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Electroplaning of Non-Inflammatory Linear Verrucous Epidermal Nevi (LVEN)

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ABSTRACT

Background: The non-inflammatory linear verrucous subtype of epidermal nevi (LVEN) although generally benign, can be aesthetically displeasing and functionally disfiguring to patients.
Objective: To provide a permanent improvement in the clinical appearance of LVEN with minimal scarring.
Method: Electroplaning with Surgitron® FFPF EMC was the chosen method of treatment.
Results: Electroplaning is a simple, safe, and effective method for improving the appearance of non-inflammatory linear epidermal nevi.

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INTRODUCTION

Linear verrucous epidermal nevi (LVEN) are hamartomas characterized by clonal proliferation of embryonic ectodermal cells in a linear configuration following Blashko's lines.[1-4,9] These sporadic, asymptomatic, female-prevalent, non-nevus cell tumors present at birth or within the first year of life are usually localized to keratinized: facial, neck, trunk or extremity skin; rarely oral and genital lesions have been reported.[5-6,10] Less common systematized forms include unilateral (nevus unis lateralis) and extensive bilateral (ichthyosis hystrix). A subset of tumors (<30%) may be associated with the epidermal nevus or Solomons' syndrome—a phakomatosis that can include: ocular, skeletal, cardiac, renal, neurologic (seizures, mental retardation) defects as well as intracranial and/or intraspinal lipomas.[2,3] Rarely, the development of squamous cell, basal cell, and other skin carcinomas has been reported.[11-17] Generally, LVEN are benign; the patients' desire for an improved appearance of the affected area is the primary rationale for treatment.

Treatment modalities including excision, laser, dermabrasion, cryosurgery, chemical peels, anthralin, systemic and topical retinoids, 5-flourouarcil, calcipotriene, and podophyllin have been limited by unacceptable cosmetic outcomes, recurrence, or unacceptable toxicities.[18-24]

OBJECTIVE

The goal in this patient was to provide a permanent improvement in the clinical appearance of the site with minimal scarring, therefore, electrosurgery was considered.

We previously reported the successful treatment of refractory, intertriginous Darier's Disease using electrosurgery.[25] The discussion that follows describes the use of electroplaning (a refined form of electrosurgery) for the removal of linear verrucous epidermal nevi from the skin of the breast and areola in an African American female that includes 10-year follow-up photographs.[26-29]

Case Study

A healthy 23-year-old African-American nulliparous female presented requesting treatment of an asymptomatic 'embarrassing' mole on her chest present since birth, growing as she grew.

There was no family history of similar lesions, her childhood developmental milestones were within normal ranges, and she denied a history of seizures or other medical problems.

On physical examination, the patient was a healthy, young adult woman without evidence of skeletal, neurologic, ocular, or auditory deficits suggestive of nevus syndrome. Her cutaneous examination was significant for mild facial acne vulgaris and hyperpigmented verruciform, soft papillomatous papules coalesced in linear arrays radiating from the skin of her left breast. The skin of the left nipple was deformed by the presence of similar lesions growing in a horn-like formation. The aperture to the lactiferous glands was not visible. There were no underlying lesions detectable by palpation. There were no café au lait spots. There were no keloidal or hypertrophic scars or evidence

FIGURE 1. LVEN Pre op **a)** anterior, **b)** lateral, **c)** anterior-medial

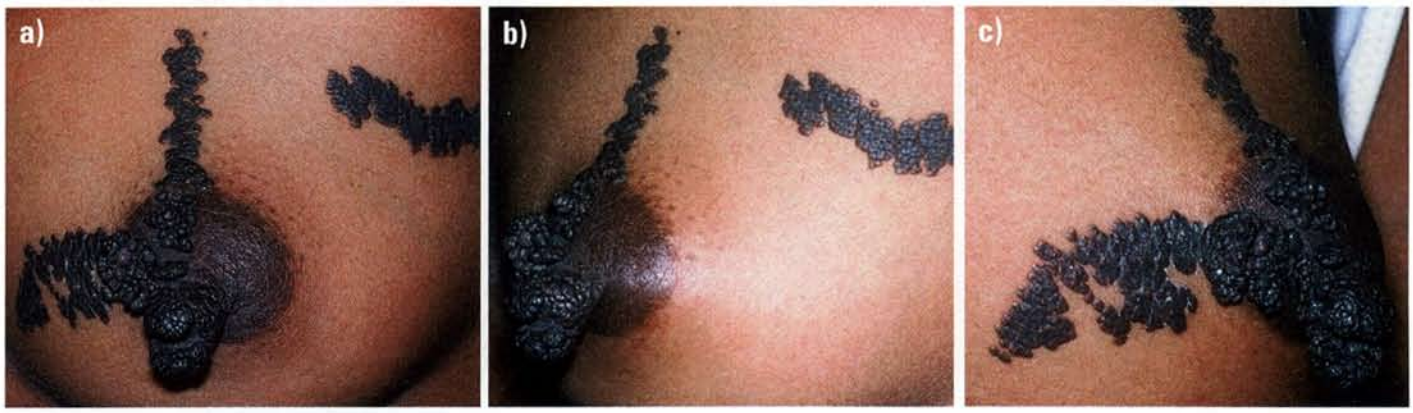


FIGURE 2. Ellman Surgitron

of significantly hyperpigmented acne scars. The clinical diagnosis was linear verrucous epidermal nevus.

The location and extent of the nevi in conjunction with the possibility of scarring precluded surgical excision. Electroplaning was described to the patient as a less radical and theoretically effective treatment option with the caveats of recurrence, keloid formation, hyperpigmentation, abnormal nipple contour, and function. [30]

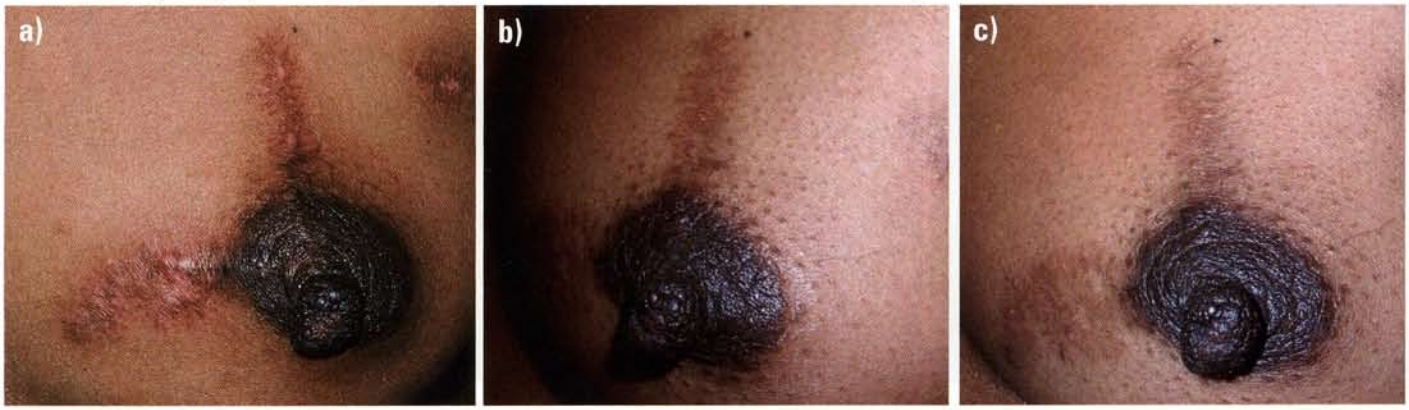
METHODS

Pre-operatively, the patient was instructed to cleanse the areas to be treated with chlorhexidine twice daily for 7 days. On the 7th day, signed consent was obtained and pre-operative surgical site photographs were taken (Figures 1a, b, c). Lesional and peri-lesional skin was prepped with alcohol pads, and tumors were locally infiltrated with 20cc 1% xylocaine w/o epinephrine (electrosurgery allows for cautery), followed by betadine re-prep and sterile draping.[26]

A Surgitron® FFPF EMC (Figure 2) pad was placed under the patient's left scapula. The surgical unit was tuned to the fully rectified mode (planning). An 8-mm fine wire loop electrode was passed through the most exophytic portions of the tumors, followed by use of a 3-mm fine wire loop at the same setting for precise planning to the normal skin height. The nipple was sculptured with a 2-mm extra fine loop (Surgitron settings unchanged). Three samples of tissue from different segments of the nevi were submitted to the dermatopathologist for histological assessment. The results confirmed the clinical diagnosis. Post-operatively, all surgical sites were covered with petrolatum and an occlusive dressing.

Forty-eight hours after surgery, the patient called stating the dressing was no longer intact. She was instructed to cleanse the treated skin with hydrogen peroxide, and apply petrolatum followed by a telfa dressing, daily. Five days post-operatively, the surgically treated skin was pink with some eschar; there was no

FIGURE 3. LVEN post-op **a)** anterior, **b)** lateral, **c)** anterior-medial



surrounding erythema or edema. Daily dressing changes were continued until the skin completely resurfaced. Five weeks post-operatively, the re-epithelialized surgical sites exhibited mild variegate hyperpigmentation and erythema. The patient was instructed to apply a steroid cream twice daily and return in 4 weeks. Nine months later the patient returned. Two of the treated sites demonstrated firm 2-3m papulonodules suggestive of early keloids. The remainder of the surgically treated skin was variably hyperpigmented. Diluted triamcinolone acetonide/xylocaine (5 mg/cc) was injected into each nodule (1/4 cc) and a pharmacy compounded bleaching cream (containing hydroquinone, tretinoin, and a mid-potency topical steroid) was prescribed for 30 days.

RESULTS

The patient was lost to follow-up and returned 10 years later requesting upper arm liposuction. Photographs of the electroplaned surgical sites were taken (Figures. 4a, b, and c). Examination of the nipple revealed a patent (functional, according to the patient) lactiferous gland. She was very pleased with the cosmetic result and no longer felt uncomfortable with the appearance of the skin on her breast.

CONCLUSIONS

Electrosurgery is our treatment of choice for earlobe keloids as well as benign nevoid nevi, rhinophyma, acne keloidalis nuchae, and severe pseudofolliculitis barbae. This report affirms the safety and efficacy of electroplaning as a simple method for improving the appearance of non-inflammatory linear epidermal nevi.

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DISCLOSURES

The author has no relevant conflicts of interest to disclose.

REFERENCES

1. Rogers M, McCrossi I. Comments C. Epidermal nevi and the epidermal nevus syndrome. *J Am Acad Dermatol.* 1989;20: 476-488.
2. Chatproedprai S, Wananukul S, Prasarnnaem T, Noppakun N. Epidermal nevus syndrome. *Int J Dermatol.* 2007;46(8):858-860.
3. Vidaurri H, Tamayo S, Durán M , et al. Epidermal nevus syndromes: clinical findings in 35 patients. *Pediatr Dermatol.* 2004;21(4):432-439.
4. Su WP. Histological varieties of epidermal nevus. *Am J of Dermatopathol.* 1982;4:161-170.
5. Tesi D, Ficarra G. Oral Linear Epidermal Nevus: A Review of the Literature and Report of Two New Cases Head Neck Pathol. 2010;4(2):139-143.
6. Ozçelik D, Parlak AH, Oztürk A, et al. Unilateral linear verrucous epidermal nevus of the face and the oral mucosa. *Plast Reconstr Surg.* 2005;115(2):17e-19e.
7. Ikeda S, Kawada J, Yaguchi H, Ogawa H. A case of unilateral systematized linear hair follicle in associated with epidermal nevus like lesions. *Dermatol.* 2003;206:172-174.
8. Askar I, Ayetekin S. Linear verrucous epidermal nevus with cutaneous horn. *Eur Acad of Dermatol Venereol.* 2003;17: 353-354 (ltr).
9. Herman T, Siegel M. McCune Albright Syndrome: Epidermal Nevus Syndrome. *Clin Pediatr.* 2010;49:1164
10. Mahto M, Ashworth J, Vickers DM. A case of linear epidermal naevus presenting as genital warts—a cautionary tale. *Int J STD AIDS.* 2005;16(3):267-269.
11. Joshi A, Sah S, Agarwilla A. Basal cell carcinoma arising in a localized linear verrucous epidermal naev. *J Plast Reconstr Aesthet Surg.* 2009;62(5):693-694.
12. Goldberg HS. Basal cell epitheliomas developing in a localized linear epidermal nevus. *Cutis.* 1980;25:2
13. Horn MS, Sausker WF, Pierson DL. Basal cell epithelioma arising in a linear epidermal nevus. *Arch Dermatol.* 1981;117:247.
14. Masood Q, Narayan D. Squamous cell carcinoma in a linear epidermal nevus. *Acta Derm Venerol.* 2000;80:227-228.
15. Cramer SF, Mandel MA, Hauler R, Lever WF, Jenson BA. Squamous cell carcinoma arising in a lin epidermal nevus. *Arch Dermatol.* 1981;117:222-224.

16. Affleck AG, Leach IH, Varma S. Two squamous cell carcinomas arising in a linear epidermal naevus in a 28-year-old female. *Clin Exp Dermatol.* 2005;30(4):382-384.
17. Hamanaka S, Otsuka F. Multiple malignant ecrine poroma and a linear epidermal nevus. *J Dermatol.* 1996;23:469-471.
18. Vossen KM, Timothy NH, Manders EK. An unusual presentation of a linear epidermal nevus. *J Hand Surg Am.* 2001;26(2):291-295.
19. Fox BJ, Lapkins NA. Comparison of treatment modalites for epidermal nevus: a case report and review. *Dermat Surg Oncl.* 1983;9:879-885.
20. Panagiotopoulosi A, Vasiliki C. Assessment of Cryotherapy for the Treatment of Verrucous Epidermal Nevae. *Acta Derm Venereol.* 2009;89:292-294.
21. Kim JJ, Chung MW, Scwayder t. Topical tretinoin and 5-FU in the treatment of linear verrucous epider nevus. *J Am Acad Dermat.* 2000;43:129-32.
22. Michel JL, Has C, Has V. Resurfacing CO2 laser treatment of linear epidermal nevus. *Eur J Dermatol.* 2001;11:436-439.
23. Herman AR, Scott RA. Systematized epidermal nevus treated with isotretinoin. *J Drugs Dermatol.* 2002;195-196.
24. Attia A, Elbasiouny M. Treatment of Verrucous Epidermal Nevus Using Long Pulsed Nd: YAG Laser, *Egyptian Dermatology Online Journal.* 6(1);2010.
25. Toombs EL, Peck GL. Electrosurgical treatment of etretinate-resistant Darier's disease. *J Dermatol S Oncol.* 1989;15:1277-1280.
26. Boughton RS, Spencer SK. Electrosurgical fundamentals. *J Am Acad Dermat.* 1987;16:862-867.
27. Brown JS. Radio surgery for minor operations in general practice. *Cosmetic Dermat.* 2000:33-36.
28. Yu SS, Tope WD, Grekin RC. Cardiac devices and electromagnetic interference revisited: n radiofrequency technologies and implications for dermatologic surgery. *Dermatol Surg.* 2005;31(8 Pt 1):9.
29. Chiarella E. Radiovaporization: radiofrequency cutting current to vaporize and sculpt skin lesions. *Derm Surg.* 2003;29:755-758.
30. Bayat A, Arscott G, Ollier WE, McGrouther DA, Ferguson MW. Keloid disease: clinical relevance of single versus multiple site scars. *Br J Plast Surg.* 2005;58(1):28-37.

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