

## Acute angle closure glaucoma

- Also called acute glaucoma or narrow-angle glaucoma
- Obstructed **anterior chamber** angle → an impairment of aqueous outflow → **rise in IOP**

### Predisposing factors

- Hypermetropia (farsightedness)
- Pupillary dilatation

Myopia is a Rf for:

- Cataract
- Retinal detachment
- Open angle glaucoma

### Presentation

- **Red**, severely **painful** eye with a **semi-dilated non-reacting pupil**
  - **Headaches** and **decreased visual acuity** are common
  - Symptoms **worsen with mydriasis** (e.g. watching TV in a dark room, applying topical mydriatics)
  - **Colored haloes** around lights may be seen by patients
  - Palpation of the globe will reveal it to be **hard**
  - **Corneal edema** results in dull or **hazy cornea**
  - Systemic upset may be seen, such as **nausea** and **vomiting** and even abdominal pain
- *The acute attack is usually unilateral; however, long-term management will be to both eyes*
- *ICP can lead to optic disc papilledema*

### Investigation

- **Ocular tonometry** → **IOP >30** mmHg (normal IOP = 15-20)

### Management

#### Medical

- Initial medical treatment typically involves all topical glaucoma medications that are not contra-indicated in the patient, together with intravenous acetazolamide
- Topical agents include
  - **Beta-blockers** - e.g. **timolol**, cautioned in asthma
  - **Steroids** - prednisolone 15 every 15 minutes for an hour, then hourly
  - **Pilocarpine 1-2%** → a miotic drug to constrict the pupil and open the angle
  - **Acetazolamide** is given intravenously (500 mg over 10 minutes) and a further 250 mg slow-release tablet after one hour
  - Offer **systemic analgesia ± antiemetics**
- This should tide the patient over until they are able to be seen by a duty ophthalmologist who will assess the situation at short intervals until the acute attack is broken
- These treatments may be repeated depending on the IOP response and a combination of these medications will be given to the patient on discharge
- The patient will remain under close observation (e.g. daily clinic reviews or as an inpatient). Subsequent treatment is aimed at specific mechanism of closure

#### Surgical

- **Peripheral iridotomy (PI)**
  - This refers to (usually two) holes made in each iris with a laser
  - This is to provide a free-flow transit passage for the aqueous
  - Both eyes are treated, as the fellow eye will be predisposed to an AAC attack too
  - This procedure can usually be carried out within a week of the acute attack, once corneal edema has cleared enough to allow a good view of the iris
- **Surgical iridectomy**
  - This is carried out where PI is not possible. It is a less favored option, as it is more invasive and therefore more prone to complications

## Anterior uveitis

- Also referred to as “**iritis**” or “**iridocyclitis**”. It is one of the important differentials of a red eye

### Features

#### Acute anterior uveitis

- **Progressive** (over a few hours/days) **unilateral, painful red eye**
- **Reduced visual acuity**
- **Photophobia**
- Pupil → **abnormal shape/size**
  - Small pupil, initially from iris spasm
  - Later it may be irregular or dilate irregularly due to adhesions between lens and iris
- **Excess tear production**
- Characteristic sign → **cells in the aqueous humour** seen on **slit-lamp**
  - Aqueous humour is **cloudy**, giving the appearance of a '**flare**'. This appears rather like a shaft of light shining through a darkened, smoky room
  - Anterior chamber flare is due to inflamed vessels **leaking protein**. Due to the cloudiness, as the slit-lamp beam of light is shone through, the beam disperses hence the term flare



#### Chronic anterior uveitis

- Presents as **recurrent** episodes, with **less acute** symptoms
- Patients may find that one symptom predominates (this tends to be **blurred vision**)
- Most common cause of chronic anterior uveitis → **Sarcoidosis**

#### Associated conditions

- Ankylosing spondylitis
- Reactive arthritis
- IBD

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| <ul style="list-style-type: none"><li>• RA → Sclera</li><li>• AS → Uveitis</li></ul> |
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#### Management

- **Prednisolone eye drops** → to reduce inflammation
  - **Cyclopentolate** → to prevent adhesions between lens and iris by keep pupil dilated
- *Intermediate uveitis = pars planitis = viritis*
- *Posterior uveitis = chorioretinitis*
- *Most common form of uveitis → Anterior uveitis*

## Central retinal vein occlusion (CRVO)

### Causes

- Glaucoma
- Hypertension
- Polycythemia

- CRAO → No blood → Pale sclera
- CRVO → Blood obstructed → Hemorrhage

### Presentation

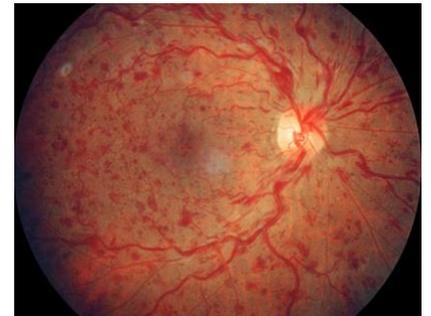
- Similar to those with central retinal artery occlusion (CRAO)
- **Unilateral sudden loss of vision**, may occur overnight
- NO pain, redness, or abnormality in pupillary dilation

#### Hypertensive retinopathy

- Asymptomatic, sudden, bilateral loss of vision

### Diagnosis

- **Retinal hemorrhages** → the main way of distinguishing venous obstruction from arterial obstruction
  - *You cannot have a hemorrhage in the retina if you don't have blood getting into the eye*
- Fundoscopy
  - Disk swelling, venous dilation, **tortuosity**, and retinal hemorrhages (**flame-shaped hemorrhages**)
  - Stormy sunset or tomato splash appearance



### Treatment

- Immediate referral to an ophthalmologist and/or intra-vitreous steroids

## Central retinal artery occlusion (CRAO)

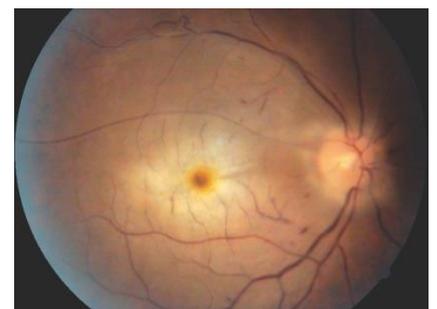
- Occlusion before it branches out as it emerges from the optic nerve, resulting in almost complete hypoxia of the inner retina

### Presentation

- **Unilateral, sudden painless** visual loss
- In 94% of cases, **vision is reduced to counting fingers** (ophthalmic artery may also be affected)
- There may be a history of **amaurosis fugax** (amaurosis fugax precedes loss of vision in up to 10% of patients)

### Examination

- An **afferent pupil defect** appears within seconds and may precede retinal changes by 1 hour
- Ophthalmoscopy
  - **White or pale** retina
  - **Cherry red spot** at the macula, *supplied by choroid vessels*
  - **Attenuation of the vessels**, *as blood backed up in retina*



What is an afferent pupillary defect (absent direct response)?

- *When the pupil won't respond to light, but constricts to a beam in the other eye (consensual response). Constriction to accommodation still occurs*

### Investigations

- Diagnosis is usually **clinical** and investigations are aimed at ruling out underlying diseases
- The most important cause to rule out is **giant cell arteritis (10%)** → *visual loss is reversible*

### Management

- If the patient presents within 90-100 minutes of onset → **firm ocular massage**. The idea behind this is to try to dislodge the obstruction
- This only works very occasionally and **immediate referral** is mandatory

**Branch retinal artery occlusion (BRAO)** → wedge-shaped pallor sparing the rest of the optic disc

## Optic neuritis

- Inflammation of the optic nerve

### Presentation

- Classically there is a triad of clinical features which are
  - **Reduced vision** (of varying severity) → Usually unilateral. Progresses for less than 2 weeks and spontaneously improves within 3 weeks
  - **Eye pain** → Particularly on movement
  - **Impaired color vision** → Initially loss of red color vision
- One of the most common cause of optic neuritis is **multiple sclerosis** → Seen especially in Caucasian populations the stem would usually (but not always) include a female patient as multiple sclerosis is more prevalent in the female gender

### Examination

- **Swollen optic disc**
- Optic disc becomes **pale later** (4 to 6 weeks after onset)
- **Relative afferent pupillary defect (RAPD) (Marcus Gunn pupil)**
- **Central scotoma** may occur

### RAPD

- *When light is directed towards the unaffected eye, both pupils constrict*
- *When light is directed towards the affected eye, both pupils do NOT constrict (appear relatively dilated)*

RAPD = damage to the whole optic nerve = mononuclear field loss

If NO RAPD = ONLY a part of optic nerve is affected = Central scotoma

**Central scotoma** → A blind spot in the middle of one's vision

## DM-related retinopathy

**Background retinopathy (not proliferative)** → *[Painting as background]*

- Microaneurysms (**dots**)
- Hemorrhage (**blots**)
- Hard **exudates**

**Pre-proliferative retinopathy**

- Addition of **Cotton** wool spots

**Proliferative retinopathy**

- Addition of **new vessel** formation (neovascularization)
- More serious. Progresses rapidly to **blindness**. Neovascularization may lead to **vitreous hemorrhage**
- **Floater**s in vision
- **Laser photocoagulation** is needed

## Hypertensive retinopathy

- Most patients are asymptomatic

**Chronic hypertension**

- BP >140/90 mmHg
- Usually asymptomatic
- Fundoscopy
  - Bilateral attenuation of arterial vessels (**copper or silver wiring**)
  - **Arteriovenous nipping/nicking** (where arteries cross the veins)
  - Eventually, **hemorrhage** and **exudates**

**Malignant (accelerated) hypertension**

- BP >180/110
- May have headache and decreased vision
- Fundoscopy
  - Hard exudates, appear as (macular star), thin white streaks radiating around the macula
  - Disc swelling
  - Cotton wool spots
  - **Flame hemorrhage**, also found in diabetic retinopathy and CRVO
  - Arterial or venous occlusion

## Amaurosis fugax

- **Painless transient monocular visual loss** (i.e. loss of vision in one eye that is not permanent)
- It is indicative of retinal ischemia, usually associated with emboli or stenosis of the **ipsilateral carotid artery**
- **Resolves spontaneously** (15-30 minutes)

### Presentation

- Sudden, unilateral vision loss; "**black curtain coming down**"
- Duration: **5-15 minutes**; resolves within < 24 hours
- Associated with **stroke** or **transient ischemic attack (TIA)** and its risk factors (i.e. HTN, atherosclerosis)
- Has an association with **giant cell arteritis**

- Curtains = CRAO (Amaurosis Fugax) or Retinal detachment

## Retinal detachment

- Usually **spontaneous**, but it may result from **trauma**
- It occurs when the force that holds the retinal attachment fails which results in accumulation of fluid in the subretinal spaces
- The two most common predisposing factors are **extreme myopia** and **surgical extraction of cataracts**, **proliferative retinopathy from diabetes**, **CRVO**, and **age-related** macular degeneration

### Presentation

- The classic symptom is → **photopsia** (flashing lights)
- A common presentation is **unilateral blurry vision** without pain or redness
- The patient may complain of seeing "**floaters**" as well as **flashes** at the periphery of vision
- Sometimes it is described as a "**curtain coming down**," as the retina falls off the sclera behind it

### *Detachment presents with 5 'F's*

- *Floaters (tiny black dots)*
- *Flashes*
- *Field loss*
- *Fall in acuity*
- *Falling curtain*

### Diagnosis

- Direct ophthalmoscopy → **grey, opaque and wrinkled retina, ballooning forward**

### Treatment

- Patients should **lean their heads back** to promote the chance that the retina will fall back into place
- The retina can be mechanically reattached to the sclera **surgically**, by **laser photocoagulation**, **cryotherapy**, or by the **injection of expansile gas** into the vitreal cavity (gas will press the retina back into place)
- **Scleral buckling**, a "buckle," or belt, can be placed around the sclera to push the sclera forward so that it can come into contact with the retina

### *Causes of sudden painless loss of vision*

- *Retinal detachment*
- *Vitreous hemorrhage*
- *CRVO*
- *CRAO*
- *Giant cell arteritis*

## Conjunctivitis

<i>Bacterial conjunctivitis</i>	<i>Viral conjunctivitis</i>	<i>Allergic _ _ conjunctivitis</i>
<ul style="list-style-type: none"> <li>• Purulent discharge</li> <li>• Eyes may be 'stuck together' in the morning</li> </ul>	<ul style="list-style-type: none"> <li>• Serous discharge</li> <li>• Recent URTI</li> <li>• Preauricular lymph nodes</li> </ul>	<ul style="list-style-type: none"> <li>• Bilateral symptoms</li> <li>• Itch is prominent</li> <li>• May give a history of atopy</li> <li>• May be seasonal (due to pollen) or perennial (due to dust mite, washing powder or other allergens)</li> </ul>

### Management of bacterial conjunctivitis

- <7 days → cotton soaked in water to remove any sticky discharge
- >7 days → Topical antibiotics (**Chloramphenicol** drops)

### Management of viral conjunctivitis

- Mostly caused by adenovirus → **Reassure**
- Artificial tears might be used

## Acute dacryocystitis

- Acute inflammation of the lacrimal sac, often as a result of **infection**

### Presentation

- Symptoms and signs are over the region of the lacrimal sac (but may spread to the nose and face with teeth pain being experienced by some)
- Therefore, look just lateral and below the bridge of the nose for:
  - Excess tears (epiphora)
  - Pain
  - Swelling and erythema at the inner canthus of the eye

### Management

- **Immediate antibiotic therapy** may resolve the infection
  - Children → **Co-amoxiclav** or **Cefaclor**
  - Adults → **Co-amoxiclav** or **Cefalexin**

## Oculomotor nerve palsy

### Causes

- Diabetes
- PCA aneurysm → excluded by **MRI, CT angiography**
- Tumors, infarction, abscess or trauma

### Features

- Initial sign → **Fixed dilated pupil** which doesn't accommodate = O
- **Ptosis**
- Unopposed lateral rectus and SO → eye deviated **down and outward**

## Cataract

- **Clouding** of the lens, **Glare** at night, **Dazzle** at light
- May cause **gradual loss of vision** (frequent changes of glasses), **absent red reflex**
- Children may present with **squint**, loss of binocular function or a **white pupil**

### Risk factors

- Exposure to great amount of **UV light** (e.g. person from Australia who never wears glasses)
- Long term use of **corticosteroids** (e.g. an asthmatic patient on Oral steroids)
- **Smoking, DM**
- **High myopia**
- **Eye trauma**

### Management

- Lens extraction

## Herpes zoster ophthalmicus

- Reactivation of VZV in the area supplied by the **ophthalmic division** of the **trigeminal** nerve

### Features

- Vesicular **rash around the eye**, may involve the eye itself
- **Hutchinson's sign** → rash on the tip or side of the nose, indicates **nasociliary involvement** and is a strong factor for ocular involvement

### Management

- Oral antiviral
- Oral corticosteroids
- If ocular involvement → refer to a specialist

### Complications

- Ocular → conjunctivitis, keratitis, episcleritis, anterior uveitis
- Ptosis
- **Post-herpetic neuralgia**, *a chronic neuropathic pain that persists 3 months or more following an outbreak of shingles, pain continues even after the eruption has resolved*

### Keratitis

- *Inflammation of the cornea*
- *Herpes simplex keratitis → presents with a dendritic corneal ulcer*
- *Treated by topical acyclovir, steroid drops are contraindicated → flaring up and blindness*

## CMV Retinitis

- History of positive **HIV**, attends the clinic with visual deterioration
- **Pizza retina**
  - Hemorrhages → tomato sauce
  - Yellowish exudate → cheese

### Presentation

- Decreased visual acuity, **floaters**, and loss of visual fields on one side
- Fundoscopy → yellow-white cloudy retinal lesions. Lesions may appear at the periphery of the fundus, but they progress centrally
- On examination, multiple **cotton wool spots** can be seen
- Starts unilateral then bilateral

## Ocular manifestations of rheumatoid arthritis (RA)

- **Keratoconjunctivitis sicca** → *most common*
- **Episcleritis** → erythema + pain (less severe than scleritis)
- **Scleritis** → erythema + pain
- Iatrogenic **steroid-induced cataract**

- Ankylosing spondylitis → Iris
- RA → Sclera [RAS]

### Keratoconjunctivitis sicca

- **Dry, itchy, gritty** eye due to decreased lacrimation + **sandy feeling** under the eyes
  - Can be found in **RA** or **Sjogren's**
  - Schirmer's test → **<10mm**
  - Treated by **artificial tears (Hypromellose, sodium chloride, sodium hyaluronate)**
  - Topical ciclosporin can be used
- *Autoimmune diseases* → Scleritis/episcleritis
- *Seronegative arthropathies/Sarcoidosis/Syphilis/IBD* → Anterior uveitis (iritis)
- *Giant cell arteritis/MS* → Optic nerve affected

## Simple (primary) open angle glaucoma

### Risk factors

- **Old** (>40 years) + **black**
- Positive **family history**
- **Myopia**

### Features

- Majority is asymptomatic
  - *Initially* → **Peripheral visual loss** – nasal scotoma progressing to “tunnel vision”
  - Other features → decreased visual acuity, optic disc cupping
- *Myopia + Peripheral visual loss* → Open-angle glaucoma

## Retinitis pigmentosa

- Positive **family history**
- *Initially* → **night blindness**
- **Peripheral visual field loss**

## Subconjunctival hemorrhage

- Presents as a **bloodshot eye**
- Occurs due to a small bleed from one of the minor conjunctival vessels on the surface of the eye
- May be caused by **HTN, straining** (coughing or sneezing), **trauma** or **spontaneously** (with no apparent cause)

### Management

- Trauma → CT
- HTN → BP monitoring
- Recurrent, patient is on anticoagulation → Check INR
- If no apparent cause → Reassure

## Notes

- Colored halos → **Closed angle glaucoma**
- Glare at night → **Cataract**
- Flare → **Iritis**
- Floaters → **Anterior Uveitis, retinal detachment, proliferative DM retinopathy, CMV retinitis**
- Peripheral visual field loss → **Open angle glaucoma**
- Central scotoma → **Optic neuritis**
- Bilateral paracentral scotoma → **Pituitary tumor compressing optic chiasma**, may progress to arcuate, double arcuate scotomas and eventually tunnel vision
- Bitemporal hemianopia → **Pituitary tumor compressing optic chiasma**
- Homonymous hemianopia → **Optic tract lesions**
- A child with acute onset of swelling, redness, increase warmth and tenderness of the eyelid with fever → **Periorbital cellulitis**
- If it involves orbital signs such as gaze restriction, proptosis and pain on eye movements → **Orbital cellulitis**, an emergency that requires → **IV antibiotics**, if CT confirms abscess → **Drainage**
- **Hypermetropia = Farsightedness**
- **Myopia = Nearsightedness**
- Degenerative corneal disease [Kill The Blue Parrot]
  - **Keratoconus**, a cone-shaped cornea
  - **Terrien marginal degeneration**, bilateral peripheral thinning of the cornea
  - **Band keratopathy**, characterized by deposition of calcium
  - **Pellucid marginal degeneration**, bilateral peripheral thinning of the cornea
- Central retinal artery is a branch of the ophthalmic which arises from the internal carotid artery