

EVALUATION OF A DIET WITH A NON-CONVENTIONAL SOURCE OF PROTEIN (RABBIT) AND CARBOHYDRATE (CASSAVA) IN ANIMALS WITH ADVERSE FOOD REACTION

EVALUACIÓN DE UNA DIETA CON UNA FUENTE DE PROTEÍNA NO CONVENCIONAL (CONEJO) Y CARBOHIDRATOS (MANDIOCA) EN ANIMALES CON REACCIÓN ADVERSA A LOS ALIMENTOS

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ABSTRACT

The diagnosis of adverse food reaction (AFR) is based on an eight week elimination diet and is confirmed by relapse upon re-challenge with the previously fed diet. Home-cooked diets have been reported to be superior for the diagnosis of AFR, however, such diets are labour-intensive for owners and ingredients novel to the dog may not be readily available. The objective of this article was to evaluate the performance of a diet with a non-conventional source of protein (rabbit) and carbohydrate (cassava) in animals with AFR. Thirty nonseasonally pruritic dogs were recruited from a referral clinic and included whenever they showed clinical signs compatible with Canine Atopic Dermatitis (cAD). Pruritus was assessed with a Visual Analog Scale (VAS), lesions with the Canine Atopic Dermatitis Extent and Severity Index (CADESI-4) and quality of life with a validated questionnaire on days 0, 30 and 60. In case of bacterial or yeast infection, only topical therapy with ointments, creams and shampoos was applied. Any concomitant drug was not permitted during the food trial. Dogs showing at least 50% pruritus improvement were re-challenged with their prior diet. Thirty dogs completed the elimination diet. Of these, 22 did not improve whereas 8 were considered to have improved by VAS, CADESI-4 and the validated guestionnaire. These 8 dogs underwent dietary challenges. All these 8 dogs reacted to their prior diets and were diagnosed with AFR. The non-conventional source of protein (rabbit) and carbohydrate (cassava) (ElevenChimps; São Paulo, Brazil) diet seemed to be a good option of elimination diet for identification of dogs with AFR.

Keywords: Adverse food reaction, atopic dermatitis, food trial, home cooked diet

RESUMEN

El diagnóstico de reacción adversa a los alimentos (RAA) se basa en una dieta de eliminación de ocho semanas y se confirma por recaida al volver a desafiar con la dieta utilizada previamente. Se ha informado que las dietas caseras son superiores para el diagnóstico de RAA, sin embargo, tales dietas requieren mucho trabajo para los propietarios y los ingredientes nuevos para el perro pueden no estar disponibles fácilmente. El objetivo de este artículo fue evaluar el rendimiento de una dieta con una fuente no convencional de proteínas (conejo) y carbohidratos (mandioca) en animales con RAA. Se reclutaron treinta perros pruríticos no estacionales de una clínica de referencia y se incluyeron cuando mostraban signos clínicos compatibles con Dermatitis Atópica Canina (DAC). El prurito se evaluó con una escala analógica visual (EAV), las lesiones con el índice de severidad y extensión de lesiones en dermatitis atópica canina (CADESI-4) y la calidad de vida con un cuestionario validado los días 0, 30 y 60. En caso de infección bacteriana o por levaduras, se implementó solo terapia tópica con ungüentos, cremas y champús. No se permitió ningún medicamento concomitante durante el ensayo de alimentos. Los perros que mostraron al menos un 50% de mejora del prurito fueron retados con su dieta previa. 30 perros completaron la dieta de eliminación. De estos, 22 no mejoraron, mientras que 8 mostraron mejoría a través de la EAV, el CADESI-4 y el cuestionario validado. Estos 8 perros fueron sometidos a desafíos dietéticos. Estos 8 perros reaccionaron a sus dietas anteriores y fueron diagnosticados con RAA. La fuente no convencional de dieta de proteínas (conejo) y carbohidratos (mandioca) (ElevenChimps) fue una buena opción de dieta de eliminación para la identificación de perros con RAA.

Palabras clave: reacción adversa a los alimentos, dermatitis atópica, prueba dietética, dieta casera

INTRODUCTION

Adverse food reactions (AFR) are well recognized as differential diagnosis for nonseasonal pruritic skin and ear diseases in dogs. Gastrointestinal signs, respiratory and neurological problems have also been attributed to AFR (1). These reactions are thought to include immune-mediated (food allergies) and nonimmune-mediated (food intolerances or nonallergic food hypersensitivities) pathomechanisms (2, 3) although this differentiation is rarely made in veterinary clinical practice (1). Food allergy is a relatively common canine skin disease. Its prevalence is estimated to be about 5% of all skin diseases and ≤ 25% of allergic skin conditions in dogs and cats (4). The most common dermatological sign of AFR is nonseasonal pruritus mainly affecting ventral areas, face, extremities and ears, mimicking the pruritus pattern of canine atopic dermatitis (cAD) (5, 6). The differentiation between AFR and cAD relies on the administration of an elimination diet for at least eight weeks (4). A food trial is the most important diagnostic tool in dogs and cats with suspected AFR (7). The first step is the introduction of an elimination diet, followed by challenging the patient's former food. In dogs and cats, as in humans, the diagnosis of AFR relies on the recurrence of clinical signs after

provocation with causative food ingredients (8). Removal of the previous diet and introduction of a novel protein "hypoallergenic" diet is advised by many authors (8,9). The choice of a test diet requires careful consideration of the diets previously fed, its palatability, and the owner's circumstances. Test diets can either be home cooked or commercially prepared, and both may typically contain a single source of protein and a single source of carbohydrate (10). In some studies, home-cooked diets have been reported to be superior for the diagnosis of AFR (10, 11, 12). However, such diets are labour-intensive for owners, ingredients novel to the dog may not be readily available (1) and ingredients cross-reactivity has been a big concern (13).

The aim of the present study was to evaluate the performance of a diet with a non-conventional source of protein (rabbit) and carbohydrate (cassava) (*ElevenChimps; São Paulo, Brazil*) in animals with AFR. ElevenChimps works with fresh food meals ready to serve for dogs. We hypothesized that this diet would be well tolerated by dogs, very practical for owner's and a good option of food for an elimination diet.

MATERIALS AND METHODS

Thirty nonseasonally pruritic dogs were recruited from a referral clinic and included whenever they showed clinical signs compatible with cAD.

All the animals had a previously preventive measures effective against fleas, ticks or *Sarcoptes scabiei*. All dogs underwent a dermatological examination, including (when necessary) hair plucks, skin scrapings and a cytological evaluation for bacterial and/or yeast infections.

After inclusion, owners were instructed to feed exclusively with the ElevenChimps homemade meal with rabbit protein and cassava for at least eight weeks. ElevenChimps (rabbit and cassava) is a fresh food ready to serve composed by cassava, rabbit, sunflower oil, escarole, pumpkin, fish oil, salt, vitamin and mineral supplementation with custom portions.

In case of bacterial or yeast infection, only topical therapy with ointments, creams and sham-

poos was applied. Any concomitant drug, with the exception of ectoparasiticides, was not permitted during the food trial.

Canine Atopic Dermatitis Extent and Severity Index (CADESI-4) scores (14) were used by the clinicians to assess dermatitis and physical examinations were performed on days 0, 30 and 60. Dog owners assessed visual analog scale (VAS) (15) scores of pruritus and they were asked to complete a questionnaire to evaluate food acceptance (QoL) and the control of the skin lesions on days 0, 30 and 60.

After sixty days of elimination diet, dog's owners were instructed to perform a diet provocation test to confirm the diagnosis of AFR. In case of relapse with the prior diet, followed by a new improvement with the elimination diet, the dogs were identified with AFR.

STATISTICAL ANALYSIS

Friedman's non-parametric test and non-parametric Mann-Whitney test was used for CADESI-4, pVAS and QoL scores, whereas Fisher's test was used for sex, gender, breed and age.

RESULTS

Thirty dogs completed the eight week trial with a non-conventional source of protein (rabbit) and carbohydrate (cassava).

Twenty five (84%) were pure bred and five (16%) were crossbred. The breeds most commonly listed were shih tzu (20%), lhasa apso (16%) e dachshund (16%). Five (17%) dogs were less than one year old, others 16 (53%) were from 2 through 7 years old and 9 (30%) dogs were over 8 years old. There were 14 (47%) males and 16 (53%) females.

Pruritus was the only symptom in 22 (73%) dogs, 6 (20%) animals were presented with pruritus and dermatological signs (erythema, excoriation and hypotrichosis) and 2 (7%) animals were presented with only skin lesions at the beginning of the trial. The pruritus observed at presentation were widespread and generalized in 7 (14%) of the dogs. In 13 (26%) animals, pruritus were observed in the face, 16 (32%) in the paws, and in 14 (28%) of the dogs it were more localized on the dorsal area.

Of these 30 dogs enrolled, 22 did not improve whereas 8 were considered to have improved. These 8 dogs were submitted a diet provocation test to confirm the identification of AFR. There were no statistically significant difference with respect to sex, breed, age and gender between the dogs that responded to the food trial to the dogs that did not respond.

Concurrent gastrointestinal signs such as soft feces, diarrhea and vomiting were reported in 4 of

the dogs during the food trial. Two developed vomiting and two dogs developed vomiting and diarrhea during the elimination diet.

The eight dogs that were considered to have improved had a range of pruritic score by VAS of 8,6 at the beginning of the trial. The pruritus range was reduced to a score of 1.1 or less, sixty days later of the beginning with only changes in diet and subsequently required no other therapy. The reduced in pruritus was statistically different (p<0,001).

Through the non-parametric Mann-Whitney test we observed that all the animals did not showed statistically difference by VAS (p=0,359) at the first appointment. Nonetheless, the 22 animals that did not improved after the trial, had significantly higher VAS (p<0,001) than the ones that improved (8 animals) at 60 days.

In those 8 animals that improved, the CA-DESI-4 score decreased from 4 to 0 at the second re-check (60 days later) and it were statistically different (p=0,048).

Through the non-parametric Mann-Whitney test we observed that all the animals did not showed statistically difference by CADESI-4 (p = 0.069) at the first appointment. Nonetheless, the 22 animals that did not improved after the trial, had significantly higher CADESI-4 than the ones that improved (8 animals) at 30 (p = 0.008) and 60 (p = 0.019) days.

DISCUSSION

To the best of the authors' knowledge, this is the first study to evaluate a non-conventional source of protein (rabbit) and carbohydrate (cassava) (ElevenChimps) as an elimination diet.

The diagnosis of a cutaneous AFR alone in 8 (27%) of the 30 dogs that completed the dietary trial is in broad agreement with earlier work: Chesney (2002) reported the condition in 30.6% of 62 referred cases fed exclusively on a home-cooked diet; Denis and Paradis (1994) 17.9%. More recently, AFR is described in 20–35% of dogs with nonseasonal pruritus as the sole cause for skin disease (1, 6).

Clinical signs in dogs with AFR were consistent with those described in the literature and it was also indistinguishable from those described for cAD (1, 18). AFR are relatively common causes of nonseasonal pruritus with or without accompanying skin lesions (7, 18). Pruritus can be either generalized or limited to face, ears, paws, axillae, inguinal or perineal region (7). In the present study, 28% of the dogs had pruritus on the dorsal area, that's an unusually region described for AFR and cAD.

Gastrointestinal signs associated with Eleven-Chimps (rabbit) were limited to vomiting, and diarrhea and vomiting in four dogs (13% of the dogs). These percentage of the dogs that developed gastrointestinal signs was very similar to what was described previous, in which constipation, soft faeces or diarrhea were observed in 10% of dogs that completed the food trial (10).

Removal of the previous diet and introduction of a novel protein "hypoallergenic" diet is advised by many authors (7, 18, 19). Yet, the concept of such a diet is not entirely correct: a "hypoallergenic" diet does not really exist (7, 20). Food itself is antigenic (foreign to the body, capable of binding to specific antibodies) and the treatment of an allergy for a certain component consists of switching it to an alternative with a different set of antigens (7). A concern about changing of the previous diet and introduction of a novel one is because some dogs are multisensitive, either from co-sensitization or cross-reactivity. The likelihood of cross-reactivity is increased amongst closely related foods, particularly if amino acid sequence homology is greater than 70% (13, 21). Beef, lamb and cow's milk 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-reactivity (13). Until now, there are no study showing cross-reactivity with rabbit and cassava.

Due to different commercial foods based on lamb and rice and the increased risk of cross-reactivity, the traditional elimination diet based on these components is not more recommended. A diet can only be "hypoallergenic" if the animal was never exposed to the food components before (7).Therefore, ElevenChimps (rabbit and cassava) can be considered a useful option for the diagnosis of AFR in dogs because it is an "exotic" source of protein and carbohydrate; rarely a dog has a previous contact with these ingredients. An "exotic" source of protein is essential for a good elimination diet and finding a diet with "novel" ingredients, be it homecooked or commercially available, is becoming increasingly challenging (22).

Furthermore, ElevenChimps works with fresh food meals ready to serve for dogs, and because of this, it demonstrated good palatability (all the dogs tolerated very well). The palatability is a concern of the hydrolysed or ultrahydrolysed commercial diets because of their bitter taste and high osmolarity (7).

One disadvantageous of a homemade diet preparation is that can be expensive (especially in large breeds) and time consuming; otherwise ElevenChimps (rabbit and cassava) is ease of use (ready to serve) with reasonable cost compared with hydrolysed or ultrahydrolysed commercial diets.

Moreover, one of the symptoms of AFR described in literature is early development of pruritus (less than one year old) (6, 7) and the commercially available hydrolysed diet are most indicated for dogs with more than one year old. In the present study, 17% of the dogs were less than one year old and even on these youngsters, we could begin the food trial.

Unfortunately, this study was not controlled with another elimination diet, causing not to be possible to know the true false-negative response rate (dogs with AFR that failed to respond to this diet trial and a possible cross-reactivity to any ingredients). In cases where a first food trial fails, it may be advisable to undergo a second trial with another diet, which contains completely different ingredients. In a previous study, 10% of dogs needed a second elimination trial for the confirmation of AFR (6,23).

Most importantly though, dropout rates indicate that about 20% of dogs with a potential diagnosis of AFR are not properly evaluated, mainly due to a lack of owners' compliance. While reliable diagnostic alternatives are awaited, this emphasizes the need for detailed client education and the optimal choice of diet (1) and ElevenChimps (rabbit and cassava) demonstrated that it can be considered a useful option for a food trial.

CONCLUSION

The non-conventional source of protein (rabbit) and carbohydrate (cassava) (ElevenChimps) diet seemed to be a good option of elimination diet for identification of dogs with AFR.

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