
Effect of post-milking teat disinfectant on the relationship between teat hyperkeratosis, somatic cell count and the incidence of mastitis

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Fifty-six Holstein-Friesian dairy cows were milked twice daily over a complete lactation. Right-sided teats were disinfected after milking (TD) by submersing teats in a disinfectant solution containing 4250-ppm chlorohexidine gluconate, which contained a fly repellent, and emollients. Left-sided teats were not disinfected (NTD). Milk samples were taken from individual quarters to measure somatic cell count (SCC) and teats were classified for hyperkeratosis (HK) on eleven occasions during the lactation. The mean SCC was lower ($P < 0.01$) and the mean score for HK was significantly higher ($P < 0.001$) for TD compared to NTD teats. There was a significant correlation ($P < 0.01$) for teat scores = 2 and SCC in NTD teats and no effect when post-milking teat disinfectant was practiced. The number of clinical infections was significantly higher ($P < 0.001$) in NTD teats compared to TD teats. NTD teats had a higher ($P < 0.01$) number of non-haemolytic staphylococci and *Staphylococcus aureus* pathogens in quarters compared to TD teats. Teat texture was improved ($P < 0.001$) with TD compared to NDT. Results from this study suggest post milking teat disinfectant will improve teat texture, SCC and mastitis, but may increase teat HK.

Key words: Post milking disinfectant, dairy cows, teat hyperkeratosis, somatic cell count

Teat hyperkeratosis is used to describe a thickened smooth keratin ring or extending fronds of keratin around the teat orifice. Damage to the teat end allows colonisation by pathogenic organisms and may reduce the defence mechanism of the teat canal. Colonization of the teat end with bacteria may be greater in the absence of post-milking disinfectant (Fox, 1991). Little or no correlation has been shown between teat HK and the development of intramammary infection (IMI), however a greater degree of TK and roughness is associated with an increased

Summary

Introduction

probability of new infection (Neijenhuis F, *et al.*, 2000). Increased teat colonization in association with a high degree of HK may increase the risk of mastitis. The objective of this study was to establish the effect of omitting teat disinfectant post milking on SCC, IMI, and teat HK

Materials and methods

Fifty-six Autumn calving Holstein-Friesian dairy cows were milked in a 14-unit, 80-degree side-by-side milking parlour, using 13.5mm long milk tubes, with a milk lift of 1.5m above the cow standing for a complete lactation. Pre-milking teat preparation consisted of washing with warm running water and drying with individual paper towels. Right-sided teats were disinfected post milking by submerging teats in a chlorohexidine solution containing 4250-ppm chlorohexidine gluconate (solution 20% Ph Eur), which contained a fly repellent, and emollients. Left-sided teats were not disinfected. Teats were classified for HK using a scale of zero to four, on thirteen occasions, at the morning milking, immediately after cluster removal. In addition individual quarter foremilk samples were taken on consecutive days for SCC and to identify pathogens. Milk samples were analyzed for SCC using the Bentley Somacount 300. Teat barrels were classified once for texture, by manual palpation in mid-lactation and scored as 1=normal (soft), 2=firm (swollen or hard).

Results and discussion

The SCC over the full lactation was lower ($P < 0.01$) for disinfected teats (153k) than for teats where disinfectant was omitted (261k). HK was higher ($P < 0.001$) where teats were disinfected compared to teats where disinfectant was omitted. The immersion of teats in disinfectant and the subsequent exposure of teats to cold weather conditions may explain the higher TK score with disinfected teats. A significant correlation ($P < 0.01$) was shown between TK and SCC with untreated teats however this correlation was not evident where teat disinfection was practiced. Teat scores =1 had no effect on SCC, however teat scores =2 had higher ($P < 0.01$) levels of SCC when teat disinfection was omitted. The number of cases of clinical mastitis was significantly higher ($P < 0.001$) for NTD teats compared to TD teats. There was no difference between treatments for sub-clinical infection. NTD had a higher ($P < 0.01$) number of non-haemolytic staphylococci and *Staphylococcus aureus* and a higher percentage of quarters ($P < 0.001$) with pathogens than TD teats. NTD had a higher ($P < 0.001$) teat texture score, indicating fewer smooth teats compared to TD.

Table 1. Effect of omitting teat disinfectant on IMI and teat texture score.

	TD	NTD	Significance
Clinical mastitis	6	22	***
Sub-clinical mastitis	5	7	NS
Mean teat texture score	0.85	0.93	***

TD: teats disinfected post milking; NTD: teats not disinfected

Table 2. Effect of omitting teat disinfectant, on the relationship between HK and SCC.

Teat HK score	Treatment	Teats	SCC '000	Significance
≤1	TD	537	126	NS
≤1	NTD	605	178	NS
2	TD	518	142	NS
2	NTD	485	306	***
≥3	TD	174	157	NS
≥3	NTD	138	412	**

Teat disinfectant post-milking improved teat texture and reduced SCC and IMI. However, an increase in HK developed which may be associated with weather conditions and/or method of applying disinfectant. Where post milking teat disinfectant was omitted higher levels of SCC occurred with teat scores =2.

Fox, L K. 1991: Colonization by *Staphylococcus aureus* on chapped teat skin: Effect of iodine and chlorohexidine post-milking disinfectants. *Journal of Dairy Science* 75: 66-71.

Neijenhuis F., Barkema, H. W., Hogeveen, H., Noordhuizen, J.P.T.M., 2000: Classification and longitudinal examination of callused teat ends in dairy cows. *Journal of Dairy Science* 83:2795-2804.

Conclusion

References