Koebnerization phenomenon after broadband light therapy in a patient with cutaneous sarcoidosis

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INTRODUCTION

Sarcoidosis is an inflammatory disease characterized by noncaseating epithelioid cell granulomas. Skin involvement is seen in approximately one-quarter of patients. Multiple cutaneous variants in sarcoidosis include lupus pernio, Lofgren syndrome, Darier-Roussy, and erythematous papules and nodules arising within pre-existing scars. Treatment consists of potent topical steroids, intralesional corticosteroids, systemic corticosteroids, antimalarial agents, and methotrexate.[1] More recently, in-office treatments involving light-based therapies such as photodynamic therapy (PDT), intense pulse light (IPL), and broadband light (BBL) are being used. Additionally, vascular laser treatments including the pulse dye laser (PDL) and fractionated resurfacing lasers have produced significant improvement in cutaneous sarcoidosis.[2-6] As with other inflammatory skin conditions, such as lichen planus, vitiligo, and psoriasis, sarcoidosis can exhibit the koebnerization phenomenon. Laser surgeons need to be aware of this potential complication when treating cutaneous sarcoidosis. Cases of adverse reactions to light- and laser-based devices are rare but are characterized by crusting, scabbing, blistering, scarring, hyperpigmentation, hypopigmentation, bruising, or incomplete response.[7] We present a case of a bullous reaction with koebnerization after BBL therapy in a patient with good response in the past to BBL treatments. We also review the literature regarding various light-based treatments for cutaneous sarcoidosis.

Abbreviations used:

ALA:	aminolevulinic acid
BBL:	broadband light
IPL:	intense pulse light
Nd:YAG:	neodymium-doped yttrium aluminium garnet
PDT:	photodynamic therapy

CASE

A 45-year-old woman, with a medical history of systemic pulmonary and cutaneous sarcoidosis on the right cheek and right distal pretibial region presented for a fifth BBL treatment of erythematous plaques and papules on her right cheek. She was not on any medications for treatment of sarcoidosis and was without new lesions. The patient underwent a BBL treatment with a 560-nm filter at 20 J/cm^2, pulse width of 30 milliseconds, 20°C cooling, 7-mm square spot size, and repetition rate of 10 Hz (Sciton Inc, Palo Alto, CA). She had previous treatments with BBL at the same settings, resulting in improvement without any complications. Within the hour after the treatment, bullae developed in the treatment area (Fig 1). The patient reported no direct sun exposure, recent tanning, new medications, or a history of trauma to the area before the light treatment. She was started on hydrocortisone 1% cream and frequent emollients with vigilant sun protection. Several weeks after resolution of the bullae, new sarcoidal plaques and papules developed in the same area. The patient did not return for follow-up for 9 months

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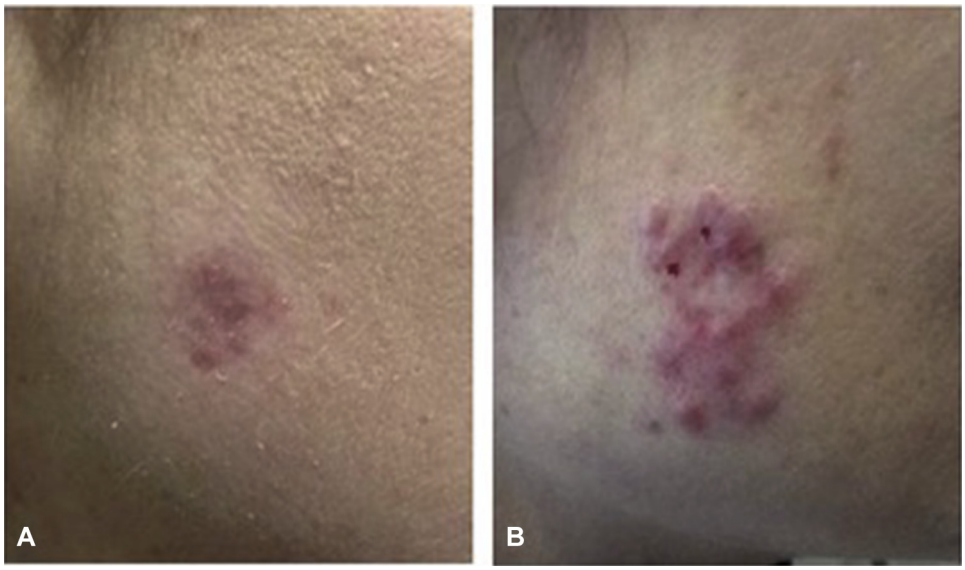

Fig 1. A 45-year-old woman with cutaneous sarcoidosis at (**A**) baseline before treatment and (**B**) with koebnerization after BBLT (560 nm filter at 20 J/cm^2, pulse width 30 msec, 20°C cooling, 7-mm square spot size, repetition rate 10 Hz).

after the last BBL treatment. At the time of re-presentation, she had one lesion treated with intralesional triamcinolone (2.0 mg/mL [0.2 cc]) and started on flurandrenolide tape nightly to the site. The patient returned for a series of additional intralesional corticosteroid injections with slight to minimal improvement.

DISCUSSION

Traditional treatment options for localized cutaneous sarcoidosis have relied on intralesional corticosteroid and cryotherapy. However, with the advancement of light-based technologies, the treatment options for localized granulomatous cutaneous disorders have expanded. Novel in-office treatments include PDT, vascular lasers, BBL, and IPL.[1]

PDT generates reactive oxygen species through the interaction of a photosensitizer, the appropriate wavelength, and oxygen to induce necrosis or apoptosis of selected cells. PDT is used most often to treat actinic keratosis, superficial nonmelanoma skin cancers, photoaging, acne, and verrucae.[8] More recently, PDT has been used to treat cutaneous sarcoidosis. In one study, a patient with cutaneous sarcoidosis who had been treated unsuccessfully with corticosteroid and cryotherapy underwent PDT with topical aminolevulinic acid (ALA) in combination with IPL (IPL-ALA-PDT). The patient received a total of 5 treatments in 2-week intervals and showed no sign of plaque recurrence 6 months after the last treatment.[2] It is hypothesized that ALA destroys endothelial cells and macrophages that produce the primary pro-inflammatory cytokines responsible for granuloma formation, interleukin-1 and tumor necrosis factor-α.[2] By decreasing interleukin-1 and tumor necrosis factor-α production, sarcoidal granuloma formation is minimized. In another study, a 42-year-old woman with a sarcoidal plaque on her forehead, who did not respond to oral and topical steroids, underwent 7 sessions of ALA-PDT. There was progressive improvement throughout all treatments.[9] PDT is an effective treatment option for cutaneous sarcoidosis with few adverse effects that may include pain, photosensitivity, and temporary postoperative erythema, burning, and discomfort.[2]

An alternative to PDT for the treatment of cutaneous sarcoidosis is vascular lasers such as PDL. It is theorized that PDL uses selective photothermolysis to target blood vessels. It penetrates only to a 2-mm depth into the skin with yellow light wavelengths that are absorbed by oxyhemoglobin and deoxyhemoglobin. An advantage to the vascular targeting is its ability to preserve the surrounding healthy tissue.[4] Soleymani and Abrouk[4] highlight a case of biopsy-proven lupus pernio, cutaneous sarcoidosis, and scar sarcoid, each successfully treated with PDL. The patient with lupus pernio underwent 6 sessions of PDL (585-nm wavelength at 6.6 J/cm^2, 5-mm spot size) spaced 6 weeks apart for erythema and telangiectasias on her nose. After completing treatment, the erythema was significantly reduced without adverse side effects. Compared with the initial biopsy, a biopsy of the treated lesion found a reduction in vascularity with persistence of noncaseating granulomas, indicating the PDL targeted the blood vessels