

A SDMA case study: Simba



Patient: Simba, 14-year-old, neutered male domestic shorthair.

Presenting reason and history: Simba's owners were concerned that he seemed to be eating a lot but losing weight. They also noticed him drinking and urinating more

and meowing more than he usually does. His owners said he seemed to be active, but they were concerned that his habits at home were not normal for him.

Physical examination: Simba was thin with a low body condition score (BCS) of 2.5 on 9-point scale. He had moderate dental disease, a rapid heart rate, and a palpable nodule in his neck area.

Chemistry, 3rd September 2015

IDEXX VetConnect PLUS		Home Directory of Services Imaging Telemedicine		Dr. Jane Robertson	
SIMBA		profile history communications		Order Diagnostics	
2016	MAR 24	2015	OCT 8	SEP 10	SEP 3
3/9/2015 (Order Received) 3/9/2015 12:20 PM (Last Updated) IDEXX Reference Laboratories Show Details					
Glucose	5.75	4 - 9.71 mmol/L	[Progress bar]		
IDEXX SDMA	f 16	0 - 14 µg/dL	[Progress bar]		
Creatinine	80	80 - 221 µmol/L	[Progress bar]		
Urea	13.21	5.71 - 13.21 mmol/L	[Progress bar]		
BUN:Creatinine Ratio	41.1		[Progress bar]		
Phosphorus	1.74	0.94 - 2.03 mmol/L	[Progress bar]		
Calcium	2.37	2.05 - 2.79 mmol/L	[Progress bar]		
Magnesium	0.9	0.74 - 0.99 mmol/L	[Progress bar]		
Sodium	155	147 - 157 mmol/L	[Progress bar]		
Potassium	3.9	3.7 - 5.2 mmol/L	[Progress bar]		
Na:K Ratio	40	29 - 42	[Progress bar]		
Chloride	124	114 - 126 mmol/L	[Progress bar]		
Total Protein	56	63 - 88 g/L	[Progress bar]		
Albumin	24	26 - 39 g/L	[Progress bar]		
Globulin	31	30 - 59 g/L	[Progress bar]		
Alb:Glob Ratio	0.8	0.5 - 1.2	[Progress bar]		
ALT	202	27 - 158 U/L	[Progress bar]		
AST	40	16 - 67 U/L	[Progress bar]		
ALP	70	12 - 59 U/L	[Progress bar]		
GGT	0	0 - 6 U/L	[Progress bar]		
Bilirubin - Total	1.71	0 - 5.13 µmol/L	[Progress bar]		
Bilirubin Unconjugated	1.71	0 - 3.42 µmol/L	[Progress bar]		

Total T₄, 3rd September 2015

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2016	MAR 24	2015	OCT 8	SEP 10	SEP 3
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Total T₄	c 115.84	10.3 - 60.49 nmol/L	[Progress bar]		

Diagnostic plan

Complete blood count (CBC); chemistry panel, including the IDEXX SDMA® Test and electrolytes; complete urinalysis; and total T₄ were recommended. Simba's CBC results were within normal limits. Other findings are shown below.

Diagnostic review

- Based on history, physical examination, and laboratory results, **Simba was diagnosed with hyperthyroidism.**
- An elevated SDMA* concentration indicates impaired glomerular filtration rate (GFR) and should never be ignored. Chronic kidney disease (CKD) is an irreversible and progressive disorder that may exist alongside other medical conditions. While attention to the hyperthyroid condition was a medical priority, based on the diagnostics performed, the kidneys required investigation and support as well.
- Possible further diagnostic investigation: Thoracic and abdominal imaging can help confirm and assess the medical conditions identified within the blood and urine diagnostics as well as other organ system impact (e.g., heart). An electrocardiogram would assess cardiac conductivity. Measurement of blood pressure was encouraged, as both kidney disease and hyperthyroidism are associated with high blood pressure. A urine culture and minimum inhibitory concentration (MIC) susceptibility and urine protein:creatinine ratio (UPC) are commonly performed as part of a complete kidney workup, also.

Urinalysis, 3rd September 2015

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2016	MAR 24	2015	OCT 8	SEP 10	SEP 3
3/9/2015 (Order Received) 3/9/2015 12:20 PM (Last Updated) IDEXX Reference Laboratories Show Details					
Collection	...	NOT GIVEN			
Color		YELLOW			
Clarity		CLEAR			
Specific Gravity		1.016			
pH		6.5			
Protein		NEGATIVE			
Glucose		NEGATIVE			
Ketones		NEGATIVE			
Blood / Haemoglobin		3+			
Bilirubin		NEGATIVE			
White Blood Cells	...	0-2 / HPF			
Red Blood Cells		15-20 / HPF			
Bacteria	...	NONE SEEN			
Epithelial Cells	...	RARE (0-1)			
Mucus	...	NONE SEEN			
Casts	...	NONE SEEN			
Crystals	...	NONE SEEN			

Diagnosis and case follow-up

Hyperthyroidism was successfully treated with I-131 and Simba was ultimately diagnosed with concurrent International Renal Interest Society (IRIS) CKD Stage 2 disease.

- One month following treatment with I-131, **Simba's total T₄ level was at 9 nmol/L, his SDMA was measured at 17 µg/dL, and his creatinine increased from 80 to 160 µmol/L.** His urine remained poorly concentrated, with **specific gravity of 1.016.**
- **A persistent elevation in SDMA indicates on going impairment of GFR and kidney disease, even though creatinine is within normal limits.**
- Simba did not return to his veterinarian for several months, but a recheck of his lab work at that time confirmed that his hyperthyroidism had been successfully treated. He continued to have an elevated SDMA, a normal creatinine, and dilute urine.
- **Following the IRIS CKD Staging Guidelines, Simba has IRIS CKD Stage 2 disease. Without SDMA, his CKD would have gone undiagnosed.** Simba's veterinarian followed the IRIS CKD Treatment Guidelines to treat him, which could help delay the progression of Simba's CKD and even extend his life.

Discussion

Simba's case reinforces that SDMA often a more reliable than creatinine as a biomarker of kidney healthy¹⁻⁵. **SDMA is more sensitive than creatinine because it detects as little as a 25 percent loss of kidney function^{1,2}. Additionally, SDMA increases earlier than creatinine with progressive kidney disease^{2,3}, so it can be the first indicator of kidney disease. Simba's case reinforces that SDMA is more reliable than creatinine, as it is not influenced by body mass⁴⁻⁵.**

Both kidney disease and hyperthyroidism are common medical conditions in older cats. Further challenging the reliability of creatinine in this case was the concurrent hyperthyroidism, which increases metabolism and artificially increases glomerular filtration rate (GFR). Diagnosing chronic kidney disease in hyperthyroid cats is challenging. Creatinine, being a by-product of muscle, is underproduced in feline hyperthyroidism as a result of muscle loss and becomes a poor indicator of kidney function.

Follow-up laboratory results, 24th March 2016

IDEXX VetConnect PLUS		Home Directory of Services Imaging Telemedicine		Dr. Jane Robertson	
SIMBA		profile history communications		Order Diagnostics	
2016		MAR 24		2015	
		OCT 8		SEP 10	
		SEP 3			
		24/3/2016 (Order Received) 24/3/2016 11:50 AM (Last Updated)		IDEXX Reference Laboratories Show Details	
				8/10/2015	
				3/9/2015	
Glucose	5.5	4 - 9.71 mmol/L		5.72	
IDEXX SDMA	22	0 - 14 µg/dL		18	16
Creatinine	168	80 - 221 µmol/L		159	80
Urea	14.28	5.71 - 13.21 mmol/L		14.99	13.21
BUN:Creatinine Ratio	21.1				41.1
Phosphorus	1.94	0.94 - 2.03 mmol/L		1.91	1.74
Calcium	2.32	2.05 - 2.79 mmol/L			2.37
Sodium	152	147 - 157 mmol/L			155
Potassium	4.6	3.7 - 5.2 mmol/L		4.6	3.9
		24/3/2016 (Order Received) 24/3/2016 11:50 AM (Last Updated)		IDEXX Reference Laboratories Show Details	
				8/10/2015	
				3/9/2015	
Collection	CYSTOCENTESIS			CYSTOCENTI...	NOT GIVEN ...
Color	STRAW			YELLOW	YELLOW
Clarity	HAZY			CLEAR	CLEAR
Specific Gravity	1.015			1.016	1.015

Visit www.idexx.com/sdma
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IDEXX SDMA® Test

*Symmetric dimethylarginine

1. Nabity MB, Lees GE, Boggess M, et al. Symmetric dimethylarginine assay validation, stability, and evaluation as a marker for early detection of chronic kidney disease in dogs. *J Vet Intern Med.* 2015;29(4):1036-1044.
2. Hall JA, Yerramilli M, Obare E, Yerramilli M, Jewell DE. Comparison of serum concentrations of symmetric dimethylarginine and creatinine as kidney function biomarkers in cats with chronic kidney disease. *J Vet Intern Med.* 2014;28(6):1676-1683.
3. Hall JA, Yerramilli M, Obare E, Yerramilli M, Almes K, Jewell DE. Serum concentrations of symmetric dimethylarginine and creatinine in dogs with naturally occurring chronic kidney disease. *J Vet Intern Med.* 2016;30(3):794-802. Hall JA, Yerramilli M, Obare E, Yerramilli M, Yu S, Jewell DE. Comparison of serum concentrations of symmetric dimethylarginine and creatinine as kidney function biomarkers in healthy geriatric cats fed reduced protein foods enriched with fish oil, L-carnitine, and medium-chain triglycerides. *Vet J.* 2014;202(3):588-596.
4. Hall JA, Yerramilli M, Obare E, Yerramilli M, Yu S, Jewell DE. Comparison of serum concentrations of symmetric dimethylarginine and creatinine as kidney function biomarkers in healthy geriatric cats fed reduced protein foods enriched with fish oil, L-carnitine, and medium-chain triglycerides. *Vet J.* 2014;202(3):588-596.
5. Hall JA, Yerramilli M, Obare E, Yerramilli M, Melendez LD, Jewell DE. Relationship between lean body mass and serum renal biomarkers in healthy dogs. *J Vet Intern Med.* 2015;29(3):808-814.