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Epidemiological observations on pastern dermatitis in young horses and evaluation of essential fatty acid spot-on applications with or without phytosphingosine as prophylactic treatment

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Background – Equine pastern dermatitis (EPD) is a common multifactorial clinical syndrome in horses. Treatment can be difficult; pathogenesis and triggering factors cannot always be determined.

Objectives – To assess risk factors for developing EPD in a large group of horses kept under the same conditions and to analyse whether or not a spot-on containing essential fatty acids and antimicrobial agents is able to prevent the development of EPD or accelerate the healing process.

Animals – Each year 50 young, privately owned, warmblood horses were prospectively included.

Methods – All horses were examined weekly between August and October for the presence of typical EPD skin lesions. Additionally, in the first year, horses were randomly divided into three subgroups of intervention. The pastern areas were treated once weekly either with 0.6 mL of a spot-on containing essential fatty acids and aromatic oils, or a preparation containing additional antibacterial phytosphingosine, or not at all.

Results – Nonpigmented pastern areas were affected significantly more often than pigmented pastern areas ($P < 0.0001$). The interaction between moisture and opportunistic pathogens seemed to be a major triggering factor for EPD. There was no difference in the occurrence of EPD in the three subgroups. The lesion scores of affected limbs in both spot-on groups were significantly lower compared to the control group.

Conclusion and clinical importance – Moisture and lack of pigmentation predisposed to EPD. Topical application of the tested spot-on once weekly did not prevent the disease. A positive effect of both spot-on products on the severity of EPD lesions was detected.

Introduction

Equine pastern dermatitis (EPD) is a progressive cutaneous reaction pattern that commonly affects the caudal part of the pastern.[1–3] Initially, erythema, oedema and scaling appear, followed by exudation and crusting.[1] Chronic cases are characterised by lichenification, hyperkeratosis and fissured skin which can develop into papillomatous hyperplasia and exuberant granulation (verrucous dermatitis or "grapes").[1] White, nonpigmented skin seems to be predisposed;[2] however, pigmented skin also can be affected.[4,5] Equine pastern dermatitis is seen mostly in heavy draught horses, such as Shires, Clydesdales and Franches-Montagnes horses, yet other breeds (e.g. Arabians and mixed-breed horses) also can be affected.[1,6–8] An investigation of 917 German coldblood horses showed that pastern dermatitis was prevalent in 47.5% of the examined Black Forest draught horses and in 58.5% of South German draught.[9] This clinical syndrome, also referred to as "scratches", "grease heel" or "mud fever", has several possible underlying diseases, perpetuating and predisposing factors. These include bacterial infection, dermatophytosis, chorioptic mange, contact allergens, photodermatitis, irritants and others.[1] While the exact pathogenesis of EPD often remains unclear, pastern leukocytoclastic vasculitis and other forms of vasculitis were reported to play a role in many idiopathic cases with frequent secondary infections.[4,10] However, pastern leucocytoclastic vasculitis also can be a secondary condition resulting from bacterial infection with, for example, *Staphylococcus (S.) aureus*[4] and *Pseudomonas aeruginosa*.[11] Staphylococci, mainly *S. aureus,* were present in 80% (16 of 20) of EPD-affected horses, implying that bacteria are an important factor in the disease pathomechanism.[12]

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Treating EPD can be difficult as the disease often is very persistent. Many horse owners try a number of home remedies with limited success. In Tasmania, oftentimes "Greasy Heal", a formulation containing kunzea oil, is used. A placebo-controlled study showed that kunzea oil had a significant impact on the reduction of lesion size and resulted in complete clinical remission in 63.6% (seven of 11) of the horses.[12] *In vitro* activity of this product against several agents such as *Malassezia*, *Trichophyton* and *S. aureus* was stated as a possible reason, although data from the authors' laboratory was not shared in that publication.[1,12] Multiple studies in humans and dogs have shown that phytosphingosines have antimicrobial activity against different bacteria and fungi species.[13-19] A spot-on (Dermoscent PYOspot, LDCA; Castres, France) containing plant extracts with PhytoC-2, vegetable oils from hemp and tamanu, and essential oils revealed *in vitro* activity against *S. pseudintermedius* and *Malassezia pachydermatitis* and can be used in dogs as preventative and supportive care.[17]

This study had two aims: first to investigate EPD and its possible risk factors in a large group of young horses kept under the same environmental conditions and second to evaluate whether or not an essential fatty acid spot-on with phytospingosines is able to prevent the development of EPD or to accelerate the healing process.

Materials and methods

Study population

In two study years (2014–2015), 50 young, privately owned, warmblood horses living on a farm in southern Germany were selected. Historically, every year some of those horses had developed pastern dermatitis between September and November. The horses were kept in four groups depending on their age (yearlings and 2-year-olds) and sex. Horses were pastured during the daytime and stabled in group stalls at night. The pastures were cultivated every year with Timothy grass and perennial ryegrass. Horses without clinical signs and that had not received any medication for at least two weeks before the start of the study were included. Horses which developed severe clinical signs during the study period requiring treatment with topical or systemic antimicrobial drugs or glucocorticoids were excluded from the treatment evaluation. It was the exclusive decision of the individual horse owner and their veterinarian whether the affected horse was treated. A written informed consent was obtained from the stable owner and horse owners before the beginning of the study. As no pain or suffering was associated with the topical application of the spot-ons and no invasive procedures were needed, an approval by an ethics committee was not required under Bavarian law.

Clinical evaluation and diagnostic procedures

Each year, horses were examined for the development of EPD by a veterinarian weekly from the beginning of August until the end of October. In 2014, an additional final examination was conducted in November (four weeks after the last treatment). The length and width of lesions on affected pastern areas were measured using a ruler. A scoring system was used to classify the lesion sizes into four categories (0, no lesions; 1, single lesion $\leq$4 cm^2; 2, more than one lesion each $\leq$1 cm^2 or single lesion between 4 and 16 cm^2; 3, lesions >16 cm^2). In addition, weather data were collected from a local weather station website (http:www.wetteronline.de/wetterdaten/schrozberg; last accessed on 11 July 2016) from June to October in both years. At the first detection of lesions compatible with EPD, impression smears from under the crusts were examined for the presence and type of bacteria or yeast organisms, and tape preparations and trichograms were searched for chorioptic mites and dermatophytes. The impression smears were stained using Diff-Quik (Medion Diagnostics AG; Düdingen, Switzerland). Additionally, in 2015, swab samples were taken from under the crusts and submitted for bacterial culture of each affected leg. If *S. aureus* was found, antimicrobial susceptibility testing was carried out. Furthermore in 2015, crusts were collected and tested with a PCR test for *Dermatophilus (D.) congolensis* at the University of Tennessee as reported previously.[20]

Treatment intervention

Treatment interventions were assigned in a randomised, single-blinded, placebo-controlled manner. The included horses were divided into a treatment group and a placebo group using computer randomisation (www.graphpad.com/quickcalcs/randomize2/, accessed last on 2 August 2014). A third group, the control group, included individuals in each intervention group that could not easily be handled and thus were not treated with any spot-on. If horses in any given group had either both nonpigmented or both-pigmented front or back limb pasterns, only the left leg was treated and the right leg served as a control. This way, each horse served as its own control to evaluate efficacy of the individual treatment, with all other factors (humidity, environment, pigmentation and genetic background) staying the same. If pigmentation differed, both legs received the same treatment, as pigmentation was considered a risk factor in other studies.[2] The intervention was initiated beforethe usual onset of clinical signs of EPD. From August to October 2014, the pastern areas were treated once weekly with 0.6 mL of the test spot-on (Dermoscent PYOspot, LDCA) or placebo spot-on (Dermoscent Essential 6, LDCA), a mixture of essential fatty acids and aromatic oils without PhytoC-2. Each spot-on solution was applied via a syringe without direct contact on the horses' legs in the morning while they were still in the stable. After approximately 1 h, horses were turned-out onto pastures. In previous years, the young horses were typically not treated, unless symptoms became severe enough to necessitate systemic antibiotics, so there was no ethical concern about using placebo or control animals to evaluate efficacy of the spot-on.

Statistical analysis

Data analysis was performed using R 3.6.3 (2020-02-29). Results with a *P*-value <0.05 were considered statistically significant. A Fisher exact test was performed to evaluate the influence of pigmentation. A multiple logistic regression was used to study the influence of pigmentation, leg position, sex and year on EPD. Backward stepwise variable elimination [based on Akaike's Information Criterion (AIC)] was used to reduce the number of variables and their interactions to the most important ones. A linear mixed-effects model was established to assess the influence of humidity, temperature and rainfall on the lesion scores, with the individual animal as random effect. Another linear mixed-effects model was used to predict lesion scores with EPD and treatment as fixed effects and the individual animal as random effect. Bonferroni adjustment for *P*-values was used for multiple pairwise comparisons among levels of the model results.

Results

Epidemiological observations

In total, 47 mares and 53 stallions were included. EPD lesions were detected in 33 horses (15 mares, 18 stallions) on 47 limbs (18 front legs, 29 hind legs). There was a higher proportion ($P < 0.0001$) of affected nonpigmented limbs (n = 37) compared to pigmented limbs (n = 10). Based on the backward stepwise variable elimination algorithm, the three most significant factors influencing EPD are pigmentation, the interaction between sex and leg position, and the interaction between year and leg position (Figure 1). The model's explanatory power is moderate (Tjur's $R^2 = 0.19$). The probability of EPD development

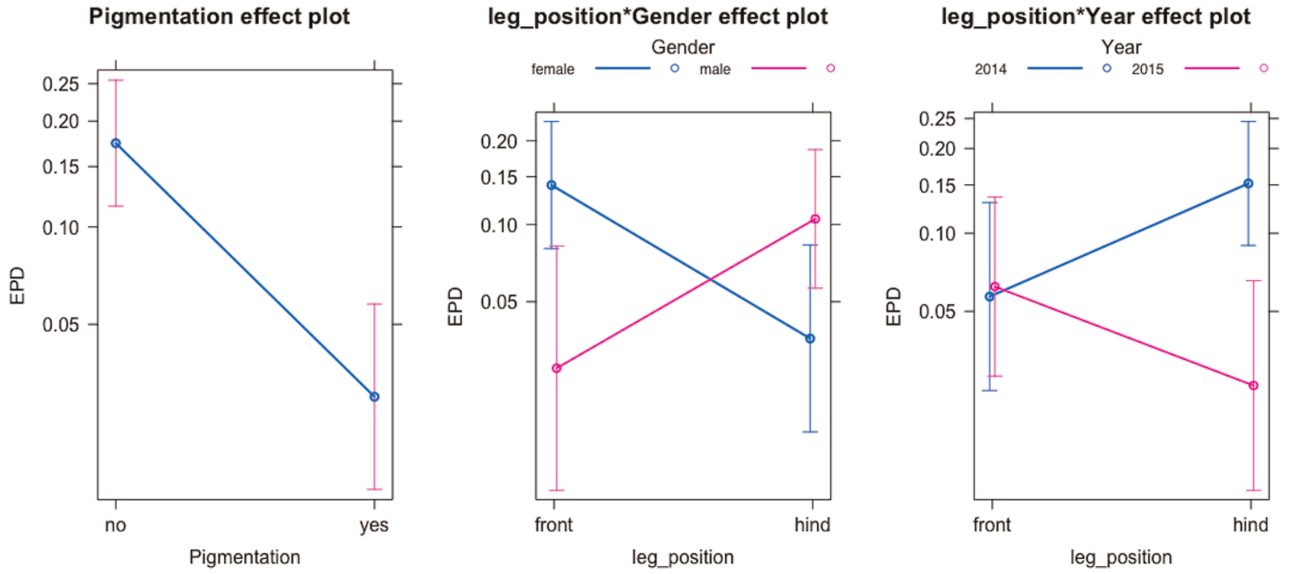

Figure 1. Effects of pigmentation and leg position on equine pastern dermatitis in a multiple logistic regression model

decreased from 17.6% in nonpigmented animals to 3% in pigmented ones [Tjur's R^2 = 0.19, odds ratio (OR) = 6.99, SE = 2.75, $P < 0.0001$].

The variables "sex" ($P = 0.91$) and "leg position" ($P = 0.8$) by themselves were not significant, however their interaction was a significant predictor for EPD ($P = 0.0001$; Figure 1). Front legs of mares were affected by EPD more often (probability 16.5%, OR = 5.889, SE = 3.935, $P = 0.008$) than front legs of stallions (probability of 3%). By contrast, the hind legs of mares were less frequently affected (probability 5%, OR = 0.314, SE = 0.151, $P = 0.016$) by EPD than hind legs of stallions (probability 12.5%). The interaction between year and leg position showed similar probabilities of EPD lesion between years for front legs (OR = 0.91, SE = 0.49, $P = 0.86$), yet significantly different probabilities (17.4% for 2014 and 3% for 2015, OR = 6.91, SE = 3.72, $P = 0.0003$) for hind legs (Figure 1).

Humidity had a significant impact on EPD lesions ($P = 0.015$), whereas temperature ($P = 0.359$) and rainfall ($P = 0.175$) had no significant effects. However, the explanatory power of the mixed-effect model producing the latter results is rather weak (conditional $R^2 = 0.11$), which shows the need for further investigations of the possible effects of weather.

Diagnostic test results

In both years there was no evidence of dermatophytes on trichograms. Chorioptic mites also could not be found on scotch tape preparations. The impression smears of EPD-affected horses showed the presence of cocci in 29 of 32 sampled cases. Other frequent findings were rod-shaped bacteria (n = 23) and degenerated neutrophils (n = 20). Bacterial testing identified *S. aureus* and *Streptococcus dysgalactiae* in 10 of 12 cases. *Pantoea agglomerans* (n = 8), *Pseudomonas* spp. (n = 5) and *Acinetobacter* spp. (n = 6) were cultured from submitted samples. Susceptibility testing showed that two strains of *S. aureus* were resistant to different antibiotics (one against sulfonamide, trimethoprim, ceftiofur, tetracycline and neomycin; the other against streptomycin). PCR testing (n = 10) for *D. congolensis* was negative in all of the sampled cases.

Outcome of treatment interventions

Twenty-four mares and 26 stallions were included. However, two horses had to be excluded from the statistical evaluation of treatment success as they required antibacterial treatment, one for EPD, the other for unrelated reasons. Two weeks after beginning the intervention, initial EPD lesions including alopecia, erythema, exudation and crusts (Figure 2) on the pastern area could be observed in some horses. Overall, 24 of 50 horses (nine mares, 15 stallions) developed EPD lesions on 33 pastern areas (nine front legs, 24 hind legs). In the treatment group,

Figure 2. Multifocal crusts on pastern area leading to equine pastern dermatitis with a lesion score of 3

EPD lesions were detected on 12 of 48 (25.0%) limbs, while clinical signs were present in only four of 37 (10.8%) placebo-treated limbs and 17 of 115 (14.8%) control limbs. Lesion scores could be substantially (conditional $R^2 = 0.31$) predicted by the type of treatment (Figure 3). The lesion scores of EPD-affected horse limbs in the control group were significantly higher than those in the placebo ($P = 0.0005$) and in treatment ($P = 0.001$) groups (Figure 3). There was no significant difference between the tested spot-on and placebo spot-on group ($P = 0.76$). The overall lesion scores of affected pasterns were decreased in the legs receiving the placebo spot-on compared to nontreated controls [−0.24, CI 95% (−0.37, −0.12), $P < 0.001$]. Likewise, the overall lesion scores of the affected legs treated with the tested spot-on were lower compared to nontreated controls [−0.14, CI 95% (−0.23, −0.05), $P = 0.002$]. No adverse effects were observed during the treatment with either spot-on. Remission was seen in 50.0% of the affected horses treated with the tested spot-on by the beginning of October 2014, while only 11.8% of the EPD lesions in the control group had resolved by that time. In November 2014, 75% and 70.6% of the lesions in affected horses of the tested spot-on group and the control horses (respectively) had resolved.

Discussion

In this group of young horses, a lack of pigmentation and high environmental humidity predisposed them to EPD. A weekly application of an essential fatty acid spot-on with or without an antibacterial phytosphingosine did not prevent pastern dermatitis, and did alleviate clinical signs in affected horses.

In accordance with previous reports[1,8] there was no sex predilection for EPD in our study and nonpigmented were affected more often than pigmented pastern areas. In a large number of stables under different living conditions, nonpigmented pasterns of 974 3-year-old Franches-Montagnes horses were affected 2.6-fold more often than pigmented pasterns.[7] Another study found no correlation between the severity of the lesions and white markings of the distal limbs.[21] Pastern leucocytoclastic vasculitis is one of several causes for EPD[2,4,5,10] and photoactivation was proposed as an aggravating factor that may contribute to a higher prevalence in white skin.[10] This can be aggravated by the ingestion of sensitising agents. The latter seems unlikely, because none of the affected horses had any systemic signs or severe dermatitis in other nonpigmentated parts of their bodies or limbs. Additionally, the pastures were cultivated and monitored regularly for the presence of toxic plants. It seems highly unlikely that such a large amount was overseen that 24 horses developed focal EPD lesions.

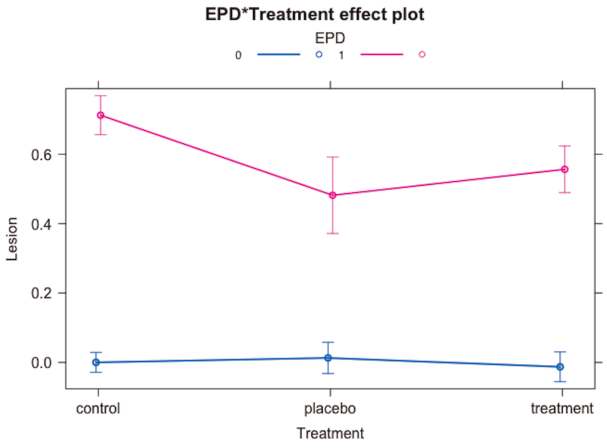

Figure 3. Effect of treatment with a mixture of essential fatty acids and aromatic oils (placebo) or a mixture of essential fatty acids and aromatic oils with phytosphingosine (treatment) on equine pastern dermatitis (EPD) compared to control, using a linear mixed-effects model (0, healthy horses, 1, EPD-affected horses)

Ultraviolet radiation (UVR) alters the local and systemic immune responses,[22] leading to neutrophil recruitment into the skin and the suppression of cell-mediated responses.[22] This immunosuppression could contribute to the bacterial infection frequently seen in horses with pastern dermatitis in this and other studies. However, the lesions occurred between the months of August and October, a part of the year characterised by reduction of daylight and hence UV radiation in the study area. In addition, UV radiation in the study area is much less than in areas of latitudes closer to the equator. Notwithstanding this, a retrospective study from Switzerland identified EPD lesions with no distinctive seasonality;[5] hence, the exact role of UV radiation in EPD warrants further detailed study. In 2014, more hind than front limbs were affected by EPD in our study. This is in accordance with previous reports.[1,2] In one study, of 3,896 limbs, 6.7% of hind and 2.7% of front limbs were affected.[7] Moreover, stallions developed EPD lesions significantly more frequently on the hind legs in comparison to mares. A possible explanation may be the contamination of the hind legs with faeces and urine,[7] which could contribute to an irritant contact dermatitis.[23] As the fetlock of the hind leg is not angled as steeply as that of the front leg, it may not dry off as fast and may accumulate more dirt. Scott and Miller (2010) describe EPD more commonly as a bilaterally symmetrical condition, in contrast to our findings. Of the 33 affected horses only nine developed bilateral symmetrical symptoms. This may be a consequence of the acute nature of EPD in our study, while clinicians in referral practice mainly see chronic cases that have progressed to a bilateral distribution pattern.

Once the horses were no longer turned out on the pastures at the beginning of November, the majority of the lesions went into remission, probably because the limbs were no longer exposed to as much moisture. Many authors propose moisture as a contributing factor to the development of EPD as symptoms frequently appear during wet periods and tall pasture grass.[1–4,12] Our data support this proposition. Particularly, the much lower humidity in 2015 compared to the previous year is probably a reason that only nine horses developed EPD lesions, whereas 24 horses were affected in 2014.

Cocci and rod-shaped bacteria frequently were identified on cytological investigation. The bacterial cultures of the second year revealed that *S. aureus* was present in almost all samples. Thomas et al. (2009) identified *S. aureus* as the most common pathogen in 75.0% of the examined horses.[12] However, after clinical remission,

cultures were negative for fungi and staphylococci implying that infection is influencing the progression and possibly the development of EPD lesions.[12] Another study isolated *S. aureus* in three of 12 cases as the second most frequent pathogen after β-haemolytic streptococci.[24] *Staphylococcus aureus* is an important opportunistic pathogen, which uncommonly causes primary infections.[25] In our study, susceptibility testing demonstrated that there were two resistant *S. aureus* strains underlining the importance of susceptibility testing before the use of systemic antibiotics.

Dermatophilosis is a disease distinctively associated with wet skin and coat.[2] However, *D. congolensis* was found neither on cytological investigation, where it presents as coccal bacteria forming the classical "railroad-tracks",[25] nor on culture. As samples were not cultured in a CO_2-rich environment conducive to *D. congolensis* growth,[26] an additional evaluation with a recently reported PCR technique was conducted.[20] Although the negative PCR results could be the consequence of different *D. congolensis* strains in Germany compared to the USA, dermatophilosis has only occasionally been identified in horses with EPD.[2,24,27] Therefore, EPD was most likely caused by the interaction of moisture and bacteria such as *S. aureus* in our study population.

EPD frequently recurs within the same season under similar weather conditions and circumstances each year. Therefore, preventative intervention would be desirable. Unfortunately, the tested spot-on (Dermoscent PYOspot, LDCA) was not able to prevent EPD in our study. In previous years, the first EPD cases occurred in September, so the spot-on applications were begun in early August. Two weeks later, the first clinical signs were observed in some horses. It is possible that two applications of the spot-on before disease onset was too short a regimen for effective prevention. The ingredients of the tested spot-on, a plant extract called PhytoC-2, and a mixture of essential oils, are reported to have antimicrobial activity,[17,18,28] thus we continued treatment after horses were affected by EPD. In general, recommendations for EPD management include dry, hygienic stables, reduced exposure to plant-derived, environmental and chemical irritants, crust removal with antimicrobial washes, and systemic antibiotics in case of severe bacterial infection. Topical antimicrobial products can reach a high local concentration in the skin with a reduced risk of systemic adverse effects.[16] Moreover they can facilitate the removal of crusts, debris and bacteria.[29,30] Horses that were treated with either the placebo or spot-on containing PhytoC-2 had significantly lower lesion scores when compared to the untreated horses. There was no statistical difference between the two spot-on subgroups which might be a result of the therapeutic effect of the essential oils, omega-3 and omega-6 fatty acids, in both the placebo and the tested-spot-on. The addition of phytosphingosine did not influence the therapeutic outcome in this study. However, the positive clinical outcome in the placebo group also may be attributable to the very low number of affected horses, all of whom had only mild to moderate lesion scores. A trend toward earlier remission in the horse limbs that were treated with the PhytoC-2 spot-on could be observed when compared to the nontreated horses. In summary, essential fatty acid spot-on therapy has the potential to decrease the severity and also hasten the recovery of EPD lesions. Further research in larger populations of EPD-affected horses is needed, to determine the full potential of topical treatment of EPD with essential fatty acids and antibacterial components.

This study has several limitations. First, dose-finding studies on the amount of spot-on needed in the fetlock area are lacking. Possibly the 0.6 mL that was chosen for practical reasons was not enough. Secondly, the young horses were untrained and unfamiliar with human handling, thus the spot-on could only be applied superficially without parting the hair, shaving affected areas or removing crusts. As hair is the first barrier of the skin against exogenous factors,[31] perhaps insufficient spot-on reached the skin surface. Lastly, the horses nibbled their fetlocks after the application of the spot-on probably owing to the scent, possibly removing some of the topical agents. All horses were monitored for 1 h after spot-on application and this behaviour ceased within 30 min. No other adverse effects were observed.

Conclusions

This study showed that EPD is a syndrome, which can be self-limiting even without treatment of any type, provided that the causative factors are addressed. In our study, nonpigmented limbs were predisposed to developing EPD. An interaction between moisture and opportunistic pathogens such as *S. aureus* appears to be a factor triggering the disease. The tested formulation containing essential fatty acids and aromatic oils with an antibacterial phytosphingosine applied topically with a syringe without direct skin contact once weekly did not prevent EPD. However, both essential fatty acid spot-ons resulted in an alleviation of clinical signs.

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Conflicts of interest

None of the authors has any conflict of interest to report. Laboratoire de Dermo-Cosmétique Animale (LDCA), the company manufacturing PYOspot and Essential 6, sponsored research and lectures by Ralf Mueller in the past and provided the topical formulations for this and other studies. No other conflicts of interest were present. However, Ralf Mueller has been a consultant, lecturer, or has received financial support for other studies from Artu Biologicals, Bayer Animal Health, Boehringer, Dechra, Elanco Animal Health, Greer Laboratories, Idexx Laboratories, Hill's, Merial, MSD, Novartis, Royal Canin, Selectavet, Synlab, Virbac and Zoetis.

Author contributions

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Natalie K.Y. Gedon: Data curation, Formal analysis, Validation, Visualisation, Writing original draft, Writing review and editing. **Yury Zablotski**: Data curation, Formal analysis, Validation, Visualisation, Software, Writing review and editing. **Stephen A. Kania**: Data curation, Formal analysis, Investigation, Methodology, Resources, Software, Writing original draft. **Harald F. Kühnle**: Conceptualisation, Data curation, Investigation, Project administration, Writing original draft. **Christoph Kühnle**: Conceptualisation, Data curation, Investigation, Project administration, Writing original draft. **Ralf S. Mueller**: Conceptualisation, Data curation, Formal analysis, Funding aquisition, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualisation, Writing original draft, Writing review and editing.

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Résumé – Contexte - La dermatite du paturon équin (EPD) est un syndrome clinique multifactoriel courant chez les chevaux. Le traitement peut être difficile ; la pathogénie et les facteurs déclenchants ne peuvent pas toujours être déterminés. **Objectifs** – Évaluer les facteurs de risque de développement d'EPD dans un grand groupe de chevaux gardés dans les mêmes conditions et analyser si un spot-on contenant des acides gras essentiels et des agents antimicrobiens est capable ou non de prévenir le développement d'EPD ou d'accélérer le processus de guérison. **Animaux -** Chaque année, 50 jeunes chevaux à sang chaud appartenant à des particuliers ont été inclus de manière prospective. **Méthodes -** Tous les chevaux ont été examinés chaque semaine entre août et octobre pour la présence de lésions cutanées typiques d'EPD. De plus, la première année, les chevaux ont été divisés au hasard en trois sous-groupes d'intervention. Les zones de paturon ont été traitées une fois par semaine soit avec 0,6 ml d'un spot-on contenant des acides

gras essentiels et des huiles aromatiques, soit avec une préparation contenant de la phytosphingosine antibactérienne supplémentaire, soit pas du tout. **Résultats** – Les zones de paturon non pigmentées étaient significativement plus souvent touchées que les zones de paturon pigmentées (*P < 0,0001*). L'interaction entre l'humidité et les pathogènes opportunistes semble être un facteur déclenchant majeur de l'EPD. Il n'y avait pas de différence dans la survenue d'EPD dans les trois sous-groupes. Les scores de lésions des membres affectés dans les deux groupes spot-on étaient significativement inférieurs à ceux du groupe témoin. **Conclusion et importance clinique** – Humidité et absence de pigmentation prédisposant à l'EPD. L'application topique du spot-on testé une fois par semaine n'a pas empêché la maladie. Un effet positif des deux produits spot-on sur la sévérité des lésions EPD a été détecté.

RESUMEN – Introducción- la dermatitis de la cuartilla equina (EPD) es un síndrome clínico multifactorial común en los caballos. El tratamiento puede ser difícil; la patogenia y los factores desencadenantes no siempre pueden determinarse.**Objetivos**- evaluar los factores de riesgo para desarrollar EPD en un gran grupo de caballos mantenidos en las mismas condiciones y analizar si una aplicación local de un producto que contiene ácidos grasos esenciales y agentes antimicrobianos puede prevenir el desarrollo de EPD o acelerar el proceso de curación.**Animales**- cada año se incluyeron prospectivamente 50 caballos jóvenes warmbloods de propiedad privada.**Métodos**- todos los caballos fueron examinados semanalmente entre agosto y octubre para detectar la presencia de lesiones cutáneas típicas de EPD. Además, en el primer año, los caballos se dividieron aleatoriamente en tres subgrupos de intervención. Las áreas de la cuartilla se trataron una vez por semana con 0,6 ml de un producto local que contenía ácidos grasos esenciales y aceites aromáticos, o con una preparación que contenía fitofingosina antibacteriana adicional, o no se trató en absoluto.**Resultados**- las áreas de la cuartilla no pigmentadas se vieron afectadas con mucha más frecuencia que las áreas de la cuartilla pigmentadas (*P* < 0,0001). La interacción entre la humedad y los patógenos oportunistas parecía ser un importante factor desencadenante de la EPD. No hubo diferencia en la aparición de EPD en los tres subgrupos. Los valores adjudicados a las lesiones de las extremidades afectadas en ambos grupos en los que ser realizó tratamiento local fueron significativamente más bajas en comparación con el grupo control.**Conclusión e importancia clínica** – la humedad y falta de pigmentación predisponen a EPD. La aplicación tópica de un producto local una vez a la semana no previno la enfermedad. Se detectó un efecto positivo de ambos productos locales al disminuir la gravedad de las lesiones de EPD.

Zusammenfassung – Hintergrund – Die bakterielle Entzündung der Fesselbeuge (EPD) beim Pferd ist ein häufiges multifaktorielles Syndrom bei Pferden. Die Behandlung kann schwierig sein; Pathogenese und auslösende Faktoren können nicht immer festgestellt werden. **Ziele** – Eine Erfassung der Risikofaktoren, die zur Entwicklung einer EPD bei einer großen Gruppe von Pferden, die alle unter denselben Bedingungen gehalten wurden, führen, sowie eine Analyse ob ein Spot-on mit essenziellen Fettsäuren und antimikrobiellen Bestandteilen in der Lage ist, die Entwicklung von EPD zu verhindern, oder den Heilungsprozess zu verbessern. **Tiere** - Jedes Jahr wurden 50 junge Warmblüter in Privatbesitz prospektiv inkludiert. **Methoden** – Alle Pferde wurden zwischen August und Oktober wöchentlich auf das Auftreten von typischen EPD Hautveränderungen untersucht. Zusätzlich wurden die Pferde im ersten Jahr zufällig in drei Untergruppen unterschiedlicher Eingriffe aufgeteilt. Die Fesselgegend wurde einmal wöchentlich entweder mit 0,6mL eines Spot-ons, welches essenzielle Fettsäuren und aromatische Öle beinhaltete oder mit einem Präparat, welches noch zusätzlich Phytosphingosine enthielt oder gar nicht behandelt. **Ergebnisse** – Nichtpigmentierte Fesselregionen waren signifikant häufiger betroffen als pigmentierte Fesselregionen (*P* < 0,0001). Die Interaktion zwischen Feuchtigkeit und opportunistischen pathogenen Keimen schien ein hauptsächlich auslösender Faktor für eine EPD zu sein. Es bestand kein Unterschied beim Auftreten der EPD zwischen den drei Untergruppen. Die Bewertungen der Veränderungen von betroffenen Extremitäten in beiden Spot-on Gruppen war signifikant niedriger im Vergleich zur Kontrollgruppe. **Schlussfolgerungen und klinische Bedeutung** – Feuchtigkeit und Mangel an Pigment prädisponieren zu EPD. Eine einmal wöchentliche topische Applikation des getesteten Spot-ons konnte die Krankheit nicht verhindern. Es wurde eine positive Auswirkung beider Spot-on Produkte auf den Schweregrad der EPD Veränderungen gesehen.

概要 – 背景 - 馬繋蹯(EPD) は馬によくみられる多因子性の臨床症候群である。治療は困難であり、病因や誘発因子は必ずしも特定できない。目的-本研究の目的は、同一条件下で飼育された大規模な馬群におけるEPD発症の危険因子を評価し、必須脂肪酸および抗菌剤を含むスポットオン製剤がEPD発症の予防または治癒過程の促進に有効であるか否かを分析することであった。供試動物-毎年、50頭の若いオーナー所有のウォームブラッドを前向きに組み入れた。方法 - 8月から10月の間、すべての馬を毎週検査し、典型的なEPD皮膚病変の有無を確認した。さらに、初年度は、馬を無作為に３つのサブグループに分け、介入を行った。馬の肩甲骨部は、必須脂肪酸とアロマオイルを含む0.6mLのスポットオン剤、または抗菌性フィトスフィンゴシンを含む製剤で週1回治療するか、まったく治療しないかのいずれかにした。結果 - 色素沈着していない繋部は、色素沈着している繋部よりも有意に高い頻度で罹患していた (P < 0.0001) 。水分および日和見病原体の相互作用がEPDの主要な誘発因子であると思われた。3つのサブグループにおいてEPDの発生に差はなかった。両スポットオン群における患肢の病変スコアは対照群に比べ有意に低かっ

た。結論と臨床的重要性 - 水分および色素沈着の欠如が EPD の素因となった。試験したスポットオン製剤を週1回外用しても、本疾患を予防することはできなかった。EPD病変の重症度に対して、両スポットオン製品のポジティブな効果が検出された。www.DeepL.com/Translator (無料版) で翻訳しました。

摘要 – 背景-马骸皮炎(EPD)是马中常见的多因素临床综合征。治疗可能很困难; 发病机制和触发因素经常无法确定。目的-评估在相同条件下饲养的大量马中发生EPD的风险因素, 并分析含有必需脂肪酸和抗菌剂的滴剂是否能够预防EPD的发生或加速愈合过程。动物-每年前瞻性纳入50匹年轻、私人所有、温血马。方法-8月至10月期间每周检查所有马是否存在典型的EPD皮肤病变。此外, 在第一年, 将马随机分为三个干预亚组。骸区域每周用0.6 mL含有必需脂肪酸和芳香油的滴剂,或含有额外抗菌植物鞘氨醇的制剂治疗一次, 或根本不治疗。结果-无色素骸区域的发病频率显著高于有色素骸区域(P < 0.0001)。潮湿和条件致病菌之间的相互作用似乎是EPD的主要触发因素。3个亚组EPD的发生无差异。与对照组相比, 两个滴剂组的患肢病变评分均显著降低。结论和临床重要性–潮湿和无色素沉着易发EPD。每周1次局部应用滴剂的试验不能预防该病。检测到两种滴剂产品对EPD病变严重程度的积极作用。

Resumo – Contexto – A dermatite de quartela equina (DQE) é uma síndrome clínica multifatorial em cavalos. O tratamento pode ser difícil; a patogênese e os fatores desencadeantes nem sempre podem ser determinados. **Objetivos** – Avaliar os fatores de risco para o desenvolvimento de DQE em um grande grupo de equinos mantidos sob as mesmas condições e analisar se um produto *spot on* contendo ácidos graxos essenciais e antimicrobianos é capaz de prevenir o desenvolvimento de DQE ou acelerar o processo de cicatrização. **Animais** – A cada ano, 50 cavalos de sangue quente, jovens, de proprietários foram incluídos prospectivamente. **Métodos** – Todos os cavalos foram examinados semanalmente entre agosto e outubro investigando-se a presença de lesões cutâneas típicas de DQE. Além disso, no primeiro ano, os cavalos foram divididos aleatoriamente em três subgrupos de intervenção. As quartelas foram tratadas semanalmente com 0,6ml de um spot on contendo ou ácidos graxos essenciais e óleos aromáticos, ou uma preparação contendo fitoesfingosina antibacteriana adicionalmente, ou nada. **Resultados** – A frequência de lesões em quartelas despigmentadas foi significativamente mais frequente que em quartelas pigmentadas (*P* < 0,0001). A interação entre umidade de patógenos oportunistas parece ter sido o principal fator desencadeante da DQE. Não houve diferença na ocorrência de DQE nos três subgrupos. Os escores de lesões nos membros afetados em ambos os grupos de spot on foi significativamente menor comparado ao grupo controle. **Conclusão e importância clínica** – Umidade e despigmentação foram fatores predisponentes de DQE. A aplicação tópica dos produtos *spot-on* testados uma vez por semana não preveniu a doença. Detectou-se um efeito positivo em ambos os produtos *spot on* na gravidade das lesões de DQE.

