

# RETINAL DETACHMENT

## BASICS

### OVERVIEW

- “Retinal” refers to the retina; the retina is the innermost lining layer (located on the back surface) of the eyeball; it contains the light-sensitive rods and cones and other cells that convert images into signals and send messages to the brain, to allow for vision
- “Retinal detachment” is the separation of the back part of the eye (retina) from the underlying, vascular part of the eyeball (known as the “choroid”); the choroid is located immediately under the retina and is part of the middle-layer of the eyeball that contains the blood vessels

### GENETICS

- Depends on the cause—dogs with hereditary opacities in the normally clear lens (known as “cataracts”) or movement of the lens out of its normal location (known as “lens luxation”) may develop separation of the back part of the eye (retina) from the underlying, vascular part of the eyeball (retinal detachment)
- Some breeds (such as the Shih tzu, poodle, Italian greyhound) may have retinal tears or fissures and retinal detachment from primary vitreous abnormalities; the “vitreous” is the clear, gel-like material that fills the back part of the eyeball [between the lens and the retina]

### SIGNALMENT/DESCRIPTION of ANIMAL

#### **Species**

- Dogs and cats

#### **Breed Predispositions**

- Depend on cause
- Terrier breeds—increased likelihood of developing primary lens luxation (movement of the lens out of its normal location), which may contribute to retinal tears or fissures and retinal detachment
- Breeds that develop cataracts (opacities in the normally clear lens)
- Shih tzus—appear to be susceptible to spontaneous retinal detachments, owing to abnormal vitreous; the “vitreous” is the clear, gel-like material that fills the back part of the eyeball (between the lens and the retina)

#### **Mean Age and Range**

- Depend on cause
- More common in older patients—cataracts and generalized (systemic) diseases, such as high blood pressure (known as “hypertension”, cancer, and immune-mediated disease) are often age-related

### SIGNS/OBSERVED CHANGES in the ANIMAL

- Blindness or reduced vision in affected eye
- Dilated pupil with slow or no pupillary light reflex; light reflex may be near normal if detachment is sudden (acute); the “pupil” is the circular or elliptical opening in the center of the iris of the eye; light passes through the pupil to reach the back part of the eye (retina); the iris is the colored or pigmented part of the eye; the pupil constricts or enlarges (dilates) based on the amount of light entering the eye; the pupil constricts with bright light and enlarges in dim light—these actions are the “light reflexes of the pupil”
- Blood vessels or a “floating membrane” (which is the retina) may be observed easily through the pupil, just behind the lens (the normally clear structure directly behind the iris that focuses light as it moves toward the back part of the eye [retina])
- Vitreous abnormalities—common; the “vitreous” is the clear, gel-like material that fills the back part of the eyeball (between the lens and the retina)
- Various changes in the appearance of the retina (light-sensitive lining of the back of the eye) may be noted when the veterinarian examines the back of the eye with an ophthalmoscope
- Other signs will depend on any underlying, generalized (systemic) diseases

### CAUSES

- If the retinal detachment involves both eyes (known as “bilateral retinal detachment”), a generalized (systemic) problem is suggested
- Toxic—the individual pet is more likely to develop ill effects to a particular medication than other animals (known as “idiosyncratic reactions”), such as trimethoprim-sulfa in dogs and griseofulvin in cats

#### **Degenerative**

- End-stage progressive retinal atrophy (a group of eye diseases characterized by generalized deterioration or degeneration of the retina, becoming increasingly worse over time)—may lead to formation of holes in the retina and retinal detachment
- Long-term (chronic) glaucoma (disease of the eye, in which the pressure within the eye is increased) with stretching of the eyeball or globe and thinning of the retina

#### **Anomalous (abnormal structure)**

- Collie-eye anomaly (inherited abnormal development of the eye, leading to changes in various parts of the eye in collies); abnormal retina around the optic nerve (the nerve that runs from the back of the eye to the brain) may lead to retinal detachments
- Multiple eye abnormalities—Akitas or any breed
- Severe abnormal development of the retina (known as “retinal dysplasia”)—abnormal development of the eyes and the skeleton, characterized by dwarfism (known as “oculoskeletal dysplasia”) in Labrador retrievers, Samoyeds, English springer spaniels, and Bedlington terriers
- Abnormal development of the retinal pigment epithelium (known as “retinal pigment epithelium dysplasia”)—Australian shepherds
- Congenital (present at birth) eye defect—any young animal; congenital or juvenile retinal detachment

#### **Metabolic**

- Generalized (systemic) high blood pressure (hypertension); retinal detachment caused by high blood pressure is seen more commonly in cats than in dogs
- Inadequate levels of thyroid hormone (known as “hypothyroidism”)
- Increased protein in the blood leading to sludging of the blood (known as “hyperviscosity”)
- Increased packed cell volume (“PCV,” a means of measuring the percentage volume of red-blood cells as compared to the fluid volume of blood); hemoglobin concentration (hemoglobin is the compound in the red-blood cells that carries oxygen to the tissues of the body); and red-blood cell (RBC) count above the normal ranges (known as “polycythemia”)
- Low levels of oxygen in the tissues (hypoxia), with bleeding complications
- Dogs—generalized (systemic) high blood pressure (hypertension) due to any cause, such as kidney failure, low levels of thyroid hormone (hypothyroidism), high levels of cholesterol in the blood (known as “hypercholesterolemia”)
- Cats—most often caused by generalized (systemic) high blood pressure (hypertension) either as a primary condition or secondary to kidney failure or excessive levels of thyroid hormone (known as “hyperthyroidism”)

#### **Cancer or Tumors**

- Any primary cancer or one that has spread to other body tissues (known as “metastatic cancer”)
- Commonly associated with the following cancers: multiple myeloma, lymphoma, and cancer of the eye (ciliary body adenocarcinoma or melanoma)
- High blood pressure (hypertension) secondary to adrenal gland tumors, like pheochromocytoma (dogs and cats), rare

#### **Infectious**

- Infectious inflammation of the retina (known as “retinitis”) or inflammation of the choroid and retina (known as “chorioretinitis”); the “choroid” is located immediately under the retina and is part of the middle-layer of the eyeball that contains the blood vessels—may cause localized or more widespread retinal detachment
- Infection may extend from or to the central nervous system (brain)

#### **Immune-mediated/Inflammatory**

- Immune-complex disease—may cause inflammation of the blood vessels (known as “vasculitis”) or inflammation of eye tissues that may result in retinal detachment
- Dogs—systemic lupus erythematosus (autoimmune disease in which body attacks its own skin and possibly other organs) or uveodermatologic syndrome (a rare syndrome in which the animal has inflammation in the front part of the eye, including the iris [anterior uveitis] and coexistent inflammation of the skin [dermatitis], characterized by loss of pigment in the skin of the nose and lips)
- Cats—periarteritis nodosa (immune-mediated disease leading to inflammation of small and medium-sized arteries); systemic lupus erythematosus (autoimmune disease in which body attacks its own skin and possibly other organs)

#### **Unknown Cause (Known as “Idiopathic Disease”)**

- If all other causes are ruled out, including tears or fissures of the retina
- Steroid-responsive retinal detachment of unknown cause (condition known as “idiopathic steroid-responsive detachment”)—reported in giant-breed dogs, but may occur in any breed

#### **Trauma**

- Affecting both eyes (bilateral)—probably never occurs
- Penetrating injury or foreign body that causes tears or fissures of the retina or bleeding within the eye—may cause partial or complete retinal detachment
- Severe blunt trauma with inflammation or bleeding
- Surgical trauma—may contribute to tears or fissures of the retina

#### **RISK FACTORS**

- Generalized (systemic) high blood pressure (hypertension)
- Old age
- Opaque lens that shrinks in size and then liquifies (known as a “hypermature cataract”)
- Movement of the lens out of its normal location (known as “lens luxation”)
- Surgical removal of the lens; the “lens” is the normally clear structure directly behind the iris that focuses light as it moves toward the back part of the eye (retina)

# TREATMENT

## HEALTH CARE

- Depends on the physical condition of the patient
- Usually outpatient
- Sudden (acute) blindness—vision may be restored if the underlying cause of the separation of the back part of the eye (retina) from the underlying, vascular part of the eyeball (retinal detachment) is identified and treated rapidly; make every attempt to determine the cause of retinal detachment
- Degeneration of retinal tissue occurs rapidly following separation of the back part of the eye (retina) from the underlying, vascular part of the eyeball (retinal detachment)—provide therapy, whether surgical or medical, as soon as possible after diagnosis
- A veterinary ophthalmologist (eye specialist) may be able to provide surgical treatment/reattachment for some types of retinal detachment
- Treatment as needed for any associated generalized (systemic) disease

## ACTIVITY

- Restrict until retinal reattachment has occurred (if reattachment is possible)
- Supervise irreversibly blind patients

## SURGERY

- Some types of retinal detachment may be repaired surgically; refer patient to a veterinary ophthalmologist (eye specialist)
- Procedure to repair a detached retina and hold it in place using a laser (known as “laser retinopexy”)—may reverse some retinal detachments associated with collie-eye anomaly (inherited abnormal development of the eye, leading to changes in various parts of the eye in collies); may stabilize partial/small retinal detachments

## MEDICATIONS

Medications presented in this section are intended to provide general information about possible treatment. The treatment for a particular condition may evolve as medical advances are made; therefore, the medications should not be considered as all inclusive.

- Depend on underlying generalized (systemic) causes, which should be identified and treated appropriately
- Steroids administered by mouth or injection, such as [prednisone](#)—if generalized fungal infection (known as “systemic mycosis”) is ruled out as a cause of the retinal detachment and if the detachment is believed to be immune-mediated; may help retinal reattachment; for immune-mediated disease, taper medications very slowly over months, as directed by your pet’s veterinarian
- Anti-inflammatory doses of prednisone—may be useful for retinal detachments of an infectious nature, as long as the underlying disease is being treated
- Medications to decrease blood pressure (known as “antihypertensive agents”)—[amlodipine](#); others (such as [propranolol](#)) can be used if amlodipine fails to control high blood pressure (hypertension)
- [Angiotensin-converting enzyme \(ACE\) inhibitors](#) (such as [enalapril](#) or [benazepril](#)) can be used to treat cats with high blood pressure (hypertension) that is not responsive to amlodipine alone; may be important in cats that have kidney failure and protein in their urine (known as “proteinuria”)
- Chemotherapy—suggested for treatment of cancer (such as lymphoma or multiple myeloma)
- [Azathioprine](#) (dogs)—type of chemotherapy, used to control inflammation; may be required in addition to steroids for uveodermatologic syndrome (a rare syndrome in which the animal has inflammation in the front part of the eye, including the iris [anterior uveitis] and coexistent inflammation of the skin [dermatitis], characterized by loss of pigment in the skin of the nose and lips) or immune-mediated retinal detachment of unknown cause (idiopathic immune-mediated detachment); avoid use in cats

## FOLLOW-UP CARE

### PATIENT MONITORING

- Depends on underlying cause and type of medical treatment
- Azathioprine—an initial complete blood count (CBC) and then a follow-up CBC should be obtained every 1 to 2 weeks for the first 1 to 3 months of treatment; monitor every 1 to 2 months for bone-marrow suppression, leading to low red-blood cell and low white-blood cell counts (if noted, the dose should be reduced or treatment discontinued); in addition, initial and follow-up blood work should be performed to evaluate for liver or pancreas toxicity
- Monitor blood pressure in cases with high blood pressure (hypertensive animals)

### POSSIBLE COMPLICATIONS

- Permanent blindness
- Cataracts (opacities in the normally clear lens)
- Glaucoma (increased pressure within the eye)

- Long-term (chronic) eye pain
- Death, if retinal detachment is secondary to a generalized (systemic) disease process

#### **EXPECTED COURSE AND PROGNOSIS**

- Prognosis for vision with complete retinal detachment—guarded; the exception is a disease of the retina due to high blood pressure (known as “hypertensive retinopathy”), which is diagnosed and treated promptly
- Blindness—may develop in days to weeks, even if retinal reattachment occurs
- Vision may return, if the underlying cause is removed and reattachment occurs
- Localized or multiple areas of inflammation of the choroid and retina (chorioretinitis)—does not impair vision markedly; will leave scars; the “choroid” is located immediately under the retina and is part of the middle-layer of the eyeball that contains the blood vessels
- Generalized (systemic) disease or cancer with eye involvement—may influence the prognosis for life

#### **KEY POINTS**

- Retinal detachment (especially if both eyes are involved [bilateral disease]) may be a sign of generalized (systemic) disease, so diagnostic testing is important
- Retinal detachment associated with movement of the lens out of its normal location (lens luxation) or cataract surgery has a potential to affect both eyes, so both eyes should be observed closely
- Retinal detachments may be reversible, with return of vision, if the underlying cause is treated and the detachment is caught early
- Blind pets, especially cats, can adapt remarkably well and live a good quality life

