

Taking a Look at Common Eye Infections



John T. Huang, MD, FRCSC and Peter T. Huang, MD, FRCSC

The acutely red eye is often seen first by the primary-care physician. The exact cause may be difficult to determine and may cause some concern that a serious ocular condition has been missed. Thorough history and clinical examination will help delineate the final diagnosis. When there are doubts, prompt referral to an ophthalmologist can prevent serious consequences.

Often, the most likely diagnosis of an acutely red eye is acute conjunctivitis. In the first day, an acute bacterial infection may be hard to differentiate from viral, chlamydial and noninfectious conjunctivitis and from episcleritis or scleritis.

Below is a review of the most commonly seen forms of eye infections and treatments. Failure to improve after three to five days should lead to a re-evaluation of the patient and appropriate referral where necessary.

CHRONIC BLEPHARITIS

Clinical: Gritty burning sensation, matting, lid margin swelling and/or scaly, flaky debris, mild hyperemia of conjunctiva; may have acne rosacea or hyperkeratotic dermatitis (Figure 1).

Anterior: Staphylococcus aureus (follicles, accessory glands); posterior (meibomian glands).

Treatment:

- Lid scrubs (baby shampoo, lid-care towellettes, warm compresses). There may be localized sensitivity to the shampoo or the components of the solution in the towellettes (*e.g.*, benzyl alcohol).
- Hygiene is important for the treatment and management of chronic blepharitis. Topical antibiotic-corticosteroid combinations (*e.g.*, tobramycin drops, tobramycin/dexamethasone or sulfacetamide sodium-prednisolone acetate). Usage of these medications is effective in providing symptomatic relief, as the inflammatory component of the problem is more effectively dealt with. However, prolonged usage of the drops beyond a few weeks requires regular checks of intraocular pressure.



Figure 1. Chronic blepharitis.

- Non-combination medications may also be used: Tobramycin drops, erythromycin eye ointment, fusidate sodium drops or ointment (fusidic acid—inactive on gram-negative organisms).
- Where there is a concurrent acne rosacea, it may be possible to use oral tetracycline, 250 mg, orally four times daily, topical facial metronidazole, twice a day for three weeks. Avoid exposure to the eyes with the metronidazole. Possible reactions to the metronidazole include localized irritation, dermatitis, itching and burning.
- Avoid tetracycline in pregnant women.
- Dry eye is often present and needs treatment.

STYE AND CHALAZION

Stye (external hordeolum) is an inflammation of the ciliary follicles or accessory glands of the anterior lid margin that is often seen with blepharitis (Figure 2).

Clinical: Painful, tender focal mounding in lids with pustules.

Treatment: Topical antibiotics (*e.g.*, sulfacetamide/prednisolone eye ointment, tobramycin drops/eye ointment, erythromycin ointment, warm compresses, surgical excision).

Clinical history: Chalazion (internal hordeolum) in the meibomian glands; acute or chronic focal tender granulomatous inflammation that may not show external mounding.

Treatment: Topical antibiotics as previously noted, warm compresses, surgical excision, if persisted eroded mass. Query sebaceous cell carcinoma, as it is very rare, but frequently lethal.

Please note that in the absence of a preseptal cellulitis (which is rare and involves extension of the infection to the soft tissue layer anterior to the orbital septum in the area of the lids and peri-ocular structures), there is no indication for treatment of styes and chalazions with systemic oral antibiotics.



Figure 2. Stye.

DACRYOCYSTITIS

Dacryocystitis is an inflammation caused by a bacterial infection in obstructed nasolacrimal ducts. It is most common in infants. In adults, it occurs in cases of chronic sinusitis, nasal polyps, facial polyps and rarely in neoplasm (Figure 3).

Clinical: Painful, tender focal mounding in lids with pustules.

Treatment: Topical (*e.g.*, sulfacetamide/prednisolone ointment, tobramycin drops) and oral antibiotics (*e.g.*, cefaclor in children or cephalexin in adults). Lacrimal probing may be needed after acute inflammation settles in children. In adults, dacryocystography and an examination of the nasal passageways may be appropriate to determine the underlying source of obstruction.



Figure 3. Dacryocystitis.

KERATITIS

Common causes of keratitis include an infection of herpes keratitis, trauma, dry eyes, ultraviolet light exposure, contact lens overwear or immunogenic states (e.g., rheumatoid arthritis, vernal keratoconjunctivitis).

With epithelial breakdown, there may be corneal opacification, tissue loss, perforation and endophthalmitis (Figure 4). Noninfectious forms of keratitis often begin in deeper layers with swelling and scarring.

Clinical: Blurred vision, photophobia, periocular pain, foreign body sensation, perilimbal hyperemia, corneal opacification.

Treatment: Referral to ophthalmologist; taking conjunctival and corneal cultures. Treatment will include third-generation quinolone drops (ciprofloxacin and ofloxacin) or fourth generation drops (gatifloxacin or moxifloxacin) or fortified topical and subconjunctival antibiotics (e.g., gentamycin, cefazolin or vancomycin). The importance of the topical quinolones requires caution in their generalized usage for lesser eye infections (e.g., blepharitis). New fourth-generation topical quinolones have better gram and coverage.



Figure 4. Keratitis.

BACTERIAL CONJUNCTIVITIS

Clinical (Adults):

- Common pathogens in adults include staphylococcus aureus, streptococcus pneumoniae and haemophilus influenzae.
- Diffused and marked conjunctival injection, purulent discharge, no pre-auricular lymphadenopathy.

Clinical (Infants):

- Ophthalmia neonatorum is seen in about 5% of infants. Causes include silver nitrate (now rare), chlamydia, neisseria gonorrhoeae, staphylococcus, streptococcus and herpes simplex (Figure 5).
- Conjunctival scrapings and cultures are needed in infants and immunocompromised patients.

Treatment (Adults):

- **Mild bacteria conjunctivitis:** Topical sulfa, aminoglycoside (gentamycin, framycetin), quinolone (ciprofloxacin, beware of generalized usage) and combination antibiotics (bacitracin).
- Steroids containing topical antibiotic combinations (e.g., tobramycin, gentamicin/betamethasone) are not appropriate for this condition.

Treatment (Infants):

Ophthalmia neonatorum:

- **N. gonorrhoeae:** Topical aqueous penicillin (20,000 units/ml, one drop hourly) and intravenous penicillin (50,000 units daily) or intravenous ceftriaxone (50 mg/kg/day to 75 mg/kg/day for seven days). Treatment is emergent in newborns.
- **Chlamydia:** Tetracycline ointment four times a day for four weeks, oral erythromycin, 50 mg/kg/day, for four weeks; parents treated with oral doxycycline or erythromycin, 500 mg, orally four times a day for four weeks.
- **Staphylococcus/streptococcus/gram-negative bacteria:** Erythromycin ointment six times a day and/or topical gentamycin every one to two hours as per gram stain.



Figure 5. Bacterial conjunctivitis.

- **Herpes simplex:** Topical trifluridine and intravenous acyclovir (in consultation with pediatrician).

Refer patient if:

- Neisseria gonorrhoea or keratitis is suspected (especially in a contact lens wearer in whom you suspect pseudomonas aeruginosa or acanthamoeba), recent eye surgery or ophthalmia neonatorum.
- He/she worsens after three days of treatment or is not improving after seven days, if patient is immunocompromised or if there is history of injury with a foreign body.

VIRAL CONJUNCTIVITIS

Viral conjunctivitis may be isolated or part of a systemic viral syndrome. There is often a history of exposure to an infected person (the incubation period is approximately eight days).

Clinical: Ocular discomfort, diffuse conjunctival hyperemia, epiphora, watery discharge, pre-auricular lymphadenopathy, unilateral or bilateral, keratitis and decreased corneal sensitivity (Figure 6).

Treatment: Supportive; lid/hand hygiene; no towel sharing. Avoid group exposure if discharge is present.

Refer patient if: Diagnosis is unclear, symptoms worsen or keratitis is present or suspected. Two forms of chlamydial conjunctivitis exist—neonatal and adult.



Figure 6. Viral conjunctivitis.

CHLAMYDIAL CONJUNCTIVITIS

Clinical:

- Injected conjunctiva with follicles, mucopurulent discharge, onset from day two to week eight in infants and uni- or bilateral.
- Symptoms vary in intensity; diagnose conjunctival scrapings (Figure 7).
- Is commonly associated with pneumonia in infants.

Treatment:

- Neonates: Topical tetracycline ointment four times a day for four weeks and oral erythromycin for four weeks.
- Adults: Oral doxycycline or erythromycin for four weeks. Treat all contacts.

Refer:

- Neonates: If not better after five days of treatment.
- Adults: If problems persist after treatment.



Figure 7. Chlamydial conjunctivitis.

Dr. J.T. Huang is a Clinical Associate Professor, Ophthalmology, Faculty of Medicine, and the Director, Undergraduate Medical Education, University of Calgary, Calgary, Alberta.

Dr. P.T. Huang is a Professor and Head, Ophthalmology, Faculty of Medicine, University of Calgary, Calgary, Alberta.

HERPES SIMPLEX INFECTION, PRIMARY AND RECURRENT

- Primary:** Cutaneous vesicles, conjunctivitis or keratitis. Pre-auricular lymphadenopathy, periocular or facial vesicles and conjunctival injection may be seen. Typically, a dendritic corneal ulcer is seen (Figure 8).
- Treatment:** Trifluridine 1%; oral acyclovir if non-ocular involvement is present. Referral to an ophthalmologist is needed.
- Recurrent:** May see conjunctivitis, keratitis or uveitis. Eyelid skin vesicles may be seen. Treatment is the same as for primary herpes simplex infection. Long-term usage of low-dose acyclovir.



Figure 8. Primary herpes simplex infection.

EPISCLERITIS VERSUS SCLERITIS

Episcleritis is the focal inflammation of deep subconjunctival (episcleral) tissue. It is often an isolated condition with no significant ocular consequences. It may be seen in a variety of viral and idiopathic autoimmune conditions (e.g., rheumatoid arthritis, polyarteritis nodosa, lupus, Wegener's granulomatosis) and gout.

Scleritis is much less common, but the etiology is the same as for episcleritis and it involves focal or diffuse inflammation of the sclera. Scleritis is often commonly associated with a systemic condition (50%). There is often a necrotizing systemic vasculitis. It can be associated with an extreme thinning of the cornea (corneal melt) or globe perforation.

- Clinical:** Eye pain (can be severe and deep in scleritis); focal to diffuse hyperemia; scleral thinning in scleritis to allow uvea to show; may be associated with keratitis.
- Treatment:** Referral to ophthalmologist for anti-allergy drops (olopatadine hydrochloride, emedastine, lodoxamide tromethamine, naphazoline with pheniramine) or topical corticosteroids for episcleritis.
- Treatment for scleritis:** Oral non-steroidal anti-inflammatory drugs (naproxen) or oral steroids. Cyclophosphamide is useful in cases of



Figure 9. Episcleritis.

The authors acknowledge the invaluable assistance of **Mr. Paul Y. Huang** in the production of this text.

polyarteritis nodosa, systemic vasculitis and Wegener's granulomatosis. Surgical patch grafts are used for threatened perforation. Treatment of scleritis requires participation of an ophthalmologist and internist.

Adverse effects for the topical anti-allergy drops include hyperemia, burning, stinging and tearing. Prolonged usage of topical corticosteroids may increase intra-ocular pressure and/or induce cataract formation. Thus, an ophthalmologist should monitor the patient if topical corticosteroid usage is contemplated.

cme