

Ocular Complaints, Disease, and Emergencies in the General Medical Setting



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KEYWORDS

• Ocular complaints • Red eye • Vision loss • Double vision

KEY POINTS

- Primary care providers must rely on an accurate and thorough history to differentiate ocular disease. History alone can dictate the need for urgent or emergent referral.
- Red eyes are commonly due to viral conjunctivitis, but red flags include persistent refractory disease, copious purulent discharge, periocular dermatologic changes, or recent ocular trauma.
- Acute vision loss should prompt urgent evaluation, and in elderly patients, giant cell arteritis must be considered.
- Double vision is more likely neurologic when it goes away with monocular occlusion or is worse when looking in certain directions of gaze.
- Primary care physicians play an essential role in ensuring appropriate ophthalmic screening for diabetes, glaucoma, and medication toxicity.

INTRODUCTION

Primary care physicians constitute about one-third of US physicians but perform about one-half of all clinical visits.¹ It is natural that patients share concerns regarding their eyes with their primary physician. Loss of vision is a common fear, particularly in elderly patients. Loss of independence with driving and being able to perform tasks such as reading and paying bills drastically affects quality of life and can lead to depression. A study found that about 2% to 3% of all primary care patient visits involve ocular complaints.² The presenting conditions consisted of the following general categories: minor inflammatory, traumatic conditions and foreign bodies, visual disturbances, and eyelid problems. The 2 most common problems presenting to primary care physicians were conjunctivitis and corneal abrasion.

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OCULAR PRESENTING COMPLAINTS

As with other organ systems, an accurate and complete history is key to making the correct diagnosis in patients with ocular complaints. Many patients refer to their complaints in vague or anatomically inaccurate terms that can lead one down a false pathway. Patients will often talk about “their eye” when they are really talking about their eyelid or periocular structures. Another common confusion with history taking is when a patient describes “something in their eye,” do they mean something they see when looking out or something they see when looking at their eye in a mirror? When taking a history of visual complaints, always clarify the circumstances under which complaints occur. If a patient describes double vision, always ask if it is at near, at distance, only in certain directions of gaze, and with their distance glasses on or off. Patients who wear glasses to see in the distance may notice double vision at a distance without their glasses!

Whether the complaint is about vision, redness, or pain, the points to clarify are similar to historical elements of complaints about other parts of the body. It is important to know if the problem is noticed in one or both eyes. Ocular diseases due to underlying systemic disease or age-related degenerated processes often affect both eyes, although they may be asymmetric in presentation. On the other hand, infectious processes or vascular occlusions typically present with only unilateral involvement at least in the early stages.

If the complaint is vision loss, the temporal profile of loss can help identify the diagnosis. Was the vision loss slow and progressive over months or was it sudden, complete vision loss? Is the visual loss central or is it peripheral? Patients can often describe the visual field loss such as top or bottom part of vision missing or just a superior or inferior quadrant missing. Inferior loss is noticed more often due to looking down while working or walking. Similarly, the temporal field of view is larger and patients with a homonymous hemianopia will often complain about temporal field loss in one eye but may fail to recognize the nasal field loss in their contralateral eye.

A visual complaint of double vision could be due to ocular motility or alignment problem. The most important differentiating factor is whether the double vision remains present when covering either eye. True binocular diplopia is only present when both eyes are open. The patient should be able to answer if the images are side by side or one on top of the other. Although monocular double vision is rarely urgent, double vision that is worse in a specific direction of gaze is more likely to be neurologic in cause.

Patients will often describe features diagnostic for their condition if you listen closely. For example, a patient may say the only problem is when they bend over, they go completely blind, but the vision returns after a few seconds once they stand up. This is called transient visual obscuration and is a temporary, reversible cause of positional vision loss in patients with papilledema, often from idiopathic intracranial hypertension. These subtle differentiations in symptomatology are essential to primary care providers who otherwise may have limited examination findings to hone in on a diagnosis.

Vision

Common problems

Not vision threatening

Dry eyes The cause of dry eyes is multifactorial and becomes more common with increasing age. Patients often complain of an intermittent blur that clears with blinking

or use of lubricant drops. Symptoms increase with extended computer use, reading, driving, or any intense visual task that reduces blinking frequency.

Patients with dry eyes may describe quick, sharp pains or a sandy, gritty sensation. Some patients complain predominately of intermittent tearing, whereas others complain of ocular discharge. The discharge can be confused with infection, but it is excess mucous production secondary to dryness. Lubricant drops can be used to rinse mucus out. It is important that the patient does not pick at the eye to retrieve the mucus, as this can cause recurrent microtrauma that exacerbates the condition.

Initial treatment of dry eyes is with over-the-counter lubricant eye drops. Many patients will turn to allergy drops or ones that “get the red out,” but these contain vasoconstricting agents that are counterproductive to long-term ocular surface health. Allergies can exacerbate dryness, but the predominate symptom is usually itching. At a minimum, lubricant drops should be used first thing in the morning and before bedtime. Most over-the-counter lubricant drops contain preservatives and should not be used in excess of 3 to 4 times a day. Preservative-free lubricant eye drops are available, which can be used more frequently if necessary. Gel drops are a thicker formulation that coat the ocular surface for a longer period of time. Patients will need to try different types of drops sequentially to learn which one works best for them. Drop use is more effective when used routinely for preventative maintenance rather than as needed when the eyes feel dry.

In addition to ocular lubrication, warm compresses (with a damp warm wash cloth over the closed eyelids for 3–5 minutes) at bedtime can help to reduce symptoms by allowing the meibomian glands to function more effectively. Oral doxycycline, 50 to 100 mg/d, can also be used for symptomatic relief of inflammatory dry eye, particularly in those with ocular rosacea. Both of these treatments may take months to achieve maximum effectiveness. More advanced dry eye treatments including prescription drops and procedural interventions are available through eye care specialists.

There are a variety of systemic diseases that have increased incidence of dry eye. Immune-mediated disorders such as Sjögren syndrome, rheumatoid arthritis, systemic lupus erythematosus, and graft-versus-host, among others, have strong associations with ocular surface disease. Other disorders such as Parkinson's, Bell's palsy, and thyroid eye disease are also associated with dry eye disease due to decreased blink and increased exposure. Many oral medications, including antihistamines, certain antidepressants, and some hormone replacement medications, may cause or worsen dry eye. Environmental factors can exacerbate dryness, including low humidity, wind, and ceiling fans that desiccate the ocular surface.

Floaters The vitreous jelly is a solid gel at birth that is firmly adherent to the retina and optic nerve. Over a lifetime, the gel becomes liquified and develops floating fibers. There comes a time in all patients, earlier in those with myopia, when the vitreous attachment to the optic nerve starts to pull away. This typically occurs between the ages of 45 and 65 years. The result is the sudden onset of visually bothersome floaters, sometimes accompanied with perception of brief flashes of light most noticeable in the dark. This is called a posterior vitreous detachment (PVD). These common, but annoying, floaters are more often noticed in high relief, for example, when looking at the blue sky, a bland wall, or a computer screen. The floaters are generally described as stringy and may have veil-like movement across the field of vision, even when the eye is held still. Sudden PVD is a risk factor for the creation of a retinal tear, which has similar symptoms but requires urgent treatment.³ Patients with sudden onset of new floaters should be referred to an ophthalmologist for further evaluation, as historical elements alone cannot determine the diagnosis (**Fig. 1**).

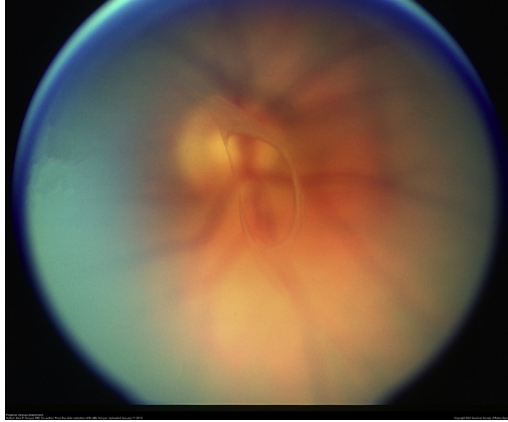


Fig. 1. Posterior vitreous detachment (PVD) is a partial or complete separation of the posterior vitreous cortex from the internal limiting membrane of the retina. (This image was originally published in the Retina Image Bank® website. Alex P. Hunyor MD. Posterior vitreous detachment. Retina Image Bank. 2013; # 3073. © the American Society of Retina Specialists".)

Vision threatening

Distorted central vision Central visual distortion is an indication of irregularity in the central retina (an area known as the macula). Many patients will describe that an object that they know to be vertical (door jamb for instance) seems crooked or wavy. Most often, these symptoms of metamorphopsia are due to a wrinkle in the retina, exudative (wet) age-related macular degeneration, or other less common retinal problems. Hearing a patient complain of central wavy distortion to their vision should prompt referral to comprehensive ophthalmologist or retinal specialist, if available ([Fig. 2](#)).

Peripheral vision loss Peripheral vision loss is less specific and can be due to neurologic or ocular causes. Cortical causes of vision loss affect BOTH eyes in all

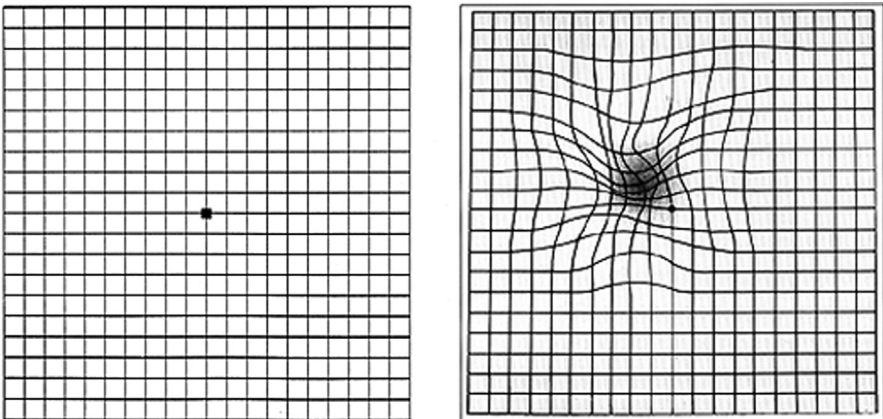


Fig. 2. Distortion. Patients with irregularity in the retinal surface in the macula will experience metamorphopsia, which is distortion in their vision. They will describe that fences are not straight or the door jamb bows. When shown an Amsler grid, which highlights distortion, they will not see straight lines, but distorted, as shown in the second picture. (Courtesy: National Eye Institute, National Institutes of Health (NEI/NIH)).

circumstances, and the associated visual field defects will respect the vertical midline of the field of vision in each eye. Strokes or tumors of the cortical visual pathways result in homonymous field defects, affecting the left or right side of vision in each eye. Patients may only recognize the field loss in their temporal field of view, so confrontation visual field testing of each eye individually must be performed to identify homonymous field defects. Similarly, parasellar masses can lead to temporal field changes in both eyes that respect the vertical midline and lead to symmetric tunneling of vision.

Ocular causes of peripheral field loss do not routinely respect the vertical midline and are often asymmetric between the eyes. Bilateral causes are often degenerative in nature, and a family history of glaucoma or inherited diseases of the retina may be elicited. Optic nerve–related changes often present unilaterally and can have associated color desaturation or vision loss respecting the horizontal midline. Unilateral causes of vision loss are varied and should similarly prompt referral to a specialist.

Concerning floaters Patients experiencing floaters from a visually threatening process will tell you that the new floaters they have are “different” from previous floaters. They will often describe hundreds of tiny black floaters that are seen at all times in one eye, “like a swarm of gnats.” Possible causes are retinal tear/detachment, vitreous hemorrhage, or inflammation in the eye. With the direct ophthalmoscope, it is possible to see floating debris in red reflex. If there is a severe intraocular hemorrhage, no red reflex may be visible at all. Retinal detachment will present with a progressive visual field defect that can be mapped out with confrontational fields testing. New onset of atypical floaters in one eye requires urgent referral to comprehensive ophthalmologist or retinal specialist, if available (**Fig. 3**.)

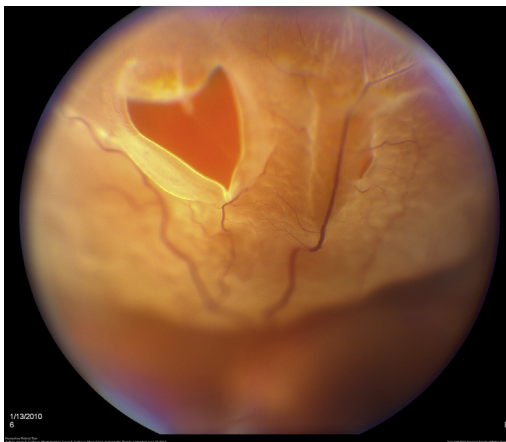


Fig. 3. Superior retinal tear with associated detachment. (“This image was originally published in the Retina Image Bank® website. Jason S. Calhoun MD. Horseshoe retinal tear. Retina Image Bank 2013; #7030. © the American Society of Retina Specialists.”)

Acute visual loss Sudden, painless visual loss is an emergency and is most often an arterial occlusive event. Occlusion of the central retinal artery results in near-complete blindness and is unilateral in almost all circumstances. Branch retinal artery occlusions will have focal areas of unilateral vision loss, typically involving one quadrant of vision. Both are considered stroke equivalents and require workup to exclude embolic or

systemic causes.⁴ Similarly, occlusion of small vessels that supply the optic nerve can result in sudden painless vision loss known as ischemic optic neuropathy, which is typically described as a loss of the upper or lower half of field of vision and is associated with nocturnal hypotension, obstructive sleep apnea, and use of phosphodiesterase inhibitors. Ischemic optic neuropathy is an irreversible cause of vision loss and is among the feared consequences of unrecognized giant cell arteritis (GCA) (Fig. 4).



Fig. 4. Right eye. Inferior branch artery occlusion due to calcium emboli from cardiac valve. Whitening of the retina is the area of ischemia.

Amaurosis fugax is a *transient* monocular vision loss event caused by vascular occlusion with a gradual return of vision as the vasculature reperfuses. Although most events are related to emboli and warrant workup as such, one must not neglect to consider arteritis as a potential cause. GCA is of particular concern if the episodes are recurrent and associated with headache, scalp tenderness, or jaw claudication. Patients will often provide stunning descriptions of their vision blacking out followed by a reblooming of their vision back to normal repeatedly. These patients require immediate steroid treatment and referral for consideration of temporal artery biopsy by a trained specialist (Fig. 5).

Subacute sudden vision loss Subacute vision loss can have a wide variety of causes, most of which require specialty evaluation. Retinal vein occlusions present with more insidious loss of vision compared with their arterial counterparts. The resulting venous congestion leads to slow exudation of fluid, which reduces quality of central vision and can require long-term specialty treatment. These occlusions occur more frequently in patients with chronic microvascular risk factors such as diabetes, hypertension, and hypercholesterolemia.

Subacute vision loss associated with *pain* should raise concern for possible optic neuritis, particularly when found in combination with other neurologic complaints. Most patients with optic neuritis will describe unilateral vision loss (color desaturation initially) over the course of a few days and pain that is worse with eye movements. Unlike ocular surface discomfort that may improve with blinking, painful causes of vision loss that do not improve with simple measures require urgent evaluation.

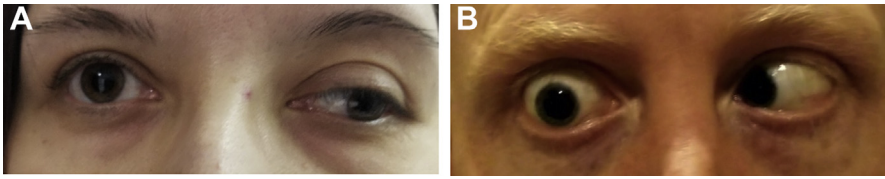


Fig. 5. Giant cell arteritis is a disease with potentially devastating visual consequences if unrecognized and untreated. The wide variation in clinical presentation and lack of specific biomarker requires that providers have a high index of suspicion for disease. Photo A is a patient presenting with scalp necrosis. High-dose steroid treatment is very effective but requires long-term treatment and has many adverse effects. As such, temporal artery biopsy should be performed for confirmation in all patients suspected to have the disease. Photo B shows patient prior to temporal artery biopsy.

- Common but nonspecific features:
 - Headache, scalp tenderness, fatigue, fever, weight loss
- Less common but more specific features:
 - Jaw claudication, polymyalgia rheumatica, scalp necrosis (photo), temporal artery prominence/thickening (photo)

Double vision The first step in evaluating double vision is always to determine if it is monocular or binocular. Monocular diplopia remains present despite occlusion of one eye and is almost never neurologic in nature. Similarly, a complaint of triple or quadruple vision is nonneurologic. True binocular diplopia can be horizontal, vertical, or oblique in nature and goes away with occlusion of either eye. There are many potential causes of acquired double vision in adulthood. Ones with insidious onset are typically decompensations of preexisting childhood strabismus, but those with acute onset require more urgent evaluation.

Certain features of double vision are red flags that can help the primary care provider identify dangerous disease processes. Specifically, any double vision associated with asymmetry of pupils or eyelid position should raise concern for a more acute cause. Pupil involving third nerve palsies **MUST** be rapidly imaged to rule out aneurysmal compression.⁵ Other red flags include diplopia associated with any ocular motility restriction on examination. Because these red flags can be subtle, asking the patient if the double vision is worse in one direction of gaze compared with another can be very helpful in eliciting a history of worrisome incomitance. Large fluctuations in double vision or eyelid position throughout the day can help identify myasthenia gravis (**Fig. 6**).

Red Eye

History and symptoms are the most helpful ways to separate the common causes of a red eye.

Subconjunctival hemorrhage

Subconjunctival hemorrhage is often a source of great concern to patients but is almost always benign. They typically occur with eye rubbing, trauma, or Valsalva. If recurrent, ask about contact lens usage, check for uncontrolled blood pressure, consider hematologic disease or anticoagulant effect, and refer to further ocular evaluation, if uncertain.

Conjunctivitis

Conjunctivitis is the most common cause of a red eye. Because of its frequency, it is often seen and treated by a primary care physician. The various types of conjunctivitis can seem similar, but history and symptoms help to differentiate the cause.

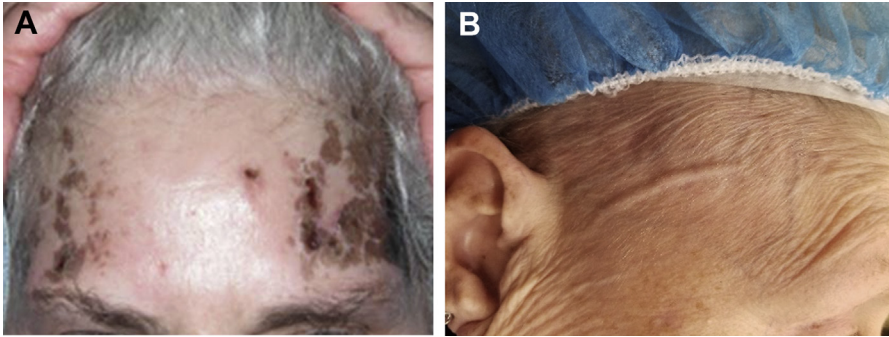


Fig. 6. New onset of oculomotor (third) cranial nerve palsy (photo A) requires neuroimaging. Pupil involvement raises concern for aneurysmal compression and should prompt urgent evaluation with CTA or MRA. Partial third nerve palsies may lack classic signs of marked ptosis or obvious motility deficits, and any patients with anisocoria and diplopia should be carefully evaluated. Trochlear (fourth) cranial nerve palsies will often have subtle findings of vertical diplopia worse in certain directions of gaze and are most commonly due to trauma or microvascular mononeuropathy when acquired. Abducens (sixth) nerve palsy will manifest with horizontal diplopia worse in lateral gaze with more readily identifiable abduction deficit (photo B). Referral for further evaluation is indicated, as a wide variety of potential causes exist, including elevated intracranial pressure, skull base lesions, trauma, cavernous sinus disease, and many others.

Special note: conjunctivitis associated with soft contact lens wear can be more complex. These patients should stop wearing their contacts and urgently see their contact lens provider. Decreased vision, purulent discharge, or pain should prompt referral to an ophthalmologist emergently.

Viral conjunctivitis

Viruses are the most common cause of conjunctivitis and are often very contagious. Typically, these are due to one of several types of adenovirus and presents with a red irritated eye, watery discharge, and potentially systemic viral symptoms. In most cases, involvement of one eye is followed by second eye involvement within 24 to 48 hours. There is often a history of exposure to someone with a red eye or a small child with a viral illness. The viral particles can remain infective on hard surfaces for several weeks, and the physician should discuss the importance of hygiene to limit spread of the disease. To avoid infecting others at home and the workplace, a recommendation should be made to self-isolate for 7 to 14 days from the onset of symptoms in the second eye. Length of isolation can be discussed with the patient and may vary by job type and duration of symptoms. Most cases are mild, but some can be severe and will need to be referred to an ophthalmologist.

On examination, the eyes are injected, and there can be lid swelling. There is only watery discharge, and patient may have a preauricular node. Patients with these symptoms should not be left in waiting room but isolated in an examination room. Providers should use personal protective equipment and avoid direct skin to skin contact.⁶ After the patient leaves, careful cleaning of all surfaces will help prevent infection of other patients or office staff. Outpatient offices have been the source of widespread public health outbreaks of epidemic keratoconjunctivitis due to insufficient preventative measures.⁷

There is no curative treatment of viral conjunctivitis, and support measures consist of preservative-free lubricant drops and cool compresses. Antibiotic drops are not

indicated and are very painful on the inflamed conjunctiva. Just as in viral bronchitis, viral conjunctivitis can develop a secondary bacterial infection that would manifest with worsening symptoms and purulent discharge. Keeping the eye lids clean helps prevent a secondary infection. Less commonly herpes simplex, herpes zoster, or molluscum can cause conjunctivitis, illustrating the importance of a careful examination of the periocular skin.

Bacterial conjunctivitis

The most common bacterial conjunctivitis is mild and usually self-limited. Patients often report waking up with lashes stuck together with matting. The infection causes a grainy sensation with pain. Treatment for 5 to 7 days with inexpensive broad spectrum topical antibiotic relieves the symptoms more rapidly. Patients with recurrent episodes of mild conjunctivitis often have blepharitis, and the underlying lid disease must be treated to clear the conjunctivitis.

More aggressive bacterial conjunctivitis produces purulent discharge. Copious purulent discharge suggests gonococcal infection, and if suspected, emergent referral to an ophthalmologist is warranted. Methicillin-resistant *Staphylococcus aureus* and chlamydia are other causes of complex conjunctivitis that may fail conservative empirical treatment.

Chronic unilateral conjunctivitis can be caused by noninfectious mimickers of bacterial conjunctivitis such as neoplasia or autoimmune processes. Conjunctival lymphomas and carcinomas may be subtle in the early stages. Autoimmune causes of uveitis or scleritis can seem similar to conjunctivitis but have severe photophobia and pain in most circumstances. Patients with rosacea-associated blepharitis can have a chronic conjunctival injection and lid disease that is amenable to treatment.

Allergic conjunctivitis

Seasonal or perennial allergic conjunctivitis is common and presents with red itchy eyes and boggy eyelid edema. Simple recommendations are to avoid the allergen and to use cool compresses and refrigerated lubricant eye drops. Bathing and washing the hair after exposure to allergen is helpful. Avoid rubbing the eyes. There are many over-the-counter drops to improve allergy symptoms, including antihistamine drops, combination antihistamine with decongestants, and combination antihistamine with mast cell stabilizers. Steroid drops should be avoided due to side effects that need to be monitored by an ophthalmologist. Some patients are relieved with simple oral antihistamines.

Vernal and atopic conjunctivitis are specific disease entities above and beyond typical allergic conjunctivitis. They tend to occur in younger individuals with other atopic symptoms and can progress to significant visual compromise. Thickened eyelid skin, photophobia, and severe recurrent seasonal disease should prompt specialty evaluation, as steroids are needed to manage these patients.

Allergic conjunctivitis can also form as a reaction to a topical drop or medication. Common culprits are aminoglycoside drops, glaucoma drops, and even the preservative used in most over-the-counter drops (benzalkonium chloride). Stopping the drops will result in improvement in a few days. Continuing the drops can lead to a contact dermatitis of the lids, with thickened, red skin. Systemic immune reactions such as Stevens-Johnson syndrome- and mycoplasma-induced rash and mucositis can present with severe conjunctivitis as well.

Chemical conjunctivitis

Exposure of caustic chemical substances results in a red, irritated eye. The degree of involvement can span from a simple irritation that resolves in a day to severe, vision-

threatening chemical injury resulting in an ocular emergency. If a patient calls with a splash injury to eye, they should be instructed to rinse the eye with eye rinse or simple tap water for 5 minutes. If the chemical is known to be toxic to the eye, such as alkaline solutions or acidic solutions, they should proceed to nearest emergency room. Attempts at neutralization of the chemical should be avoided, as these reactions are exothermic and can worsen ocular damage.

Ocular Pain

Without trauma

Mild pain is frequently due to dryness and is accompanied by a sensation of scratchiness or sand in the eye. Patients may have associated redness, although this should be mild and intermittent with dry eyes alone. Severe, deep pain associated with a dense red injection of the whites of the eye indicates possible scleritis—a condition warranting emergent referral to an ophthalmologist. Other possible causes of ocular pain are iritis/uveitis, angle closure glaucoma, recurrent erosions, eyelid mispositioning, or trigeminal neuralgia.

Varicella zoster is another important cause of ocular pain without antecedent trauma. Patients will complain of hemifacial pain that may precede vesicular formation characteristic of the disease. Lesions involving the nasal tip indicate nasociliary nerve involvement and increase the likelihood of ocular involvement.⁸ Herpes zoster can affect every ocular structure, and signs of involvement or visual compromise should prompt urgent referral to an eye care provider.

With trauma

Ocular trauma can be devastating to vision and must be carefully evaluated to avoid diagnostic error. Unfortunately, there is not a direct correlation between pain and severity of injury. A corneal abrasion can be severely painful but not sight threatening, whereas an occult globe rupture from metallic foreign body may be painless. In many cases, the mechanism of injury is the most important risk factor for severe injury. Metal on metal striking injuries along with projectiles and shattered glass have high incidences of globe laceration and highlight the importance of encouraging use of occupational safety glasses. High-risk recreational activities are personal fireworks, use of airsoft/BB guns, and paintball.

Examination findings that suggest severe ocular trauma include peaked pupils, gross blood in the eye, severe vision loss, and foreign body embedded in or near the eye. Any potential open-globe injuries should be treated with rigid shield protection, avoidance of ocular manipulation, and immediate referral for specialty evaluation. Although blunt injuries are less likely to cause ocular laceration, they commonly cause orbital floor fractures or hyphema. Hemodynamically stable patients with orbital floor fractures should be managed as an outpatient where persistent diplopia or cosmetic concerns may prompt fracture repair.

Patients at Risk for Vision Loss

Glaucoma

Glaucoma is most often a slowly progressive, painless ocular disease that leads to blindness. It is more common with increasing age. Primary care physicians can be critical to detecting these patients by screening their patients for risk factors. Patients should be encouraged to get their eyes checked, if they are not being followed-up by an optometrist or ophthalmologist, if they

- Are older than 40 years
- Have family members with glaucoma

- Are of African, Hispanic, or Asian heritage
- Have high eye pressure
- Had An eye injury
- Use long-term steroid medications
- Have diabetes
- Have migraines
- Have high blood pressure
- Have poor blood circulation
- Have other health problems affecting the whole body
- Have large optic nerve cupping

Patients with more than one of the risk factors are at even higher risk.

Diabetic retinopathy

Primary care physicians are the greatest asset in reducing diabetic retinopathy and work with ophthalmologists to decrease blindness from this disease. Motivating patients to manage their disease is amazingly difficult, but disciplines working together are more effective. Finding referral physicians that work with the primary care doctor is essential to improve patient care. Patients with type 1 diabetes should have annual screenings beginning 5 years after onset of disease. Patients with type 2 diabetes should undergo screening at the time of diagnosis and annually thereafter.⁹

Medication toxicity

Many different medications used to treat systemic conditions can have ocular side effects. This series of articles has an entire article that discusses systemic medications with potential ocular side effects, but several medications are highlighted here. Patients on the following medications have high rates of ocular toxicity and should be proactively evaluated by an ophthalmologist at initiation of treatment:

- *Ethambutol*: known to be toxic to optic nerve function. Can occur early in the course of treatment of mycobacterial disease and affects approximately 1% of all patients on the medication at World Health Organization–recommended dosing.¹⁰
- *Hydroxychloroquine*: known to be a dose-dependent potential toxin to the retina. Baseline screening followed by annual screening after 5 years of treatment can help prevent irreversible vision loss. Recommended daily doses should not exceed 5.0 mg/kg of real body weight. Even at recommended doses, risk of toxicity after 20 years of treatment is 20%.¹¹
- *Pentosan polysulfate sodium*: recently identified cause of potentially irreversible retinal damage. Now carries a black box warning regarding retinal toxicity.¹²

Examination Techniques for General Medical Care

Lid eversion

Everting the upper eyelid can be helpful to evaluate patients with foreign body sensation or corneal abrasion of unclear cause. Place topical anesthetic on the eye. Now lid eversion can be accomplished by asking the patient to look down, grasping the eye lashes and pulling the lid off the globe. Then place a cotton-tipped applicator stick against the upper edge of the tarsal plate to use as a fulcrum and pull the lid up as you gently press down with the applicator stick, everting the lid. Any patient with vertically oriented corneal abrasions, which could be an indication of a foreign body under the lid, should have this maneuver performed (**Fig. 7**).

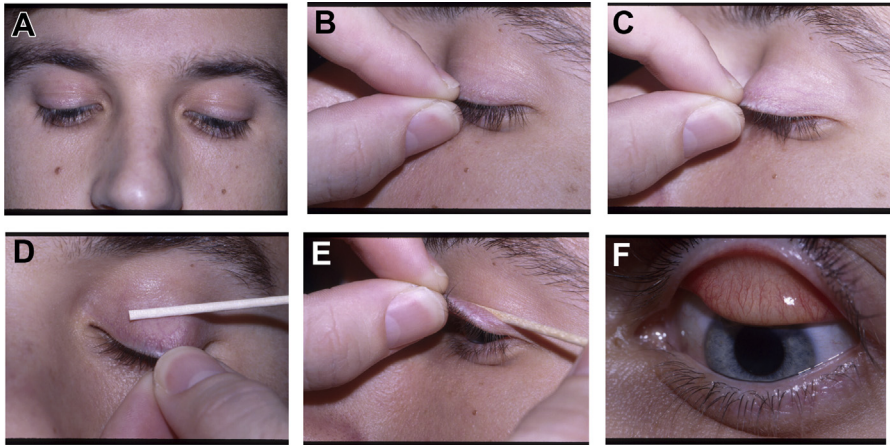


Fig. 7. Everting the upper eyelid can be helpful to evaluate patients with foreign body sensation or corneal abrasion of unclear etiology. Place topical anesthetic on the eye. (A & B) Now lid eversion can be accomplished by asking the patient to look down, grasping the eye lashes and pulling the lid off the globe. (C, D, E & F) Then place a cotton tipped applicator stick against the upper edge of the tarsal plate to use as a fulcrum and pull the lid up as you gently press down with the applicator stick, everting the lid. Any patient with vertically oriented corneal abrasions, which could be an indication of a foreign body under the lid, should have this maneuver performed.

Fluorescein staining/cobalt blue light

Sodium fluorescein is an orange vital dye that stains areas of devitalized epithelium. When viewed under cobalt blue light such as with a Wood's lamp, areas of corneal abnormality will fluoresce, highlighting areas of corneal abrasion, dendritic ulceration, or foreign body. Focal, nonmobile areas of stain uptake should raise concern for ocular surface disease warranting referral for further evaluation (**Fig. 8**).

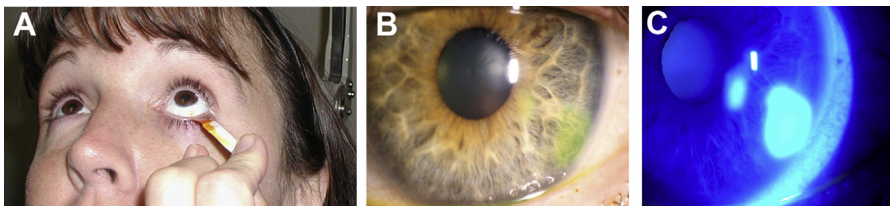


Fig. 8. Fluorescein staining is used to define corneal abrasion and other conditions with devitalized epithelium. First apply a topical ocular anesthetic to the eye. (A) Put an additional drop to the fluorescein strip, pull the inferior lid down, and apply the fluorescein drop at the edge of the lid and have the patient gently blink. (B) Stain alone will faintly outline the epithelial defect. (C) Next use a cobalt blue light to enhance the stain as seen in the photos.

Check pupil response

Pupils should be assessed in a dimly lit room with the patient focusing on a distant target. The examiner should check for equality of size and reaction to light. Any anisocoria greater than 1 mm should be referred for evaluation. A bright, focused light source should be directed at each eye individually to illicit a brisk and symmetric



Fig. 9. The direct ophthalmoscope is useful for checking for red reflex and viewing the optic nerve and retina. The physician should use the right eye to examine the right eye and switch to the left eye to examine the left eye. Approach the patient about arm's length away and at about a 20° angle temporally, as the optic nerve will be at that location. Look at the red reflex then slowly move forward, focusing as you get closer to the eye. If the pupil is large enough and the red reflex clears, the optic nerve can be observed.

response. Swinging the focused light source from one eye to the other and back can be used to evaluate for a relative afferent pupillary defect wherein the effect eye will dilate rather than constrict.

Direct ophthalmoscope

In a primary care office, direct ophthalmoscopy can be a time-consuming effort. Often times, dilation is required to view the optic nerve and retina adequately. Alternatively, using the direct ophthalmoscope to see if there is a clear red reflex in conjunction with patient history can help narrow down the diagnosis. For example, vision loss with pain

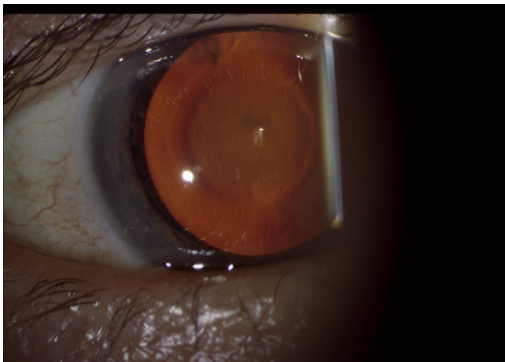


Fig. 10. In this dilated pupil the central red reflex is dim due to dense nuclear sclerosis of the lens. The view through this cataract would be very blurry and details of the optic nerve difficult to see.

on movement and a clear red reflex is more likely optic neuritis. Also, sudden vision loss with dull or no red reflex indicates there is media opacity, most likely vitreous hemorrhage or retinal detachment. If there is a clear red reflex, adequate pupil size, and you have the time, viewing the optic nerve is helpful in cases of vision loss, particularly those associated with headache or pain (Figs. 9 and 10).

CLINICS CARE POINTS

- When a patient is suspected to have a recent stroke, confrontational visual fields should be performed at the initial evaluation if the patient is able to cooperate with the examination.
- When a patient has nonspecific visual complaints, visual acuity and confrontational visual fields should be performed.
- When a patient complains of irritated eyes, always ask exactly what drops (substances) they are putting in their eye and how often. Patients may be using products not suitable for the eyes or using eye drops excessively.
- On initial examination of a new patient ask if any family members are blind and why. Also ask if parents or siblings have been treated for glaucoma.
- Ask patients suspected to have multiple sclerosis if they have had any episodes of vision loss and ask them to describe the episodes.
- Patients will frequently assign allergies as the source of a red eye. To find the true cause, ask for them to describe symptoms, time course, and the over-the-counter treatments used.
- When seeing patients in the spring and summer, remind them to use goggles (not safety glasses) to protect their eyes when using a weed eater. Anyone else in the yard should also have goggles on.
- When seeing a patient for hand injury when using tools such as grinder or electric saw, ask if they use a protective eye goggles.
- Protective eyewear should be recommended for all patients engaging in high-risk activities such as metal grinding or construction, particularly for those who are monocular.
- The risk factors for glaucoma will be found in many patients older than 50 years. Remind patients to have their eyes checked, as several serious eye conditions are slowly progressive or even asymptomatic and if not detected early will result in permanent visual loss.
- Glaucoma is often asymptomatic until advance stages, and primary care providers should inquire about strong family histories to help prevent irreversible vision loss.
- Visual complaints are best evaluated in the context of the temporal profile of disease, with acute vision loss necessitating urgent referral.
- Double vision that is worse in certain directions of gaze and goes away with occlusion of either eye is more likely to be neurologic and requires further workup.
- Intense photophobia in conjunction with a red eye should raise concern for uveitis, particularly if there is a history of immune-mediated or infectious disease.
- Patients with viral conjunctivitis are highly contagious, and strict contact precautions should be taken by both the provider and the patient to avoid community spread.
- Dry eye syndrome is the most prevalent cause of ocular irritation and intermittent blurred vision, which typically responds to over-the-counter artificial tears as a first-line treatment.
- A wide variety of systemic medications have ocular side effects or toxicity that require vigilant screening including hydroxychloroquine, ethambutol, and pentosan.
- Ocular trauma can have devastating visual consequences and any patient presenting with decreased acuity after trauma should be thoroughly evaluated.

- Recurrent amaurosis, headache, scalp tenderness, and jaw claudication are among the many potential symptoms of GCA and require high index of clinical suspicion due to severe visual consequences of unrecognized disease.

DISCLOSURE

The authors have nothing to disclose.

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