

# An SDMA case study: Scarlet



**Patient:** Scarlet, 5-year-old, spayed female golden retriever

**Presenting reason:** Scarlet was brought in for her annual checkup and vaccines.

**History:** Scarlet's owners shared that she had not been acting like herself the past few weeks.

She had a couple of urinary tract infections in the past, though she had not recently been showing those types of signs. She had been less energetic, but appetite and drinking had seemed normal as far as they had been able to tell.

**Physical examination:** Scarlet was bright, alert, and responsive (BAR), appeared well-hydrated, and had good body condition with stable weight since last visit.

## Diagnostic plan

Complete blood count (CBC); chemistry panel, including the IDEXX SDMA™ Test and electrolytes; complete urinalysis; and total T4 were recommended.

## Laboratory findings

- Scarlet's CBC was unremarkable, though her other blood and urine diagnostics identified some areas of concern.
- She had an **increased SDMA\* of 17 µg/dL (0–14 µg/dL)** and a **low urine specific gravity of 1.026**. Her creatinine was within the reference interval at 0.15 mmol/L.
- Her **total T4 and free T4 were both within reference intervals but were low normal**.

## Treatment plan and follow-up

- Scarlet was started on L-thyroxine for treatment of presumptive hypothyroidism.
- A recheck was scheduled in 2–3 weeks for follow-up CBC, chemistry, total T4, and complete urinalysis.
- Additional test considerations included diagnostic imaging of her kidneys and associated structures as well as evaluation of urine protein:creatinine (UPC) ratio and blood pressure.

**2-week recheck:** The pet owner reported that Scarlet seemed to be more active. Her total T4 result was well within the normal range, her **SDMA remained increased at 18 µg/dL**, and her **creatinine remained within the reference interval**. Her **urine specific gravity remained low at 1.027**.

## Chemistry, December 31

	←	🧪 12/31/2014 (Order Received) 1/6/2015 @ 5:49 PM (Last Updated)	IDEXX Reference Laboratories <a href="#">Show Details</a>
▶ Glucose		5 mmol/L 3.3 - 6.8	<input type="text"/>
▶ Urea		9.8 2.5 - 10.0 mmol/L	<input type="text"/>
▶ Creatinine		0.15 0.05 - 0.15 mmol/L	<input type="text"/>
▶ IDEXX SDMA		<sup>m</sup> 17 0 - 14 µg/dL	<input type="text"/>
▶ Phosphorus		1.0 0.8 - 2.1 mmol/L	<input type="text"/>
▶ Calcium		2.6 1.9 - 2.9 mmol/L	<input type="text"/>
▶ Sodium		145 142 - 152 mmol/L	<input type="text"/>
▶ Potassium		4.4 4.0 - 5.4 mmol/L	<input type="text"/>
▶ Na:K Ratio		33 28 - 37	<input type="text"/>
▶ Chloride		111 108 - 119 mmol/L	<input type="text"/>
▶ Bicarbonate		20 13 - 27 mmol/L	<input type="text"/>
▶ Total Protein		67 55 - 75 g/L	<input type="text"/>
▶ Albumin		34 27 - 39 g/L	<input type="text"/>
▶ Globulin		33 24 - 40 g/L	<input type="text"/>
▶ Cholesterol		12.3 3.5 - 9.0 mmol/L	<input type="text"/>

## Urinalysis, December 31

	←	🧪 12/31/2014 (Order Received) 1/6/2015 @ 5:49 PM (Last Updated)	IDEXX Reference Laboratories <a href="#">Show Details</a>
Collection	---	CYSTOCENTESIS	
▶ Colour		YELLOW	
▶ Clarity		CLEAR	
▶ Specific Gravity		1.026	
▶ pH		7.0	
▶ Protein		NEGATIVE	
▶ Glucose		NEGATIVE	
▶ Ketones		NEGATIVE	
▶ Blood/ Haemoglobin		NEGATIVE	
▶ Bilirubin		NEGATIVE	
▶ Urobilinogen		NORMAL	
▶ White Blood Cells		NONE SEEN	
▶ Red Blood Cells		2-5	
▶ Bacteria	---	NONE SEEN	
▶ Epithelial Cells		1+ (1-2)	
▶ Mucous	---	NONE SEEN	

## Total T4 and Free T4, December 31

	←	🧪 12/31/2014 (Order Received) 1/6/2015 @ 5:49 PM (Last Updated)	IDEXX Reference Laboratories <a href="#">Show Details</a>
▶ Total T4	<sup>d</sup>	14 13 - 52 nmol/L	<input type="text"/>
▶ Free T4 (pmol/L)	<sup>e</sup>	7.7 7.7 - 47.6 pmol/L	<input type="text"/>

## Action plan and results

- Because of the **persistent SDMA elevation, an ultrasound on Scarlet's kidneys and associated structures was scheduled.**
- The ultrasound showed the left kidney was somewhat rounded and mildly irregular with some mild dilation of the renal pelvis with changes suspected to be the result of prior kidney infections.
- A urine culture was negative; the UPC was 0.0 and her average systolic blood pressure was normal at 140 mm Hg.
- Scarlet continued to show a persistence in SDMA elevation and abnormal kidney imaging. Following the International Renal Interest Society (IRIS) Chronic Kidney Disease (CKD) Staging Guidelines, **these findings supported IRIS CKD Stage 2 disease, which was substaged as normotensive and nonproteinuric.**
- **Scarlet's treatment plan included initiating a kidney therapeutic diet and continuing with her L-thyroxine and access to fresh water sources at home,** along with more regular appointments to monitor her kidney health. A 3-month recheck was scheduled to perform CBC, chemistry panel, total T4, and complete urinalysis.

**3-month recheck:** Scarlet was reportedly doing well at home. Her total T4 levels remained well within the reference interval, and CBC was unremarkable. **Her SDMA was 15 µg/dL,** and her creatinine remained within the normal range. **Her urine specific gravity remained low at 1.027.**

**6-month recheck:** Given Scarlet's activity level, improving diagnostics, and reports from the pet owner, twice yearly checkups were recommended moving forward. At that time, **Scarlet's SDMA remained at 15 µg/dL,** her creatinine was still within the normal range, and **her urine specific gravity was at 1.026.**

## Discussion

**SDMA is a more reliable biomarker for kidney disease than creatinine,** and it helped to define a thorough medical follow-up plan for Scarlet, **even at early stages of kidney changes.**

**Early intervention and support of Scarlet's kidney function with a kidney supportive diet helped lead to stabilized SDMA results in her follow-up rechecks.** Evidence shows that SDMA can be relied upon for early detection of kidney disease and that dietary intervention prior to an elevation of creatinine can have health benefits for the kidneys.<sup>1,2</sup>

\*Symmetric dimethylarginine

### References

1. Hall JA, MacLeay J, Yerramilli M, et al. Positive impact of nutritional interventions on serum symmetric dimethylarginine and creatinine concentrations in client-owned geriatric dogs. *PLoS One*. 2016;11(4):e0153653
2. International Renal Interest Society. *IRIS Staging of Chronic Kidney Disease (CKD) Guidelines*. [www.iris-kidney.com/pdf/staging-of-ckd.pdf](http://www.iris-kidney.com/pdf/staging-of-ckd.pdf). Modified 2015. Accessed June 23, 2016.

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## Chemistry, January 18

	←	1/18/2015 (Order Received) 1/20/2015 @ 4:08 PM (Last Updated)	IDEXX Reference Laboratories <small>Show Details</small>
▶ Glucose		5.0      3.3 - 6.8 mmol/L	<input type="text"/>
▶ Urea		10.0      2.5 - 10.0 mmol/L	<input type="text"/>
▶ Creatinine		0.16      0.05 - 0.15 mmol/L	<input type="text"/>
▶ IDEXX SDMA		18      0 - 14 µg/dL	<input type="text"/>
		<a href="#">Learn More</a>	
▶ Phosphorus		1.2      0.8 - 2.1 mmol/L	<input type="text"/>
▶ Calcium		2.7      1.9 - 2.9 mmol/L	<input type="text"/>
▶ Sodium		149      142 - 152 mmol/L	<input type="text"/>
▶ Potassium		4.6      4.0 - 5.4 mmol/L	<input type="text"/>
▶ Na:K Ratio		32      28 - 37	<input type="text"/>
▶ Chloride		112      108 - 119 mmol/L	<input type="text"/>
▶ Bicarbonate		22      13 - 27 mmol/L	<input type="text"/>
▶ Anion Gap		20      11 - 26 mmol/L	<input type="text"/>

## Total T4, January 18

	←	1/18/2015 (Order Received) 1/20/2015 @ 4:08 PM (Last Updated)	IDEXX Reference Laboratories <small>Show Details</small>
▶ Total T4		29      13 - 52 µmol/L	<input type="text"/>

## Chemistry, March 27

	←	3/27/2015 (Order Received) 3/31/2015 @ 5:59 PM (Last Updated)	IDEXX Reference Laboratories <small>Show Details</small>
▶ Glucose		4.9      3.3 - 6.8 mmol/L	<input type="text"/>
▶ Urea		8.6      2.5 - 10.0 mmol/L	<input type="text"/>
▶ Creatinine		0.15      0.05 - 0.15 mmol/L	<input type="text"/>
▶ IDEXX SDMA		<sup>9</sup> 15      0 - 14 µg/dL	<input type="text"/>
		<a href="#">Learn More</a>	
▶ Phosphorus		1.3      0.8 - 2.1 mmol/L	<input type="text"/>
▶ Calcium		2.6      1.9 - 2.9 mmol/L	<input type="text"/>
▶ Sodium		148      142 - 152 mmol/L	<input type="text"/>
▶ Potassium		4.8      4.0 - 5.4 mmol/L	<input type="text"/>
▶ Na:K Ratio		31      28 - 37	<input type="text"/>
▶ Chloride		113      108 - 119 mmol/L	<input type="text"/>
▶ Bicarbonate		20      13 - 27 mmol/L	<input type="text"/>
▶ Anion Gap		20      11 - 26 mmol/L	<input type="text"/>

