
Canine Renal Disease: When Is the Right Time to Strike with Nutritional Therapy?

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Abstract

How do I feed canine patients showing early markers of renal disease without any clinical signs? Clinical trials have evaluated therapeutic dietary management for dogs with renal disease Iris stage >2.5. What nutritional factors should we consider for patients before they reach this stage? In the absence of evidence, the patient must eat. Assessing each patient individually can help guide the feeding and treatment plan to meet their nutritional needs.

Introduction

For many years, nutritional management has been accepted as a primary therapeutic modality for dogs and cats with chronic kidney disease (CKD). In fact, therapeutic renal foods have been used to treat veterinary patients for decades.^{1,2} Debate remains regarding the optimal nutrient profile, but compared to canine pet foods formulated for adult maintenance, the typical modifications of therapeutic renal diets are calorically dense foods reduced in protein, phosphorus and sodium, and enriched in dietary buffering capacity, omega-3 fatty acids, soluble fiber, water-soluble vitamins, and antioxidants.³ Nutritional therapy is designed to minimize clinical signs and ideally reduce the rate of progression of disease. Although current nutritional treatment using therapeutic renal diets is generally accepted as effective therapy, the time to implement nutritional modifications may not have general agreement particularly in the early stages of disease. Renal diets may not provide benefit nor may they always meet the patient's nutritional needs, especially in the early stages of renal disease.

Evidence-Based Therapy

The challenge of applying evidence-based medicine when managing CKD is interpreting results; some are from populations of experimentally induced disease,⁴ and others from spontaneously occurring CKD.⁵ Some studies evaluated single nutrients, and others evaluated a "diet effect" of combined nutrient modifications. Food intake is not always measured or reported, making

Glossary of Abbreviations

ACVN: American College of Veterinary Nutrition
BCS: Body Condition Score
CKD: Chronic Kidney Disease
IRIS: International Renal Interest Society
MCS: Muscle Condition Score

it difficult to assess the effect of nutrient intake.¹⁻⁵ In the quest to develop best practices for the diagnosis and treatment of renal disease in small animals, the International Renal Interest Society (IRIS) established a set of guidelines for staging (stages 1 to 4) and treating CKD in dogs and cats.⁶ These guidelines recommend implementing nutritional treatment for

stage 3 CKD, dogs with a creatinine of >2.0 mg/dl (>180 µm/l). Whenever possible, veterinary care should incorporate evidence from controlled clinical studies. However, there are no nutritional clinical trials in dogs with CKD earlier than stage 3.⁷

Acting [Feeding] in the Absence of Evidence

When a dog has laboratory values suggesting an early stage of CKD (<3), the veterinarian is left with formulating a management plan in the absence of evidence. Should we feed the dog, the kidneys or both? Recommendations of any specific therapy should be assessed not only on the basis of the grade of evidence but also on clinical experience and the pet's and owner's preferences, tolerances and abilities.¹ Performing a thorough medical and nutritional assessment can help guide the recommendations to meet the individual pet's needs.

Approach the Patient with an Individualized Care Plan

Performing a Nutritional Assessment

The American College of Veterinary Nutrition (ACVN) developed a Circle of Nutrition as a useful tool and guideline for performing a nutritional assessment. This should form the basis of your nutritional plan for every patient every time.⁷ The circle describes all the factors to consider in making a nutritional assessment and recommendation. The interrelationship of all three components (patient, diet and feeding factors) is represented as well as the need for continual reassessment. Health and nutritional status are not static but rather a dynamic process worthy of continued re-evaluation, especially in diseases known to be progressive such as CKD.

Use the Circle of Nutrition (pictured below) to guide the diet history, which is integral to nutritional management of any patient. An accurate diet history is invaluable when making an assessment of the health of the patient and will be vital to formulating an individualized diet plan.

Using the Circle of Nutrition in Dogs with Early CKD Patient Factors.

Once CKD is suspected, the veterinarian should verify that the condition is stable in order to apply the IRIS staging system.⁶ In azotemic patients, pre- and postrenal causes should be ruled out. Once that is done and primary renal disease is confirmed, then the kidney disease should be classified as acute or chronic. Evaluate and treat for underlying and potentially reversible causes, such as systemic infectious/inflammatory conditions, urolithiasis and urinary tract infection. Identify any underlying factors that could contribute to progression of disease (nephrotoxic medication, breed predispositions for renal disease⁹). In CKD, two factors have been associated with faster rates of progression and a negative prognosis: proteinuria and hypertension.^{10,11} All patients confirmed with CKD should be evaluated for hypertension and proteinuria. The physical examination should identify other comorbid conditions that may need to be addressed and should also include the patient's body weight, body condition score (BCS)¹² and muscle condition score (MCS)⁸ as indirect measures of health and nutritional status.¹³

Dietary Factors.

A thorough diet history is critical. Ideally, you would like enough information that you can reproduce the animal's exact diet and know the daily intake. This information taken together with the patient assessment provides information about the patient's daily caloric requirements and specific nutrient intake.

Treats: The diet history should also identify all snacks or treats. When collecting the drug history, investigate whether the owner is using a food to administer the medication. Meats and dairy products are of special concern since they are palatable treats and common ways to administer medication. Meat and dairy products can contribute a significant amount of phosphorus, protein and sodium.

Feeding Management/Environment A Diet History Is a Valuable Tool.

Learning about the pet's environment and the feeding factors, such as access to other animal's food, acceptance to feed, and whether the pet is fed commercial or home-prepared foods, will inform the veterinary team about many factors, including the human-animal bond and the potential success or problems with adherence to the nutritional recommendation.

Making Your Recommendation

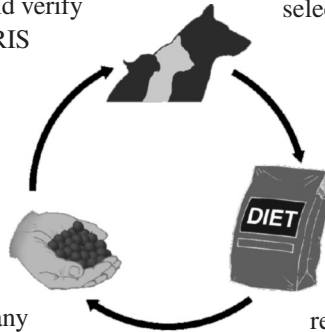
There is no published evidence for preventive benefits of implementing renal diets in canine patients prior to stage 3. Consider the following nutrients of concern when selecting a food for canine patients with early stages of CKD.

Water: In early stages of CKD, a dog's urine concentrating ability is impaired and there is increased risk of dehydration. Assure a plentiful water source and consider adding water or selecting a food with higher moisture content.

Protein: In a study evaluating urine-phrectomized geriatric dogs, there was no benefit to renal function or structure from long-term feeding of modest restrictions of protein, phosphorus or sodium and some concern about meeting minimum protein requirements for senior dogs.¹⁴ This research population could represent the equivalent of IRIS stage 2, patients with a 50% reduction of renal mass without azotemia or clinical signs of disease. Consider providing 2.55 gms protein/kg body weight (BW) or ~1 gm protein/pound BW as a general guide for the "minimum" adult canine daily requirement,¹⁵⁻¹⁸ or a level to minimize the risk of creating signs of protein deficiency. Senior dogs may need up to 50% more than this.¹⁵ Based on the diet history, assure the patient is meeting its daily protein needs. If consuming levels in excess of their needs, then consider a decremental reduction in protein consumption. Meet protein needs and avoid excess.

Phosphorus: There are only experimental models evaluating phosphate restriction in dogs with induced CKD. Several studies have evaluated the role of phosphorus restriction, however, this was evaluated in more severe CKD and phosphorus restriction was often paired with protein restriction.¹⁸⁻²¹ In light of this, the IRIS recommendation for stage 2 CKD is restriction of dietary phosphorus in the form of renal diets. Without evidence for this recommendation, this author suggests the patient avoid excess phosphorus intake rather than implement a therapeutic renal diet unless serum phosphorus is elevated (>1/5 mmol/l or >4.6 mg/dl). Educate owners about treats and foods that provide sources of phosphorus that should be limited or avoided.

Omega-3 Fatty Acids: Several positive effects are attributed to omega-3 fatty acids, such as suppressing inflammation and platelet aggregation, lowering blood pressure, and modifying renal hemodynamics.^{22,23} However, no clinical trials evaluate the effects of omega-3 fatty acids in early CKD. Renal therapeutic diets incorporate omega-3 fatty acids for the combined "diet effects." There is no evidence for benefit or harm of omega-3 supplementation of patients with CKD less than IRIS stage 3, and the therapeutic dose and/or ratio of omega-3:omega-6 fatty acids is not well-established. If electing to add supplementation to a patient's diet, assure that all sources are accounted for (diet and supplement) to calculate total daily intake and avoid excessive amounts.



Caloric Intake: Food intake should be monitored and adjusted to maintain healthy body weight and condition. This can vary by individual, and thus, nutrient intake (gms/100kcal) should be assessed in the context of food and calorie intake to assure the recommended dietary modifications are being achieved. For example, a pet with a reduced appetite consuming a restricted nutrient diet may not meet its requirements; on the other hand, a pet consuming more food than their expected food dose may not be restricting the desired nutrient.

Reasses

A vigilant monitoring plan is an important part of managing early stages of CKD in order to detect any signs of progressive changes, such as proteinuria and hypertension increasing renal values (creatinine and serum urea nitrogen). Check the patient's food intake, body weight, BCS, and MCS to monitor nutritional status. If dietary changes are implemented to avoid excess amounts of phosphorus and protein, then monitor renal values one month after changing foods. If renal function is stable, reevaluate in three months and tailor the monitoring plan to the patient's status.

Summary

Without evidence that early implementation of therapeutic renal diets prevents progression of disease, assess each patient individually before using these products. The composite nutrient modifications may not meet all the patient's nutritional needs. For example, a young dog with mildly impaired renal function due to renal dysplasia is unlikely to meet its nutritional needs with a therapeutic renal product. The same could be true for an obese geriatric dog with comorbid conditions exacerbated by obesity. Assure the patient with early CKD is meeting its dietary needs with a complete and balanced food and a feeding plan that avoids dietary excesses. Assure the food meets the protein and calorie needs to maintain health and monitor to assure stable renal function. Partner with clients to help ensure success and to maintain adherence to your feeding and monitoring goals.

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