Interstitial nephritis is a common kidney disease that occurs in felines. The disease results in inflammation of the functional unit of the kidney, the nephron, and surrounding interstitium, which may result in scarring and functional loss of the ability of the kidneys to filter waste and concentrate urine. Acute interstitial nephritis may be secondary to systemic infectious or inflammatory disease that may cause secondary vasculitis, such as Feline Infectious Peritonitis, although other bacterial or viral agents have been implicated. Chronic interstitial nephritis is more common than acute interstitial nephritis, particularly in older cats, and results in gradual, often irreversible loss of kidney function. Chronic interstitial nephritis is often present in cats diagnosed with chronic renal failure. Clinical signs of acute and chronic interstitial nephritis may include lethargy, decreased appetite, weight loss, vomiting, diarrhea, hypertension, and anemia.

Sonographic pathological changes noted in kidneys with chronic interstitial nephritis may include normal to small renal volume, increased renal cortical echogenicity with preservation of normal cortico-medullary definition or enhanced cortico-medullary definition, and cortical thickening with increased cortex to medulla ratio. Dystrophic mineralization around the renal pelvis secondary to chronic inflammation with lack of renal pelvis dilation may also be seen. Differential diagnoses for these changes may also include glomerulonephritis, acute nephrosis secondary to toxicity, and Feline Infectious Peritonitis. A medullary rim sign, a hyperechoic band associated with deposition of mineral in the epithelium of the outer medulla, may be seen in cases of interstitial nephritis but has also been observed in other diseases, in face of hypercalcemia and in clinically normal cats.

Diagnosis is often made based on sonographic changes in the kidneys and clinical history of the patient. Other diagnostics that are used in conjunction with ultrasound may include CBC, chemistry panel, urinalysis, urine culture and blood pressure. Monitoring serum albumin levels for hypoalbuminemia and urinalysis for proteinuria is recommended to evaluate for glomerular disease. A urine protein:creatinine...
ratio should be used to quantify proteinuria. A renal biopsy is needed for definitive diagnosis but is not clinically recommended in cases of straightforward chronic renal failure unless significant proteinuria is present or there is concern for FIP or lymphoma.

Treatment of interstitial nephritis is variable and dependent on clinical signs, bloodwork abnormalities, presence or absence of hypertension, and urinalysis results. Maintaining normal hydration is very important, either with increased oral water intake, subcutaneous fluids, or IV fluids depending on the stage of renal disease or failure. Fluid administration should be based on several clinical factors such as the presence of clinical dehydration, decreased vs. increased urine production, vomiting, diarrhea, blood pressure, degree of azotemia or electrolyte abnormalities. The rate of fluid administration should be based on degree of dehydration and as well as ongoing losses, primarily increased dilute urine production. If clinical dehydration or significant azotemia is present, hospitalization with IV fluids is typically recommended. Typical balanced polyionic solutions used for replacement fluids may include LRS, Normosol-R, or Plasmalyte-148. However, if hyperkalemia, hyponatremia, or hypochloremia is present, 0.9% NaCl may be administered. Once rehydration has occurred, maintenance fluids including Plasmalyte-56 or 0.45% NaCl with potassium supplementation as needed may be used. Monitoring for signs of overhydration (weight gain, subcutaneous edema, serous nasal discharge, chemosis, increased respiratory effort, tachypnea, pulmonary crackles) is essential during aggressive IV fluid administration. Once azotemia has been reduced to acceptable levels and rehydration has been accomplished, subcutaneous fluid administration at home every 12-24 hours depending on the stage of renal disease may be elected.

Renal diets have been shown to increase survival times in cats which moderate to advanced kidney disease. A canned renal diet such as (Hill’s Science Diet k/d, Purina NF, etc) is recommended to add moisture for hydration and provide a low protein diet along with minimizing phosphorous and sodium intake. Protein restriction is important when mild to moderate azotemia persists even in a well-hydrated state. Continued elevated phosphorous levels despite successful implementation of a renal diet may include administration of phosphate binding agents such as Aluminum hydroxide (Amphogel), Aluminum carbonate, Calcium carbonate, or Calcium acetate. A combination of aluminum containing and calcium containing phosphate binders may be used to prevent potential aluminum toxicity or hypercalcemia. Calcium containing phosphate binders should not be used in cases of hypercalcemia secondary to renal failure.

However, adequate caloric intake is often challenging in severe cases of interstitial nephritis. Appetite stimulants such as Cyprohepatadine (2-4 mg every 12-24 hours) or Mirtazapine (1/4 of 15 mg tablet every 72 hours – dose may need to be adjusted in cases of severe azotemia), syringe feeding or placement of esophageal feeding tubes are often elected in cases of anorexia. Long-term gastroprotectants such as Famotidine (5 mg once a day) is recommended for treatment of intermittent vomiting and uremic gastroenteritis. Antiemetic medications such as Cerenia or Zofran may be administered if consistent signs of nausea or vomiting are seen. If consistent proteinuria is noted on serial urinalysis despite a low protein renal diet, an ACE inhibitor such a Benazepril (0.5 mg/kg PO SID) may be administered to minimize renal protein loss, although monitoring the BUN and creatinine then becomes very important. Systemic blood pressure should be measured to screen for hypertension secondary to renal disease. Anti-hypertensive medications include amlodipine, ACE-inhibitors including enalapril or benazapril, possibly beta-blockers such as Atenolol, and alpha-1 blockers such as prazosin. Appropriate antibiotics are warranted if a urine culture is positive.

Aside from standard treatment of acute or chronic interstitial nephritis, several medications including Calcitriol, Azodyl, and Erythropoietin may be elected. Calcitriol, a Vitamin D analog, has recently come in favor for treatment of chronic renal diseases in which hypocalcemia is present or to minimize the onset of renal secondary hyperparathyroidism in cases of advanced renal disease. Calcitriol enhances calcium absorption from the GI tract and enhances calcium absorption by the renal tubules. A beneficial characteristic of Calcitriol is that it does not require renal activation to be effective, an important factor in cases of decreased renal function. Calcitriol should only be administered in cases of normocalcemia and when hyperphosphatemia has been controlled. Increased appetite and general well-being have been reported in cats taking Calcitriol although the timing of starting Calcitriol in the course of renal disease is controversial. Azodyl, a symbiotic labeled to reduce azotemia in both dogs and cats, is also controversial.
A recent study involving 10 cats with chronic kidney disease showed no reduction in BUN and creatinine when Azodyl was sprinkled on the food. However, the effect on azotemia of whole capsule administration as the manufacturer intended remains unknown. In cases of severe anemia (PCV less than 20%) secondary to advanced renal disease, erythropoietin (Epoetin, Procrit), a human recombinant hormone that regulates erythropoiesis, is sometimes used. Since the medication is human based, auto antibodies to the medication may form which may lead to hypersensitivity or anaphylaxis with subsequent administration. Erythropoietin should not be used in cases of uncontrolled hypertension. Darbepoetin is an alternative medication to stimulate red blood cell production with less effect on autoantibody production.

The prognosis for cats diagnosed with acute or chronic interstitial nephritis is variable. Affected cats may live months to years depending on the stage of renal disease and effectiveness of treatment.

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