

NUTRITION

Chronic Kidney Disease Screening and Confirmation Testing in Cats

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Chronic kidney disease (CKD) is one of the most commonly diagnosed conditions in older cats. A 1992 study of 2228 cats found 31% of cats older than 10 years to be affected¹; a smaller and more recent study of a random cohort of cats found incidence to be 50%.² New testing options may help you diagnose and intervene earlier in the disease process, but to ensure timely and appropriate intervention, you should base any diagnosis of CKD on a combination of those screening and confirmatory procedures. This article provides an overview of those diagnostic procedures; a follow-up article will focus on the nutritional management of cats with CKD.

CKD SCREENING TESTS

Because CKD is a common disease for older cats and can progress quietly for years before overt clinical signs are noted, annual screening of healthy cats should begin when they are approximately 5 to 6 years of age. This screening enables you to establish a baseline against which changes can be monitored over time. Components of CKD screening include a physical examination, blood testing, and urinalysis.

Physical examination. A physical examination is an essential and cost-effective component of CKD screening and can point to possible kidney impairment.

Specific elements of the examination should include

- **Body and muscle condition scoring.** It is very important to monitor all aspects of body composition, including body condition score and muscle condition score. (Charts of these scoring systems are available as PDF downloads with the online version of this article.) Gradual, unintentional weight loss and muscle wasting can be signs of early disease. A recent study indicated that weight loss in cats can occur 1 to 3 years before kidney disease is diagnosed.³
- **Kidney palpation.** Palpation can determine if kidneys are symmetrical and if they are enlarged or smaller than expected. Enlarged kidneys can be caused by ureteral obstruction, cystic changes, or infiltrative disease; abnormally small kidneys can be suggestive of CKD.
- **Fundic exam.** Hypertension is commonly associated with CKD in cats,⁴ and signs of hypertension may be evident before other signs of CKD are noted. Ocular changes, including retinal edema, intraretinal hemorrhage, tortuous vessels, detached retinas, and dilated pupils that are unresponsive to light, may be signs of hypertension caused by kidney disease. In an ideal world, blood pressure screening would be part of any routine examination; however, detection of ocular changes should prompt the measurement of systolic blood pressure if it was not part of the routine examination.

You should not make a CKD diagnosis on the basis of 1 elevated creatinine or SDMA value without determining if the results are repeatable. For a confirmed diagnosis of CKD, abnormal findings should persist for at least 3 months.

Blood testing. An annual blood screen that includes a complete blood count and chemistry profile with electrolytes is recommended. The complete blood count can help detect anemia, which is commonly mild and nonregenerative with CKD. After overt signs of CKD are present, some degree of azotemia (increased blood urea nitrogen [BUN] and creatinine) will be detected. Varying degrees of hyperphosphatemia will also be present and often worsen as CKD progresses.

Like serum creatinine concentrations and glomerular filtration rate, symmetric dimethylarginine (SDMA)^{5,6} is a means of measuring renal function in cats. Serum SDMA concentrations are inversely proportional to glomerular filtration rate and may move out of the reference range before serum creatinine concentrations are increased. Thus, measurement of SDMA may allow earlier detection of renal disease.

Although SDMA testing can be a complementary tool for CKD diagnosis, a single abnormal result does not confirm CKD, and you should not substitute SDMA findings for urinalysis and other diagnostic procedures. SDMA levels can fluctuate from day to day and be affected by factors such as hydration, diet, toxin ingestion, or medication use. A recent study showed significant variation in SDMA concentrations in healthy dogs sampled 9 times at various intervals.⁷ Therefore, you should always view SDMA findings within the context of the entire clinical picture. If the SDMA concentration is the only finding suggestive of CKD, you should re-test within 1 to 3 months to confirm repeatability.

Urinalysis. The importance of this screening test cannot be overemphasized, given that concentrating ability is often lost before BUN or creatinine increase. The urinalysis (including a microscopic sediment examination) measures urine specific gravity and determines presence or absence of proteinuria, red and white blood cells, bacteria, crystals, and casts. The International Renal Interest Society (IRIS; iris-kidney.com) guidelines on CKD in cats suggest that those with specific gravity <1.030 be further evaluated, but other data⁷ suggest that older, apparently healthy cats with specific gravity <1.035 undergo additional diagnostics, including blood pressure and SDMA measurements. Multiple factors can play a role in decreasing a cat's urine concentrating ability (e.g., age, sex, dietary moisture content, drinking avidity, and fasting status).⁸

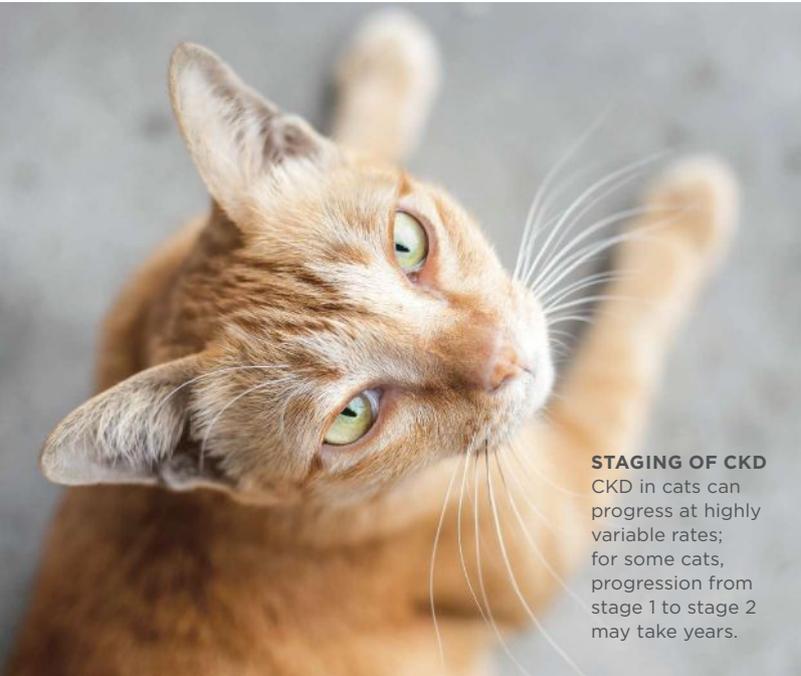
If proteinuria is detected on a dipstick, or if there is other evidence to support a diagnosis of CKD, the urine protein:creatinine ratio should be determined. If proteinuria is confirmed and the ratio is >0.4, medical and/or dietary intervention is warranted because proteinuria is associated with decreased survival times in cats.⁹

THYROID TESTING

As cats reach their senior years, adding a total thyroxine test to screen for hyperthyroidism is also advised. Hyperthyroidism may mask CKD because increased renal blood flow may lower BUN and creatinine. The influence of hyperthyroidism on SDMA metabolism is unknown, although a laboratory survey suggested that SDMA concentrations are more accurate than creatinine concentrations for identifying CKD in cats with hyperthyroidism. In cats that receive iodine-131 therapy, SDMA testing has high specificity but relatively low sensitivity for predicting development of azotemia.¹⁰

CKD CONFIRMATORY TESTS

When screening test results alert practitioners to the possibility of CKD, confirming these findings completes the picture. Illness and dehydration, as well as acute toxin ingestion, can lead to abnormal screening findings, which may later be reversed. You should not make a CKD diagnosis on the basis of 1 elevated creatinine or SDMA value without determining if the results are repeatable. For a confirmed diagnosis of CKD, abnormal findings should persist for at least 3 months.



STAGING OF CKD
CKD in cats can progress at highly variable rates; for some cats, progression from stage 1 to stage 2 may take years.

Diagnostic imaging can provide additional useful information. Abdominal radiographs may enable assessment of kidney size, the presence of renal mineralization, and/or obstructive ureterolithiasis. Abdominal ultrasonography can offer additional information about the presence of decreased corticomedullary distinction (associated with CKD), hydronephrosis (often associated with ureteral obstruction), cysts, or infarcts.

STAGES OF CKD

Currently IRIS categorizes CKD into 4 stages:

- **Stage 1:** nonazotemic

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- **Stage 2:** mild
- **Stage 3:** moderate
- **Stage 4:** severe

CKD in cats can progress at highly variable rates; for some cats, progression from stage 1 to stage 2 may take years. If repeated diagnostics indicate CKD, be cautious about prescribing a nonsteroidal anti-inflammatory drug for arthritis and consider switching high-protein, high-phosphorus diets to diets with more moderate protein and phosphorus levels.

Note, however, that switching to a protein-restricted renal diet for a cat that does not have CKD may have undesirable effects. Such a diet can be detrimental because high-calorie, restricted-protein diets can promote unwanted weight gain and loss of lean muscle. Thus, confirmation of CKD is important.

After a diagnosis of CKD has been established and the disease stage determined, you can create a patient management plan that includes medication and dietary modification. The next issue of *Today's Veterinary Practice* will cover nutritional management of CKD in cats in a follow-up Nutrition Notes article. **TVP**

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