Eyelid

Entropion is relatively rare in horses, but most commonly occurs in neonates. Usually these foals have systemic disease and either have too little retrobulbar fat or are dehydrated, resulting in enophthalmos and entropion. Usually temporary tacking until rehydration of the enophthalmos will result in resolution.

Eyelid lacerations are common traumatic injuries seen in horses. Accurate surgical correction is necessary to prevent trichiasis and tear abnormalities. If the injury is less than 6 hours old, then direct suturing is recommended as soon as possible. If the injury is older, then furacin ointment should be applied on gauze with a head wrap for 24 hours. In addition systemic antibiotics and NSAIDs should be given to reduce infection and swelling. Surgery is then performed with the edges of the laceration freshened up until the edges are bleeding and careful suturing is performed to assure anatomic correction.

Eyelid neoplasia is common in horses, with sarcoids being the most common benign tumor and squamous cell carcinoma being the most common neoplasia. Sarcoids appear as solid or ulcerated nodules on the eyelid or near the eye. As sarcoids can be difficult to treat, there are many different treatments available. I typically start with 5-FU ointment (compounded by Wedgewood Pharmacy, get ophthalmic prep) BID for 1 week, then SID for 2 weeks and then recheck the mass. If it worsens or does not respond, then I will use cryoablation. If this does not work, then I refer them for Cisplatin or BCG injections or bracytherapy.

Squamous cell carcinoma is most commonly seen in white or light skinned horses and can be on the eyelids, third eyelid, or on the cornea. They are due to excessive UV radiation in poorly pigmented tissue. SCC appears as a lobulated pink tissue that is very friable. Like sarcoids, SCC can be difficult to treat and therefore many different treatments are available. I have used topical 5-FU BID successfully in the past. If this does not work, then I generally perform cryoablation. Although this may need to be repeated and often needs to be performed under sedation or anesthesia, it can be successful as well. Other therapies have included wide excision, brachytherapy, and injection of Cisplatin or BCG.

Habronema nodules are a differential diagnosis for neoplasia as well. They are generally seen in the medial canthus of horses and have gritty, caseous exudates and many eosinophils, plasma cells, neutrophils, and mast cells are seen on cytology. Definitive diagnosis is made with histopathology since it can mimic eosinophilic granulomas. This is seen less often with current deworming schedules but can still be seen. Treatment is with Ivermectin at 200 micrograms/kg initially and at 30 days. Use of NSAIDs to reduce inflammation is also recommended. Topical treatment with Furacin can also be helpful.
Cornea

Corneal disease is a common extraocular problem in horses, with corneal ulceration being the most common. This happens most commonly due to injury. Clinical symptoms of corneal ulcerations include blepharospasm, increased tearing, conjunctival hyperemia, corneal edema, and photophobia. In addition, infected ulcerations can lead to a profound reflex anterior uveitis, which is seen often as miosis with hypopyon.

Superficial corneal ulcers should heal in 2-5 days, so if it does not, then complicating factors (infection, trichiasis, foreign body) should be considered. Initial treatment of simple superficial corneal ulcers is with the use of triple antibiotic or gentamicin ointment TID and atropine ointment BID for 3 days and then as needed for pain. As injuries for the track tend to get infected much more easily, I usually start with topical Ciprofloxacin ointment to prevent infection.

Infected corneal ulcerations are common sequelae to superficial ulcers in horses due to their environment. When an ulcer appears infected, corneal culture and sensitivity and cytology is recommended. Common bacteria include Streptococcus, Staphylococcus, and Pseudomonas. Gram-positive bacterial respond better to chloramphenicol and cefazolin, whereas gram negative respond better to tobramycin and ciprofloxacin and ofloxacin. Therefore, I usually start them on chloramphenicol and ciprofloxacin ointment 6 times daily (if possible) if there is no subpalpebral lavage placed. Alternatively I start them on cefazolin and ofloxacin 6 times daily if there is a SPL present.

Fungal infections are also quite common in horses due to their environment and the type of infection seen is based upon geographic location. In the Midwest, the most common fungus is Aspergillus. I often see these types of infection after they have been on topical steroids. This fungus has septate hyphae seen on cytology and responds well to itraconazole/DMSO, miconazole (1% Monistat), and Nystatin. Nystatin is the only commercially available antifungal and most fungal organisms are susceptible to it, but it is very expensive. Miconazole has good penetration and can be purchased very inexpensively (use vaginal prep). However liquid miconazole (to go through SPL) is more expensive. We get itraconazole/DMSO and fluconazole/DMSO compounded from Wedgewood Pharmacy and anecdotally, most fungal diseases respond well to it.

Fungal infections are associated with a profound uveitis and the fungus has an affinity for the corneal endothelium. With treatment, the uveitis can worsen dramatically as the fungi die. Therefore uveitis needs to be treated very aggressively because if it is not addressed appropriately, the cornea may heal but the eye can become blind due to cataract and phthisis bulbi from the uveitis.

Melting corneal ulcerations can be profound in horses and needs to be the most aggressively treated. Corneal culture and sensitivity and cytology should be performed immediately and a subpalpebral lavage should be placed. Aggressive antibiotic (cefazolin and ofloxacin) every 1-2 hours and/or antifungal (nystatin, miconazole, fluconazole) every 4-6 hours should be started. In addition, treatment for the melting is necessary and autogenous serum is most commonly used every 4-6 hours. Newer information shows that oral doxycycline (10mg/kg BID) has been effective in reducing infection but also at reducing matrix metalloproteinases (MMPs), which cause the corneal melting.

Another form of corneal infection is the stromal corneal infection. This occurs when there is a penetrating corneal injury that seals over with epithelium and then forms
an infection in the stroma. These infections are harder to treat because they are harder to get samples from and appropriate drugs that can penetrate are necessary. These infections are often fungal and often cause profound uveitis. They tend to elicit an exuberant vascular response, which can often times miss the infection. Therefore in order to prevent blindness from severe uveitis, surgery can be performed to remove the infection. This is known as a partial lamellar keratoplasty, where the superficial normal cornea is flapped back and the infection is removed and the cornea is sutured back down.

While medical therapy for infectious keratitis is preferred in horses, oftentimes the infection takes too long to control and penetrates deeply into the cornea. When the ulcers become deep or rupture, then surgical correction is necessary. Most commonly conjunctival grafts are placed. With corneal lacerations and rupture, a rupture or laceration of greater than 5 mm in length is associated with a very poor prognosis for recovery of vision. Therefore in these cases, enucleation is recommended. Surgery is generally very successful but requires general anesthesia.

Other corneal diseases that appear to be more immune mediated include eosinophilic keratitis and nonulcerative keratitis. Eosinophilic keratitis appears as a peripheral deposit or ulceration with white to tan thick plaques. It is often associated with allergies and many horses develop these plaques shortly after deworming. Conversely nonulcerative keratitis appears very similarly to corneal abscesses, but with minimal uveitis and more rapid corneal neovascularization. Both of these conditions respond to topical steroids and cyclosporine, but obviously these medications should be used cautiously as these conditions mimic infectious keratitis.

**INTRAOCULAR DISEASE**

**Uvea**

The most common intraocular disease in horses is equine recurrent uveitis (aka ERU, moon blindness). This disease is characterized by chronic recurring anterior and/or posterior uveitis. Acute symptoms include blepharospasm, increased tearing, corneal edema, episcleral injection, aqueous flare, fibrin or hypopyon in the anterior chamber, and miosis. Chronic symptoms include posterior synchia of iris and corpora nigra to anterior lens capsule, cataract formation, brunescent appearance of vitreous (yellow coloration), and chorioretinal scarring. This disease can often lead to blindness from cataract, secondary glaucoma, retinal detachment, lens luxation, and/or phthisis bulbi.

The cause of ERU is not always determined but is most commonly associated with Leptospirosis infection. It appears that the primary infection occurs and then an autoimmune reaction develops where the immune system attacks the eye. This is the reason that topical steroids and systemic NSAIDs are beneficial.

In acute attacks, topical steroid ointments are applied TID-QID, atropine ointment is applied BID for 3 days than SID as needed for dilation or pain relief, and systemic NSAIDs are administered. I usually use Banamine for 3-5 days first, then switch to Bute until the inflammation is controlled.

For chronic therapy, oral NSAIDs can be used at a low level (aspirin) but needs to be administered safely. Chronic topical therapy with steroids is not favorable because of the chance for corneal ulceration and infections. Therefore newer techniques for chronic
therapy includes cyclosporine implants in the suprachoroidal space and oral doxycycline for leptospirosis positive horses at 10mg/kg BID. These treatments may reduce recurrent disease.

Other uveal diseases are uncommon but the most common abnormalities are uveal cysts and iris neoplasia. Uveal cysts are either free-floating in the anterior chamber or associated with the corpora nigra. These generally are asymptomatic and only requires therapy (deflation with needle or laser ablation) if they are obstructing vision. The most common uveal neoplasias are melanoma and lymphoma. Melanoma is the most common primary ocular neoplasm and can respond well to diode laser ablation. Lymphoma is most commonly a secondary neoplasm and causes very thickened irides and hypopyon.

Lens

Cataract in horses is most commonly secondary to equine recurrent uveitis and such cases are not good candidates for cataract removal. Congenital cataracts have been documented and prompt removal is necessary for correct development of visual pathways. Inherited cataracts are reported as well and have been most commonly seen in Thoroughbreds, Belgians, and Quarter horses. These horses should not be bred. Although cataract surgery is successful in horses, severe complications (corneal ulcers, endophthalmitis, and secondary glaucoma) can occur and cause loss of vision. Lens luxation in horses is also most commonly associated with ERU and usually is associated with retinal detachment, in which case they are not good candidates for surgery. Primary lens luxation has rarely been reported and surgical removal has been attempted. In my experience, surgery has not been very successful.

Posterior Segment

Retinal disease in horses is most commonly acquired due to either chorioretinitis or due to traumatic injury. It usually presents as decreased vision and a dilated pupil, although if there is chronic chorioretinitis associated with anterior uveitis such as in ERU, a miotic pupil may be present due to posterior synechia. Retinal degeneration associated with ERU develops as peripapillary chorioretinal scarring or butterfly lesions. Retinal detachment may occur as well.

Traumatic injury to the posterior segment is either seen as severe blunt injury and posterior segment bleeding. This often results in intense vitreous hemorrhage and traction bands formed in the vitreous leading to tearing of the retina and retinal detachment. Severe blunt trauma can lead to corneoscleral rupture at the limbus with expulsion of the intraocular contents. If this occurs, then enucleation is recommended.

Head trauma can lead to acute unilateral or bilateral blindness. The pupil will be dilated and the optic nerve initially looks normal. A few weeks later, the optic nerve head will become pale indicating optic nerve head atrophy. The mechanism of vision loss is from stretching of the optic nerve from the concussive motion of the globe. A small number of horses will benefit from systemic anti-inflammatories in the acute phase. The prognosis however is very guarded.
Orbital disease in horses is most commonly due to neoplasia, trauma, or infection. The symptoms of orbital disease include displacement of the third eyelid and of the globe. The globe may be externally displaced (exophthalmic) or internally displaced (enophthalmic). Orbital fracture with displacement of bones can be evident visibly or on palpation.

The most common neoplastic orbital disease in horses is lymphoma, but squamous cell carcinoma is also often seen. Lymphoma appears as blepharedema and reduced visibility of the globe. Treatment of the lymphoma usually consists of systemic therapy and topical steroids if ulceration is not present. SCC arises from extension from the eyelids or another part of the globe. Treatment of SCC is orbital exenteration if not in the bone. If it is in the bone, there are no good therapies.

Traumatic orbital injuries can be obviously seen on initial injury. The dorsal orbital rim and zygomatic arch are at greatest risk for fracture. With the poll of the skull, these bones may transmit displacing forces to the sphenoid bones, which form the internal orbital wall leading to entrapping of the globe ventrally. Treatment can be difficult to remove the entrapment and orbital meshes may be necessary to keep the eye suspended in normal position.

Orbital cellulitis or infection can be from perforation by a foreign body, direct trauma, from septic emboli, and by extension from nearby infected cavities. Clinical symptoms include swelling of the orbit with the globe and conjunctiva being exophthalmic and restrained only by the eyelids. The conjunctiva may be so swollen that the globe and other structures are hidden. There is generally a lot of pain associated with the infection.

Orbital radiographs, orbital ultrasound, and endoscopy of the nasopharynx and guttural pouches should be performed to look for abscesses or cavity infections. Treatment is the use of cold compresses to reduce inflammation, surgical drainage of abscesses if present, and treatment systemic and local antibiotics and anti-inflammatories. The prognosis for vision is dependent on how severe the swelling is and how much damage it does on the surrounding tissue.