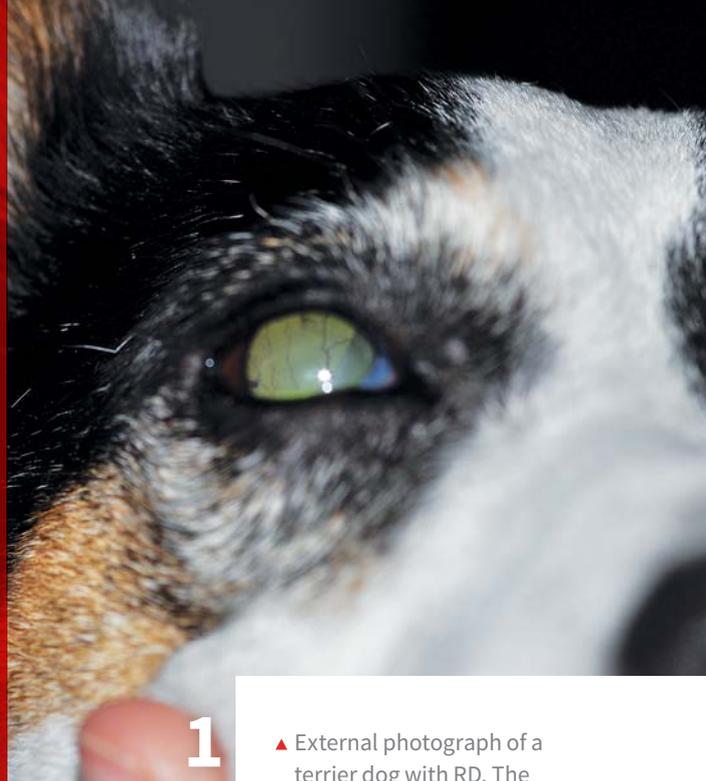


Retinal Detachment

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▲ External photograph of a terrier dog with RD. The retinal vessels are visible even from a distance, indicating that the retina has detached and come anteriorly within the vitreal chamber.

Retinal detachments (RDs) may develop secondary to a variety of systemic and/or local (ocular) conditions.

In the normal state, the retina sits directly adjacent to the concave contour of the posterior globe to receive oxygen and nutrients from the choroid, with which it is intimately associated. When the retina detaches, it floats anteriorly within the vitreal chamber and is evident as a thin grey veil with visible vasculature (*Figures 1 and 2*).

Retinal detachment may be unilateral or bilateral. If the cause is related to a systemic condition or a congenital or inherited ocular condition, both eyes are likely to be affected to some degree, although perhaps asymmetrically or sequentially. Local disease, such as unilateral trauma, cataract, or intraocular neoplasia, will typically only result in detachment in the affected eye.

Clinical Signs

RD is usually associated with mydriasis and incomplete or absent pupillary light reflexes. If a detachment is complete, the affected eye will be blind. Some sight may be retained with partial detachment. Accompanying uveitis or intraocular hemorrhage may also be present, particularly if the underlying cause is vascular (eg, systemic hypertension) or traumatic.

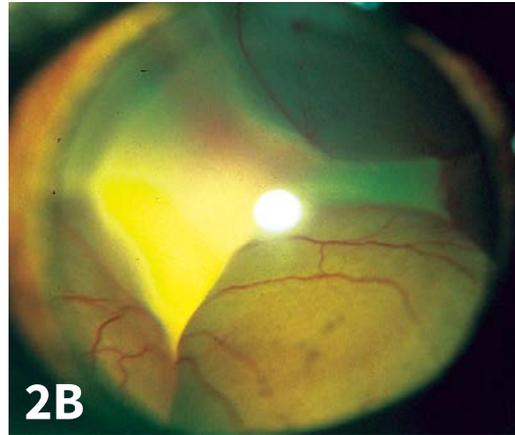
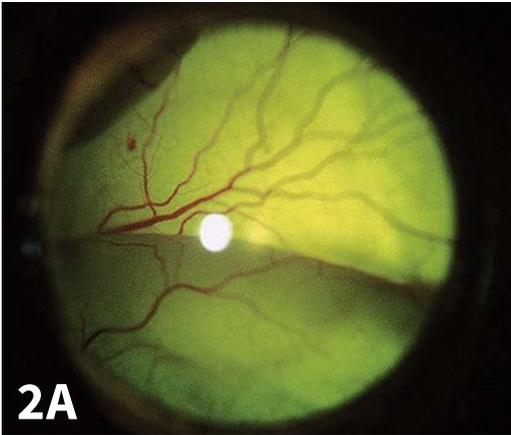
Diagnosis

Diagnosis of RD is made during a thorough ophthalmic examination that includes either direct or indirect ophthalmoscopy. RD will appear either as a thin grey veil of tissue with visible blood vessels or as a hyporeflective section of the fundus with indistinct or fuzzy margins on ophthalmoscopy. Retinal blood vessels may be observed in different planes of focus depending on how far forward they have been displaced (*Figure 3*).

TWO TYPES OF RETINAL DETACHMENTS

- ▶ Complete: The entire retina becomes detached
- ▶ Partial: A portion of the retina remains attached in its normal anatomic location while another section has detached

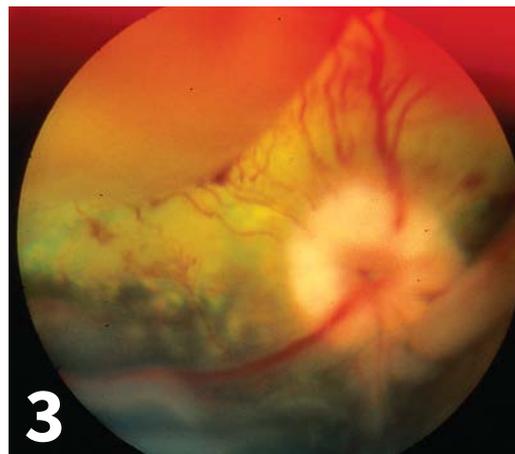
RD = retinal detachment



▲ Bullous RD in cats secondary to systemic hypertension. Note the vessels are in different planes of focus. A focal intraretinal hemorrhage is present (A). Images were obtained without use of an ophthalmoscopy lens.

Ocular ultrasonography is necessary if the posterior segment of the eye cannot be visualized because of corneal opacity, debris in the anterior chamber associated with uveitis, or cataract; ultrasonography may show a thin, linear hyperechoic structure protruding into the vitreal chamber. Most commonly, the retina will remain attached at the optic nerve and ora ciliaris retinae, which is where the ciliary body transitions into choroid and the peripheral retina begins (Figure 4, next page). This will cause a gullwing appearance, or “seagull” sign, on ultrasonography, but partial detachments or disinsertions (tearing of the retina in addition to detachment) will not show the classic seagull sign.

When a patient has acute vision loss and RD, investigation of the underlying cause should include measurement of systolic blood pressure, a complete physical examination, and a minimum database consisting of a CBC, serum chemistry panel, and urinalysis. RD may result from panuveitis secondary to infectious diseases (including fungal, bacterial or rickettsial causes), trauma, neoplasia (ocular or systemic), congenital ocular diseases (eg, Collie eye anomaly), or cataracts.



Retinal blood vessels may be observed in different planes of focus depending on how far forward they have been displaced.

▲ Photograph of the fundus of a dog utilizing a condensing lens for indirect ophthalmoscopy. RD and intra- and subretinal hemorrhage are demonstrated. Note the different planes of focus, the indistinct margins of blood vessels, and the prominent dorsal and ventral partial detachments. These conditions were secondary to acute kidney disease and systemic hypertension in this patient.

Treatment

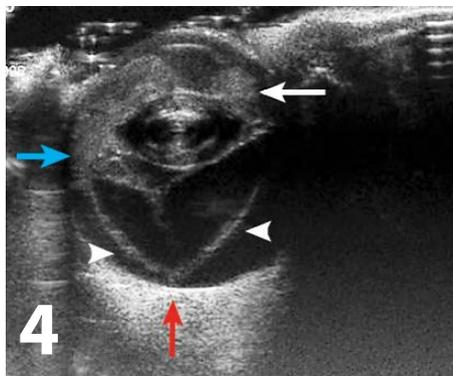
Treatment depends on the cause of RD. If the RD is a result of systemic hypertension, prompt therapy with systemic antihypertensive

agents (eg, calcium channel blockers, angiotensin-converting enzyme [ACE] inhibitors) is indicated. As blood pressure normalizes, the retina will often return to its normal or near-normal anatomic position.

If detachment is secondary to an inflammatory or autoimmune condition, treatment of the primary problem and the associated inflammation (typically systemic corticosteroids) may affect improvement. RD associated with primary ocular disease (congenital anomalies such as retinal dysplasia or lenticular disease such as cataract) may be difficult to treat; referral to a veterinary ophthalmologist for evaluation for reattachment surgery may be indicated.

Prognosis

The prognosis for regaining vision following retinal detachment is usually guarded-to-poor. If the RD is caused by systemic hypertension that is corrected promptly, reattachment may occur and vision may be restored. However, if the detachment is chronic or has been associated with extensive retinal or intraocular inflammation, return of sight is unlikely. Retinal degeneration is a common sequela to RD even if physical reattachment occurs (Figure 5).



▲ Ultrasonographic image of an eye, with the cornea oriented to the top of the image. The anterior chamber is filled with hyperechoic material, consistent with hemorrhage and fibrin (white arrow) that were evident on examination. The retina is detached (arrowheads) and is forming the classic seagull sign; 2 hyperechoic linear structures representing the retina (arrowheads) within the vitreal chamber, attached at the ora ciliaris retinae (blue arrow) and the optic nerve (red arrow).



▲ Retinal degeneration following reattachment in a hypertensive cat. Note the hyperreflective tapetum, mild retinal vessel attenuation, and optic nerve atrophy and pallor.

ACE = angiotensin-converting enzyme

sentinel[®]
spectrum[®]
(milbemycin oxime · lufenuron · praziquantel)

Caution

Federal (USA) law restricts this drug to use by or on the order of a licensed veterinarian.

Indications

SENTINEL[®] SPECTRUM[®] (milbemycin oxime/lufenuron/praziquantel) is indicated for the prevention of heartworm disease caused by *Dirofilaria immitis*; for the prevention and control of flea populations (*Ctenocephalides felis*); and for the treatment and control of adult roundworm (*Toxocara canis*, *Toxascaris leonina*), adult hookworm (*Ancylostoma caninum*), adult whipworm (*Trichuris vulpis*), and adult tapeworm (*Taenia pisiformis*, *Echinococcus multilocularis* and *Echinococcus granulosus*) infections in dogs and puppies two pounds of body weight or greater and six weeks of age and older.

Dosage and Administration

SENTINEL SPECTRUM should be administered orally, once every month, at the minimum dosage of 0.23 mg/lb (0.5 mg/kg) milbemycin oxime, 4.55 mg/lb (10 mg/kg) lufenuron, and 2.28 mg/lb (5 mg/kg) praziquantel. For heartworm prevention, give once monthly for at least 6 months after exposure to mosquitoes.

Dosage Schedule

Body Weight	Milbemycin Oxime per chewable	Lufenuron per chewable	Praziquantel per chewable	Number of chewables
2 to 8 lbs.	2.3 mg	46 mg	22.8 mg	One
8.1 to 25 lbs.	5.75 mg	115 mg	57 mg	One
25.1 to 50 lbs.	11.5 mg	230 mg	114 mg	One
50.1 to 100 lbs.	23.0 mg	460 mg	228 mg	One
Over 100 lbs.	Administer the appropriate combination of chewables			

To ensure adequate absorption, always administer SENTINEL SPECTRUM to dogs immediately after or in conjunction with a normal meal.

SENTINEL SPECTRUM may be offered to the dog by hand or added to a small amount of dog food. The chewables should be administered in a manner that encourages the dog to chew, rather than to swallow without chewing. Chewables may be broken into pieces and fed to dogs that normally swallow treats whole. Care should be taken that the dog consumes the complete dose, and treated animals should be observed a few minutes after administration to ensure that no part of the dose is lost or rejected. If it is suspected that any of the dose has been lost, redosing is recommended.

Contraindications

There are no known contraindications to the use of SENTINEL SPECTRUM.

Warnings

Not for use in humans. Keep this and all drugs out of the reach of children.

Precautions

Treatment with fewer than 6 monthly doses after the last exposure to mosquitoes may not provide complete heartworm prevention.

Prior to administration of SENTINEL SPECTRUM, dogs should be tested for existing heartworm infections. At the discretion of the veterinarian, infected dogs should be treated to remove adult heartworms. SENTINEL SPECTRUM is not effective against adult *D. immitis*.

Mild, transient hypersensitivity reactions, such as labored breathing, vomiting, hypersalivation, and lethargy, have been noted in some dogs treated with milbemycin oxime carrying a high number of circulating microfilariae. These reactions are presumably caused by release of protein from dead or dying microfilariae.

Do not use in puppies less than six weeks of age.

Do not use in dogs or puppies less than two pounds of body weight.

The safety of SENTINEL SPECTRUM has not been evaluated in dogs used for breeding or in lactating females. Studies have been performed with milbemycin oxime and lufenuron alone.

Adverse Reactions

The following adverse reactions have been reported in dogs after administration of milbemycin oxime, lufenuron, or praziquantel: vomiting, depression/lethargy, pruritus, urticaria, diarrhea, anorexia, skin congestion, ataxia, convulsions, salivation, and weakness.

To report suspected adverse drug events, contact Virbac at 1-800-338-3659 or the FDA at 1-888-FDA-VETS.

Information for Owner or Person Treating Animal

Echinococcus multilocularis and *Echinococcus granulosus* are tapeworms found in wild canids and domestic dogs. *E. multilocularis* and *E. granulosus* can infect humans and cause serious disease (alveolar hydatid disease and hydatid disease, respectively). Owners of dogs living in areas where *E. multilocularis* or *E. granulosus* are endemic should be instructed on how to minimize their risk of exposure to these parasites, as well as their dog's risk of exposure. Although SENTINEL SPECTRUM was 100% effective in laboratory studies in dogs against *E. multilocularis* and *E. granulosus*, no studies have been conducted to show that the use of this product will decrease the incidence of alveolar hydatid disease or hydatid disease in humans. Because the prepatent period for *E. multilocularis* may be as short as 26 days, dogs treated at the labeled monthly intervals may become reinfected and shed eggs between treatments.

Manufactured for: Virbac AH, Inc.

P.O. Box 162059, Ft. Worth, TX 76161

NADA #141-333, Approved by FDA

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