



# ACVIM

Small Animal Internal Medicine  
Fact Sheet

## **ACVIM Fact Sheet: Acute Kidney Injury**

### ***Overview***

The kidneys have numerous functions that are critical to maintenance of health, including toxin excretion, maintenance of normal blood electrolytes and blood pressure, and ultimately production of urine. When kidney dysfunction occurs, the health of affected dogs and cats can become severely compromised. Acute kidney injury (AKI) is a term that represents a spectrum of sudden or *acute* kidney damage, ranging from mild disease that is clinically undetectable to severe life-threatening acute renal failure (ARF).

Acute renal failure (ARF) is a sudden onset of potentially life-threatening kidney dysfunction and is a common disorder in dogs, cats and humans. For the purpose of this discussion, the terms AKI and ARF will be used interchangeably. Despite advances in the treatment of ARF, the death rate amongst both humans and animals remains unacceptably high, however, with appropriate care many animals can still recover.

There are a number of underlying conditions that can lead to AKI, and ultimately to ARF (see Table 1). Unfortunately, despite diagnostic workup, a definitive underlying cause for development of AKI is often not found.

### ***Signs & Symptoms***

Depending on the severity of kidney dysfunction, dogs and cats with AKI can exhibit variable signs of illness. In veterinary medicine, patients are usually diagnosed with AKI when they have progressed into ARF because this is when clinical signs become most apparent. In dogs and cats with significant damage to the kidneys, clinical signs are non-specific and can include lethargy, vomiting, diarrhea, abdominal pain and decreased appetite. Owners may also initially notice that affected animals urinate large amounts, followed by a decline in urine output.

In AKI, clinical signs typically have a rapid onset in a dog or cat that was previously healthy. It is also possible for animals with longer standing chronic kidney disease (CKD) to develop an acute injury; in these cases, owners will likely note a sudden worsening of clinical signs. For example, if an animal with previously diagnosed CKD develops a kidney infection, they may develop significant lethargy, vomiting and decreased appetite.

### ***Diagnosis***

Diagnosis of AKI is based on patient history, physical examination, bloodwork evaluation, urine testing (urinalysis and urine culture) and abdominal ultrasound. During the diagnostic workup, it is critical for your veterinarian to determine if an animal is affected with AKI, longer standing chronic kidney disease or a combination of both, as prognoses can be very different (this can sometimes be difficult to distinguish). If AKI is

diagnosed or suspected, further specific testing such as blood pressure measurement and testing for inflammatory or infectious diseases may be performed.

As above, patients with AKI will usually have a sudden onset of abnormal clinical signs and no history of significant weight loss (unless there are other underlying disease processes). On physical examination, patients may exhibit pain in the area of their kidneys.

In a patient with AKI, bloodwork evaluation will show elevated blood urea nitrogen (BUN) and creatinine values, which are the most commonly used markers for diagnosis of kidney dysfunction. Once elevated BUN and creatinine are found, your veterinarian will use the comprehensive evaluation to determine if chronic disease is present, to determine treatment plans and to help find a possible underlying cause for the damage.

### ***Treatment & Aftercare***

If an underlying cause such as infection or blockage is diagnosed, then it should be treated. Once the initial cause is being treated or if no underlying cause is found (which is often the case), treatment is aimed at supportive care. Your veterinarian will prescribe a fluid plan (making sure to provide adequate fluids while not administering excessive amounts of fluids), treat blood pressure abnormalities, administer pain medications, anti-nausea medications and gastrointestinal protectants, and will use bloodwork to ensure maintenance of body electrolytes and acid-base status.

In severe ARF, urine production can decrease significantly or stop altogether. In these patients, dialysis or blood purification is often needed to keep patients stable while the kidneys are given time to heal. In general, the primary indications for initiation of dialysis are severely elevated kidney values in a sick patient (especially when no underlying cause is found), life-threatening electrolyte abnormalities and overhydration due to fluid administration and lack of urine production. The goal of dialysis is to stabilize patients while kidneys recover.

### ***Prognosis***

Animals with AKI can have variable outcomes, depending upon the cause and severity of injury and the cause of AKI, when known. In some patients, medical management will give time for kidneys to heal and patients may be discharged from the hospital with kidney values that are within normal ranges. Other animals may recover but develop clinically significant permanent damage that leads to CKD. Finally, some patients may not recover or may require life-long dialysis to maintain quality of life; this is not commonly performed in veterinary medicine. It is important to note that the degree of elevation in kidney values does not always correlate with outcome, and with appropriate care, many patients that initially have significant dysfunction can have good outcomes.

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DOG	DOG and CAT	CAT
Leptospirosis	Kidney infection	Ureteral Obstruction*
Grape/raisin toxicity	Drugs (ie: Nonsteroidal anti-inflammatory drugs)	Lily toxicity
Acute Pancreatitis*	Ethylene Glycol	Renal Lymphoma*
Lyme Nephritis	Severe blood pressure alterations (Low or High)	
	Melamine/Cyanuric acid	

**Table 1.** Listed are the more common causes of acute kidney injury in dogs and cats. A (\*) indicates that the condition can occur in both species, but occurs much more commonly in the species it is listed under.

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