

Preliminary evaluation of two bathing methods for the management of *Malassezia* overgrowth in dogs with atopic dermatitis

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Background – Antifungal shampoos are widely used for canine *Malassezia* dermatitis. Few studies have evaluated effective bathing methods for atopic dogs with *Malassezia* overgrowth.

Objectives – To evaluate the efficacy of an emollient bathing product (AFLOAT VET) and 2% miconazole/2% chlorhexidine shampoo (2% MIC/CHX) in atopic dogs, and to evaluate the influence on skin barrier function of both products in healthy dogs.

Animals – Sixteen atopic dogs with secondary *Malassezia* overgrowth and 11 healthy dogs.

Methods and materials – This study was a randomized, single-blinded trial. The dogs were randomly treated with either emollient bathing or 2% MIC/CHX, twice weekly for four weeks. Clinical assessment used the Canine Atopic Dermatitis Extent and Severity Index, 4th iteration (CADESI-04), pruritus Visual Analog Scale (pVAS), and cytological evaluation of yeast numbers at Day (D)0, D14 and D28. Skin barrier function was determined by measuring transepidermal water loss (TEWL) after a single bathing procedure with each product in the healthy dogs.

Results – The pVAS scores and yeast counts were significantly reduced on D28 compared with D0 in both groups ($P < 0.05$). CADESI-04 was significantly decreased on D28 in the emollient bathing group ($P = 0.003$). There were no significant differences in each endpoint score between the groups. In healthy dogs, TEWL was significantly increased after bathing in both groups ($P < 0.01$).

Conclusion – An emollient bathing product can be effective for *Malassezia* overgrowth in dogs with atopic dermatitis. Bathing with shampoo products might affect skin barrier function even when using an emollient product.

Introduction

Malassezia pachydermatis is a common commensal organism of the cutaneous and mucosal microflora in dogs.¹ Primary diseases that cause increased moisture, altered surface lipids and/or disruption of the stratum corneum (SC) barrier function, or aberrant immune responses may encourage overgrowth of *Malassezia* yeast.^{1,2} Canine atopic dermatitis (cAD) is a chronic pruritic skin disorder associated with genetic abnormalities, an altered immune system with cutaneous inflammation, and a skin barrier impairment.³ *Malassezia* skin infections are common in cAD;⁴ a previous study revealed that *Malassezia* overgrowth was recognized in 33% of cAD cases.⁵

In order to control *Malassezia* overgrowth in dogs, topical treatments including shampooing with antiseptic or antifungal products commonly are used. Two randomized controlled trials revealed that shampooing every third day or twice weekly with 2% miconazole/2% chlorhexidine

(2% MIC/CHX) showed a good-to-excellent clinical response without adverse events in dogs with *Malassezia* dermatitis.^{6,7} However, one of these studies evaluated only basset hounds,⁶ and the other study enrolled both allergic and nonallergic dogs with *Malassezia* dermatitis.⁷ Adverse effects of 2% MIC/CHX shampoo were recorded only with physical or macroscopic examinations in previous reports.^{6–8}

The treatment guidelines for cAD, introduced by the International Committee on Allergic Diseases of Animals (ICADA), recommend bathing at least once weekly with an emollient shampoo and post-bathing topical moisturizer for improvement of skin hygiene.⁹ However, the ICADA guidelines also recommend that the use of antiseptic products should be dependent on the skin condition in each case.⁹ To the best of the authors' knowledge, there have been few reports evaluating bathing methods for *Malassezia* overgrowth in atopic dogs. Recently, a new emollient bathing product (AFLOAT VET, QIX Co. Ltd; Tokyo, Japan) has become available in Japan consisting of three components: cleansing oils (jojoba oil, sorbet-tetraoleate, ethylhexyl palmitate and an astaxanthin analogue), an emollient shampoo (amino-acid type surfactant, Yuzu ceramide, and lavender and rosemary oils) and a topical moisturizer (ceramide complex, fullerene, sodium dilauryldimethylammonium phosphate, polyquaternium-51).

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Conflicts of Interest: No conflicts of interest have been declared.

The objectives of this preliminary study were to evaluate the clinical efficacy of 2% MIC/CHX shampoo and the three-part emollient bathing product (AFLOAT VET) in atopic dogs with *Malassezia* overgrowth, and to evaluate the influence that each product had on the skin barrier function in healthy dogs.

Methods and materials

The protocol was reviewed by and approved before study initiation by the sponsor's ethical review board (QIX Corporation, Tokyo, Japan). The owners gave written informed consent for each dog to participate in the study.

The procedure for diagnosing cAD was based on published guidelines,¹⁰ including history, clinical presentation, exclusion of ectoparasitic diseases, bacterial infections and dermatophytosis, and an eight-week elimination diet trial with a novel protein food product. The inclusion criterion was the presence of generalized dermatitis associated with cytological detection of a total of ≥ 45 *Malassezia* yeasts in 15 oil immersion fields ($\times 1,000$ magnification) at three selected lesional areas (inguinal, axillae and interdigital areas). No systematic or topical antifungal or antiseptic treatment was permitted for one month before or during the trial period. If dogs had been treated with anti-inflammatory or antipruritic medications for atopic dermatitis for over three months before enrolment, these medications were permitted to continue at the same dosage and frequency throughout the whole trial.

All dogs that fulfilled the inclusion criteria were randomly allocated to receive either emollient bathing with AFLOAT VET or antiseptic/antifungal bathing with 2% MIC/CHX shampoo (Malaseb, Kirikan Ltd; Tokyo, Japan) in a 1:1 ratio. Dogs were sequentially allocated to treatment groups A, B, C or D according to a computer-generated random sequence established before the trial; there were two groups each for AFLOAT VET and 2% MIC/CHX shampoo.

In the AFLOAT VET groups, the bathing procedure was performed as follows: (i) 5 min application of the cleansing oils (50 mL/m² of body surface), (ii) rinsing with 37°C tap water, (iii) 5 min application of the emollient shampoo (80 mL/m² of body surface), (iv) rinsing with 37°C tap water, (v) 5 min application of diluted moisturizer (15 mL moisturizer to 2 L tap water) to the whole body surface, and (vi) drying with a towel.

In the 2% MIC/CHX shampoo group, the bathing procedure was performed as follows: (i) rinsing with 37°C tap water, (ii) 10 min application of the shampoo product (50 mL/m² of body surface), (iii) rinsing with 37°C tap water, and (iv) drying with a towel.

All of the owners were educated about the bathing procedures by practical demonstration videos and written instructions. Bathing procedures were performed twice a week (on Sunday and Tuesday or Wednesday) for four weeks. The bathing procedure before each recheck was conducted three days before the assessment.

Cytological evaluation of yeast count was evaluated by a veterinarian, who was blinded to the treatment allocation, on Day (D)0, D14 and D28. The cytological samples for evaluation were obtained with acetate tape from three selected lesional areas (inguinal, axillae and interdigital areas) at each visit and then stained with modified Wright–Giemsa stain (Diff-Quik, Sysmex Corp.; Hyogo, Japan) without using fixative. Mean yeast counts were performed on a total of 15 high power oil immersion fields from the three lesional areas. The severity of skin lesions was evaluated according to the Canine Atopic Dermatitis Extent and Severity Index, 4th iteration (CADESI-04),¹¹ and pruritus was assessed by the dog owner, using a pruritus Visual Analog Scale (pVAS).^{12,13} The investigators evaluating clinical scores also were blinded to treatment allocation.

Evaluation of the impact of bathing on the skin barrier function in healthy dogs

Eleven pure-bred healthy dogs with no history of dermatological clinical signs were included in this trial. The emollient bathing product (AFLOAT VET) was applied to one side of the abdominal skin, and the 2% MIC/CHX shampoo (Malaseb) was applied to the other side. After a single bathing procedure, the dogs were dried with towels and kept in the same room for ≥ 30 min. Before and after bathing, transepidermal water loss (TEWL) values were evaluated on the abdominal skin three times with a hand-held open chamber device (VAPOSCAN, Asahi-Techno Co. Ltd; Tokyo, Japan), and the average was calculated. During the measurement, the room was maintained at approximately 22–25°C and 50–60% relative humidity. The investigator evaluating TEWL was blinded to bathing allocation.

Statistical analysis

The CADESI-04, pVAS, yeast counts and TEWL values of the two groups before and after bathing were analysed with paired *t*-test, and intergroup differences were analysed with Student's *t*-test. All statistical analyses were carried out with STATVIEW software v5.0 (HULINKS, Inc.; Tokyo, Japan). A *P*-value of <0.05 was considered statistically significant.

Results

Sixteen dogs with chronic atopic dermatitis (10 male, six female) with secondary *Malassezia* overgrowth were

Table 1. Details of the atopic dogs enrolled in the trial

Case no.	Breed	Sex	Age(years)	Concurrent maintenance therapy
Emollient bathing group				
1	Mongrel	ME	4	None
2	Shih tzu	FE	6	None
3	Mongrel	ME	4	None
4	Shih tzu	ME	9	None
5	Toy poodle	FN	12	None
6	Toy poodle	FN	8	Oclacitinib, 0.4 mg/kg p.o., once daily
7	Shih tzu	ME	11	Oclacitinib, 0.5 mg/kg p.o., once daily
8	American cocker spaniel	FE	8	Prednisolone, 0.5 mg/kg p.o., twice weekly
2% MIC/CHX group				
1	Toy poodle	ME	7	Oclacitinib, 0.4 mg/kg p.o., once daily
2	Mixed breed	FE	10	Oclacitinib, 0.5 mg/kg p.o., once daily
3	Miniature schnauzer	ME	5	None
4	Toy poodle	ME	1	None
5	Toy poodle	FN	8	Ciclosporin, 5 mg/kg p.o., every three days
6	Shetland sheepdog	FN	10	None
7	Golden retriever	ME	4	None
8	Toy poodle	FE	6	Oclacitinib, 0.4 mg/kg p.o., once daily

FE female entire, FN female neutered, ME male entire, MIC/CHX miconazole/chlorhexidine, MN male neutered, p.o. per os.

recruited from seven animal clinics in Japan (Table 1). Each bathing group had eight atopic dogs and all 16 completed this trial. The mean age of dogs was 7.8 years (range 4–12 years) in the emollient bathing group and 6.4 years (range 1–10 years) in the 2% MIC/CHX group. The mean body weight of dogs was 7.3 kg (range 4.2–13.2 kg) in the emollient bathing group and 7.6 kg (range 2.4 to 30.2 kg) in the 2% MIC/CHX group. There were no significant intergroup differences in mean age and body weight ($P > 0.05$). Concurrent maintenance therapy was allowed in three dogs in the emollient bathing group (two on oral oclacitinib, one on oral prednisolone), and four dogs in the 2% MIC/CHX group (three on oral oclacitinib, one on oral ciclosporin).

The mean CADESI-04 score, pVAS and yeast counts on D0 of the emollient bathing group were 74.6, 5.13 and 26.3, and those of 2% MIC/CHX group were 46.0, 5.38 and 20.6, respectively. There were no significant intergroup differences in the mean CADESI-04 score, pVAS and yeast counts on D0 ($P > 0.05$).

The CADESI-04 score, when bathing with the emollient, improved on D14 and D28 by 29.1% and 51.9%, respectively, and the improvements in the 2% MIC/CHX group on the same days were 21.5% and 50.0%, respectively. The CADESI-04 score on D28 decreased significantly in the emollient bathing group compared with D0 (Figure 1; $P = 0.003$). On D14 and D28, improvement rates in the pruritus scores were 29.2% and 47.6%, respectively, in the emollient bathing group, and 25.7% and 37.2%, respectively, in the 2% MIC/CHX group.

The pruritus score decreased significantly by D28 compared to D0 in both groups ($P < 0.05$, Figure 2).

The improvements in the yeast counts on D14 and D28 were 69.6% and 85.3%, respectively, in the emollient group, and 40.3% and 66.0%, respectively, in the 2% MIC/CHX group. Compared to D0, the yeast counts had significantly decreased by D14 ($P = 0.009$) and D28 ($P = 0.002$) in the emollient bathing group, and by D28 ($P = 0.01$) in the 2% MIC/CHX group (Figure 3). There were no significant differences in each end-point score

between the two groups ($P > 0.05$). No adverse events were reported by dog owners or investigators in either group throughout this trial.

In order to investigate the influence of 2% MIC/CHX shampoo and the three-part emollient bathing products on skin barrier function, TEWL was measured on the abdominal skin after a single bathing procedure. The post-bathing TEWL value for 2% MIC/CHX-treated skin [mean 8.63 ± 2.20 g/m²/h (range 4.62–11.78 g/m²/h)] was significantly higher than that for the emollient-treated skin [mean 6.04 ± 1.57 g/m²/h (range 3.68–9.08 g/m²/h); $P = 0.03$]. By contrast, the mean TEWL values for 2% MIC/CHX bathing and emollient bathing were significantly higher than the pre-bathing TEWL values [mean 4.26 ± 1.25 g/m²/h (range 2.74–6.44 g/m²/h); $P < 0.01$; Figure 4]. No adverse events were observed with physical examination and macroscopic evaluation in this trial.

Discussion

This preliminary study evaluated the efficacy of either emollient bathing or treatment with 2% MIC/CHX shampoo to reduce *Malassezia* overgrowth in dogs with cAD by a randomized, single-blinded trial. The 2% MIC/CHX shampoo had previously showed good-to-excellent clinical outcomes in two published randomized controlled trials for dogs with *Malassezia* dermatitis.^{6,7} One trial showed that 94% (15 of 16) of dogs showed complete improvement with use of 2% MIC/CHX shampoo at three day intervals for three weeks.⁶ The other trial showed that 91% (29 of 32) of dogs showed >50% reduction in their skin lesion scores from baseline when shampooed twice a week with 2% MIC/CHX shampoo up to six weeks.⁷ However, these two trials did not focus on any underlying or concurrent diseases. Our study focused on *Malassezia* overgrowth concurrent with cAD. It showed that the pruritus and yeast overgrowth significantly improved after four weeks of treatment twice a week with 2% MIC/CHX shampoo, without any adverse events. These results indicated that 2% MIC/CHX

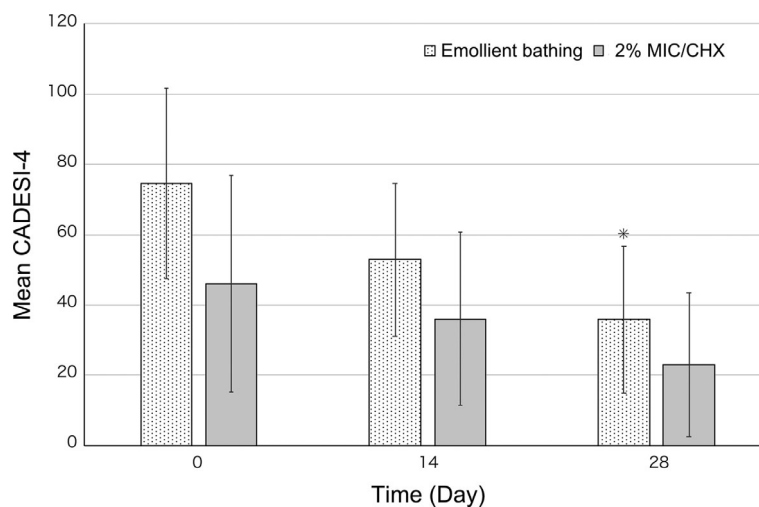


Figure 1. The mean Canine Atopic Dermatitis Extent and Severity Index, 4th iteration (CADESI-04, $\pm$ standard deviation) on Day (D)0, D14 and D28 after initiation of twice-weekly bathing with 2% miconazole/2% chlorhexidine shampoo (2% MIC/CHX) or AFLOAT VET (emollient bathing), treatment in atopic dogs evaluated by the investigators.

* $P < 0.01$.

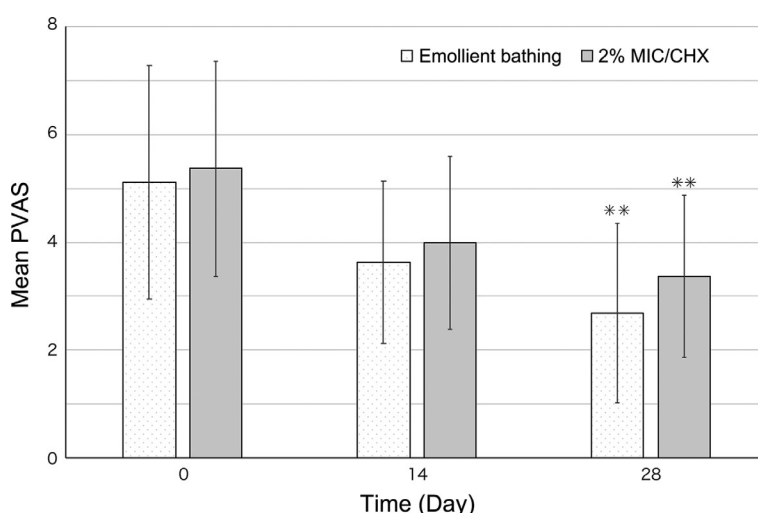


Figure 2. The mean pruritus Visual Analog Scale (pVAS, $\pm$ standard deviation) on Day (D)0, D14 and D28 after initiation of twice-weekly bathing with 2% miconazole/2% chlorhexidine shampoo (2% MIC/CHX) or AFLOAT VET (emollient bathing) treatment in atopic dogs evaluated by their owners.

** $P < 0.05$.

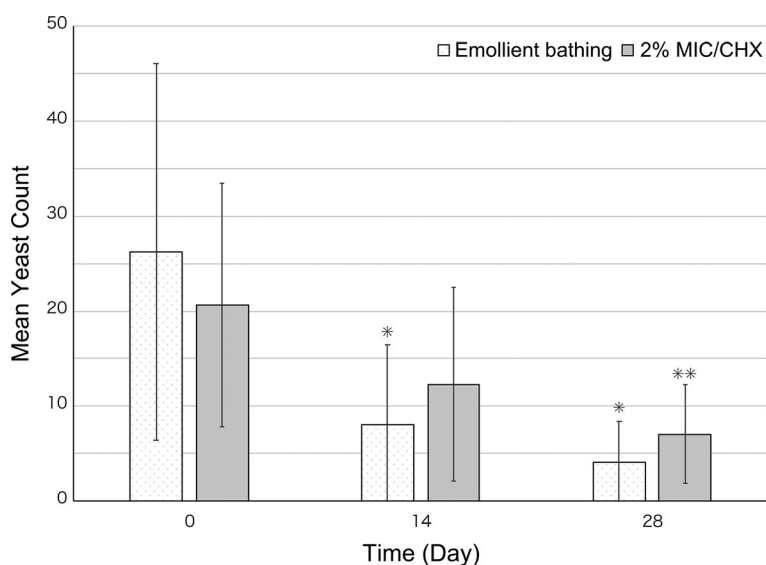


Figure 3. The mean yeast counts ($\pm$ standard deviation) on cytological evaluation on Day (D)0, D14 and D28 after initiation of twice-weekly bathing with 2% miconazole/2% chlorhexidine shampoo (2% MIC/CHX) or AFLOAT VET (emollient bathing) treatment in atopic dogs evaluated by the investigators.

* $P < 0.01$; ** $P < 0.05$.

shampoo could effectively control *Malassezia* overgrowth in dogs with cAD.

In addition, the three-part emollient bathing products showed significant improvements in skin lesions, pruritus score and yeast counts in atopic dogs with *Malassezia* overgrowth. These products contain jojoba oil and astaxanthin that have anti-inflammatory properties,^{14,15} and have no known specific antifungal properties for *M. pachydermatis* isolated from dogs. A previous double-blinded placebo-controlled study conducted to evaluate a medicated shampoo containing antiseptic and anti-inflammatory ingredients revealed no statistically significant difference in the pre- and post-treatment clinical scores between the medicated and placebo shampoos in dogs with allergic skin diseases.¹⁶

Some reports have claimed that the mechanical removal of allergens and micro-organisms from the hair coat and skin is the most important factor for shampoo therapy to improve skin hygiene.^{17,18} Active washing agents, such as surfactants and detergents, can have a similar effect as shampoos with active ingredients.¹⁸ Jojoba oil, which can be found in surfactant shampoos, has a high affinity for sebum,¹⁹ which helps remove sebum debris. The components of the AFLOAT VET products also contain various emollients, such as ceramides, plant oils and sodium dilaurylamidoglutamide lysine. Ceramides are a class of lipid molecules that consist of sphingoid bases which are important constituents of the SC and play an important role in maintaining permeability barrier function.²⁰ Reduced ceramide levels in the SC have

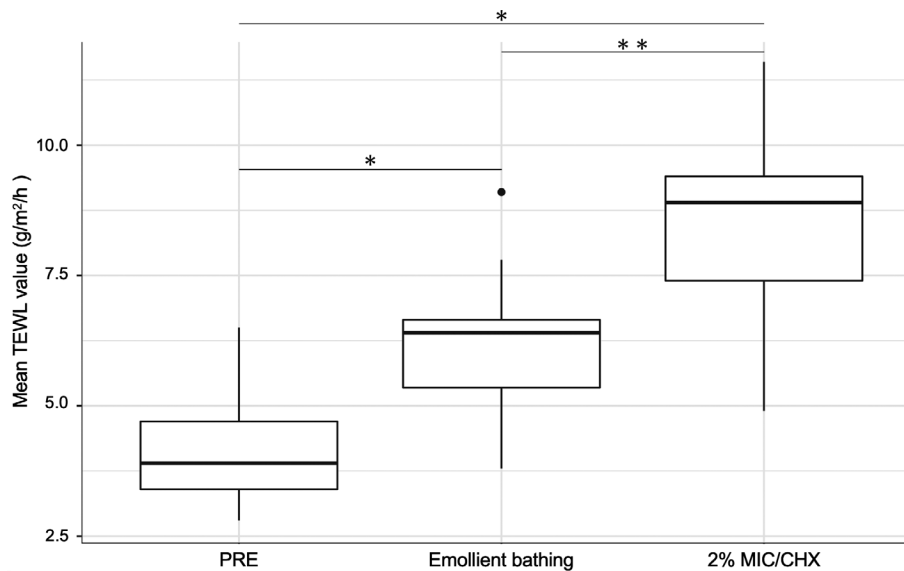


Figure 4. The mean transepidermal water loss (TEWL) values ($\pm$ standard deviation) before (PRE) and after a single bath with 2% miconazole/2% chlorhexidine shampoo (2% MIC/CHX) or AFLOAT VET (emollient bathing) in healthy dogs evaluated by the investigator.

* $P < 0.01$; ** $P < 0.05$.

been reported in patients with cAD and are associated with increased TEWL values.^{2,21–23} The topical application of a ceramide-containing product also has been shown to improve skin barrier function, including TEWL, and decrease the severity of clinical signs in dogs with atopy.^{24–26} Although this study did not evaluate the efficacy of each of the three products of AFLOAT VET, the combination of a cleansing oil with an emollient shampoo and moisturizer used in this study might effectively remove sebaceous debris, allergens and yeasts, and improve skin barrier function in atopic dogs.

This study was a preliminary evaluation in a small number of cases and it was not possible to conclude which of the three-part bathing product was most appropriate in dogs with cAD and *Malassezia* overgrowth. In East Asia, clinical isolates of *M. pachydermatis* from atopic dogs were less susceptible to azole than those from healthy dogs and that report expressed concern about this phenomenon being seen worldwide, given that secondary *M. pachydermatis* infections in patients with cAD frequently are treated using azole-containing shampoos.²⁷ From the perspective of antifungal resistance of *M. pachydermatis* in atopic dogs, it might be better to use bathing products without antifungal agents, especially in cases requiring long-term, frequent shampoo therapy.

Although there were no macroscopic adverse events recorded after bathing with 2% MIC/CHX shampoo or AFLOAT VET in atopic dogs, a trial involving normal dogs revealed that the TEWL value increased significantly after a single bath. This was noted not only with 2% MIC/CHX shampoo, but also with an emollient product of AFLOAT VET. TEWL has been used widely as a noninvasive tool to assess skin barrier integrity in dogs.² Although some reports showed high variability in the measurement of TEWL in dogs,^{2,28,29} VAPOSCAN, as used in this trial, was reported to be useful in evaluating TEWL in dogs without significant dog-to-dog, site-to-site, day-to-day or

interoperator variations.³⁰ Skin barrier impairment has been demonstrated in patients with cAD.^{21,31,32} TEWL values of lesional and nonlesional skin were significantly higher in dogs with cAD than in healthy dogs.²² TEWL has been inversely correlated with skin integrity and clinical signs in atopic dogs.^{22,33,34} Although the clinical importance of TEWL elevation after bathing is unclear, there might be a risk of skin barrier impairment when bathing with cleansing agents or surfactants, even if using a moisturizer-containing product in dogs. As this study evaluated only a single bath in a small number of normal dogs, further studies will be needed to evaluate the influence of repeated bathing with antiseptic or emollient shampoo on the skin barrier of dogs with cAD.

In summary, to the best of the authors' knowledge, this is the first preliminary study to evaluate different bathing methods for *Malassezia* overgrowth in atopic dogs. Although the number of enrolled cases was limited, bathing with a cleansing oil, an emollient shampoo and using a post-bath topical moisturizer that contains ceramides can be beneficial for the management of *Malassezia* overgrowth in dogs with cAD.

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Résumé

Contexte – Les shampooings antifongiques sont largement utilisés pour la dermatite à *Malassezia*. Peu d'études ont évalué l'effet des shampooings pour les chiens atopiques avec surpopulation de *Malassezia*.

Objectifs – Déterminer l'efficacité d'un produit émollient pour le bain (AFLOAT VET) et un shampooing de 2% de miconazole et 2% de chlorhexidine (2% MIC/CHX) chez des chiens atopiques et évaluer l'influence sur la fonction barrière cutanée des deux produits chez les chiens sains.

Sujets – Seize chiens atopiques avec surpopulation de *Malassezia* et 11 chiens sains.

Matériels et méthodes – Cette étude était randomisée en simple aveugle. Les chiens étaient traités au hasard avec soit les bains d'émollient ou 2% MIC/CHX deux fois par semaine pendant quatre semaines. L'évaluation clinique utilisait le CADESI-04 (Canine Atopic Dermatitis Extent and Severity Index, 4th iteration), la pVAS (pruritus Visual Analog Scale), et le nombre de levures à la cytologie à jour (D) 0, D14 et D28. LA fonction barrière cutanée était déterminée par le TEWL (transepidermal water loss) après un bain unique avec chaque produit chez les chiens sains.

Résultats – les scores pVAS et les comptages de levures étaient significativement réduits à D28 comparé à D0 dans les deux groupes ($P < 0.05$). Le CADESI-04 était significativement diminué à D28 dans le groupe émollient ($P = 0.003$). Il n'y avait pas de différence significative quelque soit le moment, entre les groupes.

Chez les chiens sains, la TEWL était significativement augmentée après les bains dans les deux groupes ($P < 0.01$).

Conclusion – Un bain émollient peut être efficace pour la surpopulation de *Malassezia* chez les chiens atopiques. Les bains avec des shampooings peuvent affecter la fonction barrière cutanée même en utilisant un produit émollient.

RESUMEN

Introducción – los champús antimicóticos se utilizan ampliamente para la dermatitis canina causada por *Malassezia*. Pocos estudios han evaluado métodos de baño efectivos para perros atópicos con crecimiento excesivo de *Malassezia*.

Objetivos – Evaluar la eficacia de un producto de baño emoliente (AFLOAT VET) y un champú de 2% miconazol/2% de clorhexidina (2% MIC/CHX) en perros atópicos y evaluar la influencia de ambos productos en la función de barrera cutánea en perros sanos.

Animales – dieciséis perros atópicos con sobrecrecimiento secundario de *Malassezia* y 11 perros sanos.

Métodos y materiales – este estudio fue una prueba al azar, ciega simple. Los perros fueron tratados aleatoriamente con baños emolientes o MIC/CHX al 2%, dos veces por semana durante cuatro semanas. La evaluación clínica utilizó el índice de gravedad y extensión de dermatitis atópica canina, cuarta revisión (CADESI-04), escala análoga visual de prurito (pVAS) y evaluación citológica del número de levaduras en los días (D) 0, D14 y D28. La función de barrera cutánea se determinó mediante la evaluación de la pérdida transepidermica de agua (TEWL) después de un único baño con cada producto en los perros sanos.

Resultados – las puntuaciones de pVAS y los recuentos de levaduras se redujeron significativamente en D28 en comparación con D0 en ambos grupos ($P < 0.05$). CADESI-04 se redujo significativamente en D28 en el grupo de baño emoliente ($P = 0.003$). No hubo diferencias significativas en cada valor final entre los grupos. En perros sanos, TEWL aumentó significativamente después del baño en ambos grupos ($P < 0.01$).

Conclusión – un producto de baño emoliente puede ser eficaz frente al crecimiento excesivo de *Malassezia* en perros con dermatitis atópica. El baño con champú puede afectar a la función de barrera de la piel incluso cuando se usa un producto emoliente.

Zusammenfassung

Hintergrund – Antimykotische Shampoos finden bei der Behandlung einer *Malassezia* Dermatitis des Hundes eine breite Verwendung. Es gibt wenige Studien, die die Bademethoden für atopische Hunde mit *Malassezia* Überwucherung evaluiert haben.

Ziele – Eine Evaluierung der Wirksamkeit von Weichmacher Badeprodukten (AFLOAT VET) und 2%igem Miconazol/2%igem Chlorhexidin Shampoo (2% MIC/CHX) bei atopischen Hunden, sowie die Evaluierung des Einflusses beider Produkte auf die Funktion der Hautbarriere bei gesunden Hunden.

Tiere – Sechzehn atopische Hunde mit sekundärer *Malassezia* Überwucherung und 11 gesunde Hunde.

Methoden und Materialien – Diese Studie war ein randomisierter, einfach-geblindeter Versuch. Die Hunde wurden zufällig entweder mit Weichmacher oder mit 2% MIC/CHX zweimal wöchentlich für vier Wochen gebadet. Die klinische Beurteilung erfolgte mittels Canine Atopic Dermatitis Extent and Severity Index, 4. Ausgabe (CADESI-04), Pruritus Visual Analog Scale (pVAS), und zytologische Evaluierung der Anzahl der Hefen am Tag (D) 0, D14 und D28. Die Funktion der Hautbarriere wurde mittels transepidermalem Wasserverlust (TEWL) nach einem einzigen Bad mit jedem Produkt bei gesunden Hunden bestimmt.

Ergebnisse – Die pVAS Scores und die Anzahl der Hefen waren am D28 im Vergleich zu D0 in beiden Gruppen signifikant reduziert ($P < 0.05$). CADESI-04 war am D28 in der Badegruppe mit Weichmacher signifikant reduziert ($P = 0.003$). Es bestanden keine signifikanten Unterschiede zwischen den Endpunktwerten zwischen den Gruppen. Bei gesunden Hunden war die TEWL nach dem Baden in beiden Gruppen signifikant erhöht ($P < 0.01$).

Schlussfolgerung – Ein Badeprodukt mit Weichmacher kann bei einer *Malassezia* Überwucherung bei Hunden mit atopischer Dermatitis wirksam sein. Das Baden mit Shampoo kann die Funktion der Hautbarriere beeinflussen, auch wenn ein Weichmacher Produkt verwendet wird.

要約

背景 – 抗真菌シャンプーは、犬マラセチア皮膚炎に広く使用されている。アトピー犬のマラセチア過剰増殖に対する効果的な入浴方法を評価した研究はほとんどない。

目的 – 本研究の目的は、アトピー犬におけるエモリエント入浴剤 (AFLOAT VET) および2%ミコナゾール/2%クロルヘキシジン配合シャンプー (2%MIC/CHX) の有効性を評価し、健康犬における両製品の皮膚バリア機能への影響を評価することであった。

供試動物 – 二次性マラセチア過剰症を有するアトピー犬16頭および健康犬11頭。

材料および方法 – 本研究は、無作為化単盲検試験であった。犬には、エモリエント入浴剤または2%MIC/CHX配合シャンプーのいずれかを週2回、4週間にわたって無作為に投与した。臨床評価には、0、14、28日目におけるCanine Atopic Dermatitis Extent and Severity Index, 4th iteration (CADESI-04)、pruritus Visual Analog Scale (pVAS)および酵母数の細胞学的評価を用いた。皮膚バリア機能は、健康犬を対象に、各製品

を用いた1回の入浴手順後の経皮水分蒸散量(TEWL)により測定した。

結果 – pVASスコアおよび酵母数は、両群とも0日目と比較して28日目で有意に減少した ($P < 0.05$)。CADESI-04は、エモリエント入浴群では28日目で有意に減少した ($P = 0.003$)。各エンドポイントスコアについては、両群間で有意差は認められなかった。健康犬では、両群とも入浴後にTEWLが有意に増加した ($P < 0.01$)。

結論 – アトピー性皮膚炎を持つ犬のマラセチアの過剰増殖には、エモリエント入浴剤が有効である可能性がある。エモリエント製品を使用した場合でも、シャンプー製品を使用した入浴は皮膚バリア機能に影響を与える可能性がある。

摘要

背景 – 抗真菌香波广泛用于犬马拉色菌皮炎。很少有研究评价香波洗澡对特应性犬马拉色菌过度生长的效果。

目的 – 评估保湿香波(AFLOAT VET)和2%咪康唑/2%氯己定香波(2%MIC/CHX)在特应性犬身上的疗效, 并评价两种产品对健康犬皮肤屏障功能的影响。

动物 – 16只患有继发性马拉色菌过度生长的特应性犬和11只健康犬。

方法和材料-本研究是 – 一项随机、单盲试验。犬随机接受保湿香波或2%MIC/CHX香波治疗, 每周两次, 持续4周。在第0天、第14天和第28天, 使用犬特应性皮炎程度和严重指数第4版(CADESI-04)、瘙痒视觉模拟量表(pVAS)和酵母菌数量细胞学计数来进行临床评估。使用一种香波给健康犬单次洗澡, 通过经表皮水分流失(TEWL)测定皮肤屏障功能。

结果 – 与D0相比, 两组中D28时的pVAS评分和酵母菌计数均显著降低($P < 0.05$)。D28时, 保湿香波组的CADESI-04显著降低($P = 0.003$)。各组间各终点评分差异均无统计学意义。在健康犬中, 两组洗澡后TEWL均显著升高($P < 0.01$)。

结论 – 保湿香波可有效治疗特应性皮炎犬的马拉色菌过度生长。使用香波洗澡可以影响到皮肤屏障功能, 即便是保湿香波也是如此。

Resumo

Contexto – Shampoos antifúngicos são extensivamente utilizados no tratamento da malasseziase cutânea. Poucos estudos avaliaram métodos de banho eficazes para cães atópicos com supercrescimento de *Malassezia*.

Objetivos – Avaliar a eficácia de um produto emoliente (AFLOAT VET) e um shampoo à base de clorexidina 2%/miconazol 2% (2% MIC/CHX) em cães atópicos, e avaliar a influência de ambos os produtos na barreira cutânea de cães saudáveis.

Animais – Dezesesseis cães atópicos com supercrescimento secundário de *Malassezia* e 11 cães saudáveis.

Métodos e materiais – Este estudo foi um ensaio simples-cego randomizado. Os cães foram aleatoriamente tratados com o banho emoliente ou 2% MIC/CHX, duas vezes por semana, por quatro semanas. A avaliação clínica foi feita utilizando o indicador de gravidade e extensão da dermatite atópica canina, 4ª versão (*Canine Atopic Dermatitis Extent and Severity Index, 4th iteration* - CADESI-04), a escala analógica visual de prurido (*pruritus Visual Analog Scale*- pVAS) e avaliação citológica da contagem de leveduras nos Dias (D)0, D14 e D28. A função da barreira cutânea foi determinada pela avaliação da perda de água transepidermica (TEWL) após um único banho com cada produto nos animais saudáveis.

Resultados – Os valores de pVAS e a contagem de leveduras estava significativamente reduzida no D28, comparado ao D0 em ambos os grupos ($P < 0,05$). O CADESI-4 estava significativamente reduzido no D28 no grupo de banho emoliente ($P = 0,003$). Não houve diferenças significativas em nenhum escore final entre os grupos. Nos cães saudáveis, houve um aumento significativo da perda de água transepidermica em ambos os grupos ($P < 0,01$).

Conclusão – Um produto para banho emoliente pode ser eficaz em cães atópicos com supercrescimento de *Malassezia*. Banhos com shampoo podem afetar a barreira cutânea mesmo quando realizado com produtos emolientes.