Novel treatment of calcifications from dermatomyositis with picosecond and carbon dioxide laser

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INTRODUCTION

Treating cutaneous calcifications poses a clinical challenge with limited satisfactory treatment options. Dystrophic soft tissue calcifications are a potential long-term cutaneous consequence of dermatomyositis.[1] Calcinosis deposits may be located in the skin, deep fascia, or intramuscular connective tissue. These hard nodules are painful and may form a fistula and ulcerate, draining chalky calcium through the skin. Treatment modalities with surgical excision and medications such as diltiazem, bisphosphonates, and sodium thiosulfate have been used to control calcinosis progression in dermatomyositis with limited success.[2] Carbon dioxide (CO_2) lasers and shock wave lithotripsy have shown some efficacy, but neither has yielded consistent clearance of cutaneous calcifications.[3,4]

Acoustic shockwaves generated during picosecond lasers induce optical breakdown (LIOB) creating cavitation bubbles in the skin.[5] The explosive vaporization and mechanical expansion caused by picosecond lasers within the skin without harming the epidermis was theorized to be a good nonablative approach to shatter calcification clusters before their extrusion. Using a large beam size with the wavelength of 1064 nm was essential to contribute to skin penetration to reach the overall cluster thickness. After this deep inner fragmentation for an enhanced liquefaction, we used a fractionated ultrapulsed ablative CO_2 laser to open deep 120-μm-wide release channels. The fractional ablative CO_2 lasers (Lumenis UltraPulse SCAAR FX; Yokneam, Israel) allows a depth of 3.5 mm in a single, controlled pulse with minimal collateral heating.

Abbreviation used:

CO2: carbon dioxide

CASE REPORT

Here we present a case of ulcerated calcifications in the setting of dermatomyositis in a 62-year-old female patient successfully treated with same-session picosecond and ablative fractional CO_2 laser. The patient had the calcifications for more than 10 years with significant pain. The patient had calcifications throughout her body; however, the calcifications in the hip areas were ulcerating with increasing discomfort. She did not respond to any prior pharmaceutical therapies. The right hip was treated with 3 laser treatment sessions. The initial treatment was with the Picosecond Laser (PiQo,[4] Lumenis) (1064 nm; fluence, 0.76 J/cm^2; 800 ps pulse duration; 10 mm spot) immediately followed by fractional ablative CO_2 laser (Lumenis UltraPulse Encore) (energy, 90 mJ; density, 3% 200 Hz), which resulted in a melting of the calcium into a liquid, which easily extruded from the skin (Fig 1).

One month later, the right hip was treated again with another round of fractional ablative CO_2 (energy, 130 mJ; scan size, 2 mm; pulse count, 1; density, 3% 200 Hz, topical Aquaphor). This treatment resulted in significant clinical improvement with

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Fig 1. Before and during treatment. Before (**Left**) and during (**Right**) treatment with Picosecond Laser (1064 nm; fluence, 0.76 J/cm^2; 800 ps pulse duration 10 mm spot), immediately followed by fractional ablative CO_2 laser (energy, 90 mJ; scan size, 2 mm of fractionated 120-μm spots; pulse count, 1; density, 3% 200 Hz; topical Aquaphor). One month later, the right hip was treated again with another round of fractional ablative laser (energy, 130 mJ; scan size, 2 mm of fractionated 120-μm spots; pulse count, 1; density, 3% 200 Hz; topical Aquaphor). During treatment, liquefied calcinosis cutis is extruded from skin immediately after CO_2 laser treatment.

Fig 2. Video of liquefied calcium extruding from skin after Ultrapulse — SCAAR Fx fractional ablative CO_2 laser treatment (submit for JAAD Instagram additionally).

presumed photoacoustic disruption of the calcinosis cutis subcutaneous nodules with the picosecond laser followed by CO_2 laser treatment to express the subcutaneous contents after only 3 total laser treatment sessions (Figs 1 and 2).[5]

DISCUSSION

Calcinosis cutis can present a clinical challenge with a paucity of efficacious or satisfactory treatment options with the use of picosecond lasers to disrupt the subcutaneous calcium nodules sequentially followed by fractional ablative CO_2 laser treatment. Although this treatment regimen needs additional evaluation, it could be a minimally invasive treatment option for patients with calcinosis cutis.

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