

Acute Kidney Failure

Cathy E. Langston, DVM, DACVIM (Small Animal)

BASIC INFORMATION

Description

Acute kidney or renal failure (ARF) is not a common problem in dogs and cats, but it can be devastating when it occurs. ARF ranges from a mild disease that is readily responsive to treatment to complete shutdown of the kidneys. When the kidneys fail, urea and other waste products are retained in the body (uremia) and cause the animal to become very ill.

Causes

ARF can be caused by toxins, infections, or poor blood flow to the kidneys. Common toxins include antifreeze (ethylene glycol), drugs (nonsteroidal anti-inflammatory drugs, certain antibiotics), grapes and raisins in dogs, and lily plants in cats. Bacterial infections can be a cause. Leptospirosis is a common kidney infection that affects dogs but not cats. Anything that decreases blood flow to the kidney can cause ARF, such as dehydration, low blood pressure, shock, heat prostration, and anesthesia. ARF is sometimes associated with other severe diseases in the body, such as elevated blood calcium levels, pancreatitis, and other abdominal disorders. In cats, obstruction of urinary outflow by kidney stones or scar tissue is becoming a common cause of ARF.

Clinical Signs

An abrupt increase in water intake may be one of the first signs of ARF; it is frequently associated with a poor appetite and vomiting. Diarrhea, lethargy, and depression may also occur. Signs may rapidly worsen. In severe cases, the kidneys completely shut down and stop making urine. High blood potassium levels that develop with ARF can cause the heart to slow down and stop. In other cases, the heart and respiratory rates may be high. Ulcerations may develop in the mouth, and halitosis (foul breath odor) may occur from the uremia.

Diagnostic Tests

Laboratory tests (biochemistry panel and complete blood count), urinalysis, and a urine culture are used to diagnose ARF. Evaluation of blood electrolytes is also important, because severe electrolyte problems, such as dangerously high potassium levels (hyperkalemia), can occur.

Further testing is often needed to determine the underlying cause. For example, in cats, an abdominal x-ray or ultrasound, or both, are generally helpful in determining whether a urinary obstruction is present. In dogs, a blood test for leptospirosis is usually warranted. If there is a suspicion of antifreeze ingestion, a special ethylene glycol test performed on the first day may be helpful.

Occasionally a kidney biopsy is recommended, along with tests to rule out other diseases that cause similar clinical signs.

TREATMENT AND FOLLOW-UP

Treatment Options

ARF is a serious disease that requires hospitalization in most cases. The mainstay of treatment is intravenous (IV) fluids. Careful monitoring of the patient is necessary, because the volume of urine produced can change dramatically and rapidly, leading to either dehydration or fluid retention. Diuretics, which increase the volume of urine produced, may be tried but are not always effective.

Drugs to control nausea and vomiting are usually needed. Medications may be given IV to correct severe electrolyte imbalances, such as high potassium levels and acidosis of the blood. Some patients with persistent vomiting and lack of appetite may be helped by insertion of a temporary feeding tube. Specific treatments for the underlying cause are also started. (See the handouts on **Antifreeze Poisoning**, **Leptospirosis**, and **Ureteral Obstruction in Cats**.)

If standard medical therapy is ineffective, advanced treatment options may be considered. These include hemodialysis (removal of uremic toxins by passage of the blood through a kidney dialysis machine), continuous renal replacement therapy (CRRT, a form of dialysis), or peritoneal dialysis (administration of fluids into the abdomen that absorb some of the uremic toxins, followed by removal of as much of the fluid as possible). These therapies are generally offered only by specialized hospitals, so your pet may be referred to a veterinary specialist for these treatments.

Follow-up Care

Intensive monitoring is required during hospitalization and often includes measurements of blood pressure, heart and respiratory rates, body temperature and weight, blood electrolytes, kidney function tests, and urine output. After discharge from the hospital, follow-up visits generally involve examinations and laboratory tests. If the ARF completely reverses, long-term monitoring may not be necessary, although yearly blood and urine tests are prudent.

Prognosis

ARF is a serious disease, and only about half of affected animals survive it. Patients with infections, urinary obstruction, or low blood flow as the cause tend to do better than those that developed ARF from a toxin. Of the animals that survive, about half have residual kidney damage.

SPECIAL INSTRUCTIONS: