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Successful treatment of a large epidermal nevus using serial sessions of CO_2 ablative laser

CO_2 ablatif lazerin seri seansları ile büyük bir epidermal nevüsün başarılı tedavisi

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Anahtar Kelimeler: Ablatif lazer, Co_2 ablatif lazer, epidermal nevüs, lazer, verrüköz epidermal nevüs

To Editor,

Epidermal nevi (EN), derived from epidermal keratinocytes, are considered benign hamartomas that may be present at birth but clinically may become visible in early childhood or even later and grow together with the child. Linear EN is characterized by a linear arrangement of nevi, usually present on one side of the body along the lines of Blaschko[1-3]. EN is asymptomatic and is considered to lack malignant potential. Patients seek treatment for cosmetic reasons. Several treatment modalities for EN have been mentioned in the literature, with variable success rates. Topical steroids, calcipotriol, retinoids, 5-fluorouracil, a combination of 5-fluorouracil (5%) and tretinoin (1%), chemical peeling, podophyllin, and IL-steroids have not been successful[2-4]. Surgery, dermabrasion, electrosurgery, cryotherapy, photodynamic therapy, and several lasers have been tried for the treatment of EN with variable success[1,2,4,5]. In this article, we present a case of linear EN over the forehead and scalp successfully treated with serial sessions of carbon dioxide CO_2 ablative laser.

A twenty-six-year-old man visited our clinic with a cosmetic concern regarding a large EN on the right side of his forehead and frontal scalp. He had planned to marry after one year, which obliged him to seek treatment. He had no other health complaints. The nevus was present since childhood and became warty and darker in appearance during adolescence. The patient did not have a history of similar lesions in his parents or siblings. On examination, brownish verrucous papules and plaques were present in a Blaschkoid pattern over the right side of the forehead and frontal scalp, reaching nearly the middle of the scalp (Figure 1a). The patient reported that he had not received any treatment for the nevus before. The laser treatment was discussed with the patient, including its outcome, adverse effects, and post-procedure treatment. Photographs (before, during, and after the procedure) and a detailed informed consent were obtained from the patient.

The skin was prepared with an antiseptic (betadine), and a local anesthetic containing prilocaine 2.5% w/w and lidocaine 2.5% w/w (Prila™ 5% cream) was applied under occlusion over the affected area for 45 min. On the first visit, we selected a small area (2-3 cm square), the most distal part of the nevus (towards the posterior part of the scalp), as the test spot (Figure 1b). The area was marked with a marker, and laser ablation was performed. After the procedure, a topical antibiotic was applied, and the patient was advised to apply sunscreen regularly. After 15 days, the patient was

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reassessed. There were no signs of scarring or dyspigmentation, and a decision was made to treat the complete nevus. The nevus was divided into three parts: upper, middle, and lower (Figure 1c). Each selected part was treated twice. In the first session (primary session), the major debulking of the laser was performed using ultra-pulse or super-pulse mode (depending on the thickness of the nevus) until a faint brownish color of the nevus was left, which was considered the end point of the primary session (removing approximately 70-80% of the selected part of the nevus). The second session (retouch session) was performed after 15 days (or more) of the primary session using only the ultrapulse mode to remove the rest of the nevoid material until all brownish color was removed, and there was an appearance of whitish dermal tissue with visible pinpoint bleeding. Using this protocol, six sessions were performed (three primary and three retouch, excluding spot test). The laser used was a CO_2 laser (Ecoxel™, IDS LTD, Seoul, Korea) operated in the general surgical mode. For the ultra-pulse mode, the parameters used were: energy 45-55 mJ, pulse duration: 700-900 µs, and repeat time: 50 ms. For the Superpulse mode, the settings used were: energy 60-70 mJ, pulse duration 1.0 ms, and repeat time 50 ms. Despite using the superpulse mode, no wound was formed because it was used only for debulking. At the end of using the superpulse mode, only the thickness of the nevus decreased; it became thinner and ready to be followed by the ultrapulse mode in the next session (retouch session). The ultrapulse mode (using higher energy) was continued until end points (removing the rest of the brownish nevoid material, appearance of whitish dermal tissue, and presence of pinpoint bleeding) were reached. Therefore, following such a protocol, only superficial erosions were formed at the procedure site, which were treated with fusidic acid ointment twice daily for 1 week and regular use of sunscreen. At the follow-up visit one month after the last treatment session, the treated area appeared almost normal, similar to the surrounding untreated skin, with negligible contrast (Figure 1d), and the result was described as magical by the patient. At the 6-month follow-up, the patient maintained a favorable cosmetic outcome without any side effects or recurrence of the nevus.

Several studies have supported the role of ablative CO_2 laser in the treatment of EN[1-3,5-7]. CO_2 laser devices emit laser beams with a wavelength of 10,600 nm, occupying the infrared spectrum. Water (intracellular/extracellular of epidermis/dermis) is the primary chromophore causing vaporization of tissue due to the generated heat. Consequently, tissue coagulation and destruction occur. The major issue in using a continuous laser beam is the nonspecific damage caused to the tissues by the generated heat. This type of tissue damage can reach below the surface (up to 0.5 mm to 1.0 mm),

Figure 1. (a) Linear verrucous epidermal nevus along Blaschko lines; **(b)** The most distal part of the nevus selected for spot session, immediately after spot session; **(c)** Ready to ablate the upper 1/3rd of the nevus at the first session. Note: The area of the spot session (blue stars) has healed uneventfully; **(d)** Follow-up at 1 month after the final session showing almost complete clearance of the nevus.

which explains the occurrence of undesirable effects such as scarring or dyspigmentation[2,8]. The margin of safety during laser ablation of EN is extremely narrow. On one hand, if the treating physician is trying to be defensive by staying superficial and removing only the epidermis, there is a high possibility that the nevus will recur. However, aggressive treatment that surpasses the reticular dermis increases the chances of developing hypertrophic scarring, which is very high[8]. Generally, we should limit tissue vaporization to the papillary dermis to prevent negative consequences[8]. Therefore, in the present case, each area was treated twice. In the primary session, ablation was meant to achieve debulking (removing 70-80% of nevoid substance), and ablation was stopped when a faint brownish color of the nevus was left. In the retouch session, the rest of the nevus was ablated until pinpoint hemorrhage and whitish dermal tissue became visible. This protocol achieved both goals: complete removal of the nevus and avoidance of adverse effects.

With newer CO_2 laser models (superpulse and ultrapulse type lasers), there is better control over tissue ablation and depth of thermal damage. This has been reflected clinically with less scarring[5,9]. Michel et al. [10] treated five patients with linear EN with excellent cosmetic outcomes with 1-4 sessions. There was no recurrence at the 2-year follow-up. They suggested that repeated laser passes with low-power beams can reduce the risk of scarring. Sarah and Tina used a short pulse CO_2 laser (one to two sessions) in three patients and demonstrated a good long-term outcome with almost no recurrence (except for a small lesion at the ankle in one patient) at 10-13 months of follow-up[6]. Alonso-Castro et al.[2], in their study of 20 patients (15 EN and 5 with inflammatory linear verrucous EN), found that 17 patients were satisfied or very satisfied with the laser outcome. At the 18-month follow-up, recurrence was noted in only 30% of the cases. A study by Bhat et al.[7] on 15 patients with EN (8 with verrucous EN and 7 with sebaceous nevi) showed a good outcome with a recurrence of only 20% at 10 months of follow-up. They concluded that the CO_2 laser is an effective treatment modality for EN that is safe, well tolerated, and with a minimal downtime[7]. Paradela S et al. [5], from their study on 25 cases of verrucous EN, concluded that using lower fluences with superpulse mode initially in areas of cosmetic significance can yield better aesthetic outcomes with lower rates of recurrence and scarring.

The present case substantiates the efficacy of CO_2 laser treatment for EN in producing excellent aesthetic results. Treating the same nevus area in sessions with a gap of at least 15 days gives the skin a chance to recover from thermal damage and allows complete removal of the nevus with minimal scarring and recurrence.

Ethics

Informed Consent: Photographs (before, during, and after the procedure) and a detailed informed consent were obtained from the patient.

Footnotes

Conflict of Interest: No conflict of interest was declared by the author.
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