The red eye in general practice: a clinical quiz

Smit D, MBChB, Dip Ophth(SA), FC Ophth(SA), MMed(Ophth)(Stell)
Department of Ophthalmology, Faculty of Health Sciences, Stellenbosch University, Tygerberg Hospital
Correspondence to: Dr Derrick Smit, e-mail: dpsmit@sun.ac.za

Introduction

Patients regularly present to general practitioners complaining of red eyes. Sometimes the aetiology is obvious and prescribing the correct treatment is straightforward whereas, in other cases, it can be extremely difficult to pinpoint the exact cause, and deciding on appropriate treatment becomes problematic. The following quiz cases will illustrate several causes of red eye and highlight clues in *italics* that should prove helpful in making the correct diagnosis.

SA Fam Pract 2010;52(5):424-427

Case 1

A 65-year-old male presents with a one-week history of a red right eye. He complains of a stringy, clear discharge and that his eye is sensitive to bright light. On questioning the patient, you learn that the eye had started feeling a bit scratchy about ten days before he came to see you and that, after rinsing the eye with salt water, the patient started applying some leftover chloramphenicol ointment which had cured a similar problem a few months earlier. He has continued using the ointment, despite a gradual worsening of the symptoms in his right eye.

On examination, you find that his visual acuity is 6/6. His eyelids show mild swelling and erythema, while his conjunctiva is injected and chemotic with evidence of a mucoid disc harge. The ipsilateral preauricular lymph nodes are not swollen and his cornea and anterior chamber appear normal.

What is the most likely diagnosis and how would you manage this patient?

Case 2

A 32-year-old female complains of redness and increasing pain in her right eye over the past few days. She now experiences pain on touching the eye, and the ocular pain has woken her from sleep the previous two nights. Apart from episodes of tearing, there is no significant ocular discharge and her visual acuity has not changed.

On examination, her visual acuity is 6/6 and her eyelids are normal. You find a large area of redness, temporal to the cornea, which appears to be elevated in a nodular fashion and the eye is very tender to touch. When looking at the eye in natural sunlight, you notice that the underlying sclera has a purplish hue. The rest of the examination is unremarkable.

What is the most likely diagnosis and how would you manage this patient?

Case 3

A 50-year-old male presents with a five-day history of a foreign body sensation and redness of his right eye. He states that his vision is slightly decreased and that the eye waters a lot. He has no medical history of note, but recalls having had a problem with the cornea of the same eye on a previous occasion.

On examination, his visual acuity is 6/9 and his eyelids are normal. The conjunctiva shows mild, diffuse injection and, on the cornea, you notice a whitish area below the pupil. The corneal sensation in the right eye is present, but decreased when compared to that of the left eye. Instillation of 2% fluorescein shows that the whitish area does not stain, but highlights a branching ulcer on the lateral side of the cornea.

What is the most likely diagnosis and how would you manage this patient?

Case 4

A nine-year-old male is brought to your consulting rooms by his mother, who complains that he is constantly rubbing his eyes due to severe itching. He mentions that his eyes water a lot and that bright light hurts his eyes. He is currently on treatment for asthma.

On examination, his visual acuity is 6/6 in both eyes and his eyelids are red as a result of frequent rubbing. The conjunctiva is mildly injected on both sides, but his corneas are clear and do not stain with fluorescein. Upon everting his upper eyelids, you notice several raised, fleshy lesions on the conjunctival surface of both the right and left upper lid.

What is the most likely diagnosis and how would you manage this patient?

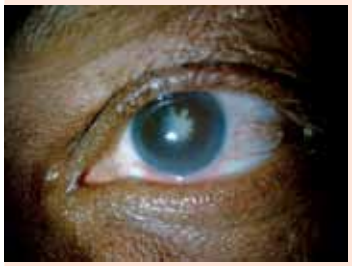
Case 5

A 60-year-old female presents to you with a one-day history of severe pain and redness in her right eye. She claims that the pain comes from deep within the eye and is worse than anything she has felt before. It has even caused her to vomit twice and spreads to the same side of her head. Her vision is markedly reduced in the affected eye and the eye waters constantly.

On examination, she is only able to count fingers at a distance of one metre. Her conjunctiva is diffusely injected and the medial part of her cornea appears a bit hazy, since you cannot see the pupil margin as clearly as you can see it on the temporal side. Her pupil is oval, mid-dilated and does not react to light. When you palpate the eye with both index fingers, it feels as hard as a golf ball.

What is the diagnosis and how would you manage this patient?

Case 6

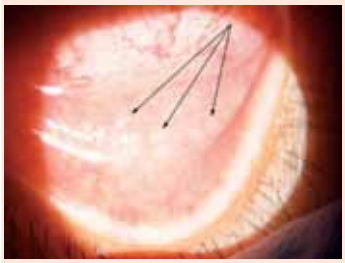


A 50-year-old female presents with a two-week history of discomfort and redness in her left eye. She describes the discomfort as a dull ache which is exacerbated both by bright light and touching the eye. She also mentions that the eye tears a lot and that the vision in the eye is blurry.

On examination, her visual acuity is 6/12, which does not improve with a pinhole. Her left eye is photosensitive, but she also complains of pain in her affected eye even when you shine your light in her unaffected eye. Her eyelids are normal and you notice that the redness is more pronounced around the cornea, especially inferiorly. The cornea appears a bit hazy and her pupil is so miosed that you cannot even see her lens. Twenty minutes after instilling cyclopentolate 1% drops, you notice that the pupil now has a scalloped appearance and that she has some cataract formation. You are unable to see the fundus clearly.

What is the most likely diagnosis and how would you manage this patient?

Case 7



A 20-year-old female presents with redness and discomfort of both eyes for a few days. She mentions that the problem started in her right eye but that the left eye also became affected about two days later. Both her eyes are now very sensitive to light and have a constant watery discharge, which causes her vision to blur at times. On specific questioning, she recalls having had an upper respiratory tract infection about a week before her symptoms started.

On examination, her visual acuity is 6/6 in both eyes. Her eyelids are slightly swollen and the conjunctiva is diffusely injected in both eyes, with multiple small, whitish, elevated lymph follicles visible in the inferior fornix (see arrows). Both corneas are clear but show small, punctate areas of staining when examined with fluorescein and a cobalt blue light. She has bilateral, tender preauricular lymphadenopathy.

What is the most likely diagnosis and how would you manage this patient?

Case 8

A 28-year-old male presents to you with a one-year history of something growing on his left eye. According to the patient, the lesion started at the edge of the cornea and has progressively enlarged. He describes the condition as uncomfortable, rather than overtly painful, and mentions that his vision has decreased steadily over the past three months. He has no previous medical history of note, but does admit to having recently lost some weight.

On examination, his right eye is normal with visual acuity of 6/6. The visual acuity in his left eye is 6/15 and does not improve with a pinhole. The eyelids of the left eye are normal and the conjunctiva is injected with a few large vessels noted superior to the cornea. A mass lesion measuring roughly 15 x 10 mm straddles the limbus medially. It is elevated, with a fleshy appearance and irregular, dilated blood vessels, both medial to and on the surface of the lesion. The rest of the eye examination appears normal and you note that neither the preauricular lymph nodes nor the submandibular lymph nodes are enlarged.

What is the most likely diagnosis and how would you manage this patient?

Answers and discussion

Case 1 **Answer:** Contact blepharoconjunctivitis (delayed onset)

Discussion: Topical ophthalmic medications may occasionally cause allergic reactions.[1] These may be either acute, type I hypersensitivity reactions or delayed, type IV hypersensitivity reactions. The former typically occur *within minutes* after exposure to an allergen and cause marked *itching* with swelling and erythema of the eyelids and conjunctiva. The latter may take 24–72 hours to develop in patients who usually have a history of previous exposure and, thus, sensitisation to the offending drug. These patients have erythematous eyelids with *leathery thickening and scaling* developing after a few days. The conjunctiva is injected and swollen and a *mucoid* discharge is often present. Visual acuity is often *not affected,* unless the condition becomes chronic. The mainstay of treatment in both forms is *allergen withdrawal*. Supportive therapy with cold compresses, artificial tears and topical antihistamines usually suffices in the acute form, whereas additional mild topical corticosteroid drops for a few days may be necessary to resolve the delayed form.

Case 2 **Answer:** (Nodular anterior) scleritis

Discussion: Anterior scleritis may be either diffuse or nodular. The diffuse type causes sectoral or widespread injection and swelling of the sclera, while the nodular type causes raised, nodular areas on a background of injected sclera. Both types typically cause *pain on touching the eye* and often *wake the patient from sleep* during the night. Visual acuity is often not affected in the early stages.

If the sclera shows a *purplish hue* when examined *in natural light,* and if the *redness persists after* administering *phenylephrine* drops, the diagnosis is more likely scleritis rather than episcleritis, which is a more innocuous condition. Anterior scleritis often responds adequately to oral NSAIDs but, since more than 50% of patients with scleritis have an associated systemic disease, they require specialist referral for systemic workup and possible administration of more potent immunosuppressive therapy.[2]

Case 3 **Answer:** Dendritic ulcer due to herpes simplex virus

Discussion: Primary herpes simplex virus-1 (HSV-1) infection commonly manifests as a nonspecific upper respiratory tract infection and the specific aetiology is seldom recognised.[3] The virus then spreads via sensory nerve axons to associated sensory nerve ganglia, such as the trigeminal ganglion, where it establishes latent infection. Reactivation may occur along any branch of the trigeminal nerve and cause conditions such as herpes labialis or herpes keratitis.

Infectious epithelial keratitis usually presents with *nonspecific symptoms,* such as foreign body sensation, mild photophobia, blurred vision or redness, and is unilateral in the majority of cases. A history of *previous cold sores* on the lips or even cornea may be present. Visual acuity usually shows a mild reduction but depends on the location of the infection. A *reduction of corneal sensation* when compared to the other side is found in most cases. Examining the cornea under cobalt blue light after the instillation of 2% fluorescein usually reveals the typical branched or *dendritic ulcer*. Treatment with *3% acyclovir ointment five times a day for 10 days* will be successful in most cases, although oral acyclovir has been shown to be as effective as the more expensive topical preparation. A specialist opinion is required should the lesion not respond to this treatment.

Case 4 **Answer:** Vernal keratoconjunctivitis

Discussion: Vernal keratoconjunctivitis most commonly occurs in *young boys* who often have a personal or family *history of atopy*.[4] Most patients fortunately outgrow the condition during puberty. *Severe, chronic ocular itching* is characteristic of the condition, while photophobia, blepharospasm, mucoid discharge and blurred vision also occur frequently. Signs tend to occur either under the upper eyelid (palpebral form) or around the cornea (limbal form). The *palpebral* form usually shows giant papillae under the upper eyelid, which has a *typical cobblestone* appearance, while the *limbal* form may reveal a *fleshy, gelatinous ring* around the limbus, which often contains whitish dots called *Trantas dots.*

Mild cases may respond well to *topical antihistamines and artificial tear drops,* although the addition of *topical mast cell stabilisers and oral antihistamines* is often required in cases of *moderate* severity.[5] *Severe* cases frequently require short courses of *topical corticosteroids,* such as fluorometholone or dexamethasone, in which case the intraocular pressure needs to be monitored to detect and treat a rise in pressure, should it occur. In *very severe* cases, *topical immunomodulatory drugs,* such as cyclosporine or tacrolimus, may be needed to control the inflammation, and this should be supervised by a specialist.

Case 5 **Answer:** Acute angle closure glaucoma

Discussion: Acute angle closure glaucoma is an *ocular emergency*[6] that is usually seen in *middle-aged or older* patients. The typical history reveals *acute onset* of a *deep-seated, intense, unilateral eye pain* which spreads to the *ipsilateral hemicranium* and is caused by ocular ischaemia. Patients often report *nausea and vomiting* and may recall noticing *coloured haloes around lights*. Reflex tearing is often also present. A small subgroup of patients may, however, have *no symptoms* whatsoever during an attack of acute angle closure, and the diagnosis is based solely on clinical findings.

Visual acuity is usually *severely decreased* due to a combination of *corneal oedema* and ocular ischaemia, with patients often only able to discern hand movements.

The conjunctiva is diffusely injected and the pupil is *fixed and mid-dilated* due to ischaemia of the iris muscles. The anterior chamber is shallow due to anterior bulging of the iris, which renders the eclipse test positive. On palpation, the eye feels much harder than the unaffected eye.

Emergency treatment starts with acetazolamide 500 mg stat po in patients not allergic to sulphonamides. If the parenteral preparation is available, an additional dose of 500 mg may be given intravenously. Glycerin 1.0–1.5 g/kg may be given orally as a 50% solution if acetazolamide is contraindicated, although careful consideration is advised before using it in diabetic patients. Topical beta-blocker drops should also be prescribed, along with systemic analgesics and antiemetics, as needed. Urgent referral to an ophthalmologist for definitive treatment should then follow, to prevent the very real threat of total blindness.

Case 6 **Answer:** Anterior uveitis (iridocyclitis)

Discussion: Anterior uveitis refers to inflammation of the iris and/or ciliary body of the affected eye and usually presents with a painful, red eye.[7] Patients often complain of decreased vision and a watery discharge. *Photophobia* occurs when the inflamed iris and ciliary muscles contract in response to light or accommodation. The *consensual light reflex,* therefore, explains why pain is felt in the affected eye when light is shone into the unaffected eye.

Visual acuity may vary from completely normal to severely decreased, depending on the severity of the inflammation. *Circumcorneal injection* indicates that the underlying iris and ciliary body are the sites of predominant inflammation, although more diffuse injection is often seen. In children, conjunctival injection *may be completely absent,* despite the presence of significant inflammation. The pupil is often *miosed* and, if untreated, may become stuck down in that position due to the formation of *posterior synechiae* between the pupil margin and the lens. When dilating drops are instilled after the formation of robust posterior synechiae, the pupil acquires a characteristic *scalloped* appearance, since only those parts of the pupil not stuck to the underlying lens are able to dilate. *Corneal precipitates* may occur on the endothelium, while *hypopion* (pus in the anterior chamber) may be present in severe cases.

Treatment usually consists of a combination of corticosteroids and dilating drops. Dilating drops relieve ocular discomfort by reducing ciliary muscle spasm and also prevent the formation of posterior synechiae. In mild cases, topical corticosteroid drops are often adequate to treat the inflammation, whereas periocular steroid injections or even systemic corticosteroids may be required in more severe cases. Uveitis is associated with an underlying systemic disease in a significant percentage of patients and specialist management is, therefore, recommended to both treat the disease and perform the necessary investigations to look for an underlying cause.

Case 7 **Answer:** Viral conjunctivitis

Discussion: Viral conjunctivitis often occurs after an upper respiratory tract infection. *Cross-infection* of the second eye is common, with symptoms emerging a day or two later than in the first eye. Patients mostly complain of tearing, light sensitivity or a foreign body sensation and visual acuity is typically unaffected. *Lymph follicles* are usually present in the inferior conjunctival fornices and imply that the likely underlying cause is either *viral or chlamydial*. Viral conjunctivitis causes tender *preauricular lymphadenopathy,* which is absent in bacterial conjunctivitis, with the exception of cases caused by *Chlamydia* spp and *Neisseria gonorrhoeae*.

Treatment of viral conjunctivitis is primarily *supportive,* with cold compresses and chilled artificial tears often providing adequate symptomatic relief. The condition is self-limiting and topical antibiotics are only necessary when findings such as a mucopurulent discharge suggest bacterial superinfection.[8] Topical steroids may be indicated in cases with associated keratitis, but are best prescribed by someone who is able to monitor the course of the disease with slit lamp microscopy.

Case 8 **Answer:** Conjunctival intraepithelial neoplasia (CIN)

Discussion: CIN lesions, per definition, are confined to the epithelial layer of the conjunctiva and, therefore, do not extend beyond the basement membrane. *More than 95%* of these lesions occur at the *limbus* and are usually situated on the exposed surface of the globe between the upper and lower eyelid. The exact cause remains uncertain, although *sun exposure, heavy smoking, exposure to petroleum products, light skin pigmentation* and infection *with human papillomavirus* (especially HPV16) and *human immunodefiency virus* (HIV) are all implicated.[9] About 10% of lesions are leukoplakic, while the majority appear as gelatinous or fleshy thickenings of the conjunctiva. The lesions often spread from the limbus to *involve the adjacent cornea*.

CIN lesions typically occur in *older* patients, where they *enlarge very slowly* and rarely progress to invasive squamous cell carcinoma. In contrast, CIN lesions in *young patients with HIV* infection often *enlarge rapidly* and frequently progress to an invasive form. Any young patient presenting with a lesion suggestive of CIN should, therefore, have his or her HIV status checked. These patients require referral to an ophthalmologist for excision biopsy, and further management is based on the histology results.

References

1. McGill JI, Holgate ST, Church MK, et al. Allergic eye disease mechanisms. Br J Ophthalmol 1998;82:1203–14.
2. Galor A, Thorne JE. Scleritis and peripheral ulcerative keratitis. Rheum Dis Clin North Am 2007;33:835–54.
3. Suresh PS, Tullo AB. Herpes simplex keratitis. Indian J Ophthalmol 1999;47:155–65.
4. Wakefield D, McCluskey PJ. Vernal keratoconjunctivitis. Med J Aust 2006;185:523.
5. Del Cuvillo A, Sastre J, Montoro J, et al. Allergic conjunctivitis and H1 antihistamines. J Investig Allergol Clin Immunol 2009;19 Suppl 1:11–18.
6. Pokhrel PK, Loftus SA. Ocular emergencies. Am Fam Physician 2007;76:829–36.
7. Agrawal RV, Murthy S, Sangwan V, et al. Current approach in diagnosis and management of anterior uveitis. Indian J Ophthalmol 2010;58:11–1.9
8. Visscher KL, Hutnik CM, Thomas M. Evidence-based treatment of acute infective conjunctivitis: Breaking the cycle of antibiotic prescribing. Can Fam Physician 2009;55:1071–75.
9. Kiire CA, Dhillon B. The aetiology and associations of conjunctival intraepithelial neoplasia. Br J Ophthalmol 2006;90:109–13.