The Red Eye

John Knapp, MD

DIFFERENTIATE RED EYE DISORDERS
- Needs immediate treatment
- Needs treatment within a few days
- Does not require treatment

SUBJECTIVE EYE COMPLAINTS
- Decreased vision
- Pain
- Redness

Characterize the complaint through history and exam.

RED EYE: POSSIBLE CAUSES
- Trauma
- Chemicals
- Infection
- Allergy
- Systemic conditions

ETIOLOGIES OF RED EYE
1. Chemical injury
2. Angle-closure glaucoma
3. Ocular foreign body
4. Corneal abrasion
5. Uveitis
6. Conjunctivitis
7. Ocular surface disease
8. Subconjunctival hemorrhage

RED EYE: CAUSE AND EFFECT

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Cause</th>
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</thead>
<tbody>
<tr>
<td>Itching</td>
<td>Allergy</td>
</tr>
<tr>
<td>Burning</td>
<td>Lid disorders, dry eye</td>
</tr>
<tr>
<td>Foreign body sensation</td>
<td>Foreign body, corneal abrasion</td>
</tr>
<tr>
<td>Localized lid tenderness</td>
<td>Hordeolum, chalazion</td>
</tr>
<tr>
<td>Symptom</td>
<td>Cause</td>
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<tr>
<td>Deep, intense pain</td>
<td>Corneal abrasions, scleritis, iritis, acute glaucoma, sinusitis, etc.</td>
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<tr>
<td>Photophobia</td>
<td>Corneal abrasions, iritis, acute glaucoma</td>
</tr>
<tr>
<td>Halo vision</td>
<td>Corneal edema (acute glaucoma, uveitis)</td>
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**RED EYE DISORDERS: AN ANATOMIC APPROACH**

- **Face**
  - Orbital area
  - Lids
  - Ocular movements
- **Adnexa**
  - Conjunctiva, sclera
  - Anterior chamber (using slit lamp if possible)
  - Intraocular pressure (with tono pen if fine)

**Equipment needed to evaluate red eye**

**Disorders of the Ocular Adnexa**

- Hordeolum

**Disorders of the Ocular Adnexa**

- Meibomian Glands located in tarsal plate in upper and lower eyelids

**Evaluation**

Often don’t need or can’t get a refraction, but definitely obtain “pinhole” visual acuity.
Chalazion

Chalazion: A painless (usually, but acutely painful), slowly enlarging bump, usually chronic, formed by inflammation (not infection) of the meibomian glands.

Hordeolum: A localized infection or inflammation, usually acute, involving hair follicles of the eyelashes or meibomian glands.

HORDEOLUM/CHALAZION: TREATMENT

- **Goal**
  - To promote drainage

- **Treatment**
  - Acute/subacute: Warm-hot compresses and eyelid massage (try to gently express the MG)
  - Chronic: incision and curettage or steroid injection or can try topical gtt like Azasite or steroid gtt

BLEPHARITIS

- AKA anterior blepharitis (lashes mostly)
- Inflammation of lid margin
- Associated with dry eyes
- Seborrhea causes dried skin and wax on base of lashes
- May have Staphylococcal infection
- Symptoms: lid burning, lash mattering

Meibomian Gland Dysfunction

- Probably most common cause of chronic eye irritation
- Inadequate quantity and/or quality of meibomian gland secretions / oil
- Can also have inflammatory component, hence AKA posterior blepharitis

Collarettes on eyelashes of patient with blepharitis
How the Eye Works

Blepharitis and Meibomian Gland Dysfunction

These are very commonly seen together (anterior + posterior blepharitis) and treatment is similar and overlaps.

Treatment

- **Blepharitis**
  - Cleaning the eyelid margins (i.e. warm water with baby shampoo or commercial eyelid cleaner e.g. Ocusoft or Sterilid - http://www.dryeyezone.com/encyclopedia/lidscrubs.html)
  - Antibiotic ointment or antibiotic & steroid combination
  - Demodex blepharitis - TTO or Cliradex (4-Terpineol)
  - Hypochlorous acid - NEW (Avenova or Ocusoft)

- **Meibomian gland dysfunction**
  - Warm compresses 2-3 times daily and eyelid massage (new: Lipiflow - in-office thermal treatment)
  - Omega 3 FA’s
  - Diet: Fish, walnuts, etc
  - Supplement: Fish oil tablets
  - Oral antibiotics in severe cases (ocular rosacea) i.e. Doxycycline

Both - artificial tears, local choices are name brand and preservative free.

Disorders of the Ocular Adnexa

- **Preseptal cellulitis**
  - External signs: redness, swelling (same as preseptal cellulitis)
  - How to distinguish from preseptal:
    - Motility impaired, painful
    - + Proposis
    - Often fever and leukocytosis
    - Civic nerve: decreased vision, dilated pupils, afferent pupillary defect, disc edema

- **Orbital cellulitis**
  - ID consultation possibly
  - Orbital CT scan (r/o subperiosteal abscess)
  - CBC +/- Blood culture
  - ENT consult if pre-existing sinus disease
  - Hospitalization for IV abx (especially for kids), in select adult cases may manage as outpt under close supervision
ORBITAL CELLULITIS: TREATMENT

- IV antibiotics stat: Staphylococcus, Streptococcus, H. influenzae
- Surgical debridement if fungus, no improvement, or subperiosteal abscess
- Complications: cavernous sinus thrombosis, meningitis

Lacrimal System Disorders

NASOLACRIMAL DUCT OBSTRUCTION: CONGENITAL

- Massage tear sac daily
- Probing, irrigation, if chronic
- Systemic antibiotics if infected

NASOLACRIMAL DUCT OBSTRUCTION: ACQUIRED

- Trauma a common cause
- Systemic antibiotics if infected
- Surgical procedure after one episode of dacryocystitis (dacryocystorhinostomy or DCR) prn

Lacrimal System Disorders

Dacryocystitis
**Ocular Surface Disorders**

**ADULT CONJUNCTIVITIS: MAJOR CAUSES**
- Viral
- Bacterial
- Allergic

**CONJUNCTIVITIS: DISCHARGE**

<table>
<thead>
<tr>
<th>Discharge</th>
<th>Cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purulent</td>
<td>Bacterial</td>
</tr>
<tr>
<td>Clear</td>
<td>Viral*</td>
</tr>
<tr>
<td>Watery, with stringy; white mucus</td>
<td>Allergic**</td>
</tr>
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</table>

* Preauricular lymphadenopathy signals viral infection
** Itching often accompanies

**BACTERIAL CONJUNCTIVITIS: COMMON CAUSES**
- *Staphylococcus* (skin)
- *Streptococcus* (respiratory)
- *Haemophilus* (respiratory)

**BACTERIAL CONJUNCTIVITIS TREATMENT**
- Topical antibiotic: qid x 7 days (aminoglycoside, erythromycin, fluoroquinolone, or trimethoprim-polymyxin)
- Artificial tears

**Copious purulent discharge: Suspect Neisseria gonorrhoeae.**
**VIRAL CONJUNCTIVITIS**
- Watery discharge
- Highly contagious
- Palpable preauricular lymph node
- History of URI, sore throat, fever common

**ALLERGIC CONJUNCTIVITIS**
- Associated conditions: hay fever, asthma, eczema
- Contact allergy: chemicals, cosmetics, pollen
- Treatment: topical antihistamine drops, rarely need NSAID or steroid drops (Ketotifen great drop to start with)
- Systemic antihistamines may help

**NEONATAL CONJUNCTIVITIS: CAUSES**
- Bacteria (N. gonorrhoeae, 2–4 days)
- Bacteria (Staphylococcus, Streptococcus, 3–5 days)
- Chlamydia (5–12 days)
- Viruses (eg, herpes, from mother)
**NEONATAL CHLAMYDIAL CONJUNCTIVITIS: TREATMENT**

- Erythromycin ointment: qid x 4 weeks
- Erythromycin po x 2–3 weeks
  - 40–50 mg/kg/day or even single dose of po azithromycin may be effective

**TEARS AND DRY EYES**

- Tear functions:
  - Lubrication
  - Bacteriostatic and immunologic functions
- Dry eye (keratoconjunctivitis sicca) is a tear deficiency state

**TEAR DEFICIENCY STATES: SYMPTOMS**

- Burning
- Foreign-body sensation
- Paradoxical reflex tearing
- Symptoms can be made worse by reading, computer use, television, driving, lengthy air travel (decreased blink rate...)

**TEAR DEFICIENCY STATES: ASSOCIATED CONDITIONS**

- Aging
- Rheumatoid arthritis
- Stevens-Johnson syndrome
- Chemical injuries
- Ocular pemphigoid
- Systemic medications
Newer Dry Eye Diagnostics, examples- Tear Osmolarity and InflammaDry (MMP-9), more on the way

Dry Eyes: Treatment
- Artificial tears
- Preservative-free artificial tears
- Lubricating ointment at bedtime
- Punctal occlusion
- Warm compresses to eyelids
- Counseling about activities that make dry eyes worse
- Cyclosporine drops (Restasis)
- Lifitegrast (Xiidra) - NEW

Exposure Keratitis: Causes and Management
- Due to incomplete lid closure
- Manage with lubricating solutions/ointments
- Tape lids shut at night
- Careful about patching without taping – may cause a corneal abrasion

Thyroid exophthalmos: one cause of exposure keratitis

Pinguecula

Pterygium
INFLAMED PINGUECULA AND PTERYGIUM: MANAGEMENT

- Artificial tears, something short course of topical steroids
- Counsel patients to avoid irritation
- If documented growth decreased vision may need surgery

ACUTE CORNEAL DISORDERS: SYMPTOMS

- Eye pain
  - Foreign-body sensation
  - Deep and boring
- Photophobia
- Blurred vision

Irregular corneal light reflex and central corneal opacity

Fluorescein dye strip applied to the conjunctiva
Corneal abrasion, stained with fluorescein and viewed with cobalt blue light

**Corneal Abrasion**

- **Signs and symptoms:** redness, tearing, pain, photophobia, foreign-body sensation, blurred vision, small pupil
- **Causes:** injury, welder’s arc, contact lens overwear

**Management**

- **Goals:**
  - Promote rapid healing
  - Relieve pain
  - Prevent infections
- **Treatment:**
  - 1% cyclopentolate (or another cycloplegic)
  - Topical antibiotics: drops polytrim, tobrex, fluoroquinolone, etc
  - Ointment erythromycin, bacitracin/polymyxin, etc
  - ± Pressure patch or tape lids shut ok but not necessary in all cases
  - Bandage contact is another option
  - ± Oral analgesics, usually OTC options enough

Applying a pressure patch reasonable, my preference is eyelid taping

**Chemical Injury**

- **A true ocular emergency**
- **Requires immediate irrigation with nearest source of water, can use Morgan Lens hooked up to normal saline or ringers lactate, may need 8-10 liters, pH should return to 7-7.4**
- **Cederroth (sterile buffered isotonic sodium chloride) - buffer, even better than saline**
- **Management depends on offending agent**

Remove with cotton tip, spud, needle tip, and/or use diamond burr for associated rust ring with metal FB
Anterior Segment Disorders

Chemical burn: acid – BAD!

Chemical burn: alkali – Worse!!!

Corneal ulcer

Giant papillary conjunctivitis

INFECTIOUS KERATITIS

- Frequently result from mechanical trauma (i.e. CL use, especially EW)
- Can cause permanent scarring and decreased vision
- Early detection, aggressive therapy are vital

Bacterial infection of the cornea

Primary herpes simplex infection
Anterior Segment Disorders

**Corneal herpes simplex dendrites, stained with fluorescein**

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**TOPICAL STEROIDS: SIDE EFFECTS**
should only be prescribed by Ophthalmology

- Always ask and document who started patient on steroid therapy
- Facilitate corneal penetration of herpes virus
- Elevate IOP (steroid-induced glaucoma)
- Cataract formation and progression
- Potentiate fungal corneal ulcers

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**Hyphema – most important thing is to look for signs of open globe i.e. peaked pupil and/or hypotony**

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**INFLAMMATORY CONDITIONS CAUSING A RED EYE:**

- Episcleritis
- Scleritis
- Anterior uveitis (iritis)
Anterior Segment Disorders

**IRITIS**

**Signs and Symptoms**
- Circumlimbal redness
- Pain
- Photophobia
- Decreased vision
- Miotic pupil

**Rule Out**
- Systemic inflammation
- Trauma
- Autoimmune disease
- Systemic infection

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**UVEITIS: SLIT LAMP FINDINGS**

- White cells in anterior chamber
- Hypopyon
- Keratic precipitates

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**ACUTE GLAUCOMA:**

**INITIAL TREATMENT** – Goal break attack
- Pilocarpine
- Timolol
- Brinzolamide or dorzolamide
- Apraclonidine or brimonidine
- Consider steroid drop and even prostaglandin analogue
- Acetazolamide 500 mg po or IV (not Sequel until IOP down)
- IV mannitol 20% 300–500 cc (or other osmotic, rarely used)
- Also: ocular massage, compression gonioscopy, and LPI, rarely may need Laser iridoplasty or even surgical PI
COMMON RED EYE DISORDERS: TREATMENT INDICATED
- Hordeolum
- Chalazion
- Blepharitis
- Conjunctivitis
- Subconjunctival hemorrhage
- Dry eyes
- Corneal abrasions (most)

VISION-THREATENING RED EYE SIGNS & SYMPTOMS: Telephone triage for same day add-on in Eye clinic
- Decreased vision
- Severe ocular pain not relieved by topical proparacaine
- Severe photophobia
- Circumlimbal redness (this classic picture of “ciliary flush” in ACG is rarely seen though…)
- Severe corneal edema
- Corneal ulcers (> 2mm) / dendrites
- Abnormal pupil (assuming not chronic)
- Elevated IOP (nl IOP 10-22 mmHg... mild elevation i.e. High 20’s is not that urgent vs IOP of 50 is huge deal)

VISION-THREATENING RED EYE DISORDERS: URGENT EVALUATION
- Orbital cellulitis
- Scleritis (very painful, not relieved at all by proparacaine)
- Chemical injury (except very mild cases of course)
- Severe corneal infection (visible without slit lamp)
- Hyphema (need to r/o open globe)
- Iritis (decreased vision and severe photophobia)
- Acute glaucoma (significantly increased IOP)

THE RED EYE
- Questions?

Matthew and Alexander