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# A painful red eye

## Case study

A man, 75 years of age, presents with a red, painful, watery right eye of 1 week duration. He describes photophobia but says his vision is not reduced or blurry. He was seen at another clinic after 2 days of symptoms and was prescribed topical chloramphenicol antibiotic eye drops. Despite using the eye drops for 5 days, there has been no improvement in his symptoms. The man has no significant ocular past history.

## Question 1

What are your differential diagnoses and what further history will help you to make a definitive diagnosis?

## Question 2

How would you examine this patient?

## Question 3

What is the most likely diagnosis (*Figure 1*)? How is this condition managed?

## Question 4

What are the potential ocular complications of this condition?

## Question 5

What lessons can be learnt from this case?

## Answer 1

The differential diagnosis of a unilateral red eye is shown in *Table 1*. A focused history can help make a definitive diagnosis. Important questions to ask in the history are shown in *Table 2*.

Conjunctivitis accounts for over 25% of all eye complaints seen in the general practice setting, and can be allergic, viral or bacterial.<sup>1</sup> Allergic conjunctivitis is usually bilateral and accompanied by itch and a history of atopy. Viral conjunctivitis is characterised by a watery discharge and may be associated with a history of viral illness. A purulent discharge is usually present in bacterial conjunctivitis.

A corneal foreign body can cause irritation and redness; it is important to seek a history of any ocular trauma or work with metal. If the patient is a contact lens wearer, microbial keratitis with organisms such as *Pseudomonas aeruginosa* or acanthamoeba, must be considered. This condition can lead to devastating outcomes including corneal perforation. As a rule, a contact lens wearer with a painful, red eye should be referred for prompt specialist assessment.

Anterior uveitis can present with redness, photophobia, pain and blurred vision. Acute angle closure glaucoma (also known as acute glaucoma) causes severe pain, photophobia and visual impairment. There is often associated nausea and vomiting.

## Answer 2

An eye examination should be performed on every patient presenting with an eye complaint (*Table 3*). The only equipment required for a basic examination is a Snellen chart, an ophthalmoscope, and 1% fluorescein dye. First, inspect the eyes for distribution of redness, obvious corneal foreign bodies and eyelid swelling/redness. Evert both lids to check for subtarsal foreign bodies. Pre-auricular nodes should be palpated as viral conjunctivitis is often associated with pre-auricular lymphadenopathy.

In acute angle closure glaucoma, the pupil may be fixed and mid-dilated, and the cornea may appear cloudy due to oedema. Anterior uveitis tends to be difficult to diagnose without a slit lamp examination; the characteristic slit lamp appearance is of inflammatory cells in the anterior chamber, with circumferential injection of blood vessels. However, if adhesion bands form between the iris and anterior lens capsule (posterior synechiae), a small and irregular pupil may be seen on basic eye examination.

Figure 1. Image of patient's right cornea

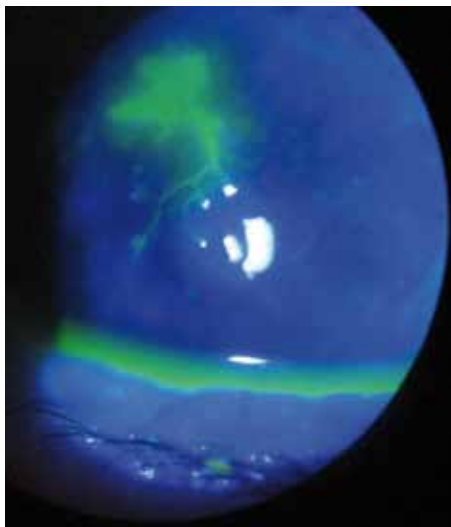


Table 1. Differential diagnosis of a unilateral red eye

Condition		Features
Conjunctivitis	Allergic	<ul style="list-style-type: none"> <li>• Usually bilateral</li> <li>• Itch</li> <li>• History of atopy</li> </ul>
	Viral	<ul style="list-style-type: none"> <li>• Symptoms often start in one eye and then develop in the other a few days later</li> <li>• Watery discharge</li> <li>• Pre-auricular lymphadenopathy</li> <li>• ± recent viral illness</li> <li>• Consider herpes simplex virus if there is history of cold sores and/or a dendritic corneal lesion on examination</li> </ul>
	Bacterial	<ul style="list-style-type: none"> <li>• Purulent discharge; often bilateral</li> <li>• Consider Pseudomonas/Acanthamoeba keratitis in contact lens wearers</li> </ul>
Corneal foreign body		<ul style="list-style-type: none"> <li>• Irritation</li> <li>• ± ocular trauma/metal work</li> </ul>
Acute anterior uveitis		<ul style="list-style-type: none"> <li>• Pain</li> <li>• Photophobia</li> <li>• Blurred vision</li> <li>• ± irregular pupil (posterior synechiae)</li> <li>• Slitlamp examination – cells in anterior chamber</li> </ul>
Acute angle closure (acute glaucoma)		<ul style="list-style-type: none"> <li>• Severe pain and headache</li> <li>• Photophobia</li> <li>• Visual impairment</li> <li>• Nausea, vomiting</li> <li>• Pupil fixed and mid-dilated</li> <li>• Cloudy cornea</li> </ul>
Microbial keratitis		<ul style="list-style-type: none"> <li>• Suspect (especially in contact lens wearer)</li> <li>• May get infiltrate or abscess (white lesion on cornea)</li> <li>• Needs prompt specialist assessment</li> </ul>
Endophthalmitis		<ul style="list-style-type: none"> <li>• History of previous intraocular surgery</li> <li>• Severe pain is typical</li> <li>• Hypopyon (pus in anterior chamber) is often present</li> <li>• If endogenous, patient may be immunocompromised</li> <li>• Needs urgent specialist treatment (within hours not days)</li> </ul>

Visual acuity should be checked in each eye separately, with the patient wearing their usual glasses and using a Snellen chart at a distance of 6 metres. A pinhole is useful to minimise the effect of refractive error if the patient has not brought their glasses. The pupils should be checked for both direct and consensual responses. The swinging flashlight test will detect a relative afferent pupillary defect (Marcus-Gunn pupil).

The cornea should be examined for abrasions or ulcers using 1% fluorescein drops illuminated with a cobalt blue light (a feature available on most direct ophthalmoscopes) in a darkened room. Local

anaesthetic drops (eg. amethocaine) can aid in the examination, but should never be prescribed for the patient to use at home.

### Answer 3

This is a dendritic ulcer, the characteristic lesion of herpes simplex virus (HSV) keratitis. The typical branching dendritic shape is clearly demonstrated. The base of the ulcer stains with fluorescein as a result of impaired cellular integrity and intercellular tight junctions. Herpes simplex virus keratitis is potentially sight threatening, and should always be considered in the differential diagnosis of a unilateral red eye.

A viral eye swab may be sent for polymerase chain reaction for herpes simplex virus DNA. Initial management is with topical acyclovir eye ointment administered five times daily. The patient should be promptly referred to a specialist to confirm the diagnosis and assess for complications. It is important to note that topical steroids can cause disastrous complications in cases of herpes simplex infection. As a general rule, an initial prescription for topical ocular steroids should only be written by an ophthalmologist after a comprehensive ocular examination to exclude conditions that can worsened with steroid use.

### Answer 4

Corneal HSV infection may be complicated by the following conditions:

- disciform keratitis
- uveitis
- raised intraocular pressure
- vitritis
- retinitis (may lead to total visual loss).

Table 2. Important points to cover in the history of a patient with a unilateral red eye

Visual deterioration
Trauma
Discharge and type
Photophobia
Contact lens wearer
Previous eye surgery

Table 3. Basic eye examination in a patient presenting with a unilateral red eye

<ul style="list-style-type: none"> <li>• General inspection of the cornea, sclera and lids. Evert the lids to look for sub-tarsal foreign bodies. Examine for pre-auricular nodes</li> </ul>
<ul style="list-style-type: none"> <li>• Check the visual acuity in both eyes with glasses and/or pinhole</li> </ul>
<ul style="list-style-type: none"> <li>• Examine the pupils. Check the shape and the light reflex, look for a relative afferent papillary defect (RAPD)</li> </ul>
<ul style="list-style-type: none"> <li>• Examine the cornea. Instil fluorescein 1% drops and illuminate with a cobalt blue light looking for corneal ulcers/abrasions</li> </ul>

## Answer 5

This case illustrates that there are multiple causes for a unilateral red eye, some of which can have disastrous consequences.

Table 4. Warning features that require prompt specialist referral

Contact lens wearer
Previous eye surgery or refractive surgery
Decreased vision
Severe pain
Nausea and vomiting
Cloudy or opaque cornea
Dendritic ulcer
Hypopyon (pus in the anterior chamber)
Nonreactive pupils or RAPD
Ocular trauma
Persisting or worsening symptoms

Every patient presenting with a unilateral red eye should be assessed with a careful history and examination. It is unclear whether such an assessment was performed on the *Case study's* initial presentation.

A basic history and examination in the general practice setting may not diagnose all the causes of a red eye, however it can detect serious diagnoses that require prompt specialist referral. 'Warning features' requiring prompt specialist review are outlined in *Table 4*.

Conflict of interest: none declared.

## Reference

1. Murtagh J. The red and tender eye. In: Murtagh J. General practice. 3rd edn. Sydney: McGraw Hill, 2003;562.