

KIDNEY DISEASE



Chronic kidney Disease (CKD), or long term kidney disease, is one of the most common medical problems seen in older dogs and cats. It can occasionally be seen in young animals as well. All older pets (over about nine or ten years of age) have some degree of kidney damage, but signs of kidney failure do not develop until about two thirds of the kidneys' tissues are damaged. When this two thirds level is reached, the kidneys can no longer conserve water and electrolytes (sodium, potassium, chloride etc.) to maintain the correct levels in the blood. Once $\frac{3}{4}$ of the kidney function is gone, the kidneys can no longer remove waste materials from the body properly, and the levels of these toxins start to rise in the bloodstream. The two tests we look at are called the blood urea nitrogen, or BUN, and creatinine. Both are nitrogen waste products that come from proteins, which the kidneys are supposed to flush out of the body through the urine. With advanced kidney disease we may also see low potassium or high phosphorus on blood tests.

There are many causes of kidney disease in addition to age related deterioration. Some of the most common include bacterial and viral infections, poisons, tumors, injuries, parasites, and hypertension (high blood pressure). Kidney disease often occurs as a result of infections in other areas of the body such as the bladder, uterus, lungs, and especially infected teeth. Kidney failure also may occur when a pet goes into shock following an accident or serious illness.

To confirm a diagnosis of kidney disease, your pet's veterinarian will need to examine blood and urine specimens. X-rays or ultrasound may also be necessary if kidney stones or cancer are suspected. These tests will help your veterinarian to determine the cause and severity of the disease so that the best treatment can be chosen. It is often not possible for your veterinarian to determine the exact cause of a dog or cat's kidney problems, especially if the disease has been present for a number of years.

COMPENSATED KIDNEY FAILURE: If the kidney failure is not severe, the pet can compensate by drinking extra water and producing more urine. In this way waste materials are literally flushed out of the body. Unfortunately, needed electrolytes such as potassium can also be flushed out to some degree. Except for increased thirst and excessive urination, the dog or cat remains relatively healthy. This is called compensated kidney failure. Signs of compensated kidney failure include: Increased thirst, increased urination, increased hunger, intermittent vomiting, minor digestive upsets, and dry skin.

UNCOMPENSATED KIDNEY FAILURE: If the kidney failure is severe, due to acute (sudden) kidney disease or worsening of chronic (longstanding) kidney disease, the dog or cat will become unable to drink enough water to flush out waste materials, and the kidneys will also be unable to pass back needed water and electrolytes to the body. This condition is called uncompensated kidney failure. Uncompensated kidney failure leads to uremia, a condition in which poisonous waste products accumulate in the body, and body fluids and electrolytes are not kept in balance. This is a serious and life-threatening condition, which may require intensive hospital care.

Signs of uremia include: Increased thirst, apathy, depression, listlessness, reddened eyes, skin problems, excessive or no urine production (depending on the stage of the disease), dehydration, pain, vomiting, diarrhea, loss of appetite, emaciation, bad breath, mouth ulcers, discolored tongue, muscle twitching, coma, and eventually death.

The severity of these signs depends on whether the uremia develops quickly or slowly, and how severe the kidney impairment is. There is no cure for chronic kidney disease, but treatment can prolong your pet's life, sometimes for many years. The objectives of kidney treatment are to:

1. Assist the failing kidneys in eliminating waste materials by liquid intake control -- fresh water should always be available, and drinking should be encouraged. The use of watering fountains, canned food, or watered down food may be recommended.
2. Decrease the amount of waste materials to be eliminated by the kidneys by diet control - special diets are fed containing the minimum amount of the highest quality protein, to reduce the load of protein waste products on the failing kidneys. Diets made for kidney disease are also restricted in phosphorus, which accumulates in the body when the kidneys are not working properly, and extra fatty acids and fat to help reduce inflammation and maintain body weight.
3. Replacing fluids, electrolytes and vitamins lost due to the increased amounts of urine excreted by the kidneys. In acute cases this may be done in the hospital with intravenous fluids. We also often train owners to give their pets subcutaneous (under the skin) fluids at home. Depending on the severity of the kidney disease this may be needed anywhere from once a week to twice a day, and it takes about ten minutes each time.
4. Minimizing damage from infections elsewhere in the body, such as infected teeth. Dental disease is a major contributing factor to kidney disease, so regular dental care is very important.
5. If necessary, managing dry skin, vomiting, high blood pressure, and other secondary problems with medication. Blood pressure should be monitored regularly - high blood pressure secondary to chronic kidney disease can cause blindness and strokes, and it can further damage the kidneys.

The aim of treating a dog or cat with chronic kidney failure is to keep the pet in a compensated condition; that is, a bodily balance whereby the kidneys are still able to remove waste materials because the pet is drinking and urinating more.

The owner who accomplishes these goals can keep a treasured pet alive and happy, with minimal expense and inconvenience, for many years. However, the disease is progressive and eventually the body will not be able to compensate. At this stage of chronic kidney disease the pet will have so little functioning kidney left, that even with intensive care, the dog or cat will not recover from the inevitable uremic crisis. At this point euthanasia is usually warranted to prevent further suffering by the pet.

Early detection and control are the keys to maximizing the lifespan of a patient with kidney disease. A yearly urine check on any aging pet is a wise idea. You can catch a urine sample from your dog yourself using a clean cup or pie pan. The urine sample

should then be transferred to a clean jar or plastic container, with a lid, and stored in the refrigerator until it is brought to the clinic. Cats are a little more difficult to get urine specimens from. Special litter is usually needed or we can obtain the sample here at the clinic.

Yearly urine screening allows us to find and treat bladder and kidney infections, and it gives us the opportunity to find the earliest signs of kidney disease (which are dilute urine and protein in the urine). In dogs, dilute urine can indicate many different disease processes including chronic renal failure, or it can just reflect that the dog has taken in a large volume of water that day.

Cats, however, are desert animals, good at conserving water, and their urine should always be concentrated. Therefore, if we see dilute, watery urine in a cat, we know that he or she has some degree of kidney failure. In both cats and dogs, large amounts of protein in the urine indicate renal failure. If we notice protein in your pet's urine, or if we suspect chronic renal failure in your pet, we will recommend a urine test that quantifies the amount of protein lost in the urine (called a urine protein creatinine ratio).

It has been proven that large quantities of protein in the urine are associated with faster progression of chronic renal failure. High blood pressure (hypertension) is also associated with progression of chronic renal failure. Therefore, when we see either or both of these problems in a pet, we start a drug called an ACE inhibitor. These drugs are commonly used in people and animals to control hypertension. They also decrease the amount of protein that is excreted in the urine, therefore providing a double benefit. A nutritional supplement called Rubenal is also recommended for protein in the urine. Humans and rats with chronic kidney disease have longer survival rates when Rubenal is used along with an ACE inhibitor drug. Studies in dogs and cats are underway but we presume that they also will benefit from Rubenal.

Blood testing for kidney function is recommended for many reasons, including age, breed risk for kidney disease, before anesthesia, when a pet is ill or losing weight or as a baseline. If kidney disease is detected, the treatment and frequency of follow up blood and urine tests depends on the stage of the disease. Currently, there are four stages of renal disease according to the International Renal Interest Society.

Stage 1: Urine is becoming dilute, or the pet has a large amount of protein in the urine or high blood pressure, but blood tests are still within the normal range

- Blood and urine testing at least annually
- K/D or equivalent prescription diet (prolongs life expectancy 1-2 years)
- Dental care as needed, usually with SQ or IV fluid support (prolongs life expectancy 2-3 years if the pet is never allowed to develop periodontal disease)
- Treat with appropriate medications if pet has high blood pressure and/or protein in the urine (UPC > 0.2). This may include ACE inhibitor, Rubenal and fatty acids.
- Allow pet free access to fresh water at all times. In cats, sometimes we use other strategies to increase water consumption.
- Consider abdominal X-ray to look for kidney stones

Stage 2: Urine is not being concentrated, creatinine less than 3 in cats and less than 2.5 in dogs

All items in Stage 1 plus:

- Blood pressure, blood and urine testing twice yearly
- Supplement potassium in cats by stage 3
- Consider Azodyl (a probiotic supplement that helps to trap nitrogen waste products in the intestine. Azodyl makes pets feel better and reduces BUN and creatinine levels.)

Stage 3: Creatinine above 3 in cats, above 2.5 in dogs

Everything in stage 1 & 2 plus:

- Blood testing quarterly, urine testing at least annually
- Dental care if health permits
- Twice yearly blood pressure checks if blood pressure is normal, quarterly if on blood pressure medication
- SQ fluids at home if owners able and willing
- Supplement potassium in cats (to make up for what's being lost into the urine)
- Azodyl probiotic supplement
- Epakitin (phosphorus binder) if phosphorus level climbs above 4.5
- Control side effects of uremia if needed (including nausea, vomiting, and GI ulcers), with medication.

Stage 4: Creatinine above 5.

Everything for stage 1-3 plus:

- Treat anemia as needed (if PCV < 20%). The kidneys monitor the blood as it passes through them and they produce a hormone as needed that tells the bone marrow when to make more red blood cells. Poorly functioning kidneys cannot perform this function, the bone marrow doesn't make enough red blood cells and the pet becomes anemic.

Acute renal failure, or sudden worsening of chronic renal failure, may require hospitalization and fluid therapy. Once stabilized the pet will then fall into one of these four categories for long term maintenance at home. Most pets, unless their life is shortened by other diseases, will gradually progress through all 3 stages.

In the early stages of CRF, the extra care your pet will need is minimal. In the later stages a significant commitment is needed on the part of the owner, as well as the veterinary team, to work together to support the health and happiness of the pet as long as possible. There are a lot of medications that may be helpful but that means a lot of things to purchase and administer, which can be discouraging. Please call us whenever you have questions about your pet's care!