Jump into the future with urinary biomarkers

SDMA markers can be detected earlier than other indicators of chronic kidney disease, leading to faster management.

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By Sarah J. Wooten, DVM
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Are you still using blood urea nitrogen (BUN) and creatinine concentrations to diagnose kidney disease in your veterinary patients? That is soo last century. Diagnostic urinary biomarkers are the wave of the future, according to Leigh Perry, VMD, DACVIM, BluePearl, Virginia Beach. In a presentation at CVC Virginia Beach, Dr. Perry shared how urinary biomarkers are changing the game. Read on to see how you can use these practical tools in your practice.

Dr. Wooten’s client communication tips
When communicating with the client, remember to stress the importance of follow-up examinations and blood work to assess therapy efficacy and disease progression. Advise your client that your treatment plan will depend on whether there is ongoing damage to the kidney, and follow-up laboratory work and examinations will help you design the treatment plan that will maximize their pet’s quality and quantity of life.

I usually set up recheck appointments before the client leaves the hospital, tell them verbally and give them written instructions of exactly what we will do at the next visit. I also schedule email reminders for subsequent laboratory work and examination follow-up while I write the records to keep patient follow-up from falling between the cracks.

How do you define chronic kidney disease?

Chronic kidney disease (CKD) is defined in a few ways, Perry says. One is inappropriate urine specific gravity or elevated creatinine or symmetric dimethylarginine (SDMA) concentrations for more than 25 days. Another definition is inappropriate urine specific gravity (<1.030 in dogs, <1.035 in cats) in the face of azotemia or dehydration on at least one visit.

Once CKD is diagnosed, Dr. Perry recommends looking at trends over time in the patient’s laboratory work as the standard of care, which allows you to determine whether a patient’s kidney damage is stable or if there is a progressive loss of nephrons. Trends also allow you to assess response to therapy. What is considered stable disease? Dr. Perry says creatinine concentration ranges <1 mg/dl and SDMA ranges <10 µg/dl.

What is SDMA?

SDMA is methylated arginine similar in size to creatinine. The kidneys are the main source of SDMA excretion, and it is not reabsorbed by the tubules. Dr. Perry says SDMA concentrations closely correlate with glomerular filtration rate (GFR): They increase in the blood when GFR is reduced by 40%. This allows earlier detection of CKD than creatinine, which is not increased until there is a 75% decrease in GFR and is affected by nonrenal factors. In particular, SDMA has a 91% specificity and 100% sensitivity for CKD, making SDMA a highly sensitive and specific test for chronic kidney disease in both dogs and cats.¹

Practically speaking, IDEXX Laboratories has recently developed a direct immunoassay that measures SDMA in serum or plasma. SDMA is incredibly stable in canine and feline serum and plasma for seven days at room temperature, 14 days at 39 F, with up to three freeze-thaw cycles, says Dr. Perry.

Creatinine works for me. Why should I care about SDMA?
SDMA concentrations appear to be unaffected by age, sex, muscle mass, liver disease, heart disease or hormonal conditions such as Cushing’s syndrome, Dr. Perry says. She notes that, in comparison, SDMA has less variability than creatinine. Creatinine concentrations vary with breed, age, muscle mass, dietary protein intake, tubular secretion of creatinine, sex, certain medications, interfering substances and size of the dog. For example, Dr. Perry says, in dogs weighing 26 to 45 kg, normal creatinine concentrations can be as high as 2 mg/dl because of higher muscle mass and lower GFRs in comparison to small and medium sized dogs.

If creatinine is already elevated, is there any point to run SDMA?

Dr. Perry thinks that there is, especially when it comes to International Renal Interest Society (IRIS) staging and treatment planning. If SDMA concentrations are >25 µg/dl, but there is no further elevation in creatinine concentration, then the patient should be treated as the next IRIS stage up. For example, if the patient is stage 2 based on creatinine concentration but SDMA is >25 µg/dl, Dr. Perry thinks that patient should be treated as an IRIS stage 3 patient.

What about when creatinine and SDMA don’t agree?

If a patient has a normal creatinine concentration but an elevated SDMA concentration, that patient is considered IRIS stage 1, and should be treated as such, Dr. Perry says. SDMA allows detection of CKD in 7% of canine patients and 16% of feline patients that would otherwise be missed with standard blood chemistry workups.

Dr. Perry says if the creatinine concentration is elevated, but SDMA concentration is normal, then other confounding factors, such as muscle mass, interfering substances, heart disease and dietary protein, should be explored.

More markers coming soon?

According to Dr. Perry, additional urinary biomarkers, including urine neutrophil gelatinase-associated lipocalin (uNGAL), urinary clusterin, serum inosine and cystatins are being explored in the laboratory setting as early indicators of acute tubular damage, acute kidney damage, acute damage due to nephrotoxic medications or pyelonephritis, return to normal function after acute damage and more. The idea is that these novel kidney biomarkers identify active damage even earlier, allowing intervention to occur before chronic, irreversible change takes place.

Reference

Related links

- IDEXX test promises to detect kidney disease months or years earlier
- International kidney society includes SDMA in guidelines
- Journal Scan: SDMA pinpointed as biomarker for feline renal disease