**EM Basic- Eye Complaints**

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**Visual Acuity**- The vital sign of the eye

-Make sure it is done in triage

-If not done, get it done ASAP- hanging eye chart in the ED or iPhone app (EyeChart- Free at Apple Store)

-If patient can’t see anything- can they see fingers, light, or motion

-If patient doesn’t have glasses/contacts- use a pinhole viewer or poke a hole in an index card/piece of paper and have patient hold up to their eye

**PEARL**- Only exception to getting a visual acuity first is a chemical burn to the eye- “test answer” is to get patient irrigated first with copious amounts of water (see section on chemical burns)

**History**

-Trauma to the eye, foreign body, or chemical burn?

 -Symptoms gradual or sudden?

-Red eye or discharge? Wake up with eyes matted shut?

 -Vision loss?

 -PMH- Contacts (VERY IMPORTANT TO ASK!)

 -Glasses? Last time saw an optometrist/opthomologist?

 -Hx of eye issues and full PMH, PSH, allergies, meds, etc.

**Exam**

**-**External eye exam- Compare eyes side by side- redness, sclera bleeding, conjunctival injection, lid droop,

-Extra-Ocular movements- trace the H, test accommodation

-Palpate the orbital area for any tenderness/swelling

-Opthalmoscope exam- check pupil reactivity, bleeding in sclera (subconjunctival hemorrhage), hyphema (blood in anterior chamber)

-Also check for any opaque spots on the cornea (corneal infiltrates/ulcers)- important for corneal abrasions in contact lens wearers

-Evert the eye lids- check for foreign bodies of upper and lower lids, can take moistened cotton swab and wipe inside of eyelids to be sure- foreign bodies can easily hide in the lids

**Topical Anesthesai**

-Trauma to the eye can be incredibly painful

-1-2 drops of tetracaine or proparacaine for pain control/facilitate exam

-Warn the patient that it will sting a little but will feel better- coach them

-Can’t send patient home with it (will use too much and impair healing) but small study says dilute proparacaine is ok- needs further study

**Fundoscopic exam**

**-**Look for papilledema and changes suggestive of central retinal artery/vein occlusion (see section on CRAO/CRVO)

-Pan-opthalmoscope is much easier to use

-Check embasic.org for videos on how to do this exam effectively

**Slit lamp exam**

-Takes a lot of practice- do it on every eye patient to get good at it

-Check embasic.org for videos on how to do this

-Turn off light and lock lamp into place after exam to prevent damage

**Flourescin exam**

**-**Need flourescin strip, saline, wood’s lamp

-Take patient’s contacts out (flourescin will permanently stain them)

-Put strip just above patient’s eye, put drop of saline onto strop and let it roll into patient’s eye

-Darken room, turn on wood’s lamp and examine for any dense, opaque uptake in corneal- will fluoresce = corneal abrasion

-Vertical corneal abrasions = probable upper eyelid foreign body

-Dendritic lesions (herpes simplex infection of eye)

-Sidell’s sign- river of flourescin flowing- indicates open globe

**PEARL-** For routine flourescin exam, don’t have to physically touch the patient’s eye with flourescin strip- technically you should for sidell’s sign but may see it without “painting” it on the eye- try doing it first without touching the eye, if negative then can touch the eye if trauma/suspicious

   

Corneal Abrsion Dendritic lesion Sidell’s sign

**Intra-ocular pressure** (IOP)

-Done after you have ruled out an open globe- check a sidell’s sign or defer exam if you are very suspicious of one

-Apply topical anesthesia first

-Calibrate tonopen (most common brand in US)- put cover on, press button, hold tip down, flip up quickly to the ceiling when it says “UP”

-Hold patient’s eye open, hold tonopen perpendicular to center of pupil, tap lightly multiple times

-Will hear a soft, quick beep with each tap, keep tapping until you get a long, loud beep

-Check the measurement- normal IOP is 10-20

Final part of exam- do a head to toe exam- don’t miss anything!

**Common eye diagnoses with treatments**

**Corneal abrasions**- caused by foreign body or blunt trauma to the eye, dense uptake on flouresecin exam

-Treatment- pain control and antibiotics (patching doesn’t work)

-Pain control- tetracaine/proparacaine in ED only, discharge with Tylenol/motrin +/- oxycodone/hydrocodone (vicodin/percocet)

-Antibiotics

**Contact lens wearer**- have to cover pseudomonas and throw out current contacts, no wearing until they see optho in followup

 -Polymixin/trimethoprim (polymixin)

 -Ciprofloxacin (Ciloxan)

 -Ofloxacin (Oculflox)

 -Tobramycin (Tobrex)

**PEARL-** For contact lens wearers, make sure to check cornea for white spots = infiltrates = optho referral that same day

**Non-contact lens wearers-** can use erythromycin ointment instead (doesn’t cover pseudomonas but cheap and easier to use in kids) or any of the above antibiotics

**Subconjunctival hemorrhage**- usually a benign diagnosis- patient freaked out when they or someone else notices blood in sclera- should be painless- usually something more serious if associated with pain

-Can be spontaneous or related to vomiting, coughing, child birth



If visual acuity and exam are normal, discharge with re-assurance that will re-sorb in a few weeks

If on warfarin (Coumadin)- check INR and treat PRN- if re-current, outpatient workup for bleeding disorder

**Hyphema**



Usually a result of trauma but can be spontaneous in those with sickle cell

Blood collects in anterior chamber

If hyphema + open globe- emergent optho consult

Head of bed to 30 degrees, eye drops as advised by optho

Usually admitted but some studies say outpatient management ok in select cases (about 5% will require surgery)

**Extra-ocular muscle entrapment**

-Usually a result of direct orbital trauma- pt complains of double vision

-May be able to see EOM deficit on exam

-CT orbits to make diagnosis

-Optho, ENT, or Oral Maxillofacial Surgery consults or transfer as appropriate (institution and call schedule dependent)

**Retrobulbar hematoma**

-EXTREME ocular emergency

-Suspect this if orbit is tense and/or large difference in IOP in setting of trauma

-If not rapidly decompressed, can lead to vision loss

-See section on lateral canthotomy below

**Chemical burns**

-Important- what patient got in their eye (alkalais worse than acids)

-With few exceptions- need copious irrigation with water/saline until pH is normal (6.5-7.5)

-Give topical anesthesia as well

-Can do this at sink or with bottle of water/saline or morgan lens

-Can also use a bag of saline attached to nasal cannula placed over nose

-Exceptions- elemental metals (sodium/potassium), dry lime, sulphuric acid (drain cleaners)- water will make worse- brush off chemical first

-If job related exposure- should have materials safety data sheet (MSDS) available or look this up online

**Foreign bodies**- if any doubt as to foreign body (for example- working with metal grinder but nothing on external exam), get CT orbits, Ultrasound may be more sensitive but CT shows damage caused by FB

**Conjunctivits**

-Can be viral or bacterial

-Bacterial usually purulent discharge, viral watery d/c but lots of overlap

-Difficult to determine viral vs. bacterial- usually err on side of treatment

-Antibiotics- same as corneal abrasion including differences between contact lens wearers and non-wearers- throw out contacts as well

-Safe answer is to refer contact lens wearers for optho followup but probably overkill

-**Hyperacute conjunctivitis caused by gonorrhea**- can occur only 12 hour after exposure- copious purulent discharge that happens suddenly- needs admission for IV and topical antibiotics, observation for perforation

**Herpes simplex infection**

-Pain +/- vesicles in V2 distribution on face

-Dendritic lesions on flourescin exam (see above)

-Optho consultation for further management

**Acute angle glaucoma**

-Older patient with sudden eye pain and unilateral vision loss

-Usually when going into dark room, pupil dilates which blocks outflow of vitreous humor through canal of schlemm

-Diagnosis hinges on large difference in IOP between eyes

-Treatment- lower IOP

 -Timolol and pilocarpine eye drops

 -With optho input- prednisolone and acetazolamide IV

**PEARL-** don’t use acetazolamide in patients with sickle cell

**Central Retinal Artery Occlusion-** acute clot in retinal artery

-Painless unilateral loss of vision with cherry red spot on macula or whitening of retina on fundoscopic exam

-Usually has risk for clot or emboli like a-fib

-Intermittent digital massage of eye to dislodge clot

-Lower IOP with timolol, pilocarpine, acetazolamide

-Rebreathe into paperbag to increase CO2 and lower IOP

-May need paracentesis of anterior chamber

-IV TPA has been used but not standard treatment

 

Central Retinal Artery Occlusion Central Retinal Vein Occlusion

**Central Retinal Vein Occlusion**

-Sudden painless unilateral vision loss

-Same treatments to lower IOP

-Much more often surgical management

**Retinal Detachment**

-Spots and floaters in patient’s vision

-Can use ultrasound for diagnosis but not highly sensitive

-If suspicious, consult opthomology

**Lateral canthotomy**

**-**If suspecting retrobulbar hematoma- cut first, ask questions later

-If you do in unnecessarily- not a big deal- usually heals on its own, if you don’t do it and patient needed it- permanent vision loss

-Numb up lateral canthal area with lidocaine with epi, procedural sedation PRN but preferred without- want to ask patient if vision better

-Clamp lateral orbit with hemostat for 30-60 seconds to devascularize

-Cut laterally with scissors (iris scissors if you have it, otherwise any scissors from laceration tray should work)

-Then cut superior and inferior tendon, check patient’s eye and IOP to see if it worked

-If it didn’t work, re-cut and be more aggressive- most common area is not actually snipping the tendons

Links

**Slit lamp exam**- 24 minutes but excellent and great videos of actual exams- worth watching the whole thing

<https://www.youtube.com/watch?v=w9wMJ6job_0>

**Fundoscopic exam**- kinda cheesy but effective

<https://www.youtube.com/watch?v=wPzCA9k8GRQ>

**Pan-opthalmoscope**- <https://www.youtube.com/watch?v=a9rhPWqV_ac>

**Ocular ultrasound**- from the ultrasound podcast

<http://www.ultrasoundpodcast.com/2012/04/episode-26-ocular-ultrasound-with-chris-fox/>

**Lateral Canthotomy on a cadaver**

<http://www.youtube.com/watch?v=cAYBGW3c95M>

**Contact-** **steve@embasic.org** **Twitter- @embasic**