





Screening renal function in patients exposed to recalled foods

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The Menu Foods pet foods acute renal failure situation has created a large demand for testing renal function in exposed or affected animals. We created this document to provide a rationale for deciding how to efficiently assess these patients in a timely and complete fashion.

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Are BUN and Creatinine sufficient for evaluating renal function?

BUN and creatinine help assess renal function, so they are "necessary but not sufficient". Creatinine is almost entirely excreted solely by the kidneys and increases with impaired function. BUN is less reliable. It is possible to have a patient with values within a laboratory's reported reference intervals, but still be abnormal. For instance, if the pet started with a much lower BUN/Creatinine (which you didn't know about), and has begun to increase these variables at the time of assessment, it is possible that renal dysfunction may be undetected at the first evaluation. Any patients with BUN or creatinine at the high end of the laboratory's reference range should be retested in 24-48 hrs to determine if the initial values are the "front end" of an acute renal problem, or simply normal for that patient. This can be omitted if very recent wellness testing confirms that these "high-normal" values are indeed normal for that animal. When retesting, obtain samples at the same time of day to minimize the effect of feeding and hydration on these variables. Do not restrict water intake.

Is urinalysis necessary?

Absolutely. In order to determine if kidneys are functioning normally, concentrating ability must be demonstrated. Normal cats usually will concentrate above 1.040 in randomly obtained samples. but occasional cats will have more dilute urine. Factors which may influence include on the percent of diet which consists of canned food, and presence of concurrent illnesses such as hyperthyroidism. If USG <1.040, a physiological explanation needs to be identified; if there is no valid reason for suboptimally concentrated urine renal dysfunction should be considered.

Dogs often have USG >1.030, but are more variable than cats, because their normal daily water consumption is more variable. Early morning collection (first urination of the day) is often the most concentrated, because of minimal water consumption throughout the night.

USG should always be assessed in light of the BUN/Creatinine. . In other words, prerenal azotemia if due to extracellular volume depletion should result in maximally concentrated urine, assuming that primary kidney disease or extra-renal diseases that interfere with normal ADH function are not present.

Examination of urine sediment is equally important (see below).

Are there any differences in interpretation of USG with acute renal failure?

Yes. Some dogs and cats with acute renal failure may have very increased BUN/Creatinine but have concentrated

urine. This can occur because the animals suddenly become oliguric or anuric, and the urine in their bladder is "residual" from before the insult. Since little or no new urine is being produced, the bladder remains partially full, and urine remains concentrated.

Are there other ways of screening for renal damage?

Yes. Urine sediment is critical. Casts in particular can be cause for concern. Few waxy or hyaline casts in concentrated urine can be insignificant. Cellular casts in any numbers or moderate or heavy granular casts are worrisome.

Crystalluria should be evaluated carefully. Any crystals that are not immediately recognizable by a clinician should be analyzed by a clinical pathologist to determine significance. For example sulfa crystals, which have been observed in cats and dogs during the pet food acute renal failure situation, are not commonly seen, and may not be correctly identified by inexperienced clinicians or technicians. Additionally, sulfa crystals can be identified with the lignin test. This test is simple to perform and details can be found in this [discussion](#).

What about the Urinary GGT:creatinine ratio?

The ratio of urinary GGT to urinary creatinine can be considered, but most of the work evaluating this test has been performed in dogs treated with excess aminoglycosides or NSAIDs, where a baseline pre-therapy is available. Thus it is most valuable when it can be compared to baseline (pre-insult) values. It may be a valuable screening test for this sort of situation (mass screening for tubular damage) but we lack sufficient data, especially for cats. It's an option for very concerned clients and an easy urine test; however, particularly for cats, a control sample should be submitted.

REFERENCES

Journal Articles:

Ko JC, Miyabiyashi T, Mandsager RE, Heaton-Jones TG, Mauragis DF. [Renal effects of carprofen administered to healthy dogs anesthetized with propofol and isoflurane](#). J Am Vet Med Assoc. 2000;217(3):346-9.

Associate:

[Acute Renal Failure](#) – Associate Chapter

Rounds and Other resources

Lunn K. [Azotemia: Don't Blame the Kidneys](#) – VIN Rounds July 24, 2005

