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BRIEF REPORT

Treatment of lupus erythematosus of the eyelids with pulsed dye laser

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Background

Cutaneous lupus erythematosus (CLE) is an autoimmune disease with heterogeneous clinical features that can be divided in acute (ACLE), subacute (SCLE), and chronic (CCLE) [1]. This classification is based on a combination of clinical features, histological changes, laboratory abnormalities, and average duration of skin lesions [2].

CCLE is the most prevalent form of CLE [1], including several subtypes. Discoid lupus erythematosus (DLE) is the most common form of CCLE, generally involving the face (forehead, philtrum, malar region, nose, ears, and cheek) in a longstanding and disfiguring way [3].

DLE involving the eyelids is rare and it may precede the development of DLE in other skin locations [4, 5]. Blepharitis and infiltrated erythematous plaques, with skin atrophy, scarring, and telangiectasia are most frequently observed [3, 4]. The lower eyelid is also commonly affected, usually with loss of eyelashes (madarosis) [3].

Standard medical therapies include patient education on proper sun protection along with topical corticosteroids or oral antimalarial drugs. Topical tacrolimus and pimecrolimus have also described as effective [3, 4]. If lack of response occurs, other systemic immunosuppressive drugs may be tried [6].

Lasers have been described as successful in treating different types of CLE, mostly DLE. Henderson et al. reported a case using CO2 laser in 1986 [7] and Zachariae firstly used argon laser to treat DLE telangiectasias [8]. The use of pulsed dye laser (PDL) to treat DLE was described in 1995 by Núñez et al. [9]; since then, it has been used in several forms of CLE with clearance rates higher than 60% [9–14].

PDL improves the telangiectasic component, erythema, and scaling. Histologic examination comparing before and after PDL treatment shows reduction in the dermal lymphocytic infiltrate, more evident in the superficial papillary dermis and improvement in basal cell hydropic degeneration and pigment incontinence. A reduction of the expression of cutaneous inflammatory regulators such as intercellular adhesion molecule-1 (ICAM-1) and vascular cell adhesion molecule-1 (VCAM-1) was also observed [10]. Cosmetically satisfactory results with few side effects (transient hipo/hyperpigmentation and slight scarring) are reported in most cases [9, 11–13, 15, 16] and recurrence after laser treatment is rare (3 of 14 patients with a median of 10 months follow-up) [13].

The authors report a series of three cases, wishing to discuss the efficacy and safety of 595-nm PDL for the treatment of DLE of the eyelids.

Material and methods

Three female patients with at least one lesion of DLE located on the eyelids were treated with PDL (Table 1). All patients gave their informed consent prior to their inclusion in the

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Table 1 Patients and outcome (F—feminine; DLE—discoid lupus erythematosus; HCQ—hydroxychloroquine; MTX—methotrexate; AD—total score of eyelid lupus severity evaluation for active disease; D—total score of eyelid lupus severity evaluation for damage)

Patient	Sex/age	Skin type	Type of lupus	Duration of the lesions	Previous treatment	Concomitant medication	Number of sessions/ interval between sessions	Clinical features					Follow-up (time/side effects/relapse)
									Before treatment		After treatment		
1	F/27	III	DLE	15 months	Tacrolimus 0.1% ointment HCQ	HCQ	1/-	Scaling Erythema Edema Telangiectasias Dyspigmentation Madarosis	0 2 0 1 0 1	AD = 3 D = 1	0 0 0 0 0 1	AD = 0 D = 1	7 months/none/none
2	F/51	III	DLE	2 months	Prednisone HCQ MTX	None	2/4 weeks	Scaling Erythema Edema Telangiectasias Dyspigmentation Madarosis	1 3 0 1 0 1	AD = 5 D = 1	0 0 0 0 0 1	AD = 0 D = 1	6 months/none/none
3	F/61	III	DLE	12 months	Tacrolimus 0.1% ointment Prednisone HCQ	None	1/-	Scaling Erythema Edema Telangiectasias Dyspigmentation Madarosis	1 3 1 0 0 0	AD = 4 D = 0	0 0 0 0 0 0	AD = 0 D = 0	10 months/none/none

Table 2 Eyelid cutaneous lupus erythematosus severity score

Evaluation of active disease	Scaling	Absent (0); scale (1); verrucous, hypertrophic (2)
	Erythema	Absent (0); pink, faint erythema (1); red (2); dark red, purple, violaceous, crusted, hemorrhagic (3)
	Edema	Absent (0); present (1)
	Telangiectasias	Absent (0); present (1)
Evaluation of damage	Dyspigmentation	Absent (0); present (1)
	Madarosis	Absent (0); present (1)

study. Clinical diagnosis was supported by histology and direct immunofluorescence. Two of the patients had lesions only on the eyelids and one had a long history of refractory DLE involving her face and hands. All patients lacked clinical response to previous treatments and were recommended strict sun avoidance, use of sunglasses and topical sunscreens (SPF 50). Patient 1 was maintained on systemic therapy until the day of the laser treatment.

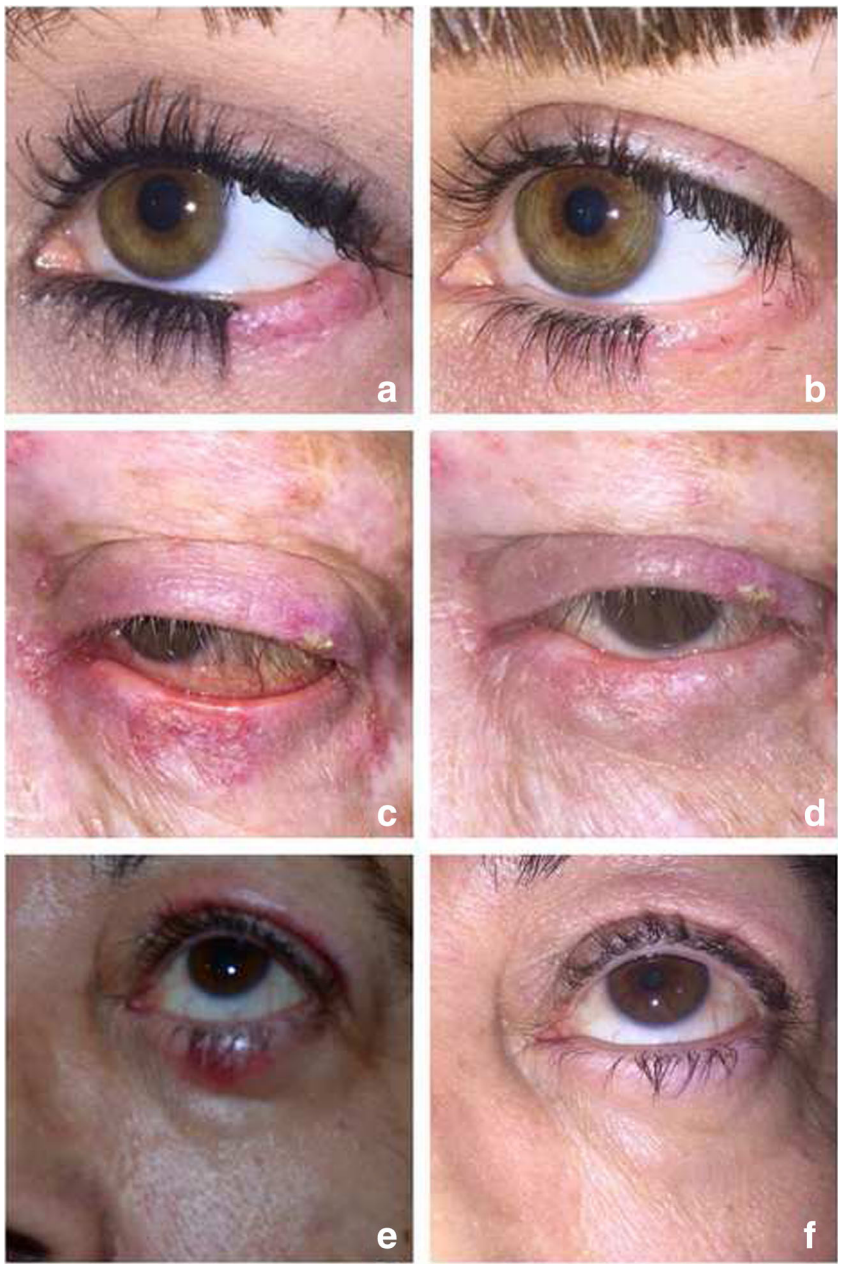

Fig. 1 Images before treatment (left side) and 4 weeks after first treatment (right side). **a**, **b** Refers to patient 1. **c**, **d** Refers to patient 2. **e**, **f** Refers to patient 3

The patients were treated with 595-nm PDL irradiation (Cynergy, Cynosure, Massachusetts, USA) using a 10 mm spot, a fluency of 8 J/cm^2, and a single pulse of 0.5 ms. Air cooling system was set at level 4 (Cryo 6, Zimmer Medizinsysteme GmbH, Neu-Ulm, Germany) and the lesions were covered with a thin layer of ultrasound gel for epidermal protection. The eyes were protected with an intra-ocular non reflective metal shield (Cox II, Oculo-Plastik, Canada) and the laser was pointed away from the eyeballs. The lesions were treated until a purpuric end point was reached; this occasionally required double passing but pulse stacking was avoided.

Clinical improvement was assessed by comparing digital photographs of each patient taken at baseline and 4 weeks after PDL, using a specific eyelid score (Table 2), adapted from CLE Disease Area and Severity Index (CLASI) [17]. Six different parameters were evaluated: scaling, erythema, edema, telangiectasias (these four corresponding to disease activity), dyspigmentation, and madarosis (these two corresponding to damage).

Results

The results are shown in Table 1. The treatment was well tolerated with no need for anesthesia or analgesia. An intense purpuric response was immediately observed after PDL treatment. All the lesions responded to the treatment (Fig. 1), with significant improvement of erythema, scaling, edema, and telangiectasias. Madarosis was irreversible in all cases. One patient had a partial response and was retreated using the same parameters with complete resolution of the lesions. No skin or ocular side effects were reported.

Discussion

All the patients had DLE lesions on the left inferior eyelid, two of them with madarosis. In all cases, PDL was used as an alternative therapy in refractory lesions. One patient had been taking hydroxychloroquine for 7 months with no response until the day of laser therapy; given the rapid resolution of the lesions after PDL therapy, we assume that the laser treatment was the preponderant factor that leads to clinical improvement. One patient had a partial response and was retreated with the same parameters at week 4, with complete resolution of the lesions at week [8]. After laser treatment, the patients were recommended strict sun avoidance, use of sunglasses, and topical sunscreens (SPF 50). There was no relapse at 6 months follow-up.

Untreated eyelid DLE often leads to scarring, ectropion, and madarosis. We highlight the good clinical response regarding the erythematosus and the telangiectasic component and the lack of effect on the madarosis. Given the rapid improvement after 1 or 2 sessions, we believe that PDL is a valid treatment for active eyelid DLE and it should be offered in an early phase of disease, in order to avoid irreversible damage. Further studies are needed to support this hypothesis.

Ocular complications such as anisocoria, uveitis, pupillary distortion, posterior synechiae, iris atrophy, nuclear cataract, visual field defect, macular hole, and retinal scarring have been reported with Diode laser (800 nm), Alexandrite laser (755 nm), and Intense Pulsed Light (IPL) (500–1200 nm), mostly related to lack of eye protection [18–21]. Although PDL has a lower tissue penetration (wavelength of 595 nm), permanent visual impairment has also been reported [22]. Eye safety procedures should always be followed during periocular laser treatments. The treatment was well tolerated without no anesthesia or analgesia.

Limitations of this study include the limited number of treated patients and the short follow-up period.

Conclusions

PDL is safe and effective in treating DLE involving the eyelids. Given the significant clinical improvement in this study and the previously published good results of PDL in the treatment of CLE [7, 9–14, 23], we recommend early PDL treatment as an adjunctive therapy in controlling DLE disease activity.

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflicts of interest.

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