

titis. Data was collected from the test day before sampling through 4 test days after sampling. Continuous outcome variables were analyzed by ANOVA and binary responses for pathogen effect using 2x2 tables and Pearson's Chi-squared tests. Impact on milk production was assessed with multivariable analysis in SAS controlling for parity, lactation and DIM.

Results

Two hundred and twenty-nine animals were identified with GPCN infections accurately identified to the genus and species level. Of the organisms identified, 67 were identified as *Streptococcus dysgalactiae* (26.5%), 28 as *Streptococcus uberis* (11.1%), 118 as *Lactococcus lactis* (46.6%), 2 as *Lactococcus garviae* (0.8%), 6 as *Enterococcus saccharolyticus* (2.4%), 3 as *Enterococcus faecium* (1.2%), 2 as *Enterococcus faecium* (0.8%), and 1 each of *Enterococcus thailandicus*, *Streptococcus equinus* and *Streptococcus mitis* (0.4% each). There was a statistically significant difference between the bacteriological cure rate for *L. lactis* (59% cures, n=66) when compared to both *S. dysgalactiae* (92% cures, n=49; $P < 0.001$) and *S. uberis* (89% cures, n=18; $P = 0.02$). At least 1 second

clinical mastitis event was recorded for 26% of cows with *S. dysgalactiae*, 31% of *L. lactis*, 14% of *S. uberis*, and 0% of *E. saccharolyticus*. The difference between *S. uberis* and *L. lactis* indicated a potential trend for an increased risk of recurrent mastitis for those cows with *L. lactis* infections ($P = 0.10$; risk ratio=2.2). There was a trend toward a difference in number of cows leaving the herd after a *S. dysgalactiae* infection (19%) compared to those with *S. uberis* (36%; $P = 0.09$) or *L. lactis* (31%; $P = 0.10$). Among the species of bacteria causing the intramammary infections investigated here, impact on milk production did not appear to differ ($P=0.83$).

Significance

Lactococcus lactis appears to be an important intramammary pathogen on some dairy farms in northern New York, resulting in a mastitis case that is less likely to result in a bacteriological cure when compared to common *Streptococcus* species, irrespective of treatment. This IMM pathogen is also potentially associated with an increasing risk for recurrent mastitis and may increase the risk of cows leaving the herd.

Randomized non-inferiority trial comparing two commercial intramammary antibiotics for the treatment of non-severe clinical mastitis in dairy cows

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Introduction

No new antimicrobials have been approved for the treatment of mastitis since 2006; it would be beneficial to perform controlled field trials comparing 2 existing treatments. Non-inferiority trials are valuable in this regard, as they do not require a negative control as in a randomized, controlled FDA drug trial. If a therapy with similar efficacy is available, decision making criteria can include convenience, lower costs, less side effects, improved delivery systems, and better integration into current protocols. The purpose was to perform a non-inferiority comparison of 2 intramammary treatments for clinical mastitis (CM). We intended to show that hetacillin (HP; Hetacin K, Boehringer Ingelheim, St. Joseph, MO) had comparable efficacy to the reference

treatment, ceftiofur (CH; Spectramast, Zoetis, Kalamazoo, MI) when considering cure and survival indices.

Materials and Methods

Cows from 6 New York dairies were considered. Cows with non-severe CM were randomly assigned to 5 d or 3 d treatment with CH or HP, respectively. Milk samples were collected sterilely on d 1, 14, and 21. The cow was given a clinical score (CS) on this day and d 2 to 5, 14 and 21. Cultures were performed on samples according to NMC guidelines. Primary outcomes were bacteriological, clinical, and pathogen cures. A cow was defined as a bacteriological cure when the initial pathogen was absent from both post-treatment samples. A clinical cure was defined when the CS became "0." If both

follow-up samples were no growth, the cow was defined as a "pathogen cure." Secondary outcomes were survival, number of clinical d, hospital d, post-CM milk production and linear score (LS), and occurrence of another CM event in the same quarter. Non-inferiority analysis of binary outcomes was completed using PROC FREQ in SAS 9.4 with a margin of -15%, which allows a risk margin of this amount or less to conclude non-inferiority. Additional statistics were performed using regression models. Cox proportional hazards were used to describe treatment effect on survival and CM risks. Results present least squares means, risk differences (RD), odds ratios (OR), or hazard ratios (HR).

Results

A total of 596 cows met inclusion criteria, 309 in the CH group and 287 in the HP group. Bacteriological cure was similar between groups (HP 67%, CH 72%; $P=0.32$). No significant differences were found in cure risk; non-inferiority of HP vs. CH for overall bacteriological cure was conclusive (RD=-2.4%). While the RD for Gram-positive etiologies between HP and CH was negative, HP-treated cows had higher cure rates for both coagulase-negative staphylococci (CNS) and *S. aureus*. A large difference existed in cure rates for *S. dysgalactiae* cows between treatment groups, favoring CH. The bacteriological cure risk difference for Gram-negative

etiologies represented numerically higher cure rates for CH-treated *E. coli* and *Klebsiella* cows versus the respective HP cows. Despite a greater bacteriological cure for CH-treated *E. coli* and *Klebsiella* CM, the drug had a lower percentage of clinical cures for these organisms. Pathogen cure was similar between groups (HP 35%, CH 32%; $P = 0.57$). Clinical cure (HP 68%, CH 64%; $P = 0.65$), milk production (kg) (HP 37.0, CH 38.2; $P = 0.09$), and LS (HP 3.4, CH 3.16; $P = 0.09$) were not significantly different between groups. Non-inferiority of HP vs CH was shown for survival to day 30 and day 60, while superiority of HP to CH was defined for clinical cure by day 4. Hospital days differed significantly by 1.8 d (CH = 8.0, HP = 6.2; $P < 0.001$). No differences were seen between groups in Cox proportional hazards for exit from the herd in the 60 days following CM (HP:CH HR=0.74; $P = 0.27$) or in the risk for a subsequent CM event (HP:CH HR=1.1; $P = 0.73$).

Significance

While most outcomes showed no statistically significant differences between treatment groups, hospital days differed favorably by 1.8 d for HP versus CH. Results suggest that herd-specific CM treatment decisions should consider treatment costs, label indications, product availability and withhold preferences when choosing between these 2 antibiotics.

The treatment of only environmental streptococci clinical mastitis cases reduced antibiotic use, days out of the tank, recurrence of clinical mastitis and a tendency to reduce culling

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Introduction

The objective was to compare antibiotic use and clinical and bacteriological outcomes for selective treatment of only clinical cases where environmental streptococci were isolated vs blanket therapy.

Materials and Methods

Cows with mild or moderate clinical mastitis (CM) from a California Central Valley dairy herd were assigned based on even or odd ID numbers to either a) a positive-control treatment group (PC) or b) a laboratory-culture-based treatment group (CB). Quarter cases assigned to PC received immediate intramammary (IMM) treatment with ceftiofur (Spectramast LC; Zoetis, Kalamazoo, MI) repeated once a day for a total of

3 days. Quarters assigned to CB underwent culture over a 24 h period at DairyExperts Laboratory (DairyExperts Inc., Tulare, CA). Only quarters showing environmental streptococci growth were treated the next day with the same therapy as cases assigned to PC. Mixed models for continuous and dichotomous outcomes were used to determine the effect of treatment group on the outcomes of interest. Cow was included as a random effect to account for the clustering of quarters within cows. A significance level of $P < 0.05$ was used.

Results

A total of 276 quarter cases of clinical mastitis from 223 cows were enrolled into the study. Bacteria were not isolated from 54% of CM quarters. Environmental streptococci were