

Blepharitis: remains a diagnostic enigma. A role for tea tree oil shampoo?

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Blepharitis is an inflammatory condition of the eyelid margins and likely to be the most under-diagnosed, undertreated, and underappreciated eye disease worldwide.¹ Traditionally, clinicians classify it into anterior or posterior blepharitis, with the latter associated with meibomian gland dysfunction and the former with local microbial colonisation or seborrhoea.

In the past, the terminology of blepharitis has been vague but over the past few years, the International Workshop on Meibomian Gland Dysfunction have produced a series of publications aimed to clarify the classification and summarise the literature on aetiology, pathophysiology, and treatment.^{1–3} However, blepharitis remains a diagnostic enigma, with a variety of treatments with variable levels of efficacy, reflecting the poor understanding of aetiology.

In this issue, Dadaci *et al*⁴ investigated the microbial flora of the eyelid margin and show excessive microbial colonisation of the lids in patients with blepharitis. The authors found that fungal elements were detected with periodic acid-Schiff staining in approximately four out of five patients with chronic anterior blepharitis.⁴ Fungi, specifically *Pityrosporum* yeasts, have been implicated in blepharitis as early as in 1990; in a placebo-controlled clinical trial, published in *Eye*, treatment with ketoconazole 2% cream on the lid margins markedly improved the clinical severity of blepharitis.⁵ Coagulase-negative *Staphylococcus*, *Staphylococcus aureus*, and *Propionibacterium acnes* are common commensal microbes that may contribute to the pathophysiology of blepharitis.⁶

Dadaci *et al*,⁴ also found that there were high levels of *Demodex* infestation. Other investigations of *Demodex* show that infestation of lash follicles is associated with the occurrence of anterior blepharitis.⁷ In a large study

involving 335 patients, the number of *Demodex* mites correlated significantly with the severity of ocular surface discomfort; treatment with tea tree oil reduced the *Demodex* counts and improved subjective ocular symptoms.⁸ The variety of pathogens implicated in blepharitis may also explain the beneficial effect of broad-spectrum treatments, such as lid scrubs with tea tree oil and shampoo. Tea tree oil exerts not only anti-*Demodex* properties, but also broader antibacterial, antifungal, and anti-inflammatory actions that may enhance its therapeutic potential.^{1,9}

However, the presence of microbes on the lid margin of patients with blepharitis does not imply causality. Excessive colonisation may be an epiphenomenon, indicating the possibility that microbes find the altered eyelid environment in blepharitis more hospitable than that of the normal eyelid. Keratinisation of the lid margin epithelium, keratinised cell debris, and the abnormal lipids in blepharitis all provide a rich substrate for microbial pathogens.¹ Patients with chronic blepharitis are often treated with antibiotics and steroid drops, a treatment that may also alter the resident commensal flora and favour excessive colonisation with selective bacterial or fungal microbes.

It must be emphasised though that this alteration of conjunctival microbial flora does not represent an infection. In addition, the matter is made more complex in the presence of posterior blepharitis where the primary aetiology is the occurrence of meibomian gland dysfunction.

Irrespective of whether fungi, bacteria or other pathogens are the primary cause of blepharitis, there is strong suspicion that excessive microbial colonisation contributes to the pathophysiology of the condition. Bacterial lipases and toxins could alter the lipid composition and destabilise the tear film, with the production of toxic-free fatty acids, causing evaporative dry eye.¹⁰ The secondary production of pro-inflammatory

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cytokines, neutrophil chemotaxis, and reactive oxygen species production are all pathogenic to the ocular surface.¹ The detrimental role that microbes may have in blepharitis is also supported by the beneficial effect antibiotics have in patients with this condition.

Progress in elucidating the aetiology of this poorly understood condition, as demonstrated by the work of Dadaci *et al*⁴ and others is being made. With greater research in this area and greater acceptance of the diagnostic criteria set up by international workshops, more target specific and long-term treatments for patients with blepharitis will no doubt emerge. In the meantime, clinicians are left with making pragmatic options to reduce microbial flora based on their own experience. Anyone for a drop of tea tree oil shampoo?

Conflict of interest

The authors declare no conflict of interest.

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