

Clinical Effect of Local Antibiotic Treatment of Digital Dermatitis Lesions and Detection of Spirochetes by Means of PCR

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Introduction

The etiology of digital dermatitis (DD) remains to be fully understood. The disease has been associated with the presence of anaerobic bacteria, though, which most likely are spirochetes (Walker et al., 1997).

The purpose of the study was to monitor the clinical healing process and the recurrence of lesions after topical antibiotic spray treatment. The presence of spirochetes in superficial wound smears taken during the course of the disease was monitored by polymerase chain reaction (PCR).

Materials and Methods

Field trials were carried out at two locations. One trial was done in southern Germany (G) using chlortetracycline, and the other one in Michigan USA (MI) where lincomycin was used. In each treatment trial the sample cohort was 12 lactating cows suffering from acute lesions of DD. Six cows were randomly assigned to the experimental group, which was treated for 3 consecutive days. The remaining 6 animals served as a control for 5 days before they were treated according to the same protocol.

The healing process was monitored during a follow-up period of 2 months.

Clinical findings were recorded on a foot-examination protocol and transformed into clinical scores representing the severity of the lesion. Observed DD lesions were assigned to 4 stages of the disease: early stages (M1), classical ulcer or mature lesion (M2), healing stages (M3) and other skin alterations with a known history or suspected association with DD (M4) (Döpfer et al., 1997). Superficial wound smears were taken before treatment and during the follow-up period, and were

subjected to PCR analysis for spirochetal 16S RNA using specific primers (Rijpkema et al., 1997).

Pearson's Chi Square test and multivariate analysis of variance (MANOVA) were used to test for an association of PCR results and clinical scores.

Results

Topical treatment resulted in rapid clinical improvement and recovery in both study groups. No improvement of lesions occurred during the control period.

Recurrences of the classical ulcer (M2) were detected in each study group. The MI trial had one case of a recurrent M2 lesion (8%) and the study group G had two cases (16%) of M2 lesions. Recurrences of small lesions (M1) were recorded in most (88%) animals 14-28 days after first treatment. Before treatment, 86% of M2 lesions had positive PCR results. On day 5 the PCR results were negative for the healing lesions in 83% of all treated M2 cases. A significant difference in the clinical scores between control and therapy groups was found using general linear models with repeated measures analysis.

No statistically significant differences of clinical scores were found between the treatment group and the control group after therapy.

PCR results were significantly different between treatment and control group in both trials. No significant difference was observed for PCR results of the treatment and the control group after therapy.

Conclusions

Results are compatible with an association of superficially detected spirochetes and clinical lesions of DD. Treatment of DD with either chlortetracycline or

lincomycin is effective in eliminating spirochetes from the surface of DD lesions as monitored by PCR.

References

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