Feline Kidney Disease: Definition & Terminology

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Recently, a shift in terminology regarding kidney disease and kidney failure has been recommended; the term *chronic renal failure* has largely been replaced by the preferred *chronic kidney disease* (CKD) for several reasons:

EARLY RECOGNITION

First, CKD can exist without kidney failure (usually defined as persistent azotemia superimposed on an inability to concentrate urine). Recognition of early (ie, nonazotemic) CKD is important because CKD may be progressive and increased monitoring, as well as renoprotective treatments (see page 33), may be beneficial. Early CKD may be diagnosed in cats with abnormal kidney structure (via palpation, imaging), persistent proteinuria and/or urine-concentrating deficits of kidney origin, or increasing serum creatinine (SrCr) concentrations within normal ranges. For example, sequential annual serum biochemistry evaluations may demonstrate an increase in SrCr from 0.6 mg/dl to 1.2 mg/dl, compatible with a loss of glomerular filtration rate (GFR) ≥50%.

CLIENT UNDERSTANDING

In addition, the term *CKD* is preferable when discussing the disease with clients. Many clients do not initially understand the term *renal* and a diagnosis that includes the term *failure* is often discouraging.

INITIAL PRESENTATION

Cats with CKD presenting for the first time are typically older (>10 years) and have a history of one or more of the following: decreased appetite, weight loss, vomiting, polyuria/polydipsia (PU/PD). At examination, these cats are often dehydrated and unkempt and have small, irregular, nonpainful kidneys.

A minimum database is helpful in ruling out diabetes and hyperthyroidism. Most cats with CKD severe enough to cause weight loss and decreased appetite will be azotemic (SrCr >1.6 mg/dl) with a urine specific gravity <1.035. Some cats with azotemic CKD retain urine-concentrating ability, and pre-renal azotemia should be ruled out with fluid therapy. Azotemia that resolves with fluid therapy alone is likely caused by dehydration and decreased renal perfusion.

Azotemic kidney disease may also be caused by acute kidney injury (AKI; the preferred term over *acute renal failure*). History, signs, and examination findings compatible with CKD versus AKI include: a long history of weight loss, poor body condition, and/or long-standing PU/PD; small, irregular kidneys; or nonregenerative anemia.

MORE FOR YOUR TEAM! Download a useful team education handout about CKD at **veterinaryteambrief.com/clinical-suite/feline-ckd**


Take It Home:
CKD Team Education

STEP 2
Team Education Primer ▶

Feline Kidney Disease *at a Glance*

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CKD affects approximately 1% to 3% of all cats, and its prevalence increases with age, with up to 35% of geriatric cats in referral hospital populations having CKD.[1] Damage of nephrons (the structural/functional units of the kidney) associated with CKD is usually irreversible and can be progressive. A primary cause is often not determined for feline CKD. Other renal diseases linked with CKD include pyelonephritis, nephrolithiasis, polycystic kidney disease, amyloidosis, and neoplasia. In some cases, the initial underlying renal insult remains undetected or untreated and continues to damage nephrons. It is also possible that progressive kidney dysfunction becomes self-perpetuating.

Healing of irreversibly damaged nephrons occurs by replacement fibrosis. CKD occurs over months or years and is a leading cause of death in cats.[2] It is often not possible to improve renal function in CKD, and treatment is therefore aimed at stabilizing renal function. There is increasing evidence that dietary and antiproteinuric treatments are renoprotective and can decrease the progressive nature of CKD.

IRIS STAGING SYSTEM

The IRIS CKD Staging System (**Table 1**) was developed to improve communication surrounding CKD and link appropriate diagnostic and therapeutic efforts to cats with varying degrees of CKD.

TABLE 1

IRIS CKD Staging System	
Serum Creatinine (SrCr) Concentration	mg/dl
Stage 1 (Nonazotemic CKD)	<1.6
Stage 2 (Mild renal azotemia)	1.6–2.8
Stage 3 (Moderate renal azotemia)	2.9–5.0
Stage 4 (Severe renal azotemia)	>5.0

Although the staging is based primarily on SrCr, it cannot be applied to cats with pre- or post-renal azotemia or cats with acute or decompensated (sometimes termed *acute on chronic*) kidney disease. The IRIS Staging System should only be applied to cats with stable CKD (ie, 2–3 SrCr determinations that vary <10%–20% over 2–4 weeks). In addition, SrCr must be interpreted with the patient's urine specific gravity and examination findings (eg, hydration status, lean body mass) to rule out pre- and post-renal causes of azotemia. Almost all normal cats should have a SrCr <1.6 mg/dl, regardless of the laboratory reference range.

FURTHER CLASSIFICATION

The IRIS Staging System is further classified by the presence or absence of proteinuria and systemic hypertension (**Tables 2** and **3**).

Characterization of renal disease and its stability is most important in the earlier stages of CKD, when appropriate treatment has the greatest potential to stabilize renal function.

TABLE 2

Urine Protein:Creatinine Ratio	Classification
<0.2	Nonproteinuric (NP)
0.2–0.4	Borderline proteinuric (BP)
>0.4	Proteinuric (P)

TABLE 3

Systolic Blood Pressure (mm Hg)	Arterial Pressure Classification	Risk for Target Organ Damage
<150	AP0	Minimal
150–159	AP1	Low
160–179	AP2	Moderate
≥180	AP3	High

ADVANCED DIAGNOSTICS

Once CKD has been diagnosed and staged, diagnostics are focused on 3 areas:

- Characterization of the primary renal disease
- Characterization of stability of the renal disease/function
- Characterization of how the decreased renal function adversely affects the cat.

Further definition of the primary renal disease beyond proteinuria and blood pressure assessments should include urine culture and kidney imaging (and possibly a fine-needle aspirate or biopsy of the kidney). Stability of renal function is assessed by serial monitoring of abnormalities identified during initial characterization of the disease. This monitoring should always include serum biochemistry profiles, urinalyses, quantification of proteinuria (urine protein:creatinine ratios), and blood pressure measurements, but may also include follow-up ultrasonography and urine cultures.

Characterization of renal disease and its stability is most important in the earlier stages of CKD, when appropriate treatment has the greatest potential to stabilize renal function. Assessment of patient problems becomes more important in later stages, when signs tend to be more severe.

MANAGEMENT

The therapeutic approach should be tailored to the disease stage. For example, disease-specific treatments for nephroliths, renal lymphosarcoma, and bacterial pyelonephritis, as well as treatments to slow progression of renal disease (ie, renoprotective treatments), will be of most value in the early to middle CKD stages.

Renoprotective Treatments

Renoprotective treatments include diets formulated to reduce serum phosphorus concentrations and angiotensin-converting enzyme inhibitors (ACEI) designed to normalize blood pressure and reduce proteinuria. Amlodipine has also been shown to decrease proteinuria in hypertensive cats and is often more efficacious in reducing systemic blood pressure compared with ACEI. Cats should be slowly transitioned to renal diets early (eg, Stage 2) to increase diet acceptance. It is ideal to maintain serum phosphorus concentrations <4.5 mg/dl with renal diets and, if necessary, enteric phosphate binders.

Risks & Progression

Risk factors for CKD progression include proteinuria, hypertension, nephroliths, and urinary tract infections (UTIs). In the later stages of CKD, treatment tends to be focused on reducing the signs associated with decreased renal function (eg, anorexia, vomiting, acidosis, potassium depletion, hypertension, anemia).

STEP 3
Communication Keys ▶

Communicating an Overwhelming Concept: *Talking CKD with Clients*

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The top priorities in discussing newly diagnosed CKD with clients include education, sympathy, and support. Remember, what may be a routine discussion for team members can be an anxious and daunting conversation for the client.

Ensure the team is well versed in the diets offered by the practice, as well as how to discuss the transition from one diet to the other.

DISCUSSING A DIET CHANGE

The diagnosis of CKD will likely include a change to a renal diet. Ensure the team is well versed in the diets offered by the practice, as well as how to discuss the transition from one diet to the other.

Technician

Mrs. Smith, I know Dr. Grauer discussed Bella's new diet, and I have set aside both canned and dry food for you so we can give her whatever she prefers. The goal is to keep her eating, so we want to do a very gradual shift from old to new food. This may take 2 to 4 weeks, depending on how picky she is.

To begin, gradually decrease her current food and increase the new food in small increments. If she begins to skip meals, stop or reverse the transition slightly and give us a call so we can help troubleshoot.

Also, Mrs. Smith, it's important that you know that some cats with CKD can lose interest in eating, so here are a few tips:

- *Slightly warm the canned food in the microwave, or create a warm slurry by mixing warm water into the food that Bella can lick up. Warming the food often increases its aroma, which can stimulate appetite.*
- *Try storing the canned food in a nonmetal container after it is opened to preserve the flavor.*
- *Some cats are social eaters, so try spending time talking to or petting Bella, which may encourage her to eat.*

TEACHING SUBCUTANEOUS FLUID ADMINISTRATION

Owners of CKD patients will sometimes be taught to give subcutaneous (SC) fluids at home. Make sure the practice has a step-by-step teaching model, which should address how to use the equipment components (eg, fluid bag, syringe, IV line, needles). The model should also demonstrate how to warm the fluids and dispose of the needles. Remember, empowering the client to perform this treatment with confidence and comfort can be critical for the patient's longevity.

Managing feline CKD can be an expensive, worrisome, and time-consuming undertaking for clients, who often second-guess themselves and their decision.

Technician
Mrs. Smith, administering these fluids can be a little intimidating, but we are here to coach you through the process as many times as you need. If you get nervous later, you can call us from home and we can talk you through it.

Here are some tips to help you administer the fluids:

- *Try gently wrapping Bella in a towel to help keep her still.*
- *Sometimes giving the fluids near a window where Bella can look outside provides a helpful distraction.*
- *Try to avoid giving Bella the fluids at feeding time, which may negatively affect her appetite.*

DISCUSSING MEDICATIONS

Depending on the stage of the CKD, the patient may be placed on oral medications for high blood pressure, inappetence, constipation, or a host of other potential signs. Again, the practice should have a standard teaching model for clients suddenly faced with medicating a cat. Education on the importance of the drug, the dosage, and the administration of water (± 2 mL via syringe) after medicating is critical. Educate the client on some of the most successful strategies for medicating at home. Ensure the client understands that if adverse effects (eg, vomiting, diarrhea, inappetence) occur, he or she should call the practice right away for a consult.

Technician
Cats can sometimes be challenging to medicate, Mrs. Smith, so here are some tips we have found to be helpful:

- *Try using Pill Pockets* (greenies.com)*. If we are lucky, Bella will gobble up the medication with the pocket.*
- *Place Bella on a slippery surface, like the dryer, to help in the restraint process. A bath towel wrapped around her with just her head sticking out is also very helpful.*
- *Make sure the pill lands on the back of her tongue; if it lands up front, she will probably spit it out.*

Some owners prefer using a Pill Gun (nutri-vet.com) *instead of using their fingers.*

SYMPATHY & SUPPORT

Managing feline CKD can be an expensive, worrisome, and time-consuming undertaking for clients, who often second-guess themselves and their decision. Part of your responsibility to the client is to understand these challenges, actively listen to the client, and counsel him or her as needed.

WEB RESOURCES FOR CLIENTS

- **Feline CRF Information Center** felinecrf.com
- **Giving Subcutaneous Fluids to a Cat** vetmed.wsu.edu/clienteed/cat_fluids.aspx
- **Giving Oral Medications to a Cat** vetmed.wsu.edu/clienteed/cat_meds.aspx

STEP 4
Team Workflow ▶

Team Workflow

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Phone the client for a routine callback or to relay the finalized test results and potential changes to the treatment plan.

RECEPTIONIST

- ✔ Immediately welcome the client
- ✔ Escort the client and patient to an examination room or the quietest location available
- ✔ Remain attentive to any client needs while waiting for a technician

TECHNICIAN/ASSISTANT

- ✔ Greet the client and introduce yourself
- ✔ Take a thorough history
- ✔ Record vital signs
- ✔ Document findings in the record
- ✔ Have all expected supplies and equipment ready for the veterinarian
- ✔ Restrain or document as needed

VETERINARIAN

- ✔ Greet the client and introduce yourself
- ✔ Review the history with the client
- ✔ Complete a physical examination, minimizing stress whenever possible
- ✔ Team up with the client to create a treatment or maintenance plan
- ✔ Perform authorized tests and explain any immediate results
- ✔ Ask the client if he or she has any further questions
- ✔ Discuss the need for the next recheck appointment

TECHNICIAN/ASSISTANT

- ✔ Prepare medications, supplies, and estimates
- ✔ Demonstrate and teach any necessary skills (eg, medicating, SC fluids)
- ✔ Provide and review all written handouts and report cards
- ✔ Confirm that all client questions and concerns have been resolved
- ✔ Escort the client to the reception area and relay the next recheck appointment

RECEPTIONIST

- ✔ Provide an invoice for the visit
- ✔ Schedule recheck appointments
- ✔ Help the client to his or her car

VETERINARIAN or TECHNICIAN/ASSISTANT

- ✔ Phone the client for a routine callback or to relay finalized test results and potential changes to the treatment plan

STEP 5
Team Roles ▶

Team Roles

TEAM MEMBER	ROLE	RESPONSIBILITIES
RECEPTIONIST	Immediate contact with a welcoming, attentive attitude to ensure client comfort	✔ Orchestrate the visit so the client is never left wondering where he or she goes or whom he or she sees next ✔ Calm any concerns the client has and voice faith in your team that they will be able to help; you are the communication hub of the practice.
TECHNICIAN/ ASSISTANT	Client educator and patient caregiver	✔ Demonstrate knowledge and appropriate medical terminology ✔ Record a thorough history and all vital signs ✔ Make every effort to keep the patient calm and comfortable ✔ Be well versed in potential tests or treatments for CKD cats to anticipate what the veterinarian may want to perform
VETERINARIAN	Educator and medical expert	✔ Listen to the client's observations and concerns ✔ Perform a thorough examination and any appropriate tests ✔ Mentor the technical team members to be a support and employ them to their fullest lawful capabilities ✔ Send appropriate written materials home with the client; reference material will often increase home-care compliance
PRACTICE MANAGER	Overseer of workflow, practice standards, policy, and client service	✔ Make sure the team has everything needed for success (eg, equipment, training, empowerment) ✔ Create an agreed-upon definition of practice standards, including client and patient care ✔ Be prepared to hold your team accountable to maintain practice standards

STEP 6
Team Training Plan ▶

Setting Practice Standards for CKD Cases

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Patients with CKD are often very high maintenance, both in the practice and at home, and frequently require more than an average amount of time for quality care. Providing consistent and efficient information and treatment can be invaluable for case management. To prepare your team, define what should be standard for your practice:

CKD patients often visit a practice frequently over many years. Nurture this bond as part of your practice culture.

BLOOD PRESSURE

- Are all CKD cats receiving a blood pressure reading during the visit?
- If so, is this after the patient has relaxed and calmed down from transport?
- Is the blood pressure reading performed with the client holding the pet?
- Is a body temperature reading done after the blood pressure reading?
- Depending on equipment, what size cuff is used, and what is the placement protocol?
- Is cuff size noted and adjusted depending on weight gain and loss?
- Are readings completed consistently by select, trained team members?

PRESCRIPTION DIETS

- Is the team knowledgeable about what diets are carried at the practice and why?
- Does the practice allow for time between examinations to sell the prescription diet?
- Is the practice using reminders for food purchases?
- Is the team well versed in diet transition strategies?
- Does a standard client handout discuss how to transition diets?

FLUID THERAPY

- Is the team familiar with *why* fluid therapy is frequently warranted in CKD cases?
- Does the practice have a relaxed, competent team member who can demonstrate how smoothly and comfortably SC fluids can be administered (and earn clients' confidence and trust)?
- Does the practice have an assigned quiet, relaxed area for fluid therapy demonstrations and training?
- What is the protocol for warming the fluids?
- How frequently are needles and lines changed?

Clients and patients facing CKD often visit a practice frequently over many years, and team members can become fond of both client and patient during this time. Nurture this bond as part of your practice culture.

For more help with implementing fluid therapy protocols in the practice, refer to the 2013 AAHA/AAFP Fluid Therapy Guidelines for Dogs & Cats*

* Guidelines can be found at catvets.com/public/PDFs/PracticeGuidelines/FluidTherapyImplementationToolkit.pdf

See Aids & Resources, back page, for references & suggested reading.