

# **ACUTE RENAL FAILURE**

Acute renal failure is a sudden loss of kidney function. There are many causes of renal failure in dogs and cats, including bacterial or viral infection, toxins or poisons, cancer, crystal or stone formation within the kidneys, bladder or urethra, and cysts in the kidneys. Symptoms of renal failure are similar to symptoms seen with other diseases, and include poor appetite, poor haircoat, vomiting or diarrhea, dehydration, increased thirst and increased urine production.

The diagnosis of renal failure is made by testing the blood and the urine. Blood testing also is done to rule out other diseases causing similar signs. If antifreeze poisoning is suspected, there is a specific blood test for that. The most common cause of renal failure in humans is over use of aspirin. Too much aspirin is an occasional cause of renal failure in pets as well. Sometimes it is impossible to tell what caused the kidneys to shut down.

In the early stages of kidney disease the kidneys can no longer retain water in the body or "concentrate" urine, so the urine becomes more and more watery. Eventually, the urine comes out the same dilution as the blood, because the kidneys have lost all their ability to pull water back into the bloodstream. As the urine gets more and more dilute, the dog or cat drinks more water to compensate for all the water he is losing into the urine. The test we use to determine the concentration of urine is called the specific gravity. Urine specific gravity matches that of the blood when about 2/3 of the kidney function is lost.

When 3/4 of the kidney function is gone, not only is the specific gravity low, but the waste products that the kidneys are supposed to flush out of the body start to build up in the bloodstream, because the kidneys can no longer get rid of them. The two waste products that we measure are the BUN and creatinine. The higher the levels of these in the bloodstream the worse the pet feels and the poorer the prognosis.

Eventually, if the damage is severe enough, the kidneys shut down completely and stop producing urine altogether. By this time the pet will be extremely ill and dehydrated.

Treatment of acute renal failure involves the administration of large amounts of IV fluids. The fluids correct dehydration and imbalances in the levels of electrolytes such as phosphorus and potassium. Large amounts of fluids also help flush waste products out of the body. If the kidneys have shut down completely and are no longer making urine, diuretic drugs are given in an effort to start the kidneys up again. If the kidneys are failing because stones or crystals are obstructing the flow of urine, this problem must be corrected as well.

Once the BUN and creatinine are high, the mouth, stomach and intestinal tract start to get ulcers, caused by these waste products, or toxins, the body is supposed to get rid of. The ulcers are painful. Sore kidneys themselves feel like a bad backache. There are medications to help with nausea, ulcers, pain, and fever if it is present. Antibiotics are needed if the kidneys are infected. If antifreeze poisoning is the cause of the kidney failure, a procedure called peritoneal dialysis can be done at Animal Emergency Center in Milwaukee, to flush waste products from the body.

The earlier acute renal failure is treated, the better the prognosis. The kidneys can't regenerate themselves. Once the kidney is damaged it stays damaged. The

sooner we can stop the disease that is causing the kidney damage (if that is even possible), the less kidney damage will occur. This is why blood testing should be done as soon as kidney disease is suspected.

Sometimes in acute renal failure the kidneys are swollen and inflamed but once the inflammation goes down the kidney will regain at least some of its function.. If the diuretics and IV fluids are effective, the kidneys resume producing urine, the toxins are flushed out and the BUN and creatinine levels gradually come back down. If the kidneys can't be restarted again, and they stay shut down, the pet will die.

Urine and blood sample tests are repeated after the dog or cat has started on its treatment. If the levels of BUN and creatinine start to decrease and the specific gravity of the urine improves, we know we are making progress. Whether the pet recovers completely or will instead move into the chronic phase of the disease depends on how much improvement we see on the tests. Some pets die even with the most intensive care we can give. Some animals need fluid therapy and special diets at home for the rest of their lives. A lucky few recover completely.

Kidney dialysis as it is done for humans is only available for dogs at two veterinary schools right now. The human machines do not work on dogs or cats. Kidney transplants are being done on dogs and cats once they are past the acute stage of renal failure and are stable in the chronic phase of the disease, with a creatinine less than 4. The surgery is risky and expensive, and the pet owner must also adopt the animal that serves as the kidney donor.

Most pet owners who have a dog or cat suffering from acute renal failure elect to let us start the pet on IV fluids and medications. Blood testing is then repeated in 24-48 hours. If the creatinine level is beginning to decrease, therapy is continued. If no progress is made, then euthanasia must be discussed. If urine production has ceased, and does not restart within a few hours, the prognosis is grave.

Treating this disease is expensive, especially if it is severe by the time the diagnosis is made. Some pets will be dead within 24 hours of the time the symptoms start, so the disease can go from mild to severe very quickly in some cases. In other pets, the disease may be caused by a smoldering, chronic kidney infection and take weeks or months to get from mild to severe.

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