



Clinical Assessment of Four Individual Treatment for Digital Dermatitis in Dairy Cows

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Abstract

Objective- To find out the best choice for complete recovery of digital dermatitis using four individual topical treatments.

Design- clinical field trial

Animal- 550 dairy cows

Procedure- The trials were begun in March and finished in August 2005 in a dairy farm including 550 milking cows in the vicinity of Tehran. The prevalence of digital dermatitis (DD) was 23%. 126 cows with DD were selected (Median Lameness Score of 3 “4-ordinal scale”) and allocated randomly in one of the four following groups of treatment regarding the lesion scoring of 3. A. Topical spray of lincomycin HCL (n=41), B. Topical dressing with Solka Hoofgel (n=32), C. Topical dressing with Solka Hoofgel + bandage (n=22) and D. Surgical removal of mass and following dressing of wounds with Solka Hoofgel + bandage (n=31). The measurements were statistically analyzed based on non parametric analysis of Variance “Kruskal Wallis “ test at each observation at a 0.05 level of significance and analysis of Covariance to compare the slopes of each linear equation.

Results- After treatment in all groups the size of lesions decreased in a few days, especially in groups C and D. The speed of wound healing were statistically significance in group C and D the rate of wound healing is also was shown to be more grater than groups A and B.

Conclusion and Clinical Relevance- Dressing of DD lesion with Solka Hoofgel when accompanied with bandage application either in active form or after surgical removal of the chronic tissues significantly reduce the lesion size with complete re-epithelialization in a short period of time.

Key words- Dairy cow, Digital Dermatitis, Solka Hoofgel

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Introduction

Digital dermatitis (DD) is a contagious superficial inflammation of the epidermis proximal to the coronal margin of the interdigital space. This disease was described first in Italy by Cheli and Mortellaro (1974) and now-a-days it is a cosmopolitan disease.

Recent survey indicates that up to 85% of dairy cattle can be infected by heel warts (Digital Dermatitis). Lameness has now become the first largest dairy cow health challenge in the Iran. Despite this many producers are adapting only minimal preventive measures allowing the problem to prevail on their farms. Heel warts cause severe pain, restrict mobility, decrease of feed intake and heat signs which in turn reduce milk yield. The actual cost per cow per year in a herd with 20% infection level has been estimated at \$168. For a 500 cow herd this equals to \$84,000 per year.

The clinical profile of the disease has not been exactly determined. DD occurs in three stages as early, intermediate and mature forms and each episode has its own clinical entity, such as erosive, ulcerative, papillomatous and warts.² Despite evidences about the effectiveness of systemic antibiotic therapy³ several other reports suggest that this procedure isn't effective of what is anticipated.⁴

Group treatment is suggested in outbreaks of disease and individual treatment is more effective procedure but it has more cost. It seems individual topical treatment is necessary and useful in the chronic form of disease.

The aim of the present study was to assess the capability of four individual treatments for DD disease in affected dairy cows. Also, complete recovery from lameness, treatment time and recurrence of lesions in each procedure were evaluated. In this regard various treatment policy that consist of surgical removal of DD lesions especially in chronic cases, topical treatment with various disinfectants or antibiotics, cryosurgery or electrocautery topical treatment under bandage^{5,6} and use of commercial agents such as Solka Hoofgel® have been recommended.

Materials and Methods

This trial was began in March and ended in August 2005 in one dairy farm in the vicinity of Tehran with 550 milking cows and the prevalence rate of 23% of digital dermatitis. One hundred twenty six cows with DD selected (Median lameness score of 3rd 4th-ordinal scale “) ⁷ and randomly allocated in one of four following groups:

- A) Treated with (1/5 g/l) spray of lincomycin HCL (n=41)
- B) Topical dressing with Solka Hoofgel® (Kanters Special Products BV, Netherlands) (n=32)
- C) Topical dressing with Solka Hoofgel® + bandage (3M Vetrap™, Banding Tape, Germany) (n=22)
- D) Surgical removal of the lesion and dressing of the wounds with Solka Hoofgel® + bandage (n=31)

The recovery process was evaluated by detecting the size of the lesions; therefore the wounds were photographed before the treatment and at the following days till total epithelial coverage. In all wounds the mid horizontal and mid vertical dimensions (in centimeters) of the total wound size (A) and wound bed (B) were recognized and the square root of the area for B, epithelialization [E=A-B] contraction [C=area of original wound (Ao)-A] and subjective observation were determined. (Fig. 1.)

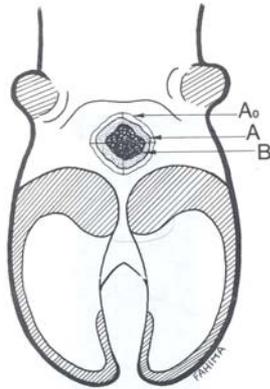


Figure 1. Schematic illustration of the wound area measured from the photographs.
 A₀: Original wound area
 A: Area inside the epithelial edge
 B: Area of wound bed

Changes measurement were statistically analysis based on non parametric analysis of Variance “Kruskal Wallis” test at each observation at a 0.05 level of significance and analysis of Covariance to compare the slopes of each linear equation.

Results

The results of measurements were shown in table1.

After treatment in all groups the size of lesions decreased in few days, especially in groups C and D which were under Solka Hoofgel® a lone and application of bandage respectively. The speed of wound healing were statistically significance ($p < 0.05$).in group C and D the rate of wound healing is also was shown to be more grater than groups A and B (Table1).

Table 1. The results of measurements of healing wounds of Digital dermatitis

Treatment group	Rate of wound healing(cm/day)	Slopes of linear equation
A) Topical spray of Lincomycin HCL	0.38	-0.34
B) Topical dressing with Solka Hoofgel®	0.33	-0.39
C) Topical dressing with Solka Hoofgel® +bandage	0.56*	-0.46*
D) Surgery removal of mass and following dressing of wound with Solka Hoof gel®+bandage	0.65*	-0.43*

Discussion

Based on clinical and histopathological evidences healing process in DD lesions followed by granulation tissue formation, contraction and finally epithelial cell coverage, therefore as these processes accomplished faster, we can expect to better result from treatment and less lesion recurrence.

Several published data show positive effects of non-antibiotic treatments of DD, especially when applied topically for the individual animals, in these trials copper sulfate, peroxide and cationic agents were used as spray or cream^{8,9,10} In addition Holzhauser showed the therapeutic effect of Solka Hoofgel® in DD lesions.¹¹

Pospicher and Kofler (2000) used topically a mixture containing organic acids, essential oils and salts of potassium, zinc, copper and aluminum at low pH for treatment of DD successfully. Also in an other research these authors showed that topical applications of commercial non-antibiotic product (Protexin®) for treatment of DD results a significant improvement within 4 to 10 days after the first treatment.¹²

Pediline® the other non antibiotic product by formulation near to Solka Hoofgel® are used effectively for treatment of DD either in footbath or local application (spray).¹³

Also use non-antibiotic compounds maybe desirable because of environmental, milk residue and resistance problems of antibiotics.¹³ There is several kind of non antibiotic product such as creams, gels and solutions that can be used as footbaths or spray but because of high constancy of gels use of these products will be make better results.^{14,15,16}

This commercial product (Solka Hoofgel®) containing of cheolated minerals (copper/zinc), organic acids (lactic acid, acetic acid), binding agent, stabilizers and emulsifiers. The convincing results of the non-antibiotic Solka Hoofgel® for the treatment of digital dermatitis, is inhibited by the antimicrobial effect of the components of formulation of the gel. These organic acids and the cheolated minerals have antiseptic activity.^{14,15,16} The low pH of about 2 of this non-antibiotic compounds prevents bacterial growth.¹⁵ In this regard various treatment policy that consist of surgical removal of DD lesions especially in chronic cases, topical treatment with various disinfectants or antibiotics, cryosurgery or electrocautery topical treatment under bandage^{5,6} and use of commercial agents such as Solka Hoofgel® have been recommended.

As Solka Hoofgel® contains some binding agents that provides better act of ingredients of gel. Also wounds covering with bandage increase this virtue. However this results requires further study.

Our results suggest that unless the good effects of all four methods, dressing of digital dermatitis lesions with Solka Hoofgel® and subsequent application of bandage either in active form or after surgical removal of the chronic tissues are significantly reduce the lesion size with complete re epithelialization in a short period of time and prevents recurrence of DD lesion.

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ارزیابی بالینی چهار روش درمان درماتیت انگشتی در گاوهای شیری

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هدف- بررسی چهار شیوه درمان انفرادی درماتیت انگشتی و برگزیدن روش درمانی که در کوتاهترین زمان ممکن منجر به بهبودی کامل گردد

طرح مطالعه- کار آزمایشی بالینی میدانی

حیوانات- ۵۵ راس گاو شیری در دامداری با شیوع ۲۳٪ درماتیت انگشتی

روش کار- ۱۲۶ راس دام مبتلا به درماتیت انگشتی با درجه لنگش ۳ انتخاب گشته و بصورت تصادفی در معرض این چهار شیوه درمانی قرار داده شدند. روشهای حاضر شامل: اسپری لینکومایسین هیدرو کلراید در ۴۴ راس گاو، استفاده از سولکا هوف ژل موضعی در ۳۲ راس دام، استفاده از سولکا هوف ژل و بانداژ موضع در ۲۲ راس گاو، برداشت جراحی و بکار بردن سولکا هوف ژل و متعاقبا بانداژ موضع در ۳۱ راس دام. بمنظور بررسی آماری از آزمون ناپارامتری کراسکال والیس و متعاقبا آنالیز کوواریانس استفاده گردید.

نتایج- نتایج حاصل از مطالعه فوق مبین آنست که استفاده از سولکا هوف ژل و بانداژ در فرم فعال ضایعه یا پس از برداشت جراحی در موارد مزمن، بصورت معنی داری سبب کاهش سایز زخم و راپیتلیزاسیون کامل طی زمان کوتاهی میگردد.

نتیجه گیری و کاربرد بالینی- بدنبال استفاده موضعی از سولکا هوف ژل تاثیرات معنی داری در روند التیام ضایعات ناشی از درماتیت انگشتی رخ میدهد.

کلید واژگان- گاو شیری، درماتیت انگشتی، سولکا هوف ژل.