

An SDMA case study: Zeke



Patient: Zeke, 14-year-old, neutered male domestic shorthair

Presenting reason and history: Zeke'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: Zeke 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.

Diagnostic plan

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

Chemistry

IDEXX VetConnect PLUS			
ZEKE		Order Diagnostics	
2016	MAR 24	2015	OCT 8 SEP 10 SEP 3
9/3/15 (Order Received) 9/3/15 6:20 AM (Last Updated) IDEXX Reference Laboratories			
Glucose	5.7	3.2 - 7.5 mmol/L	
Urea	13.2	5.0 - 15.0 mmol/L	
Creatinine	0.08	0.08 - 0.20 mmol/L	
IDEXX SDMA	f 15	0 - 14 µg/dL	
Phosphorus	1.7	1.0 - 2.3 mmol/L	
Calcium	2.4	2.1 - 2.8 mmol/L	
Sodium	155	147 - 157 mmol/L	
Potassium	3.9	3.7 - 5.2 mmol/L	
Na:K Ratio	40	29 - 42	
Chloride	124	114 - 126 mmol/L	
Bicarbonate	13	12 - 22 mmol/L	
Anion Gap	22	12 - 25 mmol/L	
Total Protein	56	63 - 88 g/L	
Albumin	25	26 - 39 g/L	
Globulin	31	30 - 59 g/L	
Alb:Glob Ratio	0.8	0.5 - 1.2	
ALT	202	27 - 158 U/L	
AST	40	16 - 67 U/L	
ALP	70	12 - 59 U/L	
GGT	0	0 - 6 U/L	
Bilirubin - Total	2	0 - 7 mmol/L	
Cholesterol	3.7	2.2 - 5.5 mmol/L	

Urinalysis

IDEXX VetConnect PLUS	
ZEKE	
Order Diagnostics	
2016	MAR 24
2015	OCT 8 SEP 10 SEP 3
9/3/15 (Order Received) 9/3/15 6:20 AM (Last Updated) IDEXX Reference Laboratories	
Collection	NOT GIVEN
Colour	YELLOW
Clarity	CLEAR
Specific Gravity	1.016
pH	6.5
Protein	NEGATIVE
Glucose	NEGATIVE
Ketones	NEGATIVE
Blood / Haemoglobin	2+
Bilirubin	NEGATIVE
Urobilinogen	NORMAL
White Blood Cells	0-2
Red Blood Cells	15-20
Bacteria	NONE SEEN
Epithelial Cells	RARE (0-1)
Mucous	NONE SEEN
Casts	NONE SEEN
Crystals	NONE SEEN

Total T4

IDEXX VetConnect PLUS			
ZEKE		Order Diagnostics	
2016	MAR 24	2015	OCT 8 SEP 10 SEP 3
9/3/15 (Order Received) 9/3/15 6:20 AM (Last Updated) IDEXX Reference Laboratories			
Total T4	c 116	10 - 60 nmol/L	

Diagnostic review

- Based on history, physical examination, and laboratory results, **Zeke was diagnosed with hyperthyroidism.**
- Increased SDMA* result guides us to investigate further
Chronic kidney disease (CKD) is a 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.

Diagnosis and case follow-up

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

- One month following treatment with I-131, **Zeke's total T4 level was at 9 nmol/L, his SDMA was measured at 17 µg/dL, and his creatinine increased from 0.08 to 0.16 mmol/L.** His urine remained poorly concentrated, with **specific gravity of 1.014.**

- SDMA continues to indicate issues with kidney function, even though creatinine is within normal limits.**
- Zeke 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 increased SDMA, a normal creatinine, and dilute urine.
- Following the IRIS CKD Staging Guidelines, Zeke has IRIS CKD Stage 2 disease. Without SDMA, his CKD would have gone undiagnosed.** Zeke's veterinarian followed the IRIS CKD Treatment Guidelines to treat him, which could help delay the progression of Zeke's CKD and even extend his life.

Discussion

Zeke's case reinforces that SDMA is more reliable than creatinine as a biomarker of kidney health. **In this particular example of its reliability, SDMA held true to the indication of kidney disease, while creatinine fell victim to the influence of both metabolism and body mass.**

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). The concurrent conditions in this case revealed the shortcomings of creatinine, whereas influence on SDMA by hyperfiltration was blunted because of SDMA's sensitivity for detecting kidney disease earlier and the fact that it is not influenced by other factors like muscle mass.

Follow-up laboratory results

2016		MAR 24	2015	OCT 8	SEP 10	SEP 3	
		3/24/16 (Order Received) 3/24/16 6:50 AM (Last Updated)		IDEXX Reference Laboratories Show Details		10/8/15	9/3/15
▶ Urea	15.3	5.0 - 15.0 mmol/L				15.0	13.2
▶ Creatinine	0.168	0.08 - 0.20 mmol/L				0.16	0.08
▶ IDEXX SDMA	^a 22	0 - 14 µg/dL				^e 17	^f 15
▶ Phosphorus	1.9	1.0 - 2.3 mmol/L				1.9	1.7
▶ Calcium	2.3	2.1 - 2.8 mmol/L					2.4
▶ Sodium	152	147 - 157 mmol/L					155
▶ Potassium	4.6	3.7 - 5.2 mmol/L				4.6	3.9
▶ Chloride	120	114 - 126 mmol/L					124
▶ Total T4	^a 12	10 - 60 nmol/L				^b 9	^c 116
		3/24/16 (Order Received) 3/24/16 6:50 AM (Last Updated)		IDEXX Reference Laboratories Show Details		10/8/15	9/3/15
▶ Collection	CYSTOCENTESIS					CYSTOCENTI ---	NOT GIVEN ---
▶ Colour	STRAW					YELLOW	YELLOW
▶ Clarity	HAZY					CLEAR	CLEAR
▶ Specific Gravity	1.014					1.014	1.016

*Symmetric dimethylarginine