



Zooming In On Red Eye

Briar Sexton, MD

A patient presenting with an acutely red eye is a familiar challenge for family physicians. “Red eye” can be caused by a variety of things, including infection, inflammation, and injury (Table 1). It may be an isolated ophthalmic condition, or a manifestation of systemic illness. Establishing the cause of a red eye often poses a diagnostic dilemma, especially when the patient is being examined without the benefit of a slit lamp or a means to check intraocular pressure.

What are the essentials of examining a red eye?

The most important part of any ophthalmologic exam is the vision evaluation, using a Snellen’s chart, an inexpensive, yet essential tool for all primary care physicians. Detecting decreased vision aids the triage ability of the referring physician, as well as the physician being consulted. When dealing with red eye, it is helpful to use an anatomic approach. Inspection of each of the anterior segment structures in a systematic fashion greatly helps the diagnosis (Table 2).

Examination should start with inspection of the conjunctiva in order to classify the pattern of redness as sectoral, diffuse, or ciliary flush. Ocular discharge can be categorized as mucoid, mucopurulent, or serous.

Cathy’s red eye

Cathy, 28, has no history of ocular disease. One morning, the school teacher wakes up and notices her left eye is a little bit red and watery. There is scant mucoid discharge. As the day progresses, she develops pain and increased tearing. One of her students has been absent from school for three days because of “pink eye.”

A few days later, she developed similar features in her right eye. She went to see her family doctor. During the course of the examination, her doctor noted tenderness to palpation over Cathy’s preauricular lymph nodes bilaterally.

Cathy’s doctor told her she had a viral conjunctivitis, and recommended she handwash frequently, avoid touching her eyes, and use different hand towels from other members of her household.

Next, the cornea can be examined for diffuse opacification, or localized epithelial defects. The use of fluorescein eye drops and cobalt blue light will reveal corneal abnormalities caused by abrasion, ulcer, or dendrite. Cobalt blue light is available on some ophthalmoscopes, or with a Wood’s lamp.

The anterior chamber depth should be assessed as normal or shallow as compared to the fellow eye. Note should be made of any layering of blood or pus in the anterior chamber. A penlight can be used for both of these examinations.

Red Eye

The pupils should be examined with a penlight for anisocoria (asymmetry), and for sluggish movement.

If possible, the intraocular pressure should be measured. In the absence of a formal assessment tool, the eyes can be digitally palpated. Inspection for proptosis is best performed with the patient seated, and the examiner looking down from behind the patient.

Who should be referred?

Patients exhibiting decreased vision, severe pain, photophobia, or coloured halos should be referred. Patients who, on examination, have decreased vision, corneal opacity, pupillary abnormalities, shallow anterior chamber depth, or proptosis should also be referred.

Patients who are not getting better despite treatment, who wear contact lenses, and who have a history of severe eye disease (*i.e.*, herpes simplex virus, uveitis) should also be promptly referred to an ophthalmologist.

What are the warning symptoms in red eye?

There are four things to look out for:

1. Blurred vision
2. Severe pain
3. Photophobia
4. Coloured halos (Table 3).



Dr. Sexton is a fourth year resident in ophthalmology, Dalhousie University, Halifax, Nova Scotia.

Table 1

Most common causes of red eye by anatomic location

1. Eyelid
 - hordeolum/chalazion
 - blepharitis
2. Conjunctiva
 - conjunctivitis
3. Sclera
 - episcleritis
 - scleritis*
4. Cornea
 - corneal abrasion
 - infectious keratitis*
 - herpes simplex keratitis*
5. Anterior Chamber
 - iritis/uveitis*
 - acute angle-closure glaucoma*

* Conditions that require prompt referral

Table 2

Diagnostic steps to examining a red eye

- Check visual acuity
- Inspect conjunctiva
- Inspect for discharge
- Inspect cornea for opacification
- Inspect cornea for epithelial abnormalities
- Inspect anterior chamber depth
- Inspect pupils
- Check intraocular pressure
- Inspect for proptosis

Diagnosis and treatment pearls

Red eye presents in many different forms:

Stye/hordeolum and chalazion

A hordeolum or stye is an acute inflammation of the eyelid caused by either an external swelling (involving the hair follicle or associated glands of Zeis or Moll), or an internal swelling (involving the



Figure 1. Thick discharge characteristic of bacterial conjunctivitis.

Table 3

Warning signs in red eye

- Decreased vision
- Corneal opacification
- Pupillary abnormalities
- Shallow anterior chamber depth
- Elevated intraocular pressure
- Proptosis

meibomian glands). Patients complain of an eyelid lump with swelling, pain, and redness. The clinician is able to identify a subcutaneous nodule within the eyelid. Treatment involves warm compresses and may include a topical antibiotic, such as bacitracin-polymyxin B. Patients can be encouraged to massage the lesion three to four times a day. If the lesion fails to resolve after three to four weeks, referral is warranted for incision and curettage. It is not indicated to perform incision and curettage in the acute phase of the lesion.

Blepharitis

Blepharitis is an inflammatory condition of the eyelid margins. It is often seen in patients with rosacea or with a recurrent history of styes.

Treatment is often chronic and patient response may be slow. Treatment mainstays are lid hygiene and topical antibiotics, such as erythromycin ointment. Some patients, particularly those with rosacea, have benefited greatly from oral tetracyclines. A typical regimen would be doxycycline 100 mg orally twice a day.

Subconjunctival hemorrhage

Subconjunctival hemorrhage is caused by an accumulation of blood between the conjunctiva and the sclera. It is generally benign and self-limiting. Patients may complain of a mild foreign body sensation due to mass effect. No referral is necessary.

Conjunctivitis

Conjunctivitis can be classified as either infectious, allergic, or chemical. Infectious conjunctivitis is

Red Eye



Figure 2. Acute follicular reaction associated with viral conjunctivitis.

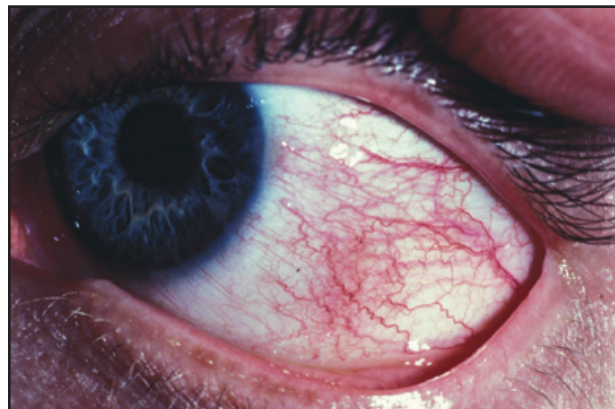


Figure 3. Mild sectoral injection of episcleral blood vessels. Episcleritis.

either bacterial or, in the vast majority of cases, viral.

Bacterial conjunctivitis

Bacterial conjunctivitis presents with tearing, purulent discharge, and lid stickiness (Figure 1). Most adult bacterial conjunctivitis is caused by *Staphylococcus* species. Treatment must involve a broad spectrum antimicrobial with both gram positive and gram negative activity. Available agents include bacitracin-polymyxin B, fusidic acid, gentamicin sulfate, and sodium sulfacetamide. Use of topical aminoglycosides has been associated with corneal toxicity. Sulfonamides have a high rate of ocular allergy. Bacitracin-polymyxin B or fusidic acid are good first-line choices. An alternate diagnosis should be considered in any patient who worsens or fails to improve after two to seven days of topical antibiotics. Rarely, neisseria species will be the cause of a hyperacute bacterial conjunctivitis. These pathogens can cause corneal ulceration and perforation, and require urgent referral. Chlamydial conjunctivitis is suspected in chronic, unilateral, follicular conjunctivitis. It requires systemic treatment. If any of the “warning” signs and symptoms discussed previously are present, prompt referral is warranted.

Viral conjunctivitis

Viral conjunctivitis is usually caused by adenovirus and may occur as part of an epidemic, or may accompany other signs and symptoms of an upper respiratory tract infection (Figure 2). Patients typically present with pain, watery or mucoid discharge, photophobia, and a preauricular lymph node. There is often a history of one eye becoming red first, followed by the other. There is no treatment, and most of these infections are self-limiting. Many patients continue to worsen for the first four to seven days. This condition can take three weeks to fully resolve. Symptomatic relief can be obtained with cool compresses and dim lighting. It is important to stress to patients that they are highly infectious.

Allergic conjunctivitis

This often presents in a seasonal allergy sufferer or someone with a personal/family history of atopy. Ocular itch is the most common symptom. Signs include tearing, chemosis, bilateral involvement, and papillary hypertrophy. Skin around the eyes may appear dry or slightly reddened. Pain is not a feature of allergic conjunctivitis. Treatment of allergic conjunctivitis can be both topical and systemic. Local treatment with cool compresses can

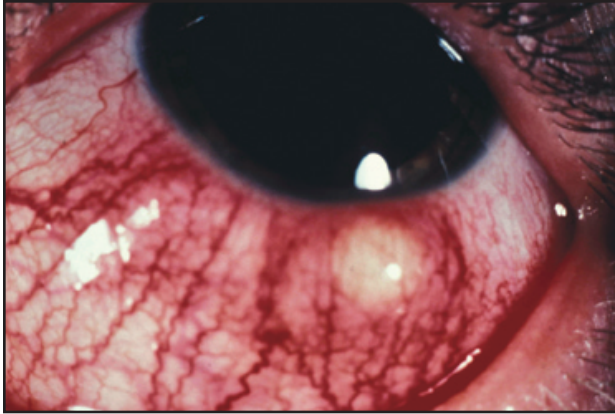


Figure 4. Nodular scleritis.

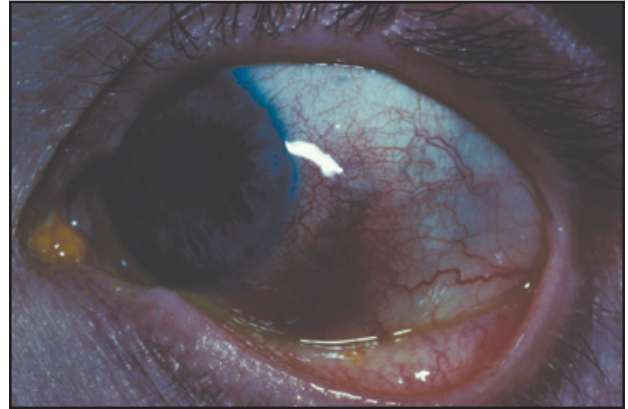


Figure 5. Scleritis; note violaceous hue.

be soothing. If the allergy is very mild, topical lubrication with artificial tears may suffice. More severe allergy provokes the use of a topical antihistamine/mast cell stabilizer (*i.e.*, patanol) four times daily. Oral antihistamines are another adjunct of therapy, particularly if systemic features of allergy are present. If this fails to control the condition, referral is indicated for the addition of topical corticosteroids or possibly cyclosporine.

Episcleritis

Episcleritis is an inflammatory condition affecting the episclera (between the conjunctiva and the sclera). It is usually unilateral. It presents with mild pain and redness, which may be sectoral (Figure 3). It is not associated with discharge or photophobia. Attacks are usually self-limited



but may last from weeks to months. Recurrent episcleritis should be referred, as it may be associated with an underlying inflammatory condition, although it is most often idiopathic.

Scleritis

Scleritis is a more serious inflammatory condition affecting the sclera (Figures 4 and 5). Scleritis presents with intense conjunctival injection which may be diffuse or localized. The sclera may appear violaceous when viewed in natural lighting. Patients complain of boring eye pain and may experience pain with eye

movements. Onset can be gradual. There is no associated discharge. Scleritis warrants referral to

Red Eye

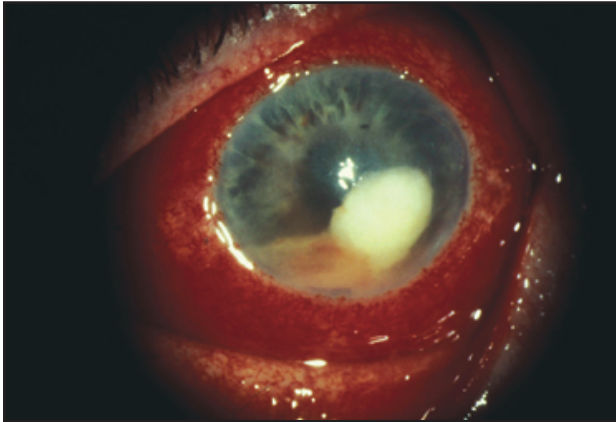


Figure 6. Corneal ulcer.

an ophthalmologist, as a higher percentage of these patients have an associated systemic illness. Scleritis also has the potential for serious complications, including ocular perforation. Treatment of scleritis is via immune suppression and is systemic. Non-steroidals and corticosteroids are considered first-line treatment, followed by immunosuppressants. Non-steroidal anti-inflammatory drug therapy can be initiated by the primary care physician for pain control.

Corneal abrasion

Corneal abrasions present with a red, tearing, painful, photophobic eye in the setting of trauma. The cornea has an area of staining with fluorescein. Alternately, the history of trauma may be remote (usually a fingernail or organic matter), and the pain may onset first thing in the morning. This is a recurrent erosion syndrome. Corneal abrasions are best managed by frequent applications of an antibiotic ointment, such as bacitracin-polymyxin B, until the defect is sealed. At that time, patients may wish to use a bland ointment, such as a tear gel, at bedtime to prevent an erosion syndrome.

Corneal ulcers

Corneal ulcers present with pain, photosensitivity, redness, tearing, and decreased vision (Figure 6). A white corneal lesion may be apparent to the naked

Take-home message

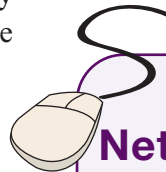


- Red eye is the most frequent ocular complaint at the primary care level.
- Patients exhibiting decreased vision, severe pain, photophobia, or coloured halos should be referred.
- Patients who, on examination, have decreased vision, corneal opacity, pupillary abnormalities, shallow anterior chamber depth, or proptosis should be referred.
- Inspection of each of the anterior segment structures in a systematic fashion greatly aids diagnosis.

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eye or after fluorescein staining and illumination with cobalt blue light. Corneal ulcers can occur in the setting of a corneal trauma, or in contact lens wearers. The most common causes are bacterial (staphylococcus, streptococcus, pseudomonas), but they may also be fungal. Corneal cultures are required and initiation of broad spectrum antibiotics is urgent. These lesions require prompt referral, as they can cause a great deal of scarring (with concomitant visual loss), and even corneal perforation.

Herpes simplex keratitis

Viral keratitis is more likely to occur without a history of trauma. Patients often have a history of cold sores. The condition presents with red eye, foreign body sensation, and tearing (Figure 6). On examination, the patient may have a dendrite visible with fluorescein staining. In some cases, corneal ulceration may be seen. Patients often have decreased corneal sensation, and there may be involvement of other ocular structures. A diagnosis or suspicion of herpes simplex keratitis requires ophthalmologic referral.

Iritis/iridocyclitis

Uveitis is an inflammation of the iris or the iris and ciliary body. It presents with pain, red eye, photophobia, decreased vision, and tearing. On examination the conjunctival injection pattern is one of ciliary flush. The pupil may be smaller on the affected side. Uveitis is another condition which should be referred to ophthalmology, as it requires steroid drops and dilators as part of the initial management. Iritis can be associated with many conditions, including the seronegative arthropathies, and so repeated episodes warrant systemic investigation.

the drainage system of the eye becomes occluded. Patients present with extreme pain, and may have nausea and vomiting. The eye is red, rigid to digital palpation and the cornea is usually opaque, obscuring iris detail. The pupil is mid-dilated and may have minimal response to light. Patients require urgent referral to prevent damage to the optic nerve. CME

References

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Angle-closure glaucoma

Angle-closure glaucoma is a relatively rare cause of increased intraocular pressure. It occurs when