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Eye health

There are around two million people in the UK with a sight problem and eye conditions account for 1.5% of general practice consultations.[1] It is estimated that eye disease costs the UK £22 billion per year, around 10% of which is direct cost to the NHS.[2] The GP has a key role as part of the primary healthcare team in the prevention and treatment of eye problems. The initial diagnosis and management can be critical to the ophthalmic outcome.[3]

This bulletin discusses the diagnosis and management of some common ophthalmic conditions presenting with a red eye, as well as the treatment in primary care of chronic open angle glaucoma.

Acute red eye

This phrase covers a wide variety of eye conditions and is the most common ophthalmic complaint seen in general practice. The patient should only be managed in general practice where a benign diagnosis is certain in order to avoid the potentially serious risk of complications from incorrect diagnosis or treatment.[4]

Diagnosis of the acute red eye is determined by symptoms and patient history, with attention to pertinent negative signs elicited on examination (see table 1). Equipment for examination should include a good light source, a Snellen chart, an ophthalmoscope, and fluorescein.[4] Slit lamp examination is also often required for diagnosis. All findings should be carefully documented. It is advised that any of the following **'red flag'** findings should trigger a referral on the same day to ophthalmology (via a Rapid Access Clinical Emergency [RACE] clinic where available):

- reduced visual acuity
- severe ocular pain
- recent eye surgery
- irregular or fixed dilated pupil
- restricted or painful eye movements
- history of trauma.

A good option for follow-up of findings that are not considered to be 'red flag', but where there may be doubt, is to refer the patient to a local Primary Eyecare Acute Referral Service (PEARS) accredited optometrist for a free assessment (see page 4).

Most cases of **infective conjunctivitis**, whether of bacterial or viral aetiology, are mild and self-limiting. Clinical remission of acute bacterial cases occurs within 2-5 days in 65% of patients, whereas the course of viral infection is more variable and may take weeks. It is clinically difficult to distinguish one from the other and trials show that only half of those diagnosed with bacterial infection using signs and symptoms alone do actually have a bacterial isolate.[5]

A recent Cochrane review of the use of topical antibiotics for **acute bacterial conjunctivitis** suggests that antibiotic use offers only marginal benefit over placebo in terms of time to clinical and microbiological resolution.[6] Resistance can occur with topical as well as systemic antibacterials and resistance to ocular chloramphenicol and fusidic acid has been reported at rates of 6-66% in trials.[5] Placebo use is more efficacious than no treatment and so patient education together with eye bathing using cotton wool and water, or the use of ocular lubricants seems a reasonable initial approach.[7,8] However, in cases of infection persisting for more than two weeks, it is advisable to swab for bacteria and chlamydia and to consider an antimicrobial.[7]

Neonatal conjunctivitis presents as conjunctival inflammation (seen as a red eye) in the first 28 days of life. Depending on the cause – often chlamydia or gonorrhoea – a serious sight-threatening infection or pneumonia may occur. Urgent referral for specialist assessment is required. Other signs such as purulent discharge may be present but are not required for diagnosis. Indeed, the simple sticky eye – often caused by poor lacrimal drainage – may present with a purulent-looking discharge but importantly is not associated with inflammation. This benign condition does not usually require specialist assessment.[7]

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Table 1 – Some differential diagnoses and usual presenting symptoms of the acute red eye (adapted from 9)

	Pain	Vision	Photophobia	Haloes	Discharge	Other
Bacterial conjunctivitis	No/Mild	Normal	No	No	Purulent	Gritty
Viral conjunctivitis	No/Mild	Normal	No	No	Watery	Gritty
Allergic conjunctivitis	No/Mild	Normal	No	No	Mucoid /No	Itchy
Acute anterior uveitis	Mild/Moderate	Reduced/Normal	Yes	Rarely	Tearing/No	_
Acute primary angle closure	Severe	Reduced/ Severely reduced	Often	Often	Tearing/No	Headache and vomiting
Corneal ulcer (bacterial)	Moderate/ Severe	Reduced/Normal	Yes	No	Purulent	_
Herpes simplex keratitis	Moderate	Reduced/Normal	Yes	No	Watery	_
Corneal erosion	Moderate	Reduced/Normal	Yes	No	Tearing	Difficult to open eyes
Scleritis	Severe	Reduced/Normal	No	No	No	-
Episcleritis	No/Mild	Normal	No	No	No	Gritty

Uveitis is a significant cause of visual impairment and may rarely even lead to blindness. However, **acute anterior uveitis**, the most common presentation in the UK, usually has a good visual outcome.[9] Table 1 details the typical presentation, but not all of these features may be evident at onset. The redness is most intense just outside the cornea, and the pupil on the affected side may be smaller due to inflammation of the iris sphincter, or distorted as the iris adheres to the lens.[9] Diagnosis is confirmed, usually with a slit lamp examination by a specialist, but a generalist can assess visual acuity, look for circumcorneal injection, and perform a direct ophthalmoscope examination. Where uveitis is suspected, urgent referral to a specialist is required for further assessment and treatment.

Acute angle closure is a sight-threatening emergency requiring urgent hospital care. It is characterised by a rapid rise in intraocular pressure as a result of the sudden obstruction of aqueous humour outflow. Sometimes the presentation may be more systemic than ocular, e.g. headache, nausea, vomiting, and even abdominal pain. It is easy to miss the diagnosis in such circumstances and it is important to consider this carefully.[10] Most medicines listing glaucoma as a contraindication or adverse effect are concerned with inducing acute angle closure.[11] Most commonly, this is through a unilateral 'pupillary block' effect and people at higher risk are those with shallow anterior chambers and narrow iridocorneal angles; usually hypermetropic 'long-sighted' individuals, whose glasses may be seen to magnify. Associated medicines tend to be those with anticholinergic effects. An idiosyncratic, bilateral, 'non-pupillary block' glaucoma may be induced by medicines such as the sulfonamides, e.g. sulfamethoxazole.[11]

Keratitis is an inflammation of the cornea which may be caused by **herpes simplex** or adenovirus infection, **bacterial corneal ulcer**, abrasion, exposure, or wearing contact lenses. Pain and vision reduced by the ulcer or by exudate in the anterior eye distinguishes keratitis from conjunctivitis. The ulcer may be seen as a white infiltrate and fluorescein staining will show its position as marginal or central. In herpes simplex keratitis, the ulcer is usually branching or dendritic and corneal sensation is decreased. It may be necessary to start the relevant topical antimicrobial at once and the patient should be referred without delay. Steroid drops are absolutely contraindicated in such cases.[12]

Corneal erosions are common; most heal without any sequelae but a small proportion may be recurrent. Trauma is often the initiating factor, but previous infections such as herpetic keratitis and bacterial ulcer, and other disorders such as diabetes mellitus and keratoconjunctivitis sicca, may also be predisposing factors.[13] Ocular lubrication, with particular attention to overnight use, is the mainstay of conservative treatment but analgesia and topical antibiotics may be necessary. Patients should be referred unless the erosion is very superficial.[4]

Episcleritis is a localised inflammation beneath the conjunctiva, next to the sclera, whereas **scleritis** is a more painful inflammation of the sclera itself.[12] The pain of scleritis may disturb or prevent sleep and the eye is tender to the touch. Examination may reveal a bluish red discolouration and patient history may reveal autoimmune disease, such as rheumatoid arthritis.[12] Hospital referral is required for confirmation of diagnosis and treatment, but a PEARS optometrist is a good first port of call.

Chronic open angle glaucoma (COAG)

COAG is a common and potentially blinding condition characterised by visual field loss, cupping of the optic disc, and damage to the optic nerve. Although ocular hypertension is a major risk factor, COAG may occur in the absence of raised eye pressure. Prevalence is around 2% in the over 40s, rising to almost 10% in those over 75; this is increased further in black patients and those with a positive family history.[14]

Currently most cases of COAG are detected by optometrists and the definitive diagnosis is subsequently made by an ophthalmologist, although diagnosis by specialists in the community is becoming more common. The condition is typically asymptomatic in its early stages and patients may not present until later when some degree of vision loss has already occurred.[14]

Blindness due to glaucoma is irreversible and about 10% of blindness registrations in the UK are attributed to the condition – although it is important to note that most people treated for COAG will not go blind.[14,15] Damage to sight can be minimised by early diagnosis followed by regular observation and the proper use of appropriate treatment. The intervals between monitoring will be determined by the risk of progression.[14]

Pharmacological treatment may be with a prostaglandin analogue (PGA), beta-blocker, carbonic anhydrase inhibitor, or sympathomimetic depending on the intraocular pressure (IOP), central corneal thickness, patient age, and co-morbidities. In the majority of cases first-line pharmacological treatment should be with a PGA. In cases of intolerance to one drug an alternative may be offered and, if target IOP cannot be attained with a single agent, combinations may be used.[14,15] Miotics are no longer routinely used in COAG but have a place in the initial management of acute angle closure.[14,16]

Most adverse effects are local to the eye and include transient stinging, burning, pain, itching, etc. However, some topical treatments, especially the beta-blockers, may exacerbate co-morbidities and/or interact with systemically administered medicines and caution should be exercised (see table 2).

Concordance (the medicine being used as agreed) and persistence (long-term continuation of treatment) rates may be poor, but patients should be made aware that these are important factors to preserve sight.[14,17,18] Persistence is better with PGAs than with beta-blockers; there is no significant difference in persistence rates between the PGAs.[18] All eye units in Wales have local 'concordance champions' trained to assess problems and, where necessary, to issue and instruct on the use of eye dropper instillation aids.

Table 2 – Pharmacological treatments for COAG [14,16,19]

Treatment	Mode of action	Adverse effects	Notes
Prostaglandin analogues: bimatoprost, latanoprost, tafluprost▼, travoprost	Increase uveoscleral outflow.	Systemic effects rare. Darkening of the iris and thickening and lengthening of the eyelashes.	Storage conditions may vary between the available generics.
Beta-blockers: betaxolol, carteolol, levobunolol, timolol	Probably reduce the rate of aqueous humour production.	Systemic absorption may follow topical application and adverse effects similar to oral beta-blockers can occur. Use with caution in patients with corneal disease.	Contraindicated in patients with bradycardia, heart block, or uncontrolled heart failure. Not recommended in asthma or COPD unless no alternative – risk of bronchospasm – appropriate precautions should be taken. Drug interactions possible, especially with verapamil.
Carbonic anhydrase inhibitors: brinzolamide, dorzolamide, oral acetazolamide	Reduce aqueous humour production. Acetazolamide also produces mild diuresis.	Acetazolamide is a sulfonamide derivative and may cause related adverse effects. Such systemic effects are rare with the topical agents but taste disturbances may occur after drainage into the nasopharynx.	Possible cross-sensitivity in patients allergic to sulfonamides. Acetazolamide not generally recommended for long-term use.
Sympathomimetics: brimonidine, apraclonidine	Reduce aqueous humour production. Brimonidine also increases uveoscleral outflow.	Most adverse effects local to the eye but CNS effects can be significant, e.g. drowsiness.	Not recommended in patients taking tricyclic antidepressants or monoamine oxidase inhibitors. Apraclonidine has limited indications.
Miotic: pilocarpine	Opens the drainage channels in the trabecular meshwork.	Pupil miosis causing blurred vision, which may affect skilled tasks. Ciliary spasm leading to headache and browache.	Not commonly used for COAG due to adverse effects.

The Welsh Eyecare Service (WECS)

The WECS is a Welsh Government-funded project that aims to "*preserve sight through the early detection of eye disease and to give help to those who have low vision and whose sight is unlikely to improve.*"[20] The service comprises four strands: the PEARS and the Eye Health Examination; Low Vision; The Children's Low Vision Project; and Diabetic Retinopathy Screening. The services will be optimised by ensuring a good geographical spread throughout Wales.

The **PEARS** is for acute eye problems that require immediate attention; optometrists must, within reason, offer an examination on the same day or within 24 hours of the request for an appointment. The **Eye Health Examination** scheme offers examination and intervention to groups of the population that are at greater risk of certain eye diseases and to those that may find losing their sight particularly disabling, such as people who are already blind in one eye.

The PEARS and Eye Health Examination schemes are both free of charge for patients and are carried out in the community by accredited optometrists. They accept referrals from GPs and self-referral by patients. GPs may refer patients by asking them to attend one of the local optometrists registered with the scheme or by telephoning ahead to ask the optometrist to see the patient. More information, and a list of practices registered with the scheme, can be obtained via www.eyecarewales.nhs.uk.

The **Low Vision** and **Children's Low Vision** projects aim to help people with visual impairment to remain independent by providing low vision aids, such as magnifiers, and by appropriate education, referral, and rehabilitation training.[20,21] '*Low vision*' is a term used to describe a sight problem that cannot be corrected by glasses, contact lenses, or medical treatment and is now thought to have a prevalence exceeding 2% of the population in some areas of Wales.[21]

Diabetic retinopathy screening is provided to every person with diabetes who is registered with a GP in Wales. The service makes use of mobile screening units, which visit the various Local Health Board areas. It is estimated that screening is carried out on around 90 000 patients annually, of which about 50% are expected to have some degree of retinopathy or show other lesions serious enough to warrant referral to an optometrist.[20]

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