

Cryolipolysis-induced morphea



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INTRODUCTION

Cryolipolysis is a noninvasive method to reduce localized fat. It involves the application of controlled cooling to damage adipocytes, which have a higher sensitivity to cold injury compared with surrounding water-rich cells.¹ Cold temperatures trigger adipocyte apoptosis, which, in turn, evokes an inflammatory response. Cryolipolysis is a favored method, as it has minimal side effects, such as transient erythema and bruising.² Here, we report a case of morphea triggered by cryolipolysis.

CASE REPORT

An otherwise healthy 67-year-old woman underwent a single cryolipolysis session at a nondermatology clinic. This involved the placement of CoolSculpt applicators at 39°F for 60 minutes to her lower abdomen and thighs (CoolSculpt, Allergan via Zeltiq Aesthetics, Pleaston, CA).

Six weeks after her procedure, she had multiple firm, thickened sclerotic plaques on her abdomen and thighs—in the same distribution as the CoolSculpt probes (Fig 1). She denied the following before the onset of her cutaneous symptoms: fever, chills, night sweats, rhinorrhea, odynophagia, cough, nausea, emesis, arthritis, oral ulcers, other rashes, photosensitivity, temperature sensitivities, or weight changes. Her family history is negative for thyroiditis and autoimmune conditions such as lupus.

Skin biopsies from the left thigh and the right abdomen found the following: orthokeratosis overlying an atrophic dermis; full-thickness dermal collagen sclerosis; perivascular and interstitial infiltrate, predominantly lymphocytic with scattered plasma cells; and negative periodic acid–Schiff and colloidal stains (Figs 2 and 3). The histopathology findings were consistent with the clinical impression of morphea.

The patient trialed the following topical therapies using a Youth Stream 6-in-1 titanium derma-roller (depth 1.5 mm) (Youth Stream Group, Chicago, IL): calcipotriol (Dovonex, LEO Pharma INC, Thornhill, Canada) twice daily during the week and halobetasol propionate 0.05% ointment (Ultravate, Valeant Canada LP, Laval, Quebec) twice daily on weekends. She simultaneously underwent ultraviolet light therapy 3 times weekly, which was discontinued after 1 month because of phototoxicity.

The patient's lesions subsequently spread to her bilateral labia majora, causing severe ongoing pain and allodynia. She was treated with a tapered course of prednisone (40 mg/d; dose decreased by half every 2 weeks), 20 mg once weekly of methotrexate, and 1 mg daily of folic acid. Her topical regimen was amended as follows: tacrolimus 0.1% ointment (Protopic, LEO Pharma INC) twice daily during the week and halobetasol propionate 0.05% ointment (Ultravate) twice daily on the weekends.

Over 3 months, she had significant clinical improvement; her lesions resolved with hyperpigmentation, and she had a subsequent decrease in pain.

DISCUSSION

Coolsculpt, a cryolipolysis device, was approved for fat reduction of the flanks, abdomen and thighs in 2010. It has since been used to treat other localized fat deposits including arms and knees and medical conditions such as gynecomastia.² A high patient satisfaction rate of 73% is attributable to a few key factors: noninvasive nature; minimal discomfort during the procedure; and only having to undergo the procedure once.²

Expected side effects include bruising, erythema, and transient numbness, all of which are temporary and reversible. Late-onset pain occurs 2 weeks after the procedure at a rate of 0.1%.² Other rare reported

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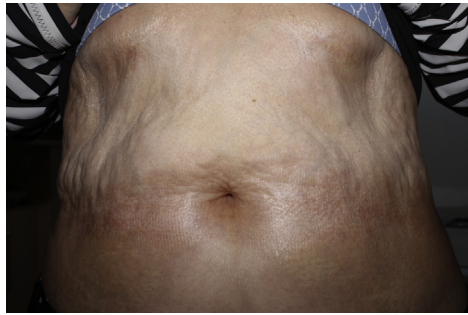


Fig 1. The patient had multiple firm, thickened sclerotic plaques on her abdomen in the same distribution as the CoolSculpt probes.

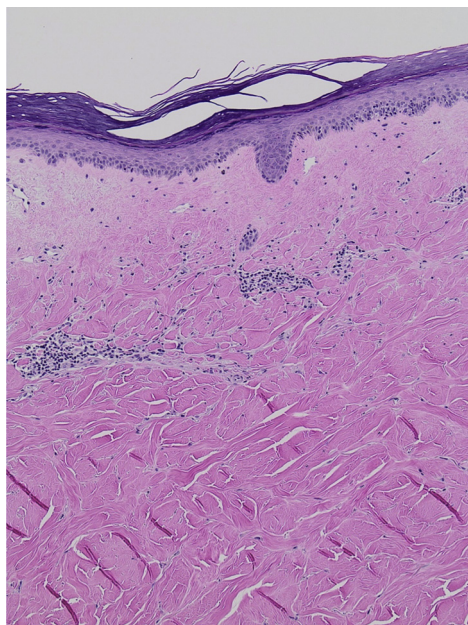


Fig 2. Histopathologic analysis found orthokeratosis overlying an atrophic dermis, full-thickness dermal collagen sclerosis, and a perivascular and interstitial infiltrate. (Original magnification: $\times 10$).

side effects include but are not limited to skin necrosis,³ motor neuropathy,⁴ and frost bite.⁵ To our knowledge, this is the first case of the development of morphea after cryolipolysis.

Morphea, or localized scleroderma, is a fibrosing disease of the dermis and subcutaneous tissue. Morphea is distinguished from systemic scleroderma by a lack of internal organ involvement, Raynaud phenomenon, nailfold capillary changes, or sclerodactyly. Morphea is classified based on its clinical phenotype; subtypes include linear, plaque, generalized, bullous and deep.

The pathogenesis of morphea is not well understood but is likely multifactorial. The current accepted mechanism begins with vascular injury, perhaps by trauma, infection, environmental exposure,

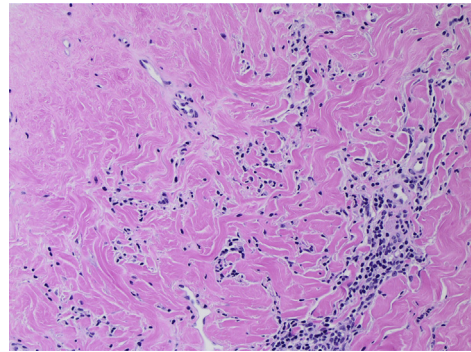


Fig 3. The perivascular and interstitial infiltrate is predominantly lymphocytic with scattered plasma cells.

or antiendothelial cell antibodies.⁶ Vascular injury then promotes increased expression of adhesion molecules, recruitment of inflammatory T cells, and increased profibrotic cytokines such as interleukin-4 and transforming growth factor- β .⁷ The release of these profibrotic cytokines, in turn, disrupts collagen production and destruction, leading to morphea.⁶

There are several reports of triggers for morphea including surgery, injection, zoster virus, radiation therapy, diagnostic x-ray, penetrating trauma, and extreme exercise.^{6,7} In our patient, the localized apoptosis of adipocytes by the CoolSculpt perhaps triggered the aforementioned inflammatory response, leading to morphea.

Treatment of morphea can be challenging. Treatment ranges from active observation to topical therapy, phototherapy, or aggressive systemic therapy. Fortunately, our patient responded to aggressive immunosuppressive therapy with methotrexate and prednisone, which has been previously reported.⁸

Cryolipolysis is a popular noninvasive fat reduction technique, with over 450,000 procedures worldwide.⁹ This isolated case of morphea after cryolipolysis does not allow us to draw conclusions about the safety of this procedure. It, however, does highlight the possibility of morphea as a result of cryolipolysis.

REFERENCES

1. Zelickson BD, Burns AJ, Kilmer SL. Cryolipolysis for safe and effective inner thigh fat reduction. *Lasers Surg Med.* 2015;47(2):120-127.
2. Krueger N, Mai SV, Luebberding S, Sadick NS. Cryolipolysis for noninvasive body contouring: clinical efficacy and patient satisfaction. *Clin Cosmet Investig Dermatol.* 2014;7:201-205.
3. Nseir I, Lievain L, Benazech D, Carricaburu A, Rossi B, Auquit-Aukbur I. Skin necrosis of the thigh after a cryolipolysis session: a case report. *Aesthet Surg J.* 2018;38(4):NP73-NP75.
4. Lee SJ, Kim YJ, Park JB, Suh DH, Kwon DY, Ryu HJ. A case of motor neuropathy after cryolipolysis of the arm. *J Cosmet Laser Ther.* 2016;18(7):403-404.
5. Choong WL, Wohlgemut HS, Hallam MJ. Frostbite following cryolipolysis treatment in a beauty salon: a case study. *J Wound Care.* 2017;26(4):188-190.

6. Fett N, Werth VP. Update on morphea: part I. Epidemiology, clinical presentation, and pathogenesis. *J Am Acad Dermatol*. 2011;64(2):217-228. quiz 229-230.
7. Grabell D, Hsieh C, Andrew R, et al. The role of skin trauma in the distribution of morphea lesions: a cross-sectional survey of the Morphea in Adults and Children cohort IV. *J Am Acad Dermatol*. 2014;71(3):493-498.
8. Fett N, Werth VP. Update on morphea: part II. Outcome measures and treatment. *J Am Acad Dermatol*. 2011;64(2):231-242. quiz 243-234.
9. Ingargiola MJ, Motakef S, Chung MT, Vasconez HC, Sasaki GH. Cryolipolysis for fat reduction and body contouring: safety and efficacy of current treatment paradigms. *Plast Reconstr Surg*. 2015;135(6):1581-1590.