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Original Article

Corneal and conjunctival sensitivity in rosacea patients

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Abstract

Purpose: To assess corneal and conjunctival sensitivity in rosacea patients.
Methods: A total of 55 patients with rosacea and 37 control subjects participated in the study. Corneal and conjunctival sensitivity was determined by Cochet-Bonnet esthesiometer. Subjective symptoms of ocular dryness were evaluated using Ocular Surface Disease Index (OSDI). Schirmer's I test (ST), tear breakup time (tBUT) and ocular surface staining with fluorescein were carried out to measure objective signs.
Results: The mean corneal and conjunctival sensitivity did not differ significantly between rosacea patients and controls (all $p > 0.05$). Schirmer's I test and tBUT were significantly reduced ($p = 0.004$ for OD and $p < 0.001$ for OS) and grade of ocular surface staining was significantly high ($p = 0.018$ for OD and $p = 0.038$ for OS) in rosacea patients. Corneal and conjunctival sensitivity did not show significant correlation with ST, tBUT, ocular surface staining (Oxford Schema), duration of rosacea and OSDI score.
Conclusions: Corneal and conjunctival sensitivity did not change significantly in rosacea.

Keywords: Corneal sensitivity, Conjunctival sensitivity, Rosacea

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Introduction

Rosacea is a common chronic disease with unknown pathogenesis. It is characterized by inflammation and vascular abnormalities of the central facial skin.[1] Previous studies demonstrated upregulation of genes involved in vasoregulation and neurogenic inflammation and suggested that dysregulation of mediators and receptors implicated in neurovascular and neuroimmune communication may be important at early stages of the disease.[2–4]

Although considered as a skin disease, rosacea may affect eye in up to 58–72% of the patients. Superficial punctate keratitis, peripheral neovascularization associated with subepithelial marginal infiltrates, stromal ulceration, corneal perforation, recurrent corneal epithelial erosions, pseudodendritic ulcer, pseudokeratoconus, and infectious keratitis have been previously reported. Conjunctival manifestations are chronic conjunctivitis, chronic papillary reaction, cicatricial conjunctivitis, pinguecula, conjunctival fibrosis and symblepharon. Blepharitis and meibomian gland dysfunction are also common findings. Dry eye with abnormal Schirmer's I test (ST) and shorter tear breakup time (tBUT) has also been reported in a majority of patients with ocular rosacea.[5–9]

Up to now, no studies have been conducted to see the effects of rosacea on corneal and conjunctival sensitivity. In this study, in order to contribute in the clarification of the involvement of tear function in rosacea, we evaluated both the incidence of subjective symptoms and objective signs of dry eye and measured corneal and conjunctival sensitivity

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in rosacea patients. We also assessed the relationship among the symptoms and signs of dry eye and corneal and conjunctival sensitivity in these patients.

Materials and methods

Fifty-five patients (43 women and 12 men) diagnosed as rosacea at the Department of Dermatology by an expert dermatologist between August 2012 and November 2013 were enrolled into this prospective study. Thirty-seven healthy subjects (30 women and 7 men) from the Ophthalmology Department outpatient clinic served as control group. Written informed consent was obtained from all the participants. The study was approved by the Institutional Review Board and was conducted in accordance with the Declaration of Helsinki.

Subjects with previous ocular surgery and trauma, manifest anterior segment infection, history of refractive surgery and contact lens wear, diabetes mellitus, hepatitis and those using systemic and topical therapeutic agents that may affect ocular surface sensitivity were excluded from the study.

Each participant underwent a complete ophthalmological examination including best-corrected visual acuity, measurement of intraocular pressure and slit lamp examination. Schirmer's test was done with test strips. The strip was positioned behind the lower lid between the temporal and middle thirds, and the patient kept his/her eyes closed for 5 min, after that the strips were removed and the length of the moistened area was measured.

One drop of 1.25 mg/ml of sodium fluorescein was instilled in the lower conjunctival sac, and corneal, nasal conjunctival and temporal conjunctival staining was graded from 0 to 5 according to the Oxford Schema.[10] The mean of these three quadrants was used for statistical analysis. The tear breakup time was the average duration between the last complete blink and the first appearance of randomly distributed dry spot under cobalt blue filtered light.[11] Dry eye was diagnosed if a symptomatic patient had abnormal tBUT ($\leqslant$5 s) and ST ($\leqslant$10 mm in 5 min).

All subjects filled out the OSDI report which assessed the symptoms of ocular irritation consistent with dry eye disease and their impact on vision-related functioning. OSDI questionnaire with 12 items was graded on a scale from 0 to 4, where 0 indicated none of the time; 1, some of the time; 2, half of the time; 3, most of the time; and 4, all of the time. The total OSDI score was then calculated with the following formula: OSDI = (sum of scores for all questions answered) $\times$ 100/(total number of questions answered) $\times$ 4. OSDI is assessed on a scale of 0–100, with higher scores representing greater disability.[12]

Corneal and conjunctival sensitivity was measured using the Cochet-Bonnet esthesiometer which mechanically stimulates the ocular surface with a nylon filament of diameter 0.08 mm. All measurements were done by a single observer between 9 AM and 4 PM. The tactile sensitivity was assessed close to the center of the cornea and at temporal and nasal bulbar conjunctiva, 3–4 mm away from the limbus along the horizontal meridian as judged by simple inspection. The patients were asked to redirect their gaze prior to the stimulus cycle. The test was started at the maximal length of 60 mm. If no response was obtained at 60 mm, the length was reduced by 5 mm until a positive response was obtained. Assessment of the tactile threshold was made by defining the length of the filament which was detectable by the subject in two of three randomly repeated trials.

Statistical analysis was done by SPSS statistical software (SPSS for windows 10.0, Inc., Chicago, USA). All data were expressed as mean ± standard deviation (±SD). One way analysis of variance (ANOVA) and Student's *t*-test were used for the analysis. Statistical significance was defined at a level of 5% ($p < 0.05$) and correlation was significant at the 0.01 level (2-tailed).

Results

Fifty-five rosacea patients (43 women, 12 men; mean age: 47.2 ± 11.9 years; range, 14–74) and 37 controls (30 women, 7 men; mean age: 48.7 ± 12.6 years; range, 14–74) involved in this study. There was no statistically significant difference between the groups in terms of age and sex ($p = 0.5$, $p = 0.4$, respectively). Mean duration of the disease was 7.6 ± 6.1 (maximum 30; minimum 0.5) years.

Dry eye was diagnosed in 50.9% ($n = 28$) of rosacea patients according to ST and tBUT results. Grade of ocular surface staining was significantly higher in rosacea patients than controls according to Oxford Schema ($p = 0.018$ for OD and $p = 0.038$ for OS). And ST and tBUT tests' results were significantly shorter in rosacea patients than controls ($p = 0.004$ for OD and $p < 0.001$ for OS versus $p < 0.001$ for OU). OSDI scores were higher in rosacea patients than in controls but this was not statistically significant (20.18 ± 15.4 vs 16.4 ± 11.9, $p = 0.2$) (Table 1).

Although mean central corneal sensitivity decreased and conjunctival (temporal and nasal) sensitivity increased in rosacea patients, the change was not statistically significant in both eyes, except for nasal conjunctival sensitivity of right eye (Table 2).

Table 1. Characteristics of rosacea patients and controls.

		Rosacea group ($n = 55$)	Control group ($n = 37$)	p value*
Age (years)		47.2 ± 11.9	48.7 ± 12.6	0.5
OSDI (0–100)		20.18 ± 15.4	16.4 ± 11.9	0.2
Ocular surface staining	OD	1.67 ± 1.9	0.86 ± 1.0	0.018
	OS	1.51 ± 1.7	0.86 ± 0.9	0.038
Schirmer's I test (mm)	OD	12.56 ± 4.4	15.57 ± 5.5	0.004
	OS	12.18 ± 5.1	17.05 ± 5.5	<0.001
tBUT (seconds)	OD	7.16 ± 2.7	10.19 ± 2.9	<0.001
	OS	8.15 ± 3.1	10.59 ± 3.0	<0.001

* p=<0.05.

Table 2. Corneal and conjunctival sensitivity of rosacea patients and controls.

		Rosacea group ($n = 55$)	Control group ($n = 37$)	p value*
Corneal sensitivity (mm)	OD	56.9 ± 7.7	58.7 ± 2.8	0.1
	OS	57.2 ± 6.1	58.8 ± 2.7	0.1
Temporal conjunctival sensitivity (mm)	OD	12.7 ± 6.3	11.2 ± 4.9	0.2
	OS	12.6 ± 6.4	11.1 ± 4.9	0.2
Nasal conjunctival sensitivity (mm)	OD	11.6 ± 6.3	9.2 ± 4.0	0.039
	OS	12.0 ± 6.6	10.5 ± 4.7	0.2

* p=<0.05.