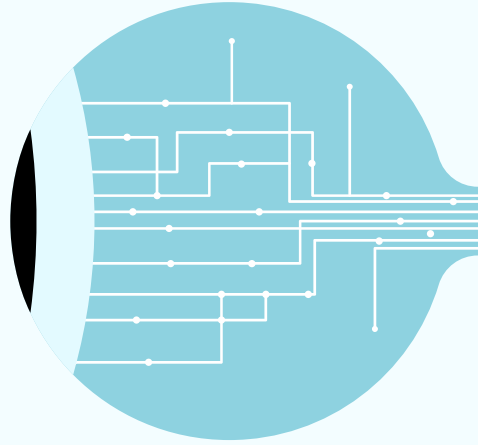


Lecture 5



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Ocular emergencies & Red eye

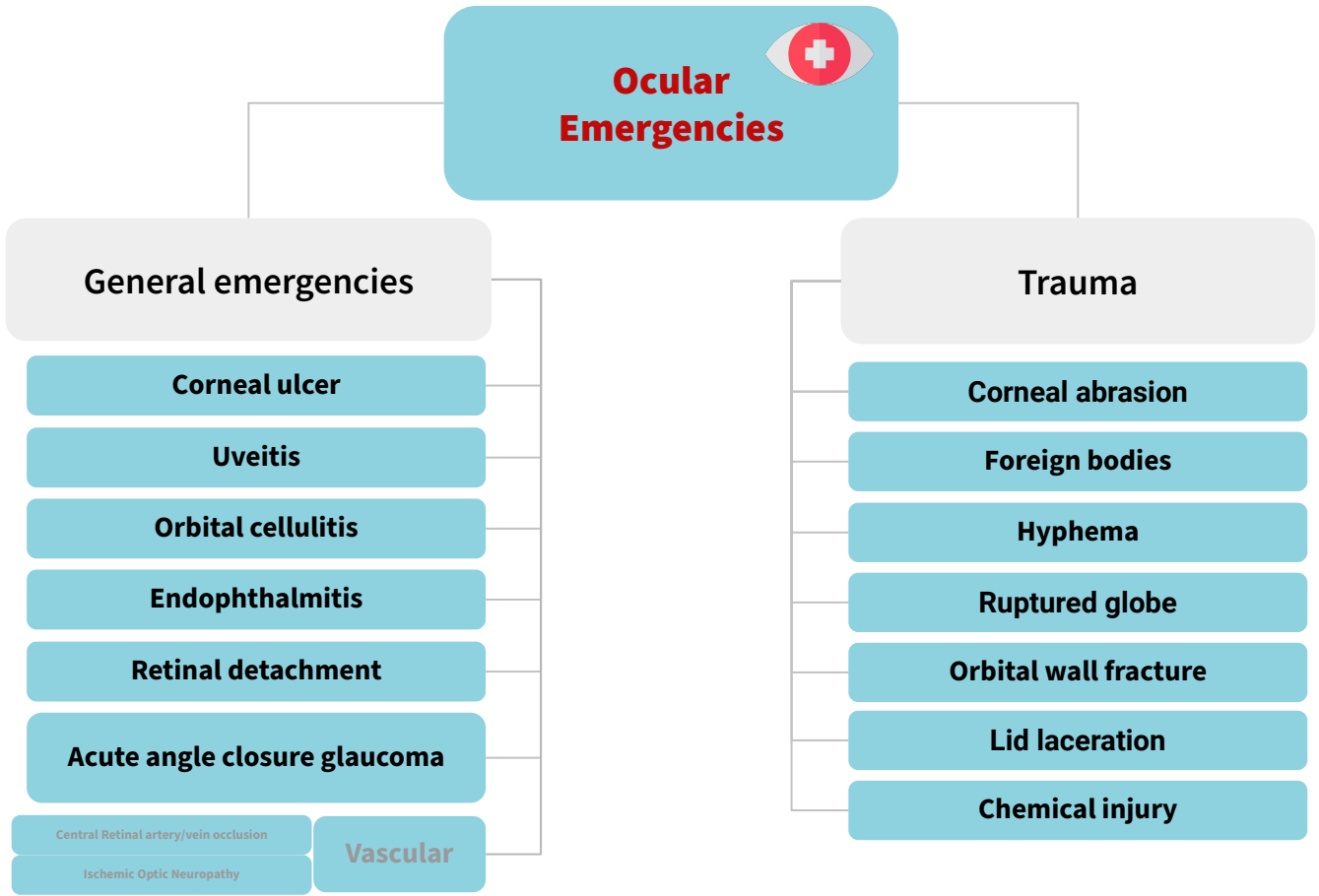
Presented by: Prof. Abdullah Alfawaz

Objectives of the course:

- To know how to triage ocular emergencies depending on presentation and management.
- To know some common ocular emergencies and trauma presentations.
- To identify common etiologies, features and management of the red eye:
 - Conjunctivitis (causes, clinical features, and management).
 - Microbial Keratitis (causes, clinical features, and management).
 - Ocular trauma including subconjunctival hemorrhage, corneal abrasion, open globe injury, blunt injury, and chemical burn.
- To identify features and management of giant cell arteritis and neovascular glaucoma.

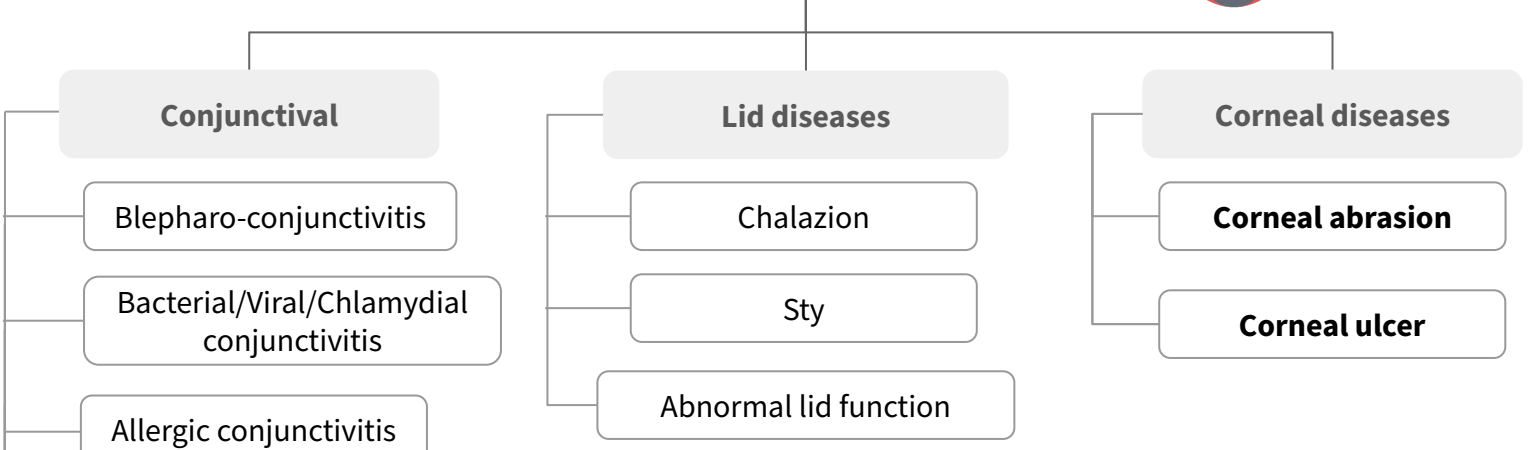
Color index:

Lecture overview



Differential diagnosis of Red eye

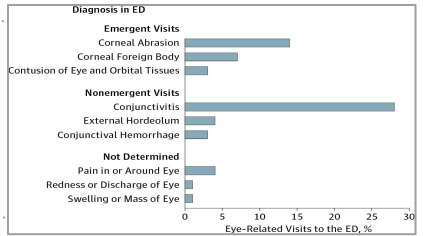
Bold = Emergency



- **Foreign body**
- Dacryoadenitis
- Dacryocystitis
- Masquerade syndrome
- Carotid and dural fistula
- **Acute angle glaucoma**
- **Anterior uveitis**
- Episcleritis/scleritis
- Subconjunctival hemorrhage
- Factitious

Other differentials of red eye

ED visits for ocular problems across the United States from 2006 to 2011 that were categorized as emergent was (41.2%)
 Corneal abrasions (13.7%) and foreign body in the external eye (7.5%) were the leading diagnoses in the emergent category however the majority of all eye related ED visits was diagnosed as conjunctivitis (28.0%)
<https://jamanetwork.com/journals/jamaophthalmology/fullarticle/2482928>



Ocular emergencies

- Usually the outcome in emergency cases depend on immediate intervention (how earlier do you manage the patient)

General emergencies	Orbital / ocular trauma
<ul style="list-style-type: none"> • Corneal ulcer • Uveitis • Acute angle closure glaucoma • Orbital cellulitis • Endophthalmitis • Retinal detachment 	<ul style="list-style-type: none"> • Corneal abrasion • Corneal and conjunctival foreign bodies • Hyphema • Ruptured globe • Orbital wall fracture • Lid laceration • Chemical injury

- There are also vascular ocular emergencies when blood supply to Retina or Optic nerve is occluded

Corneal ulcer (**Microbial Keratitis**)

Seen everyday in ED

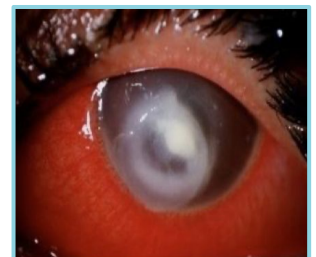
- Aka → microbial keratitis, kera=cornea
- Corneal Ulcer: Infection + Abrasion
- Occurs secondary to lid and conjunctival inflammation, but it is often secondary to trauma or **contact lens** wearer
- The defense mechanism is impaired and the cornea is vulnerable to injury
- **Could be** bacterial, viral, fungal or parasitic
- The conjunctiva and cornea act as a defensive mechanism. they are protected against infection by:
 - Blinking
 - Washing away of debris by the flow of tears
 - Entrapment of foreign particles by mucus
 - The antibacterial properties of the tears (Tear Film)
 - The tight barrier function of the corneal epithelium (neisseria gonorrhoeae is the only organism that can penetrate the intact epithelium)

❖ Predisposing causes of bacterial keratitis include:

- ◇ Keratoconjunctivitis sicca (dry eyes) (e.g in Sjogren syndrome)
- ◇ A breach in the corneal epithelium (e.g. following surgery or trauma)
- ◇ **Contact lens wear** (pseudomonas is common among these patients)
- ◇ Prolonged use of topical steroids (e.g corneal transplant Pt)

❖ Signs & Symptoms:

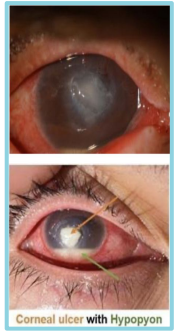
- ◇ Severe ocular **pain**
- ◇ **Photophobia**
- ◇ **Redness**
- ◇ Purulent discharge
- ◇ **Decreased vision** (if it affects the central visual axis)
- ◇ Corneal opacity (might lead to a permanent scar)
- ◇ Ciliary injection
- ◇ Hypopyon (Hypopyon is the accumulation of pus that typically settles ventrally within the anterior chamber)



Bacterial (pseudomonas) keratitis with opacity (in cornea) and ring infiltrate (**Hypopyon in ant. chamber**)

Corneal ulcer (Microbial Keratitis)

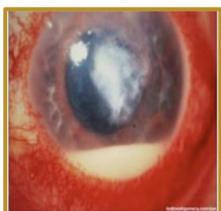
- Normally, the cornea is clear (glass-like)
- If there is opacity, then it may be due to **corneal ulcer or scar**
- The difference b/w corneal ulcer & scar is that the corneal ulcer appears cream yellowish with redness and other symptoms, but corneal scar is a sequela of an ulcer



Corneal ulcer with Hypopyon

Management of corneal ulcer:

- ★ Prompt **diagnosis** of the etiology by doing **corneal scraping** from the base of the ulcer (for culture & staining - gram & giemsa stains to diagnose) & usually you can tell the organism from the Hx and trauma
- ◇ During the time of culture you will begin to treat empirically
- ◇ **Treatment** with appropriate antimicrobial therapy is essential to minimize visual loss, meanwhile give empirical treatment until the scraping results come.
- ◇ Then treat the inflammatory process
- ◇ Promote healing and treat the primary cause if present (e.g. lid deformity, dryness, rubbing eyelashes)
- ◇ **Don't use an Eye patch!** it will increase the humidity and temperature and makes the bacteria grow faster.
- ◇ **Antibiotics:**
 - Start immediately with empirical fortified antibiotics (because culture will take 48 hours)
 - Why antibiotics?
 - The most common & most dangerous causes are bacterial
 - Pseudomonas causes perforation within hours
 - Fungal infection will take a couple of days to cause perforation
 - The response to antiviral/parasite is slow, thus we don't give antiviral/parasite empirically; it should be proven w/ culture or slide
 - Fortified antibiotics are given to cover gram -ve and +ve until the results come, then you can adjust the medications accordingly
 - If there is nothing on the culture, you have 2 options:
 - Either you see clinical improvement → continue meds
 - No clinical improvement → look for other causes such as fungal
 - Remember we treat patients not cultures
- ◇ The 2 drops are given hourly, day and night, for the first couple of days and are reduced in frequency as clinical improvement occurs,
 - why? because there is no immune system (no blood vessels)
- ◇ Give **both of the following Abx empirically** to cover both Gm +ve + Gm -ve. Also give topical Steroids
- ◇ **Gram -ve:**
 - Mild to moderate → **ceftazidime** (3rd gen cephalosporin)
 - Covers pseudomonas
- ◇ **Gram +ve:**
 - Mild to moderate → **cefazolin** (1st gen cephalosporin)
 - Severe case → **vancomycin**
- ◇ In case the Px **chronic steroid user, farmer or work with wood** cutting think about **fungal infection** as possible cause, in fungal we don't treat empirically until we have biopsy results



Two abnormalities:

- Corneal opacity
- Hypopyon

Complication:

- Corneal ulcer

- **Cephalosporins:**
 - 1 gen → gram +ve
 - 3rd gen → gram -ve
 - **Fluoroquinolones:**
 - 1st gen → gram -ve
 - 4th gen → gram +ve
- (coverage for these 2 classes go in opposite directions)

Corneal ulcer

❖ Contact lens wearer

- ◇ Any redness occurs for patients who wear contact lens should be managed with extreme caution (because it could be pseudomonas)
- ◇ Remove lens
- ◇ Rule out corneal infection (i.e. corneal ulcer) (any pain / discomfort should be reviewed because it could be beginning of infection even before the redness)
- ◇ **Antibiotics** for gram negative organisms (pseudomonas aeruginosa is the most common), treat it empirically as bacteria, give ceftazidime, if no response → antifungal, because fungi and acanthamoeba are common causative organisms
- ◇ Any pain, foreign body sensation or redness require visit to ophthalmologists (corneal infection symptoms)
- ◇ **Do not patch.** it will worsen the condition
 - Sometimes corneal ulcer is misdiagnosed as corneal epithelial defect (corneal abrasion)
- ◇ Close follow up with ophthalmologists in 24 hours
- ◇ Serious complication of lenses → loss of vision
- ◇ Don't sleep with lenses on & nor share it.
- ◇ If there is any irritation you must take them out immediately & maintain their hygiene.



Contact lens wearer

Findings:

- corneal infiltration
- hypopyon

Complications:

- corneal scarring
- glaucoma

Uveitis

Definition

Inflammation of the uveal tissue (iris, ciliary body, or choroid), retina, blood vessels, optic disc, and vitreous can be involved ' the patient may have retinitis or hypopyon secondary to uveitis'

❖ Etiology:

- ◇ **Idiopathic (50%)**
- ◇ **Inflammatory diseases:**
 - HLA B27, Ankylosing spondylitis, IBD, Reiter's syndrome, Psoriatic arthritis (immune related)
 - Sarcoidosis, Behcet's, **Vogt-Koyanagi-Harada syndrome** (panuveitis and ear involvement - blindness, sensorineural deafness and vitiligo- are common in our region)
- ◇ **Infectious:**
 - Herpes virus
 - Toxoplasmosis → transmitted through cats (poor outcome if central retina is affected 'blindness → give abx)
 - Tuberculosis (granulomatous uveitis, common in KSA & INDIA) → give anti-TB and steroids, why? → because you don't want the pt to have miliary TB
 - Syphilis (in immunocompromised)
 - CMV (especially in AIDS pts)
 - Fungal infections in immunocompromised patients
 - Complications → if it reaches the macula the pt could become blind



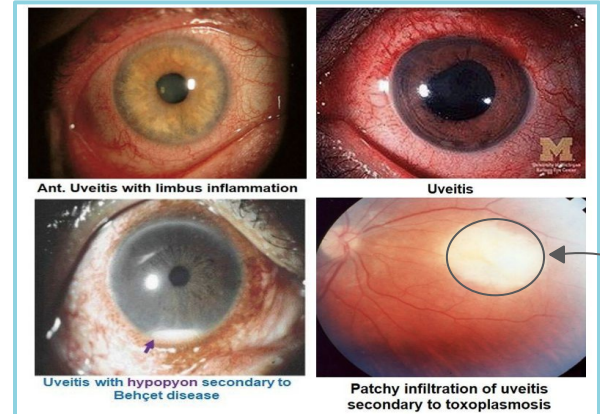
Uveitis

❖ Symptoms:

- ◇ Pain (can be absent in a lot of patients)
- ◇ Glaring of vision
- ◇ Photophobia

❖ Anatomical classification:

- ◇ Panuveitis
- ◇ Anterior uveitis
- ◇ Posterior uveitis



1. Inflammation of the iris:

- Accompanied by increased vascular permeability,
- Termed iritis or anterior uveitis
- White cells circulating in the aqueous humor of the anterior chamber can be seen with a slit lamp
- Protein, which also leaks into the anterior chamber from the blood vessels, is picked out by its light-scattering properties in the beam of the slit lamp as a 'flare'

2. Inflammation of the ciliary body:

- Termed cyclitis or intermediate uveitis

3. Inflammation of the posterior uvea:

- Termed posterior uveitis and may involve the choroid (choroiditis), the retina (retinitis) or both (chorioretinitis)
- In posterior uveitis/retinitis visual loss may occur either from destructive processes caused by the retinitis itself (e.g. in toxoplasmosis or CMV infection) or from fluid accumulation in the layers of the macula (macular edema)

4. Panuveitis:

- When inflammatory changes affect the anterior chamber, vitreous and retina and/or the choroid



When when use see this, it usually means there's inflammation inside the eye. Cornea is clear
The patient is having hypopyon without infiltrate thus it is mostly uveitis or endophthalmitis.
WBCs in the anterior chamber & redness

❖ Investigations:

- ◇ We do tests based on suspected cause, e.g:
 - Toxoplasmosis → blood test
 - Secondary TB → skin tuberculin test and chest x-ray or CT scan (more accurate)

Uveitis

Management:

- ◇ The treatment is aimed at:
 - Suppressing inflammation in the eye, and relieving pain in anterior uveitis
 - Preventing damage to ocular structures, particularly to the macula and the optic nerve, which may lead to permanent visual loss
- ◇ Identify possible cause
- ◇ **Topical steroid :**
- ◇ Steroid therapy is the mainstay of treatment but must rule out infectious cause before starting steroids
 - In anterior uveitis → the steroids are given topically (eye drops); however, topical steroids do not effectively penetrate to the posterior segment
 - Posterior uveitis is therefore treated with systemic steroids, or with steroids injected onto the orbital floor or into the sub-tenon's space
- ◇ **Topical cycloplegic:**
 - Atropine + cyclopentolate to relax the ciliary body muscles and dilate pupils → important to relieve the pain, to reduce photophobia & to prevent iris adhesion to the lens (posterior synechiae)
 - In severe Unresponsive cases
- ◇ Systemic immunosuppressive medication:
 - Steroids
 - Cyclosporine, methotrexate
 - Azathioprine, cyclophosphamide
- ◇ Immunomodulating agents:
 - Infliximab (anti-TNF) (mostly for behcet's disease)

Acute angle closure glaucoma

- Results from peripheral iris blocking the outflow of fluid → caused by rapid or sudden increase in intraocular pressure (IOP). raised IOP is caused by an imbalance b/w the production and the drainage of aqueous humor
- Patient will present to the ER usually early due to the pain

Risk factors:

- ◇ More in hyperopic patients since they have smaller eyes and thus their angle is more crowded (they have shallow anterior chambers & the structures in anterior chamber are more crowded) a triggering factor is dimming the light because the pupil gets dilated and it goes back to the angle and close it
- ◇ Myope pts will be prone to develop open angle glaucoma if left untreated.

Signs & Symptoms:

- ◇ High IOP → present with severe pain + headache
- ◇ Redness
- ◇ **Mid-dilated pupil**
- ◇ Decreased vision
- ◇ Colored halos around lights
- ◇ Severe headache or nausea and vomiting and IOP is elevated (normal IOP is 10-21 mmhg)
- ◇ **Photophobia**
- ◇ Can cause severe visual loss due to optic nerve damage
- ◇ Typical history → the symptoms increase while dimming the light (glaucoma increases at night more than morning because of pupil dilation at night. for example patient came to the doc complaining that he had eye pain whenever he is watching a film and turning off the lights)

Acute angle closure glaucoma

Management:

Medical treatment:

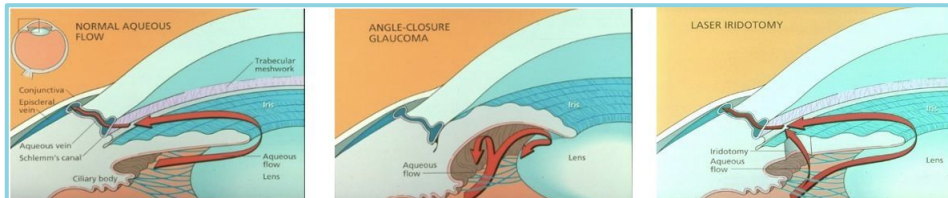
- 1st It is necessary to **stabilize** the eye and **reduce the pressure** by both topical and oral medications (reduces pressure within hours):
 - **Topical** → **pilocarpine** & beta-blockers
 - ◆ Pilocarpine constricts the pupil and draws the peripheral iris out of the angle
 - Oral → acetazolamide
 - Both beta-blockers (topical) & acetazolamide (oral or IV) reduce aqueous secretion & the pressure gradient across the iris

After reducing the IOP, → peripheral laser iridotomy → curative in most cases

- (but if late → will progress to chronic glaucoma regardless of iridotomy) (definitive tx)

Then we give pilocarpine → constrict the pupil

- ◆ We give them meds then after hours or day they can have laser this provides an alternative pathway for fluid flow from the posterior to the anterior chamber, bypassing the pupil and thus reducing the pressure gradient across the iris. this can be done with a YAG laser or surgically

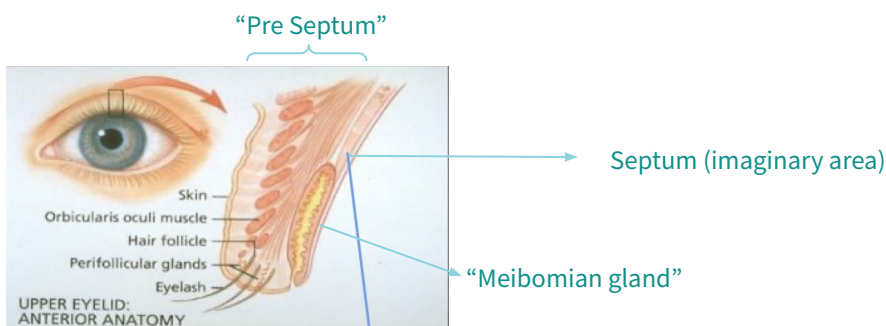


Peripheral laser iridotomy → preferably at 12 o'clock (upper part of the iris and peripheral) → because this part is will be covered normally by the eyelid so light won't enter through it (it light goes through it, it will be like a second pupil, will cause poor vision)

Pre-septal cellulitis

Definition:

- ◆ Also known as periorbital cellulitis which is an inflammation and infection of the eyelid and portions of skin around the eye
- ◆ Any inflammation anterior to the septum we call it preseptal cellulitis; if it crosses the septum, we call it orbital / septal cellulitis (the differentiation is important because orbital cellulitis is worse)
- ◆ You need to rule out orbital cellulitis



Pre-septal Cellulitis vs Orbital Cellulitis

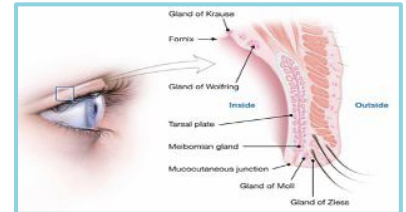
Pre-septal: Any pathology before the septum

Orbital: Any pathology after the septum

Pre-septal cellulitis

❖ Etiology:

- ◇ Skin wound, **bug bite**, **scratching**.
- ◇ **Secondary to Sinusitis**
- ◇ Laceration
- ◇ Retained foreign body from trauma
- ◇ Vascular extension, extension from sinuses (sinusitis) or another infectious site (e.g. dacryocystitis, chalazion)
- ◇ **Organisms:**
 - Staph aureus
 - Streptococci
 - H.influenzae (<5yrs)



❖ Signs & Symptoms:

- ◇ **Lid swelling and erythema ONLY!**
- ◇ Visual acuity, **motility**, pupil reaction, the globe & the optic nerve are **normal**; UNLIKE ORBITAL CELLULITIS
- ◇ Puffy and red eyes
- ◇ NO FEVER

❖ Management:

- ◇ Need to be treated properly to avoid extension of the infection to the orbit which causes orbital cellulitis (inside)
- ◇ **Warm compresses** → **always warm for infections** (we need vasodilation and subsequent ↑ in WBC & chemotaxis)
- ◇ **Systemic antibiotics (Oral)**
 - Patient > 7 years → Oral Abx + treat as outpatient. Didn't improve within 48 hours? → Admit + Intravenous Abx
 - Patient < 7 years or **febrile** → **Admit (may invade the orbit)** + Intravenous Abx
 - Especially if they are older than 6 yrs, they only need oral abx. There are a lot of abx choices, a good general one (amoxi-clav) augmentin[®] but if they are very young, we need to admit them because we are afraid of orbital cellulitis
- ◇ CT of the sinuses (**to r/o sinusitis**) and orbit (if not better or +ev history of trauma)
- ◇ CT scan is also indicated if lid abscess is suspected, or if there is severe oedema and you can not fully rule out orbital cellulitis



Diagnosis: Preseptal cellulitis
Treatment: Systemic oral abx & warm compressors

Orbital cellulitis

Definition:

- ◇ It most commonly refers to an acute spread of infection into the eye socket from either adjacent sinuses or through the blood
- ◇ **More serious!** than preseptal cellulitis because it may go to the brain and lead to meningitis, encephalitis or death
- ◇ Mostly, it is a complication of **ethmoidal sinusitis**. However, trauma, preseptal cellulitis, hematogenous routes, and even dental infections can lead to orbital cellulitis

Etiology:

- ◇ **Gram +ve**: → the most common causative organisms are staphylococcus and streptococcus
- ◇ **Anaerobes** → thus should be covered by abx

Signs & Symptoms: vision & eye are involved

- Any one of the following can make orbital cellulitis a DDX:
 - ◇ Pain
 - ◇ **Decreased vision**
 - ◇ **Impaired ocular motility** / double vision
 - ◇ Afferent pupillary defect (response of pupil to shining light)
 - ◇ Conjunctival chemosis and injection (chemosis of the conjunctiva is a type of eye inflammation that occurs when the inner lining of the eyelids swells)
 - ◇ **Proptosis** (bulging of the eye anteriorly out of the orbit)
 - ◇ Optic nerve swelling on ophthalmoscope (could cause blindness but more concerned about meningitis)
 - Motility, pupil reaction, fundal exam & color vision → normal → normal function
 - ◇ Periorbital inflammation and swelling



- * **Orbital cellulitis**
- * **Hx of sinusitis**
- * **Treatment** → **IV antibiotics**

Management:

- ◇ **Admission**
- ◇ **IV antibiotics** (Intravenous not vitreal)
- ◇ Nasopharynx and blood cultures
- ◇ Surgery may be necessary
- ◇ In case of subperiosteal abscess, first give IV abx for a couple of days, then evacuate this surgically if the abscess does not resolve spontaneously

(It's a top emergency, if left untreated → can cause cavernous sinus thrombosis)



Orbital cellulitis

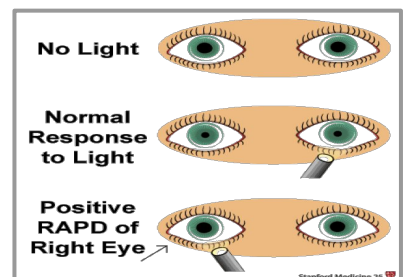


Complications:

- ◇ The risk is on the brain → the meninges have a direct connection with the orbital cavity, thus when the organism crosses the septum it reaches the meninges causing **meningitis** or **encephalitis** which are fatal
- In a patient with orbital cellulitis, development of headache, Ophthalmoplegia, paresthesia over V1 and V2 regions or seizures, Cavernous sinus thrombosis should be suspected



- Proptosis
- Subperiosteal abscess
- Dx → **orbital cellulitis**
- Tx → **admit + IV abx**, not resolved → surgical drainage



Relative Afferent pupillary defect

Helpful video

Difference between Pre-septal cellulitis and Orbital cellulitis



Pre-septal cellulitis	Orbital Cellulitis
Normal visual acuity	Decreased vision
Normal pupil reaction	Afferent pupillary defect
Normal motility	Impaired ocular motility / Painful
Normal optic nerve	Optic nerve swelling
Normal globe	Proptosis



Pre-septal cellulitis

- Eye is normal (white sclera) & only slight redness on the skin



Orbital cellulitis

- Here the eyelid is inflamed & closed completely (chemosis)
- Fundus exam shows optic nerve swelling

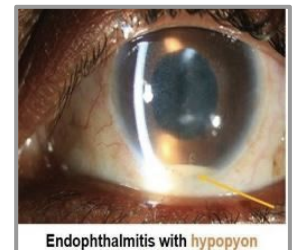
Endophthalmitis

Definition:

- ◇ Endophthalmitis is the inflammation of the vitreous cavity (inside the eye)
- ◇ It is an extreme emergency as it's a blinding disease that needs intervention within minutes (30 mins to 1 hour), if you are late it will cause abscess in the vitreous.
- ◇ It is a potentially devastating **complication of any intraocular surgery**. After cataract surgery or trauma.
- ◇ It may be endogenous endophthalmitis (secondary to septicemia or endocarditis for example), but the majority is exogenous endophthalmitis
- ◇ Sometimes the destruction is due to the inflammation not the infection itself
- ◇ Ruptured globe can cause endophthalmitis

Signs & Symptoms:

- ◇ Any patient in the **early postoperative period (within 6 weeks of surgery)** **pain** or **decreased vision** should be evaluated immediately (can damage photoreceptors)
- ◇ It causes a marked generalized conjunctival inflammation
 - On P/E → there will be redness, lid edema & hypopyon; and on fundus exam you will see vitritis (vitreous cells) & red flux will be diminished
- ◇ By looking at the eye it's sometimes difficult to differentiate b/w uveitis & endophthalmitis. what should we do?? HISTORY!
 - Post-surgery → endophthalmitis (e.g. a pt presents 2-3 day post-op with severe redness, lid edema & hypopyon on exam you find vitritis)



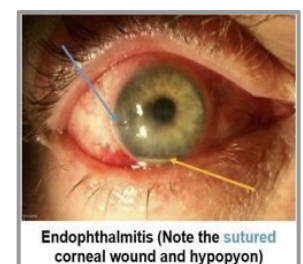
Endophthalmitis with hypopyon



● Arrow shows hypopyon

Management:

- ◇ **Vitreous sample** for culture
- ◇ **Intravitreal antibiotics injection** plus topical abx
 - The commonest is bacterial, but can be fungal
 - **Fortified broad spectrum abx vancomycin** (covering gram +ve) and **ceftazidime** (covering gram -ve) are given
- ◇ We go with a needle and take a sample of the vitreous material, and afterwards we inject Abx in the vitreous.
- ◇ If it did not resolve **after 24h** of treatment → vitreous will be like an abscess; in this case surgery is needed to drain it (**vitrectomy**)
- ◇ If visualization of vitreous is not possible in case of severe infxn, do B scan (ultrasound)
- ◇ Visual acuity will decide the treatment either intravitreal abx or surgery
- ◇ In decreased visual acuity (hand motion or less) surgery is needed; if better give, intravitreal abx only

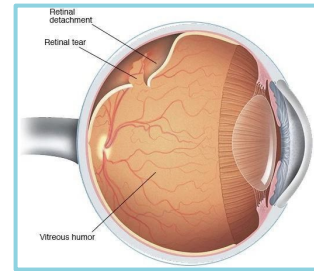


Endophthalmitis (Note the sutured corneal wound and hypopyon)

Retinal detachment

❖ Definition:

- ◇ The retina has 10 layers, RD is a separation of retinal pigment epithelium 'near choroid' (RPE) (the last layer) from the neurosensory retina 'near vitreous' (the 1st 9 layers). **it is not a separation b/w retina and choroid (retinoschisis)!!**



❖ Types: (3 types)

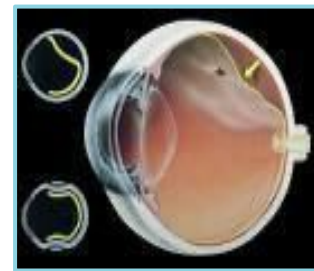
- ◇ Rhegmatogenous retinal detachment → secondary to break (tear) in the retina (acute & emergency)
- ◇ Exudative RD → chronic (uveitic patients)
- ◇ Tractional RD → chronic (Diabetic retinopathy)

❖ Risk factors:

- ◇ People with **high myopia** -6 and above → they need screening → ادا فيه وبحاب في السبكه → prophylactic laser
- ◇ Requires routine 6 months check up

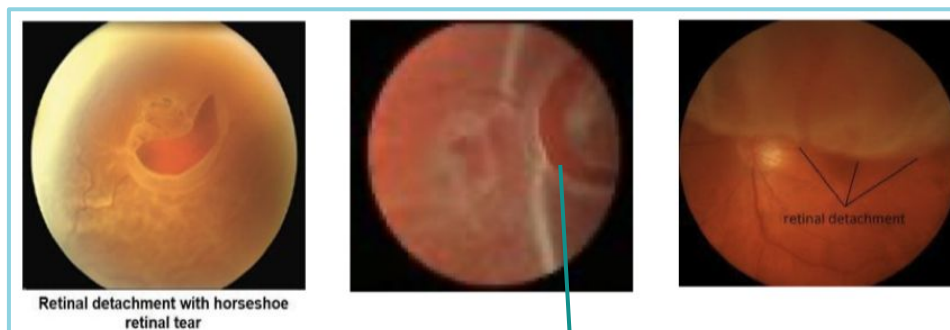
❖ Symptoms:

- ◇ **Flashes, floaters, a curtain or shadow moving over the field of vision**
- ◇ Peripheral and / or central vision loss
- ◇ History of scratching the eye
- ◇ Painless



❖ Management:

- ◇ Surgery
- ◇ **Laser**
- ◇ **Vitrectomy**
- ◇ The aim of the treatment is to close the causative break in the retina **كاتبها بلحمها** and to increase the strength of the attachment b/w the surrounding retina and the RPE (retinal pigment epithelium) by inducing inflammation in that region
- ◇ If involving the macula (macula off) → poor prognosis and surgical intervention is needed
- ◇ In the periphery (macula on) → better prognosis and can be treated by laser



Horse shoe

Corneal abrasion

Definition:

- ◇ Corneal abrasion, also known as corneal epithelial defect
- ◇ Shearing of the corneal epithelium from the basal lamina, caused by trauma
- ◇ Corneal abrasion = abrasion without infection, unlike corneal ulcer

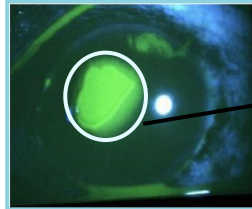


Risk factors:

- ◇ History of scratching the eye (by fingernails, papers, or during contact lens removal). happens in kids too

Symptoms:

- ◇ Foreign body sensation
- ◇ Severe pain
- ◇ Tearing
- ◇ **Photophobia** (experience of discomfort or pain to the eyes due to light exposure)
- ◇ Conjunctival injection and hyperemia

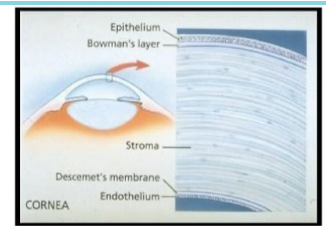
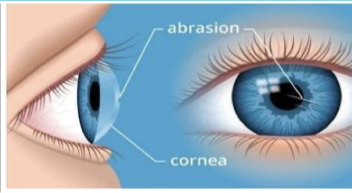
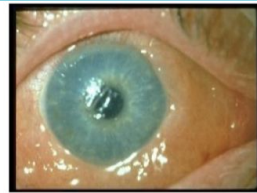


Defect area took the stain



Diagnosis:

- ◇ Slit lamp to see the irregularity of the cornea
- ◇ **Fluorescein dye** in drops or strips & blue light → will show the affected area in green
 - The instillation of fluroscein will identify the extent of an abrasion and use of concentrated fluorescein, will identify a leak of aqueous through a penetrating wound (**IN SAQs YOU MUST MENTION FLUORESCEIN DYE**)

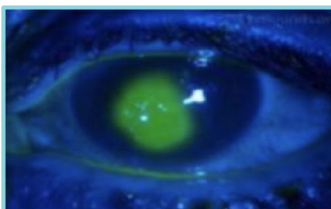


Treatment:

- ◇ It heals spontaneously
 - Stem cells in the periphery of the cornea will come and cover that defect. but before covering the defect, the eye is prone to bacterial infections, **so give prophylactic topical abx.** sometimes we patch the eye if we rule out infection
 - Sometimes pts who are contact lens wearers think they had scratched the eye while removing the lens, but actually it is a corneal ulcer not abrasion. so be careful
 - **If you have any suspicion of infection or injury from lenses, DO NOT PATCH THE EYE!!!**
 - ◆ Corneal abrasion → patch
 - ◆ Corneal ulcer → no patch
- ◇ **Topical prophylactic antibiotic** to prevent microbial keratitis (corneal ulcer): broad spectrum in general population, e.g erythromycin. In contact lens users, should cover pseudomonas (quinolones, e.g ofloxacin)
- ◇ **Pressure patch** over the eye (make sure the lid doesn't open, otherwise no healing)
- ◇ Refer to ophthalmologist (for follow-up)

Complication:

- ◇ Corneal ulcer can be a complication of corneal abrasion



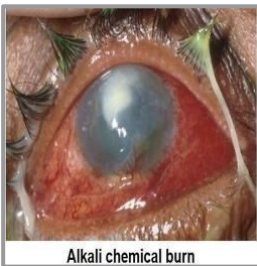
What is the finding?
- Corneal abrasion
Treatment : topical antibiotic
& eyepatch



Chemical injuries

Definition

- ◇ A vision threatening emergency (with poor outcome)
- ◇ The offending chemical may be in the form of a solid, liquid, powder, mist or vapor
- ◇ Can occur in the home, most commonly from detergents, disinfectants, solvents, cosmetics, drain cleaner, **العملاق، كلوركس، فلاس، اسمب، جرسابه**
- ◇ **Alkaline chemical injury is worse than acid, because alkali causes deep penetration**
- ◇ It may be aggressive and destroy eye surface 'epithelium' causing stem cell deficiency which end up with blindness
- ◇ Destruction of optic nerve is common in case of glaucoma resulting from alkaline injury
- ◇ Can range in severity from mild irritation to complete destruction of the ocular surface



Management:

- ◇ **Irrigate with clean water (immediately)**
 - **Immediate irrigation is essential**, preferably with saline or ringer's lactate solution, for **at least 30 mins**
 - Irrigation should be continued **until neutral pH** is reached (i.e. 7.0)
 - **Measuring tear pH with litmus paper**
- ◇ Install topical anesthetic
- ◇ Check for and remove foreign bodies (in case of fireworks/cement)
- ◇ Instill topical antibiotic
- ◇ Frequent lubrication
- ◇ Oral pain medication
- ◇ Enhance healing
- ◇ Then you deal with the sequelae; and the extent of the chemical injury depends on:
 - First action that has been done
 - Extent of injury to the stem cells
- ◇ **one of the complication of chemical injury is the abnormal healing after because the limbus is lost, in which the conjunctiva will proliferate to cover the affected area and as we know the conjunctiva is vascular and this will affect the transparency and vision**
- ◇ **the prognosis depend on the limbus (area of epithelial stem cell) surface area that get affected by chemicals, the more area damage the worst the prognosis**



What is the immediate management?

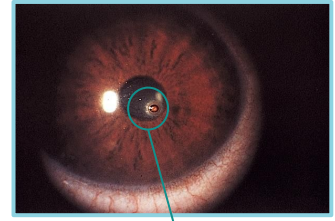
- Irrigation with water for at least 30 mins

Complications?

- Infection
- Corneal perforation

Corneal or Conjunctival foreign bodies

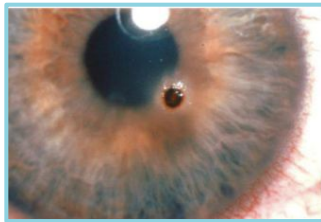
- History of trauma (usually in carpenters or metal workers (اللاحامين))
- Foreign body sensation-tearing



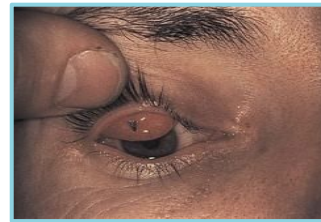
Foreign body w/ rust ring

Management:

- ◇ Instill topical anesthetic
- ◇ **Removal of the foreign body**
 - The foreign body could be hidden under the lid (check eyelids)
- ◇ **Topical antibiotic**
- ◇ Treat corneal abrasion
- ◇ Pts may develop corneal ulcer as well
- ◇ A radiograph of the orbits, with the eyes looking up and then down, or a CT scan, may also be indicated if an intraocular foreign body is suspected



- **Diagnosis: Corneal foreign body**
- **Two lines of treatment:**
- * **Topical anesthesia, topical abx**
- * **Removal of antibody**



- **Diagnosis: Conjunctival foreign body**
- **Management:**
- * **Local anesthesia**
- * **Removal of foreign body**
- can be easily missed, use fluorescein to see scratches as proof of foreign body

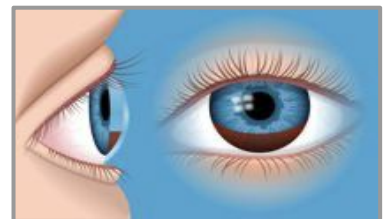
Hyphema

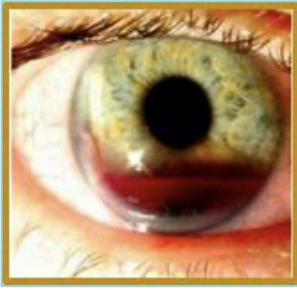
Definition:

- ◇ Blood in the anterior chamber, **mostly secondary to trauma**
- ◇ Can occur with blunt or penetrating injury
- ◇ The blunt trauma can cause rupture of the root of the iris blood vessels, or the iris may be torn away from its insertion into the ciliary body (iris dialysis) to produce a D-shaped pupil
- ◇ Can lead to high IOP & corneal pigmentation
- ◇ **Detailed history (sickle cell), because it could lead to complications.**

Management:

- ◇ **Spontaneous absorption & resolution**
 - **Bed rest 2-3 days** to prevent re-bleeding
 - Topical steroid to reduce inflammation & risk of rebleed
 - Topical cycloplegic to dilate the pupil (why? to stabilize it to prevent re-bleeding as it paralyzes the constrictor pupillary muscles bc they will cause more traction if they contracted)
 - The only thing you need to monitor is the IOP
 - 'Atropine' to fix the iris (pupil dilation) to prevent clotting & dislodging of the clot
 - Anti-fibrinolysis agents (tranexamic acid)
 - Surgical evacuation. (anterior chamber washout) if IOP is still high & unresponsive to treatment → we go inside and evacuate (eye washout)
 - People with **sickle cell anemia** need **surgical blood evacuation** because of deformed RBCs which have difficulty going through trabecular meshwork, do not wait (**sickle cell → surgical**) (**imp**)





- **Diagnosis** → hyphema
- **Complications** → posterior synechia & glaucoma



Hyphema along w/
subconjunctival
hemorrhage

- What test do you want to do to this patient?
Sickle cell test
- Why?
they usually develop high IOP
- **Note:** Acetazolamide (diamox) is not advised for sickle cell pts

Ruptured globe

❖ Definition:

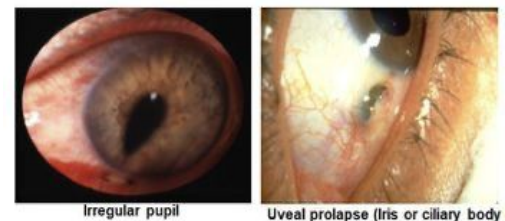
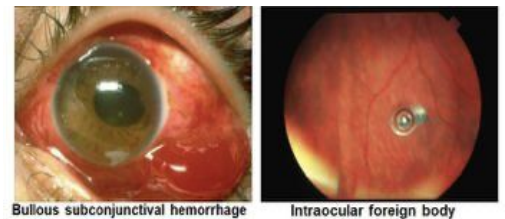
- ◇ Globe rupture occurs when the integrity of the outer membranes of the eye is disrupted by blunt or penetrating trauma.

❖ Etiology: (suspect a ruptured globe if):

- ◇ **Severe blunt trauma** → hit by a thumb or a tennis ball; the rupture will happen in the weak parts of the eye, which are around the insertion of the muscles, at the limbus and at the optic nerve
- ◇ **Sharp object** → there will be an entrance and an exit if there is perforation or only entrance if it is penetrating
- ◇ **RTA, fighting**

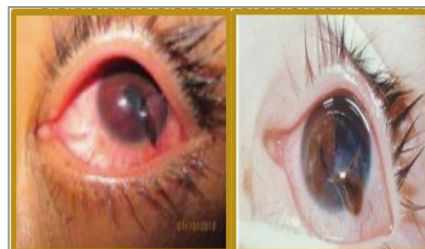
❖ Signs:

- ◇ Bullous subconjunctival hemorrhage → take him to the OR to explore the area and suture. if you leave it, you'll have an infection (e.g. endophthalmitis) so we need to close the eye
- ◇ Uveal prolapse (iris or ciliary body)
- ◇ Irregular pupil
- ◇ Hyphema
- ◇ Vitreous hemorrhage
- ◇ Lens opacity
- ◇ **Lowered IOP** → look for a defect, there must be a leak
- ◇ Intraocular foreign body
- ◇ **Any leaking point should be closed immediately to prevent infection inside the eye (endophthalmitis)**
- ◇ **If you have an intraocular foreign body (in the retina), the first thing and most imp thing to do is to take the patient to the OR to suture the eye, then you plan the subsequent surgery to remove the foreign body after 5-6 days (so close the entrance first then remove)**
 - ★ What type of imaging to see the foreign body after closure of the eye? CT (not MRI → contraindicated because it could dislodge the foreign body)



❖ If globe ruptured or laceration is suspected:

- ◇ **First** thing to do is **closing the defect** to keep The integrity of the globe & avoid infection (regardless of the extent of the trauma or presence of foreign body)
- ◇ Stop examination
- ◇ **Shield the eye**
- ◇ Give tetanus prophylaxis
- ◇ Refer immediately to ophthalmologist
- ★ **We can't do MRI maybe it's metal!! (You might get asked about it)**



- **Finding** → ruptured globe
- **Investigations** → x-ray to r/o foreign body
- **Complication** → endophthalmitis

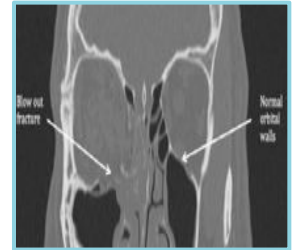
Orbital fractures

Definition:

- ◇ An orbital fracture is a traumatic injury to the bone of the eye socket.
- ◇ These injuries are usually the result of blunt force trauma to the eye (**blowout fracture**)

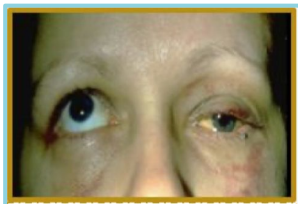
Damage to the orbit itself (a blow-out fracture) is suspected if the following signs are present:

- ◇ Emphysema (air in the skin which crackles when pressed) derived from a fractured sinus
- ◇ Limitation of eye movements, particularly on upgaze and downgaze, due to trapping of the inferior rectus muscle by connective tissue septa caught in the fracture site in the inferior orbital floor, the wall most commonly fractured.
- ◇ Subsequently the eye may become recessed into the orbit (enophthalmos).
- ◇ If the lid margin is cut at the medial canthus it is important to determine if either of the lacrimal canaliculi is severed. This will cause epiphora if untreated.



Examination:

- ◇ Assess ocular motility → blocks maxillary sinus, muscle entrapment (eye is entrapped thus pt can not look upward)
- ◇ **Assess sensation over the cheek and lip**
 - **A patch of paresthesia below the orbital rim suggesting infraorbital nerve damage.** (the infraorbital nerve is commonly injured in orbital blow-out injury involving the floor of the orbit)
- ◇ Palpate for bony abnormality (enophthalmos; eye sinking inside) in this case you need to fix the floor. put an implant
 - Enophthalmos is a backward displacement of the globe. it is a feature of an orbital 'blowout fracture'
- ◇ **When evaluating orbital fractures, focus on the following exam findings (ophtha-book) from team 435:**
 - Vision, color: Make sure the optic nerve isn't involved.
 - Extraocular movements: Usually decreased from swelling or muscle contusion, but make sure there isn't any gross muscle entrapment. If concerned, you can perform forced ductions. This involves pulling on the eye with forceps to see if the eye is mobile.
 - Proptosis: Measure the degree of proptosis or enophthalmos using the Hertel ophthalmometer (a fancy ruler).
 - Palpate: Feel along the orbital rim for step-off fractures and subcutaneous emphysema (air crepitus).
 - Sensation: Check sensation of the V1 and V2 sensation on the forehead and cheek. V2 runs along the orbital floor and can be
 - Damaged with floor fracture.



- **Diagnosis** → Blowout fracture
- **Imp modality of investigation** → CT scan



- **Diagnosis** → Blowout fracture
- **Complaints** → Decreased vision & decreased movement

Patient was asked to look upwards, patient left eye is entrapped and enophthalmos (looking inside)

- Describe findings:** Restriction of inferior rectus muscle, diplopia
- Diagnosis:** Orbital floor fracture (blowout fracture)
- Mechanism:** Blunt trauma
- Investigation:** CT scan
- Treatment:** Fix the floor, the patient eye will get back to normal

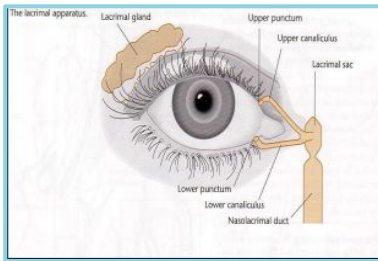
Lid laceration

❖ Definition:

- ◇ Can result from sharp or blunt trauma
- ◇ Rule out associated ocular injury

❖ Treatment:

- ◇ Surgery (approximate the lids and close them following normal anatomy), If approximation is not following the normal anatomy: patient will have problems (the lids will be deformed, tearing won't be appropriate, and the eye will be prone to infections (Corneal infection) and dryness).
 - This requires careful apposition and suturing, particularly if the lid margin is involved, to retain the lid contour. If one of the lacrimal canaliculi is damaged an attempt can be made to repair it, but if repair is unsuccessful, usually the remaining tear duct is capable of draining all the tears. If both canaliculi are involved, an attempt at repair should always be made.



- Eye is intact.
- The injury is in the lid.
- Treatment:
 - close the eye and make sure it's well aligned (it will be back to normal)



Let's go golfing

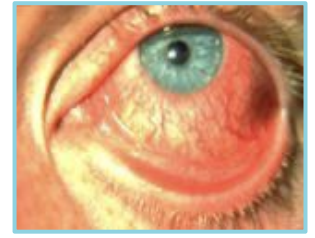
Red eye

Relevance:

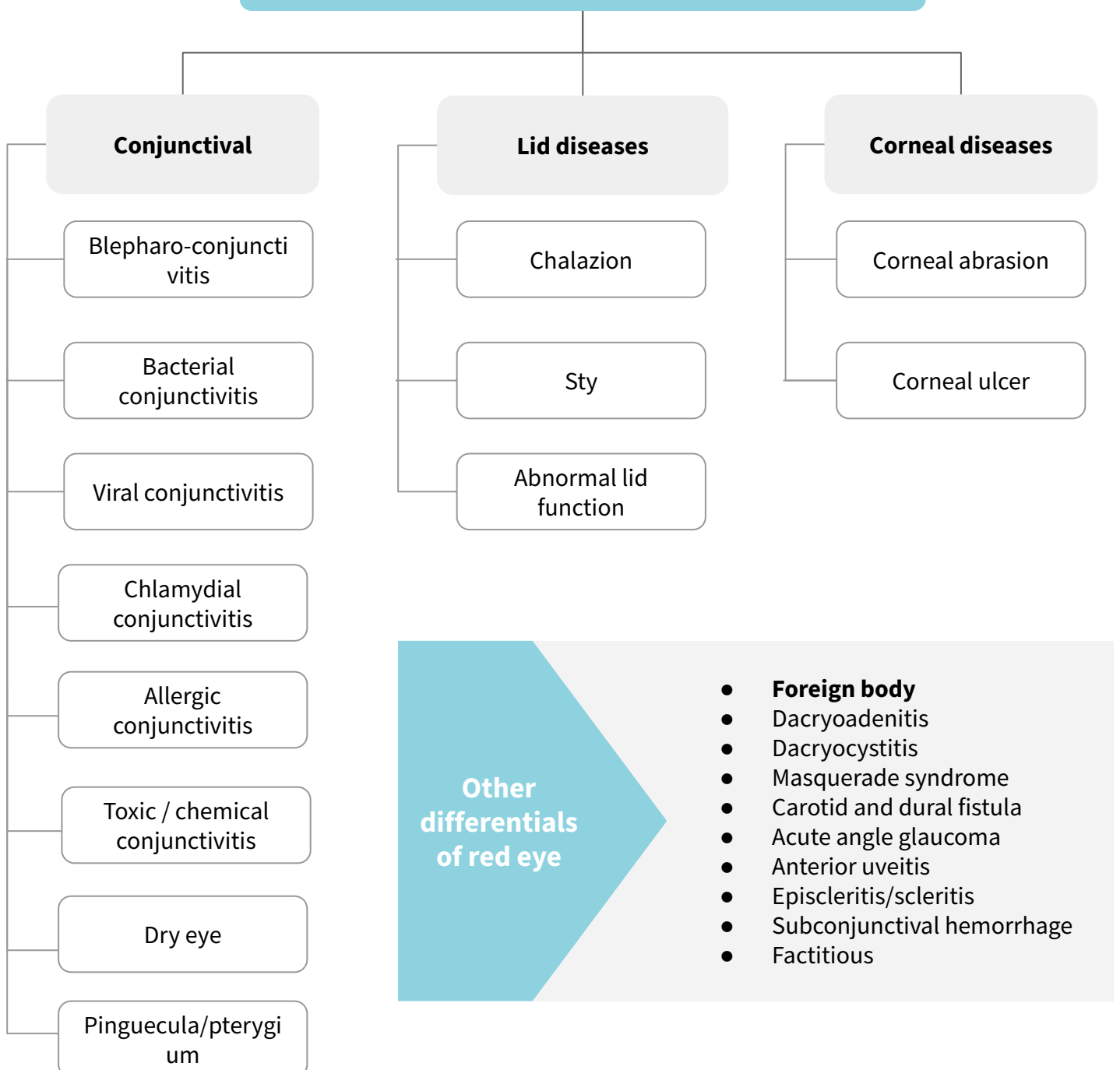
- ◇ Frequent presentation to GP.
- ◇ Must be able to differentiate b/w serious vision threatening conditions and simple benign conditions.

Definition:

- ◇ Refers to hyperemia of the superficially visible vessels of the conjunctiva, episclera or the sclera.
- ◇ Caused by disorders of these structures themselves, or of adjacent structures like the eyelids, cornea, iris, and ciliary body.



Differential diagnosis of Red eye



Red eye

1 Blepharitis

❖ Definition:

- ◇ Inflammation of the lid margin
- ◇ Adults > children
- ◇ Frequently associated with styes الكيس الدهبي (is an exquisitely painful abscess of an eyelash follicle. Treatment requires the removal of the associated eyelash and application of hot compresses)
- ◇ Meibomian gland dysfunction → blepharitis. or could be complicated with chalazion or styes (especially those with acne they are more prone to repeated attacks of blepharitis)
- ◇ Chalazion is secondary to blepharitis that results when meibomian gland is obstructed and the gland is swollen (inflamed / causing granuloma)

❖ Treatment: (sometimes systemic abx)

- ◇ Lid hygiene (cleaning the eye after mascara and eyeliner is important)
- ◇ Topical antibiotics (to treat blepharitis and prevent recurrent styes or chalazion)
- ◇ Lubricants
- ◇ Warm compression to brings WBC to clear up the infection and collection



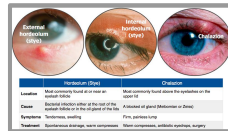
Scales around the eyelashes
blepharitis → inflammation of the lid margin
- Treatment: lid hygiene & topical Abx



- Swelling of the upper eyelid
- **Diagnosis** → chalazion
- If it was not treated well, one of the inflamed glands will accumulate secretions → get more inflamed → cause chalazion or stye or internal hordeolum
- **Treatment** → warm compresses (to dilate the gland orifice); if no response within 6 weeks, incision & drainage should be done (We use cold compresses if the patient had allergy)



- **Diagnosis** → stye
- **Treatment** → topical antibiotics, incision & drainage



EXTRA

2 Bacterial conjunctivitis

❖ Definition:

- ◇ Bacterial conjunctivitis is an infection of the eye's mucous membrane, the conjunctiva
- ◇ Affects both adults and children
 - **Ophthalmia neonatorum** → bacterial conjunctivitis in newborns due to atypical type of bacteria → must take a swab
 - **Ophthalmia neonatorum** refers to any conjunctivitis that occurs in the first 28 days of neonatal life and is a notifiable disease requiring urgent treatment. swabs for **culture** are mandatory. it is also important that the cornea is examined to exclude any ulceration
 - The commonest causative agents are bacterial conjunctivitis (usually gram +ve), neisseria gonorrhoea, herpes simplex & chlamydia

Red eye

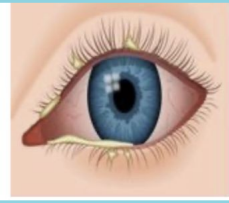
❖ Signs & Symptoms:

- ◇ Redness (Bilateral)
- ◇ Tearing
- ◇ Foreign body sensation
- ◇ Burning
- ◇ Stinging
- ◇ Photophobia
- ◇ **Mucopurulent or purulent discharge + papillary reaction**
- ◇ Lid and conjunctiva maybe edematous
- ◇ **Papillary reaction**

Membranous conjunctivitis, commonly seen in bacterial causes.



Conjunctivitis redness with copious discharge



❖ Organisms:

- ◇ Streptococcus pneumoniae
- ◇ Haemophilus influenzae
- ◇ Staphylococcus aureus
- ◇ Staphylococcus epidermidis



Papillae most likely bacterial or allergic

❖ Management:

- ◇ Conjunctival swab for culture (Usually in **newborns** (after 2 weeks of birth), they get ophthalmia neonatorum because they have **atypical organism** bacterial conjunctivitis, but in **adults** there is **no need** to take a swab **except** if there is no improvement after empiric therapy)
- ◇ **Topical broad spectrum antibiotics** (fluoroquinolones: ofloxacin) for one week



- **Diagnosis** → Bacterial conjunctivitis or blepharitis

- **Treatment:**

- topical antibiotics
- warm compressors
- lid hygiene

3 Viral conjunctivitis

❖ Definition:

- ◇ Usually associated with an upper respiratory tract infection

❖ Signs & Symptoms:

- ◇ Acute, **watery** red eye with soreness, foreign body sensation, photophobia
- ◇ Conjunctiva is often intensely hyperemic; also, there may be **follicles**, hemorrhages, inflammatory membranes and an **enlarged pre-auricular lymph node** (or submandibular)



❖ Etiology:

- ◇ **Adenoviral infection** (most common cause) → highly contagious and frequently occurs in epidemics
- ◇ When taking history, the patient will tell you that they had an URTI or have **contacted someone** with a red eye

Red eye

❖ Treatment:

- ◇ No specific treatment
- ◇ **Cold compresses** are helpful (itching is annoying the pt.)
- ◇ Anti-histamine drops
- ◇ Decongestant
- ◇ Lubricating drops
- ◇ If there is severe inflammation → topical steroids



Papillae	Follicles
Bacterial & allergic conjunctivitis	Viral, chlamydial & toxic conjunctivitis
Red dots of varying size (red due to central vessel)	Avascular, white nodules filled with lymphocytes



Follicles (small blisters) associated with viral conjunctivitis

4 Chlamydial conjunctivitis

- Can be found in newborns (during delivery) or in sexually active adults
- Usually occurs in sexually active individuals with or w/o an associated genital infection

❖ Signs & Symptoms:

- ◇ Conjunctivitis usually unilateral, tearing, foreign body sensation
- ◇ Lid crusting
- ◇ Conjunctival (profuse) discharge and **follicles** (mucopurulent follicular conjunctivitis)
- ◇ Often there is a **non-tender preauricular node**



❖ Treatment:

- ◇ Oral **tetracycline** or **azithromycin** (Topical abx is not enough, we give SYSTEMIC abx)

5 Allergic conjunctivitis

- Encompasses a spectrum of clinical condition.
- All associated with the hallmark symptom of **itching**. And it's seasonal
- There is often a **history of rhinitis, asthma and family history of atopy** (Atopy refers to the genetic tendency to develop allergic diseases such as allergic rhinitis, asthma and atopic dermatitis (eczema).

❖ Signs & Symptoms:

- ◇ Mildly red eyes
- ◇ **Watery discharge**
- ◇ **Itching**
- ◇ Chemosis
- ◇ **Papillary hypertrophy** & giant **papillae (cobblestone)**
- ◇ Hx. of allergy (March/April, بطلع برا السبب، بطلع بملعب جارحي، بطلع بملعب جارحي)

Red eye

Allergic conjunctivitis has two subtypes:

- Hayfever or seasonal
- Vernal conjunctivitis

Both present with S & Sx of conjunctivitis, lacrimation, rhinitis, and more in vernal: photophobia. They are an IgE (type IV) reactions. They are common in KSA

❖ Treatment:

- ◇ Cold compresses
- ◇ Anti-histamines
- ◇ Non-steroidals
- ◇ Mast cell stabilizers
- ◇ Topical corticosteroids
- ◇ Cyclosporine



Papillary reaction associated with bacterial & allergic conjunctivitis

2 take home messages:

1. Vernal Keratoconjunctivitis (الرمم الربيعي), very common in KSA
 - History: Age 8-15, bad rubbing + tearing + itching بحى بين الفصول Sep/Oct, March/April
 - Treatment: mast cells stabilizers + Topical steroids
2. Topical steroids should be given in severe allergy **under supervision** to avoid developing the side effects of steroids, most importantly **glaucoma & cataract & fungal** infection

DIFFERENCES BETWEEN THE TYPES OF CONJUNCTIVITIS

Etiology	Bacterial conjunctivitis	Chlamydial conjunctivitis	Viral conjunctivitis	Allergic conjunctivitis
Discharge	Mucopurulent discharge	Unilateral + mucopurulent discharge	Watery discharge	Watery discharge
Conjunctiva reaction	papillae	follicles	follicles	papillae
Other	-	<u>Non tender</u> palpable preauricular Lymph node	<u>Tender</u> palpable preauricular Lymph node & Hx of URTI	nasal congestion & sneezing

Red eye

6 Dry eye

- Common in our area
- There are primary and secondary causes
- No blinking → dry eyes (using computers for a long time or driving → no blinking)

❖ Signs & Symptoms:

- ◇ Burning or foreign body sensation
- ◇ Tearing **as a reflex**
- ◇ Usually bilateral

❖ Etiology:

- ◇ Idiopathic (**mostly**)
- ◇ Collagen vascular diseases (**the commonest is rheumatoid arthritis, SLE, sjogren syndrome**)
- ◇ Conjunctival scarring
- ◇ Infiltration of the lacrimal gland
- ◇ Vitamin A deficiency
- ◇ **Drugs → isotretinoin (roaccutane). they need to use lubricants, so imp to ask about it in medical history**
- ◇ عمليات بصحيح النظر

❖ Treatment:

- ◇ Artificial tears or ointments (it requires long-term treatment).
- ◇ In severe cases it may be necessary to occlude the puncta with plugs, or more permanently with surgery, to conserve tears (punctum plug sometimes)

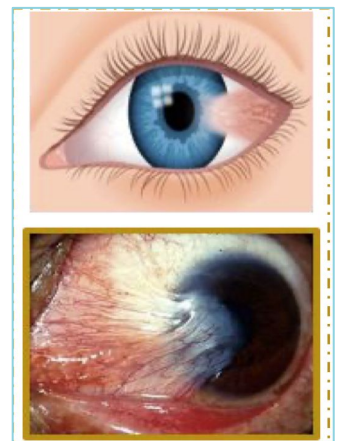
7 Pterygium اللحمية

❖ Definition:

- ◇ Extension of conjunctiva (fibrovascular membrane) invading the cornea (pterygia are wing-shaped and located nasally, with the apex towards the cornea, on to which they progressively extend)
- ◇ The exact cause is unknown but may be secondary to sun exposure (UV light) and dryness (prevention with sunglasses and lubricating with eye drops)

❖ Treatment:

- ◇ If it is small (mostly) we usually don't interfere because of **high recurrence**
- ◇ **4 Indications for surgery:**
 - **If it obstructs the vision by involving the visual axis**
 - Astigmatism
 - **Cosmetic (if large)**
 - Suspicion of malignancy (squamous cell carcinoma of the conjunctiva can present as pterygium)
 - If suspecting SCC → do excisional biopsy (signs that may raise suspicion):
 - ◆ Leukoplakic lesions over it
 - ◆ Aggressive vascularization
 - ◆ Increased in size within weeks to few months

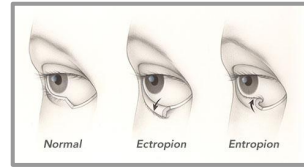


*Conjunctiva & fibrovascular membrane are growing toward the cornea

*** Indications for surgery:**
1-Affecting vision by going to the visual axis
2-For cosmetics

Red eye

8 Ectropion



❖ Definition:

- ◇ Ectropion is an eversion of the eyelid away from the globe (sagging of the eyelid)
- ◇ Entropion is an inversion of the eyelid so that your eyelashes **and** skin rub against the eye الحرفي كامل

❖ Causes:

- ◇ Age → related orbicularis muscle laxity
- ◇ Trauma
- ◇ Scarring of the periorbital skin
- ◇ Seventh nerve palsy



Lid is going down (sagging) away from the conjunctiva.
This is most likely due to aging.

❖ Symptoms:

- ◇ Dryness which increases the risk of corneal ulcer
- ◇ Recurrent infection
- ◇ Redness
- ◇ Excessive tearing

❖ Treatment:

- ◇ **Surgery** by suturing the eyelid (blepharoplasty) → tightening the eyelid

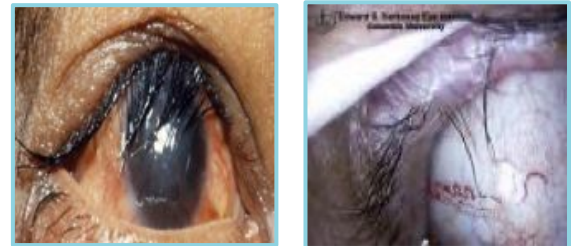
9 Trichiasis

❖ Definition:

- ◇ Eyelashes are inverted towards the eye (globe) & rubbing against the cornea which causes irritation & abrasion سحراب بلمس العين، ماب الحرفي كامل
- ◇ If it is 1 or 2 lashes, we call it trichiasis. if the whole lid edge is inverted, we call it entropion
- ◇ Most of the time, ectropion and trichiasis are **secondary to old trachoma** (الرمم)
- ◇ Present with follicle reaction

❖ Treatment:

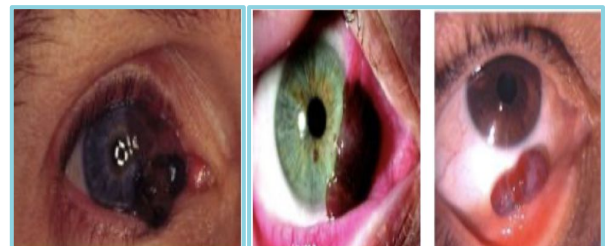
- ◇ Trichiasis → ablation
- ◇ Entropion → correct it by surgery



Dr explained it very briefly

10 Conjunctival tumor

- ❖ Melanoma
- ❖ It causes redness
- ❖ It is lethal & can metastasize to the liver
- ❖ **Diagnosis** → biopsy for a definitive diagnosis may be required



large brown fleshy lesion

Red eye

11 HSV dendrites

❖ Definition:

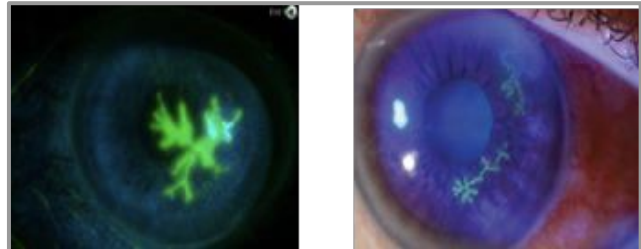
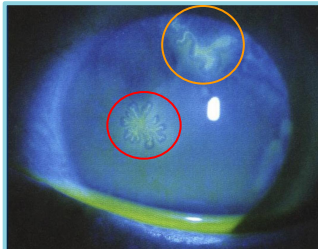
- ◇ **Primary infection by HSV-1** is usually acquired early in life by close contact such as kissing.
- ◇ Primary infection may cause a conjunctivitis, with or without punctate keratitis. It is followed by resolution and latency of the virus in the trigeminal ganglion. 'Recurrent' infection involves reactivation of the latent virus, which travels centrifugally to nerve terminals in the corneal epithelium to cause an epithelial keratitis.
- ◇ The pathognomonic appearance is of a dendritic ulcer.
- ◇ Natural History: spontaneous resolution

❖ Signs & Symptoms:

- ◇ Fever
- ◇ Vesicular lid lesions
- ◇ Follicular conjunctivitis
- ◇ Pre-auricular lymphadenopathy
- ◇ Very red, swollen & painful eye

❖ Management:

- ◇ **Fluorescein staining** to confirm
- ◇ **Topical antiviral 'acyclovir'**
- ◇ Topical steroids **must not** be given to patients with a dendritic ulcer, since they may exacerbate the disease and cause extensive corneal ulceration

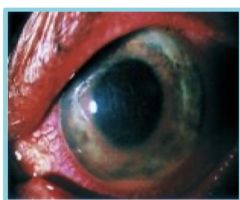


Rosette or dendrite like ulcer

12 Iritis

❖ Definition:

- ◇ Subtype of uveitis
- ◇ Associated with TB
- ◇ Inflammation of the iris accompanied by increased vascular permeability, it is termed iritis or anterior uveitis
- ◇ White cells circulating in the aqueous humor of the anterior chamber can be seen with a slit lamp. protein, which also leaks into the anterior chamber from the blood vessels, is picked out by its light-scattering properties in the beam of the slit lamp as a 'flare'



Hypopyon & large mutton fat keratic precipitates



White deposits in the cornea (keratic precipitates) which are WBC & macrophages attached to the back of the cornea

Red eye

13 Nasolacrimal obstruction ★

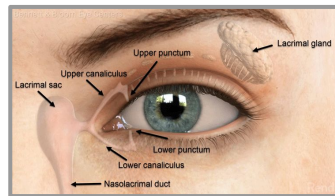
- ★ It leads to **dacryocystitis** (inflammation and swelling of the lacrimal sac), mostly due to secondary to nasolacrimal duct obstruction الدكتور ركر عليها، فرق بينهم
- If the lacrimal gland gets affected, we call it → **dacryoadenitis**

❖ Signs & Symptoms:

- ◇ Pain
- ◇ Redness
- ◇ Swelling over the innermost aspect of the lower eyelid (medial side of the orbit)
- ◇ Tearing
- ◇ Discharge



SAQ: define the mark → lacrimal gland
anatomy → sac 1st then duct (eye angle) then nose



EXTRA

❖ Organisms:

- ◇ Staph aureus
- ◇ Streptococcus
- ◇ Diphtheroids

❖ Treatment:

- ◇ Systemic antibiotic until the redness subsides
- ◇ then surgical drainage to open the lacrimal duct (DCR surgery) 'dacryorhinostomy'
 - It should not be done immediately while the eye is injected & inflamed because it will cause bleeding & subsequent obstruction

14 Episcleritis

❖ Definition:

- ◇ The outer coats covering the eye are conjunctiva then the sclera, between them is the episclera, a fine membrane containing blood vessels. sometimes it gets inflamed.
- ◇ Usually self limited.

❖ Signs & Symptoms:

- ◇ It can be localized (sectorial) or diffuse redness
- ◇ Often asymptomatic Mild pain & discomfort

❖ Etiology:

- ◇ Sometimes it is associated with RA or gout. thus they need to be investigated (ONLY if recurrent infection), we test for uric acid and RA antibodies (RF).

❖ Treatment:

- ◇ Topical or systemic NSAIDs



Red eye

15 Scleritis

- This is a **more severe condition** than episcleritis, and may be associated with collagen vascular diseases, most commonly **rheumatoid arthritis**, also SLE
- You need to know the difference b/w scleritis and episcleritis (there is more severe pain along with tenderness in scleritis as well as slight bluish discoloration of the sclera indicating deep inflammation)
- When differentiating episcleritis from scleritis, clinicians often use the phenylephrine blanching technique: blanching congested conjunctival and superficial episcleral blood vessels with either the 2.5% or the 10% concentration. When the deep episcleral plexus does not blanch, the diagnosis is usually scleritis. If the redness does disappear, it's episcleritis.

❖ Etiology:

- ◇ 30-60% associated with systemic disease (e.g. RA)

❖ Signs & Symptoms:

- ◇ Pain may be **severe with tenderness** (if you touched the eye pt. jump)
- ◇ Tearing
- ◇ Photophobia
- ◇ Maybe localized, diffuse or associated with nodules
- ◇ Redness
- ◇ Characteristically the affected sclera is swollen



❖ Complications:

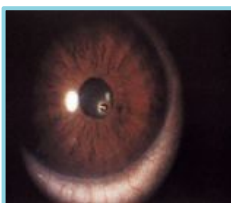
- ◇ It can result in scleral necrosis (scleromalacia perforans)
- ◇ Scleral thinning sometimes with perforation
- ◇ Keratitis, uveitis
- ◇ Cataract formation and glaucoma



❖ Treatment:

- ◇ May need systemic steroids
- ◇ Methotrexate, HUMIRA® (adalimumab) or infliximab in some cases

16 Foreign body



17 Infectious (Microbial) keratitis

- Also known as corneal ulcer (discussed earlier in this lecture)



Corneal opacity

Red eye

18

Subconjunctival hemorrhage

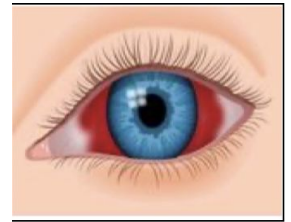
- Subconjunctival hemorrhage is bright red due to exposure to ambient oxygen levels and obscures the white sclera
- Blood underneath the conjunctiva, often in a sector of the eye (delicate blood vessels)
- usually asymptomatic
- We worry about EXCEPT it if it's spontaneous & recurrent, it needs to be investigated (check CBC, BP, platelets, INR, aPTT etc)

❖ Etiology:

- ◇ Valsalva (strong coughing or straining)
- ◇ Traumatic
- ◇ Hypertension
- ◇ Bleeding disorder (serious, sometimes 1st sign for leukemia or lymphoma cases present with subconjunctival hemorrhage)
- ◇ Idiopathic

❖ Treatment:

- ◇ Mostly it is self-limiting, but most importantly is to identify the cause, **it could be the earliest sign of lymphoma or leukemia**



Diagnosis →
Subconjunctival hemorrhage

Causes → Trauma and
Bleeding disorders

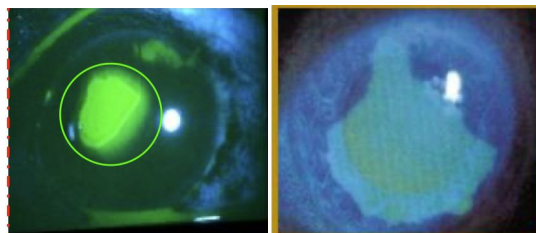
19

Corneal abrasion

(discussed earlier)



SAQ: corneal abrasion (corneal epithelial defect) with fluorescein dye



You have to mention fluorescein dye in order to get full marks in your answer! SAY THE WHOLE THING!

Red eye treatment algorithm

● History:

- Trauma
- Contact lens wearer (always considered serious)
- Severe pain/photophobia
- Significant vision changes
- History of prior ocular disease (trauma or surgery)
-

● Exam:

- Visual acuity
- Ocular motility
- Abnormal pupil
- Ocular tenderness
- White corneal opacity
- Increased IOP

YES??! → refer **urgently** to Ophthalmology

Is it conjunctivitis?

● History:

- Itching? → **allergy**, viral
- Exposure to a person with red eye → **viral**
- URTI → **viral**
- Past history of conjunctivitis → **allergy**
- Discharge with morning crust → **allergy**, chlamydial
- Exposure to drug → **allergy**
-

● Signs:

- Discharge → **bacterial**, chlamydia (depends on the nature of the discharge)
- Lid and conjunctival edema → **bacterial**
- Conjunctival redness
- Preauricular lymph node → **viral**
- Facial or eye lid vesicles → **HS**

Summary

• Corneal ulcer (microbial keratitis):

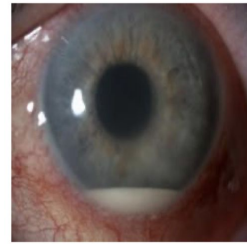
- **Symptoms:**
 - Severe pain + redness
 - Corneal opacity
 - Hypopyon
- **Management:**
 - Corneal scraping (for culture & staining) + empirical abx



bacterial (pseudomonas) keratitis with opacity

• Uveitis:

- **Anatomical classification:**
 - Panuveitis
 - Anterior uveitis (iritis)
 - Posterior uveitis
- **Etiology:**
 - Idiopathic
 - Inflammatory diseases
 - Infectious
- **Management:**
 - Topical steroids + topical cycloplegic +/- systemic immunosuppressants



- the patient is having hypopyon without infiltrate thus it is mostly uveitis or endophthalmitis.
- WBCs in the anterior chamber & redness

• Acute angle closure glaucoma:

- Results from peripheral iris blocking the outflow of fluid
- Hyperopia is a risk factor
- **Signs & Symptoms:**
 - High IOP (normal is 10-21 mmhg) ⇒ pain + headache
 - Redness, mid-dilated pupil, colored halos around lights
 - Vomiting nausea, decreased vision
 - Symptoms worse with low light environments
- **Management:**
 - Reduce IOP with medications → then peripheral laser iridotomy

• Pre-septal cellulitis (periorbital cellulitis):

- Inflammation anterior to the septum → pre-septal cellulitis
- **Signs & Symptoms:**
 - Lid swelling & erythema
 - Visual acuity, motility, pupil reaction, globe & optic nerve → normal
 - Puffy and red eyes
 - NO FEVER
- **Management:**
 - Systemic antibiotics + warm compresses

• Orbital cellulitis:

- **Signs & Symptoms:**
 - Pain
 - Decreased vision
 - Impaired ocular motility / double vision
 - Afferent pupillary defect
 - Proptosis
 - Optic nerve swelling on ophthalmoscope
- **Management:**
 - Admission + IV abx
 - Nasopharynx & blood cultures
 - In case of subperiosteal abscess → give IV abx for a couple of days, then recheck → if it didn't resolve → evacuate surgically

Summary

● Endophthalmitis:

- Vitreous cavity inflammation (emergency)
- **Signs & Symptoms:**
 - Any pt in the early postoperative period (within 6 wks) with pain or decreased vision should be evaluated
 - Redness, lid edema, hypopyon
- **Management:**
 - Vitreous sample for culture
 - Intravitreal abx injection + topical abx (fortified vancomycin + ceftazidime)

● Retinal detachment:

- Separation b/w RPE from the neurosensory retina (the first 9 layers)
- **Risk factors:**
 - Myopia
- **Symptoms:**
 - Flashes, floaters
 - Peripheral and or central vision loss

● Corneal abrasion:

- History of scratching the eye
- **Symptoms:**
 - Foreign body sensation, severe pain, tearing, photophobia
- **Diagnosis** → fluorescein dye in drops or strips & blue light
- **Management:**
 - Topical abx (ofloxacin)
 - Patch the eye (if infxn is ruled out)

● Chemical injuries:

- Alkaline is worse
- **Management:**
 - Irrigate for at least 30 mins
 - Instill topical anesthetic & topical antibiotic
 - Check for foreign bodies + lubricate frequently

● Corneal or conjunctival foreign bodies:

- **Management:**
 - Instill topical anesthetic + topical antibiotic
 - Remove foreign body (check eyelids)
 - Treat corneal abrasion

● Hyphema:

- Blood in the anterior chamber
- **Management:**
 - Bed-rest
 - Topical steroid + topical cycloplegic
 - Anti-fibrinolysis agents (tranexamic acid)
 - Surgical evacuation (first line in sickle cell anemia patients)

Summary

• Orbital fractures:

- Examination → assess ocular motility, assess sensation over cheek & lip (infraorbital nerve), check for enophthalmos

• Blepharitis:

- Inflammation of the lid margin
- **Treatment** → lid hygiene + topical abx + lubricants



DIFFERENCES BETWEEN THE TYPES OF CONJUNCTIVITIS

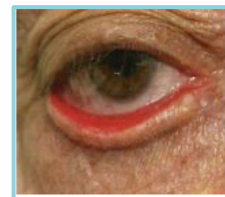
Etiology	Bacterial conjunctivitis	Chlamydial conjunctivitis	Viral conjunctivitis	Allergic conjunctivitis
Discharge	Mucopurulent discharge	Unilateral + mucopurulent discharge	Watery discharge	Watery discharge
Conjunctiva reaction	papillae	follicles	follicles	papillae
Other	-	<u>Non tender</u> palpable preauricular Lymph node	<u>Tender</u> palpable preauricular Lymph node & Hx of URTI	nasal congestion & sneezing

• Pterygium:

- Extension of conjunctiva invading the cornea
- **Management:**
 - **Indications of surgery:**
 - Obstructs vision
 - If it causes astigmatism
 - Cosmetic
 - Suspicion of malignancy

• Ectropion:

- Eversion of the eyelid away from the globe
- **Causes** → aging, scarring of periorbital skin, 7th nerve palsy
- **Treatment** → surgery (blepharoplasty)



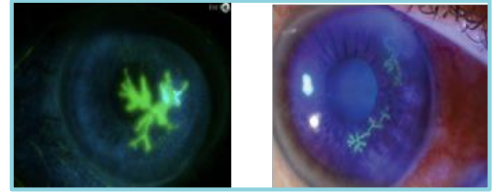
• Trichiasis:

- Eyelashes are inverted towards the eye & rubbing against the cornea which causes irritation and abrasion
- If it is 1 or 2 lashes we call it trichiasis. if the whole lid edge is inverted we call it entropion
- **Management:**
 - Trichiasis → ablation
 - Entropion → correct it by surgery

Summary

● HSV dendrites:

- Caused by HSV-1
- **Management :**
 - Fluorescein staining (dendritic ulcer)
 - Acyclovir



Rosette or dendrite like ulcer

● Nasolacrimal obstruction:

- Leads to dacryocystitis
- **Treatment** → systemic abx then surgical drainage (dacryorhinostomy)

● Episcleritis:

- **Signs and Symptoms:**
 - Redness
 - Pain or just discomfort or asymptomatic
 - No discharge, vision is not reduced
- **Etiology** → sometimes associated with RA or gout
- **Treatment** → topical or systemic NSAIDs



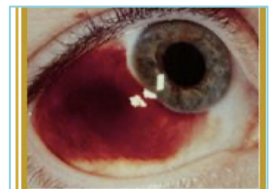
● Scleritis:

- More severe than episcleritis
- **Etiology** → sometimes associated with RA or SLE
- More severe pain than episcleritis, and there is tenderness
- + bluish discoloration of the sclera, photophobia, redness
- **Treatment** → may need systemic steroids



● Subconjunctival hemorrhage:

- Mostly self-limiting but you need to identify the cause (could be the earliest sign of leukemia)



Lecture Quiz

Q1- A 7-year-old child with nasal congestion and sore throat he came complaining of tearing and red eye with follicular conjunctiva, preauricular lymph node was swollen also, what is the most likely organism?

- A. Chlamydia trachomatis
- B. Staphylococcus aureus
- C. Adenovirus

Q2- A 60 years-old male who has a history of inferior orbital trauma. What is the most common presentation?

- A. Decreased corneal sensitivity
- B. Decreased sensation in the cheek
- C. Inability to adduct the eye
- D. Inability to look down in adduction eye

Q3- A female patient came to ER after a splash of chemical detergent into her eyes. She opens her eyes with difficulty and is complaining of severe pain. What is the main initial treatment?

- A. Topical antibiotic
- B. Systemic antibiotic
- C. Eye irrigation
- D. Topical steroids

Q4- 14 years old child presented with red right eye after trauma that happened 3 days ago. On examination there was cells in anterior chamber and keratic precipitates, what is the management?

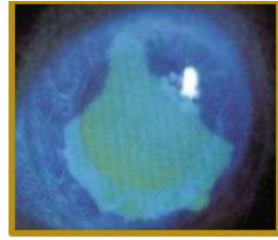
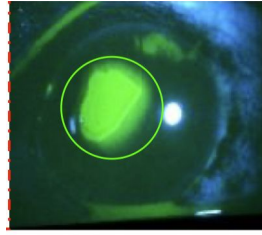
- A. Topical corticosteroid and cycloplegic
- B. Topical antibiotic and cycloplegic
- C. Systemic corticosteroids and cycloplegic
- D. Systemic antibiotic and cycloplegic

Q5- A 20- -year- -old male with history of runny nose over last few days presented with acute eyelid swelling, proptosis, and limitation of extraocular motility. What is the initial treatment of choice?

- A. Antibiotic eye drops
- B. Oral systemic antibiotics
- C. Surgical intervention
- D. Intravenous antibiotic

Short Answer Questions

Case 1



A: What is the diagnosis?

B: What is the treatment?

C: Mention one complication for this condition?

Case 2



A: What is the diagnosis for the green circle?

B: What is the most likely cause for this condition?

C: If the inflammation located in red circle what is the diagnosis ?

Answers:

Case 1

A: corneal abrasion with fluorescein dye

B: Topical antibiotics + batching (less imp than antibiotics)

C: Corneal ulcer

Case 2

A: Dacryocystitis

B: Secondary to nasolacrimal duct obstruction

C: Dacryoadenitis (inflammation of the lacrimal gland)

This work was originally done by 438 and 439 Ophthalmology Team

Edited by 441 Ophthalmology Team

Team leaders:

Abdullah Aldayel Ibrahim Aljurayyan Sultan Alosaimi

Members:

Mohamed Faisal ALQahtani

Note Takers:

Abdullah Aldayel Abdulaziz Alqusiyer

