

The influence of treatment with lokivetmab on transepidermal water loss (TEWL) in dogs with spontaneously occurring atopic dermatitis

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Background – Atopic dermatitis (AD) is one of the most common skin diseases in dogs. Monitoring the progress of treatment may include assessment of lesion severity by use of Canine Atopic Dermatitis Extent and Severity Index (CADESI), assessment of pruritus and measurement of biophysical parameters of the skin.

Hypothesis – This study aimed to assess changes in transepidermal water loss (TEWL) during 12 weeks of treatment with lokivetmab and its correlation with the CADESI-04 and the severity of pruritus.

Animals – Ten client-owned dogs with canine AD.

Methods and materials – The animals were administered lokivetmab three times at four week intervals. Pruritus and CADESI-04 were assessed, and TEWL was measured at six body regions, on Day 0 and repeated at weeks 4, 8 and 12.

Results – There was a significant decrease in the CADESI-04 score, the severity of pruritus and the mean TEWL between baseline and each of the time points. TEWL also decreased in the majority of body sites examined. Significant correlations between the CADESI-04 and mean TEWL ($r = 0.519$, $P = 0.0003$), and between pruritus severity and mean TEWL ($r = 0.517$, $P = 0.0003$), were found.

Conclusions and clinical significance – Overall TEWL decreased during lokivetmab treatment but not at all body sites. If TEWL is used to assess the effectiveness of a treatment, a mean TEWL score should be calculated from several areas of the body.

Introduction

Atopic dermatitis (AD) is a common allergic skin disease in dogs and the pathogenesis has been associated with disturbances in skin barrier function.^{1–5} The assessment of skin barrier function, using biophysical methods, may include measurement of epidermal hydration, erythema, skin pH and, most commonly, transepidermal water loss (TEWL).^{6–9} Increased transepidermal water loss was reported in the course of allergic disease in dogs.^{4,10,11} Treatments, such as ciclosporin and allergen-specific immunotherapy, have been associated with a reduction in values for TEWL.⁸ During treatment, a decrease in TEWL value was observed for various areas of the body.⁸ Some studies have reported correlation between TEWL values, for some of the assessed body areas, and clinical assessment systems including the Canine Atopic Dermatitis Extent and Severity Index – CADESI.^{8,12}

Lokivetmab (Cytopoint, Zoetis Belgium SA; Louvain-la-Neuve, Belgium) is a caninized anti-IL-31 antibody that binds circulating IL-31 and prevents its binding to the receptor. The subcutaneous (s.c.) administration of lokivetmab to atopic dogs has been reported to reduce pruritus for four weeks and in the improvement of skin lesions, based on the assessment of the third iteration of CADESI(-03).^{13,14}

This aim of this study was to assess TEWL in atopic dogs over the course of 12 weeks of treatment with lokivetmab and its correlation with the CADESI-04 scoring system and an evaluation of the severity of pruritus.

Methods and materials

Animals

Ten dogs were recruited (five male and five female), aged from nine months to six years (median 16 months) weighing from 8.5 to 40 kg (median 11.65 kg). Dog breeds included French bulldog (four individuals), akita inu, fox terrier, West Highland white terrier, Labrador retriever, Boston terrier and cross-breed. The dogs were privately owned and were presented to the Department of Clinical Diagnostics and Veterinary Dermatology at the University of Life Sciences in Lublin. Owners' written consent to participate in the study was obtained before treatment. All procedures used in this study (TEWL

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Table 1. Characteristics and baseline assessment data for 10 dogs at the start of the study (Day 0)

Dog number	Breed	Body weight (kg)	Age (months)	CADESI-04 score	Numerical pruritus score	Average value for transepidermal water loss for six body areas
1	French bulldog	9	9	20	4	66.33
2	French bulldog	12	14	37	5	71.06
3	Boston terrier	10.5	12	32	3	111.45
4	French bulldog	15	48	33	4	94.38
5	French bulldog	11.3	18	29	3	244.76
6	Wire fox terrier	7.25	72	22	4	45.31
7	West Highland white terrier	8.5	72	89	4	70.91
8	Mixed breed	26	60	31	4	25.2
9	Labrador retriever	40	12	51	4	29.51
10	Akita	35.5	12	19	4	26.21

CADESI-04, Canine Atopic Dermatitis Extent and Severity Index, 4th iteration.

Table 2. Canine Atopic Dermatitis Extent and Severity Index, 4th iteration (CADESI-04) scores, pruritus measurements and average transepidermal water loss (aTEWL) in dogs treated with lokivetmab for 12 weeks

	Start of the study, Week 0 mean (SD)	Week 4 mean (SD)	Week 8 mean (SD)	Week 12 mean (SD)
CADESI-04	36.3 (19.68) a**, b**, c**	11.1(11.72) a**, d*	5.8 (8.1) b**	3.3 (5.66) c**, d*
Pruritus (numerical pruritus scale)	3.9 (0.53) a***, b***, c***	1.4 (1.01) a***, d*, e*	0.4 (0.9) b***, d*	0.4 (0.91) c***, e*
aTEWL	78.51 (61.9) a*, b**, c**	32.81(19.93) a*, d*	21.77 (9.03) b**	20.2 (6.04) c**, d*

a, b, c, d and e were statistically significant differences.

* $P < 0.05$.

** $P < 0.001$.

*** $P < 0.0001$.

measurement, clinical assessment of the CADESI and pruritus scores) were noninvasive. The Local Ethics Board in Lublin considered all procedures to be routine veterinary and did not require institutional approval. Lokivetmab was used according to manufacturer's recommendation. The characteristics of the dogs included in the study are reported in Table 1.

Dogs were diagnosed with AD on the basis of published diagnostic criteria (set 2).¹⁵ Other pruritic diseases were excluded based on trichoscopic examination, skin scrapings and cytological evaluation. Flea bite hypersensitivity and food allergy were excluded by appropriate anti-flea treatments and a strict eight week elimination diet. Dogs were sampled for a commercial test reporting allergen-specific IgE antibodies (PolyCheck Allergies Dog Panel, BioCheck GmbH; Münster, Germany). Sampling was performed during a period of clinical flare before treatment. The dogs were not treated before the study and did not receive ciclosporin, oclacitinib, glucocorticoids, antihistamines, polyunsaturated fatty acids, pentoxifylline and lokivetmab for at least two months before the study.

Lokivetmab treatment

The dogs were treated with lokivetmab (Cytoint, Zoetis) using 1 mL single-use vials containing 10, 20, 30 or 40 mg/mL. Dogs weighing ≤ 10 kg received 10 mg lokivetmab, 10–20 kg dogs received 20 mg, 20–30 kg dogs received 30 mg and 30–40 kg dogs received 40 mg, according to the manufacturer's instructions. The dose of the drug administered ranged from 1 to 1.76 mg/kg (mean 1.26 mg/kg) depending on the weight of the animal. Lokivetmab was administered s.c. three times at four week intervals.

TEWL measurement

Measurements of TEWL were performed in dogs before treatment (Week 0) and three times at four week intervals (at weeks 4, 8, and 12). Measurements were made on six areas of the body including the concave surface of the right auricle, interdigital space of the right forelimb, right lateral thoracic area, abdomen, right axilla and right groin. The measurements were obtained after acclimatization of the

animals in the room for ≥ 60 min. The temperature in the room where the test was carried out ranged from 21 to 25°C and humidity ranged from 41 to 60%. If necessary (for the lateral thoracic area), the hairs were clipped using an electric razor (Type 1245, 0.3 mm blade, Moser Animalline; Unterkirnach, Germany) before the measurement. The hairs in nonhairless areas of the body (auricle, abdomen, axilla, groin and interdigital space) were not clipped. Measurement of TEWL was performed using a vapometer with a closed chamber (VapoMeter SWL 4605, DELFIN Technologies; Kuopio, Finland). Each measurement was performed three times by the same operator and the average of three measurements was used for further analysis.^{10,11,16}

CADESI-04 and numerical pruritus scale (NPS)

For each dog at each visit, the CADESI-04 scoring system was applied immediately before TEWL determination.¹⁷ The severity of pruritus was assessed using a numerical six point scale from 0 to 5 based on a previously published method.¹⁸

Statistical analysis

Normal distribution of the obtained results was tested with the Shapiro–Wilk test. Statistical differences between individual measurements at weeks 0, 4, 8 and 12 for the CADESI and severity of pruritus were calculated. Each dog's average TEWL (aTEWL) was calculated and counted as the mean of six measurements on each area of the body in weeks 0, 4, 8 and 12. The differences between measurements at weeks 0, 4, 8 and 12 for aTEWL were calculated. The differences in TEWL between measurements at weeks 0, 4, 8 and 12 also were calculated separately for each of the six assessed body regions. The differences in statistical significance between the results were calculated based on the Wilcoxon–Mann–Whitney U-test. In all cases Bonferroni corrections were implemented. $P < 0.05$ was considered significant. Additionally, the correlation coefficients between aTEWL and CADESI-04, aTEWL and NPS, and CADESI-04 and TEWL on individually assessed regions, and between NPS and TEWL on particular assessed regions were calculated. Spearman test for $P < 0.05$ was

Table 3. Transepidermal water loss (TEWL) values for six body areas in atopic dogs receiving lokivetmab therapy over 12 weeks

	Week 0 mean (SD)	Week 4 mean (SD)	Week 8 mean (SD)	Week 12 mean (SD)
Auricle	45.23 (47.61) a	28 (15.88)	17.24 (8.52) a	23.42 (18.04)
Interdigital	70.85 (98.93) a,b	25.35 (13.62)	20.84 (9.72) a	20.8 (8.36) b
Thorax	69.41 (70.05)	43.39 (49.06)	25.93 (30.12)	21.98 (11.61)
Abdomen	142.05 (146.6) a,b,c	27.12 (8.66) a,d	20.49 (7.15) b	16.99 (7.59) c,d
Axilla	51.94 (72.49) a,b	30.53 (14.46) c	21.57 (12.06) a	16.82 (4.98) b,c
Groin	91.62 (85.11) a	42.49 (48.13)	24.56 (10.58)	21.24 (14.69) a

a, b, c and d were statistically significant differences. $P < 0.05$.

used to calculate the correlation. All analyses were performed using Statistica 10 software (Statsoft; Tulsa, OK, USA).

Results

Signalment and initial values for CADESI, NPS and TEWL (at Day/Week 0) for 10 dogs are presented in Table 1.

During therapy, gradual and statistically significant decreases in CADESI-04 scores, pruritus measurements and overall TEWL were observed after four weeks; reductions were not statistically significant after eight and 12 weeks of therapy (Table 2). Changes were also noted for TEWL at individual body sites, some of which were statistically significant (Table 3).

A significant correlation was found between aTEWL and CADESI-04 ($r = 0.519$, $P = 0.0003$) and between aTEWL and NPS ($r = 0.517$, $P = 0.0003$). The results for the correlations are shown in Figures 1 and 2. Correlations between CADESI-04 and TEWL, and between NPS and TEWL, at individual body regions are reported in Table S1.

Discussion

Lokivetmab administered s.c. to a group of atopic dogs was associated with significant reductions in the clinically evaluated CADESI-04 parameters, pruritus severity and average TEWL values after four weeks. There also were gradual reductions in TEWL in individual areas of the body, although varying intensities were noted depending on the area assessed. For example, values for the abdomen were statistically different between the time points, similar to findings for the aTEWL. There were no significant differences for any of the measurements for the thoracic area. It is difficult to explain why a decrease in TEWL was not observed in all examined body areas. Reductions in this parameter during treatment were observed in body areas commonly associated with AD lesions, including the abdomen, interdigital area, axilla and groin, but not in the thorax, which is not a common site for lesions of AD. These results suggest that the former body areas should be exclusively examined in future research.

There appeared to be a correlation between values for CADESI-04 and TEWL, which was most evident for the average TEWL. Correlations between CADESI-04 and TEWL for individual body areas were weaker and significant for only half of the body areas examined. Likewise, when assessing the correlation between aTEWL and the severity of pruritus, the correlation was stronger than those observed between the severity of pruritus and TEWL assessed at individual body areas. We recommend

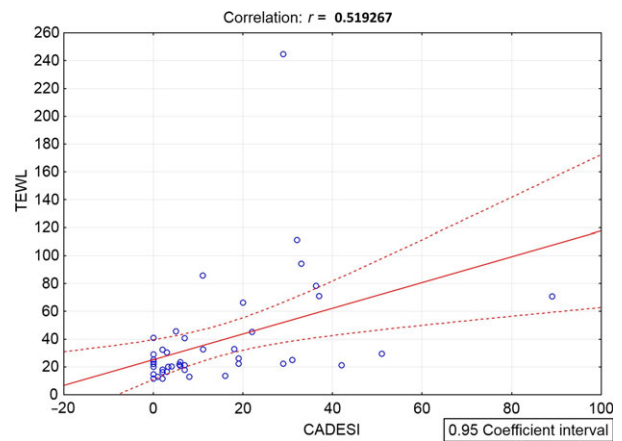


Figure 1. The correlation between the Canine Atopic Dermatitis Extent and Severity Index (CADESI) and average transepidermal water loss (aTEWL).

Solid line, trend line; dotted line, 0.95 coefficient interval.

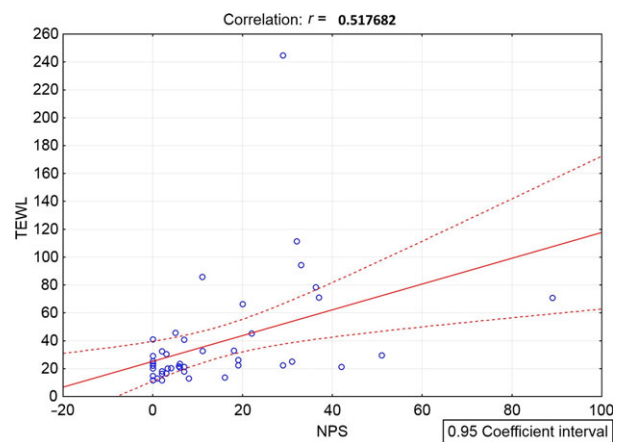


Figure 2. The correlation between the numerical pruritus scale (NPS) and average transepidermal water loss (aTEWL).

Solid line, trend line; dotted line, 0.95 coefficient interval.

that aTEWL should be used in future studies to assess skin barrier function.

To the best of the authors' knowledge, TEWL has not been used to assess the effectiveness of treatment with lokivetmab. A previous study reported a decrease in the CADESI-03 value and pruritus after the use of lokivetmab and this was most apparent with the single application of a dose of two mg/kg.¹⁴ The duration of the effect on pruritus was 49 days and for CADESI-03 it was eight weeks. Another study evaluated the effectiveness of lokivetmab administered monthly using CADESI-03 and the Pruritus Visual Analog Scale (PVAS); there was a significant

reduction in the CADESI-03 (from 184 to 57) after 12 weeks of treatment.¹³ The decrease was greatest after the first administration of the drug (CADESI-03 reduced from 184 to 76 after four weeks; 54% reduction). This finding is similar to our study where the largest decrease, in CADESI-04, was also recorded after four weeks (from 36.6 to 11.1; 69% reduction). For pruritus, the greatest decrease was observed after four weeks, a reduction of greater than 51% compared with a 64% decrease in our study.

One study reported a gradual decrease in aTEWL (calculated as an average of 10 areas studied) that correlated with a decrease in the CADESI-03 in dogs with AD treated with ciclosporin. The decrease was found in the majority of areas assessed, although, similar to our study, not all decreases were shown to be statistically significant.⁸ TEWL values were reported to have been reduced in an evaluation of the efficacy of hydrocortisone aceponate; the clinical parameters CADESI and PVAS also decreased.⁹ Values for TEWL were used to evaluate treatment of cAD with oclacitinib; the results were inconclusive and for one body area the TEWL values were decreased, whereas increases were observed in other areas.¹⁶

The decrease in the average TEWL during lokivetmab treatment in our study may be explained by a reduction in inflammation in most of the examined areas. The reduction in inflammation led to normalization of epidermal barrier function. Self-trauma due to AD will damage the stratum corneum; the reduction of pruritus associated with lokivetmab treatment may help normalization of the skin barrier and lead to reduced TEWL values.

A limitation of our study is the choice of an pruritus assessment scale developed some time ago.¹⁸ We decided to use this scale to simplify the assessment of pruritus by the owners. The numerical pruritus scale contained six categories of pruritic behaviour similar to that used in the validated PVAS10 method.^{19,20}

Lokivetmab administered at four week intervals was associated with decreases in the CADESI-04, pruritus and average TEWL values. When assessing response to treatment, it would seem reasonable to use the average TEWL calculated from several areas of the body given that a greater correlation is found in such cases. The assessment of individual parts of the body is much more variable and reduction in the TEWL value is not noted in every area during treatment.

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Supporting Information

Additional Supporting Information may be found in the online version of this article.

Table S1. Correlation between TEWL, measured from individual parts of the body, CADESI 04 and the intensity of pruritus (numerical pruritus scale).

Résumé

Contexte – La dermatite atopique (AD) est une des causes les plus fréquentes de dermatose du chien. Le suivi du traitement peut inclure la sévérité des lésions par un CADESI (Canine Atopic Dermatitis Extent and Severity Index), l'évaluation du prurit et la mesure des paramètres biophysiques de la peau.

Hypothèses – Cette étude doit déterminer les changements de la perte en eau transépidermique (TEWL) au cours de 12 semaines de traitement avec le lokivetmab et ses corrélations avec le CADESI-04 et la sévérité du prurit.

Sujets – Dix chiens de propriétaires avec cAD.

Matériel et méthode – Les animaux ont reçus du lokivetmab trois fois à quatre semaines d'intervalles. Le prurit et le CADESI-04 ont été évalués et la TEWL a été mesurée sur six zones du corps au jour 0 puis à semaines 4, 8 et 12.

Résultats – Il y avait une diminution significative du score CADESI-04, de la sévérité du prurit et de la TEWL médiane entre les valeurs de départ et chacun des points. La TEWL a aussi diminué dans la majorité des sites corporels examinés. Les corrélations significatives entre CADESI-04 et TEWL moyenne ($r = 0.519$, $P = 0.0003$), et entre sévérité du prurit et TEWL moyenne ($r = 0.517$, $P = 0.0003$) ont été observées.

Conclusions et importance clinique – La TEWL globale a diminué au cours du traitement lokivetmab mais pas pour tous les sites corporels. Si la TEWL est utilisée pour déterminer l'efficacité du traitement, un score TEWL moyen pourrait être calculé de plusieurs zones corporelles.

Resumen

Introducción – la dermatitis atópica (EA) es una de las enfermedades cutáneas más comunes en perros. El seguimiento de la progresión del tratamiento puede incluir la evaluación de la gravedad de la lesión mediante el uso del índice de extensión y severidad de la dermatitis atópica canina (CADESI), evaluación del prurito y medición de los parámetros biofísicos de la piel.

Hipótesis – este estudio tuvo como objetivo evaluar cambios en la pérdida transepidermica de agua (TEWL) durante 12 semanas de tratamiento con lokivetmab y su correlación con el CADESI-04 y la gravedad del prurito.

Animales – diez perros de propietarios particulares con AD canina (cAD).

Métodos y materiales – a los animales se les administró lokivetmab tres veces en intervalos de cuatro semanas. Se evaluaron el prurito y el CADESI-04, y la TEWL se midió en seis regiones del cuerpo, en el día 0 y se repitió en las semanas 4, 8 y 12.

Resultados – hubo una disminución significativa en la puntuación de CADESI-04, la gravedad del prurito y la media de TEWL entre el valor basal y cada uno de los puntos temporales evaluados. TEWL también disminuyó en la mayoría de los sitios del cuerpo examinados. Se encontraron correlaciones significativas entre el CADESI-04 y la media de TEWL ($r = 0,519$, $P = 0,0003$), y entre la severidad del prurito y la media de TEWL ($r = 0,517$, $P = 0,0003$).

Conclusiones y significación clínica – la TEWL general disminuyó durante el tratamiento con lokivetmab pero no en todos los sitios del cuerpo. Si se usa la TEWL para evaluar la efectividad de un tratamiento, se debe calcular un valor medio de TEWL en varias áreas del cuerpo.

Zusammenfassung

Hintergrund – Die atopische Dermatitis (AD) ist eine der häufigsten Hauterkrankungen von Hunden. Eine Überwachung der Behandlung kann eine Beurteilung mittels Canine Atopic Dermatitis Extent und Severity Index (CADESI), sowie eine Erfassung des Pruritus und eine Messung der biophysikalischen Parameter der Haut beinhalten.

Hypothese – Diese Studie zielte darauf ab, die Veränderungen des transepidermalen Wasserverlusts (TEWL) innerhalb von 12 Wochen mit der Behandlung von Lokivetmab und die Korrelation mit CADESI-04 und dem Schweregrad des Pruritus zu erfassen.

Tiere – Zehn Hunde mit caniner AD (cAD) in Privatbesitz.

Methoden und Materialien – Den Tieren wurde Lokivetmab in vier wöchigen Intervallen dreimal hintereinander verabreicht. Der Pruritus und der CADESI-04 wurden erfasst, der TEWL an sechs Körperregionen am Tag 0 und nach 4, 8 und 12 Wochen gemessen.

Ergebnisse – Es gab eine signifikante Reduzierung beim CADESI-04 Score, beim Schweregrad des Pruritus und beim durchschnittlichen TEWL zwischen Ausgangswert und jedem der weiteren Zeitpunkte. Der TEWL nahm auch an der Mehrheit der untersuchten Körperstellen ab. Es wurden signifikante Korrelationen zwischen CADESI-04 und dem durchschnittlichen TEWL ($r = 0,519$, $P = 0,0003$) und zwischen Schweregrad des Pruritus und dem durchschnittlichen TEWL ($r = 0,517$, $P = 0,0003$) gefunden.

Schlussfolgerungen und klinische Bedeutung – Der insgesamt TEWL nahm während der Lokivetmab Behandlung ab, allerdings nicht an allen Körperstellen. Wenn der TEWL zur Beurteilung der Wirksamkeit

der Behandlung verwendet wird, sollte ein durchschnittlicher TEWL Wert von verschiedenen Körperstellen kalkuliert werden.

要約

背景 – アトピー性皮膚炎(AD)は犬の最も一般的な皮膚病の一つである。治療の進行を監視することは、犬アトピー性皮膚炎の程度および重症度指数(CADESI)の使用による病変の重症度の評価、掻痒の評価、ならびに皮膚の生物物理学的パラメータの測定を含み得る。

仮説

本研究は、ロキセトマブによる12週間の治療中の表皮水分蒸散量(TEWL)の変化、およびCADESI-04との相関および掻痒の重症度を評価することを目的とした。

供試動物

犬アトピー性皮膚炎(cAD)を有する飼育犬10頭。

材料および方法

動物に4週間隔で3回ロキセトマブを投与した。掻痒およびCADESI-04を評価し、TEWLを0日目に6つの身体領域で測定し、4、8および12週目に繰り返した。

結果 – CADESI-04スコア、掻痒の重症度およびベースラインと各時点との間の平均TEWLが有意に低下した。調査した身体部位の大部分でTEWLも減少した。 CADESI-04と平均TEWL($r = 0.519$, $P = 0.0003$)の間、および掻痒重症度と平均TEWL($r = 0.517$, $P = 0.0003$)の間に有意な相関を認めた。

結論と臨床的意義 – ロキセトマブ治療中に全体のTEWLは減少したが、すべての身体部位では減少しなかった。 TEWLを治療有効性を評価に使用するならば、平均TEWLスコアは身体のいくつかの領域から計算されるべきである。

摘要

背景

异位性皮膚炎(AD)は犬類最常见的の皮膚病之一。监测治疗进展包括评估犬异位性皮膚炎严重程度指数(cadesi)、瘙癢评分和皮肤生物物理参数,进而评估病变的严重程度。

假设

本研究洛基维特单抗(lokivetmab)12周的治疗,旨在评估在此期间犬经表皮失水量(TEWL)的改变,及其与cadesi-04和瘙癢程度的相关性。

动物

十只患有异位性皮膚炎的私家犬。

方法和材料

每隔四周给动物注射1次lokivetmab,连续3次。对瘙癢和cadesi-04进行评分,并分别在第0天、第4周、第8周和第12周测量6个身体部位的TEWL。

结果 – 与基础值相比,其他每个时间点的cadesi-04分值、瘙癢程度和平均TEWL都显著降低了;大多数被检测身体部位的TEWL也下降了。在cadesi-04和平均TEWL($r=0.519$, $p=0.0003$)之间、以及瘙癢程度和平均TEWL($r=0.517$, $p=0.0003$)之间存在显著相关性。

结论和临床意义

在lokivetmab治疗期间,整体TEWL降低,但并非所有身体部位都降低了。如果使用TEWL来评估治疗的有效性,则应计算若干身体部位的平均TEWL。

Resumo

Contexto – A dermatite atópica (DA) é uma das dermatopatias mais comuns em cães. O monitoramento do progresso do tratamento deve incluir a avaliação da gravidade das lesões utilizando o Índice de gravidade e extensão da dermatite atópica canina (*Canine Atopic Dermatitis Extent and Severity Index* - CADESI), avaliação do prurido e mensuração de parâmetros biológicos da pele.

Hipótese – Este estudo teve como objetivo avaliar as mudanças na perda de água transepidermica (TEWL) durante 12 semanas de tratamento com lokivetmab e a sua correlação com o CADESI-4 e a gravidade do prurido.

Animais – Dez cães de proprietários, com dermatite atópica.

Métodos e materiais – Administrou-se lokivetmab nos animais por três vezes, em um intervalo de quatro semanas. O prurido e o CADESI-04 foram avaliados, a TEWL foi mensurada em seis regiões corpóreas, no DIA 0 e repetidas nas semanas 4, 8 e 12.

Resultados – Houve uma redução significativa no escore de CADESI-04, na gravidade do prurido e na média de TEWL entre o tempo zero e cada um dos tempos experimentais. Houve redução na TEWL na maioria das regiões corpóreas examinadas. Foram observadas correlações significativas entre CADESI-04 e TEWL média ($r = 0.519$, $P = 0.0003$), e entre a gravidade do prurido e a TEWL média ($r = 0.517$, $P = 0.0003$).

Conclusões e significância clínica – A TEWL geral reduziu durante o tratamento com lokivetmab, mas não em todas as áreas corpóreas. Se a TEWL for utilizada para avaliar a eficácia de um tratamento, um escore de TEWL média deve ser calculado de várias áreas corpóreas.

Supporting Information

Table S1. Correlation between transepidermal water loss (TEWL) measured from individual parts of the body, the Canine Atopic Dermatitis Extent and Severity Index (CADESI 04) and the intensity of pruritus (numerical pruritus scale)

Location	CADESI 04	Pruritus intensity NPS
TEWL auricle	$r=0.25$, $p=0.1$	$r=0.07$, $p=0.62$
TEWL interdigital	$r=0.33^*$, $p=0.02$	$r=0.44^*$, $p=0.002$
TEWL thorax	$r=0.18$, $p=0.21$	$r=0.31^*$, $p=0.03$
TEWL abdomen	$R = 0.39^*$, $p = 0.008$	$r = 0.47^*$, $p = 0.001$
TEWL axilla	$r = 0.25$, $p = 0.09$	$r = 0.35^*$, $p = 0.01$
TEWL groin	$R = 0.43^*$, $p = 0.003$	$r = 0.32^*$, $p = 0.03$

* significant correlation