



## Ocular Emergencies & Red Eye



### Objectives:

- Not given.

[ Color index : **Important** | **Notes** | Extra ]

**Resources:** Slides, Lecture notes of ophthalmology, Notes, 434 team.

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## Ocular Emergency:

<b>General Emergencies:</b>	<b>Orbital/Ocular Trauma:</b>
<b>Microbial keratitis &gt; Corneal ulcer</b>	<b>Corneal abrasion</b>
<b>Uveitis</b>	<b>Corneal &amp; conjunctival foreign bodies</b>
<b>Acute angle glaucoma</b>	<b>Hyphema</b>
<b>Orbital cellulitis</b>	<b>Ruptured globe</b>
<b>Endophthalmitis</b>	<b>Orbital wall fracture</b>
<b>Retinal detachment</b>	<b>Lid Laceration</b>
	<b>Chemical injury</b>

## Ocular emergencies:

### ◆ Hyphema:

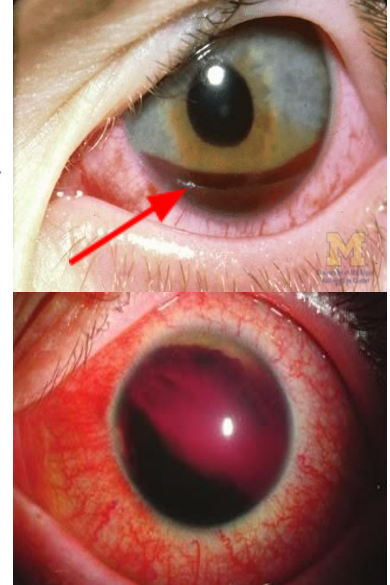
- Hyphema is defined as the presence of blood within the aqueous fluid of the **anterior chamber**.
- The most common cause of hyphema is “trauma”.
- doctors call it “8 Ball hyphema “ when it is filled with blood. *“Eight-Ball” Hyphema. This hyphema completely fills the anterior chamber*
- Can occur with blunt or penetrating injury.
- Can lead to **high intraocular pressure**.
- Detailed history (Sickle cell) to help in the treatment. Moderate increase of IOP in sickle cell hemoglobinopathy patients may produced rapid deterioration of visual function, because sickling can lead to obstruction of the central retinal artery and profound irreversible visual loss.

### Management:

- Bed rest 2-3 days to prevent re-bleeding. “no movement “.
- Topical steroid to reduce inflammation
- Topical cycloplegic to cause pupil dilation then prevent accommodation to prevent dislodging of the clot which cause re-bleeding. [Atropine](#)
- Anti-fibrinolysis agents (Tranexamic acid)
- Surgical evacuation if increase IOP, stays more than five days and not responding to treatment.

If total wait for 3 days if not responding and pressure more than 30mmHg do Surgical evacuation, Not total wait for 5 days if pressure less than 30 mmHg.

- **Sickle cell anemia patients need immediate intervention. (OR)**



### ◆ Corneal Abrasion:

- Corneal abrasions result from a disruption or loss of cells in the top layer of the cornea, called the corneal Epithelium. caused by fingernails or lenses. [the epithelium has the ability to replicate.](#)

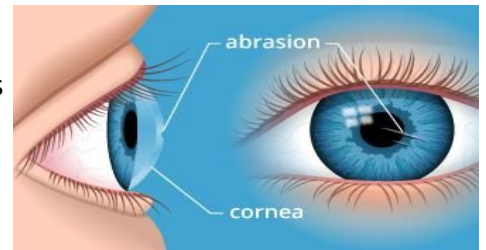
### Symptoms:

- Foreign body sensation.
- Severe Pain.
- Redness.
- Tearing .
- Photophobia experience of discomfort or pain to the eyes due to light exposur

“Corneal Abrasion can lead to Corneal Ulcer if untreated “

**Treatment:** [it heals within 24 hrs.](#)

- Topical antibiotic.[to prevent infections](#)
- Cycloplegia to dilate pupil to decrease pain .
- **Pressure patch over the eye.**
- Refer to ophthalmologist.
- Important to treat to avoid infection.
- If infection is suspected do scraping biopsy to rule it out.



## ❖ Retinal Detachment: انفصال الشبكية

- Retinal detachment is a disorder of the eye in which the retina separates (neuronal layer from the pigmented layer). انفصال الطبقة الأخيرة عن التسعة اللي قبلها.

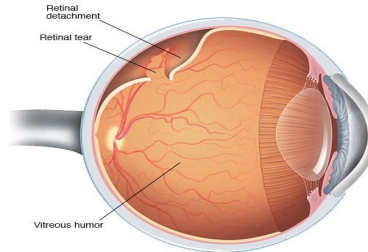
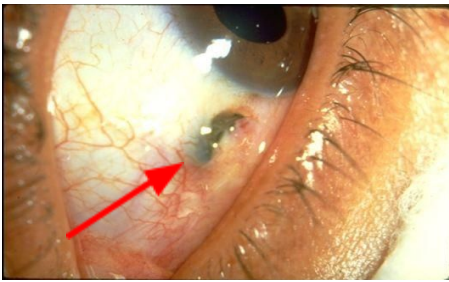
**Risk factors:** people with high myopia -6 and above.

### Symptoms:

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

**Management:** Surgery **Laser and vitrectomy.**

the aim of the treatment is to close the causative break in the retina and to increase strength of the attachment between 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 needed  
- In the periphery (Macula on); better prognosis and quick surgical intervention  
- Retinal detachment: Intra-retinal separation between retinal pigment epithelium (RPE) and neurosensory layer.  
- Retinoschisis: Separation between retina and choroid, no urgent intervention needed and usually congenital.  
- Rhegmatogenous retinal detachment: (emergency and need surgery) common in people with high myopia because they have peripheral breaks, fluid goes inside it and cause detachment.

## ❖ Corneal Ulcer:

- Corneal ulcer occurs secondary to lid and conjunctival inflammation but is often due to trauma or contact lens wear.
- Bacterial, viral, fungal or parasitic.

### Symptoms:

- Ocular pain, redness and discharge with decreased vision and white lesion on the cornea

**Prompt diagnosis of the etiology by doing corneal scraping** (Slide, culture to diagnose)

**Treatment:** appropriate antimicrobial therapy are essential to minimize visual loss

- start by antibiotics, why? because most common is bacterial, most serious (perforation) is bacterial, it takes long time to response if u treat as fungal.

#gram +ve: cefazolin (mild to moderate), vancomycin (for severe case)

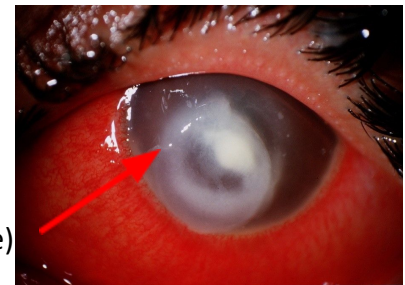
#gram -ve: Ceftazidime

-we give antibiotics every hour, why? because there is no immune system (no blood vessels)

- in the pics, the more whitish it looks means it scarred (healed).
- **Hypopyon is simply a pus collection in the anterior chamber.**

### Contact lens wearer:

- Any redness occurring for patients who wear
- contact lens should be managed with
- extreme caution
- Remove lens
- Rule out corneal infection
- **Antibiotics for gram negative organisms** Most common organism is *Pseudomonas aeruginosa*.
- Do not patch
- Follow up with ophthalmologist in 24 hours



bacterial keratitis with opacity



Hypopyon



## ❖ Chemical Injuries:

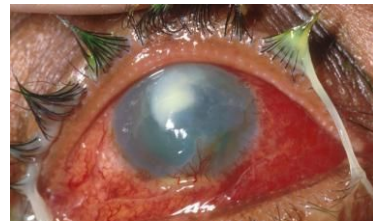
- A vision-threatening emergency.
- The offending chemical may be in the form of a solid, liquid, powder, mist, vapor.
- Can occur in the home, most commonly from detergents, disinfectants, solvents, cosmetics, drain cleaners
- **Alkaline chemical injury** is worse more penetration.
- Can range in severity from mild irritation to complete destruction of the ocular surface.
- It may be aggressive and destroy eye surface “Epithelium” causing stem cell deficiency end up with blindness.
- Destruction of optic nerve common in case of glaucoma resulting from alkaline injury.

### Management: poor prognosis

- Irrigate with clean water.
- Instill topical anesthetic.
- Check for and remove foreign bodies **in case of fireworks/Cement**.
- **Immediate irrigation** essential, preferably with saline or Ringer’s lactate solution, **for at least 30 minutes. \*immediately before take history even\***.
- Irrigation should be continued until neutral pH is reached (i.e., 7.0) - Instill topical antibiotic.
- Frequent lubrications.
- Oral pain medication.
- Enhance healing



Alkali chemical burn



Ocular irrigation

## ❖ Uveitis: It could be Anterior, posterior or panuveitis.

- Inflammation of the uveal tissue (**iris, ciliary body, or choroid**), retina, blood vessels, optic disc, and vitreous can be involved. “the patient may has retinitis or hypopyon secondary to uveitis “.  
It could be:
  - 1- anterior as iridoscleritis.
  - 2- at the back as choroiditis, retinitis.
  - 3- Panuveitis (inflammatory changes affect the anterior chamber, vitreous and retina and/or the choroid).

### Etiology:

- Idiopathic 50%
- Inflammatory diseases:  
HLA B27, Ankylosing spondylitis, IBD, Reiter’s syndrome, Psoriatic arthritis. Sarcoidosis, Behcet’s, Vogt-Koyanagi-Harada Syndrome (**panuveitis and ear involvement**) .
- Infectious:
  - Herpes virus.
  - Toxoplasmosis; **transmitted through cats Poor outcome**.
  - **Secondary** Tuberculosis; granulomatous uveitis (common in KSA, India) – give anti Tb and steroids **Why? because you don’t want the patient to have miliary TB**.



- Sarcoidosis(lung CT to diagnose); granulomatous uveitis (USA).
- Syphilis

## Management:

- Identify possible cause.
- Topical steroid “first”.
- Topical cycloplegics **to dilate pupils**.
- Systemic immunosuppressive medication “according to workup, either shift to systemic or continue topical”
  - Steroid.
  - Cyclosporine.
  - Methotrexate.
  - Azathioprine.
  - Cyclophosphamide.
- Immunomodulating agents.
  - Infliximab (Anti TNF).



**Figure 9.1** External ocular appearance in a patient with anterior uveitis. Note the inflammatory response at the limbus.

## ◆ Acute Angle Closure Glaucoma(موية زرقاء):

- Is caused by a rapid or sudden increase in intraocular pressure (IOP). High pressure inside the eye is caused by an imbalance in the production and drainage of fluid. When the peripheral iris bunched up in the angle.
- “ Normal IOP 10 to 21 mmHg “
- Result from peripheral iris blocking the outflow of fluid

### symptoms

- Present with pain, redness, mid-dilated pupil, decreased vision and colored halos around lights
- Severe headache or nausea and vomiting
- Increased Intraocular pressure
- Can cause severe visual loss due to optic nerve damage

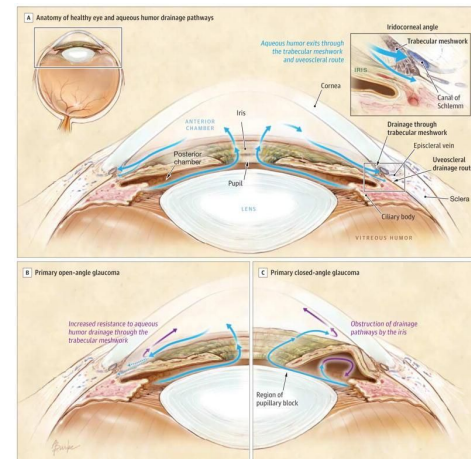
Typical history: while dimming the light.

\*Glaucoma increases at night more than morning because of pupil dilation at night.

in One of the cases a patient came to the doctor complaining that he had eye pain whenever he watching a film and turn off the lights

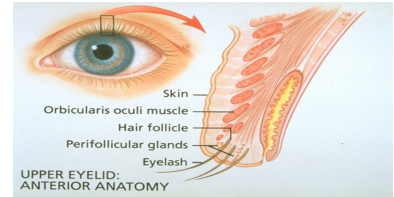
### Management :

- Medical treatment to **reduce the pressure and relieve the pain**.
- peripheral **laser iridotomy** will be curative in most cases.



Anatomy of upper eyelid: the septum is important as it separates the outside and inside the eye.

- infection outside the septum is: Preseptal cellulitis.
- infection after the septum is: Orbital cellulitis.



## ◆ Preseptal Cellulitis:

also known as Periorbital cellulitis is an inflammation and infection of the eyelid and portions of skin around the eye, anterior to the orbital septum.

- patient presents with Lid swelling and erythema.
- Visual acuity, motility, pupils, and globe should be **normal**.
- To rule out orbital cellulitis.



### ● Etiology:

- Puncture wound or sinusitis
- Laceration
- Retained foreign body from trauma
- Vascular extension, or extension from sinuses or another infectious site ( e.g., dacryocystitis, chalazion)
- Organisms :Staph aureus most common, H.influenzae most common in less than 5 yrs, streptococci.

### ● Management:

- Need to be treated properly to avoid extension of the infection to the orbit which cause orbital cellulitis.
- Warm (**always warm for infections**- we need vasodilation and subsequent increase in WBCs and chemotaxis) compresses.
- Systemic antibiotics **augmentin** (no admission needed).
- CT sinuses and orbit if not better or +ve history of trauma.

## ◆ Orbital Cellulitis:

It most commonly refers to an acute spread of infection into the eye socket from either the adjacent sinuses or through the blood.

- More serious than preseptal cellulitis because it may go to the brain and lead to death.
- May be a consequence of preseptal cellulitis.

**Symptoms:** مو شرط كلهم

- Pain, Decreased vision.
- Impaired ocular motility/double vision
- Afferent pupillary defect
- Conjunctival chemosis and injection Chemosis of the conjunctiva is a type of eye inflammation It occurs when the inner lining of the eyelids swells.
- Proptosis \*is a bulging of the eye anteriorly out of the orbit.
- Optic nerve swelling on fundus exam
- 'Motility, pupil reaction, fundal exam, color vision need to be tested to check optic nerve function. "



**Management:**

1. Admission.
2. Intravenous antibiotics (vancomycin)
3. Nasopharynx and blood cultures
4. Surgery may be necessary

as in case of subperiosteal abscess so, they will drain the puss.

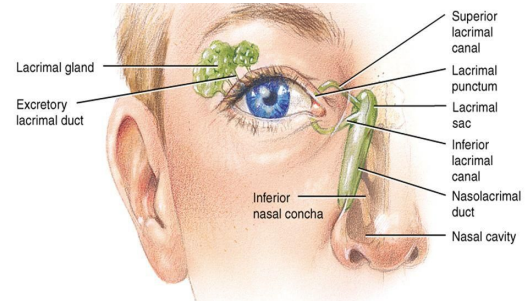
**Complication:** meningitis



## ❖ Lid Laceration:

\*it is not considered emergency unless it involves the canal

- 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).

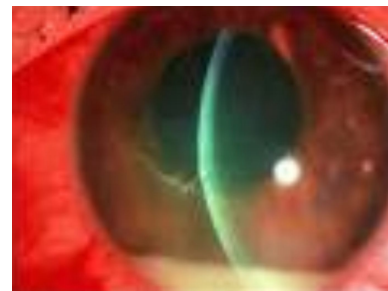
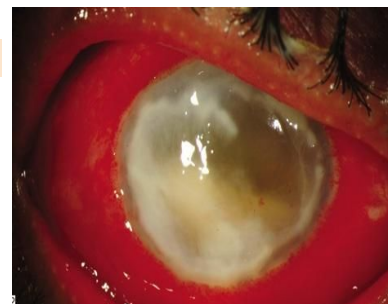


## ❖ Endophthalmitis (EXTREME EMERGENCY): \*Endophthalmitis is an inflammation of the interior of the eye

- Potentially devastating complication of any intraocular surgery
- Secondary to trauma or post-surgery (channel from outside to inside which cause bacterial entry and it found good environment to live in as there is no direct blood vessels in the vitreous to provide strong immunity) - Sometimes the destruction is due to the inflammation not the infection itself.
- Any patient in the early postoperative period (within 6 weeks of surgery) should be evaluated for pain or decreased vision immediately.
- patient Present 2-3 days post-op with Severe redness, lid edema and hypopyon on exam you find vitritis.

### Management :

- Vitreous sample for culture.
- Intravitreal antibiotics injection plus topical antibiotics.
- Broad spectrum antibiotics or **Ceftazidime** and **Vancomycin**
- In severe infection the vitreous will be like an abscess in this case surgery is needed to drain it (Vitreotomy).
- If visualization of vitreous is not possible in case of severe infection, do B scan
- In decreased visual acuity (hand motion or less) Surgery is needed, if better give Intravitreal antibiotics only.



\*Visual acuity will decide the treatment if Intravitreal antibiotics or surgery

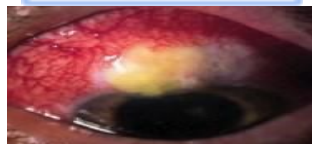
- do surgery – if no response to antibiotics and Endophthalmitis secondary to blebitis.

\*blebitis. is a presumed infection in or around a filtering bleb without vitreous involvement.

PROPTOSIS



Blebitis.





## ◆ Ruptured globe:

Suspect a ruptured globe if:

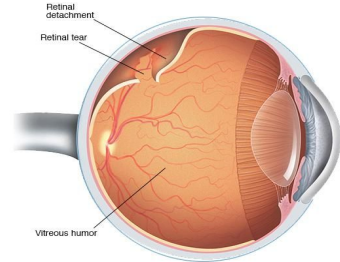
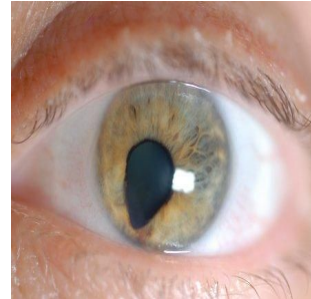
- Severe blunt trauma: rupture at weak part of the eye which is **insertion of the muscles** and lamina cribrosa.
- Sharp object or **By a fist or tense ball.**

### Symptoms & signs:

- Bullous subconjunctival hemorrhage **Take him to OR explore the area and suture if you leave it you'll still have infection.**
- Uveal prolapse (Iris or ciliary body)
- Irregular pupil
- Hyphema
- Vitreous hemorrhage
- Lens opacity
- **Lowered intraocular pressure**
- **if you have a foreign body first thing to do is suture and then deal with the foreign body you don't need to take it out immediately.**

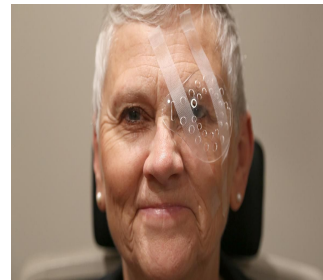
### IF suspect a ruptured globe:

1. Stop examination
2. Shield the eye
3. Give tetanus prophylaxis
4. Refer immediately to ophthalmologist.



Irregular pupil

Uveal prolapse (Iris or ciliary body)



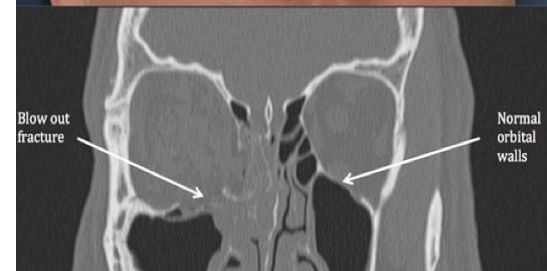
Bullous sub conjunctival hemorrhage

## ◆ Orbital Fracture: 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)

- Assess ocular motility
- Assess sensation over cheek and lip - Palpate for bony abnormality
- Enophthalmos; eye sinking inside

### When evaluating orbital fractures, focus on the following exam findings:

1. Vision, color: Make sure the optic nerve isn't involved.
2. 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.
3. Proptosis: Measure the degree of proptosis or enophthalmos using the Hertel exophthalmometer (a fancy ruler).
4. Palpate: Feel along the orbital rim for step-off fractures and subcutaneous emphysema (air crepitus).
5. 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 fractures.



## RED EYE:

### ❖ Bacterial conjunctivitis:

- **conjunctivitis** is an inflammation or swelling of the conjunctiva

#### Signs & symptoms:

**mucopurulent discharge, papillae**, redness, ocular irritation, tearing, foreign body sensation, burning sensation, stinging, photophobia maybe lid and conjunctival edema.

**Organism:** streptococcus, staphylococcus, Haemophilus influenzae.

**Treatment:** topical broad spectrum/Fluoroquinolones (ofloxacin, levofloxacin).



### ❖ Viral Conjunctivitis: Hx of contact with someone with red eye.

#### Signs & symptoms:

Acute, **watery discharge, follicles**, associated with **preauricular lymph nodes**  
Foreign body sensation, photophobia, soreness, conjunctival hyperemia

**Treatment:** cold compression



### ❖ Allergic Conjunctivitis: usually associated with asthma, atopy, sinusitis.

#### Signs & symptoms:

Itching watery discharge, **papillae**, seasonal with rhinorrhea.

**Treatment:** Antihistamine, cold compress rest eye

Topical steroids: they'll love it and keep on using it resulting in glaucoma and cataract. (avoid it)



### ❖ Chlamydial Infection: Common in kids known as Ophthalmia neonatorum.

- **Mucopurulent discharge**, pt got infection during delivery, treat the mother also.
- oral tetracycline

## Dry Eye:

### Associated with:

- Weather.
- Collagen-vascular diseases:
  - Rheumatoid arthritis, sjogren syndrome
- Excessive Vitamin A:
  - drug Isotretinoin (Roaccutane)
- vitamin A deficiency

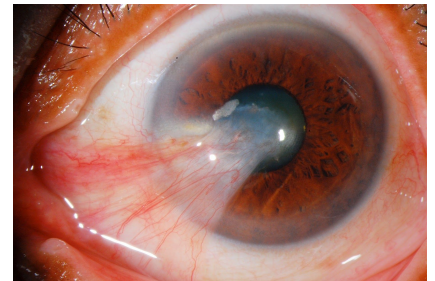
**Treatment:** Artificial drops

### ◆ Pterygium:

Extension of conjunctiva, secondary to sun exposure prevention with sunglasses and lubricating with eye drops.

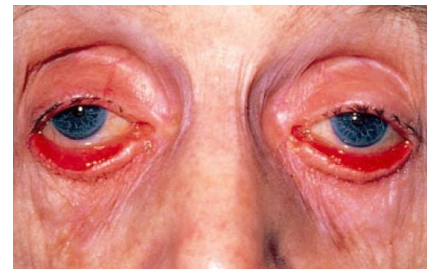
**Few indication for surgery:**

- if affecting the central vision by involving central axis
- Astigmatism
- cosmetic
- suspicion of malignancy (Sq cell carcinoma)



### ◆ Lid Ectropion:

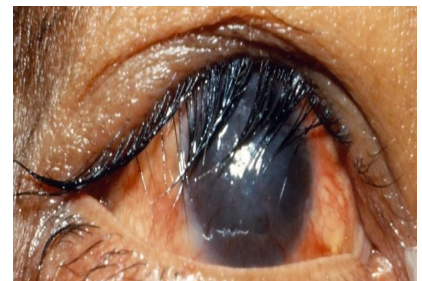
- an eversion of the lid away from the globe .
- **causes:**
  - age - related orbicularis muscle laxity.
  - scarring of the periorbital skin;
  - seventh nerve palsy.
- secondary dryness redness.
- The malposition of the lids everts the puncta and prevents drainage of the tears, leading to **epiphora**. It also exposes the conjunctiva and lower globe to dehydration . Ectropion causes an irritable eye. Surgical treatment is an effective treatment.



### ◆ Trichiasis

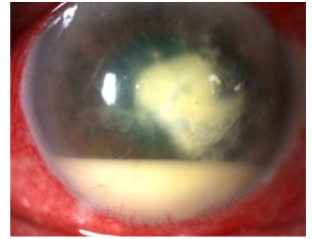
- Aberrant eyelashes are directed backwards towards the globe.
- It is distinct from entropion (all lid inside).
- The lashes rub against the cornea and can cause irritation > abrasion > Ulcer.
- Secondary to old trachoma

**Treatment:** adjust it by **electrolysis**



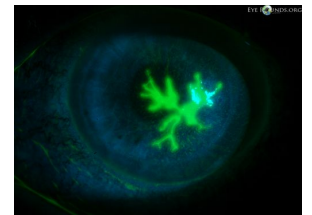
### ◆ Infectious Keratitis:

- Infection of the cornea.
- can lead to corneal ulcer.



### ◆ Corneal Abrasion:

- fluorescein stain
- Herpes type-1
- Anti-viral



### ◆ Lacrimal Dacryocystitis:

- Closed obstruction of the drainage system predisposes to infection of the sac (Dacryocystitis).
- lacrimal obstruction > open surgically.
- Dacryocystitis > Antibiotic then later open surgically.
- pain, redness, discharge, swelling, tearing.
- organisms involved (staph aureus, streptococcus).



### ◆ Conjunctival tumor:

- Melanoma.

### ◆ Episcleritis:

- Inflammation of Superficial sclera.
- This inflammation of the superficial layer of the sclera causes mild discomfort.
- localized or diffuse redness
- Asymptomatic.
- Self-limited.
- Treatment: Topical/Systemic NSAIDs.
- pt with gout check uric acid





## ◆ Scleritis:

- This is a more severe condition than episcleritis, and may be associated with the collagen vascular diseases, most commonly rheumatoid arthritis, but also polyarteritis nodosa and SLE. It is a cause of intense ocular pain. Both inflammatory areas and ischaemic areas of the sclera may occur.
- Characteristically the affected sclera is swollen.
- **Severe Pain and tenderness**
- Localized or diffuse redness, can result in scleral sclerosis, nodules maybe, tearing, photophobia.
- The following may complicate the condition:
  - scleral thinning ( scleromalacia ), sometimes with perforation.
  - keratitis.
  - uveitis.
- Test: phenylephrine > cause vasoconstriction :
  - bleached > conjunctivitis.
  - not > scleritis.
- Treatment: Steroids.



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## ◆ Subconjunctival Hemorrhage:

- Trauma.
- No need for treatment it is caused by trauma but if lymphoma, leukemia do **CBC**.
- Valsalva maneuver can cause it!



## ❖ **Blepharitis:** Lid Margin Inflammation

- Chronic inflammation of the lid margins

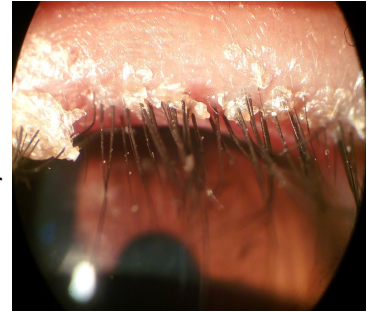
### **Symptoms & signs:**

- tired, itchy, sore eyes, worse in the morning;
- crusting of the lid margins in anterior blepharitis and redness in both (crust over eye lashes).
- Debris in the form of collarettes around the eyelashes (cylindrical dandruff).

**Treatment:** Topical Ab, Hygiene (**Mascara and eyeliner**), warm compression.

**Not responding to treatment? eye incision and curettage.**

**“Extra from Lecture Notes on Ophthalmology”**



### ➤ **Anterior blepharitis:**

- inflammation of the lid margin is concentrated in the lash line and accompanied by squamous debris around the eyelashes.
- The conjunctiva becomes injected. It is sometimes associated with a chronic staphylococcal infection. In severe disease the cornea is affected ( blepharokeratitis ).
- Small infiltrates or ulcers may form in the peripheral cornea (marginal keratitis) due to an immune complex response to staphylococcal exotoxins.
- signs :
  - redness and scaling of the lid margins; some lash bases may be ulcerated – a sign of staphylococcal infection.
  - debris in the form of a collarette around the eyelashes (cylindrical dandruff). This may indicate an infestation of the lash roots by Demodex folliculorum .
  - a reduction in the number of eyelashes.

### ➤ **Posterior blepharitis** (or meibomian gland dysfunction):

- the meibomian glands are usually obstructed by squamous debris.
- Signs:
  - obstruction and plugging of the meibomian orifices.
  - thickened, cloudy, expressed meibomian secretions.
  - injection of the lid margin and conjunctiva.
  - tear film abnormalities and punctate keratitis.
  - Both forms of blepharitis are strongly associated with seborrhoeic dermatitis, atopic eczema and acne rosacea. In rosacea there is hyperaemia and telangiectasia of the facial skin and a rhinophyma (a bulbous irregular swelling of the nose with hypertrophy of the sebaceous glands).

## Summary:

- **Hyphema** is defined as the presence of blood within the aqueous fluid of the anterior chamber. The most common cause of hyphema is "trauma". it Can lead to high intraocular pressure and usually treated with-Bed rest , Topical steroid and Topical cycloplegic .
- **Corneal abrasions** result from a disruption or loss of cells in the top layer of the cornea, called the corneal Epithelium. the patient come with Foreign body sensation,Photophobia and severe pain.
- **Alkaline chemical injury** to the eyes is worse because it will cause penetration. Immediate irrigation is very important as management .
- **Inflammation of the uveal tissue** (iris, ciliary body, or choroid), retina, blood vessels, optic disc, and vitreous can be involved. and we treat it first with topical steroids .
- **Orbital cellulitis** More serious than preseptal cellulitis because it may go to the brain and lead to death.May be a consequence of preseptal cellulitis.
- **Endophthalmitis: (extreme ophthalmic emergency)** treated with Intravitreal antibiotics injection plus topical antibiotics.