Chapter 2
Eye Issues

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2.1 Introduction

Ophthalmologic symptoms are frequent chief complaints in both the primary care office and emergency department settings [1]. While the majority of patients presenting with these symptoms will have a self-limiting etiology, rapidly sight-threatening diagnoses are on the differential, and the clinician must maintain a high degree of vigilance to properly rule out these conditions.

2.2 Differential Diagnosis

- Eyelid/periorbital conditions
  - Blepharitis
  - Hordeolum
  - Chalazion
  - Dacryoadenitis
  - Dacryocystitis
  - Periorbital (preseptal cellulitis)
  - Orbital cellulitis

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- Red/painful eye
  - Traumatic
    - Globe rupture
    - Hyphema
    - Subconjunctival hemorrhage
    - Corneal abrasions
    - Corneal foreign bodies
    - Chemical burns
  - Atraumatic
    - Acute angle-closure glaucoma
    - Conjunctivitis
    - Dry eye (keratoconjunctivitis sicca)
    - Episcleritis
    - Corneal ulcer
    - Scleritis
    - Keratitis
    - Corneal ulcer
    - Iritis
    - Pterygium

2.3 History

A full ophthalmologic history should be obtained in all patients with ocular/periorbital complaints, with particular attention to use of contact lenses and surgical history. Key components of the general medical history include the use of any anticoagulants and the presence of systemic disease with potential ocular manifestations, such as sarcoidosis, HIV, TB, and rheumatoid arthritis.

A history of sudden vision loss or decrease should prompt emergent specialist consultation. A description of a curtain or veil being pulled across the visual field, as well as new onset or worsening floaters, suggests a retinal detachment. Sudden visual loss, particularly in a patient with atrial fibrillation or other cerebrovascular accident risk factors, suggests a central retinal artery occlusion. Vitreous hemorrhage and central retinal vein occlusion may also result in abrupt, painless vision loss.

- Other important historical features to elicit include:
  - Diplopia
  - Discharge
    - Amount
    - Consistency
    - Worsening in AM

- Discomfort
  - Aggravation of symptoms with blinking
  - Foreign body sensation
  - Itching
- Exposures
  - Chemical
    - *Red flag: Alkali and other caustic exposures
  - UV light (including skiing/high altitudes, welding)
- Genitourinary symptoms may suggest chlamydial or gonorrheal disease
- Trauma
- Upper respiratory infection symptoms
- Vomiting
  - *Red flag: Highly suspicious for angle-closure glaucoma if associated with visual disturbance and/or red eye

2.4 Physical Exam

Visual acuity is the vital sign of the eye and should be assessed in any patient presenting with an ocular complaint. If the patient's prescribed glasses are not at bedside, visual acuity measured through a pinhole will suffice [1]. An orderly progression through the physical examination of the periorbital region and the eye can then ensue as outlined below.

Pitfall: Following a traumatic injury, the integrity of the globe must immediately be assessed. The presence of pupillary irregularity (particularly a teardrop-shaped pupil), a corneal or scleral laceration, a positive Seidel's test, or a flat anterior chamber should prompt cessation of any further manipulation of the globe and immediate ophthalmology consultation.

Periorbital Exam

- Discharge
  - *Red flag: Copious purulent discharge in patients with risk factors for sexually transmitted diseases (gonorrheal conjunctivitis)
- Edema
- Erythema
- Papular lesions (i.e., hordeolum, chalazion)
- Proptosis
  - *Red flag: Proptosis is associated with retrobulbar hemorrhage (particularly in the setting of trauma), orbital cellulitis, cavernous sinus thrombosis, and malignancy.

- Vesicular rash (HSV, VZV)
  - *Red flag: Hutchinson's sign, a vesicular lesion on the tip of the nose, is highly associated with herpes zoster ophthalmicus.

Extraocular Movements

- *Red flag: Restriction of movement is associated with orbital cellulitis, traumatic entrapment, or cranial nerve palsies.

Conjunctival and Scleral Evaluation

- Conjunctival injection
- Chemosis
- Foreign bodies
- Laceration (*red flag for globe rupture)
- Scleral injection
- Subconjunctival hemorrhage

Pupil Exam

- Photophobia
- Reactivity
  - Assess for an afferent pupillary defect (Marcus Gunn pupil). A defect is present if the affected eye dilates in response to direct light and constricts in response to consensual light. Conditions affecting the retina, optic nerve, optic chiasm, and optic tract may result in this finding [2].
  - Shape
    - *Red flag: An irregularly shaped pupil, particularly a teardrop shape, strongly suggests globe rupture.
- Size
  - Subtle (<1 mm discrepancy) anisocoria is physiologic in approximately 20 % of patients, but may also result from third nerve palsy due to uncal herniation, Horner's syndrome, medications, and direct trauma [1].

Corneal Examination

- Fluorescein uptake
  - Abrasions
  - Dendritic lesions
    - *Red flag for HSV ophthalmicus
  - Seidel's sign (dye streaming from injury site)
    - *Red flag for globe rupture
- Foreign bodies
- Ulcer

Intraocular Pressure

- Normal 10–20 mmHg
  - *Red flag: Increased intraocular pressure suggests acute angle-closure glaucoma in the appropriate clinical scenario.
- Pitfall: Do not attempt to measure intraocular pressure if there is any concern for globe rupture.
- Pitfall: Falsely elevated pressure may result if any pressure is placed on globe by examiner during measurement.

Slit-Lamp Examination

- Cell and flare (the presence of white blood cells and protein in the anterior chamber) suggest iritis.
- Depth of the anterior chamber.

Funduscopic Exam Red Flags

- Papilledema
- Retinal detachment
- Retinal hemorrhage
- Retinal pallor
  - *Red flag for central retinal artery occlusion (particularly if associated with "cherry red spot")
- Pitfall: In general, a dilated exam should only be performed by an ophthalmologist. Do not dilate if any concern for acute angle-closure glaucoma.

2.5 Specific Conditions and Their Management

2.5.1 Eyelid/Periorbital Conditions

Blepharitis

- Acute or chronic inflammation of the hair follicles at the lid margin, commonly associated with staphylococcal infection, is termed blepharitis.
- Characterized by edema, erythema, pruritus, discharge, and crusting of the lid margin.
- Conjunctival injection may be present.
- Symptoms are typically most severe in the morning.
- Application of warm compresses and gentle cleaning with shampoo are typically effective.
  - In refractory cases, the use of topical antibiotics can be considered [3–5].

Hordeolum

- A hordeolum is an eyelid mass resulting from acute bacterial infection.
- An external hordeolum, commonly referred to as a stye, is a lesion originating from the glands of Zeiss or Moll.
- *Staphylococcus aureus* is the most commonly identified pathogen.
- Warm compresses applied several times daily are first line therapy.
- Topical bacitracin can also be considered.
- If persistent despite these measures, patients may be referred to an ophthalmologist for incision and drainage [6].

Chalazion

- Obstruction of a meibomian gland can result in formation of a chronic inflammatory lesion at the lid border termed a chalazion.
- The skin itself is typically normal; however, lid edema and/or a discrete nodular lesion may be noted.
- The presence of pain should suggest an alternative diagnosis.
- Warm compresses can be applied, but the lesions are typically self-limited.
  - Antibiotics are not indicated.
- If large and persistent, incision and drainage by an ophthalmologist can be considered [4, 6].

Dacryoadenitis and Dacryocystitis

- Infection of the lacrimal glands is termed dacryoadenitis, while infection of the lacrimal sac is termed dacryocystitis.
- Patients with dacryoadenitis typically present with abrupt onset eyelid edema, particularly near the upper lid margin.
- Dacryocystitis is typically preceded by an upper respiratory infection with development of erythema and edema just inferior to the medial canthus occurring several days later.
- Fever is typically present.
- With either condition, patients can appear quite ill.
- A variety of pathogens, both viral and bacterial, can be responsible for each.
  - *S. aureus* is the most common bacterial etiology in dacryoadenitis.
  - In neonates, *Streptococcus pneumoniae* is the predominant etiology.
  - *S. aureus* and *Staphylococcus epidermis* are more common in older children and adults.
- Therapy of dacryoadenitis includes parental antibiotics with anti-staphylococcal coverage.
  - MRSA coverage should be added as appropriate based on local susceptibility patterns.
  - Patients with dacryocystitis typically require parenteral antibiotics.
  - Infants in particular require admission to the hospital [6, 7].

Periorbital (Preseptal) and Orbital Cellulitis

- Cellulitis affecting the area surrounding the eye is divided into periorbital (preseptal) or orbital cellulitis depending on the presence of infection posterior to the orbital septum.
- Orbital cellulitis is acutely life- and sight threatening; therefore, differentiating the two entities is crucial.
- Periorbital cellulitis is typically more indolent in development and often preceded by minor skin trauma or a cutaneous facial infection such as a hordeolum.
- Orbital cellulitis is much more commonly abrupt in onset and the result of extension of sinusitis.
- Erythema, edema, and warmth surrounding the affected eye, as well as fever, may be present in both entities.
- The presence of visual changes, proptosis, and restriction of extraocular movement, as well as pain associated with such movement, suggest orbital cellulitis and/or abscess formation.
- If orbital cellulitis is suspected, patients should be emergently evaluated with CT or MRI to establish the presence or absence of inflammatory changes posterior to the orbital septum.
- In a well-appearing patient with periorbital cellulitis, treatment with an oral antibiotic regimen active against both MRSA and *S. pneumoniae* and *Haemophilus influenzae* is appropriate [4].
  - Clindamycin alone or, alternatively, amoxicillin/clavulanate along with sulfamethoxazole/trimethoprim are appropriate choices.
- Patients who do not experience improvement in symptoms within 24 h should be reassessed for evidence of orbital cellulitis.
- Patients with orbital cellulitis require hospital admission, broad-spectrum parenteral antibiotics, and ophthalmology consultation.

2.5.2 Intrinsic Orbit Conditions

2.5.2.1 Traumatic Injuries

Globe Rupture

- A globe rupture should be suspected after any high-impact blunt or penetrating injury to the orbit or periorbital region.
- Other traumatic injuries may coexist depending on the mechanism of injury.
- Eye pain is typically present and visual acuity is typically compromised.
- Globe rupture may be occult, and a low threshold for further evaluation and consultation should be maintained if the diagnosis is suspected despite lack of the cardinal findings noted above.

  - CT of the orbits is the typical next study in such cases.
  - MRI is contraindicated if there is any concern for a metallic foreign body.

- Management includes emergent ophthalmology consultation, broad-spectrum IV antibiotics (e.g., vancomycin and a fourth-generation cephalosporin), and placement of an eye *shield*.
  - No further manipulation of the globe should occur unless undertaken by an ophthalmologist.
  - Provide adequate analgesia and update tetanus immunization status as appropriate.
  - Patients should remain NPO.
  - Elevate the head of the patient's bed and treat any nausea or vomiting to protect against elevation of intraocular pressure.

Hyphema

- Blood in the anterior chamber following a traumatic injury is an indication for urgent ophthalmology evaluation.
- In the interim, patients should be evaluated for evidence of any other traumatic injuries.
- If no contraindication, patients should be advised to sit upright to minimize the opportunity for staining of the cornea.
- Pain control should be administered (avoid topical agents if any suspicion of a globe rupture).
- Due to rebleeding risk, NSAIDs and aspirin are contraindicated.
- Treat nausea and limit potential pupillary accommodation/constriction, which can result in further bleeding, by dimming/reducing ambient light.
- An eye shield can be utilized.

Subconjunctival Hemorrhage

- While the characteristic appearance of extravasated blood associated with a subconjunctival hemorrhage is often alarming to patients, the condition is typically benign.
- Patients may notice this finding after a direct traumatic injury, coughing, or Valsalva. Alternatively, the onset can be spontaneous.
- The presence of pain should prompt a search for an alternative/coexisting diagnosis, particularly in the setting of trauma.
- Evaluate for a corneal abrasion in these patients, and consider the possibility of an open globe injury.
- If the patient is anticoagulated, consider assessment of coagulation parameters.
- Reassurance of patients is indicated, as is counseling that up to 2–3 weeks may be needed for full resorption of the blood [3].

Corneal Abrasions

- Intense pain and photophobia are the most common presenting complaints among patients presenting with corneal abrasions.

- A history of eye trauma immediately preceding the onset of symptoms is often apparent.
- It is crucial to evaluate for more sinister injuries, particularly an open globe or hyphema, in the setting of a significant traumatic mechanism.
- Unfortunately, the physical exam, including measurement of visual acuity, is often limited by the patient's presenting symptoms.
- If there is no evidence of an open globe, a dose of topical anesthetic (i.e., proparacaine 0.5 %) should be administered and will provide near immediate relief.
  - Despite their efficacy, continued use of these agents is contraindicated due to concern for epithelial toxicity [8].
- Subsequent fluorescein instillation will allow for enhancement of the abrasion under a Wood's lamp or the cobalt blue filter of an ophthalmoscope or slit lamp.
- The presence of absence of a Seidel sign should be assessed concurrently.
- Eversion of the upper eyelid to evaluate for a retained foreign body is warranted.
- Patients with hypopyon (pus in the anterior chamber), hyphema, or corneal ulceration should be evaluated by an ophthalmologist emergently.
- Urgent referral is warranted for:
  - Patients without healing after 3–4 days
  - Patients with a significant decrease in visual acuity
  - Large abrasions (>1 quarter of the diameter of the cornea)
  - Those with purulent discharge
- Adequate analgesia is important for all patients.
- Most small abrasions will heal completely within 24 h at which time patients should be pain-free.
- In the interim, oral NSAIDs and/or opiate analgesia can be prescribed.
- Topical NSAIDs are also appropriate, although their cost can be significant.
- There is no evidence that patching of abrasions, in particular small lesions, leads to improvement in rate of healing or pain control [9].
- Contact lens wearers should never be patched.
- Larger abrasions require a longer course of oral analgesia.
- An ophthalmologist may consider the use of a cycloplegic agent in such cases.
- Appropriate antibiotic coverage should be administered. In abrasions associated with contact lens use, patients should receive coverage for *Pseudomonas aeruginosa* (e.g., ofloxacin or ciprofloxacin, one to two drops four times daily for 3–5 days).
- Appropriate coverage for others includes polymyxin-trimethoprim or erythromycin ointment (one drop or 0.5 in., respectively, four times daily for 3–5 days).

Corneal Foreign Body

- Corneal foreign bodies characteristically present with severe eye irritation worsened with blinking.
- Conjunctival injection, photophobia, and increased lacrimation are typically also present.

- Evaluate for a ruptured globe prior to any attempt at foreign body removal.
- Following application of topical anesthetic, attempts at foreign body removal can be made with irrigation or use of a moistened cotton swab.
- If unsuccessful, a clinician with experience in corneal foreign body removal with a 25-gauge needle or eye spud under magnification can make an additional attempt.
- Metallic foreign bodies present for more than several hours can result in formation of a rust ring.
  - If such a ring is noted following foreign body removal, the patient should be referred to an ophthalmologist within the next several days.
  - There is no need for emergent rust ring removal provided prompt ophthalmology follow-up is available.
- Urgent ophthalmology consultation is indicated for patients with foreign bodies which cannot be easily removed.
- All patients should be referred to ophthalmology on an outpatient basis to evaluate for delayed presentation of infection.
- Provide oral analgesia and topical antibiotics as would be given for patient with a corneal abrasion [5, 10].

Chemical Burns

- Any exposure of the globe to caustic material is a true ophthalmic emergency.
- Alkali exposures are particularly dangerous as they result in liquefactive necrosis, which results in a deeper progression of damage compared with the coagulation necrosis caused by acidic substances.
- The initial treatment for all chemical burns is copious irrigation with normal saline, preferably via a Morgan lens.
  - Do not delay irrigation to obtain visual acuity or other testing.
  - Following 30 min of irrigation, ocular pH should be checked.
  - Continue irrigation until the eye has maintained a pH of 7.0 for at least 30 min.
  - It is prudent to evert the eyelid to evaluate for the possibility of retained or crystallized particulate matter, which may result in persistent difficulties in achieving a neutral pH.
- Immediate ophthalmology consultation is indicated in all cases of caustic exposure [5, 11].

2.5.3 Atraumatic Conditions

2.5.3.1 Acute Angle-Closure Glaucoma

- An abrupt increase in intraocular pressure can result from impaired drainage of aqueous humor in anatomically predisposed individuals (typically patients with hyperopia).
  - Typical precipitants include dim lighting and medications with the side effect of pupillary dilatation (e.g., anticholinergics).

- This pressure increase can be acutely sight threatening and demands emergent reversal.
- Symptoms include blurred vision, visualization of colored halos near lights, nausea, vomiting, frontal headache, and severe eye pain.
- On physical exam, conjunctival injection, a fixed mid-dilated pupil, and a hazy cornea may be appreciated.
- If available, tonometry should be conducted by the clinician; if unavailable, emergent referral to an ophthalmologist is indicated.
  - Intraocular pressure is typically >30 mmHg.
- Pending ophthalmological evaluation, systemic acetazolamide can be given as well as consideration of topical timolol, apraclonidine, and/or pilocarpine.
- Laser peripheral iridotomy is the typical definitive treatment [11].

2.5.3.2 Conjunctivitis

Viral

- Viral conjunctivitis is the most common cause of a red eye [12], although bacterial infection and allergic mechanisms are also commonly responsible.
- Discerning the etiology responsible for a specific case of conjunctivitis can be difficult. Inflammation of the conjunctiva almost universally results in redness and discharge of the affected eye(s), as well as closure of the eyes upon awakening, regardless of etiology.
- Itching of the eyes in the setting of other conjunctivitis symptoms is a distinguishing factor implicating an allergic etiology.

Bacterial

- Bacterial infection is more common in children than adults.
- Concomitant or preceding upper respiratory infection symptoms suggest adenoviral conjunctivitis.
- Clinicians should be vigilant in performing an orderly physical exam in patients with conjunctivitis, with special attention to fluorescein staining to rule out more serious pathology which patients and/or parents will typically ascribe to "pink eye."
- Viral conjunctivitis is most commonly caused by one of many strains of adenovirus, although HSV can cause particularly severe disease as discussed below.
  - Adenoviral conjunctivitis is highly contagious, potentially transmissible up to 2 weeks following onset of symptoms.
  - Strict hand hygiene is therefore indicated.
  - Topical antibiotics are not necessary, as bacterial superinfection is rare and patients can be expected to have spontaneous resolution of symptoms generally within several days, with occasional persistence up to 2 weeks.

- The most common bacterial etiologies are *S. aureus* (particularly in older children and adults), *H. influenzae*, *Streptococcus pneumoniae*, and *Moraxella catarrhalis* predominate in young children [13].
  - Preferred agents for nonusers of contact lenses are erythromycin ointment (0.5 in. applied four times daily) or polymyxin-trimethoprim (one to two drops applied four times daily).
  - A 5–7-day course is typically prescribed.
    - Topical aminoglycosides are generally avoided due to their inherent toxicity to the corneal epithelium and tendency to cause further irritation with prolonged use.
  - The presence of a concomitant acute otitis media, particularly in children, implies *H. influenzae* infection [7].
    - Affected patients should also be treated with systemic antibiotics with activity against this pathogen (i.e., amoxicillin/clavulanate).
- *Pseudomonas* is a common pathogen in contact lens wearers.
- Such patients are also at high risk of corneal ulceration and keratitis, and a thorough evaluation for these conditions is indicated, as their presence necessitates prompt ophthalmology consultation.
  - In the absence of these findings, management in contact lens users typically employs topical fluoroquinolones.
- Patients should be advised to discard the lenses they were using just prior to symptom development and to avoid use of any lens until cleared to do so by an ophthalmologist.
- If there is no improvement in symptoms after 12–24 h of treatment, urgent ophthalmology referral is indicated.
- Chlamydial conjunctivitis should be suspected in at-risk patients refractory to standard bacterial conjunctivitis treatment.
  - Infection occurs through contact either directly from the genitalia or via the hands.
  - Symptoms of coexisting genital tract disease are variably present.
  - Systemic therapy (azithromycin 1 g PO × 1 or doxycycline 100 mg PO bid × 14 days) to clear the genital infection as well as topical therapy (e.g., erythromycin) should be administered.
  - Sexual contacts should also be tested and treated [3, 12].
- Hyperacute bacterial conjunctivitis, typically associated with *Neisseria gonorrhoeae*, is often heralded by a very abrupt onset of copious discharge from the affected eye(s) after introduction of the pathogen (≤12 h).
  - Spread is similar to that noted with chlamydial disease.
  - Urethritis symptoms are often present.
  - Cultures should be obtained and topical antibiotics (e.g., erythromycin) as well as systemic ceftriaxone (1 g IM) administered.
  - Due to the high risk of complications including corneal perforation and blindness, immediate ophthalmology consultation is warranted [12].

- Children born in US hospitals typically receive erythromycin ointment immediately after birth to reduce the likelihood of gonococcal ophthalmia neonatorum.
  - This condition most commonly presents during the first week of life with the onset of copious purulent eye discharge and conjunctival erythema.
  - Patients may present overtly septic due to disseminated infection.
  - Systemic ceftriaxone should be administered and patients admitted to the hospital with emergent ophthalmology consultation.
  - Chlamydia conjunctivitis typically presents somewhat later than gonorrhea (days 5–14).
  - Pneumonia is commonly associated.
  - Oral and topical erythromycin should be administered and prompt ophthalmology consultation obtained.
  - If untreated, corneal scarring can result [14].

Allergic

- Allergic conjunctivitis can be caused by environmental allergens such as pollen as well as through contact with irritating topical medications.
- In addition to the general supportive care recommended for all patients with conjunctivitis, topical and/or systemic antihistamines and a topical vasoconstrictor can be utilized.
- However, identification and avoidance of possible triggers are absolutely indicated.

Corneal Ulcer

- A deep infection of the cornea secondary to epithelial disruption due to direct bacterial invasion, trauma, or sloughing of cells due to dessication (such as with incomplete lid closure due to Bell's palsy) is termed a corneal ulcer.
- Soft contact lens wearers are at particularly high risk.
- Pain, photophobia, and foreign body sensation are typical symptoms.
- An area of white discoloration of the cornea is often appreciated; the lesion will enhance with fluorescein under a Wood's lamp.
- *P. aeruginosa* is of particular concern in contact lens wearers, while *S. pneumoniae* and *S. aureus* are typical culprits in other patients.
- Urgent ophthalmology consultation is indicated.
- A topical fluoroquinolone, with very frequent application, is typically prescribed following culture of the lesion [5, 14].

Episcleritis and Scleritis

- Differentiating episcleritis from scleritis is key, as the former is a generally benign condition, while the latter (which can also affect deeper structures of the globe) is potentially sight threatening.
- Features of episcleritis include onset of excessive lacrimation, irritation, and eye redness which typically only affect a segment of the globe.
- This stands in contrast to the more diffuse redness associated with conjunctivitis.
- Scleritis is typically associated with severe pain, an important distinguishing feature from the "grittiness" or mild irritation patients with episcleritis may report.

- Scleritis is often associated with systemic disease, specifically, rheumatoid arthritis and Wegener's granulomatosis.
- If scleritis is suspected, urgent referral to ophthalmology is warranted.
- Treatment typically consists of systemic NSAIDs, glucocorticoids, or other immunosuppressants [15].
- Although episcleritis is typically self-limited, topical lubricants, with or without topical NSAIDs, are often employed for symptomatic relief.

2.5.3.3 Keratitis

Herpetic

- Pitfalls: Only ophthalmologists should prescribe topical ophthalmic steroids. In the case of herpes simplex virus infection, topical steroid use can result in deeper involvement of eye structures and permanent visual impairment.
- Inflammation of the cornea is termed keratitis.
- Patients commonly present with severe pain, photophobia, and eye redness.
- Herpes simplex virus (typically reactivation rather than primary infection) is the most common cause; however, other viruses, bacteria, UV radiation, and incomplete closure of the eyelid, such as with Bell's palsy, are also responsible.
- Contact lens wearers are at increased risk due to *P. aeruginosa*. Herpes simplex infection involving the cornea is associated with ulceration and a characteristic dendritic pattern noted on fluorescein staining.
- Typical herpetic lesions may be present on the conjunctiva and eyelids.
- Treatment includes topical antivirals (e.g., trifluridine 1% nine times daily). Patients with bacterial or viral keratitis should be seen by an ophthalmologist on a same day basis [5, 14].

UV Keratitis

- Associated with welding, skiing, and high-altitude exposure.
- Symptom onset is typically within 6–12 h of the insult.
- Avoidance of triggers and use of eye protection should be advised.
- Oral analgesia should be prescribed and the patient referred for outpatient ophthalmology follow-up.
- Pitfalls: Beware of the possibility of topical anesthetic abuse among patients with frequent exposure to insults which result in UV keratitis. Never prescribe topical anesthetic drops given the potential for corneal epithelial toxicity.

Iritis

- Iritis is commonly associated with infectious and systemic diseases such as herpes viruses, tuberculosis, syphilis, spondylarthritides, and sarcoidosis.
- Traumatic injuries may also be causative.

- The pupil is typically constricted and sluggishly reactive.
- Symptoms include pain, blurred vision, and conjunctival injection.
- Eye discharge is typically scant if present.
- A key exam finding is consensual photophobia (pain when light is exposed to the unaffected eye due to constriction of the iris).
- On slit-lamp examination, a "cell and flare" pattern due to the presence of white blood cells and proteinaceous material in the anterior chamber may be noted.
- In more severe infection, white blood cells may settle in the anterior chamber resulting in accumulation of a hypopyon.
- Sequelae of the diagnosis include glaucoma and cataract formation.
- Urgent ophthalmology consultation is warranted.

Herpes Zoster Ophthalmicus

- Herpes zoster ophthalmicus refers to reactivation of latent varicella zoster virus in the ophthalmic division of cranial nerve V.
- Patients often experience a prodrome of fatigue as well as pain affecting the dermatome in the days prior to onset of rash.
- Hutchinson's sign, the presence of vesicles on the tip of the nose, is associated with a higher likelihood of ocular involvement.
- Ocular manifestations can include blepharitis, conjunctivitis, keratitis, scleritis, iritis, retinitis, and optic neuritis.
- Management includes urgent ophthalmology consultation if there is any evidence of ocular involvement and administration of systemic antivirals (e.g., acyclovir 800 mg PO five times daily for 7–10 days).
- Antivirals are of most use when started within 72 h of onset of rash.
- Adequate analgesia should also be administered.
- Hospitalization and IV antivirals should be considered for the immunocompromised and those with severe disease (i.e., retinitis) [16].

Pterygium

- A wedge-shaped proliferation of conjunctival tissue which extends onto the cornea is termed a pterygium.
- The pathogenesis is unclear; however, excessive exposure to UV radiation is a known risk factor.
- The symptoms are typically slowly progressive and the lesion itself painless.
- However, patients may present due to cosmetic concerns, eye irritation, and potentially visual loss due to covering of the visual axis or induced astigmatism is possible.
- Patients with eye irritation should be counseled to use eye lubrication.
- In the event of visual disturbance, non-emergent ophthalmological referral is appropriate for consideration of removal [12].

References

1. Robinett DA, Kahn JH. The physical examination of the eye. Emerg Med Clin N Am. 2008;26:1–16.
2. Duong DK, Leo MM, Mitchell EL. Neuro-ophthalmology. Emerg Med Clin N Am. 2008;26:137–80.
3. Cronau H, Kankanala RR, Mauger T. Diagnosis and management of red eye in primary care. Am Fam Physician. 2010;81:137–44.
4. Carlisle RT, DiGiovanni J. Differential diagnosis of the swollen red eyelid. Am Fam Physician. 2015;92:106–12.
5. Wirbelauer C. Management of the red eye for the primary care physician. Am J Med. 2006;119:302–6.
6. Wald ER. Periorbital and orbital infections. Infect Dis Clin N Am. 2007;21:393–408.
7. Sethuraman U, Kamat D. The red eye: evaluation and management. Clin Peds. 2009;48: 588–600.
8. Yagci A, Bozkurt B, Egrilmez S, Palamar M, Ozturk BT, Pekel H. Topical anesthetic abuse keratopathy: a commonly overlooked health care problem. Cornea. 2011;30:571–5.
9. Turner A, Rabiu M. Patching for corneal abrasion. Cochrane Database Syst Rev. 2006;7:CD004764.
10. Wipperman JL, Dorsch JN. Evaluation and management of corneal abrasions. Am Fam Physician. 2013;87:114–20.
11. Pokhrel PK, Loftus SA. Ocular emergencies. Am Fam Physician. 2007;76:829–36.
12. Leibowitz HM. The red eye. N Engl J Med. 2000;343:345–51.
13. Hovding G. Acute bacterial conjunctivitis. Acta Ophthalmol. 2008;86:5–17.
14. Deibel JP, Cowling K. Ocular inflammation and infection. Emerg Med Clin N Am. 2013;31:387–97.
15. Okhravi N, Odufuwa B, McCluskey P, Lightman S. Scleritis. Surv Ophthalmol. 2005;50: 351–63.
16. Shaikh SA, Ta CN. Evaluation and management of herpes zoster ophthalmicus. Am Fam Physician. 2002;66:1723–30.