

Epidermal nevus in blaschkoid distribution treated with dual-wavelength copper vapor laser

Sir,

Epidermal nevi develop due to benign overgrowth of cells either involving keratinocytes only (non-organoid type) or in combination with cells of hair follicles, sebaceous glands or sweat glands (organoid type). Epidermal Blaschko line-distributed nevi may be represented by linear verrucous inflammatory nevus, sebaceous and non-organoid nevus. Linear verrucous inflammatory nevus appears as red, eczematous-like area.

Epidermal nevus usually occurs on the trunk and limbs and is uncommon on the face or scalp.¹ Blaschkoid epidermal nevi are associated with post-zygotic mutations.²

Facial epidermal blaschkoid nevus without both inflammation and itching, clinically, may be consistent with the diagnosis of nevus sebaceous. On clinical grounds, such case should be presented as an epidermal nevus in blaschkoid distribution.

Facial blaschkoid nevus gives rise to poor cosmetic appearance and makes patients seek the aid of dermatologists to remove it. Surgical excision of facial blaschkoid nevus may be ineffective and associated with recurrences and scar formation. The ablative lasers (Er: YAG, CO₂) were used for the treatment of small- or medium-sized nevus sebaceous with acceptable results. The use of CO₂ laser for the treatment of nevus sebaceous has shown fair results, but is associated with hyperpigmentation, mild atrophic scarring and significant downtime as side effects.^{3,4} The treatment of nevus sebaceous should include total elimination of acanthotic cells as well as sebocytes and remodeling of the adjacent vascular bed of the involved area. The dual-wavelength copper vapor laser wavelengths (511 and 578 nm) are highly absorbed by melanin, lipids and blood chromophores and seem to be optimal for the removal of nevus sebaceous, targeting all relevant chromophores in the lesional acanthotic epidermal cells, sebocytes and blood vessels.⁵ This is a report of the use of copper vapor laser to successfully treat facial epidermal blaschkoid nevi which has not been reported hitherto.

A 24-year-old man with Fitzpatrick skin phototype II presented with a yellowish plaques, sized 10 × 20 cm, along Blaschko's lines on the right cheek, forehead, nose, neck [Figure 1a] and back of the trunk. Located on the face, this patch showed neither any inflammation nor itching. Based on clinical signs (as the photomicrograph is not available), this case may be considered as epidermal nevus in blaschkoid distribution.

The patient had no associated growth or developmental abnormalities such as ocular, neurological or bone anomalies.

The informed consent was obtained after the patient was counseled regarding the risks and benefits of laser treatment. At the request of the patient, laser treatment was carried out only on the face.

The facial and scalp lesions were treated with copper vapor laser (Yakhroma-Med, Lebedev Physical Institute of the Russian Academy of Sciences). The settings were as follows: average power of 0.8–1.0 W, a ratio at green (511 nm) and yellow (578 nm) wavelengths of 3:2, the exposure time was 0.2 s and the diameter of the light spot on the skin was 1 mm. The treatment endpoint was the treated area acquiring a grayish tint. The treatment was performed without anesthesia. After the procedure, the skin was treated with 0.05% solution of chlorhexidine gluconate and Bepanthen cream twice a day.

The laser procedure was not accompanied by any bleeding or erythema. The irradiated skin healed with exfoliation after ten days with complete restoration of epidermis, without any pigmentary changes. The lesions were treated with copper vapor laser six times at an interval of two months. Following six sessions of dual-wavelength laser radiation, the facial nevus sebaceous compartment was completely cleared [Figure 1b]. No recurrences were observed up to 24 months after the final laser treatment.

In the laser management of the epidermal blaschkoid nevus, the target chromophores include melanin in acanthotic

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Figure 1a: Epidermal nevus in blaschkoid distribution over the face in a male patient before copper vapor laser treatment

cells, lipids in sebocytes as well as oxyhemoglobin and hemoglobin in erythrocytes of the microvascular bed of the papillary dermis.⁶ The high simultaneous absorption of dual-wavelength copper vapor laser radiation at 511 nm and 578 nm by all the target nevus sebaceous chromophores provided the sound removal of nevus sebaceous due to the appropriate heating of melanin in acanthotic cells, sufficient sebum discharge and photodestruction of the involved dilated microvascular bed.⁷ Copper vapor laser at 578 nm, mostly absorbed by oxyhemoglobin and deoxyhemoglobin, provides appropriate photocoagulation followed by the remodeling of the vascular bed, likely preventing both relapses and malignant change in facial blaschkoid nevus.⁷ The limited penetration depth of copper vapor laser in the dermis due to the high absorption of radiation by melanin, sebum lipids, oxyhemoglobin and hemoglobin determines the main advantage of copper vapor laser in comparison with other laser systems. Copper vapor laser neither passes into the deep dermis nor overheats dermal stem cells, essential for the appropriate skin healing after the laser exposure.⁶ Copper vapor laser can be useful in the treatment of facial epidermal nevi distributed along Blaschko's line without inflammatory signs.

Additional prospective studies with more patients and longer follow-up are warranted to determine the treatment efficacy.



Figure 1b: Fair resolution of the plaque eight months after six copper vapor laser treatments

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

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Conflicts of interest

There are no conflicts of interest.

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Treatment of congenital melanocytic nevi in the periorbital area with dual-wavelength copper vapor laser

Sir,

Facial congenital melanocytic nevus represents a rare condition with a prevalence of about 2%.¹ As periorbital congenital melanocytic nevus appears as a hyperpigmented plaque close to the eye, it inevitably poses cosmetic problems. The excision of the nevus is reported to be associated with the high risk of scarring in the esthetic zones.² Ablative lasers such as CO₂ laser (10,600 nm) and Er:YAG (2940 nm) as well as non-ablative mid-infrared lasers, especially ruby (694 nm), alexandrite (755 nm) and Nd:YAG (1064 nm) have so far been successfully tried for the treatment of congenital melanocytic nevus.^{3,4} Nevertheless, the application of laser systems in the periorbital area remains limited due to reported side effects including bleeding, edema, relapses, scarring and ocular complications.⁴ The complications of laser treatment may emerge due to the deep penetration of mid-infrared radiation because of its low absorption by both melanin and hemoglobin assumed as targeted chromophores. However, dual-wavelength copper vapor laser radiation at a wavelength of 511 nm is highly absorbed by melanin and radiation at 578 nm is mostly absorbed by hemoglobin. Thus, this laser seems to be the most appropriate for the safe removal of periorbital congenital melanocytic nevus.

The nevi were treated using copper vapor laser in two patients with Fitzpatrick II skin phototype. A 14-year-old girl presented with a brownish plaque of size 42 × 35 mm beneath the left lower eyelid [Figure 1]. A 23-year-old man presented with, a hyperpigmented plaque of size 30 × 50 mm in the right periorbital area [Figure 2]. The nevi were noted since birth and increased in size during body growth. No history



Figure 1a: The 14-year-old girl with congenital melanocytic nevus at the left periorbital area before copper vapor laser treatment



Figure 1b: The 14-year-old girl with congenital melanocytic nevus at the left periorbital area after the third copper vapor laser treatment

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