FOOD ALLERGIC DERMATITIS: CHALLENGES IN CHOOSING THE ELIMINATION DIET

DERMATITIS ALÉRGICA ALIMENTARIA: DESAFÍOS EN LA ELECCIÓN DE LA DIETA DE ELIMINACIÓN

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ABSTRACT

Currently, the elimination diet trial is the most important diagnostic tool in dogs and cats with suspected Food Allergic Dermatitis. The first step is the introduction of an elimination diet trial, followed by the challenge with the patient's previous diet. In dogs and cats, as in humans, the diagnosis of FAD is based on the recurrence of clinical signs after provocation with the causative food ingredients. The removal of the previous diet and the introduction of a new "hypoallergenic" protein diet is recommended by many authors. A diet can only be considered "hypoallergenic" if the animal has never been exposed to food components before. Therefore, the choice of a diet requires attention to the assessment of three main factors: previous diets history, palatability and the circumstances of the owner. While easiest and trustful diagnostic tests are not available, customer education and the ideal choice of diet are essential. This study aimed to review the possible options for elimination diets trial available in the Brazilian market to help clinicians decide the best choice of diet for their canine patients.

Key words: dog, allergy, food, diet

RESUMEN

Actualmente, la prueba de restricción dietética es la herramienta de diagnóstico más importante en perros y gatos con sospecha de Dermatitis Alérgica Alimentaria (DAA). El primer paso es la introducción de una dieta de eliminación, seguido del desafío con la dieta anterior del paciente. En perros y gatos, como en humanos, el diagnóstico de DAA es basado en la reaparición de los signos después de la provocación con los ingredientes alimentarios causantes. Muchos autores recomiendan la eliminación de la dieta anterior y la introducción de una nueva dieta proteica "hipoalergénica". Una dieta solo puede considerarse "hipoalergénica" si el animal nunca antes ha estado expuesto a los componentes de estos alimentos. Por lo tanto, la elección de una dieta de prueba requiere evaluar tres factores principales: el histórico de dietas anteriores, la palatabilidad y las circunstancias del tutor. Si bien no se dispone de pruebas de diagnóstico sencillas y confiables, la educación del cliente y la elección ideal de la dieta son esenciales. Este trabajo tuvo como objetivo revisar las posibles opciones de dietas de eliminación disponibles en el mercado brasileño para ayudar a los médicos veterinarios a elegir la mejor dieta para sus pacientes caninos.

Palabras clave: perro, alergia, alimento, dieta

LITERATURE REVIEW

Adverse reactions to food are divided into two categories: immunological and non-immunological reactions. A food allergy (food hypersensitivity) leads to a series of immune reactions after eating food. Food intolerance occurs through non-immune-mediated reactions, such as, for example, food idiosyncrasy, toxicity and food poisoning. Overlap between the different types is possible because a clear distinction is difficult (1).

The main clinical sign associated with food allergy is non-seasonal pruritus, but it can also manifest with dermatological signs such as external otitis, recurrent pyoderma and other primary or secondary forms of skin lesions (1-4), such as papules, erythema, excoriations, epidermal collarets, pododermatitis, hyperpigmentation and seborrhea (1,3,4).

The presence of otitis externa is an important sign for Food Allergic Dermatitis (FAD). In some animals, otitis externa can be the only symptom of FAD (3,4).

In 20 to 30% of the cases of FAD, other allergic skin diseases are also present (5). A combination of atopic dermatitis (AD), FAD and flea allergic dermatitis is well known (1,3). Differentiating between AD and FAD based only on history and clinical signs is difficult. The age of onset of the clinical signs can help to distinguish: AD occurs in young adults (1-3 years), while FAD is more observed in animals less than one year old (1). Additionally, in contrast to FAD, AD can occur seasonally (1).

Concomitant gastrointestinal signs associated with food allergies include vomiting, diarrhea, flatulence and increased frequency of defecation (2,3). Approximately 67% of dogs with food allergies have concomitant gastrointestinal signs (2-4).

The differentiation between AD and FAD depends on the administration of a strict elimination diet instituted for a period of at least eight weeks (7). Currently, the dietary composition restriction test is the most important diagnostic tool in dogs and cats with suspected FAD (1). The first step is the introduction of an elimination diet, followed by the challenge with the patient's previous diet. In dogs and cats, as in humans, the diagnosis of FAD is based on the recurrence of clinical signs after provocation with food ingredients to which they were previously exposed (8). The removal of the previous diet and the introduction of a new "hypoallergenic" protein diet is recommended by many authors (1,8,9). However, this concept is not entirely correct: a really "hypoallergenic" diet does not exist (10). Food itself is antigenic (foreign body to the organism, capable of binding to specific antibodies). A diet can only be considered "hypoallergenic" if the animal has never been exposed to food components before. The identification of what is truly a new protein for any individual, depends entirely on the accuracy and length of the anamnesis comprising the food history. Due to the greater complexity of pet food, it has become more and more difficult to formulate elimination diets (1,11).

Therefore, the choice of a test diet requires a careful assessment of three main factors: previous diets, palatability and the circumstances of the owner. These diets can be homemade or commercially prepared (hydrolyzed diets), and both typically containing a single source of protein and a single source of carbohydrate (12).

Homemade diets

In some studies, homemade diets are reported to be superior for diagnosing FAD (12-14). Dogs that tolerate homemade ingredients, develop FAD in commercially prepared versions, which suggests over-processing of additives (3,15,16). Another point that has been discussed, is the discrepancy that has been found in relation to ingredients and quantities described on the labels and the ingredients and their quantities actually present in processed foods (17). These factors end up favoring the homemade diet, since the owner will be responsible for preparing the entire diet, which reduces the risk of contamination or the addition of an undesirable ingredient.

A review study conducted in 2016 found that the most frequently reported food allergens involved in FAD in dogs are bovine proteins (34%), dairy products (17%), chicken (15%), wheat (13%) and lamb (14.5%). Others reported less frequently were soy (6%), corn (4%), egg (4%), pork (2%), fish and rice (2%). Barley, rabbit, chocolate, beans and tomatoes have also been reported as food allergens for dogs (18). Homemade diets consist primarily of a source of protein and a source of carbohydrates. The most recommended food components for the homemade dog diet are fish, rabbit, venison, potatoes and tofu (1,15). The traditional elimination diet based on lamb and rice cannot be used in several cases due to different commercial foods based on lamb and rice which enlarges the possibility that animals with FAD have already been exposed to these food components (1).

These diets, on the other hand, require a lot of work from the owners, who must dedicate time in preparing them and in looking for new ingredients for the animal's diet (1), in addition, the cross reaction of the ingredients has been a major concern (19). The probability of cross-reaction increases among closely related foods, especially if the homology of the amino acid sequence is greater than 70% (19). Cow's milk, lamb and cow are derived from the same biological family (Bovidae) and share a recent common ancestor. As a consequence, they are more likely to have similar antigens, leading to increased cross-reaction (19).

Another problem with the homemade diet is the adequate nutritional support for animal's growth and maintenance. The diets recommended by veterinarians in North America were nutritionally inadequate for 89% of dogs and 92% of cats (20). These foods contained excessive amounts of protein, calcium, fatty acids, certain vitamins and other microelements (20).

An option of homemade diet present in the Brazilian pet market that has been shown to be interesting is the commercial homemade food prepared for a specific animal, following the specific nutritional needs of each individual. These companies develop individual portions ready to serve. A recently published study showed that the diet based on rabbit and cassava protein (*ElevenChimps*) proved to be a good option for the identification of canine FAD (21). This homemade diet option facilitates the owner's life who does not need to waste time preparing the diet or looking for ingredients considered exotic. In addition, there is no loss of nutritional value for the animals, nor of palatability, since in this study this diet proved to be very well tolerated by dogs (21). Another option, from this same company, would be the diet based on pork protein and cassava. In the authors' experience, the diet formulated with pork and cassava proved to be as effective in identifying dogs with FAD as the diet based on rabbit and cassava (22). Pork protein is more accessible to consumers and, as previously reported, it does not appear as a common allergen, only 2% of dogs develop FAD to this protein (18, 22).

Cheaper and more accessible diet options are very important as most diets considered "hypoallergenic" are expensive and owners cannot afford the elimination diet test and diet maintenance costs.

Hydrolyzed diets

Commercial diets based on hydrolyzed diets can represent a valuable tool for the diagnosis of FAD, since these are very practical for owners and nutritionally balanced (1,9, 23).

The immunological reaction is generally associated with water-soluble glycoproteins in the diet that have molecular weights ranging from 10,000 to 70,000 kD. The efficacy of hydrolyzed diets depends on the degree of hydrolysis and the protein material used (16). The protein hydrolysis process involves the cleavage of peptide bonds. In theory, proteins hydrolyzed at a molecular weight less than <10 kD do not trigger an immune-mediated response, as they are too small to induce IgE binding on the mast cell surface (23). During hydrolysis, protein sources, which include chicken, poultry, liver, casein and soy, are enzymatically broken down to polypeptides, altering and reducing the allergenic properties of the molecule (16). Because of their low molecular weight, hydrolyzed proteins do not need to have a single origin or unique source of protein. Polypeptide hidrolyzed in veterinary diets include chicken, poultry liver and soy (16, 23).

Among the options of feed considered "hypoallergenic" available in the Brazilian market, are Royal Canin Hypoallergenic, Hill's Z / D, and Equilbrio Hypollergenic.

A new formulation of therapeutic feed, Royal Canin Anallergenic, has recently been launched in the American and European markets. A feed formulated with unique and very short chains of amino acids, which can be considered too small to initiate allergic reactions, but it is still absorbed as "normal" protein that participate in metabolic processes and fulfill the supply of essential nutrients. The hydrolyzed is composed by essential amino acids extracted from bird feathers with 88% of the protein in the form of single amino acids and 95% of the total protein content with molecular weight less than 1 kD (24). A study evaluated this diet (Royal Canin Anallergenic) and another hypoallergenic (Hill's Prescription Diet z/d Ultra) in a control of dogs allergic to chicken's proteins. The ultrahydrolyzed feather- birds based diet (Royal Canin Anallergenic) did not induce recurrence of itching in dogs allergic to chicken in contrast to the hydrolyzed diet of the chicken liver (Hill's Prescription Diet z / d Ultra) that triggered itching in 40% of these dogs (24). Therefore, even these diets considered low molecular weight, "hypoallergenic", can induce FAD in some animals (24).

The anallergenic feed showed high palatability and high acceptance by dogs and owners (24). Palatability is a concern of commercial hydrolyzed and ultra-hydrolyzed diets, as they tend to have a bitter taste and high osmolarity, which increases the chance of clinical symptoms related to the gastrointestinal tract of dogs (1, 25).

Therefore, even with commercial feed considered "hypoallergenic", some dogs continue to develop FAD (24), either because of added ingredients or additives not described on the labels (17), or because some animals will exhibit reactions to partially hydrolyzed commercial dog foods (24).

To conclude, the lack of a reliable diagnostic test is a big concern and would be a great step forward in determining FAD in suspected patients. Up to now, an extensive food trial is the only way to diagnose FAD (16). The choice of an elimination diet is a challenge and must be based on a very well conducted dietary history, characteristics of the animal and the owner, palatability, cost of the diet and maintenance (16, 22).

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