CHAPTER 4

THE RED EYE

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CROSS-REFERENCE

Red eye due to trauma: see Chapter 5 Eye trauma.

OVERVIEW

Many of your patients who present with red eye will have common, benign conditions that you can treat yourself. However, some will have acute, sight-threatening diseases in which even a few hours delay in referral will result in permanent loss of vision. How can you tell who to worry about?

Fortunately, a few questions, visual acuity testing and examination of the eye with a torch (and magnification if you have it) are all that is usually required to triage the serious from the non-serious. As always, if there is any doubt, refer.

The red eye Critical points

- All cases of red eye of unknown cause with decreased vision, pain or photophobia require urgent (same-day) referral to an ophthalmologist or ophthalmic emergency department. Do not prescribe any treatment for these patients before referral – this wastes time and can interfere with investigations.

- Do not call every red eye ‘conjunctivitis’! There are many other causes of red eye, many of them serious and requiring urgent treatment by an ophthalmologist.

- The only time you should prescribe antibiotic drops or ointment is for bacterial conjunctivitis: two red eyes, pus-like discharge, normal vision, no pain or photophobia. Red eye(s) of other causes will either resolve with no treatment (e.g. viral conjunctivitis), require a different treatment (e.g. allergic conjunctivitis), or require urgent referral (e.g. iritis or infectious corneal ulcer).

- Never prescribe steroid or antibiotic–steroid eye drops unless asked to by an ophthalmologist – serious damage to the eye can occur.
The red eye Critical points—cont’d

- A newborn baby with red eyes and eye discharge has sight- and life-threatening infection (ophthalmia neonatorum; see p. 000) until proven otherwise, and requires urgent ophthalmic review.

APPROACH TO A PATIENT WITH RED EYE(S)

ASK ABOUT

- A history of trauma or foreign body hitting the eye (see Chapter 5 Eye trauma).
- Burred vision, pain or sensitivity to light (photophobia) that you can’t explain after a careful examination (i.e. not due to a corneal abrasion or foreign body). These are all serious symptoms – refer urgently.
- Haloes around lights as well as blurred vision and pain (acute glaucoma).
- Itch (allergic conjunctivitis).
- Recent viral upper respiratory infection (viral conjunctivitis).
- History of eye disease or operation:
  - red eye with blurred vision in the past could be iritis, dendritic ulcer, marginal keratitis
  - red eye after eye surgery – suspect endophthalmitis: refer urgently.
- Contact lens wearer:
  - be wary of corneal infections – refer early.

LOOK FOR

ONE OR TWO EYES AFFECTED?

TEST VISION: NORMAL OR DECREASED?

TEST PUPILS

- Abnormal pupil size, shape or poor reaction to light in a red eye is a sign of serious eye disease, e.g. acute glaucoma or iritis.

LOOK AT THE EYE

Use light and magnification:
● How red is the eye and where is the redness? There are three patterns of redness:

1. **Ciliary injection**: redness greatest in a ring around the peripheral cornea, often seen in iritis, acute glaucoma, and other serious causes of red eye. However, this pattern of redness should not be relied on for diagnosis.

2. **Conjunctival injection**: diffuse redness of the whole conjunctiva, often seen in conjunctivitis.

3. **Subconjunctival haemorrhage**: a thin continuous layer of bright red blood overlying the white sclera.

● Is there any discharge?
  - yellow pus-like discharge: in both eyes in bacterial conjunctivitis; in one eye in severe corneal ulcer
  - clear, watery discharge: in viral or chronic infectious conjunctivitis.

● Examine the cornea: is it clear, or is there a foreign body or ulcer?

● Examine the anterior chamber (the space between the clear cornea and coloured iris): is there a fluid level of pus (hypopyon) or blood (hyphaema) (Fig. 4.1)?

● Anterior chamber ‘depth’ is very difficult to assess without a slit lamp but sometimes in acute glaucoma the iris can be seen to be almost pressed up against the back of the cornea (‘shallow’ anterior chamber).

● Stain the cornea with fluorescein and look with a blue light:
  - uniform diffuse yellow glow is normal (except in acute chemical burn or severe infection, when it can signify a total epithelial defect)

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Fig. 4.1 Left, hyphaema; right, hypopyon.
corneal ulcers or abrasions appear as a well-demarcated area of bright yellow staining (an epithelial defect)

if the substance of the cornea (stroma) under this is crystal clear, the diagnosis could be traumatic corneal abrasion, viral dendritic ulcer or other conditions mainly affecting the epithelium (the surface layer of the cornea)

if the substance of the cornea under this is cloudy or white, the diagnosis could be a bacterial, viral or fungal infectious corneal ulcer.

- Evert the eyelids (top and bottom):
  - is there a foreign body under the upper eyelid?
  - are there lumps on the inside surface of the eyelids?
  - papillae (fine pink ‘cobblestones’): in both eyes in bacterial or allergic conjunctivitis
  - follicles (small grey ‘rice grains’): in one or both eyes in viral conjunctivitis.

**OPHTHALMOSCOPY**

- Difficult if the patient is photophobic.
- It is best not to dilate the pupil with drops in acute red eye with decreased vision before referral.

**CHECK THE INTRAOCULAR PRESSURE**

- Every patient with one red eye and unexplained pain or decreased vision must have an urgent eye pressure check to exclude acute glaucoma.
- Normal intraocular pressure is less than 21 mm of mercury (mmHg).
- Acute glaucoma is likely if the pressure is very high (usually more than 40 mmHg).

**ONE RED EYE, DECREASED VISION**

The following serious causes of red eye are usually unilateral, although they can occasionally affect both eyes together.

**DIAGNOSTIC FLOWCHART 4.1: ONE RED EYE, DECREASED VISION**

**INFECTIOUS CORNEAL ULCER**

- Causes include bacteria (Fig. 4.2, left), fungi, viruses (including
herpes simplex virus (Fig. 4.2, right), the cause of dendritic ulcer).

- **Contact lens wearers** are at greatly increased risk of corneal infections.

**SYMPTOMS**
Pain, foreign body sensation, blurred vision, photophobia.

**SIGNS**

- Mild to severe redness.
- (Usually) decreased visual acuity.
- Red eye (often ‘ciliary injection’: redness maximal around the edge of the cornea).
- Viewing the cornea with white light:
  - viral dendritic ulcer: there might be no obvious abnormality
  - bacterial or fungal ulcer: white or yellow area in the normally clear cornea (corneal infiltrate).
- Fluorescein plus blue light: an area of corneal epithelial defect (staining yellow) is seen:
  - usually in a branching (dendritic) pattern if herpes simplex virus is the cause
  - other causes: irregular area of staining overlying the corneal infiltrate.
- Hypopyon (pus) in the anterior chamber in severe cases.

**MANAGEMENT**

- **Urgent ophthalmic referral.**
- **Do not start any treatment before referral** – the use of topical antibiotics before ophthalmic assessment can cause delay in referral and makes culturing the causative agent of the infection difficult.

**OPHTHALMIC MANAGEMENT**
Dendritic ulcer due to herpes simplex: topical aciclovir ointment.
Possible bacterial or fungal keratitis: take corneal culture sample then commence frequent broad-spectrum antibiotic drops and follow closely – the patient might require admission to hospital if severe.

**NON-INFECTIONOUS CORNEAL ULCER**

**CAUSES**
- Autoimmune disease, e.g. rheumatoid arthritis.
- Exposure keratopathy, e.g. in patients with seventh nerve palsy (facial palsy) who can’t close the eyelids on one side.
- Severe dry eye.
- Atopic keratitis (in a patient with severe facial eczema).
- Neurotrophic keratopathy (ulcer due to numb eye, e.g. from trigeminal nerve disease).
- Contact lens related non-infectious ulcer.

**SYMPTOMS**
- Foreign body sensation, pain (except in neurotrophic), blurred vision.

**SIGNS**
- Mild to severe redness.
- Can appear identical to a corneal abrasion (see p. 000) or an infectious corneal ulcer (see above).
- Signs of underlying cause, e.g. poor eyelid closure, severe dry eye, numb cornea, severe atopic skin and eyelid disease.

**MANAGEMENT**
- Urgent ophthalmic referral.
- Treat specific cause, e.g. frequent lubricants +/- lid surgery for seventh nerve palsy.

**ACUTE GLAUCOMA** (Fig. 4.3)
- This is a sudden severe rise in intraocular pressure (IOP).
- Usually due to occlusion of the ‘angle’ of the anterior chamber (where aqueous fluid is normally drained): ‘acute angle-closure glaucoma’.
- If unrelieved for more than a few hours, very high intraocular pressure can cause permanent visual loss.
SYMPTOMS

- Sudden-onset aching eye pain, which is often severe and can be accompanied by nausea and vomiting.
- Blurred vision +/- rainbow-like ‘haloes’ around lights.

SIGNS

- Red eye (can be mild or severe).
- Decreased visual acuity (mild or severe).
- Cloudy cornea (corneal oedema) if severe.
- Anterior chamber depth (the distance between the cornea and iris) might be shallow.
- Pupil often mid-dilated and not reactive to light.
- **Very high intraocular pressure on testing with tonometer:**
  - usually over 40 mmHg (normal eye pressure is less than 22 mmHg)
  - **all patients with unexplained red eye and pain or blurred vision must have their intraocular pressure measured urgently to exclude acute glaucoma.**

MANAGEMENT

- Urgent ophthalmic referral.

OPHTHALMIC MANAGEMENT

- Urgent medical treatment to decrease intraocular pressure.
- Then YAG laser iridotomy:
  - in acute angle closure the normal path of aqueous fluid from the ciliary body where it is produced to the drainage angle is blocked where the iris presses against the lens

Fig. 4.3 Acute glaucoma.
laser holes shot through the peripheral iris produce an alternative route for the aqueous flow and intraocular pressure often returns to normal.

**IRITIS (ANTERIOR UVEITIS)** (Fig. 4.4)

- Inflammation in the iris and anterior chamber of the eye, with no abnormalities anywhere else in the eye (normal vitreous and retina).
- Usually autoimmune and of unknown cause; sometimes due to infections or specific autoimmune diseases.
- Usually unilateral, however, it can be bilateral.

**SYMPTOMS**

- Usually young or middle-aged patients.
- Blurred vision, photophobia (bright lights hurt the eye), pain if severe.
- Sometimes a history of autoimmune disease associated with iritis, e.g. ankylosing spondylitis, inflammatory bowel disease.

**SIGNS**

- Red eye(s) (may be mild initially).
- Decreased vision (only mild initially).
- Usually clear cornea.
- If severe, the pupil might be small or irregular and constrict poorly to light.

*Fig. 4.4* Iritis. Left, circumciliary injection; right, keratic precipitates (KPs).
Hypopyon (pus in anterior chamber) if severe.

**Slit lamp:**
- *iritis can’t be diagnosed without a slit lamp microscope examination*
  - turn the slit lamp light to maximum, adjust the beam so it is short and narrow, and angle the beam through the anterior chamber at about 45 degrees; the room lights should be off
  - cells (fine, moving, white specks) and flare (the normally invisible light beam looks like a car headlight through fog) are seen in the anterior chamber
  - keratic precipitates (KPs; clumps of inflammatory cells) might be seen on the inner aspect of the cornea.

**Ophthalmoscopy:**
- often difficult due to photophobia
- normal vitreous and retina (unless also posterior uveitis).

**MANAGEMENT**
- Urgent (same-day) ophthalmic referral.
- *All patients with an unexplained red eye and pain, photophobia or blurred vision must have a careful slit lamp examination of the anterior chamber to exclude iritis.*

**OPHTHALMIC MANAGEMENT**
- Exclude inflammation at the back of the eye (which can spill forwards and mimic iritis).
- Intensive topical steroids plus dilating drops initially; sometimes systemic immunosuppression required.
- Test for underlying infective or autoimmune condition if atypical, refractory, bilateral or recurrent.

**ENDOPHTHALMITIS**

Endophthalmitis (Fig. 4.5) is a severe inflammation extending throughout the interior of the eyeball, involving both the aqueous and vitreous compartments.

**CAUSES**
- Infection after eye surgery.
Infection after penetrating eye injury or traumatic eyeball rupture.
Infection spreading to one or both eyes through the blood stream, e.g. from infected heart valves in endocarditis or contaminated needles in intravenous drug users.

**SYMPTOMS**
- Blurred vision, ‘floaters’, aching pain in the eye, photophobia.

**SIGNS**
- Decreased visual acuity.
- Signs of iritis.
- (Sometimes) hypopyon (pus in the anterior chamber).
- A relative afferent pupillary defect (RAPD) might be present if the retina has been damaged or detached.
- Decreased red reflex.
- Eyelid swelling.

**MANAGEMENT**
- Urgent ophthalmic referral and admission.
- If postsurgical or post-traumatic: vitreous biopsy and intravitreal and topical antibiotics.

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**Fig. 4.5** Endophthalmitis.
For traumatic causes of red eye with normal vision, see Chapter 5 Eye trauma.

**DIAGNOSTIC FLOWCHART 4.2: ONE RED EYE, NORMAL VISION**

**DIAGNOSTIC FLOWCHART 4.3: TWO RED EYES, NORMAL**

1. **Pain, photophobia or haloes?**
   - Yes
     - **Suspect 'early' case of serious disease**
       - *e.g.* early iritis or corneal ulcer
   - No
     - **Watery discharge, lid follicles, and/or recent 'cold'?**
       - Yes
         - **Viral conjunctivitis**
       - No
         - **Subconjunctival haemorrhage**
           - **Episcleritis**
           - **Chronic conjunctivitis**
VISION

**BACTERIAL CONJUNCTIVITIS** *(Fig 4.6)*

**SYMPTOMS**

- Might be briefly unilateral, but usually becomes bilateral.
- Red, sticky, gritty eyes with pus-like discharge (but no pain or photophobia).
- Family members or co-workers are often affected (it is very contagious).

**SIGNS**

- Two red eyes.
- Yellow, pus-like discharge.
- Diffuse (‘conjunctival’) redness of the ocular surface.
Lid eversion: papillae (cobblestone-like, small, pink lumps).
- Normal visual acuity.
- Normal corneas, anterior chambers and pupils.

**INVESTIGATIONS**

- None required initially – bacterial swabs are not routinely required unless there is no response to treatment within a week or atypical features are present.

**MANAGEMENT**

- Topical antibiotic drops to both eyes, 2-hourly while awake for 2 days then 4 times a day for a week.
- Warn patients that they are contagious for as long as the eyes are red.
- Refer if:
  - decreased vision, pain or photophobia at any stage
  - not better in 2 weeks.

**VIRAL CONJUNCTIVITIS** (Fig. 4.7)

**SYMPTOMS**

- One or two eyes red, watery, gritty.
- (Often) symptoms of a current or recent viral upper respiratory infection.
SIGNS

- One or two red eyes – diffuse redness of the ocular surface (‘conjunctival injection’).
- Clear, watery discharge (no pus).
- Lid eversion: follicles (small grey lumps that look like tiny grains of rice).
- Normal visual acuity.
- Normal corneas, anterior chambers and pupils.
- (Sometimes) enlargement of the pre-auricular and/or cervical lymph nodes; other signs of viral infection.

MANAGEMENT

- Antibiotic eye drops have no effect on viral conjunctivitis.
- Topical steroid treatment is not necessary in most cases and should never be started, except by an ophthalmologist.

TELL THE PATIENT

- They have an eye infection with a virus similar to that which causes the ‘common cold’.
- Antibiotics will not help and they will get better by themselves.
- It can sometimes take up to 3 weeks for the redness to resolve.
- They are highly contagious while the eye is red, and should avoid contact with other people – they should avoid touching their eyes,
wash their hands frequently and use a separate towel to other household members. (Make sure you don’t get it yourself, or give it to your next patient! Wash your hands carefully.)

- If the redness clears and their vision remains normal, they do not need to see you again.
- **They need to be seen urgently by an ophthalmologist if:**
  - vision decreases at any stage
  - the eye becomes painful (rather than just irritated)
  - they are no better in 2 weeks.

**ALLERGIC CONJUNCTIVITIS**

Allergic conjunctivitis (Fig. 4.8) can occur:

- as a chronic or recurrent problem in allergic people (asthma, hayfever, eczema)
- as an acute contact allergy to eye drops, contact lens cleaning solution, cosmetics, plant material etc.

**SYMPTOMS**

- **Itch** is the predominant symptom.
- This can be seasonal, e.g. worse in spring (due to increased pollen).
- Intermittent or chronic eye redness.

*Fig. 4.8* Allergic conjunctivitis: large papillae under the everted upper lid.
There might be some mucous or watery discharge but this is not usually copious.

**SIGNS**

- Mild redness might be present or the eyes might not appear inflamed at all.
- Lid eversion: papillae (fine, pink, ‘cobblestone-like’ lumps), especially under the upper lids.
- Normal visual acuity and cornea.

**MANAGEMENT**

- Avoid the allergen if possible, if a contact allergy.
- Try treatment with topical mast cell inhibitor, e.g. cromoglycate or lodoxamide drops t.d.s. in both eyes for a 2-month trial (it can take several weeks to achieve a full effect). If successful, this can be safely continued long term (or seasonally as necessary).
- If there is also a component of dry eye, ‘artificial tears’ can be used when needed.
- Routine ophthalmic referral if distressing symptoms persist.
- **Steroid eye drops should only ever be commenced under ophthalmic supervision**, and for as short a time as possible. Long-term use can give patients (who are often young) cataracts or irreversible visual loss from glaucoma.

**INFECTIOUS CHRONIC CONJUNCTIVITIS**

‘Chronic’ conjunctival infections might initially look like bacterial or viral conjunctivitis. However, they last more than 4 weeks. Causes include:

- atypical bacterial conjunctivitis
- chlamydial inclusion conjunctivitis
- trachoma.

**Atypical bacterial conjunctivitis**

- Unusual or resistant organisms requiring specific antibiotic drops.
- Perform conjunctival swab for bacterial culture.
- Also test for chlamydial inclusion conjunctivitis, or (if dry rural area) trachoma.
**Chlamydial inclusion conjunctivitis**

- A sexually transmitted eye disease of young adults.

**SYMPTOMS AND SIGNS**

- Persistent follicular conjunctivitis (resembling viral conjunctivitis) in one or both eyes for more than 4 weeks.
- If chronic, conjunctival scarring and peripheral corneal inflammation can occur.
- The patients might also have symptoms of chlamydial urethritis.

**INVESTIGATION**

- Special conjunctival swab test for chlamydia (a ‘standard’ bacterial swab culture will not detect this organism).

**TREATMENT**

- 2 weeks oral doxycycline (avoid if pregnant or breast-feeding).
- Test for other sexually transmitted diseases.
- Refer sexual partners for testing.

**Trachoma**

- An endemic infectious disease of dry rural areas associated with poverty and poor hygiene, spread by flies and direct contact.
- A major cause of preventable blindness (400 million people affected world-wide).
- Children are often acutely infected, with the infection then becoming chronic; acute infection can resemble viral conjunctivitis.
- Chronic sight-threatening complications of the eye surface can occur.

**INVESTIGATION**

- Special conjunctival swab test (if available).

**TREATMENT**

- Ideally, refer to ophthalmologist; however, this might be difficult due to lack of availability, poverty and remote location.
- Suspected acute cases are treated with a single dose of oral azithromycin or longer courses of other antibiotics.
Public health measures are vital to decrease endemic disease in affected communities.

**Marginal Keratitis** (Fig. 4.9)

- This is usually a mild, non-infectious ulceration of the peripheral cornea, caused by a peripheral corneal reaction to chronic eyelid inflammation (chronic blepharitis).
- Rarely, severe sight-threatening marginal keratitis can occur due to infections or autoimmune disease (e.g. in rheumatoid arthritis).

**Symptoms**

- Sudden increase in eye irritation and foreign body sensation, usually on a background of chronic gritty/irritated eyes.
- No significant pain, photophobia or blurred vision (unless severe).

**Signs**

- Mild localised eye redness (often only surrounding the involved sector of the cornea).
- Normal visual acuity (suspect serious cause if not).
- Fluorescein with blue light: small peripheral corneal ulceration with underlying mild corneal haze.
- Often 'bridging' fine blood vessels from the conjunctiva to the ulcer.
MANAGEMENT

- Urgent ophthalmic referral to exclude infectious and autoimmune causes.

OPHTHALMIC MANAGEMENT

- If marginal keratitis secondary to blepharitis:
  - treat with topical antibiotics plus steroids, under close ophthalmic supervision until healed.
- Treat chronic blepharitis with hot lid compresses and lid scrubs twice a day long-term to try to prevent recurrence (see p. 196).

RECURRENT CORNEAL EROSION

This is a small, non-infectious, spontaneous corneal epithelial defect that appears weeks to years after an initial traumatic corneal abrasion. This occurs because the corneal epithelium that regrows over a traumatic defect might not be as tightly adherent as it was before the original injury, and peels off again with minimal or no trauma.

SYMPTOMS

- Sudden onset of foreign body sensation (can be severe) – often on waking in the morning.

SIGNS

- Usually normal (or near-normal) visual acuity.
- Eye redness may be minimal or absent.

  The cornea looks normal with a white torchlight.
- Fluorescein plus blue light: small area of yellow fluorescein staining (can be anywhere on the cornea) – the underlying cornea is clear (not white or cloudy as in bacterial ulcer).

MANAGEMENT

- Urgent ophthalmic referral to exclude corneal ulceration of other causes (e.g. dendritic ulcer).

OPHTHALMIC TREATMENT

- The acute ulceration usually heals within a few days with eye
patching and/or lubricants.

- However, erosions often recur and can become problematic for the patient.
- Prevention involves frequent use of lubricants (including lubricant ointment at night, to decrease the chance of recurrent erosion in the morning).

**SPONTANEOUS SUBCONJUNCTIVAL HAEMORRHAGE** (Fig. 4.10)

This is the spontaneous appearance of bright red blood between the white sclera and the overlying thin transparent conjunctiva. This often looks very dramatic and is worrisome for the patient. It is usually benign, although occasionally it might be the presenting sign of systemic disease.

**CAUSES**

- (Usually) no cause can be identified.
- Eye rubbing.
- Severe coughing or straining.
- Rarely, severe hypertension or blood clotting disorders.

**SYMPTOMS**

- Often noticed incidentally by the patient or relatives.
- Sometimes mild foreign body sensation at onset.
• No blurred vision, pain or photophobia.

**SIGNS**

• Diffuse area of bright red blood under the conjunctiva of one eye (this looks different to most ‘red eyes’, which are dilation of the fine conjunctival and scleral blood vessels).
• Normal visual acuity.
• Eye examination otherwise normal.

**INVESTIGATIONS**

• Check the blood pressure in all patients.
• If recurrent or severe, or if a history of other unexplained bruising or bleeding, check full blood count and blood coagulation studies.

**MANAGEMENT**

• Investigate as above if indicated.
• Reassure patients as to the benign nature of the condition and tell them it could take 2 weeks or more for the redness to resolve.
• Refer if recurrent, persistent or severe.

**EPISCLERITIS** (Fig. 4.11)

![Episcleritis](image)

**Fig. 4.11** Episcleritis.
This is a mild, self-limited inflammation of the episclera (a fine connective tissue layer between the white sclera and the overlying clear conjunctiva).

**SYMPTOMS**

- Mild eye irritation and redness.
- No significant itch or discharge.
- No significant pain or photophobia.

**SIGNS**

- Redness of the eye – usually mild, usually sectoral (sometimes diffuse).
- Normal visual acuity.
- Otherwise normal ocular examination.

**MANAGEMENT**

- Mild: no treatment – almost all resolve spontaneously.
- Discomfort and/or redness persisting for more than 2 weeks: ophthalmic referral for consideration of treatment with topical steroids or non-steroidal agents.
- **Do not start steroid treatment yourself, unless under instruction from an ophthalmologist.**

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Fig. 4.12 Scleritis.
**SCLERITIS** (Fig. 4.12)

- An inflammation of the white sclera itself.
- It is usually **painful** (compared with episcleritis, which is uncomfortable rather than painful).
- As opposed to episcleritis (which usually occurs in otherwise healthy patients), patients with scleritis often have serious underlying systemic vasculitis.

**SYMPTOMS**

- Mild to severe aching eye pain (often wakes the patient at night).
- Vision normal early on, but may later become severely reduced due to ocular complications.

**SIGNS**

- Diffuse or sectoral redness of the eye.
- The eye is often tender to touch.
- Vision normal or decreased.
- There might also be:
  - peripheral corneal ulceration
  - signs of intraocular inflammation.

**MANAGEMENT**

- Urgent ophthalmic referral for investigation and treatment.
- Ophthalmic treatment may involve oral immunosuppressive agents.

**CONTACT LENS PROBLEMS**

Contact lens wearers are prone to both minor and serious corneal diseases.

- A contact lens wearer with a red eye plus pain, photophobia, or decreased vision has an infectious corneal ulcer until proven otherwise.

Conditions contact wearers have an increased risk of include:

**Corneal ulcers** (Fig. 4.13)

- Refer urgently to an ophthalmologist.
Non-infectious ulcers:
- from severe overwear, poorly-fitting lenses, poor lens hygiene, or traumatic lens insertion or removal
- if small and peripheral, vision might be normal and the patient complains of foreign body sensation rather than pain.

Infectious corneal ulcer:
- often more painful than non-infectious ulcers
- affect central or peripheral cornea
- due to bacteria, or unusual organisms (e.g. fungi or Acanthamoeba)
- if early, vision might be normal.

Other problems
Refer to the optometrist or ophthalmologist who prescribed the lenses if the patient describes:
- chronic irritation: poor fit of lenses or dirty lenses
- chronic itch: allergy to the lens cleaning solution or lens material
- contact lens overwear: this can cause persistent irritation, vascularisation and scarring of the peripheral cornea
- sleeping in lenses: this is usually not serious if it occurs occasionally but it can sometimes cause hypoxic corneal inflammation
- difficulty removing the lenses: can cause extensive corneal abrasions.

OTHER CAUSES
There are many other less common causes of persistent red eye(s) with normal vision, including:
- pterygium or inflamed conjunctival tumour
- low-flow carotid-cavernous fistula
- autoimmune chronic conjunctivitis, e.g. ocular pemphigoid.

**RED EYE IN A NEONATE**

**OPHTHALMIA NEONATORUM**

This is a general term for eye infections in new-born babies (within the first 2 weeks of life). These are often due to sexually transmitted diseases passed during birth from the mother to the baby. Causative organisms include:
- **gonorrhoea** – this is very serious and can cause:
  - bilateral severe infectious corneal ulcers resulting in perforation of both corneas and bilateral blindness
  - bloodstream spread with fatal meningitis or encephalitis without urgent intravenous antibiotic treatment.
- **chlamydia** – often less severe than gonorrhoea, but still serious:
  - discharge can be purulent or watery
  - associated with a serious chlamydial lung infection
  - treat with intravenous antibiotics.
- **herpes simplex virus** – usually watery discharge; can be associated with severe systemic infection and requires intravenous antiviral treatment.
- **other ‘common’ bacteria** – these are less serious than the above.

New-born babies also often have congenital nasolacrimal duct obstruction, which can cause chronic watering and sticky discharge from one or both eyes. This does not cause red eye, red eyelids or severe eye discharge and hence should not be confused with ophthalmia neonatorum.

**RED EYE IN A CHILD**

- Red eyes in children are caused by similar diseases as in adults (with the exception of acute angle closure glaucoma, which is rare).
- Examination can be difficult because of poor cooperation and difficulty assessing critical signs such as visual acuity in preverbal children.
- Serious disease, such as iritis and endophthalmitis, can still occur in children.
- For this reason, any child with a red eye in whom visual acuity
cannot be measured requires urgent ophthalmic referral for further examination. In some cases this might require an examination under general anaesthetic to exclude serious ocular disease.