Eye Emergencies

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Auckland Eye

No financial disclosures

Ophthalmic Emergencies

- Patients with ophthalmic symptoms and signs will often present to the GP and these may indicate normal visual changes or pathology from minor to major.
- A small number of patients will present with conditions where your immediate management may influence the final outcome.
- Recognition of these and appropriate referral may save vision or even life.

Outline

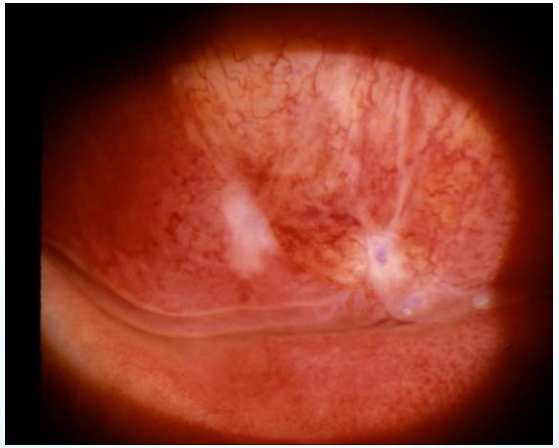
- Eye trauma
  - PEI, Blunt Injury, Chemical injury
- Acute loss of vision
  - Keratitis, Angle closure glaucoma, Retinal detachment, Vascular occlusion, Endophthalmitis
- Warning eye signs of life threatening pathology
  - Painful horner's
  - Painful third nerve palsy

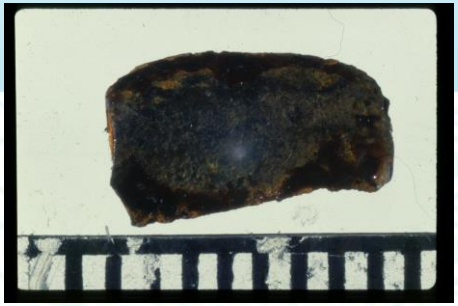
Trauma: Penetrating Eye Injury

- Compromised integrity of cornea or sclera
- Not always obvious so always consider it
- Beware the lid laceration with concealed PEI
- Delay in treatment can lead to worse outcome:
  - Loss of or damage to intra-ocular contents
  - Severe infection: Endophthalmitis

    - ALSO

  - Sympathetic ophthalmia if treatment delayed
  - Intra-ocular toxicity if IOFB not recognised





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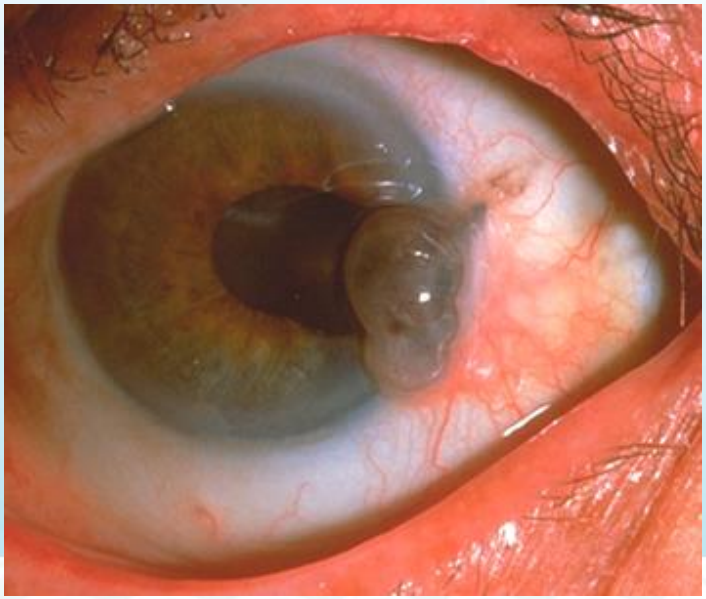
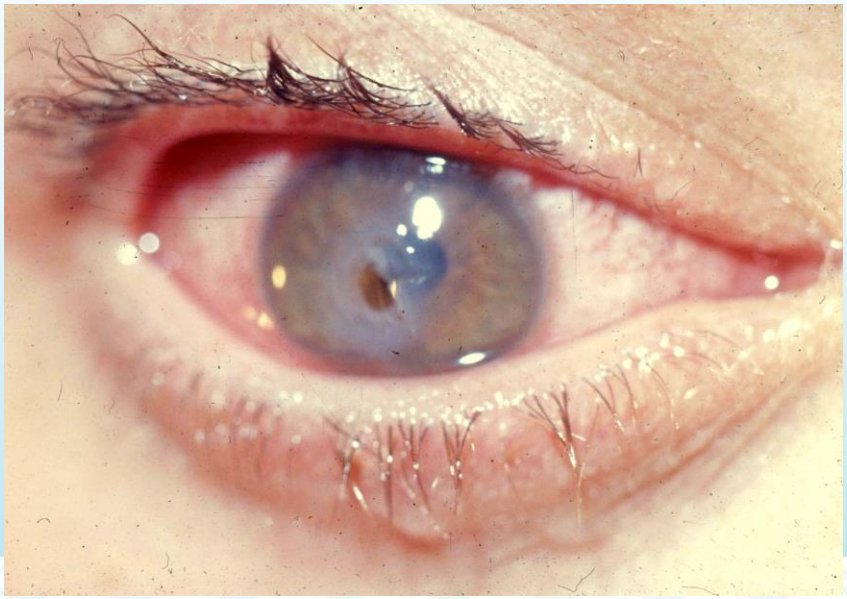
PEI Slit lamp signs

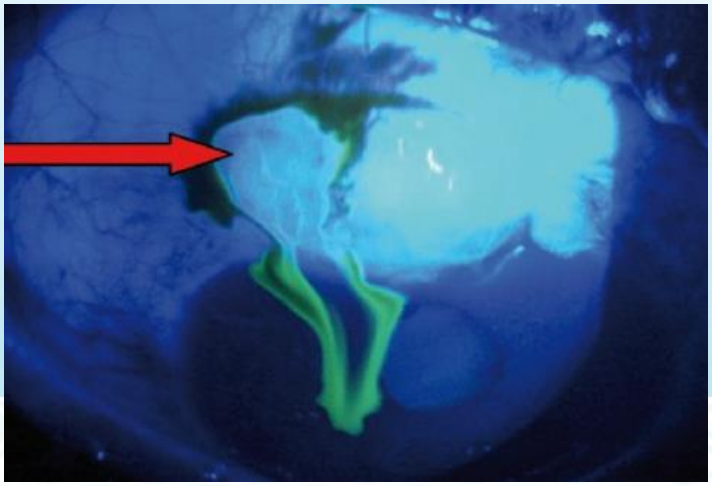
- Shallow anterior chamber (cf uninjured eye)
- Irregular or displaced pupil
- Prolapsed uveal tissue





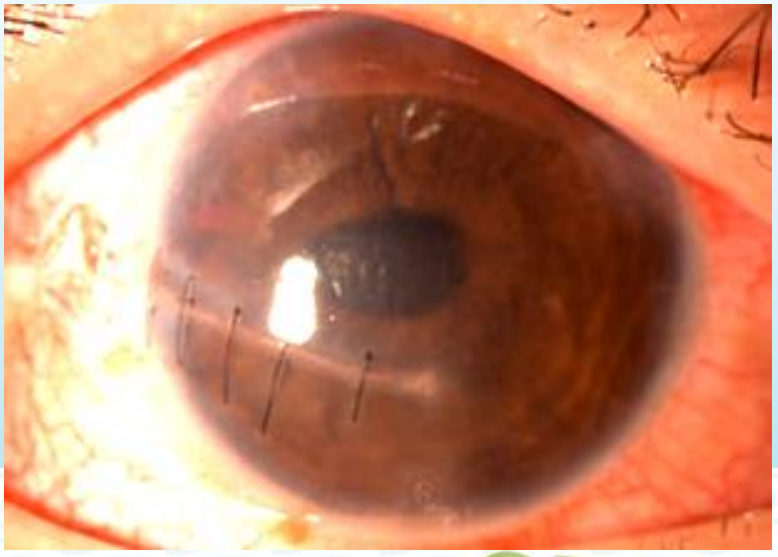
PEI: Seidel Test

- Undiluted fluorescein
- When diluted by aqueous fluoresces brightly
- Stream of aqueous revealed
- Don’t press on eye
- Don’t bother doing if PEI obvious



PEI Management:

- Eye shield
- Tonometry contraindicated
- Leave embedded foreign object in place
- Analgesia and antiemetics: prevent vomiting / squeezing
- Update tetanus immunization
- Immediate referral to an ophthalmologist
- NBM usually as surgery likely



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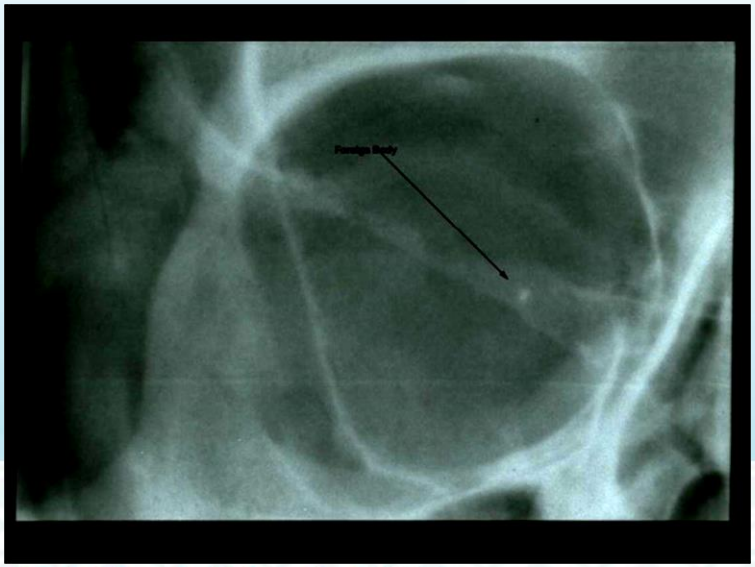
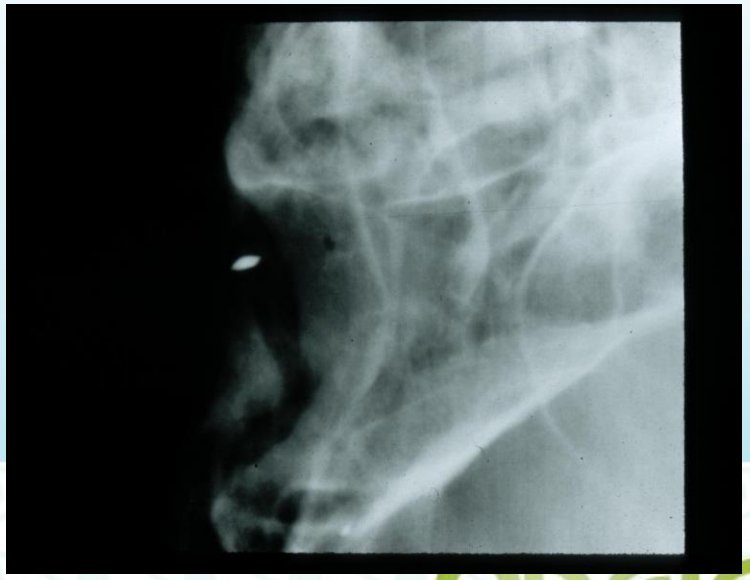
Intra ocular foreign body??

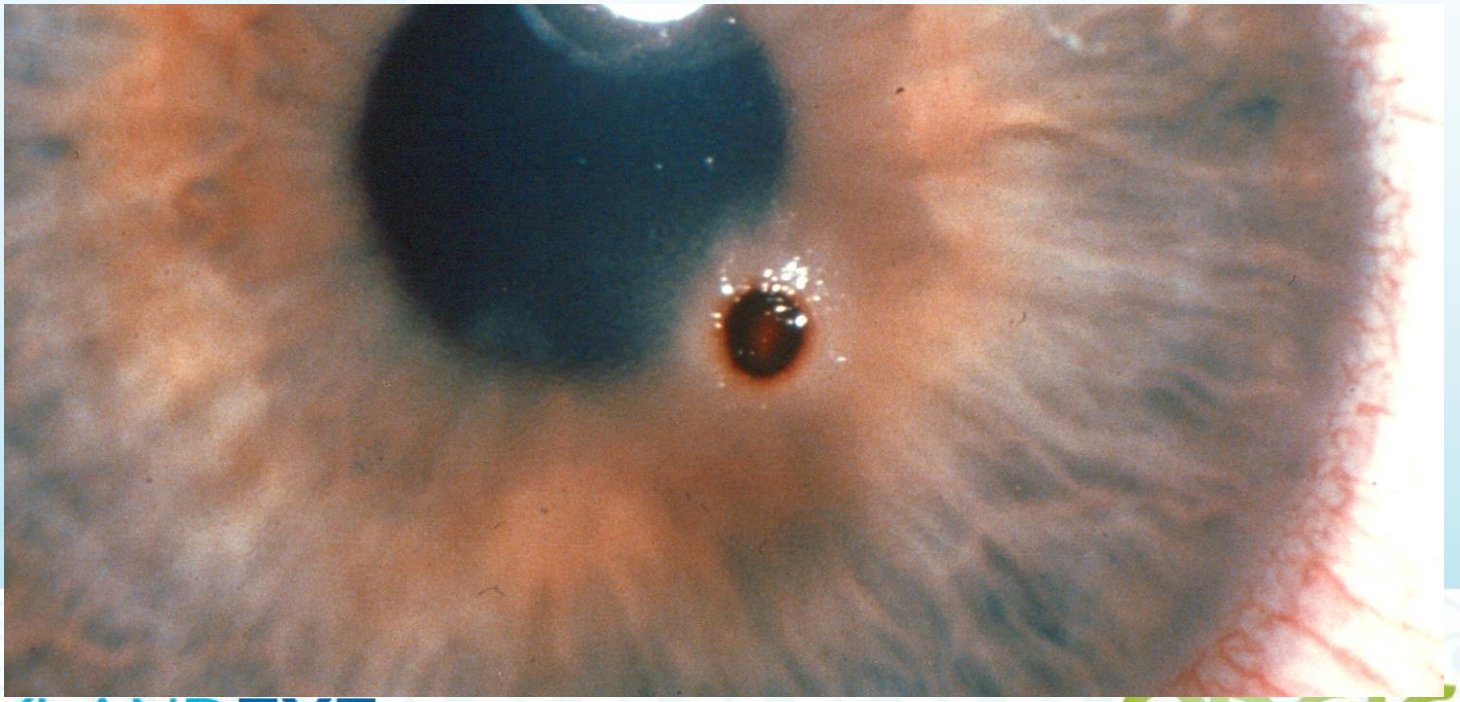
- High velocity: hammer on steel, nail gun
- High level of suspicion
- Look carefully for entry wound: may be on lids
- X-ray orbits: upgaze, downgaze, lateral





Rust ring: How much can you leave?

- Leave a day or 2 to soften
- Remove with needle
- OK to leave some rust so long as eye is not inflamed



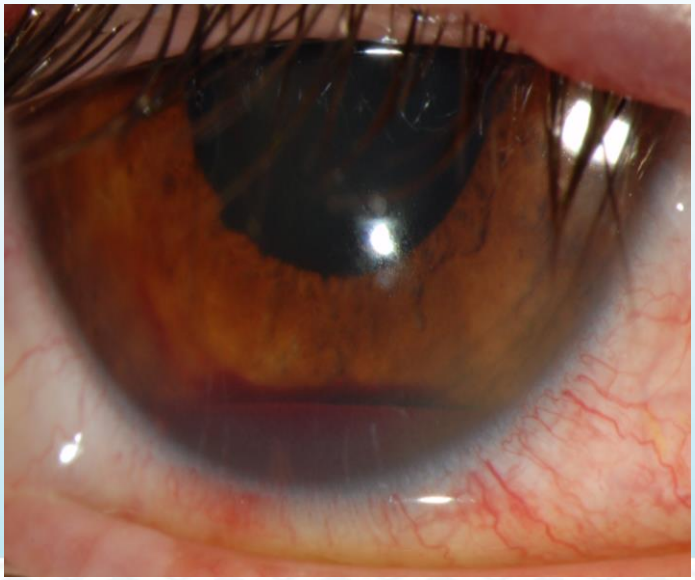
Any questions?

Trauma: Blunt Injury

- Assault, sporting, airbags, bungees
- Consider other injury likely:
  - globe rupture
  - blow out fracture
- Refer for S/L exam urgently
- Even without PEI the consequences for vision can be severe

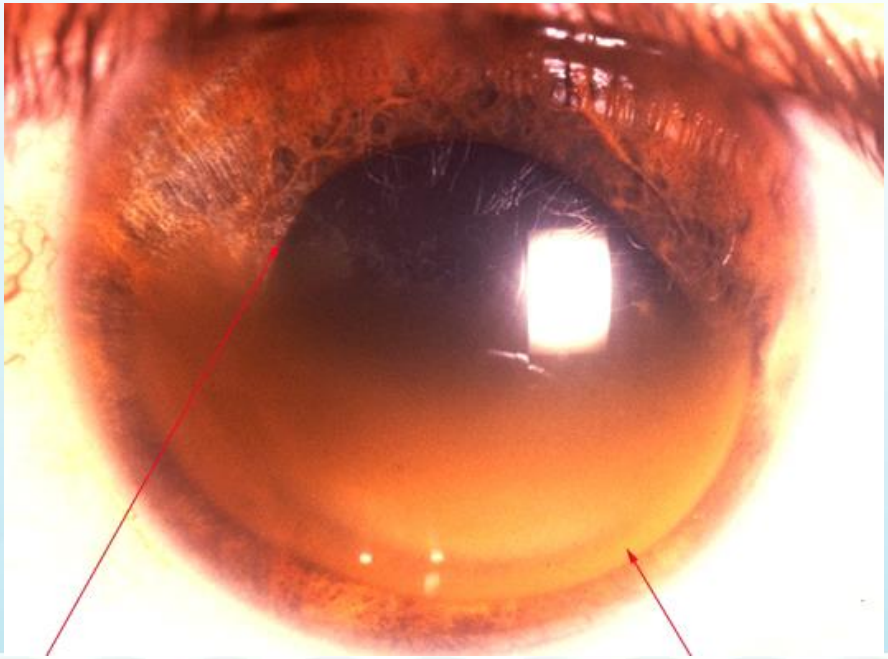
Trauma: Blunt Injury

- Hyphaema:
  - Bleeding from torn iris or angle vessels
  - Secondary bleed often more severe
  - Bed rest essential
  - IOP control



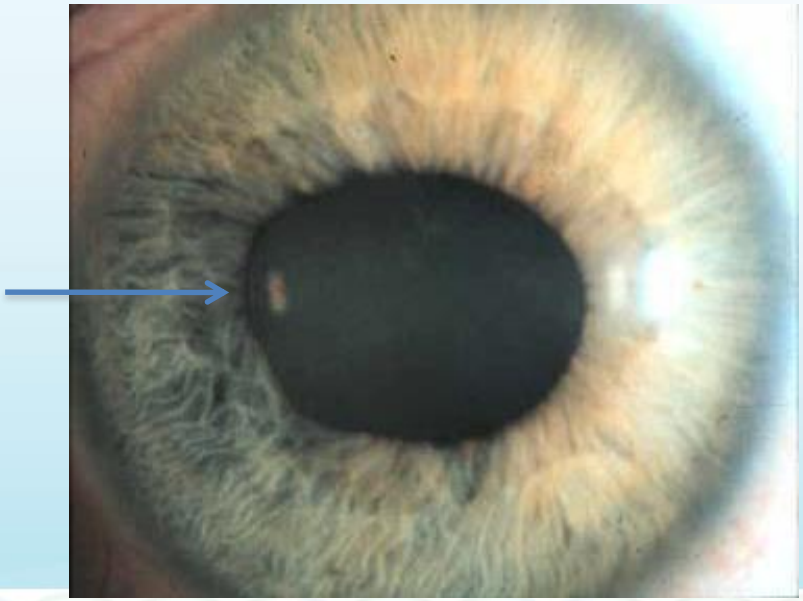
Trauma: Blunt Injury

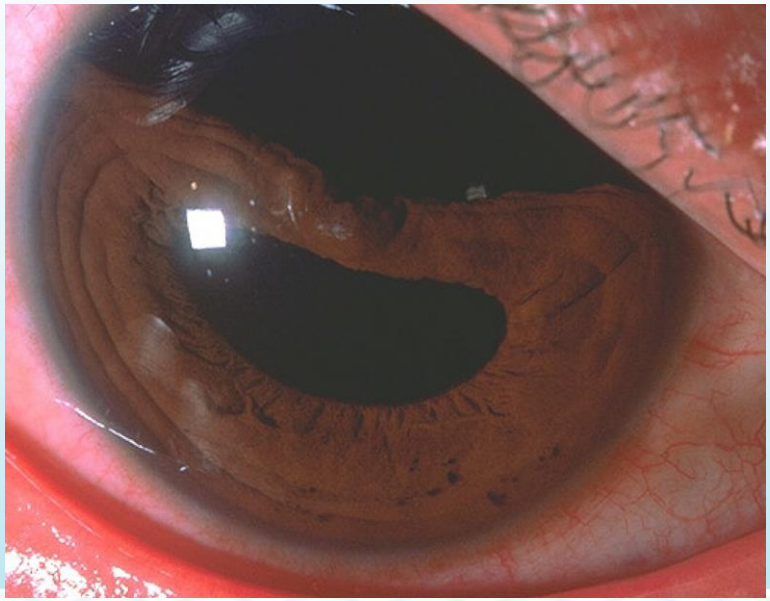
- Hyphaema:
  - Corneal bloodstaining
  - Risk if high pressure and repeat bleeding
  - May take months to clear



Trauma: Blunt Injury

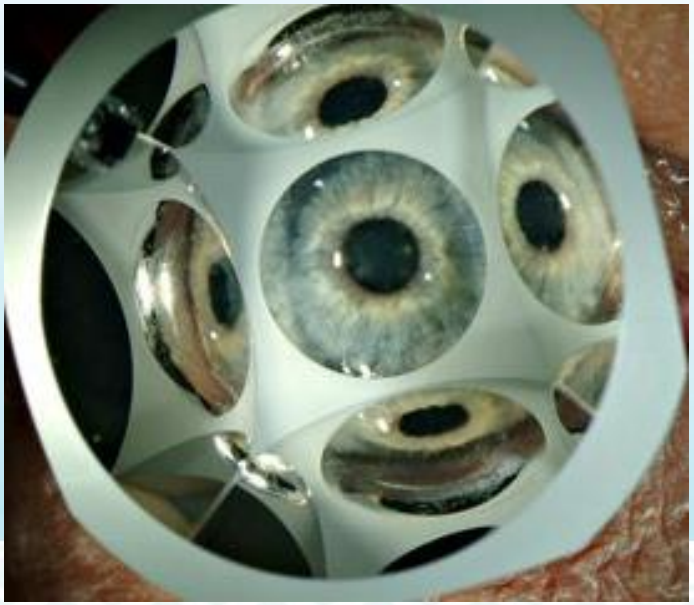
- Iris injury:
  - Compressive force can tear fragile iris tissue
  - Most common : sphincter splits
  - More severe: iridodialysis





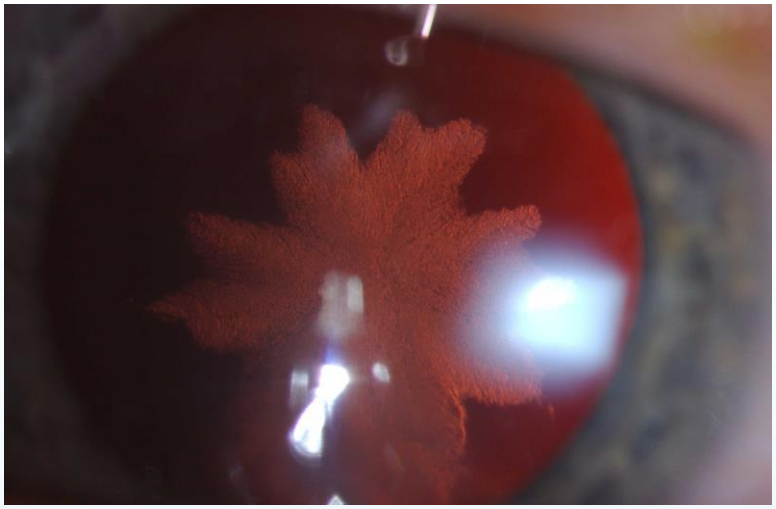
Trauma: Blunt Injury

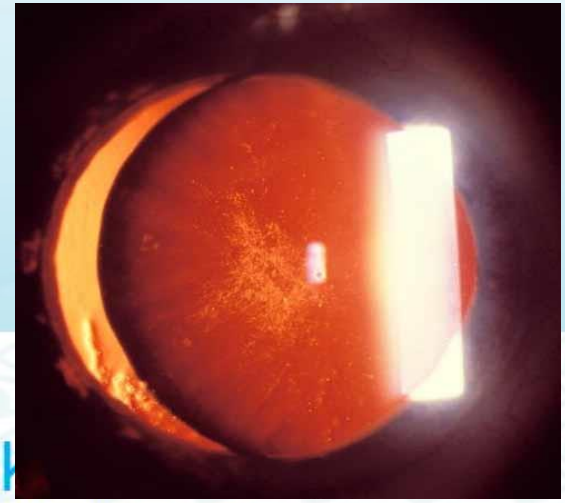
- Angle recession:
  - Root of iris and trabecular meshwork torn off sclera
  - Gonioscopy on all hyphaemas when settled
  - Risk of late glaucoma if recession present as trabecular meshwork damaged
  - All significant blunt injury needs referral

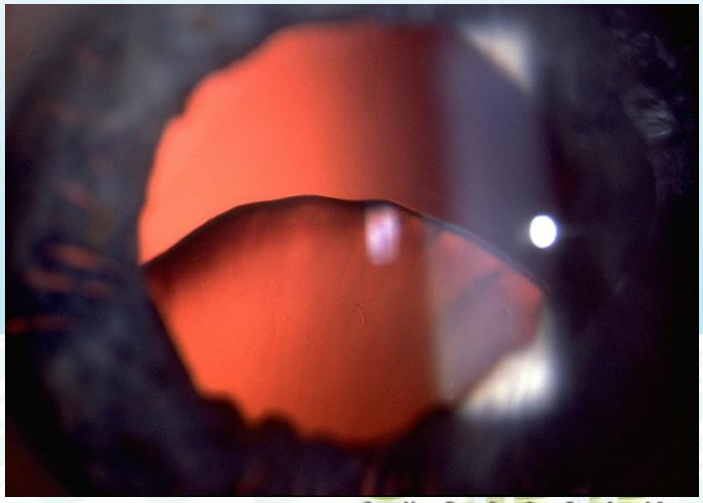


Trauma: Blunt Injury

- Lens dislocation and cataract
  - Often marked change in vision
  - Sometimes not obvious
  - Subtle A/C deepening
  - Iridodnesis
  - Important to identify history of trauma in any patient with cataract as zonular damage likely

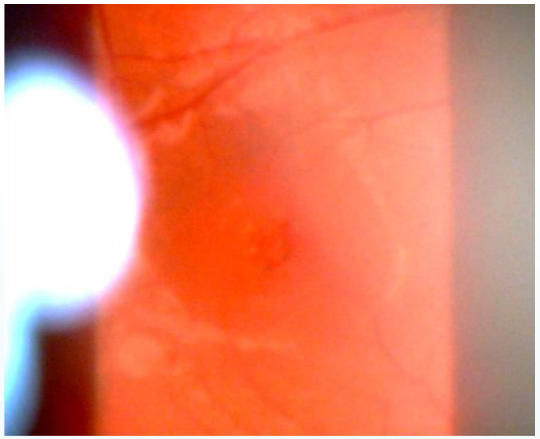


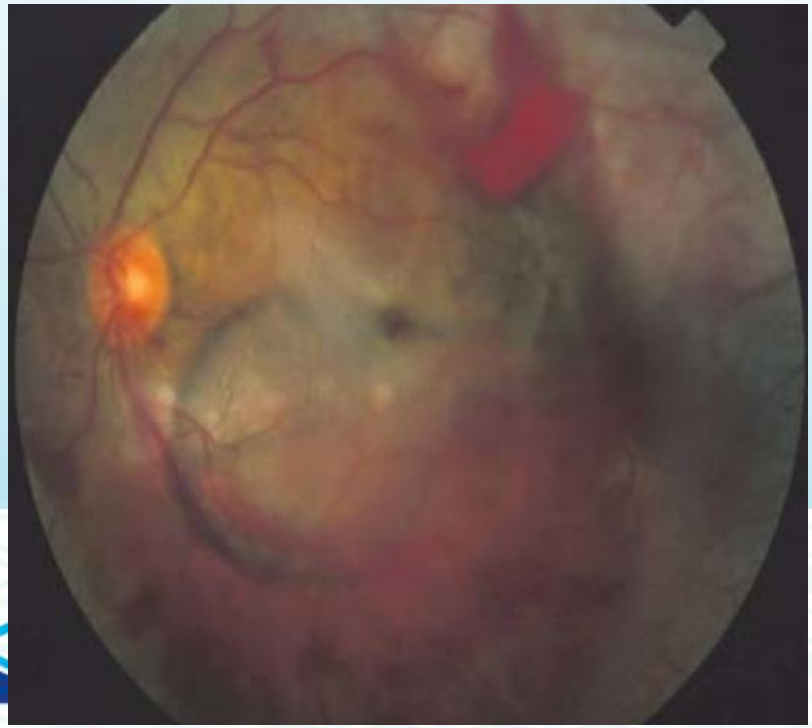


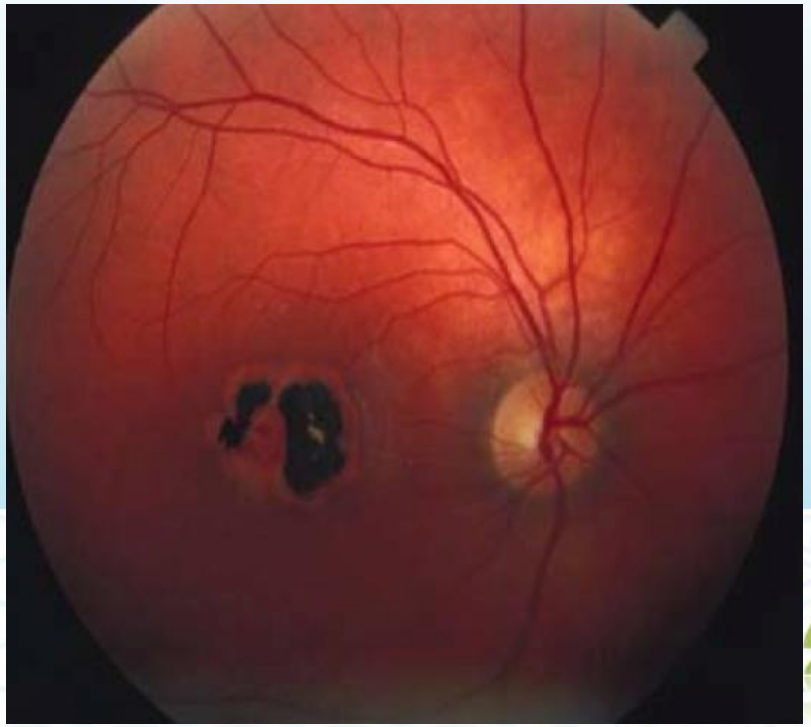


Trauma: Blunt Injury

- Commotio retinae:
- Posteriorly transmitted force
  - Haemorrhage
  - Oedema
  - Traumatic macular hole
  - Long term vision reduction





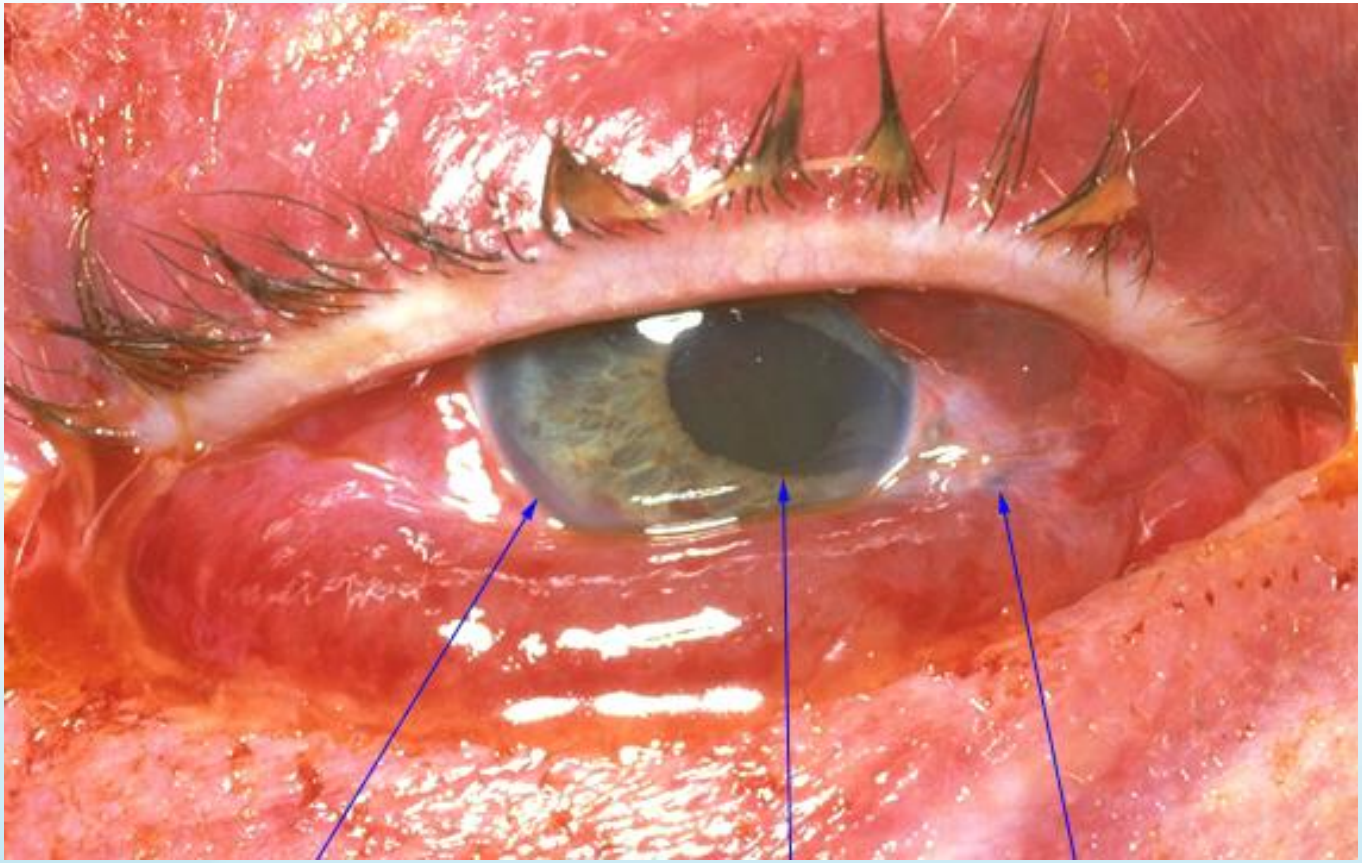


? Ruptured globe

Lid laceration

Bruising

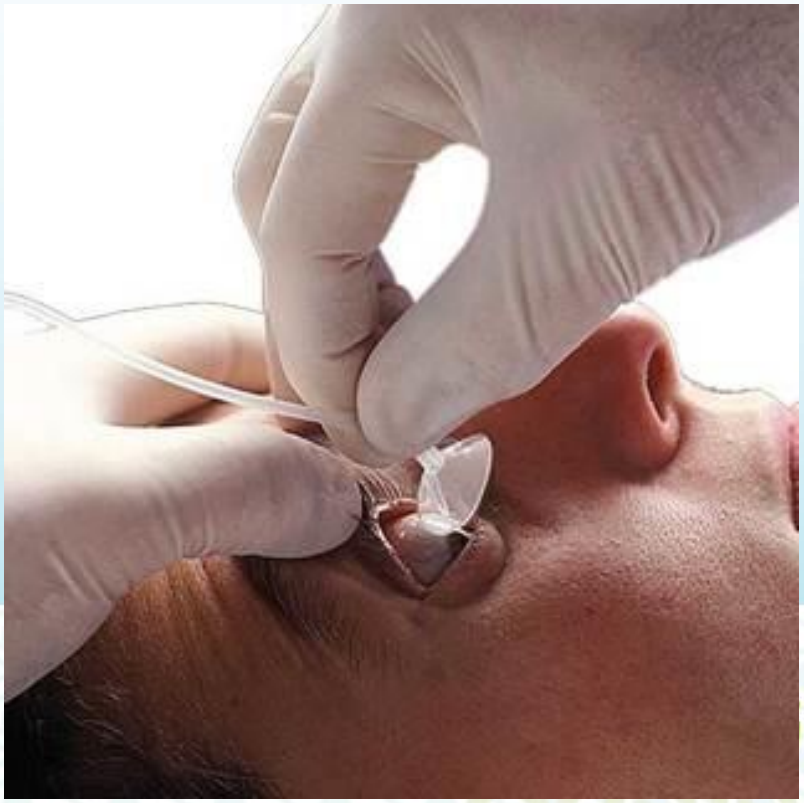
Ruptured globe



Hyphaema Irregular pupil Uveal prolapse

Trauma: Chemical Injury

- True ocular emergency: don't check VA
- Time to irrigation and duration influences final outcome
- Topical anaesthetic
- Saline or Ringer's
- IV tube or Morgan lens
- At least 1-2 litres
- At least 30 minutes



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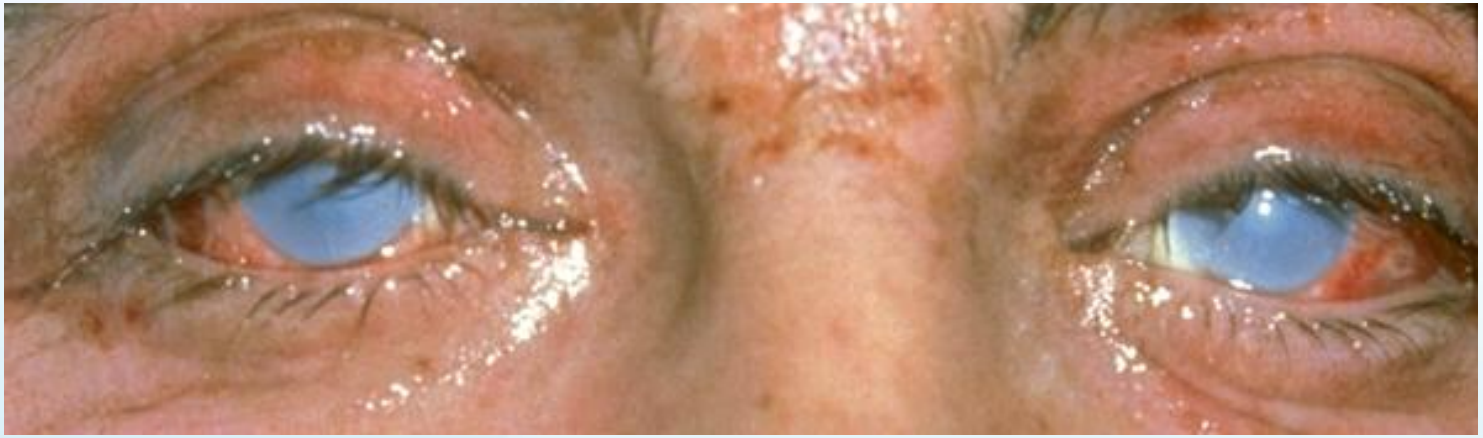
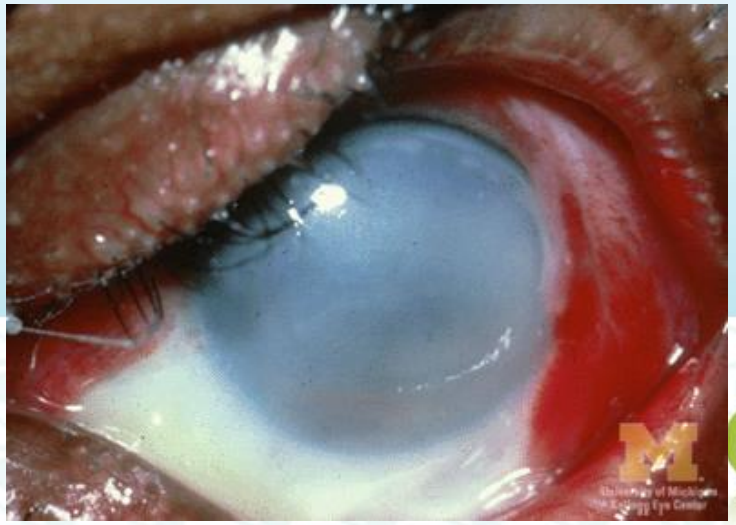
Trauma: Chemical Injury

- Irrigate until the pH is within normal range (7.0 to 7.3).
- Don’t attempt to neutralise alkali with acid.
- Transfer urgently to ophthalmology dept.
- If delay in transfer, may sweep superior fornix with cotton bud to remove solid debris.
- Patients should be instructed to bring the container of the chemical that caused their eye injury.

Trauma: Chemical injury

- Prognosis depends on degree of limbal damage
- Alkali usually worse than acid as it penetrates more

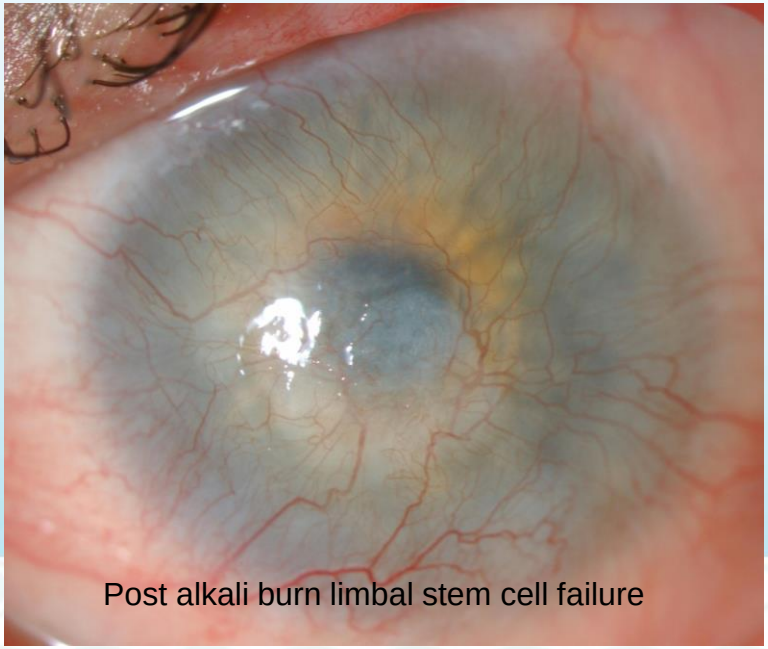




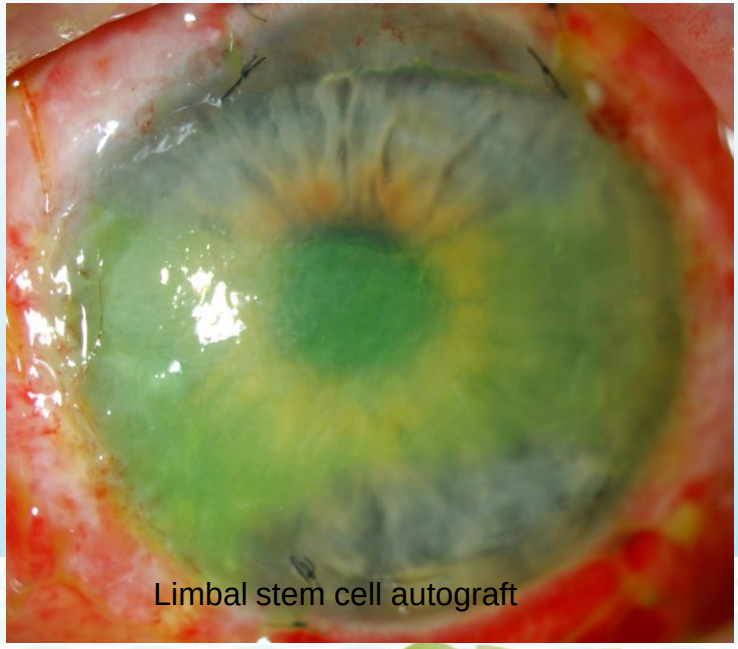
Limbal damage post trauma

- Failure to epithelialise
- Vascularisation
- Conjunctivalisation, dry eye
- Corneal melt , perforation
- Corneal infection
- Scarring, symblepharon

PLUS: deeper damage:
cataract,
glaucoma,
uveitis



Post alkali burn limbal stem cell failure



Limbal stem cell autograft

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Any questions ?

Sudden Visual Loss:

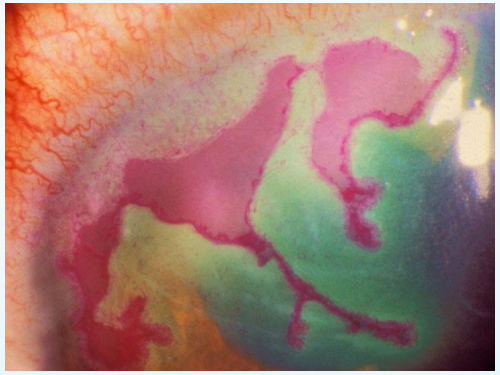
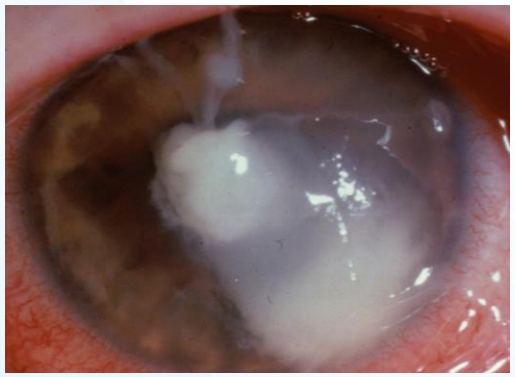
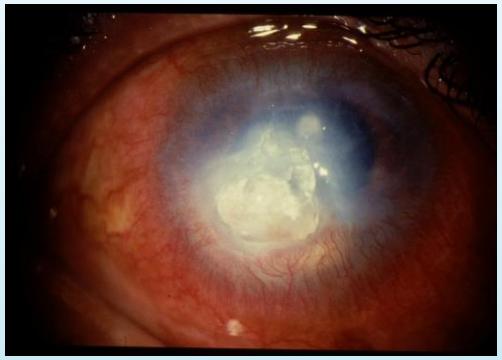
- Urgent appropriate management may be vision saving.
  - Keratitis
  - Angle closure glaucoma
  - Retinal detachment
  - Vascular occlusion
  - Other retinal macular or vitreous
  - Endophthalmitis

- PLUS: recent awareness of chronic loss:
  - Refractive error and amblyopia
  - Unilateral cataract
  - End stage open angle glaucoma

Microbial keratitis

- Symptoms:
  - Lacrimation
  - Photophobia
  - Irritation or pain
  - Reduced vision
- Signs:
  - Intense injection (circumcorneal)
  - Corneal infiltrate
  - Epithelial defect (fl. +ve)
  - Hypopyon

Microbial Keratitis

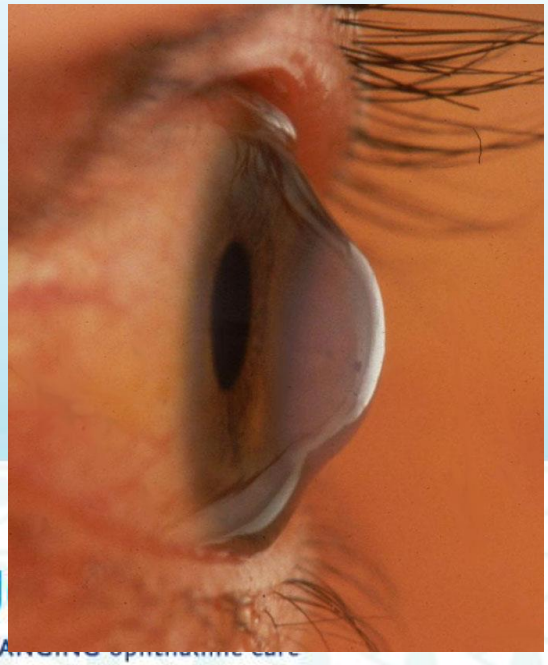

- Viral
- Bacterial
- Fungal
- Amoebic
- Features seldom pathognomonic
- Most need urgent admission, corneal scrape for culture
- Intensive Rx, adjusted once results available

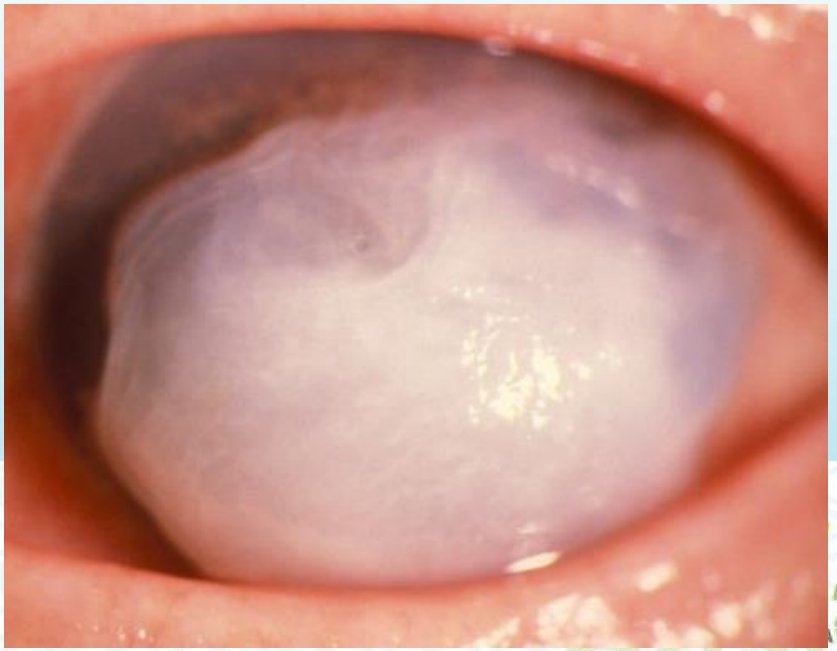
Risk factors for microbial keratitis

- Does not “just happen” (except HSV)
- C/L wear especially any overnight wear
- Trauma including surgery.
- Reduced ocular surface defences: lid abnormalities, corneal anesthesia, dry eye, poor blink.
- Reduced systemic defences: diabetes, immunocompromise, malnutrition, old age.

Hydrops in Keratoconus

- Another corneal cause of sudden vision loss
- Keratoconus may be undiagnosed
- Split in DM allows aqueous into stroma
- Gradual resolution over a few months



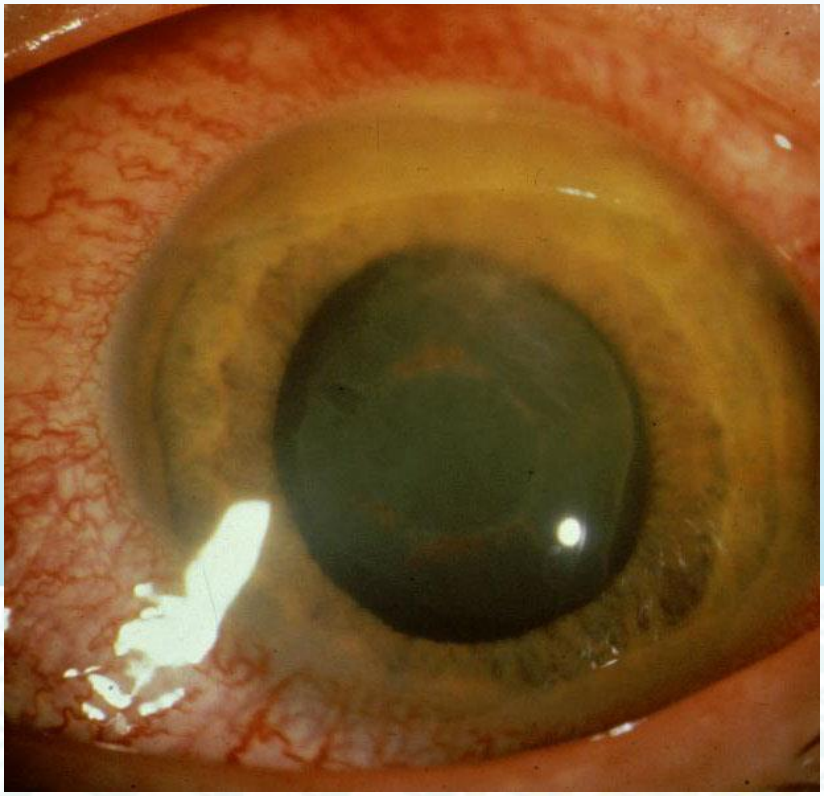


Acute Angle Closure Glaucoma

- If acute angle-closure glaucoma is not treated immediately, damage to the optic nerve and significant and permanent vision loss can occur within hours.
- Patients often present with
  - blurred vision
  - severe eye pain / frontal headache
  - colored halos around lights
  - nausea and vomiting

Acute Angle Closure Glaucoma

- Physical findings include
  - increased Intra Ocular Pressure
  - mid-dilated poorly reactive pupil
  - shallow anterior chamber
  - hazy (steamy) cornea
  - hyperemic conjunctiva.



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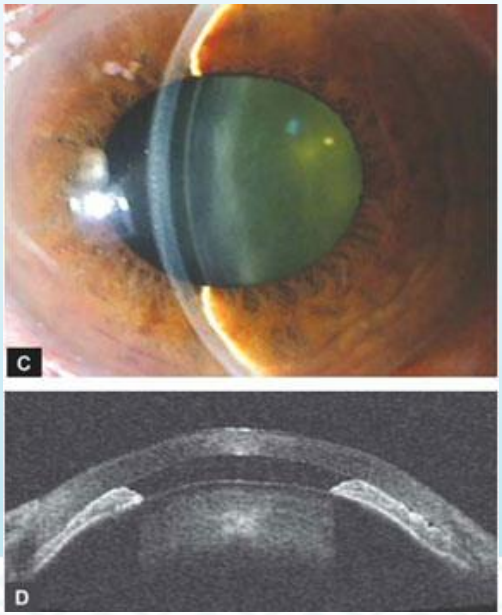
Acute Angle Closure Glaucoma

- Risk factors include:
  - Enlargement or anterior placement of the lens
  - Hypermetropia
  - Narrow angle, and shallow anterior chamber.



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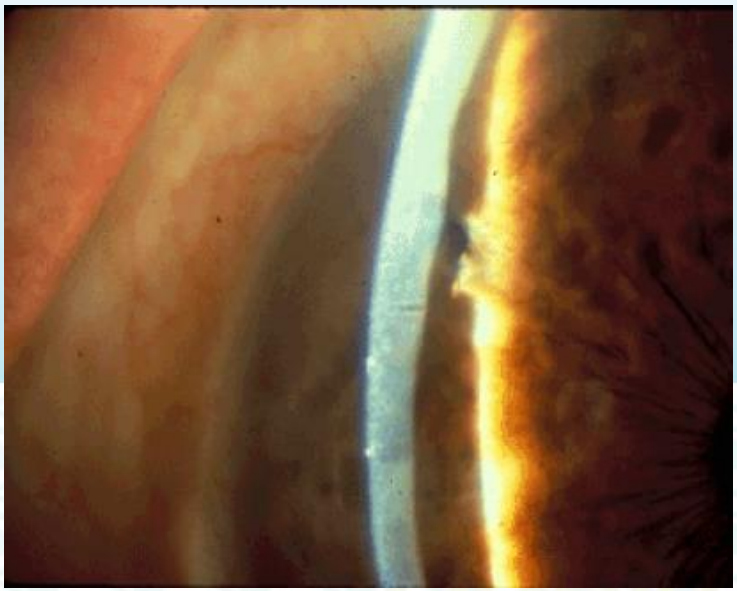
Acute Angle Closure Glaucoma

- Therapy is initiated to lower the intraocular pressure, reduce pain, and clear corneal oedema in preparation for iridotomy.
- Topical pressure lowering agents:
  - 0.5% timolol maleate (Timoptol)
  - 1% apraclonidine (Iopidine)
  - 2% pilocarpine (Isopto Carpine)
- Oral Acetazolamide
- Definitive treatment is laser iridotomy.
- Surgical iridectomy if laser iridotomy not successful.



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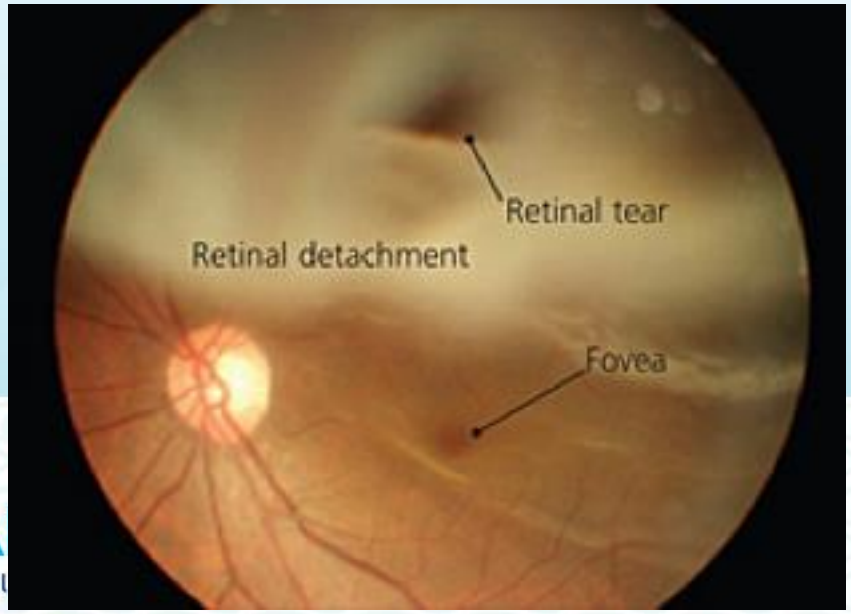
Sudden Visual Loss: Retinal

- Retinal detachment
- Retinal artery occlusion
- Retinal vein occlusion
- Vitreous haemorrhage
- Wet macular degeneration

Retinal Detachment:

- Separation of neural retina from the RPE
- Separates photoreceptors from their blood supply
- Early diagnosis and treatment essential
- Treated within days often full return of vision
- Delayed treatment may lead to permanent vision loss even NPL in the eye

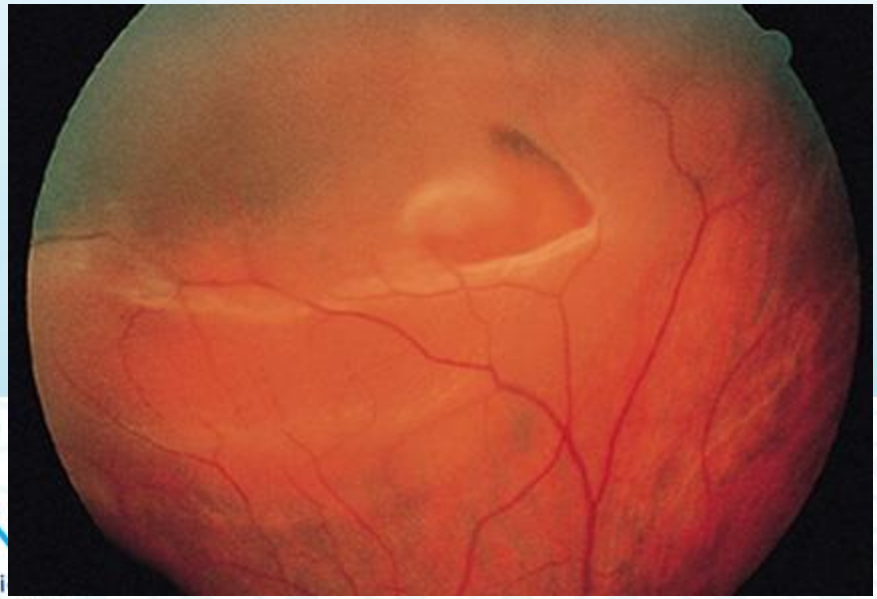


Retinal Detachment:

- 1 in 10,000 per year
- 1 to 5 per week at Greenlane Clinical Centre
- Risk factors:
  - Myopia : 55% of non traumatic RRD
  - Cataract surgery (esp. complicated)
  - Diabetic retinopathy (tractional)
  - Family history of retinal detachment
  - Older age ie degenerative retinal holes
  - Trauma

Retinal Detachment:

- Flashing lights (vitreous traction on peripheral retina)
- Floaters (vitreous condensation or haemorrhage)
- Curtain like progressive field defect
- Reduced central vision once macula detached
- VA may be 6/6 to PL
- Not usually loss of RR or APD

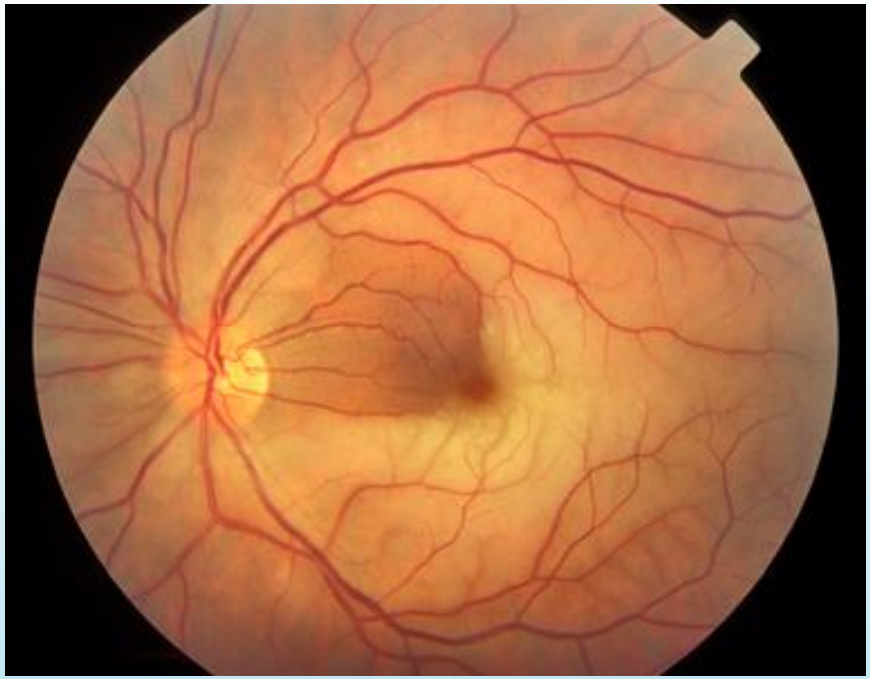


Retinal Detachment:

- Difficult to identify with direct ophthalmoscope
- Referral is mandatory for symptoms
- The more recent the onset the more urgent
- Surgery usually involves;
  - Vitrectomy
  - Drainage of sub retinal fluid
  - Intra-ocular gas or oil to flatten the retina
  - Laser or cryotherapy to seal off the hole
  - External scleral indents less often used now

Retinal Artery Occlusion

- Painless and sudden loss of vision in one eye.
- Amaurosis fugax (transient) may precede loss.
- Signs:
  - Reduced VA
  - APD usually
  - No loss of red reflex
  - Cherry red spot

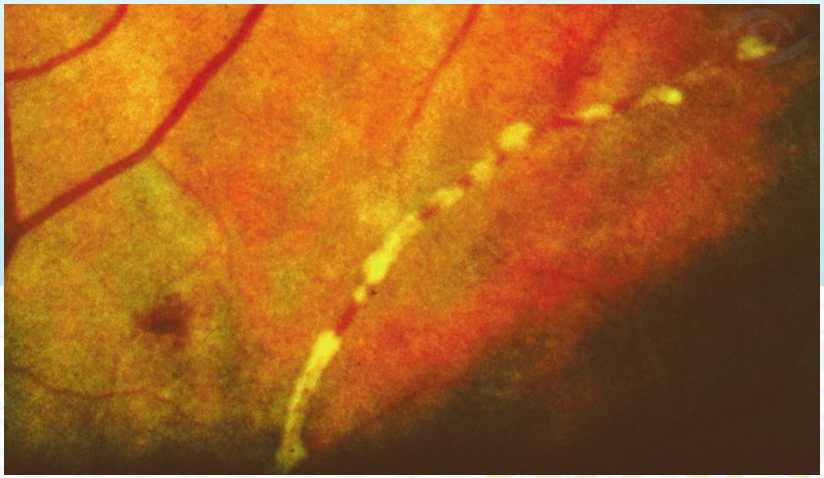


Risk factors

- Older patients:
  - atherosclerosis, diabetes, hypercholesterolaemia, hypertension, hypercoagulable state, cardiac arrhythmias.
  - Giant cell arteritis in 5 to 10 percent of cases
- Younger patients:
  - collagen vascular diseases, hypercoagulopathies, cardiac valvular disease, syphilis, sickle cell disease.
- Glaucoma, eye surgery: post elevated IOP.

Retinal artery occlusion

- CRAO or BRAO
- Embolic: carotid or cardiac: will need ECHO and carotid imaging
- Difficult to see with direct ophthalmoscope
- GCA if >60 years old
- All need ESR, CRP urgently
- All need referral
- Bilateral, transient consider:
  - Migraine
  - Vertebrobasilar
  - Hypertensive



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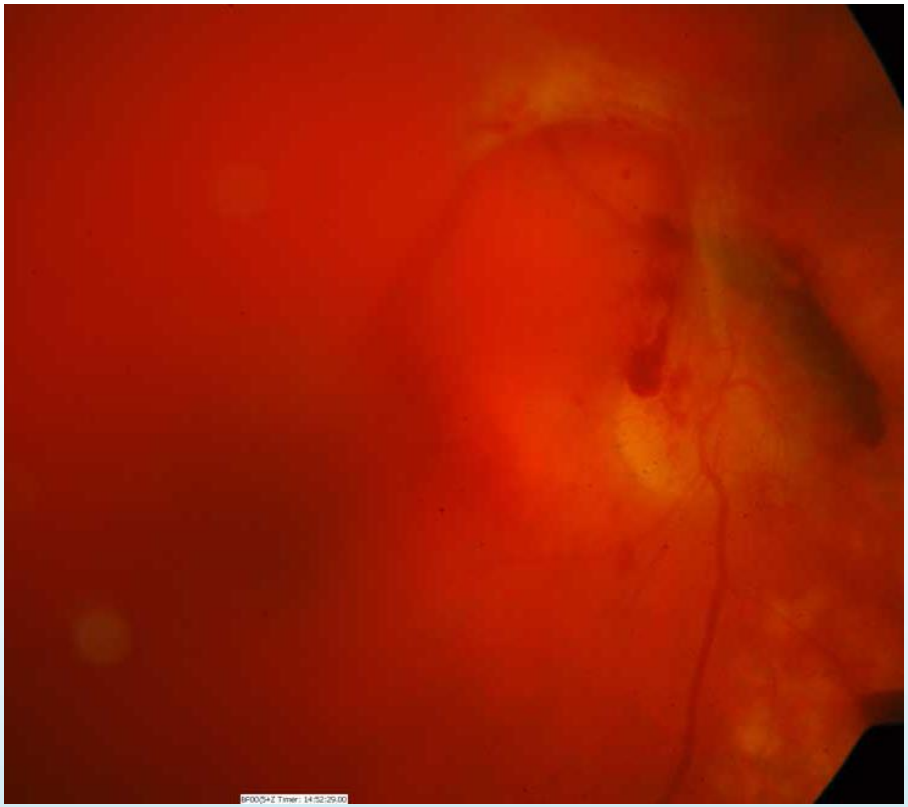
Retinal vein occlusion

- Central or branch vein occlusion
- Often a delay to present
- Blood and thunder fundus
- Measure BP, FBC, glucose, lipids
- Refer for FFA and OCT
- Late neovascularisation:
  - Retina or iris
  - 90 day glaucoma
- May need PRP or anti-VEGF

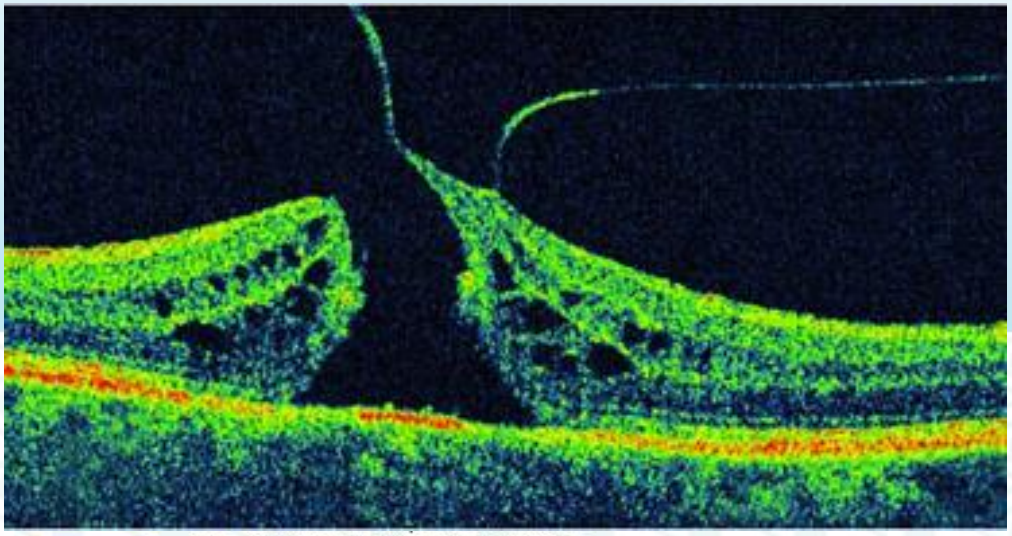
Vitreous hemorrhage

- Painless vision loss
- Loss of red reflex
- No APD usually
- Bleeding from the retinal vessels
- Retinal neovascularisation:
  - Diabetes
  - Vein occlusion
- Traumatic



Macular Degeneration

- Central loss, peripheral vision maintained
- No APD
- Good red reflex
- Painless
- Preceded by metamorphopsia

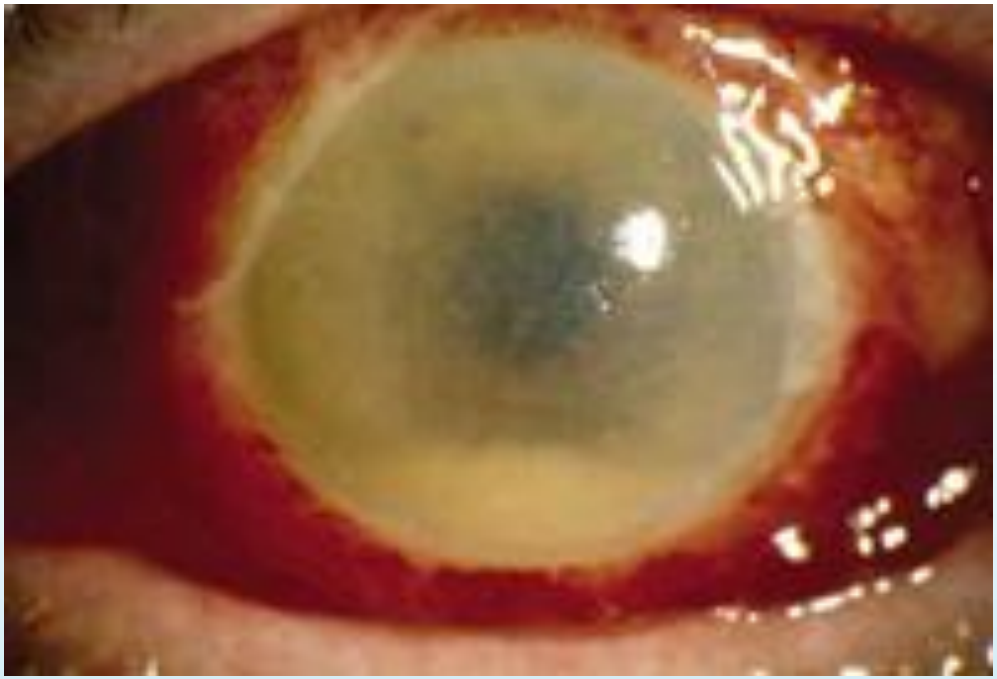


Macular Degeneration:

- Gradual loss: not urgent but needs referral
- Sudden loss or metamorphopsia: urgent referral
- Previously little therapy to reverse vision loss
- Now : intravitreal VEGF inhibitors:
  - Halt deterioration
  - Improve vision in many cases
- But: temporary benefit and need repeat usually weeks to months later

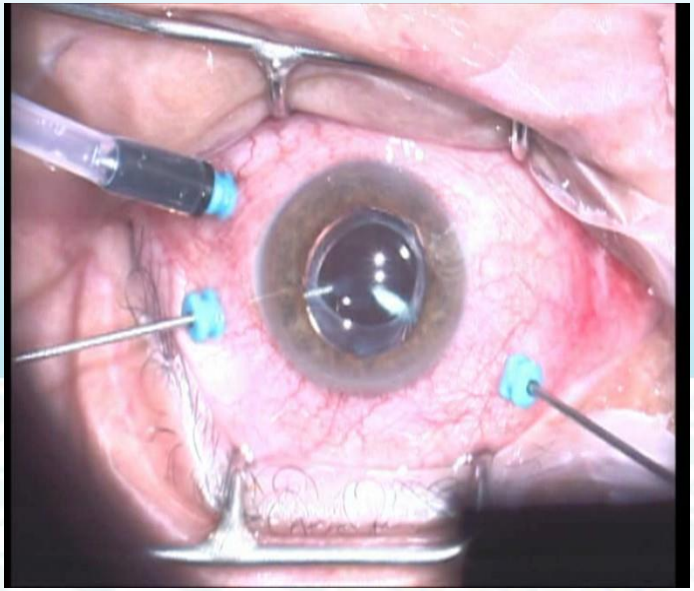
Sudden visual loss: Endophthalmitis

- Severe pain
- Reduced vision
- Recent eye surgery
- Hypopyon
- Intense injection
- Poor red reflex



Sudden Visual Loss: Endophthalmitis

- Post cataract: 1 in 1000 incidence
- Post intravitreal avastin injection: 1 in 200
- Emergency referral
- Risk of severe vision loss high
- Reduced by early intra-vitreal antibiotics asap. (hours count)
- Then will require vitrectomy



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Any questions?

Case Presentation:

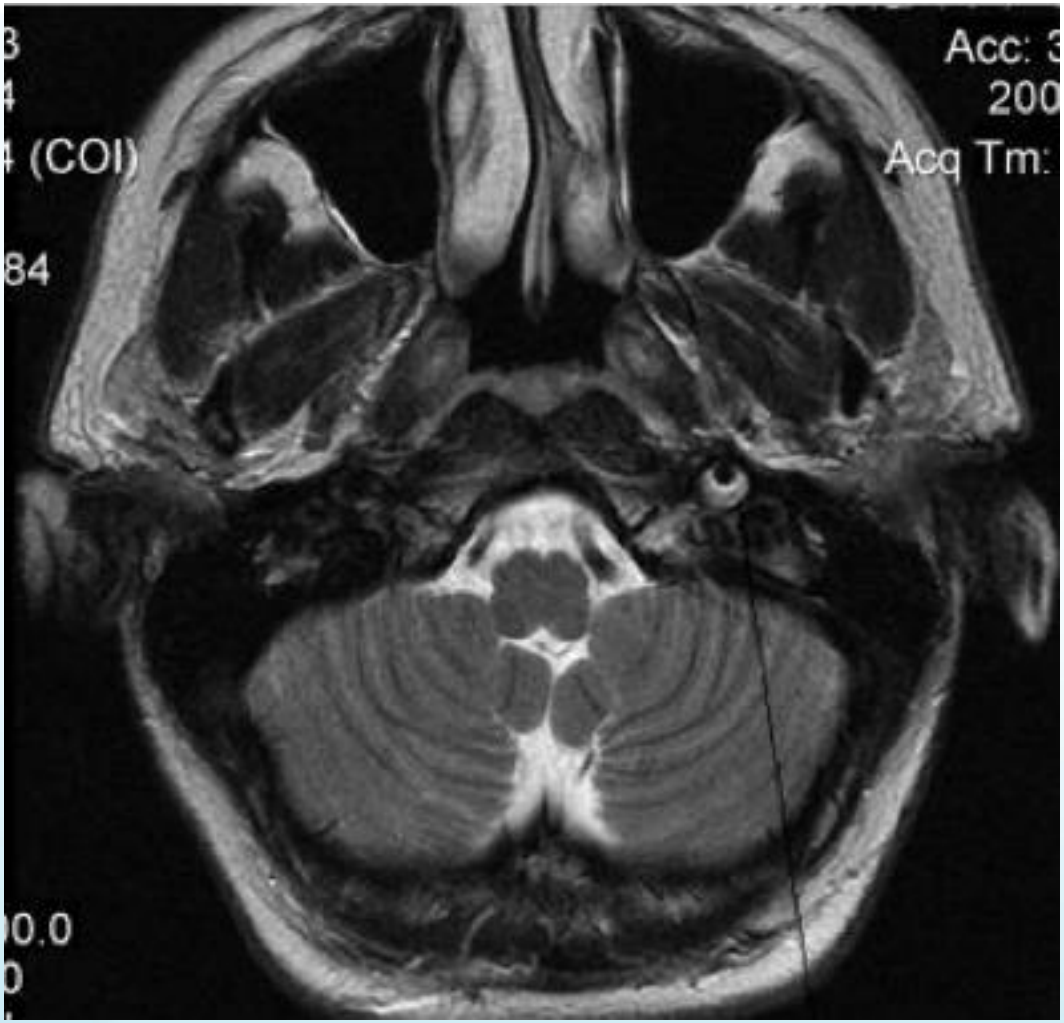
- 43 y.o. female non smoker c/o pain left face and neck
- Left ptosis, small pupil (miosis).
- No diplopia. No visual loss. No history of head / neck trauma

?

Horner Syndrome: ptosis, miosis, anhidrosis

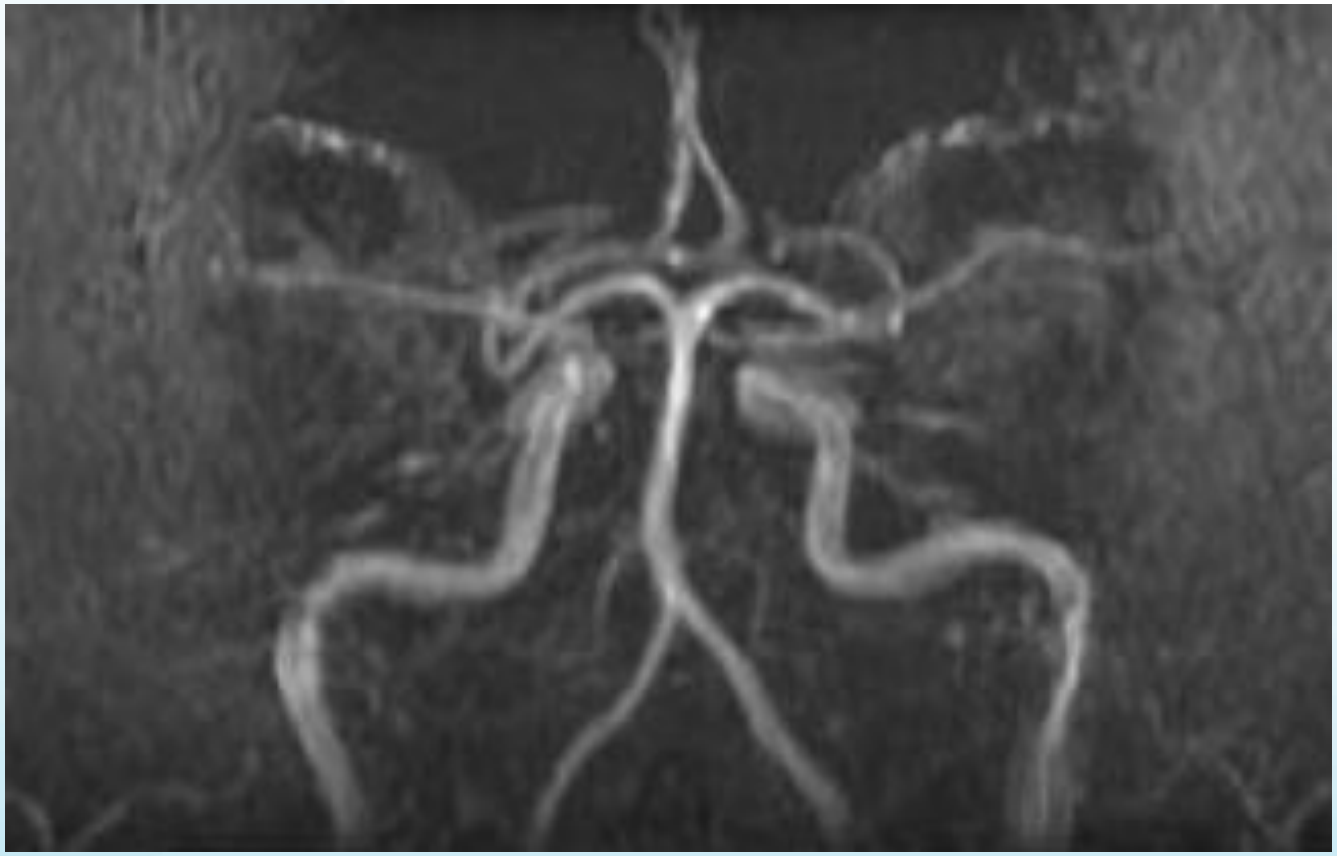
- Sympathetic chain from hypothalamus via brainstem, spinal cord, apex of lung, carotid, cavernous sinus and orbit.
- Iris dilator muscles, sweat glands of forehead, mullers muscle of eyelid.
- Multiple causes
  - Neoplasia, trauma, pancoast tumour, carotid dissection, MS, migraine…….
- Neck, facial, and head pain ipsilateral to the lesion because of ischemia or stretching of the trigeminal pain fibers surrounding the carotid arteries.

MRI:



T2-Weighted Magnetic Resonance Imaging Showing Blood in the Arterial Wall and Narrowing of the Lumen of the Left Internal Carotid Artery

Angiogram:



Magnetic Resonance Angiography of the Neck Showing Left Internal Carotid Artery Dissection

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Warning Signs: Painful Horner

- Painful Horner syndrome should suggest the possibility of a carotid dissection until proven otherwise.
- Magnetic resonance imaging and angiography scan of the head and neck is the imaging modality of choice to look for dissection.
- For patients with carotid dissection, anticoagulation with warfarin for 3–6 months to prevent carotid thrombosis and embolism

Case Presentation:

- Acute eye clinic 30/5/14
- 31 y.o female c.o. 2/12 increasing facial pain
- 1/52 diplopia, ptosis, blurred vision

Examination findings

- RVA 6/7.5 LVA 6/15
- No APD Colour vision normal
- R pupil 3mm / L pupil 6mm poor reaction
- L ptosis restricted levator function
- CT: L eye exotropia and hypotropia
- OMs: reduced L elevation and adduction
- Distressed by eye and head ache

?

Third Nerve Palsy

- A third nerve palsy can produce ptosis, anisocoria, and ophthalmolplegia
- Involved eye down and out from unopposed LR and SO activity

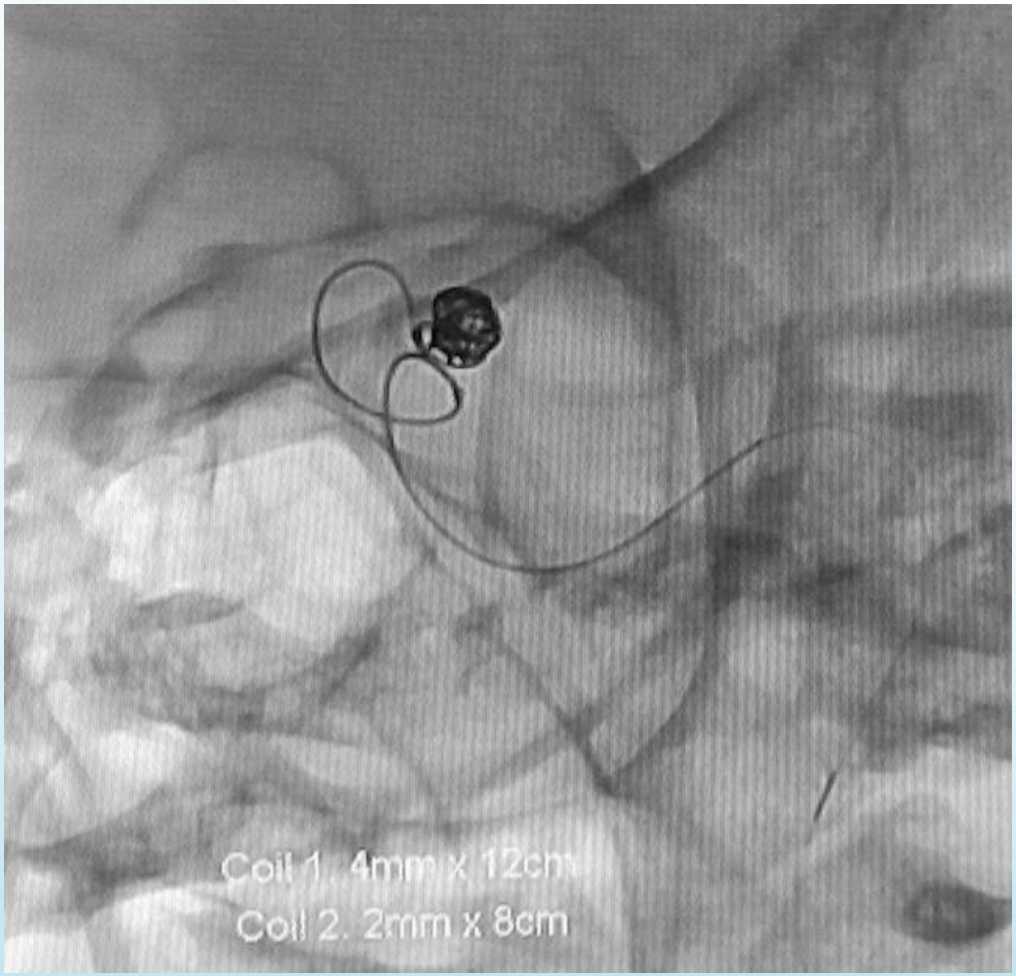
- An isolated, pupil-involved third nerve palsy is due to an aneurysm of the posterior communicating artery until proven otherwise: urgent neuroimaging.
- An isolated, pupil-sparing, complete third nerve palsy in a diabetic patients is likely to be due to small vessel ischemia.

-> Patient referred for urgent CT angiogram

CT Angiogram 30/5/14:

Left terminal Internal carotid/ PCA unruptured 6mm aneurysm

Endovascular coiling of aneurysm 31/5/14



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Summary 1

- Prompt recognition and appropriate treatment essential
- The outcome may depend on timely management
- Refer ocular emergencies immediately to the emergency department or ophthalmologist
- Most frequent conditions:
  - PEI, Retinal detachment, CRAO, Acute angle-closure glaucoma, and Chemical injury

Summary 2

- Eye injury from high-velocity trauma should be immediately evaluated by ophthalmologist.
- Suspected globe rupture should be immediately referred to an ophthalmologist.
- An eye exposed to chemicals should be irrigated until the pH is within normal range or with at least 1 to 2 liters of normal saline or other solution suitable for eye irrigation.
- Lowering intraocular pressure in acute angle-closure glaucoma may save vision; laser iridotomy is the definitive treatment for acute angle-closure glaucoma.

Summary 3

- Careful eye examination and simple tests can help decisions about appropriate treatment and referral.
- All patients with eye problems should be tested for:
  - Visual acuity .
  - Ocular movements incl. eyelid.
  - Confrontation visual field.
  - Pupillary examination incl. APD
  - Direct ophthalmoscopy.

Summary 4

- Life threatening systemic condition may present with eye symptoms
- Most of the nerves supplying the eye pass through or near vital intracranial structures
- Ocular symptoms of vascular occlusion will be immediately recognised by the patient
- Careful examination as above may allow appropriate referral

Thank you!

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