

Ocular Emergencies

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Acute Conditions

- Emergency
 - Retinal Artery Occlusion
 - Chemical burns (alkali)
 - Temporal Arteritis
 - Orbital compartment syndrome
- Very Urgent
 - Perforation
 - Rupture
 - Acute glaucoma

Acute Conditions

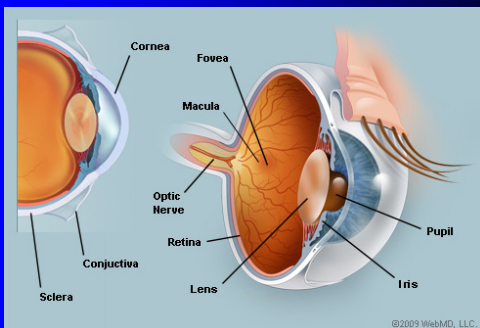
- Urgent
 - Orbital cellulitis
 - Orbital injury
 - Corneal ulcer
 - Corneal abrasion
 - Hyphema
 - Intraocular foreign body
 - Retinal detachment
 - Macular edema

Non Traumatic Red Eye Possible Causes



- Conjunctivitis
- Corneal Inflammation/Infection
- Iritis (Uveitis)
- Acute glaucoma

Anatomy



Non Traumatic Red Eye

Conjunctivitis

Discharge type

Purulent
Serous or clear
Stringy, white

Etiology

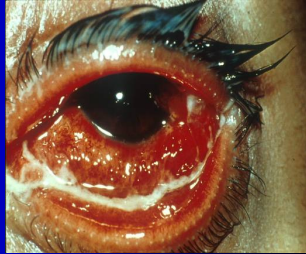
Bacterial
Viral
Allergic

Pre-auricular lymph node enlargement: Viral

Non Traumatic Red Eye

Bacterial Conjunctivitis

- Mucopurulent d/c
- Staph, strep
- Visual acuity good
- Treatment: Antibiotic ointment or drops (Erythromycin, fluoroquinolone)



Non Traumatic Red Eye

Bacterial Conjunctivitis



Non Traumatic Red Eye

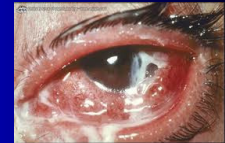
Bacterial Conjunctivitis

- Gonococcal
 - Copious discharge
 - Pre-auricular adenopathy
 - Neonates: Bilateral, 3-5 days post vaginal delivery
 - Treatment: IV Penicillin
 - Can cause perforation



Non Traumatic Red Eye

Gonococcal Conjunctivitis



Non Traumatic Red Eye

Bacterial Conjunctivitis

- *Chlamydia* (Inclusion)
 - Lymphoid follicles
 - Neonates: 5-14 days post vaginal delivery
 - Adults: recurring symptoms, ocular manifestation of STD
 - Treatment: Systemic (and topical) antibiotics



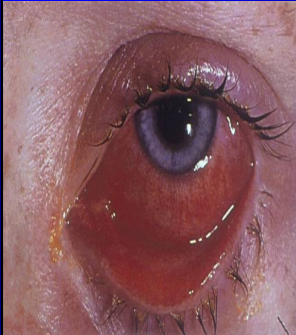
Non Traumatic Red Eye

Viral Conjunctivitis

- Adenovirus
- Frequently bilateral
- Associated with URI
- Treatment: supportive



Case #1



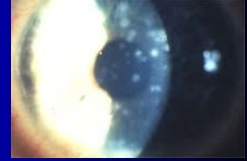
A 31 yo female with red, painful eyes, moderate serous discharge for 5 days. It began in the left eye, now with intense foreign body sensation, mild photophobia and blurred vision.

Her left eye is shown in the photograph.

Non Traumatic Red Eye

Epidemic Keratoconjunctivitis (EKC)

- Highly contagious: families, swimming pools, eye clinics
- Virulent strain of adenovirus
- Keratitis which causes subepithelial opacities
- Treatment: Ophthalmology referral, topical antibiotics to prevent secondary infection



Non Traumatic Red Eye

Allergic Conjunctivitis

- Cobblestone papillae under upper lid
- Pet dander, pollen, mold
- Treatment: Topical antihistamines, vasoconstrictor



Non Traumatic Red Eye

Episcleritis

- Minimally painful red eye
 - *Acute* onset
 - Can be diffuse or localized
- Simple or nodular
- Reassurance, NSAID's (topical or oral) may be helpful



Episcleritis

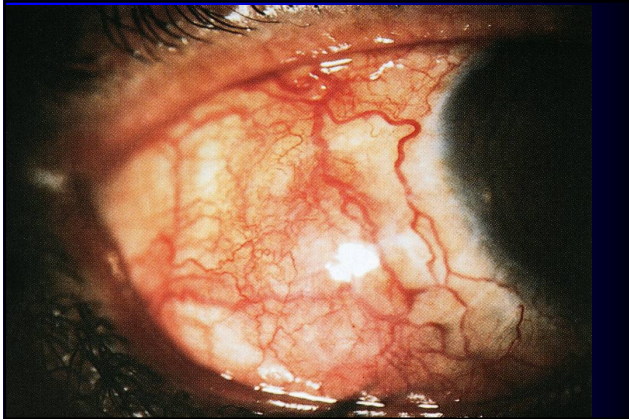


Non Traumatic Red Eye

Scleritis

- Moderate to severe pain
- *Gradual* onset (days)
- Anterior & posterior
- Bilateral > 50%





Non Traumatic Red Eye

Scleritis

- Infective – syphilis, TB, Zoster, leprosy
- Autoimmune – RA, WG, SLE, PN, Goodpasture's, Crohn's, sarcoid
- Metabolic - gout

Non Traumatic Red Eye

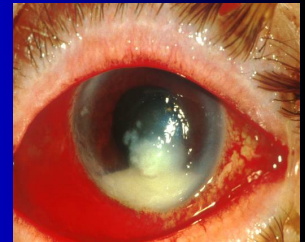
Scleritis

- Treatment:
 - High dose systemic steroids
 - Systemic NSAID's
 - Topical cyclosporine
 - Methotrexate

Non Traumatic Red Eye

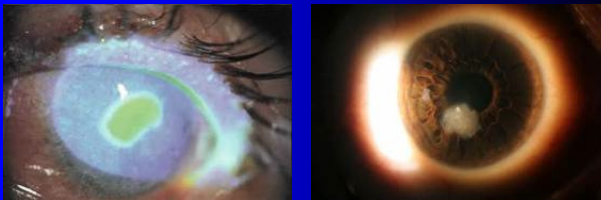
Corneal Inflammation/Infection

- Corneal Ulcer
 - Viral, bacterial, fungal, chemical, Vit A def
 - Contact lens: Pseudomonas
 - Look for associated hypopyon
 - Treatment: Immediate ophthalmology consult



Non Traumatic Red Eye

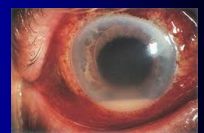
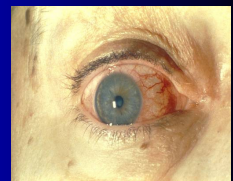
Corneal Ulcer



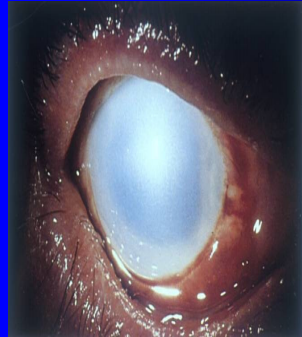
Non Traumatic Red Eye

Endophthalmitis

- Inflammation of intraocular cavities
 - Exogenous: "Conjunctivitis" following eye surgery
 - Endogenous: Septic emboli
 - Decreased vision, floaters, redness & pain
 - Hypopyon without ulcer
 - Treatment: Ophthalmology consult, hospitalization



Case #2



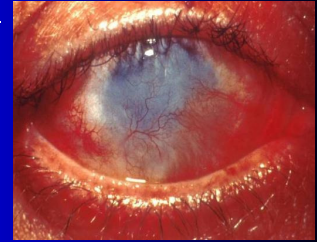
A 32-year-old construction worker was injured when a lye compound splashed into his eye. He arrives at the ED 15 min after the injury.

The photograph illustrates the injured eye.

Non Traumatic Red Eye

Chemical Burns

- Alkali Burn = Absolute Eye Emergency
 - Sodium hydroxide
 - *Liquefaction necrosis*
 - Treatment: Immediate irrigation
 - Ophthalmology consult
 - Goal pH 6.8 – 7.4



Foam Party?



Non Traumatic Red Eye

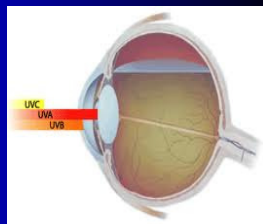
Chemical Burns

- Acid Burns
 - Coagulation necrosis
 - Treatment: Ringer's lactate

Non Traumatic Red Eye

Corneal Inflammation

- Ultraviolet Keratitis
 - Welder's keratitis, Snow blindness, Tanning beds
 - Delayed Symptoms
 - Slit Lamp: Diffuse punctate keratopathy
 - Treatment: Cycloplegics, systemic analgesia

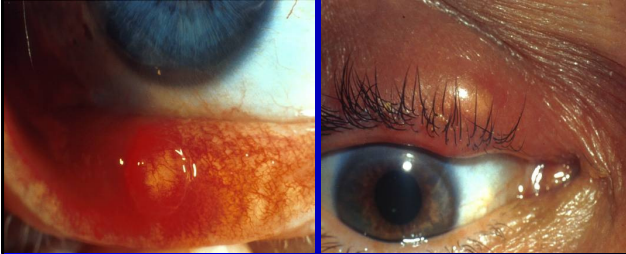


Ultraviolet Keratitis



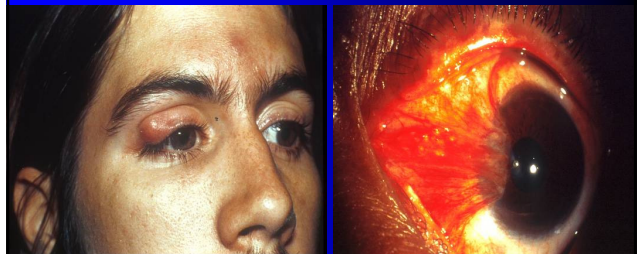
Superficial Punctate Keratitis

Disorders of the Lids and Ocular Soft Tissues



Internal and external hordeolum (Stye)

Disorders of the Lids and Ocular Soft Tissues



Chalazion

Pterygium

Disorders of Lids and Soft Tissue

Pingueculum

- Raised conjunctival nodular degeneration



Disorders of the Lids and Ocular Soft Tissues

- Dacryocystitis (sac)
 - Medial unilateral mass
 - *Staph aureus*
 - Topical and Systemic antibiotics
 - Children <4 years consider *H. influenza*
- Dacryoadenitis (gland)
 - Temporal aspect of upper eyelid
 - Adults: bacterial
 - Children: viral (mumps)
 - Cool compresses/oral antibiotics

Disorders of the Lids and Ocular Soft Tissues

- Dacryocystitis
- Dacryoadenitis



Disorders of the Lids and Ocular Soft Tissues

- Preseptal cellulitis
 - CT scan?
 - Warm compresses
 - Systemic antibiotics



Disorders of the Lids and Ocular Soft Tissues

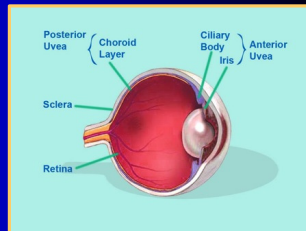
- **Orbital Cellulitis**
 - Unilateral proptosis
 - Swelling/Erythema of lids, pain with eye movement
 - Causes: Sinusitis (Ethmoid)
 - Hematogenous < 2yo
 - Evaluation: CT scan
 - Treatment: IV antibiotics, surgical drainage?



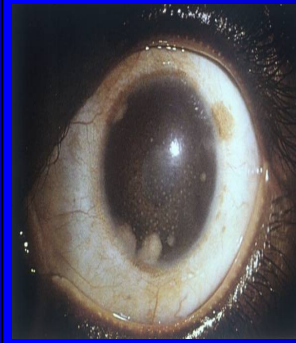
Non Traumatic Red Eye

Uveitis

- **Uvea**
 - Iritis (anterior)
 - Cyclitis (Intermediate)
 - Choroiditis (posterior)

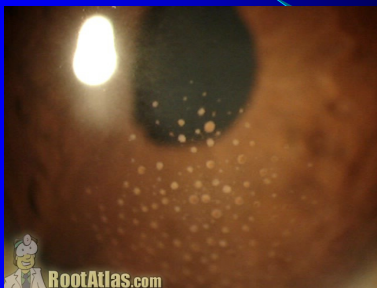


Case #3



A 35-year-old black woman is admitted for fever of unknown origin. She recalls several episodes of bilateral photophobia, decreased vision, and mild discomfort.

Keratic Precipitates



Non Traumatic Red Eye

Iritis/Anterior Uveitis

- **Risk Factors**
 - Idiopathic
 - Infectious
 - Trauma
 - Auto-immune/Systemic
 - Lupus
 - Rheumatoid Arthritis
 - IBS
 - Sarcoidosis

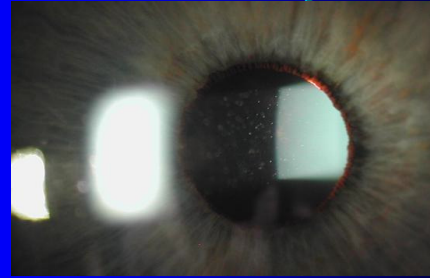
Non Traumatic Red Eye

Iritis

- Consensual photophobia
- Ciliary flush
- Slit Lamp: "Cells and Flare"
- Treatment: Mydriatics, cycloplegics, and topical steroids

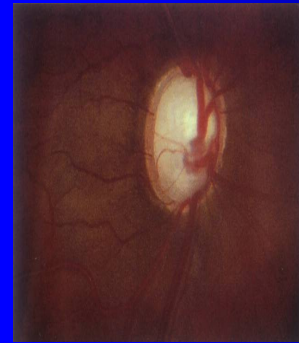


Cell and Flare

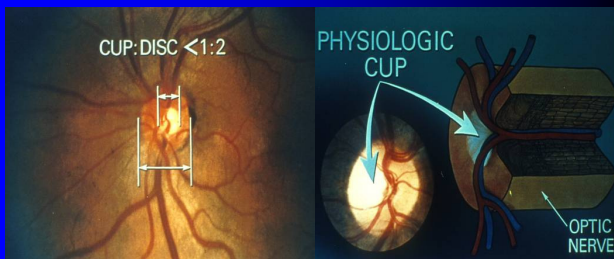


Case #4

A 55-year-old man comes in for a routine physical examination. Your examination reveals the findings illustrated in the photograph in both optic discs.



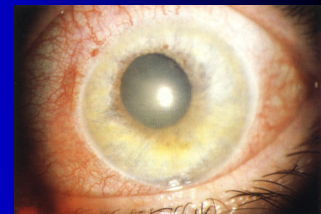
Glaucoma



Non Traumatic Red Eye

Acute Angle Closure Glaucoma

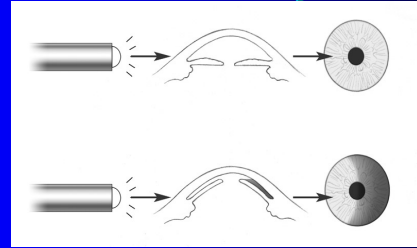
- Precipitated by mydriatics, changes in light
- N/V, headache
- Halos in vision
- Steamy cornea, mid-dilated nonreactive pupil
- Ciliary flush
- IOP > 40



Acute Angle Closure Glaucoma



Penlight Shadow Test



Non Traumatic Red Eye

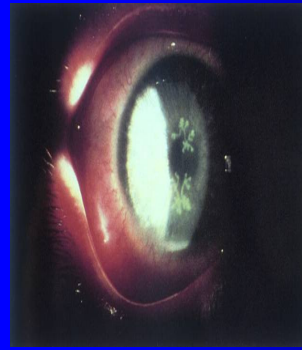
Acute Angle Closure Glaucoma

• Treatment

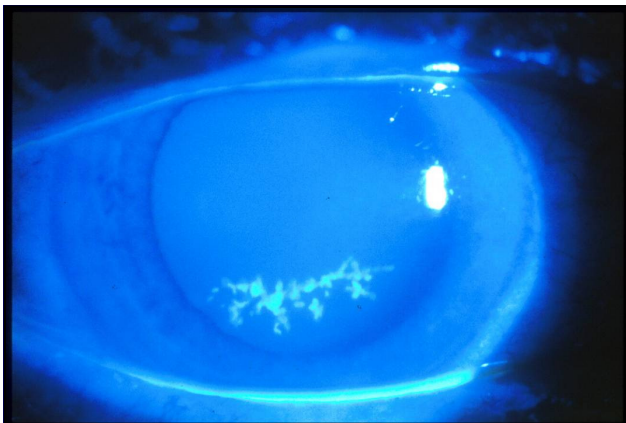
- AA: topical alpha agonist
- BB: topical beta blocker
- CC: topical corticosteroid and oral/IV carbonic anhydrase inhibitor
- IV Mannitol & Glycerol
- Topical Pilocarpine 1-2%
- Peripheral Iridotomy



Case #5



A 33-year-old man has recurrent episodes of left eye irritation for four years. These episodes last 5 to 6 days, and have been treated with eye drops. Currently, the patient has foreign body sensation, photophobia, and tearing.



Non Traumatic Red Eye

Corneal Infection

- Herpes Simplex Keratitis
 - Localized pain/foreign body sensation
 - Fluorescein stain: dendritic pattern
 - Treatment: Antiviral agents, ophthalmology



Herpes Simplex



Non Traumatic Red Eye

Corneal Infection

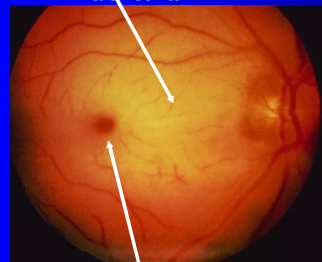
- Herpes Zoster Ophthalmicus
 - Unilateral
 - Hutchinson's Sign
 - Nasociliary nerve
 - Corneal pseudodendrite
 - Treatment: Ophthalmology referral, antiviral agents



Acute Visual Loss

Case #6

Pale retina



A 70-year-old man suffered a sudden and total loss of vision in one eye. He experienced no pain or other symptoms.

The fundus of the involved eye is depicted in the photograph. The opposite eye remains normal.

"Cherry-red" spot

Central Retinal Artery Occlusion

Central Retinal Artery Occlusion

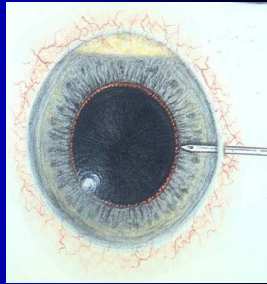
- Embolism
- Thrombus
- Vasospasm
- Vasculitis
- Sickle cell



Relative Afferent Pupillary Defect
(Marcus Gunn Pupil)

Central Retinal Artery Occlusion

- NO STANDARD THERAPY
 - Digital massage
 - Carbogen (95% O₂ and 5% CO₂),
 - Acetazolamide (500mg IV)
 - Anterior chamber paracentesis
 - Ophthalmology consult
 - Hyperbaric consult



Case #7

A 65-year-old woman c/o sudden, painless loss of vision in one eye. She has only “hand motion” visual acuity. The opposite eye appears normal, and she complains of no systemic symptoms.

The fundus of the involved eye is illustrated.



“Blood and Thunder” Central retinal vein occlusion

Acute Visual Loss

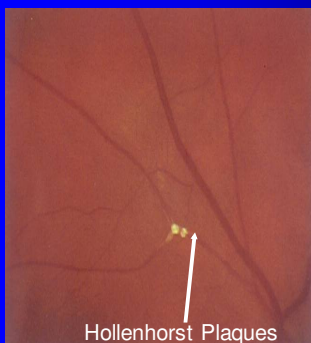
- Optic (Retrobulbar) Neuritis
 - Loss of central vision
 - Eye pain with movement
 - Unilateral optic disc swelling
 - Multiple sclerosis
- Eclipse Burn (Solar Retinopathy)
 - Photocoagulation of macula
 - Loss of central vision
 - “Gun Barrel” central visual field defect

Acute Visual Loss

- Hysterical Blindness
 - Conversion disorder
 - Optokinetic drum – elicits optokinetic nystagmus
 - Medicolegally, diagnosis must be made by ophthalmologist



Case #8



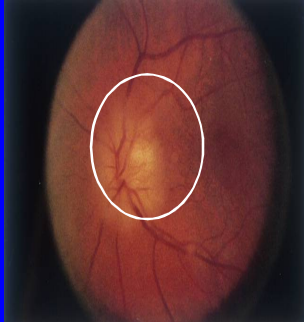
Hollenhorst Plaques

A 65-year-old man has had several episodes of momentary blindness in one eye over the past year. These episodes usually have lasted from seconds to minutes.

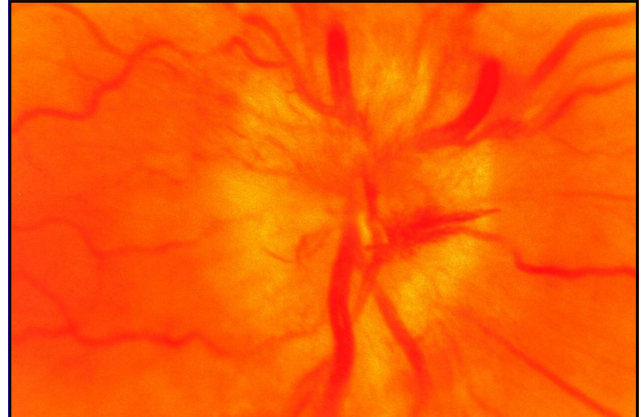
Acute Visual Loss

- Amaurosis Fugax
 - Fleeting unioocular visual loss
 - Vasospasm secondary to atherosclerosis

Case #9



A 70-year-old woman suffered sudden but painless loss of vision in one eye. She also has experienced headaches and shoulder pain during the past several months. The affected eye is shown in the photograph. Her other eye remains normal.



Acute Visual Loss

- Temporal Arteritis
 - Anterior Ischemic optic neuropathy
 - Frequently assoc with amaurosis fugax
 - Treatment: IV Methylprednisolone
 - Immediate consult with ophthalmologist and neurologist

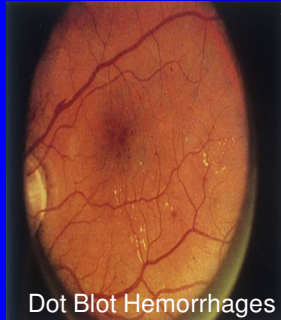


Retinopathies

Diabetic Retinopathy

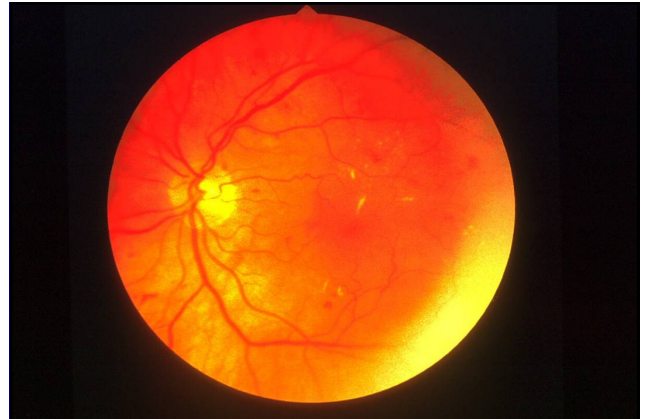
- Microaneurysms
- Cotton wool spots
- Hemorrhage (dot-blot, flame)
- New vessels- Proliferative retinopathy

Case #10

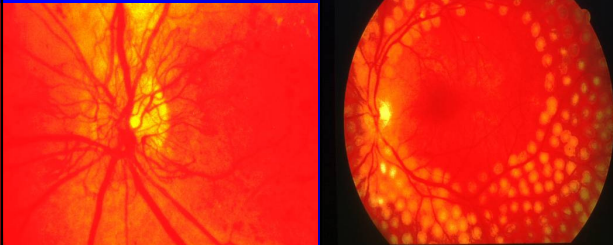


Dot Blot Hemorrhages

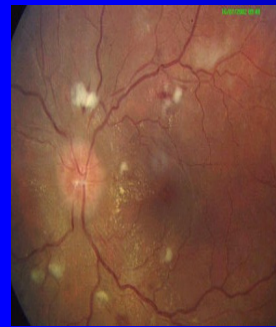
A 60-year-old obese woman complains of general malaise and has no ocular complaints. The fundus photograph illustrates the findings in both eyes.



Proliferative Retinopathy Laser Photocoagulation



Case #11

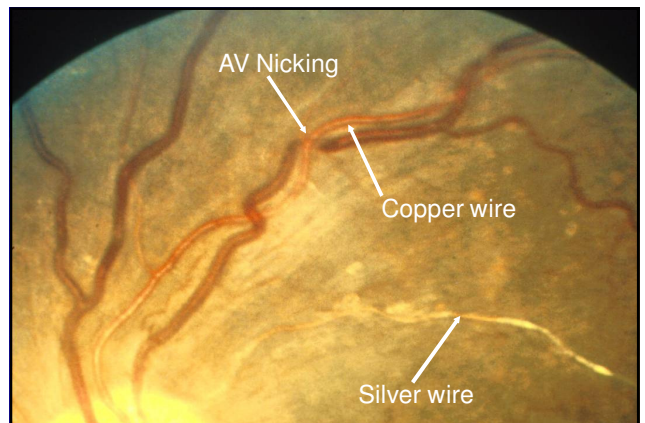


A 55-year-old man has complained of morning occipital headaches for several months. His headaches have recently become more frequent and severe.

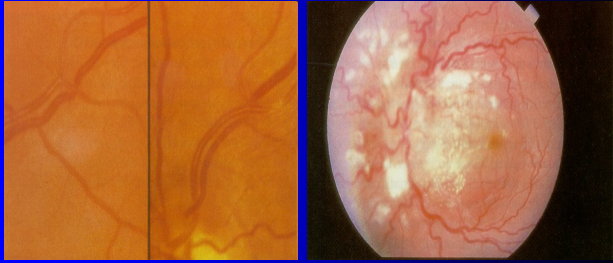
The appearance of the fundus was similar in both eyes.

Hypertensive Retinopathy

- A-V nicking
- Retinal arterial narrowing
- Flame hemorrhages
- Cotton wool spots
- Papilledema



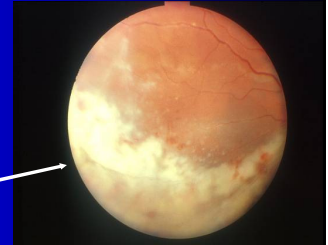
Hypertensive Retinopathy



Retinopathies

- 30 year old presents with 6 month history of fever, weight loss, cough, and rash.

CMV Retinitis
("pizza pie")



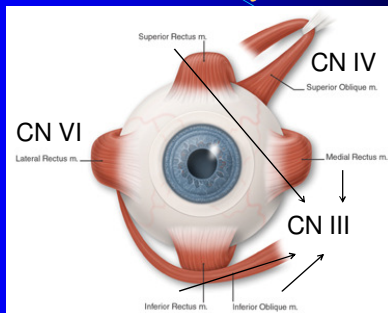
Neuro-ophthalmology

Case #12

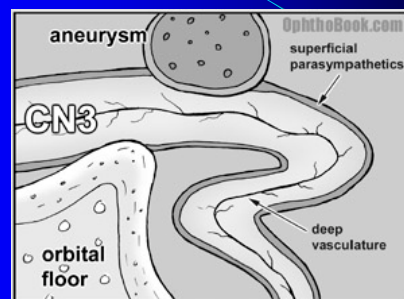


This 42-year-old woman had been in good health until today, when she suddenly developed diplopia in all fields of gaze. The accompanying photograph was taken while the patient was looking up.

Anatomy



CN III: Oculomotor Nerve



Neuro-Ophthalmology

• Third Nerve Palsy

- Supplies levator palpebrae, ocular muscles and carries parasympathetic fibers to iris
- Signs:
 - Ptosis
 - Deviation of the eye: down and out
 - Dilated Pupil
- Diabetic III nerve palsy may *spare pupil*
- Cause: Posterior communicating artery aneurysm



Neuro-Ophthalmology

Horner's Syndrome

- Ptosis
- Meiosis
- Anhidrosis
- Cause: Pancoast tumor, carotid dissection, aortic aneurysm



Right Horner's Syndrome

Neuro-Ophthalmology

• Sixth Cranial Nerve

- Abducens: Innervates lateral rectus
- Signs: Loss of abduction
- Cause: Intracranial tumors ~ 30%



Right Abducens Nerve Palsy

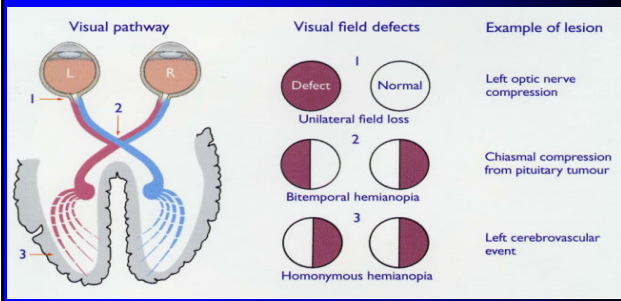
Neuro-Ophthalmology

• Myasthenia Gravis

- Signs:
 - Diplopia
 - Ptosis
- Spares pupil
- Diagnosis: Tensilon test



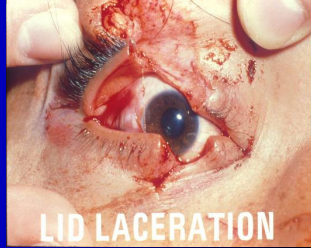
Visual Loss



Trauma

Trauma

- Lid Lacerations
 - Only skin of lid: close with 6-0 or 7-0 nylon
 - Five anatomical areas where expertise is needed:
 - Lacrimal canaliculi
 - Levator
 - Orbital septum
 - Canthal tendons
 - Lid margins



Trauma

- Conjunctival Lacerations
 - Usually minor
 - Positive fluorescein dye
 - Repair if > 1 cm (ophtho)
 - Suspect:
 - Retained foreign body
 - Orbital fracture
 - Scleral rupture
 - Empiric topical antibiotics +/- patch



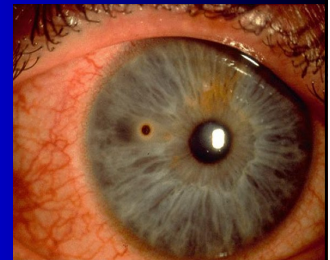
Trauma

- Corneal Abrasions
 - Positive fluorescein stain
 - "Ice Rink Sign"
 - Contacts: pseudomonas
 - Treatment:
 - Topical cycloplegic
 - Topical antibiotic



Trauma

- Foreign Bodies
 - Rust Ring: Metallic
 - Removed with burr or 18g needle.
 - Alternative: Refer within 24-48 hrs
 - Wooden Splinters: Must be removed by slit lamp. Watch for fungal infection.



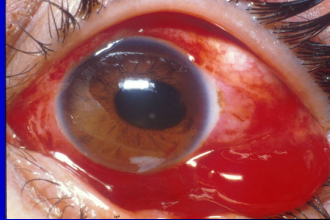
Trauma

- Globe Perforation
 - Suspect with penetrating wound of lid
 - Vitreous hemorrhage
 - Teardrop pupil
 - Seidel Test
 - Treatment:
 - Rigid metal eye shield
 - Ophthalmology consult



Trauma

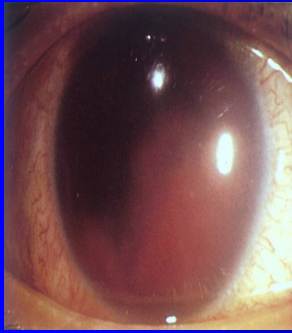
- Globe Perforation
 - Systemic antibiotics
 - Tetanus prophylaxis
 - NPO
 - Protect the eye!!!



Trauma



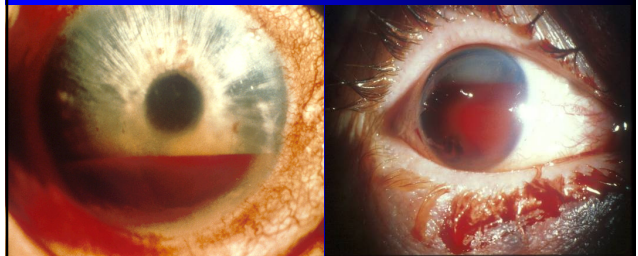
Case #13



A 25-year-old medical student was struck in the eye with a ball while playing racquetball. He was not wearing protective eye gear at the time.

The injured eye is shown.

Trauma

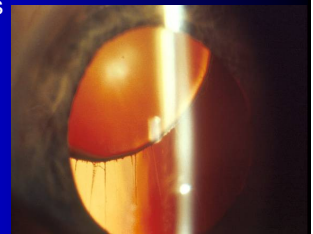


Trauma

- Hyphema
 - Hyphema: Hemorrhage in anterior chamber
 - Rebleed in 5 days, worse than initial bleed (most common)
 - Consider sickle cell
 - Tx: Ophthalmology
 - Assume globe is ruptured
 - Shield eye
 - 25% of pts have other ocular injuries

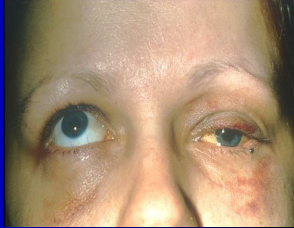
Trauma

- Traumatic Dislocated Lens
 - Blunt trauma
 - Marfan's syndrome
 - Iridodonesis: trembling of lens with shaking of head
 - Treatment: can be delayed for several weeks

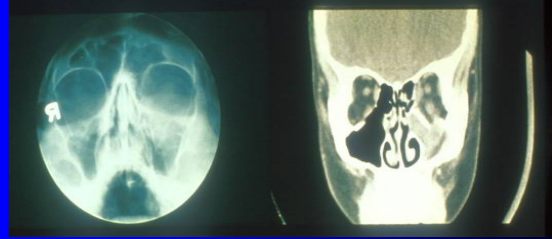


Trauma

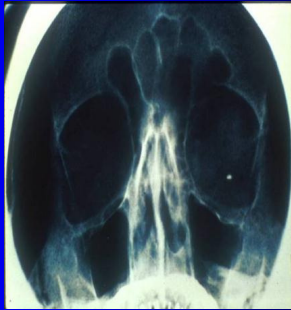
- Blow-Out Fracture of Orbit
 - Inferior rectus muscle entrapment
 - Infraorbital nerve involved
 - Pain and diplopia in upward gaze
 - Tx: Ophtho referral for surgery if diplopia



Orbital Floor Fracture

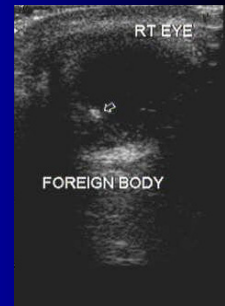


Trauma



Trauma

- Intraocular Metallic Foreign Body
 - Pounding metal most common
 - May present 1-2 days after injury
 - Non localizing pain
 - Diagnosis: XR/CT or ultrasound
 - Treatment: Surgical removal
 - Treat like globe rupture



Trauma

- Traumatic Iritis
 - Blunt trauma
 - Photophobia/decreased visual acuity
 - Ciliary flush
 - Slit Lamp: Cells and flare
 - Treatment: Short-acting mydriatic, cycloplegic



Air Bag Injuries

- Sodium azide releases sodium hydroxide
- Screen for alkali burn: pH measurement
- Associated blunt trauma



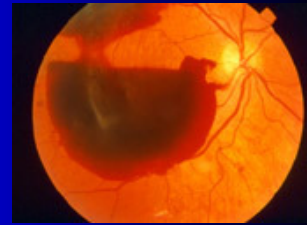
Cyanoacrylate Glue

- Household superglues – chemical keratitis
- Treat with topical antibiotics
- Do not force eyelids open



Trauma

- Vitreous and Retinal Hemorrhage
 - Blunt trauma
 - Loss of red reflex
 - Retinal detail obscured
 - Torn retinal or uveal blood vessel



Trauma

- Retinal Detachment
 - Painless
 - Lowering or raising of curtain
 - Flashing lights in peripheral vision
 - "Dunes on a beach"



Trauma

Orbital Compartment Syndrome (OCS)

- Acute elevation of intraorbital pressure
- Ocular dysfunction
- Retrobulbar hemorrhages most likely cause
- Irreversible optic nerve damage and retinal ischemia within *90 minutes*

OCS

- Ocular pain, proptosis, afferent pupillary defect, diminished vision
- Chemosis, increased IOP, mydriasis, diminished retroulsion of globe, ophthalmoplegia



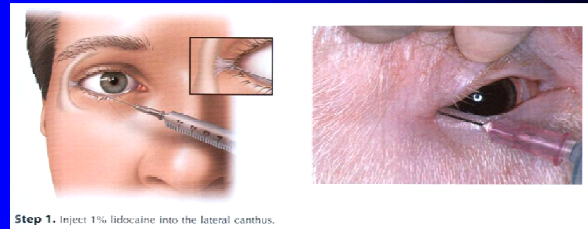
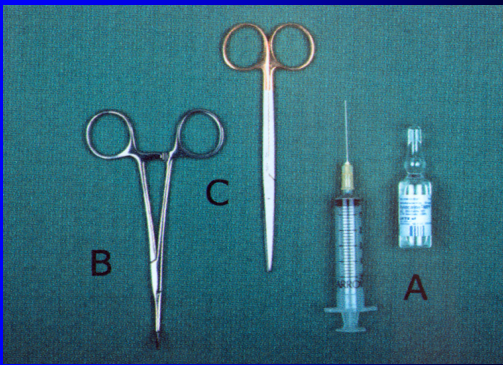
OCS



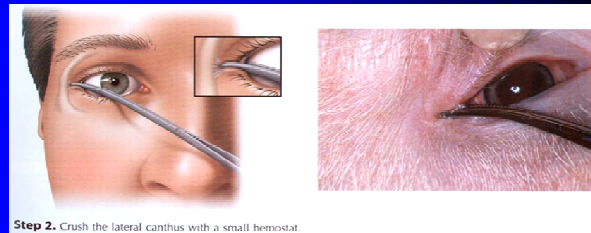
OCS

Treatment

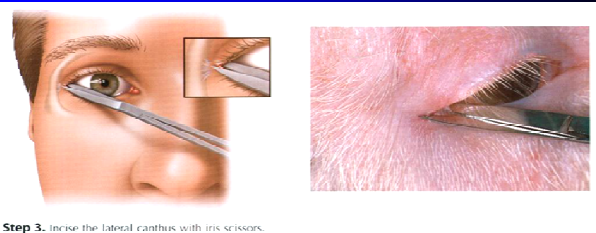
- Surgical intervention (primary)
- Immediate lateral canthotomy & cantholysis
- Within one hour of injury & ocular dysfunction
- Medical therapy is adjunctive



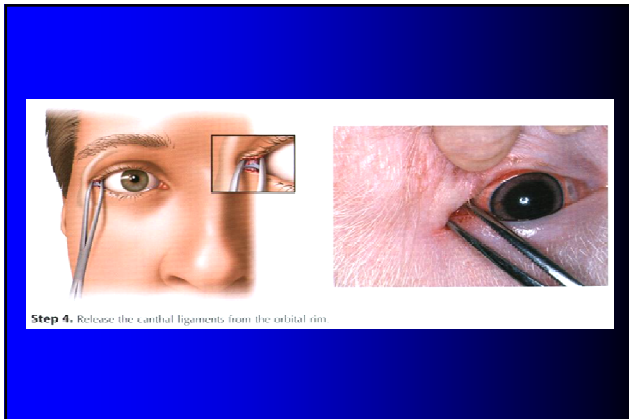
Step 1. Inject 1% lidocaine into the lateral canthus.



Step 2. Crush the lateral canthus with a small hemostat.



Step 3. Incise the lateral canthus with iris scissors.



Side Effects of Topical Steroids

- Enhance corneal penetration of herpes virus
- Steroid induced glaucoma
- Cataract formation
- Potentiates fungal corneal ulcers


Color Codes for Ophthalmic Medication

Top Color	Drug Action	Examples
Red	Pupil dilation (Mydriasis)	Homatropine Tropicamide (Mydracyl)
Green	Pupil constriction (Miosis)	Pilocarpine
Yellow	Caution	Timolol-Maleate
Clear or White	Topical anesthesia	Proparacaine
Blue	Irrigation solutions Lubricants	

Color Codes for Ophthalmic Medications

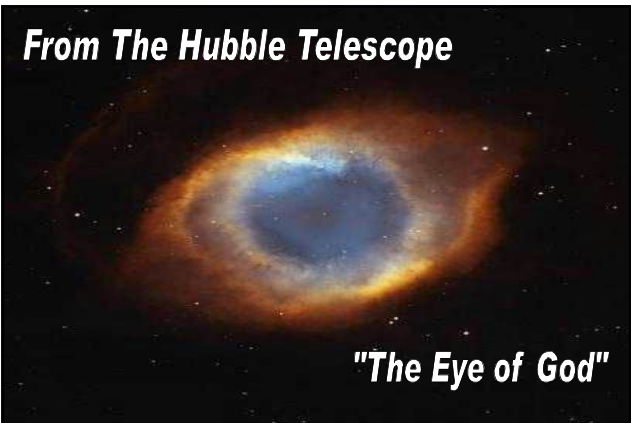
- Red – Dilate
- Green – Constrict
- Yellow - Caution

Case #14



A 75-year-old man suffered bilateral but asymmetric decrease in vision. Initially, the patient had problems with distance vision; he is now experiencing difficulty with both distance and near vision.

Cataract



Good luck on the test!