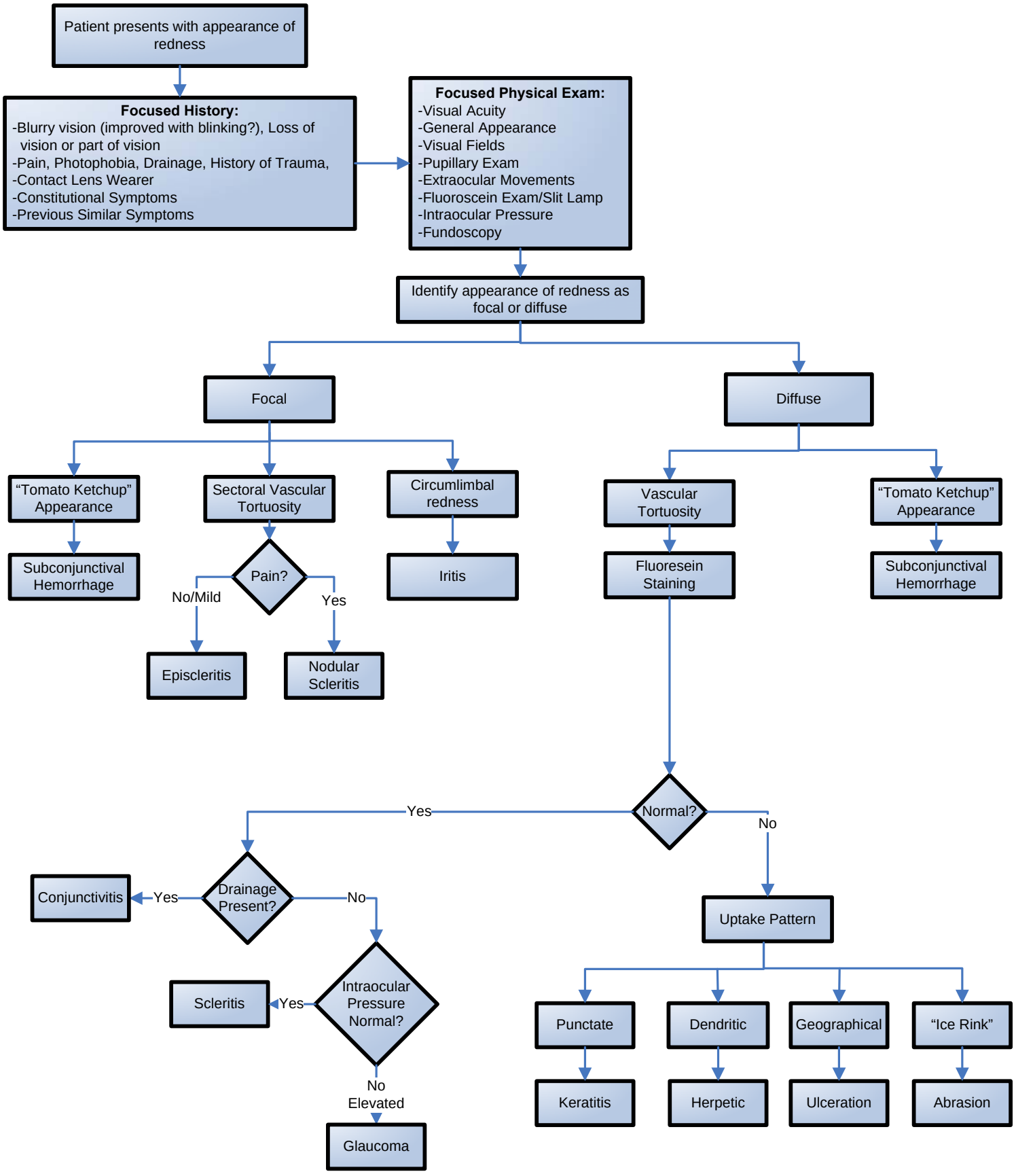
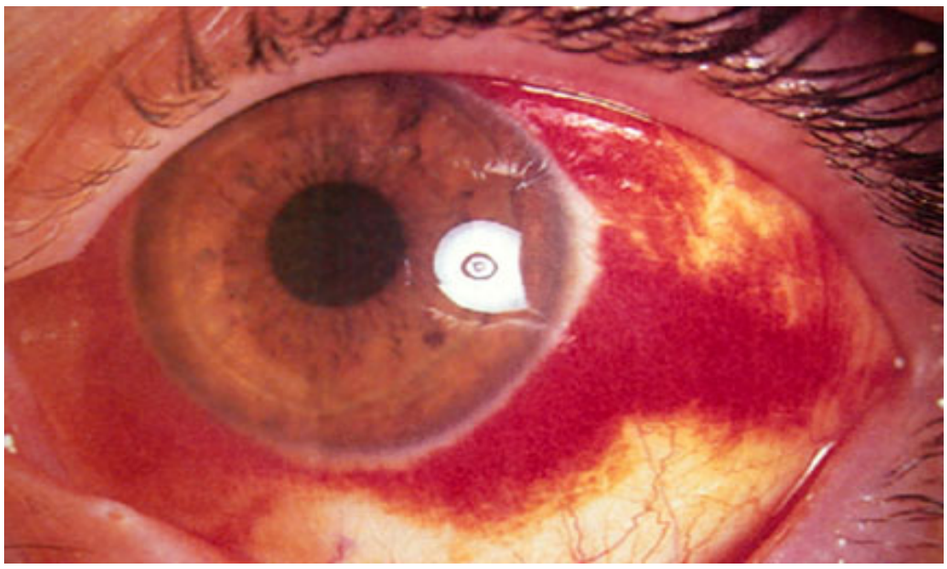
EmergencyKT: Red Eye

Exclusion Criteria
Caustic Injury
Globe Penetrating Trauma



Subconjunctival Hemorrhage



Diagnosis/Description of Condition

- Well-delineated area of redness due to the rupture of a small conjunctival vessel
- May have been preceded by coughing/sneezing/trauma
    - Can be seen in weight lifters
- Eye exam should, otherwise, be completely normal

✳ If bilateral or recurrent, should consider investigation of blood dyscrasias

Recommended Treatment

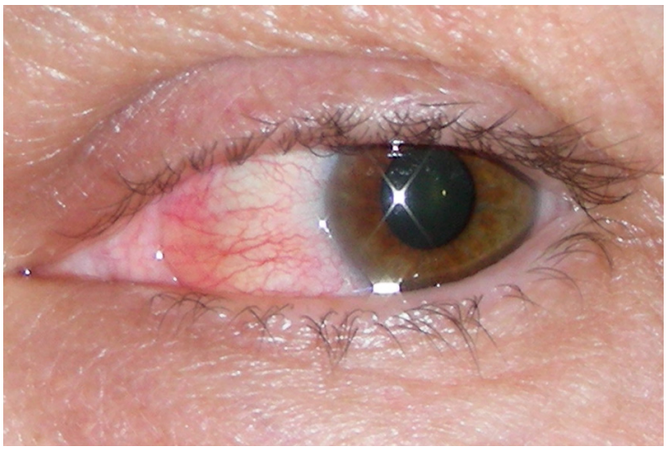
- Condition is self-limited and should resolve by 1-2 weeks

Recommended Follow-Up/Consultation

- Unless recurrent or bilateral, no follow-up or consultation is required.

Leibowitz, Howard. The Red Eye. New England Journal of Medicine, vol. 343, no 5. August 3, 2000.
Roy, Hampton MD. The Red Eye. Annals of Opthalmology, vol. 38, no. 1, Spring 2006.
Howes, David and Hinkebein, Mary Kay. The Red Painful Eye. Emergency Medicine: An Approach to Clinical Problem Solving. 2nd Edition. Saunders. 2003. p 417-435.

Episleritis



Diagnosis/Description of Condition

- Rapid onset of localized redness, characterized by radially-oriented, dilated episcleral vessels
- Sensation of dull ache
- May have associated tearing
- May be recurrent
- Should be NO:
    - Purulent discharge or decrease in visual acuity
    - Evidence of scleritis (focal or diffuse redness, bluish or pinkish discoloration of sclera, severe sharp pain, or decrease in vision)
- May be associated with systemic diseases
    - Inflammatory bowel disease, RA, SLE, atopy, psoriasis
- May be associated with ocular conditions
    - Ocular rosacea, keratoconjunctivitis sicca

Recommended Treatment

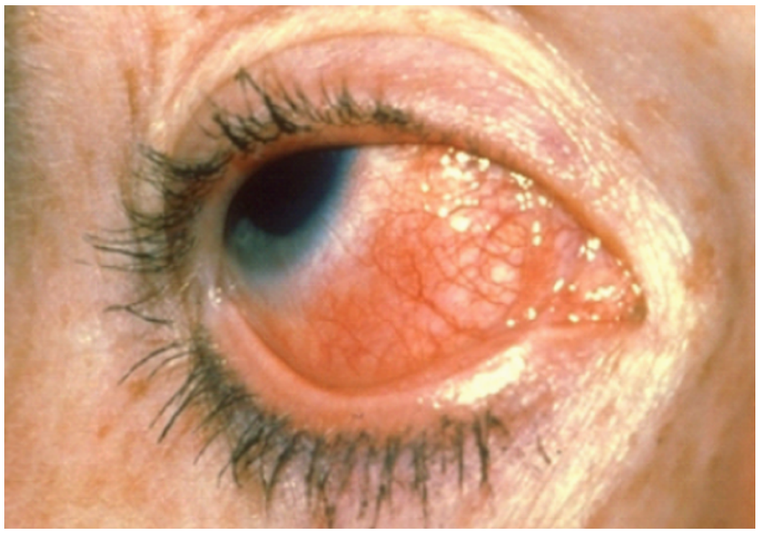
- Chilled saline eyedrops TID x 3 weeks
- Oral NSAIDs for control of discomfort

Recommended Follow-Up/Consultation

- Outpatient follow-up with opthalmology within 1 week

Severity of episcleritis and systemic disease association(1999) Ophthalmology, 106 (4), pp. 729-731.
A randomised, double-blind trial of topical ketorolac vs artificial tears for the treatment of episcleritis(2005) Eye, 19 (7), pp. 739-742.
Scleritis and episcleritis(1976) British Journal of Ophthalmology, 60 (3), pp. 163-191

Scleritis



Diagnosis/Description of Condition

- Progressive, subacute onset of either focal or diffuse redness
    - Often will be a bluish-violet hue to the sclera due to vascular congestion
    - Redness does not resolve with application of phenylephrine
- Significant aching pain and tenderness, usually minimal to no tearing, usually no impact on vision initially
- Pupillary responses preserved
- Inflammation of the deep episcleral plexus with edema of the sclera
- Up to 50% of cases are associated with autoimmune or connective tissue disorders (Wegener's granulomatosis, Rheumatoid Arthritis, etc.)
- Vision threatening, risk of scleral perforation

Recommended Treatment

- Oral NSAIDs
- Topical steroids (i.e. Pref-Forte 1% 2 gtts 4x daily)
- Oral steroids - usually reserved for severe cases or cases resistant to initial therapy

Recommended Follow-Up/Consultation

- Outpatient follow-up with opthalmology within 24-48 hours

Mahmood, Ahmed, MD, et. al. Diagnosis and Management of the Acute Red Eye. Emergency Clinics of North America, vol. 26, 2008, 35-55.

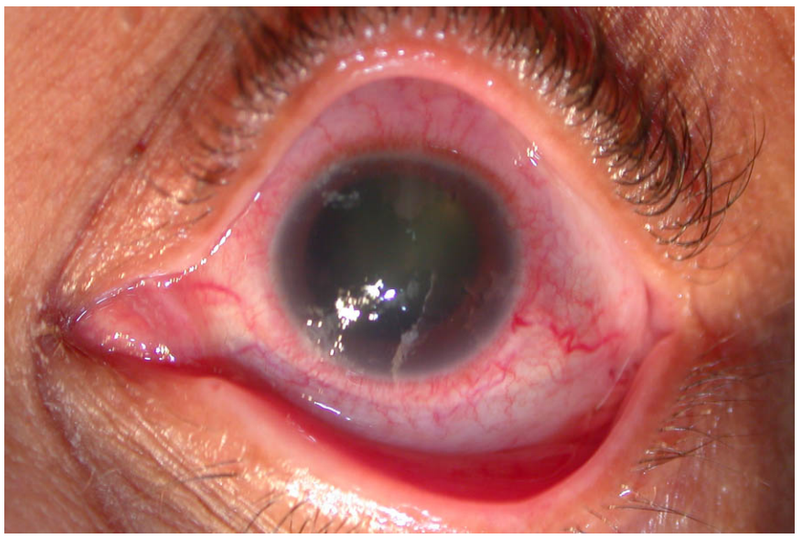
Raji, Veena Rao, et. al. Scleritis and Systemic Disease Association in a Community-Based Referral Practice. American Journal of Ophthalmology, Dec. 2009.

Jabs, Douglas, MD., et. al. Episcleritis and Scleritis: Clinical Features and Treatment Results. American Journal of Ophthalmology, Oct. 2000

Rachitskaya, Aleksandra, et. al. An Update on the Cause and Treatment of Scleritis. Current Opinion in Ophthalmology, issue 21, 2010, 463-467.

Okhravi, Narciss, et. al. Scleritis. Survey of Ophthalmology, vol. 50, no 4. July-Aug. 2005.

Acute Angle Closure Glaucoma



Diagnosis/Description of Condition

- Glaucoma is optic neuropathy with atrophy of the optic nerve head.
    - Angle-closure glaucoma is caused by narrowing of the anterior chamber angle. Aqueous humor cannot drain, pressure inside the eye rises, and damage occurs subsequently to the optic nerve.
- Patients often complain of severe pain, headache, decreased vision, and nausea
- Exam findings
    - Mid-dilated pupil, poorly responsive to light
    - Corneal edema/cloudiness
    - Elevated intraocular pressures (usually >40 mmHg)

Recommended Treatment

- Surgical management is only definitive treatment
- Medical Management
    - Timolol and Lantoprost
    - Additional agents as directed by ophthalmology

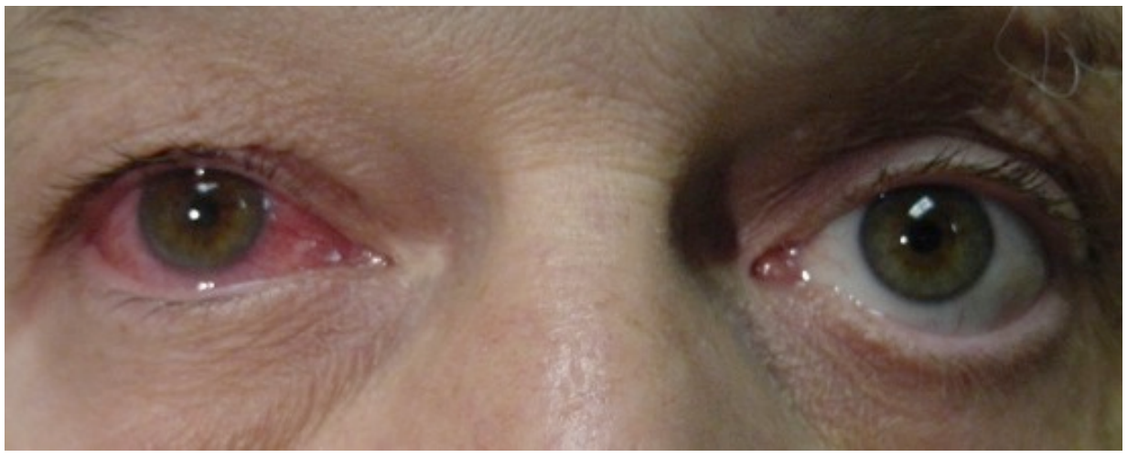
Drug (Drug Class)	Dosing	Mechanism of Action	Side Effects
Timolol (β-blocker)	0.5% 1 gtt	Decreased aqueous production	Bronchoconstriction, bradycardia
Brimonidine (α-agonist)	0.15%-0.2% 1 gtt	Decreased aqueous production	Contact reaction
Pilocarpine (Muscarinic agonist)	2-4% solution 1 gtt	Increased tonographic outflow	Eye ache, cephalgia
Lantanoprost (Prostaglandin)	0.005% 1 gtt	Improves uveoscleral outflow	Discoloration of iris
Acetazolamide (Carbonic anhydrase inhibitor)	500 mg PO or IV	Decreased aqueous production	Malaise
Mannitol (Hyperosmotic)	1-2 g/kg over 45 min	Osmotic diuretic	Hypotension

Recommended Follow-Up/Consultation

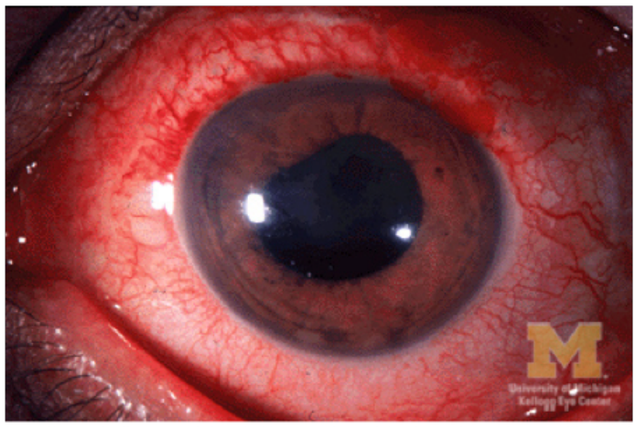
- Emergent consultation with opthalmology

Marx, Hockberger, Walls. Rosen's Emergency Medicine 7th Edition. Elsevier, 2010. Chapter 69, Ophthalmology.
Yanoff & Duker. Ophthalmology, 3rd Edition. Mosby, 2008. Chapter 10.12.
Saw, Seang-Mei, MD, PhD, et. al. Ophthalmology v. 110, issue 10, 2003, p. 1869-78.

Iritis/Uveitis



http://lifeinthefastlane.com/2010/08/uveitis/



http://www.kellogg.umich.edu/theeyeshaveit/red-eye/anterior-uveitis.html

Diagnosis/Description of Condition

- Anterior:
  - Definition - anterior uvea = iris + ciliary body; inflammation of anterior uvea = anterior uveitis = iritis
  - Exam:
    - Red and painful eye, typically no foreign body sensation.
    - Ciliary Flush: injection around iris.
    - Consensual response: pain in affected eye with light in unaffected eye
  - Diagnosis:
    - Consensual Response + Slit-lamp exam “cells and flare”

  If topical anesthesia relieves pain (and no sign of corneal pathology) it probably is not this disease.
- Posterior:
  - Definition: posterior uvea = choroid; inflammation of posterior uvea = vitritis, choroiditis, retinitis
  - Exam - typically painless, may have floaters or reduced visual acuity
  - Diagnosis: more difficult, requires scleral depression, or slit-lamp with special lenses
- Causes:
  - Infections: e.g. syphilis, Herpes, TB, CMV, HIV, Toxoplasmosis
  - Immune-Mediated: e.g. Crohn’s/UC, JRA, Sarcoidosis
  - Trauma

  Detailed history is crucial in the non-trauma patient

Recommended Treatment

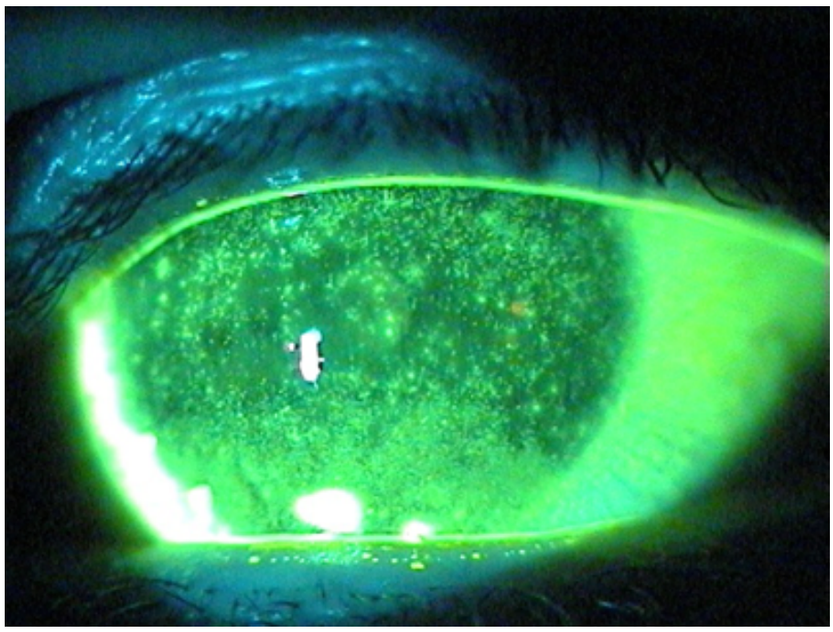
- Consider workup for likely causes as well as treating symptoms
- Cycloplegia: e.g. Cyclopentolate 1 to 2%: 1 drop three times a day for mild to moderate inflammation (lasts up to 2 days)
- Topical Steroids: Use in consultation with Ophthalmology. E.g. Prednisolone acetate 1%: 1 drop every 4 to 6 hour
- Warm compresses, analgesia

Recommended Follow-Up/Consultation

- Follow up with Ophthalmology within 24 hours
- Referral to appropriate specialist for likely underlying cause

Marx, Hockberger, Walls. Rosen's Emergency Medicine 7th Edition. Elsevier, 2010. Chapter 69, Ophthalmology, pages 859-876
Rosenbaum, James T MD. www.UpToDate.com, Uveitis, February 2010
Weinberg RS. Uveitis. *Ophthalmology Clin North Am.* 1999;12:71–79.

Punctate Keratitis



Diagnosis/Description of Condition

- Non-specific punctate of fluorescein seen in a number of conditions
- Patients typically present with pain, photophobia, redness, and a foreign body sensation
- Pre-disposing conditions:
    - UV-exposure - tanning beds, welders
    - Topical eye medications
        - Can be seen with OTC eye gtts as well as prescription medication
    - Dry eyes
        - May see inspisation of Meibomian glands
    - Contact lens associated
        - Can be due to local trauma, overuse, reaction to preservative, or infectious
- Can be infectious in origin

Recommended Treatment

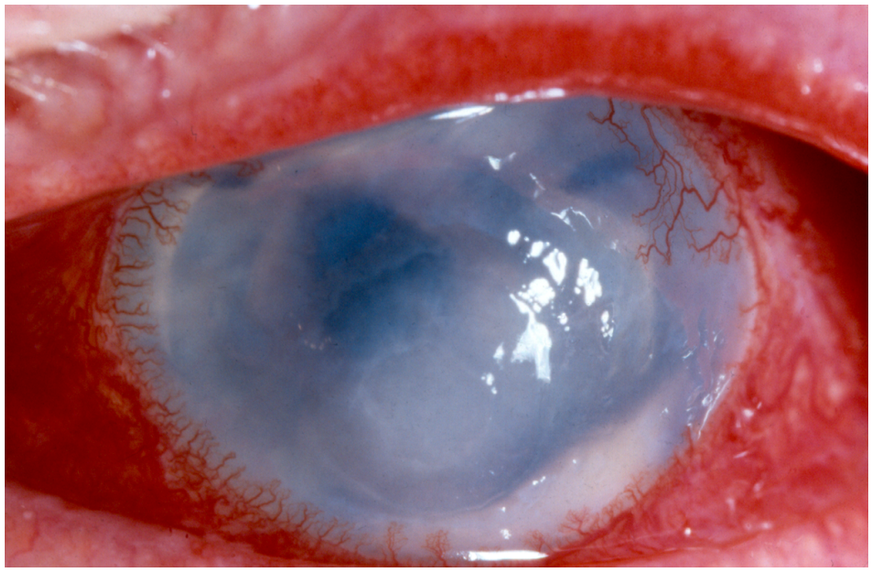
- Remove any identified causative agent (i.e. discontinue contact lens wear)
- Topical fluoroquinilone (Moxifloxacin 1% q2h or Ofloxacin 0.3% q2h)
- Preservative-free artificial tears

Recommended Follow-Up/Consultation

- Follow-up with opthalmology in 24 hours

Brunette, Douglas MD. Opthalmology. Rosen's Emergency Medicine: Concepts and Clinical Practice, 6th ed. Mosby-Elsevier. 2006. p. 1044-1065.
Levsky Marc E, DeFlorio Paul, "Chapter 2. Ophthalmologic Conditions" (Chapter). Knoop KJ, Stack LB, Storrow AB, Thurman RJ: The Atlas of Emergency Medicine, 3e: http://www.accessmedicine.com.proxy.libraries.uc.edu/content.aspx?aID=6000227.

Corneal Ulcer (Bacterial Keratitis)



Diagnosis/Description of Condition

- Patients present with pain, foreign body sensation, redness, may have decreased vision depending on location of ulcer
- Dense uptake of fluorescein in a geographic pattern
- Predisposing conditions
    - Contact lens wear
    - Corneal trauma
    - Corneal surface disease
- Organisms
    - Coagulase (-) Staph most common overall
    - Increased incidence of Gram (-) organisms, specifically Pseudomonas in contact lens wearers

Recommended Treatment

- Topical Antibiotics
    - Monotherapy with fluoroquinilones - Moxifloxacin 1% q1h or Ofloxacin 0.3% q1h
    - Dual therapy with fortified tobramycin and cephazolin
        - Fortified tobramycin likely not commercially available
- No evidence to support empiric treatment with corticosteroids

Recommended Follow-Up/Consultation

- If in center with ophthalmology coverage, recommend consultation
    - Early scrapings allow for culture and may increase antibiotic penetration
- If reliable patient and mild disease, may arrange follow-up with opthalmology in 24 hours

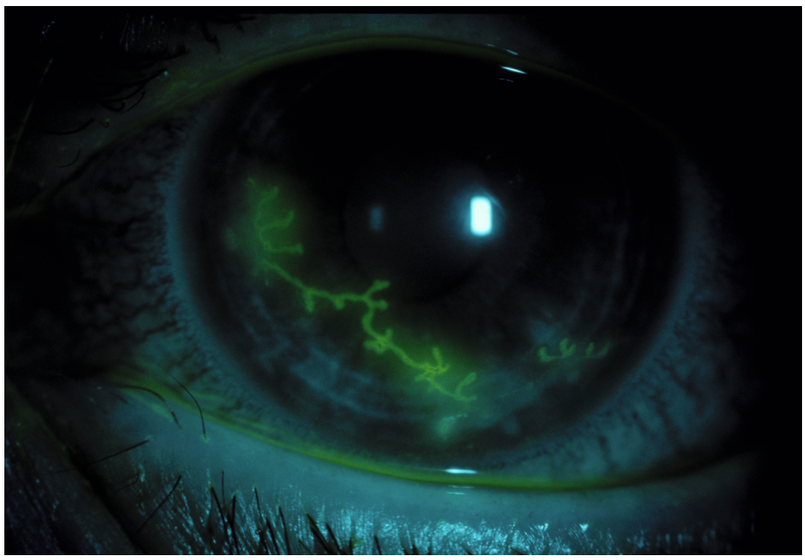
Bourcier, et. al. Bacterial keratitis: predisposing factors, clinical, and microbiological review of 300 cases. British Journal of Opthalmology, 87; 834-838. 2003.

Constantinou, et. al. Clinical Efficacy of Moxifloxacin in the Treatment of Bacterial Keratitis. Opthalmology. Vol 114, n. 9. 2007

Suwan-apichon O, et. al. Topical steroids as adjunctive therapy for bacterial keratitis. The Cochrane Library, Issue 1, 2009.

Magauran, Brendan, MD MBA. Conditions Requiring Emergency Opthalmologic Consultation. Emergency Medicine Clinics of North America. Vol 26. 2008. 233-238

Herpetic Keratitis



Diagnosis/Description of Condition

- Important to Differentiate between HSV keratitis and Herpes Zoster Ophthalmicus
- HSV Keratitis
    - Unilateral, often recurrent vesicular involving eyelids, conjunctiva, and cornea
    - Painful recurrences often precipitated by recent URI, fever
- HZV Ophthalmicus
    - Recurrence of varicella virus affecting the V1 distribution of the trigeminal nerve
    - Vesicular rash involving forehead, nose, eyelids, conjunctiva, and cornea
    - Prodromal pain is common
    - Can cause extraocular muscle palsy or palsy of orbicularis oculi

Recommended Treatment

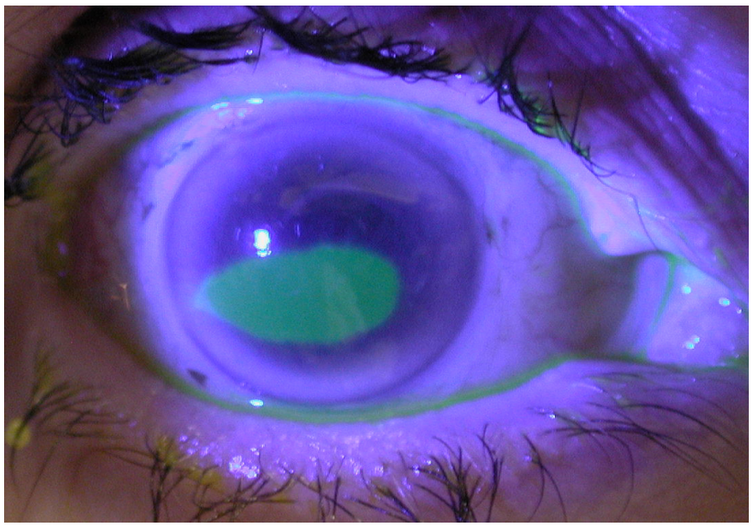
- HSV Keratitis
    - Topical antiviral (i.e. Acyclovir 3% ointment 5 times daily)
    - Topical interferon may lead to faster healing, may use if available or if recommended by consultant
        - 200,000 units of interferon/ml - 2 gtts 8 times daily
- Zoster Ophthalmicus
    - Oral antivirals (Acyclovir 800 mg PO 5 x daily, valacyclovir 1000 mg PO TID, or famciclovir 500 mg PO TID)
    - Bacitracin-Polymixin ophthalmic ointment BID
    - Appropriate treatment for iritis, glaucoma if present
    - Consider systemic steroids if severe pain or swelling
        - Prednisone 20mg TID x 2 days, BID x 6 days, daily x 4 days

Recommended Follow-Up/Consultation

- If in center with ophthalmology coverage, consultation recommended
- If mild disease and reliable follow up can be arranged, may follow up within 24 hours after initiation of appropriate therapy

Liesegang, Thomas, MD. Epidemiology and Natural History of Ocular Herpes Simplex Virus Infection in Rochester, MN 1950-1982. Tr. Am. Opthal. Soc. vol. LXXXVI, 1988.
Liesegang, Thomas, MD. Herpes Zoster Ophthalmicus: Natural History, Risk Factors, Clinical Presentation, and Morbidity. Ophthalmology, vol. 115, no 2, Supplement. February, 2008.
Pavan-Langston, Deborah, MD FACS. Herpes Zoster: Antivirals and Pain Management. Ophthalmology. vol. 115, no 2, Supplement, February, 2008.
Kaufman, Stephen C., MD, PhD. Anterior Segment Complications of Herpes Zoster Ophthalmicus. Ophthalmology. vol. 115, no 2, Supplement, February, 2008.
Dworkin, Robert, MD, et. al. Recommendations for the Management of Herpes Zoster. Clinical Infectious Diseases. vol 44, Supplement, 2007.
Wilhelmus, K. R. Antiviral Treatment and other Therapeutic Interventions for Herpes Simplex Virus Epithelial Keratitis. The Cochrane Library. Issue 12, 2010.

Corneal Abrasions



Diagnosis/Description of Condition

- Pain, foreign body sensation, photophobia, decreased visual acuity (if abrasion is within visual axis)
    - Pain is relieved with the application of topical anesthetic
- Epithelial defect seen on fluorescein exam
    - Seidel's test to evaluate for perforation: place fluorescein directly on the abrasion to see if aqueous humor leaks from the anterior chamber
- Evaluation of the lid for foreign body
- Contact lens wearers should be treated as if they have bacterial keratitis

Recommended Treatment

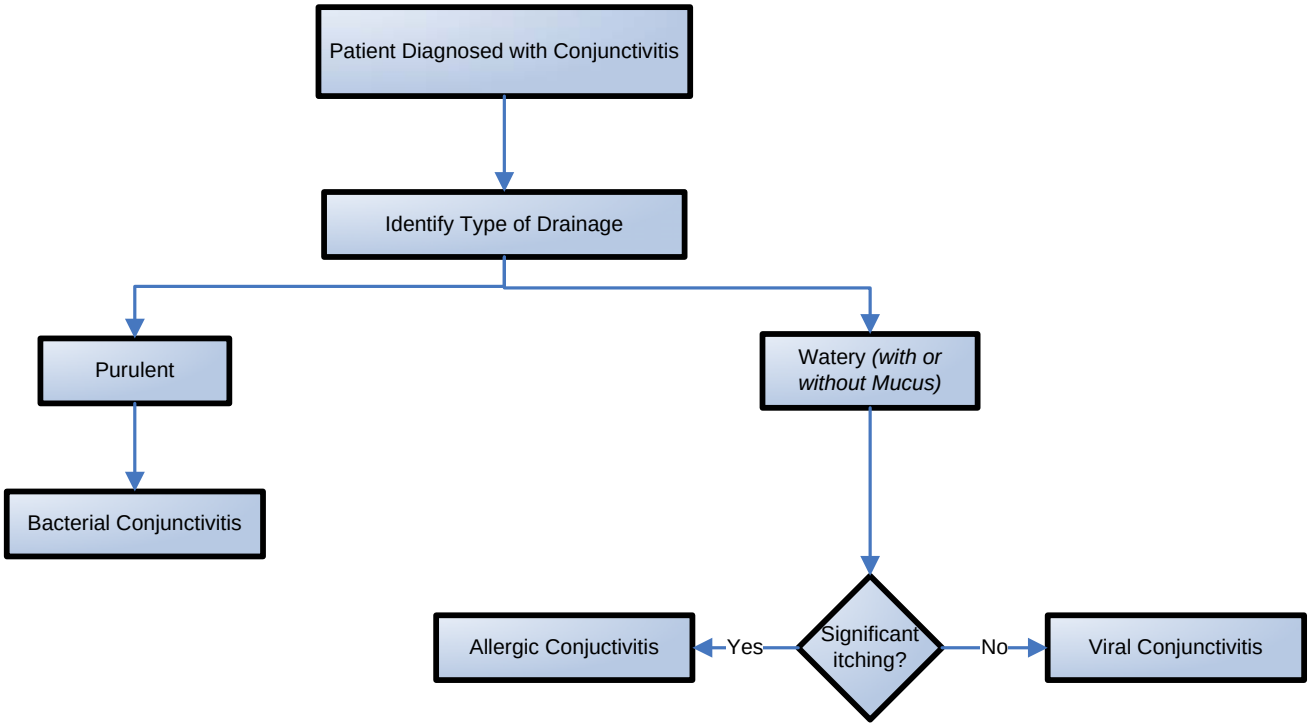
- Topical Antibiotics (i.e. Erythromycin ophthalmic ointment, 1/2 in to conjunctiva QID x 7 days)
- Topical NSAIDs (i.e. Diclofenac ophthalmic, 1 gtt daily to QID PRN pain)
- Cycloplegia (i.e. Cyclopentolate 1-2 gtt)
    - Warn patient that mydriasis may continue for up to 24 hours
- Tetanus vaccination
    - No known cases of clinical tetanus from corneal abrasion
    - May consider for perforation or injuries containing dirt or organic matter
- Eye-patching is not recommended
- Topical anesthetics are not recommended

Recommended Follow-Up/Consultation

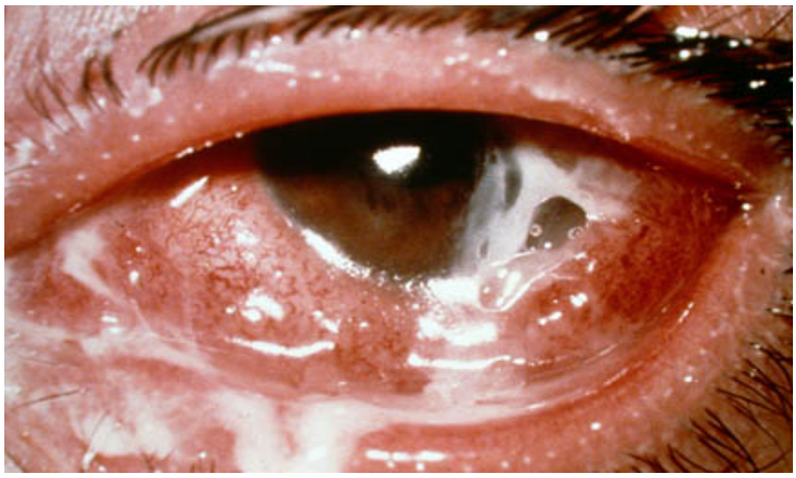
- If uncomplicated, may follow up electively with PMD or ophthalmology
- If contact lens wearer, follow up with ophthalmology within 24 hours or sooner if available

Marx, Hockberger, Walls. Rosen's Emergency Medicine 7th Edition. Elsevier, 2010. Chapter 69, Ophthalmology, pages 859-876
Jacobs, Deborah. UpToDate.com. Corneal Abrasions and Corneal Foreign Bodies. January 2011.
Mukherjee P, Sivakumar, A. Tetanus Prophylaxis in Superficial Corneal Abrasions. Emergency Medicine Journal, Jan 2003; 20(1):62-4.
Leibowitz, Howard. The Red Eye. New England Journal of Medicine, vol. 343, no 5. August 3, 2000.
Roy, Hampton MD. The Red Eye. Annals of Opthalmology, vol. 38, no. 1, Spring 2006.

EmergencyKT: Conjunctivitis



Bacterial Conjunctivitis



Diagnosis/Description of Condition

- Inflammation of the bulbar and palpebral conjunctiva
- Redness and discharge in one or both eyes, with affected eye “stuck shut” in morning.
- Drainage is purulent compared to the watery/mucus discharge of viral or allergic conjunctivitis.
- Photophobia and visual loss should not be present.
- Neisseria conjunctivitis: Severe and sight threatening. Profuse purulent discharge, tender eye, eyelid swelling.
    - Look for concurrent urethritis.
- Contact Lens Wearers: Be aware of ulcerative keratitis, which can progress to ocular perforation in 24 hours if not treated appropriately.

Recommended Treatment

- Bacterial:
    - Polymyxin B/Trimethoprim sol. 1-2 gtt every 3-6 hours for 7-10 days
    - Erythromycin ophthalmic ointment, ½ inch to conjunctiva qid x 7 days
- Neisseria (suspected):
    - Ceftriaxone 1g IV x 1 dose (likely also cover Chlamydia with Azithromycin 1g PO x 1)
- Contact Lens Wearers:
    - Fluoroquinolone for pseudomonas coverage,
        - Levofloxacin 0.5% sol, 1-2 gtt every 2 hours while awake for 2 days, then every 4-8 hours for 5 days
        - Moxifloxacin 1% 1-2 gtt q2h while awake
    - Discontinue contact lens use until 24 hours after discharge and sclera clears

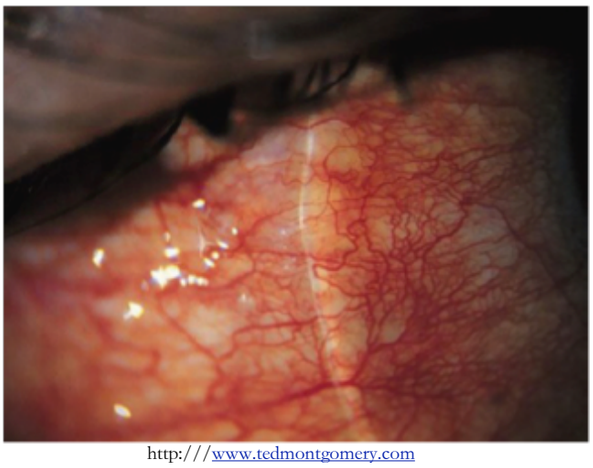
Recommended Follow-Up/Consultation

- If contact lens wearer, should follow-up with ophthalmology within 24 hours or sooner if able
- If uncomplicated, may follow up with ophthalmology or PMD within 1 week as needed.

Marx, Hockberger, Walls. Rosen's Emergency Medicine 7th Edition. Elsevier, 2010. Chapter 69, Ophthalmology, pages 859-876
Jacobs MD, Deborah. www.UpToDate.com, Conjunctivitis. January 2011.

Viral Conjunctivitis

http://michigan.aoa.org/images/MOA-Viral-Conjunctivitis-2.jpg



http:///www.tedmontgomery.com

Diagnosis/Description of Condition

- The most common cause of conjunctivitis.
    - Adenovirus is the most common cause.
- Generally produces more redness, itching, eye irritation, **clear watery** discharge.
- Commonly occurs in setting of other viral symptoms.
- Very contagious for 10-12 days after onset.

Recommended Treatment

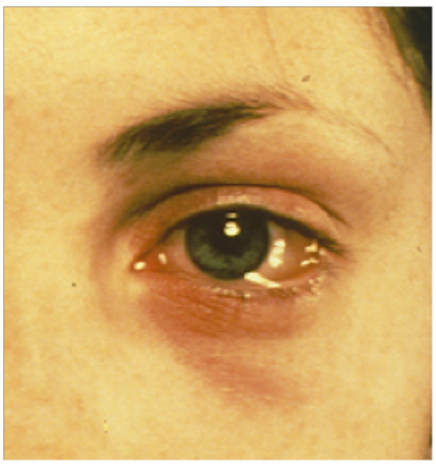
- Self-limited and benign process
- Symptomatic treatment: Artificial tears, cool compresses
    - Topical antihistamines for itching if present
- If diagnosis is in question, may opt to treat as bacterial conjunctivitis

Recommended Follow-Up/Consultation

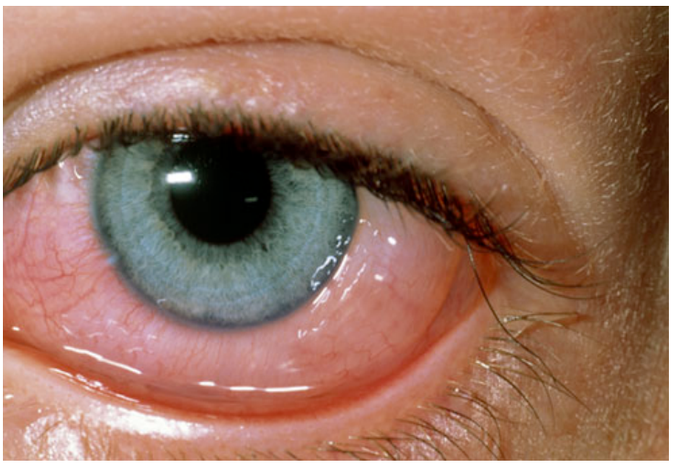
- May follow up electively with PMD
- If symptoms severe or persistent, consider referral to ophthalmology

Marx, Hockberger, Walls. Rosen's Emergency Medicine 7th Edition. Elsevier, 2010. Chapter 69, Ophthalmology, pages 859-876
Jacobs MD, Deborah. www.UpToDate.com, Conjunctivitis. January 2011.

Allergic Conjunctivitis



http://www.uptodate.com



http://20-20-24-7.com/2011/05/is-it-pink-eye-or-allergies-2/

Diagnosis/Description of Condition

- Ocular allergy is estimated to affect 20% of the population on an annual basis
- Does not threaten vision
- Itching, tearing, conjunctival edema, watery discharge, burning, photophobia, eyelid edema.
- Itching is what predominates when compared to other forms of conjunctivitis.

Recommended Treatment

- Strict instructions to not rub eyes, as this can cause further mast cell degranulation and worsening of symptoms.
- Artificial tears and cool compresses
- Topical antihistamines for symptom relief.

Recommended Follow-Up/Consultation

- May follow up electively with PMD
- If symptoms severe or persistent, consider referral to ophthalmology

Marx, Hockberger, Walls. Rosen's Emergency Medicine 7th Edition. Elsevier, 2010. Chapter 69, Ophthalmology, pages 859-876
Jacobs MD, Deborah. www.UpToDate.com, Conjunctivitis. January 2011.