

The importance of dietary control in skin and hair disorders in dogs

Adrian MACRI*, Lucy HURLEY, Sorana MATEI

University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca,
Str. Mănăştur no. 3-5, Cluj-Napoca, Romania,
Email: adimacri@yahoo.com

Abstract

The frequency of hair and skin disorders in dogs has increased in recent years. Diet has a role to play in dealing with these disorders. Several companies produce commercial diets to help treat these disorders. These disorders include Atopic dermatitis, Zinc responsive dermatosis, food allergy dermatitis and dandruff. For this study two different foods were used. These were premium original chicken and brown rice and Super premium anallergenic. They were fed to four dogs of different breeds. One dog which had dandruff was fed with premium original chicken and brown rice. The other three, which included dogs with pruritus, dandruff and food allergy dermatitis, were fed with superpremium anallergenic dog food. The results of the trial were as follows: the dog with dandruff, which was fed with premium dog food, showed no modifications during the trial period. In fact its condition remained the same. The dog with pruritus worsened during the trial period when it was fed with super-premium anallergenic dog food. The dog with dandruff fed with super-premium anallergenic did not show any modifications and its condition remained the same. The dog with food allergy dermatitis shows no modifications or lesions when fed with super-premium anallergenic dog food. Three of the four dogs were reluctant to eat the foods initially. The conclusion of the trial was the fact that the diets used were unable to illustrate improvement in two of the four dogs. The condition of one dog worsened during the period while the condition of the other one was managed when eating the food.

Key words: skin and hair disorders, commercial diets, food trial

Introduction

Skin and hair disorders are an important part of small animal practice. Bacterial infections, ectoparasitism, allergies, fungal infections and neoplasia are common problems. The skin and coat can be affected by many nutritional factors. Therefore, it is important to investigate these factors in patients with skin disorders. Changes in the skin which occur due to nutritional abnormalities include a dry dull coat with brittle hairs, slow hair growth, abnormal production of scales, crusts and erythema in areas of stretch such as the distal extremities (Hand et al., 2010). Dogs are prone to a large range of inflammatory skin diseases. These include allergic disorders, parasitic infestations, bacterial infections and adverse reactions to food.

Skin disorders, which result in inflammation, are associated with Immunoglobulin E (IgE) mediated type one hypersensitivity responses. These respond to changes in dietary fatty acid concentrations. They manifest in the form of atopic dermatitis, flea bite hypersensitivity and food hypersensitivity. Atopic dermatitis is the most commonly diagnosed skin allergy in dogs. The dogs are sensitive to dust mites, moulds, weeds, grasses and trees. A high number of dogs are also affected by an adverse food reaction (Halliwell et al., 2009). When diagnosing a skin allergy, one must always consider the presence of both adverse food reaction and atopy.

Atopic dermatosis results in pruritus, self trauma at the level of the skin, yeast infection or secondary bacterial infection. Chronic otitis externa may also be observed, when diagnosing this condition the history and clinical signs need to be carefully observed. Some breeds are more predisposed than others e.g. Chinese Shar Peis, Irish setters, Dalmations, Labrador Retrievers, several terriers and toy breeds. Clinical signs begin when the dog is exposed to IGE sensitive mast cells which degranulate and release a host inflammatory response. This occurs after exposure to the offending antigen. The inflammatory mediators include histamine, heparin, proteolytic enzymes, chemotactic factors and various types of eicosanoids (Case et al., 2011).

Fatty acid supplementation is recommended in the management of inflammatory skin disease in dogs. Omega three fatty acids used in supplement include polyunsaturated fatty acids, eicopentaenoic acid and docosahexaenoic acid found in fish oil. The omega-six fatty linoleic acid is needed for normal epidermal lipid barrier function (Lloyd et al., 1989). This supplementation has had varying effects when used to manage pruritus and inflammatory responses associated with atopic dermatitis. A small proportion of allergic dogs do not need to be treated with other therapies when a fatty acid supplement is given. Others will not respond which may be due to the fact that different agents induce inflammation and pruritus (Ellis, 2008).

When changing the levels of fatty acids in the diet to control inflammatory disease one needs to ensure that the optimal levels of linoleic acid are supplied to meet essential dietary requirements and to reduce the fatty acid metabolic profile. By controlling the ratio of omega-six and omega-three acids pruritus and tissue eicosanoid profiles reduce in some allergic pets. This may help in controlling atopic dermatitis. New evidence suggests that increasing the polyunsaturated fatty acids in the diet may improve the epidermal barrier in the skin and have a positive effect on the immune system by regulating transcription or transduction (Fuhrmann et al., 2006).

When a dog illustrates signs of an inflammatory dermatological disease as the result of an adverse reaction to ingredients within its diet, it is known as a cutaneous adverse food reaction. This may occur due to a food hypersensitivity, an intolerance to food or an adverse metabolic reaction. A reaction may be non-immune mediated or immune mediated. An immune mediated reaction is caused by a dietary hypersensitivity to several or one components within the diet. Intolerance to food is an abnormal physiological response to a food ingredient which is not mediated by the immune. These can occur due to a food toxicity, a pharmacological reaction to dietary ingredients and a lack of lactose within the intestine. Incidence of occurrence can be seen at any age however the initial signs are usually seen in dogs under one. They can be seen all year round and are not always linked to a recent dietary change. There is no sex or age predilection (Hillier and Griffin, 2001).

The major allergens identified in dogs are proteins with a large molecular weight. In dogs beef, soy and dairy products are the most common food allergens. They also develop reactions to wheat, pork, chicken, corn, horse meat, eggs and fish. These ingredients are common allergens as they are used frequently in pet foods. Therefore there is an increased likelihood of exposure. Clinical signs in the case of an adverse reaction usually manifest as pruritus, which occurs four to twenty four hours after ingestion of the offending antigen. Secondary lesions occur due to intense scratching, biting and self-trauma. Secondary bacterial infections may also occur. A minority of cases presented with a recurrent pyoderma not associated with pruritus. Some dogs may present with gastrointestinal signs including diarrhoea and vomiting.

Three types of elimination diet can be used: a homemade diet, a commercial limited ingredient food or a commercial hydrolysed protein food. A homemade diet should contain one source of protein and carbohydrate. Common protein sources are lamb, rabbit, venison or tofu. Potatoes and rice are the source of carbohydrates. This diet can be expensive and time consuming. It is not nutritionally balanced and should not be given beyond the period required for diagnosis. Commercial limited ingredient foods contain one source of carbohydrate and one source of protein. They can be used during the diagnostic phase and long term feeding. One needs to be aware that not all of the products have been carefully tested as elimination diets. Different sources of protein are used in different products therefore it needs to be selected carefully using the history as a guide. They are used if the dog is too big to make a homemade diet or if the owner does not want to make one. Commercial hydrolysed protein foods are those which contain protein that has undergone hydrolysis to reduce its size and eliminate antigenicity. Chicken, soy and liver are most commonly

used. These diets are complete and can be used for long term feeding in dogs with adverse food reactions (Cave, 2006; Loeffler et al., 2004).

Feeding the elimination diet should be done gradually over a three to four day period. No scraps or treats should be given. Improvements may be seen within a few weeks while others may need to be on it for a six to ten week period. If pruritus does not decrease during the elimination phase then either food allergy is not diagnosed or the diet still contains an offending allergen. Long term-management is achieved by feeding a complete balanced palatable diet without offending antigens. The protein content should be digestible and of a high quality. A reduced omega six omega three fatty acid ratio needs to be used to reduce pruritus. Strict compliance is essential to prevent relapse (Rosser, 1993).

Material and methods

This study investigated the role played by diet in managing skin and hair disorders in four dogs and to see the efficacy of super-premium anallergenic dog food and premium original chicken and brown rice dog food when dealing with these disorders. The trial period was from April to June 2016.

The first case was that of a 5-year-old male dog, weighing 15 kg, which suffered from dandruff for the last five years. His condition improved when washed with aloe vera shampoo. However, it recurred again within a few days. This dog was fed with premium original chicken and rice during the trial period and with super-premium light weight care before the trial period.

The second case was that of a 5-year-old female dog, weighing 30 kg, which suffered from pruritus since she was one. She scratched herself after eating cheese, pork, and food containing eggs and milk. This dog was on a super-premium skin food sensitivity z/d dog food but unfortunately it did not help her, so she was put on a premium food which contains lamb and rice. During the trial period the dog was fed with super-premium anallergenic dog food.

The third case was that of a 6-year-old female Pit Bull Terrier Cross weighing 26.5 kg, which suffered from dandruff since she was four months old. It was diagnosed when she was two years old. This dog scratched herself after eating fresh chicken. She was previously fed with a premium food which contains lamb and rice. She was fed with premium salmon and rice before the trial period. During the trial period she was fed with super-premium anallergenic dog food.

The last case was that of a 6-year-old male Labrador weighing 30 kg, which started licking his paws and had hot spots present on his ears in 2012. He was diagnosed with food allergy dermatitis and he was placed on a super-premium anallergenic dog food. The owner changed his diet after a year to premium trainer wet and dry food and his condition flared up again. He also developed urinary calculi. The owner then put the dog back on the super-premium anallergenic food he was fed with during the trial period.

Super-premium anallergenic food is recommended to decrease intolerance to nutrients and ingredients. It contains hydrolysed protein and purified carbohydrates. The benefits are the fact that it contains oligopeptides of a low molecular weight which reduce the risk of an allergic food reaction. It supports the skin barrier, restricts allergens and contains antioxidants to help neutralise free radicals.

Premium original chicken and brown rice is a hypo-allergenic food produced by a veterinary surgeon in Wales. It does not contain added beef, dairy or wheat. It is suitable for sensitive skin and digestion. It is highly digestible as it uses natural ingredients such as whole grains and animal proteins. It has no artificial colours or preservatives which are known to cause food intolerance including itchy skin, digestive upset, excessive moulting, full anal glands and waxy ears.

Results and discussion

Each of the dogs had a clinical examination before the trial began. On being closely examined, case number one showed evident dandruff and no other lesions or modifications were present. When case number two was examined it was evident that she suffered from pruritus and areas of hair loss were visible on her hind legs and around her anus. During examination the dandruff of case number three was very evident on her back but no other modifications were seen. When case number four was examined the only sign of his past condition was a small lesion on his front right paw no other lesions or modifications were present.

During the trial period one dog was fed with premium original chicken and brown rice while the other three were fed with super-premium anallergenic. We noticed that case number 1, case number 2 and case number 3 were reluctant to eat the foods at the beginning of the trial. This led us to believe that they did not find these foods very palatable. However case number 4 illustrated no reluctance in eating this food. The animals were observed very closely during the period to see if any modifications were observed. Case number 1 showed no modifications during the trial period. In fact, his condition remained the same when he received premium chicken and brown rice dog food. Case number 2 scratched more during the trial period and a new lesion was observed on her hind right limb when she received super-premium anallergenic dog food. Case number 3 showed no modifications during the period and her condition remained the same when she received super-premium anallergenic dog food. Case number four suffered from hot spots in 2012 and was diagnosed with food allergy dermatitis. He had been fed with super-premium anallergenic dog food since 2013 and he had the sign of an old lesion on his front right paw. When this dog was fed this food he did not suffer from any modifications.

This trial showed a mixture of results as some conditions remain the same while others improved or worsened.

Similar results were observed when a trial was carried out in 2004 on 60 dogs which were fed with a soy hydrolysate and rice based elimination diet.

These dogs also had skin conditions which included localized or generalized pruritus, erythema, self trauma, seborrhea and recurrent pyoderma and/or Malassezia dermatitis as well as otitis. 58 dogs finished the trial. 36 improved during the period but their conditions recurred when the original diets were fed. 20 dogs out of the 36 were diagnosed with an uncomplicated adverse food reaction.

Their clinical signs were either completely regress or were very mild during the trial period. 2 of these 20 dogs did not respond to a soy hydrolysate based diet but did to a soy based home made diet and to rice and rabbit commercially available elimination diets. The remaining 16 dogs improved during the trial period. Their clinical signs remained mild to moderate and the pruritic score was reduced. 22 dogs did not improve when fed the test diet and no improvement in clinical signs or pruritic score were observed. They were diagnosed with atopic dermatitis and did not respond to other elimination diet either (Biourge et al., 2004).

Conclusions

One major finding of the trial was that the commercial diets used were unable to illustrate signs of improvement in three out of four cases.

Moreover, due to the fact that a small number of dogs participated in this trial, it is difficult to assess the efficacy of the diets used.

Furthermore, it was noticed that diet alone cannot treat all dermatological problems. However, if a dog finds a diet which manages its condition, it should not be changed except deemed absolutely necessary. Last but not least, if the animal reacts negatively to any food in their diet, it needs to be eliminated from it.

Bibliography

1. BIOURGE C., FONTAINE AND MARGREET VROOM, 2004, Diagnosis of Adverse Reactions to Food in Dogs: Efficacy of a soy isolate hydrolysate based diet, *The Journal of Nutrition*, vol. 134, no 8, 2s-264s
2. CASE LINDA, DARISTOTLE LEIGHANN, HAYEK MICHAEL, RAASCH MELODY, 2011, *Canine and Feline Nutrition*, Mobsy Elsevier, 3-43,381-402 .
3. CAVE N.J., 2006, Hydrolysed protein diets for dogs and cats, *Vet. Clin. Small Anim. Pract.*, 36:1251-1268
4. ELLIS C.J., 2008, Food allergy, atopic dermatitis, or could it be both?, *Vet Forum*, 25:15-19
5. FUHRMANN H., ZIMMERMANN A., GUCK T., OECHTERING G., 2006, Erythrocyte and plasma fatty acid patterns in dogs with atopic dermatitis and healthy dogs in the same household, *Can J. Vet Res*, 70:191-196
6. HALLIWELL R.E.W., 2009, Allergic skin diseases in dogs and cats: an introduction, *Ejcap-journal*, vol. 19, issue 3 december, 209-211
7. HAND M. S., CRAIG T., REBECCA REMILLARD, ROUDEBUSH P., NOVOTNY B., 2010, *Small Animal Clinical Nutrition*, 5th edition Mark Moris Institute
8. HILLIER A., GRIFFIN C.E., 2001, The ACVD task force on canine atopic dermatitis (X): is there a relationship between canine atopic dermatitis and cutaneous adverse food reactions?, *Vet. Immunol. Immunopathol.*, 81:227-231
9. LLOYD D.H., 1989, Essential fatty acids and skin disease, *Journal of small animal practice*, issue 30, 207-212
10. LOEFFLER A., LLOYD D.H., BOND R. AND OTHERS, 2004, Dietary trials with a commercial chicken hydrolysate diet in 62 pruritic dogs, *Vet. Rec.*, 154:519-522
11. ROSSER E.J., 1993, Diagnosis of food allergy in dogs, *J. Am. Vet. Med. Assoc.*, 203:259-262