

REVIEW ARTICLE

Primary Care Approach to Eye Conditions

Sharanjit Kaur, DO¹; Helaine Larsen, DO¹; Alanna Nattis, DO²

¹Good Samaritan Hospital Medical Center, Family Medicine, West Islip, NY

²Lindershurst Eye Physicians and Surgeons, PC, West Islip, NY

KEYWORDS:

Acute Angle-Closure
Glaucoma

Chemical Burns

Conjunctivitis

Red Eye

Retinal Detachment

ABSTRACT: Many patients present to the primary care physician with complaints relating to the eye. While many are benign, others can be vision threatening. Performing a thorough history and physical can quickly assess the severity. More common, often benign conditions include conjunctivitis, keratoconjunctivitis sicca, blepharitis, subconjunctival hemorrhage, corneal abrasion, stye, chalazion, ectropion, entropion and episcleritis. Other more complex conditions include ptosis and cataracts. Vision-threatening conditions including uveitis, malignancies, retinal detachment, acute angle closure glaucoma, globe injuries and chemical burns require immediate recognition and referral to an ophthalmologist.

INTRODUCTION

Eye-related complaints make up 2-3% of primary care office visits.¹ Knowledge of how to respond when these patients present is fundamental for the family physician, as is recognizing when to refer to an ophthalmologist for further care. Family physicians should be able to recognize eye conditions that can lead to visual loss, therefore requiring urgent referral to the ophthalmologist.² A thorough history and physical is core in making a diagnosis and determining the urgency of the eye condition. History should focus on visual changes, duration of symptoms, presence or absence of a foreign body, history of trauma or recent eye surgery, and associated symptoms, such as a headache, nausea or ocular discharge. Nearly half of the eye problems that present to the family physician include conjunctivitis, keratoconjunctivitis sicca, and corneal abrasions.³ More severe conditions include retinal detachment, acute angle closure glaucoma, mechanical globe injuries and chemical injuries.⁴ Basic equipment such as a Snellen chart, a tonometer, a penlight, an ophthalmoscope, dilating drops and fluorescein stain are available to the primary care physician to aid in achieving the correct the diagnosis.

HISTORY AND PHYSICAL EXAMINATION

Initial evaluation should consist of questions relating to vision loss or change, foreign body sensation, photophobia and headache. If a patient complains of a foreign body sensation then corneal abrasion, retained foreign body or keratitis should be part of the differential diagnosis. A sandy sensation is often associated with keratoconjunctivitis sicca, blepharitis, or dry eye syndrome.¹ A

thorough history of contact lenses use should be obtained focusing on the wearing schedule, overnight use, hygiene protocol, and swimming or showering while wearing a contact lens to rule out a corneal ulcer. If a patient is complaining of photophobia, it could be a sign of corneal involvement. A headache with associated eye pain points toward the diagnoses of acute angle-closure glaucoma, cluster headaches, iritis, and migraines.¹ When symptoms recur, a systemic inflammatory disease should be considered.

Comprehension of basic eye anatomy is pivotal for the primary care physician in order to perform a detailed and complete physical exam. The primary care physician should inspect the eyelid and sclera for inflammation, abrasions, hemorrhage, erythema or lesions. The upper eyelid should be evaluated and everted if corneal abrasion or retained foreign body is suspected. The eyelid and the periorbital region should be examined for rashes or vesicles.

Additionally, Woods Lamp can be utilized to evaluate for corneal abrasion or foreign body.² The conjunctiva should be evaluated for injection, which is indicative of inflammation or infection.¹ All patients complaining of eye pain should be assessed for visual disturbances (*Table 1*). A Snellen chart should be used to assess visual acuity, having the patient read from a distance of 20 feet. Limitation of ocular motility should be ruled out by performing an exam of extraocular muscle function.

COMMON EYE CONDITIONS

One of the most common ophthalmologic diagnoses seen by the primary care physician is conjunctivitis.³ The major causes of conjunctivitis can be divided between noninfectious and infectious.⁵ (*Table 2*) Noninfectious causes include allergic, exposure, blepharitis, foreign body, subconjunctival hemorrhage, iritis, chemical burns,

CORRESPONDENCE:

Sharanjit Kaur, DO | skaur6103@yahoo.com

and corneal abrasions.⁵ Other conditions commonly seen in the primary care setting include strabismus, uveitis, carcinomas, entropion, ectropion, pterygium, sty, and chalazion (*Table 3*).

EVALUATION AND MANAGEMENT OF COMMON OCULAR CONDITIONS

Viral conjunctivitis is most commonly caused by adenovirus and herpes, the former being highly contagious. Viral conjunctivitis is often associated with an upper respiratory infection and other

generalized systemic symptoms such as a sore throat, fever, and headache.^{3,5,6} Symptoms of adenoviral conjunctivitis include eye redness, lacrimation, watery discharge and blurred vision. These symptoms are usually mild and often self-limiting after one to two weeks. The treatment is often supportive care with cold compresses and artificial tears. Since viral conjunctivitis is easily transmissible, it is imperative to educate patients regarding strict hand and contact lens hygiene as well as the avoidance of sharing personal objects until their symptoms resolve completely. The primary care physician should refer the patient

TABLE 1:

Different causes of eye pain^{3,6}

HISTORY	CAUSES
Photophobia	Keratitis, corneal abrasion, acute angle-closure glaucoma, migraine
Headache	Acute angle-closure glaucoma, migraine
Decreased vision	Optic neuritis, uveitis, cellulitis
Contact lens use	Corneal abrasion, keratitis, bacterial conjunctivitis, corneal ulcer
Foreign body sensation	Corneal abrasion, dry eye, keratitis, foreign body

TABLE 2:

Major causes of conjunctivitis^{3,6,16}

CONJUNCTIVITIS	MOST COMMON CAUSES	SIGNS	SYMPTOMS
Viral	Adenovirus (most common), Herpes Simplex Virus, enterovirus, Coxsackievirus	Diffuse conjunctival injections, preauricular lymphadenopathy, lymphoid follicle on the eyelid	Mild to no pain, occasional discomfort with mild itching, watery or serous discharge, often starts of unilateral
Herpes zoster	Herpes zoster	Vesicular rash, uveitis, keratitis	Pain and tingling sensation precedes rash and conjunctivitis, unilateral
Bacterial: acute and chronic	Common pathogens (children): Streptococcus pneumonia (adults) Staphylococcus aureus	Edema, conjunctival injections	Mild pain, red eye with foreign body sensation, mild purulent discharge, bilateral glued eyes upon awakening
Bacterial: hyperacute	N. gonorrhoeae	Chemosis, possible corneal involvement	Severe pain, diminished vision, purulent discharge
Allergic (Figure 1)	Allergens	Conjunctival injection, cobblestone papillae under upper eyelid	Bilateral involvement, tearing, itching, watery discharge

to an ophthalmologist if the patient's symptoms do not resolve after a total of 10 days or if there is any suspicion of corneal involvement.^{3,6}

Bacterial conjunctivitis is also highly contagious and usually spreads through direct contact with contaminated fingers. Bacterial conjunctivitis is usually unilateral and can be classified as hyperacute, acute or chronic. It usually consists of a greater amount of discharge and lid swelling than viral conjunctivitis. *Neisseria gonorrhoeae* is an important cause of hyperacute conjunctivitis. Those at risk include newborns who acquire the infection during delivery and young adults who acquire the infection during sexual activity.⁶ The infection is usually sudden in onset and is characterized by copious, purulent discharge and severe pain. Patients also complain of some vision loss in the affected eye. Patients with a suspected diagnosis of *Neisseria conjunctivitis* should be referred to an ophthalmologist for aggressive management as it can quickly lead to vision loss secondary to corneal ulceration and perforation. Acute bacterial

conjunctivitis has the classic symptoms of discomfort, blurry vision, and mucopurulent secretions with "sticky" eyelids upon awakening.^{3,6} Symptoms usually last for less than seven days.

Staphylococcus aureus and *Staphylococcus epidermidis* are common etiologies of conjunctivitis in adults, while *Streptococcus pneumoniae* and *Haemophilus influenzae* tend to affect children.⁶ There are various antibiotic eye drops available for treatment, and they are generally well tolerated (*Table 4*). Chronic bacterial conjunctivitis occurs when symptoms last longer than four weeks with frequent relapses. The patient complains of sore eyelids and ocular discomfort with little discharge. Upon examination, the eyelids appear thickened, slightly inflamed and crusty.^{3,6} The conjunctiva may appear normal or slightly erythematous. Bacterial culture is usually needed to identify the organism responsible for patients with chronic bacterial conjunctivitis.⁵ Patients with this diagnosis typically require referral to an ophthalmologist for further management.

TABLE 3:

Common eye conditions⁹

CONDITION	SIGNS	SYMPTOMS	TESTS	TREATMENT
Entropion	An in-turned lower lid margin	Irritation, burning and foreign body sensation. Tearing results from lashes abrading the globe	Clinical diagnosis	Manually tape the lid away from the globe. Botulinum toxin injection Surgery is performed to correct the abnormality
Ectropion	An out-turned lower lid margin	Irritation, burning, and foreign body sensation. Tearing results from punctal malposition	Clinical diagnosis	Artificial tears, gel or ointment for lubrication Surgery is performed to correct the abnormality
Stye (Figure 2)	A painful, erythematous nodule on the skin surface or conjunctival surface of the lid	Painful nodule or pustule of the eyelid	Clinical diagnosis	Warm compresses and topical antibiotics drops (fluoroquinolones or polytrim) Incision and drainage if compresses and antibiotics fail
Chalazion (Figure 3)	A firm well demarcated nodule below the lid margin	Usually symptom free or minimally tender nodule of the lid	Clinical diagnosis	Early: warm compresses Intermediate: injection of triamcinolone Late: marsupialization of encysted meibomian gland
Pterygium	Fibrovascular growth extending from the conjunctiva onto the cornea	Symptom free Intermittent irritation, redness, mild visual disturbance	Clinical diagnosis	Artificial tears for lubrication Sunglasses to block UV light Surgical resection
Floppy eyelid syndrome	Usually unilateral or asymmetric	Irritation, burning, foreign body sensation and discharge	Clinical diagnosis	A fox shield is taped over the eye at night to prevent the lid rubbing on the pillow Surgery is necessary to tighten the upper and lower lids horizontally
Contact dermatitis	Acute: erythema and edema of the eyelid Chronic: scaling and lichenification	Generalized pruritis or painful eyelid	A thorough history of exposure Patch testing may be needed	Advised to avoid contact with suspected cause A topical corticosteroid such as fluorometholone 0.1% ophthalmic ointment

Chlamydial conjunctivitis is often seen in young sexually active adults. It presents very similarly to acute bacterial conjunctivitis, though it may be seen as smoldering chronic conjunctivitis in some cases. The common symptoms include ocular irritation, scant mucopurulent discharge, glued eyelids upon awakening and blurred vision. Patients do not respond well or fully to typical antibiotics that are prescribed for acute bacterial conjunctivitis. Bacterial culture (Giemsa stain) and ELISA testing can reveal the diagnosis of Chlamydial conjunctivitis. Treatment includes erythromycin ophthalmic ointment and oral therapy with azithromycin (single one gram dose) or doxycycline (100 mg twice a day for 14 days) to clear the infection. The patient's sexual partner should also be treated to prevent further infections and reinfection.^{3,6}

TABLE 4:

Common ophthalmic antibiotics for acute bacterial conjunctivitis^{3,5,6,16}

Trimethoprim/polymyxin B
Ofloxacin 0.3%
Azithromycin 1%
Besifloxacin 0.6%
Ciprofloxacin 0.3%
Erythromycin 0.5%
Levofloxacin 1.5%
Gentamicin 0.3%
Sulfacetamide 10%

Allergic conjunctivitis is seen in patients with an atopic disease, such as allergic rhinitis, eczema and asthma. Seasonal allergic conjunctivitis is often the most common type and it is related to specific environmental allergens. Symptoms include bilateral eye lacrimation, itching, and diffuse erythema (*Figure 1*). Visual acuity is preserved and there is no corneal involvement. Large cobblestone papillae under the eyelid and chemosis may be present in severe cases.⁷ The primary care physician should educate the patient to avoid allergens and not to rub their eyes as this can worsen the condition. Over-the-counter oral antihistamines and topical histamine H1-Receptor antagonists can help alleviate symptoms. Acute allergic conjunctivitis is often self-limiting.^{3,6}

Chronic allergic conjunctivitis, often referred to as vernal keratoconjunctivitis, is usually seen in patients age 3-25 years, with a history of asthma or eczema. It presents with chronic itching, photophobia, blurred vision, discoloration of the periorbital area and a thick, clear, stringy discharge. Everting the eyelids may reveal large flat papillae in severe cases of giant papillary allergic conjunctivitis. If the cornea appears hazy, ulcerated or symptoms fail to improve, the patient should be referred to an ophthalmologist for treatment.^{3,6,7}

Keratoconjunctivitis sicca or dry eye is a condition caused by decreased tear production or poor tear quality. Some risk factors for the condition include advanced age, female sex, autoimmune conditions such as rheumatoid arthritis and Sjogren's syndrome,

FIGURE 1:

Allergic conjunctivitis



FIGURE 2:

Stye



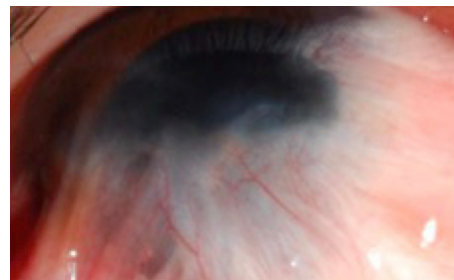
FIGURE 3:

Chalazion



FIGURE 4:

Ocular surface burn with scar



as well as certain medications such as anticholinergics.⁷ Diagnosis is usually made clinically, but certain diagnostic testing (i.e., tear osmolarity, tear break up time, and corneal fluorescein staining) can be used to facilitate the diagnosis.³ Treatment can be initiated based on signs and symptoms. Treatment initially includes frequent use of artificial tears throughout the day and nightly application of lubricant ointments. Use of a humidifier

can also help decrease tear loss. If artificial tears and humidifiers are not efficacious, cyclosporine ophthalmic drops (Restasis®, Allergan, Dublin, Ireland) or lifitegrast ophthalmic solution (Xiidra, Shire, Lexington, MA) may be used to increase tear production. Topical corticosteroids may also help in severe cases of dry eye. In general, if treatment beyond lubricants proves ineffective, the dry eye, the patient should be referred to an ophthalmologist.^{3,7}

Blepharitis is a chronic inflammatory condition of the eyelid margins. If blepharitis is suspected, the patient should be evaluated for seborrheic dermatitis that is associated with scalp or facial flaking, as well as rosacea, which is associated with redness and swelling on the nose or cheeks.³ The diagnosis of blepharitis is a clinical one. Treatment is supportive care such as eyelid hygiene, lid massage and warm compresses. When a patient does not respond to supportive care, topical erythromycin or bacitracin ophthalmic ointment can be used. In severe cases, oral antibiotics such as doxycycline or tetracycline may be considered.⁷

A corneal abrasion is a clinical diagnosis. Confirmatory tests such as fluorescein staining or Wood's lamp can be used.⁸ A blanching pattern of staining suggests an abrasion or herpes virus (herpes simplex (HSV) or herpes zoster (HZV) infection. If corneal HSV or HZV is suspected, the patient should be referred to an ophthalmologist for appropriate treatment.³ In the case of a corneal abrasion, the primary care physician should also check for foreign bodies under eyelids and in the conjunctival fornices. Treatment consists of antibiotic eye drops and/or ointment to prevent infection, supportive care, cycloplegics and pain control.⁷ Steroids are contraindicated in corneal abrasions. If symptoms do not improve within 48 hours, the patient should be referred to an ophthalmologist.⁸

A subconjunctival hemorrhage occurs when a conjunctival blood vessel ruptures. It appears as a bright red patch in the subconjunctival space of the eye.² Subconjunctival hemorrhage is a clinical diagnosis and it is harmless and often requires no treatment. Supportive care with warm compresses and lubricants are the treatments of choice.² If pain is present, this should raise suspicion for foreign body and/or corneal involvement. Ophthalmologist referral is warranted if there is corneal involvement, history of blunt trauma, drainage, or persistent pain.³

Episcleritis is an inflammation of the superficial layers of episclera. It usually self-limited and resolves after two to three weeks. An in-depth investigation is needed if there are recurrent episodes. Treatment consists of supportive care and artificial tears, but in some cases may require a short course of topical steroids.³

Ptosis is defined as a drooping or falling of the upper eyelid. There are many etiologies of ptosis. Congenital ptosis results from a malformed levator muscle, while acquired ptosis may be due to the gradual thinning or disinsertion of the levator aponeurosis. For congenital or acquired ptosis, surgery is performed to tighten the levator aponeurosis or resect the levator muscle. Other important causes of ptosis include Horner's syndrome, third nerve palsy and myasthenia gravis. In patients with Horner's syndrome, the classic triad of miosis, ptosis and anhidrosis is seen.⁹ If a

Horner's syndrome is suspected, urgent referral to a neurologist and ophthalmologist is warranted for workup. In the case of an acute and painful Horner's syndrome, the patient should be sent for urgent neurologic and radiologic evaluation, as this could indicate a carotid dissection. The third (oculomotor) cranial nerve innervates all the extraocular muscles except the lateral rectus and superior oblique. Etiologies of the third nerve palsy include ischemic cranial mononeuropathy, vasculitis, compression of the third nerve by an aneurysm, tumor, or uncal herniation and trauma. Symptoms commonly seen are ptosis, diplopia, periorbital pain and headache. Magnetic resonance imaging of the brain with contrast is required when there is no obvious vascular risk factor. If symptoms are seen in young patients, or there is suspicion for an aneurysm, cerebral angiography may be necessary. Variable ptosis, or ptosis worse at the end of the day may be signs of ocular myasthenia. Myasthenia gravis and its ocular variant are autoimmune disorders of the neuromuscular junction. Patients may note that ptosis and symptoms of weakness improve after rest. A thorough workup including an acetylcholine receptor antibody titer, edrophonium chloride testing, nerve stimulation and chest computed tomography to rule out thymoma should be done. Patients with myasthenia should be referred to neurology for appropriate treatment.⁹

Strabismus can be esotropia or exotropia. Congenital esotropia is rare and occurs before the age of 6 months and accommodative esotropia occurs between two and four years of age.⁹ Double vision and loss of depth perception occur initially. If strabismus is not treated, amblyopia may result which leads to blindness. In esotropia, one or both eyes deviate inward. In exotropia, one or both eyes have deviated outward.⁹ All patients with strabismus should be referred to an ophthalmologist.

Uveitis is an inflammatory condition involving the uveal tract and can be classified as anterior uveitis and posterior. Most cases of anterior uveitis are acute in onset and have an idiopathic origin. The patient usually complains of redness, photophobia and pain. Nonocular symptoms such as back pain, joint stiffness, dysuria can occur if systemic disorders are the cause of uveitis.⁹ On physical exam there is conjunctival injection and deposits on the posterior surface of the cornea. Floating inflammatory cells and protein in the anterior chamber are detectable with the slit lamp biomicroscope. Inflammatory cells are found in the iris surface.⁹ In patients who are experiencing their first episode of unilateral and nongranulomatous anterior uveitis systemic workup is not necessary. Patients with recurrent episodes or bilateral granulomatous disease should have a systemic workup including a CBC, ESR, ANA, Lyme, RPR, and chest x-ray to rule out systemic disease.⁹ Posterior Uveitis is usually acute and most commonly caused by toxoplasmosis.⁹ Patients complain of decreased vision, floaters, redness, pain and photophobia. On physical exam, optic disc swelling and edema are observed. Inflammatory cells within the vitreous are known to cause a hazy view of the fundus of the eye.⁹ Retinal and choroid hemorrhages, exudates, and infiltrates can be noted during slit lamp biomicroscope examination.⁹ All patient with uveitis should be referred to an ophthalmologist within 24 hours.

The primary care physician may see malignant eyelid tumors such as basal cell carcinoma, squamous cell carcinoma and melanoma. Basal cell carcinoma is the most common eyelid malignancy that appears in the lower and medial region and it appears as a pearly nodule.⁹ If the lesion is located along the lid region, then eyelashes may be missing.

Basal cell carcinoma has a low potential to metastasize, but it can become locally invasive.⁹ Surgical resection is the gold standard of treatment.⁹ Options such as cryotherapy and radiation may be considered when surgery is not appropriate. Squamous cell carcinoma is less prevalent but more aggressive when compared to basal cell carcinoma. It is characterized by its erythematous, raised, scaly and central ulceration.⁹ It occurs most frequently on the upper lid.

Actinic Keratosis can be the precursor lesion for this cancer.⁹ The physician should palpate the preauricular and submandibular lymph nodes to detect potential metastases. The gold standard of treatment is surgical resection. Sebaceous carcinoma invades locally and spreads to lymph nodes.⁹ It occurs in middle-aged to elderly patients and may mimic chalazion or blepharitis. It is known to be an aggressive tumor and metastasis to the lungs, liver and bone.⁹ Melanoma is a rare eyelid tumor. When examining the eye, the physician should always evert the eyelid to look for any kind of conjunctival involvement.⁹ If at a point in surveillance there is a change in the general appearance of the lesion, it warrants excisional biopsy of the lesion.

A cataract is a clouding of the eye's crystalline lens, and in most cases is age related. Patients complain of slowly progressive visual loss over months to years. Reduced color perception, monocular diplopia, and night-time glare are also common symptoms.⁹ Cataracts are best evaluated after dilation of the pupil. The treatment of choice is surgical removal of the lens and placement of an intraocular lens implant. Over 1.5 million cataract surgeries are performed annually in the United States. Approximately 99% of patients obtain improved vision and quality of life after cataract surgery.⁹

OCULAR EMERGENCIES

Family physicians should be familiar with common signs and symptoms of some of the most common ocular emergencies. Ocular emergencies, if not recognized early, can lead to permanent vision loss and therefore warrant immediate attention. Some of the ocular emergencies include retinal detachment, acute angle-closure glaucoma, mechanical globe injuries and chemical injuries.^{4,10} Physicians should begin with a thorough eye examination, which includes measurement of visual acuity, visual field testing, direct fundoscopic examination, and penlight examination of the anterior segment of the eye.

Retinal detachment occurs when the neurosensory layer of the retina is separated from the retinal pigment epithelium.⁴ Risk factors include increased age, myopia, traumatic injury, family history, cataract surgery and a previous retinal detachment in

the contralateral eye.¹ Patients with a retinal detachment may experience unilateral flashing lights and floaters in the affected eye. Severe vision loss may occur if the macula is involved in the detachment. If retinal detachment is suspected, the family physician should perform a dilated fundoscopic examination to visualize the detachment. If retinal detachment is suspected, the patient should immediately be referred to an ophthalmologist. Treatment of retinal detachment usually consists of surgery using laser photocoagulation to seal the retinal tear, then reattachment of the retina to the retinal epithelium. Untreated patients can have permanent and severe vision loss. Thus, it is very important for primary care physicians to have a high index of suspicion for retinal detachment based on the patient's signs and symptoms.^{4,10}

A patient with unilateral eye pain and associated symptoms of a headache, nausea, vomiting should be considered to have acute angle-closure glaucoma until proven otherwise. Acute angle-closure glaucoma is a medical emergency in which the intraocular pressure rises rapidly, potentially leading to permanent vision loss within hours.¹¹ Risk factors associated with angle-closure glaucoma include older age, female sex, and Asian descent. Additionally, some commonly used medications are known to cause an increase in the intraocular pressure (*Table 5*); therefore the primary physician should always thoroughly review the patient's medications. Physical examination typically shows a mid-dilated pupil, cloudy cornea and conjunctival injection.¹² Treatment of choice is a reduction of intraocular pressure using topical anti-hypertensive eye drops and laser peripheral iridotomy. The commonly used topical medications for this condition include 0.5% timolol maleate, 1% apraclonidine and 1% pilocarpine.¹³

Mechanical globe injuries and globe ruptures warrant immediate attention. Mechanical globe injuries occur when there is a full thickness rupture through the cornea and the sclera.⁴ Globe rupture is often followed by blunt trauma to the eye. Patients with mechanical globe injuries present with eye pain, tearing, redness and decreased vision after trauma to the affected eye. If a patient presents with a history of blunt trauma to the eye, an exam with a penlight or slit lamp should be done to assess for a subconjunctival

TABLE 5:

Medications associated with acute-closure glaucoma^{13,14}

CLASSES	MEDICATIONS
Adrenergic agonists	Ephedrine, phenylephrine
Anticholinergic agents	Ipratropium bromide, promethazine, botulism toxin
Cholinergics	Pilocarpine
Sulfa agents	Acetazolamide, topiramate
Antihistamines	Loratadine, diphenhydramine, cimetidine, ranitidine
Anticoagulants	Heparin

TABLE 6:Roper-Hall Classification system¹⁵

GRADE	CORNEAL INVOLVEMENT	CONJUNCTIVAL LIMBUS	PROGNOSIS
I	Epithelial damage	No limbal ischemia	Good
II	Corneal haze, iris details visible	<1/3 limbal ischemia	Good
III	Total epithelial loss with stromal haze, iris details obscured	1/3 - ½ limbal ischemia	Guarded
IV	Cornea opaque, iris and pupil details obscured	> ½ limbal ischemia	Poor

hemorrhage, hyphema and irregular pupil. If a foreign body is visualized, it should not be removed.⁴ A tetanus booster should be administered. A plastic or metal eye shield should be placed over the affected eye and patient should be immediately referred to an ophthalmologist. The primary care physician should educate the patient not to increase the eye pressure by coughing or straining. Computed tomography of the orbits is needed to evaluate for intraocular foreign bodies and fractures. Initial treatment consists of broad-spectrum antibiotics (i.e., ciprofloxacin, levofloxacin, moxifloxacin, ceftazidime). Removal of foreign bod(ies) and surgical repair by an ophthalmologist greatly reduces the risk of endophthalmitis if performed within the first 24 hours of injury.^{4,10}

Chemical eye injury following exposure to acidic or alkaline compounds is another ophthalmologic emergency. Patients usually present with severe eye pain, redness, tearing, photophobia and decreased vision (*Figure 4*).¹⁰ The evaluating physician should try to identify the type and the amount of chemical involved. A thorough examination of the external eye is necessary; periocular burns should be identified and pH testing should be performed. The Roper-Hall classification system (*Table 6*) may be used to describe the extent of the injury.¹⁰ The patient should immediately be referred to an ophthalmologist for treatment. Treatment involves placement of topical anesthetic followed by copious ocular surface irrigation using saline solution. The pH of the eye should be assessed after the irrigation. Continuous irrigation is needed until the pH of the affected eye is neutralized. Following irrigation, antibiotic eye drops are necessary; steroid drops and cycloplegics may also be used in certain cases. Ocular surface burns need close follow up with an ophthalmologist as early and late scarring can occur, leading to compromise of the ocular anatomy and possible vision loss.

CONCLUSION

Most primary care physicians are adequately equipped to manage common ophthalmologic conditions. A detailed history and physical will help tailor the differential diagnosis appropriately. The primary care physician should also be able to recognize the scenarios that warrant immediate referral to an ophthalmologist.

AUTHOR DISCLOSURES:

No relevant financial affiliations

REFERENCES:

- Pflipsen Matthew, Massaquoi Mariama, Wolf Suzzane. Evaluation of the Painful Eye. *Am Fam Physician*. 2016;93(12):991-998.
- Galor A, Jeng BH. Red eye for the internist: when to treat, when to refer. *Cleve Clin J Med*. 2008;75(2):137-144.
- Cronau H, Kankanala RR, & Mauger T. Diagnosis and Management of Red Eye in Primary Care. *Am Fam Physician*. 2010;(8):137-44.
- Geltson D, Christopher. Common eye emergencies. *Am Fam Physician*. 2013;88(8):515-519.
- Morrow L, Gary, Abbott L, Richard. Conjunctivitis. *Am Fam Physician*. 1998 Feb 15;57(4):735-746.
- Foster A. Red eye: the role of primary care. *Comm Eye Health*. 2005;(18):69-72.
- Wirbelauer C. Management of the Red Eye for the Primary Care Physician. *Am J Med*. 2006;(119):302-306.
- Wilson A, Stephen, Last Allen. Management of corneal abrasion. *Am Fam Physician* 2004;70:123-8,129-30.
- Palay, David A., and Jay H. Krachmer. *Ophthalmology for the primary care physician*. Mosby, 1997.
- Pokhrel K, Prabhat, Loftus A, Sanaz. Ocular Emergencies. *Am Fam Physician*. 2007;76:829-36
- Distelhorst S, James, Hughes M, Grady. Open-Angle Glaucoma. *Am Fam Physician*. 2003;67:1937-44,1950.
- Gupta Divakar, Chen P. Philip. Glaucoma. *Am Fam Physician*. 2016 Apr 15;93(8):668-674.
- Quigley HA. Glaucoma. *Lancet* 2011; 377:1367.
- Ah-kee Elliott Yann et al. "A Review of Drug-Induced Acute Angle Closure Glaucoma for Non-Ophthalmologists." *Qatar Medical Journal* 2015.1 (2015): 6.PMC. Web. 20 Jan. 2018.
- Roper-Hall MJ. Thermal and chemical burns. *Trans Ophthalmol Soc UK* 1965;85:631-53.
- Tarabishy B. Ahmad, Galor A, Jeng. Bacterial Conjunctivitis: A review for internists. *Cleve Clin J Med*. 2008;75(7):507-512