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The Prevalence of Ocular Signs in Acne Rosacea

Comparing Patients From Ophthalmology and Dermatology Clinics

Vinicius Coral Ghanem, M.D., Neal Mehra, Serena Wong, and Mark J. Mannis, M.D., F.A.C.S.

Purpose. To describe and compare the ocular signs in patients diagnosed with acne rosacea by the ophthalmologist with the ocular signs in the patients diagnosed with rosacea by the dermatologist. **Methods.** We reviewed the medical records of 176 randomly selected patients diagnosed with rosacea at the University of California, Davis, Medical Center: 88 patients each from the Department of Dermatology and the Department of Ophthalmology. Of the 88 patients diagnosed with acne rosacea by a dermatologist, 22 (25%) had an ophthalmologic evaluation done prior to the study. In those patients without an ophthalmologic assessment, ocular complaints noted by the dermatologist were recorded. We recorded ocular signs including lid, conjunctival, corneal, episcleral, and scleral manifestations as well as charted observations of the iris, lens, intraocular pressures (IOPs), best corrected visual acuity (VA), and funduscopic examination. Age and sex were recorded from the initial ophthalmologic evaluation. The analysis was designed to compare the prevalence of signs and symptoms in two clinical settings. **Results.** The prevalence of documented meibomian gland dysfunction ($p < 0.001$), telangiectasia ($p = 0.004$), and anterior blepharitis ($p = 0.008$) was significantly higher in ophthalmology patients when compared with dermatology patients. Of the conjunctival signs evaluated, only the presence of interpalpebral conjunctival hyperemia ($p = 0.005$) was found to be significantly higher in ophthalmology patients. The corneal, episcleral, scleral, and lens findings did not demonstrate a statistically significant difference between groups. **Conclusion.** The major and most easily observable ocular problems in rosacea patients presenting either to ophthalmology or dermatology are lid disease–related manifestations. As might be expected, eye signs and symptoms are more commonly noted in the eye clinic. A clinician's increased awareness of the common ocular findings of rosacea, however, may aid in earlier diagnosis and treatment of ocular rosacea.

Key Words: Acne rosacea—Ocular signs—Early diagnosis.

Acne rosacea is a relatively common dermatosis that affects up to 10% of the population, most notably those with fair skin.[1] It is a chronic skin disease characterized by persistent erythema, telangiectasis, papules, pustules, and sebaceous gland hypertrophy, preferentially affecting the convexities of the face.

Although it is considered primarily a disease of the skin, rosacea also commonly affects the eyes. Starr and McDonald[2] examined the eyes of patients with rosacea and found ocular complications in 58% and corneal involvement in 33%. Ocular involvement may include meibomian gland dysfunction, chronic conjunctivitis, recurrent chalazia, corneal neovascularization and scarring, marginal corneal infiltrates and ulceration, corneal and scleral perforation, episcleritis, scleritis, and iritis.[3–5] McCulley and Sciallis[6] have reported that meibomitis is frequently observed in rosacea patients and suggested it may be caused by a generalized sebaceous gland dysfunction that involves the meibomian glands. This hypothesis has been further supported by the finding of prominent sebaceous gland hypertrophy in the skin.[4] Wise[7] reported that ocular signs are much more prevalent in patients from ophthalmologic clinics when compared with patients from dermatologic clinics. However, this study compared a relatively small number of patients and was published more than 40 years ago.

In the current study, we describe and compare the ocular signs in patients diagnosed with rosacea by the ophthalmologist with the ocular signs in patients diagnosed with rosacea by the dermatologist.

MATERIALS AND METHODS

We conducted a retrospective review of medical records from 176 patients diagnosed with acne rosacea at the University of California, Davis, Medical Center. Of the 176 patients, 88 were diagnosed and followed by the Department of Dermatology, and 88 were diagnosed and followed by the Department of Ophthalmology. Patients from each department were randomly selected from a database of patients with an established diagnosis of acne rosacea. We gathered information from the initial ophthalmologic evaluation. In cases in which an ophthalmology assessment was not available, ocular complaints noted by the dermatologist were recorded.

Ocular signs including lid, conjunctival, corneal, episcleral, and scleral manifestations were systematically recorded on a standardized data collection form. In addition, charted observations of the iris, lens, intraocular pressures (IOPs), best-corrected visual acuity (VA), and funduscopic examinations were noted. Visual acuity was analyzed based only on right eye values for data randomiza-

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From the Department of Ophthalmology, University of California, Davis, Sacramento, California.

Address correspondence and reprint requests to Mark J. Mannis, M.D., Department of Ophthalmology, 4860 Y Street, Suite 2400, Sacramento, CA 95817. E-mail: mjmannis@ucdavis.edu

tion. Only the higher IOP value of each patient was used for statistical analysis. We combined the findings of chalazion and hordeolum to describe the collective manifestations of roseatic blepharitis. If the Schirmer I test was performed, its result was recorded. The values for both eyes were averaged. We recorded the presence of intraocular lenses or cataracts. Cataracts were classified as initial (clear view of the fundus), moderate (hazy view of the fundus), and advanced (poor view of the fundus).

Statistical analysis employed Fischer's exact test (two-tailed) on the data collected to compare prevalence of ocular signs observed in patients presenting to dermatology with those presenting to ophthalmology. Continuous data (age, VA, IOP) were analyzed using the Student *t* test. The data were considered statistically significant when *p* values were less than 0.05.

RESULTS

Of the 88 patients diagnosed with acne rosacea by a dermatologist, only 22 (25%) had an ophthalmologic evaluation performed prior to the study. We compared the data from these patients with the data from the 88 patients diagnosed with rosacea in the ophthalmology clinic. The mean age of dermatology and ophthalmology patients was 54.7 years (range, 28–79) and 54 years (range, 23–82), respectively. Although the patient population in the dermatology charts reviewed was predominantly female (77%), the ophthalmology patient pool was more evenly distributed (58% female, 42% male).

The median VA for the right eye in dermatology patients was 20/20 (range, 20/15–20/40). For ophthalmology patients, the median right eye VA was 20/20 (range, 20/15–20/70). Median VAs for the left eye in the dermatology and ophthalmology groups were comparable with their respective right eye medians. One ophthalmology patient had a corneal perforation OS, resulting in a VA of finger counting in that eye.

Statistical analysis indicated that among rosacea lid signs assessed, the prevalence of documented meibomian gland dysfunction, i.e., inspissation or plugging ($p < 0.001$), telangiectasia ($p = 0.004$), and anterior blepharitis ($p = 0.008$), was significantly higher in ophthalmology patients when compared with dermatology patients (Table 1). Of the conjunctival signs including interpalpebral hyperemia, diffuse hyperemia, papillary reaction, follicular reaction, pinguecula, and conjunctival scarring, only the presence of interpalpebral hyperemia ($p = 0.005$) was found to be significantly higher in ophthalmology patients. The corneal, episcleral, and scleral signs did not reveal a statistically significant difference between groups (Table 1). No intraocular inflammation (iritis or vitreitis) or anterior chamber changes (cells, hyphema, or hypopyon) were found in either dermatology or ophthalmology patients. There were no differences between groups with regard to the prevalence of changes in the crystalline lens or the presence of intraocular lenses (Table 2). No fundus changes were responsible for reduced VA in any patient. The most frequent changes in the fundus were posterior vitreous detachment, hard drusen, and retinal pigment epithelial changes.

The distribution pattern of the punctate epithelial keratopathy found is seen in Table 3. No pattern was more prevalent after comparing both groups.

There were only three patients in the dermatology group who had Schirmer test results; therefore, it was not possible to perform a comparison. In the ophthalmology group, 37 patients had Schirmer testing performed. The Schirmer test for this group showed an average of 13 mm of wetting. Fourteen patients (37.8%) had less than 10 mm of wetting and seven patients (18.9%) less than 6 mm.

Intraocular pressures were similar in both groups ($p = 0.74$). The mean IOP (only the higher IOP from each patient was analyzed) for the dermatology and ophthalmology patients was 15.8 mm Hg (range, 10–21) and 15.5 mm Hg (range, 8–28), respectively. Intraocular pressures for two patients in dermatology and five patients in ophthalmology were not available. Glaucoma was detected in two patients from ophthalmology and in none from dermatology.

TABLE 1. *Prevalence of ocular signs in rosacea in dermatology and ophthalmology patients*

Signs	Dermatology (22 patients)	Ophthalmology (88 patients)	*p* Values
Meibomian gland dysfunction	6 (27.3%)	75 (85.2%)	<0.0001
Telangiectasia/erythema	4 (18.2%)	47 (53.4%)	0.004
Anterior blepharitis	3 (13.6%)	39 (44.3%)	0.008
Chalazion/hordeolum	6 (27.3%)	13 (14.8%)	0.21
Madarosis	0 (0%)	4 (4.5%)	0.58
Trichiasis	0 (0%)	5 (5.7%)	0.58
Interpalpebral hyperemia	2 (9.1%)	36 (40.9%)	0.005
Diffuse hyperemia	0 (0%)	8 (9.1%)	0.35
Papillary reaction	2 (9.1%)	24 (27.3%)	0.09
Follicular reaction	0 (0%)	9 (10.2%)	0.2
Pinguecula	3 (13.6%)	9 (10.2%)	0.7
Conjunctival scarring	0 (0%)	2 (2.3%)	1
Pannus	1 (4.5%)	9 (10.2%)	0.68
Corneal neovascularization	0 (0%)	10 (11.4%)	0.21
Corneal scarring	1 (4.5%)	14 (16%)	0.3
Corneal thinning	0 (0%)	5 (5.7%)	0.58
Corneal edema	0 (0%)	2 (2.3%)	1
Central corneal infiltrate	0 (0%)	2 (2.3%)	1
Marginal corneal infiltrate	1 (4.5%)	4 (4.5%)	1
Spade shape infiltrate	0 (0%)	1 (1.2%)	1
Central ulceration	0 (0%)	2 (2.3%)	1
Marginal ulceration	0 (0%)	1 (1.2%)	1
Lipid corneal deposition	0 (0%)	2 (2.3%)	1
Corneal phlyctenule	1 (4.5%)	0 (0%)	1
Corneal perforation	0 (0%)	1 (1.2%)	1
Episcleritis	0 (0%)	4 (4.5%)	1
Scleritis	0 (0%)	1 (1.2%)	1

DISCUSSION

The prevalence of ocular complaints in patients with acne rosacea is estimated at 45% to 85% of cases.[8,9] However, none of these complaints is specific for the disease. In our study, only 22

TABLE 2. *Prevalence of lens changes and intraocular lens implantation in acne rosacea patients*

Lens changes or PCIOL implant	Dermatology (22 patients)	Ophthalmology (88 patients)		*p* Values	
	OU	OD	OS	OD	OS
Initial cataract	6 (27.3%)	18 (20.5%)	16 (18.2%)	0.57	0.38
Moderate cataract	0	1 (1.2%)	3 (3.4%)	1	1
Advanced cataract	0	4 (4.5%)	4 (4.5%)	0.58	0.58
PCIOL implant	0	7 (8%)	7 (8%)	0.34	0.34

PCIOL, posterior chamber intraocular lens; OU, both eyes; OD, right eye; OS, left eye.

TABLE 3. *Distribution of the punctate epithelial keratopathy in acne rosacea patients*

PEK	Dermatology (22 patients)	Ophthalmology (88 patients)	*p* Values
Diffuse	0 (0%)	10 (11.4%)	0.21
Interpalpebral	1 (4.5%)	6 (6.8%)	1
Marginal	0 (0%)	3 (3.4%)	1
Inferior	4 (18.2%)	12 (13.6%)	0.74

PEK, Punctate epithelial keratopathy.

(25%) of the 88 patients followed by the dermatology clinic had an ophthalmologic evaluation performed, while 23 (26%) reported various ocular complaints to the dermatologist. The most common complaints by those patients not seen by the ophthalmologist included itchy eyes, watery eyes, and foreign body sensation. Ocular complications can affect up to 58% of patients with rosacea. Moreover, corneal complications and permanent loss of vision can occur if the treatment is delayed.[3] Quarterman et al.[9] demonstrated that patients with cutaneous rosacea are likely to have some degree of ocular disease. Hence, dermatologists and primary care physicians should inquire about ocular symptoms and examine the eyelids, in particular. Patients even slightly suspicious for ocular involvement should also be referred for a formal ophthalmologic evaluation.

Unfortunately, ocular rosacea is frequently undiagnosed. The patient often fails to complain of minor eye symptoms in the context of severe dermatologic manifestations, and the dermatologist fails to inquire about them. Conversely, the ophthalmologist often does not inspect the patient's face adequately during the external ocular examination, leaving mild but diagnostic cutaneous disease unnoticed.[4] This omission by the ophthalmologist may confound the diagnosis and delay appropriate treatment.

Wise[7] reported that the most common ocular signs in patients with rosacea from the ophthalmologic clinic were blepharitis (93%), conjunctival hyperemia (80%), and corneal vascularization and infiltrate (67%). Jenkins et al.[10] reported conjunctival hyperemia (86%), telangiectasia of the lid margin (63%), blepharitis (47%), and superficial punctate keratopathy (41%). These data are similar to those of our study, in which the most common ocular signs were meibomian gland dysfunction (85.2%), lid margin telangiectasias (53.4%), blepharitis (44.3%), and interpalpebral hyperemia (40.9%). Diffuse bulbar hyperemia was found only in 9% of the cases. Similar results were found by Akpek et al.[11]

On the other hand, Wise[7] reported that patients from dermatology clinics had much less eye involvement than those from ophthalmology clinics. Corneal vascularization and infiltrate were found in 27% of the patients, blepharitis in 17%, conjunctival hyperemia in 17%, and chalazion in 7%. In the current study, the most common ocular signs in patients from the dermatology clinic were meibomian gland dysfunction (27.3%), chalazion/hordeolum (27.3%), lid margin telangiectasia (18.2%), anterior blepharitis (13.6%), and pinguecula (13.6%). These results suggest that the major (and most easily observable) ocular problems in rosacea patients presenting either to ophthalmology or dermatology are lid disease–related complaints. Table 4 summarizes these results.

Akpek et al.[11] reported the most common corneal finding in rosacea to be punctate epithelial keratopathy (PEK), usually confined to the inferior half of the cornea. In the current study, 18.2% of the patients from the dermatology clinic and 13.6% from the ophthalmology clinic presented with inferior PEK, consistent with the findings of Akpek et al.[11]

TABLE 4. *Most common ocular signs in rosacea from the dermatology and ophthalmology clinics*

Study	Ophthalmology clinic	Dermatology clinic
Present study	Meibomian gland dysfunction (85.2%) Lid margin telangiectasia (53.4%) Blepharitis (44.3%) Interpalpebral hyperemia (40.9%)	Meibomian gland dysfunction (27.3%) Chalazion/hordeolum (27.3%) Lid margin telangiectasia (18.2%) Inferior PEK (18.2%) Anterior blepharitis (13.6%) Pinguecula (13.6%)
Wise[7]	Blepharitis (93%) Conjunctival hyperemia (80%) Corneal vascularization and infiltrate (67%)	Corneal vascularization and infiltrate (27%) Blepharitis (17%) Conjunctival hyperemia (17%)
Jenkins et al.[10]	Conjunctival hyperemia (86%) Lid margin telangiectasia (63%) Blepharitis (47%) Superficial punctate keratopathy (41%)	
Akpek et al.[11]	Lid margin telangiectasia (81%) Meibomian gland dysfunction (78%) Blepharitis (65%) Conjunctival hyperemia (45%)	

PEK, punctate epithelial keratopathy.

A study of this type comparing prevalences in two disparate clinics has some potential weaknesses. This study is a retrospective analysis, and, as such, suffers from the inherent problems associated with retrospective data collection, including the possible propagation of selection bias errors. It is logical that the dermatologist will concentrate on skin disease and the ophthalmologist on ocular disease. This means, of course, that we may not be seeing a true difference in the prevalence of disease but rather a difference in what is actually looked for. If eye disease is significant enough to be symptomatic, the patient may mention it to the dermatologist, only if he or she thinks it may be related to the skin problem for which the examination is being conducted. The dermatologist is unlikely to ask about eye symptoms or observe eye signs if the patient does not complain. Similarly, the ophthalmologist does not routinely ask about dermatologic symptoms and may not reliably identify the skin manifestations of rosacea. Logic would dictate, therefore, that in the eye clinic, ocular complaints would dominate, and in the dermatology clinic, skin symptoms would be more central. Future prospective studies would be beneficial in mitigating selection bias errors, advancing our understanding of the initial presentation of rosacea and its disease process.

Clearly, routine efforts to ask about ocular symptoms in dermatology patients and about skin symptoms in ophthalmology patients will favor an earlier and more accurate diagnosis of ocular rosacea. This may be promoted by a novel standardized classification system recently reported by Wilkin et al.[12], applied when analyzing the manifestations of rosacea. In establishing diagnostic criteria, rosacea signs were divided into primary and secondary features. The study defined secondary features as signs commonly occurring with primary manifestations but that also may occur independently. Ocular manifestations were classified as a second-

ary feature of rosacea. Provisional guidelines for the diagnosis of rosacea involve the presence of one or more of the primary features including flushing (transient erythema), nontransient erythema, papules and pustules, and telangiectasia with or without any of the secondary features consisting of burning or stinging, plaque, dry appearance, edema, ocular manifestations, peripheral location, or phymatous changes.[12] The report also grouped primary and secondary features that are most often concurrent into four subtypes and one variant grouping. Notably, subtype four is inclusive of only roseatic ocular signs and symptoms.[12] This new classification system represents an effort to create the foundation for a consistent and thorough early evaluation of rosacea patients when presenting initially to either the ophthalmologist or the dermatologist.

Ocular rosacea cannot be diagnosed solely by ocular findings, even though 20% of patients develop eye manifestations before the emergence of skin findings. Therefore, a clinician's increased awareness of ocular findings (in particular lid disease–related symptoms) may aid in earlier diagnosis and treatment, preventing permanent eye impairment. Any ocular complaints expressed by the patient in the setting of a dermatology clinic should be referred promptly for ophthalmologic examination. Conversely, signs suggestive of rosacea in the eye should lead the ophthalmologist to consider underlying skin disease.

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