The 2009 Executive Summary of the ICare in America Survey (www.icareinamerica.com) suggested that as many as 28 million US adults are affected by symptoms associated with blepharitis. Cognizant of blepharitis and its forms, eye care specialists are looking for options to manage the condition successfully.

BACKGROUND

Blepharitis is generally categorized as either meibomian gland dysfunction (MGD)/posterior blepharitis (Figure 1) or anterior blepharitis (Figure 2), although these forms rarely present independently. Generally, posterior and anterior blepharitis are comorbidities that interact to perpetuate the overall disease state of the eyelid.

Anterior blepharitis, including angular blepharitis, can result from an overpopulation of bacterial lid commensals or Demodex (a ubiquitous mite) and from seborrheic changes of the lid margin. By causing inflammation, irritation, and/or hyperkeratinization of the lid margin, bacterial exotoxins and Demodex contribute to obstruction of the meibomian gland orifices. Chronic inflammation from meibum stasis and keratinization of the meibomian gland's ducts and orifices ultimately leads to obstructive MGD, a loss of gland clusters, and atrophic nonfunctional glands. In nonobstructive MGD, sometimes referred to as seborrheic MGD, copious amounts of abnormal meibum are delivered to the tear film. Additionally, bacterial lipases, acting upon meibum, create irritating free fatty acids that are released into the tear film. MGD can occur as a primary disorder or secondary to acne rosacea.

An overview of the options for treatment.

BY KATHERINE M. MASTROTA, MS, OD

Figure 1. Filigree-like vessels cross the lid margin in MGD. Note the trapped lipid and irregular placement of the meibomian gland's orifices as well as the early rounding of the edge of the inner lid margin.

Figure 2. Debris and remnants of makeup harbor lipase and exotoxin-secreting bacteria in an eye with anterior blepharitis.
STRATEGIES FOR TREATMENT

Goal
The aim of treatment is to address infection, infestation, and inflammation of the lid and lid margin as well as meibomian gland function and/or congestion. Therapy is prescribed to manage acute or chronic blepharitis. Lid disease is dynamic in nature and affected by myriad factors, including the patient’s age, environment, medications, and overall health. Because treatment must be flexible, therapies may be used in combination or interchangeably.

Lid Hygiene
Often, treatment begins with gentle cleansing of the eyelid margin along the base of the eyelashes. Warm compresses and mechanical massage of the tarsal plate area can be added in cases of posterior blepharitis. A warm compress softens the wax in the meibum and loosens any debris on the eyelid margin and eyelashes. Patients may use a variety of homemade compresses (eg, a microwave-heated sock full of uncooked rice, a hardboiled egg wrapped in a washcloth) or commercially available eyelid-warming devices (eg, gel packs, goggles).

Using the index finger to gently massage the closed upper and lower lids expresses the meibomian gland’s ducts and dampens the gland’s inflammatory response, while increasing tear breakup time. The MG Expressor Kit (Gulden Ophthalmics, Elkins Park, PA) is available for in-office meibomian gland expression. Maskin Meibomian Gland Intraductal Probes (Rhein Medical Inc., Tampa, FL) were designed to probe the meibomian glands, thus releasing presumed adhesions within the gland’s central duct and allowing recanalization to enhance lipid flow.

Gentle cleansing of the eyelashes reduces bacterial colonization of the lids, washes away irritating bacterial toxins, improves the health of the eyelash follicle, and stimulates the egress of meibum. Because commercially prepared cleaning products are free of unnecessary fragrances and colorings, they avoid allergic reactions in sensitive individuals. Currently available by prescription are combination kits that include doxycycline (to be discussed further), lid-cleansing foams or solutions, and lid-warming devices. Lid-cleansing preparations such as Ocusoft Lid Scrub (Cynacon/Ocusoft, Inc., Richmond, TX) and tea tree oil-based Cliradex (Ocular Surface Research & Education Foundation, Miami, FL) have both antimicrobial and acaricidal activity.1,2 Sterilid (Advance Vision Research, Woburn, MA) is another popular choice for lid hygiene.

Seborrheic disease is thought to be due to a combination of an overproduction of skin oil and irritation from the yeast Malassezia. The condition may respond to gentle overall cleaning with an over-the-counter dandruff shampoo. It is important to caution patients against overzealous scrubbing, which can exacerbate inflammation, create microabrasions in the dermis, and strip the skin of its natural protective oils (sebum), making it susceptible to bacterial infection.

Over-the-Counter Tears
Various studies have demonstrated the correlation between MGD and evaporative dry eye.3,5 Hydrating the

INTRADUCTAL MEIBOMIAN GLAND PROBING AND PHARMACEUTICAL INJECTION

BY STEVEN L. MASKIN, MD

Despite the availability of a wide array of topical and systemic therapies targeting the meibomian glands, meibomian gland dysfunction (MGD) remains an enigma. I concluded that understanding this disease and developing optimal therapy require entering the gland itself. To achieve this goal, I have developed in collaboration with Rhein Medical Inc. (Tampa, FL) a system of sterile, stainless steel intraductal probes of various lengths that have a diameter of 76 µm. These instruments directly establish and confirm a patent duct system. The probing system also has intraductal tubes with an outer diameter of 104 µm to permit the injection of a pharmaceutical agent after probing.

With a topical anesthetic ointment, patients tolerate the procedure well. My coinvestigators and I reported the successful treatment and long-term relief of the symptoms of refractory MGD with this therapy.1,2 Other surgeons have had similar success.

Our studies have uncovered two distinct patterns of symptoms in obstructive MGD, both of which respond to probing but at different rates, with up to 9 months of follow-up. Based on our findings with the probes, we have identified four characteristics that may be used as a grading scale for the meibomian gland’s obstruction. It is also noteworthy that, after probing, patients have reported an improvement in symptoms they had not previously recognized, a finding that supports the notion that MGD exists subclinically. An article on these findings has been accepted for publication in Cornea.

Steven L. Maskin, MD, is the founder of Focus on Females Education Foundation, and he is in private practice at the Dry Eye and Cornea Treatment Center in Tampa, Florida. A patent on the described system of probes is pending. Dr. Maskin may be reached at (813) 875-0000.


MAY/JUNE 2010 ADVANCED OCULAR CARE 35
of meibomian gland atrophy.

Omega-3 Fatty Acids

Supplementation with omega-3 fatty acids (cold-pressed, pharmaceutical grade) encourages the production of anti-inflammatory prostaglandins and modifies the composition of meibomian lipids. A variety of products are available that contain combinations of fish, flaxseed, and evening primrose oils. Although no consensus exists regarding dosage, most clinicians suggest 2 g/day. Another option is the off-label use of omega-3-acid ethyl esters (Lovaza; GlaxoSmithKline) at a dose of 4 g/day.

Topical Steroids and Antibiotics

Short-term therapy with ester-based steroids may effectively break the inflammatory cycle in patients who have significant lid disease or blepharoconjunctivitis. These ester-based steroid-containing agents (Lotemax, Alrex, Zylet; all from Bausch + Lomb) have a significantly lower propensity to raise IOP or cause cataract formation than ketone-based steroid preparations. Similarly, monotherapy or combination therapy in the form of a solution or ointment can be a useful means of directly applying therapy to the eyelid's margins or base.

Recent research showed that high concentrations of topically administered azithromycin are achieved within the ocular tissues. Additionally, macrolides have known anti-inflammatory characteristics. The off-label use of azithromycin (Azasite; Inspire Pharmaceuticals, Inc.) has shown promise for the management of both the anterior and posterior forms of blepharitis. The topical administration of azithromycin was found to effectively reduce inflammation and modify lipid production, and it may be effective at modifying the course of MGD. As this is an off-label use, dosing regimes have not been established. Anecdotal evidence suggests the safe and effective management of blepharitis with courses of Azasite for 1 month or longer.

Cyclosporine

The off-label use of cyclosporine (Restasis; Allergan, Inc.) has proven useful for decreasing the number of meibomian gland inclusions in eyes with MGD. More important, however, is the improvement in aqueous-deficient dry eye, which can affect or exacerbate MGD and vice versa.

Ocular surface in aqueous-deficient dry eye disease via supplemental tears tempers the inflammatory mediators that can affect the function of the meibomian gland. Additionally, lipid-containing tear supplements such as Soothe XP with the lipid-restorative Restoryl (Bausch + Lomb, Rochester, NY) bolster the oil-deficient tear film, especially in advanced cases of meibomian gland atrophy.

Oral Tetracycline

Effective for patients who have ocular or dermatologic rosacea, the oral administration of tetracycline has nonspecific anti-inflammatory properties that inhibit keratinization and suppress bacterial lipases. Current prescribing patterns favor low doses of doxycycline, the efficacy of which has been demonstrated.

CONCLUSION

It is important for both the clinician and the patient to understand the complex and dynamic nature of lid disease. Treatment must be tailored to and modified as demanded by the clinical presentation and the affected individual's symptoms. Fortunately, the future holds promise for the treatment of blepharitis. Under development are devices to aid in the evacuation of congested meibomian glands, and researchers are studying the role of topically applied hormones in MGD.

Katherine M. Mastrota, MS, OD, is the center director of Omni Eye Surgery in New York. Dr. Mastrota is a consultant to and/or on the speakers’ board of Allergan, Inc.; Bausch + Lomb; Inspire Pharmaceuticals, Inc.; and Ista Pharmaceuticals, Inc. She is on the scientific advisory boards of Cynac/on/Ocusoft and Noble Vision Group, LLC. Dr. Mastrota may be reached at (212) 353-0030; katherine.mastrota@msn.com.

14. Pulido AR, John C. Effect of postoperative blepharitis treatment on tear meibomian. Poster presented at The ARVO Annual Meeting; May 4, 2010; Fort Lauderdale, FL.