Question

You have been managing a 7-year old male Cocker Spaniel for immune-mediated hemolytic anemia and recurrent urinary tract infections with prednisone and trimethoprim sulfa antibiotics. He now presents to you for the ocular abnormalities visible in the photo. What test is most likely to confirm your tentative diagnosis? (Image courtesy of Bradford Holmberg, DVM PhD, DACVO)

- Tonometry
- Corneal biopsy
- Pupillary light response
- Schirmer tear test
- Dilated fundic exam

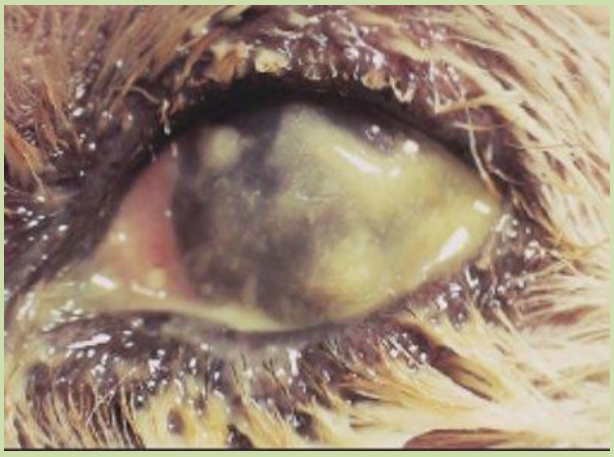
Explanation - This dog has a severe mucoid ocular discharge and corneal changes that are most consistent with keratoconjunctivitis sicca (dry eye). The history of TMS antibiotics is a likely etiology. The diagnostic test of choice for KCS is a Schirmer tear test. The other choices are not specific for the diagnosis of this condition.

Most sources state that the reference range of Schirmer tear test (STT) values is 15 to 20 mm/min in most species. But when considering the STT results, you must consider several factors. First, older dogs frequently have STT values lower than 15 mm/min but have no clinical signs of keratoconjunctivitis sicca (KCS). In addition, some animals, especially cats, have very low values (many are 0) when they are stressed in a clinic environment yet have no clinical signs of KCS.

Thus, I determine whether reduced tear production is meaningful based on two factors: 1) a lower-than-15 mm/min STT value and 2) clinical signs of KCS. For example, if an animal is presented that has a red eye or ocular discharge and a STT result of 10 to 14 mm/min, I suspect that decreased tear production is causing it—unless I can find another cause such as a corneal ulcer. On the other hand, if a cat is presented for evaluation of an eyelid mass or iris discoloration but no signs of red eye, squinting, or ocular discharge and has a STT result of 1 mm/min, I will assume that the low result is due to stress.

Question

A 6-year old West Highland White Terrier comes in to see you for the mucopurulent ocular discharge as seen in the photo below. A Schirmer tear test shows no tear production. What is the treatment of choice for canine keratoconjunctivitis sicca?

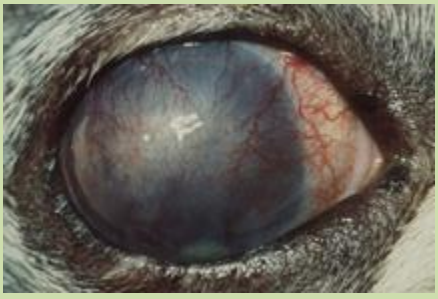


- Systemic cyclosporine and antibiotics
- Topical cyclosporine and a topical steroid
- Systemic antibiotics and corticosteroids
- Topical cyclosporine and systemic corticosteroids

Explanation - The correct answer is topical cyclosporine and a topical steroid. The treatment of KCS is aimed at reducing immune destruction of the lacrimal glands. Topical cyclosporine (**Optimmune**) and a topical steroid (frequently in a triple antibiotic/steroid ointment) are the treatment of choice.

Question

A 2-year old Pug presents with a history of a thick green ocular discharge bilaterally. A Schirmer tear test is performed and the results are as follows: 5 mm OS and 8 mm OD in 60 seconds. The eye is shown in the picture. What is the most appropriate therapy? (Image Courtesy of Brad Holmberg, DVM MS PhD DACVO)



- Latanoprost
- Cyclosporine eye drops
- Terramycin

- Carbonic anhydrase inhibitor

Explanation - The correct answer is cyclosporine eye drops. Clinical signs and findings are consistent with a diagnosis of keratoconjunctivitis sicca. The key is the reduced Schirmer tear test results. A normal tear test result would be greater than 15 mm in 60 seconds. Mucoid discharge is a classic finding, as there is **immune mediated adenitis** of the tear glands and the Pug is unable to produce normal tears. Since the disease is immune mediated, cyclosporine is indicated to reverse this process and stimulate tear production. Another acceptable option would be tacrolimus which can also be used to treat this condition.

Question

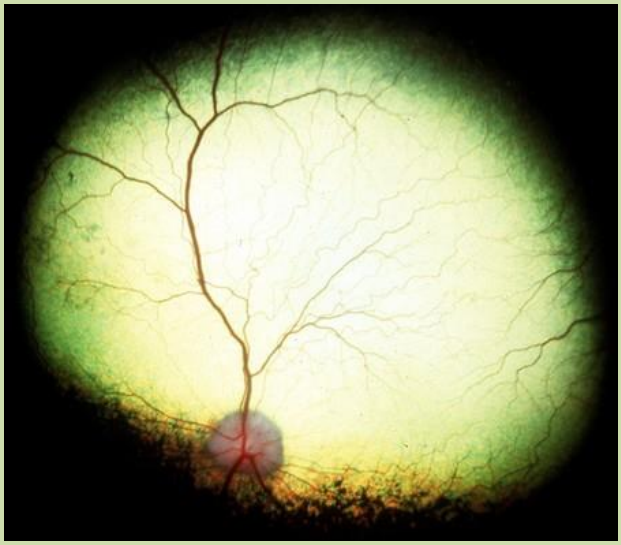
How long does it take an uncomplicated corneal ulcer in a dog to heal?

- Hours
- Days
- Minutes
- Weeks

Explanation - The correct answer is days. Although healing time varies with the size and cause of the ulcer, in general, an uncomplicated corneal ulcer will heal in **less than 5 days**. If an ulcer has been present for more than a week, it should be considered complicated and the source of complication should be looked for.

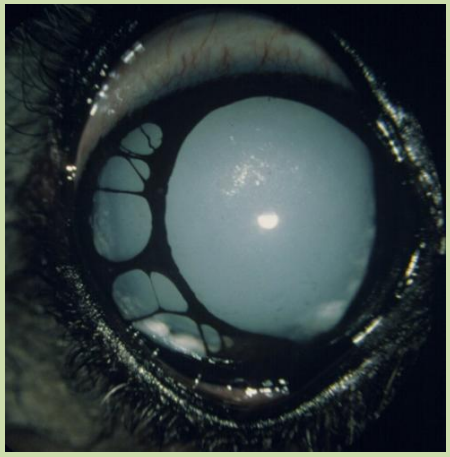
Question

You are examining a 12-year old spayed female Border Collie. You note that her pupillary light reflex is slow and incomplete. Her menace and palpebral responses are normal. You see that the iris-pupil margin is somewhat irregular. Fundic exam is shown in the image. What is the most likely cause of the slow PLR? Both eyes are similarly affected. (Image Courtesy of Brad Holmberg, DVM MS PhD DACVO)



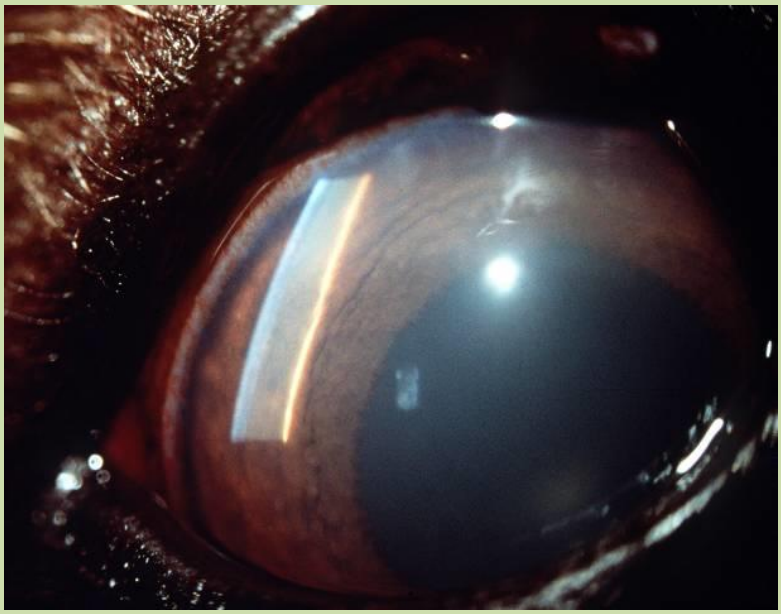
- Cranial nerve III deficits
- Progressive retinal atrophy
- Uveal neoplasia
- Iris atrophy

Explanation - The correct answer is iris atrophy. This is a normal canine fundus in the picture. Iris atrophy is a normal aging change seen in almost all dogs over 10 years old. It leads to scalloping of the iris margin and sometimes a moth-eaten stroma. It can cause absent or incomplete PLRs, dyscoria, or anisocoria. Progressive retinal atrophy is less likely, especially with a normal fundic exam. It would be weird to have bilateral CN III deficits. This is not how uveal neoplasia usually manifests.



Question

Which of these is least likely a cause for anterior uveitis as shown in this dog with aqueous flare?



- Trauma
- Systemic Lupus Erythematosis
- Coccidioides immitis infection
- Lymphoma
- Hypertension

Explanation - The correct answer is systemic lupus erythematosis. SLE causes many signs, but anterior uveitis is not considered one of them. The causes of uveitis include infection (bacterial, viral, fungal, rickettsial), immune mediated (lens-induced uveitis), neoplasia, hypertension, and trauma. Over 50% of the time, the cause is not found and the uveitis is termed idiopathic.

Question

Which of these are you least likely to see in acute glaucoma as depicted in this dog?

- Corneal edema
- Episcleral injection
- Pain
- Buphthalmos

Explanation - The answer is buphthalmos. Acute glaucoma can be a very painful condition characterized by epiphora, episcleral injection, corneal edema, and sometimes mydriasis. Buphthalmos, or an enlarged globe, does not usually occur with an acute rise in IOP and is seen more chronically.

Question

You are examining a 12-year old male castrated mixed breed dog with progressive exophthalmos and third eyelid protrusion of the left eye over the past month as shown here. On palpation, no pain is elicited but the eye does not retropulse. The owner reports that otherwise the dog has been behaving normally, and physical exam is otherwise unremarkable. What is the most likely diagnosis? (Image Courtesy of Brad Holmberg, DVM MS PhD DACVO)

- Orbital neoplasia
- Endophthalmitis
- Retrobulbar abscess
- Intraocular neoplasia

Explanation - The correct answer is orbital neoplasia. These are the typical signs of orbital neoplasia, which is somewhat common in older dogs. Infections are usually accompanied by more systemic signs and localized pain and erythema. Endophthalmitis and intraocular neoplasia would not cause exophthalmos but would manifest with intraocular signs.

Question

Keratoconjunctivitis sicca, as seen in the image, comes from an abnormality in which of these structures? (Image Courtesy of Brad Holmberg, DVM MS PhD DACVO)

- Nasolacrimal ducts
- Meibomian gland
- Conjunctival goblet cells
- Lacrimal gland and gland of the 3rd eyelid

Explanation - The correct answer is lacrimal gland and gland of the 3rd eyelid. KCS comes from a decrease of the aqueous portion of the tear film. This is produced by the lacrimal gland and the gland of the 3rd eyelid. Remember, there are three layers of the tear film.

The mucous portion lies against the cornea and keeps the tear film adhered to it. This is made by conjunctival goblet cells.

The aqueous portion has nutritional and immunologic factors and is in the middle. It is produced by the lacrimal gland and the gland of the 3rd eyelid.

The lipid portion of the tear film is the most outer part, and it allows for even spreading and prevents evaporation of tears. It is produced by the meibomian glands.

Question

Which of these is not a potential effect of chronic anterior uveitis in dogs?

- Keratoconjunctivitis sicca
- Corneal scarring
- Cataracts
- Glaucoma

Explanation - The correct answer is keratoconjunctivitis sicca. Chronic uveitis can lead to cataract formation and corneal scarring because the inflammatory mediators in the anterior chamber can destroy corneal and lens proteins. It can lead to glaucoma when debris from uveitis plugs the iridocorneal angle. Uveitis cannot extend into the lacrimal glands and destroy them.

Question

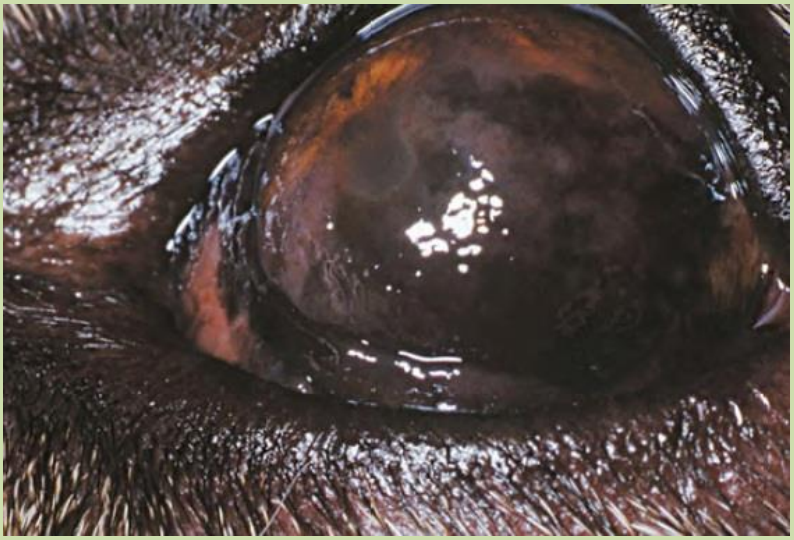
Dogs with which endocrinopathy have an increased incidence of sudden acquired retinal degeneration syndrome (SARDS)?

- Diabetes mellitus
- Hyperparathyroidism
- Hypothyroidism
- Hyperadrenocorticism
- Addison's

Explanation - The correct answer is hyperadrenocorticism. SARDS is frequently seen in middle-aged obese spayed females and often have signs of PU/PD and polyphagia as well as increased liver enzymes and cholesterol. The reason for the association of Cushing's disease and SARDS is poorly understood.

Question

This 8-year old female spayed Pug is being treated for chronic superficial keratitis without much success. You suspect this is a result of poor owner compliance with the medications you prescribed. What is the most likely Schirmer tear test value?



- 6 mm/min
- 22 mm/min
- 15 mm/min
- 27 mm/min

Explanation - A normal Schirmer tear test is considered to be greater than 15 mm/min. A value between 10-15 mm/min is considered marginal and may or may not be consistent with Keratoconjunctivitis Sicca (KCS), which is dry eye. When diagnosing KCS it is important to have a good clinical picture, especially when the Schirmer tear test is in the gray area.

Question

You examine a Basset Hound with primary glaucoma in one eye. What would you tell the owner about his prognosis for the other eye?

- This is very strange because glaucoma almost always occurs bilaterally
- It will probably also develop glaucoma in 6-12 months
- It will probably develop glaucoma within the next 1-3 months
- It has no increased chance of developing glaucoma

Explanation - The correct answer is that it will probably also develop glaucoma in 6-12 months. The usual course for primary glaucoma is development in one eye with the contralateral eye following in 6-12 months. These animals have an iridocorneal angle that becomes increasingly compromised during the first few years of life and eventually causes an acute pressure spike in the eye.

Question

You examine a dog with bilateral blepharospasm, mucoid ocular discharge, and 360 degree corneal vascularization. What test will most likely give you a diagnosis as to the cause of these signs?

- Schirmer tear test
- Tonometry
- Fundic exam
- Fluorescein dye stain

Explanation - The correct answer is Schirmer tear test. A mucoid ocular discharge is the primary sign of keratoconjunctivitis sicca. A Schirmer tear test measures the amount of aqueous tear film being produced. In KCS, it should measure very low.

Question

The image of the eye below is from a canine patient diagnosed with keratoconjunctivitis sicca (KCS). This condition causes a decrease in tear production which then results in the classic changes observed in this image. Which of the following is not an etiology of the disease?

- Sulfonamide toxicity
- Long-term atropine administration
- Immune mediated
- Penicillin toxicity

Explanation - In canine patients, the most common cause of KCS is immune mediated. This is why these patients are treated with cyclosporine, a t-cell modulator. Penicillins have not been documented to result in KCS. Sulfonamide containing antibiotics, such as TMS have been shown to cause KCS in some patients. Long-term atropine administration has also been shown to result in KCS. Atropine is a parasympatholytic and will result in decreased tear production. Etodolac has also been associated with KCS in dogs. The corneal pigmentation seen is a nonspecific response to chronic irritation or inflammation. There is also evidence of corneal vascularization which occurs as part of the inflammatory and healing response.

Question

Which of these is usually the cause of glaucoma as depicted in this dog?

- Decreased outflow of vitreous
- Increased outflow of aqueous
- Increased production of aqueous
- Increased production of vitreous
- Decreased outflow of aqueous

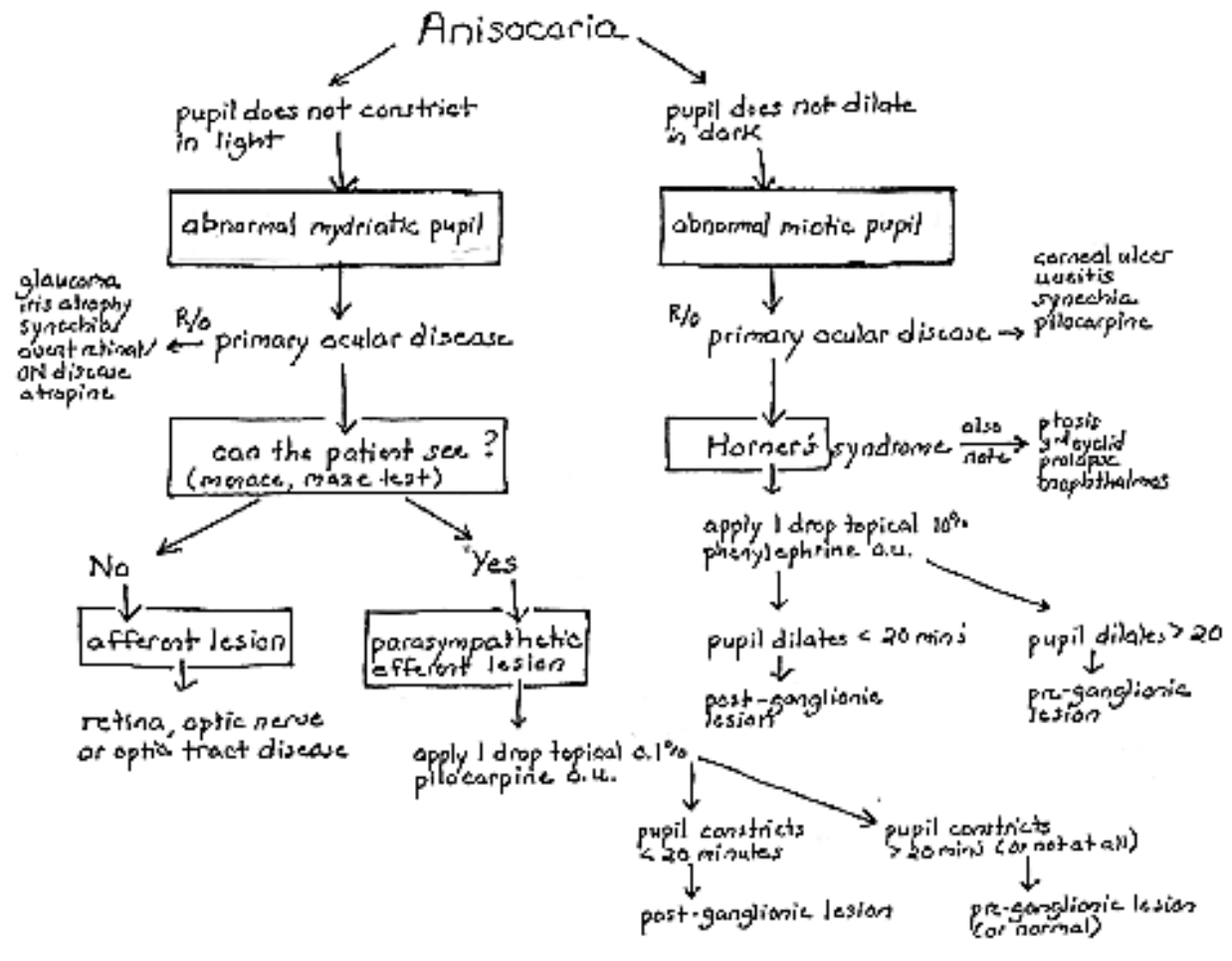
Explanation - The correct answer is **decreased outflow of aqueous**. Glaucoma is an increase in IOP which is dependent on production of aqueous and outflow of aqueous. Clinical increases are always from decreased outflow although treatment can be aimed at either increasing outflow or decreasing production of aqueous.

Question

You are examining the eyes of a dog with all the signs of Horner's syndrome. After instilling topical hydroxyamphetamine, there is no change. You then instill topical phenylephrine and in 5 minutes, the eye returns to normal. What can you conclude about this dog's Horner's?

- The Horner's is idiopathic in origin
- He has a post-ganglionic lesion
- He has a pre-ganglionic lesion
- The Horner's has only been present for less than 24 hours
- The Horner's has been present for a long time

Explanation - The answer is that he has a post-ganglionic lesion. Hydroxyamphetamine acts by encouraging release of norepinephrine from the neuromuscular junction. If there is a pre-ganglionic lesion, NE will still be released by the postsynaptic neuron and signs will resolve. If there is a post-ganglionic lesion, there will be no NE to release. Also, with a post-ganglionic lesion, denervation hypersensitivity to NE occurs. As a result, adding phenylephrine topically can cause a rapid response. With pre-ganglionic lesions, the response usually takes greater than 20 minutes.



Question

What changes are seen on electroretinogram (ERG) with sudden acquired retinal degeneration syndrome (SARDS) in dogs?

- Decreased ERG amplitude (weakened response)
- Increased ERG amplitude (exaggerated response)
- Normal ERG amplitude
- Flat-line ERG (no response)

Explanation - The correct answer is flat-line ERG. By definition, an animal with SARDS has a flat-line ERG from day 1 of onset of the condition

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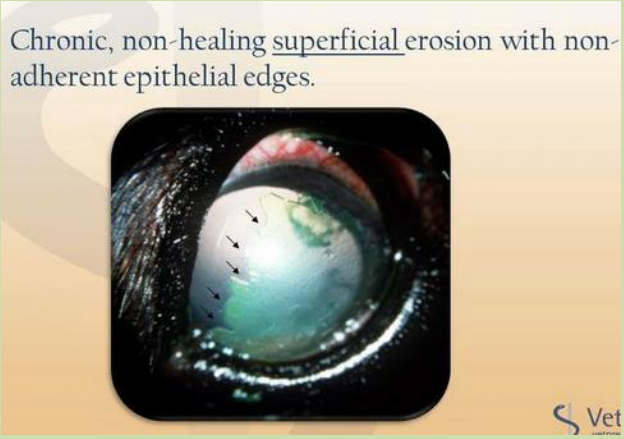
Question

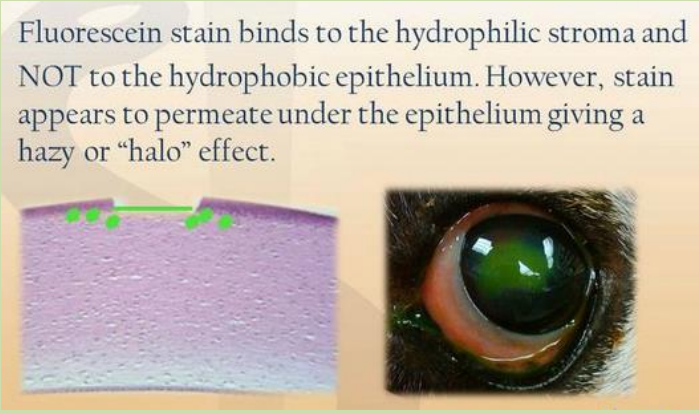
A 6-year old Boxer dog presents to your clinic with the complaint of blepharospasm of 2 weeks duration. A Schirmer tear test and tonometry of the affected eye are normal, but on fluorescein dye stain, you see an intensely staining area surrounded by a "halo" of lighter stain. What is the most likely diagnosis?

- Herpesvirus infection
- Infected corneal ulcer
- Indolent corneal ulcer
- Descemetocele

Explanation - The correct answer is **indolent corneal ulcer (aka Boxer ulcer)**.

The 2-week duration and staining pattern are typical of indolent ulcers. Boxers are also frequently affected by this condition. An indolent ulcer occurs due to a defect in the ability of the corneal epithelium to adhere.





Question

Which of these is not a proper treatment for glaucoma (primary or secondary) in a dog?

- Topical dorzolamide (carbonic anhydrase inhibitor)
- Oral methazolamide (carbonic anhydrase inhibitor)
- Topical latanoprost (prostaglandin analog)
- Topical mannitol
- IV mannitol

Explanation - The answer is topical mannitol. Carbonic anhydrase inhibitors act by decreasing aqueous production which is partially dependent on the conversion of carbon dioxide to bicarbonate. It can be used topically or systemically. Latanoprost (Xalatan) is a prostaglandin analog frequently used topically in the treatment of glaucoma. IV mannitol works to decrease IOP through its properties as an osmotic attractant. It is not used topically.

Question

A 1-year old female Golden Retriever presents with bilateral exophthalmos that has taken place over the past 2 days. It is not painful, and no swelling is evident. The dog is otherwise healthy. What condition do you suspect?

- Orbital neoplasia
- Extraocular polymyositis
- Lymphoma
- Retrobulbar abscess

Explanation - The answer is **extraocular polymyositis**. Extraocular polymyositis is a condition seen primarily in young Goldens and they present with the signs above. It is kind of similar to masticatory muscle myositis in that it occurs due to an autoimmune reaction against muscle antigens. It is treated with prednisone +/- azathioprine. The condition can be differentiated from these other conditions because orbital neoplasia and retrobulbar abscesses are usually unilateral. Abscesses are usually accompanied by more systemic signs. Orbital neoplasia is usually more slowly progressive and seen in older animals. Lymphoma could present in a similar fashion but is less likely in such a young dog with no other signs.

Question

What is the treatment of choice for traumatic proptosis of the eye as shown in this image?

- Exenteration
- Push globe back into orbit with sterile blunt instrument
- Tarsorrhaphy
- Conjunctival flap
- Phacoemulsification

Explanation - The answer is tarsorrhaphy. Tarsorrhaphy is the treatment of choice for proptosis. In this procedure, the eyelids are pulled in front of the proptosed globe rather than pushing the eye in and then temporarily suturing the lids shut. Exenteration is a procedure used to remove eyes with neoplasia that is infiltrating into the surrounding structures. A conjunctival flap is a procedure usually used to help healing of complicated corneal ulcers. Phacoemulsification is the procedure used to remove cataracts.

Question

A 7-year old female spayed **Cocker Spaniel** presents for an inflamed and buphthalmic left eye. She has a history of bilateral cataracts but can still see relatively well. Intraocular pressures were taken and the left eye was found to be high, while the right eye was within normal limits. What is the most likely cause for the increased intraocular pressure in the left eye?

- Increased production of aqueous due to inflammation
- Sequela of the cataracts
- A retrobulbar mass
- Inherited glaucoma

Explanation - The correct answer is inherited glaucoma. Cocker Spaniels are predisposed to developing eye problems such as cataracts, distichiasis, retinal abnormalities, and primary glaucoma.

Even though only the left eye currently has increased intraocular pressures, the right eye should be treated as well because it will likely develop glaucoma in the future.

Question

Which of the following is NOT indicated in the treatment of idiopathic anterior uveitis in a dog?

- Topical dexamethasone
- Systemic carprofen
- Topical atropine
- Systemic prednisone
- Topical antibiotics

Explanation - The answer is **topical antibiotics**. The goal in treatment of idiopathic uveitis is to reduce inflammation and resultant intraocular damage. **Topical steroids** are frequently used (prednisolone or dexamethasone but not hydrocortisone). **Topical NSAIDS** such as flurbiprofen or Voltaren are newer treatment options. **Topical atropine** is used to relieve ciliary spasm and reduce posterior synechia development; however, caution should be exerted as the potential to exacerbate secondary glaucoma exists. **Systemic steroids** are an option and can be used even if a patient has a corneal ulcer in contrast to topical steroids. Systemic steroids should only be used after you have ruled out systemic infection as a cause of the uveitis. **Systemic NSAIDs** such as carprofen or flunixin are also options. Topical antibiotics are not indicated in the treatment of this disease as there is no identifiable infectious component. They are often given anyway because triple antibiotic ointments with dexamethasone are often the cheapest and easiest source of a topical steroid preparation.

Question

Lens removal is strongly recommended for several conditions. Which of these conditions necessitates immediate lens removal?

- Progressive retinal atrophy
- Posterior lens luxation
- Incipient cataract
- Anterior uveitis
- Anterior lens luxation

Explanation - The correct answer is **anterior lens luxation**. Lens removal is indicated in cases of anterior lens luxation because they usually cause discomfort and usually cause uveitis and glaucoma. Posterior lens luxations are usually innocuous and can be left on the floor of the vitreous cavity. An incipient cataract should only have a minor effect on vision and does not necessitate lens removal. Uveitis and retinal atrophy will not be improved by lens removal. Keep in mind that an argument could be made for removal of the lens in both posterior lens luxation and the cataract; however, the best answer choice is still anterior lens luxation.

Question

The dog in the photograph below presents to you for the pictured ophthalmic abnormality. You surgically remove the affected structure. What disease have you put the dog at increased risk for developing in the future? (Image courtesy of Bradford Holmberg, DVM PhD DACVO)

- Glaucoma
- Chronic uveitis
- Ectropion
- Cataract
- Keratoconjunctivitis sicca

Explanation - The abnormality pictured is "cherry eye" or prolapse of the third eyelid. Recommended therapy is gland replacement by the Morgan pocket technique or Kaswan anchoring technique.

Removal of the gland places dogs at increased risk of developing keratoconjunctivitis sicca (KCS), as the third eyelid gland contributes significantly to tear production.

Question

The Pug in the picture presents on emergency. What is the likely cause of this condition?

- Immune mediated disease
- Glaucoma
- Trauma
- Infection
- Intoxication

Explanation - The correct answer is trauma. Traumatic proptosis is very common in brachycephalic breeds and is the lesion in the picture.

Question

When examining the eye of a 6-year old Labrador Retriever, you see the brown, round circular masses shown in the image free floating in the anterior chamber. What is the most likely diagnosis?

- Ocular lymphoma
- Uveal melanoma
- Viral infection
- Uveal cyst

Explanation - The correct answer is **uveal cyst**. This description is most consistent with a uveal cyst and not a melanoma because it is free-floating. It is often difficult to distinguish these two conditions because cysts can also be attached to the pupillary margin or posterior iris. The other way to try to distinguish the two is with **transillumination**. Melanomas will not transilluminate while many cysts will. Also, cysts are usually very spherical or ovoid and smooth while melanomas are usually fleshier-appearing masses.

Question

You examine a Vizsla with blood in the anterior chamber of the eye as shown in this image and keratic precipitates on the posterior cornea. What is the most accurate diagnosis based on these findings?

- Chorioretinitis
- Anterior uveitis
- Coagulopathy
- Glaucoma

Explanation - The correct answer is **anterior uveitis**. Hyphema and keratic precipitates are specific signs of anterior uveitis. At this point, the cause is undetermined in this animal. While some of these other answer choices may be present in conjunction with uveitis, they are not described by the signs listed in the question

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Question

What is the difference between an incomplete and a complete cataract?

- An incomplete cataract is a focal change, and a complete cataract is diffuse throughout the lens.
- An incomplete cataract is in the center of the lens and is a normal aging change. A complete cataract involves the entire lens and is abnormal.
- An incomplete cataract occurs after the development of a complete cataract due to degradation of the lens fibers.
- Both are diffuse changes throughout the lens, but the animals can see through an incomplete cataract.

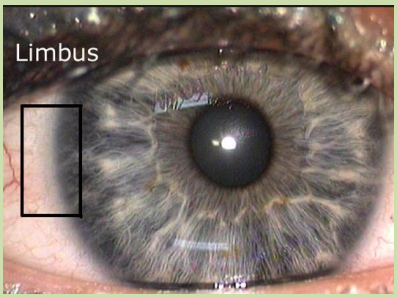
Explanation - The correct answer is that both are diffuse changes throughout the lens, but the animals can see through an incomplete cataract. An incomplete cataract is not completely opacified and a tapetal reflection can be seen through it. The animal can see through an incomplete cataract, albeit probably not as clearly as through a normal lens. A complete cataract is a completely opacified lens that cannot be seen through and through which a tapetal reflection cannot be seen. A focal cataract is referred to as an **incipient cataract**. The normal aging change to the center of the lens is nuclear sclerosis. Degradation of lens proteins after developing a cataract is termed a resorbing cataract.

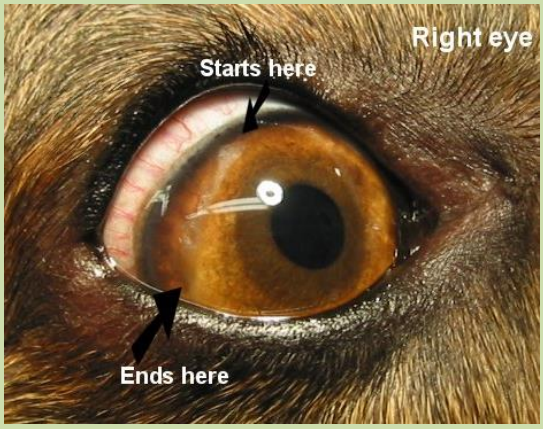
Question

You are examining the eyes of a 4-year old German Shepherd. You see corneal melanosis and vascularization along the lateral aspect of the limbus. Both eyes show similar lesions. A Schirmer tear test is normal, and fluorescein dye is negative for stain uptake. What is the most likely diagnosis?

- Trauma
- Ocular lymphoma
- Chronic superficial keratitis
- Keratoconjunctivitis sicca

Explanation - The answer is **chronic superficial keratitis**, sometimes referred to as **pannus**. It is a condition seen mainly in German Shepherd and shepherd crosses and is due to UV light exposure. It is believed that the UV light alters corneal proteins leading to an immune reaction. It is treated with topical steroids and cyclosporine, and animals often require lifelong therapy. KCS is not the correct choice because of the normal tear test. Lymphoma in the eye should cause changes in the uvea or retina but rarely the cornea





Question

Which of these drugs is known to cause keratoconjunctivitis sicca in some dogs?

- Trimethoprim-sulfa

- Cyproheptadine
- Cyclosporine
- Carprofen

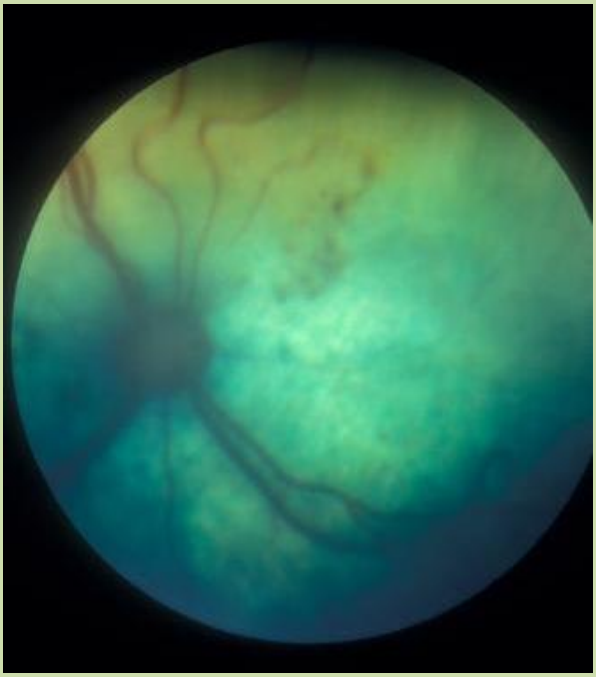
Explanation - The correct answer is trimethoprim-sulfa. One of the main potential side effects of sulfa drugs is KCS. Other drugs that can cause KCS include atropine, general anesthetics, and interestingly, EtoGesic (etodolac). Cyclosporine is used in the treatment of KCS.

Question

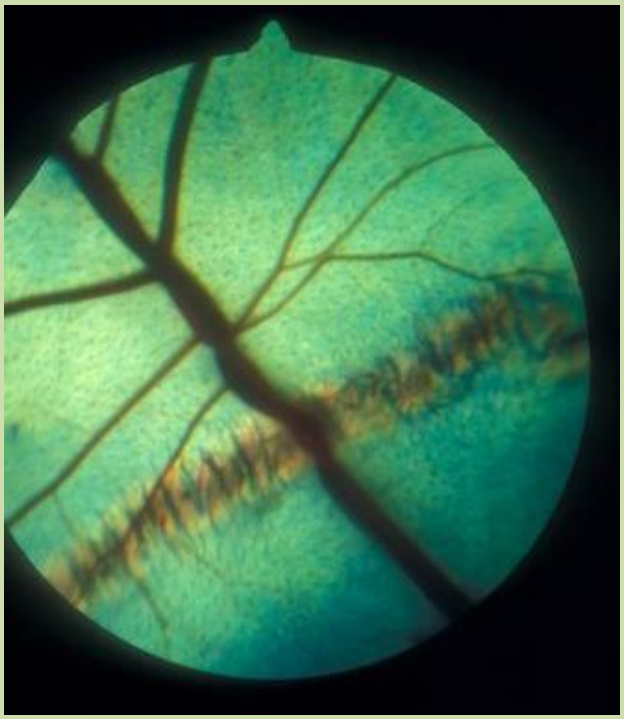
Which of these is not a sign of ongoing or acute chorioretinitis in dogs?

- Poorly defined gray spots throughout the fundus
- Retinal separation
- Retinal hemorrhage
- Multifocal areas of tapetal hyperreflectivity

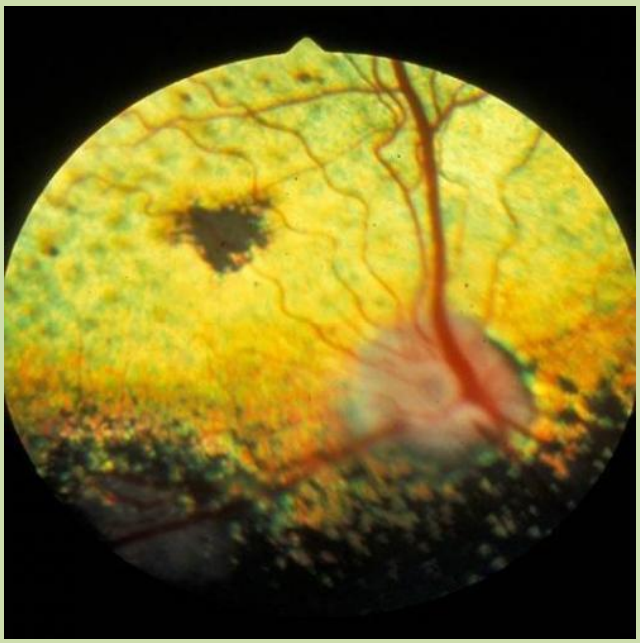
Explanation - The correct answer is multifocal areas of tapetal hyperreflectivity. Poorly defined gray spots indicate areas of cellular infiltration during acute chorioretinitis. Retinal separation and hemorrhage are also commonly seen in acute cases. Hyperreflectivity is a sign of previous damage or chronic chorioretinitis.



Active chorioretinitis, cat. In active chorioretinitis, the normally transparent retina becomes infiltrated with edema, inflammatory exudates, and cells appearing as raised, translucent, or cloudy areas. This lesion is consistent with histoplasmosis



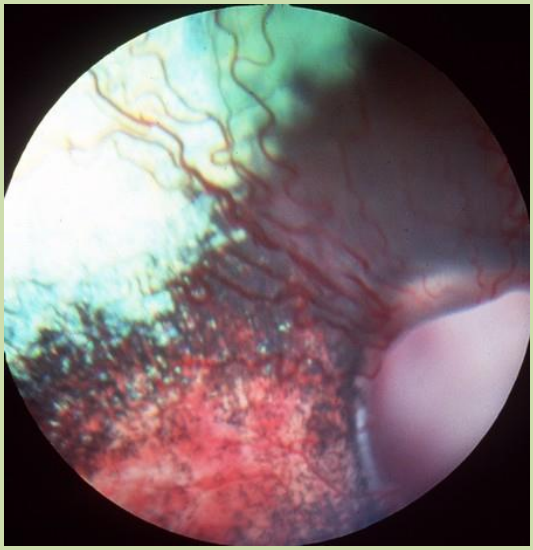
Previous chorioretinitis, adult Guernsey cow. When chorioretinits resolves, often the inflamed tissues become pigmented, and changes in the reflectivity of the tapetal fundus result. This lesion was associated with previous bacterial septicemia.



Both active and inactive chorioretinitis, dog with systemic blastomycosis. Both active (gray area next to optic nerve head)) and inactive (black area in central tapetal fundus) chorioretinitis in a hunting dog affected with testicular blastomycosis.

Question

Which of these breeds of dogs has a congenital ocular anomaly characterized by choroidal hypoplasia, manifested by varying degrees of visual dysfunction with signs of large bizarre choroidal vessels visible on fundic exam as depicted here?



- German Shepherd Dog
- Boston Terrier
- Collie
- Toy Poodle

Explanation - The correct answer is collie. **Collie Eye Anomaly** is seen in up to 80% of the breed. Some are completely blind and others show no visual deficits. Other signs include optic disc coloboma, retinal hemorrhage and retinal separation.

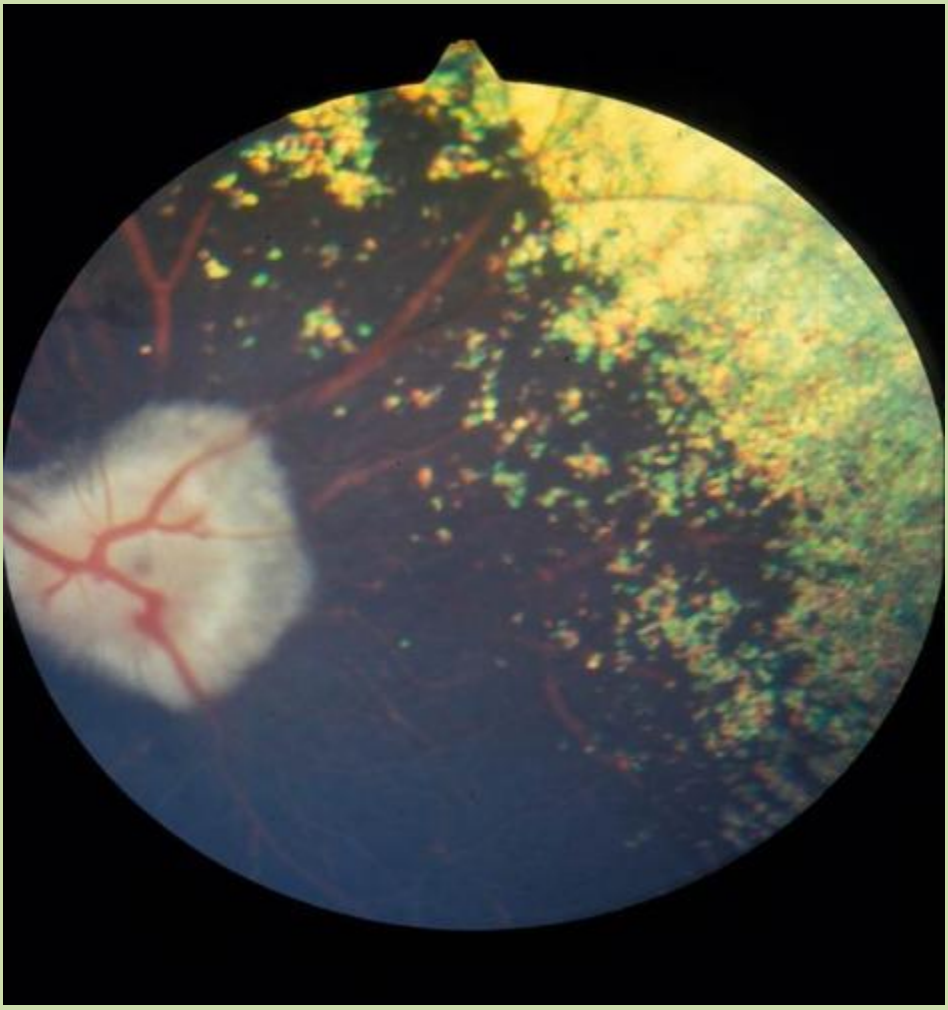
Question

You are examining a 3-year old female Miniature Poodle whose owner complains that she has been bumping into things more and more recently, especially at night. On fundic examination, you note tapetal hyperreflectivity, gray, vermiform lines on the fundus, retinal vascular attenuation, and a pale optic disc. Which of these choices is the most likely cause of her problem?

- Sudden Acquired Retinal Degeneration Syndrome (SARDS)
- Taurine Deficiency
- Progressive Retinal Atrophy (PRA)
- Glaucoma

Explanation - The correct answer is PRA. **Progressive retinal atrophy**, sometimes called progressive retinal degeneration is an inherited retinal disease seen in several breeds but most notably Toy and Miniature Poodles. Age of onset is variable, but signs are usually night blindness progressing to complete blindness due to loss of rods prior to cones. Retinal lesions are classically

the ones described in this case. It is differentiated from SARDS by the clinical course and the fact that there are no retinal lesions in acute SARDS. You could see similar retinal lesions from glaucoma but would expect more clinical signs and you wouldn't have night blindness progressing. Taurine deficiency causes retinal lesions in cats not dogs, and they have a different appearance.



Changes in tapetal reflectivity, reduced retinal vascularity, and early optic nerve atrophy are consistent with the diagnosis of progressive retinal atrophy.

Question

A 6-year old intact male domestic short haired cat presents with acute onset exophthalmos of the right eye in the past 2 days. He is painful on palpation around his eye and head. The eye can be retropulsed with minimal resistance. He has not been eating in the past day and has a rectal temperature of 103.4F. What is the most likely diagnosis?

- Anterior uveitis
- Retrobulbar abscess
- Orbital neoplasia
- Glaucoma

Explanation - The answer is a **retrobulbar abscess**. Acute, painful exophthalmos is usually due to retrobulbar abscessation. These lesions are **usually painful** and may be swollen. These animals are frequently systemically ill with fever and leukocytosis. Causes of retrobulbar abscesses include penetrating wounds, foreign bodies, spread from dental or sinus infection, and hematogenous spread. Glaucoma does not cause exophthalmos, although, chronically it can cause buphthalmos which may appear similar. Anterior uveitis also does not cause exophthalmos.

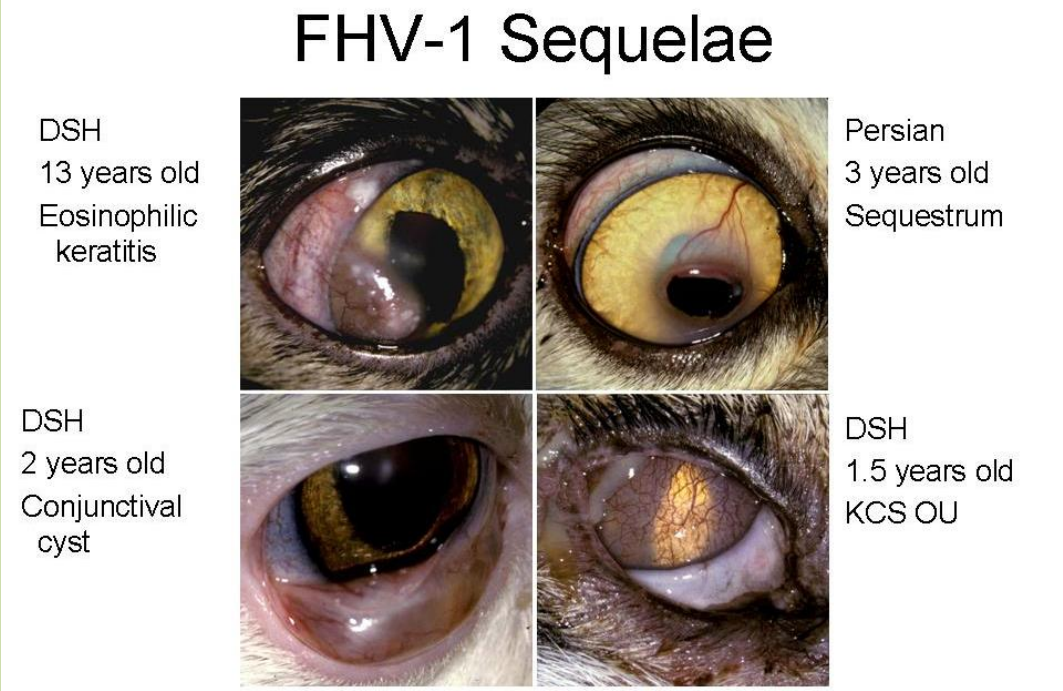
Question

Which of these is not an ocular manifestation of herpesvirus in cats?

- Corneal sequestrum
- Conjunctivitis
- Eosinophilic keratitis
- Corneal ulcers
- Corneal dermoid

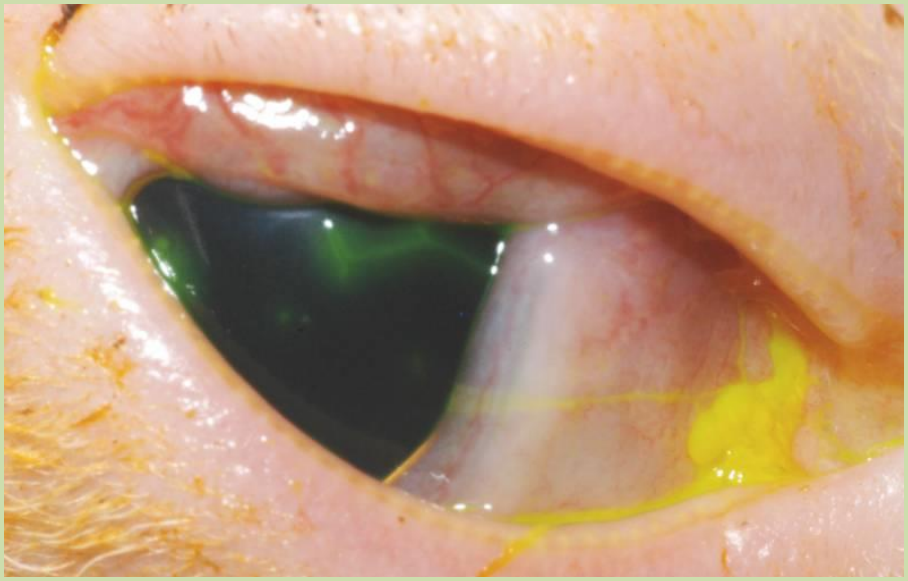
Explanation - The answer is corneal dermoid. Corneal dermoids are congenital lesions. **Eosinophilic keratitis** and **corneal sequestrum** are **specific** corneal lesions caused by herpes infections. Corneal ulcers can be initiated by herpes virus. Conjunctivitis is also caused by herpesvirus, although there are many other causes as well, including calicivirus.

Dermoid is a congenital defect where haired skin is located in an abnormal place on an eye and will often irritate the cornea and can cause ulcers.



Question

You examine a cat with unilateral blepharospasm, conjunctival hyperemia, and epiphora of the right eye. You perform a fluorescein stain and the eye is shown in the image. What is the most likely cause?



- Herpesvirus infection
- Keratoconjunctivitis sicca
- Corneal dystrophy
- Trauma

Explanation - The correct answer is herpesvirus infection. Herpesvirus is **the only infectious cause of corneal ulcers in cats** although they can become infected secondarily with bacteria. Herpes causes characteristic ulcers which are linear or sometimes referred to as dendritic ulcers. The lesions tend to be unilateral but can be bilateral. Usually, this is a persistent or recurrent disease that often flares up with stress.

Question

This 2-year old domestic short haired cat presents for ocular pain and the changes seen in the photograph. The palpebral fissure of the left eye is larger than the right. What is the most likely diagnosis?

- Anterior uveitis
- Herpesvirus
- Glaucoma
- Chorioretinitis

Explanation - The correct answer is glaucoma. Key features to note is that the eye is buphthalmic and painful. There is corneal edema present as is evident by the blue haze over the cornea. An appropriate next step would be to inspect the eye for aqueous flare and measure pressures.

Question

Which of these signs is unlikely to be seen in a cat with glaucoma?

- Fundic changes (hyperreflectivity, vascular attenuation, pale optic disc)
- Buphthalmos
- Mydriasis
- Strabismus

Explanation - The answer is strabismus. Cats rarely show acute changes with glaucoma like dogs, so they often present with signs of chronic glaucoma which are buphthalmos, corneal fibrosis, lens luxations, mydriasis, tapetal hyperreflectivity and retinal vascular attenuation, and pale optic discs. Strabismus is not a component of glaucoma.

Question

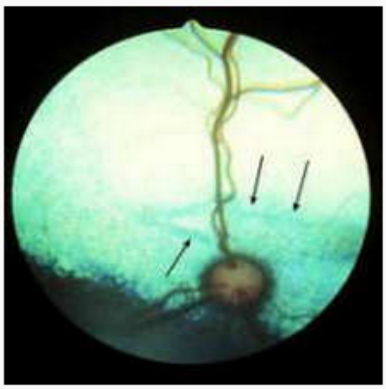
Taurine deficiency in cats causes what abnormality in the eye?

- Central retinal degeneration

- Progressive retinal atrophy
- Sudden acquired retinal degeneration
- Glaucoma
- Anterior uveitis

Explanation - The answer is **central retinal degeneration**. Cats with taurine deficiency can develop feline central retinal degeneration (FCRD) in addition to DCM. This is because photoreceptors contain large amounts of taurine, and cats cannot synthesize it. The classic lesion is an elliptical area of tapetal hyperreflectivity starting in the area centralis dorsolateral to the optic disk that progresses to a horizontal band and eventually can involve the entire fundus.

Retinal degeneration occurs as an inherited condition less commonly in cats than in dogs. The condition has been identified as a specific genetic entity in the Abbyssian cat where rod/cone degeneration occurs which a highly variable age of onset (4 months to 6 years). A slowly progressive form of non-inherited retinal degeneration is associated with dietary taurine deficiency. The condition was originally described in 1975 and named Feline Central Retinal Degeneration (FCRD). Although most species are able to endogenously synthesize taurine from cysteine, this ability is limited in the cat. Commercial cat foods contain adequate levels of taurine and this form of nutritional retinal degeneration is seen most often in cats fed predominantly dog food.



Central retinal degeneration in a cat. Note the horizontal band of tapetal hyperreflectivity indication retinal thinning.

Question

Which of the following causes the lesions seen in this picture of a cat's retina?

- Taurine deficiency
- Arginine deficiency
- Thiamin deficiency
- Cobalamin deficiency

Explanation - Cats with taurine deficiency can develop feline central retinal degeneration (FCRD) in addition to cardiomyopathy. This is because photoreceptors contain large amounts of taurine and cats cannot synthesize it. The classic lesion is an elliptical area of tapetal hyperreflectivity starting in the area centralis dorsolateral to the optic disk that progresses to a horizontal band and eventually can involve the entire fundus.

Question

What is the most common reason for post-anesthetic cortical blindness in cats?

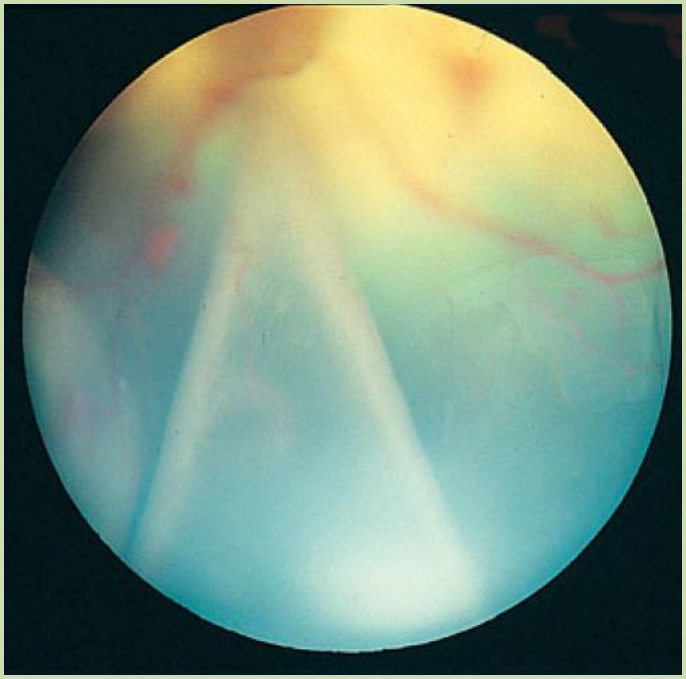
- Arrhythmias
- Hypoxia
- Gas anesthetic reaction
- Elevated end-tidal CO2

Explanation - Post anesthetic cortical blindness results from **poor perfusion (hypoxia)** during anesthesia. The visual cortex is extremely sensitive to the effects of hypoxia (poor oxygenation) which can result in blindness. Not all arrhythmias will necessarily compromise tissue perfusion (for example isolated VPC's or first degree AV block etc.). Hypersensitivity or allergy to anesthetic gases used (such as isoflurane gas) are rarely documented. Elevated end-tidal CO2 indicates poor

ventilation (such as from inadequate fresh gas flow, increased dead space, saturated up soda-lyme, a deep anesthetic plane, etc.), but not necessarily poor perfusion.

Question

A 14-year old cat presented with a sudden total loss of sight and obvious hyphema completely filling the left anterior chamber. There was no ocular pain and the right pupil remained dilated and nonresponsive. Fundoscopic examination of the left eye was not possible but the right fundus is shown. What diagnostic tests are recommended to confirm the most likely underlying cause of this abnormality?



- Abdominal ultrasound, pre- and post-prandial bile acids
- Intraocular pressure measurement, complete blood count, coagulation profile
- Blood glucose curve, serum fructosamine levels, urinalysis
- Thoracic radiographs, serum ionized calcium levels, parathyroid hormone assay
- Systolic blood pressure measurement, serum chemistry panel, and thyroid hormone levels

Explanation - This is an image of a retinal detachment. In a cat of this age, the most likely underlying cause or abnormality is **hypertension**, likely secondary to renal and/or thyroid disease. Therefore, the best answer choice is to measure systolic blood pressure, serum chemistry to assess renal values, and thyroid hormone levels to assess for hyperthyroidism.

Question

A cat presents to your clinic with phthisis bulbi, and corneal edema and scarring. About a year ago, the cat had a history of having a cat fight and was scratched in the eye. The eye is not visual as it

has no menace, and there is no pupillary response in either eye when light is shined in the affected eye. The eye does not seem to be painful at this time. What should you recommend?

- Monitor the eye and plan enucleation if further clinical signs develop
- Enucleation
- Use lubricating ointments to protect the eye
- Suture the eyelids to protect the eye

Explanation - The correct answer is enucleation. In a cat with a history of penetrating ocular trauma and subsequent blind eyes, this is very suspicious for **feline traumatic sarcoma**. This is a unique tumor of cats and is a very malignant intraocular neoplasm. Eyes almost always develop phthisis prior to showing neoplasia. This can occur years after the inciting trauma. The treatment is early enucleation because if you wait for signs to develop, the tumor has frequently already metastasized.

Phthisis bulbi is a shrunken, non-functional eye. It may result from severe eye disease, inflammation, injury, or it may represent a complication of eye surgery

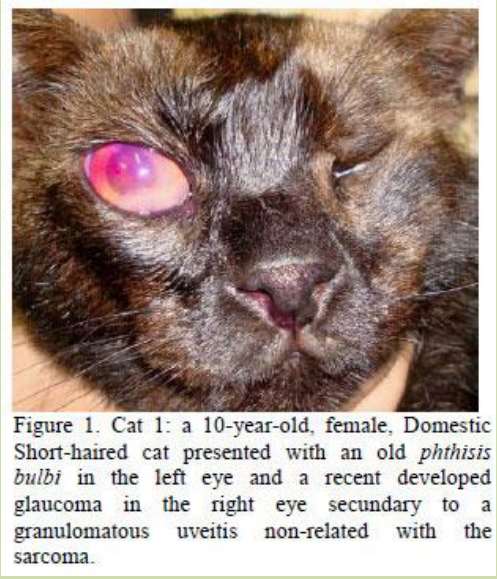


Figure 1. Cat 1: a 10-year-old, female, Domestic Short-haired cat presented with an old *phthisis bulbi* in the left eye and a recent developed glaucoma in the right eye secundary to a granulomatous uveitis non-related with the sarcoma.

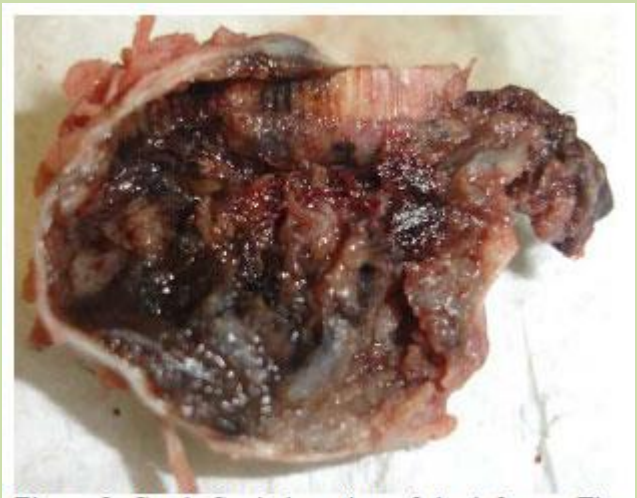
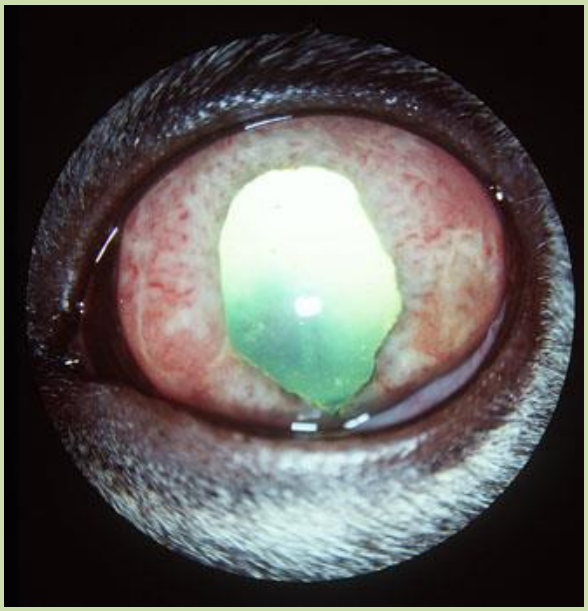


Figure 2. Cat 1. Sagital section of the left eye. The neoplasia is occupying the entire intraocular space.

Question

Rubiosis iridis as seen in this cat is a sign of what process in the eye?

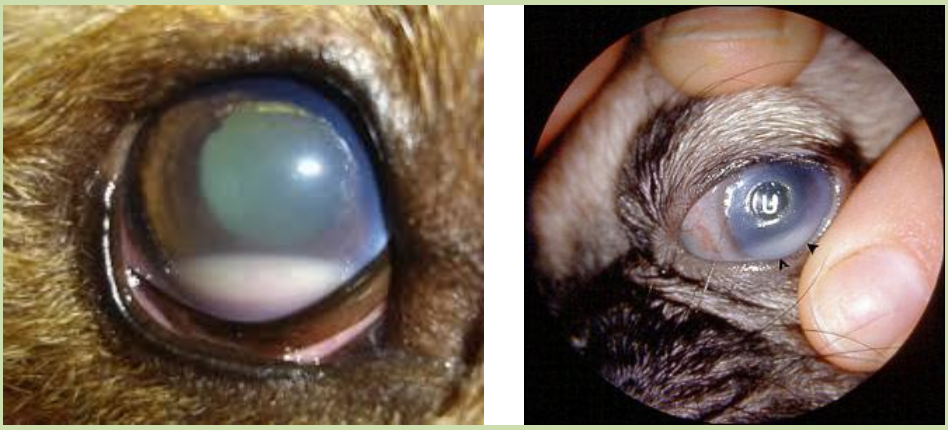


- Chorioretinitis
- Lens luxation
- Iris atrophy
- Anterior uveitis
- Glaucoma

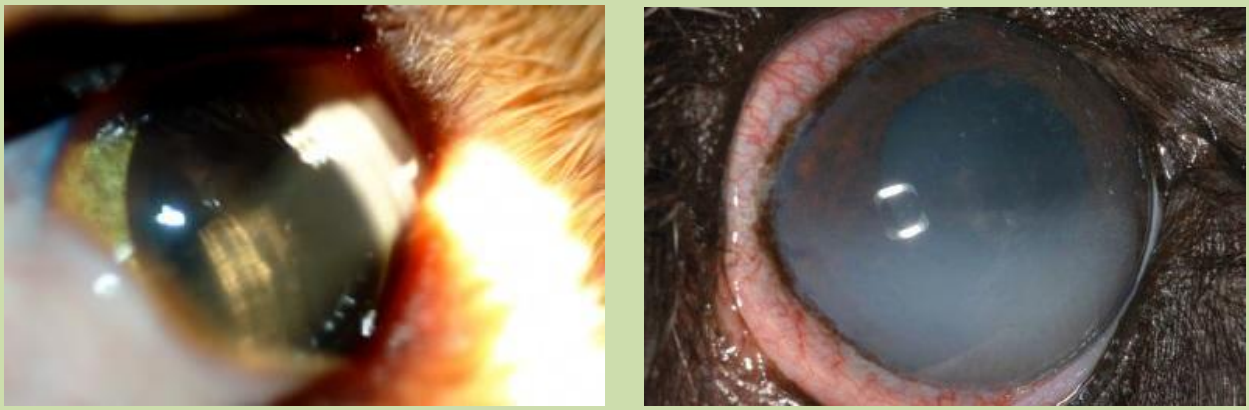
Explanation - The correct answer is **anterior uveitis**. Rubiosis iridis along with other signs such as aqueous flare, hyphema, hypopyon, keratic precipitates, and decreased intraocular pressure are all suggestive of anterior uveitis which can be caused by a number of infectious, immune-mediated, traumatic, and idiopathic causes.

NB : Rubeosis iridis is a medical condition of the iris of the eye in which new abnormal blood vessels (i.e. neovascularization) are found on the surface of the iris

Hyphema is RBCs in the anterior chamber of the eye)



Hypopyon is WBCs in the anterior chamber of eye



Aqueous flare is a pathognomonic sign of uveitis and is due to breakdown of the blood-ocular barrier with subsequent leakage of proteins into the anterior chamber.

Keratic precipitates (inflammatory cells adhered to the corneal endothelium)

Question

A cat presents with a proptosed left eye. You replace the globe and repair lacerated extra-ocular muscles. What additional procedure is indicated before waking the cat from anesthesia?

- Temporary tarsorrhaphy
- Corneal graft
- Conjunctival graft
- Third eyelid flap

Explanation - The correct answer is temporary tarsorrhaphy. This will protect the eye and help keep it in position while the ocular muscles heal along with any ulceration/trauma that resulted from proptosis. The tarsorrhaphy is usually left for 3 weeks.

Tarsorrhaphy is a surgical procedure in which the eyelids are partially sewn together to narrow the opening.

Question

An 8-year old male neutered cat comes in on urgent care acutely mydriatic. The owners have noticed him suddenly bumping into walls. Upon further questioning, they also have noticed that he has been seen at the water bowl more frequently. During your exam, you note that he has lost two pounds since his last visit 6 months ago and has retinal hemorrhages and a detached right retina on his fundic evaluation. What is the most important next step?

- Perform feline infectious serology
- Perform T4 and renal profile
- Perform coagulation profile
- Measure blood pressure in the exam room

Explanation - A cat that has retinal hemorrhages and a detached retina should have a blood pressure measured immediately. This quick and easy diagnostic step can determine if hypertension should be treated. Controlling hypertension can sometimes allow retinas to reattach and restore vision.

The next best test after measuring a blood pressure would be to submit at least a renal profile and T4. It is important to rule out hyperthyroidism and renal disease because both conditions can cause hypertensive retinopathy.

Generally, retinal hemorrhages alone do not warrant measurement of coagulation parameters. A more serious ocular condition like non-traumatic hyphema would be a better indicator to run this test.

Feline infectious serology is a good test to perform to evaluate underlying infectious causes of retinopathy if your other baseline tests are normal.

Question

A 10-year old male castrated cat that you have previously diagnosed with hyperthyroidism presents to you for acute onset of blindness. You perform an ophthalmic exam and note retinal hemorrhage. What diagnostic test should you perform first?

- Coagulation times
- Blood pressure
- Total T4 levels
- Serum BUN and creatinine
- Free T4 levels by equilibrium dialysis

Explanation - The correct answer is blood pressure. Cats with hyperthyroidism are likely to develop hypertension. If this is severe enough (>180-200 mmHg systolic), they can be at risk for acute retinal detachment or hemorrhage resulting in blindness. Prompt resolution of the hypertension is critical to prevent further damage to the eye and other organs.
