NUTRITIONAL TREATMENT OF FOOD ALLERGY IN DOGS AND CATS: AN UPDATE

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Introduction

Food allergy (or hypersensitivity) is an immunologically based reaction to food and is different from food intolerance. Both fall under the heading of an adverse food reaction (AFR) as the clinical signs may be identical and their nutritional management is similar (1). Food allergy -and particularly cutaneous adverse food reactions- is frequently suspected in companion animals although it is difficult to determine the exact incidence from the literature.

Treatment of food allergy – General recommendations

Once food allergy is suspected, the first step is to collect an accurate feeding history from the owner because the elimination diet must not contain any of the ingredients previously given. In most cases, at least 2 commercial diets (one for growth and one for adult maintenance), (dental) treats, table scraps, and human foods used to hide medications, have been provided through years and it is not easy to identify all the protein sources to which the dog or cat has come in contact with. Moreover, although animal proteins are mostly suspected as allergens, a complete diet also contains vegetable proteins from grains, fibre sources or other plants, as well as flavouring factors whose potential in sensitizing the animal should not be underestimated.
Further, the labelling of regular maintenance pet food is not precise since the regulation on the placing on the market and use of feed states that “in the case of compound feed intended for non-food producing animals, the indication of the specific name of the feed material may be replaced by the name of the category to which the feed materials belong »*(*2). Concretely, meat protein sources are labelled as « animals products and by-products » or « meat and animal derivatives », which allow a wide variability in the pet food composition in term of ingredients choice. In a recent study comprising 17 leading dog and cat wet foods sold on the UK market, substantial levels of unspecified animal species were detected in 15 products tested (3). These findings clearly demonstrate the difficulty for the veterinarian in obtaining a precise feeding history.

Dietary management with commercial diets

Commercial specific purpose diets are more practical since they are balanced and complete and can be given on the long term. As lots of products are available, it is important for the vet to understand how to make the best choice for the patient. As the diet must not contain any of the ingredients mentioned by the owner in the feeding history, careful reading of the list of ingredients on the label is of utmost importance to avoid exposure to potential antigens. Although data vary across studies, conventional protein sources are known to be responsible for allergy, but not exclusively. Indeed, the list of published food allergens has been nearly the same for the last 30 years although protein sources have been changed in most foods after the BSE crisis; chicken replacing beef (4). Further, there are not enough published data about allergens since, in most cases, commercial foods are used in the feeding trial and if symptoms ameliorate most of the owners are not interested in the provocation trials, neither with the previous diet nor with the single ingredients. This would explain, at least in part, the lack of data about food allergens in dogs and cats.
Commercial foods dedicated to the treatment of AFR are « feedingstuffs for particular nutritional purpose » (5). In the case of food allergy, the particular nutritional purpose is « reduction of ingredients and nutrient intolerances ». Notwithstanding that, the labelling declarations concern only the animal protein source(s) and/or the carbohydrate source(s), moreover the content of essential fatty acids, total omega-6 and total omega-3, (if added) is often included in the chemical analysis. With the objective of reducing the possibility of nutrient intolerances, the regulation is therefore inadequate since all proteins sources, including plants proteins from dietary fibre or palatability factors, should be clearly labelled.
Historically, « novel proteins » in homemade diets, but also in commercial diets, have been first used to diagnose AFR. The problems with « novel proteins » are numerous: some of them are so widespread in regular pet foods for companion animals that they can no longer be considered as novel proteins (e.g. lamb, turkey, duck, fish); some of them are not sustainable sources (e.g.

venison) while others are very expensive or not ethical (e.g. salmon, kangaroo, horse). Surprisingly, in a recent study (6), the presence of ingredients not declared in the label was detected in 10 out of 11 commercial limited antigens diets designed for diagnosing canine ARF. In this study, authors concluded that feeding dogs commercial limited antigen diets may not prevent them from ingesting potential allergens, eventually leading the veterinarian to an undiagnosed ARF; moreover, authors suggested that the use of home-cooked diets should be considered whenever the dog fails to respond to dietary restriction.
For some years, hydrolysed protein sources have been developed (7). The first one –soy hydrolysate- was developed for infant nutrition and then has been used in animal nutrition. As soy does not meet all the essential amino acids requirements when used as unique protein source in the diet of carnivorous animals, methionine must be added to make it complete. Other hydrolysed protein sources have been developed from chicken and duck feathers but they are not systematically the unique protein source of the diet. In a double-blinded placebo-controlled study (8), 12 chicken sensitized dogs showed a significantly reduced clinical manifestation when fed a chicken hydrolysed diet. Nevertheless authors observed that dogs sensitized to the native protein may still react to the hydrolysed protein, and suggested that treated dogs should be carefully monitored.
Further, it is not known if novel/hydrolysed proteins work because they are less allergenic, more digestible or simply because there is a change of diet. Commercial diets used for the diagnosing of AFR usually contain a higher level of omega-3 fatty acids than regular maintenance foods (9) thanks to the inclusion of ingredients such as fish or linseed oil, which are known to decrease the inflammatory condition. This can mislead again the veterinarian in the correct diagnosis of AFR.

Dietary management with homemade diets
The customised homemade diet is based on the use of a “novel” protein and carbohydrate source. The traditional choice is a combination of horsemeat and potato. Horse and potato are scarcely used in pet food (3) and potato does not contain gluten that is the main protein of grains. The ratio between horse and potato must be adapted to the species; a higher ratio of protein/energy is recommended in the cat, compared to the dog. For example, 200 g of horsemeat and 1200 g of cooked potatoes contain 1000 kcal of Metabolizable Energy (ME) and 25 % of crude protein in dry matter (DM). This amount of food can be given to a 24 kg inactive (and/or neutered) adult dog for a limited time because it is not balanced (Ca/P = 0.2, essential fatty acids, minerals including trace elements and vitamins are lacking). The usual duration of the elimination diet is 8 to 12 weeks, but in most cases, in the dog, symptoms will ameliorate within 3 to 4 weeks. Then, a provocation test is made, using the previous diet. Signs can appear quite quickly if dogs are actually allergic to a diet component, sometimes within hours. Some owners do not accept the provocation test but the veterinarian should insist on it, as this is the only tool to make a definite diagnosis of AFR. Once the previous diet is shown to be responsible of the ARF, it is possible to test some ingredients separately to identify that/those triggering the reaction. Indeed, if the diet is a commercial maintenance dog or cat food, it will not be possible to test each ingredient because some of them may not be labelled (3) or may not be easily available on the market (e.g. beet pulp). If owners refuse the provocation test, there are 2 ways to feed the animals: 1) to balance the home-made elimination diet to provide it on a long term (and test new ingredients if the owner accepts it) or 2) to choose a commercial limited antigen or hydrolysed diet which may be able to control the symptoms on a long term. This choice will be done by trial and error, and this may take some time.
A canine balanced diet with horse meat and potatoes (in 1000 kcal ME) would contain: 180 g horsemeat, 1100 g of potatoes, 15 g of vegetable oil (or a mix of fish and vegetable oil) and 15 g of a mineral/vitamin mixture with Ca/P ratio = 2). Vegetables can also be added. Each new ingredient must be introduced alone for 2 weeks and only if it is well tolerated, a new ingredient can be tested again.
For a 4 kg neutered cat, an elimination diet should contain 70 g of horsemeat (or other low fat meat) and 210 g of cooked potatoes (corresponding to 200 kcal ME, 35 % of crude protein DM and 1,9 % dietary fibre DM). As in the dog, this diet is not balanced and therefore cannot be used for the long-term maintenance.

The use of BARF foods (bone and raw foods) is adopted by lots of clients nowadays. Although the use of raw diets has been claimed as a mean to avoid food sensitization and food allergy, there is no evidence-based data in pet nutrition. A BARF diet contains a lot of ingredients (10 to 20 a week) such as meat, bones, liver, bovine tripe, crude oil and dietary fibre sources as vegetables or fruits. For this reason they are not suitable as elimination diets, unless a single raw source of animal protein and a single source of vegetable are adopted. Commercial BARF foods – sold as mixed meat and chicken bones- are usually not complete (what most of owners ignore) and most BARF diets offered by owners to their dogs resulted to contain excesses or deficiencies of one or more nutrients (10). So, they are not recommended for long-term maintenance, unless under the strict supervision of a veterinarian nutritionist.
Veganism, a strictly plant-based diet, has become a more popular topic in recent years among dog and cat owners. Clients frequently cite ARF as an argument for feeding vegan diets. There is no scientific data supporting this hypothesis.
Beside the choice of the food, another element plays a pivotal role in making an elimination feeding trial effective: the owner's compliance, as he/she is recommended not to feed the dog or cat with anything but the prescribed diet for the 8-12 week period of trial. It means that practitioners have to precisely explain to the owners the goals of the elimination trial and the importance of respecting every step to obtain their compliance. Failure in the correct diagnosis of ARF is also due to the lack of understanding of the owner.

Conclusions

There is a need for the pet food industry to show greater transparency to customers in the disclosure of the animal proteins (sources and amount) included in their products, particularly in the "feedingstuffs for particular nutritional purpose".

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