

**ONLINE CE NEWSLETTER SERIES FOR OPTOMETRISTS**  
*WITH ONLINE TESTING AND INSTANT CE CERTIFICATE*

## *Eye on Glaucoma™*

# **Case Chronicles in Glaucoma and Ocular Surface Disease**

### **CASE 3 IN A SERIES OF 4**

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This course is COPE approved for 1 credit.

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## LEARNING METHOD AND MEDIUM

This educational activity consists of a case report and ten (10) study questions. The participant should, in order, read the Learning Objectives contained at the beginning of this activity, read the material, answer all questions in the post test, and complete the Activity Evaluation/Credit Request form. To receive credit for this activity, please follow the instructions provided below in the section titled To Obtain CE Credit. This educational activity should take a maximum of 1.0 hour to complete.

## CONTENT SOURCE

This continuing education (CE) activity captures content from a roundtable discussion.

## ACTIVITY DESCRIPTION

There is a growing awareness of the impact of ocular surface disorders on the successful management of patients with ocular hypertension and glaucoma. Recent studies provide new insights into patient problems and concerns, and an increasing awareness of the significance of preservatives on ocular health. Improved versions of current therapies, and the availability of new therapies, provide opportunities for improved outcomes toward the prevention of glaucoma progression. Recently, a group of experts convened to discuss their insights and approaches for managing these patients. This CE activity brings you highlights from these case discussions in a 4-part series.

## TARGET AUDIENCE

This educational activity is intended for optometrists.

## LEARNING OBJECTIVES

Upon completion of this 4-Part CE Case Series, participants will be better able to:

- Assess ocular surface health in patients on ocular antihypertensives
- Review the evidence on the effects of preservatives on the ocular surface as they relate to ocular hypertension treatment regimens
- Employ appropriate ocular antihypertensive strategies in patients with glaucoma or ocular hypertension to manage OSD

## ACCREDITATION DESIGNATION STATEMENT

This course is COPE approved for 1.0 hour of CE credit for optometrists.

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Each of the contributing physicians listed above has attested to the following:

1. that the relationships/affiliations noted will not bias or otherwise influence his or her involvement in this activity;
2. that practice recommendations given relevant to the companies with whom he or she has relationships/affiliations will be supported by the best available evidence or, absent evidence, will be consistent with generally accepted medical practice; and
3. that all reasonable clinical alternatives will be discussed when making practice recommendations.

## OFF-LABEL DISCUSSION

This activity includes off-label discussion of steroids for dry eye. Please consult products for all approved indications and administration.

## GRANTOR STATEMENT

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We offer instant certificate processing and support Green CE. Please take this post test and evaluation online by clicking the Take Exam button at the end of this case. Upon passing, you will receive your certificate immediately. You must answer 7 out of 10 questions correctly in order to pass, and may take the test up to 2 times. Upon registering and successfully completing the post test, your certificate will be made available online and you can print it or file it. Please make sure you take the online post test and evaluation on a device that has printing capabilities. There are no fees for participating in and receiving CE credit for this activity.

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## CASE PRESENTATION

**Dr Fingeret**: A 73-year-old African American male with a 7-year history of primary open-angle glaucoma (POAG) presented for his quarterly glaucoma evaluation. He complains of burning and stinging in each eye upon instillation of his ocular antihypertensive medications. His aversion to the medications has worsened to the point that he reports often neglecting to

administer the medications. His ocular antihypertensive regimen includes latanoprost (generic formulation) in each eye at bedtime and timolol/dorzolamide (generic formulation) in each eye twice daily. The patient also has been using over-the-counter artificial tears for several years. The artificial tears no longer provide relief for his ocular discomfort.

## **EXAMINATION**

**Allergy History:** None

**Past Medical History:** Hypertension, diabetes (diet-controlled) for 10 years

**Nonocular Medications:** Hydrochlorothiazide

**Ocular History:** 7-year history of primary open-angle glaucoma

**Visual Acuity (Best Corrected With Low Hyperopic Spectacle Prescription):**

20/20 OD    20/20 OS

**Anterior Segment Examination: ([Figures 1, 2, 3](#))**

Conjunctiva:

1+ conjunctival hyperemia OU

Eyelids:

Protrusion of meibomian glands with material expressed with gentle pressure

Blepharitis with material present on lid margins OU

Cornea:

Mild-Moderate punctate staining central OU

Tear break-up time <5 seconds OD and OS

Anterior chamber (including angle assessment):

Anterior chamber clear with wide-open angle

All structures visible with gonioscopy

Lens:

1+ Nuclear sclerosis OU



**Figure 1.** Examination of the patient's eye showing mild conjunctival hyperemia.



**Figure 2.** Examination of the patient's eyelid showing pouting of meibomian glands.



**Figure 3.** Examination of the patient's eyelid showing blepharitis with material on the lid lashes.

*Photos Courtesy of Murray Fingeret, OD*

**IOP:**

25 mm Hg OD      22 mm Hg OS

**Pachymetry:**

525 OD      521 OS

**Optic Nerve/Retinal Nerve Fiber Layer (RNFL)/Retina: ([Figures 4A, 4B, and 5](#))**

Average disc size OU

Inferior, superior, nasal, and temporal (ISNT) Rule not obeyed

No hemorrhage present

Zone Alpha and Beta Parapapillary atrophy present OU

Mild RNFL loss inferior temporal OU

C/D .7x .7 .65x .6

Optical Coherence Tomography imaging performed showing good quality scans with overall thinning of the RNFL and statistically abnormal superior and inferior sector thinning

**Fundoscopy Examination ([Figures 4A and 4B](#))**



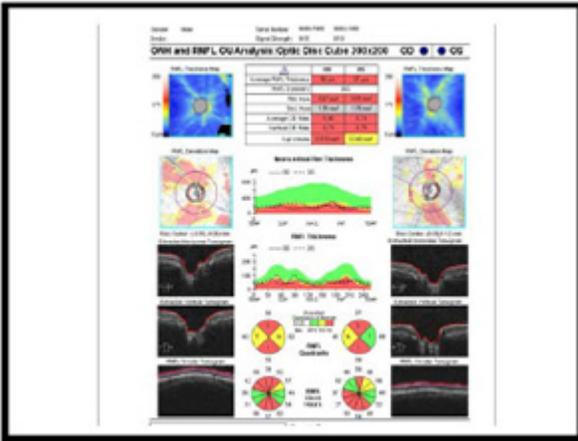
**Figure 4A.** Photograph of the patient's optic nerve of the right eye.



**Figure 4B.** Photograph of the patient's optic nerve of the left eye.

*Photos Courtesy of Murray Fingeret, OD*

Optic Nerve Head and Retinal Nerve Fiber Layer Images: **(Figure 5)**



**Figure 5.** Optic nerve head and retinal nerve fiber layer imaging analysis of both eyes of the patient.

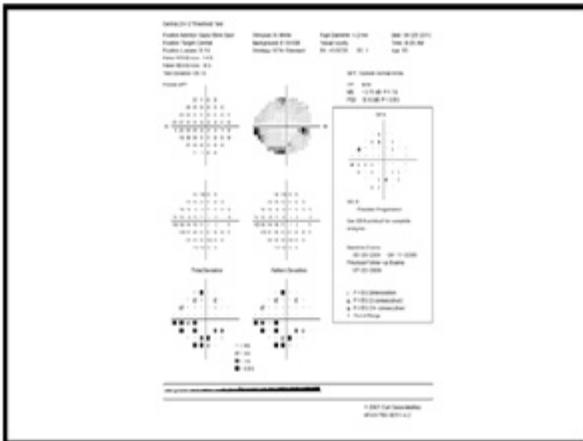
Figure Courtesy of Murray Fingeret, OD

**Visual fields (SITA Standard):**

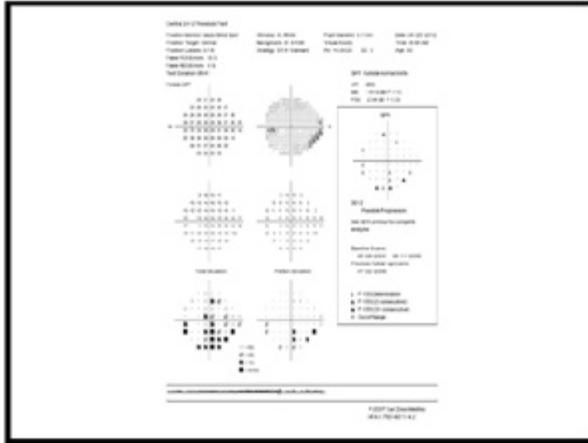
Borderline reliability – OD, OS

OD: arcuate scotoma; OS : partial arcuate scotoma

Visual Field Images **(Figures 6A and 6B)**



**Figure 6A.** Visual field of the patient's right eye.



**Figure 6B.** Visual field of the patient's left eye.

*Figures Courtesy of Murray Fingeret, OD*

## PERTINENT EXAMINATION FINDINGS

External eye examination finds mild conjunctival hyperemia and pouting of the meibomian glands with clear material expressed upon gentle pressure of the patient's eyelids. A moderate amount of debris is visualized on his eyelashes. He also has some corneal punctate staining. His tear break-up time is very fast. His current intraocular pressures (IOPs), 25 mm Hg OD and 22 mm Hg OS, are 7 to 8 points higher than in previous visits and are approaching pretreatment levels. The patient reports that he is not using his ocular antihypertensive medications because of the irritation he experiences when administering them, and he also states that his eyes feel irritated constantly.

## ASSESSMENT

This patient's POAG is complicated by ocular surface disease (OSD), which interferes with his adherence to glaucoma therapies.

## DISCUSSION

**Dr Fingeret:** What would be the other panelists' considerations for treating this patient's glaucoma and OSD?

**Dr Sowka:** Before attempting to modify his ocular antihypertensives, I would embark upon treating his meibomian gland dysfunction (MGD) and blepharitis. My recommendation would be to apply profound lid hygiene: lid scrubs, hot compresses, digital massage, and perhaps a course of oral doxycycline or topical azithromycin. Getting his MGD treated first will likely improve his chances of tolerating any new ocular antihypertensives.

**Dr Fingeret:** Would you consider the use of topical steroids on his eyelids?

**Dr Sowka:** I would consider topical steroids only for severe dry eye. Using a steroid is always risky because it can cause an IOP spike—an added risk here because this patient has not been using his glaucoma therapies.

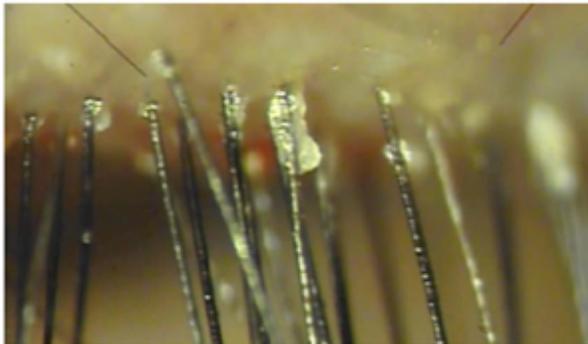
If this option is pursued, however, because of extremely severe OSD and uncomfortable dry eye, I would use only a small dose for a short period of time. I recently have done this with a patient of mine. Loteprednol, 0.2%, (brand formulation) was too expensive, so I prescribed the generic fluorometholone. Both steroids have a low propensity to elevate IOP.<sup>1,2</sup> In my patient's

case, a week of steroid treatment was life changing and so far, no IOP rise, thankfully. Applying a steroid topically to this case patient's eyelid rather than instilling a steroid directly into his eye may minimize the risk of steroid-induced IOP increases.

**Dr Fingeret:** Dr Sowka, are you suggesting discontinuing all his glaucoma medications—so long as the patient does not have advanced glaucoma—and treating the eyelids and the ocular surface until the MGD and blepharitis resolve?

**Dr Sowka:** Yes, with an additional caveat: If this patient had a pretreatment IOP above 40 mm Hg, I would not discontinue his glaucoma medications. Another option is to reduce the glaucoma medications down to 1 agent and to proceed on the course of blepharitis treatment.

**Dr Hom:** I would take a diagnostic approach initially, investigating for *Demodex* mite infestation. There are several reasons to first rule out *Demodex* as the cause of his ocular signs and symptoms. Firstly, in patients who are aged 70 years and older, the prevalence of *Demodex* approaches 100%,<sup>3</sup> and this patient is 73 years old, placing him in the high-risk age group. Secondly, consider that *Demodex* might be a cause of the patient's blepharitis<sup>4</sup> and worsening MGD.<sup>5,6</sup> A 2011 study conducted in the Philippines showed that 85% of patients with MGD had underlying *Demodex* infestation.<sup>7</sup> Thirdly, the images of the patient's eyes indicate some lid debris at the base of the eyelashes. **(Figure 2)** That debris could be cylindrical dandruff, although it is difficult to visualize against the patient's dark skin. In a 2005 study, Gao and colleagues found that cylindrical dandruff is 80% pathognomonic for *Demodex*.<sup>4</sup> **(Figure 7)** Lid debris typically appears farther down the lash, but in *Demodex* infestation, a more typical presentation of lid debris appears at the eyelash base.<sup>4</sup> This cylindrical debris is caused either by *Demodex folliculorum* mites that live in the follicle and/or by *Demodex brevis* mites that live deep in the eyelash's sebaceous glands and in the meibomian gland.<sup>4</sup> The lid debris is the waste products that the mites leak out from the follicle.



**Figure 7.** Cylindrical dandruff indicative of *Demodex* mite infestation.

*Photo Courtesy of Milton Hom, OD*

To check for the presence of the parasites, epilate the lash and look at the eyelash underneath a light microscope to see if there are any mites visible. The presence of the *Demodex* mites could explain the patient's discomfort. And if *Demodex* is indeed the cause of discomfort, my suggestion is to treat the patient with in-office tea tree oil treatments.<sup>5</sup> Clinicians should be aware that *Demodex* might be the culprit in many lid disease cases that are resistant to routine therapies. If a patient is not getting better with routine treatment, *Demodex* could be the reason.

An important point with respect to *Demodex* treatment is that *Demodex* infestation is usually related to rosacea.<sup>3,8</sup> Treatment for acne rosacea usually involves steroid therapy. However, steroids should be avoided in patients with *Demodex* because steroids may increase mite counts.<sup>9</sup> Thus, treatment of the rosacea with steroids actually could cause the *Demodex* infestation to worsen.<sup>10</sup> Optometrists are often reluctant to use steroids in a patient with glaucoma in the first place because of its effect on IOP. Thus, if this patient has *Demodex* infestation, I would not use steroids on the patient's eyelids.

**Dr Gaddie:** I agree completely with Dr Hom that this appears to be a case complicated by *Demodex*. While the prevalence is close to 100% at this age<sup>3</sup>, not everyone with *Demodex* has symptoms or requires treatment.<sup>6</sup> But certainly in this case the condition does warrant treatment, and I think you could do so without stopping glaucoma therapy. I also use a tea tree oil treatment for *Demodex* and doing so does not necessitate discontinuation of glaucoma treatment. In my clinical experience I have found that patients who are on prostaglandin analogs are more susceptible to *Demodex*, possibly as a result of the inflammatory mechanisms of the drugs.

Certainly laser trabeculoplasty would be a great option to otherwise reduce the load of topical medications and their associated preservatives vs a preservative-free medication option.

**Dr Fingeret:** Allow me to relate how I managed this patient's glaucoma in light of his OSD. I treated his OSD condition with warm compresses, meibomian gland expression, and eyelid cleaning. I added omega-3 fatty acid therapy<sup>11,12,13</sup> and switched him to preservative-free ocular antihypertensives: tafluprost (brand formulation) and the combination preservative-free dorzolamide/timolol (brand formulation). When the patient returned a month later, he felt better. His eyes looked relatively white, and he reported that the ocular antihypertensive medications were not causing stinging in his eyes. His IOPs were 13 mm Hg OD and 14 mm Hg OS, which confirmed that his previously poorly controlled IOP was related to poor adherence to glaucoma therapy.

The question then arises: Were the patient's OSD symptoms independent of his ocular antihypertensive medications, or did the medications contribute to the OSD? My assessment was the latter. Although his medications may not have been the instigators of or culprits in the OSD, they were at least contributing to it. Consequently, switching to a preservative-free ocular antihypertensive eliminated any contribution of the benzalkonium chloride (BAK)-preserved ocular antihypertensives aggravating the patient's OSD.

When corneal staining and hyperemia are present with an unclear cause, my assessment is that BAK may be exacerbating OSD. In a 2008 study examining the prevalence of OSD in patients with glaucoma, Leung and colleagues found that 59% of patients reported symptoms of OSD.<sup>12</sup> The researchers also investigated the link between the number of BAK-containing drops and clinical test results for OSD. After controlling for age and sex, each additional BAK-containing drop was associated with approximately twice the risk of abnormal results on corneal and conjunctival lissamine green staining (odds ratio = 2.03; 95% confidence interval = 1.06 – 3.89;  $P=$ .034).<sup>14</sup> BAK has been found to exacerbate conditions that are deleterious to the ocular surface, including blepharitis, MGD, tear film instability, conjunctival inflammation, and keratitis.<sup>15</sup> Compared with preservative-free ocular antihypertensives, preserved ocular antihypertensives, particularly those containing BAK, can aggravate dry eye disease and can cause a markedly increased prevalence and frequency of symptoms of burning, stinging, and discomfort.<sup>15</sup> Even if there had been preexisting OSD prior to BAK exposure in this case patient, my thought was that a preservative-free ocular antihypertensive would avoid additional insult to the eye and might make the patient's eyes feel better.

**Dr Sowka:** Based on the success of Dr Fingeret's treatment plan, the patient's condition was unlikely to have been caused by *Demodex* infestation. Nonetheless, optometrists should consider adding *Demodex* to the differential diagnosis in a patient presenting with some of the following signs and symptoms: blepharitis, MGD, OSD, debris near the eyelash base. Also, a *Demodex* treatment plan is a helpful addition to the optometrist's armamentarium. Regardless of why the treatment for this patient was a success, whether it was due to the blepharitis treatment or to the switch to a preservative-free ocular antihypertensive, the end result was a positive outcome—a patient with glaucoma who is now comfortable using his ocular antihypertensive medications.

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