64

15 Wagner RF, Flores CA, Argo LF. A double-blind placebo controlled study of a 5% lidocaine/prilocaine cream (EMLA~) for topical anesthesia during thermolysis. J Dermatol Surg Oncol 1994;20:148 - 150

16 Hage JJ, Bouman FG. Surgical depilation for the treatment of pseudofolliculitis or local hirsutism of the face: experience in the first 40 patients. Plast Reconstr Surg 1991;88: 446 - 451

17 Anderson RR, Parrish RR. Selective photothermolysis: precise microsurgery by selective absorption of pulse radiation. Science 1983;220:524 - 527
