

5OH in the milk sample was 42 ppb. This concentration is substantially greater than the 2 ppb tolerance limit set forth by the FDA.

Significance

In this relatively small survey of 500 milk samples we found a positive violation rate of 0.2%. From 2003 to 2011 the percentage of milk tanker samples that had a violative residue associated with any drug in the United State ranged from 0.032 to 0.11% (National Milk Drug

Residue Data Base Annual Reports 2003-2011). This suggests that 5OH residues may be found in the milk almost as often as other potential drug residues. Although this study only sampled a small fraction of milk delivered to processing plants it demonstrates that illegal FLU milk residues may occur in the dairy industry and may necessitate future FLU milk testing at dairy processing plants using a rapid assay. Therefore, emphasis on observing the appropriate drug withdrawal time, route of administration, and labeled dosage is critical to the prevention of residue violations.

Benefits of intrauterine treatment with cephapirin in dairy cows with endometritis

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Introduction

Reproductive performance of dairy cows (Sheldon et al, 2006) and farm economic efficiency (Bartlett et al, 1986, Drillich et al, 1994, Guard et al, 1994) are related to the health status of the uterus at the end of the voluntary waiting period. Uterine diseases affect about half of dairy cows in the postpartum period (Kluciński et al, 1990, Leblanc et al, 2008) and cause infertility by disrupting uterine and ovarian functions (William et al, 2005).

The hypothesis of the current study was that treatment with antibiotic would improve uterine health and reproductive efficiency in dairy cows with uterine infection. The objective was to assess the efficacy of cephapirin intrauterine treatment preceding a timed AI protocol in lactating cows with purulent vaginal discharge (PVD) and cytological endometritis (CYT).

Materials and Methods

A total of 1178 Holstein cows from 17 different commercial dairy herds were recruited between September 2010 and October 2011. Cows were examined around 34 (± 7) DIM to diagnose PVD (n = 992) and CYT (n = 983). All cows were systematically enrolled on an ovulation synchronization protocol (Presynch-Ovsynch) for the first insemination. Genital examination was performed by transrectal palpation, vaginoscopy, and endometrial cytobrush. Purulent vaginal discharge and CYT were defined respectively as the presence of vaginal discharge and as a percent of polymorphonuclear cells (PMN) being detrimental to subsequent reproductive perform-

ance. After examination, cows were randomly assigned to receive or not to receive a cephapirin intrauterine treatment (CEPH) (Metricure, 500 mg cephapirin benzathine; Merck Animal Health, Montreal, Canada). Herd records were compiled in a databank (Dossier de santé animale: DSAHR) and validated. Pregnancy diagnosis was done by transrectal palpation about 35 days after insemination.

Statistical analyses were performed using logistic regression models in SAS. Using a mixed logistic regression with herd as random effect and season and lactation as fixed effect (GLIMMIX), the vaginal discharge and %PMN were analyzed to predict (odds ratio, OR) the first AI success rate ($p < 0.05$). Survival analysis investigated the efficiency of the treatment by using Cox proportional hazard model (PHReg) including season, parity, and herd as variables. Based on the highest sum of sensibility and specificity for the pregnancy status at 120 DIM, the optimal cutoff was 7% of PMN for CYT and the presence of trouble discharge with or without purulent material for PVD.

All procedures conformed to the national guideline for care and use of laboratory animals of the University of Montreal.

Results

The prevalence of PVD and CYT were 23 and 28%, respectively. In the final model, presence of PVD and CYT in control cows (CONT, not treated with cephapirin) was detrimental on FSCR (PVD: 26% ± 5 ; No-PVD: 41% ± 3 ; $P < 0.01$; CYT: 26% ± 4 ; No-CYT: 43% ± 3 ; $P < 0.01$). Survival curves showed a significant detrimental effect

of both PVD and CYT ($p < 0.01$) reflected in an increase of median days open (PVD: 158 (130 to 204); No-PVD: 118 (106 to 128); CYT: 159 (129 to 184); No-CYT: 110 (95 to 124)).

Cephapirin treatment was associated with a significant improvement of FSCR in cows with PVD (PVD-CEPH: $40\% \pm 5$, PVD-CONT: $24\% \pm 4$; $P = 0.01$), but not with CYT (CYT-CEPH: $33\% \pm 6$; CYT-CONT: $23\% \pm 5$; $P = 0.07$). The treatment improved the pregnancy risk for PVD cows with a hazard ratios of 1.64 (1.18 to 2.29; $p < 0.01$) for PVD (referent= CONT) and median days open were reduced (PVD-CEPH: 120 (94 to 134)).

Significance

In conclusion, the results of the present study suggested that PVD diagnosed by vaginoscopy and CYT by cytobrush around 34 DIM were associated with a significant reduced risk of conception at first service and an increase median days open. Also, the results suggested that CEPH improved reproductive performance in PVD cows but not in cows with CYT.

Using chitosan microparticles to prevent metritis in lactating dairy cows

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Introduction

Metritis, an acute inflammatory disease of multiple layers of the uterine lining with systemic implications, affects 20 to 40% of the postpartum dairy cows and has marked welfare, health, production, reproduction, and economic consequences to the individual animal and the herd. In cows with risk factors such as dystocia, delivery of twin calves, retained placenta (RP) or still-birth the incidence ranges from 50 to 70%. Traditionally, antibiotics have been used to prevent or treat uterine disease. Ceftiofur hydrochloride is 1 of the 3 approved antibiotics for systemic administration for treatment of metritis in dairy cows, and it is the antibiotic of choice because it does not incur a milk withhold. The Food and Drug Administration, based on the risk to public health, and as an attempt to limit the use of third generation cephalosporins, banned the use of this class of drugs for disease prevention in food animals. Chitosan microparticles (CM) is a polysaccharide derived from chitin found in the exoskeleton of crustaceans, and at a concentration of 0.2%, was found to be as effective as ceftiofur hydrochloride at reducing intrauterine *E. coli*. The main aim of this study was to investigate whether CM could be used as an alternative to traditional antibiotics for the prevention of metritis in dairy cows.

Materials and Methods

101 Holstein cows with the above mentioned reproductive risk factors were randomly assigned to 1 of

2 treatments 24 hours postpartum:

- CM (n = 51): intrauterine (iu) infusion of 8 g of CM dissolved in 40 mL of sterile water for 5 days
- Control (n = 50): iu infusion of 40 mL of sterile saline solution for 5 days.

Rectal temperature was recorded daily from 1 to 5 DIM and at 4, 7, 10, and 14 days-in-milk (DIM). Metritis was evaluated at 4, 7, 10, and 14 DIM, and was characterized by the presence of fetid watery vaginal discharge. Clinical endometritis (CE) was evaluated at 21 and 28 ± 2 DIM, and was characterized by purulent discharge at 21 DIM and by mucopurulent discharge at 28 DIM. Milk yield was recorded daily for the first 30 DIM. Blood samples were collected at 1, 4, 7, 10, and 14 DIM and were assayed for NEFA and BHBA. Dichotomous outcomes were analyzed by logistic regression using the LOGISTIC procedure of SAS and continuous outcomes were analyzed by ANOVA for repeated measures using the MIXED procedure of SAS. Models included the effects of treatment, parity, specific risk factor, body condition score at enrollment, and interaction between treatment and other covariates. The effect of time and interaction between treatment and time was also included in repeated measures analyses. Differences with $P < 0.05$ were considered significant and $0.05 < P \leq 0.10$ was considered a tendency.

Results

Treatment with CM resulted in a tendency for decreased incidence of metritis up to 7 DIM compared