Allergic Gastroenteritis/Inflammatory Bowel Disease & Chronic Kidney Disease – Canine

Jennifer Larsen, DVM, PhD, DACVN

Definition

Dogs with both ***allergic gastroenteritis/inflammatory bowel disease*** (IBD) and ***chronic kidney disease (CKD)*** suffer from a diet-responsive inflammatory process affecting immune, digestive, and absorptive functions of the gastrointestinal (GI) tract as well as glomerular and/or renal tubular disease resulting in azotemia, reduced urine-concentrating ability, and polyuria/polydipsia (PU/PD), with or without associated clinicopathologic abnormalities (anemia, proteinuria, hypoproteinemia, hypercalcemia, hyperphosphatemia, hypo- or hyperkalemia). For more on allergic gastroenteritis/IBD in dogs, see pages 62–63; for more on CKD, see pages 84–85.

Key Diagnostic Tools and Measures

Consider history, physical examination, clinical signs, and minimum database: serum biochemical analysis, complete blood count (CBC), urinalysis, and diet history. Serum tests for the diagnosis of food allergy are not reliable and should not be used. Response to a dietary change is likewise not diagnostic, as improvement or resolution of clinical signs of many GI diseases can occur due to a response to changes in fat or fiber levels, fiber types, digestibility, or secondary effects on intestinal microflora. Abdominal
ultrasound, serum folate and cobalamin concentration, and ideally dietary elimination-rechallenge trials and biopsies can provide valuable additional information, and can confirm a preliminary diagnosis.

Pathophysiology

The inciting cause of allergic gastroenteritis/IBD often is unknown, but it may be a reaction to food components, bacterial antigens, and/or self-antigens. Upper or lower GI signs can be seen (inappetence, vomiting, diarrhea, borborygmus, flatulence). Chronic kidney disease is associated with accumulation of metabolic products of protein catabolism and other compounds usually excreted in urine. BUN is a marker of dozens of other nitrogenous waste compounds that impact appetite, smell, and taste. Hypergastrinemia from reduced renal clearance leads to GI mucosal irritation and ulceration as well as acidosis and abnormalities in mineral metabolism (impaired urinary phosphorus clearance, secondary hyperparathyroidism, altered vitamin D metabolism, hypercalcemia).

Signalment

Breeds predisposed to these conditions include Irish setters (for gluten-sensitive enteropathy) and German shepherd dogs and Shar-Pei (for lymphoplasmacytic enteritis).

Key Nutrient Modifications

Feeding a highly digestible, novel antigen, and/or a low-fat diet appear to be valuable strategies (novel ingredients determined by thorough diet history of individual patient). Altering the dietary fiber type and level can also have a beneficial effect. Pre- and probiotic therapy is useful for many cases. Protein restriction is needed to manage azotemia, and phosphorus restriction is indicated to reduce the risk of soft tissue mineralization and slow progression of CKD. Supplementation of B vitamins replenishes losses secondary to polyuria. Sodium restriction helps manage hypertension and/or fluid retention. Supplementation of omega-3 fatty acids has an anti-inflammatory effect and is renoprotective. If necessary, a canned diet can help attenuate dehydration.

Recommended Ranges of Key Nutrients

Nutrient	% DM	g/100 kcal	% DM	g/100 kcal
	Recommended dietary level		Minimum dietary requirement*	
Fat	8–12	2.0–3.5	5	1.4
Protein	15–24	3.5–6.0	18	5.1
Phosphorus	0.25–0.4	0.05–0.1	0.5	0.14
Sodium	0.2–0.3	0.04–0.07	0.06	0.02

Modified intake of these nutrients may help address metabolic alterations induced by disease states. The recommended dietary composition is shown as percent of dietary dry matter (DM) and as g or mg per 100 kcal metabolizable energy. All other essential nutrients should meet normal requirements adjusted for life stage, lifestyle, and energy intake.
*Nutrient requirement for adult animals as determined by the Association of American Feed Control Officials

Therapeutic Feeding Principles

As for all patients, the primary goal of nutritional management of the dog with both allergic gastroenteritis/IBD and CKD is to meet energy requirements with a diet inclusive of nutrient modifications specific for the disease. Although not all patients will demonstrate an immune response to diet ingredients per se, positive response to a diet change may still be noted since diets likely differ in fat and fiber levels, fiber types, and digestibility of ingredients. It is not always possible to discern which aspect of the successful diet is responsible for the positive effect. Choose hydrolyzed or novel ingredient diets if possible; some patients will do well on known tolerated ingredients even if prior exposure is documented. A thorough diet history is crucial to determining a list of potential novel ingredients for an individual patient (see Appendix II). Sometimes less exotic ingredients will be options. Limit the number of antigens the patient is exposed to (consider flavored medications, treats, access to food for other pets or table scraps). Patients can lose tolerance to ingredients over time, so it is useful to maintain a list of novel options specific to the animal. For very severe disease, malabsorption of fat-soluble vitamins as well as folate and cobalamin may occur.

Feeding strategies for CKD focus on slowing the progression of disease (phosphorus restriction and supplementation with long-chain omega-3 fatty acids) as well as managing clinical signs (avoiding acidification, protein and sodium restriction, supplementation with B vitamins, and modifying levels of calcium, vitamin D, and potassium if necessary). Consider that in many cases, the ingredients of the canned and dry versions of a prescription diet formulated for the management of CKD will be different. Thus, it may be helpful to compare the list of novel or tolerated foods for the patient to both the dry and canned versions. If the appropriate commercially available diet is not tolerated by the patient, then a home-cooked diet formulation is indicated.

- **Treats –** Treats should be low in protein, phosphorus, and sodium. The treats should not introduce an ingredient that is not present in the base diet. For many patients, treats should be avoided, especially in the initial stages of diet evaluation. If provided, total daily treats should be provided at no more than 10% of the daily caloric intake. Avoid foods known to be toxic to dogs: grapes and raisins, onions and garlic, macadamia nuts, bread dough, and chocolate.
- **Tips for Increasing Palatability –** Altering the moisture level of the diet by soaking kibble or baking canned diets can increase acceptance in some pets. Heating the diet can also be useful. The owner should provide a calm

and safe environment for eating and can also try positive reinforcement. If necessary, the daily treat allowance (up to 10% of the daily calories) can be used to add appropriate food items to the meals.

■ **Diet Recommendations** – For critically ill animals, initially feed resting energy requirements (RER; $70 \times BW$ in $kg^{0.75}$), monitor body weight, and adjust as necessary. For more chronic and stable cases, provide true maintenance energy requirements if possible (MER; the amount of calories that has maintained stable body weight). If the diet history is not complete enough to determine this, then estimate MER by calculation. MER can be determined by calculating RER for the current weight and multiplying by the appropriate factor: 1.4 for dogs prone to obesity, 1.6 for neutered dogs, and 1.8 for intact dogs (see Appendix III). Choose a diet that has been formulated for the management of CKD and that supplies ingredients known to be tolerated or that are novel to the individual patient.

Client Education Points

- Monitoring and reassessment will be necessary on a regular basis.
- Diet compliance in important for patients with both diseases.
- Avoid treats high in protein, sodium, or phosphorus. Do not feed treats that contain ingredients not present in the main diet. Consider feeding part of the daily diet as a treat, or use the alternate form of the diet if appropriate (canned or dry).
- A feeding tube may be needed if the patient will not eat adequate amounts of an appropriate diet.
- Chronic kidney disease in dogs progresses at variable rates in different patients, and comorbidities may negatively impact prognosis.

Common Comorbidities

Pancreatitis, GI upset from uremia or hypergastrinemia, allergic dermatitis, hypertension, and protein-losing enteropathy (secondary lymphangiectasia) may occur in dogs with allergic gastroenteritis/IBD and CKD.

Interacting Medical Management Strategies

Use of angiotensin-converting enzyme (ACE) inhibitors in CKD may contribute to hyperkalemia. Phosphate binders may decrease palatability and cause constipation, anorexia, nausea, or vomiting. Sodium content of any parenteral fluids should be considered in hypertensive or otherwise sodium-sensitive patients. Flavored and/or compounded medications can be a source of undesirable antigens (also consider the source of gelatin capsules).

Monitoring

Clinical signs of GI disease appear to be correlated with severity of inflammation within the GI tract. Monitoring serum BUN/creatinine, phosphorus, calcium, and potassium levels, urine specific gravity, and blood pressure is useful for managing CKD. Regular assessment of the patient for urinary tract infection is indicated. Add serum albumin concentration for patients with concurrent lymphangiectasia and/or glomerular disease and urine protein:creatinine ratio (UPC) for patients with glomerular disease. If diet is not effective in lowering serum phosphorus, add a binder. If mineral/electrolyte values are persistently deranged, a diet change may be indicated. If GI signs do not resolve with the current diet, and diet compliance is confirmed, consider altering ingredients, fiber levels and types, or concurrent/secondary disease. Consider the use of probiotics (however, consider any flavorings or other associated antigens in product). If azotemia or UPC is worsening, and diet compliance is confirmed, further protein restriction is indicated. Consider concurrent disease if UPC does not improve (e.g., Lyme nephritis).

Algorithm – Nutritional Management of Concurrent Canine Allergic Gastroenteritis/IBD and Chronic Kidney Disease