

Treatment of Udder Cleft Dermatitis with Repiderma

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1 Introduction

Udder Cleft Dermatitis (UCD) is a necrosis of the skin with foul odor, with an approximately 2-10-cm-diameter lesion located at the cranial edge of the cleft between the two cranial quarters, although it can also be centered between all four quarters. More common in heifers but can be present at all stages of lactation and during the non-lactating period. Pathogenic anaerobic bacteria have been recovered from these lesions.

2 Etiology

Characteristic features of Udder Cleft Dermatitis are a moist appearance, necrosis of skin and a foul odor. Udder cleft dermatitis is well known in the field, however relatively little is described in the veterinary literature. Thus far, the etiology and treatment of UCD are unknown or disappointing. Udder cleft dermatitis are foul-smelling areas of moist dermatitis that result from pressure necrosis of skin. Common locations include the lateral udder on the ventral midline immediately adjacent to the median septum of the fore-udder. Pressure necrosis is enhanced by frictional injury and udder movement. The abraded skin oozes serum, which leads to moist dermatitis. Finally, opportunistic anaerobic bacteria such as *Fusobacterium necrophorum* and *A. pyogenes* invades and propagate the necrosis of the skin.

2.1 Prevalence

The GD Deventer investigated in 2011 the prevalence of the disease at 20 Dutch dairy farms. In total 1143 cows were examined. At 85 percent of the investigated farms the problem Udder Cleft Dermatitis occurred. Farm level prevalence's ranged between 0.0% and 14%. An interesting in the publication was that none of the used therapies (*CTC spray*, based on chlortetracycline, *Naxcel*, based on ceftiofur sodium and *Tylan* based on tylosin) were effective.

A study done by Warnick in 2002 examined the udder cleft dermatitis in America. In total 1,597 Holstein cows were examined. Of the 1,597 cattle examined, 280 (18%) had udder cleft dermatitis. The study suggest that cows in any stage of lactation and cows that are not lactating can have udder cleft dermatitis but that lesions are more common in older cows.

3 Repiderma

Intra Repiderma contains two active ingredients in spray form. Both components are required, as these components have a different clinical effect and thus provide a two-way mechanism for an effective skin treatment: Zinc is mainly incorporated for its effect on wound repair and copper is mainly incorporated for its anti-microbial properties, while it also has an effect on wound repair but with a different mechanism of action. This way Repiderma treatment is based on inhibiting the cause of the disease (bacterial infection) as well as stimulating healing of the large open lesion.

4 Mode of action

4.1 Antimicrobial properties copper

The bactericidal properties of copper have been known for many years. It has been used as a disinfectant for veterinary purposes and in the food industry. Copper sulphate, for example, has been used for many years as a disinfectant if footbaths for cattle (Epperson and Midla, 2007).

Copper at low concentrations is required for living organisms including bacteria. At higher concentrations however, copper can be bactericidal or bacteriostatic. These effects can be caused by different mechanisms including substitution of essential ions and blocking of functional groups of proteins, inactivation of enzymes, production of hydroperoxide free radicals by membrane bound copper and alterations of membrane integrity (Faúndez, 2004).

4.2 Wound healing properties of copper

Besides the earlier mentioned bactericidal and bacteriostatic effects, copper has also an effect in wound repair (Sen, 2002). An important phase in the wound healing is the angiogenesis (the formation of new blood vessels). The most prevalent factor to stimulate this process is the vascular endothelial growth factor (VEGF) (Stefanini, 2008). The expression of VEGF is copper sensitive: when Cu^{2+} was topical applied, wound healing was accelerated.

Another effect of topical Cu^{2+} was the accelerated secondary healing and contraction of dermal wounds in humans (Sen, 2002). The authors concluded that copper-based therapeutics are a feasible approach for wound healing.

4.3 Wound healing properties of zinc

Zinc is an essential element in both animal and humans. It serves as a co-factor in numerous transcription factors and enzyme systems including zinc-dependent matrix metalloproteinase's that augment auto debridement and keratinocyte migration during wound repair (Lansdown, 2007). Zinc confers resistance to epithelial apoptosis through cytoprotection against reactive oxygen species and bacterial toxins possibly through antioxidant activity of the cystein-rich metallothioneins.

Zinc deficiency of hereditary or dietary cause can lead to pathological changes and delayed wound healing. Topical administration of zinc appears to be superior to oral therapy due to its action in reducing super-infections and necrotic material via enhanced local defense systems and collagenolytic activity, and the sustained release of zinc ions which stimulates epithelialisation of wound (Lansdown, 2007).

4.4 Chelated forms of copper and zinc

Often copper and zinc are used as inorganic form (e.g. copper sulphate, zinc chloride, etc). In Repiderma the copper and zinc organic chelated complexes. This allows a deeper penetration into cells / skin layer which gives rise to a better efficacy of the product as the infectious diseases are often also present in deeper skin layers. This improved efficacy has been demonstrated in different practical field trials.

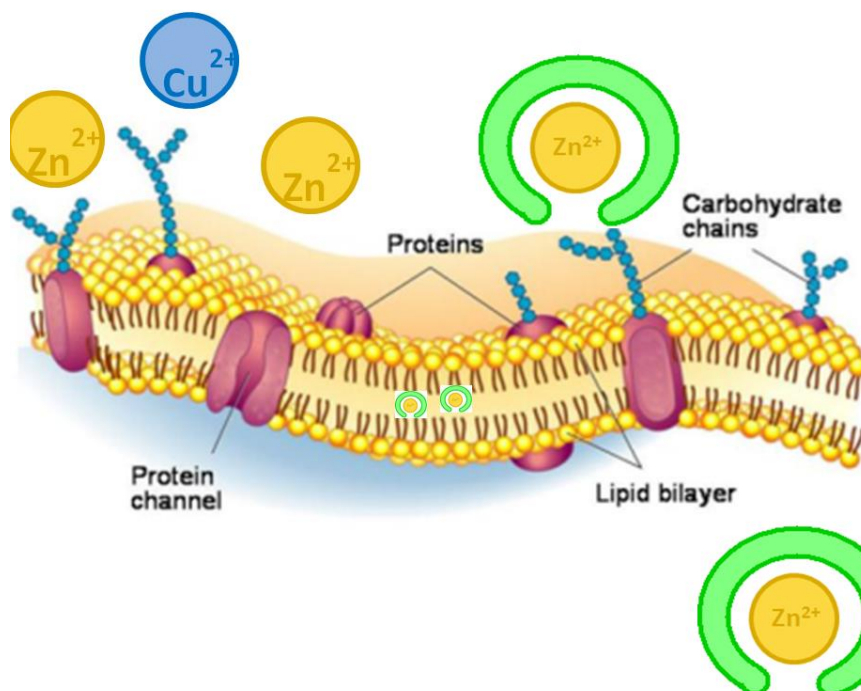


Figure 1.- Simulation of the penetration of chelated zinc and copper in comparison with ionized zinc and copper

5 Materials and Methods

Farm 1: *Toon van de Ven, Hooghoutseweg 23, 5074 NA Biezenmortel, the Netherlands*

Number of animals treated with Repiderma: 4

Treatment scheme: first day 2 times a day and thereafter one time a day during two weeks.

Cow: Holstein Friesian cow

Farm 2: *Lloyd Vandenberg, Lloyd Vandenberg Dairy Ltd, Coalhurst, AB T0L 0V0, Canada*

Free-stall barn: cows always inside, alley scraper manure system, 100 lactating and dry cows,

Number of animals treated with Repiderma: 1

Treatment scheme:

Day 0, 1, 2 were treated in a hoof trimming chute. The skin was pulled open to get the optimum coverage. A picture was taken on this day.

Day 3, 4, 5: Cow was treated in a parallel parlor, the skin was not pulled open while spraying.

Day 8, 9, 10, 11, 12, 14: the wound was sprayed in the parlor and the skin was pulled open to get a better coverage.

Day 15: The wound was inspected in the chute



Photo 1. Farmer T. van de Ven at Biezenmortel with his son

6 Results

6.1 Results the Netherlands

Of the four cows, three are cured and one is cured for 80%. Also this farmer experienced that other treatment schemes are not effective, he worked with CTC-spray and Zinc Spray without any results or a minor effect and when you stop the treatment the disease reappears again.

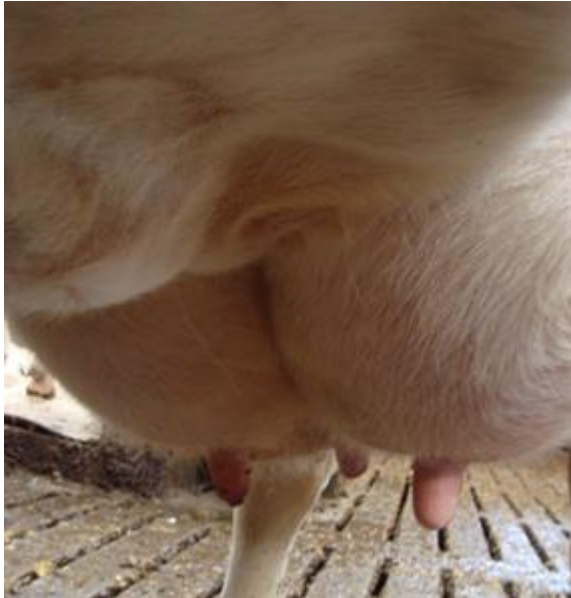


Photo 2. Cow with UCD, this is not direct visible



Photo 3. When the udders are separated a clear lesions of the skin becomes apparent



Photo 4. Repiderma is easy applied by opening the cleft with one hand and spray the wound.

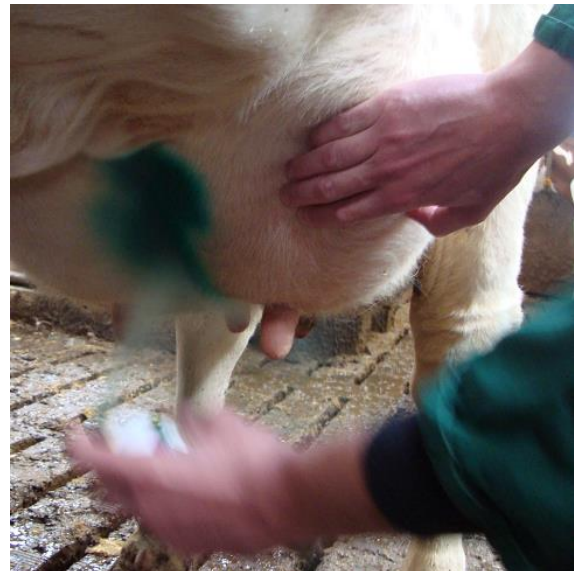


Photo 5. The color that is added to the Repiderma gives a clear indication of the treated area.

6.2 Results Canada

Although that the wound was very severe and intensive treatment with Repiderma could heal the wound. On day 7 a towel was used to clean the wound before spraying, this caused parts of the newly formed scab to come off and it started bleeding again,



Photo 6. Day 0, 6 May 2013



Photo 7. Day 7, 13 May 2013



Photo 8. Day 15, 21 May 2013



Photo 9. Lesion after two month

7 Adverse effects

No adverse effects have been reported on the treated cows.
Repiderma has no withdrawal time.

8 Conclusion

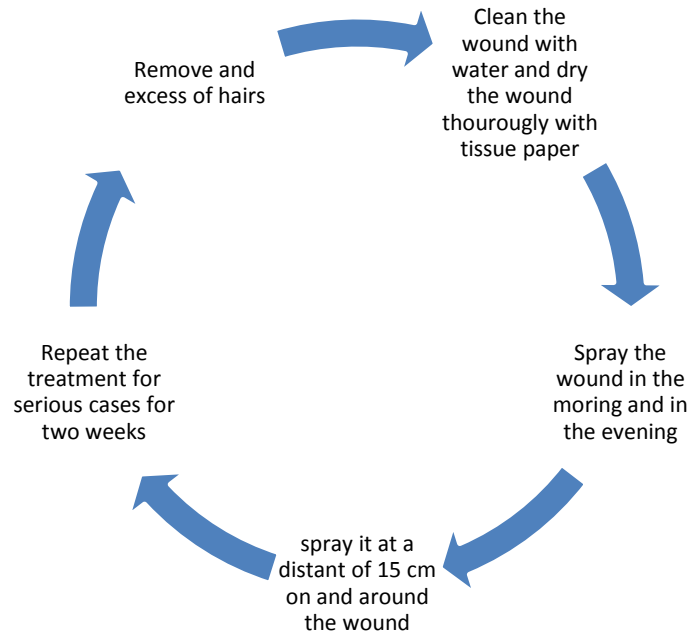
Repiderma can be used for the treatment of Udder Cleft Dermatitis, keep in mind that the lesion can be severe and that the treatment scheme will take one to two weeks.

We envisage that the treatment of UCD can done in the milking parlour, because Repiderma has no withdrawal time there will be no interference with the milk quality.

9 Summery treatment scheme

- 1 day morning and evening
- Depending on the lesion treat the wound daily during two weeks
- Every time Repiderma is applied check if the wound is covered properly

Treatment scheme



10 References

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