“Drug-resistant granuloma faciale”: treatment with carbon dioxide-GaAs laser

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ABSTRACT: Granuloma faciale (GF), also known as “eosinophilic granuloma,” is a rare benign leukocytoclastic vasculitis which most commonly occurs on the face of middle-aged Caucasian males. Clinically, GF appears as single or multiple, slowly growing, reddish-brown papules, nodules or plaques which may be cosmetically unpleasant. Its pathogenesis is unknown and GF is notoriously resistant to treatments. Both medical (dapsone, colchicine, gold injections, isoniazid, clofazimine, corticosteroids, psoralen ultraviolet radiation, and topical tacrolimus) and surgical therapies (excision, graft, dermabrasion, argon laser, carbon dioxide laser, pulsed dye laser, cryotherapy, and electrocautery) have been used for GF but no effective treatment has yet been found. Furthermore, the typical facial location of GF requires an acceptable cosmetic result. We report two cases of drug-resistant GF which were successfully treated with laser vaporization combining two different wavelengths: carbon dioxide (CO₂) 10,600 nm and GaAs 1540 nm.

KEYWORDS: carbon dioxide laser, granuloma faciale, GaAs laser

Introduction
Granuloma faciale (GF) is an uncommon, benign, inflammatory dermatosis characterized by chronic leukocytoclastic vasculitis and a dense infiltrate of polymorphonuclear cells (1). GF presents as asymptomatic, solitary or multiple, reddish/brown, papules, plaque or nodules generally located on the face, especially in sun exposed areas such as the nose (37%), preauricular region (22%), cheeks (22%), forehead (15%), and ears (2). It has a chronic, slow growing course and is most common in middle-aged Caucasian males. GF is notoriously resistant to treatments and does not reliably respond to any therapy (3). We report the cases of two patients in which GF lesions were successfully treated with laser vaporization combining two different wavelengths: carbon dioxide (CO₂) 10,600 nm and GaAs 1540 nm.

Case series

Case 1
A 72-year-old Caucasian man presented with a firm, erythematous, and nodular lesion localized on the dorsum of the nose (FIG. 1a). The lesion, slowly growing for two years, measured 1.5 cm (maximum diameter). Topical treatments with high-potency steroids and tacrolimus 0.1% ointment allowed an immediate partial regression...
that in both cases was rapidly followed by relapse after drug withdrawal. The patient denied any personal or family history of inflammatory cutaneous diseases. A full blood count and autoimmune tests were negative. Histological examination of a punch incisional biopsy confirmed the suspicion of GF. The patient was scheduled for laser vaporization with a double wavelength device (Youlaser MT apparatus, Quanta System, Solbiate Olona, Italy) emitting 10,600 nm and GaAs 1540 nm wavelengths simultaneously. Spot size was 1 mm (pulse duration 0.25 ms, pulse delay 5 ms) and power was 8 and 10 W for the 1540 and 10,600 nm wavelength, respectively. Topical mupirocin ointment was then applied twice daily for 10 days. The patient was evaluated at 1, 3, 6, and 12 months. At 18 months follow-up no recurrences were observed and the patient was very satisfied about the esthetic outcome (FIG. 1b).

Case 2

A 64-year-old male presented with three firm, erythematous and nodular lesions located on the nose (dorsum) and zygomatic areas (bilaterally) (FIG. 2a). These lesions appeared 6 years before, slowly enlarging and reaching the dimension of 1.8 cm (maximum diameter). The patient had no personal or family history of inflammatory cutaneous diseases. A full blood count and autoimmune antibodies were negative. An incisional punch (3 mm diameter) biopsy confirmed the clinical suspicion of GA. The patient didn't respond to topical steroid therapy (propionate clofetadrol 0.05% ointment). Laser vaporization was performed with the same parameters of Case 1. In the first session only the lesion located on the nose was treated. The 6-month follow-up showed no recurrences and a satisfactory aesthetic result. In a second session zygomatic lesions were treated. Postoperatively, topical mupirocin ointment was applied three times/daily in open dressing after both treatment sessions. No recurrences were observed at 20-month follow-up (FIG. 2b).

Discussion

GF is a benign craniofacial leukocytoclastic vasculitis characterized by recurrent, reddish-brown, plaques, or nodules most frequently occurring on the nose, cheek, forehead, and ears (2). Isolated extrafacial GF is rare (4) and usually coexists with facial lesions (5). The pathogenesis of GF is unknown; however, actinic exposure, radiations, trauma, allergies, and Arthus-like reactions have been suggested as predisposing factors (6). The diagnosis is based on clinical characteristics, dermoscopy, and histopathology (1). The histological features of GF are distinctive, thus the histology should be performed to exclude other diseases. Histologically, GF is characterized by a dense polymorphous infiltrate of neutrophils, lymphocytes, histiocytes, and eosinophils in the upper two-thirds of the dermis, with a narrow grenz zone in the subepidermis (6). The epidermis and adnexal structures are spared (6). Perivascular inflammation with extravasated erythrocytes may sometimes be present. Differential diagnosis of GF includes: lupus vulgaris, discoid lupus erythematosus, fungal and mycobacterial infections, sarcoidosis, lymphocytoma cutis, fixed drug eruption, erythema elevatum
CO2) and 1540 nm (GaAs) simultaneously, with a wavelength laser device able to emit 10,600 nm. Our GF patients were treated using a double 0.5 mm, 5 W) resulted in residual scarring (13). Medical treatments have been used, including dapsone, colchicine, gold injections, isoniazid, clofazimine, topical or intralateral corticosteroids, psoralen ultraviolet radiation (PUVA) and, recently, topical tacrolimus (1,3,6,7). Surgical options such as excision, graft, dermabrasion, argon laser, CO2 laser, pulsed dye laser (PDL) (8), cryotherapy (9), and electro surgery have been used with different results (2,3). Medical treatments are burdened by high risk of relapse after discontinuation, whereas ablative and surgical procedures may cause scarring or post-inflammatory pigmentation (3). Several types of laser, such as 585 nm PDL (8,10,11), argon (12), KTP 532-nm (3), and CO2 (13,14) have been applied, achieving different cosmetic results. The 585 nm PDL targets the oxyhemoglobin in blood vessels, resulting in selective photothermolysis and the prominent telangiectasia of GF suggests that it may be effective in the treatment of these lesions (8). Cheung and Lanigan (10) obtained a good cosmetic result with 595 nm PDL in 2 of 4 patients treated, and the improvement was maintained for at least 12 months. However, the low depth penetration of these wavelengths is not able to significantly improve severe exophytic GF. CO2 lasers (targeting water) vaporize tissues in a non-selective manner and carry the risk of scarring or hypopigmentation (13,14); however, the esthetic outcome depends on the operator and the laser type. Madan (14) obtained good cosmetic results in GF patients using the scanner-assisted Sharplan 40C CO2 (Sharplan Lasers, Marlton, NJ) in silktouch mode (spot size 4 mm, 12 W). Bakkour and Madan (15) have successfully treated a rhinophyma-like GF with a CO2 laser (MCO 50plus; KLM Martin, Tuttlingen, Germany) in scanning mode (spot size 4-6 mm, power 22 W, 0.15 ms dwell time); whereas the use of continuous mode CO2 laser (beam size 0.5 mm, 5 W) resulted in residual scarring (13). Our GF patients were treated using a double wavelength laser device able to emit 10,600 nm (CO2) and 1540 nm (GaAs) simultaneously, with a good cosmetic result that was maintained at 18 and 20 months, respectively. The two wavelengths were combined in order to improve superficial coagulation, thus reducing the bleeding during the procedure. The simultaneous use of the 1540 nm wavelength doesn’t modify the ablation of each single pulse, but increases the coagulation in the treatment area. Although further and larger studies would be needed to assess the effectiveness of different laser types in treating GF, the low incidence of this disease makes unlikely larger and randomized clinical trials. We suggest the use of CO2 laser (in combination with a non-ablative source as 1540 nm where available) as the method of choice to treat drug-resistant GF; a rare disease for which no effective treatment has yet been found.

References