An SDMA case study: Bess

Patient: Bess, 15-year-old, spayed female domestic shorthair

Presenting reason: Bess was due for a routine annual wellness examination.

History: The owner reported that Bess was slowing down as she got older and was not eating as much as she used to. Her owner had not noticed any changes in drinking or urinating, though she is part of a multiple-cat household.

Physical examination: Bess showed some moderate periodontal disease, and other examination parameters were within normal limits. There was thinning of her muscle mass over her back, as commonly seen with older patients.

Diagnostic plan

Complete blood count (CBC); chemistry panel, including the IDEXX SDMA™ Test and electrolytes; complete urinalysis; and total T_4 were recommended. For Bess and patients her age with similar pet-owner observations, these tests are appropriate to build a good clinical picture alongside the physical examination.

Chemistry

	9/24/2015 (Order Received) 9/27/2015 @ 7:04 AM (Last Updated)		IDEXX Reference Laboratories Show Details	6/23/15	7/8/11
Glucose	82	72 - 175 mg/dL		94	94
BUN	36	16 - 37 mg/dL		42	24
Creatinine	1.9	0.9 - 2.5 mg/dL		2.0	1.3
IDEXX SDMA Learn More	[a] 25	0 - 14 µg/dL			
BUN:Creatinine Ratio	18.9			21.0	18.5
Phosphorus	4.4	2.9 - 6.3 mg/dL		4.4	5.2
Calcium	9.7	8.2 - 11.2 mg/dL		9.5	9.3
Sodium	154	147 - 157 mmol/L		150	151
Potassium	4.9	3.7 - 5.2 mmol/L		4.8	5
Na:K Ratio	31	29 - 42		31	30
Chloride	116	114 - 126 mmol/L		113	123
TCO2 (Bicarbonate)	21	12 - 22 mmol/L		22	17
Anion Gap	22	12 - 25 mmol/L		20	16
Total Protein	7.3	6.3 - 8.8 g/dL		7.3	7.3
Albumin	3.2	2.6 - 3.9 g/dL		3.2	3.1
Globulin	4.1	3.0 - 5.9 g/dL		4.1	4.2
Alb:Glob Ratio	0.8	0.5 - 1.2		0.8	0.7
ALT	64	27 - 158 U/L		56	48
AST	40	16 - 67 U/L		32	24
ALP	36	12 - 59 U/L		54	59
GGT	1	0 - 6 U/L		<1	3
Bilirubin - Total	0.1	0.0 - 0.3 mg/dL		0.1	0.1
Bilirubin - Unconjugated	0.0	0.0 - 0.2 mg/dL		0.0	0.0
Bilirubin - Conjugated	0.1	0.0 - 0.2 mg/dL		<0.1	0.1
Cholesterol	191	91 - 305 mg/dL		203	223
Creatine Kinase	164	64 - 440 U/L		305	193
Hemolysis Index	[h] 3+			[j] N	[l] N
Lipemia Index	[i] N			[k] N	[m] N
Spec fPL	2.5	0.0 - 3.5 ug/L			

Total T_4

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Total T4	[b] 2.3	0.8 - 4.7 µg/dL		[c] 2.1	[d] 2.1

Hematology

	9/24/2015 (Order Received) 9/27/2015 @ 7:04 AM (Last Updated)		IDEXX Reference Laboratories Show Details	6/23/15	7/8/11
RBC	8.84	7.12 - 11.46 M/µL		7.7	9.26
Hematocrit	44.7	28.2 - 52.7 %		40.0	47.9
Hemoglobin	13.7	10.3 - 16.2 g/dL		12.4	14.8
MCV	51	39 - 56 fL		52	52
MCH	15.5	12.6 - 16.5 pg		16.1	16.0
MCHC	30.6	28.5 - 37.8 g/dL		31.0	30.9
% Reticulocyte	0.1	%		0.1	0.3
Reticulocyte	9	3 - 50 K/µL		8	27.78
WBC	7	3.9 - 19 K/µL		6	7.3
Neutrophil	5.061	2.62 - 15.17 K/µL		3.84	4.38
Lymphocyte	1.225	0.85 - 5.85 K/µL		1.59	2.044
Monocyte	0.21	0.04 - 0.53 K/µL		0.138	0.146
Eosinophil	0.504	0.09 - 2.18 K/µL		0.432	0.657
Basophil	0	0 - 0.1 K/µL		0	0
Platelet	580	155 - 641 K/µL		389	462
Remarks	SLIDE REVIEWED MICROSCOPICALLY.			SLIDE REV...	SLIDE REV...

Urinalysis

	9/24/2015 (Order Received) 9/27/2015 @ 7:04 AM (Last Updated)	IDEXX Reference Laboratories Show Details	6/23/15	7/8/11
Collection	CYSTOCENTESIS		NOT GIVEN...	UN
Color	YELLOW		YELLOW	YELLOW
Clarity	HAZY		CLEAR	CLOUDY
Specific Gravity	1.014		1.014	1.050
pH	6.5		6.5	7.0
Protein	[b] NEGATIVE		[c] NEGATIVE	NEGATIVE
Glucose	NEGATIVE		NEGATIVE	NEGATIVE
Ketones	NEGATIVE		NEGATIVE	NEGATIVE
Blood / Hemoglobin	NEGATIVE		NEGATIVE	3+
Bilirubin	NEGATIVE		NEGATIVE	NEGATIVE
Urobilinogen	NORMAL		NORMAL	NORMAL
White Blood Cells	0-2		0-2	2-5
Red Blood Cells	NONE SEEN		NONE SEEN...	>100
Bacteria	NONE SEEN		NONE SEEN...	NONE SEEN...
Epithelial Cells	RARE (0-1)		RARE (0-1...	RARE (0-1...
Mucus	NONE SEEN		NONE SEEN...	NONE SEEN...
Casts	NONE SEEN		NONE SEEN...	NONE SEEN...
Crystals	NONE SEEN		NONE SEEN...	NONE SEEN...
Other				

Diagnostic review

Bess showed an increased SDMA* and concurrent decrease in urine-concentrating ability with a **urine specific gravity of 1.014.** Her CBC, other chemistry panel indicators, and total T_4 were otherwise within normal limits.

Possible next steps

- **The increased SDMA signaled the need to investigate kidney health further. The appropriate next step is a complete urinalysis,** which was performed already. The low urine specific gravity was further evidence of kidney health compromise.
- Diagnostic imaging can be of value to further evaluate the kidneys, to confirm kidney disease, and to help determine an underlying cause (e.g., evidence of infection or stone), and it should be considered in patients showing evidence of kidney disease.
- Blood pressure should be further evaluated in patients with kidney disease.

Follow-up action

- Follow-up diagnostics 2 weeks later included radiographs, blood pressure measurement, and follow-up CBC, chemistry, and complete urinalysis along with a urine protein:creatinine (UPC) ratio.
- **Results:** Radiographs showed no evidence of stones, with kidneys smaller than normal size. The only abnormality on lab results was an **increased SDMA of 25 µg/dL,** and urine specific **gravity remained low at 1.016. She was normotensive with a blood pressure of 145 mm Hg. Her UPC was normal at 0.1.**

Diagnosis

Following the International Renal Interest Society (IRIS) Chronic Kidney Disease (CKD) Staging Guidelines, these findings showed that Bess had IRIS CKD Stage 2 disease, substaged as normotensive and nonproteinuric. However, given that Bess's SDMA result was 25 µg/dL, per the IRIS CKD Staging Guidelines, creatinine had underestimated the degree of Bess's kidney dysfunction. Treatment recommendations for IRIS CKD Stage 3 disease should be considered.

IRIS CKD Staging Guidelines

		Stage 1 No azotemia	Stage 2 Mild	Stage 3 Moderate	Stage 4 Severe
Creatinine in mg/dL					
Stage based on stable creatinine	Canine	<1.4	1.4–2.0	2.1–5.0	>5.0
	Feline	<1.6	1.6–2.8	2.9–5.0	>5.0
SDMA in µg/dL		>14	>14	Moderately increased	Markedly increased
Consider understaged based on creatinine			≥25		
				≥45	
UPC ratio					
Substage based on proteinuria	Canine	Nonproteinuric **<0.2**	Borderline proteinuric **0.2–0.5**	Proteinuric **>0.5**	
	Feline	Nonproteinuric **<0.2**	Borderline proteinuric **0.2–0.4**	Proteinuric **>0.4**	
Systolic blood pressure in mm Hg		Normotensive **<150**	Borderline hypertensive **150–159**		
Substage based on blood pressure		Hypertensive **160–179**	Severely hypertensive **≥180**		

SDMA = IDEXX SDMA™ Test
See iris-kidney.com for more detailed staging, therapeutic, and management guidelines.

Discussion

- **SDMA is more reliable than creatinine in assessing kidney health and detection of disease.**
- Cases like Bess's are common in our practices—an older patient experiencing muscle loss with age and decreased activity. Creatinine is a breakdown product of muscle, and as muscle mass decreases it will impact creatinine levels on chemistry evaluations. **SDMA is not influenced by muscle mass and as such is more reliable in detecting kidney disease.**
- IRIS has recognized the medical importance of SDMA and has included it in its guidelines for diagnosing, staging, and treating CKD.

For more information on treatment of chronic kidney disease visit **www.iris-kidney.com/guidelines/recommendations.html** or visit **idexx.com/sdma**

*Symmetric dimethylarginine