Efficacy of Intramammary Pirlimycin as a Pre-calving Antibiotic Treatment for Nulliparous Heifers

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Introduction

Recently, more and more studies indicate that intramammary infection (IMI) in peripartum heifers are frequent and associated with financial losses. The objective of this study was to evaluate the effectiveness of an intramammary antibiotic treatment (pirlimycin) during the pre-calving period on the proportion of intramammary infection (IMI) in heifers at the onset of lactation as well as on milk production and somatic cell count (SCC) during their first lactation.

Materials and Methods

A total of 428 primiparous dairy heifers from 23 dairy herds in the St. Hyacinthe region (haphazard sample) registered to PATLQ (milk control) for follow-up on SCC and milk production were included in the study. Heifers were assigned randomly, according to the chronological expected calving date within the same herd, to one of the two following treatment groups: 1) control group (n=209), no intramammary antibiotic infusion; or 2) treated group (n=219), intramammary infusion of 50 mg of pirlimycin hydrochloride (Pirsue, Pharmacia Animal Health, Orangeville, ON) in all four quarters between six and 12 days preceding the expected calving date. Two series of samples of mammary secretions from each of the quarters were taken aseptically from all heifers included in the study. Two or three farm visits were made for each of the heifers. The first visit was done between six and 12 days before the expected calving date, and a second between two and eight days following calving. A third visit (n=16) was made between 16 and 22 days following calving if a bacteriological cure of IMI caused by *Staphylococcus aureus* was observed during the first post-calving visit.

Results

For all heifers, pre-calving visits were done between 0 to 23 days before calving. IMI was detected in 69.1% of heifers and 32.6% of quarters during the prepartum period, and these proportions were similar in both groups. The class of bacteria most frequently isolated prepartum was CNS (59.3%). *S. aureus* was isolated from 10.3% of heifers and from 3.2% of quarters. After calving, presence of IMI was significantly lower in treated heifers (31.1%) than in control heifers (45.4%). Also, presence of *S. aureus* was significantly lower in treated heifers (5.5%) than in control heifers (11.6%). When all gram-positive pathogens were combined, antibiotic treatment had a significant effect on cure rate and on prevention of new IMI at calving, compared to no treatment. Finally, new IMI rates by quarter for gram-negative bacteria and yeast were significantly higher in the treated group (2.3%) than in the control group (0.8%). The interval between time of treatment and calving significantly modified the effect of treatment on milk production. An increase of 664 lb (302 kg) of milk was observed when antibiotic treatment was applied more than one week before calving. A negative effect on production was observed when treatment was administered less than one week before calving. SCC was not significantly affected by treatment.

Significance

When administered to heifers between 0 and 23 days before first calving, a pirlimycin intramammary treatment eliminated more infections present at the time of treatment and significantly decreased the proportion of IMI at the onset of lactation, including infections caused by *S. aureus,* compared with a control group. IMI in the pre-calving and post-calving periods were caused, in decreasing order, by coagulase-negative staphylococci, *S. aureus*, gram-negative bacteria and yeast and streptococci. Concerning all gram-positive bacteria, treatment had a curative effect on IMI present before calving and a preventive effect on new IMI at calving. SCC was not significantly affected by treatment, but milk production was increased by more than 660 lb (300 kg) in heifers treated more than one week before calving. In a future study, an efficient diagnostic method in the pre-calving period for detecting IMI or identifying risk factors associated with IMI should be developed in order to evaluate the effect of antibiotic treatment targeting only infected quarters.