

Food allergy in dogs- clinical signs and diagnosis

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SUMMARY

Clinicians have long recognized a dermatitis which appears to be triggered by dietary components. The first descriptions of food induced canine dermatitis date back to 1933 [1,2]. However, although we make a clinical diagnosis of canine “food allergy” it is not clear at this time whether these cases are truly immunologically mediated or due to a “food intolerance” (Tab. 1). Furthermore, although there is evidence of a role for IgE in the pathogenesis of food allergy in colony dogs with spontaneous food allergy [3] it is not clear whether this is representative of the disease in the general population. Thus for the purpose of this discussion, although the term food allergy is used throughout, it should be recognized that this term is a presumptive clinical diagnosis and adverse food reaction is a more accurate term for these canine cases.

This paper was commissioned by FECAVA for publication in EJCAP.

Clinical presentation

Food allergy in dogs often assumes the clinical presentation that we traditionally associate with canine atopic dermatitis (CAD) triggered by environmental allergens [5,6]. Thus, they present with pruritus and the ventral abdomen, axillae, groin, muzzle, periocular, perianal, and palmar or plantar and dorsal interdigital skin are usually involved (Figures 1-3). Not all body regions are necessarily affected in individual dogs. A primary papular eruption may also be present. Secondary infections with *Staphylococci* or *Malassezia* often occur. A history of non-seasonal pruritus is present in the older dog, but a pattern cannot be determined in puppies and young adults with only a few weeks to months of discomfort. Food allergy often co-exists with environmental allergies in the same individual, the reported incidence varying from 33-49% of allergic dogs [5-7].

Other presentations of food allergy are recognized such as a recurrent superficial pyoderma [7,8] and pruritic papular eruptions over the trunk and head (Fig. 4). Recurrent otitis externa is a common complaint and may be present in 56% to 80% of cases [7-11]. Dogs may present with only otitis externa and occasionally this affects a single ear. There is debate over the frequency of concurrent gastrointestinal signs in patients with dermatologic signs of food allergy [5-7,10,11]. In this author's experience, intermittent vomiting, diarrhoea, colitis, or borborygmus may be present. It has been reported that canine food allergy may respond poorly to antipruritic doses of glucocorticoids, but most clinicians now agree this distinction is not a useful diagnostic feature. Two studies report that the majority of dogs with food allergy present before three years of age (Fig. 5) [5,6]. However, this disorder can occur at any age and should be considered in the older dog with no previous history of pruritus (Figures 6 and 7). Labrador retrievers, West Highland White terriers, boxers, Rhodesian ridgebacks and pugs are reportedly at increased risk for developing food allergy [5,6,10].

Atopy	a genetic predisposition to develop allergic disease
Atopic disease	any manifestation of atopy i.e. dermatitis, conjunctivitis etc.
Atopic dermatitis	a genetically predisposed inflammatory and pruritic allergic skin disease with characteristic clinical features.
Adverse food reaction	any clinically abnormal response attributable to the ingestion of food or food additive
Food intolerance	abnormal physiological response to food with no immunological basis
Food allergy	Immunologically mediated adverse food reaction.

Tab. 1.

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Fig. 1 Chronic facial dermatitis and otitis in a dog with food allergy.



Fig. 3 Ventral interdigital erythema and pruritic pododermatitis.



Fig. 2 Lichenification and erythema of the axilla, limb and sternum of the same dog (Fig. 1).



Fig. 4 Multifocal alopecia and papules on the trunk of a young dog with food allergy.

Prior to embarking on a diagnostic work up for food allergy the possibility of the presence of other pruritic skin diseases should be entertained. Ectoparasitic infestations in particular should be ruled out. If skin scrapings and coat brushings are negative then a therapeutic trial with a parasiticide is warranted.

Diagnosis of food allergy

A diagnosis is achieved by documenting a clinical improvement during the course of feeding a novel diet (see below) with recrudescence of clinical signs when previously fed foods are re-introduced. This diet should be fed exclusively and any additional food elements avoided. Table 2 provides an example

of questions which might be asked to determine what the dog is currently being fed. The optimal duration of a diet trial has not been determined but most veterinary dermatologists recommend a period of six to eight weeks which allows for evaluation of sustained improvement. Additionally, it is often the case that other treatments are instituted along with the initiation of the diet trial such as antibiotic or antifungal therapy for concurrent microbial infections. The diet needs to be continued once this treatment has finished in order to determine whether clinical improvement is sustained or merely attributable to the antimicrobial treatment itself. It is usually easiest to perform the challenge with a small amount of previously fed dog food. Clinical signs generally manifest within 2 weeks of challenge although, in my experience often within 2-48 hours. If the dog does not relapse with "dog food" then other previously fed treats should be introduced one by one. Serological or intradermal testing for

1. What is your dog's current and past dog food?
2. What dog treats does your dog receive?
3. Do you feed your dog table scraps?
4. Does your dog get raw hide chews, pigs ears or anything similar?
5. If you need to give your dog pills do you hide them in food?
6. What does your dog drink?
7. Does your dog have access to the cat food?
8. If there is another dog in the house what does it eat and do the dogs share bowls?
9. Will your dog eat food it finds on the street or in the park?
10. Does anyone else feed your dog ie the neighbour or dog walker?

Tab. 2 Diet history.

food allergy is not diagnostically reliable at this time and is not to be recommended.

Performing an effective food trial is challenging. It takes time to determine the dog's current food intake and educate the client about performing a diet trial correctly. It is often the case that the interview is conducted with one family member who embraces the concept and plan but the diet fails because other family members continue to feed treats. It is a good idea to make contact with the owners one or two weeks after initiating the trial to ensure the diet is going to plan and offer moral support. Clients generally find the first week the hardest, particularly if the dog is habituated to a lot of extra treats and table scraps.

Before and during the diet trial the dog's weight should be monitored carefully. Diets designed for the diagnosis and management of food allergy are nutritionally complete but occasionally a rapid gain or loss of weight can be seen.

Diet selection

Limited antigen diets in common use fall into three categories: commercially available novel protein diets, hydrolysed protein diets and novel protein home cooked diets. Commercially available diets are generally designed for the management of true food allergy, although as discussed, the true incidence of immunologically mediated disease in the dog is currently unknown.

Food allergens have been characterized at the molecular level in man and are generally glycoproteins with a molecular weight greater than 10 000 kD and they are stable to digestive processes [12]. The nature of food allergens in the dog is largely unknown. Home cooked diets are often advocated when performing a diet trial, thus avoiding pet food additives which might have the potential to cause adverse reactions. However, although additives are often incriminated as causing adverse reactions in pets there are no well documented reports to support this



Fig. 5 A six month old Labrador with facial pruritus due to food allergy. Pruritus was so intense the dog had been put in an Elizabethan collar.

Fig. 6 A ten year old dog with a 6 month history of ventral pruritus. Food allergy was diagnosed.



Fig. 7 A close up view of the same dog (Fig. 6). Malassezia was demonstrated on cytology from the ventral abdomen.



idea. Furthermore, the use of home cooked diets often lead to poor client compliance due to the added effort required for diet preparation. Home cooked diets are contra-indicated in growing animals and should be nutritionally balanced if used for long term feeding.

Commercial novel protein diets contain whole proteins which are not commonly found in dog foods. Although a truly "novel" protein is becoming more difficult to find as the diets available for general consumption increasingly contain more varied and exotic ingredients. The diet should be selected on the basis of the protein content which should be one which has not routinely been fed to the pet in the past, and ideally not at all.

Hydrolysed diets theoretically negate the need to find a "novel" protein. The Parent protein in these diets is usually from a readily available source such as chicken or soy in which the peptide bonds of the parent protein have been broken to create small peptide fragments. These peptides are too small to bridge adjacent allergen specific IgE molecules on the surface of mast cells thus degranulation does not occur. The rationale behind the use of these diets assumes that canine food allergy is mediated by IgE, which as previously discussed has not been determined. Various studies have examined the performance of hydrolysed diets in a clinical setting and found them to be well tolerated [5,13-15]. There is less critical evaluation however on the performance of these diets in dogs known to be hypersensitive to the parent protein. A small number of studies suggest that 20-50% of individuals will react adversely to the hydrolysed diet if they are sensitive to the parent protein [16-18]. Furthermore these diets tend to be more costly and less palatable.

For optimal compliance the selected diet should be of similar consistency to the diet currently being fed. Thus, if the dog is on a mixture of dry and moist food this should be adhered to if at all possible.

Long term management of the food allergic dog

For long term management the dog with food allergy may be maintained on the limited antigen diet which was used in the diet trial. Alternatively, and if the offending allergens have been identified, an alternative diet which is "allergen" free for that dog can be utilized. In the author's experience some dogs with food allergy can develop a hypersensitivity to the new diet after months to years on this diet and under such circumstances a new diet needs to be found. Young dogs may also progress to develop concurrent hypersensitivities to environmental allergens.

Dietary responsive disease

Various studies have demonstrated an apparent beneficial effect of feeding limited antigen diets to dogs with AD in the absence of demonstrable food allergy [19,20]. This precise reason is undetermined but may be attributable to the enhanced essential fatty acid content of these diets.

References

- [1] Burns PW. Allergic reactions in dogs. *Journal of the American Veterinary Medical Association*. 1933; 83: 627-34.
- [2] Schnelle GB. Eczema in dogs-an allergy. *North American Vet*. 1933; 14: 37-44.
- [3] Jackson HA, Hammerberg B. Evaluation of a spontaneous canine model of immunoglobulin E-mediated food hypersensitivity: dynamic changes in serum and fecal allergen specific IgE values relative to diet change. *Comparative medicine*. 2002; 52: 316-21.
- [4] Loeffler A, Lloyd DH, Bond R, Kim JY, Pfeiffer DU. Dietary trials with a commercial chicken hydrolysate diet in sixty three pruritic dogs. *Veterinary Record*. 2004; 154: 519-22.
- [5] Jackson HA, Murphy KM, Tater KC, *et al*. The pattern of allergen hypersensitivity (dietary or environmental) of dogs with non-seasonal atopic dermatitis cannot be differentiated on the basis of historical or clinical information: A prospective evaluation 2003-2004 (abstract). *Vet Dermatol*. 2004; 16: 200.
- [6] Picco F, Zini E, Nett C, Naegeli C, Bigler B, Rufenacht S *et al*. A prospective study on canine atopic dermatitis and food-induced allergic dermatitis in Switzerland. *Vet Dermatol*. 2008; 19: 150-155
- [7] Chesney CJ. Food sensitivity in the dog: A quantitative study. *Journal of Small Animal Practice*. 2002; 43: 203-207.
- [8] Harvey R. Food allergy and dietary intolerance in dogs: a report of 25 cases. *J Small Anim Pract*. 1993; 34:175-179.
- [9] Olson M, Hardin JA, Buret A, *et al*. Hypersensitivity reactions to dietary antigens in atopic dogs. In: Rheinhardt GA, Carey DP, eds. *Recent advances in canine and feline nutrition*, Vol. 3. Wilmington, Ohio: Orange Frazer Press, 2000;69-77.
- [10] Rosser EJ Jr. Diagnosis of food allergy in dogs. *J Am Vet Med Assoc*. 1993; 203: 259-262.
- [11] Carlotti D, Remy I, Prost C. Food allergy in dogs and cats. A review and report of 43 cases. *Vet Dermatol*. 1990; 1: 55-62.
- [12] Taylor SL, Lehrer SB. Principles and characteristics of food allergens. *Critical Reviews in Food Science and Nutrition*. 1996; 36(S): S91-S118.
- [13] Biourge VC, Fontaine J, Vroom MW. Diagnosis of adverse reactions to food in dogs: efficacy of a soy-isolate hydrolysate based diet. *Journal of Nutrition*. 2004; 134: 2062S-64S.
- [14] Rosser ER. Evaluation of a novel carbohydrate and hydrolyzed protein containing diet in previously confirmed food allergic dogs (abstract). *Vet Dermatol*. 2001; 12: 230.
- [15] Olivry T, Kurata K, Paps JS *et al*. A blinded randomized controlled trial evaluation the usefulness of a novel diet (Aminoprotect Care) in dogs with spontaneous food allergy. *Journal of Veterinary Medical Science*. 2007a; 69: 1025-31.
- [16] Jackson HA, Jackson MW, Coblenz L *et al*. Evaluation of the clinical and allergen specific serum immunoglobulin E responses to oral challenge with cornstarch, corn, soy and a soy hydrolysate diet in dogs with spontaneous food allergy. *Vet Dermatol*. 2003; 14: 181-7.
- [17] Ricci R., Jackson H.A., Paps J.S., Hammerberg B. The magnitude of the clinical response to oral proteins in dogs with spontaneous chicken allergy is significantly reduced when the protein is hydrolyzed (abstract). *Vet Dermatol*. 2006; 17: 210.
- [18] Beale KM and Laflamme DP. Comparison of a hydrolyzed soy protein diet containing corn starch with a positive and negative control diet in corn- or soy-sensitive dogs (abstract). *Veterinary Dermatology*. 2001; 12: 237.
- [19] Glos K, Linek M, Loewenstein C, Mayer U, Mueller RS. The efficacy of commercially available veterinary diets recommended for dogs with atopic dermatitis. *Vet Dermatol*. 2008; 20: 280-7
- [20] Bensingor E, Morgan DM, Nuttall T Efficacy of an essential fatty acid-enriched diet in managing canine atopic dermatitis: a randomized, single-blinded, cross-over study. *Vet Dermatol*. 2008; 19: 156-62