

Randomized clinical trial evaluating the effects of the administration of acidogenic boluses at dry off on udder health

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Introduction

High milk production at dry off is a risk factor for intramammary infections (IMI) postpartum due to milk leakage and impaired formation of the keratin plug during the dry period. The use of acidifying agents at dry off can induce a temporary feed intake reduction and decrease in milk yield of high-producing dairy cows. Thus, acidogenic boluses are a potential tool to help maintain udder health around the dry period. The study aim was to evaluate the effects of the administration of acidogenic boluses at dry off on udder health.

Materials and methods

This randomized control trial was performed on 4 farms in Minnesota. Cows were blocked by farms and randomly assigned to 1 of 2 groups at dry off. Cows in the treatment group (TRT; n = 475) received 2 acidogenic boluses (Bovikalc® Dry; Boehringer Ingelheim Animal Health) at dry off and cows in the control group (CON; n = 481) did not receive any boluses. All cows received antimicrobial and internal teat sealant in all quarters. Quarter milk samples were aseptically obtained at dry off and in the first week postpartum for aerobic culture. IMI were grouped based on the isolated microorganism in *Staphylococcus aureus*, NAS (non-aureus *Staphylococcus*), SSLO (*Streptococcus* spp. and *Streptococcus*-like organisms.), Gram-negative bacteria and others (any other microorganism). DHIA test records (milk-yield and SCC score) and clinical mastitis (CM) cases from the first 100 days in milk (DIM) were obtained from the farm management software. Subclinical mastitis (SCM) was defined as having SCC > 200,000 cells/mL. New cases of SCM were defined as having SCM only at postpartum. New IMI was defined as a quarter that had a specific microorganism in the postpartum sample but not at dry off. IMI cure was defined as a quarter that had an IMI by a specific microorganism at dry off but not postpartum. Mixed logistic regression was used to assess the effect of treatment and the odds of postpartum SCM, acquisition of new IMI, and cure of IMI during the dry period. The association between treatment, linear score and milk yield was analyzed using mixed linear regression. Cox proportional hazards regression was used to analyze the relationship between treatment and time to clinical mastitis. Farm was added as a random effect in all models while cow was included as a random effect when appropriate to account for repeated measurements or clustering of quarters within the same cow. Potential confounders offered to the models included parity at enrollment (1, 2, ≥3), milk yield, and presence of SCM in the last test before dry off and presence of CM in the previous lactation.

Results

Mean ± SD DIM at dry-off was 330 ± 40 and average dry period length was 54 ± 10 d. In the last DHIA test before dry off, 25.5% of cows had SCM and average milk production was 60 ± 22 lb./d. After exclusion of contaminated samples (24%), prevalence of microorganisms in dry-off milk samples (n = 2780) was 1.3%, 19.7%, 6.4%, 4.3%, 23.8%, and 50.2% for *S. aureus*, NAS, SSLO, gram-negative bacteria, other microorganisms, and no growth, respectively. SCC score (mean ± SE) was lower in TRT compared to CON in the first 70 DIM (10 - 40 DIM: CON = 2.81 ± 0.38, TRT = 2.44 ± 0.38, P = 0.03; 40 - 70 DIM: CON = 2.92 ± 0.35, TRT = 2.56 ± 0.35, P = 0.04). No differences were found between 70 - 100 DIM. While numerically lower, there was no difference between groups for likelihood of new SCM (OR: 0.84, 95%CI: 0.58, 1.20) or CM (HR: 0.86, 95%CI: 0.62, 1.21) after calving. Though no statistically significant differences were present, there were numerically lower odds observed in the TRT group for both new IMI (OR = 0.85, 95% CI: 0.70, 1.03) and IMI cure (OR = 0.86, 95%CI: 0.62, 1.20). Milk-yield was similar between groups in the first 100 DIM.

Significance

Lower SCC scores in the first 70 DIM reported for TRT cows shows a protective effect of acidogenic boluses administration at dry off. Although our results indicate no significant differences between groups, the numerically lower risk observed for new IMI, CM and SCM in response to the treatment suggests additional benefits to udder health.

