Banishing Ocular Demodex

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New methods for the detection and eradication of Demodex mites suggest that these microscopic parasites are an underappreciated cause of ocular irritation, conjunctival inflammation, blepharitis, and perhaps even facial rosacea.

Demodex is the most common resident parasite of human skin, finding a home in hair follicles and sebaceous glands. Two Demodex species, Demodex folliculorum and Demodex brevis, often coexist in areas such as the cheeks, forehead, nose, and external ear, where active sebum excretion favors their growth and breeding. In the periocular area, D. folliculorum lives in eyelash follicles, while D. brevis burrows deep into meibomian glands and lash sebaceous glands.

In low densities, Demodex mites rarely cause problems, and whether there is ocular pathology associated with their infestation, or overgrowth, remains controversial. In large part, this uncertainty stems from the difficulty of isolating and counting these microscopic mites on the eyelashes of symptomatic patients. Nonetheless, longstanding suspicions link ocular Demodex infestation to significant inflammation of the ocular surface and lid margins, with symptoms that include ocular burning, itching, and redness.

During his years as a professor at the University of Miami’s Bascom Palmer Eye Institute, Scheffer Tseng, MD, investigated the ocular manifestations of Demodex, and together we have continued this work under the auspices of The Ocular Surface Research and Education Foundation.

Our studies and clinical experience suggest that Demodex is a frequently overlooked cause of blepharitis and meibomitis, and that the ocular irritation caused by Demodex is frequently misdiagnosed as dry eye disease or ocular allergy. Our research has confirmed a strong correlation between periocular Demodex infestation and facial rosacea and suggests that the causative link may be hypersensitivity to the Bacillus bacteria that reside on and within Demodex mites.

Improved Detection

We found that cylindrical dandruff at the eyelash root is pathognomonic of Demodex infestation. Indeed this type of “dandruff” represents the buildup of casts associated with actively breeding Demodex mites (Figure 1). To view these cylindrical eyelash sleeves under the slit lamp, the clinician should examine the patient’s lid margins while asking the patient to gaze downward (Figure 2).

In addition, we found that conventional methods used to count Demodex on sampled eyelashes result in undercounting. Counting accuracy can be improved by slowly pipetting saline at the edge of the slide cover slip rather than dropping oil on the lash before mounting (which can scatter the mites). Also, waiting for up to 20 minutes before counting gives Demodex time to migrate out of the cylindrical dandruff.

Using this improved sampling method, we detected Demodex in 100% of a sampling of 32 patients who presented with cylindrical eyelash dandruff, as well as on 22% of 23 patients with visibly clean lashes.

Improved Treatment

Over the years, various treatments have been used to eradicate confirmed or suspected ocular Demodex in patients presenting with blepharitis. Researchers have reported reducing but not fully eliminating Demodex infestations using topical 1% mercury oxide ointment, 4% pilocarpine gel, or 2% metronidazole gel for 2 to 4 weeks. These treatments temporarily reduced symptoms, but none fully eradicated Demodex.

We began surveying other potential acaricides to discover ones that might be safe for use in lid cleansing. Among these was tea tree oil, an essential oil distilled from the leaf of the Australian tea tree, Melaleuca alternifolia. This botanical had long been used by Australian aboriginals as a remedy for skin infections, and in modern times, has been shown to have potent antimicrobial and acaricidal effects.
THE PHARMACEUTICAL REGIMEN

Treatment

- Once daily lid scrub using 10% tea tree shampoo diluted 50-50 with water, massaging lids with eyes closed for 3 to 5 minutes followed by rinse. Continue for 4 to 6 weeks.
- If needed, add weekly lid scrub using 50% tea tree oil (diluted with mineral oil), with patient stroking an oiled cotton swab or finger across the base of eyelashes several times.

Today, tea tree oil shampoo is commonly used to kill hair lice and their nits, and 2.5% tea tree oil gel is well tolerated and non-toxic remedy for dental plaque and chronic gingivitis.\(^1\)

After finding that 100% tea tree oil effectively killed Demodex in vitro, we compared the efficacy of lid scrubs using 50% tea tree oil (diluted with mineral oil) with conventional baby shampoo lid scrubs.\(^2\) In seven patients with confirmed Demodex infestation, a month-long regimen of daily baby shampoo lid scrubs failed to eliminate the mites in any patient, with counts remaining constant or increasing in five of the seven.

By contrast, rapid and significant mite reduction was seen in nine patients who received a weekly, in-office lid scrub using a cotton swab wetted with 50% tea tree oil, followed by twice-daily, in-home lid massages, with the patient using a clean finger wetted with a one-to-one solution of water and tea tree shampoo (available at some pharmacies, health food stores, and pet supply shops). Within 4 weeks, Demodex counts reached zero in seven of the nine patients, with no signs of recurrence 1 month after treatment. In the remaining two patients, Demodex counts dropped but did not reach zero during treatment and then slowly rebounded over the following months. All reductions were associated with improvement in inflammatory symptoms (Figures 3 and 4).

In our studies as well as our clinical practice, tea tree oil lid scrubs are generally well tolerated by patients, but can produce mild reddening and irritation of the lid margin and ocular surface. We counsel patients to resolve such irritation, should it occur, with saline drops and cold compresses to the eye.

Conclusion

We do not suggest that Demodex infestation is the primary cause of ocular surface disease or blepharitis, but our clinical experience has convinced us that it is sufficiently common that it should be included in the differential diagnosis of associated symptoms, particularly when such symptoms do not resolve with conventional treatment.

The diagnostic steps we have developed require just a few minutes of the clinician’s time and, when coupled with the inexpensive treatment regimen of tea tree oil lid scrubs, can produce remarkable and lasting relief.

THE BOTTOM LINE

Demodex mites may be a surprisingly common cause of ocular irritation, conjunctival inflammation, blepharitis, and possibly facial rosacea. Cylindrical dandruff on the eyelash root is pathognomonic for Demodex overgrowth. Lid scrubs with diluted tea tree oil can eradicate these infestations.

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References