



DANADA VETERINARY HOSPITAL, P.C.

Chronic Kidney Disease In Dogs

Chronic kidney disease (CKD) is one of the most common metabolic disorders seen in dogs. Although it is most common in older pets, chronic kidney disease can unfortunately affect younger animals as well. The kidneys serve many vital functions in the body. They function as the primary filters that eliminate toxic waste from the body. They also help the body retain proper water balance (hydration), as well as electrolyte and protein levels. Additionally, the kidneys are also responsible for producing hormones that stimulate the bone marrow to make new cells. As kidneys become diseased, some or all of these functions can begin to fail.

In response to decreased function, the body increases blood flow to the less efficient kidney cells to help them filter out waste products better. This leads to increased urine production (polyuria), and subsequently increased water consumption (polydipsia) to help maintain hydration. The increase blood flow comes with a cost though. Just as flood waters can damage a levy wall, increased flow through the kidneys can damage kidney cells and their filters over time. Cells can have a difficult time retaining proteins that are essential for everyday functions. As cells get more damaged, they begin to die off and the kidneys become smaller and less operational. When enough disease is present, the body can start to experience deficiencies in some electrolytes such as potassium, which results in symptoms such as muscle weakness, heart arrhythmias, and more. Calcium and phosphates can accumulate creating hormonal imbalances as well as permanent mineralization of tissues.

In short kidney disease is a cascading series of events that results in the disease being a progressive illness rather than one that can be cured. The key to managing kidney patients successfully is to identify the disease as early as possible and to take measures to slow progression for as long as possible to maintain quality of life.

Contributing Factors

Most chronic kidney disease is caused by unknown factors that tend to be age-related. However, infection in the urinary tract or kidneys, toxic substances, and kidney stones can trigger acute worsening of CKD. This is called an acute or chronic kidney injury.

Prevalence

The estimated prevalence of chronic kidney disease in dogs is about 1 % of the overall population. However, in older dogs (>10 years old), the prevalence can be 10-30%. Smaller dogs are more prone to kidney disease than larger breeds, but some specific breeds are more likely than others. These include

the Shar Pei, Bull Terrier, English Cocker Spaniel, Cavalier King Charles Spaniel, West Highland White Terrier, and Boxers. Males and females experience CKD at similar rates.

Renal disease in young dogs is most likely due to a congenital defect in the structure of the kidneys. A number of breeds are at risk for juvenile kidney disease; these include the Shih Tzu, Samoyed, Doberman pinscher, Shar Pei, Lhasa Apso, and Basenji.

Clinical Signs

As described above, the classic signs of kidney disease are increased urine output and a compensatory increase in water intake (thirst). The clinical signs of more advanced kidney disease include loss of appetite, weight loss, muscle loss, depression, vomiting, diarrhea, and very bad breath. Occasionally, ulcers will be found in the mouth.

High blood pressure (hypertension) can occur in a large number of dogs with chronic renal disease. Signs of high blood pressure are not evident in most patients, but if severe enough, patients can experience blindness from retinal detachment, or stroke (neurologic) symptoms.

Diagnosis

The diagnosis of kidney disease starts with blood, urine, and blood pressure evaluation. Blood is evaluated for accumulation of protein waste materials called BUN and Creatinine. Healthy kidneys should consistently clear these products from the body. When kidney function is suboptimal, these wastes start to climb. Unfortunately, they may not do so until more than two-thirds of the renal function is affected. In recent years, a new enzyme, called SDMA has been identified. SDMA tends to increase much sooner in the process of renal disease than the BUN and Creatinine do, resulting in earlier detection of the disease.

Blood also helps to identify secondary changes that require attention along with the renal disease. These can include low protein levels, low potassium, high levels of phosphates, or calcium imbalance. Blood may also provide clues about underlying causes or concurrent illnesses that may affect the patient's overall health.

Urine testing evaluates the patient's ability to concentrate urine. As kidney disease progresses, loss of urine concentrating ability occurs, resulting in a higher likelihood of dehydration. Urine also helps to assess for excess protein loss, and infection. In some cases, tumors or evidence of toxic changes may be seen in the urine as well.

Blood Pressure evaluation is critical for renal patients. Hypertension occurs in a large percentage of dogs with CKD and can be a driving force in disease progression if not identified and treated.

Imaging may be used to help identify tumors, cysts, or other underlying causes for renal impairment. This is especially important for young animals with CKD.

Treatment

The International Renal Interest Society (IRIS) is an advisory board that studies kidney disease extensively. IRIS has identified four separate stages of kidney disease as well as guidelines for management for each stage. These stages are based on creatinine and SDMA levels, and the presence of protein in the urine or hypertension. These guidelines are widely accepted by veterinarians and are used to help manage existing kidney disease and slow progression.

IRIS Staging guidelines can be found here: www.iris-kidney.com/pdf/2_IRIS_Staging_of_CKD_2023.pdf

It is important to note that patients in stage 1 and 2 still have normal creatine values and may only show mild signs such as increased urination and drinking. Stages 3 and 4 tend to be more commonly affected by clinical signs of illness and require more involved care.

The overall goal of treatment is to maintain body weight and appetite as well as to slow progression for as long as possible. Based on the results of blood, urine, and blood pressure testing, your veterinarian will be able to determine the treatments necessary.

Fluids - In the earliest stages, water access should be increased to make sure your dog always remains hydrated. This can be accomplished via increasing the number of bowls, offering canned food, or adding broth to water bowls to encourage intake. As the CKD progresses, fluid administration under the skin may also be implemented. For critically ill pets or those that present in later stages of CKD, hospitalization and administration of intravenous fluids (diuresis) may be necessary to improve a patient's status.

Nutrition – While many renal diets are protein restricted, the real goal of these diets is to reduce the phosphate waste in the body. In truth, protein restriction is not ideal unless the patient is losing too much protein in the urine. It is best to maintain caloric intake to help your dog keep up their body mass. Renal diets are recommended when phosphorus levels in the blood reach a level that is too high. Otherwise, feeding a diet your pet likes is better than trying to restrict their options. As the CKD worsens, use of appetite stimulants can aid in maintaining nutritional needs.

Phosphorus Management – phosphate waste products have a damaging effect on the body. The goal is to keep phosphate levels within normal limits for as long as possible. If they start to climb, renal diets can be started to reduce intake of phosphates. When this is not enough, medications that bind phosphates can be administered to allow pets to excrete some of these waste products in their feces.

Blood Pressure Management – Blood pressure medications are employed if the blood pressure exceeds safe limits

Proteinuria Management – In some cases of CKD, excess levels of protein are detectable in the urine, it indicates that the filtering mechanisms of the kidneys are severely damaged. Low protein diets can help eliminate some of the strain on these filters, and special medications can be started to help the filtration process.

Management of Urinary Infections – UTIs can accelerate the demise of the kidneys. As the concentration of urine decreases, the potential for UTIs increases. If there is suspicion of infection on urinalysis, antibiotics may be utilized.

Management of Anemia – In advanced cases of CKD, the damaged kidneys can no longer create the hormone necessary for stimulating red blood cell (RBC) production from the bone marrow. As a result, many late-stage kidney patients can experience anemia (low RBC count). This may require artificial administration of hormones and iron, and in extreme cases, may even require transfusion.

Dialysis – Some local specialty clinics now offer dialysis (cleansing of the blood) just as with human kidney disease. This procedure can prolong quality and quantity of life but is cost prohibitive for many clients.

Kidney Transplant – Some universities offer kidney transplants just as in humans. This procedure is rather expensive, and the family must adopt the donor pet in addition to the cost of the procedure.

Prognosis

The prognosis for CKD is highly variable. It depends on the underlying cause, how early the condition was detected, and how successfully treatment can be implemented. Although CKD is a progressive illness that ultimately will be terminal, many patients can experience a good quality of life for many years if detected very early on. In contrast, pets that are not detected until advanced signs of illness are present have a guarded to poor prognosis. Some will not respond to treatment at all. Others may show an initial response if hospitalized, followed by a quick decline once they are home.

Prevention

Kidney disease is not a preventable disease. It occurs as a consequence of aging. However, once disease is identified many steps can be taken to slow progression.