Treatment of Diffuse Plane Xanthoma of the Face With the Erbium:YAG Laser

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The Cutting Edge: Challenges in Medical and Surgical Therapeutics

REPORT OF A CASE

A 23-year-old woman presented with an 8-year history of progressive diffuse plane xanthomata of the face and neck. Beginning at the earlobes and neck, these yellowish maculopapular lesions had spread over the whole face and neck region, making the patient look as if she were wearing a mask (Figure 1A and Figure 2A). Histologic features were typical for plane xanthoma with multiple foam cells surrounding the sebaceous glands and hair follicles in the whole dermis, in parts reaching the dermis-fat junction. Electron microscopic findings showed foamy histiocyte-like cells and solitary infiltrating giant cells in the dermis. Triglyceride, lipoprotein, and cholesterol levels were normal. Other reasons (eg, monoclonal gammopathies, lymphoproliferative diseases, or normolipemic xanthomatous syndromes) were excluded as well by findings from lipid- and immunoelectrophoresis, blood cell counts, radiography of the skull, and electron microscopy, which were consistent with diffuse idiopathic plane xanthoma (group II, type 1).

THERAPEUTIC CHALLENGE

This patient was disturbed by her facial disfigurement. Because of the cobblestonelike surface of the lesions, she was not able to put on makeup and felt as though she was wearing a mask. Our aim was to remove the widespread lesions with a low risk of scarring.

SOLUTION

We proposed to remove the plane xanthoma with a resurfacing laser. Two 1-cm² test areas on the chin and forehead were treated on one side with an Erbium (Er):YAG laser (MCL 29; Aesculap-Meditec GmbH, Heroldsberg, Germany) (laser wavelength, 2.94 µm; pulse length, 250 microseconds; repetition rate, 7-10 Hz; spot size, 4 mm; pulse energy, 500 mJ; fluence, 4 J/cm²) and on the other side with a continuous-wave (CW) carbon dioxide (CO₂) laser (Sharplan 1020 [50-mm handpiece]; Sharplan Laser Industries, Tel Aviv, Israel) with a 1- and 2-mm spot size at 5 W. In each case, the lesions were ablated into the superficial dermis until papillary bleeding occurred.

After 3 months, both test areas showed resolution of the lesions without recurrence (Figure 1A and Figure 2A). Because the Er:YAG laser–treated area had healed faster, the Er:YAG laser was used for full-face resurfacing under general anesthesia. No pretreatment with hydroquinone was done. Perioperatively, herpes prophylaxis with acyclovir (200 mg by mouth 3 times a day) was prescribed for 10 days. Postoperatively, hydrocolloid dressings were applied until the beginning of rep epithelialization, followed by the application of petrolatum gauze and antiseptic ointment (Bepanthen; F. Hoffmann-La Roche Ltd, Basel, Switzerland) for 1 week. For further postoperative care, we recommended an ointment containing ascorbic acid and sun protection.

After 2 months a retreatment of the persisting parts of the xanthomas was performed, but not all of the lesions could be completely removed (Figure 1B and Figure 2B, yellowish areas). One year after the second laser session, the persisting areas of xanthoma on the upper lip, cheeks, and chin had remained flat and smooth, showing no tendency to recur. In the periorbital area where the xanthomas had been totally removed, no recurrences were noted. Textural changes or scarring were absent (Figure 1B and Figure 2B). A third Er:YAG laser session is planned to further improve the results. Because of the high risk of scarring, we did not treat the neck and earlobe region. Presently, the patient is pleased with these partial results. Because of the smoothened surface, she can now apply makeup without problems to cover the remaining discoloration.

COMMENT

Single plane xanthomas are yellow to cream-colored patches and plaques associated with xanthelasma palpebrarum and normal plasma lipid levels. Histologically, clusters of xanthoma cells with foamy cytoplasm surrounding blood vessels are in the dermis. Touton or foreign body giant cells are absent.

Diffuse plane xanthomas can be divided into 2 groups: group I is associated with increased serum lev-
els of lipids due to familial hyperlipemia or biliary cirrhosis, whereas group II has normal lipid levels. The latter can further be divided into 3 subtypes: type 1 is idiopathic, type 2 is associated with lymphoproliferative diseases, and type 3 is associated with abnormalities of the structure or content of lipoproteins. All types can appear principally in a widespread or diffuse pattern, but group II type 2 is more likely to appear in a diffuse pattern.

Ablative lasers such as the scanned CW CO₂, pulsed CO₂, and Er:YAG lasers are safe and effective devices for the removal of epidermal or superficial dermal lesions. The scanned CW and pulsed CO₂ lasers are classic devices for skin resurfacing. The thermal effect leading to collagen shrinkage is desired in the treatment of rhytids because it seems to enhance tightening. In areas of thin skin such as the periorbital area, these lasers have to be used very cautiously to prevent scarring or an ectropion.

Figure 1. A, Full face 8 weeks after the treatment of the test areas before the first full lesional treatment. B, Full face 1 year after the second full lesional treatment. Almost complete clearance on forehead, periorbital, and nasolabial areas; persisting brownish xanthoma on the upper lip, cheeks, and chin.

Figure 2. A, Forehead area before the first full lesional treatment. Almost complete clearance in the test areas (no hypopigmentation compared with the untreated area just above the right eyebrow). B, Close-up of forehead area 1 year after the last full lesional treatment.
of the eyelid. The Er:YAG laser is a purely ablative laser with a much smaller thermal coagulation zone due to its high absorption in tissue.\textsuperscript{9,11,12}

All therapeutic options in the treatment of plane xanthoma are based on mechanical removal by excision, chemabrasion, dermabrasion, or ablative laser therapy.\textsuperscript{13,14} We chose to remove the lesions by laser ablation. Because of its high scarring risk, the CW CO\textsubscript{2} laser has to be used very carefully. The scanned CW CO\textsubscript{2} and pulsed CO\textsubscript{2} laser were considered because of their reduced risk of scarring (coagulation zone up to 200 \textmu m).\textsuperscript{7} However, we chose the Er:YAG laser because of the faster healing seen in the test areas.\textsuperscript{15,16} Additionally, the phenomenon of skin tightening by collagen shrinkage (an effect seen in CO\textsubscript{2} laser resurfacing) was not important in this case.

With the Er:YAG laser, no further treatment is possible as soon as papillary bleeding occurs. The risk of scarring is therefore reduced to a minimum. Another advantage of the "cold ablative" technique with the Er:YAG laser over the use of the scanned CW CO\textsubscript{2} and pulsed CO\textsubscript{2} lasers is in the duration of postlaser erythema and hypopigmentation or hyperpigmentation: the Er:YAG laser has the shortest duration, followed by the pulsed CO\textsubscript{2} laser and then the scanned CW CO\textsubscript{2} laser.\textsuperscript{15-18} Using the cold ablative technique (with reported coagulation zones of 5 to 50 \textmu m),\textsuperscript{12,17,18} the reepithelialization time of approximately 6 days is faster than that of CO\textsubscript{2} laser-treated areas.

In our patient, the test sites treated with the Er:YAG and CW CO\textsubscript{2} lasers showed similar clearance of the lesions. Knowing that the risk of scarring would be higher with the CW CO\textsubscript{2} laser, we chose to perform the full-face treatment with the Er:YAG laser. In 2 sessions the lesions were removed almost completely. Six days after each of the laser treatments, reepithelialization was complete. No scarring or textural changes of the skin could be seen. Due to the superficial ablation of the lesions, a recurrence of the plane xanthomas would be expected to occur. However, almost 1 year later the patient shows no recurrence of the xanthoma.

Because diffuse plane xanthoma can be a precursor of monoclonal gammopathy and associated myeloproliferative disorders, annual immunoelectrophoresis should be performed to monitor for the onset of these diseases. Er:YAG laser therapy of facial diffuse plane xanthoma is an effective ablative treatment that shows acceptable rates of adverse effects and fast reepithelialization.

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