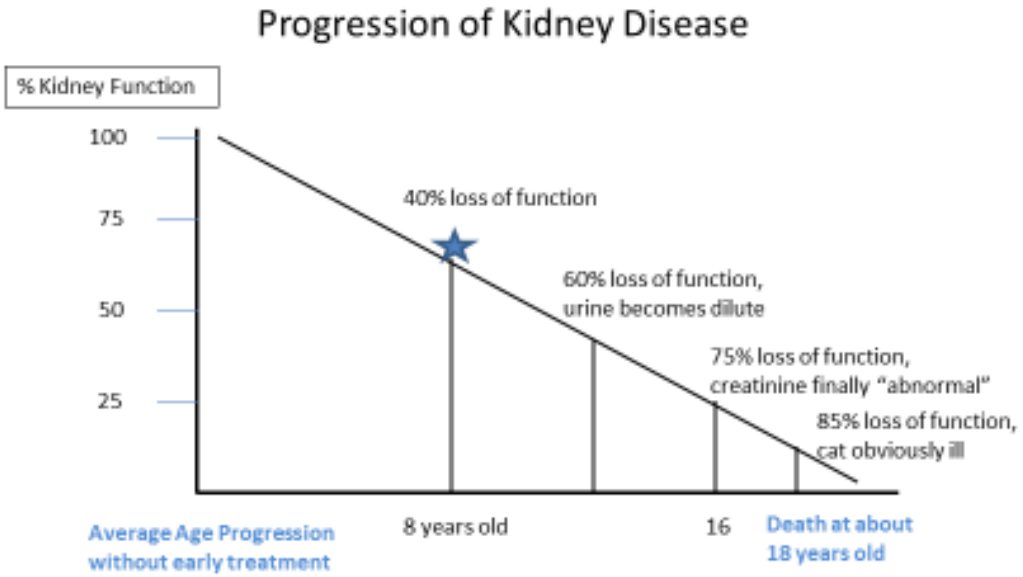
# KIDNEY DISEASE IN CATS

Kidney disease is the number one killer of cats over 14 years of age. Unless they develop another life-threatening disease first, all cats will eventually die from kidney failure. In heart disease in humans, the plaque build-up in the arteries starts many years before a heart attack occurs. Similarly, kidney disease in cats starts years before illness occurs. The kidneys begin to deteriorate from day one, just as your brand new car starts to age and depreciate as soon as you drive it off the lot.

In the average cat, kidney disease starts somewhere between age 6-9 years. It then slowly progresses over the next 8-10 years, with death from kidney failure usually occurring at around age 16-18. There is a lot of variation to this, however. Some cats have elevated kidney blood tests as early as age 3 or 4. Others are luckier and start much later in life. Genetics plays a part in this, as does medical care the cat receives throughout its life.




There are many causes and contributors for kidney disease in addition to age-related deterioration. These include bacterial and viral infections, poisons (such as antifreeze or ingestion of lilies), 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. Early onset of kidney failure can be caused by genetic problems such as polycystic kidney disease, seen most commonly in Persian cats. Kidney failure also may occur when a pet goes into shock following an accident or serious illness.

The first test that reveals early kidney disease is the SDMA blood test. This will become higher than normal when about 40% of kidney function has been damaged. This is stage 1 of CKD and is ideally when medication is begun that will slow the deterioration of the kidneys and lengthen lifespan the most effectively. Many times, if blood testing has not been done to screen for it at an early stage, kidney failure is

diagnosed at a later stage.

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. You would notice larger quantities of urine in the litter box and possibly increased water consumption. This is stage 2 CKD.

At the next stage, stage 3, once 75% of 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. At this stage we start to see more obvious symptoms, especially gradual weight loss.

The two blood tests for kidney disease that we have been doing for years and years 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.

To look for contributing factors or an underlying cause for kidney disease, we will need to examine a urine specimen to look for urinary tract infection or evidence of a kidney stone. X-rays or ultrasound may also be necessary if kidney stones or cancer are suspected. These tests will help us 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 cat's kidney problems, especially if the disease has been present for a number of years. If we find no underlying cause we generally assume we are seeing age-related decline.

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. Electrolytes such as potassium can also be flushed out to some degree, so we may need to supplement potassium. Except for increased thirst and excessive urination, the dog or cat remains relatively healthy. This is called <u>compensated kidney failure</u>. Signs of compensated kidney failure include: Increased thirst, increased urination, increased hunger, intermittent vomiting, minor digestive upsets, and dry skin.

If the kidney failure is severe, due to acute (sudden) kidney disease or worsening of chronic (longstanding) kidney disease, your cat will become unable to drink enough water to flush out waste materials. The kidneys will also be unable to pass back needed water and electrolytes to the body. This condition is called <u>uncompensated kidney failure</u>. 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. <u>Assist the failing kidneys in eliminating waste materials by liquid intake control</u> - 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. With moderate kidney disease, 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 also sodium, to decrease the high blood pressure which often accompanies kidney disease. Extra fatty acids and fat in the diet helps to reduce inflammation and maintain body weight. Fish oil supplements are usually recommended to decrease inflammation inside the kidneys, which helps to keep them healthier.

Elderly cats become less efficient at digesting and absorbing protein, so eventually the lower protein in kidney disease diets isn't enough for them. At the present time, we don't have a higher protein prescription diet made specifically for kidney disease. We will switch your cat to a higher protein diet with as little sodium as we can find, usually a diet made for diabetes. Because these diets don't have the increased potassium and decreased phosphorus of a kidney disease diet we may need to add more potassium supplements, as well as medication to bind phosphorus in the intestinal tract so that less is absorbed into the bloodstream.

It's very important for you to realize that all protein is not created equal. Chicken feathers and shoe leather both contain a lot of protein but it is completely indigestible, which means it does the pet no good while placing increased workload on the kidneys. The digestibility of the protein in a particular food is not listed on the label so there is no way for you to obtain this information without calling the pet food manufacturer. Please trust us to recommend a diet that will be the best solution for your cat. **The worst thing to feed your cat as it gets older is grocery store canned cat food. These foods often contain huge amounts of poor-quality protein.**

3. Replacing calcitriol, the active form of vitamin D, via oral supplementation. The kidneys are responsible for calcitriol production. When kidney disease occurs this function slows and eventually stops. Lack of active vitamin D causes all kinds of problems, including worsening the kidney disease itself. Our current recommendation is to start calcitriol as soon as kidney disease is detected, which can be done when about 40% of kidney function is lost – years before symptoms begin to occur. With chronic kidney disease, starting calcitriol early gains you about three years of increased life expectancy.

4. Minimizing damage from infections, both in the kidneys and 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. 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.

6. Benazapril is a medication that we start when the cat gets to stage 3 of CKD. This medication decreases blood pressure within the kidneys, which reduces kidney damage over time. It is also used to treat hypertension (high blood pressure), and proteinuria (protein loss into the urine).

7. If necessary, managing dry skin, vomiting, hypertension, 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. More than 60% of cats with kidney disease develop high blood pressure. Some cats need amlodipine as well as benazepril to keep hypertension controlled.

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 the end stage of chronic kidney disease the pet will have so little functioning kidney left, that even with intensive care, the 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.** Blood testing should be done annually from an early age, as most cats reach the threshold to start medication between the ages of 6 and 9 years, and in some cats as early as 2-3 years of age. A yearly urine check on any aging pet is also a wise idea. You can catch a urine sample from your cat yourself or we can get one here. Special litter is usually needed at home, or we can obtain the sample using a syringe and needle. 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.

Yearly urine screening allows us to find and treat bladder and kidney infections or stones, and it gives us the opportunity to find early signs of kidney disease (dilute urine and protein in the urine).

Cats 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, or UPC).

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 benazepril, an ACE inhibitor drug. These drugs are commonly used in both people and animals to control hypertension. Some patients will need amlodipine as well to keep their blood pressure down or to minimize protein loss into the urine. Recheck blood pressure readings or UPC tests are needed to ensure we have the right medications and the right dosages for an individual patient.

Once we have made a diagnosis of kidney disease, the 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 (IRIS).

**Stage 1**: The pet has a large amount of protein in the urine, high blood pressure, SDMA is >14 or Creatinine is greater than 1.5. At this stage your pet will need:

● Blood pressure, blood and urine testing at least annually
● Dental care as needed, with IV fluid support (you can prolong life expectancy 2-3 years if your cat is never allowed to develop periodontal disease)
● Calcitriol therapy to replace the active Vitamin D that the kidneys are no longer producing enough of
● Appropriate medication if pet has high blood pressure and/or protein in the urine (BP >150 or UPC > 0.2).
● Fatty acid supplementation (fish oil) to decrease inflammation inside the kidneys
● Allow pet free access to fresh water at all times and consider purchasing a water fountain. Introduce high quality canned cat food if your cat will eat it.
● Consider an abdominal X-ray to look for kidney stones

**Stage 2**: Urine is not being concentrated, creatinine >2.2
At this stage your cat will need all items in Stage 1 plus:
● Blood pressure, blood and urine testing twice yearly
● Benazapril medication to decrease blood pressure within the kidneys, even if systemic blood pressure is still normal. Benazapril can add a tear or so to life expectancy.
● Start a kidney disease diet
● Supplement potassium in cats once Creatinine is >3.0

**Stage 3**: Creatinine above 3.5

Everything in stage 1 & 2 plus:
● Supplement potassium
● 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.)
● Blood testing every 3-6 months, urine testing at least annually
● 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
● Phosphorus binder medication if the 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:
● Blood pressure and blood testing every 3 months, urine testing at least twice a year
● 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 IV 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 4 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!

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