



**Ettinger: Textbook of Veterinary Internal
Medicine, 7th Edition
Acute Renal (Kidney) Failure
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What is acute renal (kidney) failure?

The kidneys perform many vital functions. One of those is the removal of toxins from the body that build up simply from cell function causing production of waste products. Kidney failure means that the kidneys cannot remove these toxins. "Acute" kidney failure means that the problem developed over a few days.

Many different things can cause acute kidney failure. Certain poisons are well known for their ability to damage the kidney. These poisons include the following:

- Antifreeze (radiator fluid, ethylene glycol)
- Lily plants (cats only)
- Raisins
- Certain drugs, including pain pills such as aspirin or ibuprofen (Advil)

Severe infections in the kidney from bacteria can cause sudden kidney failure. Although kidney infections can occur spontaneously, usually some reason exists why the cat or dog cannot fight off infection as easily (such as kidney stones or partial urine blockage). Leptospires are a group of bacteria that can cause acute kidney failure in dogs. Dogs get leptospirosis from urine or water contaminated by infected animals (deer, cattle, rats, raccoons, mice, dogs, other animals).

Anything that decreases blood flow through the kidney can cause kidney failure. This includes dehydration from any cause (such as severe vomiting and diarrhea). Heatstroke or other disorder causing massive damage to blood vessels, such as bee stings or snakebites, can lead to kidney failure.

What are the symptoms of acute kidney failure?

Dogs or cats with acute kidney failure may have a variety of problems. Symptoms of kidney failure include excessive thirst and an excessive volume of urine in the early stages. Later symptoms of acute kidney failure include lethargy, poor appetite, and vomiting. In severe kidney failure, the amount of urine may actually decrease, or the pet may stop making urine altogether. Other signs as things get worse include digested blood in the stool making the stool look black and tarry, or vomiting digested blood, which looks like coffee grounds.

What tests are needed?

Blood and urine tests are used to determine if kidney failure is present, and if it is, how severe it is. Other tests, such as x-rays, sonogram (ultrasound), and special blood tests are usually necessary to tell what caused the kidney failure. Sometimes a biopsy of the kidney is recommended. The cause of kidney failure is not always easily discernable.

What treatment is available?

The initial treatment for acute kidney failure is usually intravenous fluids (IV). These fluids are used to restore good hydration and to flush out the substances that the kidneys are supposed to be removing from the bloodstream. Urine production is monitored throughout the IV fluid therapy as a decrease in urine can indicate the need for other therapies. Diuretics (water pills) are the most common medications used when attempting to increase urine output.

In addition to fluid treatment, other medications are commonly used. Antacids such as Pepcid or Zantac are given because kidney failure frequently causes stomach ulcers. If ulcers are bleeding, medications to coat the ulcer may be prescribed. Antibiotics are given if the cause of the kidney failure is known or suspected to be infection. Because kidney failure is a big drain on the body's resources and because pets with kidney failure frequently refuse to eat, a temporary tube may be recommended.

The condition of dogs and cats with acute kidney failure can change rapidly, and careful monitoring is necessary. This may include repeatedly checking blood pressure, body weight, electrocardiogram, and blood tests. It may be necessary to place a urinary catheter to measure urine volume. Potassium is an electrolyte normally found in the blood in low levels. With acute kidney failure, potassium levels may increase to dangerous levels, unlike in chronic kidney failure when levels tend to decrease. The increased potassium level slows the heartbeat and can cause the heart to stop. Very high blood pressure may develop because of the kidney failure, and blood pressure medicines are frequently needed. High blood pressure can cause blood vessels in the eye or brain to burst. This may manifest itself as bloating in the belly, swollen legs, or as shortness of breath, if the fluid builds up in the lungs.

Not all animals with acute kidney failure will respond to IV fluids. Advanced renal therapies (e.g., peritoneal dialysis, hemodialysis) may be necessary. Signs that indicate these therapies should be considered include a dangerously high potassium level, fluid in the lungs, or lack of improvement in laboratory results while one receives IV fluids. Peritoneal dialysis involves putting a tube directly into the belly cavity, putting fluid into the belly, and then draining it out after an hour to a few hours. This flushes out many of the toxins that the kidneys are failing to remove. It requires having a doctor or nurse by the patient 24 hours a day initially to keep flushing the fluid in and out. Unfortunately, even in the best of circumstances, complications such as infection around the tube and clogging of the tube are frequent after only a few days.

Hemodialysis involves putting a very large IV catheter in a vein and using the catheter to remove part of the blood at a time. The blood is sent through a machine that cleans

the blood. Hemodialysis is effective, but only a handful of veterinary hospitals are equipped to do hemodialysis. Both peritoneal dialysis and hemodialysis are generally very expensive.

What is the prognosis?

Despite all the advances in treatment of acute kidney failure, it is such a serious disease that many patients die from it. About 60% of dogs and cats with this disease either die or are put to sleep because of it. Dialysis is usually reserved for those patients in which medical treatment has failed and the chance of death without dialysis is almost 100%. In those patients, dialysis may allow up to half of them to recover, depending on the underlying cause of kidney failure. Of the ones that recover, some may recover completely, or they recover partially and end up with long-lasting kidney damage that can be treated at home.