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Original article

Effect of pulsed laser light in patients with dry eye syndrome☆,☆☆

*S. Guilloto Caballero**, *J.L. García Madrona*, *E. Colmenero Reina*

Departamento de Córnea y Cirugía Refractiva, Clínica Vistalaser Oftalmología, Málaga, Spain

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ABSTRACT

Objectives: The objective of this study was to determine the clinical benefits of pulsed light therapy for the treatment of Dry Eye Syndrome (DES) due to the decrease in aqueous tear production (aqueous deficient DES) and/or excessive tear evaporation (evaporative DES) due to Meibomian Gland Dysfunction (MGD).

Methods: A study was conducted on 72 eyes corresponding to 36 patients with DES. Out of these 72 eyes, 60 underwent refractive surgery (48 with femtosecond laser, 6 were operated with a mechanical microkeratome, and 6 with refractive photo-keratectomy[RPK], 6 treated with phacoemulsification, and 6 with no previous surgical treatment. Pulsed laser light (Intense Pulsed Light Regulated [IRPL®]) was use to stimulate the secretion of the Meibomian glands during 4 sessions, one every 15 days.

Results: Patients with aqueous deficient DES did not show any improvement. Eyes with no previous surgery and those treated with phacoemulsification and PRK had a favorable outcome. On the other hand, less conclusive results were observed in the eyes treated with excimer laser.

Conclusions: This treatment could be very helpful to treat evaporative DES produced by MGD. On the other hand, it is not helpful for those cases related to an isolated damage in the aqueous phase, or the mucin phase.

Efecto del láser de luz pulsada en pacientes con síndrome de ojo seco

Palabras clave:
Síndrome de ojo seco
Disfunción de las glándulas de Meibomio

RESUMEN

Objetivos: El objetivo de este estudio fue determinar los beneficios clínicos de la terapia de luz pulsada para el tratamiento del síndrome de ojo seco (SOS) consecuencia de la disminución de la producción de lágrima acuosa (SOS acuodeficiente) y/o de la evaporación lagrimal excesiva (SOS evaporativo) por la disfunción de las glándulas de Meibomio (DGM).

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* *Corresponding author.*
E-mail address: sol.guilloto@gmail.com (S. Guilloto Caballero).

Láser de luz pulsada
Tiempo de rotura de la película lagrimal
Meniscometría

Métodos: Estudiados 72 ojos correspondientes a 36 pacientes con SOS, de los cuales 60 ojos fueron intervenidos de cirugía refractiva (48 con láser de femtosegundo, 6 con microqueratomo mecánico y 6 con fotoqueratectomía refractiva [PRK]), 6 intervenidos con facoemulsificación y 6 sin intervención quirúrgica previa. Utilizamos un láser de luz pulsada (Intense Regulated Pulsed Light [IRPL®], E-Swin, Adainville, Francia) para estimular la secreción de las glándulas de Meibomio, realizando 4 sesiones, una cada 15 días.
Resultados: Los pacientes con SOS acuodeficiente no presentan mejoría alguna. Tanto los ojos no intervenidos quirúrgicamente, como los operados con facoemulsificación y los tratados con PRK, evolucionaron muy favorablemente. Por otro lado, observamos unos resultados menos concluyentes en los ojos tratados con láser excimer.
Conclusiones: El láser de luz pulsada puede ser de gran ayuda como tratamiento para el SOS evaporativo producido por la DGM, al contrario no lo es en las formas relacionadas con un daño aislado de la fase acuosa, o de la fase mucínica.

Introduction

The dry eye syndrome (DES) is a common pathology affecting between 10 and 20% of the population,[1–3] the frequency of which is correlated with age.

The importance of functional signs and daily discomfort of patients have given rise to a range of therapeutic actions. However, currently available treatments are mostly substitutions and frequently insufficient to diminish patients discomfort.

The Intense Regulated Pulsed Light (IRPL®) treatment (E-Swin, Adainville, France) is a pulsed polychromatic light generator that produces perfectly regulated and homogeneous light pulses. Sculpted impulses are released in the form of pulse sequences having a distance, energy and spectrum precisely determined to stimulate Meibomium glands to recover their normal function.[4–6] This article describes the personal experience of the authors, in view of the small amount of publications in current literature about the effectiveness of pulsed light laser for treating Meibomium gland dysfunction (MGD).

Subjects, material and methods

The present study was carried out in accordance with the guidelines of the Helsinki declaration and informed consent for IRPL® treatment given by each patient.

Eligibility for treatment: eligible candidates for IRPL® should have skin phototype I, II and III, as darker skins (phototype IV) exhibited a relative propensity to side effects such as pigmentation loss.[7] All patients with previous ocular or systemic pathology, subjects with a history of allergy to sunlight exposure, pregnant females, patients with skin exposed to the sun or UVA light during the month before treatment date, as well as having skin lesions of unusual appearance were excluded from treatment with IRPL®.

Treatment procedure: the intensity of the IRPL® treatment ranges from low power of 8 J/cm^2, which sequentially increases to a high power of 20 J/cm^2. Power must be regulated with each subsequent session according to the impression of the patients, the severity of the disease and the obtained results.[4,6]

In the present study, as the patients belonged to phototypes II and III of the Fitzpatrick scale, the intensity applied in the first session was 11.4 J/cm^2, while in the second session it was increased to 12.2 J/cm^2 and in the third and fourth session it was raised to 13.0 J/cm^2.

When the physician has selected the adequate match of power and type of skin, the patient is ready for treatment as described below: (1) the skin of all patients was inspected to make sure it was clean and dry, free of cosmetics; (2) eventual moles, dark spots or freckles were covered with self-adhesive patches; (3) ocular protection was placed on the patient and verified for adequate placement; (4) gel was generously applied (at least 1 cm thick), taking care to prevent gel from making contact with the eyes; (5) protective goggles were put on the operator; (6) 5 flashes were made in the left middle face, starting from internal canthus of the eye and finishing in the temporal area; (7) the operation was repeated in the right middle face, and (8) the gel was withdrawn and the skin cleansed.

The efficacy of said treatment depends on the application of a specific protocol. For the present study, the treatment was carried out in 4 sessions with a time interval of 15 days between each, a total of 45 days for all patients (day 0/day 15/day 30/day 45). It is convenient to consider additional sessions if necessary to maintain the obtained clinic benefits. These additional sessions must be carried out 6 months after the treatment and for this reason there are no sufficient data to verify whether they are necessary or not.

Procedure of the study: overall, the study comprised 72 eyes of 36 patients of 43 ± 25 years of age and predominantly female (58.33%). Of these, 60 eyes underwent refractive surgery (48 with femtosecond laser [FS], 6 with mechanical microkeratome [MM] and 6 with refractive photokeratectomy [PRK]), 6 with phacoemulsification and 6 without previous surgeries.

The patients who had undergone surgery exhibited a residual refraction of $+0.50 \pm 0.50$ sphere and -0.75 ± 0.25 cylinder, with visual acuity (VA) of 0.8 ± 0.2 measured with the Snellen test, while patients who had not undergone surgery exhibited