HANDBOOK FOR JUNIOR RESIDENTS AND MEDICAL STUDENTS LEARNING EMERGENCY OPHTHALMOLOGY

Compiled by The Task Force on Undergraduate Teaching in Ophthalmology of the International Council of Ophthalmology and based on their curriculum 2009
In this booklet we have put together common **ophthalmic emergency conditions** that we think you need to know and key ophthalmic disorders we think you need to have seen. There are descriptions and colour pictures of these conditions. This pocket sized book summaries the key points in the ophthalmology curriculum complied by the Task Force of the International Council of Ophthalmology and is a format that is very portable!

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<table>
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</thead>
<tbody>
<tr>
<td>Trauma</td>
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<td>Periorbital haematoma</td>
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<td>Orbital blowout</td>
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<td>Lid laceration</td>
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<td>Subconjunctival Haemorrhage</td>
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<tr>
<td>Chemical burns – cornea and conjunctiva</td>
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<td>Foreign body</td>
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<td>Corneal abrasion</td>
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<td>Hyphema</td>
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<td>Iridodialysis</td>
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<td>Cataract</td>
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<td>Lens subluxation /dislocation</td>
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<tr>
<td>Intraocular foreign body</td>
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<td>Scleral rupture</td>
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<td><strong>Painful Red Eye</strong></td>
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<td>Chalazion</td>
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<td>Dacryocystitis</td>
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<td>Orbital cellulitis</td>
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<td>Conjunctivitis</td>
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<td>Scleritis</td>
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<td>Viral keratitis</td>
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<td>Shingles</td>
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<td>Uveitis</td>
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<td>Acute angle-closure</td>
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<td>Endophthalmitis</td>
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<th><strong>Sudden Painless Loss of Vision</strong></th>
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<td>Vitreous haemorrhage</td>
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<td>Retinal tear/detachment</td>
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<td>Central retinal artery occlusion</td>
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TRAUMA

Ocular trauma is very common, especially in developing countries. It can involve any part of the ocular system, including the eyelids, globe and visual pathways. All patients with a history of trauma must have a full ophthalmic examination.

Periorbital haematoma
Haematoma (black eye) is the most common result of blunt injury to the eyelid.
Signs: Ecchymosis, sub-conjunctival haemorrhage
Management: This will resolve on its own and treatment is aimed at patient comfort. Cool compresses can be useful. In cases with bilateral involvement, a skull-base fracture needs to be excluded.

**Orbital blowout**
A blowout fracture of the orbital floor is usually the result of a sudden increase in the orbital pressure caused by a striking object, such as a fist or tennis ball.

Signs: These include enophthalmos (sinking of the eye ball into the orbit), diplopia (double vision), infraorbital nerve anaesthesia and limitation of upgaze limitation. A CT scan helps to evaluate the fracture.

Management: Surgical repair is often required.
Lid laceration

Lid lacerations must be explored thoroughly to ensure the lacrimal system is intact. Improper eyelid closure can cause exposure keratopathy.

Management: minor lid lacerations should be repaired by direct horizontal closure whenever possible, in order to archive the best functional and cosmetic results. Accurate apposition of the eyelid margins is critical. Major tissue loss needs oculoplastic surgery. Lacerated lacrimal ducts should be repaired to maintain normal tear drainage.
Subconjunctival haemorrhage
This is Blood under the conjunctiva, and is usually unilateral, localised and sharply circumscribed; the underlying sclera is often not visible. There is no inflammation, pain or discharge, and the visual acuity is unchanged. Sometimes, there can be an association with minor injuries, including eye-rubbing, and it is more common with use of anti-platelet agents and anticoagulants. Management: This is mostly reassurance, but checking blood pressure and coagulation may be indicated.

**Chemical burns of cornea and conjunctiva**

**Mild**

**Moderate**
Severe
Alkalis (bleach, cement) tend to penetrate deeper into the ocular structures than acids. This is an ocular emergency, and the initial management consists of copious irrigation of the eyes under topical anaesthetic. Signs include corneal haze, limbal ischaemia and loss of epithelium.

Management: An acute ocular emergency. Immediate, prolonged and copious irrigation with normal saline until the ocular pH remains normal. Intensive topical steroids, antibiotics and Lubricants are given. Later management may include limbal stem cell grafting for limbal stem cell loss, but keratoplasty or keratoprothesis (artifical cornea) surgery may be required for dense corneal scarring.
Superficial foreign Body

Cornea
**Bulbar conjunctiva**

Signs: foreign body on corneal surface or bulbar conjunctiva. If the foreign body is not visible, evert the eyelids to expose a possible subtarsal foreign body. Management: topical antibiotics after removal of the foreign body.

**Corneal abrasion**

Corneal epithelium is scraped and lost after eye trauma. Symptoms: sore, watery eye with blurred vision. Signs: red and watery eye. Fluorescein staining in area where corneal epithelium is lost. Management: topical antibiotics and eye pad for symptomatic relief.
Eye globe perforation

Scleral rupture

Corneal rupture
This results from severe blunt trauma and perforating ocular trauma. Signs: soft eye, protruding iris, irregular pupil. The perforated eye is prone to infection (endophthalmitis). Late complications include sympathetic ophthalmia (inflammation of the uvea of the normal fellow eye that occurs late after perforating injury)
Management: Surgical primary repair.
Hyphaema

Mild

Severe

Blood in the anterior chamber following blunt trauma to the eye.
Symptoms: red eye and severe loss of vision following trauma.
Signs: visible blood in anterior chamber and cornea may also be stained. Eye may be very sore if intraocular pressure is raised. Haematocornea causes cloudy vision.
Management: Bed rest And topical atropine to reduce the risk of rebleeding. Urgent assessment by ophthalmologist is required, as treatment of raised intraocular pressure or anterior chamber irrigation may be required.
Iridodialysis

A dehiscence of the iris from the ciliary body at its root.
Symptoms: This may be asymptomatic, or it may cause monocular diplopia and glare.
Signs: misshapen pupil.
Management: surgical iridoplasty may be required
Cataract

Traumatic cataract may arise from direct penetrating injury to the lens. Concussion may cause an imprinting of iris pigment onto the anterior lens capsule and a rosette-shaped cortical opacity. Management: cataract extraction and intraocular lens implantation
**Lens subluxation/dislocation**

Lens subluxation

Lens dislocated into the anterior chamber

*Lens dislocated out from the globe*
Direct trauma to the eye may result in lens subluxation or total dislocation. Victims may experience reduced vision, monocular diplopia and intraocular hypertension.
Management: lens removal with (usually) intraocular lens implantation.

**Intraocular foreign body (IOFB)**

Anterior chamber

Lens
An IOFB may lodge in any of the ocular structures it passes through, so may be located anywhere from the anterior chamber, lens to the retina and choroid. Foreign bodies are prone to result in infection (endophthalmitis). Management: immediate referral to ophthalmologist for removal of foreign body.

**Siderosis**

Retinal toxicity can be caused by an iron IOFB remaining in the eye for a long time. Symptoms: reduced vision Signs: dilated pupil, rust-brown or yellow lens opacity and abolised electro-retinogram (ERG). Management: late IOFB removal may not help visual recovery.
PAINFUL RED EYE

Chalazion
Inflammation of the meibomian glands causes lumps in the eyelids. Signs: eyelid swelling, redness and pain. Management: self-limited, topical antibiotics and surgical removal if necessary.

**Ophthalmic zoster (shingles)**

A painful condition caused by Herpes zoster infection. Signs: when the 1\textsuperscript{st} division (ophthalmic nerve) of the 5\textsuperscript{th} (trigeminal) cranial nerve is affected, extremely painful, blister-like lesions appear on the face. Sometimes, the cornea, uvea can get inflammed. Management: anti-viral drugs and analgesics.
Dacryocystitis

Infection of the lacrimal sac – usually secondary to obstruction of the lacrimal duct.
Signs: a tender, red, tense swelling at the medial canthus. May be associated with preseptal cellulitis.
Management: initial warm compresses and oral antibiotics. Sometimes, draining and tear sac removal may be necessary.
Orbital cellulitis
This is a life-threatening infection of the soft tissues behind the orbital septum. It is more common in children. Symptoms: fever, pain and visual impairment. Signs: unilateral, tender, warm and red periorbital lid oedema, proptosis, painful ophthalmoplegia and optic nerve dysfunction. CT scan shows thickened periocular tissues. Management: admission and intravenous antibiotic therapy.
Rhabdomyosarcoma

Highly malignant orbital tumor of striated muscles in children
Symptoms: unilateral eye pain.
Signs: reduced vision. Extremely progressive exophthalmos or proptosis (bulging or protrusion of the eye ball), red eye.
Management: referral to oncologists for exenteration, radiotherapy and chemotherapy.

Conjunctivitis

Inflammation of the conjunctiva (a mucous membrane that covers white of the eye and inner surface of the eyelids)

Bacterial conjunctivitis
Symptoms: Red sticky eyes, usually bilaterally.
Signs: red eyes with purulent discharge. No corneal or anterior chamber involvement. Systemically well.
Management: regular hygiene to minimise secretion buildup, topical antibiotics for 5 days.

**Viral conjunctivitis**
Contact history with recent eye or upper respiratory tract infection symptoms (especially children). Highly contagious.
Symptoms: burning sensation and watery discharge (different from purulent exudate in bacterial infections). Classically begins in one eye with rapid spread to the other, often pre-auricular lymphadenopathy.
Signs: eye red and watery. Swollen conjunctiva particularly in lids.
Management: will resolve on own and treatment aimed at comfort. Cool compresses, regular lubricants (without preservative). Antibiotic drops if indicated. Resolution may take weeks.

**Allergic conjunctivitis**
Symptoms: eyes itch (++) and are red and sore. 
Signs: eyelid swelling and papillae (tiny elevation on the palpebral conjunctiva). History of atopy e.g. asthma, eczema. 
Management: remove allergens where possible, topical anti-histamines, cool compresses.

**Episcleritis**

**Sectoral episcleritis**
Diffuse episcleritis


Scleritis
This is inflammation of the sclera. In the most severe form scleral necrosis can occur.
Symptoms: Eye pain which radiates to head and wakes patient at night.
Signs: The eye is red and may have visible sclera nodules or a necrotic patch. The sclera may be discolored and is tender to palpation. There is often an associated history of rheumatoid arthritis, vascular or connective tissue disease.
Management: Urgent (same day) referral to an ophthalmologist. Topical and/or systemic corticotherapy may be required.

**Keratitis**

**Viral keratitis**
Bacterial keratitis

Fungal keratitis
Parasitic keratitis

Corneal inflammation from various agents such as virus, bacteria, fungi and parasite (acanthamoeba).
Symptoms: A sore, red eye, often in contact lens wearer or following trauma.
Signs: White area on cornea, may be peripheral or central.
Management: Urgent (same day) referral to ophthalmologist for corneal scrape and intensive topical antibiotic/ antiviral/ antifungal therapy. Keratoplasty (corneal graft) may be required especially when the cornea is perforated.
Uveitis
Inflammation of any part of the uveal tract (iris, ciliary body and choroid). Symptoms: photophobia, eye red and sore, vision may or may not be affected. Signs: red eye with ciliary injection around iris, anterior chamber appears cloudy from cells and flare. Management: urgent (same day) referral to ophthalmologist for mydriasis, intensive steroid therapy and aetiological workup.

**Acute angle-closure glaucoma**
A sudden increase in intraocular pressure occurs owing to a closed anterior chamber angle which prevents aqueous drainage. Symptoms: Painful eye with systemic symptoms including headache, nausea and vomiting. Signs: More common in Asian races. The eye is red, very tender and feels hard on palpation; the cornea usually has hazy appearance. The anterior chamber is shallow with irregular semi-dilated pupil. Management: urgent (same day) referral to ophthalmologist. Topical pilocarpine, Aqueous inhibitors and beta blockers may help to lower the intraocular pressure. Laser iridotomy or trabeculectomy is indicated according to intraocular pressure level and whether the angle is open. Additional cataract extraction may help to open the angle and normalize the pressure.

**Endophthalmitis**
Most commonly seen after trauma or intraocular surgery. Symptoms: painful eye with loss of vision. Signs: lid swelling, discharge, red eye, hypopyon, reduced vision. Management: urgent referral to ophthalmologist for vitreous sampling, intravitreal antibiotics and vitrectomy.
SUDDEN PAINLESS LOSS OF VISION

Vitreous haemorrhage

Bleeding in the vitreous cavity seen in individuals with diabetes mellitus, cardio-vascular diseases and retinal detachment.

Symptoms: Sudden loss of vision often with floaters.
Signs: Reduced or absent red reflex. Limited or no fundal view.
Management: Refer to ophthalmologist for ultrasound scan to ensure that there is no underlying retinal detachment. A vitrectomy may be required for non-clearing haemorrhage.
Retinal tear/detachment occurs when there is separation of sensory retina from the retinal pigment epithelium. Most common aetiology is a predisposing retinal hole tear – often associated with myopia but may follow trauma.

Symptoms: Painless loss of vision. The patient may have encountered a recent history of increased number of visual floaters and/or visual flashes. There may be a “dark shadow” in the vision of the affected eye.

Signs: Grey area of raised retina at site of detachment. The vision will be reduced if macula becomes detached.

Management: urgent (same day) referral to ophthalmologist for surgical repair (cryotherapy with gas tamponade and/or scleral buckle).
Central retinal artery occlusion

Blocked blood flow in the central retinal artery, which often occurs in one eye.
Symptoms: Sudden and painless loss of vision.
Signs: The visual acuity is very poor, at best perception of light or hand movements, together with a Relative Afferent Pupillary Defect (RAPD).
Fundus examination: Pale retina (abnormal and asymmetrical red reflex), cherry-red spot at macula due to cilioretinal sparing. Delayed arterial filling on fluorescein angiogram.
Investigation: urgent (same day) ESR and CRP to exclude giant cell arteritis.
Management: Urgent (same day) referral to ophthalmologist to see whether any immediate treatment is possible. Intensive intraocular pressure lowering (AC inhibitors and paracenthesis) may help in some cases. A work-up for causes of Transient Ischaemic Attacks will need to be arranged.

**Central retinal vein occlusion**

Blocked blood flow through the central retinal vein.
Symptoms: Sudden and painless loss of vision.
Signs: Dilated tortuous veins, cotton wool spots, optic disc swelling, retinal haemorrhage visible in all four quadrants which may obscure much of fundus
detail. Predisposing factors include increasing age, hypertension and diabetes, as well as raised intraocular pressure.
Investigation and Management: Screen for diabetes and hypertension, exclude glaucoma. Routine referral for an ophthalmological opinion. Fluorescein angiography is often performed to investigate how ischaemic the fundus is, and laser can be indicated to prevent neovascular glaucoma and recurrent vitreous haemorrhage.

Papillitis
Acute inflammation of optic nerve is associated with moderate to severe vision loss. Long lasting papillitis leads to optic atrophy.
Symptoms: sudden reduced vision, discomfort upon eye movement.
Signs: central visual field defect, optic disc swelling, Relative Afferent Pupillary Defect (RAPD).
Management: exclude multiple sclerosis, infection of meninges, orbital tissues or paranasal sinuses. Intensive systemic corticotherapy may help.

**Proptosis**

Acute or chronic expansion of globe contents which may be unilateral or bilateral
Signs: may have corneal exposure, displacement of globe, vision may or may not be affected, eye movements may be affected, RAPD if optic nerve involved
Management: imaging to define cause of propotosis. Investigations as appropriate depending on which orbital structures are involved which may include thyroid function tests and orbital biopsy

**VII nerve palsy**

Main problem for eye is failure of eyeid closure so corneal exposure. May be idiopathic (Bell’s palsy) or caused by trauma, tumour, infection, inflammation

Signs: Vary in severity but failure to close eyelid is the key sign, may be other signs of VII th nerve palsy

Management: ensure eye closure and lubricate. May recover. If not may require procedures to help with this eg tarsorrhaphy, weights on upper lid,