The Differential Diagnosis of The Red Eye

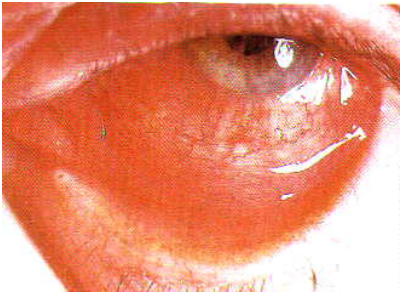
By
Dr Mouna AlSaad
Assistant professor Jordan university
VR surgeon

The Red Eye

- The most common cause of red eye is conjunctivitis
- Always check visual acuity, pupil size and reactivity. Evert lids to look for foreign body.

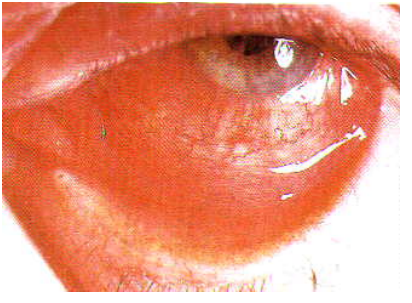
Conjunctiva/Cornea
Viral Conjunctivitis

- Inflammation of palpebral conjunctiva and bulbar conjunctiva.
- Etiology: Viral: Adenovirus type 3 associated with Pharyngitis, fever, malaise
- Transmission is direct contact.
- Incubation 5-12 days.



Conjunctiva/Cornea
Viral Conjunctivitis

- Clinical presentation
  - Edema and hyperemia of one of both eyes.
  - Conjunctival injection
  - Ipsilateral palpable preauricular lymphadenopathy.



Conjunctiva/Cornea
Viral Conjunctivitis

- Management:
  - Topical vasoconstrictors (naphazoline) and steroids (Vexol, Flarex,)
  - Sulfonamide drops
  - Highly contagious.
- Differential diagnosis: acute uveitis, acute glaucoma, corneal disorders

Conjunctiva/Cornea Bacterial Conjunctivitis

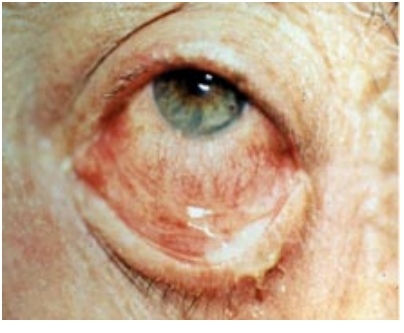
- The eye has many defenses to prevent bacterial invasion such as bacteriostatic lysozymes and immunoglobulins in the tear film, blinking, immune system.

Conjunctiva/Cornea
Bacterial Conjunctivitis

- Etiology:
  - Common pathogens: Staphylococcus aureus, Haemophilus influenzae, Streptococcus pneumoniae and Pseudomonas aeruginosa
  - Severe bacterial conjunctivitis that invades cornea: Neisseria gonorrhoeae and Corynebacterium diptheroides

Conjunctiva/Cornea
Bacterial Conjunctivitis

- Irritation, hyperemia, tearing
- Copious purulent discharge from both eyes
- Mild decrease in visual acuity
- Differential diagnosis: acute uveitis, acute glaucoma, corneal disorders



Conjunctiva/Cornea
Bacterial Conjunctivitis

- Diagnosis:
  - Gram stain: presence of polymorphonuclear cells and predominant organism
- Complications include secondary keratitis, corneal ulcer.
- Management: Broad spectrum topical antibiotics such as Polytrim (polymixin B sulfate and trimethoprim sulfate), gentamicin 0.3%, or tobramycin 0.3%,

Chlamydial/Gonococcal Conjunctivitis

- Serotypes A, B, Ba and C cause trachoma, and serotypes D through K produce adult inclusion conjunctivitis
- Chlamydial (inclusion) conjunctivitis is found in sexually active young adults.
- Diagnosis can be difficult.

Chlamydial/Gonococcal Conjunctivitis

- Eye infection greater than 3 weeks
- Mucopurulent discharge
- Conjunctival injection
- Corneal involvement uveitis possible
- palpable preauricular node
- Conjunctival papillae
- Chemosis

Chlamydial/Gonococcal Conjunctivitis

- Diagnosis:
  - Fluorescent antibody stain, enzyme immunoassay tests
  - Giemsa stain: Intracytoplasmic inclusion bodies in epithelial cells, polymorphonuclear leukocytes and lymphocytes.

Chlamydial/Gonococcal Conjunctivitis

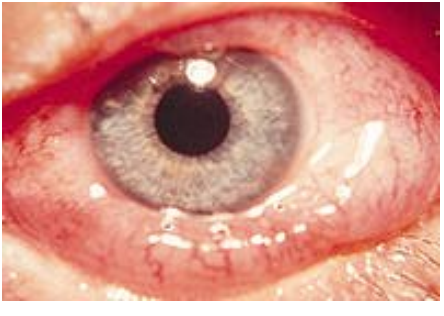
- Management:
  - Oral
    - Tetracycline
    - Azithromycin
    - Amoxicillin and erythromycin or Doxycycline
  - Topical: erythromycin, tetracycline or sulfacetamide
  - Gonococcal: ceftriaxone 1g IM, and then 1gm IV 12-24 hours later.
  - Topical Fluoroquinolone

Conjunctiva/Cornea
Allergic Conjunctivitis

- Allergen contact with conjunctiva results in release of inflammatory mediators
- These Inflammatory mediators results in sensation of itching, vascular permeability and vasodilation

Conjunctiva/Cornea
Allergic Conjunctivitis

- Conjunctival injection
- Thin, watery discharge.
- photophobia and visual loss
- Large cobblestone papillae
- Lack preauricular lymph nodes.
- Lids swollen and red



Conjunctiva/Cornea
Allergic Conjunctivitis

- Differential diagnosis: acute uveitis, acute glaucoma, corneal disorders
- Management:
  - Avoid contact with allergen, cold compresses, artificial tears
  - Topical antihistamines, topical vasoconstrictors or decongestants such as phenylephrine (vasoconstrict and retard release of inflammatory mediators)
  - Mast cell stabilizers (Alomide and Crolom)
  - Severe cases : topical steroids such as Vexol, Flarex or Alrex

Conjunctiva/Cornea Keratoconjunctivitis sicca

- Tear film made of 3 layers:
  - A lipid layer
  - an aqueous layer
  - hydrophilic mucin layer
- Any abnormality in any of these layers leads to an unstable tear film and symptoms of keratitis sicca.
- Sjogren's disease- xerostomia

Conjunctiva/Cornea
Keratoconjunctivitis sicca

- Dryness
- Redness
- Scratchy feeling of the eyes. .
- Ocular irritation
- Mucous plaques and discharge
- Corneal epithelial defects or ulceration

Conjunctiva/Cornea
Keratoconjunctivitis sicca

- Diagnosis: slit lamp exam shows subtle abnormalities of tear film stability, reduced tears, Schirmer test
- Management:

Conjunctiva/Cornea Keratoconjunctivitis sicca

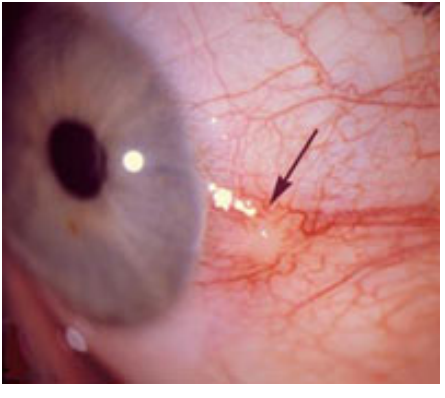
- Complications:
  - Severe and chronic may lead to keratinization of the ocular surface or loss of the corneal epithelium

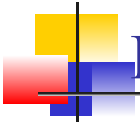
Pinguecula

- Benign yellow colored thickening of the conjunctiva
- If it extends onto the cornea it is known as a pterygium
- Can be caused by chronic sun exposure, repeated trauma, dry/windy conditions

Pinguecula

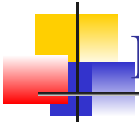
- Yellow or white nodule on conjunctiva near cornea





Pinguecula

- Management:

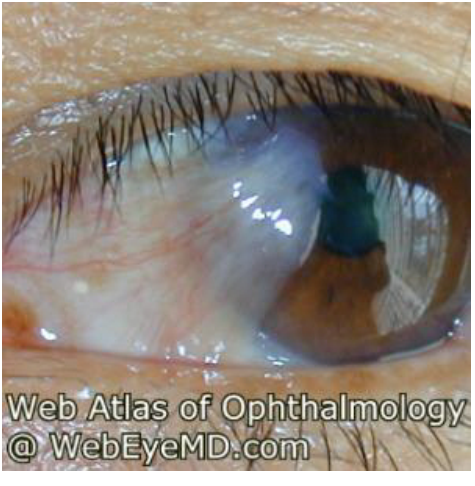


Pterygium

- Conjunctiva begins to grow onto cornea
- Etiology is UV sunlight and dry conditions

Pterygium

- Blurred vision
- Eye irritation
- Itching, burning



Pterygium

- Complications:
  - blockage of vision
- Management:
  - Eye drops to moisten eyes and decrease inflammation.

Dacryocystitis

- Nasolacrimal system obstruction resulting in a lacrimal sac infection
- Etiology:
- Acute:
- S. aureus, B-hemolytic strep. Chronic: S. epidermidis, candida
- Chronic:
- mucosal degeneration, ductile stenosis, stagnant tears, bacterial overgrowth

Dacryocystitis

- Pain
- Redness of tear-sac
- Swelling
- Purulent material

Dacryocystitis

- Diagnostics:
  - CT
- Management
  - Augmentin with topical antibiotic drops.
  - Warm compresses
  - Might need surgical removal of obstruction
  - Patient Education:

Blepharitis

- Can be associated with a bacterial infection such as S. aureus or a chronic skin condition
- Two forms:
  - Anterior: affects outside lids where eyelashes attach. Caused by bacteria or seborrheic.
  - Posterior: Inner eyelid (meibomian glands). Leads to gland plugging and Chalazion formation.

Blepharitis

- S Aureus:
  - Itching, lacrimation, tearing, burning, photophobia
- Seborrheic:
  - lid margin erythema, dry flakes, oily secretions on lid margins, associated dandruff

Blepharitis

- Diagnostics:
- Complications:thickened lid margins, dilated and visible capillaries, eyelash loss, Ectropion and Entropion, corneal erosions

Blepharitis Management

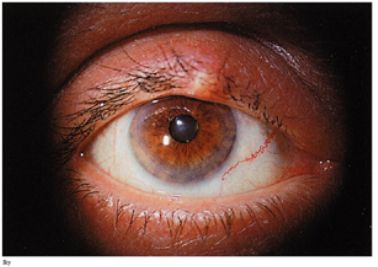
- Anterior:
  - keep scalp, eyelids and brows clean. Remove scales with baby shampoo.
- Posterior:
  - Expression of meibomian gland on regular basis. If corneal inflammation need oral antibiotic.

Hordeolum

- Localized infection or inflammation of the eyelid margin involving:
  - Hair follicles of the eyelashes
  - Meibomian glands
- Due to blockage and infection of sebaceous glands
- Etiology

Hordeolum

- Painful, erythematous, and localized.
- Can lead to edema of lid
- Can lead to Conjunctival infection.



Hordeolum

- Diagnostics:
- Management:
  - Topical antibiotic/ointment such as Bacitracin ophthalmic ointment
  - Severe might need oral tetracycline or Cloxacillin

Chalazion

- Localized sterile swelling of upper or lower eyelid that forms when meibomian gland becomes blocked.
- Blepharitis and acne rosacea often prior to Chalazion.

Chalazion

- Hard non-tender swelling of upper or lower eyelid
- Painless
- Conjunctiva red and elevated
- May distort vision
- Invert the eyelid to visualize the palpebral conjunctiva and note internal chalazia.

Chalazion

- Diagnostics: Biopsy for recurrent, viral or bacterial cultures
- Differentials: conjunctivitis, Hordeolum, meibomian gland carcinoma
- Management:
  - Warm compresses tid
  - Injection or corticosteroid or I/D
  - Surgical removal

Entropion

- Etiology: older population, extensive scarring of conjunctiva, infection

Entropion

- Redness
- Light sensitivity
- Dryness
- Increased lacrimation
- Foreign body sensation
- Scratching of cornea
- Eye irritation

Entropion

- Diagnostics:
- Management:
  - Artificial tears
  - Surgical tightening of muscles
  - Botox injections to build up fascia
  - Cool compresses
  - Epilation of the eyelashes

Ectropion

- Etiology: Older population, 7th nerve palsy, can be congenital. Obicularis oculi muscle relaxation

Ectropion

- Excessive lacrimation
- Drooping of eyelid
- Redness
- Light sensitivity
- Dryness

Ectropion

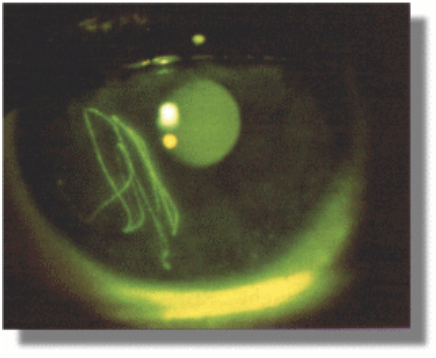
- Diagnostics:
- Management:

Corneal Abrasion

- Irregularity of the cornea
- Results from trauma or foreign body,

Corneal Abrasion

- Pain/ Redness/Photophobia
- Excessive tearing
- Foreign body sensation
- Blurred vision



Corneal Abrasion

- Diagnostics:
  - Fluorescein staining:
    - Yellow fluorescence of exposed basement membrane underlying epithelium
- Management: Remove foreign body with cotton tipped applicator. Antibiotic ophthalmic ointment, eye patch with pressure, Oral pain medication.
- Complications

Uveitis

- Intraocular inflammation of iris, ciliary body and choroid
  - Anterior uveitis: ocular inflammation limited to iris or iris and ciliary body (irodocyclitis)
  - Intermediate uveitis: inflammation of structures just posterior to the lens
  - Posterior uveitis: inflammation of the choroid , retina or near optic nerve and macula
- Etiology: Immune, infection, idiopathic.

Uveitis

- Anterior uveitis:
  - Deep eye pain
  - Photophobia
  - Conjunctiva vessel dilation
  - Ciliary flush
  - Small pupil/irregular
  - Cornea clear or slightly cloudy

Uveitis

- Diagnosis: slit lamp exam- look for keratitic precipitates
- Differential diagnosis: conjunctivitis, episcleritis, keratitis, acute angle closure glaucoma
- Management: Mydriatics, corticosteroids
- Complications:

Subconjunctival Hemorrhage

- Bleeding of the conjunctival or episcleral blood vessels into the subconjunctival space.
- Risk factors include blunt trauma, rubbing eyes, vigorous coughing, bleeding disorder

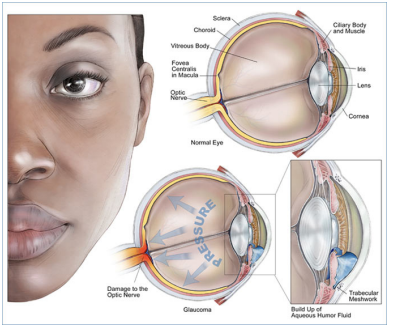
Subconjunctival Hemorrhage

- Eye red with mild irritation
- Vision not affected
- If trauma rule out ruptured globe or retrobulbar hemorrhage
- Management:

Glaucoma

Disease of optic nerve related to abnormal drainage of aqueous from the trabecular meshwork

Leads to increased ocular pressure which can lead to ischemia and degeneration of the optic nerve. Loss of ganglion cells and atrophy of optic disc and enlargement of optic cup

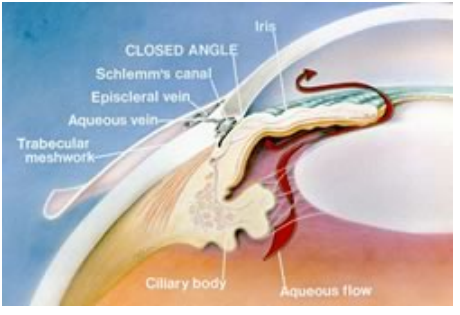


Glaucoma

- Risks: >50, African Americans, Asians, Eskimo , family history, hyperopia, myopia
- Patients on steroids and anticholinergics

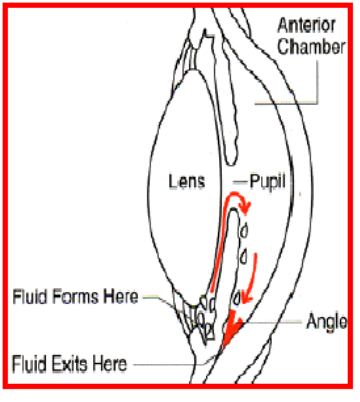
Glaucoma

- Angle closure glaucoma:
  - Ophthalmologic emergency.
  - Closure of preexisting narrow anterior chamber angle. Causes rapid increase in IOP due to occlusion of narrow angle and obstruction of outflow of aqueous humor.



Glaucoma

- Open Angle glaucoma:
  - Improper drainage through trabecular meshwork. Usually degenerative changes.
  - Asymptomatic until late in disease.
  - Increased cup:disc ratio on fundoscopic exam



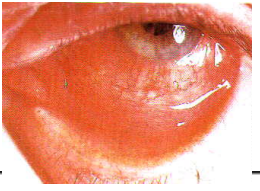
Angle Closure Glaucoma

- Ocular pain and blurred vision
- Halos around lights
- Conjunctiva injected. Cornea cloudy
- Pupil mid-dilated not reactive.
- N/V/headache
- IOP >40
- Visual field defects

Glaucoma

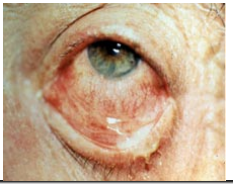
- Diagnostics: tonometer
- Complications:
- Management:
  - Open Angle Glaucoma: B Adrenergic blocking eye drops (timolol, levobunolol),alpha 2 agonists,
  - Closed Angle: Iridotomy, systemic acetazolamide, osmotic diuretics, pilocarpine

Example 1



- A 22 year old female comes to you complaining of pharyngitis, fever and eye tearing. She has noticed a watery discharge and red eye. There is preauricular lymphadenopathy
- What is this?
- What is the etiology?
- What is the management?

Example 2

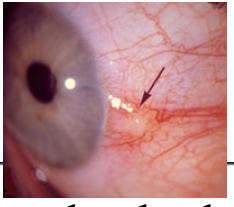


- A 13 year old female presents with bilateral purulent discharge from her eyes. She noticed this yesterday to right eye and now both eyes. She woke up with her eyes sticking together.
- What is this?
- What is the etiology?
- What are management options?
- If she is sexually active, what other findings would point to chlamydial conjunctivitis?

Example 3

- This patient has a history of Sjogren's syndrome. Besides xerostomia, you diagnose this based on the appearance of her eyes. She complains of ocular irritation.
- What is this?
- What are histology findings associated with this?
- How is this diagnosed?
- What is the management?

Example 4



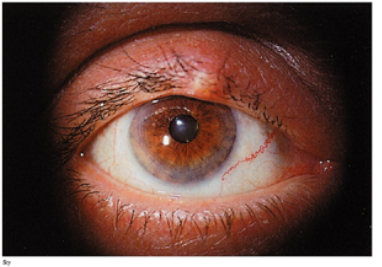
- A patient comes to you because her husband noticed a yellow nodule on her eye.
- What is this?
- What are risks for this?
- What is the management of this?
- What can this advance to?

Example 5

- A four year old has a bump by her eye. Mom is concerned since it is leaking yellow "stuff".
- What is this?
- What is the etiology of this in the acute form?
- What is the management of this?

Example 6

- This patient has a “stye”. What is the medical term for this?
- What is the management of this?
- What might you call this if the area was not painful or tender?



Example 7

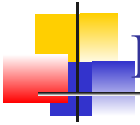
- A 77 year old male patient reports excessive tearing. He thinks he might have allergies. What do YOU think he has?
- What is the management for this?

Example 8

- A 22 year old male reports sudden onset of pain, photophobia and excessive tearing to his right eye. He thinks he has a piece of sand in his eye. It started while on the beach.
- What is your differential diagnosis?
- How can you confirm your diagnosis?
- What is the management for this?

Example 9

- A patient complains of acute onset of blurred vision, photophobia, ciliary flush, and small irregular pupil. The cornea appears cloudy. What is this?
- What is the differential?
- What would this be if pupil was mid-dilated and not reactive?



Example 10

- A patient develops acute ocular pain and blurred vision. His IOP is >40mmHG.
- What is your differential?
- Who is at risk for this?
- How is this treated?