Ophthalmology

Optic pathway

- Nasal fibres (temporal fields) decussate the the **optic chiasm**
- After the *lateral geniculate nucleus* the fibres spread as the **optic radiation**
  - lower fibres in **temporal lobe** - lesions give *upper quadrantanopia* (all homonymous)
  - upper fibres in **anterior parietal lobe** - lesions give *lower quadrantanopia*
  - distal fibres in **posterior parietal lobe** - lesions give *hemianopia with macular sparing*

Ametropia

- Refractive errors causing visual impairment
  - **Myopia** - ‘near-sighted’, high optic power, preretinal focus; requires *concave* lens
    - associated with prematurity, Marfan’s, Ehlers-Danlos, homocystinuria
  - **Hypermetropia** - ‘long-sighted’, low optic power, postretinal focus; requires *convex* lens
  - **Presbyopia** - loss of lens elasticity causing loss of accommodation, blurring

Cataracts

- Common **lens opacities** associated with *advanced age* and strong genetic basis
  - congenital cataracts associated with TORCH, chickenpox, EBV, galactosaemia
- Risks - female sex, DM, steroids, eye trauma, uveitis, smoking, alcohol
- Symptoms - *progressive painless visual loss*, difficulty reading / recognising faces
- Management - **surgery** (phacoemulsification - lens replacement)

Charles-Bonnet syndrome

- **Visual hallucinations** associated with *age-related macular degeneration* in the elderly
  - may be distressing, vivid, elaborate, stereotyped; patient retains at least partial insight
  - occur ‘in a state of quiet restfulness’ e.g. post-prandial, listening to radio
- Management - reassurance; try eye movement, distraction, ambient light, company
- Prognosis - majority self-resolve within 18 months

Glaucoma

- **Optic neuropathy** usually with *high IOP, optic disc cupping, progressive visual loss*
  - *high IOP* (> 21mmHg) may precede glaucoma - progress in 10% over 5 years
- **Open angle** - commonest; adult onset, often bilateral, *asymptomatic / peripheral visual loss*
  - risks - FH, HTN, DM, *myopia* (cf. closed angle - associated with hypermetropia)
  - grading - mild, moderate (*arcuate scotoma*), severe (subtotal optic cupping)
- **Closed angle** - latent, subacute, acute, chronic and absolute stages; commoner in women
  - symptoms - **eye pain**, blurred vision / visual loss, nausea, vomiting, *mid-dilation onset*
  - leads to *acutely red eye* (‘ciliary flush’ - periphery of cornea), unreactive mid-dilated pupil
• **Normal tension glaucoma** - may be associated with Raynaud's, migraine, hypotension

• Investigations - gonioscopy (angle), corneal thickness, tonometry (IOP), fundoscopy

• Management - reduce IOP by 30% - **latanoprost / timolol / acetazolamide (lifelong)**
  - in acute closed angle - **IV acetazolamide / mannitol; bilateral peripheral iridotomy**
  - if refractory - consider laser therapy / iridotomy

• Complications - **blindness**

### Macular degeneration (ARMD)

• **Macula** is 3mm temporal from optic disc, 5.5mm diameter; **fovea** within it, 1.5mm diameter
  - degeneration (drusen deposits) commonly occurs in aged > 50
  - generally **atrophic** ('dry') but in 10% **exudative** - neovascular changes, **detached retina**

• Risks - **smoking**, sedentary lifestyle, malnutrition, CVD

• Symptoms - scotoma, difficulty driving / recognising faces, straight line distortion, photopsia

• Investigations - **Amsler grid**, slit lamp, optical coherence tomography (OCT)
  - consider fluorescein angiography if suspected neovascularisation

• Management - optimise refraction, magnifiers / aids, support groups
  - in exudative - intraocular **anti-VEGFs** (ranibizumab), photocoagulation, PDT

### Optic neuritis

• Triad of unilateral **reduced vision / colour vision** (esp. red), **eye pain**; may be **RAPD**
  - **acute demyelinating** - caused by **MS**, includes symptoms of flashes, **Uhthoff's**, fatigue
  - ischaemic optic neuropathy - caused by **GCA, DM**
  - also caused by steroids, TB, syphilis, orbital cellulitis, vit. B12 deficiency, amiodarone

• Majority spontaneously improve within 3wks; lasting visual impairment only in **ADON**

### Periorbital cellulitis

• More commonly affects children

• Stages - I (preseptal), II (orbital), III (subperiosteal abscess), IV (orbital abscess), V (CST)

• Causes - **local infection** (esp. **sinusitis**), **orbital trauma, distal bacteraemia**

### Preseptal cellulitis

• More common, more benign, rarely progresses to orbital cellulitis; usually **Staph. aureus**

• Symptoms - tenderness, erythema, swelling, mild fever, **largely normal visual acuity**
  - may be tense oedema, no proptosis / pain / oscular dysmotility

• Management - **coamoxiclav** PO for 10 days with **daily review**

### Orbital cellulitis

• Uncommon, sight-threatening, potentially life-threatening; usually **Strep. pneumoniae, HiB**

• Symptoms (rapid onset) - erythema, swelling, **severe pain, blurred vision**, systemic illness
  - may be reduced periorbital sensation, proptosis, painful ophthalmoplegia, papilloedema
• Investigations - **CT sinuses**; FBC (leucocytosis), blood cultures (often negative)
• Management - **ceftriaxone** / flucloxacillin IV for 10 days
• Complications - **blindness**, raised IOP, abscess, meningitis, cavernous sinus thrombosis

### Retinitis pigmentosa

• **Hereditary progressive dystrophy of retinal photoreceptors / pigment epithelium**
• Symptoms (often in childhood) - night / progressive **peripheral vision loss** (tunnel vision)
  • associated with *Usher’s syndrome* (with congenital deafness), Friedreich’s ataxia, MD
• Management - regular visual checkups, sunglasses; consider vit. A, acetazolamide
• Complications - blindness, cataracts, glaucoma

### Retinal detachment

• Separation of inner retina from outer pigment epithelium; may be macular on/off
  • **rhegmatogenous** - commonest; retinal break from vitreous traction
  • **non-rhegmatogenous** - *tractional* (in DM) and *exudative* (hypertensive RPE damage)
• Risks - myopia, FH, eye surgery, retinal disease, trauma, Marfan’s, uveitis
• Symptoms - **photopsia** on eye movement, floaters, ‘curtain’ visual field defect
  • **RAPD** indicates *extensive detachment* and requires urgent surgery
• Management - laser therapy / cryotherapy if retinal break only
  • **scleral buckle** (silicone sponge), vitrectomy, pneumatic retinopexy

### Retinal vascular occlusion

• Causes - **atherosclerosis**, *embolism* (carotid / cardiac), GCA, vasculitis, COCP, myeloma
• Symptoms - acute unilateral **painless visual loss** (counting 2 fingers), **RAPD**

#### Retinal artery occlusion

• The **choroid** (ciliary arteries) supplies outer *retinal pigment epithelium* (RPE) inc. **macula**
• The **central retinal artery** (superior and inferior branches) supplies the inner *neural retina*
• On fundoscopy - pale retina, attenuated vessels, ‘boxcars’, **cherry-red macula**
  • **Central occlusion** - usually affects aged > 60, cause of blindness in elderly
    • majority result in permanent significant visual loss
  • **Branch occlusion** - less widespread visual loss, focal retinal pallor
    • better prognosis for long-term vision

#### Retinal vein occlusion

• Much more common than retinal artery occlusion
• May be **ischaemic** (25%; risk of glaucoma, blindness) or **non-ischaemic** (75%)
• On fundoscopy - widespread dot-blot / flame **haemorrhages**, optic disc oedema
• Management - consider photocoagulation if ischaemic neovascularisation, **anti-VEGF**
  • most have persisting reduced central vision
Scleritis

- **Episcleritis** - common, usually benign, occurs in young adults, self-limiting within 2wks
  - symptoms - acute mild pain, grittiness, *red eye* (extra-corneal), *normal vision*, recurs
  - associations - IBD, RA, vasculitis, SLE, herpesvirus, gout, thyrotoxicosis
  - treat conservatively - complications typically arise from over-treatment (e.g. steroids)

- **Scleritis** - rare, severe full-thickness inflammation, usually anterior, occurs in middle-age
  - symptoms - subacute severe pain radiating to forehead / jaw, wakes at night, red eye
  - watering, photophobia, gradual decrease in vision
  - associations - RA, vasculitis, SLE, AS, Reiter’s, gout, Churg-Strauss, TB, syphilis
  - management - PO NSAIDs / prednisolone, consider methotrexate
  - complications - glaucoma, cataracts, uveitis, detached retina

Uveitis

- **Anterior uveitis** (iritis) - associated with **HLA-B27** (AS, Reiter’s, psoriasis, IBD, sarcoid)
  - symptoms - progressive **painful red eye**, blurred vision, **headache**, photophobia
  - signs - **distorted pupil**, **consensual photophobia**, circumlimbal injection, anterior chamber inflammatory cells / flare (*hazy*), synechiae (iridocorneal adhesions), keratic precipitates (white spots), retinal lesions

- **Posterior retinitis** (chorioretinitis)
  - causes - TORCH, chickenpox, EBV, TB, syphilis, Lyme disease, Whipple’s disease
  - symptoms - subacute **painless reduced visual acuity**, **floaters**
  - largely self-limiting

- Management - **prednisolone 1% eye drops**, tapering dose
- Complications - blindness (cytoid macular oedema), cataract, glaucoma, detached retina