

MICROBIOLOGICAL CHARACTERISTICS OF THE OCULAR SURFACE IN THE PATIENTS WITH DISCOID LUPUS ERYTHEMATOSUS

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ABSTRACT

Discoid lupus erythematosus (DLE) is a chronic photosensitive dermatosis characterized by scarring and atrophy. In our study we evaluate both the alteration of the ocular surface and the changes in the ocular microbiota in patients with DLE. We studied 40 patients: 20 (group A) affected by discoid lupus erythematosus (DLE) (13 F - 7 M) with signs of distress and/or dry eyes (burning, foreign body sensation, dryness and itching) and 20 (group B 11 F - 9 M) patients with signs of distress and/or dry eyes (burning, foreign body sensation, dryness and itching). We considered the results of different tests, such as Schirmer I, Schirmer II, breakage of the film tears (BUT) and conjunctiva swab, for the detection of aerobic and anaerobic bacteria. The ocular surface disease index (OSDI) represent a major greater disability in the patients with DLE compared with control subjects (35.1 ± 4.7 vs. 28 ± 4.2 $p < 0.001$).

The data obtained in the study group "A" and "B" were respectively the following: Schirmer I

10.2 ± 0.2 vs. 9.6 ± 0.4 ($p < 0.05$); Schirmer II 3.8 ± 0.1 vs. 3.9 ± 0.2 (NS); BUT 4.1 ± 0.3 vs 4.3 ± 0.2 ($p < 0.05$). (Fig. 1).

Culture test showed bacterial growth in 12 (30.0%) the A group and 8 (20.0%) in the B group.

The significant change in tear tests (Schirmer I and BUT) obtained in the two study groups A and B shows an alteration of the ocular surface with a significant reduction in the tear film.

This study indicate that patients with DLE show an alteration of the ocular surface with major risk factors of eye infection.

Key words: discoid lupus erythematosus (DLE); dry eye; bacteria; tear film infection, autoimmunity.

Received November 30, 2014; Accepted May 02, 2015

Introduction

Dry eye syndrome (DES) is characterized by symptoms of ocular dry eyes and discomfort. The symptoms of DES include constant irritations, foreign body sensation, and blurred vision which interfere with the ability to work and carry out daily functions⁽¹⁻³⁾.

Population- based studies identify this condition in 5% to 30% of population aged 50 years or older^(4,5). These estimated suggest that DES is more prevalent than diabetes, cancer, and heart disease^(6,7).

Lupus erythematosus (LE) is a multifactorial disease with evidence of genetic susceptibility, environmental effects and disturbances in both innate and adaptive immunity, manifesting as dis-

turbances in apoptotic cell clearance, cytokines, B cell immunity and T-cell signaling⁽⁸⁻¹²⁾.

Discoid lupus erythematosus (DLE) is a chronic photosensitive dermatosis characterized by scarring and atrophy, erythema, telangiectasia, follicular plugging, dyspigmentation and atrophy. Several researchers have observed that DLE occurs infrequently with more severe systemic organ involvement⁽¹³⁻¹⁶⁾.

The lesion are sharply demarcated and can be round, thus giving rise to the term discoid or disc-like⁽¹⁴⁾.

Several other authors have observed that in the subgroup of LE with active discoid lesions, patients tended to have a more benign disease course. Based on these earlier observational data

many clinicians have effected prognostic information to the patient with LE, who present with discoid lesions as part of the LE clinical phenotype⁽¹⁵⁾.

Patients with LE present tears and ocular surface discomfort, visual disturbance, and tear film instability with damage to the ocular surface^(17,18).

In patients with discoid lupus erythematosus as autoimmune disease, one can observe an alteration of the tear film resulting in possible damage to the ocular surface associated with symptoms of ocular discomfort. We have hypothesized that DLE would have a negative effect on the some components of the tears film and the change in the composition of ocular microbiota⁽¹⁹⁻²²⁾.

In this study we evaluate the alteration of the ocular surface in subjects with discoid lupus erythematosus (DLE).

Materials and methods

Patients

All patients with clinical or pathologic evidence of DLE in our department were invited to participate in the study. Of the 45 enrolled patients, 40 completed the study. Our institutional review board approved the study. All patients were 24 years or older and were enrolled after signing institutional review board - approved informed consent. We collected all demographic data, date of first symptoms, date of diagnosis as American College of Rheumatology (ACR) criteria and serologic^(1,23). None of the patients had infections of the ocular surface and appendages or allergic diseases of the ocular surface in the last 30 days. We excluded patients with previous eye surgery, lachrymal disorders, and medical therapy with systemic or topical medications that alter the tearing and/or topical steroids during the 4 weeks preceding the start of the study. All patients received Schirmer I test, Schirmer II test, B.U.T. (break-up time) test and bacteriological research⁽²⁴⁾.

Methods

Evaluation of the clinical signs of dry eye considers three features of the tears film and ocular surface tears functions, tear composition, and ocular surface alterations. The simple tests of tear function are performed by direct observation all patients carry out. A questionnaire was administered to all patients.

The Ocular Surface Disease Index (OSDI) is a 12-item questionnaire designed as a screening sur-

vey that assesses symptoms and their impact on vision-related functioning. The instrument, developed by Allergan, Inc (Irvine, CA) has been the most widely utilized survey in clinical dry eye research and clinical trials, and also possibly the most accepted in clinical care as a validated instrument. There are three subscales: Vision Related Function, Ocular Symptoms (sensitive to light, gritty, painful or sore, blurred vision, poor vision), and Environmental Triggers. The survey is available online and takes minutes to complete and score. A recent publication by Miller et al described standard cut-points for the overall OSDI score: normal (0-12 points), mild dry eye⁽¹³⁻²²⁾ points), moderate dry eye (23-32 points), and severe dry eye (33-100 points)⁽²⁵⁾.

The corneal light reflex is a gross measure of the luster and integrity of the tear film. Irregularities of this reflex indicate either instability of the tear film or irregularities of the ocular surface.

Tear film instability is a valuable sign of dry eye disease and can be produced by either aqueous - deficient dry eye or evaporative dry eye or a combination of both mechanisms.

The method for determining tear film stability is the tear fluorescein in break-up time (TF BUT) that is performed by instilling a small amount of fluorescein due into the tear film and having the patient blink while being observed through the slit-lamp with incident cobalt blue filtered light.

The uniform greenish hue of the fluorescein across the cornea is observed for early breakup as identified by a dark spot forming in the tear film Normal TF BUT range is 10-15 seconds.

Rapid tear film breakup is an indicator of tear instability that can be due to dry eye or ocular surface irregularities. Determination of tear secretion rate differentiates aqueous - deficient dry eye from evaporative dry eye, and is most frequently done clinically by use of the Schirmer tear test strip. The Schirmer test is performed by placing a small strip of filter paper of known dimension (5x35 mm) on the margin of the lower eyelid at the junction of the lateral and middle third of the lid and leaving it in place for 5 minutes, then measuring the length of the strip that is wet with tears.

In this test is done without prior instillation of topical anesthetic, it is a measure of reflex secretion of tear (Schirmer 1 test); if the test is done following instillation of a topical anesthetic, it is a measure of baseline tear secretion (basal tear secretion test).

The normal value of the Schirmer 1 test is greater than 10 mm of wetting, but cutoff referent values for dry eye have been recommended as 5 mm of wetting.

Some clinicians use a value of 7 mm with the Schirmer 1 test and 3 mm for the Schirmer with anesthetic⁽²⁶⁾.

Bacteriological analysis

It was carried out testing of conjunctiva swab Hess, to search for aerobic and anaerobic bacteria.

Samples from patients were seeded in the appropriate culture medium and incubated in aerobic and anaerobic atmosphere for the isolation and identification of bacteria, with separate counts for aerobic and anaerobic bacteria. After the identification of bacteria has been confirmed through Vitek (Biomerieux, Mercy l’Etoile, Francia) in case of aerobic bacteria and through API 20A (Biomerieux) in case of anaerobic bacteria⁽²⁶⁾.

Statistical analysis

The results are expressed as mean ± standard deviation. Statistical significance in contingency tables was evaluated using the chi square and Fisher exact test. Student’s test for unpaired data, one way ANOVA, and Mann-Whitney rank sum test were used for comparisons of continuous variables. Statistical analysis was performed using tests for repeated measures as well by controls for multiple comparisons with correction by Duncan Procedure.

Results

The demographic characteristics of patients included in our study are shown in Table n. 1. The figures n. 1 and 2 highlight the average values of tear secretion test obtained in the two study groups “A” patients with discoid lupus erythematosus (DLE) and group “B” control.

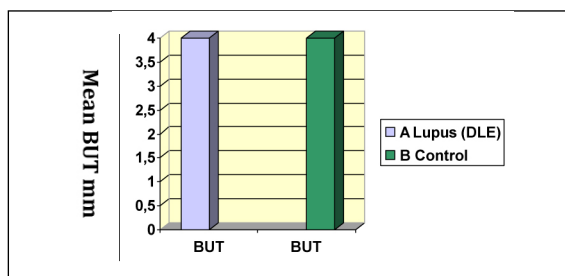


Figure 1: Break-up time (BUT) in the group A patients with discoid lupus erythematosus (DLE) and group B control.

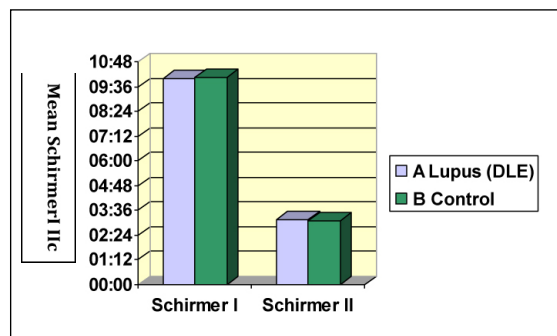


Figure 2: Test of Schirmer I and II in the group A patients with discoid lupus erythematosus (DLE) and group B control.

In the patients with DLE compared with control from the OSDI represent a major greater disability (35.1 ± 4.7 vs 28 ± 4.2) p< 0.001.

	Patients with DLE	Subjects Control
Gender		
Male	7	9
Female	13	11
Age (years) means	38,9±5,2	40,1±5,0
Mild DLE	5	/
Moderate DLE	11	/
Severe DLE	4	/
Systolic Blood Pressure (mmHg)	128±10,2	130±10,1
Diastolic Blood Pressure (mmHg)	91±8,7	84,5±9,7
Pulse-Rate(Beats/minutes)	86±10	84,2±10,1

Table 1: Subjects characteristics at enrollment.

N°. Patients (40)	N°. Eyes (80)	“A” (Lupus DLE)		“B” (control)	
		N°.	%	N°.	%
culture test	80	12	30	8	20

Table 2: Overall incidence of culture positivity of bacteriological tests in the groups.

The data obtained in the study group “A” and “B” were respectively the following: Schirmer I 10.2 ± 0.2 vs. 9.6 ± 0.4 (p <0.05); Schirmer II 3.8 ± 0.1 vs. 3.9 ± 0.2 (NS); BUT 4.1 ± 0.3 vs 4.3 ± 0.2 (p<0.05). (Fig. 1). Culture test showed bacterial growth in 12(30.0%) the A group and 8 (20.0%) in the B group. (Table N.2). The total numbers of isolations of aerobic and anaerobic bacteria found in the A and B groups are shown in Table 3.

Microrganisms	A (lupus DLE)	B (control)
Aerobes	8	6
Anaerobes	4	2
Total strains	12	8

Table 3: Total number of aerobic and anaerobic isolates cultures of the group A and B.

Microrganisms	A lupus DLE		B control	
	N°	%	N°	%
S. epidermidis	6	50.2	6	75.0
S. aureus	2	16.6	0	—
Peptococcus spp.	2	16.6	2	25.0
Peptostreptococcus spp.	2	16.6	0	—
Total strains	12	100	8	100

Table 4: Overall incidence of culture positivity of bacteriological tests in the groups A(lupus DLE) and B (control).

In the table 4 are brought the kinds of aerobes and found anaerobes in patients with DLE in comparison to the group it checks.

Discussion

These results indicate that patients with DLE compared with subjects control present a greater disability in three subscales of OSDI. The patients with DLE are among the most severely effected by their disease in vision related function in ocular symptoms and in environmental triggers.

With respect to common medical conditions, the biochemical parameters in DLE subjects are similar to or worse than those control subjects.

The significant change in tear tests (Schirmer I, Schirmer II and BUT) obtained in the two study groups A and B shows an alteration of the ocular surface with a significant reduction in the tear film. The alteration of this structure results in a variety of ocular disorders in different pathogenesis, including dry eye syndrome is certainly very good. As it state in preceding searches, confirmed 1.2 a lachrymal stable film is the result of the equilibrium of a siege of complex functions harvest in action from the system of the ocular surface. A suitable environment for pH, electrolyte concentration, relative humidity and the presence of the elements essential nutrient is essential because the ocular surface can

perform its main functions along with an integration of the normal bacterial flora that exerts a direct and indirect defense of the same surface.

In fact, the function of physical and immunological barrier by the epithelium of the ocular surface is undertaken under the narrow junction of epithelial cells that determines sharpen the versus barrier effect the bacteria with cause disease⁽²⁷⁻³⁶⁾.

Conclusion

However, this study was limited by the small sample size. Therefore, larger studies must be done to elucidate how ocular symptoms and vision related function changes over time and whether or not it improves with treatment⁽³⁷⁻⁴²⁾.

This reduction and alteration of the tear film in subjects with discoid lupus erythematosus (DLE) is surely due to the modifications of the components of the same biological structure tear. In light of these our results, it is confirmed an alteration of the ocular surface in patients with DLE, which determines definitely a major risk factors infective eye.

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