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Sussex Eye Hospital Ophthalmic Accident and Emergency

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Aim

The aim of these guidelines is to provide a basic management plan for a range of conditions likely to be seen in ophthalmic A&E. In particular they are meant to outline what investigations may be appropriate from A&E and provide guidance for appropriate referral on of the patient. They are not meant to replace textbooks, which will contain far more detail, but should be used in conjunction with them.

Principles

The ophthalmic A&E is the appropriate setting for patients with urgent or acute eye problems. It should not be replacing outpatients. Patients with chronic or non - urgent conditions should be investigated and treated from clinic not A&E.
Patients should only be followed up a maximum of once in A&E and then referred to clinic if necessary.
Think carefully if a patient needs to be followed up at all or simply advised to return if the condition is not settling.

General guidance

Clearly it is hoped that all patients will be accurately diagnosed and appropriately treated, however that does not mean that every last detail needs to be sorted out in A&E. The important step is to distinguish serious pathology from more minor conditions. Remember many conditions are not sight threatening and are self-limiting.

- Always check visual acuity.
- If the visual acuity is reduced always try and explain why.
- Have a low threshold for a dilated fundal examination.
- Have a low threshold for glucose and BP measurements.
- Ask for help when needed, but bear in mind need for urgency, i.e. now, today, in outpatients.
- Try and make a diagnosis and or action plan.
- Write this clearly on Symphony.

SECTIONS

1. Conjunctivitis
2. Cornea
3. Glaucoma
4. Neuro-ophthalmology
5. Oculoplastics
6. Paediatric
7. Uveitis
8. Medical retina
9. Vitreoretinal
10. Post-operative endophthalmitis

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Conjunctivitis

The conjunctivitis section includes:

General considerations
Bacterial
Viral
Allergic
Chlamydial

Precautions

Steps must be taken to make sure you do not catch infection yourself or transmit it to other patients.
Wash your hands.
Dispose of minims and tissues.
Wipe down chin and head rest of slit lamp and any other surfaces that may have become contaminated with tears with disinfectant spray and/or wipes.
Warn patient not to go swimming and to use their own towel until the episode has cleared.

Swabs

Will it change my management?

Not indicated unless:

No improvement and diagnosis unclear, e.g. to distinguish between adenoviral, chlamydial and Thygeson keratitis

Rarely: If possible outbreak suspected for infection control.

Viral Conjunctivitis:
There is no indication for routine swabbing for viral conjunctivitis.

Conjunctivitis - Diagnosis

Aetiolgy	Condition	Onset/ Duration	Symptoms	Conjunctival Response	Preauricular Lymph-adenopathy	Discharge
Bacterial	Bacterial	Acute Usually one eye	FB sensation Purulent discharge Lid Crusting Tearing	Diffuse hyperaemia Papillae	Occasional	Purulent
Viral	Adenoviral	Acute Usually bilateral	Tearing Gritty discomfort Lid crusting on waking	Diffuse hyperaemia Follicles Petechial hges Pseudomemb	V Common	Watery Serousmucoid
	Herpetic	Acute	Tearing	Diffuse hyperaemia Follicles	Occasional	Watery Serousmucoid
Allergic	Seasonal	Seasonal /recurrent	Itching Tearing	Mild hyperaemia Mixed follicles/ papillae	Unusual	Mucoid
	Vernal	Seasonal/chronic	Itching Mucus discharge	Giant papillae (tarsal) Trantas dots (limbal)	Unusual	Ropey Mucoid
	Giant Papillary	Acute/ Chronic	Itching Contact lens intolerance Mucous discharge	Giant papillae – check for shield ulcer	Unusual	Mucoid
Chlamydial	Chlamydial	Acute/ Chronic	Tearing	Diffuse hyperaemia Giant follicles (predominantly inferiorly)	Occasional	Mucoid

Conjunctivitis - Management

CONDITION	MANAGEMENT	FOLLOW UP
Bacterial Conjunctivitis	Start topical antibiotic: 1st line: Chloramphenicol. 2nd line: Fucithalmic (Do not use fluoroquinolone antibiotics such as oflocaxin or ciprofloxacin.) Educate patient about cleaning and contact	No routine follow up. Advice to return if not better.
Adenoviral Conjunctivitis	Cold compress Acute: Topical antibiotic only if secondary bacterial infection Late with sub epithelial punctate keratitis: Vision unaffected : no treatment Photophobia and reduced vision: no Rx or topical steroids 4/3/2/1/d each week plus clinic follow-up. Educate patient about cleaning and contact	Acute: No routine follow up. Advice symptoms can last for a month. Re-attend if vision becomes affected Late: Clinic follow up
Allergic Conjunctivitis	Identify/remove allergen (consider regular eye drops) Educate patient Opatanol BD Cetirizine 10mg po OD (N.B.: Remember Contact lens)	No routine follow up. Advice to see GP for persistent chronic symptoms
Chlamydial Conjunctivitis	See following section	See following section

Management of Chlamydia Conjunctivitis

N.B
The most important point to be made is to advice not to use Fluorescein drops if we are suspecting Chlamydia as it interferes with immunofluorescence of the swab results)

Diagnosis

Persistent follicular conjunctivitis, usually unilateral, often quite productive of mucus and discharge.

Investigations
The nursing staff will take a conjunctival swab (fornix scrape) with the specific kit and send to microbiology**. AVOID FLUORESCEIN AS INTERFERES WITH IMMUNOFLOUORESCENCE**.
A patient contact telephone number should be documented on the EPR system.
The patient does not need to be told to return, they will be informed of any positive result that affects their management.

Management
A member of A&E staff will contact the patient with a positive result and ask them to attend A&E. As a policy we do not give out test results over the phone.

The patient should be informed of the importance of:
• Treatment to avoid long term complications
• Partner notification and abstaining from unprotected sexual intercourse until they and their partner(s) have been treated
• Attendance at a Sexual Health / GUM clinic for full screening to exclude other STIs

Ideally the patient should be asked if they consent to referral to GUM clinic, who will then be contact them directly. This will then allow them to have full STI screening, appropriate antibiotics and partner notification.

Patients who refuse referral, are unable to attend, or require urgent treatment should be given oral antibiotics. There is no effective topical cure, lubricants may provide symptomatic relief.

Antibiotic therapy:
- 1st line: Azithromycin 1g po stat single dose
- 2nd line: Doxycycline 100mg BD po 7 days
- 3rd line: Erythromycin 500mg BD 14 days or Ofloxacin 200mg BD 7 days

Caution with all during pregnancy and breastfeeding – seek advice from GUM clinic.

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Cornea

The corneal section includes:

Meibomian gland disease
Marginal keratitis
Herpes simplex keratitis
Herpes Zoster Ophthalmicus
Bacterial keratitis
Chemical injury
Protocol for treating chemical injury

Meibomian gland dysfunction.
Explanation that this is a chronic relapsing condition.
Look out for signs of rosacea.
Lid hygiene & lubricants - patient information leaflet (Look out for signs of Acne Rosacea. If florid then consider dermatology referral via GP)

Discharge **no follow up**.

Marginal keratitis.
Confirm lesions are concentric with limbus and document clear interval.
Document corneal sensation.
G. Maxitrol qds for one week, BD for one week.
Treat meibomian gland dysfunction as above.
Look out for signs of rosacea.
Discharge no follow up unless numerous relapses or significant underlying MGD – refer to **general clinic routine(**Same as above with regards to Acne)

Herpes simplex keratitis
Dendritic ulcer (epithelial disease).

Oral aciclovir 400mg 5 x day for 7 days.
Discharge **no follow up**.
If more than 3 episodes over the course of 6 months refer to corneal clinic.

Disciform keratitis (stromal &/or uveitis)

Oral aciclovir 400mg 5 times daily maximum 2 weeks (Same as above with regards to ointments)

Would suggest a corneal opinion in presence of Disciform keratitis with mild ED.

We may still start on steroid weighing the pros and cons of the individual case.

Add topical steroid dexamethasone 0.1% QDS once epithelial defect resolved if present (low threshold for corneal opinion when starting topical steroids if ED present)

- Consider increasing steroid frequency if significant uveitis and no epithelial defect
- Refer to corneal clinic soon/1 month (corneal fellow clinic if available) – continue treatment unchanged until then (to go to GP for repeat prescription).

Herpes Zoster Ophthalmicus

Document corneal sensation and IOP

Oral Acyclovir 800mg x5 day for 1 week, if rash onset <5 days. Max treatment of 2 weeks with oral Acyclovir - Not needed if the patient has already taken oral. Just needs extensive lubricants. Can have 2 weeks of oral if they have HZ epi disease

Advise lubricants and oral NSAIDS for analgesia with GP f/u to discuss neuralgia
Cautious treatment of uveitis: Topical steroid QDS with oral ACV cover
Raised pressure: timoptol 0.25% BD, **clinic follow up in 1 week**

Bacterial Keratitis

These cases should ideally be reviewed by the EED registrar if they are being brought back to EED for review.
Document: contact lens use (type/duration of wear/last worn), history of swimming/showering in contact lens, preceding trauma, past corneal disease or surgery, topical drop use, systemic antibiotic or immunosuppressive.

Microbiology samples

Send contact lenses & case if possible, with consent from patient.
Wipe pus/mucus/debris with a sterile C&S swab & send for culture.

Scrape kits are kept in the fridge in A&E fridge and Pickford Ward. Use a green needle or 15 blade, fresh for each plate or slide. Obtain samples from the advancing edge of the ulcer and the centre of the ulcer. Inoculate the surface of plates over the central cross and the slides in the etched circle (please do not stab the agar plates with needles as the bacteria will suffocate and not grow on the plate if they are aerobic).
Kit in order of inoculation:

1) chocolate agar
2) 1st slide (gram stain) labelled on frosted end with pencil
3) blood agar
4) Sabouraud's

Then if acanthamoeba is suspected:

5) 2nd slide (calcofluor for acanthamoeba/fungal) – discard if not used
6) Acanthamoeba agar

Ensure each sample is labelled with a patient sticker. The microbiology request form should have clear documentation of the contact telephone number for gram stain results. All samples to be sent as urgent.

Treatment

G. Ofloxacin 0.3% hourly daytime for 48hrs. If ulcer <1mm, off axis, no atypical features then instruct the patient to return only if no improvement. Otherwise they do not have to return, can reduce their drops to 2hrly for the week. No CL wear for further week without treatment, then see their own optician before resuming CL wear.

If ulcer >1mm or any atypical features, scrape, A&E reg. to see then A&E follow up 24-48 hours.
Consider additional cyclopentolate 1% TDS and oral NSAIDS for analgesia.
Depending on severity and difficulty of drop administration consider admission plus hourly G. Cefuroxime 5% & G. Gentamicin 0.3% hourly day and night for 48 hours and seek senior &/or corneal specialist advice. For any admissions, please let the corneal team know.

For severe or atypical ulcers that WILL require corneal input, refer for review at the first visit. Gets the ball rolling so that the patient isn't seen in A&E several times before they are referred. Call the fellow, or speak to the corneal consultant for advice

Chemical injury

Aims are to ensure immediate and adequate lavage of injured eyes and to identify those which may require more aggressive treatment.

Initial management

Anything other than CS gas irrigate eye with at least 1000 ml of normal saline.

- Check & document the pH of both eyes before commencing
- Use topical anaesthetics liberally to facilitate irrigation and examination
- Irrigate the superior and inferior fornices and remove any foreign bodies that may act as a depot for the chemical. Intravenous tubing connected to a container of normal saline makes an ideal irrigation tool. A lid speculum greatly facilitates irrigation.
- Continue irrigation with sterile water or normal saline solution for at least 20 minutes.
- Evert the eyelids, especially if plaster or cement to remove particulate debris
- Five to 10 minutes after stopping irrigation, touch dry litmus paper to the inferior fornix to test pH.
- Continue irrigation until pH is normalised

Minimum data set

- Nature of chemical and duration of contact.
- Extent and timing of previous irrigation, and that required to normalise the pH.
- pH with litmus paper.

Visual acuity.
State of lids and adnexae.
Extent of conjunctival / limbal blanching (as clock hours or degrees)
Corneal epithelial loss (as approximate % of total corneal surface).
Clarity of stroma. Lens involvement. IOP.

> 50% epithelial loss >900 of limbal blanching Any stromal involvement	**admit**; inform on call SPR & Consultant. All drops preservative free: G chloramphenicol QDS, G dexamethasone 0.1% 1-2 hourly; G.Vitamin C drops 2 hourly G cyclopentolate TDS. Systemic Vitamin C 1g po BD Doxycyline 100mg po OD
<50% epithelial loss < 900 limbal blanching No stromal whitening	Rx g chloramphenicol QDS + G dexamethasone 0.1% QDS. **casualty follow up 24hrs**

<u>The most important drop in any chemical or thermal injury of any grade/severity is topical steroids.</u>

For very mild cases/non alkali injuries with no limbal ischaemia or significant corneal involvement use G dexamethasone 0.1% and occ. chloramphenicol QDS for 1 week, no follow-up unless persistent or deteriorating symptoms.

- **CS gas** (Give advice maybe no need to come to eye department)

Wear gloves, apron and mask

Do not irrigate eye.

Put patient in well-ventilated area and use a fan to evaporate residual chemical.
Remove contaminated clothing and put outside to air, or bag.
Main problem is lacrimation and can induce bronchospasm (consider medics).
IOP can be raised in short term.

Protocol for treatment (irrigation) of chemical injuries

Initial management

Triage for immediate assessment/treatment
Anything other than CS gas irrigate eye with at least 1000 ml of normal saline.

- Check & document the pH of both eyes before commencing
- Use topical anaesthetics liberally to facilitate irrigation and examination
- Irrigate the superior and inferior cul-de-sacs and remove any foreign bodies that may act as a depot for the chemical.

Intravenous tubing connected to a container of normal saline makes an ideal irrigation tool. A lid speculum greatly facilitates irrigation.

- Continue irrigation with sterile water or normal saline solution for at least 20 minutes.
- Evert the eyelids, especially if plaster or cement to remove particulate debris
- 10 minutes after stopping irrigation, touch dry litmus paper to the inferior cul-de-sac to test pH. Testing any sooner would mean that irrigating fluid and not the tear film was being tested.
- Continue irrigation until pH is normalised (compare to the other eye if unaffected)

Referral

Each case should be considered on its merits with a high index of suspicion if industrial accident, assault, intoxicated patient with limited reliability, or high pH (>=8) on arrival.
Refer urgently:

- If prolonged irrigation (>2 litres) does not lead to normalisation of the pH. **Further irrigation of these patients should not be interrupted but continued in the ED until either eye casualty or the on-call SpR is confirmed available and ready to receive the patient**.
- If clinical assessment indicates a severe injury with significant reduction of corrected visual acuity (with topical anaesthetic instilled and pinhole if glasses not available), widespread injection with staining epithelial loss.
- Careful examination to identify a severely blanched conjunctiva “white eye” or total corneal epithelial loss.

All other chemical injuries to be seen by ophthalmology the following day, in eye casualty Monday – Saturday (no need to telephone the on call doctor for permission), or ward 20 via the on call SpR on a Sunday.

CS gas (Give advice maybe no need to come to eye department)
Wear gloves, apron and mask. **Do not irrigate eye.**
Put patient in well-ventilated area and use a fan to evaporate residual chemical.
Remove contaminated clothing and put outside to air, or bag.
Main problem is lacrimation and can induce bronchospasm (consider medics).
IOP can be raised in short term – ophthalmology review next day if out of hours

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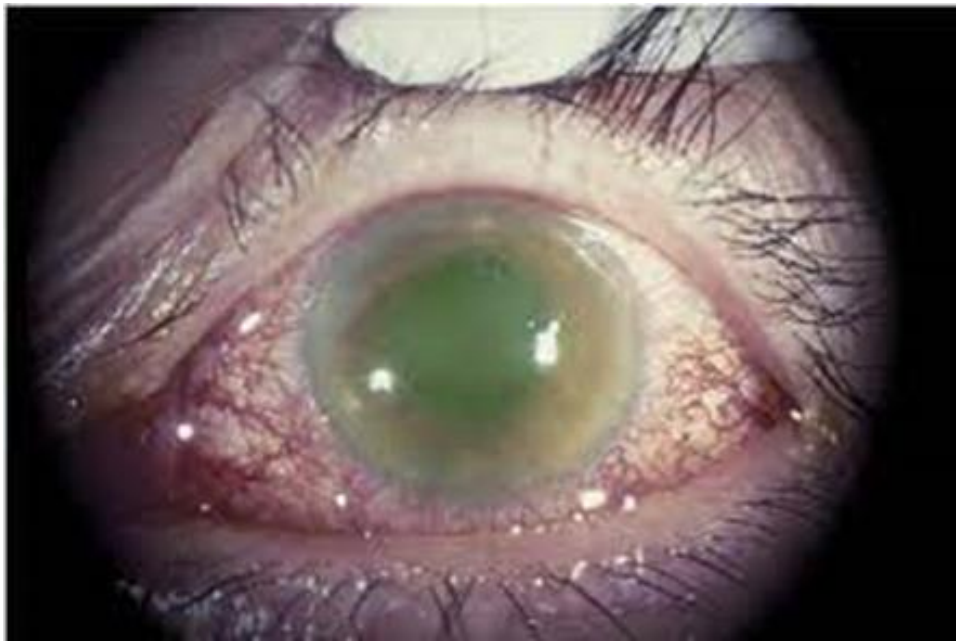
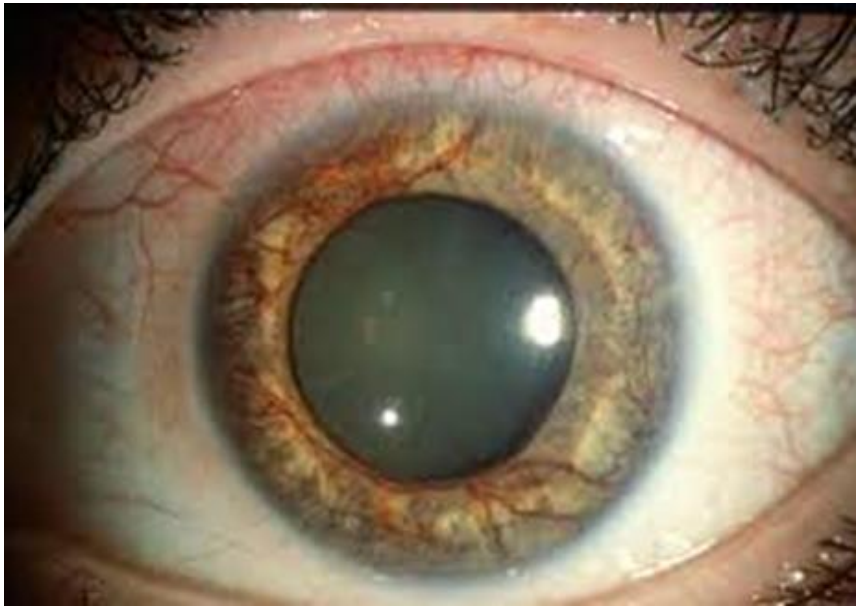
Glaucoma

MANAGEMENT OF ACUTE PRIMARY ANGLE CLOSURE

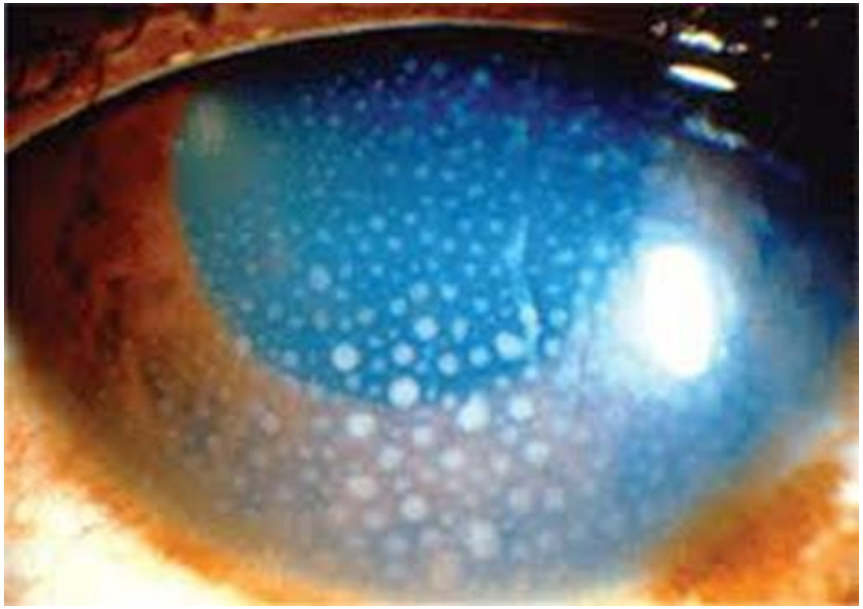


Acute Angle Closure

Consider/exclude other primary or secondary causes of glaucoma: specifically secondary pupil block and neovascular or uveitic processes which may present with very high pressure and corneal oedema.

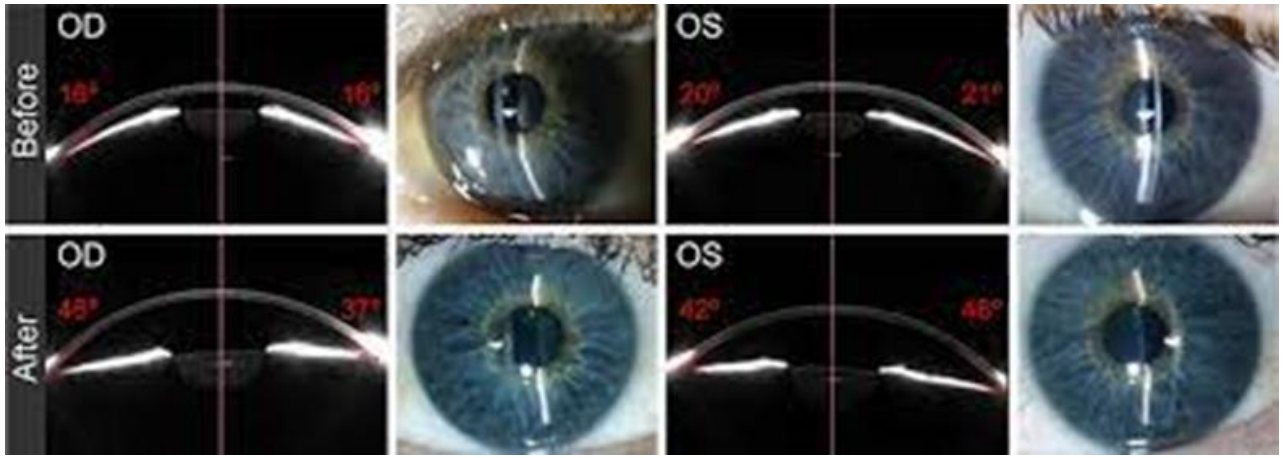


Rubeotic Glaucoma

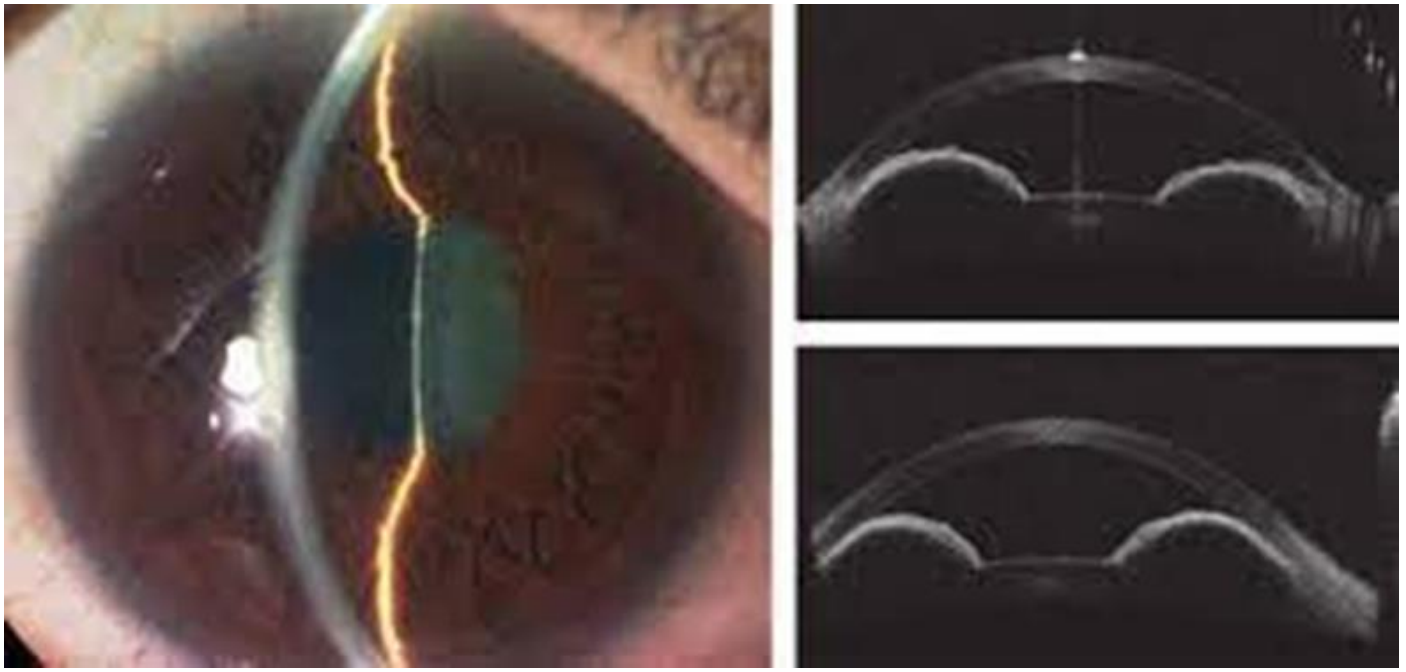


Granulomatous Uveitis

If anterior chamber depth is very asymmetrical between eyes, discuss the possible use of atropine with a glaucoma consultant BEFORE using pilocarpine (this may be Aqueous Misdirection), or this may be iris bombe (laser or surgical PI is indicated).



Aqueous misdirection



Iris bombe

If the patient presents:

- during working hours START Rx & let Glaucoma Team know.
- out of working hours, weekends and bank holidays START Rx, ADMIT & NOTIFY on call Consultant and Glaucoma Consultant.

Immediate

1. Diamox 500mg IV and 500mg orally at the same time
(max effect 2 hrs, can reverse Pupil Block by opening angle)

2. g.Pilocarpine 2% stat (4% in dark irides)

3. g.Dorzolamide/Timolol 0.5% stat
(just g.Dorzolamide if can't take B-blocker)

4. g.Apraclonidine 0.5% stat

5. g.PredForte 1% or g.Maxidex stat

6. Lie patient supine
(permits lens to fall back with vitreous dehydration)

7. Analgesics and antiemetics as indicated

8.Reassess after 60mins

If IOP still elevated

Consider indenting central cornea gently with 4 mirror gonioprism or a moistened cotton bud, 2-3 cycles of 30 secs on / 30 secs off

This allows the displacement of aqueous from the posterior to the anterior chamber producing a widening of the angle

Admit and notify on call consultant and Glaucoma Consultant

If IOP reduced

Refer to Glaucoma Service for advice on further management, and discharge on treatment as follows

1. g.Pilocarpine 2% (4% in dark irides) QDS

2. g.Apraclonidine 0.5% TDS

3. g.Dorzolamide/Timolol 0.5% BD
(just Dorzolamide if can't take B-blocker)

4. g.PredForte 1% or g.Maxidex 2 hourly affected eye and QDS fellow eye

5. Acetazolamide SR 250mg BD PO omit if IOP < 10mmHg
Clinic

Patient should be reviewed in outpatients within 7 days in Glaucoma Clinic

MANAGEMENT OF BLEB RELATED INFECTION

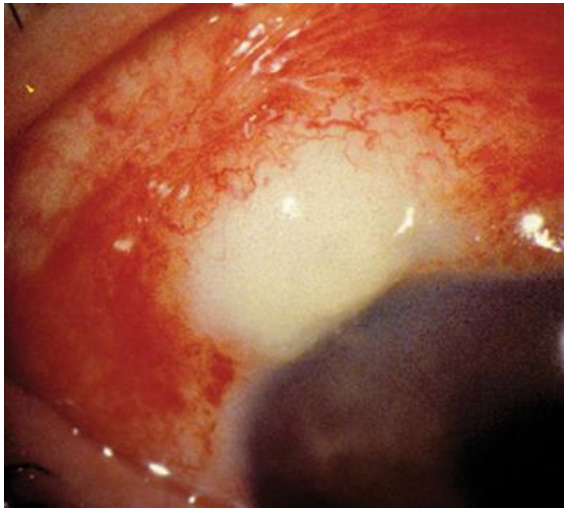
Symptoms: redness, photophobia, purulent discharge, blurred VA, pain

- sudden onset and rapid progression is characteristic of endophthalmitis
- prodrome of a few days is characteristic of blebitis

Signs:

- mucopurulent infiltrate ‘white on red’ or opalescent fluid within bleb, +/- leak
- surrounded by intense conjunctival inflammation
- purulent discharge
- variable AC activity
- +/- AC shallowing & hypotony
- +/- vitritis (if vitreous can’t be visualised, then the eye must be treated as having fulminant endophthalmitis and also perform Ultra Sound B scan)

• **IF 1+ AC CELLS CONSIDER THIS TO BE ENDOPHTHALMITIS AND TREAT IT AS SUCH IRRESPECTIVE OF ABSENCE OF VITRITIS.**



BLEBITIS

Immediately

1. Conjunctival swab - micro / culture / sensitivities

2. Instill g.povidone iodine 5% into conjunctival sac

3. Admit

(If I think it may be uveitis vs. blebitis/endophthalmitis I will sit patient outside clinic room and every time I go out to call in a different patient I will instill topical antibiotic and topical steroid, and look in the eye every hour)

4. g.Levofloxacin and g.Cefuroxime hourly day and night

5. Moxifloxacin** 400mg PO mane 10 days
(warn patient of risk & symptoms of hepatitis - document in notes)
Augmentin 625mg TDS PO 7 days
(Azithromycin 500mg 3 days if penicillin allergy)

6. Topical steroids g.PredForte 1%/g.Maxidex QDS
-Shouldn't be initiated until course of infection clear, usually 24-48 hrs after therapy started

BLEB RELATED ENDOPHTHALMITIS

Immediately

1. Conjunctival swab / AC tap / Vitreous biopsy - micro / culture / sensitivities

2. Instill povidone iodine 5% into conjunctival sac

3. Intravitreal antibiotics as per Endophthalmitis instructions
Vancomycin 1.0mg in 0.1ml Amikacin 0.4mg in 0.1ml
(Some surgeons prefer Ceftazidime 2mg in 0.1ml instead of Amikacin)

NB Amikacin should be used in patients allergic to penicillin

4. Admit

5. Antibiotics topical and systemic as blebitis

6. Topical steroids as blebitis

7. Systemic steroids Consider Prednisolone 1mg / kg 12 hours after admission if no medical contraindications (liaise with consultant)

Consider formal vitrectomy if significant vitreous involvement, discuss with VR team

All patients MUST BE REVIEWED within 4-6 hours following admission to evaluate progression.

** MOXIFLOXACIN IS CONTRAINDICATED IN CHILDREN AND PATIENTS WITH LIVER DISEASE. USE CIPROFLAXACIN INSTEAD.

Raised Eye Pressure

Primary open angle glaucoma – 1st presentation

If eye pressure under 30mmHg refer to Glaucoma team

If eye pressure is over 30mmHg start topical treatment

g.Latanoprost nocte

If history of dry eyes/ocular surface disease use preservative free drops

g.Tafluprost nocte

Arrange clinic follow up within 2 weeks

Secondary Glaucoma

In many cases it is unlikely that you will get the pressure to reduce that much depending on the cause of the raised eye pressure as eye pressures are usually very high.
Treat any obvious cause of raised pressure.

Consider one or all of the following as a stat dose then on discharge until seen in clinic depending on how high the eye pressure is.

Check eye pressure 1-2 hours after giving drops +/- Diamox

1. g.Latanoprost stat then nocte

2. g.Dorzolamide/Timolol 0.5% BD stat then BD
(just Dorzolamide if can't take B-blocker)

3. g.Apraclonidine 0.5% stat then BD

4. g.PredForte 1% or g.Maxidex if there is any element of inflammation

Diamox 500mg IV and Diamox 500mg PO stat then Diamox SR 250mg bd on discharge if indicated

Discharge on some or all medications as above depending on response to treatment, and after discussion with glaucoma team.

It is important to try and reduce the eye pressure below 40mmHg before discharge but this is not always possible.

If the pressure has successfully reduced clinic follow up should be within 2 weeks.

If eye pressure is not coming down, discuss with glaucoma team and arrange very quick review as patient may need urgent surgical intervention.

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NEURO-OPHTHALMOLOGY

NEURO-OPHTHALMOLOGY

1. Papilloedema management:

- Check VA, HVF, colour vision, RAPD, OD photo, OD OCT
- FAF and/or US b-scan to exclude OD drusen
- BP & BM to exclude malignant hypertension and diabetic papillitis
- Previous history of IIH: direct referral to neurology
- Rest: **refer to the medical team urgently** for Brain imaging and venography (CT/MRI) within 24 hours + LP once lesions excluded on imaging
- Children with raised discs sent by an optom seen out of hours/weekend: Arrange review in clinic for a senior review and ideally FAF (to avoid emergency CT/LP/heightened parental anxiety)
- Relay any of the following red flags to the admitting medical team:

1. Bilateral CN6 palsies (usually points to very elevated ICP)
2. Severe grade 4 papilloedema
3. Visual loss of worse than 6/9 in either eye (with no other explanation)
4. Initial LP showing a pressure >40 cm CSF
5. Abnormal Visual Fields (formal perimetry)

Above red flags are under current IIH guidelines under Medicines and Speciality guidelines on the microguide (available at https://viewer.microguide.global/BSUH then click on IIH under Neurology)
***Red flags only applicable if imaging confirms no other cause for papilloedema**

- Inform neuro-ophthalmology consultant (Mr Heath/Mrs Barrett) of the referral

2. GCA management

Patients presenting with a history of new visual loss (transient or permanent) or double vision should be evaluated as soon as possible on the same calendar day by an ophthalmologist.

- More likely if >70, consider as a differential diagnosis in patients over 50
- Features suggestive of GCA on history: High likelihood if features of ischaemia; jaw & tongue claudication and TIA's
- Check VA, HVF, colour vision, RAPD, OD photo, OD OCT
- GCA highly likely:

1. Immediate admission for 1g IV prednisolone for 3/7 (If high suspicion awaiting bloods/Ix should not delay treatment)
2. Urgent referral to Rheumatology – as per advice of Rheumatology consultant Dr Hajela this is best done via Panda to ensure same day or next day review **(click on Rheumatology inpatient referral under referrals tab)**
3. Arrange TAB
4. Neuro-ophthalmology follow-up if required

- Early consideration and targeted investigations if features suggestive of alternative diagnosis
- Refer to table 1 below for other relevant history, examination and investigations (from the latest BSR 2020 guidelines for diagnosis and treatment of GCA

A proposed list of clinical assessments that could be carried out at or near diagnosis of GCA

History and examination	Investigations
• Height and weight • Features of GCA relevant to prognosis: fever, sweats or weight loss; ischaemic manifestations (jaw claudication, tongue claudication) • Signs and symptoms indicating involvement of extracranial arteries, e.g. bruits, different blood pressures in the two arms and limb claudication • Ophthalmological evaluation for patients with transient or permanent visual loss or diplopia • History of comorbidities and medications that might predispose to glucocorticoid-related adverse effects, including infection, hypertension, diabetes, osteoporosis, low-trauma fracture, dyslipidaemia, peptic ulcer and psychiatric adverse effects • Features that may suggest an alternative diagnosis, e.g. neurological deficits, very severe constitutional symptoms or localised ear, nose and throat signs	• Measures of activity of GCA: laboratory markers of inflammation (CRP for all patients, plus either ESR or plasma viscosity) and full blood count (platelet count may be elevated in GCA) • Consider serum protein electrophoresis and urine Bence–Jones protein/serum free light chains if ESR elevated out of proportion to CRP • Baseline laboratory tests of major organ system function (plasma glucose, renal and liver function tests, calcium and alkaline phosphatase) • Screening tests for risk of serious infection[a] (may include urine dipstick, chest radiograph and tests for latent tuberculosis according to local or national protocol) • Screening tests for osteoporosis risk[a] (may include TSH, vitamin D, bone density test, DXA)

Table 1 (BSR 2020 guidelines for diagnosis and treatment of GCA available at https://doi.org/10.1093/rheumatology/kez664)

3. Demyelinating optic neuritis

- Key features to enquire in history: Subacute vision loss, pain, unilateral/bilateral
- Check VA, VF, colour vision, RAPD, OD photo, OD OCT
- <u>If VA >CF manage conservatively</u>

1. If 1st episode or recurrent with no previous investigations, request:
   Imaging MRI orbit + brain FLAIR sequence and consider baseline bloods
2. Neuroophthalmology review to be arranged with results of investigations

- <u>Consider neuromyelitis optica spectrum disorder (NMSOD) if:</u>

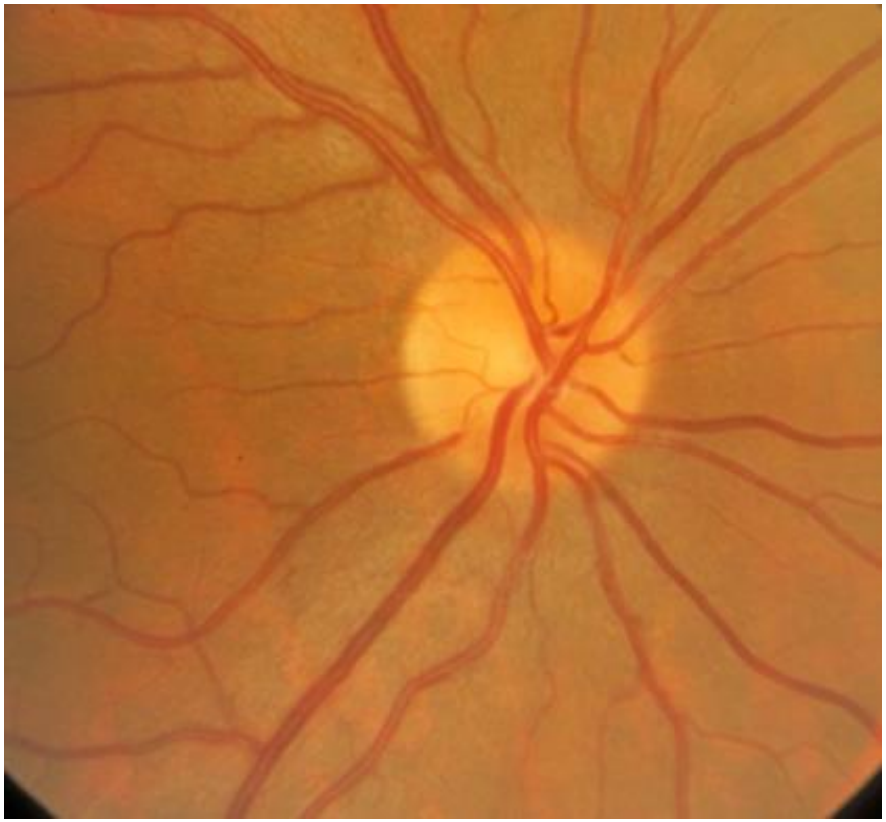
1. Bilateral VA loss + pain
2. VA ≤ CF + pain

If any of above or other features suggestive of NMSOD request:

1. Urgent imaging MRI orbit +brain FLAIR sequence
2. Consider spinal imaging but this can be arranged at a later date and should not delay getting an urgent MRI of orbits
3. AQP4-IgG and anti-MOG antibodies
4. If high likelihood (pain key feature) - commence PO/IV MP for 3/7 followed by oral prednisolone taper (baseline bloods, infective screen and CXR prior to commencing steroids)
5. If unsure of diagnosis or no pain await imaging results prior to commencing steroids
6. Urgent review to be arranged with ophthalmology consultant then urgent referral to neurology

Frisén grading of papilloedema Look at NFL, cup, vessels, swelling

Grade 0 papilloedema:



Minimal swelling of the nasal margin
NFL clear
No vessel obscuration
Cup, if present, not obscured

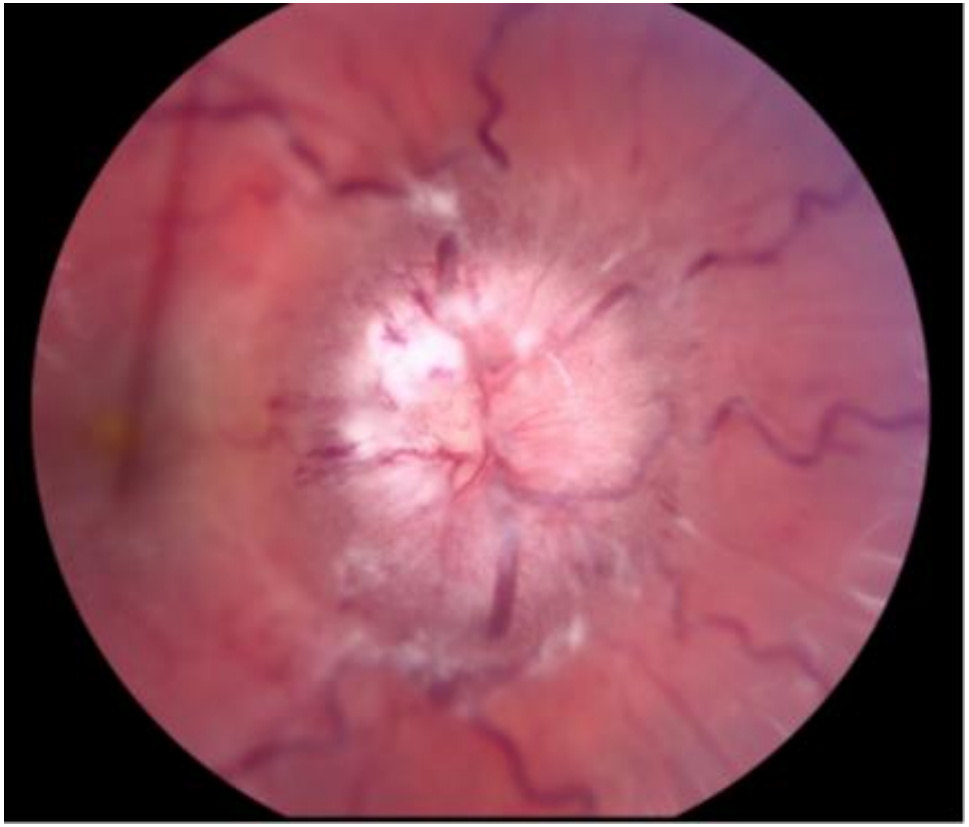
Grade 1 papilloedema:

230 degree C-shaped welling of the nasal, superior and inferior borders
Temporal margin is normal with sharp disc margin
Cup, if present, is maintained

Grade 3 papilloedema:

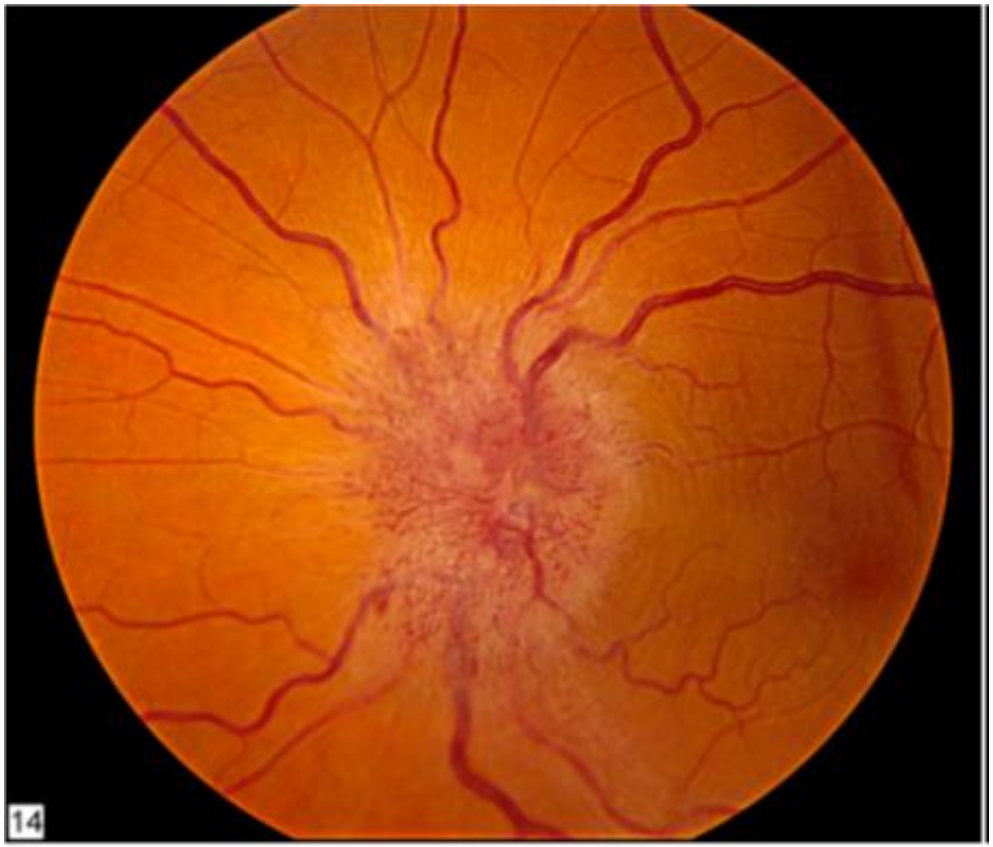
Elevation of the temporal margin
360 degrees disc swelling
No major vessel obscuration

Grade 4 papilloedema:



360 degree disc swelling
NFL opaque
Vessels largely, but **not completely, obscured on disc** and lost at the margin

Grade 5 papilloedema:



360 degree disc swelling
NFL opaque
Vessels **obscured on disc surface**

Other common findings in papilloedema:
Splinter, sub-retinal, pre-retinal and intra-retinal haemorrhages; retinal and choroidal “Paton’s” folds; nerve fibre layer infarcts; venous tortuosity; partial macular star; AION, BRAO, CRAO and vein occlusion and retino-choroidal collateral veins

DIPLOPIA

Monocular: Persists with monocular occlusion
Cause is ocular or refractive
Refer to clinic appropriately or discharge

Binocular: Due to abnormal ocular motility – see below

Double vision can be due to disease of:

Extraocular muscles (inc myasthenia, myositis)
Orbit (inc thyroid eye disease, space occupying lesion, inflammatory)
Cranial nerves
Brain

History

Monocular or binocular diplopia
Sudden or intermittent onset
Change with gaze direction or distance? (horizontal diplopia for distance is VI palsy unless proven otherwise)
Diurnal variation?
Pain?
Associated symptoms – headache, neurological symptoms
Past history: vascular risk factors, cancer, smoking

Examination:

Visual acuity
Eye movements
Look for anisocoria (dilated pupil in III palsy suggests aneurysm, Horner's syndrome in VI palsy suggests cavernous sinus lesion)
Ptosis (III palsy, myasthenia, Horner's syndrome) or lid retraction
Orbital signs
Cavernous sinus signs: Horner's syndrome, reduced corneal sensation
Cranial nerves (including corneal sensation)
Visual field to confrontation
Ocular examination
Dilated fundoscopy

Blood pressure
BM
ESR and CRP for giant cell arteritis if indicated
Orthoptic assessment if diagnosis uncertain

Always consider the possibility of giant cell arteritis

Further management

ALL patients with diplopia should be seen by Registrar or above.
Blenderm one lens of patient's glasses (orthoptics can supply plano spectacles with blenderm if required).

Patients should be warned not to drive with one eye occluded until they have had a 'period of adaptation' (usually 6 weeks) and not to drive with double vision

Consultant on call should be informed of ALL patients referred for scan or neurology opinion.

- **3rd Nerve palsy:** 10-20% due to aneurysm

III palsy cannot be said to be pupil sparing unless it is a COMPLETE III ie TOTAL palsy of SR, IO, IR and MR.
Pupil involvement or pain suggests aneurysm

ALL III palsies need an MRAngiogram or CTAngiogram scan the same day whether pupil sparing and painful or not .

- **Microvascular 3rd, 4th or 6th nerve palsy (unlikely under 50yo)**

FBC, U+E, glucose, cholesterol, ESR
Start aspirin 75mg od po unless contraindicated
Refer neuroophthalmology with OD for follow-up within 1 month

- **Diplopia plus disc swelling or other neurological involvement:**

Discuss with Consultant on call.
Consider referral to Neurology unless obvious orbital cause.

- **Bilateral sixth nerve palsies – consider raised intracranial pressure.**
- **Check blood pressure + urinalysis (exclude malignant hypertension)**
- **Discuss with neurology**

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Oculoplastics

The oculoplastic section includes:

- Acute orbit
- Peri-ocular lesions
- Lid malposition
- Lacrimal
- Orbital fractures
- Protocol for management of all eyelid / conjunctival lacerations and orbital injuries

Acute orbit

History:

Symptoms of acute infection, fevers, rigors
History of sinusitis
Any history of thyroid dysfunction or systemic symptoms associated
Previous history of orbital inflammatory disease
Systemic symptoms of ANCA Associated Vasculitis (GPA/EGPA)
Known systemic malignancy esp. lymphoma

Examination:

Document soft tissue involvement – mark extent if suspicion of cellulitis and document any necrosis, fluctuant swelling, crepitus or skin anaesthesia
Ptosis or lid retraction
Extraocular movements
Optic nerve function: Acuity, RAPD, colour vision
Exophthalmometry
Auscultate if any signs of CCF

Investigations:

Systemic observations – temperature, BP, pulse
FBC, ESR, CRP, U&Es and consider TFT+ TBII if suspicion of TED
CT orbits with contrast

Action:

- Consider admission
- If suspected orbital cellulitis follow protocol in paeds section
- Do not give steroids without consultation with oculoplastics consultants unless emergency situation with optic nerve compromise
- Consider NSAIDS whilst awaiting test results/definitive diagnosis
- Urgent discussion with oculoplastics consultants

Peri-ocular lesions

History:

How long have they noticed ANYTHING at that site?
Is it growing? Slowly or fast?
Any pain / tenderness / anaesthesia
Medications – any aspirin /clopidogrel / warfarin

Examination:

Palpate and stretch skin to assess true size then measure
Relation to other structures, i.e. lacrimal drainage, lid margin
Evidence of tissue destruction – loss of lashes, cicatricial ectropion
Evidence of deep fixation or orbital involvement (e.g. restricted eye movements)

Action:

Photograph if at all possible
Definite chalazia, small skin tags etc refer NP cyst list, (but remember BCCs frequently cystic)
BCC refer to oculoplastics routine (AJD or EB)
Any other lesions suspicious of malignancy discuss urgently with oculoplastic consultant (remember 2 week rule). Take patient telephone number and explain they may require a biopsy.

Lid malposition

Lower lid

Only refer if the patient is symptomatic and keen for surgical intervention

- Routine referral to oculoplastic clinic

Entropion: if the cornea is severely affected, give lubricants, advice about taping and consider referral to next available Botulinum clinic, as well as oculoplastics clinic.

If cornea no significant concern then refer to oculoplastics clinic or discuss with team for prompt surgery (ask if patient is on warfarin or anti-platelet treatments) NB. Short waiting list: most patients do not need botox.

Upper lid

Exclude neurological causes. Ask about diplopia.

Evert upper lid and palpate orbit to exclude a mechanical cause.

Aponeurotic ptosis: slow history; good levator function; high skin crease; often have evening fatigue (MG typically present on waking)

- Routine referral to oculoplastic clinic

Lacrimal

Acute: treat ocular surface or allergic symptoms.
Chronic: not appropriate for EED management or investigation (ie syringing)
- Routine referral to lacrimal clinic or oculoplastic clinic
Dacryocystitis: treat with warm compresses and oral antibiotics (co-amoxiclav 625mg TDS 10 days if not allergic)
- Soon referral to oculoplastic clinic

Lacrimal gland swelling:

Unilateral or bilateral?
Any signs of infection?
Inflammatory – investigations for sarcoid: CXR and serum ACE
Neoplastic – consider lymphoma
- Soon referral to oculoplastic clinic (within 2 weeks).

Orbital fracture

Examination:

- Restricted elevation
- Enophthalmos
- Surgical emphysema

NB. Severe pain or gaze evoked vasovagal symptoms esp in young person requires urgent surgery – discuss with max fac/oculoplastic team.

Action:

- Orthoptic assessment if available
- Fundus examination
- Maxfax referral if other facial fractures found/suspected (eg. zygoma)
- CT orbits if significant ocular motility restriction or enophthalmos, or child with vaso vagal symptoms

Preseptal and Orbital Cellulitis Guidelines For Children and Adults

Introduction and Definitions

Pre-septal cellultis is infection in the eyelid that has not spread posterior the orbital septum. This is a fibrous circumferential layer of tissue that is attached to the margin of the orbit and is continuous with the periosteum inside and outside the orbit. Orbital cellulitis is infection in the orbit, i.e.posterior to the septum. It is an emergency, that can rapidly cause blindness, and even, if not treated, death through extension to the brain. Orbital cellulitis most commonly derives from the sinuses, but occasionally comes from pre-septal cellulitis, particularly in young children as their septum is not fully developed

History

Enquire about and accurately and legibly record the following:

- Duration of symptoms
- Speed of development
- Visual symptoms: colour perception, visual blurring, diplopia
- Local symptoms: dental, sinus
- Systemic symptoms: fever, night sweats, nausea, vomiting
- Relevant history: facial/nasal trauma or surgery, facial wounds (even minor grazes or trauma), cosmetic procedures e.g. fillers or botox, insect bites, dental, sinus, lacrimal, chronic systemic or immune compromising conditions, diabetes
- Medications
- Last ate/drank (and what food if urgent surgery being considered)

Examination

- Area of eyelid swelling: accurately record including marking with skin and consider photographic record
- Visual function: acuity, colour vision, pupil reactions
- Eye movements
- Exophthalmometry
- Conjunctiva: injection, chemosis
- Intra-ocular pressure
- Fundus examination, but do not dilate pupil until pupil reactions accurately checked.
- Systemic: temperature, pulse, blood pressure
- Hard palate if mucormycosis suspected

Investigations

- Facial photograph and optic nerve photograph if possible, if function compromised.
- CT scan if suspicion of orbital involvement.
- Consider MRI as first line in children to avoid radiation dose[1-3]
- Review scan with oculoplastics fellow to:
- Determine if MRI necessary for better resolution of soft tissue infection.
- Assess sinuses to determine if ENT input required

Grading of Severity

Determine which of these groups the patient is in

- Pre-septal cellulitis
- Orbital cellulitis, with varying, sometimes co-existing subtypes:
- Diffuse orbital infection
- Subperiosteal abscess
- Orbital abscess
- Orbital cellulitis with intracranial extension

Differential Diagnosis

- Idiopathic orbital inflammatory disease
- Orbital vasculitis
- Severe inflammatory thyroid eye disease
- Necrotising fasciitis
- Dacryocystitis
- Dacryoadenitis

Medical Management

- Inform oculoplastic fellow
- Admit
- Nil by mouth
- Blood tests: FBC, U&Es, LFTs, ESR, CRP, blood cultures. Consider HIV, Hep B and Hep C testing if immune compromise or high-risk behaviour suspected
- blood culture: more likely positive in younger patients (positive in up to 33%7)
- Swab breaks in the skin or eye or discharge
- Mark around inflamed area
- Intravenous antibiotics: see page 48

Surgical Management

- Discuss with Oculoplastic Fellow/Consultants.
- Broadly:
    - Emergency surgery for:
        - Optic nerve compromise
        - Compartment syndrome
    - Urgent surgery for:
        - No improvement/worsening after 48 hours of antibiotics. Consider repeat CT or MRI scan prior to surgical intervention.
        - CT improvement generally lags behind that of the clinical picture (or might be worse) [8]
        - Loculated abscess
- Consider earlier surgical intervention risk factors for atypical bacteria or fungal infection.
- Medical management may be appropriate for subperiosteal abscess without optic nerve compromise
- **Note: resolution on CT might be delayed in comparison with clinical improvement**

Multidisciplinary Involvement

- Infectious Diseases/ Microbiology re antibiotics and if immune compromise
- ENT if sinus involvement
- Paediatrics for all children

Antibiotic Treatment Guidelines[5]

•**Adults**

Preseptal cellulitis

	Penicillin tolerant	*Penicillin Allergy, IgE or non IgE*
Mild/Moderate	Amoxicillin /Clavulanate PO 625mg TDS for 7 days	Clindamycin 300-450mg QDS PO for 7 days
Severe	Amoxicillin /Clavulanate 1.2g QDS IV for 7 days	Clindamycin 1.2g QDS IV 7 days

All Orbital Cellulitis

	Penicillin tolerant	*Penicillin Allergy, non IgE (i.e. delayed rash)*	*Penicillin Allergy, IgE (i.e Anaphylaxis)*
IV treatment, duration according to clinical response	Ceftriaxone 2g OD IV, Metronidazole 500mg TDS IV	Ceftriaxone 2g OD IV, Metronidazole 500mg TDS IV	Clindamyin 1.2g QDS IV, Ciprofloxacin IV 400mg bd
Oral switch if clinically significant improvement	Amoxicillin /Clavulanate 625mg TDS for 7 days	Clindamycin 300-450mg QDS PO for 7 days Ciprofloxacin 500-750mg bd (weight based)	Clindamycin 300-450mg QDS PO Ciprofloxacin PO 500-750mg -7 days

Children

Preseptal cellulitis

	Penicillin tolerant	*Penicillin Allergy, IgE or non IgE*
Mild/Moderate	Amoxicillin /Clavulanate 250/62 0.3mL/kg BD PO for at least a week	Clindamycin 3–6 mg/kg QDS PO
Severe	Amoxicillin /Clavulanate 30mg/kg QDS IV for at least a week	Clindamycin 20-40 mg/kg divided q6-8h IV

Paediatric Orbital Cellulitis

	Penicillin tolerant	*Penicillin Allergy, non IgE (i.e. delayed rash)*	*Penicillin Allergy, IgE (i.e Anaphylaxis)*
IV treatment, duration according to clionical response (Approx 2-7 days of intravenous)[6]	Ceftriaxone 50mg/kg OD IV*, Metronidazole IV 7.5 mgs/kg TDS	Ceftriaxone 50mg/kg OD IV*, Metronidazole IV 7.5 mgs/kg TDS	Clindamycin 20-40 mg/kg divided q6-8h IV, Ciprofloxacin IV
Oral switch if clinically significant improvement	Amoxycillin /Clavulanate 250/62 0.3mL/kg BD PO	Clindamycin 3–6 mg/kg QDS PO, Ciprofloxacin PO	Clindamycin 3–6 mg/kg QDS PO, Ciprofloxacin PO

* If < 1month old switch Ceftriaxone for Cefotaxime IV

Appendix

Likely Organisms

- Staph aureus , Strep pyogenes, Strep pneumoniae
- Haemophilus influenzae, anaerobes
- Consider Mucomycosis/Aspergillosis in patients with diabetic ketoacidosis or immunosuppression → refer to ID/ Microbiology

Computed Tomography Radiation and Cancer Risk[1-3]

- Risk of leukaemia positively associated with estimated doses of radiation delivered to red bone marrow and risk of brain cancers positively associated with doses delivered by CT to the brain.
- 2-3 head scans triples the risk of brain cancer in children within the next 10 years
- 5-10 head scans triples the risk of leukaemia in children within the next 10 years
- However, the individual risk is still very low:
    - Estimated lifetime risk of leukaemia in child from one paediatric CT head is 1:10,000
    - Estimated lifetime risk of brain cancer from one paediatric CT head is approx 1:2000
- No estimates in the literature yet for risk of causing other tumours
- **But this highlights that CT should only be done if clinically justifiable, particularly in children**

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Paediatrics

The paediatric section includes:

- Neonatal conjunctivitis
- Orbital cellulitis
- Leucocoria
- Paediatric glaucoma
- Acute sudden onset strabismus
- Conjunctival/corneal abrasion
- Ocular trauma
- Post-operative squints
- NAI screening

Neonatal Conjunctivitis (Ophthalmia Neonatorum)

Defined as conjunctivitis occurring in the 1st month after birth.

History taking to include:

Method of delivery
Onset of symptoms (N Gonorrhoea more likely 1st 24 – 48 hours post-partum)
(Chlamydia 5 – 14 days post-partum)
Child's general health – feeding/ respiratory / temperature
Parental GU symptoms

Symptoms

Purulent discharge
Conjunctival chemosis
Lid swelling

Management

Swab both eyes – send for Gram stain, M, C + S including Chlamydia for PCR
Check temperature – assess general state of child (Chlamydial pneumonia)
Discuss with paediatrician on call

Urgent microscopy to exclude N Gonorrhoea
If gonorrhoea +ve refer directly to paediatricians for IV therapy
Else treat with po erythromycin suspension 12.5mg/kg/day qds for 14 days.

Parents to attend GUM clinic if swabs positive
Chlamydial conjunctivitis is a notifiable disease

Follow-up

Refer **SOON** to paediatric ophthalmology clinic

Paediatric Leucocoria

Defined as a white pupil. Variety of causes at different ocular levels.
The most important cause to exclude is retinoblastoma.
Other potential causes include corneal opacities, cataract, uveitis, vitreous opacities, PHPV, Coats' disease, retinal detachment

History taking

- Duration
- Family history
- Maternal health during pregnancy - TORCH
- Parental concerns about vision – note may be asymptomatic
- Other medical problems – Down's / metabolic disorders

Signs

- Leucocoria
- Absent / decreased red reflex

Management

Assess both eyes – may be bilateral
Assess for RAPD – cataract does not cause an RAPD
Assess for other ocular abnormalities
Determine at what ocular level leucocoria is present – e.g. lens / retina / cornea

Dilated fundal examination mandatory (Age <6/12 use cyclopentolate 0.5%, else 1%)
May need speculum examination
If retinoblastoma suspected **immediate** referral to consultant
Else prompt referral to paediatric ophthalmologist

Follow up
Urgent paediatric ophthalmology clinic
IF THERE IS ANY SUSPICION OF A TUMOUR OR FUNDAL LESION YOU MUST SPEAK TO THE PAEDIATRIC CONSULTANTS OR CONSULTANT ON CALL BEFORE THE CHILD LEAVES THE HOSPITAL

Paediatric Glaucoma

Elevation of pressure associated with optic nerve damage. 80% of primary congenital glaucoma presents within 3/12.

Suspicious symptoms in history taking

	Epiphora
	Photophobia
	Rubbing of eyes
	Enlargement of eyes
	Comparison of photos if possible
	Family history
	Aphakia / Intraocular surgery e.g. cataract extraction
Signs	Blepharospasm
	Corneal enlargement / opacification, Haab's striae
	Buphthalmos (large eyes, thin sclera)
	Optic disc cupping
	Reduced acuity

Management

<u>Urgent</u>
Attempt IOP measurement – optician can undertake non contact tonometry
Diamox 5mg/kg/qds, **do not** use brimonidine (respiratory depression)

<u>Follow up</u>
Urgent paediatric ophthalmology clinic for consideration of surgery – discuss with consultant

Acute sudden onset squint

Most commonly esotropia. Need to exclude nerve palsy (commonly VI) and fundal pathology.

History taking

- Birth / peri-natal history
- Family history
- Actual duration of symptoms
- Evidence of longstanding squint
- Constant / Intermittent symptoms
- General health – temperature, rash, vomiting, drowsiness, poor feeding, headache

Signs

- Eye misalignment
- Limited eye movements
- Pupillary assymetry
- Ptosis

Management

Examine eye movements – cover test if possible
Orthoptic assessment if unclear
Assess pupillary reactions
Cycloplegic refraction
Dilated fundus examination – assess for papilloedema, retinal pathology

If cranial nerve palsy / papilloedema – liaise with paediatrician
Urgent imaging – see neuro-ophth guidelines
Inform consultant on call

If fundal pathology deal with as appropriate

Conjuctival / Corneal abrasion including chemicals

Depending on the age of the child determine VA if possible. Try to find out the nature of the substance causing the abrasion / burn.

History taking

Witnesses (especially in case of preverbal children)
Nature of substance (acid / alkaline, liquid / solid / gas)
Duration of symptoms

Signs

Lid involvement (chemosis, burn)
Intense photophobia + blepharospasm
Corneal involvement (epithelial, stromal)
Conjuctival adhesions / scarring
Anterior chamber inflammation

Management

- Examine anterior segment (may prove challenging)
- Determine extent of epithelial defect / burn with fluorescein staining
- Assess pupillary reaction
- Dilated fundus exam
- Involve consultant on call if extensive chemical burn and /or signs of limbal deficiency to consider admission (liaise with Paediatric ophthalmologist)
- Involve Paediatric ophthalmologist if examination difficult and / or unsure of findings
- Treatment and follow up according to extent and cause of damage (see corneal guidelines) remember drops can be quite difficult to instil in a child in pain. No need to routinely follow up simple corneal abrasions – clear SOS advice

Ocular trauma: Penetrating + Perforating, Blunt trauma

It is very important to determine and document VA asap since it is the most reliable indicator of visual prognosis. Be aware of child abuse on every case of child trauma if the history and physical finding do not fit.

History:	Dynamics of trauma Type of objects causing trauma (sharp / blunt) Potential for penetrating injuries (projectile) Possibility of contamination Eye problems prior to trauma (amblyopia, squint ect)
Signs:	Proptosis Enophthalmos Eyelid involvement (oedema, laceration, ptosis) Restriction of eye movements Corneal / scleral laceration Hyphema Shallow anterior chamber Pupillary reaction Dislocated lens Vitreous haemorrhage

Management

Asses both eyes (often there is damage to both)
Penetrating + perforating trauma involve consultant on call (admit)
Blunt trauma with hyphema and raised IOP may need admission depending on age of child (involve consultant on call)
A dilated fundus exam is mandatory in all cases B scan should be performed in those cases when fundus evaluation is not possible because of media opacities (hyphema, cataract, vitreous haemorrhage)
Gonioscopy should be performed before fundus dilation comparing to the other eye

Follow Up

Depending on severity of trauma may be appropriate to involve paediatric ophthalmologist (seek consultant on call advice)

Post-operative squint surgery

Most of the cases will be post-operative inflammation but be aware of potential complications such as granuloma or cyst formation. Preseptal or orbital cellulitis is rare but well documented. Anterior segment ischemia is uncommon but still possible especially in redo operations. Endophthalmitis is extremely rare in squint surgery but has the same devastating effect as in intraocular procedures.

History	Systemic symptoms (fever, malaise)
	Temporal relation of symptoms onset to squint surgery
	Sudden onset of diplopia following initial satisfactory outcome
Signs	Lid swelling
	Conjuctival chemosis
	Eye misalignment disproportionate compared to type of surgery
	Ciliary injection
	AC inflammation

Management

Involve paediatric ophthalmologist in all cases of serious complications above mentioned. A slipped or lost muscle is easier to fix the sooner the patient is brought back to the operating theatre. However muscles can slip even many years after squint surgery. Hence temporal relation of symptoms points to the correct level of urgency for every individual patient.

Suspected NAI retinal screening

The referring paediatrician contacts the ophthalmology registrar on call, they see the child and if they are happy they have performed a satisfactory examination and there are no haemorrhages, no further action is taken.

If there are haemorrhages or the examination is incomplete, then the paediatric team (Mr Heath/Mrs Barrett) or the on call consultant should be contacted.

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Uveitis

GENERAL COMMENTS ABOUT TERMINOLOGY & DIAGNOSIS

This brief guidance on management of uveitis in the Sussex Eye Hospital A+E is intended to help make appropriate initial treatment, investigation and follow up decisions. It is far from a comprehensive uveitis guide and it is important for clinicians to exercise their judgement on a case by case basis and seek advice when unsure of the best management.

Uveitis refers to the presence of intraocular inflammation. A specific diagnosis or aetiology for each case may inform on prognosis and guide management, although to start with a clear anatomic classification and exclusion of infectious causes is sufficient to initiate appropriate treatment and follow up.

The anatomical and clinical classifications of uveitis are the cornerstones of diagnosis.

ANATOMICAL CLASSIFICATION

This defines the anatomical location of inflammation in the eye.

· Anterior uveitis: Anterior chamber
· Intermediate uveitis: Vitreous cavity
· Posterior uveitis: Retina and / or choroid
· Pan-uveitis: All above locations equally involved

CLINICAL CLASSIFICATION

This defines the clinical association or aetiology of the inflammatory process – the important distinction being between non-infective and infective causes.

· Non-infective with no known systemic association (e.g. isolated AAU, birdshot retinochoroiditis)
· Non-infective with known systemic association (e.g. ankylosing spondylitis, sarcoidosis, Behcet's disease)
· Infection-related (eg viral retinitis, TB, toxoplasma, syphilis, endogenous endophthalmitis)
· Masquerade – can be non-malignant (e.g. uncontrolled diabetic retinopathy) or malignant (e.g. intraocular lymphoma)
· Medication induced (e.g. oral rifabutin, alphagan drops)

PRINCIPLES OF MANAGEMENT

CLINICAL HISTORY

- Immune status – Be on alert for immunosuppression/immune compromise, recent surgery or sepsis/infection, older age, malignancy all indicate higher risk of infectious cause.
- Systemic symptoms – to give clue about aetiology. Enquire about oral/genital ulcers, rashes, respiratory symptoms, joint/back pain, bowel symptoms, travel history, TB risk/contacts
- A past history of uveitis reduces the risk of this presentation being infective (bacterial/viral/fungal/protozoal) in aetiology. Most cases of infective uveitis will present acutely and floridly and with no past history of intraocular inflammation.

EXAMINATION

VA + IOP – at triage
Anterior - assess AC activity, iris for nodules/atrophy, band keratopathy, posterior synaechiae
Then DILATE both eyes - This is essential to assess posterior segment activity. Look for cataract, vitritis, retinitis, choroiditis, retinal vasculitis, macular oedema (OCT) or disc swelling.

MANAGEMENT

Anterior uveitis only, no identifiable systemic association in history.

- Investigations are not usually necessary (with the exception of simultaneous bilateral onset).
- Topical treatment depending on severity of anterior chamber activity (4 x per day maxidex or predforte may suffice for mild cases initially; hourly drops for more aggressive inflammation). Taper drop frequency over 1 to 2 months. Dilate pupil with cyclopentolate 1% once or twice a day for first week or until under control.
- Follow up: in A+E for first episode or in those with known IOP rise previously – e.g. 1 or 2 weeks but may be sooner in some cases. Recurrent anterior uveitis without pressure problems do not usually need follow up but can be advised to return if symptoms don't settle down with the course of topical treatment.
- Please do not routinely book simple anterior uveitis into Uveitis clinic. Exceptions to this include: uveitis in a child, anterior uveitis with macular oedema, non-resolution, uncontrolled pressure rise.

Anterior uveitis only, with suspected systemic association in history or known associated disease.

- Consider if investigations (see below) are necessary (not if known associated disease e.g. sarcoid)
- Treatment may vary from above – e.g. tapering topical treatment to zero in patients with sarcoid is likely to lead to relapse
- Consider referring to Uveitis clinic, or discussing with Mr Hughes / Dr Ortiz

Posterior segment intraocular inflammation (with or without anterior uveitis)

- **Look for hallmarks of infection in case emergency treatment necessary** – risk factors in history (see above), granulomatous KPs, retinitis
- Investigations most likely required if not already done
- Manage anterior chamber inflammation topically
- If deemed necessary (e.g. if infective cause suspected), discuss treatment for posterior segment disease with on call consultant or Mr Hughes / Dr Ortiz
- Refer to Uveitis clinic in timeframe dependent on acuteness of presentation (discuss if unsure).

INVESTIGATIONS

In general a basic uveitis screen would include:
- Chest X ray
- Blood tests – Syphilis serology, sACE, FBC, U+E, LFT, CRP, ESR

Other targeted tests may be appropriate for specific cases depending on history and clinical findings including:
Toxoplasma serology
HLA B27
T Spot (TB)
ANA (children only)
Lyme serology
Bartonella serology
HLA A29 (Birdshot chorioretinopathy)

NB - ANCA and RhF are not useful tests for uveitis but are necessary for investigating scleritis.

SCLERITIS

Suspected scleritis should trigger a clinical history for related causes (RhA, vasculitis) – joint pain, rashes, respiratory symptoms, nose bleeds, ear pain/swelling.

Investigations should include: urinalysis, BP, CXR, FBC, U+E, LFT, CRP, ESR, ANCA, RhF
Initial management:

- for anterior scleritis can be NSAIDs (if not contraindicated), such as Flurbiprofen 50mg TDS or Indomethacin 50-100mg BD.
- Posterior scleritis will often require oral prednisolone if chorioretinal signs present.

Follow up: Uveitis clinic

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Medical Retina

The Medical Retina section includes:

- Age-related Macular Degeneration—Dry or neovascular; new or existing treated neovascular AMD
- Myopic Macular degeneration
- Diabetic Retinopathy and Macular oedema
- Retinal Vein Occlusion
- Intravitreal injection complications
- Central Serous Retinopathy
- Retinal Artery Occlusion

In general, diagnosis of medical retina conditions requires knowledge of likely symptoms, a fair amount of proficiency in examining the fundus by slitlamp biomicroscopy with indirect lenses (90, 78 or 60 dioptre) and some ability to interpret OCT scans.

DRY AGE-RELATED MACULAR DEGENERATION

Symptoms—reduced central visual acuity, difficulty with close work, inability to read even with reading glasses

Signs—can be few drusen or focal retinal pigment changes i.e. hyper or hypopigmentation or areas of geographic atrophy

Investigations—OCT to rule out exudative AMD if there is clinical suspicion

Management—explain condition to patient. Currently no treatment is available for dry AMD.

Explain regarding monitoring central visual acuity in each individual eye, particularly looking for central scotoma, distortion where straight lines appear wavy, difficulty seeing faces or reading text on TV etc. An Amsler grid is not necessary and everyday objects can be used to monitor changes in vision. Explain importance of reporting quickly to their optician or to EED in hours (out of hours attendance not required).

Information leaflet is available in the department; this includes advice regarding healthy diet with plenty of fruits and vegetables and smoking cessation advice.

Follow-up —If vision severely affected, may be eligible for registering as sight impaired, or may benefit from low vision aids (LVA), this can be achieved with an LVA appointment without need for a doctor clinic visit. Please contact Amanda Dean (Eye Liaison Officer) on extension 67528. If she's unavailable then please email her (amanda.dean7@nhs.net) with the patient details, outcome of their A&E attendance/reason they are being referred to her and she will make contact with the patient. Please make sure you fill out the diagnosis and VA (Page 2) and have the patient sign the consent page (Page 5), then place the CVI form on her desk, or in her in-tray in the prep room (this is something you can ask the EED nursing team to do). The consent page only needs to be completed if Amanda is not available to see the patient on the day.

NEOVASCULAR AGE-RELATED MACULAR DEGENERATION (EXUDATIVE OR WET AMD)

New presentation:

Symptoms— affects patients over 50 years age. Recent onset central distortion, duration of symptoms (this is usually in weeks or days), reduction in near vision, recent difficulty with close work, central scotoma or referred with changes seen by optician at regular sight test.

Previous ophthalmic history especially glaucoma or cataract surgery
Enquire about smoking (current or previous) and driving status

Signs—central macular haemorrhage which can be red intraretinal or dark subretinal, pigment epithelial detachment seen as a central raised area on slit lamp indirect ophthalmoscopy, cystoid macular oedema, exudates clustering around fovea with a suggestive raised lesion.
Similar signs may be seen in a peripapillary distribution with central intraretinal fluid
Orange-brown nodules of polypoidal choroidal vasculopathy may also be noticed
Signs of dry AMD as detailed above may also coexist in the same eye or the fellow eye.

Investigations—OCT to detect intra or subretinal exudation or PED. Please look at OCT and write down your impression. Ask a senior if unsure.

Treatment - Seek advice from Medical Retina team either in person if there is a Macula clinic running that session or email the team for advice (uhsussex.sehmacularreferrals@nhs.net). Please do not routinely book FFAs from EED without consulting the Medical Retina team. Provide patients with an information leaflet regarding Macula treatment if you are reasonably sure of the diagnosis. Intravitreal injections should not be performed directly from EED, but should go via the Macula team. If you're confident with diagnosis then please e-mail Alison Pullen and/or Lesley Standen (alison.pullen1@nhs.net and/or lesley.standen1@nhs.net) asking them to book the patient for 3 loading intravitreal Anti-VEGF injections. You then have to complete the orange form, consent form and yellow prescription form (there are pre-prepared packs with the required paperwork).

Give dietary and smoking cessation advice as above. Advise regarding monitoring central vision in other eye as above.

Nutritional supplements may be used to reduce risk of other eye progressing to neovascular AMD—these are not prescription medicines but are available to buy at most chemists/ pharmacies.

If they do not meet the NICE treatment criteria (i.e. VA worse than 6/96 or better than 6/12) then consider commencing Intravitral Avastin. In patients with poor vision, consider eligibility for certificate of visual impairment or requirement for low vision aids and refer accordingly to clinic (see follow up advice for dry AMD as above).

Patients known to have exudative AMD

Patients already diagnosed and receiving anti-VEGF treatment may present with new symptoms due to worsening of their condition.

Symptoms and signs are the same as for new wet AMD as above.

History—ask regarding duration of symptoms, interval since their last injection

Look at Medisoft to get further details about their previous treatment (Lucentis or Eylea or Avastin).

Investigation—OCT to document any changes.

Management—If the interval since their last antiVEGF injection is >4 weeks, they may warrant another injection. Seek advice from Medical Retina team (uhsussex.sehmacularreferrals@nhs.net).

If interval since injection is less than 4 weeks, check that they have their next macula clinic appointment or injection appointment and advise them to keep it. If you are unsure or think they may need a sooner review then please discuss or email Medical Retina team (uhsussex.sehmacularreferrals@nhs.net).

For any other complications of injections see below in later section

MYOPIC MACULAR DEGENERATION

Signs and symptoms similar to exudative AMD, however the patients may be much younger and are usually highly myopic.

Investigation and management should be as for new exudative AMD (see above). **These OCTs can be difficult to interpret** and so there should be a high index of suspicion when symptoms are significant in somebody with axial myopia even if there isn't fluid apparent on OCT. These patients need to be booked urgently (1-2 weeks) into a macula clinic for the consideration of treatment with intravitreal Lucentis or Eylea.

DIABETIC RETINOPATHY AND MACULAR OEDEMA

Sussex Eye Hospital is the base for the regional retinopathy service. If there appears to be proliferative or pre-proliferative retinopathy or diabetic macular oedema on photographs, patients will be referred for further assessment.

If patients attend our EED department with proliferative diabetic retinopathy then PRP should be done on the day or booked for urgent PRP within 2 weeks. If patient presents with vitreous haemorrhage then please refer to the VR guidelines section on vitreous haemorrhage for advice on management.

Patients with diabetic macular oedema that fulfill the NICE criteria for intravitreal anti-VEGF or Ozurdex then please refer to the macular clinic within 6 weeks for consideration of treatment. If they have evidence of macular oedema but **do not** fulfill the NICE criteria for intravitreal treatment then please refer to clinic within 3 months.

RETINAL VEIN OCCLUSION (Central, branch or hemiretinal)

Symptoms range from mild blurring to field defects to total loss of vision in one eye. This may also be noticed by their optician and referred to EED.

History—ask about duration of symptoms, past ophthalmic history especially glaucoma, medical history specifically regarding hypertension, diabetes and raised cholesterol. In younger patients(<45), ask regarding haematological problems or history of vasculitis.

Signs—document best corrected visual acuity, intraocular pressure and look for afferent pupil defect. Look for rubeosis iridis preferably before dilating. Fundus examination will reveal superficial and deep retinal haemorrhages affecting the entire retina in CRVO or one sector in BRVO or one half (superior or inferior) in HRVO. Macular oedema, tortuous engorged retinal veins, cotton wool spots and swollen optic disc may be present. Features suggesting ischaemic CRVO are vision <6/60, relative afferent pupil defect, numerous cotton wool spots and should trigger searching for new vessels on the iris, disc or retina.

Investigation— Please check blood pressure, full blood count, random glucose and ESR on the day to help look for systemic associations which can be flagged up to their GP. OCT should be done if macular oedema is suspected.

Management

Explain the condition and need for repeated review to the patient. Information leaflets are available

Of systemic associations--Any abnormal blood results should be communicated to the patient's GP. Please do not advise aspirin in EED. This is the responsibility of their physician as it requires various other bits of clinical information which would not be available in the eye department.

Of the eye—If there is evidence of glaucoma or ocular hypertension, pressure-lowering medication should be commenced right away. This is especially important for the fellow eye.

Macular oedema may need treatment with intravitreal steroid or antiVEGF—make an urgent referral to Medical retina clinic to be seen within 4 weeks. Mild BRVO may resolve spontaneously and may be observed depending on the overall clinical picture.

Ischaemic VO without rubeosis should be followed up in the medical retina clinic to watch for rubeosis /angle neovascularisation.

Ischaemic VO with rubeosis or new vessels on the disc or retina needs urgent panretinal photocoagulation – please perform that yourself as soon as possible or arrange for them to have an urgent appointment in the laser clinic within 2 weeks. These patients may also benefit from urgent intravitreal Avastin to control the rubeosis – please seek advice. If IOP is raised then that needs to be managed medically in the first instance, please discuss with Medical retina team and/or glaucoma team for further management.

If patient presents with vitreous haemorrhage then please refer to the VR guidelines section on vitreous haemorrhage for advice on management.

Follow up - All cases of retinal vein occlusion need to be reviewed in the Medical retina clinic within 2 months unless sequelae such as macular oedema is already present then please refer urgently within 4 weeks.

INTRAVITREAL INJECTION-RELATED COMPLICATIONS

Innocuous—the following need only reassurance. Injection information leaflets are available to explain.

- Conjunctival hyperaemia
- Sub-conjunctival haemorrhage
- Few floaters or visible air bubble/ steroid pellet
- Ocular surface features of dry eye—lubricants may be given.
- Post-injection corneal abrasion--Treat as any other abrasion.

Follow up for all above — keep their scheduled review appointments. Care should be taken not to give the patient the impression that they have developed an ‘allergic reaction’ to any of the drops or drugs unless this is truly the case.

Major—sight-threatening

Post-injection endophthalmitis

Symptoms—Rapid blurring or reduction of vision within 48-72 hrs of injection, numerous floaters, severe pain persisting to next day, sticky discharge.

Signs—Reduced VA from previous visit, cloudy cornea, flare and cells in anterior chamber, vitreous haze or cells or poor view of fundus.

Management - These need to be treated as infective and need urgent vitreous tap and intravitreal antibiotics. The on-call registrar and consultant have to be informed, and microbiology (refer to the endophthlamitis guidelines).

Post-injection raised pressure

Small volume injections (0.05ml) are unlikely to cause a significant rise in IOP. In all cases where patients are symptomatic with pain or reduced vision immediately following injection then IOP should be measured. If the IOP is raised risking non-perfusion of the central retinal artery, immediate intervention is indicated such as an anterior chamber paracentesis (care should be taken if the patient is phakic) or acetazolamide and digital massage.

CENTRAL SEROUS RETINOPATHY

Symptom--disturbance in the central vision, which is variously described as a central cloudy/ grey/ brown/ blurred patch, remains in the same location. Ask regarding steroid treatment—any current or previous use in any form including non-prescription for body building, inhaled for asthma, nasal sprays for allergies.

Signs—Reduced visual acuity, may improve with +1D lens, Ring reflex around fovea, Raised area in macula with loss of foveal light reflex, RPE changes in same or fellow eye indicating previous episodes

Investigations - OCT helps to document subretinal fluid and can be used as baseline.

Management—no treatment required in the majority of patients. Explain self-limiting nature of this condition.

Information leaflets are available.

Follow up—routine referral to Medical retina clinic within 3 months unless worsening then they should be advised to get in touch. If you are unsure of the diagnosis then please discuss with the Medical Retina team either via e-mail or in person depending on urgency.

RETINAL ARTERY OCCLUSION

This can be either central or branch retinal artery occlusion.

Symptoms range from a small field defect in BRAO to sudden painless total loss of vision in CRAO.

Asymptomatic incidental arteriolar emboli do not require any investigation or management from EED. If incorrectly referred by opticians, they are to be referred back to the GP for assessment of vascular risk factors.

History—ask about GCA symptoms if of appropriate age, hypertension, diabetes, cholesterol and smoking.

Signs
Signs of CRAO–afferent pupil defect, no perception of light or just PL/ HM vision, cherry red spot on fundus examination, discontinuous segments of the blood column in retinal arteries (cattle trucking).

Signs of BRAO—Retinal ischaemia in one quadrant or smaller area

Management—this should be treated as a TIA and the stroke risk needs to be evaluated. A local TIA clinic referral should be made electronically on Panda. Please organise all blood investigations and commence on anti-platelet according to the stroke team protocol. Patients should be advised not to drive for a month or at least until they are seen in the TIA clinic.

In acute RAO (<8 hours), measures to re-establish circulation can be tried, such as IV acetazolamide 500mg, rebreathing into a paper bag, globe massage or limbal paracentesis.

If risk of GCA check inflammatory markers and treat accordingly (see neuro-ophthalmology section).

Follow up—This needs a routine referral to the Medical Retina clinic to ensure the patient has had a review at the TIA clinic and that their stroke risk has been assessed. This also helps to check that the patient has access to low vision services or ECLO if required.

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Vitreoretinal

The VR section includes:

VR team timetable and on-call cover arrangements
Flashes and floaters
Vitreous haemorrhage
Retinal tears
Retinal detachments

Penetrating ocular trauma
IOFBs
Centre-involving macular haemorrhage
Full-thickness macular holes
Vitreomacular traction
Lamellar macular holes with or without epiretinal membranes or pseudoholes
Epiretinal membranes

On –call arrangements

During working hours please contact the VR fellow or VR consultant that is on site as per the weekly time table sent out via email by Claire Mohns.
Out-of-hours please contact the VR fellow in the first instance unless she/he is on leave then please contact the VR consultant.
The 2 VR consultants are on-call alternate weekends and cover bank holidays subject to leave, please consult the weekend VR on-call rota that can be found as part of the Ophthalmology weekend plan on the Team Drive (T:).

FLASHES AND FLOATERS

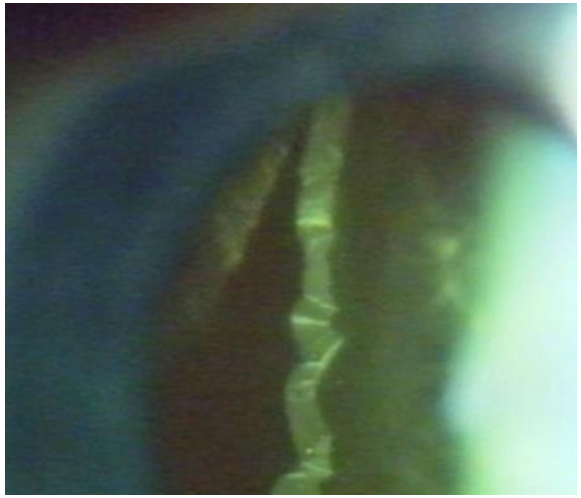
History:
Duration, nature of onset, description of symptoms (what kind of “flashes”, floaters, field defect), POH, PMH, FH

Features suggestive of increased risk of retinal tear and/or detachment:
- Sudden onset in one eye
- Flashes (pathognomic features of temporal photopsia described as momentrary arc of light in the temporal field of vision) **and** floaters rather than just one symptom alone
- Multiple floaters
- Complaint of reduced quality of vision
- High myopia
- Previous retinal tear/detachment
- Predisposing syndrome (Sticklers, Marfans)
- Recent onset of symptoms (<2 weeks)
- Recent significant ocular injury (blunt, sharp iatrogenic or traumatic)
- Family history of retinal tear/detachment

Examination:
Acuity, **pigment cells in vitreous**, preretinal/vitreous haemorrhage, vitreous syneresis, presence or absence of posterior vitreous detachment (PVD) by looking for the typical posterior hyaloid membrane appearance in a patient with PVD (see below) or presence of a Weiss ring, lattice degeneration, retinal tears, retinal detachment

Posterior hyaloid membrane in PVD:
- Continuous, discrete, highly creased/crinkled, and refractile membranous sheet (Figure 1)
- Observed by slit-lamp dynamic vitreous biomicroscopy with a wide illumination observation angle
- Dynamic examination performed by asking the patient to look up and then observing the vitreous

Figure 1: Slit-lamp biomicroscopy images demonstrating the clinical appearance of the posterior hyaloid membrane in a patient with posterior vitreous detachment



Features suggestive of increased risk of tear and/or detachment

- Reduced corrected acuity
- ***Pigment cells in vitreous***
- Signs of previous vitreoretinal disease in the same eye or fellow eye

NB Perform dilated fundal examination of BOTH eyes

Management:

The reasons for seeing patients with acute-onset flashes and/or floaters are:

- To identify retinal breaks before a retinal detachment occurs, and treat prophylactically (see below)
- To exclude a retinal detachment already present

It should be possible for the vast majority of these cases to be examined carefully in EED and discharged; if the EED practitioner does not feel confident to exclude a retinal break then the opinion of a more senior doctor (usually the EED registrar) or the Vitreoretinal fellow should be sought at that visit, especially if pigment cells are seen in the vitreous.

Please refer to floaters flow chart below (Appendix 1) that is useful when triaging these patients over the phone as some can be booked into our floaters clinic on a Thursday AM.

VITREOUS HAEMORRHAGE

PVD related

Where there is sufficient view of the fundus to exclude tears can be discharged with a PVD leaflet which has SOS symptoms for the patient to return if they deteriorate.

If the vitreous haemorrhage is significant (there is some view of the retina and retinal tears cannot be ruled out with certainty due to poor view) the case should be discussed with the VR fellow or consultant on an urgent basis.

If there is no fundal view due to vitreous haemorrhage then B scan should be performed to rule out RD, and the VR fellow or consultant should be informed on an urgent basis. In these patients there is a significant risk of a retinal detachment occurring that may go undetected. Such patients should **not** be monitored with serial ultrasound scans. In the absence of other explanations for the haemorrhage (e.g. known proliferative diabetic retinopathy, previous BRVO) the VR team will generally manage these patients like macula-on retinal detachments and will proceed to early vitrectomy.

Acute spontaneous vitreous haemorrhages (with no or inadequate retinal view) non-PVD related

Recurrent in diabetic with known treated PDR:
Observation, perform US scan and refer to VR clinic in 6-8 weeks.

First haemorrhage in diabetic who has not received PRP:
Perform US scan same day, to ensure retina flat then clinic in 2-3 weeks. NB if adequate fundal view PRP should be performed as soon as possible.

Recurrent or first haemorrhage in known retinal vein occlusion:
Check for iris neovascularisation, check IOP. Perform US scan same day to ensure retina is flat. Discuss with the retinal team if recent CRVO (within last 3 months) or iris new vessels present. Otherwise refer to the VR clinic to be seen in 4-6 weeks.

RETINAL TEARS

Initial treatment is the responsibility of the on call / A&E doctor. In most cases these patients do not need to be referred to the VR team for laser. Exceptions would be cases in which the on call doctor is unable to perform adequate laser (- he/she should notify the VR fellow or VR consultant) or associated with vitreous haemorrhage (see above).

The laser can be used out-of-hours, bearing in mind that the laser room is located two floors away from the ward. Doctors treating such patients should inform the nursing staff on Pickford ward that they are taking the patient for laser. In some cases it may be appropriate to ask a nurse to accompany the patient downstairs. Keys to the laser are kept in the cupboard in the laser room.

Patients with retinal tears that are treated adequately can then be followed up 2 weeks later, ideally by the treating doctor, with the usual SOS symptoms explained.

RETINAL DETACHMENTS

Sussex Eye Hospital is a tertiary referral centre for vitreoretinal surgery and we endeavour to provide a high-quality service to the peripheral hospitals that refer to us and to patients presenting to our own A&E.

Telephone calls may be received via A&E or Pickford if out of hours. Depending on the presentation, patients may be asked to come in straight away, or in the following days either to the pre-operative ward round or one of the retinal clinics. Please liaise with the VR fellow/consultant to advise on best course of action.

Questions that are useful to ask the referring doctor to facilitate surgical planning:

- Duration of symptoms
- Refractive status
- Age of patient
- Other past ophthalmic history of note
- Visual acuity
- Macula on or off?
- If macula-off, how long for? (longer history of mac-off = less surgical urgency)
- Phakic / Pseudophakic
- Presence of PVD
- Location of detachment – What clock hours? How many disc diameters away from the optic nerve? (nasal and inferior usually can wait, superior progress faster)
- Visible break(s), type of breaks (HST or round holes or dialysis?)
- Bullous or not? (bullous progresses much quicker than a shallow detachment)
- Suitability for local anaesthesia (often logistically easier to arrange out-of-hours surgery)

Retinal detachments at particularly high risk of rapid progression are those with tractional flap tears, particularly if they are bullous and have superior breaks. New presentations of retinal detachment should be discussed with the VR fellow or one of the VR consultants. In general, most emergency VR surgery can be accommodated onto one of the VR lists that run on Monday AM, Tuesday PM, Thursday AM and Friday AM. Exceptionally, surgery may be performed outside these times depending on the urgency of the case.

If accepting a patient from a peripheral referral hospital for a VR opinion please ensure that the referring doctor tells the patient that they are being referred for an opinion and surgery will not necessarily take place on the same day. While awaiting surgery, patients in whom there is evidence of rapid progression may be advised to posture in bed with the retinal breaks dependent.

The catchment area for the VR service extends eastwards as far as the Kent Border. As such, we have a relatively high number of patients staying on Pickford Ward overnight. Sometimes patients will be admitted the night before planned surgery. Under these circumstances it may be necessary for the on-call doctor to ensure that the patient's drug chart is appropriately completed and that any other medical issues are suitably addressed.

PERIPHERAL DEGENERATIONS

Innocuous peripheral degenerations, such as white with pressure, peripheral microcystoid degeneration and paving stone degeneration can be discharged from A&E.

Patients with white without pressure, snow flake degeneration or lattice degeneration with or without atrophic retinal holes should be given advice regarding retinal detachment warning signs and discharged from A&E (-they do not need to be seen in a VR clinic).

Senile retinoschisis, also called degenerative or acquired retinoschisis

Typical retinoschisis is usually benign and doesn't require follow-up in the VR clinic. Clinically the appearance is of a dome shaped relatively immobile smooth transparent elevation of inner layer wall. Inferotemporal location is most common, causes an absolute scotoma and can be associated with peripheral microcystoid degeneration. If you are unsure or see such an appearance in high myope, meaning it could be a chronic rhegmatogenous retinal detachment then please discuss with the VR fellow or consultant or refer to the VR clinic.

PENETRATING OCULAR TRAUMA

These cases should be discussed with the general consultant on-call to arrange primary repair. The registrar will need to co-ordinate the anaesthetic service and theatre service. Out-of-hours, the on-call theatre staff require at least one hour's notice to be called in when not on site. The nursing staff on Pickford ward will call in the theatre staff when advised to do so by the on-call registrar.

IOFBs
The VR consultant on call should be notified in the same way as for detachments. In most cases CT scan should be performed. Any leaking wounds should receive primary repair. Intravitreal antibiotics should be considered.

CENTRE-INVOLVING MACULAR HAEMORRHAGE
Patients can be considered for pneumatic displacement with recombinant tissue plasminogen activator (rtPA) and gas or Vitrectomy with subretinal rtPA and gas if presenting within 2 weeks of symptom onset. Please discuss these cases with the VR fellow or consultant on an urgent basis as the sooner the treatment is instigated the better the visual outcome. If the decision is taken to treat, this would generally be done as quickly as possible, likely next operating list. This treatment is not suitable in every case and has limited success.

FULL-THICKNESS MACUALR HOLES
These patients should be referred to be seen in the VR clinic within 6 weeks.

VITREOMACULAR TRACTION
These patients should be referred to the VR clinic to be seen in 2-3 months as almost a third of cases will resolve spontaneously.

LAMELLAR MACULAR HOLES WITH OR WITHOUT EPIRETINAL MEMBRANES OR PSEUDOHOLES
If symptomatic with reduced vision (6/12 or worse) and distortion then please refer routinely to the VR clinic.
If asymptomatic then can be discharged with the advice that can be referred back if develops symptoms.

EPIRETINAL MEMBRANES
If symptomatic with reduced vision (6/12 or worse) and distortion then please refer routinely to the VR clinic.
If asymptomatic then can be discharged with the advice that can be referred back if develops symptoms.

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Post-operative Endophthalmitis (POE)

Introduction

Endophthalmitis is an extremely serious and rapidly destructive intra-ocular infection. These guidelines apply to patients with acute bacterial endophthalmitis following intraocular surgery or intravitreal injections although reference to other types of endophthalmitis will be made. Please take specialist advice in non-post-operative cases, such as endogenous endophthalmitis, blebitis, trauma-related, keratitis with secondary intraocular infection. These forms of endophthalmitis are manged differently.

Regardless of the source of infection, the primary aim of treatment is to deliver a therapeutic dose of suitable antimicrobial agents into the vitreous cavity **WITHOUT DELAY (<2hours).** The secondary aims are intra-ocular fluid sampling for microbiological analysis, and clearance of intravitreal toxins/organisms by pars plana vitrectomy in selected cases – see below. If contacted by units outside Sussex Eye Hospital remember that the first sampling and intravitreal injections are best done locally to ensure no further delay in treatment that often occurs if patients are transferred. If necessary, these guidelines can be faxed or emailed to them. The visual prognosis often depends on the vision at first presentation and prompt treatment. If the patient does not respond to treatment then we would accept the patient at 48 hours post injection – please discuss with consultant on-call before accepting the patient.

Signs and symptoms

The presence of pain (remember 25% present without pain), visual loss, lid swelling, hypopyon, vitritis and often no fundal view in the post-operative period. The diagnosis is made on clinical grounds and is followed by intraocular sampling for microbiological culture and intravitreal antimicrobial agents.

Common microbes implicated in POE

Gram +ve bacteria (most common)

- Coagulase -ve staphylococcus sppn(e.g. S. epidermidis) (skin flora, less virulent)
- Staphylococcus aureus (skin flora, highly virulent, presents rapidly)
- Streptococcus spp (oral flora, highly virulent, presents rapidly)
- Bacillus spp (environmental flora, highly virulent, presents rapidly)
- Propionibacterium acnes (skin flora, low virulence, chronic presentation)

Gram –ve bacteria (less common)

Fungi (rare)

Management

Get help if it is difficult to manage endophthalmitis single-handed. Inform consultant in charge of the patient if available on site or on-call consultant if out of hours. Sampling and intravitreal injection should take place in the minor-ops room in outpatients or on the ward out of hours and not in the intravitreal injection suite. Antibiotics and instructions for preparing them for intravitreal use are found in the small fridge in theatre recovery. When recovery is locked out-of-hours, the key is kept on Pickford ward (metal cupboard in nurses' room).

Selection of antimicrobial agents

Antibiotic selection is made before microbiological culture/sensitivities are available, and therefore a **combination of TWO broad-spectrum antibiotics** is used. To achieve the concentration of antibiotics required, **intravitreal injection** is administered.

Sampling and administration in brief

1. The ideal sample for microbiology will be an aqueous and vitreous sample but the most important sample is a vitreous sample. If a sample cannot be obtained (dry tap), inject antibiotics anyway and perform a paracentesis to reduce the pressure.

2. After samples have been collected, intravitreal Amikacin (gram-ve coverage) and Vancomycin (gram +ve coverage) should be administered (some surgeons prefer Ceftazidime (gram -ve coverage) and Vancomycin – remember that these two antibiotics will precipitate if mixed in the same syringe).

If fungal agent strongly suspected or culture-proven, one of the following intravitreal anti-fungal agents may be administered: Amphoterecin B (5 mcg in 0.1ml) or Voriconazole (50-100 mcg in 0.1ml). This is a rare cause of POE but more common in poorly controlled diabetic/immunocompromised patients).

NB Cases of suspected fungal endophthalmitis should always be discussed with microbiology upon admission, who will advise regarding systemic anti-fungal treatment.

3. Call microbiology to let them know that samples are coming over.

4. Ask microbiology to save/freeze part of the sample for future bacterial PCR (16S ribosomal PCR), should the Gram stain and culture be negative. **This should be written clearly on the request form.**

5. Patients should be given oral Moxifloxacin, topical steroid and antibiotic therapy.

6. Patient management is reviewed daily. In some cases, consider starting PO prednisolone.

7. After 48 hours, if the inflammatory signs are improving, no further intravitreal therapy is given (eg. hypopyon, red reflex etc.) However, if the situation has either not improved, or the situation is deteriorating, further intravitreal antibiotics should be considered. It is helpful to involve the VR team if there is not an initial response to treatment or if a second injection is being considered.

8. After a further 48 hours, if the inflammatory signs are better, no further intravitreal therapy is given. If the situation has not improved or is deteriorating, vitrectomy should be considered. The classical teaching from the Endophthalmitis Vitrectomy Study – that patients presenting with LP vision or worse should proceed to immediate vitrectomy – is not always appropriate, please liaise with the VR team early in such cases.

Sampling and administration in detail

AQUEOUS AND VITREOUS SAMPLING & INTRAVITREAL ANTIBIOTIC PROCEDURE:

1. Instill topical anaesthetic drops
2. Instill aqueous Povidone-iodine 5% into the conjunctival sac and prep lid margins and periocular skin.
3. Administer subconjunctival or preferably subtenons anaesthetic. Intravitreal injection into an inflamed/infected eye is painful. At Sussex Eye Hospital we do not perform peribulbar anaesthesia without formal anaesthetic cover on-site.
4. Draw up the antibiotics as per instructions in the packs (held in theatre recovery, see above). Prepare the antibiotics prior to sampling and have them ready for injection. The dose and volumes of antibiotics required are critical as **mistakes may result in irreversible retinal damage.**

Vancomycin 1.0mg in 0.1ml Amikacin 0.4mg in 0.1ml
(Some surgeons prefer Ceftazidime 2mg in 0.1ml instead of Amikacin)

NB Amikacin should be used in patients allergic to penicillin

5. Wash hands, wear sterile gloves and a mask.
6. Insert the lid speculum (plastic drape not required). Thereafter do not further manipulate the eyelashes.
7. Wash away the excess povidone-iodine with saline
8. Sampling and antibiotic injection

Vitreous sampling

- Using a 5 ml syringe, a 23-gauge (blue) needle is inserted 4 mm (phakic eyes) or 3.5 mm (pseudophakic/aphakic eyes) behind the limbus into the middle of the vitreous cavity and 200-400 µl aspirated. If the eye is soft following AC sampling, some gentle counter-pressure with forceps will help get the needle through the sclera.
- After the sample is taken, remove the syringe leaving the needle in the eye. Now inject the antibiotics (an assistant may be helpful to pass the antibiotic syringes). If this not possible then removing the syringe and needle completely after the sample is taken is acceptable. Then injecting the antibiotics separately with a 30-gauge needle is a reasonable alternative.
- Carefully label the syringes and place into microbiology specimen bag.
- **In the event of a dry tap, inject the antibiotics anyway**. A paracentesis will probably be required as this can lead to a significant rise in intraocular pressure (if no vitreous sample has been removed).

Further management of bacterial POE

1. *Systemic antibiotics*
   Oral Moxifloxacin 400mg once daily for 10 days (Moxifloxacin can be started straight away – there should be a supply on Pickford ward). Monitor LFTs when starting Moxifloxacin. If LFTs are abnormal, seek Microbiological advice and consider changing to Ciprofloxacin 750mg bd.

NB Consider involving Microbiology early on, especially in complex cases, so they may advise regarding optimal systemic anti-microbial treatment

2. Arrange for baseline bloods including serum glucose, LFTs (for Moxifloxacin), weight, blood pressure measurements.

3. Topical antibiotics
   G. Chloramphenicol QDS

4. Topical steroids
   G. Prednisolone 1% or dexamethasone 0.1% hourly during the day (0600 until midnight) and 2hourly during the night (midnight until 0600)

5. Mydriatics
   G. Cyclopentolate 1% and Phenylpherine 2.5% TDS

6. Prescribe analgesia.

7. Systemic steroids

At 24-48 hours: If clinical course remains stable or improving, and consistent with bacterial infection, consider adding supplementary systemic steroids. Exert caution in diabetic/frail patients, who will require careful systemic monitoring whilst on oral steroids. In such patients, peri-ocular/intra-ocular steroid administration may be the safest option. If fungal or viral endophthalmitis is suspected, do not routinely administer supplementary steroids at this stage (may potentiate infection). In immunocompromised patients, supplementary steroids may not be safe or necessary (tendency to mount a poor inflammatory response).

If systemic prednisolone is considered, the dose is 1mg per kg / day (with gastro-protection cover), remember to record weight, blood pressure and glucose as a baseline if starting prednisolone and be aware that some patients suffer acute psychological side effects from high-dose steroids.

ROLE OF INTRA-VITREAL STEROIDS

- Dexamethasone 400mcg/0.1ml

The role of intra-vitreal steroids given at the time of initial intra-vitreal antibiotic administration is **controversial**. These are contra-indicated in suspected fungal/viral endophthalmitis, but may be beneficial in dampening an early and aggressive inflammatory reaction, often seen in bacterial endophthalmitis. However, the evidence is weak and overall probably improves visual recovery eary on but doesn't affect the final outcome. It is generally not recommended.

ROLE OF PARS PLANA VITRECTOMY (i.e. when to speak to VR!)

The pivotal Endophthalmitis Vitrectomy Study (EVS) concluded that patients with presenting visual acuity (VA) worse than 'hand movements' benefited from immediate pars plana vitrectomy (PPV). However, these findings are somewhat out-dated, and there is currently a trend towards early PPV for numerous additional non-EVS indications.

<u>Consider early involvement with the VR team in the following situations:</u>

- VA <HM at presentation
- Suspicion of a highly virulent organism, regardless of VA (rapid onset of symptoms and worsening of clinical signs – occurring over hours c.f. days)
- Exogenous endophthalmitis occurring post intra-vitreal injection, related to suture abscess/blebitis/trauma OR endogenous endophthalmitis (higher likelihood of virulent organism)
- No clinical improvement at 48 hours post administration of intra-vitreal antibiotics
- Onset/persistence of post-endophthalmitis complications (e.g. retinal detachment, dense vitreous opacities)

<u>NOTE</u>: Do **NOT** delay administration of intra-vitreal antibiotics whilst awaiting a VR opinion.

Every case of suspected post-operative endophthalmitis should be recorded in the book on Pickford ward. This is essential for audit purposes. Please liaise with Sister of the ward.