Preoperative ocular surface disease algorithm introduced

by Christopher Starr, MD

Annual ASCRS Clinical Surveys have shown that although members fully recognize the importance of a healthy ocular surface in obtaining accurate preoperative measurements and achieving optimal postoperative outcomes from anterior segment surgery, they are not sure how to incorporate evolving knowledge about ocular surface disease (OSD) and advanced diagnostic technologies and therapies into practice.

To help surgeons navigate this process, the ASCRS Cornea Clinical Committee created a new consensus-based preoperative OSD algorithm (Figures 1 and 2). With sensitive and specific new point-of-care diagnostics and better examination tools, we can target each OSD subtype and treat it separately, optimizing the cornea, tear film, and measurements before cataract and refractive surgery.

Increased involvement of technicians, physician extenders

To streamline the process, we combined preoperative tests with ocular assessments and extensively rely on the use of technicians and physician extenders.

Focusing specifically on all subtypes of OSD (not just dry eye disease), the algorithm begins with refractive testing (e.g., optical biometry, keratometry, topography, etc.), followed by the essential OSD screening battery, which technicians administer to every preoperative cataract and refractive surgery patient. Essential tests include the ASCRS SPEED II questionnaire, tear osmolarity, and matrix metalloproteinase (MMP-9).

The combination of tear osmolarity and MMP-9 provides an abundance of information about the health of the ocular surface.23 In a large collaborative study we performed with Marjan Farid, MD, has financial interests to disclose.

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Educational Objectives

• Describe the ASCRS Cornea Clinical Committee ocular surface disease algorithm for preoperative patients and its integration into surgical practices.

• Implement more consistent practice protocols for assessing lid and meibomian gland function and structure in order to proactively identify MGD signs and symptoms; review evidence for efficacy of therapies for MGD.

• Appropriately pair treatment choices to severity and etiology of acute and chronic dry eye disease.

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Continued on page 2
colleagues at Duke University, a majority of our preoperative cataract surgery patients had objective signs of OSD as measured by osmolarity and MMP-9. Surprisingly, almost 50% of those who reported no symptoms had abnormal osmolarity and MMP-9.

If results are positive on any of these screening tests, OSD is likely, and additional but non-essential point-of-care OSD tests can be performed if available in the office. While the OSD screening battery helps identify the presence of OSD, it does not narrow down the various subtypes. Tests such as meibography, noninvasive tear breakup time, lactoferrin, tear meniscus height, and lipid layer interferometry, among others, can aid in OSD subtype identification when available.

The next part of the algorithm involves a quick directed clinical exam called “LLPP”—look, lift, pull, and push. We look at the base of the lashes, eyelids, lid position, blink position, tear meniscus, conjunctiva, and cornea. Then, we lift the upper eyelid to examine the superior cornea for lumps and/or bumps and the conjunctiva for superior limbic keratoconjunctivitis. Next, the upper eyelid is pulled away from the eye to assess laxity and floopiness. Finally, we gently push on the lower lid to express the meibomian glands and determine the quality and quantity of meibum. Staining with lissamine green, fluorescein,
Supported by an unrestricted educational grant from Shire, Johnson & Johnson Vision, Sun Ophthalmics, and Allergan

Integrating the ASCRS Preoperative OSD Algorithm into surgical practice

by Francis Mah, MD

Surgical practices need to emphasize OSD management to staff

The new ASCRS Preoperative Ocular Surface Disease (OSD) Algorithm is a proactive system that will produce a paradigm shift in the way we manage ocular surface disease (OSD) before cataract and refractive surgery (Figures 1 and 2).1 This is a critical step. Research has shown that it is important to address OSD when performing cataract and refractive surgery.2–4 If OSD is not diagnosed or poorly managed before cataract or refractive surgery is performed, visual outcomes may fall short of expectations.

Furthermore, OSD can impact preoperative measurements. For example, Eptropoulos et al. reported that tear hyperosmolarity affects or both should be performed after the LLPP examination to assess for corneal staining and tear breakup time.

Interpreting results

Surgeons analyze the data and findings generated from the algorithm and determine which OSD subtypes are present and how severe they are.

A key highlight of the new algorithm is that it differentiates between visually significant OSD (VS-OSD) and non-visually significant OSD (NVS-OSD).1 If NVS-OSD is identified, surgeons can proceed with surgery and the refractive measurements but should also counsel the patient that it may worsen postoperatively and prophylactic treatment should be started preoperatively. In contrast, if VS-OSD is diagnosed, surgery is delayed until converted to NVS-OSD.

We recommend that each subtype of OSD is treated aggressively, using a multifaceted treatment regimen to reduce delays in surgery. Treatment usually requires a combination of prescription medications (antibiotics, steroids, immunomodulators, etc.) and procedural treatments (blepharoplasty, thermal pulsation, punctal plugs, amniotic membrane, pulsed light, etc.) when multifactorial VS-OSD is present.5–7

The patient typically returns 2 to 4 weeks after beginning treatment, and preoperative measurements and OSD testing are repeated, following the algorithm from the beginning. If OSD is resolved or the patient has NVS-OSD, we can finalize the refractive planning and proceed with surgery.

Conclusion

It is essential to pinpoint and treat OSD before refractive and cataract surgery to achieve the high-quality results patients expect. The stakes are high and timing is very important. This algorithm, whether adopted faithfully or partially, will help surgeons navigate this complex process.

References

5. Sheppard JD, et al. Effect of loteprednol etabonate 0.5% on initiation of dry eye treatment with topical cyclosporine 0.05%. Eye Contact Lens. 2014;40:289–296.

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Francis Mah, MD
Algorithm launches new era in preoperative OSD management

Building a mindset

Before integrating the algorithm into a surgical practice, surgeons themselves need to recognize the impact of OSD in treating cataract and refractive patients. They also need to make it clear to everyone in the practice who is involved in patient care that it is necessary to implement this algorithm or another system to evaluate every cataract and refractive surgery patient for OSD and treat it.

In response to some medical professionals and patients who question the importance of diagnosing and treating OSD, we remind them that it is essential to perform corneal topography before refractive surgery or optical biometry before cataract surgery. We would never skip these tests on patients, who have high expectations of cataract and refractive surgery. Preoperative OSD management is the next step in trying to improve preoperative measurements, surgical outcomes, and patient satisfaction.

If we do not try to implement an OSD diagnostic and treatment system or show our passion for it, the office staff will not be on board. It is especially important to educate technicians and physician extenders about its importance because they play a major role in its implementation.

Simplified process

The new algorithm is easy to perform. Essential tests include the ASCRS SPEED II questionnaire, tear osmolarity, and matrix metalloproteinase-9. Data from these tests are provided to the surgeon, who then performs the LLPP (look, lift, pull, and push) step of the examination.

Additional tests may be added if available, but we designed the algorithm to be accessible and inexpensive.

The algorithm standardizes diagnosis of meibomian gland dysfunction, which accounts for 86% of cases of dry eye disease. At the beginning of the process, the technician assesses tear osmolarity, and ultimately, the surgeon examines the meibomian glands. The algorithm also enables practices to include tests specifically focusing on meibomian gland dysfunction, such as meibography.

Surgeons may consider ways to manage OSD testing expenses. If patients answer any questions positively on the ASCRS SPEED II questionnaire, testing will be reimbursed. However, even if patients have negative results, they may have asymptomatic OSD, so additional testing is important. Practices may include a portion of unreimbursed test expenses in premium packages for cataract surgery, whether the patient is having femtosecond laser cataract surgery or receiving toric, extended depth of focus, pseudoadjusting, or multifocal intraocular lenses.

Conclusion

When integrating the ASCRS Preoperative OSD Algorithm, surgeons need to embrace this process and emphasize its importance to staff. It is important to educate staff about the benefits of OSD management, stressing that it will improve postoperative outcomes and patient satisfaction, which will have a positive impact on the practice.

References


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Figure 1. Anterior staphylococcal blepharitis

Figure 2. Inspissated meibomian glands
New direction for ocular surface disease diagnosis

by Preeya Gupta, MD

New tool provides step-by-step guidance for diagnostic process

The new ASCRS Preoperative OSD Algorithm developed by the ASCRS Cornea Clinical Committee provides surgeons in busy surgical practices with an easy-to-use framework for diagnosing and treating OSD. With this tool, surgeons can address OSD as part of the process for evaluating presurgical patients.

The literature provides extensive evidence showing that a high percentage of patients arriving for cataract surgery consults have OSD, and we can assume that this is true for refractive surgery patients as well. To deliver premium outcomes and achieve high-quality vision, it is imperative for clinicians to address OSD.

Essential tests

The OSD algorithm was designed to assess symptoms and signs of OSD in all patients being evaluated for refractive or cataract surgery. After noninvasive preoperative measurements are performed, we administer the ASCRS SPEED II questionnaire, which assesses patients’ symptoms. This incorporates questions from the SPEED questionnaire (Johnson & Johnson Vision) and questions regarding additional OSD subtypes, along with questions about patient expectations, personality traits, and willingness to pay out-of-pocket costs to reduce spectacle dependence, which were adapted from Dr. Steven Dell’s Cataract and Refractive Lens Exchange Questionnaire.

Subsequently, the technician performs point-of-care tear osmolarity and matrix metalloproteinase-9 testing to identify signs of OSD.

Determining OSD subtypes

If all of these tests have negative results, OSD is unlikely; if any have positive results, additional testing is recommended to determine the stage of OSD and which aspects of OSD are present. Assessments may include meibography, corneal topography, optical coherence tomography tear meniscus measurements, ocular scatter index, aberrometry, lipid layer thickness, noninvasive tear breakup time, or others.

Meibography enables the clinician to examine the underlying structure of the meibomian glands, which is very helpful in staging meibomian gland disease. It is difficult to determine at the slit lamp whether patients have meibomian gland atrophy (Figure 1).

The next step is the clinical examination, including LLPP (look, lift, pull, and push) (Figure 2). The surgeon looks at the lashes, eyelids, interpalpebral surface, and blink; lifts the upper lids to examine the superior surface; pulls the lid to determine whether the patient has lid laxity; and gently pushes on the meibomian glands to assess function and the meibum expressed.

The algorithm guides clinicians in identifying sub-

<table>
<thead>
<tr>
<th>Clinical exam (LLPP)</th>
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<tbody>
<tr>
<td><strong>Look:</strong> Blink, lids, lashes, interpalpebral surface</td>
</tr>
<tr>
<td>Stain (dye instillation): corneal staining? TBUT? +/- Schirmer’s</td>
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Figure 1. Meibomian gland dysfunction and fine telangiectasia along the lid margin

Figure 2. LLPP (look, lift, pull, and push)

continued on page 6
n the preoperative setting, it is essential to diagnose and treat ocular surface disease (OSD) quickly to reduce potential surgical delays and improve visual outcomes.

The new ASCRS Preoperative OSD Algorithm provides critical direction to help surgeons take decisive action against OSD before cataract and refractive surgery.1

Aggressive approach
Surgeons need to develop an aggressive, multifaceted treatment regimen for preoperative patients, which may include prescription medications and procedural interventions. Most OSD is visually significant OSD because of punctate staining of the cornea, which can affect vision quality and tear quality, the lipid layer, and tear breakup time. Tear film irregularities will result in higher-order aberrations.

Patients with non-visually significant OSD may have significant symptoms, but their tear makeup may be acceptable. However, we need to address their OSD based on symptoms and signs because it will become visually significant without prompt treatment and may worsen after surgery. Patient education, using point-of-care test results and diagnostic imaging, is key in improving patient compliance. Patients should understand that their vision

References

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Categories of OSD, such as eyelid malposition that leads to corneal surface degradation, dry eye disease (meibomian gland dysfunction or aqueous deficient dry eye), and irregularities such as Salzmann’s nodules, anterior basement membrane dystrophy, infectious or allergic conjunctivitis, and many others.

OSD is designated as visually significant OSD (VS-OSD) or non-visually significant (NVS-OSD).1 It is critically important to delay surgery and aggressively treat patients with VS-OSD because it can impact keratometry values.4 Patients with corneal staining can have abnormal corneal topography. These are all pieces of data that we will use to develop our refractive plans and goals. Our ability to deliver on our promises to patients becomes much more variable in patients with VS-OSD.

If NVS-OSD is not impacting the corneal surface, it is unlikely to alter measurements, so we may not need to delay surgery.

Conclusion
The algorithm is easy to follow and integrate into practice. Most steps of this new tool are performed by technician staff, who can administer the questionnaire and perform preoperative testing. The surgeon performs the clinical examination and interprets the collected point-of-care testing data.

New system helps surgeons aggressively treat ocular surface disease before surgery

continued from page 5

continued on page 7

ASCRS Preoperative OSD Algorithm guides targeted, multifaceted treatment strategies

by Marjan Farid, MD

Marjan Farid, MD
problems—such as ocular fatigue and difficulty reading for long periods of time—result from OSD, not cataracts. I explain to patients that the more effectively we treat OSD before surgery, the better their recovery will be after surgery, and patients understand that.

**Treating OSD**

Clinicians often are uncertain about where to begin when treating OSD. Unlike the gradual step-by-step approach used for standard dry eye, our goal for preoperative patients is to improve the ocular surface rapidly.

Two major areas should be treated aggressively from the beginning—tear film inflammation and lid margin disease.

We need to quickly improve tear quality to improve the ocular surface. If patients have even a slightly positive matrix metalloproteinase-9 (MMP-9) response, I begin with a topical anti-inflammatory that has a rapid onset of action such as loteprednol or lifitegrast. Cyclosporine also is an option, from proven formulations such as cyclosporine 0.09% in a nanomicellar formulation that gets the drug to the ocular tissue in a high concentration and more rapidly.

If significant inflammation is present in lid margin disease, I may also use an oral anti-inflammatory, such as doxycycline or minocycline, which can reduce concomitant rosacea and inflammation of the lid margin.

Meibomian gland disease is often the root of tear film problems and OSD. We can reduce punctate keratitis with aggressive lubrication, but we need to address the source—the obstructed glands and lack of a good-quality lipid layer in the tear film.

We have many procedural interventions that we can offer. I usually offer thermal pulsation in the preoperative setting to clear the meibomian glands. A single treatment helps clear the meibomian glands and prepare them for surgery. Warm compresses at home can be somewhat effective to maintain the lids, but we need something more aggressive when glands are chronically obstructed. The heat needs to penetrate multiple layers of the lid, and thermal pulsation provides heat where it needs to be.

Blepharoexfoliation can remove bacteria and debris from the lid margins of patients with blepharitis, which is important to reduce the risk of infection. The biofilm that forms in chronic blepharitis along the lid margin is a major culprit for obstruction of the meibum flow. Additional heating devices have become available that heat the oil glands and mechanically debride the glands.

**Pinpointing potential risks**

The ASCRS SPEED II questionnaire recommended in the algorithm guides surgeons in diagnosing OSD and provides additional information to guide treatment. It covers topics such as IOL selection and risk factors for OSD. Patients receiving multifocal or extended depth of focus IOLs may have a lower tolerance for tear film irregularities. This is where we need to be most aggressive and identify patients who may not be good candidates for these lenses.

**Conclusion**

Using the ASCRS Preoperative OSD Algorithm, surgeons can methodically identify OSD subtypes and develop aggressive treatment strategies to optimize the ocular surface before surgery.
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CME questions (circle the correct answer)

1. When using the new preoperative OSD algorithm, when a patient arrives for a cataract surgery consult, which of the following tests is considered essential?
   a. Tear meniscus height
   b. Non-invasive tear breakup time
   c. Tear osmolarity
   d. Lipid layer interferometry

2. Which of the following are two steps in the LLPP portion of the OSD algorithm?
   a. Lifitegrast and pulsation
   b. Lift and push
   c. Lipid layer treatment and punctal occlusion
   d. None of the above

3. During the “pull” portion of the clinical examination, what is the clinician looking for?
   a. Eyelid laxity
   b. Meibomian gland secretions
   c. Conjunctival staining
   d. Signs of blepharitis

4. What is a likely course of action if non-visually significant ocular surface disease is diagnosed?
   a. Surgery is delayed and the ocular surface is treated.
   b. The surgeon proceeds with surgery and the ocular surface is treated prophylactically.
   c. Surgery is performed and symptoms are treated if they occur postoperatively.
   d. Ocular surface treatment is unnecessary.

5. What is the focus of treatment according to the algorithm?
   a. Step-by-step treatment of symptoms as they arise
   b. A gradual approach that focuses on one therapy at a time
   c. Treatment of meibomian gland dysfunction exclusively
   d. An aggressive strategy that treats each subtype of ocular surface disease

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