Chronic Kidney Disease Staging in Dogs & Cats

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Overview

To promulgate standards of care for small animals, the International Renal Interest Society (IRIS) has established guidelines to diagnose, assess, and manage chronic kidney disease (CKD) in dogs and cats. The most recent versions can be found on the IRIS website (iris-kidney.com; see ***Resources***).

Diagnosing and staging CKD requires serum (from fasting blood) creatinine, a readily available diagnostic test, to infer glomerular filtration rate (GFR; see ***CKD Toolkit***, page 87). GFR should be assessed on at least 2 occasions in a stable patient. Of note, alternative assessments of GFR (eg, symmetric dimethylarginine [SDMA]) may add to or supplant blood creatinine in the future.[1] Important additional supportive information includes assessment of urinary concentrating ability (ie, urine specific gravity) without identifiable nonrenal cause, abnormal renal palpation or renal imaging findings, proteinuria of renal origin, and abnormal renal biopsy results.

SDMA, now available on commercial serum chemistry profiles, appears to enter the plasma at a constant rate, independent of muscle mass and dietary protein intake. SDMA is cleared by glomerular filtration alone, independent of urine volume. These characteristics suggest that SDMA may offer a more consistent indicator of GFR, less affected by confounding factors that impact both serum creatinine and blood urea nitrogen as indicators of kidney function and could allow earlier detection of CKD than traditional tests.[2]

The **magnitude of proteinuria** and **degree of hypertension** can provide further insight regarding the nature and likelihood of CKD progression

CKD TOOLKIT
Find detailed figures on CKD staging and substaging by proteinuria or blood pressure on page 87.

and are incorporated as substages (see ***CKD Toolkit***, page 87). Some breeds (eg, greyhounds) tend to have a higher normal range for blood pressure as compared with most other breeds.[3]

Staging can facilitate appropriate patient monitoring and treatment. IRIS has developed additional guidelines to address these elements (see ***Resources***). These guidelines reinforce the value of repeating tests to make sure they accurately reflect patient status and regular patient reassessment to determine response to treatment, rate of CKD progression, and the need to adjust management strategies.

Diagnosis & Staging

IRIS has established algorithms for diagnosis and staging to accompany the staging criteria for dogs and cats (see ***Resources***). The algorithms use standard, readily available test results to establish initial staging; however, substaging requires collection of urine for estimation of the urine protein:creatinine ratio and measurement of blood pressure. Blood pressure measurements can be inconsistent because of the requirement for special equipment and, most importantly, a standard technique.[4]

Treatment

IRIS staging can assist with development of empirical recommendations regarding appropriate, logical treatment for each CKD stage (see ***Resources***). Predictions based on clinical experience might be made about the likely response to treatment.

Management strategies may include:

- Discontinuing all potentially nephrotoxic drugs, if possible
- Identifying and treating any pre- or postrenal abnormalities
- Ruling out any treatable conditions (eg, pyelonephritis, renal urolithiasis)
- Correcting dehydration
- Reducing proteinuria (eg, low-protein diet, ACE inhibitors, angiotensin-receptor blockers)
- Addressing systemic hypertension (eg, calcium channel blockers, ACE inhibitors)
- Reducing dietary intake and GI absorption of phosphate
- Correcting metabolic acidosis (usually only encountered in advanced Stage 3 and Stage 4)
- Treating anemia (usually only encountered in advanced Stage 3 and Stage 4)

Reduced phosphate intake[4] and reduction of proteinuria[5-9] are the most important treatment strategies for reducing CKD progression. Patients in Stage 1 represent the best opportunity for intervention with these strategies to prevent or ameliorate CKD's rate of progression.[5-10] Correction of systemic hypertension, if present, is also important.[11-14]

Dogs and cats in Stages 1 through 3 often respond to appropriate management with improved longevity and slowing of progression,[15] whereas those in Stage 4 tend to be fragile and much more prone to repeated episodes of uremic crises that require IV fluid support and renal replacement therapy (ie, dialysis) for restabilization.

IRIS Staging for the Medical Record

IRIS staging allows characterization of patient status in the medical record in a shorthand format that facilitates rapid recognition of status, disease progression, and response to treatment. For example*:

RESOURCES

Several resources are available from IRIS to help diagnose, stage, and treat dogs and cats with CKD:

- Staging of CKD: **iris-kidney.com/pdf/staging-of-ckd.pdf**
- Treatment Recommendations for CKD in Dogs: **iris-kidney.com/pdf/treatment-recommendation-dogs.pdf**

CKD = chronic kidney disease

GFR = glomerular filtration rate

IRIS = International Renal Interest Society

SDMA = symmetric dimethylarginine

A feline CKD patient before treatment with a blood creatinine of 1.6 mg/dL (283 µmol/L), UP/C of 1.5, and systolic blood pressure of 230 mm Hg would be classified as:

IRIS CKD Stage 1, P (proteinuric), SH (severely hypertensive)

On follow-up after treatment with antihypertensive agents and strategies to reduce proteinuria, the cat returns with a blood creatinine of 2 mg/dL (353 µmol/L), UP/C of 0.4, and systolic blood pressure of 155 mm Hg and would be reclassified as:

IRIS CKD Stage 2, BP(T) (borderline proteinuric on treatment)

A canine CKD patient presented with a blood creatinine of 2.5 mg/dL (220 µmol/L), UP/C of 0.4, and systolic blood pressure of 165 mm Hg would be classified as:

IRIS CKD Stage 3, BP (borderline proteinuric), H (hypertensive)

On follow-up during administration of treatment to address both proteinuria and hypertension, the dog returns with a blood creatinine of 3.8 mg/dL (336 µmol/L), UP/C of <0.2, and systolic blood pressure of 145 mm Hg and would be reclassified as:

IRIS CKD Stage 3, NP(T) (nonproteinuric on treatment), NH(T) (nonhypertensive on treatment)

Conclusion

IRIS staging CKD patients can help improve patient assessment and outcome, promote timely implementation of treatment strategies, facilitate assessment of treatment effectiveness, and standardize the terminology of CKD patient status. Although adoption is likely far from universal, implementation in practice is encouraged.

*Examples are based on similar examples found on the IRIS website.

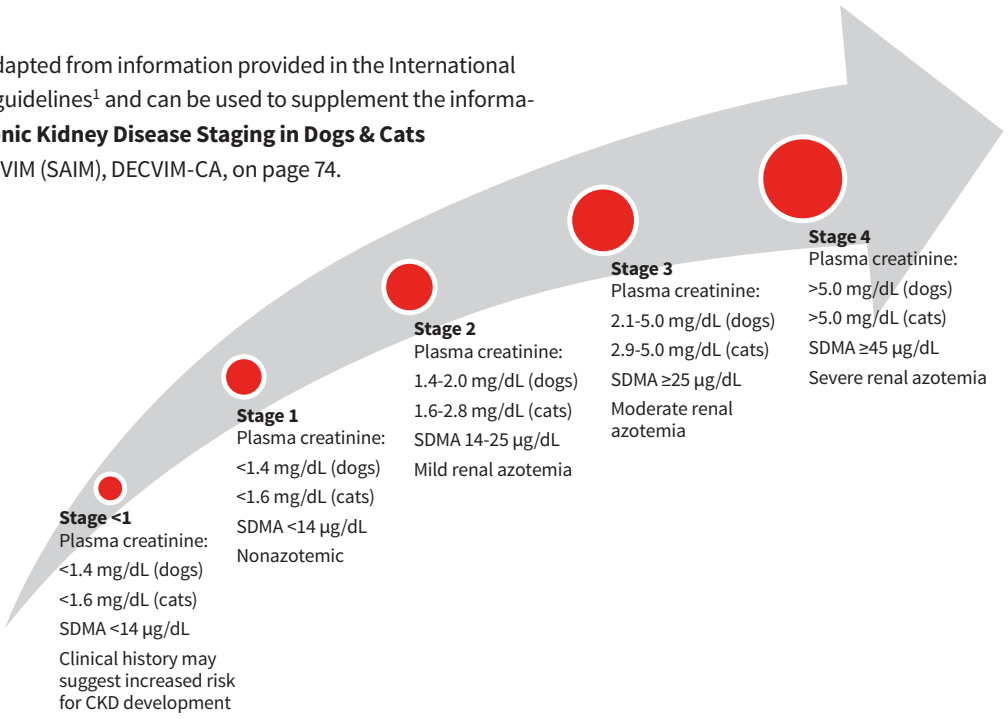
See page 90 for references.

CKD Toolkit: Staging in Dogs & Cats

The following figures were adapted from information provided in the International Renal Interest Society (IRIS) guidelines[1] and can be used to supplement the information found in the article **Chronic Kidney Disease Staging in Dogs & Cats** by David F. Senior, BVSc, DACVIM (SAIM), DECVIM-CA, on page 74.

CHRONIC KIDNEY DISEASE STAGING IN DOGS & CATS

SDMA = symmetric dimethylarginine



SUBSTAGING BASED ON PROTEINURIA

UP:C = urine protein:creatinine ratio

Nonproteinuric	Borderline Proteinuric	Proteinuric
UP:C <0.2 (dogs) <0.2 (cats)	UP:C 0.2-0.5 (dogs) 0.2-0.4 (cats)	UP:C >0.5 (dogs) >0.4 (cats)

SUBSTAGING BASED ON BLOOD PRESSURE*

Normotension (minimal risk)	Borderline Hypertension (low risk)	Hypertension (moderate risk)	Severe Hypertension (high risk)
Systolic BP: <150 mm HG Diastolic BP: <95 mm HG	Systolic BP: 150-159 mm HG Diastolic BP: 95-99 mm HG	Systolic BP: 160-179 mm HG Diastolic BP: 100-119 mm HG	≥180 mm HG ≥120 mm HG

*Adjustments should be made for breeds with typically higher blood pressure.

Reference

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