



Successful Treatment of Sebaceous Nevus With Copper Vapor Laser

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Abstract

Introduction: Sebaceous nevus (SN) is a benign skin hamartoma with a potent transformation in benign or malignant tumors in adolescents or adults. Due to the most common location in the esthetic zone, an SN makes patients seek a dermatologist for cosmetic concerns on the face or neck. The surgical excision of a large-sized SN in the esthetic zone may require reconstruction with a skin flap and be associated with recurrences and scar formation.

Case Report: We describe the successful treatment of the large-sized neck SN with copper vapor laser (CVL) for the first time. A left-sided neck SN (linear size of 27 mm) in the 24-year-old Caucasian female completely resolved after eight CVL sessions. The settings were as follows: average power accounted for 0.8-1.0 W, with a ratio at green (511 nm) and yellow (578 nm) wavelengths of 3:2. The pulse duration was set as 20 nanoseconds, the repetition rate 16.6 kHz, the exposure time 200 ms, light spot diameter of 1 mm. The CVL treatment resulted in the complete disappearance of the SN without remote side effects such as hyperpigmentation, scarring or recurrences 24 months after the treatment. The patient was satisfied with the excellent cosmetic results.

Conclusion: The CVL treatment of the SN provides the most relevant result due to the complete elimination of SN cells and the remodeling of the vascular bed supplying the involved areas.

Keywords: Sebaceous nevus; Laser treatment; Copper vapor laser.

Introduction

A sebaceous nevus (SN) is a benign skin hamartoma first described by Josef Jadassohn in 1895. The prevalence of SN in newborns varies from 0.1-0.3 %.¹ The SN may manifest as a solitary nevus or be associated with SCALP syndrome (SN, central nervous system malformations, aplasia cutis congenital, limbal dermoid, and pigmented nevus). Schimmelpenning-Feuerstein-Mims syndrome manifests as an SN with coexisting brain, skeletal, ocular and more rarely cardiovascular and urogenital defects.^{2,3} The advanced SN in adults presents hyperplasia of sebocytes, acanthosis in the epidermis, inflammation, and peripheral telangiectasias in the papillary dermis.^{4,5} The excisions of a large SN, mainly located on the scalp and face, are limited by soft tissue laxity and convex surfaces and may require reconstruction with a skin flap.⁶

The pathogenetic management of the SN must eliminate hamartous sebocytes, acanthotic cells and the obliteration of the involved microvessels. The laser radiation must be appropriately absorbed by such target molecules as lipids, melanin, oxyhemoglobin, and vascular endothelial growth factor (VEGF). Lipids and melanin differ in their high absorption of 511 nm radiation.⁷ Highly absorbed by oxyhemoglobin, 578-nm radiation suppresses VEGF

expression.⁸

So far, the dual-wavelength radiation (511 nm and 578 nm) has proven to be most appropriate for the laser management of a large-sized verrucous SN in the esthetic zone.

Here, we report the first case of successful therapy of the SN using a dual-wavelength copper vapor laser (CVL).

Case Report

We report the case of a 24-year-old Caucasian female patient who presented with a well-defined, brownish oval verrucous left-sided second-stage SN plaque on her neck (linear size of 27 mm) (Figure 1A). The lesion had been present since birth. She had no developmental abnormalities. She decided to seek medical consultation because the lesion had increased over the past two years.

The diagnosis is based on clinical features and confirmed by histopathology. Histologic examination revealed mature sebaceous and acanthotic cells in the epidermis and peripheral telangiectasia in the lower papillary and upper reticular dermal layers.

The patient gave written informed consent for the SN treatment with CVL (Yakhroma-Med, Lebedev Physical Institute of the Russian Academy of Sciences).

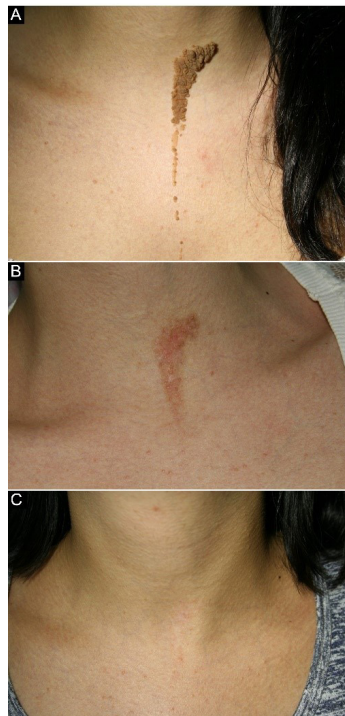


Figure 1. Sebaceous Nevus Over the Neck in a Female Before (A), 1 Month After the First Copper Vapor Laser Treatment (B), and Complete Resolution of the Lesion at an 8-Month Follow-up After CVL treatment (C)

CVL treatment was performed at an average power of 1.0 W, with a ratio at green and yellow wavelengths of 3:2. The exposure time was 0.2 sec. The diameter of the light spot on the skin was 1 mm. The SN (linear size of 27 mm) was successfully treated during eight CVL sessions at 3-4 week intervals.

The immediate clinical endpoint of multiple stacking passes was accepted as the mild graying of the exposed area. The color of the treated SN's area acquired a grayish tint for several days. Peels were exfoliated after 7-10 days, with the formation or restoration of the epidermis without hyper- or hypopigmentation (Figure 1B). The treatment was performed without anesthesia. After laser exposure, the skin was treated with a 0.05% chlorhexidine gluconate solution. In the early postoperative period, Bepanthen cream was applied twice a day. The healing process lasted two weeks.

Results

According to the clinical examination, the SN resolved completely without flat scarring after healing the post-radiated area. Figure 1C demonstrates the excellent clinical and cosmetic results owing to the CVL treatment of the SN. No recurrences or side effects such as dyschromia, atrophy, or scarring were observed during the entire observation period up to 24 months after the treatment.

Discussion

Many researchers consider the SN to be a risk factor for

malignization.^{9,10} The treatment of SN may implement surgical excision, dermabrasion, topical photodynamic therapy, and cryosurgery.¹⁰ The ablative lasers (Er: YAG and CO₂) have been reported to be used to treat the SN.^{11,12} Verma and colleagues study showed appropriate results of the SN treatment with the CO₂ laser. Still, in 26 % of the cases, the patients demonstrated hyperpigmentation and mild atrophic scarring (13 % of cases) in the post-treatment period. Probable bleeding, hypopigmentation, and scarring limit the use of ablative CO₂, Erbium lasers.¹³ The low safety of the ablative laser treatment can be related to the poor removal of involved microvessels.¹⁴ The complete removal of the facial SN with the fractional CO₂ laser included the following pulsed dye laser (595 nm) treatment to prevent scarring after the ablation of the large-sized lesion.¹⁵ The treatment of epidermal nevi with picosecond lasers demonstrated limited success due to blistering and disruption of the epidermal-dermal junction.¹⁶

The dual-wavelength CVL radiation seems promising for the relevant pathogenetic laser treatment of verrucous SN in esthetical zones. CVL 511-nm (green) radiation eradicates hamartous sebocytes and acanthotic epidermal cells. CVL 578-nm (yellow) radiation inhibits VEGF¹⁷ and provides reliable obliteration of adjacent microvessels.¹⁸ Moreover, CVL treatment provides fast healing without remote scarring of the large-sized, advanced SN on the neck.

Conclusion

The dual-wavelength CVL (511 & 578 nm) radiation seems effective and safe for SN treatment of large-sized verrucous SN in esthetical zones. CVL provides the most relevant result due to the complete removal of hamartous sebocytes and acanthotic epidermis and the remodeling of the involved vascular bed. The dual-wavelength CVL management of the advanced SN provides the appropriate reconstruction of skin and appendages without any remote side effects.

Additional studies are required to determine the optimal parameters to achieve maximum treatment efficiency and minimize the risk of complications.

Authors' Contribution

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Competing Interests

There are no conflicts of interest.

Ethical Approval

The patient gave written informed consent for publication (including the images). According to the World Medical Association Declaration of Helsinki (2013), this study was conducted ethically. The Local Ethical Committee at the Medical Center "Health Institute" approved this research study.

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