LESION STAGE AND ITS EFFECT ON THE TREATMENT OF DIGITAL DERMATITIS

Thomas Hemling[1] • Harinath Bathina[1] • Joy Lising[1] • Joanne Siciliano-Jones[2] • Jordanna Calaman[2] • [1]West Agro, Inc., Kansas City, Missouri • [2]F.A.R.M.E. Institute, Homer, New York

The incidence rate for hairy heel warts has reached near epidemic proportions in the United States. Lameness resulting from this disease continues to plague the nation's dairies and the corresponding profit loss for each lame cow continues to rise. Decreased milk production, expensive treatment costs, contaminated and discarded milk and poor reproduction are just some of the ways in which hoof problems such as hairy warts can negatively impact the profitability of a dairy operation.[1] In this study, the correlation between the stage of the disease at which treatment is initiated and the effectiveness of treatment is investigated.

Common Diseases	*Cost per Case ($)*	*Cost per Cow ($)*
Clinical Mastitis	190	74
Lameness	**302**	**91**
LDA	340	31
Ketosis	145	22
Retained Placenta	285	31
Milk Fever	334	24

BACKGROUND

Hairy heel warts (digital dermatitis, papillomatous digital dermatitis or PDD) were first characterized in the 1970's. Since that time, as awareness of the disease has steadily increased, research has increased as well. While extensive studies have been conducted on specific treatment compounds and their effects, there has been minimal investigation into the various stages of the disease itself and their susceptibility and/or resistance to treatment. One of the objectives of this study was to examine initial lesion stage and treatment effect. One hundred seventy-four lesions total were evaluated in three blind studies. Effectiveness of treatments in reducing pain, color and size of the lesions was evaluated according to standard methods.[2,3]

TREATMENT PROCEDURE

1. An initial evaluation of the lesion is conducted.
2. The lesion is doused with 25 cc's of treatment product.
3. Eight grams of cotton balls are saturated with 35 cc's of treatment and placed directly against the lesion.
4. The cotton is anchored in place with a flexible bandage wrap.
5. Duct tape is wrapped fully around the bandage to protect it from moisture, dirt, etc.
6. After four days the bandages are removed and the lesions evaluated.

EVALUATION

Lesion evaluation is based on the following scoring criteria:

Score	*Color*	*Stage*	*Pain*	*Size*
0	Flesh	Healed, no lesion	No demonstrable pain	Actual measurement
1	Black	Proliferative	Sensitive	using a metric tape
2	Gray	Granulomatous	Severe	measure to the
3	White	Ulcerative		nearest 0.25 cm
4	Red			

RESULTS

Results are displayed in *Figures A* and *B*. "Improvement" is defined as a decrease in score of at least one full unit for color, stage, and pain and a minimum decrease in size of 0.25 cm. *Table 1* shows the means and average deviations for each of the evaluation criteria.

Fig. A

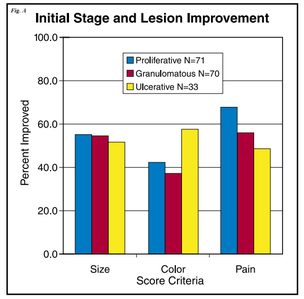

Fig. B

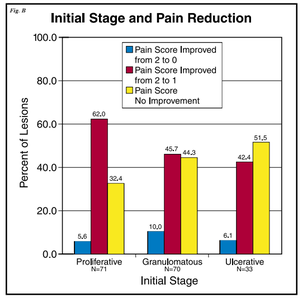

TABLE 1:

SIZE

Stage	*Count*	*Mean*	*Avg. Dev.*
Proliferative	71	-0.51	0.35
Granulomatous	70	-0.59	0.42
Ulcerative	33	-0.92	0.63

COLOR

Stage	*Count*	*Mean*	*Avg. Dev.*
Proliferative	71	-0.81	0.75
Granulomatous	70	-1.94	0.89
Ulcerative	33	-1.41	0.94

PAIN

Stage	*Count*	*Mean*	*Avg. Dev.*
Proliferative	71	-0.89	0.50
Granulomatous	70	-0.75	0.62
Ulcerative	33	-0.68	0.52

DISCUSSION

Previous published and unpublished research has shown a range of effectiveness for treatment products for PDD. It has also been reported that products effective in one trial are less effective or not effective in another trial. Potential reasons for the trial to trial difference can be attributed to a range of factors including: housing conditions, weather, nutrition, and method of application. Given the relative small sample size used in most of the reported trials (10-20 lesions per treatment) the distribution of the initial stage of the lesions between different treatment products could bias the outcome. Some researchers have speculated that a cure is most likely if the treatment is initiated when the lesion is in the ulcerative stage. In this paper we have attempted to determine if there is a correlation between the initial stage of the lesion and the treatment results.

In *Figure A*, the results indicate that reduction of size is not differentiated based on initial stage. The ulcerative Stage 3 lesion showed the greatest color change. Stage 1 proliferative lesion showed the greatest improvement in pain.

In *Figure B*, the results were sorted by the initial stage. As presented in this manner it is apparent that for this data set there is a low number of lesions that improved from severe pain to no pain during the 4 day bandage trials. If we look at both pain score improvements of 2 or 1, then the proliferative stage showed the greatest response to treatment.

CONCLUSIONS

The data analyzed in this paper does not support the hypothesis that ulcerative lesions are more likely to show a favorable response to treatment. This data set may be biased, however, by the relatively low number of ulcerative lesions or by the low level of effectiveness of the treatment products. In the future, we plan to collect data on more effective products and conduct statistical analysis to determine if a correlation between initial stage and treatment outcome exists.

REFERENCES

1. Guard, C., 1997, The Cost of Lameness, Hoof Trimmer's Association Hoof Health Conference Proceedings.
2. Hemling, T.C., J. Lampe, 1998, Field Trial Models for the Evaluation of Hairy Wart Treatment Products, NMC Annual Meeting Proceedings.
3. Britt, J.S., S.L. Berry, J. Shearer, T. Hemling, B. Steevens, M. Dreher, 1999, A Uniform Protocol for Evaluating Response to Treatment of PDD Lesions, The Bovine Practitioner, 33: 2, 149-154.