



SEEING EYE TO EYE

Since no known cure or treatment is available for SARDS, educating the client on how to make their pet comfortable is key.

OPHTHALMOLOGY

Sudden Acquired Retinal Degeneration Syndrome: An Overview

**MEET THE AUTHOR**

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Pam graduated from Purdue University's veterinary technology program in 1997. She has been employed at Purdue University ever since, first in the small animal intensive care unit and then in the veterinary ophthalmology department. Pam's special interests include large animal ophthalmology, ocular imaging, and surgery. She also enjoys teaching veterinary and veterinary nursing students on the clinic floor, in the classroom, in labs, and online. Pam has served on the executive board of the Veterinary Ophthalmic Technician Society as vice president and unseated board member. She is a charter member and current secretary of the Academy of Veterinary Ophthalmic Technicians. She enjoys continuing to learn as much as she can about veterinary ophthalmic nursing.

Sudden acquired retinal degeneration syndrome (SARDS) is a permanently blinding disease that occurs suddenly, as the name suggests. It is one of the leading causes of incurable canine vision loss diagnosed by veterinary ophthalmologists. Much research has been done to try and discover both the cause and a cure; however, as yet, neither has been found. This article provides an overview of the current knowledge about SARDS and the role of the veterinary nurse in identifying and managing these patients.

The predominant signalment of a SARDS patient is a middle-aged, spayed female, mixed-breed dog. Of the purebred dogs, small breeds are most commonly affected (**BOX 1**). The median age at diagnosis is 7 to 10 years. Often, the dog is moderately overweight.

HISTORY AND CLINICAL SIGNS

Owners of dogs with SARDS present their pets with the primary complaint of sudden blindness. They often report that their dog bumps into stationary objects, becomes confused in corners, or seems lost in large, open spaces. In these situations, the dog may become anxious and begin vocalizing and/or panting excessively. Astute owners may notice the dog's pupils are dilated.

During the history taking, the veterinary nurse should ask whether the owner has observed polyphagia, polydipsia, polyuria, and recent weight gain. Up to

**BOX 1****Top Breeds Affected by SARDS¹**

- Beagle
- Bichon frise
- Brittany spaniel
- Cocker spaniel
- Dachshund
- Maltese
- Miniature schnauzer
- Pomeranian
- Pug

85% of dogs with SARDS have these systemic signs.² One study reported that 26% of dogs diagnosed with SARDS also presented with conjunctival hyperemia.³ It is unclear whether this finding is related to SARDS, as conjunctival hyperemia has many nonspecific causes.

Although most SARDS patients have no neurologic abnormalities, loss of smell has been reported in a few cases.¹ It is unknown how this is linked to the loss of vision.

Patients that present with signs of hyperadrenocorticism should be tested with adrenocorticotropic hormone stimulation or low-dose dexamethasone suppression testing.

OPHTHALMIC EXAMINATION

After a thorough history is taken, and before the complete physical examination is performed, the ophthalmic examination should take place. It can begin with the veterinary nurse observing the patient moving around the examination room and noting if it bumps into stationary objects. If this is not obvious, a maze should be set up in the room and the dog encouraged to walk through it in both light and dark conditions.

Some acutely blind dogs have a very wide-eyed appearance, as if they are opening their eyes as much as possible trying to see (**FIGURE 1**). The veterinary nurse should discern if this is the case or if the patient is exophthalmic or buphthalmic. Next, the palpebral reflex should be evaluated to determine whether the patient can blink. Some dogs that do not blink during

menace or dazzle testing are misdiagnosed as blind when they have facial nerve paralysis.

After confirmation that the patient can blink, the menace reflex should be evaluated. To perform this test, the examiner covers one of the patient's eyes with their hand and makes a menacing gesture toward the other eye with the other hand, taking care not to create an air current that could be felt by the patient. Dogs with SARDS do not react to the menacing motion (i.e., have a negative result).

The ability to track motion can be evaluated by dropping a cotton ball or tissue in front of the patient. The object used should have no smell and make no noise. Most animals that can see follow the dropped object, but occasionally they are not interested in it.

Using a transilluminator or other suitable bright, white light source, the veterinary nurse should begin to evaluate the pupils. The pupils should be symmetric in size. Almost all (90%) dogs with SARDS have mydriatic pupils with a slight pupillary light reflex—that is, the pupils constrict slightly in response to bright light.² This constriction is slow and incomplete. The same bright light source should also be used to evaluate the dazzle reflex. Dogs with SARDS do not have a dazzle reflex, meaning they do not blink or pull away in response to the bright light being shone in



FIGURE 1. Classic appearance of a dog with SARDS. Note the wide eyes and dilated pupils. This dog is middle-aged and overweight.

their eye. In these patients, the retina does not perceive the light.

Next, the anterior chamber should be evaluated. Other than the mydriatic pupils, the anterior segment examination should be normal in cases of SARDS. There should be no signs of inflammation or anything obscuring vision.

The posterior segment and fundus should be evaluated next. The vitreous should be clear, and there should be nothing blocking the examiner's view of the fundus. The fundus itself should have no abnormalities. The exception is in patients that have been blind for several weeks. In these patients, fundic changes may be noted, such as tapetal hyperreflectivity, blood vessel attenuation, and optic disc atrophy.

Patients with dilated pupils should also have intraocular pressure measured to rule out glaucoma.

To confirm a diagnosis of SARDS versus a neurologic disconnection between the eyes and the occipital cortex, referral to an ophthalmologist for electroretinography is recommended. Referral to a neurologist to rule out other neurologic deficits or diseases that imitate SARDS may also be offered. The veterinary nurse can assist the client in scheduling these appointments.

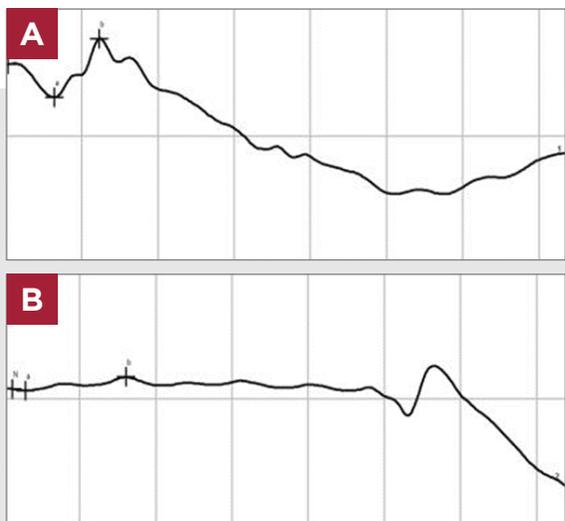


FIGURE 2. (A) Normal electroretinogram. The first short flat line is the baseline. Where the line starts to curve down is when the light is flashed. The amplitude of lowest point to the baseline is measured as the a-wave. The amplitude of the lowest point to the highest point is measured as the b-wave. Testing for SARDS focuses on the amplitude of the b-wave. **(B)** Flat ERG. The little waves seen are artifacts caused by movement, most likely the dog's panting.

DIAGNOSIS

Electroretinography tests the electrical function of the retina. The resulting chart, or electroretinogram (ERG), is similar to an electrocardiography (ECG) or electroencephalography (EEG). Every ophthalmology practice has its own set protocol and baseline normal values for the ERG system and software it uses. In the author's practice, electroretinography is performed on awake animals after 20 minutes of dark adaptation and pharmacologic pupil dilation. Dark adaptation allows for complete relaxation of the rods and cones so that maximal response is recorded. Three electrodes—ground, reference, and active—are attached to the patient. A bright white light is then flashed into the eye, and the active electrode picks up the electrical response of the retina, which is transferred to the computer and reported in a graph measured in microvolts. In dogs with SARDS, no electrical response from the retina is seen. This is reported as a flat ERG (**FIGURE 2**). A flat ERG distinguishes SARDS from optic neuritis and, in addition to the classic signalment and history, is enough for a diagnosis of SARDS.

Another test that can be used to diagnose SARDS, the chromatic pupillary light reflex, uses a special instrument that emits red and blue light at specific wavelengths. In one study, healthy eyes responded to low intensities of both red and blue light, but in dogs with SARDS the pupil responded only to high-intensity blue light.⁴ This is due to stimulation of a photosensitive pigment called melanopsin.

ETIOLOGY AND PATHOGENESIS

SARDS is caused by a widespread loss of function of the photoreceptors in the retina, but researchers have been unable to discover the cause of this loss. Most research leans toward an autoimmune disease, although a neuroendocrine disease process has not been completely ruled out. Some researchers believe that SARDS is used to describe a multidisease process.

One study reported that more than 90% of SARDS patients have increased adrenal sex hormone and/or cortisol serum concentrations.⁵ Another article reported that in Canada, the most common laboratory abnormality is elevated liver enzymes and hypercholesterolemia.⁶

Some veterinarians recommend pituitary and adrenal gland imaging. This can help determine if there is a neuroendocrine component.

**BOX 2****Recommended Resources for Owners**

- Blind Dogs Can Have Normal Lives Too!
whole-dog-journal.com/care/blind-dogs-can-have-normal-lives-too/
- Blind Dog Support
blinddogsupport.com
- Enable Your Pet
enableyourpet.com
- Walkin' Pets
handicappedpets.com

A very recent study evaluated optical coherence tomography (OCT) in dogs diagnosed with SARDS.⁷ It found that 38% of the patients in the study had a <1 mm wide retinal detachment that was not diagnosed during the ocular examination. This study also looked at microarray and histology analysis of enucleated eyes diagnosed with SARDS and found molecular changes that were suggestive of immune-mediated disease. This study concludes that these observations are highly suggestive of an immune-mediated cause of SARDS.

TREATMENT

Unfortunately, there is no treatment for SARDS. Various treatments have been tried to restore vision and have failed. One study evaluated the use of mycophenolate mofetil, a strong immunosuppressive medication with minimal systemic side effects, in 10 dogs diagnosed with SARDS.⁸ After 6 weeks of treatment, no increase in vision or ERG was observed. Other areas of interest in ongoing research include a canine-specific intravenous immunoglobulin (IVIg) and treatment for atypical hyperadrenocorticism.

For the past 12 years, Dr. Sinisa Grozdanic has been testing the use of human IVIg in SARDS patients. Dr. Grozdanic's work is based on the theory that many SARDS patients have a history of autoimmune disease and that there is clinical evidence confirming that SARDS is an immune-mediated disease. He has identified 4 stages of SARDS and reported success with early treatment with a combination of systemic immunosuppressive therapy and IVIg.⁹ In these studies, positive vision is considered being able to pass a maze test.¹⁰ However, these findings are still considered controversial and have yet to be peer reviewed.

PROGNOSIS AND CLIENT EDUCATION AND COMMUNICATION

Blind dogs can live very happy lives. Owners of dogs with SARDS report that if anything, their relationship with their pet improved after the sudden blindness.¹¹ It does take some time—up to a couple of months—for the dog to adjust to being blind, and adjustment is harder with sudden vision loss than with gradual blindness. However, dogs have cognitive mapping skills and can easily memorize their home environment. They may still become disoriented outside of their home or yard.

A few accommodations may need to be made for safety reasons. Blind dogs should be kept in a fenced yard or on a leash when outside. Access to bodies of water should be restricted. Even the best swimmers may become lost in the water and unable to find shore or the stairs to get out of a pool. Owners should avoid moving furniture as much as possible to avoid confusing the dog's mental map of the environment and may want to consider padding sharp corners to prevent injuries.

Other changes can help dogs with their mental map. For example, different textured surfaces can be used to indicate food, water, door, stairs, walls, or fences. Placing rocks 6 to 12 inches inside the yard fence can serve as a warning track that the fence is near.

Several websites provide advice for living with blind dogs, such as providing toys that make noise or have a strong scent (**BOX 2**).

The veterinary nurse should discuss learning to live with the concurrent systemic signs (e.g., polyphagia) with the owner. It has been noted

GLOSSARY

Buphthalmia: Enlargement of the globe

Cones: Photoreceptors in the retina responsible for color vision; these function best in bright light (photopic vision)

Exophthalmia: Protrusion of the globe

Mydriasis: Dilated pupil

Rods: Photoreceptors in the retina responsible for low light vision (scotopic vision)

BRAVECTO[®]

(fluralaner) flavored chew for dogs

BRIEF SUMMARY (For full Prescribing Information, see package insert)**Caution:**

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

Indications:Bravecto kills adult fleas and is indicated for the treatment and prevention of flea infestations (*Ctenocephalides felis*) and the treatment and control of tick infestations [*Ixodes scapularis* (black-legged tick), *Dermacentor variabilis* (American dog tick), and *Rhipicephalus sanguineus* (brown dog tick)] for 12 weeks in dogs and puppies 6 months of age and older, and weighing 4.4 pounds or greater.Bravecto is also indicated for the treatment and control of *Amblyomma americanum* (lone star tick) infestations for 8 weeks in dogs and puppies 6 months of age and older, and weighing 4.4 pounds or greater.**Contraindications:**

There are no known contraindications for the use of the product.

WARNINGS**Human Warnings:**

Not for human use. Keep this and all drugs out of the reach of children. Keep the product in the original packaging until use in order to prevent children from getting direct access to the product. Do not eat, drink or smoke while handling the product. Wash hands thoroughly with soap and water immediately after use of the product.

Keep Bravecto in a secure location out of reach of dogs, cats, and other animals to prevent accidental ingestion or overdose.

Precautions:

Fluralaner is a member of the isoxazoline class. This class has been associated with neurologic adverse reactions including tremors, ataxia, and seizures. Seizures have been reported in dogs receiving isoxazoline class drugs, even in dogs without a history of seizures. Use with caution in dogs with a history of seizures or neurologic disorders.

Bravecto has not been shown to be effective for 12-weeks duration in puppies less than 6 months of age. Bravecto is not effective against *Amblyomma americanum* ticks beyond 8 weeks after dosing.**Adverse Reactions:**

In a well-controlled U.S. field study, which included 294 dogs (224 dogs were administered Bravecto every 12 weeks and 70 dogs were administered an oral active control every 4 weeks and were provided with a tick collar); there were no serious adverse reactions. All potential adverse reactions were recorded in dogs treated with Bravecto over a 182-day period and in dogs treated with the active control over an 84-day period. The most frequently reported adverse reaction in dogs in the Bravecto and active control groups was vomiting.

Percentage of Dogs with Adverse Reactions in the Field Study

Adverse Reaction (AR)	Bravecto Group: Percent of Dogs with the AR During the 182-Day Study (n=224 dogs)	Active Control Group: Percent of Dogs with the AR During the 84-Day Study (n=70 dogs)
Vomiting	7.1	14.3
Decreased Appetite	6.7	0.0
Diarrhea	4.9	2.9
Lethargy	5.4	7.1
Polydipsia	1.8	4.3
Flatulence	1.3	0.0

In a well-controlled laboratory dose confirmation study, one dog developed edema and hyperemia of the upper lips within one hour of receiving Bravecto. The edema improved progressively through the day and had resolved without medical intervention by the next morning.

Post-Approval Experience (2019):

The following adverse events are based on post-approval adverse drug experience reporting. Not all adverse events are reported to FDA/CVM. It is not always possible to reliably estimate the adverse event frequency or establish a causal relationship to product exposure using these data.

The following adverse events reported for dogs are listed in decreasing order of reporting frequency for fluralaner: Vomiting, lethargy, diarrhea (with and without blood), anorexia, pruritis, polydipsia, seizure, allergic reactions (including hives, swelling, erythema), dermatitis (including crusts, pustules, rash), tremors and ataxia.

Contact Information:For a copy of the Safety Data Sheet (SDS) or to report suspected adverse drug events, contact Merck Animal Health at 1-800-224-5318. Additional information can be found at www.bravecto.com.For additional information about adverse drug experience reporting for animal drugs, contact FDA at 1-888-FDA-VETS or <http://www.fda.gov/AnimalVeterinary/SafetyHealth>.**How Supplied:**

Bravecto is available in five strengths for use in dogs (112.5, 250, 500, 1000, and 1400 mg fluralaner per chew). Each chew is packaged individually into aluminum foil blister packs sealed with a peelable paper backed foil lid stock. Product may be packaged in 1, 2, or 4 chews per package.

Distributed by:

Intervet, Inc., (d/b/a Merck Animal Health), Madison, NJ 07940

Fluralaner (active ingred.) Made in Japan.

Formulated in Austria

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that polyphagia is the only associated systemic sign to increase in severity over time.¹¹

CONCLUSION

Blindness is not a reason for euthanasia. Hopefully, ongoing research and clinical trials will someday reveal a treatment or cure for SARDS. In the meantime, the veterinary nurse can provide counseling and training to help the owner and patient return to the happy life they had before blindness occurred, keeping in mind the transition is harder on the owner emotionally than it is for the dog (turn to page 38 to read the case report of an 11-year-old dog diagnosed with SARDS). **TVN**

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