

Disclaimer: This Clinical Practice Guideline ('CPG') was written for use in The Royal Victorian Eye and Ear Hospital Emergency Department. It should be used under the guidance of an Ophthalmology or ENT registrar. If clinical advice is required, please contact the Eye and Ear Admitting Officer for assistance: EYE: +61 3 9929 8033; ENT: +61 3 9929 8032. Links to internal Eye and Ear documents cannot be accessed from the website CPG.

Description:

A corneal infection caused by bacteria, fungi or acanthamoeba. The aim of treatment is to minimise visual loss, reduce pain, eliminate the infectious agent and minimise structural damage to the cornea. Early diagnosis and treatment is necessary to reduce long term visual loss.

Red Flags:

- Large ulcer
- Central ulcer
- Poor lid closure/blink or an anaesthetic cornea
- Corneal thinning with impending or overt perforation
- Risk of fungal infection with organic injury
- Risk of acanthamoeba with contact lens wearers

How to Assess:

History:

- Ocular symptoms: pain, redness, discharge, decreased vision, photophobia
- Identify risk factors:
 - Contact lens wear
 - Ocular trauma
 - Ocular surface disease: e.g., dry eyes, neurotrophic keratopathy, HSV/HZV, abnormalities of eyelid anatomy and function
- Concurrent use of other ocular medications: topical corticosteroids, anaesthetics

Examination:

- Visual acuity
- Corneal sensation
- Slit-lamp biomicroscopy, should include evaluation for the following:
 - Eyelid/adnexae: ectropion/entropion (lid margin malposition), trichiasis (lashes), lagophthalmos (exposure), blocked nasolacrimal duct
 - Conjunctiva: injection, discharge
 - Cornea: infiltrate (white opacity); document the size, depth, and location of the infiltrate and size of overlying epithelial defect (using fluorescein for latter). Assess for stromal thinning and/or perforation
 - Intraocular pressure: recommend iCare®
 - Anterior chamber: presence of cells and size of hypopyon if present
 - Posterior segment: red reflex/ retina. Ultrasound if no view (to exclude endophthalmitis)

Investigations:

- Corneal scraping
 - Indications: corneal scraping is indicated whenever microbial keratitis is suspected
 - Procedure: refer corneal scraping procedure
 - Use 2 glass slides, blood agar, chocolate agar, fungal slope (Sabourauds), broth
 - If contact lens wearer, also include an epithelial biopsy on non-nutrient agar
- Culture of contact lenses and cases
 - In contact lens wearers the contact lenses and cases should be cultured. Send lens and case in pathology bag, or put contact lens in saline.
- PCR
 - Swabs for viral PCR should be performed where indicated or where microbial keratitis occurs without a clear underlying cause

Acute Management:

- Setting
 - Admission to hospital should be considered if a large area involved with significant thinning or any concern regarding compliance with intensive eye drop regime
- Treatment
 - Commence intensive broad-spectrum antibiotics with a fluoroquinolone (Ofloxacin 3g/mL) eye drops hourly day and night until review (usually after 48 hours)
 - Topical cycloplegia for comfort and to prevent synechiae formation in the presence of significant inflammation (Atropine 1% eye drops BD or Cyclopentolate 1% TDS)
 - Topical ocular hypotensives if raised intraocular pressure
 - Cease topical corticosteroids, except in corneal graft patients (refer to cornea unit)
 - Oral pain medication as needed
 - No contact lens wear in affected eye
 - Clear shield (without pad) if risk of corneal perforation
 - Manage underlying cause, e.g. trichiasis
 - NB. Antifungals or treatment for acanthamoeba are only used where diagnosis is confirmed on stain or culture

Follow up:

- Initial review
 - Re-assess in 48 hours to assess initial culture results and response to treatment
 - Refer to Cornea Unit if severe microbial keratitis, corneal graft patient, significant corneal thinning, cases of fungal or acanthamoeba keratitis, patient requiring admission or other concerns.
- Subsequent review
 - Review depending on severity to confirm continued clinical improvement and culture results
 - Taper topical antibiotics. A suggested regimen is:
 - q 1 hourly by day and night for 48 hours
 - q 1 hourly by day and q 2 hourly by night for a further 48 hours
 - q 2 hourly by day for 48 hours
 - Then 4 to 6 times a day until epithelial healing
 - Consider topical steroids (e.g. fluorometholone – Flarex®) one eye drop QID after at least 48 hours, if culture positive with a sensitive organism and/or if significant clinical improvement.

Discharge instructions:

- Patients and care providers should be educated about the need for compliance with treatment
- Patients who wear contact lenses should be educated about the increased risk of infection with contact lens wear, overnight wear, and the importance of contact lens hygiene
- Contact lens wearer should not resume contact lens wear in the affected eye until 2 weeks after resolution of infection

Evidence Table

Author(s)	Title	Source	Level of Evidence (I – VII)
M Daniell	Overview: Initial antimicrobial therapy for microbial keratitis	Br J Ophthalmol. Sep 2003; 87(9): 1172–1174.	V11

The Hierarchy of Evidence

The Hierarchy of evidence is based on summaries from the National Health and Medical Research Council (2009), the Oxford Centre for Evidence-based Medicine Levels of Evidence (2011) and Melynck and Fineout-Overholt (2011).

- I) Evidence obtained from a systematic review of all relevant randomised control trials.
- II) Evidence obtained from at least one well designed randomised control trial.
- III) Evidence obtained from well-designed controlled trials without randomisation.
- IV) Evidence obtained from well-designed cohort studies, case control studies, interrupted time series with a control group, historically controlled studies, interrupted time series without a control group or with case series.
- V) Evidence obtained from systematic reviews of descriptive and qualitative studies.
- VI) Evidence obtained from single descriptive and qualitative studies.
- VII) Expert opinion from clinician, authorities and/or reports of expert committees or based on physiology.

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