

CLINICAL TREATMENT OF PAPILLOMATOUS DIGITAL DERMATITIS (FOOTWARTS) ON DAIRY CATTLE

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Introduction

Papillomatous digital dermatitis (PDD) or digital dermatitis as it is known in Europe was first described in 1974 in Italy by Drs. Cheli and Mortellaro (2). Since that time it has been discovered and described in many countries of the world, see review by Deryck Read (5). Epidemiological studies showed a marked increase around 1990 in the proportion of California dairies that reported seeing the disease for the first time (8). Further studies showed that the major risk factors for having a high prevalence of the disease on a dairy were muddy corrals and purchasing heifers (7;12). Dr. Read has covered what we know about the etiology of this disease in the previous paper. We will concentrate on treatment of the lesions.

Previous Treatment Studies

Various authors have reported different treatments for PDD. Read reports a 1992 study (35 cows) that used hydrochloric acid (36%) or formalin (39%) as a single topical foot paint, oxytetracycline (OTC) powder in a foot wrap, parenteral procaine penicillin G (18,000 IU BID for 3 days), or ceftiofur (2mg/kg IM daily for 3 days) (5). All of the treatments were found to be efficacious when cows were examined at days 7, 14, and 21. Each of the treatments, however, had disadvantages: HCl resulted in small, persistent, deep, painful skin ulcers; formalin resulted in extensive hyperkeratosis; high doses of penicillin cause muscle soreness at injection sites (and milk withholding); ceftiofur was expensive; and topical treatment with OTC required restraint to clean and wrap the affected feet.

Many hoof trimmers prefer to use topical antibiotics (OTC, lincomycin, or lincomycin/spectinomycin) in a foot wrap. Dosages and carriers vary with different hoof trimmers. Lesions appear to be healing within two to three days and pain subsides quickly. Feet must be cleaned thoroughly before bandaging and antibiotic must be applied to the interdigital space near the heel as well as the lesion itself since spirochetes are found to be present in the interdigital space (6). Some hoof trimmers report that they get 90 percent clinical cures using this treatment.

Dr. Walter Guterbock and Ms. Celeste Borelli conducted a controlled treatment trial with 151 cows on three dairies (4). The treatments were: 1. Cotton balls saturated with OTC (100 mg/ml in propylene glycol base) under a duct tape bandage; 2. Cotton balls saturated with lincomycin/spectinomycin solution (LS50 at 33.4 mg/ml lincomycin and 66.6 mg/ml spectinomycin) under a duct tape bandage; 3. Parenteral ceftiofur (1 gm SID IM for 3 days); 4. Topical 37% formaldehyde solution (one treatment, no bandage); 5. Control (cotton balls and duct tape bandage). All the treatments were better than the controls at 28 days. Clinical healing was apparent in 70–93 percent of the treated lesions vs. 28 percent of the control lesions. The LS50 and OTC bandage treatments were better than the other treatments, but the difference was not statistically significant.

Dr. Jan Shearer from Florida has reported that a topical spray using OTC (25 mg/ml oxytetracycline HCl) was efficacious for treating, controlling and preventing PDD on dairies (9–11). Lesions were visibly improved and prevalence was reduced in the trial herds. These trials did not involve control animals.

Workers from the UK have reported success using footbaths with lincomycin/spectinomycin (0.3–1.0 mg/ml), lincomycin, OTC (2–4 mg/ml) (1;3). Footbaths on large western dairies are sometimes successful in controlling PDD, but require committed management efforts to keep the solutions fresh. Current recommen-

dations are to change the footbath solution every 150–300 cows depending on the cleanliness of the cows feet and how soon the solution is fouled. Some producers have used a clear water footbath before the antibiotic solution footbath. Care needs to be exercised when using lincomycin since it is toxic to the rumen microflora if ingested.

It should be noted that all the antibiotic treatments mentioned in this paper are extra-label drug use and legally require a veterinary prescription to be used on a dairy.

University of California-Davis Treatment Studies

1995 In-Parlor Spray Trial

The objective of our 1995 in-parlor spray treatment trial was to simulate a footbath. We used low concentrations of two antibiotic products and one non-antibiotic product as the treatments. We also had a control group that received no treatment. Cows were enrolled from three dairies.

The experimental groups were:

1. Low dose Terramycin-343(r)—(1 mg/ml) mixed with deionized water
2. High dose Terramycin-343(r)—(4 mg/ml) mixed with deionized water
3. Low dose L-S50(r)—(0.5 mg/ml) mixed with deionized water
4. High dose L-S50(r)—(1 mg/ml) mixed with deionized water
5. RotNot(r)—(2 ml/L deionized water)
6. Control (wart, no treatment)

Cows were enrolled in the study by spraying the rear feet with water from the drop hose during milking. Cows with visible, active, painful lesions on one or both rear feet were enrolled and randomly assigned to one of the six treatment groups.

The lesions were scored on a scale of 1–4:

1. Flat, raw lesion with distinct margin involving skin-horn junction of heel near the interdigital cleft or below the dewclaws
2. Flat, raw lesion with red raw areas, long hairs at the margin, destruction of the adjacent heel horn
3. Raised lesion with early papillae formation
4. Raised lesion with advanced papillae formation

Lesions were also evaluated for pain (0=no pain, 1=pain) and activity (0=no activity, 1=active lesion).

The treatments were mixed in 2-L, hand-pump, agricultural sprayers. As cows entered the parlor to be milked, their feet were washed off with water from the drop hoses and the treatment was applied by using a stream from the hand sprayer, saturating the foot from the dewclaws down. Cows were treated on Monday through Friday during week 1 and week 2 (10 treatments in total). We evaluated the cows after the first week (day 5), after the second week (day 12), after one month (day 30) and after 3 months (day 90).

During our evaluations on the first two dairies it was apparent that the RotNot(r) was not any better than the untreated controls so we did not use that treatment on the third dairy.

When we calculated mean difference in lesion score from day 1, the cows in the LS50 groups and the high dose OTC group showed significant improvement at the day 12 evaluation. By days 30 and 90, only the LS50 groups were significantly different than the controls. If we looked at clinical cured cows (lesion score=1, pain and activity=0) then only the high dose LS50 group was different than the control (66 percent vs 27 percent).

1995 Foot Wrapping Study

At the same time we were conducting the in-parlor spray treatment trial we conducted a foot wrapping study on one of the dairies. Cows were selected by the farm personnel and held up for us to examine on a tilt table. Cows with active PDD lesions on one or both rear feet were enrolled on the trial.

The treatments (16 cows per group) were:

1. Oxytetracycline (100 mg/ml in propylene glycol base)
2. LS50 (50 mg/ml in deionized water)
3. Lincomycin (40 mg/ml in deionized water)

The antibiotic solutions were applied to cotton balls which were then placed on the lesion and held in place with a stretch gauze bandage with a duct tape finish.

Cows were evaluated in the parlor during milking at days 15, 30 and 90. The clinical cure rate was not significantly different between the treatments. The cure rate at 90 days was about 30 percent for the OTC, and about 50 percent for the Lincomycin and LS50 groups.

1996 In-Parlor Spray Trial

During 1996 we conducted in-parlor spray treatment trials on 2 dairies using higher doses of antibiotics than the 1995 trials. The treatments were:

1. OTC1—Terramycin-343(r) (25 mg/ml) used once per day for 14 days
2. OTC2—Terramycin-343(r) (25 mg/ml) used once per day for 14 days, no treatment for 14 days, then once per day for 14 days
3. Linco1—Lincomix(r) (8 mg/ml) used once per day for 14 days
4. Linco2—Lincomix(r) (8 mg/ml) used once per day for 14 days, no treatment for 14 days, then once per day for 14 days
5. Control (no treatment)

The clinical response was better than that we got with the lower doses of antibiotics used in 1995. The results were similar on the two dairies, with some minor differences. If we look at the percent of animals with painful lesions, about 70 percent of the control cows on dairy 1 had lesions that were still painful at day 90 (compared to about 30 percent of the treated cows). On dairy 2, about 85 percent of the control cows were still painful on day 90, compared to about 10–35 percent of the treated cows. There were some striking management differences in the 2 dairies as well.

1996 Biopsy Study

The results from the 1995 in-parlor spray treatment trial raised the question of recurrence or reinfection. At any rate, it was apparent that we were not curing as high a percentage of these cows as we would like. We conducted a biopsy study on 25 cows during the summer of 1996. Cows were treated with a slurry of OTC or lincomycin (11 per group) applied to a 4x4 gauze pad and held in place with stretch gauze and duct tape bandage. Three cows were controls and were bandaged after biopsying (no antibiotic). Cows were biopsied on day 1 prior to treatment and their feet were photographed using a 100 mm macro lens. The cows were re-restrained and photographed again at day 14. On day 28 we re-biopsied all cows and photographed the feet.

Of the three control cows, two looked like they had not healed and one appeared to be healing. Of the 22 treated cows, 18 appeared to be healing or healed at day 28. Histologically, we were correct on all of the enrolled cows (active lesions) and on the four treated and two control cows, which appeared to have active lesions at day 28. Ten of the 18 cows that appeared to be healed at day 28 had some histological evidence of activity or incomplete healing.

1997 Biopsy Study

This year we are examining 30 cows for a more detailed biopsy study. One of the objectives is to tell whether cows are being cured and getting re-infected or whether the lesions are recurring on the cows.

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