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VETERINARY HOSPITAL & HOTEL

Kidney Disease in Cats

Chronic kidney (renal) disease is a relatively common disorder in cats, especially geriatric cats. Renal insufficiency (CRI) or renal failure (CRF) occurs when the kidneys are no longer able to perform their normal function of removing waste products from the blood. The former is the early stage of the latter.

Kidney failure is not the same as the inability to make urine. In fact, most cats with kidney failure are producing large volumes of urine in an attempt to remove the waste products that have accumulated in the blood. This apparent contradiction between the large volume of urine produced and declining kidney function is often a source of confusion for owners.

Typically, renal failure comes about as the kidneys slowly undergo aging changes and begin to “wear out.” It is a process that develops over months to years. Initially, there may be no apparent signs, and the cat’s blood work is normal. However, there are irreversible microscopic changes underway in the aging kidney. Eventually, the kidneys will begin to shrink because of scar tissue and will become small and hard. By this time, there are usually signs of progressive kidney disease, and the lab work will indicate associated changes.

The kidneys are nothing more than filters which selectively keep certain compounds in the blood, while allowing unnecessary waste products to escape into the urine. When aging causes the filtration process to become progressively less effective, blood flow to the kidneys increases in an attempt to improve filtration. This is the reason that the cat with kidney failure is producing a large volume of urine. Because of the loss of excessive fluid through the urine, the cat is obligated to drink more water to avoid becoming dehydrated. This is called a *compensatory change*.

Thus, the typical clinical signs of kidney failure include increased water consumption (polydipsia) and increased urine production (polyuria).

Prevalence

Various clinical studies have evaluated the prevalence of renal failure in cats. For most cats, onset of clinical signs begins anywhere from 7-12 years of age. However, the prevalence of overt kidney failure is highest in cats older than fifteen years of age. One study found that approximately 49% of cats over 15 years of age had some degree of chronic renal insufficiency or failure.

The frequency of renal failure in male cats is the same as for female cats.

One study indicated no apparent breed predispositions; however, a very large study conducted by 23 veterinary colleges found that renal failure was recognized more than twice as often in the following breeds: Maine coon, Abyssinian, Siamese, Russian Blue, and Burmese.

Causes/Transmission

Chronic renal failure in cats is technically called chronic tubulointerstitial nephritis. This term describes a microscopic finding and is not specific for a particular cause. In most cats, a specific cause for renal failure cannot be determined. In many cats, kidney failure is the end result of several diseases or insults to the kidneys over a prolonged period of time.

Contributing Factors

At the present time, there are four contributing factors identified that may hasten progression of renal disease.

1. Hyperthyroidism (overactive thyroid glands). This hormonal disease is common in older cats. Hyperthyroid cats are usually hypertensive (have high blood pressure), and this results in increased blood flow through the kidneys. As mentioned above, extra blood flow helps the aging kidney maintain function. With treatment of hyperthyroidism, blood pressure normalizes and the extra blood flow to the kidneys is no longer present. This can cause a sudden decompensation of kidneys with already marginal function.

2. Long term intake of an acidified diet. Diets that are used to make urine pH more acidic are very common. These diets have been developed to aid in management of lower urinary tract (bladder) problems in cats; this is also called "cystitis." While these diets are useful for managing certain bladder problems more common to young adult cats, they are potentially very harmful to the kidneys of older cats. These diets cause chronic loss of potassium from the body. Chronic low potassium has been identified as a significant factor in progression of kidney disease in older cats. Even when blood levels of potassium are normal, older cats may have low levels of total body potassium. Because total body potassium cannot be measured, the contribution of potassium depletion may be missed.
3. Urinary tract infection. Bacterial infection in the kidneys and/or bladder may be present without any apparent signs. Bacteria can damage the kidneys. Therefore, cats with kidney disease should have their urine checked for the presence of bacteria. The most accurate way to check for bacterial infection is to have the urine cultured.
4. Small stones in the kidneys of older cats are common. They are usually made up of a mineral called calcium oxalate. They are easy to see on x-rays. They can contribute to a decline in the kidney function. Currently, there is no successful way to manage these stones. They typically don't pass and aren't painful to your cat. Removal is not recommended due to the damage that surgery would cause the already diseased kidney tissue. Lithotripsy (ultrasonic break up) may be an acceptable form of management in the future, as it is in humans.

Clinical Signs

As described above, the classic signs of kidney failure are increased urine output and a compensatory increase in water intake (thirst). With more advanced kidney failure, other signs may include loss of appetite, weight loss and a poor hair coat, depression, vomiting, diarrhea, and very bad breath. Occasionally, ulcers will be found in the mouth. A heart murmur may be present when the anemia of renal failure develops.

High blood pressure is common in cats with failing kidneys. The sustained high blood pressure causes some cats to detach the retinas in the back of the eye or to have strokes. These situations result in sudden blindness and loss of equilibrium.

Diagnosis

The diagnosis of kidney failure is made by determining the level of two waste products in the blood, blood urea nitrogen (BUN) and blood creatinine, coupled with the measurement of urine specific gravity (concentration). The normal cat has very concentrated urine (high specific gravity), whereas the cat with renal failure has dilute urine (low specific gravity).

When the BUN and creatinine reach certain levels, they are indicators of renal failure. However, the problem with these tests is that they do not become abnormal until late in the disease. Over 75% of kidney function must be lost before the test results are substantially elevated. A decrease in urine concentration is often the earliest indicator of developing kidney disease.

Treatment

Treatment is in two phases.

1. Phase 1 - Diuresis

In the first phase of treatment, large volumes of intravenous fluids are given in an attempt to flush toxins from the body. This flushing process, called diuresis, is designed to maximize the function of all remaining kidney tissue. If enough functional kidney cells remain, they may be able to adequately meet the body's needs for waste removal with the help of this additional fluid. Also, the fluid therapy helps to replace various electrolytes, especially potassium.

Other important aspects of initial treatment may include proper nutrition, drugs to control vomiting or inappetence, and antibiotics if dental disease or a urinary tract infection is suspected. We may recommend a urine culture because an infection is sometimes hard to diagnose due to the diluted urine these cats are producing. An infection that goes untreated can cause further damage to the kidneys.

The goal of intensive fluid therapy is to substantially decrease the blood levels of BUN and creatinine (the serum markers for kidney function). If improvement is seen in the blood tests after 3-4 days of fluid therapy, the prognosis is good assuming continued treatment at home occurs. If there is no improvement after 3-4 days, the prognosis is not good. Unfortunately, there is no test that will predict which cats will respond and which will not.

2. Phase 2 - Ongoing Medical Therapy at Home

The second phase of treatment is to continue supporting the kidneys at home. This is accomplished with one or more of the following, depending on the situation. *Your veterinarian will advise you on which of these your cat needs.* The number of recommendations may seem overwhelming. It is important to keep in mind that any treatment must be tolerable to both you and your cat. Our goal is to improve quality of life, not just to increase longevity.

1. Special kidney diets: These help in three ways. First, they help to minimize protein waste products that require the kidneys to work excessively. The result is that the BUN will improve, and the cat will usually feel better. Second, these diets have restricted amounts of phosphorus and they do not have products that create an acidic urine pH. Third, these diets are supplemented with potassium. The decision to change to these diets is usually based on the values obtained from lab work. *It is currently thought that these diets provide the greatest advantage to cats with moderate to severe kidney disease.* In the earlier stages, a high quality, nutritionally complete diet will help slow weight loss and support them nutritionally.

There are several commercially available “medical” diets available. Please note that the cat foods labeled “For Urinary Health” are designed to manage bladder problems and are harmful to cats with kidney failure. These diets are usually found in grocery stores and pet shops. You will need to purchase kidney failure diets from a veterinarian.

Canned food is always a better choice than dry food. Cats with kidney disease are very prone to chronic dehydration. Even though they seem to drink plenty of water, most of this fluid is lost via copious urine production. Canned food is about 70% water, whereas dry food is around 8-10% water.

Having multiple water sources around the house will also encourage your cat to drink more than if you just offer one water bowl.

2. Potassium supplementation. Potassium is lost in the urine when urine production becomes excessive. A potassium supplement will replace that loss. As mentioned above, depletion of body potassium can worsen kidney function. Low potassium can cause muscle weakness, cramping, and diminish appetite. Most cats with a low urine concentration should be on a potassium supplement. Potassium is ideally given twice daily but even once daily is better than none at all. It comes in a powder, paste, tablets, or liquid form.

3. Fluids given at home. Cats with kidney disease are prone to dehydration. Providing an extra source of fluids will not only help prevent dehydration, but will help dilute the toxins that build up in the blood. Fluids support the kidneys as their function continues to decline. Fluids are administered under the skin once daily to once weekly, depending on the severity of kidney failure. Most owners easily master this technique so don't be afraid to consider this very helpful option.

4. Aluminum Hydroxide and Epakatin are phosphate binders. As the filtering ability of the kidneys declines, phosphorus begins to accumulate in the blood. High serum phosphorus contributes to depression and anorexia. Phosphate binders attach to phosphorus in the food so that it is not absorbed in the intestine. Blood levels of phosphorus can be monitored to help tailor the drug dosage. These drugs are used when the kidney failure diets are not able to control phosphorus levels. Binders are available in a powder that can be mixed into food or a pill.

5. Calcitriol is a drug to phosphorus and calcium levels in the blood. Calcium and phosphorus must remain at about a 2:1 ratio in the blood for proper function of a variety of body systems. Even before calcium and phosphorus values become abnormal on the blood work, calcitriol is usually low in the body. This is because the kidneys produce calcitriol. By supplementing this hormone in low doses, before adverse changes take place, they can be prevented and the cat may feel better. It may also extend the life of their kidneys. Close monitoring of calcium and phosphorus is needed while on this drug. It comes in a once daily liquid or gel capsule.

6. Erythropoietin is a drug that stimulates the bone marrow to produce new red blood cells. It is a hormone produced by the kidneys. Many cats in kidney failure have a low red blood cell count (anemia). A synthetic form of erythropoietin will correct the anemia in most cats. Unfortunately for some cats, the drug cannot be used long term because the immune system recognizes the drug as "foreign" and will make antibodies (immune proteins) against it. Treatment consists of injecting a small amount of liquid under the skin. You can be taught to do this at home or your veterinarian can do it for you. The schedule and frequency will vary. An iron supplement is recommended when starting this drug until the appetite is normal.

7. Famotidine (Pepcid A/C) is a drug that helps to neutralize excess stomach acid. The high kidney values measured on the blood work can cause stomach irritation and ulcers with subsequent lack of appetite. Most cats with kidney disease will benefit from once to twice daily famotidine. Cyproheptadine, an anti-histamine drug, may also be helpful in stimulating appetite in cats with kidney failure. Mirtazapine is an anti-anxiety drug that can stimulate appetite.

8. Drugs to control high blood pressure and its detrimental effects on the kidneys. Benazapril is a drug that has shown to lower the pressure within the kidneys themselves, helping to prevent scarring and fibrosis. About 65% of cats that have kidney failure also have systemic hypertension. Control of high blood pressure is also important in preventing blindness, strokes, heart disease, and more kidney damage. This drug comes in tablet form and the most common dosage is ¼ tab once daily. In situation where benazapril alone is not appropriate, amlodipine may be used.

Kidney Transplants

This procedure is being done at a few locations in the US, including here in Boise. Generally, the cat must still be in good condition and not ill from the kidney failure in order to be accepted for a transplant. The cat cannot have other diseases that might complicate the transplant or be life-threatening.

Many transplant centers require that the owner adopt the cat that has donated a kidney for the procedure. Some find this undesirable; others find it very rewarding. Also, multiple medications must be given daily for the duration of the cat's life; the anti-rejection drugs can be extremely expensive. Repeated blood tests are required to monitor function of the transplanted kidney and to monitor blood levels of the anti-rejection drug. The cost for the transplant procedure, medicines, blood monitoring, and follow up care can ultimately be thousands of dollars.

Prognosis

Prognosis can depend on response to the initial stage of treatment, your ability to perform the recommendations, and your cat's acceptance of the recommendations. However, we encourage treatment in most situations because many cats will respond and have the potential for good quality of life for months to years.

Prevention

For the most part, kidney failure is not a preventable disease. It occurs as a consequence of aging. However, known causes that can be prevented or managed include the following:

1. Urinary tract infections should be identified and treated.
2. Middle aged and older cats should **not** be fed acidified diets or those labeled "For Urinary Health", unless specifically recommended by a veterinarian for certain bladder (not kidney) conditions.
3. Regular dental care. Dental tartar and the resultant gum inflammation create an opening for the "showering" of bacteria into the bloodstream. This bacteria is filtered out through the kidneys, creating kidney infections and scarring.
4. Promote the feeding of more canned food and less dry food. The lack of moisture in dry food is thought to contribute to urinary and kidney disease.

More Information

You can learn more about CRF on the following website. If you have any questions, or before proceeding with any treatment, always consult your veterinarian.

www.felinecrf.org