

Adverse Food Reaction in Dogs.

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Introduction.

Adverse food reactions cover a spectrum of conditions including both immunological and non-immunological causes. Immunological adverse food reactions (food allergy) are either IgE mediated or non-IgE mediated. Under the non-immunological causes are included food intolerance (metabolic, pharmacological, idiosyncratic, food poisoning), dietary indiscretion (scavenging, gluttony, pica) and food aversion (psychological avoidance, psychological intolerance).

The prevalence of adverse food reaction in dogs is responsible for about 7-12% of canine dermatoses and 10 to 15% of canine allergic dermatoses. It has also been documented as the sole cause of skin disease in 20 to 35% of dogs with non-seasonal pruritus and in 9 to 50% of dogs with atopic dermatitis.

Adverse food reactions (non-immunological).

The most common example of **metabolic reactions** to food is lactose intolerance, which is present in many adult dogs and cats. Lack of lactase activity in the brush border results in the development of bloating, flatulence, abdominal discomfort and diarrhea after ingestion of dairy or milk products. Many of these cases are suspected to be secondary to an acute viral infection which has resulted in the permanent destruction of the brush border enzyme lactase.

Pharmacological reactions are due to a pharmacological effect of components in the food for example chocolate toxicity in dogs related to theobromine, which can induce gastrointestinal, neurologic, cardiovascular and renal abnormalities. This syndrome is most frequently seen in small breeds. Pharmacological reactions due to ingestion of spoiled foods are more common. Bacteria can produce a variety of vasoactive amines in spoiled food.

Food idiosyncrasies are not well documented in dogs and cats.

Food poisoning is usually the consequence of toxic substances that have been produced by microbial contamination of the feed but may also be due to toxic principles naturally present in the food (e.g. onion poisoning) or maliciously introduced (e.g. melamine poisoning).

Dietary indiscretion is the indiscriminate ingestion of food (usually human food) or ingestion of excessive quantities of food, that leads to mild cases of acute gastritis and/or pancreatitis with single episodes of vomiting and/or diarrhea. Many of these cases spontaneously resolve without therapy.

Food hypersensitivity (immunologic adverse food reactions).

Pathogenesis.

The intestinal mucosa serves as a protective barrier against entrance of potentially harmful substances. Macromolecular food components (proteins, lipids and carbohydrates) are digested in the small intestine with only the building blocks (amino acids, fatty acids, cholesterol, mono and disaccharides) being absorbed. It is the proteins that are absorbed which are most immunogenic, however, most of this protein is processed through intracellular digestion and rendered non-immunogenic. A small amount escapes lysosomal digestion and reaches the mucosal associated lymphoid tissues resulting in a cell mediated suppressor response. The MALT also synthesizes IgA that is secreted onto the luminal surfaces of mucosal cells, binding to food antigens and rendering them non-immunogenic.

If there is damage to the intestinal mucosa macromolecular protein can be absorbed initiating an immunological response. There are a large number of potential food antigens with the most common food allergens recognized in dogs being milk, soy, wheat, oats, beef, eggs, horsemeat, chicken, corn, pork and yeast. Rice grains are not a common cause of food hypersensitivity in dogs. In cases where an animal is allergic against one protein it may also be allergic against a related protein.

Clinical symptoms.

Cutaneous adverse food reaction (food hypersensitivity) may develop between the ages of 7 weeks and 13 years, often presenting with non-seasonal pruritus, that can be complicated by other concurrent seasonal factors such as concurrent atopy, flea allergy, ectoparasites or seasonal variation in diet. Symptoms are usually related to skin and/or the gastrointestinal tract with respiratory symptoms, neurological signs and cystitis being less commonly reported.

Cutaneous presentations usually include pruritus and erythema affecting the ears, feet, face, ventral body, limbs and/or perineum regions. The cutaneous signs mimic those of other pruritic dermatoses such as ectoparasitic hypersensitivity (including flea allergy) or atopic dermatitis, which frequently occurs concurrently with adverse food reaction. However, a common and consistent skin presentation is perineum pruritus, which is an important indicator lesion for adverse food reaction.

Gastrointestinal signs occur with increased frequency in pruritic dogs with adverse food reaction. Symptoms may include increased defecation frequency, soft feces, intermittent diarrhea and flatulence. However, in some dogs with cutaneous disease, gastrointestinal signs are absent.

Diagnosis of immunological AFR.

Clinical signs of allergic skin disease with perineum pruritus and gastrointestinal signs, raise the level of suspicion for AFR. However, AFR mimics many other pruritic dermatoses and so diagnosis cannot be based on clinical presentation alone. Dietary elimination trials followed by

dietary provocation remains the diagnostic procedure of choice and gold standard for the diagnosis of adverse food reaction. The new **food reaction test (FRT)** has become an integral part of the selection or preparation of a hypoallergenic diets. Home prepared diets are tailored to each dog, based on the FRT and dietary history. This FRT is not a test for food hypersensitivity. The high negative predictive value of allergen specific IgE and mixed IgG of the FRT, makes it ideally suited for the selection of ingredients for inclusion in a hypoallergenic diet (commercial hydrolyzed or homemade). However, such homemade diets are labor-intensive, certain ingredients may not be readily available and supplements are required for young growing dogs.

The **FRT** provides a whole **new approach** through the following innovative features.

- FRT identifies a combination of different immune reactions against food proteins (IgE, IgG subclasses 1 to 4).
- FRT eliminates common false positive results by blocking Cross reactive carbohydrates, thus increasing the specificity of the test results.
- FRT is a tool in the selection of a commercial or home-cooked diet.
- FRT can be used to guide the composition of an elimination diet and introduction of new food components.

More recently, hydrolyzed veterinary diets have become available for the diagnosis of adverse food reaction in dogs. The process of hydrolysis breaks down protein sources to polypeptides changing and reducing the allergenic properties. These hydrolyzed veterinary diets have been shown to be far less likely to contain added ingredients missing from the label, when compared to other pet foods apparently containing “novel” or “limited” ingredients proposed for elimination diets. Therefore, there is sound scientific basis for the use of veterinary hydrolyzed diets in feed elimination trials.

The clinical approach to the diagnosis of AFR involves selection of dogs with non-seasonal pruritus or a history suggestive of AFR. Careful recording of clinical signs and owner’s observations relating to pruritus, skin lesion distribution and presence or absence of gastrointestinal signs. Prophylactic treatment for ectoparasites and form part of the process as should flea control. Any pyoderma or microbial overgrowth should be treated as part of the diagnostic process. The selected hypoallergenic diet should be fed in a rigorous food restriction trial for a minimum of 8 weeks. In addition to the hypoallergenic diet, only water should be given to drink. Regular contact with the owner is required to monitor response and progress and to ensure that all treatments in the diet are properly instituted. On completion of the trial dogs are challenged with foods, drinks and treats formerly provided.

Therapy

In cases of true food hypersensitivity, the feeding of a hypoallergenic diet is usually associated with a partial response within 2 weeks, but complete remission of clinical signs can take up to 6 to 8 weeks. For the diagnosis of food hypersensitivity in more than 90% of dogs, elimination diet trials should last at least 8 weeks.

In instances where there is a favorable response to the hypoallergenic diet, many owners refuse to challenge the dog and choose to continue with the restriction diet. In the case of home-cooked

diets it is important to provide supplements for dietary balance and where possible one should try and persuade the owner to use an equivalent commercial diet. If there is complete response to the diet, and signs recur on challenge, adverse food reaction can be diagnosed. Where there has been partial response and signs recur on challenge other concurrent pruritic skin diseases should be considered, particularly atopy.

Further Reading.

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