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The red eye in contact lens wearers

A high risk presentation

Sore eyes are a common primary care presentation. Within this group, contact lens wearers are at risk of developing serious complications and should be identified accordingly. Contact lens associated bacterial keratitis is a sight threatening condition requiring urgent treatment. *Pseudomonas aeruginosa* is the most commonly isolated pathogen from corneal scrapings in patients who wear contact lenses and develop this condition. Pseudomonas is not sensitive to chloramphenicol and as such, will not respond to the most commonly prescribed antibiotic for sore eyes. These patients require urgent referral for corneal scrapings to allow culture and sensitivity, which will direct treatment.

The sore red eye is a common presentation to both emergency departments and general practitioners. While many of these presentations can be well managed in a primary care environment, in addition to the commonly recognised red flag symptoms of photophobia and decreased visual acuity, contact lens wearers are a subgroup that must be identified and managed as high risk. The existence of further risk factors for contact lens associated keratitis, such as smoking, poor compliance with contact lens hygiene protocols and in particular, the use of lenses that are left in overnight or worn for extended periods, should signal an even greater urgency for immediate review by an ophthalmologist.¹

Contact lens associated keratitis is a severe, sight threatening condition. Pathogens such as acanthamoeba and staphylococcal species can be responsible, however, the majority of cases involve *Pseudomonas aeruginosa* (Figure 1).^{2,3} While there are various phenotypes of pseudomonas, a common pathogenic mechanism is the release of proteases and the initiation of a strong inflammatory response. The action of proteases can lead to thinning and perforation of the cornea within 3 days of the onset of infection.⁴ The intense inflammatory reaction can lead to a hypopyon and endophthalmitis (infection in the vitreous), potentially leading to enucleation or blindness.

Not only do the severe consequences of contact lens associated keratitis (Figure 2) make it an important

subgroup of patients to recognise, but the common treatment of suspected eye infections, chloramphenicol, is not effective against pseudomonas (or many other common contact lens associated pathogens).^{3,5} Therefore, the common safety net management plan will not only allow pseudomonas to continue growing, but wastes valuable time in delaying appropriate treatment.

A patient presenting with an acutely red eye requires a thorough work up to determine whether the cause is infectious, traumatic, autoimmune or otherwise. While chloramphenicol remains a common empirical treatment for basic eye infections, it must not be used in patients where a contact lens associated keratitis has not been specifically excluded by a health professional with both the equipment and expertise to do so. This is not to say that empirical use of fluoroquinolones such as ciprofloxacin or ofloxacin is justified – quite the contrary. Identification of any of the pathogens involved in keratitis requires a corneal scraping.³ Culture and sensitivity on the resulting isolates will be affected if antibiotics have already been commenced. Further, restriction of antibiotic use to genuine cases of keratitis ensures that sensitivity profiles can be monitored and resistance does not become widespread. It should be noted that there is a Pharmaceutical Benefits Scheme restriction on the prescribing of ciprofloxacin and ofloxacin eye drops for the treatment of bacterial keratitis only.

Management

Once a patient is recognised as being at risk of contact lens keratitis, management should include:



Figure 1. *Pseudomonas aeruginosa* sclerokeratitis in contact lens wearer



Figure 2. Scarring after pseudomonas keratitis

- immediate removal of the lenses
- ensuring the patient keeps their lenses and lens case so that they can be sent for culture
- staining of the cornea with fluorescein and full examination including visual acuity (remember, not all cases of bacterial keratitis will stain with fluorescein)
- if an epithelial defect or obvious infiltration (opaque zone) is present, then the patient should be referred immediately to an ophthalmologist for assessment the same day. If no obvious ulcer is present then the patient should still be referred for urgent ophthalmic assessment. In the rural setting, phone advice from an ophthalmologist should be sought before deciding on a management plan.

Definitive ophthalmic management will generally include scraping the corneal epithelium and stroma and directly plating this to culture media to obtain isolates and sensitivities. Severe cases will involve admission for round-the-clock broad spectrum topical fortified antibiotics, pending sensitivity results. In some cases, systemic antibiotics may also be used.

Summary of important points

In the general practice setting, a few simple maxims will ensure safe and simple practice for the general or emergency department practitioner:

- a painful eye in a contact lens wearer should be considered to be sight threatening bacterial keratitis until proven otherwise, and
- the most likely pathogen in contact lens associated bacterial keratitis is *Pseudomonas aeruginosa* which is not sensitive to chloramphenicol.

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References

1. Stapleton F, Keay L, Jalbert I, Cole N. The epidemiology of contact lens related infiltrates. *Optom Vis Sci* 2007;84:257–72.
2. Willcox MD, Holden BA. Contact lens related corneal infections. *Biosci Rep* 2001;21:445–61.
3. Bourcier T, Thomas F, Borderie V, et al. Bacterial keratitis: predisposing factors, clinical and microbiological review of 300 cases. *Br J Ophthalmol* 2003;87:834–8.
4. Matsumoto K, Ikema K, Tanihara H. Role of cytokines and chemokines in pseudomonas keratitis. *Cornea* 2005;24:S43–9.
5. Chalita MR, Hofling-Lima AL, Paranhos A Jr., et al. Shifting trends in in-vitro antibiotic susceptibilities for common ocular isolates during a period of 15 years. *Am J Ophthalmol* 2004;137:43–51.