Effect of Prepartum Intramammary Treatment of Heifers on Somatic Cell Count, Milk Production and Mastitis Postpartum

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Introduction

Mastitis in heifers has been the topic of numerous studies in the past few decades. Many studies have concluded that a large percentage of heifers began their first lactation with intramammary infections (IMI), usually with coagulase-negative *Staphylococcus* (CNS) species. These bacteria are ubiquitous on skin and hair of heifers, and then colonize the teat canal and gland. Several studies have examined the outcome of prepartum intramammary antibiotic therapy in heifers and have shown antibiotics are successful at reducing infections.[1,2] However, results have varied on the benefit of reducing these infections. Oliver *et al*[2] found prepartum intramammary antibiotic therapy in heifers increased milk production (+1000 lb; 454.5 kg) and decreased somatic cell count (SCC) linear score (-0.6) significantly over untreated animals. Treatment was demonstrated to be profitable, as long as the increase in milk production is greater than 84 lb (38.1 kg).[4] In the seven-state study,[1] prepartum antibiotics were effective in curing IMI in heifers, but the differences in SCC and milk production between treatment and control groups were small. The goal of this study was to treat prepartum heifers with intramammary antibiotics and monitor SCC, cultures and milk production during the first part of their lactation to determine the efficacy and value of therapy.

Materials and Methods

Selection was based on heifers due to calve from February 2004 to June 2004. Heifers were treated 21 days prior to the expected due date with an intramammary infusion of Albadry Plus (400mg Novobiocin, 200,000 IU Penicillin G, Pharmacia) into all four quarters. Orbeseal (Pfizer) was administered and all teats were dipped with T-Hexx teat dip (Hydromer). Samples were taken for culture and SCC analysis on fresh heifers between two and eight days-in-milk (DIM) and a second sample was taken between 24 and 39 DIM. Milk samples were cultured on blood agar plates using the standard National Mastitis Council protocol and diagnosis was made by presumptive identification using gram staining, catalase test, coagulase test, CAMP reactions, esculin reactions and lactose fermentation patterns on MacConkey agar. To be considered infected, a pure sample of one pathogen must have been isolated from the quarter. If two or more pathogens were present, the sample was considered contaminated. Monthly test day SCC analysis was performed at a Dairy Herd Improvement Association (DHIA) laboratory. Daily milk weights were automatically entered into DC 305 from the parlor at the MSU dairy farm, and could therefore be analyzed throughout the first lactation for all treated and control heifers in the study. Statistical analysis of culture results was performed using a Chi square test, and SCC data was analyzed using a student T-test and repeated measures ANOVA.

Results

Treated heifers calved 14-23 days after treatment, with an average of 18 days after treatment. The bacteria isolated were almost exclusively coagulase-negative *Staphylococcus* species (16/17 quarters) and the remaining quarter contained a coliform. This quarter was discarded from analysis. New infections observed only at the second sampling were also discarded from analysis. Only one heifer (control group) was observed to have a clinical infection in one quarter infected with CNS, and therefore she was treated at that time, according to the protocol of the dairy. This clinical infection occurred within one week of parturition. More than half of the control heifers (58.3%) and 27.1% of quarters had an IMI at freshening, but only 7.7% of the treated heifers and 1.9% of the treated quarters were infected at freshening. However, by 30 DIM, only 16.7% of control heifers and 4.2% of quarters were still infected, while no treated heifers still had infections. Monthly test day milk weights, fat corrected milk and 305ME were not different between the control and treated groups. Treated heifers had a significantly ($P<0.05$) lower first test day SCC (61,000) than the controls (206,000). Treated heifers also had a significantly lower SCC during the first five months in milk than controls (132,000 vs 144,000).

Significance

Intramammary antibiotic treatment prepartum in heifers is effective at reducing IMI at freshening, and appears to significantly reduce SCC during the first month and over the lactation as a whole, but has no effect on milk production. Treated heifers had a significantly (P=0.01) lower number of IMI at calving, but by 30 DIM, there was no significant difference in number of infections. This suggests that the antibiotic therapy was successful at reducing the number of infected fresh heifers, but is of questionable value, as heifers clear infections on their own during the first 30 DIM. Therapy also appears to significantly reduce raw (P=0.018) and linear (P=0.015) SCC taken during the first 30 DIM (first test data). The difference in SCC observed between the control and treated heifers (206,000 vs 61,000) would allow for a milk quality bonus for the treated heifers. However, no significant differences were observed in SCC during any of the other test periods, but overall, the treated heifers had a significantly lower (P=0.02) SCC for the first 180 DIM. Milk production, fat correct milk and 305 ME between the control group and the treated group did not vary during the first 180 DIM. Clinical infections were low in this group of heifers in the first month after calving. Only one heifer exhibited signs of mastitis (clots and flakes in milk) early in the lactation, and she was a control animal. Therefore prepartum treatment may be beneficial in preventing clinical episodes of mastitis in fresh heifers. This data supports the use of prepartum therapy in heifers if the goal is to reduce early IMI and reduce SCC in order to obtain milk quality bonuses. Individual farms would have to determine if the bonus would pay for the cost of therapy.

Effect of Pre-milking Stimulation on Milking Performance

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Introduction

While pre-milking stimulation from forestripping has been traditionally recommended, some recent literature has disputed its biological need and some parlor managers have questioned its utility in parlor efficiency. The objective of our trial was to study the importance of manual forestripping on milking performance and the extent to which it needs to be performed.

Materials and Methods

Four commercial dairies milking 400 to 2000 head in New York state enrolled cows in the study. Cows were randomized to one of four treatment groups: 1) no forestripping, 2) three strips of milk from one quarter, 3) three strips of milk from each of the four quarters, or 4) 12 strips of milk from one quarter. Cows in all treatment groups were treated the same otherwise: pre-dip prior to forestripping, wipe pre-dip after 60-70 seconds and attach milking unit 90 seconds after pre-dip application. All intervals were monitored with a digital stopwatch. All milking performance outcomes were measured with a cow-side continuous mass flow meter (Lactocorderâ). Data analysis was performed using commercially available software (SAS v.9.1).

Results

A total of 705 cow-milkings were randomized to treatment groups. Percent bimodality was 63.1 in the no-forestrip group, 55.5 in the three-strips group, 41.3 in the three-strips from four quarters group and 42.4 in the 12 strips from one quarter group. They were statistically different from each other. Two-minute milk production was significantly greater in the three-forestrip groups (11.2-11.9 lb; 5.1-5.4 kg) than in the no-forestrip group (10.1 lb; 4.6 kg). Total unit-on time was significantly greater in the no-forestrip group (6.2 min) than in the other three groups (5.6 – 5.8 min).

Significance

Forestripping in any manner resulted in better milking performance. A systemic oxytocin response is suggested, as opposed to a teat-specific response. Spending time forestripping may increase milking performance, including parlor throughput.