

# Managing feline renal disease

*Proper care can help cats live longer, more comfortable lives.*



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**M**ost veterinary practitioners have experience with renal disorders in older cats. Despite this fact, renal problems can be difficult to diagnose and even tougher to manage. Causes can be infectious, metabolic or neoplastic (see *Table 1*, page 33), but the vast majority of cases have an ill-defined or idiopathic etiology.

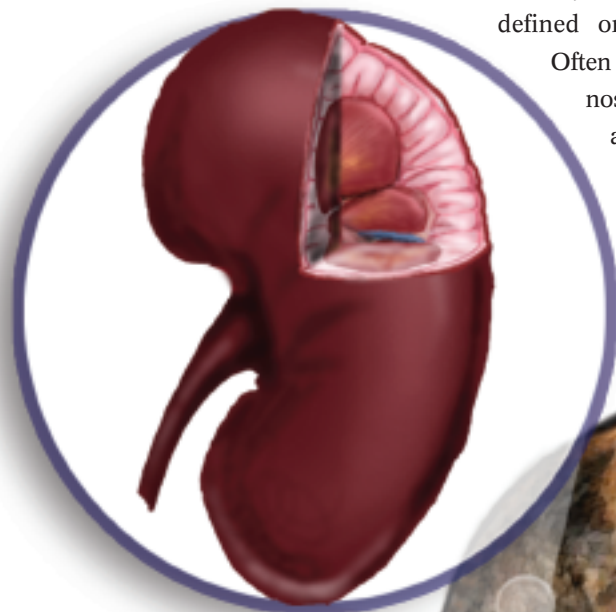
Often the disease is not diagnosed until renal changes are advanced and it is difficult to determine what initiated the pathologic process. Medical management

of chronic renal disease should be based on the stage of the disease if the underlying causes cannot be resolved, and the best outcomes occur with early diagnosis. With appropriate therapy, cats with renal disease can live quite comfortably—sometimes for years after diagnosis.

## Setting the stage

Stages of chronic renal disease in cats are categorized based on increasing levels of serum creatinine (see *Table 2*, page 34).<sup>1</sup> Creatinine concentrations accurately indicate glomerular filtration rate and correlate negatively with renal function. Unfortunately, serum creatinine rises above normal only when more than 75 percent of renal function has been lost.<sup>2</sup> Urine concentrating ability starts to fail earlier in the disease process, when about two-thirds of renal function is lost. Evaluation of urine specific gravity in cats differs from that in dogs because cats typically excrete very concentrated urine (specific gravity of 1.035 to 1.055). A consistent urine specific gravity of less than 1.025 in cats may signal the onset of renal disease.

Clinical signs of renal disease are caused by increasing blood concentrations of uremic toxins (positively correlated with serum



Illustrations by Christian Hammer



creatinine concentrations) and the inability of failing kidneys to produce hormones and retain water and other necessary serum constituents within physiologic levels (*Figure 1*, page 36). Medical management of chronic renal disease aims to reestablish normal physiology. The type and intensity of therapy is based on the stage of the disease.

Early clinical signs of renal disease in cats include increased drinking, increased urine formation and urinating outside the litter box. Clients may report that water bowls are empty or that their Pet is drinking from the toilet, sink or shower and has not done this before. Normal cats drink so little that it may be unusual for clients to see the Pet at the water bowl. They may find that they have to change the litter box more frequently because of increased wetness. An older cat that suddenly starts to urinate outside the litter box should be tested for renal disease along with diabetes mellitus and lower urinary tract disease. Veterinarians must take a thorough history of water consumption and urination patterns in all feline patients in order to detect and effectively treat chronic renal disease in the early stages. General treatments include dietary changes, fluid therapy and ancillary medications in addition to the specific treatment of all concurrent and underlying conditions.

### Dietary changes

Dietary changes should be instituted as soon as renal disease is identified. Reduced protein and phosphate levels help to slow the progression of the disease. Proteinuria is toxic to renal tubules and higher nitrogenous waste levels increase the renal workload. Increased serum phosphorus leads to overproduction of parathyroid hormone,

**Table 1: Causes of Chronic Renal Disease in Older Cats**

#### Infectious causes

- Pyelonephritis
- Feline infectious peritonitis
- Septicemia from:
  - ◆ Oral disease
  - ◆ Bite wounds
  - ◆ Other

#### Metabolic or autoimmune causes

- Amyloidosis
- Glomerulonephritis

#### Neoplastic causes

- Lymphoma
- Renal carcinoma
- Other

#### Idiopathic causes

which has been shown to reduce renal function. In other species, sodium restriction helps control hypertension associated with renal disease. The renin-aldosterone axis is activated by sodium chloride and this may potentiate renal fibrosis and contribute to chronic renal disease. However, this is not the case in cats.<sup>3</sup> In fact, dietary salt enrichment may be necessary to replace sodium lost in urine by the failing kidneys. Alkalinizing agents such as sodium bicarbonate, calcium citrate and potassium citrate may be required, and a high intake of omega-3 fatty acids (Glenhaven A2/N, one capsule daily) helps to slow the decrease in the glomerular filtration rate.

Studies indicate that feeding a renal diet

**Table 2: Stages of Chronic Renal Disease in Older Cats****Stage 1: Serum creatinine < 1.6 mg/dl****Clinical signs**

- None

**Lab abnormalities (possible)**

- Urine specific gravity less than 1.025
- Microalbuminuria with or without overt proteinuria
- Bacteriuria
- Cylindruria
- Hypertension

**Stage 2: Serum creatinine 1.6-2.8 mg/dl****Clinical signs**

- Mild polyuria and polydipsia
- Inappropriate urination

**Lab abnormalities (likely)**

- Urine specific gravity less than 1.025
- Microalbuminuria with or without overt proteinuria
- Bacteriuria
- Cylindruria
- Hypertension

**Stage 3: Serum creatinine 2.9-5 mg/dl****Clinical signs**

- Obvious polyuria and polydipsia
- Decreased appetite
- Weight loss
- Some vomiting

**Lab abnormalities**

- Mild anemia
- Urine changes as noted in stages 1 and 2

**Stage 4: Serum creatinine > 5 mg/dl****Clinical signs**

- Marked polyuria and polydipsia
- Anorexia
- Marked weight loss
- Frequent vomiting
- Dehydration
- Constipation
- Depression
- Reduced skin turgor and grooming

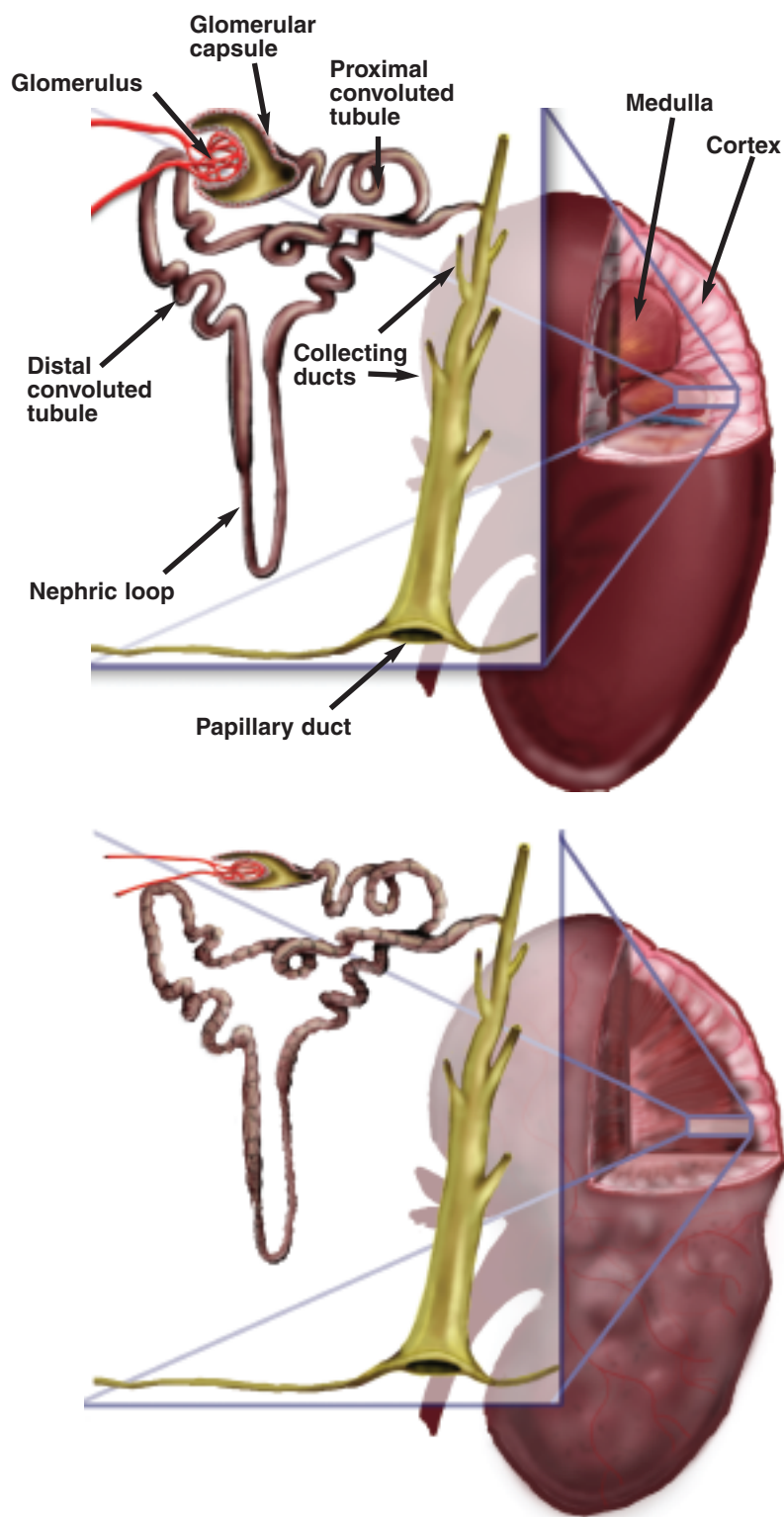
**Lab abnormalities**

- Urine changes as noted in stages 1 and 2
- Anemia—normocytic, normochromic
- Hyperphosphatemia
- Hypertension
- Reduced platelet function

to cats with chronic renal disease may double their life expectancy.<sup>4</sup> Several high-quality therapeutic diets are available, such as Royal Canin Modified Formula and Renal LP, Hill's Feline k/d and others. All diets are formulated to provide high-quality protein in restricted amounts with minimal

phosphorus. However, because cats are carnivores, the palatability of these diets may limit their utility to manage chronic renal disease. Particularly in stages 3 and 4, affected cats should be fed another balanced feline diet if they refuse to eat adequate amounts of a renal diet to maintain weight.

**Figure 1:** A normal kidney (top) and a kidney affected with chronic renal disease (bottom).



With anorexia and weight loss already prominent effects of renal failure, these problems must not be worsened by attempts to modulate the diet.

**Fluid therapy**

Fluid therapy is an important part of managing renal disease in adult cats.<sup>5</sup> Even normal cats drink barely enough to stay hydrated. Thus, when the kidneys fail to excrete concentrated urine, dehydration rapidly ensues. Besides reducing renal function further, dehydration causes depression, reduces food and water intake and initiates a deleterious cycle that hastens disease progression. Fluid therapy not only corrects dehydration but reduces the plasma concentration of uremic toxins, thereby helping to improve appetite and reduce gastrointestinal disturbances such as vomiting and diarrhea.

Early in chronic renal disease, a Pet may be enticed to drink more water if a client provides multiple sources of water, uses flat water bowls, changes water frequently or provides access to running water.

Later in chronic renal failure, Pets become unable or unwilling to ingest enough water, and forced fluid therapy is needed. Fluids may be administered intravenously, subcutaneously or intragastrically. Intravenous administration of balanced polyionic fluids such as Normosol R or lactated Ringer’s solution is the most effective means of combating dehydration and inducing diuresis. This method must be used in very ill cats. Cats with normal cardiac function should be given 80 to 100 ml/kg every 24 hours.

The Pet must be hospitalized for intravenous treatment, and, unfortunately, the effects are short-lived. After the Pet is stabilized with intravenous fluids, it is often

**Table 3: Drugs Used to Treat Chronic Renal Disease in Cats**

<b>Drug</b>	<b>Dosage</b>	<b>Indications/ Classification</b>	<b>Notes</b>
Metoclopramide	0.3 mg/kg PO or SC t.i.d.	Antiemetic	
Chlorpromazine	0.3 mg/kg SC t.i.d.; 2-4 mg/kg PO s.i.d. to q.i.d.	Antiemetic	
Ranitidine	0.5-2 mg/kg PO s.i.d. to b.i.d.	Gastric acidity	
Cimetidine	10 mg/kg IV or PO t.i.d.	Gastric acidity	
Famotidine	0.5 mg/kg IV or PO s.i.d.	Gastric acidity	
Omeprazole	0.7 mg/kg PO s.i.d.	Gastric acidity	
Cyproheptadine	2 mg per cat PO s.i.d.	Appetite stimulant	Effects are short-term. Force feeding via an esophageal tube is much more efficacious if the Pet can tolerate it without vomiting.
Potassium gluconate	2 mEq per cat PO b.i.d.	Hypokalemia subsequent to anorexia and urine losses	
Potassium citrate	20-30 mg/kg PO s.i.d.	Hypokalemia subsequent to anorexia and urine losses	Preferred over potassium gluconate when acidosis is thought to be a clinical problem.
Sodium bicarbonate	10 mg/kg PO b.i.d.	Metabolic acidosis	
Aluminum hydroxide	50-90 mg/kg per day in divided doses	Intestinal phosphate binder	Helps combat renal secondary hyperparathyroidism.
Human recombinant erythropoietin (HRE)	100 U/kg SC three times weekly	Anemia (PCV < 20%)	Treatment goal is to raise PCV to 30% or higher. Iron dextran should be given concomitantly. Unfortunately, 30% or more of cats develop antibodies to the erythropoietin, rendering treatment ineffective.
Iron dextran	10 mg/kg IM every three weeks	HRE administration	
Enalapril or benazepril	0.25-0.5 mg/kg PO s.i.d. to b.i.d.	Angiotensin enzyme (ACE) inhibitors	Shown to reduce proteinuria and to have other renoprotective effects. <sup>6</sup> Either drug may be used as soon as proteinuria is detected. Can reduce blood pressure and may initially lower glomerular filtration rate, so monitor creatinine carefully and titrate drug dosage as necessary.
Amlodipine	0.625 mg, or one-quarter of a 2.5-mg tablet, PO s.i.d. <sup>7</sup>	Hypertension	Hypertension in cats can cause blindness, seizures and unusual behavior.

possible to maintain renal function with subcutaneous fluid therapy. Many owners can learn to administer the fluids at home. Depending on the stage of renal disease, up to 250 ml of balanced polyionic fluids can be given one to several times per week. Unfortunately, many cats do not tolerate this treatment or their owners cannot perform the task.

Oral fluid therapy can be used to treat chronic renal disease in cats after the placement of an esophageal or intragastric feeding tube. Esophageal feeding tubes are most easily placed, are well-tolerated for several weeks and are safer than gastric tubes. Water, medications and food can be administered through either tube, and there is no need for sterile technique, fluids or needles when administering fluids. Although tube placement does require a short period of general anesthesia for the Pet, many owners find oral tube maintenance a much easier task than subcutaneous fluid therapy. Telazol, isoflurane and sevoflurane are safe in cats with chronic renal disease.

### **Ancillary drug therapy**

Numerous drugs may be used for ancillary therapy of chronic renal disease in cats, depending on the cause and stage of disease (see *Table 3*, page 38).<sup>5</sup> However, practitioners should keep in mind that since most cats are difficult to medicate orally and tend to shun food containing drugs, ancillary therapy of chronic renal disease is limited. The struggle to give medications may cause the Pet to hide and worsen anorexia and dehydration.

Practitioners should help clients understand that medications can improve their Pet's quality of life only if the Pet tolerates the administration. Rather than asking the

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client to try to administer multiple medications, veterinarians should address the most severe clinical problems, such as vomiting or progressive anemia. The most important aspects of treating chronic renal disease in cats remain dietary management and fluid therapy.

### **Prognosis and client education**


Long-term prognosis of chronic renal disease is poor. Once established, renal failure is progressive and ultimately results in the

Pet's death. The goal of therapy, as in any disease process, is to enable the cat to experience a comfortable and happy life for as long as possible.

As veterinarians, we should help clients understand that their active participation in managing chronic renal disease can prolong the life of their Pet. However, their expectations must be reasonable. The following are key points to address with clients when chronic renal disease has been diagnosed:

- Many cats with chronic renal disease live happily for months to years.
- The most important aspects of treatment are dietary changes and fluid therapy.
- Certain drugs help to ameliorate clinical signs and should be given as prescribed, unless administration reduces the Pet's quality of life or interferes with the client-

Pet bond (*e.g.*, causes hiding behavior or increases anorexia).

- Despite the most ardent efforts of all concerned, Pets with chronic renal failure ultimately will die. When the Pet's quality of life becomes poor, practitioners should help clients make educated decisions regarding euthanasia for their friend. 

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