Owner Awareness of Adrenal Sex Hormone Elevations in SARDS-affected Dogs

Caroline D. Levin
P.O. Box 165
Deary, ID 83823
carolinedlevin@gmail.com

Purpose

To determine if owners are aware of adrenal sex hormone elevations in their dogs diagnosed with Sudden Acquired Retinal Degeneration Syndrome (SARDS).

Methods

An email survey was conducted of 50 owners of SARDS-affected dogs who contacted the author from January, 2021 through December, 2021. Participants represented the United States of America (33), Australia (4), the United Kingdom (4), Canada (3), Mexico (2), Chile (1), Colombia (1), Italy (1) and South Africa (1). Their names have been protected.

Participants were asked three questions:

1. When your dog was diagnosed with SARDS, were you informed of the potential for elevated adrenal sex hormones?
2. Did you pursue lab work to assess adrenal sex hormone levels?
3. If so, will you supply a copy of the laboratory report?

Findings

1. The majority of respondents (98%) were not informed of the potential for adrenal sex hormone elevations at the time of SARDS diagnosis. Only one respondent (2%) received printed material citing excessive estrogen as a possible factor in SARDS (Table 1).

2. Once informed, 48% of all respondents pursued adrenal sex hormone assays with a general practice veterinarian. This included 58% of respondents in the USA, and 29% of non-USA respondents (Table 1).

3. 92% of all respondents reported elevations in their dog's adrenal sex hormone levels. This included 19 of 19 (100%) of respondents in the USA, and 3 of 5 (60%) of non-USA respondents. Elevated sex hormones consisted of: adrenal estrogen (17), progesterone (3), androstenedione (3), or 17-OH progesterone (1) (Table 1).

4. All respondents (100%) who pursued hormone testing supplied laboratory reports: Endocrine/Immune Panel, National Veterinary Diagnostic Services, Waller, TX USA (15), University of Tennessee Adrenal Sex Hormone Panel, Knoxville, TN USA (4), serum progesterone via Futurlab AIA 360, Vicento, Italy (1), serum progesterone,

University of Van Pretoria, Onderstepoort, South Africa (1), or serum progesterone, Nationwide Laboratories, Cambridge, England (1) (Table 1).

5. Respondents who did not pursue hormone testing cited lack of available adrenal assays (12), veterinarian resistance (4), euthanasia (2), lack of interest (1), or unknown (1). The remainder were lost to follow-up (6) (Table 1).

Discussion

Signs of steroid excess are a common feature in SARDS-affected dogs. Historically this has been attributed to hyperadrenocorticism or Cushing's disease. At the time of SARDS diagnosis, the potential for Cushing's diseases is routinely discussed with dog owners. However, while clinical presentation is suggestive of Cushing's disease only 20% of SARDS-affected dogs receive a Cushing's diagnosis.[1]

Elevations in adrenal sex hormone levels were first reported in SARDS-affected dogs in 2003[2] and again in 2007[3,4] and 2009[5]. Like cortisol, adrenal sex hormones are steroids. They are described in human medical literature as steroid sex hormones or simply sex steroids.[6,7] Adrenal sex steroid excess is reported in more than 90% of SARDS-affected dogs,[1] making it nearly five times more common than a Cushing's diagnosis. Low-dose, daily cortisol hormone replacement mediates sex steroid levels and associated clinical signs.[3,4]

This survey found that at the time of SARDS diagnosis, respondents were rarely informed of the potential for adrenal sex steroid excess. Once respondents found this information online, about half (48%) pursued adrenal sex steroid testing for their dog. The rate was higher for participants in the USA (58%), where adrenal sex steroid panels are readily accessible.

Once tested, the majority of dogs (92%) demonstrated elevations in adrenal sex steroid levels. Grouped geographically, all respondents (100%) in the USA reported elevations in adrenal sex steroids. USA-based practitioners have access to established adrenal sex steroid panels. Non-USA respondents reported a lower rate of sex steroid excess (60%). In two of these non-USA cases (#32, #36), sex steroids were reported within normal limits as those panels evaluated ovulatory status rather than adrenal activity.

Conclusion

At the time of SARDS diagnosis dog owners are unaware of the potential for adrenal sex steroid pathology despite it being a routine feature of this syndrome. When owners subsequently obtain this information, half pursue diagnostics and routinely confirm sex steroid elevations. This survey also highlights the need for veterinary adrenal sex steroid panels to be developed internationally.

References

1. Komáromy AM, Abrams KL, Heckenlively JR, Lundy SK, Maggs DJ, Leeth CM, MohanKumar PS, Petersen-Jones SM, Serreze DV, van der Woerdt A. Sudden acquired retinal degeneration syndrome (SARDS) – a review and proposed strategies toward a better understanding of pathogenesis, early diagnosis and therapy. Veterinary Ophthalmology 2016; 19: 319-331.

2. Carter RT, Bentley E, Oliver JW, Miller PE, Herring IP. Elevations in adrenal sex hormones in canine sudden acquired retinal degeneration (SARDS) (abstract). 34th Annual Meeting of the American College of Veterinary Ophthalmologists 2003; 34: 40.

3. Levin CD. Sudden acquired retinal degeneration, associated pattern of adrenal activity, and hormone replacement therapy in a Brittany Spaniel: a case report (abstract). 38th Annual Meeting of the American College of Veterinary Ophthalmologists 2007; 38: 29.

4. Levin CD. Sudden acquired retinal degeneration, associated pattern of adrenal activity, and hormone replacement in three dogs: a retrospective study (abstract). 38th Annual Meeting of the American College of Veterinary Ophthalmologists 2007; 38: 28.

5. Carter RT, Oliver JW, Stepien RL, Bentley E. Elevations in sex hormones in dogs with sudden acquired retinal degeneration syndrome (SARDS). Journal of the American Animal Hospital Association 2009; 45: 207–214.

6. Baker ME. Adrenal and sex steroid receptor evolution: environmental implications. Journal of Molecular Endocrinology 2001; 26: 119-125.

7. Vandenput L, Ohlsson CJ. Sex steroid metabolism in the regulation of bone health in men. Journal of Steroid Biochemistry and Molecular Biology 2010; 121: 582-588.

Table 1.

Client #	Date of contact	Client location	Client informed of potential elevations?	Were sex steroids assayed?	Were sex steroids elevated?	Lab report supplied?	Testing Facility
1	01/02/21	Australia	No	No testing available	n/a	n/a	n/a
2	01/22/21	USA	No	Yes	Adrenal estrogen	Yes	NVDS
3	01/23/21	Mexico	No	Yes	Adrenal estrogen	Yes	NVDS
4	01/25/21	USA	No	Lost to follow-up	n/a	n/a	n/a
5	01/27/21	Canada	No	Yes	Adrenal estrogen	Yes	NVDS
6	02/05/21	USA	No	No, lack of interest	n/a	n/a	n/a
7	02/16/21	UK	No	No testing available	n/a	n/a	n/a
8	03/02/21	USA	No	No, reason unknown	n/a	n/a	n/a
9	03/04/21	USA	No	Yes	Adrenal estrogen	Yes	NVDS
10	03/07/21	USA	No	Yes	Adrenal estrogen	Yes	NVDS
11	03/17/21	USA	No	Yes	Adrenal estrogen	Yes	NVDS
12	03/18/21	Australia	No	No testing available	n/a	n/a	n/a
13	03/18/21	USA	No	Yes	Progesterone	Yes	Univ. of Tenn,

14	03/26/21	USA	No	Yes	Adrenal estrogen	Yes	NVDS
15	04/08/21	USA	No	Yes	Adrenal estrogen	Yes	NVDS
16	04/12/21	USA	No	Lost to follow-up	n/a	n/a	n/a
17	05/19/21	USA	No	No, euthanized	n/a	n/a	n/a
18	05/28/21	USA	No	Yes	Adrenal estrogen	Yes	NVDS
19	05/29/21	USA	No	Yes	Adrenal estrogen	Yes	NVDS
20	05/30/21	UK	No	No testing available	n/a	n/a	n/a
21	06/01/21	USA	No	Lost to follow-up	n/a	n/a	n/a
22	06/06/21	Italy	No	Yes	Progesterone	Yes	In-house via Futurlab
23	06/10/21	USA	No	Yes	Adrenal estrogen	Yes	NVDS
24	06/22/21	USA	No	No, vet resistance	n/a	n/a	n/a
25	07/16/21	USA	No	Yes	Adrenal estrogen	Yes	NVDS
26	07/27/21	USA	No	No, euthanized	n/a	n/a	n/a
27	07/28/21	Canada	No	No testing available	n/a	n/a	n/a
28	08/17/21	USA	**Yes**	Yes	Adrenal estrogen	Yes	NVDS
29	08/19/21	USA	No	Yes	Adrenal estrogen	Yes	NVDS
30	08/21/21	USA	No	Yes	Adrenal estrogen	Yes	NVDS
31	09/06/21	Mexico	No	No testing available	n/a	n/a	n/a
32	09/08/21	S. Africa	No	Yes	None elevated	Yes	Univ. of Van Pretoria
33	09/09/21	USA	No	Lost to follow-up	n/a	n/a	n/a
34	09/24/21	USA	No	Yes	Adrenal estrogen	Yes	NVDS
35	09/27/21	Australia	No	No testing available	n/a	n/a	n/a
36	09/39/21	UK	No	Yes	None elevated	Yes	Nationwide Laboratories
37	10/06/21	USA	No	Yes	Androstenedione	Yes	Univ. of Tenn.
38	10/13/21	Canada	No	No testing available	n/a	n/a	n/a
39	10/20/21	Australia	No	No testing available	n/a	n/a	n/a
40	10/27/21	USA	No	Lost to follow-up	n/a	n/a	n/a
41	11/04/21	Chile	No	No testing available	n/a	n/a	n/a
42	11/04/21	USA	No	No, vet resistance	n/a	n/a	n/a
43	11/05/21	USA	No	Yes	Androstenedione, progesterone, 17-OH progest.	Yes	Univ. of Tenn.
44	11/15/21	UK	No	No testing available	n/a	n/a	n/a
45	11/15/21	USA	No	No, vet resistance	n/a	n/a	n/a
46	11/25/21	Colombia	No	No testing available	n/a	n/a	n/a
47	12/02/21	USA	No	Yes	Androstenedione	Yes	Univ. of Tenn.
	12/02/21	USA	No	Lost to follow-up	n/a	n/a	n/a
49	12/08/21	USA	No	No, vet resistance	n/a	n/a	n/a
50	12/31/21	USA	No	Yes	Adrenal estrogen	Yes	NVDS