Evaluation of Teat Condition Using Liquid or Powder Dips in Winter

A.S. Leaflet R2604

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Summary and Implications

Objective of this study was to compares a 0.5% iodine aqueous teat dip vs 0.5% chlorhexidine gluconate powdered teat dip under winter conditions on overall teat end and teat skin condition and health. Under the conditions of this trial there were slight non-significant decreases in teat end condition associated with colder temperatures and temperature changes in both groups, with no differences between groups in TE change. Both groups saw some decreases in teat skin condition with powder dipped teats showing a 2 fold increased hazard of dry teat skin. Results of this trial show teat changes (skin and end condition) associated with cold temperature changes even under ideal (minimal wind) housing and different teat dips. Producers need to realize changes will occur, assess their own farm condition (housing, weather, wind) and be judicious in determining conditions requiring switches to winter dip products and practices.

Introduction

In order to maintain teat health and mitigate adverse effects from severe winter conditions, management policies on some farms involves switching from standard liquid post milking to high emollient liquid 'winter' dips or dry powdered teat dips. Use of powdered teat dips is reported to eliminate the possibility of frozen teat dips that potentially can occur with aqueous liquid dips under severe wind chill conditions. Powdered products showed improved teat health but some limited germicidal effects compared with liquid products (Goldberg *et al.* 1994). Limited data exists comparing powder and liquid dips on teat condition and health under winter conditions and confined free stall housing. This trial compares a 0.5% iodine aqueous teat dip vs 0.5% chlorhexidine gluconate powdered teat dip under winter conditions.

Materials and Methods

Cows: All protocols were approved by the ISU Committee on Animal Care (IACUC # 10-06-6228-B).

Trial design and farm practices: Trial used a split udder design. Four pens of lactating cows confined in a curtain sided naturally ventilated free stall barn (minimal wind) were post dipped in a trial during a winter period (Jan - Mar 2010). Left teats were assigned to either a 0.5% iodine 5% emollient dip (LIQ, n=184 cows, 3 pens) (DeLaval KontACT RTU Advanced) or a 0.5% chlorhexidine gluconate powder dip (POW, n=62 cows, 1 pen). Right teats used other experimental formulas and are not included in this report. The trial was 9 weeks in duration where dipping with these dips was done for 8 weeks (Jan. – Mar. 2010) sandwiched between .5 week periods where the herd used it's standard herd commercial pre and post dips (pre milking teat dip was a 0.25% iodine, 2% skin conditioning product (BacStop, IBA) and post dip was either a .5% iodine, 12% emollient iodine barrier dip (Transcend, IBA) or a powder based winter dip (Derma-Dry; IBA). All other farm and milking practices were similar across all 5 weeks.

Cows were milked twice a day in a double 12 parallel parlor. Cows were forestripped (3 strips/teat) and pre-dipped (6 cow sequence), then dried with terry cloth towels prior to milker unit attachment. Automatic detachers were set at 1.8 lb. flow rate and 1 second delay. All cows were housed in a single pen in a free stall barn with mattresses and separated manure solids bedding.

Teat skin and teat end evaluations: Teat skin (TS) and teat end (TE) condition were scored every ~3d (Jan 26 - Mar 8) using a categorical scoring system. Teat skin and teat end scoring was performed using a variation of the Goldberg and Timms methods, respectively, by a single trained grader (Tables 1 and 2). Scoring was performed twice per week. TS and TE were scored on a 1-5 scale (TS 1: optimal condition, soft, supple skin; TS 2: some scaling; TS 3-5: chapped/cracked) (TE 1: normal, TE 1.5-3: smooth ring; TE 3.5-4: rough ring; TE >4: very rough). Data was entered into an Excel database. Results were compiled and analyzed using SAS.

Statistical models: Stratified Cox regression analysis was used on teat skin data to assess the deviation of a quarter from an initial score of 1 (TS-OK). Stratified logistic regression analysis was used on teat end data to assess the changes over time of proportions of teat ends with condition score ≤3 (TE-OK). Temperature data were obtained from the local weather station.

Results and Discussion

Both groups had >95% teats with TS-OK at trial start. Cows exposed to POW were 2 times more likely to deviate from optimal teat skin condition (CI=1.3-3.0; P<0.01) compared to LIQ (Figure 1). Both dips showed some skin dryness during the trial, especially during cold weather changes. Baseline prevalence of TE-OK was 91% (LIQ) and 81% (POW) (Figure 2). Non-significant decreases in TE-OK were observed in both groups over time with the

majority of decreases associated with changing temperatures. At end, 81% (LIQ) and 77% (POW) were in TE-OK category (no differences between groups in TE-OK % change over time).

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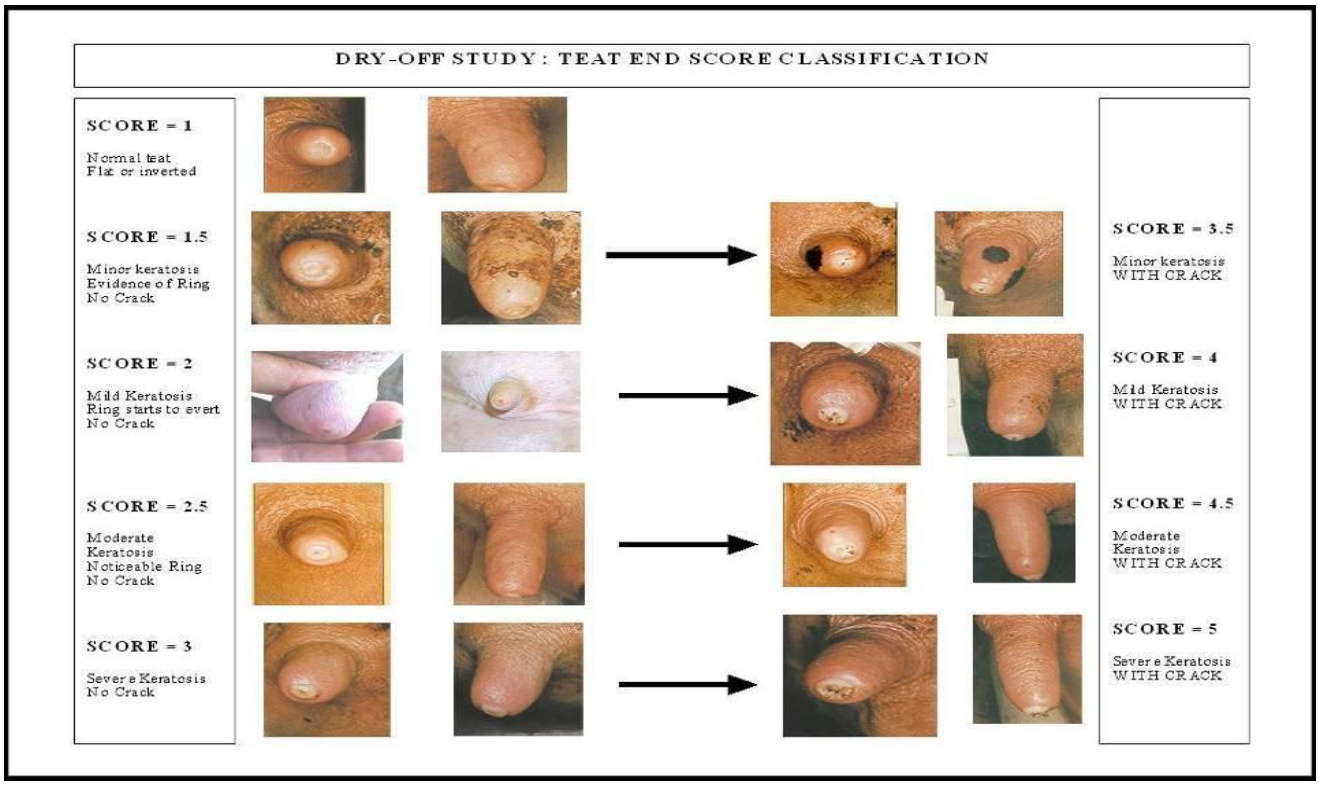
Table 1.Teat skin scoring scale.

Score	Description
0	Teat skin has been subjected to physical injury (stepped on/ frost bite)
1	Teat skin is smooth, soft and free of any scales, cracks, or chapping.
2	Teat skin shows some evidence of scaling especially when feeling (areas of dryness by feeling drag when sliding a gloved hand along the teat barrel &/or seeing areas of lower reflective sheen to the surface of the skin).
3	Teat skin is chapped. Chapping is where visible bits of skin are visibly peeling.
4	Teat skin is chapped and cracked. Redness, indicating inflammation, is evident.
5	Teat skin is severely damaged / ulcerated / open lesions.

Table 2. Teat end scoring scale (0*- 5).

Teat End Scoring system	**Degree of hyperkeratosis or callousing**				
Cracking	none	minor	mild	moderate	severe
No cracking	**1**	**1.5**	**2**	**2.5**	**3**
Cracked	**---**	**3.5**	**4**	**4.5**	**5**

0* zero score – physical injury of teat not associated with trial



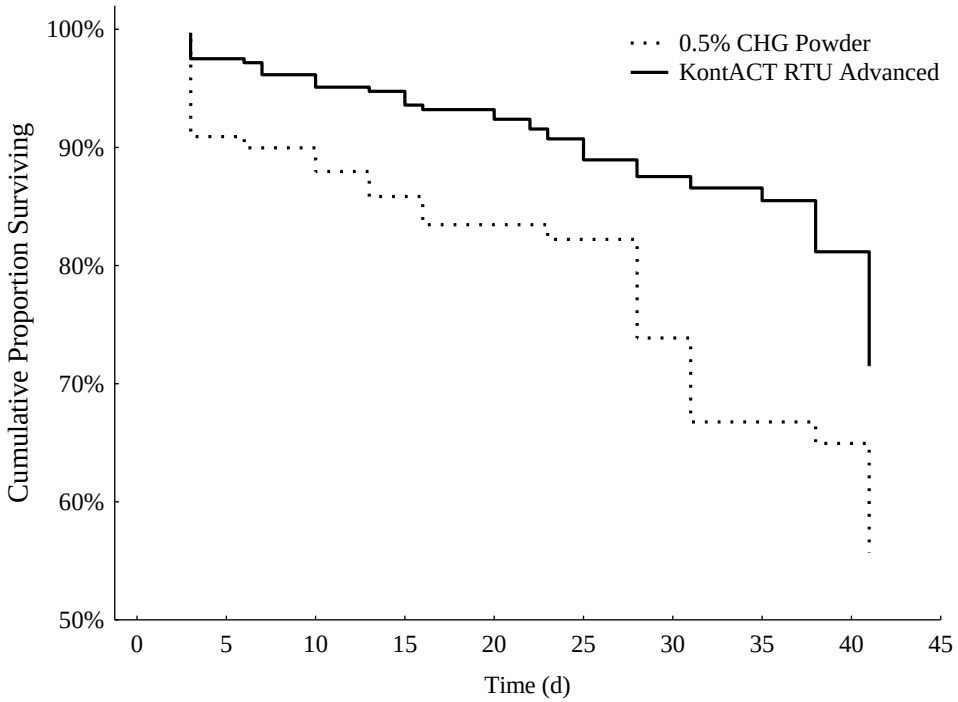


Figure 1. Kaplan-Meir graph of the survival of teats with optimal teat skin (TE-OK, teat skin condition = 1) over the trial period.

Table 3. Proportion of teat ends with condition score ≤3 (TE-OK) for liquid and powder teat dips, and temperature (average and low) over the trial period.

	KontACT RTU Advanced		0.5% CHG powder		Temperature (°F)	
Date	% teats	OR (±95% CI)	% teats	OR (±95% CI)	Avg	Low
Jan 26	90	--	81	--	20.7	15.0
Jan 29	91	1.2 (0.6-2.1)	84	1.2 (0.6-2.6)	8.7	2.0
Feb 05	94	1.5 (0.8-2.8)	81	0.8 (0.4-1.8)	24.7	17.3
Feb 08	93	0.9 (0.4-1.7)	85	1.4 (0.6-2.9)	22.3	14.7
Feb 11	90	0.7 (0.4-1.3)	85	1.0 (0.4-2.1)	12.0	-4.3
Feb 18	85	0.6 (0.4-1.0)	79	0.7 (0.3-1.5)	18.7	10.3
Feb 23	83	0.9 (0.6-1.4)	84	1.4 (0.7-3.1)	15.0	7.0
Feb 26	86	1.2 (0.8-2.0)	82	0.8 (0.4-1.8)	12.5	0.5
Mar 02	84	0.9 (0.6-1.4)	76	0.7 (0.4-1.5)	21.0	12.0
Mar 05	85	1.0 (0.7-1.6)	69	0.7 (0.4-1.3)	27.0	13.3
Mar 08	82	0.8 (0.5-1.2)	77	1.5 (0.8-2.9)	35.0	31.0

** Temperatures averaged over 3d, including -1d, -2d and day of scoring